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Inverter Drives 8400 protec HighLine -----

Reference manual

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13548917

Overview of technical documentation for Inverter Drives 8400

Project planning, selection & ordering

- 8400 hardware manual
- Catalogue

Mounting & wiring

- MA 8400 protec Stateline/HighLine
- MA for the accessories

Parameter setting

- BA keypad
- SW 8400 protec Stateline
- SW 8400 protec HighLine
- SW for the integrated safety system (optional)
- KHB for the communication medium used

Drive commissioning

- SW 8400 protec Stateline/HighLine
 - chapter "Commissioning"
 - chapter "Diagnostics & error management"
- Remote maintenance manual

Networking

- KHB for the communication medium used

Legend:

- Printed documentation
- Online documentation (PDF/Engineer online help)

Abbreviations used:

- BA Operating instructions
- KHB Communication manual
- MA Mounting instructions
- SW Software/reference manual

← This documentation

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1 About this documentation



Danger!

The inverter is a source of danger which may lead to death or the severe injury of persons.

To protect yourself and others against these dangers, observe the safety instructions before switching on the inverter.

Please read the safety instructions provided in the **8400 protec mounting instructions** and in the **8400 protec hardware manual**. Both documents are supplied with the inverter.

Target group

This documentation is intended for all persons who want to parameterise, configure and diagnose the 8400 protec HighLine inverter with the engineering software L-force »Engineer« and the X400 keypad.

Information regarding the validity

The information in this documentation are valid for the following standard devices:

Product series	Type designation	From software version
8400 protec HighLine	E84DHxxxx	01.00

Screenshots/application examples

All screenshots provided in this documentation are application examples. Depending on the software version of the inverter and the version of the »Engineer« software installed, the screenshots in this documentation may differ from the representation in the »Engineer«.



Tip!

Information and tools regarding the Lenze products can be found on the Internet:

<http://www.Lenze.com> → Download

1 About this documentation

1.1 Document history

1.1 Document history


Version			Description
8.1	02/2018	TD23	Error corrections & supplements
8.0	01/2018	TD23	Extended by new functions for 8400 protec HighLine V18.00.00, error corrections
7.0	06/2017	TD23	Extended by new functions for 8400 protec HighLine V17.00.00
6.0	–	–	–
5.0	02/2016	TD06	Extended by new functions for 8400 protec HighLine V16.00.00
4.0	03/2015	TD06	Extended by new functions for 8400 protec HighLine V8.00.00
3.0	03/2013	TD05	Extended by new functions for 8400 protec HighLine V12.00.00 and converted to new layout
2.1	02/2011	TD05	Error corrections & supplements
2.0	12/2010	TD05	Extended by new functions for 8400 protec HighLine V06.00.00
1.0	02/2010	TD05	First edition, parameter reference V02.00.00

1 About this documentation

1.2 Conventions used

1.2 Conventions used

This documentation uses the following conventions to distinguish between different types of information:





Type of information	Highlighting	Examples/notes
Spelling of numbers		
Decimal separator	Point	The decimal point is always used. For example: 1234.56
Text		
Version information	Blue text colour	All information that only applies to or from a certain software version of the inverter is marked accordingly in this documentation. Example: This function extension is available from software version V3.0 onwards!
Program name	» «	The Lenze »Engineer« PC software...
Window	<i>italics</i>	The <i>Message window...</i> / The dialog box <i>Options...</i>
Variable names		By setting <i>bEnable</i> to TRUE...
Control element	Bold	The OK button ... / The Copy command ... / The Properties tab ... / The Name input field ...
Sequence of menu commands		If several commands must be used in sequence to carry out a function, the individual commands are separated by an arrow: Select File → Open to...
Shortcut	< bold >	Use < F1 > to open the online help. If a shortcut is required for a command to be executed, a "+" has been put between the key identifiers: With < Shift >+< ESC > ...
Hyperlink	<u>Underlined</u>	Optically highlighted reference to another topic. It is activated with a mouse-click in this online documentation.
Icons		
Page reference	(23)	Optically highlighted reference to another page. It is activated with a mouse-click in this online documentation.
Step-by-step instructions		Step-by-step instructions are indicated by a pictograph.

All information that only applies to or from a certain software version of the inverter is marked accordingly in this documentation.

1 About this documentation

1.3 Terminology used

1.3 Terminology used

Term	Meaning
Engineering tools	 <p>»EASY Navigator« – ensures easy operator guidance</p> <ul style="list-style-type: none"> • All convenient Lenze engineering tools at a glance • Tools can be quickly selected • The clear structure simplifies the engineering process from the start
	 <p>»EASY Starter« – easy-to-use tool for service technicians</p> <ul style="list-style-type: none"> • Specifically designed for commissioning and maintaining Lenze devices • Graphic user interface with very few icons • Easy to run online diagnostics, set parameters and perform commissioning • No risk of accidentally changing an application • Loading off-the-shelf applications onto the device
	 <p>»Engineer« – multi-device engineering</p> <ul style="list-style-type: none"> • For all products in our L-force portfolio • Practical user interface • Graphic interfaces make it easy to navigate • Can be applied in every phase of a project (project planning, commissioning, production) • Parameter setting and configuration
	 <p>»PLC Designer« – for programming processes</p> <ul style="list-style-type: none"> • Creating your own programs • Programming of Logic & Motion according to IEC 61131-3 (AWL, KOP, FUP, ST, AS and CFC Editor), based on CoDeSys V3 • Certified function blocks according to PLCopen Part 1 + 2 • Graphical DIN 66025 Editor (G code) with DXF import • Integrated visualisation for a simple process representation • All important information at a glance for commissioning
Application block	<p>Block for a technology application (e.g. actuating drive speed)</p> <p>A technology application is a drive solution based on the experience and know-how of Lenze in which function blocks interconnected to a signal flow form the basis for implementing typical drive tasks.</p>
ASM	Abbreviation for asynchronous motor
Service brake	The service brake serves to shutdown rotary or translatory masses in motion in a controlled manner. The energy to be dissipated in this process is produced in the form of friction energy. Unlike emergency braking, this process is a regular and recurring operating mode.
Code	Parameter used for inverter parameterisation or monitoring. Is usually referred to as "index".
Display code	Parameter that displays the current status or value of an input/output of a system block.
FB Editor	<p>Function block editor</p> <p>Graphical interconnection tool which is provided for FB interconnections in the »Engineer« on the FB-Editor and by means of which the applications integrated in inverters from device version "HighLine" can also be reconfigured and extended by individual functions.</p>
Function block	<p>General designation of a function block for free interconnection (from "HighLine" device version).</p> <p>A function block can be compared with an integrated circuit that contains a certain control logic and delivers one or several values when being executed.</p> <p>Each function block has a unique identifier (the instance name) and a processing number which defines the position at which the function block is calculated during the task cycle. Example: "L_Arithmetik1" (function block for arithmetic operations)</p>
Holding brake	The holding brake serves to statically hold e.g. a position during the downtimes of a robot/travelling/synchronous/hoist drive.
Keypad	<p>The keypad is an alternative to the PC for the local operation, parameterisation, and diagnostics in a simple manner.</p> <p>Note: Use the diagnosis terminal for the 8400 protec HighLine inverter. The diagnosis terminal combines the keypad with a housing and a connecting cable.</p>

1

About this documentation

1.3

Terminology used

Term	Meaning
LA	Abbreviation for Lenze Application block Example: "LA_NCtrl" (block for the "Actuating drive speed" application)
Lenze setting	This setting is the default factory setting of the device.
LP	Abbreviation for Lenze Port block Example: "LP_CanIn1" (CAN1 port block)
LS	Abbreviation for Lenze System block Example: "LS_DigitalInput" (system block for digital input signals)
Emergency brake	The emergency brake serves to shutdown rotary or translatory masses in motion in emergency situations. Emergency situations are exceptional situations that only occur sporadically.
Port block	Block for implementing the process data transfer via a fieldbus
PSM	Abbreviation for permanently excited synchronous motor
QSP	Abbreviation for quick stop
SC	Abbreviation for Servo Control
SLPSM	Abbreviation for sensorless control of synchronous motors
SLVC	Abbreviation for SensorLess Vector Control
Subcode	If a code contains several parameters, they are stored in "subcodes". This manual uses a slash "/" as a separator between code and subcode (e.g. "C00118/3"). This term is also referred to as "subindex" in common parlance.
System block	System blocks provide interfaces to basic functions and to the hardware of the inverter in the FB Editor of the »Engineer« (e.g. to the digital inputs).
USB diagnostic adapter	The USB diagnostic adapter is used for the operation, parameterisation, and diagnostics of the inverter. Data are exchanged between the PC (USB connection) and the inverter (diagnostic interface on the front) via the diagnostic adapter. <ul style="list-style-type: none">• Order designation: E94AZCUS
VFCplus	Abbreviation for Voltage Frequency Control

1 About this documentation

1.4 Definition of the notes used

1.4 Definition of the notes used

The following signal words and symbols are used in this documentation to indicate dangers and important information:

Safety instructions

Layout of the safety instructions:



Pictograph and signal word!

(characterise the type and severity of danger)

Note

(describes the danger and gives information about how to prevent dangerous situations)

Pictograph	Signal word	Meaning
	Danger!	Danger of personal injury through dangerous electrical voltage Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Danger!	Danger of personal injury through a general source of danger Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Stop!	Danger of property damage Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph	Signal word	Meaning
	Note!	Important note to ensure trouble-free operation
	Tip!	Useful tip for easy handling

2 Introduction: Parameterising the inverter

Being a component of a machine which includes a speed-variable drive system, the inverter needs to be adjusted to its drive task. The inverter is adjusted by changing parameters which are saved in the memory module. The parameters can be accessed by keypad, by the »EASY Starter« or by the »Engineer«. Access is also possible by a master control via fieldbus communication. For this purpose, interfaces X31 (fieldbus input) and X32 (fieldbus output) are available.



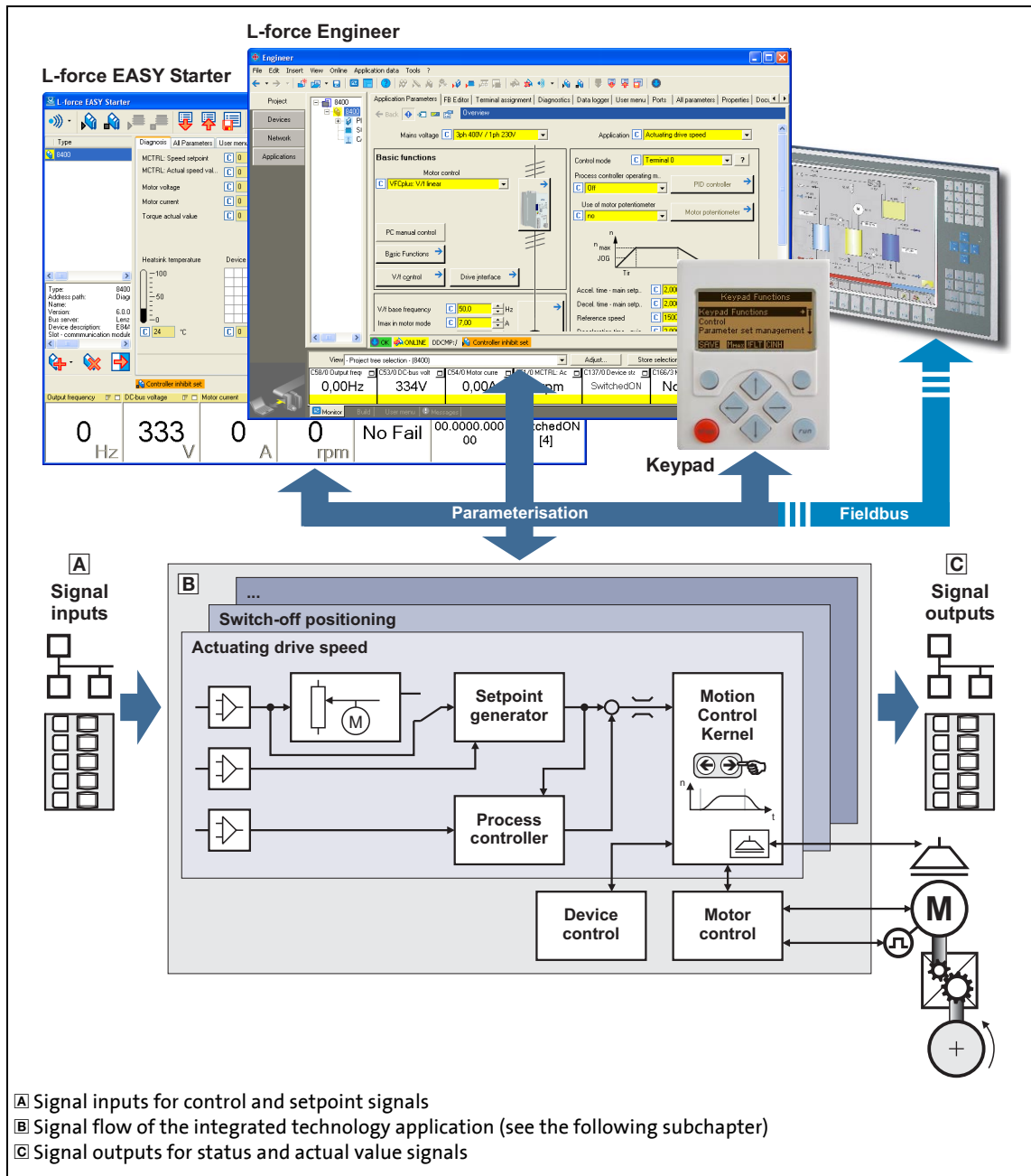
Danger!

In general, changing a parameter causes an immediate response in the inverter!

An enabled inverter can cause an unwanted behaviour at the motor shaft! For instance, setpoint sources can change over abruptly (e.g. when the signal source is configured for the main setpoint).

Certain device commands or settings which may cause critical states of drive behaviour constitute exceptions. Such parameter changes are only possible if the inverter is inhibited. Otherwise, a corresponding error message will be issued.

2 Introduction: Parameterising the inverter



[2-1] Adaptation of the drive solution via parameter setting

2 Introduction: Parameterising the inverter

2.1 Integrated technology applications

2.1 Integrated technology applications

The following technology applications integrated in the inverter 8400 protec HighLine provide the main signal flow for the implementation of a general or a special drive solution:



Technology application "Actuating drive speed"

This preset technology application serves to solve speed-controlled drive tasks, e.g. conveyor drives (interconnected), extruders, test benches, vibrators, travelling drives, presses, machining systems, metering units.



Technology application "Table positioning"

This technology application serves to solve position-controlled drive tasks which are normally controlled by a higher-level control via a fieldbus, e.g. transport facilities, rotary tables, storage and retrieval units, feed drives, metering units, hoists.

Note: An external sequence control is required for this TA!



"Switch-off positioning" technology application

This technology application is used to solve speed-controlled drive tasks which require a pre-switch off or stopping at certain positions, e.g. roller conveyors and conveying belts. The pre-switch off is implemented by connecting switch-off sensors.



Note!

Please note that the "Stateline" and "HighLine" device types differ with regard to the number, functional range, and flexibility of the technology applications offered.



Detailed information on each technology application can be found in the main chapter entitled "[Technology applications](#)". (📖 375)

2.1.1 Purpose of the technology applications

The stepped Inverter Drives 8400 series provides solutions for simple to complex applications – depending on the user's experience and knowledge about the handling of drives and drive tasks.

On the one hand, a great scope of standard drive tasks for frequency inverters is covered by the technology applications offered by Lenze, and on the other hand, the user is relieved from time-consuming programming activities. In practice, some drive tasks are alike so that minor modifications of the corresponding technology applications lead to quick results.

Other important features of technology applications are:

- Direct implementation of drive tasks without recreating a function block interconnection inside the device
- Operation via keypad and/or operation via convenient operator dialogs in the «Engineer».
- Commissioning via few operating and diagnosing parameters (local keypad operation).
- Achieving a transparency as high as possible via the integrated functionality of the device by representing signal flow diagrams.
- Provision of a basic functionality suitable and often sufficient for many applications.

2.1.2 Application cases for a technology application

You should use a technology application if

- the task can be solved completely or to a great extent by the basic functionality of the technology application.
- the end customer does not want to create the comprehensive core functions of the corresponding technology on his own.
- the creation time for a project is to be reduced by using the ready-made technology application
- the end customer wants to build upon the know-how of Lenze.

**Tip!**

If the end customer of the machine does not want to use ready-made solutions of Lenze, it is also possible from the "HighLine" version onwards to implement individual drive solutions by means of the "free interconnection".

Here, a technology application can be used as starting basis, which has to be adapted to the requirement by a change or extension via function block editor (see the following chapter).

2.1.3 Technology application = function block interconnection

In case of the 8400 device version, each technology application is connected to a "function block interconnection" ("FB interconnection"). These FB interconnections serve to implement signal interconnections. Various FBs are available for digital signal processing, signal conversion and logic modules.

For special drive tasks it has proved of value to use the integrated technology applications as a basis for modifications or extensions of the available FB interconnections.

- From "StateLine" version onwards, the preconfigured signal links can be reconfigured in the I/O level by means of parameter setting or using the »Engineer« function block editor.
- Moreover, from the "HighLine" version onwards, the experienced user has the opportunity to implement own drive solutions independent of the predefined technology applications by using the "free interconnection".

I/O level & application level

The interconnection of the interfaces is shown in the I/O level of the function block editor according to the control mode. In the "deeper" application level, the main signal flow is realised in the form of an interconnection of various function and system blocks.

Motion control kernel

Important basic (drive) functions as well as further basic functionalities are implemented in the firmware of the inverter in the so-called **Motion Control Kernel (MCK)** which can be accessed by the active technology application via defined internal interfaces. By this means the expensive creation of single function block interconnections is omitted so that the expenditure and the complexity for the realisation of standard functions is minimised.

The **Motion Control Kernel** is integrated in the main setpoint path and, depending on the set operating mode, it creates the required control and setpoint signals for the motor control and the drive interface.



More information:

- A detailed description of the basic functions implemented in the **Motion Control Kernel** can be found in the main chapter "[Basic drive functions \(MCK\)](#)". (📖 466)
- Detailed information on the creation or change of interconnections by means of the function block editor can be found in the main chapter "[Working with the FB Editor](#)". (📖 1170)
- All available function and system blocks are described in the main chapter "[Function library](#)". (📖 1222)

2 Introduction: Parameterising the inverter

2.2 Selection of the appropriate commissioning tool

2.2 Selection of the appropriate commissioning tool

There are several possibilities for commissioning the 8400 protec HighLine inverter:



Commissioning via keypad X400 (or diagnosis terminal X400)

The keypad is an alternative to the PC for the local operation, parameterisation, and diagnostics in a simple manner. The keypad is especially suited for test and demonstration purposes and for the case that only few parameters have to be adapted.



Note:

- Use the diagnosis terminal for the 8400 protec HighLine inverter. The diagnosis terminal combines the keypad with a housing and a connecting cable.
- The description how to make the settings with the keypad also applies to the diagnosis terminal.



Commissioning with PC and »EASY Starter«

The »EASY Starter« is a Lenze tool for easy online diagnostics, parameter setting and commissioning of the inverter.



Commissioning with PC and »Engineer«

The »Engineer« is a Lenze engineering software for parameter setting across all devices, configuring and diagnosing individual components (as for instance inverters, industrial PCs, motors, I/O systems) and machine control systems.





Tip!

The Engineering tools »EASY Starter« and »Engineer StateLevel« are provided free of charge in the internet:

<http://www.lenze.com> → Download → Software Downloads

For communication between PC and inverter, the USB diagnostic adapter can be used for instance (see the following subchapter).

2.2.1 Overview: Accessories for commissioning

Version	Features	Product key
Diagnosis terminal X400 	Keypad X400 in a robust housing, also suitable for installation into the control cabinet door. <ul style="list-style-type: none"> • Supports hot plugging • Graphic display with plain texts • Backlighting • Easy user guidance • 4 navigation keys, 2 context-sensitive keys • Adjustable RUN/STOP function • Incl. 2.5 m cable • Enclosure IP20; in case of front installation in control cabinet IP65 • Can be used for L-force Inverter Drives 8400 and Servo Drives 9400 	EZAEBK2001
USB diagnostic adapter 	For electrical isolation of your PC and the inverter. <ul style="list-style-type: none"> • Supports hot plugging • Diagnostic LED for data transfer display • plug and play • Input-side voltage supply via USB connection from PC • Output-side voltage supply via the diagnostic interface of the inverter • Connecting cables can be selected in various lengths: 	E94AZCUS
Connecting cable for USB diagnostic adapter	2.5 m length	EWL0070
	5 m length	EWL0071
	10 m length	EWL0072

2.3**General notes on parameters**

All parameters for inverter parameterising or monitoring are saved as so-called "codes".

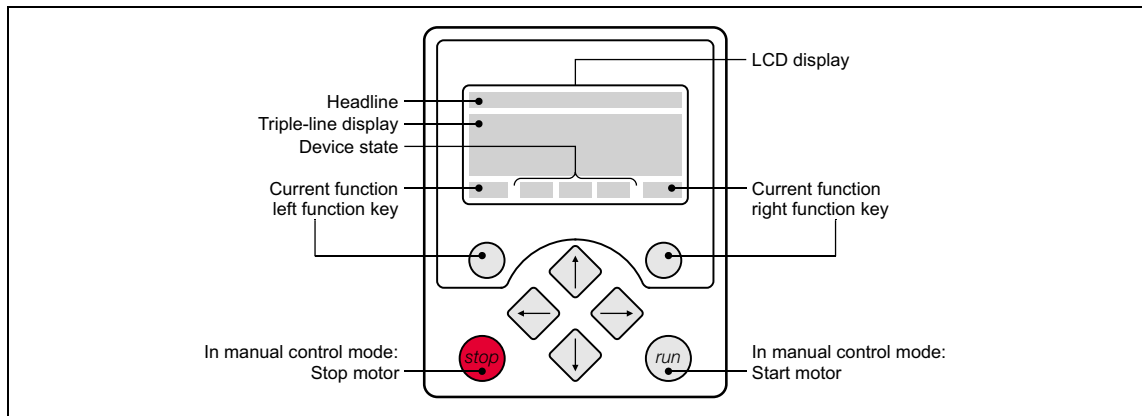
- The codes are numbered and indicated by the prefix "C" before the code, e.g. "C00002".
- Moreover, each code has a name and specific attributes, as for example access type (reading, writing), data type, limit values and default setting ("Lenze setting").
- For the sake of clarity, some codes contain "subcodes" for saving parameters. This Manual uses a slash "/" as a separator between code and subcode, e.g. C00118/3".
- According to their functionality, the parameters are divided into three groups:
 - Setting parameters: For specifying setpoints and for setting device / monitoring functions.
 - Configuration parameters: For configuring signal connections and terminal assignments.
 - Diagnostic/display parameters: For displaying device-internal process factors, current actual values and status messages. These are read-only parameters.

2.3.1 Changing the parameterisation with the keypad

Connect the diagnosis terminal with the keypad to the diagnostic interface X70.

- The X70 plug is provided behind the service hatch. To open it, press lightly against the service hatch and push the two plastic bars down. Tools are not required.
- After using the diagnostic interface, remove the connecting cable from X70 and close the service hatch completely.
- The connecting cable can also be connected to the diagnostic interface during operation and removed again.

Keypad display and control elements



LCD display			
Headline			
In the menu level: Menu name In the parameter level: Parameter name			
Three-part display			
In the menu level: List of available menus In the parameter level: Code/subcode and setting or actual value			
Device status			
RDY	Inverter is switched on	IMP	Pulse inhibit active
RUN	Inverter is enabled	IFLT	"Fault" device status is active
CINH	Inverter is inhibited	ITRB	"Trouble" device status is active
QSP	Quick stop active	ITQSP	"TroubleQSP" device status is active
Imax	Current limit exceeded	WRN	A warning is indicated
Mmax	Speed controller 1 in the limitation		
Function - left function key		Function - right function key	
EDIT	Change parameter setting (change to editing mode)	OK	Accept change in the inverter (no saving with mains failure protection → SAVE)
≡	Back to main menu	ESC	Abort (discard change)
CINH!!!	Parameter can only be changed when the inverter is inhibited.		
EDIT	Change parameter setting (change to editing mode)	OK	Accept change in the inverter (no saving with mains failure protection → SAVE)

Control elements	
○	Execute the function assigned to the function key (see LCD display)
⊛	Execute the stop function set in C00469 (Lenze setting: Inhibit inverter)
⊚	Deactivate stop function again (Lenze setting: Enable inverter again)
⬆	In the menu level: Select menu/submenu In the parameter level: Select parameter
⬇	In the editing mode: Change marked digits or select list entry
CINH	In the menu level: Select submenu/change to parameter level In the editing mode: Cursor to the right
RDY	In the menu level: One menu level higher (if available) In the parameter level: Back to the menu level In the editing mode: Cursor to the left

Menu structure

In the keypad, the parameters are classified into various menus and submenus.

- The **USER menu** includes a selection of frequently used parameters.
- The **Code list** contains all parameters.
- The **Go to param** function enables you to reach the corresponding parameter directly.
- The **Logbook** logs all errors and their chronological history.
- The **Diagnostics** menu contains diagnostic/display parameters for displaying device-internal process factors, current actual values and status messages.

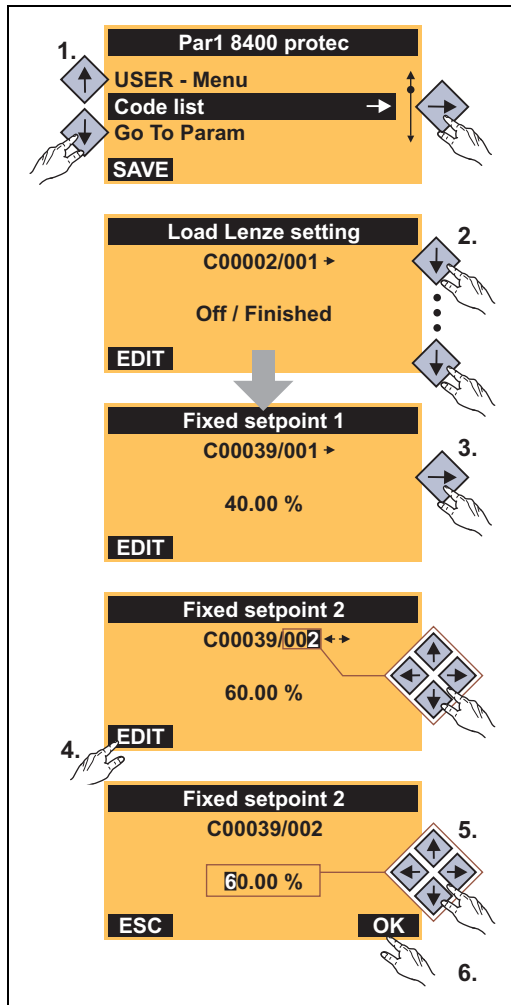
User level

From version [12.00.00 onwards](#), the extent of menus, submenus and codes shown in the keypad can be adapted by selecting the "Userlevel" in [C00001/1](#):

- **Standard** user level (Lenze setting): Only the most important menus and codes are displayed in the keypad.
- **Expert** user level: All menus and codes are displayed in the keypad.
- **Service** user level: Only for the purpose of service (Lenze Service).

After changing the user level, the menus in the keypad are restructured according to the selected user level. The parameters of plugged-in communication module are always shown completely independent of the set user level.

General operation



[2-2] Example: Changing parameters with the keypad

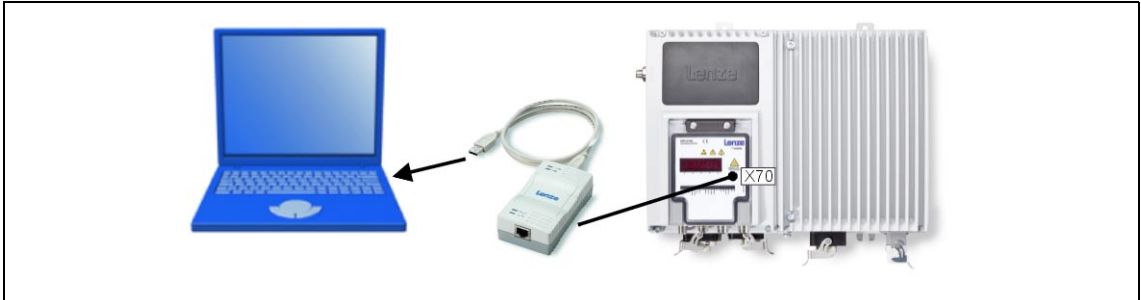
1. Use the \uparrow/\downarrow navigation keys to select the desired menu.
 - Use the \leftarrow/\rightarrow navigation keys to reach a higher/lower menu level.
 - Use the \equiv function key to return to the main menu.
2. Use the \uparrow/\downarrow navigation keys to select the parameter to be set within a submenu.
3. In order to select another subcode in case of a parameter with subcodes:
 - Press the navigation key \diamond to change to the editing mode for the subcode.
 - Use the navigation keys to set the desired subcode.
4. Use the **EDIT** function key to switch over to the editing mode.
5. Use the navigation keys to set the desired value.
6. Use the **OK** function key to accept the change and to leave the editing mode.
 - Use the **ESC** function key to leave the editing mode without accepting the change.

2 Introduction: Parameterising the inverter

2.3 General notes on parameters

2.3.2 Change parameter settings with PC and Lenze software

The USB diagnostic adapter, for instance, can be used for the communication between the PC (including the »EASY Starter« or »Engineer« software) and the inverter, see the following illustration. The USB diagnostic adapter is the connection between the PC (free USB port) and the inverter (X70 diagnostic interface).



[2-3] Exemplary constellation for parameterising the inverter

The **All parameters** tab in the »EASY Starter« and the »Engineer« provides a quick access to all parameters of the inverter.

The given categories and subcategories correspond 1:1 to the menus and submenus of the keypad:

#	C...	S...	Name	Value	Unit
2	1		Load Lenze setting	Off / ready	
2	6		Load all parameter sets	Off / ready	
2	19		Reset error	Off / ready	
5	0		Application	Actuating drive speed	
7	0		Control mode	Terminal 0	
10	1		AIN1: (+y0) = min	0,00	%
10	3		AIN1: (-y0) = (-min)	0,00	%
11	0		Appl.: Reference speed	1500	rpm
12	0		Accel. time - main setpoint	2,000	s
13	0		Decel. time - main setpoint	2,000	s
15	0		VEC: V/f base frequency	50,0	Hz

A Category
B Subcategories

[2-4] All parameters tab in the »Engineer«

Moreover, the »Engineer« provides a commissioning interface on the **Application parameters** tab where you can commission the application in a few steps.



Detailed information on how to handle the »Engineer« can be found in the integrated online help that you can call with the **[F1]** function key.


2.3.3 Save parameter settings in the memory module safe against mains failure

Inverter parameter changes via the EASY Starter /»Engineer«, the keypad, or a master control via fieldbus communication will be lost after mains switching of the controller unless the settings have been explicitly saved to the integrated memory module.

General information

- In the delivery state, the Lenze setting of the parameters has been saved to the integrated memory module. These parameters are
 - the parameters of the inverter
 - the parameters of the communication module plugged into the MCI interface
 - the parameters of the possibly existing safety module (device variant)
- When the device or the external 24 V voltage supply is switched on, all parameters are automatically loaded from the memory module into the main memory of the inverter.
- Full functionality of the memory module is even provided if the power supply has been switched off and only the electronic components of the inverter are externally supplied by a 24 V DC voltage, e.g. via the X10/24E terminal.
- The memory module can be preconfigured with customised data.
- The memory module is available as a spare part - without any data.

During operation

- Parameter sets can be saved and loaded manually.
- Using the keypad, you can press function key **SAVE** to save the parameter settings.
- The »EASY Starter«/»Engineer« serves to execute the saving via the icon  in the *toolbar* or via the device command "Save all parameter sets" ([C00002/11](#) = "1: On / start").
 - The storage process may take a couple of seconds. After the device command has been called in [C00002/11](#), dynamic status information ("Work in progress 20%" → "Work in progress 40%" → "Work in progress 60%", etc.) is returned.



Note!

In order to prevent data inconsistencies during the saving process:

- Do not switch off the supply voltage!
- Do not remove the memory module from the device!

Automatic saving of changed parameter settings is explicitly not supported because this significantly reduces the service life of the memory module.

Unplugging the memory module

The memory module is hot-pluggable. A removal during operation causes a warning "[PS01: No memory module](#)" and should thus be avoided. The behaviour of the device, however, remains unchanged as all parameters are available in the RAM memory after the device has been started. The device can also be parameterised when the memory module has been unplugged. In this case, the parameter sets cannot be saved in the memory module.

Replacement of the inverter

In the event of a device replacement, the entire parameter data of an axis can be copied to the replacement device by "taking along" the memory module, so that additional PC or keypad operations are not required.

When the inverter is replaced, the versions of the old device and the new device are of importance.

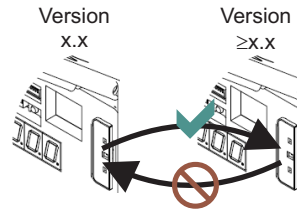
Check software version before the replacement

Particularly with regard to the use of older inverters (e.g. if the customer is using one from stock) it makes sense to check the software (firmware) version. The software version of the inverter can be seen on the nameplate in the "SW" line and can be determined by reading out code [C00099](#).

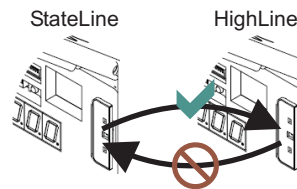
Parameter compatibility

After the device replacement and before data are actually transferred, the versions are internally checked. Basically, the following applies:

- Parameter sets of old devices can only be processed on new devices with the same or higher device version (downward compatibility):



- Parameter sets of devices with versions that have less functions (e.g. 8400 StateLine) can only be loaded into and executed on devices with versions that have more functions, e.g. 8400 HighLine (the reverse is not possible!):



- If the parameter set saved in the memory module is not compatible with the standard device, the "[PS03: Par.set device invalid](#)" is output.



Note!

One exception regarding the described downward compatibility is the firmware version V08.x that cannot be loaded from the firmware version V12.x.

The relation between software version and power class of the devices is explained in the following:

Software versions for devices with a power up to 4 kW

- V02.xx
- V06.xx
- V07.xx
- V08.xx

Software version for devices with a power from 7.5 kW

- V12.xx

2.3.4 User menu for quick access to frequently used parameters

When a system is installed, parameters must be changed time and again until the system runs satisfactorily. The user menu of the inverter contains a selection of frequently used parameters to be able to access and change these parameters quickly:

Parameters	Name	Lenze setting
C00051	MCTRL: Actual speed value	-
C00053	DC-bus voltage	-
C00054	Motor current	-
C00061	Heatsink temperature	-
C00137	Device status	-
C00166/3	Mess. - status det. error	-
C00011	Appl.: Reference speed	1500 rpm
C00039/1	Fixed setpoint 1	40.00 %
C00039/2	Fixed setpoint 2	60.00 %
C00012	Acceleration time - main setpoint	2.000 s
C00013	Deceleration time - main setpoint	2.000 s
C00015	VFC: V/f base frequency	50 Hz
C00016	VFC: Vmin boost	1.60 %
C00022	I _{max} in motor mode	depending on the device power
C00120	Setting of motor overload (I ² xt)	100.00 %
C00087	Rated motor speed	1460 rpm
C00099	Firmware version	-
C00200	Firmware product type	-
C00105	Decel. time - quick stop	2.000 s
C00173	Mains voltage	0: "3ph 400V / 1ph 230V"

Greyed out = display parameter



Tip!

The user menu can be freely configured in [C00517](#).

In the »Engineer«, you can configure the user menu comfortably via the **User menu** tab (see »Engineer« online help).

The [password protection](#) serves to restrict the access to parameters of the user menu. Then, all other parameters cannot be accessed without knowing the password and are thus protected against unwanted changes.

2.4 Device access protection

This function extension is available from version 06.00.00!

Various tasks can be executed via the functions of the device access protection:

- [Password protection](#)
 - Only authorised persons (with password knowledge) may read/change all parameters of the inverter.
 - Non-authorised persons (without password knowledge) can only access the max. 32 parameters of the user menu.
- [Device personalisation](#)
 - Only inverters and memory modules personalised with a specific binding ID can be used in the system.



Note!

If password protection/device personalisation is used:

- Inform the end customer that Lenze can only provide restricted service for the devices with access protection.
- It is not possible for Lenze to modify a replacement device via special accesses in such a way that it cooperates with a personalised memory module.
- The keypad does not support the alpha-numeric entry of a password, thus the keypad cannot be used for entry.

2.4.1 Password protection

When the password protection is active, only write/read access to the parameters of the user menu is possible. An option for configuring various protection functions for each individual communication channel is currently being prepared.

- The following describes how to set/check/delete a password by means of the parameters relevant for these functions.
- From »Engineer« V2.14 onwards, these functions can also be executed via dialog (menu command **Online** → **Set/check/delete password**).

Short overview of the relevant parameters for password protection:

Parameters	Info	Lenze setting										
C00505/3	Password <ul style="list-style-type: none"> • The password must have a length of 4 ... 16 characters. • The password may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9). Note: After the execution of one of the device commands listed below, this parameter provides the current password status: <table border="1"> <tr> <td>off</td> <td>No password is set, password protection is not active (Lenze delivery status).</td> </tr> <tr> <td>on</td> <td> Password is set, password protection is active. <ul style="list-style-type: none"> • This status is also displayed if checking/deleting the password has not been successful due to an invalid entry. </td> </tr> <tr> <td>ok</td> <td> Password is set, password protection is not active. <ul style="list-style-type: none"> • The password protection is temporarily deactivated. </td> </tr> </table>	off	No password is set, password protection is not active (Lenze delivery status).	on	Password is set, password protection is active. <ul style="list-style-type: none"> • This status is also displayed if checking/deleting the password has not been successful due to an invalid entry. 	ok	Password is set, password protection is not active. <ul style="list-style-type: none"> • The password protection is temporarily deactivated. 					
off	No password is set, password protection is not active (Lenze delivery status).											
on	Password is set, password protection is active. <ul style="list-style-type: none"> • This status is also displayed if checking/deleting the password has not been successful due to an invalid entry. 											
ok	Password is set, password protection is not active. <ul style="list-style-type: none"> • The password protection is temporarily deactivated. 											
Device commands												
Before the following device commands are executed, enter the corresponding password in C00505/3 .												
C00002/31	Set password ▶ Activate the password protection	0: Off / ready										
C00002/32	Check password ▶ Temporarily deactivate the password protection	0: Off / ready										
C00002/33	Delete password ▶ Deactivate password protection/change password	0: Off / ready										
Status displays												
C00003	Status of the last device command	-										
C00507/1	Password protection - all communication channels <ul style="list-style-type: none"> • Bit coded display of the active protective functions: <table border="1"> <tr> <td>Bit 0</td> <td>Only access to user menu</td> </tr> <tr> <td>Bit 1</td> <td>Parameter write protection</td> </tr> <tr> <td>Bit 2</td> <td>Parameter read protection</td> </tr> <tr> <td>Bit 3 ... 14</td> <td>Reserved</td> </tr> <tr> <td>Bit 16</td> <td>Memory module binding on</td> </tr> </table>	Bit 0	Only access to user menu	Bit 1	Parameter write protection	Bit 2	Parameter read protection	Bit 3 ... 14	Reserved	Bit 16	Memory module binding on	-
Bit 0	Only access to user menu											
Bit 1	Parameter write protection											
Bit 2	Parameter read protection											
Bit 3 ... 14	Reserved											
Bit 16	Memory module binding on											
Greyed out = display parameter												

Activate the password protection

The password protection is activated by setting a password.



How to set a password:

1. Enter the desired password in [C00505/3](#).
 - The password must have a length of 4 ... 16 characters.
 - The password may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9).
2. Execute "Set password" device command: [C00002/31](#) = "1: On / start"
 - After successful execution, password status ON is displayed in [C00505/3](#) and password protection takes immediate effect.

Temporarily deactivate the password protection

The "Check password" device command serves to temporarily deactivate the password protection in order to execute password-protected functions.

- The password protection remains deactivated until
 - an invalid password will be entered and checked
 - or -
 - the external 24-V supply of the control electronics is switched off (< 19 V).



How to temporarily deactivate the active password protection:

1. Enter the set password in [C00505/3](#).
2. Execute "Check password" device command [C00002/32](#) = "1: On / start"
 - After a successful check, password status OK is displayed in [C00505/3](#).

Deactivate password protection/change password

The password protection is simply activated by deleting the set password. If you want to change the set password, first delete the set password as well. Then set the new password.

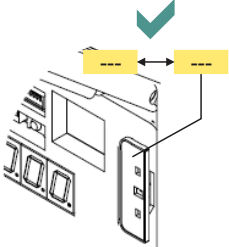
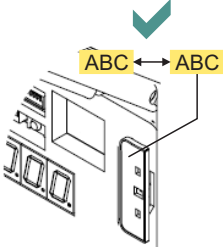
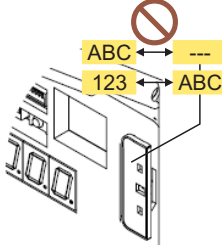


How to delete the set password:

1. Enter the set password in [C00505/3](#).
2. Execute "Delete password" device command [C00002/33](#) = "1: On / start"
 - After a successful deletion, password status OFF is displayed in [C00505/3](#).

2.4.2 Device personalisation

The inverter and the memory module are married via the device personalisation by means of a binding ID. When the device personalisation is active, all write/read actions between inverter and memory module are only executed if both components have the same binding ID.

Lenze delivery status:	Procedure carried out by the customer:	Impermissible replacement by the end user:
		
No binding ID is set.	Customer sets binding ID for device personalisation.	When device personalisation is active: The replacement of the inverter or memory module causes an error message if the binding ID is incorrect or not available.

If, for instance, a parameter set has been loaded from the memory module with an active device personalisation, saving of this parameter set on another memory module with a different or non-existent binding ID is not possible.

- Thus, copying the parameter set from a personalised memory module to a non-personalised memory module is not possible!

Two types of checks are distinguished:

- If a differing binding ID is detected when the inverter is switched on (during device initialisation):
 - the "Fault" error response is returned.
 - The "[PS10: Invalid memory module binding](#)" error message is entered into the logbook.
- If a differing binding ID is detected while a device command for loading/saving the parameter set is executed:
 - Loading/saving is not executed.
 - A corresponding status for the device command is output in [C00003](#).

Short overview of the relevant parameters for device personalisation:

Parameters	Info	Lenze setting
C00505/2	Binding ID <ul style="list-style-type: none"> • The binding ID must have a length of 4 ... 16 characters. • The binding ID may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9). Note: After the execution of one of the device commands listed below, this parameter provides the current binding ID status:	
	off	No binding ID is set.
	on	Binding ID is set.
Device commands Before the following device commands are executed, enter the corresponding binding ID in C00505/2 .		
Greyed out = display parameter		

Parameters	Info	Lenze setting	
C00002/29	Set binding ID ▶ Activate device personalisation	0: Off / ready	
C00002/30	Delete binding ID ▶ Deactivate device personalisation/change binding ID	0: Off / ready	
Status displays			
C00003	Status of the last device command	-	
C00507/1	Password protection - all communication channels • Bit coded display of the active protective functions:	-	
	Bit 0		Only access to user menu
	Bit 1		Parameter write protection
	Bit 2		Parameter read protection
	Bit 3 ... 14		Reserved
	Bit 16	Memory module binding on	
Greyed out = display parameter			

Activate device personalisation

The device personalisation is activated by setting a binding ID.



How to set the binding ID:

- Enter the desired binding ID in [C00505/2](#).
 - The binding ID must have a length of 4 ... 16 characters.
 - The binding ID may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9).
- Execute "Set binding ID" device command [C00002/29](#) = "1: On / start"
 - After successful execution, status ON is displayed in [C00505/2](#).

Deactivate device personalisation/change binding ID

The device personalisation is simply deactivated by deleting the set binding ID. If you want to change the set binding ID, first delete the set binding ID as well. Then set the new binding ID.



How to delete the binding ID:

1. Enter the set binding ID in [C00505/2](#).
 - If inverter and memory module do not have the same binding ID, enter the binding ID of the memory module to delete the binding ID of both components.
2. Execute "Delete binding ID" device command [C00002/30](#) = "1: On / start"
 - After a successful deletion, status OFF is displayed in [C00505/2](#).

2.4.3 Unlocking the inverter with a MasterPin

Every inverter has an individual master password called "MasterPin". By entering the MasterPin, an inverter inhibited by the password mechanisms can be reset to the delivery status.



Stop!

When the MasterPin is used, the parameter set is reset to the Lenze setting both in the inverter and in the memory module!

- This results in a permanent loss of the customised parameterisation that must be recreated!
- A reset to the Lenze setting can result in unforeseen level changes at the I/O terminals (e.g. brake control)!



How to restore the delivery status:

1. Inhibit the inverter if it is enabled, e.g. via the [C00002/16](#) device command.
2. Enter the MasterPin in [C00505/1](#).
 - The MasterPin comprises the last 6 digits of the serial number of the memory module.
3. Execute "Check MasterPin" device command [C00002/28](#) = "1: On / start"

2 Introduction: Parameterising the inverter

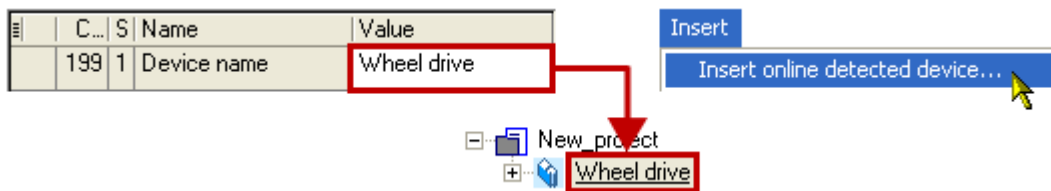
2.5 Device identification

2.5 Device identification

For device identification, any device name (e.g. wheel drive) with max 32 characters can be set in [C00199/1](#) for the inverter and saved in the memory module with mains failure protection.

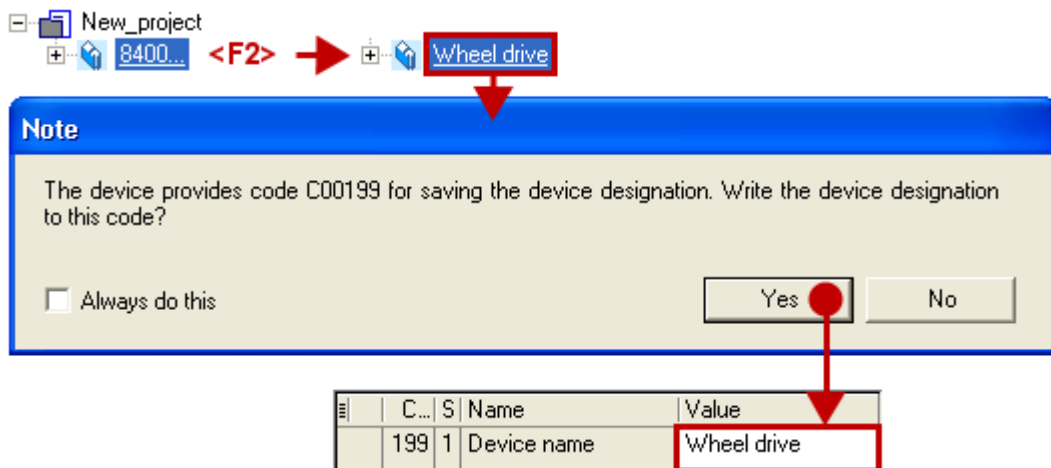
2.5.1 Automatic acceptance of the device name in the »Engineer«

If a device name is assigned in [C00199/1](#) and the inverter in the »Engineer« is added to the project via the **Insert** → **Insert device detected online...** function, the device name stored in [C00199/1](#) (here: wheel drive) is used as device designation in the *Project view* instead of the type (8400 protec HighLine):



This mechanism also functions in reverse direction:

If you rename the inverter in the *project view* via <F2>, you will be asked afterwards if you want to take over the changed name in [C00199/1](#):



2.5.2 Extended item designation

This function extension is available from version 12.00.00!

In [C00199/2...5](#), four texts à max. 32 characters can be set for item designation and saved in the memory module safe against mains failure. These additional subcodes are not dependent on the previously described text acceptance mechanism in the »Engineer« for the device name ([C00199/1](#)).

3 Commissioning



Danger!

Uncontrolled motor movements can occur

Under certain conditions the motor may rotate after mains connection.

Possible consequences:

- Persons in the vicinity of the machine or plant risk getting hurt.
- Unexpected starting action may damage the machine or plant.

Protective measures:

- Commissioning with external 24 V supply and without mains voltage. In this case, the inverter can only be parameterised and diagnosed during commissioning.
- Remove the motor plug X21. An active motor temperature monitoring prevents the output of a motor voltage. If monitoring is deactivated, a voltage can be applied to the plug.
- Ensure that setpoints are not active.



Tip!

- Information on some of the operating statuses can quickly be obtained via the [LED status displays](#) on the front of the inverter. ([□ 590](#))
- **Check firmware:** Particularly with regard to the use of an older inverter (e.g. if the customer is using one from stock) it makes sense to check the software (firmware) version. The software version of the inverter can be seen on the nameplate in the "SW" line and can be determined by reading out code [C00099](#).
- **Restore delivery status:** Set code [C00002/1](#) to "1: On / start" to reset all parameter settings of the device to the Lenze setting. This leaves you with a defined device configuration. ▶ [Load Lenze setting](#) ([□ 102](#))



The following chapters describe the commissioning of the available technology applications with the »Engineer«.

Information on how to commission using the keypad (or diagnosis terminal) can be found in the **8400 hardware manual**. The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.

3.1 Safety instructions with regard to commissioning

General safety instructions

In order to prevent injury to persons or damage to material assets

- check before connecting the mains voltage
 - the wiring for completeness, short circuit, and earth fault
 - the "emergency stop" function of the entire system
 - that the motor circuit configuration (star/delta) is adapted to the output voltage of the inverter
 - the in-phase connection of the motor
 - whether all connectors are locked correctly in order to ensure trouble-free operation.
 - whether all connectors of the control terminals and interfaces that are not used are closed with the supplied plastic caps in order to maintain the certified product features of the safety system.
- check the setting of the most important drive parameters before enabling the controller:
 - the V/f rated frequency must be adapted to the motor circuit configuration!
 - the drive parameters relevant for your application must be set correctly!
 - the configuration of the I/O terminals must be adapted to the wiring!
- ensure that there are no active speed setpoints before enabling the controller.
 - The 8400 protec inverters are provided with a factory set automatic brake operation that operates the holding brake. If no setpoint is set, the motor is locked by the holding brake.

Safety instructions with regard to motor operation



Danger!

- For thermal reasons, continuous operation of self-ventilated motors at a low field frequency and rated motor current is not permissible!
 - In the Lenze setting, the [Motor temperature monitoring \(PTC\)](#) is activated. (📖 313)
 - Activate the [Brake resistor monitoring \(I2xt\)](#) if necessary. (📖 314)
- [C00015](#) must be used to select 87 Hz operation if a delta-connected asynchronous motor (nameplate data: 400 V ∇ / 230 V Δ) is to be operated in conjunction with an inverter for a mains voltage of 400 V.

3.2 Commissioning notes for external 24 V supply

For devices with an external 24 V supply at terminal X10/24E, the following sequence is to be observed during commissioning:

Switching on

1. Connection of the external 24 V supply
 - Control electronics and fieldbus communication start to operate.
 - The integrated 7-segment display shows the message "LU" (undervoltage in the DC bus).
2. Connection of the 400 V mains voltage
 - The message "LU" goes off.
 - The integrated 7-segment display changes to the automatic display, i. e. the parameter saved as status value 1 is displayed. (Lenze setting: motor output frequency in [Hz])

Switching off

1. Disconnection of the 400 V mains voltage
2. Disconnection of the external 24 V supply



Note!

When the 24 V supply is disconnected, the control electronics become inoperable. The switch function of Ethernet-based fieldbuses is also inoperable.

The disconnection of the 24 V supply in the case of an available 400 V mains voltage can cause an error status for master controls.

Related topics:

- ▶ [LED status displays](#) (📖 590)
- ▶ [Drive diagnostics via the integrated 7-segment display](#) (📖 593)

3.3 Notes on motor control

In the Lenze setting, the V/f characteristic control (VFCplus) as motor control is set in [C00006](#) with a linear characteristic.

- V/f characteristic control (VFCplus) is a motor control mode for classic frequency inverter applications on the basis of a simple and robust control procedure for the operation of machines with a linear or quadratic load torque characteristic (e.g. fans).
- The presettings of the parameters ensure that the inverter is immediately ready for operation and the motor works adequately without further parameterisation if an inverter and a 50 Hz asynchronous machine with matching performances are assigned to each other.



Note!

Check the nameplate data against the motor data set in the inverter. Further information is provided in the chapter "[Motor selection/Motor data](#)". (📖 133)

Recommendations for the following application cases:

- If the inverter and motor differ greatly in terms of performance:
Set the I_{max} limit (in motor mode) in [C00022](#) to 2x rated motor current.
- If a high starting torque is required:
When the motor is idling, set a value for V_{min} boost in [C00016](#) which ensures that the rated motor current flows at a field frequency of f = 3 Hz (display in [C00058](#)).
- For noise optimisation:
In [C00018](#), set a switching frequency of "16 kHz var./drive-opt."
- If a high torque must be provided at small speeds without feedback:
Select "Sensorless vector control (SLVC) as motor control mode in [C00006](#).

Related topics:

- ▶ [Motor control \(MCTRL\)](#) (📖 132)

3.4 Preconditions for commissioning with the »Engineer«

For commissioning, you need

- a PC that meets the following system requirements:
 - a processor with 1.4 GHz or higher
 - at least 512 MB RAM and 650 MB free hard disc space
 - Microsoft® Windows® 2000 operating system (from service pack 2 onwards) or Windows® XP
- the Lenze »Engineer« PC software
- a connection to the inverter, e.g. via a USB diagnostic adapter:
 - connect the USB diagnostic adapter to the X70 diagnostic interface.
 - establish a connection between the USB diagnostic adapter and the PC via a free USB port.



Tip!

How to obtain/update the »Engineer« software:

- **Download from the internet:** The full version of the »Engineer StateLevel« is provided free of charge in the internet:
<http://www.Lenze.com> → Download → Software downloads
- **Requesting the CD** You can also request the »Engineer« separately on CD free of charge at your Lenze representative. See the "About Lenze" area on our homepage for e.g. the corresponding German address.

3.5 Trouble-shooting during commissioning

When the »Engineer« is used, trouble during commissioning can be detected and eliminated conveniently. Proceed as follows:

- Check whether error messages appear in the »Engineer«.
 - On the **Diagnostics** tab, relevant actual states of the inverter and pending error messages are displayed in a well-arranged visualisation.
- Check the input terminals for their corresponding setpoints.
 - The **Terminal assignment** tab displays the current input/output signals.
- Check the signal flow of the application.
 - For this purpose, click the **Signal flow** button on the **Application parameter** tab. The displayed signal flow shows active setpoints and their further processing.

Related topics:

- ▶ [Diagnostics & error management](#) (📖 589)
- ▶ [LED status displays](#) (📖 590)
- ▶ [Drive diagnostics via the integrated 7-segment display](#) (📖 593)
- ▶ [Error messages of the operating system](#) (📖 617)

3.6 Commissioning wizard 8400

This function extension is supported by the »Engineer« from version 2.15 onwards!

The **commissioning wizard 8400** serves to carry out a guided commissioning of the inverter based on the Lenze setting of the parameters. The set parameters can then be saved in the inverter with mains failure protection.






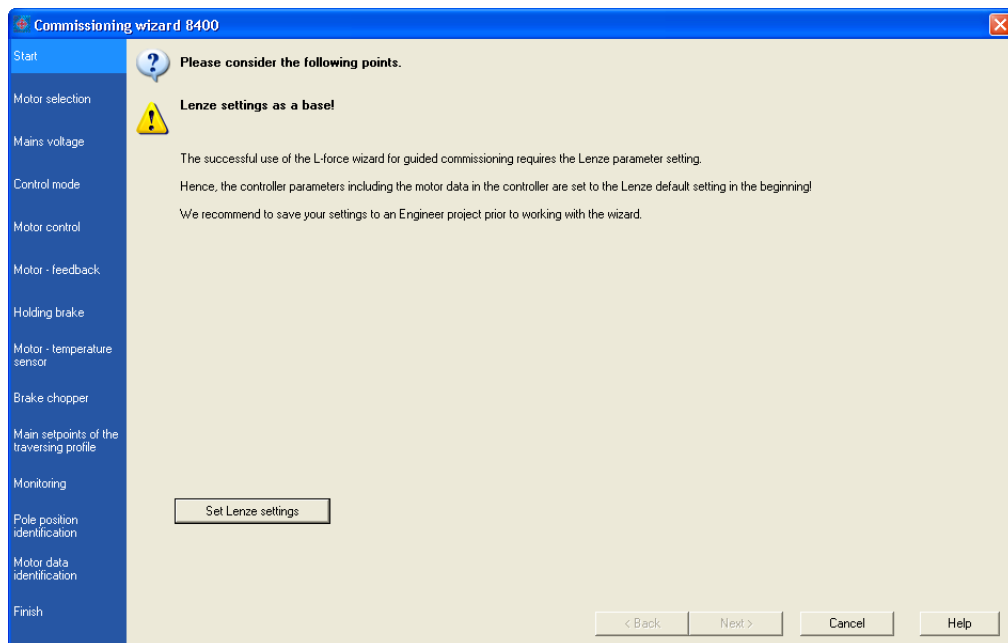
Note!

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

- ▶ [Safety instructions with regard to commissioning](#) (📖 51)

**How to carry out a guided commissioning using the »Engineer«:**

1. Go to the *Project view* and select the 8400 protec HighLine inverter.
2.  Going online.
 - After a connection to the inverter has been established, the following status is displayed in the *Status line*:

3. Click the  icon to open the *commissioning wizard 8400* dialog box.
 - Now the commissioning wizard guides you step by step through the setting of the important parameters for a quick commissioning.
 - The **Next** button can only be activated again after all parameter settings in the device have been reset via the **Load Lenze setting** button.

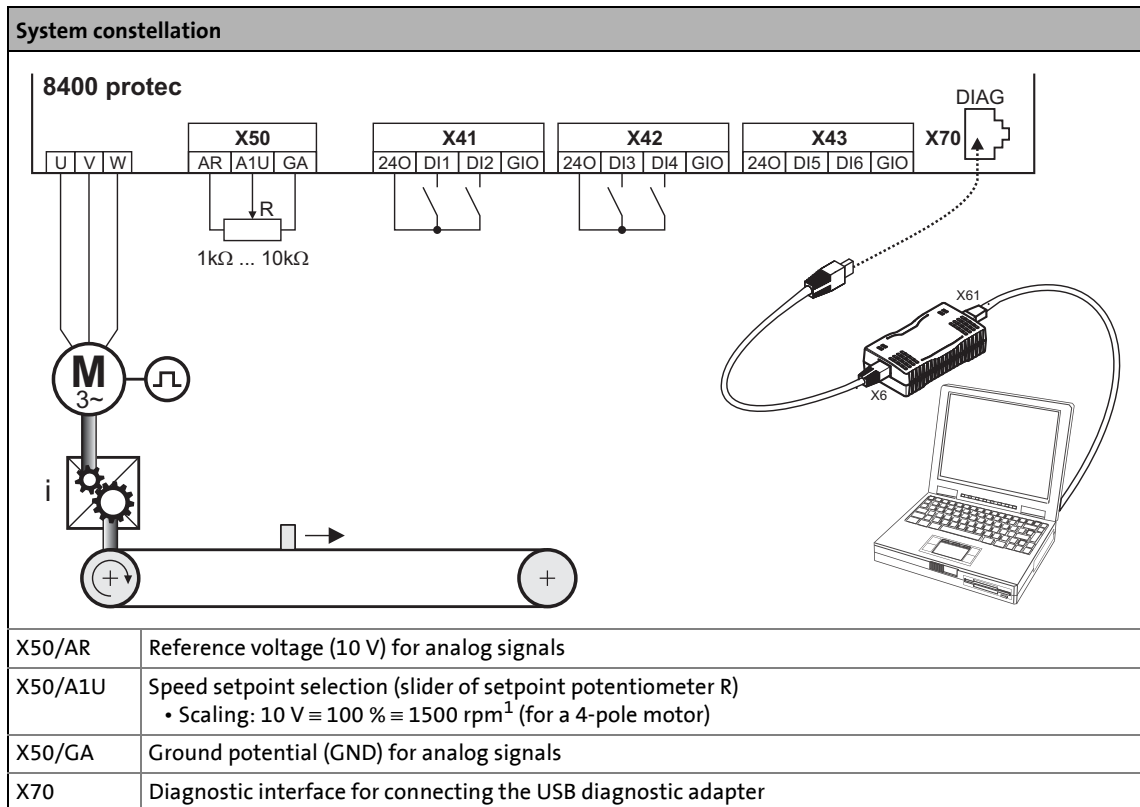
**Related topics:**

- ▶ [Commissioning of the "Actuating drive speed" technology application](#) (📖 57)

**Note!**

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

▶ [Safety instructions with regard to commissioning](#) (📖 51)



[3-1] Block diagram for wiring the commissioning example for the "Actuating drive speed" application

Commissioning steps

Find a description of the commissioning steps of the "Actuating drive speed" technology application below.

Please observe the sequence of the steps in the following chapters and follow them through carefully. This will help you to commission your inverter quickly and as safely as possible:

- ▶ [Prepare inverter for commissioning](#)
- ▶ [Creating an »Engineer« project & going online](#) (📖 59)
- ▶ [Parameterising the motor control](#) (📖 60)
- ▶ [Parameterise application](#) (📖 61)
- ▶ [Save parameter settings safe against mains failure](#) (📖 63)
- ▶ [Enable inverter and test application](#) (📖 63)

3.7.1 Prepare inverter for commissioning

1. Power terminal wiring.

Refer to the mounting instructions supplied with the inverter to find help on how to correctly design the power connections to match the requirements of your device.

2. Wire the control terminals.

The assignment for your digital inputs should correspond to one of the preconfigured control modes ([C00007](#)) for terminal control:

Control mode	Assignment of the digital terminals			
	DI1	DI2	DI3	DI4
Terminals 0	JOG 1/3	JOG 2/3	DCB	Cw/Ccw
Terminals 2	JOG 1/3	JOG 2/3	QSP	Cw/Ccw
Terminals 11	Cw/Ccw	DCB	MPotUp	MPotDown
Terminal 16	JOG 1/3	JOG 2/3	Cw/QSP	Ccw/QSP
Abbreviations used:				
JOG	Selection of fixed setpoints 1 ... 3 parameterised in C00039/1...3			
DCB	Manual DC-injection braking			
Cw/Ccw	CW/CCW rotation			
QSP	Quick stop			
MPotUp	Motor potentiometer: Increase speed			
MPotDown	Motor potentiometer: Reduce speed			
Cw/QSP	Fail-safe selection of the direction of rotation in connection with quick stop			
Ccw/QSP				

3. Connect USB diagnostic adapter.



Danger!

For the commissioning with motor operation observe that no setpoint is applied before connecting the mains voltage.

In the Lenze setting, the "Inhibit at power-on" auto-start option has been deactivated in [C00142](#), i.e. the motor can directly start up if the controller is enabled after mains connection!

4. Switch on voltage supply of the inverter.

- Without motor operation: Connect external 24 V supply.
- With motor operation: Connect mains voltage.

If the green "DRV-RDY" LED is blinking and the red "DRV-ERR" LED is off, the inverter is ready for operation and commissioning can proceed.

Related topics:

- ▶ [Commissioning notes for external 24 V supply](#) (□ 52)
- ▶ [Automatic restart after mains connection/fault...](#) (□ 122)
- ▶ [LED status displays](#) (□ 590)

3.7.2 Creating an »Engineer« project & going online




You can find detailed information on the general use of the »Engineer« in the online help which you can call with **[F1]**.

- In the "Working with projects" chapter, all options of the *start-up wizard* are described to create a new »Engineer« project.


The following steps serve to describe a general method for creating a project with the **Select component from catalogue** option. For this purpose, individual components (inverter, motor, etc.) are selected from selection lists.


1. Start »Engineer«.
2. Create a new project with the *Start-up wizard* and the **Select component from catalogue** option:
 - In the **Component** step, select the 8400 protec HighLine inverter.
 - Select the available communication and safety system in the **Device modules** dialog step.
 - In the **Application** step, select the "Actuating drive speed" application. (The application can also be selected any time afterwards via the **Application parameter** tab or [C00005](#).)
 - Select the other components (motor/gearbox) to be added to the project in the **Other components** dialog step.

3.  Going online.

- After a connection to the inverter has been established, the following status is displayed in the *Status line*:



4. If the inverter is enabled:  Disable inverter.

5.  Download parameter set.

- This command serves to overwrite the current parameter settings in the inverter by parameter settings of the »Engineer« project.

3.7.3 Parameterising the motor control

1. Select the **Application parameters** tab from the *Workspace*.

- The motor control parameters, among other things, can be found on the left:

2. In the **1 Motor control** list field (**C00006**), select the desired motor control.

3. Adapt the motor control parameters:

Parameters	Lenze setting		Info
	Value	Unit	
2 V/f base frequency (C00015)	50.0	Hz	▶ Adapting the V/f base frequency (📖 164)
3 I _{max} in motor mode (C00022)	47.00	A	▶ Optimising the I_{max} controller (📖 167)
4 V _{min} boost (C00016)	1.60	%	▶ Adapting the V_{min} boost (📖 166)

Related topics:

- ▶ [Notes on motor control](#) (📖 53)
- ▶ [Motor control \(MCTRL\)](#) (📖 132)

3.7.4 Parameterise application

The application parameters can be found on the right side of the **Application parameter** tab:

1. In the **1 Control mode** list field ([C00007](#)), select the control mode suitable for the wiring of the terminals.
 - The corresponding wiring diagram is displayed in a pop-up window if you click the **?** button right to the list field.
 - For a detailed description, see the chapter "[Terminal assignment of the control modes](#)". ([□ 388](#))
2. Optional: Use process controller.
 - For this purpose, select the desired operating mode in the **2 L_PCTRL_1: Operating mode** list field ([C00242](#)).
 - For a detailed description see the [L_PCTRL_1](#) function block. ([□ 1439](#))
 - Go to the parameterisation dialog of the process controller via the **Process controller** button.
3. Optional: Use motor potentiometer.
 - For this purpose, select "1: On" in the **3 L_MPot_1: Use** list field ([C00806](#)).
 - For a detailed description see the [L_MPot_1](#) function block. ([□ 1394](#))
 - Go to the parameterisation dialog of the motor potentiometer via the **Motor potentiometer** button.

4. Adapt the application parameters:

Parameters	Lenze setting		Info
	Value	Unit	
4 Accel. time - main setpoint (C00012)	2.000	s	The setpoint is led via a ramp function generator with linear characteristic. The ramp function generator converts setpoint step-changes at the input into a ramp. ▶ L_NSet_1 (☰ 1412)
5 Decel. time - main setpoint (C00013)	2.000	s	
6 Reference speed (C00011)	1500	rpm	All speed setpoint selections are provided in % and always refer to the reference speed set in C00011 . The motor reference speed is indicated on the motor nameplate.
7 Decel. time - quick stop (C00105)	2.000	s	If quick stop is requested, motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105 , the motor is brought to a standstill ($n_{act} = 0$). ▶ Activate/deactivate quick stop (☰ 106)
8 Fixed setpoint 1 (C00039/1)	40.00	%	A fixed setpoint for the setpoint generator can be activated instead of the main setpoint via the digital DI1 and DI2 inputs. • Fixed setpoints are selected in [%] based on the reference speed (C00011). ▶ L_NSet_1 (☰ 1412)
9 Fixed setpoint 2 (C00039/2)	60.00	%	
10 Fixed setpoint 3 (C00039/3)	80.00	%	

**Tip!**


- Click the **Signal flow** button to go down one dialog level to the signal flow of the application with further possible parameter settings. See chapter "[Basic signal flow](#)". (☰ 378)
- The preconfigured I/O connection in the selected control mode can be changed via configuration parameters. See chapter "[User-defined terminal assignment](#)". (☰ 368)

More detailed information on the technology application:

- ▶ [TA "Actuating drive speed"](#) (☰ 377)
- ▶ [Internal interfaces | application block "LA_NCtrl"](#) (☰ 380)
- ▶ [Process data assignment for fieldbus communication](#) (☰ 397)
- ▶ [Terminal assignment of the control modes](#) (☰ 388)
- ▶ [Setting parameters \(short overview\)](#) (☰ 399)
- ▶ [Configuration parameters](#) (☰ 401)

3.7.5 Save parameter settings safe against mains failure

In order to prevent parameter settings carried out in the device from being lost by mains switching, you have to explicitly save the parameter set with mains failure protection in the device.

-  Save parameter set.

3.7.6 Enable inverter and test application



Stop!

Before stipulating a speed setpoint, check whether the brake in the form of a holding brake on the motor shaft has been released!

1. Enable inverter

- If there is no other active source for the controller inhibit, the inverter changes from the "SwitchedOn" status to the "OperationEnabled" status.
- The **Diagnostics** tab and [C00158](#) display all active sources for the controller inhibit.

2. Select the speed setpoint.

In the "Terminal 0" control mode by selecting a voltage at the analog input via the setpoint potentiometer or by selecting a fixed setpoint via the digital DI1/DI2 inputs:

DI1	DI2	Speed selection
LOW	LOW	The setpoint speed is selected via analog input 1 • Scaling: 10 V \equiv 100 % \equiv reference speed (C00011)
HIGH	LOW	Fixed setpoint 1 (C00039/1) is used as setpoint speed. • Lenze setting: 40 % of the reference speed (C00011)
LOW	HIGH	Fixed setpoint 2 (C00039/2) is used as setpoint speed. • Lenze setting: 60 % of the reference speed (C00011)
HIGH	HIGH	Fixed setpoint 3 (C00039/3) is used as setpoint speed. • Lenze setting: 80 % of the reference speed (C00011)



Note!

Observe the actual speed value (display in [C00051](#)) as well as the [LED status displays](#).
([590](#))



Tip!

Other control functions in the "Terminal 0" control mode:

- DI3: HIGH level \equiv Request DC-injection braking
- DI4: HIGH level \equiv Request a change of direction of rotation

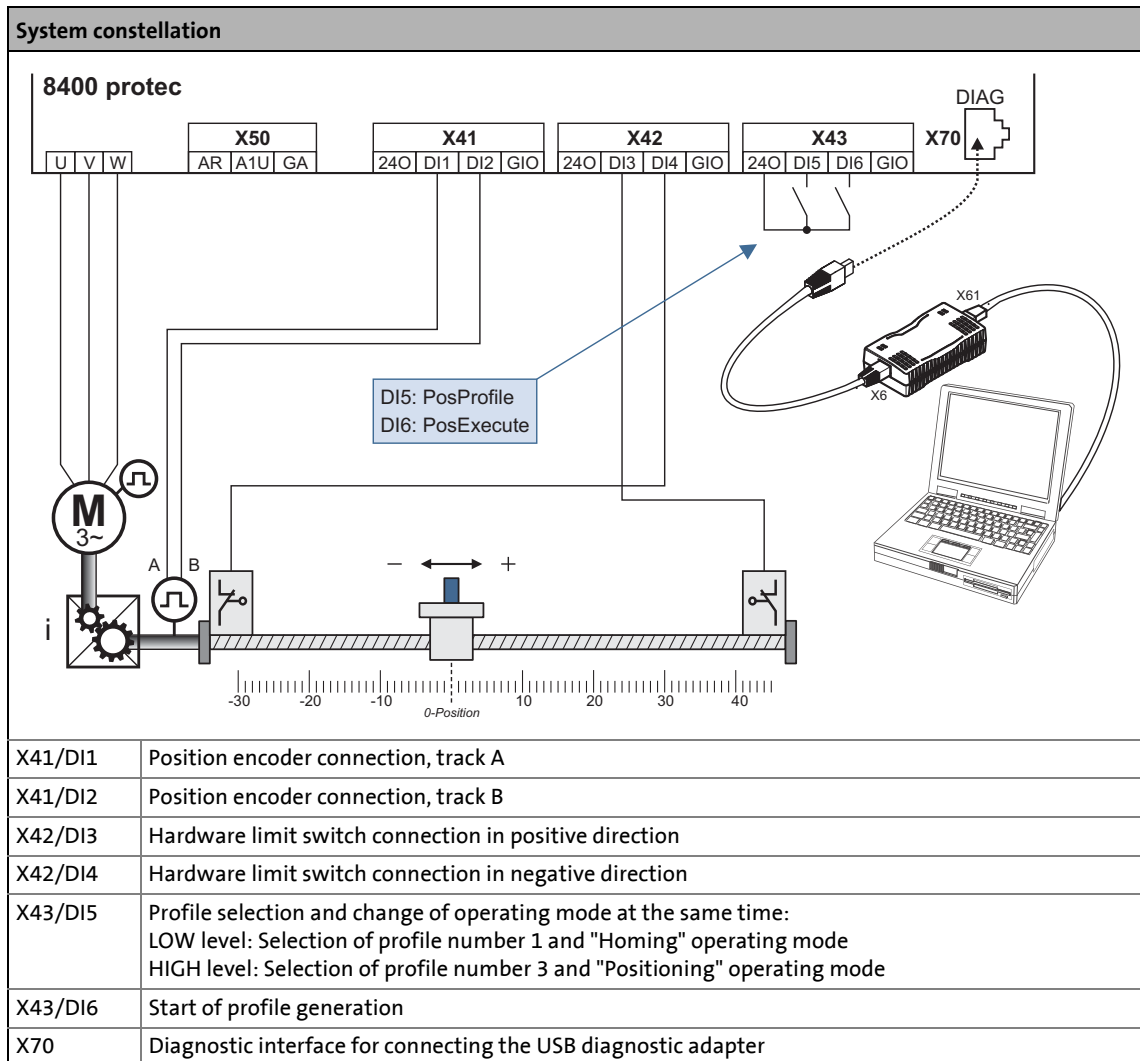
Related topics:

- ▶ ["Inhibit at power-on" auto-start option](#) (📖 122)
- ▶ [Trouble-shooting during commissioning](#) (📖 55)
- ▶ [Diagnostics & error management](#) (📖 589)

**Note!**

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

► [Safety instructions with regard to commissioning](#) (51)



[3-2] Block diagram for wiring the commissioning example for the "Table positioning" application

Commissioning steps

Below find a description of the commissioning steps of the "Table positioning" application shown in illustration [3-2].

Please observe the sequence of the steps in the following chapters and follow them through carefully. This will help you to commission your inverter quickly and as safely as possible:

- ▶ [Prepare inverter for commissioning](#)
- ▶ [Creating an »Engineer« project & going online](#) (📖 68)
- ▶ [Parameterising the motor control](#) (📖 69)
- ▶ [Parameterise application](#) (📖 70)
- ▶ [Save parameter settings safe against mains failure](#) (📖 78)
- ▶ [Enable inverter and test application](#) (📖 78)

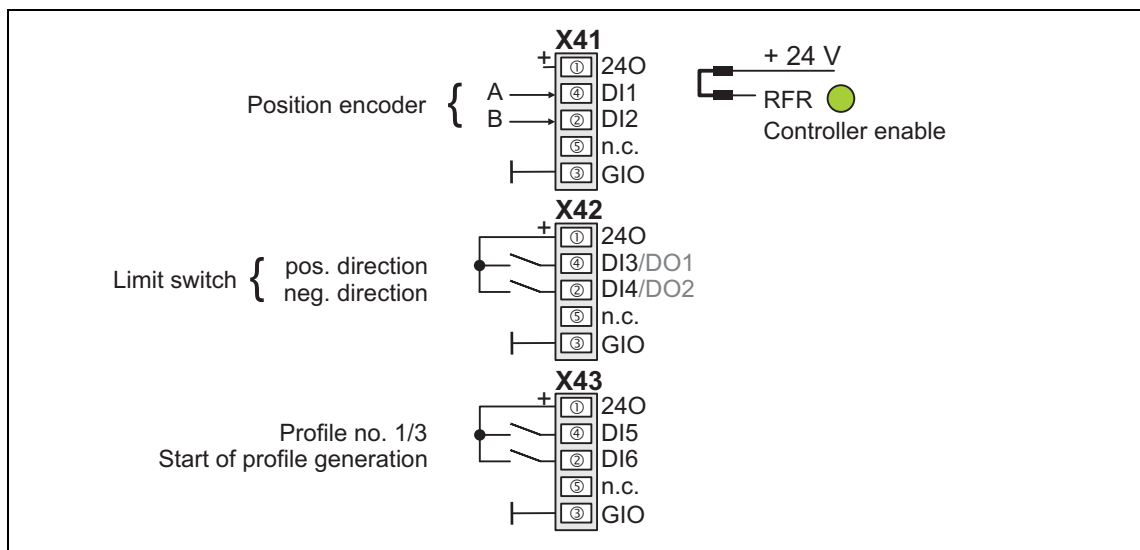
3.8.1 Prepare inverter for commissioning

1. Power terminal wiring.

Refer to the mounting instructions supplied with the inverter to find help on how to correctly design the power connections to match the requirements of your device.

2. Wire the control terminals.

The system constellation including position encoder and hardware limit switches shown in illustration [3-2] requires wiring according to control mode "[Terminals 0](#)":



3. Connect USB diagnostic adapter.



Danger!

For the commissioning with motor operation observe that no setpoint is applied before connecting the mains voltage.

In the Lenze setting, the "Inhibit at power-on" auto-start option has been deactivated in [C00142](#), i.e. the motor can directly start up if the controller is enabled after mains connection!

4. Switch on voltage supply of the inverter.

- Without motor operation: Connect external 24 V supply.
- With motor operation: Connect mains voltage.

If the green "DRV-RDY" LED is blinking and the red "DRV-ERR" LED is off, the inverter is ready for operation and commissioning can proceed.

Related topics:

- ▶ [Commissioning notes for external 24 V supply](#) (📖 52)
- ▶ [Automatic restart after mains connection/fault...](#) (📖 122)
- ▶ [LED status displays](#) (📖 590)




3.8.2 Creating an »Engineer« project & going online



You can find detailed information on the general use of the »Engineer« in the online help which you can call with **[F1]**.

- In the "Working with projects" chapter, all options of the *start-up wizard* are described to create a new »Engineer« project.

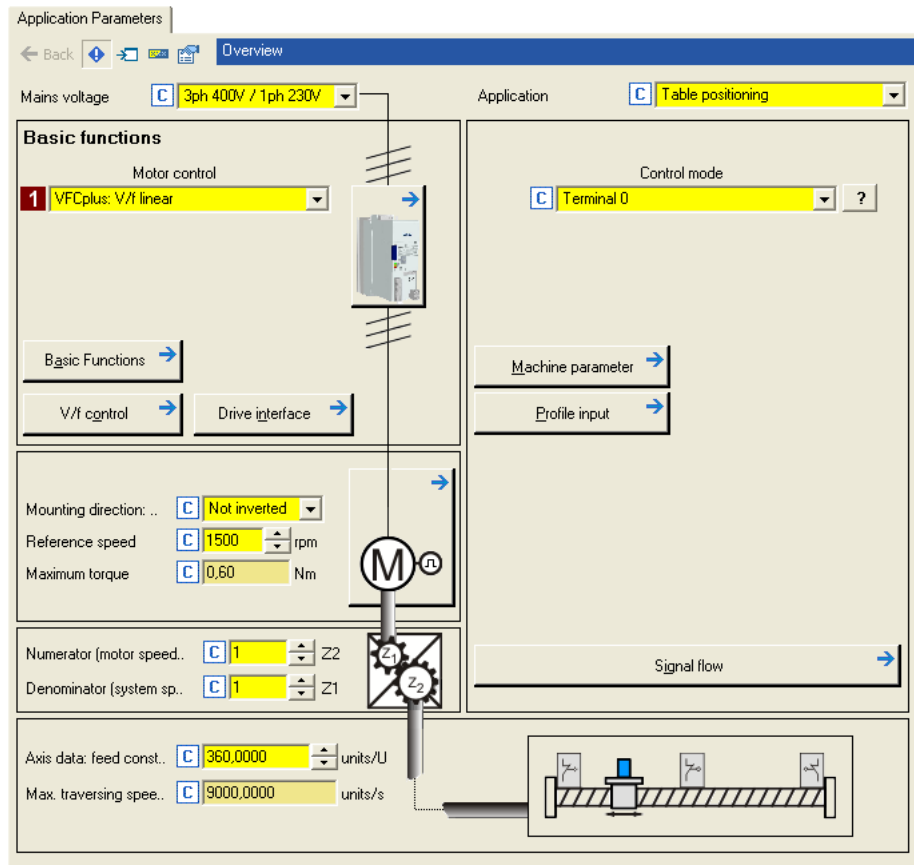
The following steps serve to describe a general method for creating a project with the **Select component from catalogue** option. For this purpose, individual components (inverter, motor, etc.) are selected from selection lists.

1. Start »Engineer«.
2. Create a new project with the *Start-up wizard* and the **Select component from catalogue** option:
 - In the **Component** step, select the 8400 protec HighLine inverter.
 - Select the available communication and safety system in the **Device modules** dialog step.
 - In the **Application** step, select the "Table positioning" application. (The application can also be selected any time afterwards via the **Application parameter** tab or [C00005](#).)
 - Select the other components (motor/gearbox) to be added to the project in the **Other components** dialog step.
3.  Going online.
 - After a connection to the inverter has been established, the following status is displayed in the *Status line*:
4. If the inverter is enabled:  Disable inverter.
5.  Download parameter set.
 - This command serves to overwrite the current parameter settings in the inverter by parameter settings of the »Engineer« project.

3.8.3 Parameterising the motor control

1. Select the **Application parameters** tab from the *Workspace*.

- The motor control parameters, among other things, can be found on the left:



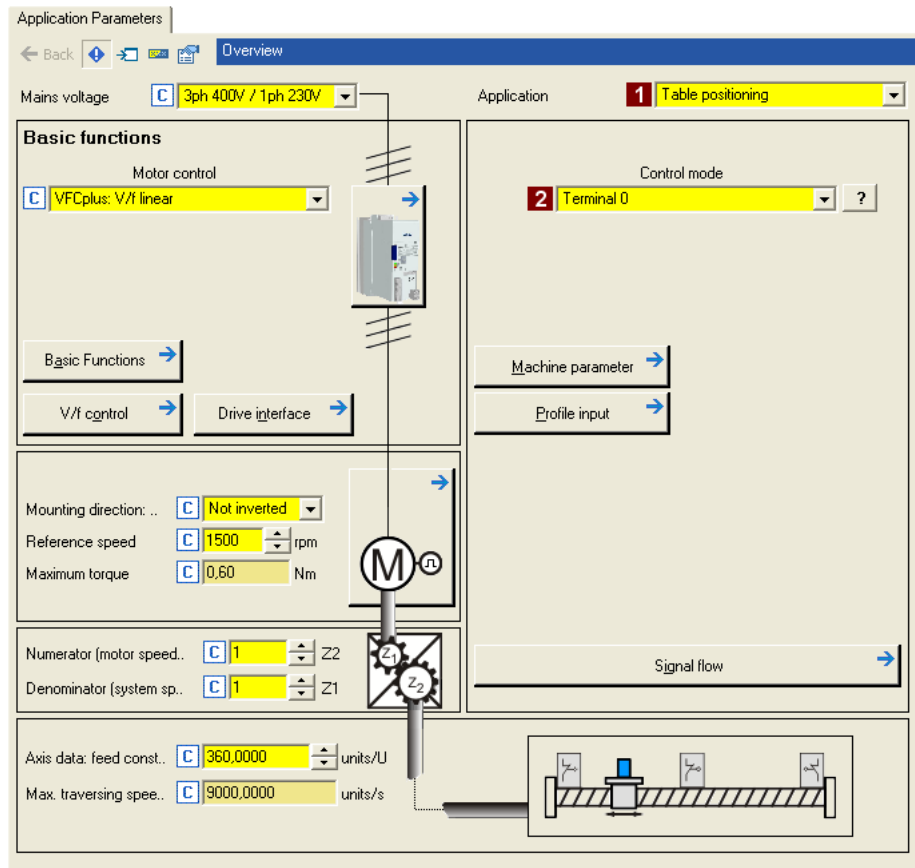
2. In the **1 Motor control** list field ([C00006](#)), select the desired motor control.

Related topics:

- ▶ [Notes on motor control](#) (📖 53)
- ▶ [Motor control \(MCTRL\)](#) (📖 132)

3.8.4 Parameterise application

The application parameters can be found on the right side of the **Application parameter** tab:



1. Select "Table positioning" in the **1 Application** list field ([C00005](#)) (if you have not already done so while creating the project).
 - After the "Table positioning" application is selected, the contents of the tab change, e.g. the **Machine parameters** and **Profile entry** buttons are shown now.
2. In the **2 Control mode** list field ([C00007](#)), the preset "[Terminals 0](#)" control mode is already suitable for the system constellation shown in illustration [\[3-2\]](#) and need not be changed.
 - The corresponding wiring diagram is displayed in a pop-up window if you click the **?** button right to the list field.
 - For a detailed description, see the chapter "[Terminal assignment of the control modes](#)". ([\[388\]](#))

3.8.4.1 Set machine parameters

**Note!**

Setting the machine parameters is a basic prerequisite for the operating modes "[Homing](#)", "[Manual jog](#)" and "[Positioning](#)".

The more precisely the machine parameters are set, the better the results of positioning!

Detailed information on the machine parameters is provided in chapter "Basic drive functions" in subchapter "[Machine parameters](#)". (496)

1. Go to the right side of the **Application parameter** tab and click the **Machine parameter** button to change to the *Overview* → *Machine parameter* dialog level:

Application Parameters

← Back Overview → Machine parameter

Mechanics selection

Conveyor drive ?

Spindle drive ?

Rotary table ?

Z = Number of teeth
n = Speed

	Axis Clocklength	7	0,0000	units
Mounting direction: Motor	1 Not inverted			
Counter (motor speed Z2xZ4)	2 1			Z2
Denominator (system speed Z1xZ3)	3 1			Z1
Mounting direction: Position encod..	4 Not inverted			
Counter (motor speed)	5 1			
Denominator (encoder speed)	6 1			
	Axis data: feed constant	8	360,0000	units/U
	Max. traversing speed 100%_C11	C	9000,0000	units/s
	Axis data: position resolution	C	182,0444	incr/unit
	Positioning accuracy	C	0,0000	units
	Reference speed	9	1500	rpm
	Maximum torque	C	0,60	Nm
	Max. traversing distance	C	11796482	units

2. Set the machine parameters according to the system constellation at hand.

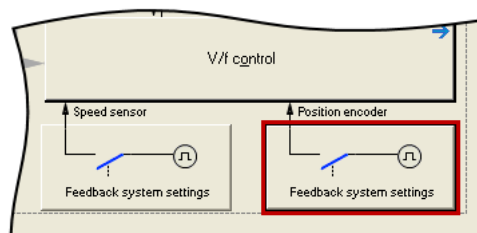
Parameters	Lenze setting		Info
	Value	Unit	
1 Mounting direction: Motor (C01206/1)	not inverted		Inversion if motor mounting is mirrored.
2 Counter (C01202/1)	1		Gearbox factor - motor • Entry of the gearbox factor as numerator/denominator ratio (numerator = motor speed and denominator = output speed of gearbox) or from the number of teeth of the gearbox arrangement.
3 Denominator (C01202/2)	1		
4 Mounting direction: Position encoder (C01206/2)	not inverted		Inversion if position encoder mounting is mirrored.
5 Counter (C01203/1)	1		Gearbox factor - position encoder • Entry of the gearbox factor as numerator/denominator ratio, with numerator = motor speed and denominator = position encoder speed.
6 Denominator (C01203/2)	1		
7 Axis cycle (C01201/1)	0.0000	units	Cycle for Modulo measuring system • The Modulo system is activated by setting a cycle (C01201/1) > 0 units. • When the cycle (C01201/1) is set to 0 units (Lenze setting), the traversing range is unlimited (classical measuring system).
8 Feed constant (C01204)	360.0000	units/rev.	The feed constant corresponds to the movement of the machine during one revolution of the gearbox output shaft. • The value is entered in application units referred to one revolution.
9 Reference speed (C00011)	1500	rpm	All speed setpoint selections are provided in % and always refer to the reference speed set in C00011 . The motor reference speed is indicated on the motor nameplate.

3. After setting the machine parameters, click the **Back** button to change to the *Overview* dialog level.

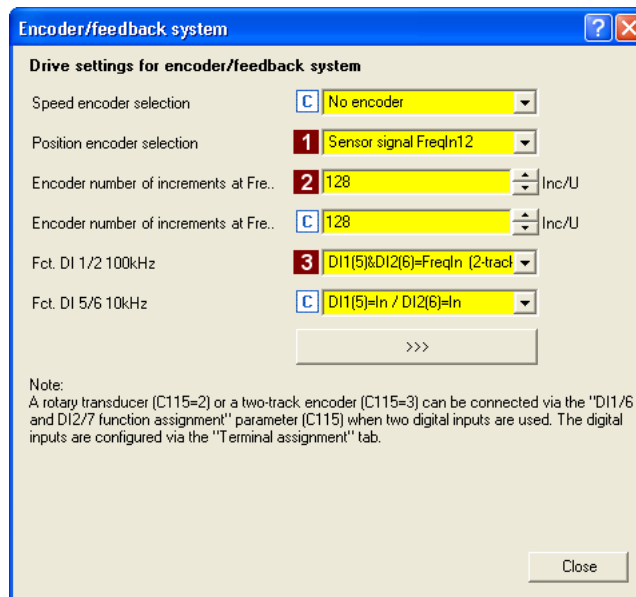
3.8.4.2 Set the position encoder

In the Lenze setting, the digital input terminals are configured as "normal" digital inputs. Since in this system constellation DI1 and DI2 are used to connect a two-track position encoder, the function assignment of these two inputs must be changed accordingly.

1. Go to the right side of the **Application parameter** tab and click the **Signal flow** button to change to the *Overview* → *Signal flow* dialog level.
2. Click the **Feedback system settings** button in the signal flow:



The *Encoder/Feedback system* parameterisation dialog will be shown:



3. In the **1** **Position encoder selection** list field ([C00490](#)), select "Encoder signal FreqIn12".
4. Set the number of position encoder increments in the **2** **Number of encoder increments at FreqIn12** input field ([C00420/1](#)).
5. In the **3** **Fct. DI 1/2 100kHz** list field ([C00115/1](#)), select "DI1(5)&DI2(6)=FreqIn (2-track)".
 - This selection ensures that the digital DI1 and DI2 input terminals are configured as frequency inputs.
6. Adapt the proportional gain, **Kp position controller** ([C00115/1](#)), if necessary. This parameter can be found on the second page of the dialog and can be reached via the >>> button.
7. Click the **Close** button to close the parameterisation dialog again.

Related topics:


- ▶ [Digital terminals](#) (📖 332)
- ▶ [Using DI1\(5\) and DI2\(6\) as frequency inputs](#) (📖 336)

3.8.4.3 Set homing



Detailed information on the "Homing" operating mode is provided in chapter "Basic drive functions" in subchapter "[Homing](#)". (521)



- Click the  button (in the "MotionControlKernel" block) in the signal flow to change to the *Overview* → *Signal flow* → *Homing* dialog level:

The screenshot shows the 'Homing' dialog box with the following configuration:

- Ref. TP signal source: No TP
- Homing mode: >_Lp
- Ref. home position: 0,0000 unit
- Ref. reference offset: 0,0000 unit
- Ref. sequence profile: 0
- System of measurement settings: 0x0
- Homing Step: No Action
- Actual MCTRL position obtained at power off:
- Dist. Ref-Mark to Ref-TP: 0,0000 units
- Actual position: 0,0000 units
- Ref. S-ramp time: 0,000 s
- Ref. M-Limit mode 14/15: 10,00 %
- Ref. waiting time mode 14/15: 100 ms
- Ref. start speed: 720,0000 unit/s
- Ref. start acceleration: 720,0000 unit/s²
- Positive SW limit position: 0,0000 units
- Ref. search speed: 180,0000 unit/s
- Ref. search acceleration: 720,0000 unit/s²
- Negative SW limit position: 0,0000 units

- Select the homing mode and hence the type of homing via the **1 Homing mode** button or directly in the **2 Homing mode** list field ([C01221](#)).
 - A graphic display of all possible homing modes can be seen via the **Homing mode** button.
 - In this system constellation without touch probe, the preset ">_Lp" mode can be used: movement in positive direction, positive edge of the limit switch sets reference.
- Set the position to be used for loading the set position and the actual position after homing has finished in the **3 Homing home position** input field ([C01227/2](#)).

4. Recommendation: Set an offset in the **4 Homing home offset** input field ([C01227/1](#)) to prevent the machine from stopping at an activated limit switch.

- Background: The load machine can also leave the travel range limit switch. There follows a return to the home position that was set with the positive edge of the travel range limit switch.

5. Set suitable profile parameters for the homing:

Parameters	Lenze setting		Info
	Value	Unit	
5 S-ramp time (C01226/1)	0.000	s	S-ramp time for reference search/homing. • Setting "0 s" ≙ no rounding
6 Start speed (C01224/1)	720.0000	unit/s	Starting speed for approaching the pre-stop signals.
7 Start acceleration (C01225/1)	720.0000	unit/s ²	Starting acceleration for the starting speed ramps.

6. After setting the parameters for the homing, click the **Back** button to change back to the *Overview* → *Signal flow* dialog level.

3.8.4.4 Enter one or more profiles



You can find detailed information on entering profiles in the chapter entitled "Basic drive functions", subchapter "[Profile entry](#)". (□ 552)

1. Click the **Profile entry** button (in the "MotionControlKernel" block) in the signal flow to change to the *Overview* → *Signal flow* → *Profile entry* dialog level:

Application Parameters

Overview → Signal flow → Profile input

Profile number: 1

Profile 3: Mode: 2 Absolute (shortest path)

A	Profile 3: Position	3	360.0000	Unit
B	Profile 3: Speed	4	360.0000	Unit/s
C	Profile 3: Accel.	5	720.0000	Unit/s ²
D	Profile 3: Decel.	6	720.0000	Unit/s ²
E	Profile 3: S-ramp time	7	0.000	s
F	Profile 3: Final speed	8	0.0000	Unit/s
	Profile 3: Sequence profile	9	0	

**Note!**

In the Lenze setting, the profiles are assigned to certain operating modes, i.e. the selection of a profile also results in a change of operating mode:

- If profile 0 is selected: Activation of "Speed follower" operating mode
- If profile 1 is selected: Activation of "Homing" operating mode
- If profile 2 is selected: Activation of "Manual jog" operating mode
- If profile 3 ... 15 is selected: Activation of "Positioning" operating mode

In the control modes "[Terminals 0](#)" (Lenze setting) and "[Terminal 16](#)", changeover between profile 1 (homing) and profile 3 (positioning) can be effected via the digital input DI5.

In the control modes "[Terminals 2](#)" and "[Terminals 11](#)" profiles 0 ... 3 can be selected via the digital inputs DI4 and DI5.

2. Select number 3 in the **1 Profile number** list field to enter a positioning profile which can be selected via digital input DI5.

3. Set the profile parameters:

Parameters	Lenze setting		Info
	Value	Unit	
2 Profile x: Mode (C01300/x)	absolute (shortest way)t		Selection of the way in which positioning is to be carried out. ▶ Positioning modes (☰ 555)
3 Profile x: Position (C01301/x)	360.0000	unit	Target position or distance to be traversed.
4 Profile x: Speed (C01302/x)	360.0000	unit/s	Maximum velocity at which the target is to be approached.
5 Profile x: Acceleration (C01303/x)	720.0000	unit/s ²	Specification of the maximum velocity variation which is to be used for acceleration.
6 Profile x: Deceleration (C01304/x)	720.0000	unit/s ²	Specification of the velocity variation which is to be used for maximum deceleration to standstill.
7 Profile x: S-ramp time (C01306/x)	0.000	s	Due to stipulation of an S-ramp time for a profile, the profile is executed with S-shaped ramps, i.e. acceleration and braking processes are initiated smoothly in order to reduce jerk and thus the stress on the drive components.
8 Profile x: Final speed (C01305/x)	0.0000	unit/s	This specifies the velocity at which the drive is to start the next profile after reaching the target position.
9 Profile x: Sequence profile (C01307/x)	0		Optional: Sequence profile for profile linkage / following block control. After execution of the profile (target position reached), the set following (subsequent) profile is started automatically. In this way, profile chains can be stipulated without additional control processes.

4. After entering the profile, click the **Back** button to change back to the *Overview* → *Signal flow* dialog level.

Related topics:


- ▶ [Operating mode change with profile number](#) (☰ 493)
- ▶ [Positioning](#) (☰ 548)

More detailed information on the technology application:

- ▶ [TA "Table positioning"](#) (☰ 404)
- ▶ [Basic signal flow](#) (☰ 405)
- ▶ [Internal interfaces | application block "LA_TabPos"](#) (☰ 408)
- ▶ [Process data assignment for fieldbus communication](#) (☰ 427)
- ▶ [Terminal assignment of the control modes](#) (☰ 418)
- ▶ [Setting parameters \(short overview\)](#) (☰ 429)
- ▶ [Configuration parameters](#) (☰ 430)

3.8.5 Save parameter settings safe against mains failure

In order to prevent parameter settings carried out in the device from being lost by mains switching, you have to explicitly save the parameter set with mains failure protection in the device.


-  Save parameter set.

3.8.6 Enable inverter and test application



Stop!

Before stipulating a speed setpoint, check whether the brake in the form of a holding brake on the motor shaft has been released!

1.  Enable inverter
 - If there is no other active source for the controller inhibit, the inverter changes from the "[SwitchedOn](#)" status to the "[OperationEnabled](#)" status.
 - The **Diagnostics** tab and [C00158](#) display all active sources for the controller inhibit.
2. Select the respective control signals via the digital inputs (see sections below).



Note!

Observe the actual speed value (display in [C00051](#)) as well as the [LED status displays](#).
([book 590](#))

Homing

1. Request "Homing" operating mode:
Set digital input DI5 to LOW level to select profile 1 and at the same time request the "Homing" operating mode.
2. Start homing:
Set digital input DI6 to HIGH level ("alternative function PosExecute").
3. Complete homing when home position has been reached:
Reset digital input DI6 to LOW level.

Positioning

1. Request "Positioning" operating mode:
Set digital input DI5 to HIGH level to select profile 3 and at the same time request the "Positioning" operating mode.
2. Start positioning:
Set digital input DI6 to HIGH level ("alternative function PosExecute").
3. Complete positioning if target position has been reached:
Reset digital input DI6 to LOW level.

**Tip!**

The active operating mode ([C01243](#)) in the signal flow can also be controlled by means of the setting of the switch in the "Motion Control Kernel" block.

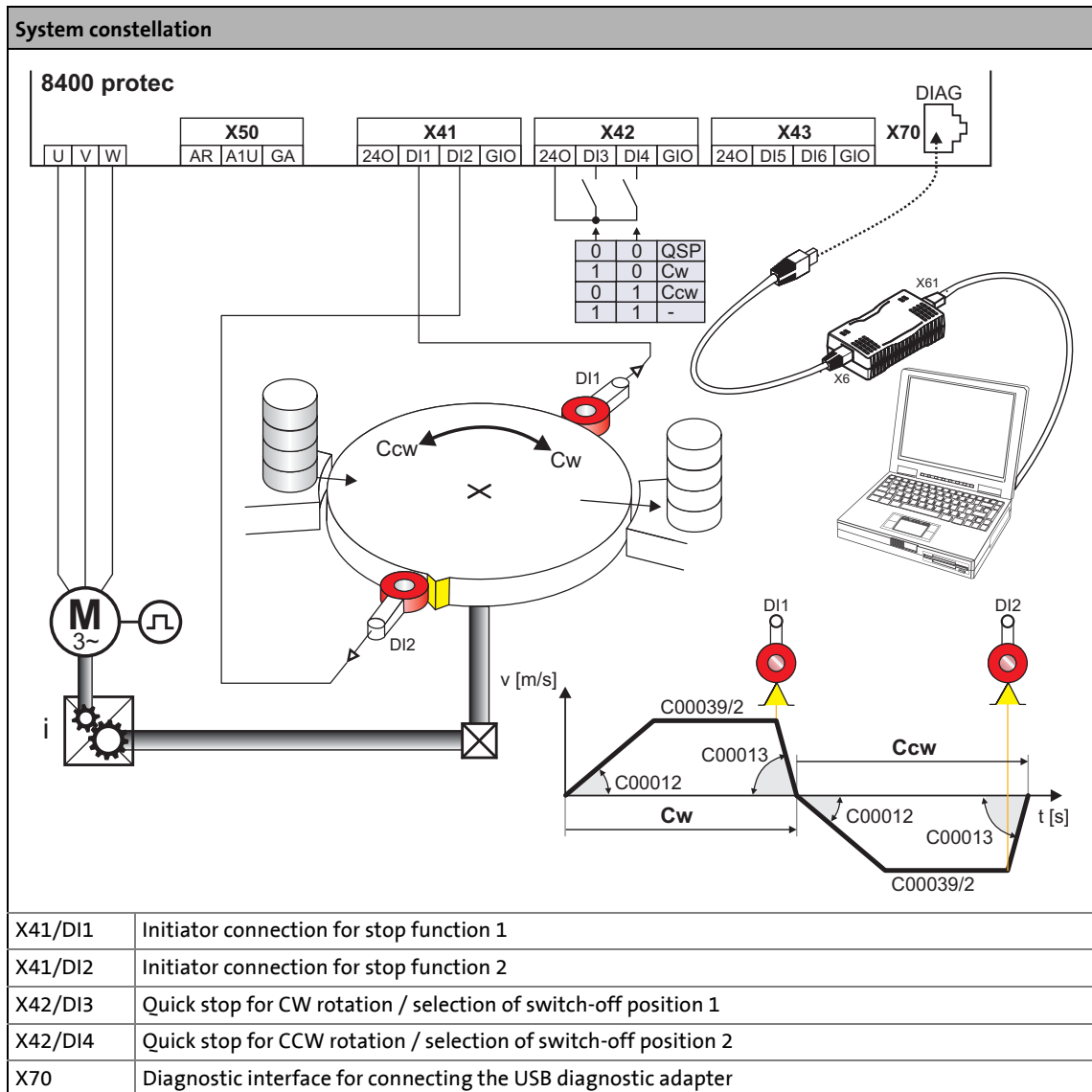
Related topics:

- ▶ ["Inhibit at power-on" auto-start option](#) (📖 122)
- ▶ [Trouble-shooting during commissioning](#) (📖 55)
- ▶ [Diagnostics & error management](#) (📖 589)

**Note!**

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

► [Safety instructions with regard to commissioning](#) (51)



[3-3] Block diagram for wiring of the commissioning example for the "Switch-off positioning" application

Functional principle of a switch-off positioning without pre-switch off

In case of the switch-off positioning without pre-switch off shown above, it makes sense to use the "[Terminals 2](#)" control mode:

1. Set DI3 to HIGH level to activate CW rotation.
2. The drive accelerates along the acceleration ramp ([C00012](#)) up to the traversing speed set in [C00039/2](#).
3. After reaching the DI1 contact, the drive comes to a stop with quick stop (QSP) in the target position.
4. Reset DI3 to LOW level and set DI4 to HIGH level to activate CCW rotation now.
5. The drive is accelerated along the acceleration ramp ([C00012](#)) up to the traversing speed set in [C00039/2](#).
6. After the DI2 contact has been reached, the drive is braked to standstill with quick stop (QSP) in the initial position.



Tip!

- In order to avoid positioning inaccuracy due to signal propagation delays, the initiators can be directly evaluated by the inverter. Limit switch evaluation can be configured in the inverter. In code [C00488/x](#) you can change the method of detecting position signals from level evaluation to edge evaluation.
- In order to prevent unintended movements of the load in the target position, the use of a holding brake is recommended as an alternative to DC-injection braking (limited torque).
- The device terminals and their function assignment do not appear in the FB Editor. The assignment of (hardware) terminals to (software) functions is explained in the chapter "[Terminal assignment of the control modes](#)". ([□ 444](#))

Commissioning steps

As shown in illustration [\[3-3\]](#), below find a description of the commissioning steps of the "Switch-off positioning" application without pre-switch off.

Please observe the sequence of the steps in the following chapters and follow them through carefully. This will help you to commission your inverter quickly and as safely as possible:

- ▶ [Prepare inverter for commissioning](#) ([□ 82](#))
- ▶ [Creating an »Engineer« project & going online](#) ([□ 83](#))
- ▶ [Parameterising the motor control](#) ([□ 84](#))
- ▶ [Parameterise application](#) ([□ 85](#))
- ▶ [Save parameter settings safe against mains failure](#) ([□ 87](#))
- ▶ [Enable inverter and test application](#) ([□ 87](#))

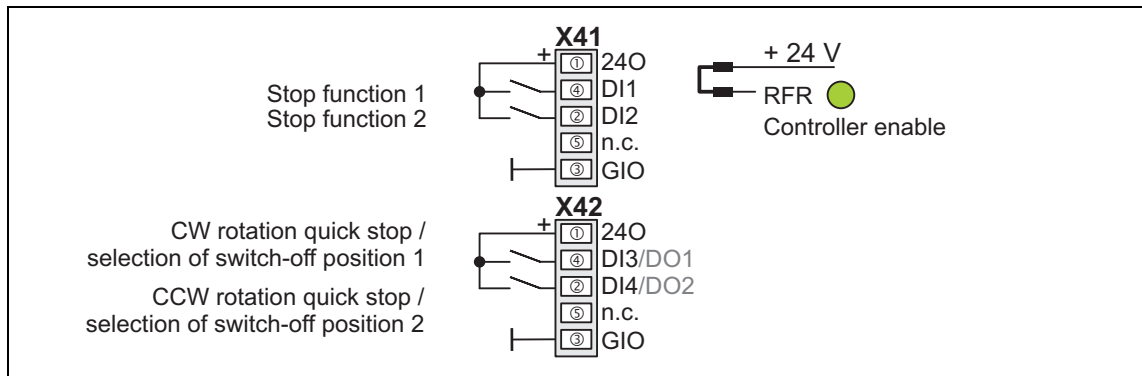
3.9.1 Prepare inverter for commissioning

1. Power terminal wiring.

Refer to the mounting instructions supplied with the inverter to find help on how to correctly design the power connections to match the requirements of your device.

2. Wire the control terminals.

In case of the application shown in illustration [3-3], switch-off positioning without pre-switch off, wiring according to the "[Terminals 2](#)" control mode makes sense:



3. Connect USB diagnostic adapter.



Danger!

For the commissioning with motor operation observe that no setpoint is applied before connecting the mains voltage.

In the Lenze setting, the "Inhibit at power-on" auto-start option has been deactivated in [C00142](#), i.e. the motor can directly start up if the controller is enabled after mains connection!

4. Switch on voltage supply of the inverter.

- Without motor operation: Connect external 24 V supply.
- With motor operation: Connect mains voltage.

If the green "DRV-RDY" LED is blinking and the red "DRV-ERR" LED is off, the inverter is ready for operation and commissioning can proceed.

Related topics:

- ▶ [Commissioning notes for external 24 V supply](#) (52)
- ▶ [Automatic restart after mains connection/fault...](#) (122)
- ▶ [LED status displays](#) (590)

3.9.2 Creating an »Engineer« project & going online



You can find detailed information on the general use of the »Engineer« in the online help which you can call with **[F1]**.

- In the "Working with projects" chapter, all options of the *start-up wizard* are described to create a new »Engineer« project.

The following steps serve to describe a general method for creating a project with the **Select component from catalogue** option. For this purpose, individual components (inverter, motor, etc.) are selected from selection lists.

1. Start »Engineer«.
2. Create a new project with the *Start-up wizard* and the **Select component from catalogue** option:
 - In the **Component** step, select the 8400 protec HighLine inverter.
 - Select the available communication and safety system in the **Device modules** dialog step.
 - In the **Application** step, select the "Switch-off positioning" application. (The application can also be selected any time afterwards via the **Application parameter** tab or [C00005](#).)
 - Select the other components (motor/gearbox) to be added to the project in the **Other components** dialog step.

3. Going online.

- After a connection to the inverter has been established, the following status is displayed in the *Status line*:



4. If the inverter is enabled: Disable inverter.

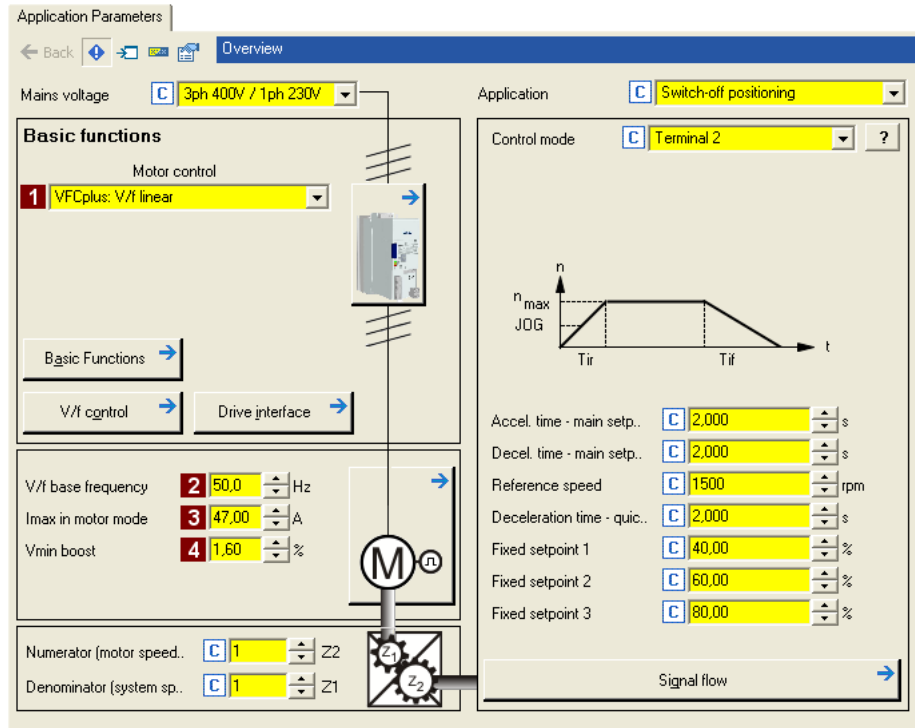
5. Download parameter set.

- This command serves to overwrite the current parameter settings in the inverter by parameter settings of the »Engineer« project.

3.9.3 Parameterising the motor control

1. Select the **Application parameters** tab from the *Workspace*.

- The motor control parameters, among other things, can be found on the left:



2. In the **1 Motor control** list field ([C00006](#)), select the desired motor control.

3. Adapt the motor control parameters:

Parameters	Lenze setting		Info
	Value	Unit	
2 V/f base frequency (C00015)	50.0	Hz	▶ Adapting the V/f base frequency (📖 164)
3 Imax in motor mode (C00022)	47.00	A	▶ Optimising the Imax controller (📖 167)
4 Vmin boost (C00016)	1.60	%	▶ Adapting the Vmin boost (📖 166)

Related topics:

- ▶ [Notes on motor control](#) (📖 53)
- ▶ [Motor control \(MCTRL\)](#) (📖 132)

3.9.4 Parameterise application

The application parameters can be found on the right side of the **Application parameter** tab:

- In the **1 Application** list field ([C00005](#)), select the "Switch-off positioning" application (if you have not already done so while creating the project).
 - After the "Switch-off positioning" application is selected, the contents of the tab change, e.g. the **Process controller** and **Motor potentiometer** buttons are not shown any more.
- In the **2 Control mode** list field ([C00007](#)) and in case of illustration [\[3-3\]](#), for the shown switch-off positioning without pre-switch off the "[Terminals 2](#)" control mode must be selected.
 - The corresponding wiring diagram is displayed in a pop-up window if you click the **?** button right to the list field.
 - For a detailed description, see the chapter "[Terminal assignment of the control modes](#)". ([388](#))

3. Adapt the application parameters:

Parameters	Lenze setting		Info
	Value	Unit	
3 Accel. time - main setpoint (C00012)	2.000	s	The setpoint is led via a ramp function generator with linear characteristic. The ramp function generator converts setpoint step-changes at the input into a ramp. Note: These settings only apply if no other ramp times have been selected at the L_NSet FB!
4 Decel. time - main setpoint (C00013)	2.000	s	
5 Reference speed (C00011)	1500	rpm	All speed setpoint selections are provided in % and always refer to the reference speed set in C00011 . The motor reference speed is indicated on the motor nameplate.
6 Decel. time - quick stop (C00105)	2.000	s	If quick stop is requested, motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105 , the motor is brought to a standstill ($n_{act} = 0$). ▶ Activate/deactivate quick stop (☞ 106)
7 Fixed setpoint 1 (C00039/1)	40.00	%	Fixed setpoints are selected in [%] based on the reference speed (C00011). Fixed setpoint 2 must be smaller than fixed setpoint 3! Otherwise, the drive will be started with a low speed and accelerated after the pre-switch off.
8 Fixed setpoint 2 (C00039/2)	60.00	%	
9 Fixed setpoint 3 (C00039/3)	80.00	%	

**Tip!**


- Click the **Signal flow** button to go down one dialog level to the signal flow of the application with further possible parameter settings. See chapter "[Basic signal flow](#)". (☞ 435)
- The preconfigured I/O connection in the selected control mode can be changed via configuration parameters. See chapter "[User-defined terminal assignment](#)". (☞ 368)
- Low-jerk traversing profiles can be implemented by means of S-shaped ramps.
- In the case of high breakaway torques combined with horizontal motion sequences, "Sensorless vector control (SLVC)" can be used as motor control ([C00006](#)).
- For reversal of rotation direction (bidirectional motion), comprehensive configuration options are available in the inverter (e.g. by means of the [L_DFlipFlop](#) function block).

More detailed information on the technology application:

- ▶ [TA "Switch-off positioning"](#) (☞ 433)
- ▶ [Internal interfaces | application block "LA_SwitchPos"](#) (☞ 436)
- ▶ [Process data assignment for fieldbus communication](#) (☞ 453)
- ▶ [Terminal assignment of the control modes](#) (☞ 444)
- ▶ [Setting parameters \(short overview\)](#) (☞ 455)
- ▶ [Configuration parameters](#) (☞ 457)

3.9.5 Save parameter settings safe against mains failure

In order to prevent parameter settings carried out in the device from being lost by mains switching, you have to explicitly save the parameter set with mains failure protection in the device.


-  Save parameter set.

3.9.6 Enable inverter and test application



Stop!

Before stipulating a speed setpoint, check whether the brake in the form of a holding brake on the motor shaft has been released!

1.  Enable inverter
 - If there is no other active source for the controller inhibit, the inverter changes from the "[SwitchedOn](#)" status to the "[OperationEnabled](#)" status.
 - The **Diagnostics** tab and [C00158](#) display all active sources for the controller inhibit.
2. Select the respective control signals via the digital inputs.



Note!

Observe the actual speed value (display in [C00051](#)) as well as the [LED status displays](#).
([590](#))

Related topics:

- ▶ ["Inhibit at power-on" auto-start option](#) ([58](#) 122)
- ▶ [Trouble-shooting during commissioning](#) ([55](#))
- ▶ [Diagnostics & error management](#) ([589](#))

3.10 PC manual control

This function extension is available from version 06.00.00 onwards and is supported by the »Engineer« from version 2.13 onwards!

For the purpose of testing and demonstration and when an online connection has been established, the PC manual control enables the manual control of various drive functions from the »Engineer«.

Supported drive functions:

- Speed control (follow speed setpoint)
- Activate/deactivate quick stop
- Set/reset home position
- Manual jog
- Positioning (relative or absolute)

More control functions:

- Reset error message
- Set digital/analog outputs (in preparation)

Diagnostic functions:

- Display of the actual speed value and motor current (as time characteristic)
- Display of the current device status
- Display of the status determining error
- Display of the status of the digital/analog inputs (in preparation)

3.10.1 Activate PC manual control

**Stop!**

PC manual control must be explicitly activated by the user.

If PC manual control is activated, the inverter is inhibited via device command ([C00002/16](#)) first.



Note!

With active PC manual control:

The online connection between PC and controller is monitored by the inverter.

- If the online connection is interrupted longer than the timeout time set (Lenze setting: 2 s):
 - The error response "Fault" takes place, i.e. the motor becomes torqueless and coasts, if it has not yet been in standstill.
 - The "[Ck16: Time overflow manual control](#)" error message is entered into the logbook.

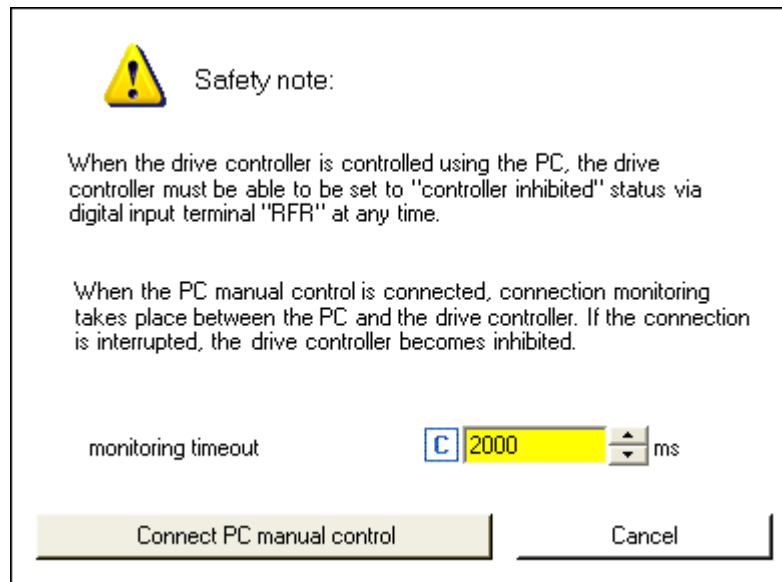
PC manual control provides the **Motion Control Kernel** and the motor interface with all required control signals and setpoint signals.

- The available application (function block interconnection) is now decoupled from these interfaces, but is continued to be processed and remains unchanged.
- It does not matter what type of motor control is set in [C00006](#).



How to activate the PC manual control:

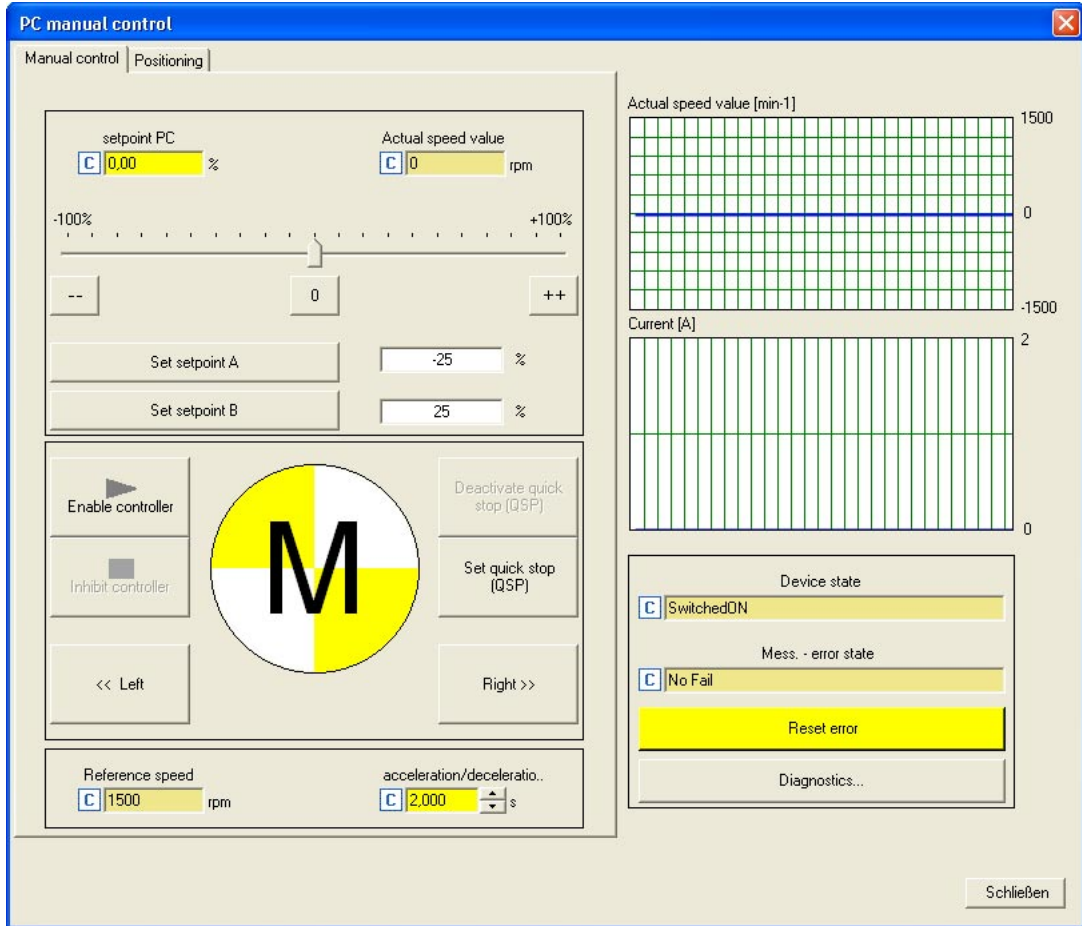
1. If an online connection to the inverter has not been established yet:
 - Go online.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the "PC manual control" button.
 - First, the following safety note is displayed:



- Click the **Cancel** button to abort the action and close the dialog box.
 - The **Timeout monitoring** input field serves to adapt the timeout time for the connection monitoring between PC and inverter.
4. To acknowledge the note and activate PC manual control:
 - Click the **Activate PC manual control** button.
 - The inverter is inhibited via device command ([C00002/16](#)).
 - The *PC manual control* operator dialog is displayed.

PC manual control - operator dialog

The left side of the *PC manual control* operator dialog contains several tabs for selecting the various control functions and the right side contains setpoint and status displays for diagnostic purposes:



Note!

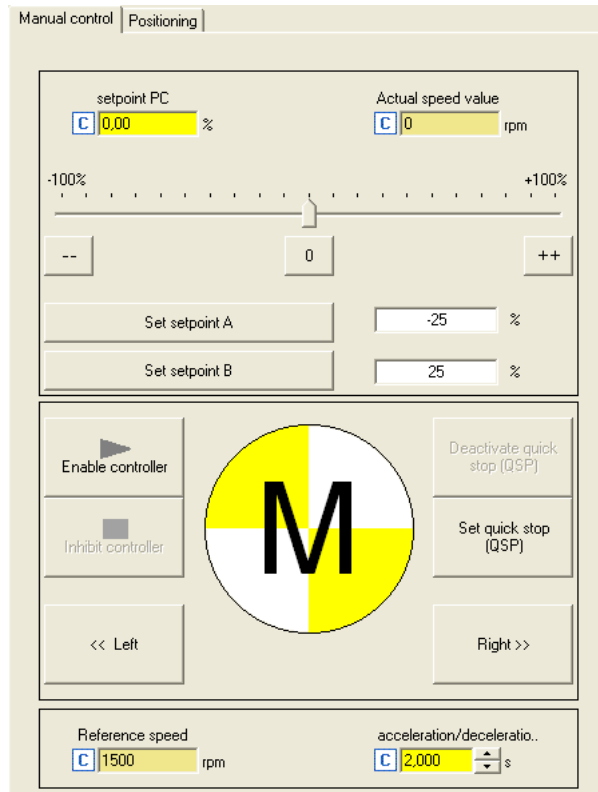
PC manual control can be exited any time by clicking the **Close** button.

If you exit PC manual control or change to another tab, the inverter is inhibited via device command ([C00002/16](#)), i.e. the motor becomes torqueless and is coasting unless it already is at standstill.

The different versions are described in the following chapters.

3.10.2 Speed control

The **Speed control** serves to easily rotate the drive without setting control parameters or feedback systems in the "Speed follower" mode:



How to easily rotate the motor:

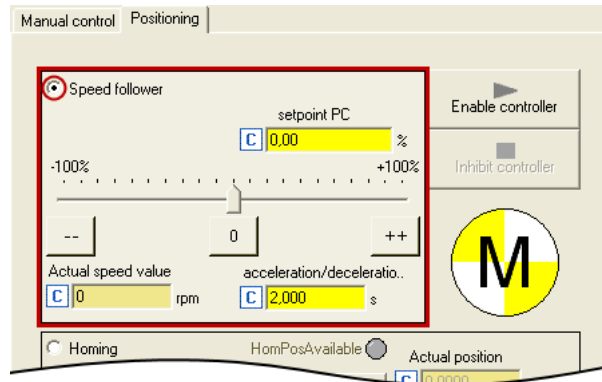
1. Set the desired speed setpoint in [%] based on the reference speed, e.g. directly in the **Setpoint PC** input field or via the slider.
 - Via the -- / 0 / ++ buttons, the currently set speed setpoint can be reduced/increased in steps of 10 percent or set to zero.
 - Via the **Set setpoint A/B** buttons, the speed setpoint can be set to a previously set constant value A/B.
2. To start the speed follower:

Enable the inverter via the **Enable controller** button.

 - Please note that the inverter is only enabled if no other sources of a controller inhibit (e.g. terminal RFR) are active.
 - The enabled drive now follows the defined speed setpoint.
 - In order to prevent shocks or overload at higher setpoint changes, the speed setpoint is lead via a linear ramp generator with adjustable acceleration/deceleration time.
 - Via the **Inhibit controller** button, the inverter can be inhibited again, i.e. the motor becomes torqueless and is coasting unless it already is at standstill.

Further functions:

- If the **Set quick stop (QSP)** button is clicked, the motor is braked to a standstill within the deceleration time parameterised in [C00105](#).
 - Via the **Deactivate quick stop (QSP)** button, the quick stop can be deactivated.
- Via the << **CCW** and **CW** >> buttons, the direction of rotation can be changed.
- The "speed follower" operating mode can be activated via the second **Positioning** tab without the functions described before:



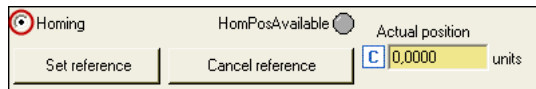
3.10.3 Set/reset home position

The measuring system in the machine is selected by means of homing and the 0 position is set within the possible physical travel range.



Detailed information on the "Homing" operating mode is provided in chapter "Basic drive functions" in subchapter "[Homing](#)". ([book 521](#))

A change to the "Homing" operating mode is made by selecting the correspondent option on the **Positioning** tab:



How to set the reference manually with standing drive:

Click the **Set reference** button.

The current actual position in the machine measuring system now corresponds to the home position set in [C01227/2](#) (Lenze setting: 0.0000 units).



Stop!

If you set the reference with PC manual control, the drive is referenced with it.

If another home position is used for normal operation:

Click **Cancel reference** and reset the status signals *HomPosAvailable* and *HomePosDone* in the MCK status word in order that no mechanical problems occur in normal operation.

- Setpoints and actual positions remain untouched until a renewed reference setting or homing.

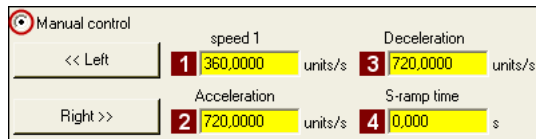
3.10.4 Manual jog

In the "Manual jog" mode, the drive can be traversed manually in a clockwise or anticlockwise direction.



You can find detailed information on the "Manual jog" mode in the chapter entitled "Basic drive functions" in the subchapter "[Manual jog](#)". (📖 540)

A change to the "manual jog" operating mode is made by selecting the correspondent option on the **Positioning** tab:



- The profile parameters stored in the parameter set for the basic "manual jog" function are used:

Parameters	Lenze setting		Info
	Value	Unit	
1 Speed 1 (C01231/1)	360.0000	units/s	Manual jog speed
2 Acceleration (C01232/1)	720.0000	units/s ²	For accelerating and decelerating, different values can be set so that smooth starting and quick stopping of the drive can be implemented.
3 Deceleration (C01232/2)	720.0000	units/s ²	
4 S-ramp time (C01233/1)	0.000	s	In order to reduce jerking, the two ramps can be set in such a way that they are s-shaped. This is done by entering a relative S-ramp time.



How to traverse the drive manually in inching mode:

- If the inverter is still inhibited, enable the inverter via the **Enable controller** button.
 - Please note that the inverter is only enabled if no other sources of a controller inhibit (e.g. terminal RFR) are active.

If the inverter is in the "OperationEnabled" device status:
- Press the **<< Left** or **Right >>** button (and keep it pressed) to traverse the drive with the corresponding direction of rotation.

3.10.5 Positioning (relative or absolute)

Positioning means that a workpiece/tool or material is moved from a starting position to a defined destination.



You can find detailed information on the "Positioning" mode in the chapter entitled "Basic drive functions" in the subchapter "[Positioning](#)". (□ 548)

A change to the "Positioning" mode and a simultaneous selection of the positioning mode (relative or absolute) is made by selecting the corresponding option on the **Positioning** tab:

The screenshot shows the "Positioning" tab interface. At the top, there are two radio buttons: "Relative positioning" (selected) and "Absolute positioning". Below this, there are four input fields for parameters: "Run PDS" (1) with value 360.0000 unit, "Speed" (2) with value 360.0000 unit/s, "Stop PDS" (3) with value 720.0000 unit/s², and "Decel." (4) with value 720.0000 unit/s². At the bottom, there is a "Profile number" dropdown set to 01 and an "S-ramp time" (5) input field with value 0.000 s.

- The profile parameters stored in the parameter set for the basic "Positioning" function are used:

Parameters	Lenze setting		Info
	Value	Unit	
1 Position (C01301/1...15)	360.0000	units	Target position or distance to be traversed. • With "Relative positioning": Distance to starting position (current position). • With "Absolute positioning": Distance to defined zero position.
2 Velocity (C01302/1...15)	360.0000	units/s	Maximum velocity at which the target is to be approached.
3 Acceleration (C01303/1...15)	720.0000	units/s ²	Specification of the maximum velocity variation which is to be used for acceleration.
4 Deceleration (C01304/1...15)	720.0000	units/s ²	Specification of the velocity variation which is to be used for maximum deceleration to standstill.
5 S-ramp time (C01306/1...15)	0.000	s	A profile is traversed with S-shaped ramps by defining an S-ramp time for it.



Note!

In order that no complex travel movements occur, no switching to a sequence profile takes place that has been set in the profile data!

You can find detailed information on entering profiles in the chapter entitled "Basic drive functions", subchapter "[Profile entry](#)". (□ 552)

**How to carry out positioning:**

1. Select the profile to be executed (1 ... 15) in the **Profile number** list field.
2. If the inverter is still inhibited, enable the inverter via the **Enable controller** button.
 - Please note that the inverter is only enabled if no other sources of a controller inhibit (e.g. terminal RFR) are active.

If the inverter is in the "OperationEnabled" device status:

3. Press the **Run POS** button to start positioning.
 - The **Stop POS** serves to stop active positioning at any time.

4 Device control (DCTRL)

This chapter provides information on internal device control as well as the device commands which can be executed via the subcodes of [C00002](#).

- The device control causes the inverter to take defined device statuses.
- The device control provides a multitude of status information in many ways:
 - Visually via the [LED status displays](#) on the front of the inverter. ([📖 592](#))
 - As text messages in the [Logbook](#). ([📖 602](#))
 - As process signals via the outputs of the [LS_DriveInterface](#) system block. ([📖 125](#))
 - Via diagnostic / display parameters which are included in the »Engineer« parameter list as well as in the **Diagnostics** category in the keypad.



Note!

The device states of the inverter are based on the operating states of the CiA402 standard. ▶ [Device state machine and device states](#) ([📖 111](#))

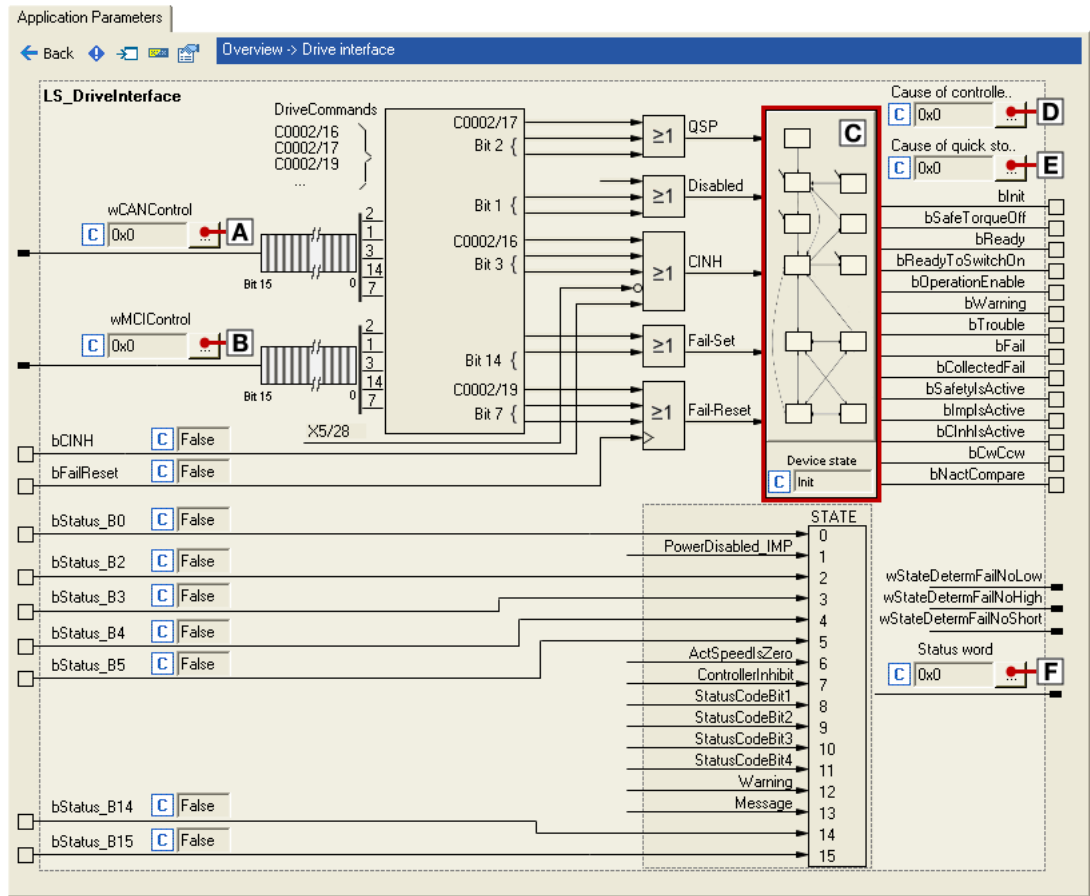


How to get to the parameterisation dialog of the device control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the **Drive interface** button.

Parameterisation dialog in the »Engineer«

The parameterisation dialog shows the input / output signals and the internal signal flow of the [LS_DriveInterface](#) system block which displays the device control in the function block editor:



Range / Meaning	Display parameter
A Display of the control word via system bus (CAN)	C00136/2
B Display of the control word via communication module (e.g. PROFIBUS)	C00136/1
C Display of the internal state machine and the current device status	C00137
D Display of all active sources of a controller inhibit	C00158
E Display of all active sources of a quick stop	C00159
F Display of the status word of the device control	C00150

4 Device control (DCTRL)

4.1 Device commands (C00002/x)

4.1 Device commands (C00002/x)

This chapter describes the device commands of the inverter which are provided in the subcodes of [C00002](#) and can be carried out using the keypad or, alternatively, the »Engineer« when an online connection has been established.

The device commands serve, among other things, to directly control the inverter to organise parameter sets, and to call diagnostic services.

Regarding the execution of the device commands, a distinction is drawn between:

- Device commands which have an immediate effect on control (e.g. "Activate quick stop")
 - After being called in [C00002/x](#), these device commands provide static status information ("On" or "Off").
- Device commands with longer execution duration (several seconds)
 - After being called in [C00002/x](#), these device commands provide dynamic status information ("Work in progress 20%" → "Work in progress 40%", etc.).
 - The execution of the device command has not finished successfully until the "Off / ready" status information is provided in [C00002/x](#).
 - In the event of an error, the "Action cancelled" status information is provided in [C00002/x](#). In this case, further details can be obtained from the status of the device command executed last which is displayed in [C00003](#).



Stop!

Before the supply voltage is switched off after a device command has been transmitted via [C00002/x](#), the device command must be checked for successful completion on the basis of the status information provided in [C00002/x](#)!

- This is of particular importance for device commands which save data to the memory module of the device. Incomplete storage processes may lead to data inconsistencies in the memory module.






Note!

- Before activating device commands by a master control, wait for the "Ready" signal of the inverter.
- The device will reject a write process to [C00002/x](#) if the value is >1 and issue an error message.
- [C00003](#) displays the status of the device command that was executed last.

Activate device command

When an online connection has been established, simply use the »Engineer« to activate a device command by selecting the corresponding option from the **Parameters** tab in [C00002/x](#) ("0: off" or "1: On / start").

- Alternatively, the device command can also be activated via e.g. keypad or through a master control by writing to [C00002/x](#).
- Some of the frequently used device commands (such as "Save parameter set") can also be executed via the *Toolbar* icons of the »Engineer« when an online connection has been established:

Symbol	Function
	Enable inverter
	Inhibit inverter
	Save parameter set (for 8400: Save all parameter sets)



Note!

Device commands that can be executed via the *Toolbar* of the »Engineer« always affect the element currently selected in the *Project view* including all subelements!

- If no inverter but a system module is selected in the *Project view*, the corresponding device command will be activated in all lower-level inverters having an online connection with the »Engineer«.

Before the desired action is carried out, a confirmation prompt appears first, asking whether the action is really to be carried out.

Short overview of device commands

Device commands described in this chapter:

C00002 Subcode:	Device command	Controller inhibit required	Status information
1	Load Lenze setting	●	dynamic
6	Load all parameter sets	●	dynamic
11	Save all parameter sets		dynamic
16	Enable/inhibit inverter		static
17	Activate/deactivate quick stop		static
19	Reset error		static
21	Delete logbook		static
27	Device search function (from version 06.00.00)		static

Device commands described in other chapters:

C00002 Subcode:	Device command	Controller inhibit required	Status information
23	Identify motor parameters ▶ Automatic motor data identification	●	dynamic
26	CAN reset node ▶ Reinitialising the CANopen interface		static
28	Check MasterPin (from version 06.00.00) ▶ Unlocking the inverter with a MasterPin	●	static
29	Set binding ID (from version 06.00.00) ▶ Device personalisation		static
30	Delete binding ID (from version 06.00.00) ▶ Device personalisation		static
31	Set password (from version 06.00.00) ▶ Password protection		static
32	Check password (from version 06.00.00) ▶ Password protection		static
33	Delete password (from version 06.00.00) ▶ Password protection		static

4 Device control (DCTRL)

4.1 Device commands (C00002/x)

4.1.1 Load Lenze setting

The [C00002/1](#) = "1: On / start" device command resets the parameters to the Lenze setting which are saved in the inverter firmware.

- Can only be executed if the controller is inhibited; otherwise, the feedback [C00002/1](#) = "6: No access - controller inhibit" will be returned.
- All parameter changes made since the last saving of the parameter set will get lost!
- This device command has an effect on the settings of the parameters of the operating system, application and module.



Note!

When the Lenze setting [C00002/1](#) is loaded, all communication parameters are reset as well. After the mains is switched on, the Lenze setting is accepted and the inverter might not be accessible anymore via the communication module.

From **version 18.00.00** onwards, [C01004](#) (Load Lenze setting without:) serves to prevent that all communication parameters will be reset when the Lenze setting [C00002/1](#) is loaded.

In order that the communication parameters are not reset while loading the Lenze setting, you must parameterise [C01004](#) before mains switching:

- When using a communication module: [C01004](#):set bit 0 = 1.
- When using CAN OnBoard: [C01004](#):set bit 1 = 1.



How to load the Lenze setting:

1. If the inverter is enabled, it must be inhibited, e.g. by executing the "Enable/Inhibit inverter" device command "[C00002/16](#) = "0: Off / ready)".
2. Execute the "Load Lenze setting" device command:
[C00002/1](#) = "1: On / start"

The loading process may take a couple of seconds. After the device command has been called, [C00002/1](#) returns dynamic status information ("Work in progress 20 %" → "Work in progress 40 %" → "Work in progress 60 %", etc.).

Notes on execution time

The execution time of this device command usually is 2.5 s, independent of the communication module used. If - in addition to the device-internal time monitoring - a monitoring of the execution time is to be implemented for this device command in a higher-level control, the monitoring time has to be 2 ... 3 times higher.

4 Device control (DCTRL)

4.1 Device commands (C00002/x)

4.1.2 Load all parameter sets

The [C00002/6](#) = "1: On / start" device command reloads all parameter settings from the memory module to the inverter.

- Can only be executed if the controller is inhibited; otherwise, the feedback [C00002/6](#) = "6: No access - controller inhibit" will be returned.
- All parameter changes made since the last saving of the parameter set will get lost!
- This device command has an effect on the settings of the parameters of the operating system, application and module.



Note!

The inverter is currently provided with one data record for all parameters, i.e. every parameter has a value. Several data records per inverter are in preparation.

The basic function [Parameter change-over](#) provides a change-over between four sets with different parameter values for up to 32 freely selectable parameters. ([□ 766](#))



How to load the parameter settings from the memory module:

1. If the inverter is enabled, it must be inhibited, e.g. by executing the "Enable/Inhibit inverter" device command "([C00002/16](#) = "0: Off / ready").
2. Execute the "Load all parameter sets" device command:
[C00002/6](#) = "1: On / start"

The loading process may take a couple of seconds. After the device command has been called, [C00002/6](#) returns dynamic status information ("Work in progress 20 %" → "Work in progress 40 %" → "Work in progress 60 %", etc.).

4.1.3 Save all parameter sets

If parameter settings are changed in the inverter, those changes will be lost after mains switching of the inverter unless the settings have been saved explicitly.

The [C00002/11](#) = "1: On / start" device command saves the current parameter settings safe against mains failure to the memory module of the inverter.



Note!

When the device is switched on, all parameters are automatically loaded from the memory module to the main memory of the inverter.

Observe the following to avoid data inconsistencies which cause errors when the parameters are loaded from the memory module:

During the storage process:

- Do not switch off the supply voltage!
- Do not remove the memory module from the device!

The inverter is currently provided with one data record for all parameters, i.e. every parameter has a value. Several data records per inverter are in preparation.



How to save the parameter settings to the memory module:


Execute the "Save all parameter sets" device command:

[C00002/11](#) = "1: On / start"

The storage process may take a couple of seconds. After the device command has been called in [C00002/11](#), dynamic status information ("Work in progress 20%" → "Work in progress 40%" → "Work in progress 60%", etc.) is returned.



Tip!

- This device command can also be activated via the  icon in the *Toolbar*.
- The "[Load Lenze setting](#)" device command ([C00002/1](#) = "1: On / start") resets the parameter settings to the delivery status of the device.

Notes on execution time

The execution time of this device command depends on the communication module used. If - in addition to the device-internal time monitoring - a monitoring of the execution time is to be implemented for this device command in a higher-level control, the monitoring time has to be 2 ... 3 times higher than the times specified in the following table:

Communication module used	Typical execution time		
	StateLine C	HighLine C	TopLine C
Without communication module	3.5 s	3.5 s	3.5 s
PROFIBUS® or INTERBUS	3.5 s	3.5 s	3.5 s
EtherCAT®, PROFINET® or EtherNet/IP™	4.0 s	3.5 s	4.0 s
Ethernet POWERLINK	15.0 s	15.0 s	15.0 s

4 Device control (DCTRL)

4.1 Device commands (C00002/x)

4.1.4 Enable/inhibit inverter

The [C00002/16](#) = "1: On / start" device command enables the inverter, provided that no other source of an inverter inhibit is active.

The [C00002/16](#) = "0: Off / ready" device command inhibits the inverter again, i.e. the power output stages in the inverter are inhibited and the speed/current controllers of the motor control are reset.

- The motor becomes torqueless and coasts, if it has not yet been in standstill.
- When the controller is inhibited, the status output *bCInhActive* of the [LS_DriveInterface](#) system block is set to TRUE.
- When the controller inhibit request is reset, the drive synchronises to the actual speed. For this purpose,
 - If the flying restart circuit is activated in [C00990](#), the flying restart function parameterised in [C00991](#) is used for the synchronisation to the rotary or standing drive. ▶ [Flying restart function](#) (□ 264)
 - In the case of an operation with feedback, the actual speed is read out by the encoder system.
 - In the case of a sensorless vector control (SLVC), the actual speed from the motor model of the motor control is used for the synchronisation.
- [C00158](#) provides a bit coded representation of all active sources/triggers of a controller inhibit:

Bit	Cause/Source of controller inhibit
Bit 0	Terminal controller enable
Bit 1	CAN control word
Bit 2	MCI control word
Bit 3	SwitchOn
Bit 4	Application (LS_DriveInterface system block: <i>bCInh</i> input)
Bit 5	Device command (C00002/16)
Bit 6	Error with error response "Fault" or "Trouble"
Bit 7	Internal signal
Bit 8	Reserved
Bit 9	Reserved
Bit 10	AutoStartLock
Bit 11	Motor parameter identification
Bit 12	Automatic brake operation
Bit 13	DCB-IMP
Bit 14	Reserved
Bit 15	Reserved



Tip!

The inverter can also be enabled or inhibited via the  and  toolbar icons.

4 Device control (DCTRL)

4.1 Device commands (C00002/x)

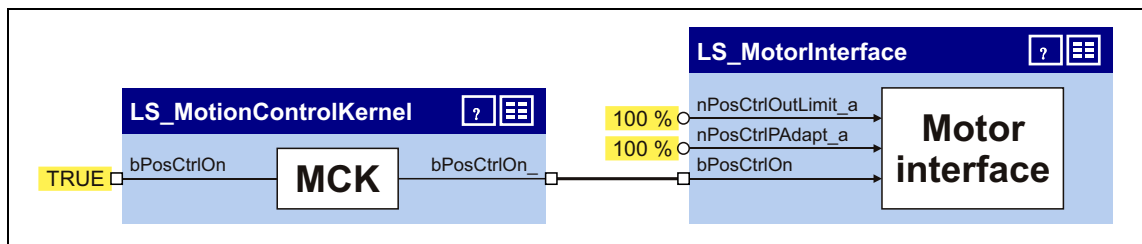
4.1.5 Activate/deactivate quick stop

The [C00002/17](#) = "1: On / start" device command activates the quick stop function, i.e. the motor control is separated from the setpoint selection, and within the deceleration time parameterised in [C00105](#) the motor is brought to a standstill ($n_{act} = 0$).

Parameters	Info	Lenze setting	
		Value	Unit
C00105	Decel. time - quick stop	2.000	s

- From version 12.00.00, [C00104/1](#) can be used to activate the position control during ramp-down and/or at standstill if the following is provided:
 - A position feedback system is set in [C00490](#).
 - The position control is activated (input *bPosCtrlOn* at the [LS_MotionControlKernel](#) system block is set to TRUE, see the following configuration cutout).
 - The inputs *nPosCtrlOutLimit_a* and *nPosCtrlPAadapt_a* at the [LS_MotorInterface](#) system block are set to 100 %.

Parameters	Info	Lenze setting
C00104/1	Bit 0: Standstill position-controlled	0
	Bit 1: Ramp position-controlled	0



[4-1] Activate required configuration for the "Position control during ramp-down and/or at standstill" function

- The motor is kept at a standstill during closed-loop operation.
- A pulse inhibit is set if the auto-DCB function has been activated via [C00019](#).
- From version 16.00.00, further options for the quick stop function can be activated in [C00104/1](#).
 - ▶ [Optional settings](#) (107)
- [C00159](#) provides a bit coded representation of all active sources/triggers of a quick stop:

Bit	Cause/source for quick stop
Bit 0	Reserved
Bit 1	CAN control word (bit 2)
Bit 2	MCI control word (bit 2)
Bit 3	Reserved
Bit 4	Application (LS_MotorInterface system block: <i>bQspOn</i> input)
Bit 5	Device command (C00002/17)
Bit 6	Device error with "TroubleQSP" error response
Bit 7	Internal signal
Bit 8	Reserved
Bit 9	Reserved
Bit 10	Operating system of

4 Device control (DCTRL)

4.1 Device commands (C00002/x)

Bit	Cause/source for quick stop
Bit 11	Reserved
Bit 12	MCK (System block LS_MotionControlKernel : Input <i>bQspOn</i>)
Bit 13	Reserved
Bit 14	Reserved
Bit 15	Reserved

Deactivate quick stop again

The [C00002/17](#) = "0: Off / ready" device command deactivates the quick stop again, provided that no other source of a quick stop is active.

4.1.5.1 Optional settings

From version 16.00.00, the options described in the following for the quick stop function can be activated in [C00104/1](#). In the Lenze setting, no option is activated.

Standstill position-controlled

When bit 0 is set in [C00104/1](#), the position control is activated at standstill.

- The basic conditions are shown in the [Flow diagram](#) for the quick stop function.
- More conditions for a proper function:
The inputs *nPosCtrlOutLimit_a* and *nPosCtrlPAdapt_a* at the [LS_MotorInterface](#) system block have to be set to 100 % (default setting for all technology applications).

Ramp position-controlled

If bit 1 is set in [C00104/1](#), the position control is activated while ramping down.

- The basic conditions are shown in the [Flow diagram](#) for the quick stop function.
- More conditions for a proper function:
The inputs *nPosCtrlOutLimit_a* and *nPosCtrlPAdapt_a* at the [LS_MotorInterface](#) system block have to be set to 100 % (default setting for all technology applications).

Continue following error

(from version 16.00.00)

If bit 2 is set in [C00104/1](#), the current following error is continued if the quick stop with position control is activated while ramping down.

Starting value is the setpoint speed

(from version 16.00.00)

If bit 3 is set in [C00104/1](#), the starting value for quick stop is the setpoint speed. If the bit is not set, the starting value for quick stop is the actual speed if this does not derive more than 5 rpm from the setpoint. This serves to prevent a jump to a setpoint with a high deviation.

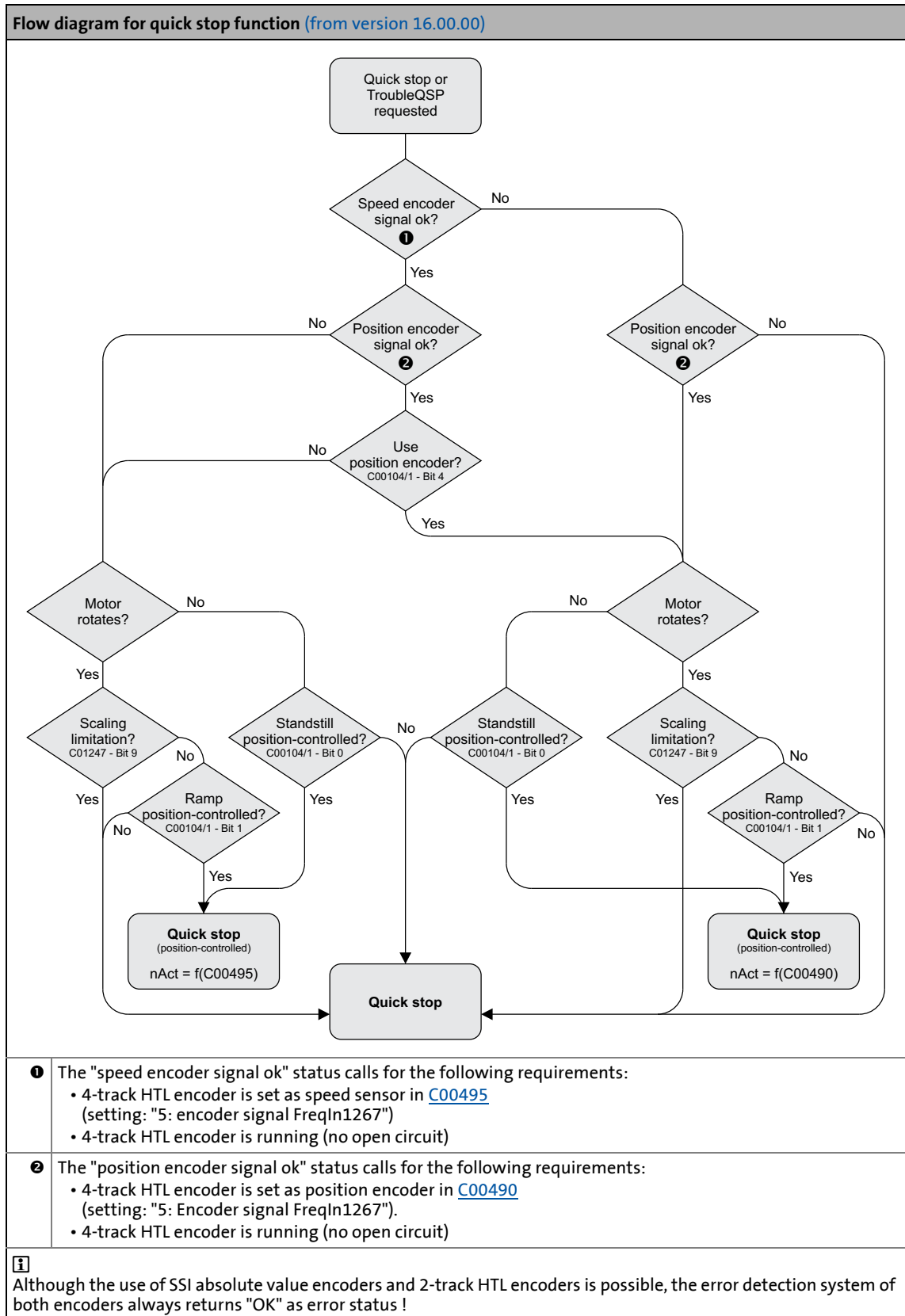
Use position encoder

(from version 16.00.00)

If bit 4 is set in [C00104/1](#), the position encoder is used instead of the speed encoder for quick stop with position control.

- The basic conditions are shown in the [Flow diagram](#) for the quick stop function.

Flow diagram



4 Device control (DCTRL)

4.1 Device commands (C00002/x)

4.1.6 Reset error

The [C00002/19](#) = "1: On / start" device command acknowledges an existing error message if the error cause has been eliminated and thus the error is no longer pending.

- After the reset (acknowledgement) of the current error, further errors may be pending which must also be reset.
- The status determining error is displayed in [C00168](#).
- The current error is displayed in [C00170](#).



Tip!

An error message can also be acknowledged by activating the **Reset error** button in the **Diagnostics** tab.

Detailed information on error messages can be found in the "[Diagnostics & error management](#)" chapter. ([□ 589](#))

4.1.7 Delete logbook

The [C00002/21](#) = "1: On / start" device command deletes all logbook entries.



Tip!

To display the logbook in the »Engineer«, click the **Logbook** button on the **Diagnostics** tab.

In the *Logbook* dialog box, it is also possible to delete all logbook entries by clicking the **Delete** button.

Detailed information on the logbook can be found in the "[Diagnostics & error management](#)" chapter. ([□ 589](#))

4 Device control (DCTRL)

4.1 Device commands (C00002/x)

4.1.8 Device search function


This function extension is available from version 06.00.00!

In some applications where inverters are installed in control cabinets or are positioned in a spacious plant, it is often difficult to locate a device connected online for e.g. maintenance work. There is an established online connection with the device but you do not know where the inverter is located physically.

The [C00002/27](#) = "1: On / start" device command serves to carry out an "optical location":

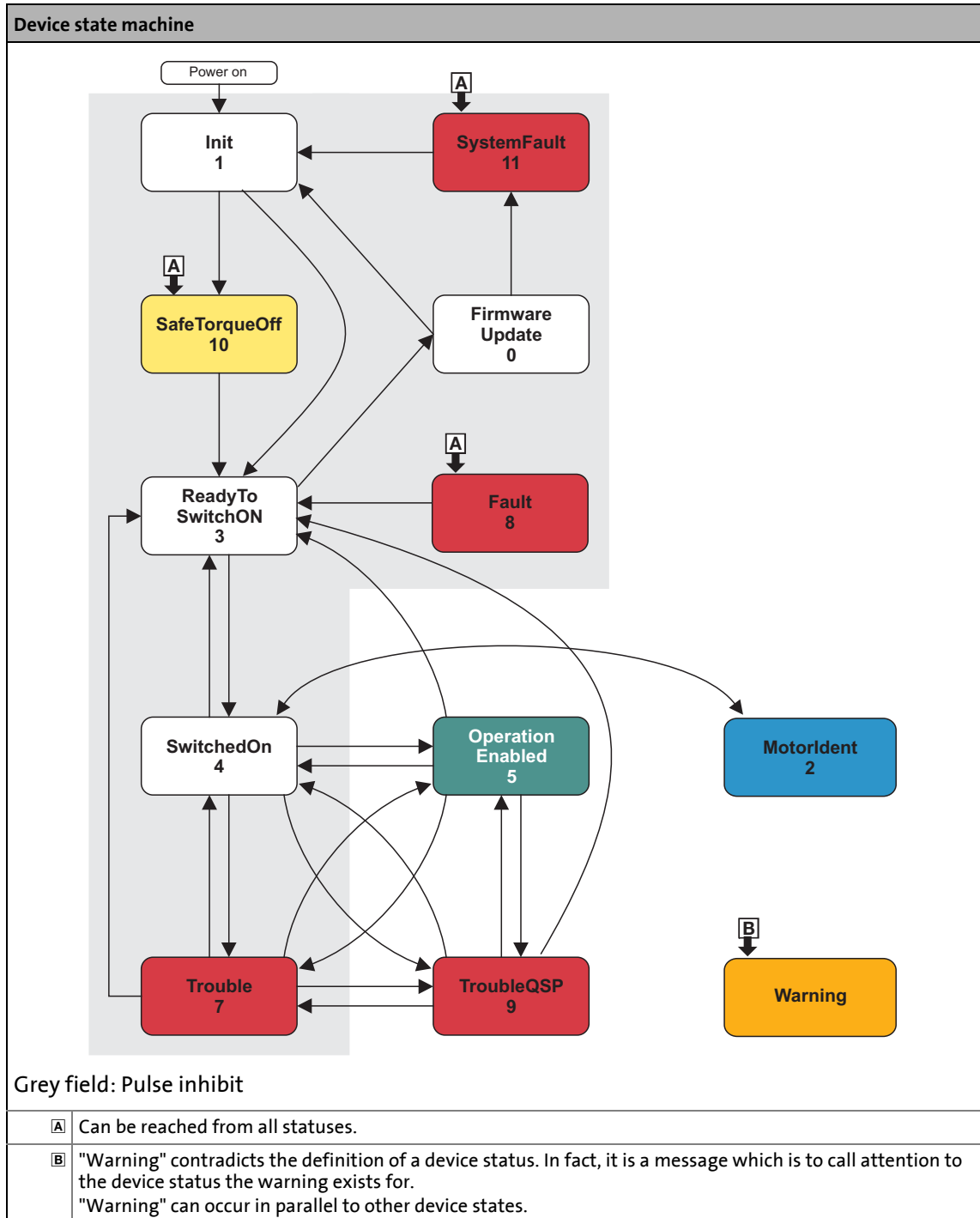
- For the time set in [C00181/1](#), the 7-segment display of the inverter indicates "HELLO". Afterwards, the function is turned off again automatically.
- If the device command is executed again within the set time period, the duration is extended accordingly.
- The setting [C00002/27](#) = "0: Off / ready" serves to abort or switch off the function.
- Adjustable time period: 0 ... 6000 s (Lenze setting: 5 s)



The device search function can also be activated via the  *toolbar* icon.

4.2 Device state machine and device states

The behaviour of the inverter is mainly determined by the current device status within the device state machine. Which device status is active and which device status is next depends on certain control signals (e.g. for controller inhibit and quick stop) and status parameters.



- The arrows between the device states mark possible state changes.
- The digits stand for the status ID (see table below).

- The change from one status to the other is carried out within a 1-ms cycle. If within this time there are several requests for status changes, the status with the higher priority is processed first (see table below).
- The [C00137](#) displays the current device status.
- [C00150](#) (status word) provides a bit coded representation of the current device status via bits 8 ... 11 (see table below).

ID	Device status (Display in C00137)	Priority	Status bits (Display in C00150)				Meaning
			Bit 11	Bit 10	Bit 9	Bit 8	
0	FirmwareUpdate	-	0	0	0	0	Firmware update function is active
1	Init	-	0	0	0	1	Initialisation active
2	Ident	-	0	0	1	0	Identification active
3	ReadyToSwitchOn	Prio 5	0	0	1	1	Device is ready to start
4	SwitchedOn	Prio 4	0	1	0	0	Device is switched on
5	OperationEnabled	Prio 1	0	1	0	1	Operation
6	-	-	0	1	1	0	-
7	Trouble	Prio 3	0	1	1	1	Trouble active
8	Fault	Prio 7	1	0	0	0	Fault active
9	TroubleQSP	Prio 2	1	0	0	1	TroubleQSP is active
10	SafeTorqueOff	Prio 6	1	0	1	0	Safe torque off is active
11	SystemFault	Prio 8	1	0	1	1	System fault active • This device state is not used since the inverter lacks the activating event.

[4-1] Device statuses, priorities, and meaning of the status bits in the status word

4.2.1

FirmwareUpdate



Note!

This function may only be executed by qualified Lenze personnel!

4.2.2 Init

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
OFF	OFF	Init	0	0	0	1

The inverter is in this status immediately after switching on its 24 V supply voltage.

In the "Init" status, the operating system is initialised and all device components (communication module, memory module, power section, etc.) are identified. When identifying the power section, it is checked first if it is switched on or if the required voltage lies within the tolerance zone, respectively.

- The inverter is inhibited, i.e. the motor terminals (U, V, W) of the inverter are deenergised.
- The digital and analog inputs are not yet evaluated at this time.
- The bus systems (CAN, PROFIBUS etc.) do not work yet, i.e. communication is not possible.
- The application is not yet processed.
- The monitoring functions are not active yet.
- The inverter cannot be parameterised yet and no device commands can be carried out yet.




Note!

If the 24V voltage supply is in the valid range (>19V) and the initialisation is finished, the device changes automatically to the "[ReadyToSwitchOn](#)" status.

If only the 24V voltage supply is available during the mains connection, the error message "[LU: Undervoltage in the DC bus](#)" is also entered into the logbook of the inverter.

4.2.3 Ident

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	Ident	0	0	1	0

The inverter has been provided with the "Motor parameter identification" function for automatic identification of the motor parameters. If the motor parameter identification is active, the inverter is in the "Ident" device status.

The "Ident" device status can only be reached from the "[SwitchedOn](#)" device status, i.e. the inverter must be inhibited first so that identification can be started afterwards via the corresponding device command:

Device command	Function	Detailed information
C00002/23	Identify motor parameters	▶ Automatic motor parameter identification




Stop!

While the motor parameters are detected,

- the inverter does not respond to setpoint changes or control processes, (e.g. speed setpoints, quick stop, torque limitations),
- the application remains active,
- all system interfaces (IO, bus systems, etc.) remain active,
- error monitoring remains active,
- the inverter is controlled independently of the setpoint sources.

After the motor parameter identification is completed, the status changes back to "[SwitchedOn](#)".

4.2.4 SafeTorqueOff

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	SafeTorqueOff	1	0	1	0



Note!

This device status is only possible in connection with an integrated safety system and if a power section supply is available!

Integrated safety systems with Inverter Drives 8400

Inverters of the 8400 series can be equipped with the integrated "Safe torque off (STO)" safety system.

The integrated safety system can be used on machines for the protection of persons.

The drive function is still carried out by the inverter. The safety system provides safe inputs. If the safety system is activated, it executes control functions according to EN 60204-1 directly in the inverter in case of errors.

Safety state

If the inverter is switched off by the safety system, the device changes to the "SafeTorqueOff" status.

If the safety system deactivates the "Safe torque off (STO)" request, the device changes to the "[ReadyToSwitchOn](#)" status.




Detailed information on the integrated safety system can be found in the hardware manual!

The hardware manual contains important notes on the safety system which must be observed!

- The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.

4.2.5 ReadyToSwitchOn

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	ReadyToSwitchOn	0	0	1	1

The inverter is in this device status directly after the initialisation has been completed!

- The bus systems are running and the terminals and encoders are evaluated.
- The monitoring functions are active.
- The inverter can be parameterised.
- The application is basically executable.



Note!

- The "ReadyToSwitchOn" state is not only activated after the mains connection, but also after the deactivation of "[Trouble](#)", "[Fault](#)" or "[SafeTorqueOff](#)".
- If [C00142](#) activates the autostart option "Inhibit at power-on" (Lenze setting), explicit deactivation of the controller inhibit after mains connection is always required for the inverter to change from the "ReadyToSwitchOn" status to the "[SwitchedOn](#)" status.
- If only the 24V voltage supply is available during the mains connection, the error message "[LU: Undervoltage in the DC bus](#)" is entered into the logbook of the inverter and the inverter remains in the "ReadyToSwitchOn" status.



Danger!

If the "Inhibit at power-on" auto-start option has been deactivated in [C00142](#), the "ReadyToSwitchOn" status switches directly to the "[SwitchedOn](#)" status after mains connection.

▶ [Automatic restart after mains connection/fault...](#) (📖 122)

4.2.6 SwitchedOn

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	SwitchedON	0	1	0	0

The drive is in this device status if the DC bus voltage is applied and the inverter is still inhibited by the user (controller inhibit).

- The bus systems are running and the terminals and encoders are evaluated.
- The monitoring functions are active.
- The application is basically executable.

If the controller inhibit is deactivated, the device changes to the "[OperationEnabled](#)" status and the motor follows the setpoint defined by the active application.



Tip!

[C00158](#) provides a bit coded representation of all active sources/triggers of a controller inhibit.


Depending on certain conditions, a status change takes place based on the "SwitchedOn" device status:

Change condition	Changeover to the device status
Control bit "EnableOperation" of all control channels = "1" AND terminal RFR = HIGH level (controller enable)	OperationEnabled
Control bit "SwitchOn" of a control channel = "0".	ReadyToSwitchOn
Motor parameter identification requested.	Ident
Undervoltage in the DC bus.	Trouble/Fault (depending on C00600/1)
Error with error response "Trouble" occurs.	Trouble
Error with error response "TroubleQSP" occurs.	TroubleQSP

Related topics:

- ▶ [wCANControl/wMCIControl control words](#) (□ 128)

4.2.7 OperationEnabled

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	OperationEnabled	0	1	0	1

The inverter is in this device status if the controller inhibit is deactivated and no error ("Trouble" or "TroubleQSP") has occurred.

If the operation is enabled and the magnetisation in case of servo control (SC) and sensorless vector control (SLVC) has been completed, the motor follows the setpoint determined by the active application.



Depending on certain conditions, a status change takes place based on the "OperationEnabled" device status.

Change condition	Changeover to the device status
Control bit "EnableOperation" of a control channel = "0" OR terminal RFR = LOW level (controller inhibit).	SwitchedOn
Control bit "SwitchOn" of a control channel = "0".	ReadyToSwitchOn
Undervoltage in the DC bus.	Trouble/Fault (depending on C00600/1)
Error with error response "Trouble" occurs.	Trouble
Error with error response "TroubleQSP" occurs.	TroubleQSP

Related topics:

▶ [wCANControl/wMCIControl control words](#) (□ 128)

4.2.8 TroubleQSP

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
		TroubleQSP	1	0	0	1

This device status will be active as soon as a monitoring mode responds the error response "TroubleQSP" has been parameterised for.

- The drive is decelerated to standstill with torque within the deceleration time parameterised for quick stop independently of the defined setpoint and can be kept there.
- The device status can only be abandoned by acknowledging the error if the error cause is removed.
- When the controller is inhibited, it is possible to jump to the "[SwitchedOn](#)" status even during the error status since the controller inhibit function has a higher priority. As long as the error is pending and has not been acknowledged, the status is changed back to the "TroubleQSP" status when the controller is enabled afterwards.


Depending on certain conditions a status change takes place based on the "TroubleQSP" device status.

Change condition	Changeover to the device status
Control bit "SwitchOn" of a control channel = "0".	ReadyToSwitchOn
Control bit "EnableOperation" of all control channels = "1" AND terminal RFR = HIGH level (controller enable) AND error is reset by the control bit "ResetFault" AND no more errors are pending.	OperationEnabled
Control bit "EnableOperation" of a control channel = "0" OR terminal RFR = LOW level (controller inhibit) AND error is reset by the control bit "ResetFault" AND no more errors are pending.	SwitchedOn
A message is active in the system.	Trouble

Related topics:

- ▶ [wCANControl/wMCIControl control words](#) (📖 128)
- ▶ [Basics on error handling in the inverter](#) (📖 589)
- ▶ [Error messages of the operating system](#) (📖 617)

4.2.9 Trouble

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
OFF		Trouble	0	1	1	1

This device status becomes active as soon as a monitoring mode responds for which the error response "Trouble" has been parameterised.

- The motor has no torque (is coasting) when the inverter is inhibited.
- The "Trouble" device status is automatically exited if the error cause has been removed.



Note!

If in [C00142](#) the "Inhibit at trouble" is activated, explicit deactivation of the controller inhibit is required before this status can be abandoned.

Depending on certain conditions a status change takes place based on the "Trouble" device status.

Change condition	Changeover to the device status
The error cause is no longer active.	ReadyToSwitchOn
Control bit "EnableOperation" of all control channels = "1" AND terminal RFR = HIGH level (controller enable) AND the message has been cancelled.	OperationEnabled
Control bit "EnableOperation" of a control channel = "0" OR terminal RFR = LOW level (controller inhibit) AND the message has been cancelled.	SwitchedOn
In the system, there is an error configured on "TroubleQSP". AND the message has been cancelled.	TroubleQSP

Related topics:

- ▶ [wCANControl/wMCIControl control words](#) (📖 128)
- ▶ [Basics on error handling in the inverter](#) (📖 589)
- ▶ [Error messages of the operating system](#) (📖 617)

4.2.10 Fault

"DRV-RDY" LED	LED "DRV-ERR"	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
OFF		Fault	1	0	0	0

This device status will be active as soon as a monitoring mode responds the error response "Fault" has been parameterised for.

- The motor has no torque (is coasting) when the inverter is inhibited.
- The error must explicitly be reset ("acknowledged") in order to exit the device status, e.g. by the device command "[Reset error](#)" or via the control bit "ResetFault" in the control word *wCanControl* or *wMCIControl*.

**Note!**

If an undervoltage in the DC bus of the inverter occurs (error message "LU"), the device changes to the "[Trouble](#)" status.

An additional error of higher priority leads the device into the "[Fault](#)" status.

According to the [Device state machine](#), the device changes to the "[ReadyToSwitchOn](#)" status after acknowledging the error although the undervoltage is still available!

If the "Inhibit at fault" auto-start option has been activated in [C00142](#), explicit deactivation of the controller inhibit is required before the status can be abandoned.

Related topics:

- ▶ [wCANControl/wMCIControl control words](#) (📖 128)
- ▶ [Basics on error handling in the inverter](#) (📖 589)
- ▶ [Error messages of the operating system](#) (📖 617)

4 Device control (DCTRL)

4.3 Automatic restart after mains connection/fault...

4.3 Automatic restart after mains connection/fault...

.../Error/undervoltage/loading of the Lenze setting

In [C00142](#), the starting performance of the inverter after mains connection, undervoltage, loading of the Lenze setting as well as a "[Trouble](#)" or a "[Fault](#)" reset can be parameterised individually:

Auto-start option (C00142)	Lenze setting
Bit 0 "Inhibit at power-on" auto-start option	0 ≡ Inhibit is not active
Bit 1 Inhibit at trouble	0 ≡ Inhibit is not active
Bit 2 Inhibit at fault	0 ≡ Inhibit is not active
Bit 3 Inhibit at undervoltage	0 ≡ Inhibit is not active
Bit 4 Auto-start option "Inhibit at Lenze setting" <small>(from version 06.00.00)</small>	1 ≡ Inhibit is active
Bit 5 Reserved	0
Bit 6	
Bit 7	



Note!

In the Lenze setting, only the automatic restart after loading the Lenze setting is inhibited.

4.3.1 "Inhibit at power-on" auto-start option

The auto-start option "Inhibit at power-on" prevents the change to the "[SwitchedOn](#)" status after mains connection if the controller is already enabled at mains connection.



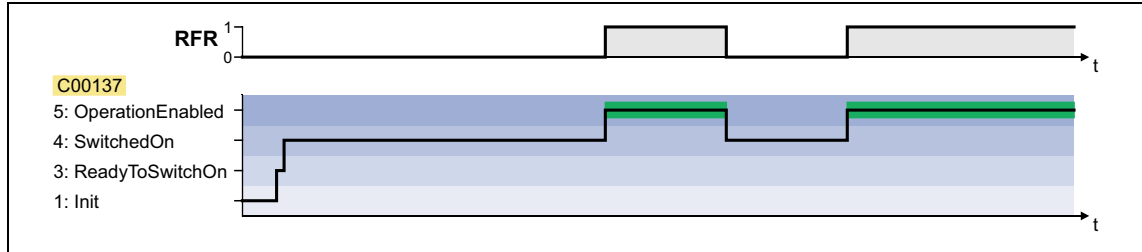
Danger!

In the Lenze setting, the "Inhibit at power-on" auto-start option has been deactivated in [C00142](#) (bit 0 = 0), i.e. the motor can directly start to run if the controller is enabled after mains connection!

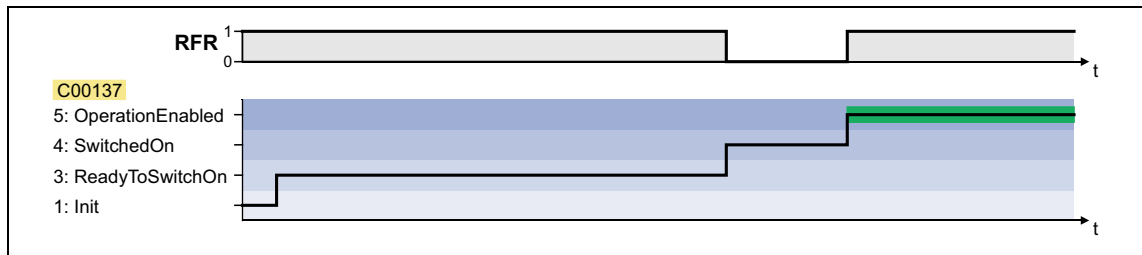
The following three cases describe the behaviour of the inverter after mains connection depending on whether the controller is enabled and the set auto-start option. Here, it is assumed that after mains connection, no errors and trouble occur in the inverter and the "EnableOperation" control bit in the *wDriveControl* is set to "1".

Case 1: No controller enable at mains connection

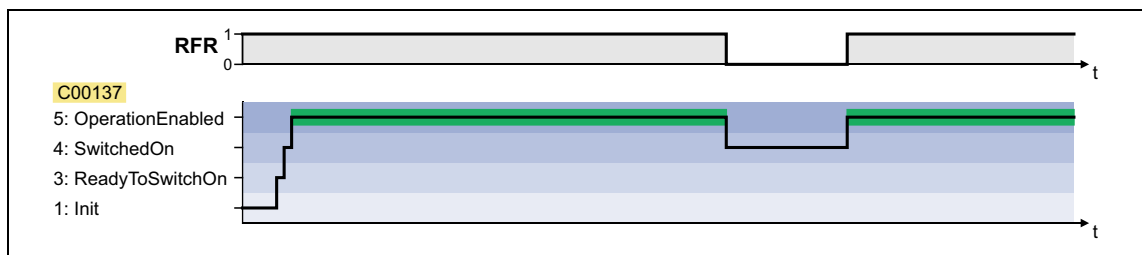
If the controller is not enabled at mains connection, the inverter remains in the "[SwitchedOn](#)" status. Only with the controller enable, the device changes to the "[OperationEnabled](#)" status, independent of the set auto-start option:

**Case 2: Controller enable at mains connection and "Inhibit at power-on" activated**

If the controller is enabled at mains connection and the auto-start option "Inhibit at power-on" is activated, the inverter remains in the "[ReadyToSwitchOn](#)" status. For changing to the "[SwitchedOn](#)" status, the controller enable must first be deactivated. Only when the controller is enabled again afterwards, the status changes to "[OperationEnabled](#)":

**Case 3: Controller enable at mains connection and "Inhibit at power-on" deactivated**

If in [C00142](#) the autostart option "Inhibit at power-on" is deactivated (bit 0 = 0), the status first changes from "[ReadyToSwitchOn](#)" to "[SwitchedOn](#)" and then to "[OperationEnabled](#)" after mains connection with an enabled controller:

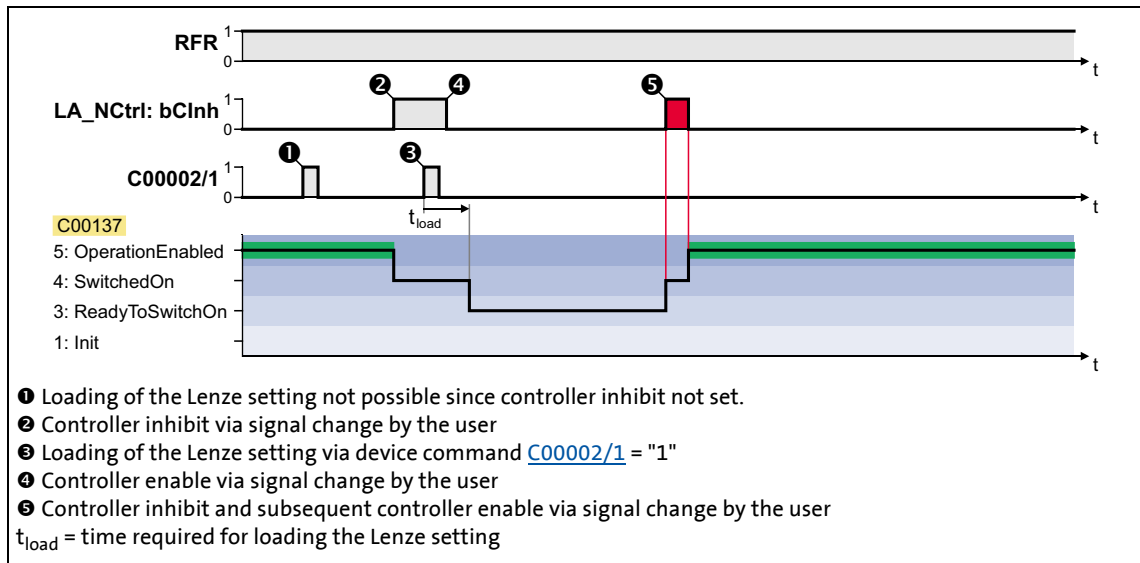


4.3.2 Auto-start option "Inhibit at Lenze setting"

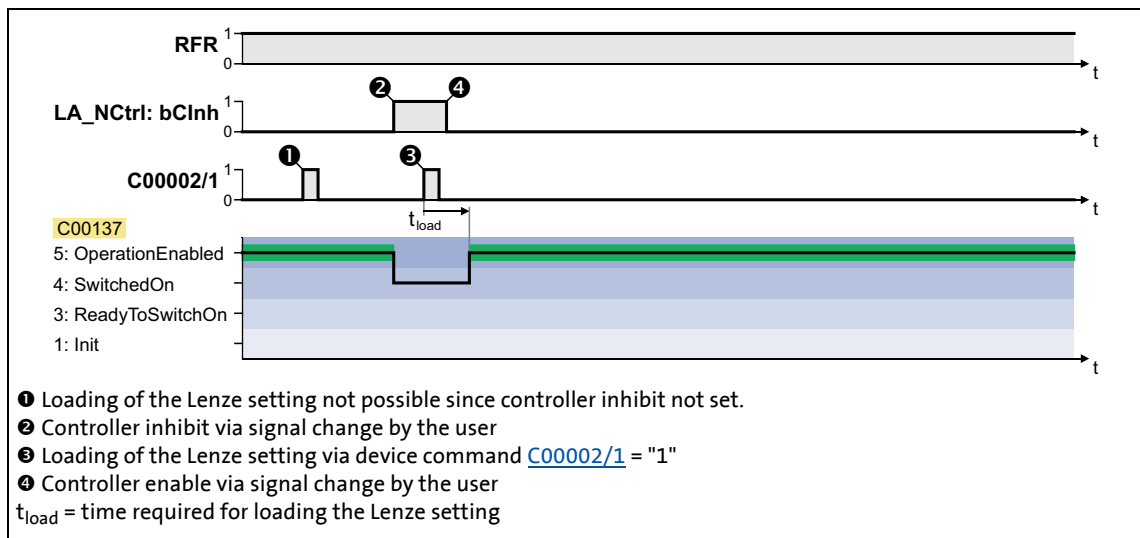
This function extension is available from version 06.00.00!

The "Inhibit at Lenze setting" auto-start option configurable via bit 4 of [C00142](#) prevents the change to the "[SwitchedOn](#)" status after the Lenze setting has been loaded and the controller is enabled.

For a change to the "[SwitchedOn](#)" status, the controller enable must first be deactivated after the Lenze setting has been loaded. Only if the controller is enabled again afterwards, the status changes to "[OperationEnabled](#)":



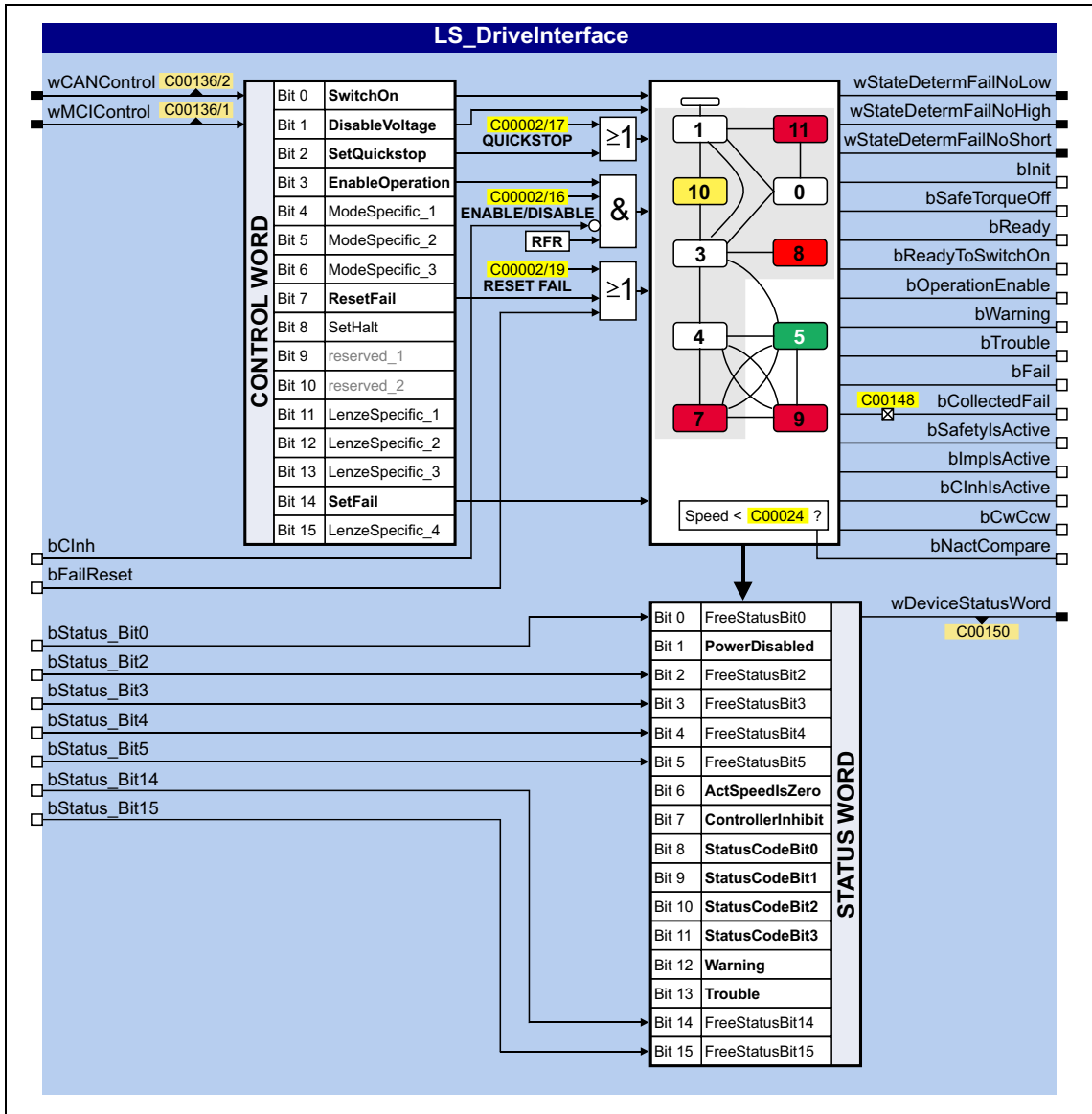
[4-2] Example 1: Behaviour with activated auto-start option "Inhibit at Lenze setting" ([C00142](#): Bit 4 = "1")



[4-3] Example 2: Behaviour with deactivated auto-start option "Inhibit at Lenze setting" ([C00142](#): Bit 4 = "0")

4.4 Internal interfaces | "LS_DriveInterface" system block

The LS_DriveInterface system block displays the device control in the FB Editor.



Inputs

Designator DIS code data type	Information/possible settings				
wCANControl C00136/2 WORD	Control word via system bus (CAN) <ul style="list-style-type: none"> The inverter controlled by a master control (e.g. IPC) receives its control word by the CANopen system bus interface. The process data word is provided at this input by the upstream port block LP_CanIn1. For a detailed description of the individual control bits, see chapter "wCANControl/wMCIControl control words". (□ 128) 				
wMCIControl C00136/1 WORD	Control word via communication module (e.g. PROFIBUS) <ul style="list-style-type: none"> The inverter controlled by a master control (e.g. IPC) receives its control word by a plugged-in communication module. The process data word is provided at this input by the upstream port block LP_MciIn1. For a detailed description of the individual control bits, see chapter "wCANControl/wMCIControl control words". (□ 128) 				
bCInh C00833/36 BOOL	<p>▶ Enable/inhibit inverter (□ 105)</p> <table border="1"> <tr> <td>FALSE</td> <td>Enable inverter: The inverter switches to the "OperationEnabled" device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. </td> </tr> <tr> <td>TRUE</td> <td>Inhibit inverter (controller inhibit): The inverter switches to the "SwitchedOn" device status.</td> </tr> </table>	FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. 	TRUE	Inhibit inverter (controller inhibit): The inverter switches to the " SwitchedOn " device status.
FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. 				
TRUE	Inhibit inverter (controller inhibit): The inverter switches to the " SwitchedOn " device status.				
bFailReset C00833/37 BOOL	<p>▶ Reset error message (□ 621)</p> <table border="1"> <tr> <td>FALSE</td> <td>TRUE</td> <td>The current error is reset.</td> </tr> </table>	FALSE	TRUE	The current error is reset.	
FALSE	TRUE	The current error is reset.			
bStatus_Bit0 bStatus_Bit2 bStatus_Bit3 bStatus_Bit4 bStatus_Bit5 bStatus_Bit14 bStatus_Bit15 C00833/38...44 BOOL	Freely assignable bits in the status word of the inverter. <ul style="list-style-type: none"> You can use these bits for returning information to the master control (e.g. IPC). 				

Outputs

Designator DIS code data type	Value/meaning
wDeviceStatusWord C00150 WORD	Status word of the inverter (based on DSP-402) <ul style="list-style-type: none"> The status word contains all information relevant for controlling the inverter. The status word is sent as a process data word to the master control via a port block: <ul style="list-style-type: none"> Port block LP_CanOut1 when the CANopen system bus interface is used or Port block LP_MciOut when a plugged-in communication module is used (e.g. PROFIBUS). For a detailed description of each status bit see chapter "wDeviceStatusWord status word". (□ 129)
wStateDetermFailNoLow WORD	Display of the status determining error (32-bit error number, Low-Word) <ul style="list-style-type: none"> From version 06.00.00 onwards: If the "Use 16BitFailNo." (Bit 15 = "1") option is activated in C00148, the short 16-bit error number (wStateDetermFailNoShort) is provided via this output as well. <ul style="list-style-type: none"> In this case, the wStateDetermFailNoHigh output is "0". Advantage: The bus transfer of the error numbers is possible via a data word without changing the interconnection of the technology application.
wStateDetermFailNoHigh WORD	Display of the status determining error (32-bit error number, High-Word)
wStateDetermFailNoShort WORD (from version 06.00.00)	Display of the status determining error (16-bit error number)

Designator DIS code data type	Value/meaning	
bInit BOOL	TRUE	" Init " device state is active
bSafeTorqueOff BOOL	TRUE	" SafeTorqueOff " device state is active
bReady BOOL	TRUE	" SwitchedOn " device state is active
bReadyToSwitchOn BOOL	TRUE	" ReadyToSwitchOn " device state is active
bOperationEnable BOOL	TRUE	" OperationEnabled " device state is active
bWarning BOOL	TRUE	A warning is indicated
bMessage BOOL	TRUE	" Trouble " device state is active
bFail BOOL	TRUE	" Fault " device state is active
bCollectedFail BOOL	TRUE	Group error: A device status according to the group error configuration in C00148 has occurred, the drive is not able to follow the setpoint selection.
bSafetyIsActive BOOL	TRUE	In preparation
bImplsActive BOOL	TRUE	Pulse inhibit is active
bClnhIsActive BOOL	TRUE	Controller inhibit is active
bCwCcw BOOL	FALSE	Motor rotates in CW direction
	TRUE	Motor rotates in CCW direction
bNactCompare BOOL	TRUE	During open-loop operation: Speed setpoint < Comparison value (C00024)
		During closed-loop operation: Actual speed value < Comparison value (C00024)

Option "Lock bFail at TroubleQSP"

The [TroubleQSP](#) device status gets active as soon as a monitoring function responds that has been parameterised for the "TroubleQSP" error response. Since the *bFail* status output is not set in this case, it is not recognisable after pulse inhibit due to e.g. automatic brake operation (as well for a higher-level control), why the drive is standing und does not start when the setpoint is selected. Only after an error reset, a setpoint is accepted again.

From version 12.00.00: If the "Lock bFail at TroubleQSP" option is activated (bit 14 = "1") in [C00148](#), the *bFail* status output is also set to TRUE if the device status is [TroubleQSP](#).

4.4.1 wCANControl/wMCIControl control words

The inverter is controlled by a master control (e.g. IPC) via the *wCanControl* or *wMCIControl* control word, respectively.

- *wCANControl*: Control word via system bus (CAN)
 - The process data word is provided at the *wCanControl* input via the upstream [LP_CanIn1](#) port block.
 - Display parameter: [C00136/2](#)
- *wMCIControl*: Control word via a plugged-in communication module (e.g. PROFIBUS)
 - The process data word is provided at the *wMCIControl* input via the upstream [LP_MciIn1](#) port block.
 - Display parameter: [C00136/1](#)
- The bit assignment for the *wCanControl*/*wMCIControl* control words can be seen from the table below.



Note!

The assignment of bits 11 ... 13 and bit 15 depends on the technology application selected in [C00005](#)!

- See description of the corresponding technology application.

Bit	Name	Function
Bit 0	SwitchOn	1 ≙ Change to the "SwitchedOn" device status <ul style="list-style-type: none"> • This bit has to be set in the CAN AND MCI control word in order that the drive changes to the "SwitchedOn" device state. In order to reach the "ReadyToSwitchOn" state, it is sufficient to set the bit to 0 in of the two control words.
Bit 1	DisableVoltage	1 ≙ Inhibit inverter control (pulse inhibit)
Bit 2	SetQuickStop	Activate quick stop (QSP) <ul style="list-style-type: none"> ▶ Activate/deactivate quick stop (📄 106)
Bit 3	EnableOperation	1 ≙ Enable inverter (RFR) <ul style="list-style-type: none"> • This bit must be set in CAN AND in the MCI control word, otherwise the controller will be inhibited.
Bit 4	ModeSpecific_1	Reserved (currently not assigned)
Bit 5	ModeSpecific_2	
Bit 6	ModeSpecific_3	
Bit 7	ResetFault	1 ≙ Reset fault (trip reset) <ul style="list-style-type: none"> • Acknowledge error message (if the error cause has been eliminated).
Bit 8	SetHalt	1 ≙ Activate stop function <ul style="list-style-type: none"> • Stop drive via stopping ramp (in preparation).
Bit 9	reserved_1	Reserved (currently not assigned)
Bit 10	reserved_2	
Bit 11	LenzeSpecific_1	Assignment depends on the selected technology application <ul style="list-style-type: none"> • See description of the corresponding technology application.
Bit 12	LenzeSpecific_2	
Bit 13	LenzeSpecific_3	
Bit 14	SetFail	1 ≙ Set error (trip set)
Bit 15	LenzeSpecific_4	Assignment depends on the selected technology application <ul style="list-style-type: none"> • See description of the corresponding technology application.

**Tip!**

If a bus control is not wanted (e.g. in case of control via terminals):

Connect both control word inputs with the *wDriveCtrl* output signal of the [LS ParFix](#) system block. This output signal has the fixed value "9", which corresponds to the following assignment:

- Bit 0, SwitchOn = 1
- Bit 3, EnableOperation = 1
- All others: 0

4.4.2 wDeviceStatusWord status word

The *wDeviceStatusWord* status word provided by the control system contains all information relevant for controlling the inverter.

- The status word is sent as a process data word to the master control via a port block:
 - The **LP_CanOut1** port block if "CAN on board" is used or
 - the **LP_MciOut1** port block if a plugged-in communication module is used (e.g. PROFIBUS).
- Display parameter: [C00150](#)
- The bit assignment of the *wDeviceStatusWord* status word can be seen from the table below.

Bit	Name	Status
Bit 0	FreeStatusBit0	Free status bit 0
Bit 1	PowerDisabled	1 ≙ Inverter control inhibited (pulse inhibit is active)
Bit 2	FreeStatusBit2	Free status bit 2 (not assigned, freely assignable)
Bit 3	FreeStatusBit3	Free status bit 3 (not assigned, freely assignable)
Bit 4	FreeStatusBit4	Free status bit 4 (not assigned, freely assignable)
Bit 5	FreeStatusBit5	Free status bit 5 (not assigned, freely assignable)
Bit 6	ActSpeedIsZero	During open-loop operation: 1 ≙ Speed setpoint < Comparison value (C00024)
		During closed-loop operation: 1 ≙ Actual speed value < Comparison value (C00024)
Bit 7	ControllerInhibit	1 ≙ Inverter is inhibited (controller inhibit is active)
Bit 8	StatusCodeBit0	Bit coded display of the active device status ▶ Device state machine and device states (see table 4-1)
Bit 9	StatusCodeBit1	
Bit 10	StatusCodeBit2	
Bit 11	StatusCodeBit3	
Bit 12	Warning	1 ≙ a warning is indicated
Bit 13	Trouble	1 ≙ Inverter is in the " Trouble " device status • E.g. if an overvoltage has occurred.
Bit 14	FreeStatusBit14	Free status bit 14 (not assigned, freely assignable)
Bit 15	FreeStatusBit15	Free status bit 15 (not assigned, freely assignable)

4 Device control (DCTRL)

4.5 Energy saving mode

4.5 Energy saving mode

This function extension is available from version 17.00.00 onwards!

In energy saving mode, the energy demand of the inverter can be adapted to the most diverse environments and applications.

Via [C1704](#), various functions can be utilised in a user-defined fashion, bringing the energy consumption of the inverter down to a minimum value:

- inhibiting the power output stages (controller inhibit)
- entering the energy saving mode using quick stop
- switching off the LEDs
- switching off all outputs

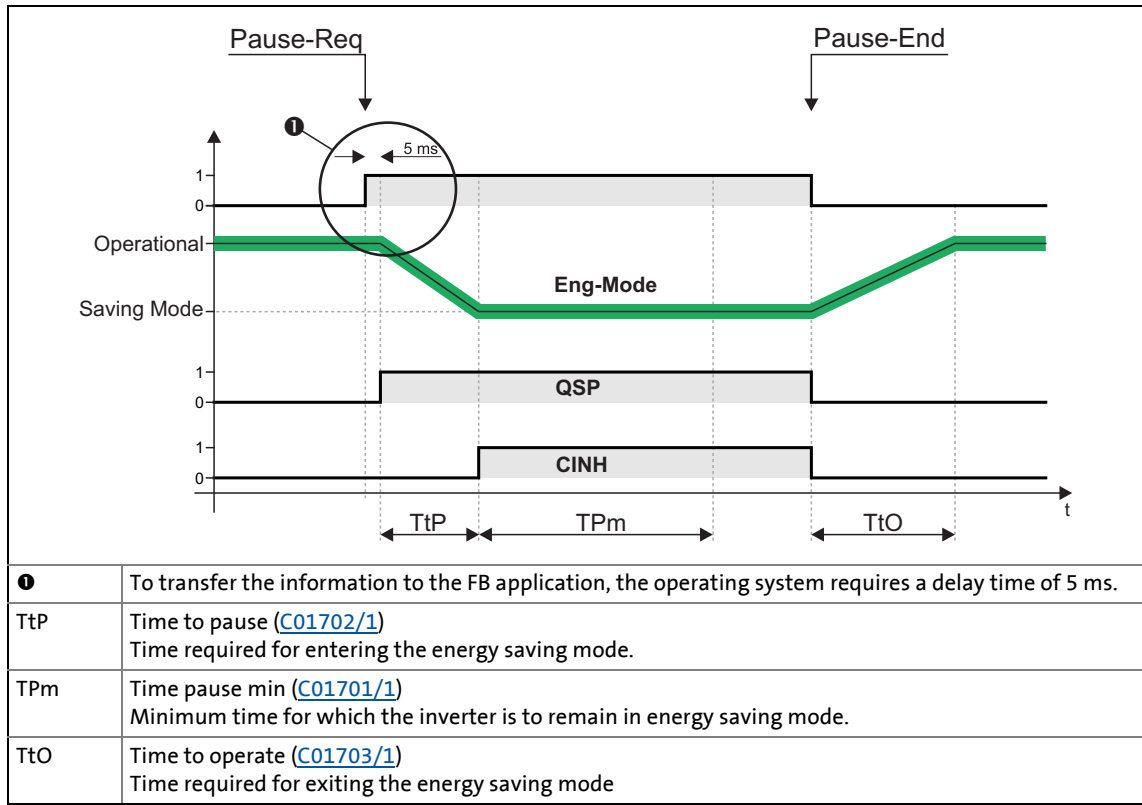
If the use of the energy saving mode is not desired, [C1704](#) provides the possibility of inhibiting this operating status.

The functions for the energy saving mode provide the basis for implementing the **PROFenergy** PROFINET profile.



Detailed information about the **PROFenergy** PROFINET profile can be obtained from the PROFINET specifications.

Activating / deactivating the energy saving mode



The energy saving mode is activated via the **PROFenergy** PROFINET profile as follows:

1. Via a "Pause-Req" command, entry into the energy saving mode is requested.
 - At the same time, a dead time is transferred with the command.
2. If the sum of the times set in [C1701/1](#), [C1702/1](#), and [C1703/1](#) is smaller than the dead time requested, the inverter starts entering the energy saving mode.
3. Via a "Pause-End" command, this operating status can be exited again.

5 Motor control (MCTRL)

This chapter provides information on the parameter setting of the inverter's internal motor control.

Topics:

Basic settings:

- ▶ [Motor selection/Motor data](#)
- ▶ [Selecting the control mode](#)
- ▶ [Defining current and speed limits](#)

Description of the motor control types:

- ▶ [V/f characteristic control \(VFCplus\)](#)
- ▶ [V/f characteristic control - energy-saving \(VFCplusEco\)](#)
- ▶ [V/f control \(VFCplus + encoder\)](#)
- ▶ [Sensorless vector control \(SLVC\)](#)
- ▶ [Sensorless control for synchronous motors \(SLPSM\)](#)
- ▶ [Servo control \(SC\)](#)

Parameterisable additional functions:

- ▶ [Selection of switching frequency](#)
- ▶ [Operation with increased rated power](#)
- ▶ [Flying restart function](#)
- ▶ [DC-injection braking](#)
- ▶ [Slip compensation](#)
- ▶ [Oscillation damping](#)
- ▶ [Phase sequence reversal for correcting misconnected UVW motor phases](#)

Further topics:

- ▶ [Encoder/feedback system](#)
- ▶ [Position control/additive speed specification](#)
- ▶ [Braking operation/brake energy management](#)
- ▶ [Monitoring](#)

Internal interfaces (process signals):

- ▶ [Internal interfaces | System block "LS_MotorInterface"](#)
- ▶ [Internal status signals | System block "LS_DeviceMonitor"](#)

5 Motor control (MCTRL)

5.1 Motor selection/Motor data

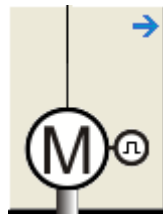
5.1 Motor selection/Motor data

The motor data term comprises all parameters that only depend on the motor and that only characterise the electrical behaviour of the machine. The motor data are independent of the application in which the inverter and the motor are used.



Proceed as follows to open the dialog for parameterising the motor data:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the following button:



Parameterisation dialog in the »Engineer«

Motor data		Actual values	
Rated motor power	0,08 kW	Actual speed value	0 rpm
Rated motor speed	2700 rpm	Motor voltage	0 V
Rated motor current	0,54 A	DC-bus voltage	0 V
Rated motor frequency	100 Hz	Motor current	0,00 A
Rated motor voltage	390 V	Thermal motor load (Fxt)	0,00 %
Motor cosine phi	0,50		

- Via the **From Motor Catalogue** button, the motor catalogue can be opened to select another motor. ▶ [Selecting a motor from the motor catalogue in the »Engineer«](#) (137)
- Via the **From inverter...** button, the motor data set in the inverter can be copied to the »Engineer« when an online connection has been established.
- When an online connection has been established to the inverter, the **Identification in progress...** button serves to automatically identify different motor data. ▶ [Automatic motor data identification](#) (139)
- The **Encoder/feedback system...** button serves to get to the settings for the encoder/feedback system, if available. ▶ [Encoder/feedback system](#) (277)

**Stop!**

Motors with electronic nameplates (ETS) must not be operated on 8400 inverters!

**Note!**

Sensorless vector control in particular requires the motor data parameters to be set. The motor data comprise the data of the motor nameplate and the data of the motor equivalent circuit.

If the motor has been selected via the motor catalogue of the »Engineer« or the motor data have been adapted offline using the »Engineer«, all motor data must then be copied to the inverter and saved power-failure-proof to the memory module (device command: [C00002/11](#)) when an online connection has been established.

**Note!****Setting a rated motor frequency with a decimal position**

If the motor has a rated motor frequency with a decimal position (e.g. motor nameplate data "23.7 Hz"):

- [Up to and including version 06.xx.xx](#), the following motor nameplate data must be increased by a factor of 10:
 - [C00089](#): Rated motor frequency
(a value of "23.7 Hz", for instance, must be increased to 237 Hz.)
 - [C00081](#): Rated motor power
 - [C00087](#): Rated motor speed
 - [C00090](#): Rated motor voltage
- [From version 12.00.00](#), the rated motor frequency must be entered without decimal position to clearly identify the right motor type. (a value of "23.7 Hz", for instance, must be set to 23 Hz in [C00089](#))
 - [C01000](#) displays the set motor type (ASM or PSM).
 - [C00969](#) displays the set number of motor pole pairs.
- [From version 16.00.00 onwards](#), the motor type (ASM or PSM) can also be set manually in [C01001/1](#) for a clear identification.

**Note!**

If a rated motor speed is set for an asynchronous motor (ASM) in [C00087](#) which corresponds to a very high slip speed, the number of pole pairs is identified incorrectly. Moreover, a synchronous motor (PSM) is detected instead of an asynchronous motor (ASM) at certain slip speeds. Detailed information and possible remedies can be found here:

- ▶ [Application notes for asynchronous motors with high slip speed](#) (📖 148)

Motor data

In the parameterisation dialog, the data of the motor nameplate for the selected motor are displayed under "Motor data".

Parameters	Info
C00081	Rated motor power
C00087	Rated motor speed
C00088	Rated motor current
C00089	Rated motor frequency
C00090	Rated motor voltage
C00091	Motor cos φ

Actual values

When an online connection to the inverter has been established, the following actual values are displayed in the parameterisation dialog under "Actual values":

Parameters	Info
C00051	Actual speed value
C00052	Motor voltage
C00053	DC-bus voltage
C00054	Motor current
C00066	Thermal motor load (I2xt)
Greyed out = display parameter	

Adapting motor data manually

If a third party manufacturer's motor is used, the displayed motor data can exactly be adapted to the real motor by clicking the **From project...** button and selecting the "Own motor settings" entry from the **Motor selection** dialog box afterwards. For this purpose, the data of the motor nameplate and the equivalent circuit diagram must be available.



Tip!

For a better concentricity factor, we recommend to perform motor parameter identification of the third party manufacturer's motor first. The motor parameters can be manually adapted afterwards.

Improving the concentricity factor includes

- the adjustment of the inverter error characteristic to the drive system and
- the knowledge of the motor cable resistance.

Both factors are determined in the course of motor parameter identification.

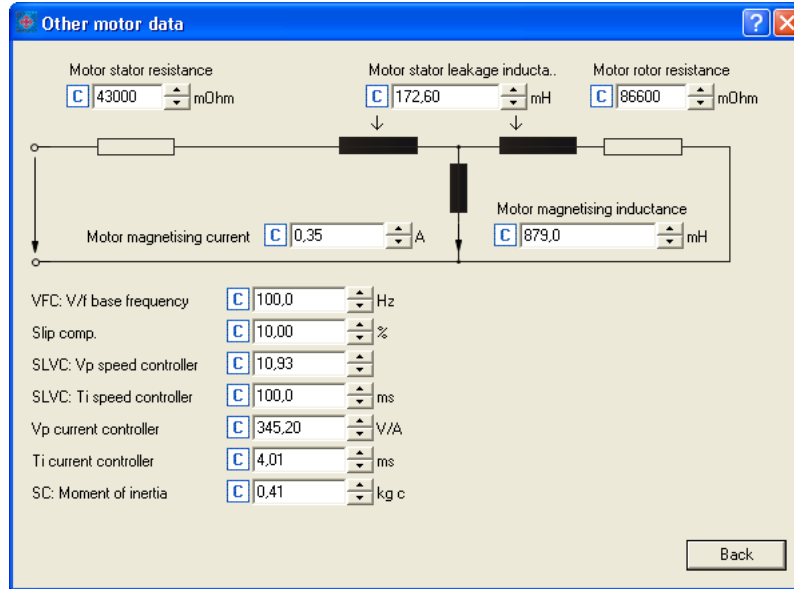
▶ [Automatic motor data identification](#) (139)

5 Motor control (MCTRL)

5.1 Motor selection/Motor data

Other motor data

Click the **Other motor data...** button and go to the *Other motor data* dialog box including the motor equivalent circuit (in the following for an asynchronous motor):



Parameters	Info	ASM	PSM
C00084	Motor stator resistance	●	●
C00085	Motor stator leakage inductance	●	●
C00082	Motor rotor resistance	●	
C00095	Motor magnetising current	●	
C00092	Motor magnetising inductance	●	
C00015	VFC: V/f base frequency	●	●
C00021	Slip compensation	●	
C00070/1	SLVC: Vp speed controller	●	
C00071/1	SLVC: Ti speed controller	●	
C00075	Vp current controller	●	●
C00076	Ti current controller	●	●
C00273	Moment of inertia	●	●
C00016	VFC: Vmin boost	●	●
C00070/2	SC: Vp speed controller	●	●
C00071/2	SC: Ti speed controller	●	●
C00070/3	SLPSM: Vp speed controller	●	●
C00071/4	SLPSM: Ti speed controller	●	●
C00072	SC: Tdn speed controller	●	●
C00011	Appl.: Reference speed	●	●
C00022	Imax in motor mode	●	●
C00966	VFC: Time const. slip comp.	●	
C00982	VFC-ECO: Voltage reduction ramp	●	
C00073/1	VFC: Vp Imax controller	●	●
C00077	SC: Vp field controller	●	
C00078	SC: Tn field controller	●	

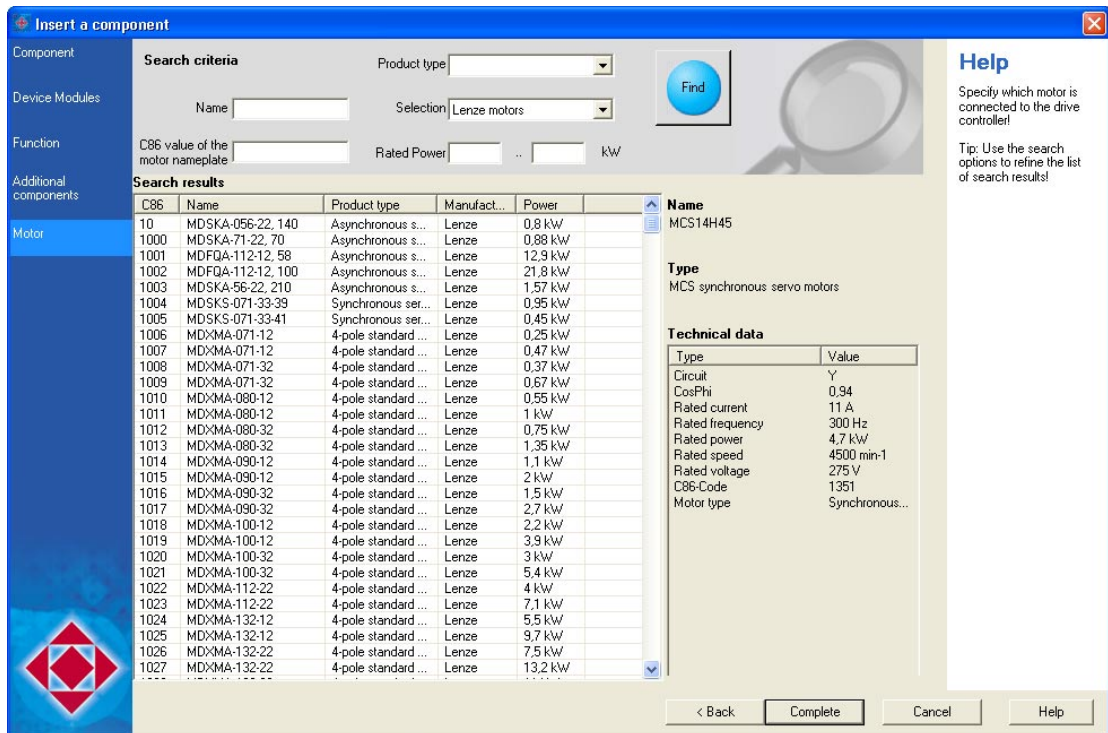
5 Motor control (MCTRL)

5.1 Motor selection/Motor data

- From version 12.00.00 onwards, [C01000](#) displays the set motor type (ASM or PSM).
- Generally, a synchronous motor without speed feedback can also be operated with the [V/f characteristic control \(VFCplus\)](#) control mode. The parameters for this control mode (e.g. V/f base frequency) thus also have an according influence on synchronous motors.

5.1.1 Selecting a motor from the motor catalogue in the »Engineer«

If you, when inserting the inverter into the project in the dialog step "Other components", put a checkmark in the control field **Motor**, you can select as a further dialog step the motor for the inverter from the motor catalogue:



- Alternatively, the motor can be inserted into the project at a later time via the **Insert a component** command.
- Go to the **Application parameters** tab in the *Overview* → *Motor data* dialog level and click the **From motor catalogue...** button to also reach the motor catalogue for the selection of another motor.

Accepting the default values of the motor

If a motor is selected from the motor catalogue at a later time, the *Use motor's default values* dialog box is displayed afterwards which includes all motor data of the selected motor. Please select here which of the default values are to be copied to the inverter:

Controller: 8400 protec HighLine [8400 protec HighLine]
 Motor: SDSGA047-22, 100 (Y)

Motor parameter

Use selection of motor controller in C0006: No default value available for this motor

Use following values in drive controller:

Code	Subcode	Description	Value	Unit
0015	000	VFC: V/f base frequency	100	Hz
0016	000	VFC: rpm boost	4.93	%
0021	000	Slip comp.	10	%
0073	001	VFC: Vp Imax controller	1.45	
0075	000	Vp current controller	345.2	V/A
0076	000	Ti current controller	4.01	ms
0077	000	SC: Vp field controller	1.22	
0078	000	SC: Tn field controller	24.5	ms
0081	000	Rated motor power	0.08	kW
0082	000	Motor rotor resistance	86600	mOhm

Path parameters for operation with zero load

Use following values in drive controller:

Code	Subcode	Description	Value	Unit
0022	000	Imax in motor mode	0.95	A
0070	001	SLVC: Vp speed controller	10.93	
0070	002	SC: Vp speed controller	6.25	
0071	001	SLVC: Ti speed controller	100	ms
0071	002	SC: Ti speed controller	50	ms
0072	000	SC: Tdn speed controller	0	ms
0273	000	SC: Moment of inertia	0.41	kg cm ²

OK

- The listed motor parameters are already optimally preset for the selected Lenze motor. An adaptation is not required.
- The "plant parameter" term comprises all parameters that result from the combination of motor and load. These characterise the transfer behaviour of the entire controlled system.
 - The plant parameters depend on the application in which the inverter and motor are used.
 - When a Lenze motor is selected in the »Engineer«, plant parameters are suggested for this motor for a load-free operation.

 **Tip!**

If a third party manufacturer's motor is used, select a Lenze motor from the motor catalogue first which is similar in terms of current, voltage and speed rating. Adapt the preselected motor data exactly to the real motor afterwards.

5 Motor control (MCTRL)

5.1 Motor selection/Motor data

5.1.2 Automatic motor data identification

The motor parameter identification serves to automatically identify the inverter characteristic, the influences of the motor cable and various motor parameters.



Note!

We strongly recommend motor parameter identification before the initial commissioning of the sensorless vector control (SLVC) and the sensorless control for synchronous motors (SLPSM, [from version 12.00.00 onwards](#)).

Automatically identified motor parameters

Parameters	Info	ASM	PSM
C00015	V/f base frequency	●	●
C00016	V _{min} boost	●	●
C00021	Slip compensation	●	
C00082	Motor rotor resistance	●	
C00083	Motor rotor time constant	●	
C00084	Motor stator resistance	●	●
C00085	Motor stator leakage inductance	●	●
C00092	Motor magnetising inductance	●	
C00095	Motor magnetising current	●	

Automatic calculation of the current controller and field controller parameters

[From version 12.00.00 onwards](#): Following successful motor parameter identification, the current controller and field controller parameters listed in the below table are calculated as well.

- If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".

Parameters	Info	ASM	PSM
C00073/1	VFC: Vp Imax controller	●	●
C00075	Vp current controller	●	●
C00076	Ti current controller	●	●
C00077	SC: Vp field controller	●	
C00078	SC: Tn field controller	●	

Automatic calculation of the speed controller parameters

[From version 12.00.00 onwards](#): Following successful motor parameter identification, the speed controller parameters listed in the below table can also be calculated automatically.

- If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "5".

Parameters	Info	ASM	PSM
C00070/1	SLVC: Vp speed controller	●	
C00071/1	SLVC: Ti speed controller	●	
C00070/2	SC: Vp speed controller	●	●
C00071/2	SC: Ti speed controller	●	●
C00072	SC: Tdn speed controller	●	●

5 Motor control (MCTRL)

5.1 Motor selection/Motor data

Parameters	Info	ASM	PSM
C00070/3	SLPSM: Vp speed controller	●	●
C00071/3	SLPSM: Ti speed controller	●	●

- Care must be taken that the constant mass inertia of the drive (mass inertia of motor, gearbox, shaft and constant load) is entered as exactly as possible in [C00273](#) to calculate the speed controller parameters as dynamically as possible.
 - Mass inertias that are not constant (e.g. changing loads of reels or different loads of hoists) must be entered in [C00919/1](#).
 - If the mass inertia set in [C00273](#) is too low, the speed controller parameters are calculated less dynamically.
 - If the mass inertia set in [C00273](#) is too high, speed controller operation is unstable.
- If the mass inertia in [C00273](#) is set to "0", the setting of bit 5 in [C02865/1](#) has no effect on the speed controller parameter calculation. In this case, the speed controller parameters will not be calculated automatically after motor parameter identification.

Automatic calculation of other controller parameters

From version 12.00.00 onwards: Following successful motor parameter identification, the controller parameters listed in the below table can also be calculated automatically.

- If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

Parameters	Info	ASM	PSM
C00011	Appl.: Reference speed	●	●
C00022	Imax in motor mode	●	●
C00497	Nact filter time constant	●	●
C00966	VFC: Time const. slip comp.	●	
C00982	VFC-ECO: Voltage reduction ramp	●	

5 Motor control (MCTRL)

5.1 Motor selection/Motor data

Automatic calculation of the field weakening controller parameters for ASM servo control

From version 16.00.00, the field weakening controller parameters are automatically calculated as well after a successful motor parameter identification. Moreover, the special functions of the internal motor control listed in the table are activated.

- If these parameters are not to be calculated/activated, bit 6 has to be set to "1" in [C02864/1](#).

Parameters	Info	ASM	PSM
C00577	SC: Vp field weakening controller	●	
C00578	SC: Tn field weakening controller	●	
Activation of special functions of the internal motor control			
C02864/1	Bit 5 is set to "1" → Field/field weakening controllers are called in a 500-μs cycle.*	●	
	Bit 7 is set to "1" → In case of servo control for asynchronous motors, the rated motor speed C00087 is assumed for the calculation of the slip from the nameplate (C02879 /Bit 1 = "0" for a warm machine.* ▶ Slip calculation from motor equivalent circuit diagram data (□ 251)	●	
* If bit 6 is set to "1" in C02864/1 , bit 5 and bit 7 are reset to "0".			

Principal sequence of the motor parameter identification

1. The motor stator resistance ([C00084](#)) is measured.
2. The inverter error characteristic is measured.
3. The motor stator leakage inductance ([C00085](#)) is measured.
4. The V/f base frequency ([C00015](#)) is calculated.
5. The slip compensation ([C00021](#)) is calculated.
6. The V_{\min} boost ([C00016](#)) is detected.
7. Only for asynchronous motors:
The motor magnetising inductance ([C00092](#)) and the motor rotor resistance ([C00082](#)) are measured.
The motor magnetising current ([C00095](#)) is measured.

From version 12.00.00:

8. If [C02865/1](#) - bit 4 = "0" (Lenze setting):
The current controller and field controller parameters are calculated. (See [table](#).)
9. If [C02865/1](#) - bit 5 = "1":
The speed controller parameters are calculated. (See [table](#).)
10. If [C02865/1](#) - bit 6 = "1":
Other controller parameters are calculated. (See [table](#).)

From version 16.00.00:

11. If [C02864/1](#) - bit 6 = "0" (Lenze setting):
The field weakening controller parameters are calculated and certain special functions of the internal motor control are activated. (See [table](#).)

Selection of the identification mode

From version 12.00.00 onwards, two identification modes are available in [C02867/1](#):

- "1: Basic identification" (previous mode)
 - Only for asynchronous motors
 - Duration approx. 30 s
- "2: extended identification"
 - Stands out due to increased accuracy of the determined motor parameters.
 - Also supports synchronous motors and asynchronous motors with a power of more than 11 kW.
 - Duration approx. 80 s



Tip!

In the Lenze setting, a setting of "0: automatic" is selected in [C02867/1](#). This setting ensures that the inverter automatically selects the optimum procedure for motor parameter identification.



Danger!

During motor parameter identification, the motor is energised via the outputs U, V and W of the inverter!

Observe the corresponding safety instructions!



Stop!

- If motor parameter identification is aborted, unstable drive behaviour may be the result!
- The following applies to the motor parameter identification of synchronous motors:
 - Only the extended motor parameter identification can be used.
 - During the motor parameter identification, the shaft of the synchronous motor must rotate freely (must not be locked).
 - During motor parameter identification, rotations take place.
- For asynchronous motors as of a power of 11 kW, the following applies:
 - Only the extended motor parameter identification can be used.
- When the extended motor parameter identification is started, it is decided based on the motor control selected in [C00006](#) whether an asynchronous or a synchronous motor is to be identified.
 - Thus, set a suitable motor control for the motor in [C00006](#) before starting the extended motor parameter identification! ▶ [Selecting the control mode \(149\)](#)



Note!

- We strongly recommend motor parameter identification before the initial commissioning of the sensorless vector control (SLVC) and the sensorless control for synchronous motors (SLPSM).
- The motor parameter identification must be carried out when the motor is cold!
- The load machine may remain connected. Holding brakes, if present, may remain in the braking position.
- With an idling motor, a small angular offset may occur at the motor shaft.
- The amplitude of the rated motor current ([C00088](#)) is injected to identify the stator resistance. If the rated motor current amounts to less than 60 % of the rated inverter current, at least 60 % of the rated inverter current will be injected to ensure sufficient motor parameter identification accuracy.

Preconditions for executing the motor parameter identification

- The motor parameter identification must be carried out when the motor is cold!
- The load machine may remain connected. Holding brakes, if present, may remain in the braking position.
- In case of a synchronous motor:
 - The shaft must be able to rotate freely (must not be locked).
 - An identification is only possible with the extended motor parameter identification.
- For an asynchronous motor from a power of 11 kW:
An identification is only possible with the extended motor parameter identification.
- The inverter has to be ready for enable (has to be in the "[SwitchedOn](#)" state).
Inhibit the inverter if it is enabled, e.g. via the [C00002/16](#) device command or a LOW signal at the X4/RFR terminal.
- The motor has to be at standstill.

Required parameter settings before the motor parameter identification is executed

- For an extended motor parameter identification, a motor control suitable for the motor has to be set in [C00006](#). When the identification starts, this setting determines whether an asynchronous motor or a synchronous motor has to be identified. ▶ [Selecting the control mode](#) (□ 149)
- The motor parameters listed in the table below are excluded from automatic identification and must therefore be adapted to the used motor before motor parameter identification is carried out (see motor nameplate).

Parameters	Info
C00081	Rated motor power
C00087	Rated motor speed
C00088	Rated motor current (according to the connection method Y/Δ) Note The amplitude of the rated motor current (C00088) is injected to identify the stator resistance. If the rated motor current amounts to less than 60 % of the rated inverter current, at least 60 % of the rated inverter current will be injected to ensure sufficient motor parameter identification accuracy.
C00089	Rated motor frequency
C00090	Rated motor voltage
C00091	Motor cos φ

- If the motor nameplate data are entered in the »Engineer« motor catalogue instead of selecting a motor, it is recommendable to use the extended motor parameter identification ([C02867/1](#) = "2: extended identification").
- Especially for third-party motors, it is also recommendable to carry out the slip calculation with the motor equivalent circuit diagram data ([C02879/1](#)). If the slip calculation is derived from the motor nameplate data, this can negatively affect the stability and accuracy of the drive behaviour because the rated speed specified on the motor nameplate often is rather inaccurate.
- The available motor cable must be specified in terms of length and cross-section:

Parameters	Info
C00915	Motor cable length
C00916	Motor cable cross-section

The motor cable resistance resulting from these settings is displayed in [C00917](#).

- For the measurement of the required variables, the motor is energised via the inverter terminals U, V and W during the motor parameter identification. The corresponding current controller is preset in the Lenze setting so that an optimal controller behaviour is achieved with an asynchronous motor power-adapted to the inverter.

Thanks to optimisation, the current controller can be set via the following parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00075	Vp current controller	7.00	V/A
C00076	Ti current controller	10.61	ms

- Switching frequency for the motor parameter identification:
 - [Up to and including version 12.xx.xx](#), the motor parameter identification is executed with a switching frequency of 4 kHz.
 - [From version 16.00.00](#), the motor parameter identification can also be executed with a switching frequency of 8 kHz instead of 4 kHz. For this purpose, the option "Motor ident.: Switching frequency 8 kHz" (Bit 4 = "1") has to be set in [C02864/1](#).
Example of how to use this option: Between the output of the inverter and the motor, a sinusoidal filter is connected which may only be operated with a minimum switching frequency of 8 kHz. (See also the section "[Preventing a decrease of the switching frequency](#)".) ([□ 259](#))

Generally, a switching frequency of 4 kHz is recommended for the motor parameter identification as it serves to obtain the most accurate results.

Premature abort of the motor parameter identification



Stop!

If motor parameter identification is aborted, unstable drive behaviour may be the result!

The motor parameter identification can be aborted in the following cases:

- If a special motor (e.g. mid-frequency motor) or a servo motor is used.
- If there is a large deviation between inverter and motor power.

In case of a simple motor parameter identification, we recommend the following:

- to reduce the P component Vp of the current controller ([C00075](#)) e.g. by halving.
- to increase the time constant Ti of the current controller ([C00076](#)) e.g. by doubling.

In case of the extended motor parameter identification, the current controller parameters are determined automatically. If the identification is aborted all the same, the current controller parameters set in [C00075](#) and [C00076](#) can be used by parameterising [C02866](#) to "1".

Another cause for the abort of the motor parameter identification could be the implausibility of the entered nameplate data, e.g. the entry P = 0 kW for the motor power.

Execute automatic motor parameter identification



Danger!

During motor parameter identification, the motor is energised via the outputs U, V and W of the inverter!

- Observe the corresponding safety instructions!
- With an idling motor, a small angular offset may occur at the motor shaft.
- During the motor parameter identification, rotations occur in case of a synchronous motor.



How to carry out automatic motor parameter identification:

1. Activate motor parameter identification via the [C00002/23](#) = "1: On / start" device command.
2. Enable inverter.
 - The inverter changes to the "[Ident](#)" device status.
 - Motor parameter identification starts.
 - The progress of the identification run can be seen in [C00002/23](#).
 - The identification is completed if the "0: Off / ready" message is displayed in [C00002/23](#).
 - After successful identification, it changes back to the "[SwitchedOn](#)" device status.
3. Inhibit inverter again.

5.1.3 Application notes for asynchronous motors with high slip speed



Note!

If a rated motor speed is set for an asynchronous motor (ASM) in [C00087](#) which corresponds to a very high slip speed, the number of motor pole pairs is identified incorrectly.

Moreover, a synchronous motor is (PSM) is detected instead of an asynchronous motor (ASM). In this case, the "[Id7](#)" error message can occur since motor and motor control type do not match.

Examples, possible impacts and remedies are described in the following sections.

Examples:

Number of pole pairs	Mechanical synchronous speed	Rated motor frequency (C00089)	Incorrect number of pole pairs if the rated motor speed (C00087) is lower:
1	3000 rpm	50 Hz	1986 rpm
2	1500 rpm	50 Hz	1195 rpm
3	1000 rpm	50 Hz	854 rpm
4	750 rpm	50 Hz	665 rpm

Possible impacts depending on the motor control type:

Motor control type	Possible impacts on the drive
Servo control (SC) - ASM	The motor can accelerate up to maximum speed of the motor.
V/f control (VFCplus + encoder)	
Sensorless vector control (SLVC)	The output speed is considerably too high. Example: $p=2, f_n=50 \text{ Hz}, n_n=1195 \text{ min}^{-1} \rightarrow$ Speed is 50 % too high
V/f characteristic control (VFCplus)	

Remedies:

- **For version 12.xx.xx:**
Limit the rated motor speed: $C00087 = C00089 * 60 / (\text{number of pole pairs} + 0.5)$
- **From version 16.00.00:**
Set the motor type ("ASM" or "PSM") manually in [C01001/1](#). The rated motor speed does not need to be limited since the number of pole pairs can be detected safely when the motor type has been set manually.

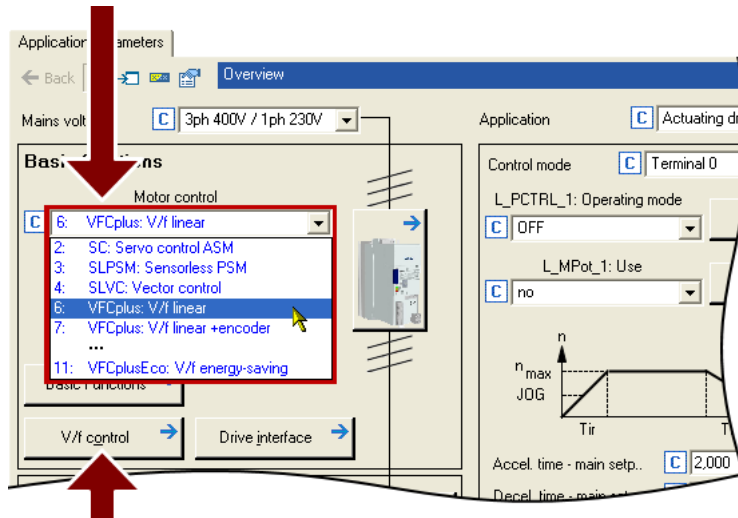
5 Motor control (MCTRL)

5.2 Selecting the control mode

5.2 Selecting the control mode

The 8400 protec HighLine inverter supports various modes for motor control (open loop or closed loop).

- V/f characteristic control (VFCplus) with linear characteristic for asynchronous motors is preset.
- The control mode can be selected in the »Engineer« on the **Application parameter** tab via the **Motor control (C00006)** list field:



- A click on the **Motor control...** button leads you to the parameterisation dialog of the selected motor control. (The button is labelled according to the selected motor control.)



Tip!

In order to make the selection of the motor control easier, we provide a selection help with recommendations and alternatives for standard applications in the subchapter entitled "[Selection help](#)". (153)

The following section briefly describe the control modes. A reference to more details can be found at the end of each section.

V/f characteristic control (VFCplus)

The V/f characteristic control (VFCplus) is a motor control mode for standard frequency inverter applications based on a simple and robust control process which is suitable for the operation of asynchronous motors with linear or square-law load torque characteristic (e.g. fans). Furthermore, this motor control mode is also suitable for group drives and special motors. Due to the low parameterisation effort, commissioning of such applications is fast and easy.

The V_{\min} boost ([C00016](#)) and slip compensation ([C00021](#)) required for optimising the drive behaviour are dimensioned for asynchronous motors with power adaptations to the inverter in the Lenze setting.

▶ [V/f characteristic control \(VFCplus\)](#) (📖 157)

Energy-saving V/f characteristic control (VFCplusEco)

From version 12.00.00

In contrast to the V/f characteristic control mode (VFCplus), this motor control mode uses a $\cos\phi$ control in partial load operational range to automatically reduce the power loss in the asynchronous motor (energy optimisation).

The motor data required for the $\cos\phi$ control and the V_{\min} boost ([C00016](#)) and slip compensation ([C00021](#)) required for optimising the drive behaviour are dimensioned for asynchronous motors with power adaptations to the inverter in the Lenze setting.

The required motor data (motor rotor resistance, motor stator resistance, motor stator leakage inductance and mutual motor inductance) only affect the extent of energy optimisation but not the stability.

In case of applications with dynamically very high sudden load variations from the unloaded operation, this motor control mode should not be used since a motor stalling cannot be excluded.

Energy optimisation for dynamic applications is not possible with this motor control mode.

▶ [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (📖 175)

V/f control (VFCplus + encoder)

The V/f control can be selected for operating asynchronous motors with speed feedback. With this motor control, a slip regulator can be additionally parameterised which adjusts the actual speed value dynamically to the speed setpoint.

▶ [V/f control \(VFCplus + encoder\)](#) (📖 185)

Sensorless vector control (SLVC)

Sensorless (field-oriented) vector control for asynchronous motors is based on a decoupled, separate control for the torque-producing and the field-producing current component. In addition, the actual speed is reconstructed by means of a motor model so that a speed sensor is not required.

In comparison to the V/f characteristic control without feedback, the following can be achieved by means of sensorless vector control SLVC:

- A higher maximum torque throughout the entire speed range
- A higher speed accuracy
- A higher concentricity factor
- A higher level of efficiency
- The implementation of torque-actuated operation with speed limitation
- The limitation of the maximum torque in motor and generator mode for speed-actuated operation



Tip!

If a high torque without feedback is to be provided at small speeds, we recommend the "Sensorless vector control" motor control mode.

▶ [Sensorless vector control \(SLVC\)](#) (📖 192)

Sensorless control for synchronous motors (SLPSM)

From version 12.00.00

This sensorless control enables an encoderless control of synchronous motors. The process is based on field-oriented control within a higher speed range (e.g. > 10 % of the rated motor speed). The actual speed value and rotor position are reconstructed via a motor model.

Standard applications for this control type are pumps and fans, horizontal materials handling and simple positioning technology.

▶ [Sensorless control for synchronous motors \(SLPSM\)](#) (📖 209)

Servo control (SC)

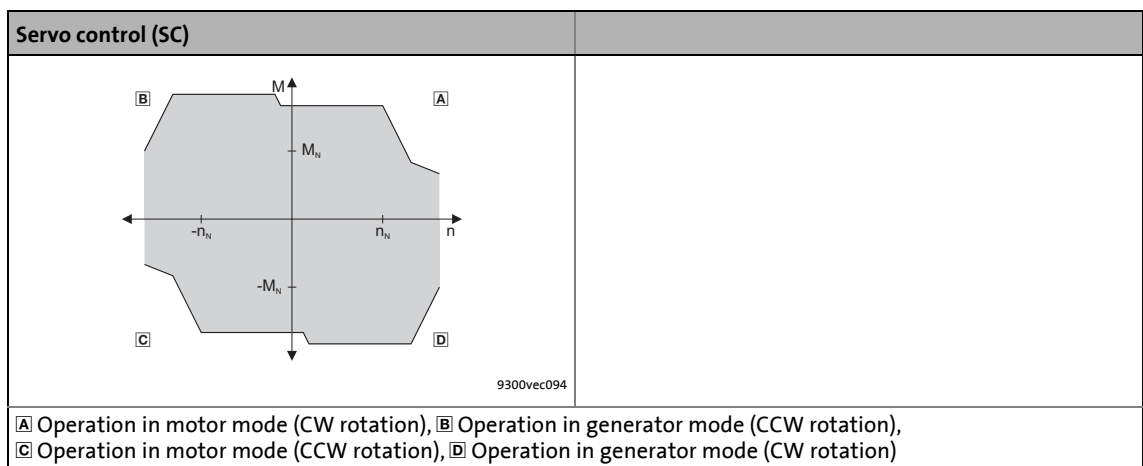
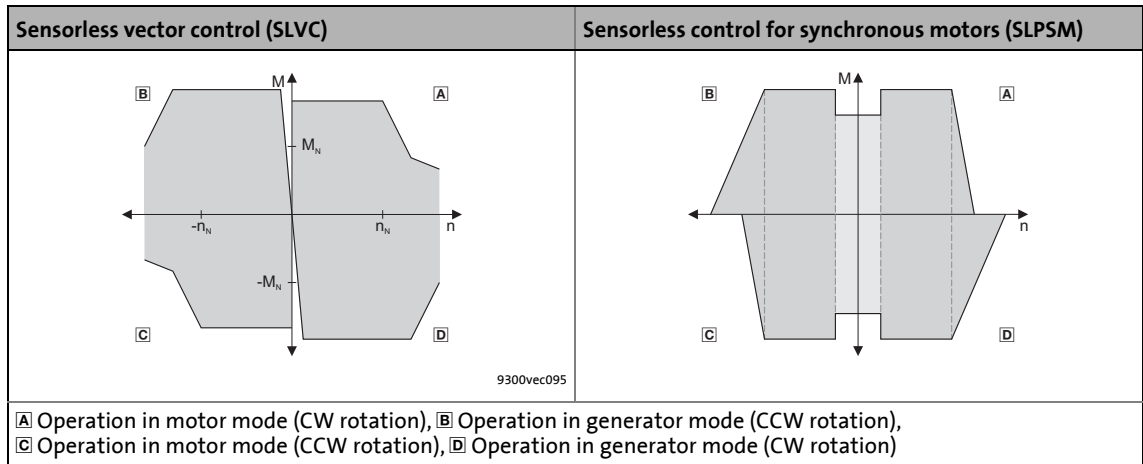
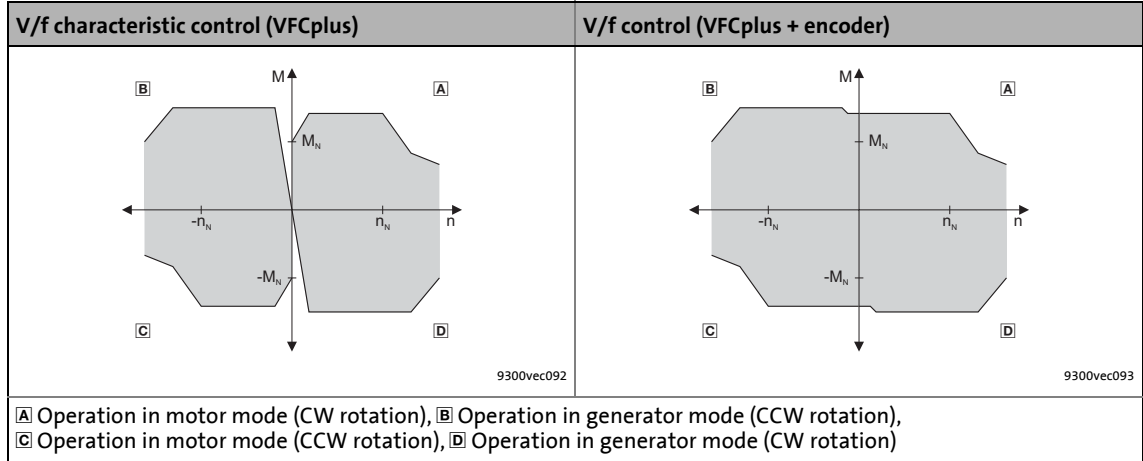
Field-oriented servo control (SC) for asynchronous motors is based on a decoupled, separate control of the torque-producing and the field-producing current component. The motor control is based on a field-oriented, cascaded controller structure with feedback function and enables dynamic and stable operation in all of the four quadrants.

The servo control basically offers the same advantages as the sensorless vector control (SLVC).

▶ [Servo control \(SC\)](#) (📖 232)

Speed feedback

As shown in the following graphics, the drive systems with feedback have, independently of the motor control, more advantages than systems without feedback.



5 Motor control (MCTRL)

5.2 Selecting the control mode

5.2.1 Selection help

To ease the selection of the motor control mode, the two following tables contain recommendations and alternatives to standard applications.

Application	recommended	Alternatively
Single drives		
With constant load	VFCplus: V/f linear	SLVC or SLPSM
With extremely alternating loads	VFCplus: V/f linear	SLVC
With high starting duty	SLVC	VFCplus: V/f linear
Torque limitation	SLVC	SLPSM
With torque limitation (power control)	VFCplus: V/f linear	SLPSM
Three-phase reluctance motor	VFCplus: V/f linear	-
Three-phase sliding rotor motor	VFCplus: V/f linear	-
Three-phase AC motors with permanently assigned frequency/voltage characteristic	VFCplus: V/f linear	-
Pump and fan drives with quadratic load characteristic	VFCplus: U/f square-law From version 12.00.00: VFCplusEco	SLVC or SLPSM
Simple hoists	VFCplus: V/f linear	-
Group drives (several motors connected to inverter)		
Identical motors and loads	VFCplus: V/f linear	-
Different motors and/or alternating loads	VFCplus: V/f linear	-

[5-1] Standard applications without speed feedback

Application	recommended	Alternatively
Single drives		
With constant load	SC	VFCplus / SLVC
With extremely alternating loads	SC	VFCplus / SLVC
With high starting duty	SC	VFCplus / SLVC
With speed control (speed feedback)	SC	VFCplus
With high dynamic performance e.g. for positioning and infeed drives	SC	-
Torque limitation	SC	SLVC
With torque limitation (power control)	-	-
Winder with dancer position control	SC	VFCplus
Unwinder with dancer position control	SC	VFCplus
Three-phase reluctance motor	-	-
Three-phase sliding rotor motor	-	-
Three-phase AC motors with permanently assigned frequency/voltage characteristic	-	-
Pump and fan drives with quadratic load characteristic	-	-
Simple hoists	VFCplus: V/f linear	-
Group drives (several motors connected to inverter)		
Identical motors and loads	VFCplus	-
Different motors and/or alternating loads	-	VFCplus

[5-2] Standard applications with speed feedback

5.3 Defining current and speed limits

Limitation of the speed setpoint

Parameterising the reference speed in [C00011](#) means that the drive must rotate at the set speed if a speed setpoint of 100% is specified.

All speed setpoint selections are provided in % and always refer to the reference speed set in [C00011](#).



Tip!

For reasons of achievable resolution and the accuracy involved, the reference speed should be geared to the speed range required for the respective application.

Lenze recommendation: Reference speed ([C00011](#)) = 1500 ... 3000 rpm

Irrespective of the selected motor control, there are more limitation options:

Parameters	Info	Lenze setting	
		Value	Unit
C00909/1	Max. positive speed	120	%
C00909/2	Max. negative speed	120	%
C00910/1	Max. positive output frequency	1000	Hz
C00910/2	Max. negative output frequency	1000	Hz



Note!

In the torque-controlled operation (*bTorquemodeOn* = TRUE), the limitation of the speed setpoint does not have any effect! In this case, a permissible speed range can be defined via speed limitation (*nSpeedHighLimit* and *nSpeedLowLimit*).

For the torque-controlled operation, a permissible speed range can be defined via the speed limitation (inputs *nSpeedHighLimit_a* and *nSpeedLowLimit_a* at the SB [LS MotorInterface](#)).

For a correct function of the speed limitation in both direction, the following applies:

The speed limitation operates with a internal hysteresis of 50 min⁻¹. The upper or lower speed limit resulting from the settings has to be higher than this hysteresis!

Current limitation in motor and generator mode

In the various motor control modes, the inverter is provided with functions which determine the dynamic behaviour under load and counteract exceedance of the maximum current in motor or generator mode.

Parameters	Info	Lenze setting	
		Value	Unit
C00022	I _{max} in motor mode	47.00	A
C00023	I _{max} in generator mode • 100 % ≙ I _{max} in motor mode (C00022)	100	%

The current limits must be selected depending on

- the permissible maximum current of the motor → recommendation: $I(\text{Mot})_N < 1.5 \dots 2.0$
- the permissible maximum current of the inverter
- the torque in motor/generator mode required for the application



Note!

Highly dynamic applications

(that have e.g. too short acceleration/deceleration times or excessively changing loads)

The overcurrent disconnection may respond (fault message OC1 or OC11) if the setting of the maximum current in motor mode in [C00022](#) approximately corresponds to the maximum permissible value of the respective inverter.

Remedies:

- Increase of the acceleration and deceleration ramp times
- Reduction of the maximum current in motor mode ([C00022](#))
- Reduction of the maximum current in generator mode ([C00023](#))
- Adaptation of the indirect peak current limitation (procedure depends on the selected motor control mode, see below)
- Reduction of the reset time of the current limiting controller ([C00074/1](#))

Influencing the torque in motor/generator mode

The torque in motor and generator mode can be limited via the *nTorqueMotLim* and *nTorqueGenLim* process signal inputs.

- If V/f characteristic control (VFCplus) is selected, limitation is indirectly performed via a so-called I_{max} controller.
- If sensorless vector control (SLVC) or servo control (SC) is selected, limitation has a direct effect on the torque-producing current component.

If keypad control is selected, the *nTorqueMotLim* and *nTorqueGenLim* process signals can be parameterised via [C00728/1...2](#).

From version 18.00.00 onwards

The positive and negative torque can be limited via the two process signal inputs *nTorqueMotLimit_a* and *nTorqueGenLimit_a*.

- [C02864](#): Bit 15 = 1: *nTorqueMotLimit_a* acts as *nTorqueHighLimit_a* (positive torque limitation) and *nTorqueGenLimit_a* acts as *nTorqueLowLimit_a* (negative torque limitation).

**How to adapt the peak current limitation:**

V/f characteristic control (VFCplus):

- Reduce the slip compensation with [C00021](#).

V/f control (VFCplus + encoder):

- Reduce the slip limitation to twice the rated motor slip with [C00971](#).
- Reduce the V_{\min} boost in [C00016](#).

Sensorless vector control (SLVC):

- Reduce the slip compensation with [C00021](#).
- Reduce the limitation of the torque in motor mode via $nTorqueMotLimit_a$ ([C00728/1](#)) and the limitation of the torque in generator mode via $nTorqueGenLimit_a$ ([C00728/2](#)).

Servo control (SC):

- Reduce the jerk limitation with [C00274](#).
- Reduce the limitation of the torque in motor mode via $nTorqueMotLimit_a$ ([C00728/1](#)) and the limitation of the torque in generator mode via $nTorqueGenLimit_a$ ([C00728/2](#)).

5.4 V/f characteristic control (VFCplus)

In case of the V/f characteristic control (VFCplus), the motor voltage of the inverter is determined by means of a linear or quadratic characteristic depending on the field frequency or motor speed to be generated. The voltage follows a preselected characteristic.



Stop!

- The following must be observed when operating drives with quadratic V/f characteristic:
 - Please always check whether the corresponding drive is suitable for operation with a quadratic V/f characteristic!
 - If your pump drive or fan drive is not suitable for operation with a quadratic V/f characteristic, you must either use the V/f characteristic control function with a linear V/f characteristic or the sensorless vector control (SLVC).
- For adjustment, observe the thermal performance of the connected asynchronous motor at low output frequencies.
 - Usually, standard asynchronous motors with insulation class B can be operated for a short time with their rated current in the frequency range 0 Hz ... 25 Hz.
 - Contact the motor manufacturer to get the exact setting values for the max. permissible motor current of self-ventilated motors in the lower speed range.
 - If you select the quadratic V/f characteristic, we recommend to set a lower V_{\min} .
- The nameplate data of the motor (at least rated speed and rated frequency) must be entered if, instead of a standard motor, an asynchronous motor is used with the following values:
 - rated frequency \neq 50 Hz (star) or
 - rated frequency \neq 87 Hz (delta) or
 - number of pole pairs \neq 2



Note!

When the auto DCB threshold ([C00019](#)) is set > 0 rpm, there is no torque at the motor shaft in the lower speed range!

▶ [Automatic DC-injection braking \(Auto-DCB\)](#) (📖 269)

5.4.1 Parameterisation dialog/signal flow

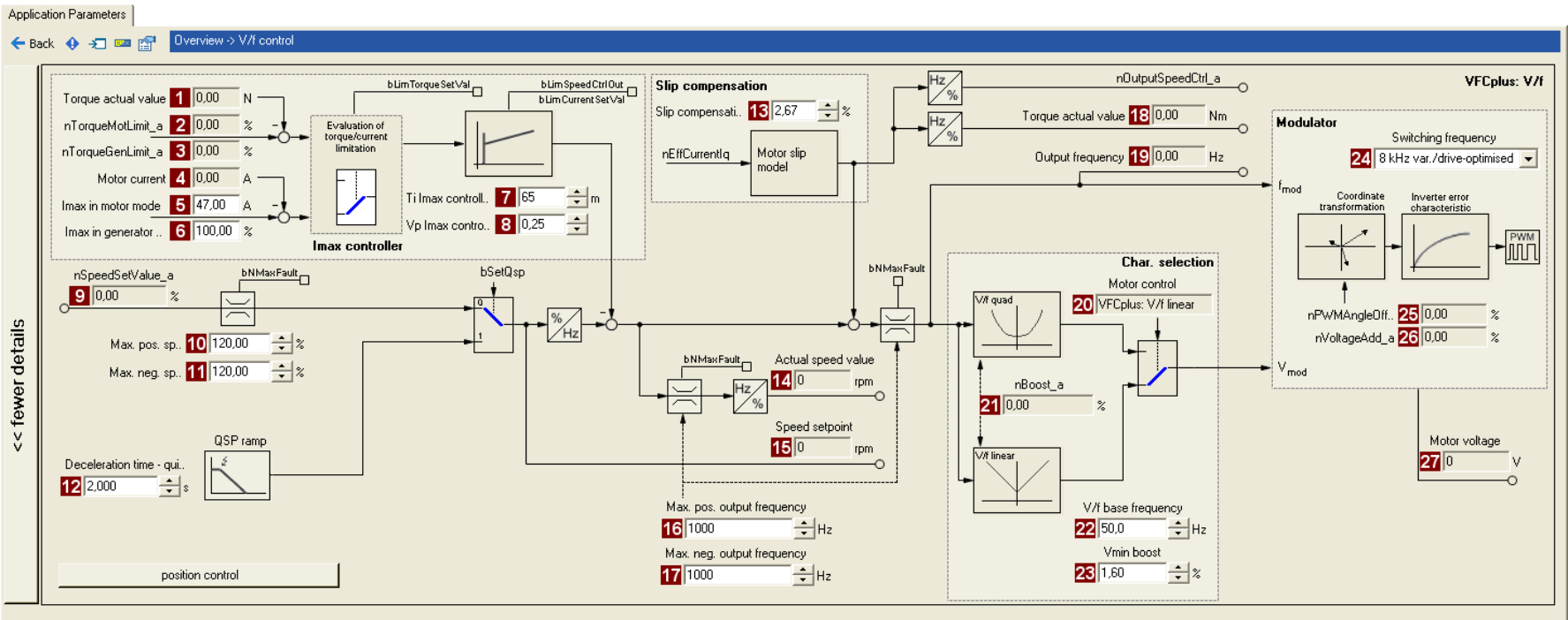


Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control from the *Overview* dialog level in the **Motor control** list field:
 - "6: VFCplus: V/f linear" for linear characteristic or
 - "8: VFCplus: V/f quadr" for square-law characteristic

More available V/f characteristic control modes:

- "10: VFCplus: V/f definable".
With this motor control, the V/f characteristic can be freely defined. ▶ [Defining a user-defined V/f characteristic](#) (171)
 - "11: VFCplusEco: V/f energy-saving" (from version 12.00.00 onwards).
With this motor control, the motor is always operated in an optimal efficiency range via a $\cos\phi$ control and the resulting voltage reduction (reduced copper losses in the asynchronous motor). ▶ [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (175)
4. Click the **Motor control V/f** button to change to the *Overview* → *Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the >>**More details** button in the left-most position, a signal flow with more details/parameters is displayed.



Parameters	Info	Parameters	Info	Parameters	Info
1	C00056/2 Actual torque value	13	C00021 Slip compensation	18	C00056/2 Actual torque value
2	C00830/29 Limitation of torque in motor mode	14	C00051 Actual speed value	19	C00058 Output frequency
3	C00830/28 Limitation of torque in generator mode	15	C00050 Speed setpoint	20	C00006 Motor control
4	C00054 Motor current	16	C00910/1 Max. pos. output frequency	21	C00830/26 MCTRL: nBoost_a
5	C00022 I _{max} in motor mode	17	C00910/2 Max. neg. output frequency	22	C00015 V/f base frequency
6	C00023 I _{max} in generator mode			23	C00016 V _{min} boost
7	C00074 T _i I _{max} controller			24	C00018 Switching frequency
8	C00073 V _p I _{max} controller			25	C00830/32 MCTRL: nPWMAngleOffset_a
9	C00830/22 Speed setpoint			26	C00830/31 MCTRL: nVoltageAdd_a
10	C00909/1 Max. pos. speed			27	C00052 Motor voltage
11	C00909/2 Max. neg. speed				
12	C00105 Decel. time - quick stop				

5.4.2 Basic settings

The "Initial commissioning steps" listed in the table below are sufficient for a simple characteristic control.

- Detailed information on the individual steps can be found in the following subchapters.

Initial commissioning steps	
1.	Defining the V/f characteristic shape. (📖 161)
2.	Defining current limits (I_{max} controller). (📖 162)



Tip!

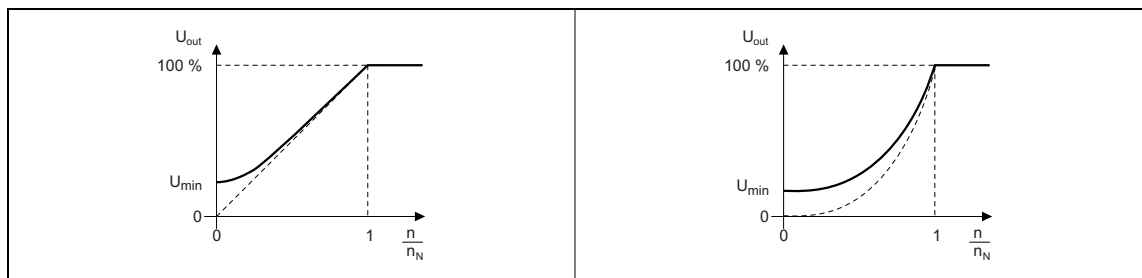
Information on the optimisation of the control mode and the adaptation to the real application is provided in chapter "[Optimising the control mode](#)". (📖 163)

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". (📖 258)

5.4.2.1 Defining the V/f characteristic shape

In principle, four different characteristic shapes can be stipulated:

1. **Linear V/f characteristic:**
For drives for a constant, speed-independent load torque.
2. **Quadratic V/f characteristic:**
For drives with a load torque curve which is quadratic or in relation to speed. Quadratic V/f characteristics are preferred in the case of centrifugal pumps and fan drives.
3. **Freely definable V/f characteristic:**
For drives that require adaptation of the magnetising current by means of the output speed. The freely definable V/f characteristic can be used e.g. for operation in conjunction with special machines such as reluctance motors in order to suppress oscillations at the machine or to optimise energy consumption.



[5-3] Principle of a linear V/f characteristic (on the left) and a quadratic V/f characteristic (on the right)

4. **Linear V/f characteristic with voltage reduction (from version 12.00.00 onwards):**
For drives which often work in partial load operation, the energy-saving V/f characteristic control (VFCplusEco) offers the opportunity to reduce the voltage at low load in order to save energy. At higher loads, the voltage reduction is cancelled and a linear characteristic is caused.

The V/f characteristic shape is defined by selecting the corresponding motor control mode in [C00006](#):

V/f characteristic shape	Motor control to be selected (C00006)
Linear V/f characteristic	6: VFCplus: V/f linear
Square-law V/f characteristic	8: VFCplus: V/f quadr
User-definable V/f characteristic	10: VFCplus: V/f definable
Linear V/f characteristic with voltage reduction	11: VFCplusEco: V/f energy-saving

Tip!

- You can find detailed information on freely definable V/f characteristics in the subchapter entitled "[Defining a user-defined V/f characteristic](#)". (📖 171)
- You can find detailed information on the linear V/f characteristic with voltage reduction in the chapter entitled "[V/f characteristic control - energy-saving \(VFCplusEco\)](#)". (📖 175)

5.4.2.2 Defining current limits (I_{max} controller)

The V/f characteristic control (VFCplus) and the V/f control (VFCplus + encoder) operating modes are provided with a current limitation control which is decisive for the dynamic behaviour under load and counteracts exceedance of the maximum current in motor or generator mode. This current limitation control is called I_{max} control.

- The efficiency (motor current) measured by the I_{max} control is compared with the current limit value for motor load set in [C00022](#) and the current limit value for generator load set in [C00023](#).
- If the current limit values are exceeded, the inverter changes its dynamic behaviour.

Motor overload during acceleration

The inverter prolongs the acceleration ramp to keep the current on or below the current limit.

Generator overload during deceleration

The inverter prolongs the acceleration ramp to keep the current on or below the current limit.

Increasing load with constant speed

- If the motor current limit value is reached:
 - The inverter reduces the effective speed setpoint until a stable working point is set or an effective speed setpoint of 0 rpm is reached.
 - If the load is reduced, the inverter increases the effective speed setpoint until the setpoint speed is reached or the load reaches the current limit value again.
- When the generator current limit value is reached:
 - The inverter increases the effective speed setpoint until a stable working point is set or the maximally permissible speed ([C00909](#)) or output frequency is reached ([C000910](#)).
 - If the load is reduced, the inverter reduces the effective speed setpoint until the setpoint speed is reached or the load reaches the current limit value again.
- If a sudden load is built up at the motor shaft (e.g. drive is blocked), the overcurrent disconnection may respond (fault message OC1 or OC11).

5.4.3 Optimising the control mode

The V/f characteristic control (VFCplus) is generally ready for operation. It can be adapted subsequently by adapting the characteristic and/or the drive behaviour.



Note!

Following successful motor parameter identification, the V/f base frequency ([C00015](#)) and the V_{\min} boost ([C00016](#)) as well as the slip constant for slip compensation ([C00021](#)) are calculated automatically.

From version 12.00.00:

- Following successful motor parameter identification, the gain of the I_{\max} controller ([C00073/1](#)) is calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#), [C00966](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

Adapting characteristic

For the linear and quadratic characteristic, it is also possible to match its curve to different load profiles or motors by adapting the V/f base frequency ([C00015](#)) and the V_{\min} boost ([C00016](#)).

- ▶ [Adapting the V/f base frequency](#) (📖 164)
- ▶ [Adapting the \$V_{\min}\$ boost](#) (📖 166)

Freely defining the characteristic

The V/f characteristic can also be defined freely if the linear and quadratic characteristics are not suitable.

- ▶ [Defining a user-defined V/f characteristic](#) (📖 171)

Adapting drive behaviour

- Limitation of the maximum current by a current limitation controller (e.g. to prevent the motor from stalling or to limit to the maximally permissible motor current). ▶ [Optimising the \$I_{\max}\$ controller](#) (📖 167)
- Adaptation of the field frequency by a load-dependent slip compensation (improved speed accuracy for systems without feedback)
- Adaptation of the controller parameters of the slip regulator if V/f control (VFCplus + encoder) is selected. ▶ [Parameterising the slip regulator](#) (📖 189)

5.4.3.1 Adapting the V/f base frequency

The V/f base frequency ([C00015](#)) determines the slope of the V/f characteristic and has considerable influence on the current, torque, and power performance of the motor.

- The setting in [C00015](#) applies to all permitted mains voltages.
- Mains fluctuations or fluctuations of the DC-bus voltage (operation in generator mode) do not need to be considered when the V/f base frequency is set. They are automatically compensated for by the internal mains voltage compensation of the device.
- Depending on the setting in [C00015](#), it may be required to adapt the reference speed ([C00011](#)) to traverse the entire speed range of the motor.
- The V/f base frequency is automatically calculated from the stored motor nameplate data by the motor parameter identification:

$$C00015 \text{ [Hz]} = \frac{U_{FI} \text{ [V]}}{U_{Ratedmot} \text{ [V]}} \cdot f_{Rated} \text{ Hz}$$

U_{FI} : Mains voltage 400 V or 230 V
 $U_{ratedmot}$: Rated motor voltage depending on the connection method
 f_{rated} : Rated motor frequency

[5-4] Calculation of the V/f base frequency

Typical values of the V/f base frequency

Inverter with 400-V mains connection			
Motor voltage [V]	Motor frequency [Hz]	Motor connection	V/f base frequency (C00015)
230 / 400	50	Y	50 Hz
220 / 380	50	Y	52.6 Hz
280 / 480	60	Y	50 Hz
400 / 690	50	Δ	50 Hz
400	50		
230 / 400	50	Δ	87 Hz
280 / 480	60		
400	87		
220 / 380	50	Δ	90.9 Hz

Inverter with 230-V mains connection			
Motor voltage [V]	Motor frequency [Hz]	Motor connection	V/f base frequency (C00015)
230	50	Δ	50 Hz
220 / 380	50	Δ	52.3 Hz

**Note!****87-Hz operation**

4-pole asynchronous motors which are designed for a rated frequency of $f = 50$ Hz in star connection can be operated in delta connection when being constantly excited up to $f = 87$ Hz.

- Advantages:
 - Higher speed-setting range
 - 73% higher power output in case of standard motors
- Motor current and motor power increase by the factor $\sqrt{3}$.
- The field weakening range starts above 87 Hz.
- Generally, this process can also be used with motors which have different numbers of pole pairs. In case of 2-pole asynchronous motors, the mechanical limit speed must be maintained.

5.4.3.2 Adapting the V_{min} boost

The V_{min} boost ([C00016](#)) of the motor voltage serves to select a load independent magnetising current which is required for asynchronous motors. The torque behaviour of the motor can be optimised by adapting the setting in [C00016](#).

The *nBoost_a* process signal at the SB [LS_MotorInterface](#) serves to carry out a V_{min} boost as well:

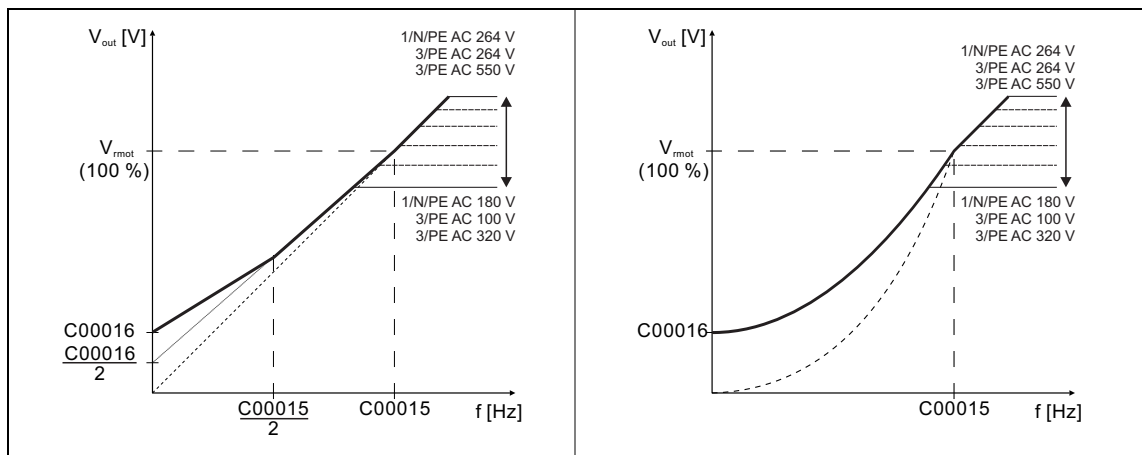
Designator DIS code data type	Information/possible settings
nBoost_a C00830/26 INT	<p>Process signal for the V_{min} boost</p> <ul style="list-style-type: none"> This signal is added to C00016 and has thus an increasing or decreasing effect. This signal serves to implement a load-dependent V_{min} boost to improve the torque behaviour in different load states, as for instance in case of operation in generator or motor mode. Scaling: 16384 ≙ 100 % rated device voltage V_{FU} (400 V or 230 V)
	<p>STOP Stop!</p> <p>Values selected too high may cause the motor to heat up due to the resulting current!</p>



Note!

The V_{min} boost has an effect on output frequencies below the V/f base frequency ([C00015](#)).

The general linear and quadratic V/f characteristics are shown in the illustrations below. The illustrations show the impacts of the parameters used to adapt the characteristic shape.



[5-5] Representation of the linear V/f characteristic (on the left) and quadratic V/f characteristic (on the right)



How to set the V_{min} boost:

- Operate motor in idle state at approx. 6 % of the rated motor speed.
- Increase V_{min} boost ([C00016](#)) until the following motor current is reached:

Motor in short-time operation up to 0.5 n_{rated}

- for self-ventilated motors: I_{motor} ≈ I_{rated motor}
- for forced ventilated motors: I_{motor} ≈ I_{rated motor}

Motor in continuous operation up to $0.5 n_{\text{rated}}$

- for self-ventilated motors: $I_{\text{motor}} \approx 0.8 I_{\text{rated motor}}$
- for forced ventilated motors: $I_{\text{motor}} \approx I_{\text{rated motor}}$



Note!

V_{min} boost is automatically calculated by the motor parameter identification using the data specified on the motor nameplate so that a no-load current of approx. $0.8 I_{\text{rated motor}}$ results at the slip frequency of the machine.

V/f control (VFCplus + encoder)

If V/f control (VFCplus + encoder) is selected, we recommend a decidedly lower V_{min} boost:

- In this case, select a V_{min} boost which ensures that approx. 50 % of the rated motor current flows at slip frequency when the motor is idling.

5.4.3.3 Optimising the I_{max} controller

Using the Lenze setting of the current limitation controller, the drive is stable:

Parameters	Info	Lenze setting	
		Value	Unit
C00073/1	VFC: Vp I_{max} controller	0.25	
C00074/1	VFC: Ti I_{max} controller	65	ms

Most applications do not require optimisation.

The setting of the current limitation controller must be adapted if

- power control including great moments of inertia is performed.
 - Recommendation: Increase of the reset time Ti ([C00074/1](#)) of the I_{max} controller.
- vibrations occur in the V/f control (VFCplus + encoder) mode during the intervention of the current limitation controller.
 - Recommendation: Increase of the reset time Ti ([C00074/1](#)) of the I_{max} controller.
- overcurrent errors (e.g. OC3) occur due to load impulses or too high acceleration ramps.
 - Recommendation: Reduction of the gain Vp ([C00073/1](#)) and reset time Ti ([C00074/1](#)) of the I_{max} controller.

5.4.3.4 Optimising the stalling behaviour

Motor stalling due to a torque overload in the field weakening range is prevented in all characteristic-based motor control types (VFCplus) by means of an inverter-internal stalling current monitoring. In the field weakening range, hence at frequencies above the base frequency, it reduces the maximum current to prevent the motor from stalling. The reduction depends on the current field frequency, the base frequency, the DC-bus voltage and the maximum current ([C00022](#)). Generally it applies that a higher field frequency causes a stronger limitation of the maximum current.

The behaviour in the field weakening range can be adapted via the override point of field weakening ([C00080](#)). This parameter serves to shift the frequency-dependent maximum current characteristic:

- [C00080](#) > 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to higher field frequencies.
 - The maximally permissible current and the maximum torque increase in the field weakening range.
 - The risk of motor stalling increases.
- [C00080](#) < 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to lower field frequencies.
 - The maximally permissible current and the maximum torque are reduced in the field weakening range.
 - The risk of motor stalling is reduced.



Note!

We recommend to keep the Lenze setting (0 Hz).

5.4.3.5 Torque limitation

The previous chapter, "[Optimising the I_{max} controller](#)", describes how the drive can be protected from overload. During commissioning, these settings are carried out once and remain unchanged afterwards. However, it is often necessary to limit the torque to a lower value for plant or process reasons.

- To avoid overload in the drive train, the torque in motor mode can be limited via the *nTorqueMotLimit_a* process input signal, and the torque in generator mode can be limited via the *nTorqueGenLimit_a* process input signal:

Designator <small>DIS code data type</small>	Information/possible settings
nTorqueMotLimit_a C00830/29 INT	Torque limitation in motor mode <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % M_{max} (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1. From version 18.00.00 onwards: C02864 : Bit 15 = 1: positive torque limitation (nTorqueHighLimit_a)
nTorqueGenLimit_a C00830/28 INT	Torque limitation in generator mode <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % M_{max} (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2. From version 18.00.00 onwards: C02864 : Bit 15 = 1: negative torque limitation (nTorqueLowLimit_a)



Note!

- The actual torque ([C00056/2](#)) is directly calculated from the current slip speed of the machine. This requires correct entry of the motor data. ([133](#)) ▶ [Motor selection/Motor data](#)
- To avoid instabilities during operation with active slip compensation, the torque limit values are internally processed as absolute values.
- If slip compensation is deactivated ([C00021](#) = 0), indirect torque limitation (differential signal between apparent motor current and *nTorqueMotLimit_a* or *nTorqueGenLimit_a*) occurs. Above the no-load current of the motor, the accuracy of the indirect torque limitation is limited.

5 Motor control (MCTRL)

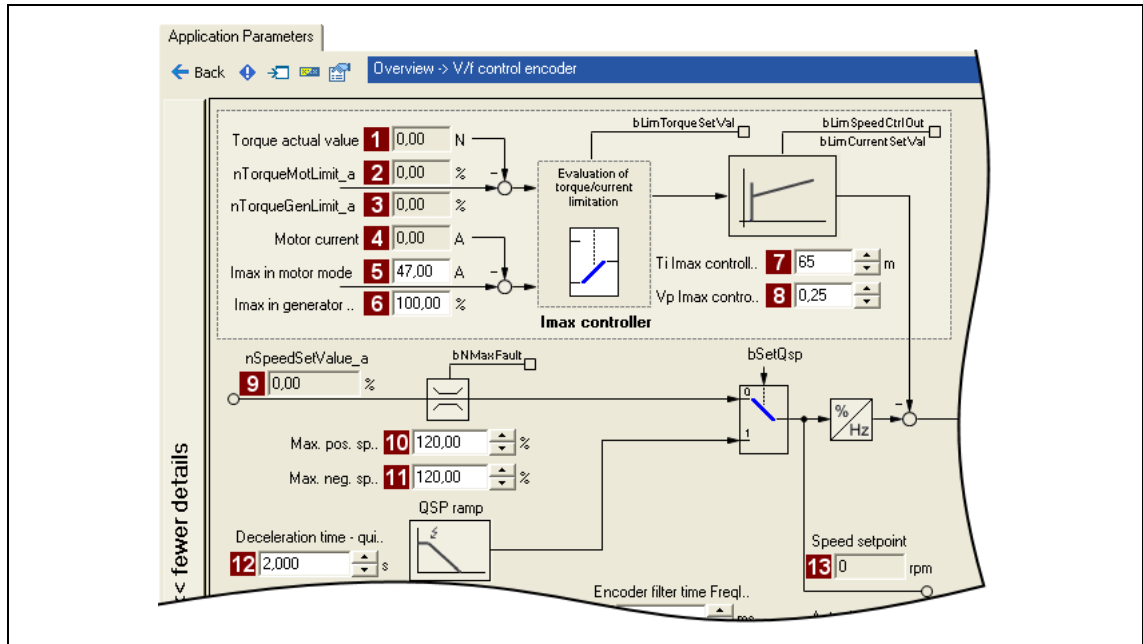
5.4 V/f characteristic control (VFCplus)

V/f characteristic control (VFC)

The accuracy of the torque limitation is limited because the actual torque ([C00056/2](#)) is only calculated from the slip speed measured indirectly via the motor current.

V/f control (VFC + encoder)

The slip speed of the motor is available at the slip controller output. This leads to a high accuracy for the actual torque ([C00056/2](#)) and the torque limitation.



[5-6] Extract from the signal flow of the V/f control (VFC + encoder)

Parameters	Info	Parameters	Info
1	C00056/2 Actual torque value	9	C00830/22 MCTRL: nSpeedSetValue_a
2	C00830/29 Limitation of torque in motor mode	10	C00909/1 Max. pos. speed
3	C00830/28 Limitation of torque in generator mode	11	C00909/2 Max. neg. speed
4	C00054 Motor current	12	C00105 Decel. time - quick stop
5	C00022 I_max in motor mode	13	C00050 Speed setpoint
6	C00023 I_max in generator mode		
7	C00074 Ti I_max controller		
8	C00073 Vp I_max controller		

5.4.3.6 Defining a user-defined V/f characteristic

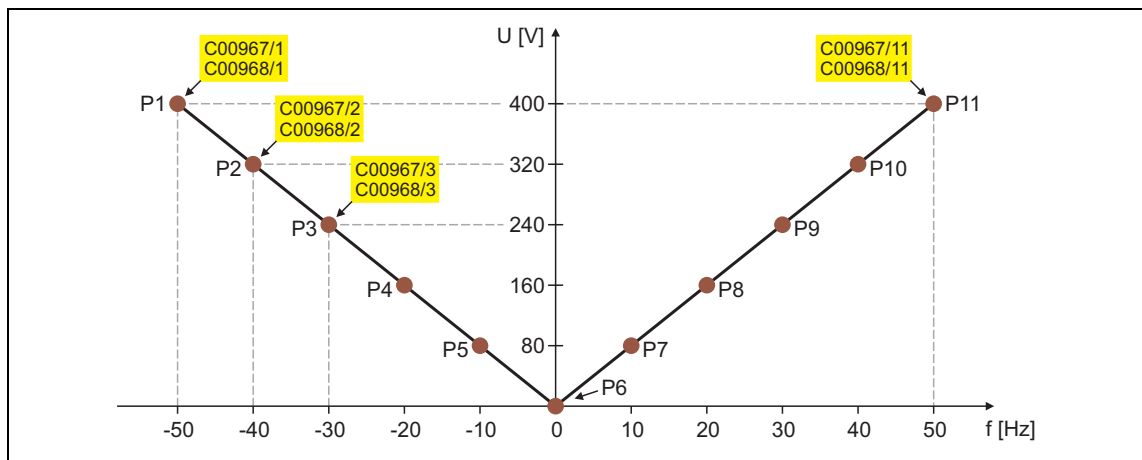
For individual adaptation of the motor magnetisation to the actual application, the motor control "10: VFCplus: V/f definable" with a freely definable characteristic can be selected in [C00006](#) as an alternative if the linear and quadratic characteristics are not suitable.



Note!

The V/f base frequency ([C00015](#)) and the V_{\min} boost ([C00016](#)) no longer exert an influence if this motor control is chosen.

- The 11 grid points (voltage/frequency values) of the characteristic are selected via the 11 subcodes of [C00967](#) and [C00968](#).
 - It is necessary to set all 11 grid points by means of corresponding subcodes.
 - If fewer grid points (voltage/frequency values) are needed, this can be achieved indirectly by ascribing the same voltage and frequency values to consecutive grid points.
Example: $C00967/3 = C00967/4$ and $C00968/3 = C00968/4$
 - The grid points can be specified in any sequence. Internally, they are automatically ordered from the minimum to the maximum frequency value.
 - Above the maximum and below the minimum frequency, the previous rise is continued until the maximum output voltage.
- In the Lenze setting, the 11 grid points represent a linear characteristic.
 - 3-phase devices: Output voltage 400 V at $f = 50$ Hz
 - 1-phase devices: Output voltage 230 V at $f = 50$ Hz



	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
V	400 V	320 V	240 V	160 V	80 V	0 V	80 V	160 V	240 V	320 V	400 V
f	-50 Hz	-40 Hz	-30 Hz	-20 Hz	-10 Hz	0 Hz	10 Hz	20 Hz	30 Hz	40 Hz	50 Hz

[5-7] Freely definable characteristic (Lenze setting for 3-phase devices)

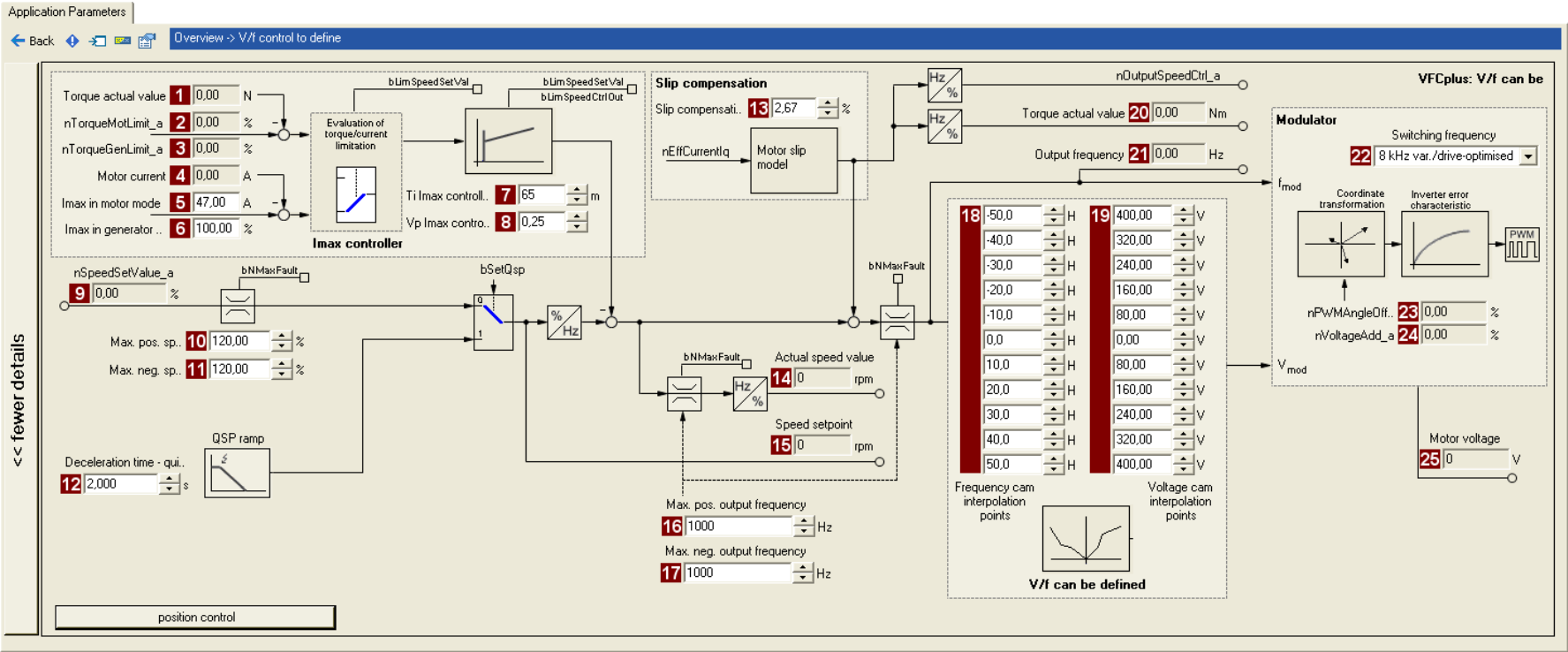
**Tip!**

Cases of application for this function:

- Operation of reluctance motors or synchronous motors during controlled acceleration (reduction of natural frequencies caused by wrong excitation).
- Adaptation of the voltage requirement for the motor, depending on specific load conditions.

**Proceed as follows to open the dialog for parameterising the motor control:**

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "10: VFCplus: V/f definable" from the *Overview* dialog box in the **Motor control** list field:
4. Click the **Motor control V/f definable** button to change to the *Overview → Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed.



Parameters	Info	Parameters	Info	Parameters	Info
1	C00056/2 Actual torque value	13	C00021 Slip compensation	18	C00967/x Frequency interpol. points
2	C00830/29 Limitation of torque in motor mode	14	C00051 Actual speed value	19	C00968/x Voltage interpol. points
3	C00830/28 Limitation of torque in generator mode	15	C00050 Speed setpoint	20	C00056/2 Actual torque value
4	C00054 Motor current	16	C00910/1 Max. pos. output frequency	21	C00058 Output frequency
5	C00022 I _{max} in motor mode	17	C00910/2 Max. neg. output frequency	22	C00018 Switching frequency
6	C00023 I _{max} in generator mode			23	C00830/32 MCTRL: nPWMAngleOffset_a
7	C00074 T _i I _{max} controller			24	C00830/31 MCTRL: nVoltageAdd_a
8	C00073 V _p I _{max} controller			25	C00052 Motor voltage
9	C00830/22 Speed setpoint				
10	C00909/1 Max. pos. speed				
11	C00909/2 Max. neg. speed				
12	C00105 Decel. time - quick stop				

5.4.4 Remedies for undesired drive behaviour

Drive behaviour	Remedy
Inadequate smooth running at low speeds, especially in the case of operation with a long motor cable	▶ Automatic motor data identification (📖 139)
Problems in case of high starting duty (great mass inertia)	▶ Adapting the Vmin boost (📖 166)
Drive does not follow the speed setpoint.	<p>The current controller intervenes in the set field frequency to limit the controller output current to the maximum current (C0022, C0023). Therefore:</p> <ul style="list-style-type: none"> • Prolong acceleration/deceleration times: <ul style="list-style-type: none"> C00012: Accel. time - main setpoint C00013: Decel. time - main setpoint • Consider a sufficient magnetising time of the motor. Depending on the motor power, the magnetising time amounts to 0.1 ... 0.2 s. • Increase the maximally permissible current: <ul style="list-style-type: none"> C00022: I_{max} in motor mode C00023: I_{max} in generator mode)
For operation without speed feedback (C00006 = 6): Insufficient speed constancy at high load (setpoint and motor speed are not proportional anymore)	<ul style="list-style-type: none"> • Increase slip compensation (C00021). Important: Unstable drive due to overcompensation! • With cyclic load impulses (e. g. centrifugal pump), a smooth motor characteristic is achieved by smaller values in C00021 (possibly negative values). <p>Note: The slip compensation is only active for operation without speed feedback.</p>
"Clamp operation active" error message (OC11): Inverter cannot follow dynamic processes, i.e. too short acceleration/deceleration times in terms of load ratios.	<ul style="list-style-type: none"> • Increase the gain of the I_{max} controller (C00073/1) • Reduce the reset time of the I_{max} controller (C00074/1) • Prolong the acceleration time (C00012) • Prolong the deceleration time (C00013)
Motor stalling in the field weakening range (adaptation especially required for small machines)	<ul style="list-style-type: none"> • Reduce the override point of field weakening (C00080) • If motor power < inverter power: Set C00022 to I_{max} = 2 I_{rated motor} • Reduce dynamic performance of setpoint generation

5.5 V/f characteristic control - energy-saving (VFCplusEco)

This function extension is available from version 10.00.00!

With the energy-saving V/f characteristic control mode (VFCplusEco), the motor voltage of the inverter is detected by means of a linear characteristic depending on the field frequency to be created or the motor speed. Moreover, a $\cos\phi$ control and the resulting voltage reduction causes the motor to be always operated in the optimum efficiency range (reduction of copper losses in the asynchronous motor).

- Hence, these are the advantages of this motor control mode:
 - Good robustness
 - Easy parameter setting
 - High energy efficiency (lower heating of the motor in partial load operational range)
 - Same speed accuracy and maximum torques as with VFCplus
 - Less noise generation of the motor with active voltage reduction
- Predestinated application areas of this motor control mode are materials handling technology and pump and fan systems.
- This motor control mode serves to improve efficiency of standard asynchronous motors with efficiency class IE1 (standard IEC 60034-30 2008) in the range 0 ... $M_{\text{efficiency_max}}$ between 0 ... 20 % (\emptyset 5 ... 10 %).
 - For asynchronous motors with energy efficiency class IE2 the potential for efficiency improvement is reduced to approx. 0 ... 15 %.
 - Description of $M_{\text{efficiency_max}}$: Indicates the torque [%] of $M_{\text{rated_motor}}$, where the motor has the max. efficiency.)
- In case of asynchronous motors with a higher energy efficiency class (IE2 and IE3), the absolute energy saving of the motor control mode is lower due to improved efficiency of the machine. However, energy saving is still achieved in a higher load range.
- $M_{\text{efficiency_max}}$ is performance-related and listed in the following table for some power values of the energy efficiency class IE1 and IE2:

Power	$M_{\text{efficiency_max}}$ (related to $M_{\text{rated_motor}}$)	
	IE1	IE2
0.25 kW	75 %	
0.75 kW	65 %	75 %
2.2 kW	55 %	85 %
7.5 kW	30 %	45 %
22 kW	23 %	
45 kW	21 %	



Stop!

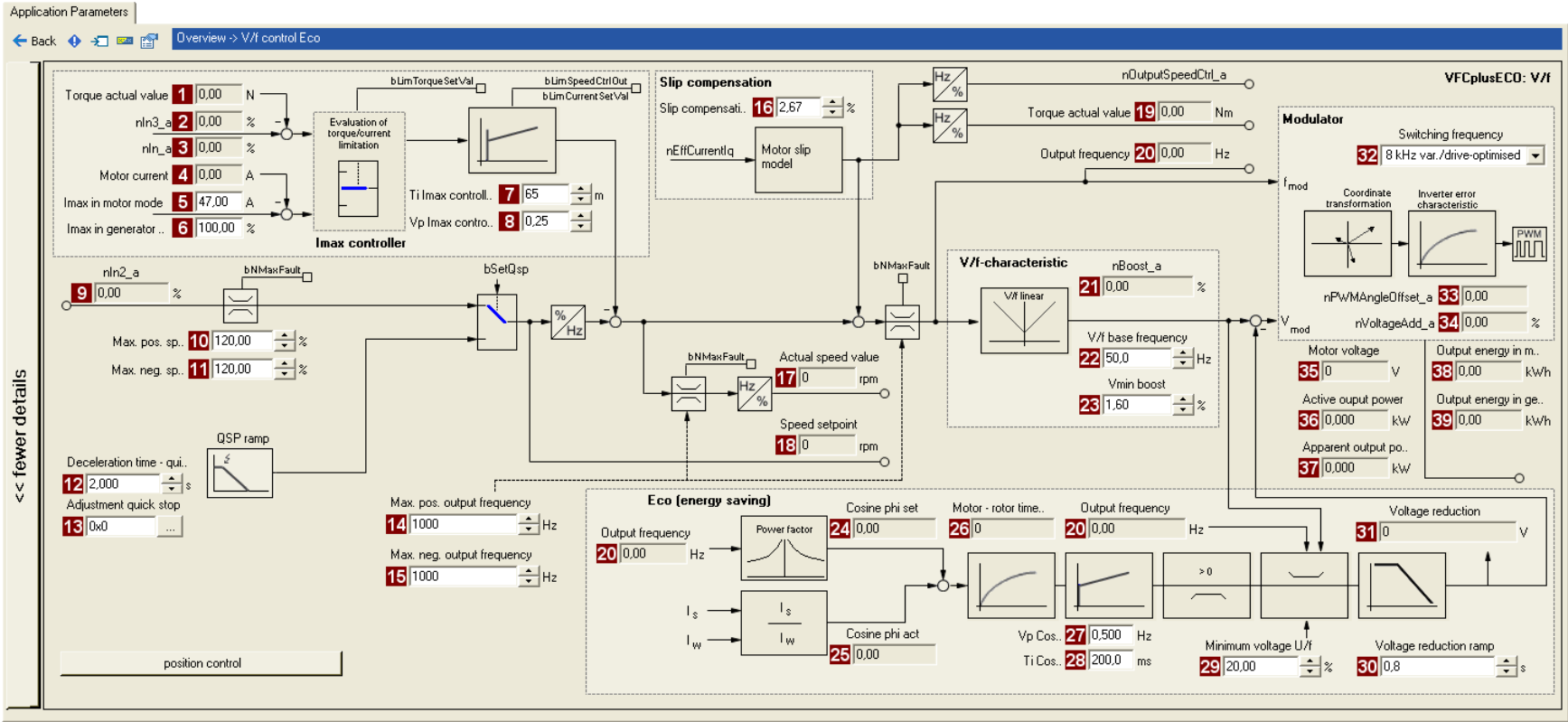
- For adjustment, observe the thermal performance of the connected asynchronous motor at low output frequencies.
 - Usually, standard asynchronous motors with insulation class B can be operated for a short time with their rated current in the frequency range 0 Hz ... 25 Hz.
 - Contact the motor manufacturer to get the exact setting values for the max. permissible motor current of self-ventilated motors in the lower speed range.
- The nameplate data of the motor (at least rated speed and rated frequency) must be entered if, instead of a standard motor, an asynchronous motor is used with the following values:
 - rated frequency \neq 50 Hz (star) or
 - rated frequency \neq 87 Hz (delta) or
 - number of pole pairs \neq 2

5.5.1 Parameterisation dialog/signal flow



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "11: VFCplusEco: V/f energy-saving" from the *Overview* dialog box in the **Motor control** list field:
4. Click the **Motor control V/f Eco** button to change to the *Overview* → *Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the >>**More details** button in the left-most position, a signal flow with more details/parameters is displayed.

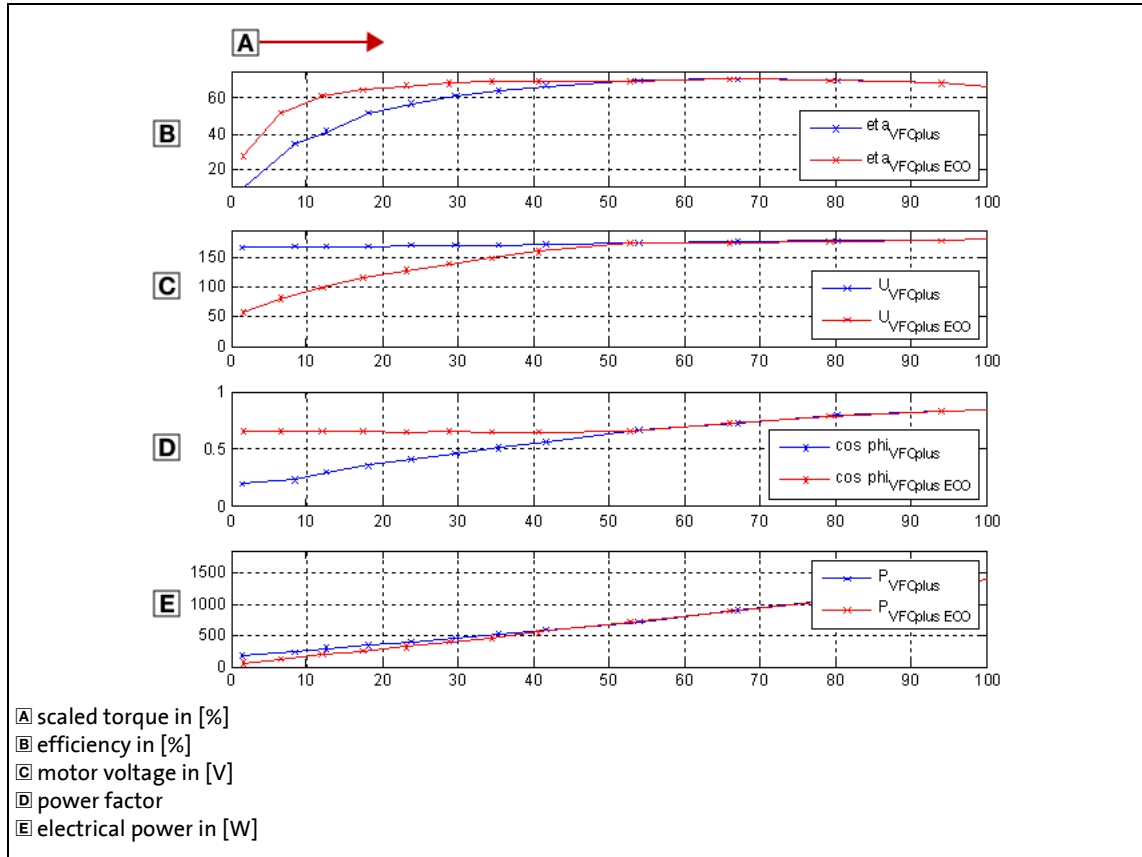


Parameters	Info	Parameters	Info	Parameters	Info
1	C00056/2 Actual torque value	14	C00910/1 Max. pos. output frequency	27	C00975 VFC-ECO: Vp
2	C00830/4 Limitation of torque in motor mode	15	C00910/2 Max. neg. output frequency	28	C00976 VFC-ECO: Ti
3	C00830/5 Limitation of torque in generator mode	16	C00021 Slip compensation	29	C00977 VFC-ECO: Minimum voltage V/f
4	C00054 Motor current	17	C00051 Actual speed value	30	C00982 VFC-ECO: Voltage reduction ramp
5	C00022 I _{max} in motor mode	18	C00050 Speed setpoint	31	C00978 VFC-ECO: Voltage reduction
6	C00023 I _{max} in generator mode	19	C00056/2 Actual torque value	32	C00018 Switching frequency
7	C00074 Ti I _{max} controller	20	C00058 Output frequency	33	C00830/32 MCTRL: nPWMAngleOffset_a
8	C00073 Vp I _{max} controller	21	C00830/26 MCTRL: nBoost_a	34	C00830/31 MCTRL: nVoltageAdd_a
9	C00830/3 Speed setpoint	22	C00015 V/f base frequency	35	C00052 Motor voltage
10	C00909/1 Max. pos. speed	23	C00016 V _{min} boost	36	C00980/1 Active output power
11	C00909/2 Max. neg. speed	24	C00979/2 Cosine phi set	37	C00980/2 Apparent output power
12	C00105 Decel. time - quick stop	25	C00979/1 Cosine phi act	38	C00981/1 Output energy in motor mode
13	C00104/1 Quick stop setting	26	C00083 Motor rotor time constant	39	C00981/2 Output energy in generator mode

5.5.2 Comparison of VFCplusEco - VFCplus

The following characteristics show the impact of the energy-saving V/f characteristic control (VFCplusEco) compared to the standard V/f characteristic control (VFCplus).

- The characteristics were recorded with a standard asynchronous motor 2.2 kW with energy efficiency class IE1 at speed = 600 rpm.



[5-8] Comparison of VFCplusEco - VFCplus

5.5.3 Basic settings

The "Initial commissioning steps" listed in the table below are sufficient for the V/f characteristic control - energy-saving (VFCplusECo).

- Detailed information on the individual steps can be found in the following subchapters.

Initial commissioning steps					
1.	Determine the motor control: C00006 = "11: VFCplusEco: V/f energy-saving"				
2.	<p>The required motor data are pre-initialised depending on the device and thus, they do not need to be entered directly. In order to achieve a high energy optimisation, these motor data can be entered (see the following section).</p> <p>Set the motor selection/motor data</p> <ul style="list-style-type: none"> • When selecting and parameterising the motor, the motor nameplate data and the equivalent circuit diagram data are relevant. Detailed information can be found in the "Motor selection/Motor data" chapter. (133) <p>Depending on the motor manufacturer, proceed as follows:</p> <table border="1"> <thead> <tr> <th>Lenze motor:</th> <th>Third party manufacturer's motor:</th> </tr> </thead> <tbody> <tr> <td> Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification </td> <td> 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance </td> </tr> </tbody> </table>	Lenze motor:	Third party manufacturer's motor:	Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram manually: C00084 : Motor stator resistance C00085 : Motor stator leakage inductance C00092 : Motor magnetising inductance
Lenze motor:	Third party manufacturer's motor:				
Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram manually: C00084 : Motor stator resistance C00085 : Motor stator leakage inductance C00092 : Motor magnetising inductance				
3.	Defining current limits (I_{max} controller) . (162)				



Tip!

Information on the optimisation of the control mode and the adaptation to the real application is provided in chapter "[Optimising the control mode](#)". ([180](#))

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([258](#))

5.5.4 Optimising the control mode

The V/f characteristic control - energy-saving (VFCplus) is generally ready for operation. It can be adapted subsequently by adapting the characteristic and/or the drive behaviour.



Note!

Following successful motor parameter identification, the V/f base frequency ([C00015](#)) and the V_{\min} boost ([C00016](#)) as well as the slip constant for slip compensation ([C00021](#)) are calculated automatically.

From version 12.00.00 onwards:

- Following successful motor parameter identification, the gain of the I_{\max} controller ([C00073/1](#)) is calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#), [C00966](#), [C00982](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

Adapting characteristic

For the linear characteristic as part of the V/f characteristic control - energy-saving (VFCplusEco), it is also possible (like in case of the standard V/f characteristic control) to match its curve to different load profiles or motors by adapting the V/f base frequency ([C00015](#)) and the V_{\min} boost ([C00016](#)).



Note!

For an adaptation of the V_{\min} boost, the V/f characteristic control - energy-saving (VFCplusEco) must not be set. For this purpose, set the [V/f characteristic control \(VFCplus\)](#).

▶ [Adapting the V/f base frequency](#) (☞ 164)

▶ [Adapting the \$V_{\min}\$ boost](#) (☞ 166)

Adapting drive behaviour

- Limitation of the maximum current by a current limitation controller (e.g. to prevent the motor from stalling or to limit to the maximally permissible motor current). ▶ [Optimising the \$I_{\max}\$ controller](#) (☞ 167)
- Adaptation of the field frequency by a load-dependent slip compensation (improved speed accuracy for systems without feedback).
- [Improving the behaviour at high dynamic load changes](#). (☞ 181)
- [Adapting the slope limitation for lowering the Eco function](#). (☞ 182)
- [Optimising the \$\cos/\phi\$ controller](#). (☞ 182)

Torque limitation

Limit the torque to a lower value. ▶ [Torque limitation](#) (☞ 169)

5.5.4.1 Improving the behaviour at high dynamic load changes

Due to the voltage reduction executed via the $\cos\phi$ control, the motor may stall in the Lenze setting at high dynamic load torque changes. This is caused by the flux reduction and the connected reduction of the stalling torque of the motor current:

$$M_{\text{Max}(t)} = M_{\text{Stalling}} \cdot \frac{U_{\text{Motor}(t)}^2}{(U_{\text{Motor}(t)} - U_{\text{Reduction}})^2} \quad \text{with } M_{\text{Stalling}} = 1.6 \dots 2.5 \cdot M_{\text{Rated_motor}}$$

V_{Motor} = display in [C00052](#)
 $V_{\text{Reduction}}$ = display in [C00978](#)

It generally applies that when the output voltage is divided in halves, the maximum torque is approx. reduced by the factor 4. A reduction by the factor 5 reduces the torque to approx. 15 ... 50 % of the rated torque.

The minimum voltage and thus the maximum influence access of the Eco function on the output voltage can be defined in [C00977](#). With full influence of the Eco function, the following stalling torque can be ensured depending on the setting in [C00977](#):

Minimum voltage V/f (C00977)	Maximum torque
100 %	160 % ... 250 % M_{rated}
70 %	80 % ... 130 % M_{rated}
50 %	40 % ... 70 % M_{rated}
20 %	15 % ... 50 % M_{rated}

An adaptation of the minimum voltage V/f ([C00977](#)) improves the stability in case of load impulses.

- In the Lenze setting, the minimum voltage V/f is set to 20 % for the highest energy optimisation. This setting serves to respond to load torques if these amount to approx. 25 % of the rated torque or occur with low dynamics.
- An increase of the minimum voltage V/f to 70 % permits to apply a dynamic load impulse from 0 to 100 % rated motor torque without the motor stalling. This reduces the energy optimisation to be achieved by approx. 75 %.
- A further increase of the stability at still higher dynamic load impulses can be achieved by a further increase of the minimum voltage V/f, but means a further loss in energy optimisation.



Note!

The energy optimisation can be switched off by setting the minimum voltage V/f ([C00977](#)) to 100 %. Then, the behaviour corresponds to the V/f characteristic control (VFCplus) with linear characteristic.

In case of applications with very high dynamic sudden load variations from the unloaded operation, this motor control mode should not be used or the energy optimisation should be switched off, since a motor stalling cannot be excluded.

5.5.4.2 Adapting the slope limitation for lowering the Eco function

The ramp set in [C00982](#) for voltage reduction serves as slope limitation in order to prevent that voltage is suddenly applied to the motor when the Eco function is deactivated. Otherwise, the overvoltage limitation (Imax, Clamp) would be activated.

- This ramp is, depending on the device, pre-initialised to approx. the triple rotor time constant. An adaptation of this parameter is not required.

When the Eco function is switched off, a quick reaction (high dynamic performance) is required, but with a low current overshoot and a small torque jump. Thus, the Lenze setting of [C00982](#) is a compromise regarding the switch-off of the Eco function (voltage reduction = 0).

- To increase the dynamics when switching off the Eco function:
Reduce → setting in [C00982](#).
(Current compensation actions increase when the Eco function is switched off.)
- In order to reduce current compensation actions when switching off the Eco function:
Increase → setting in [C00982](#).
(The dynamics when switching off the eco function is reduced)

5.5.4.3 Optimising the cos/phi controller

With the Lenze setting, the cos ϕ controller is set such that usually no adaptation is required for all power ratings and application cases.

Behaviour	Remedy/recommendation
The cos ϕ actual value (C00979/1) varies greatly.	Reduce gain Vp (C00975) and reset time Ti (C00976).
The cos ϕ actual value (C00979/1) is permanently lower than the cos ϕ setpoint (C00979/2).	Increase gain Vp (C00975) and reset time Ti (C00976).

5.5.5 Remedies for undesired drive behaviour

Drive behaviour	Remedy
Inadequate smooth running at low speeds, especially in the case of operation with a long motor cable	<p>▶ Automatic motor data identification (☐ 139)</p> <p>Reduce the influence of the Eco function by increasing the minimum voltage V/f (C00977) if necessary.</p>
Problems in case of high starting duty (great mass inertia)	<ol style="list-style-type: none"> 1. Set motor control VFCplus with linear characteristic (C00006 = 6). 2. Adapting the Vmin boost. (☐ 166) 3. Again set motor control VFCplusEco (C00006 = 11).
Drive does not follow the speed setpoint	<p>The current controller intervenes in the set field frequency to limit the controller output current to the maximum current (C0022, C0023). Therefore:</p> <ul style="list-style-type: none"> • Prolong acceleration/deceleration times: <ul style="list-style-type: none"> C00012: Accel. time - main setpoint C00013: Decel. time - main setpoint • Consider a sufficient magnetising time of the motor. Depending on the motor power, the magnetising time amounts to 0.1 ... 0.2 s. • Increase the maximally permissible current: <ul style="list-style-type: none"> C00022: I_{max} in motor mode C00023: I_{max} in generator mode • Make adaptations for the Eco function: <ul style="list-style-type: none"> • Improving the behaviour at high dynamic load changes. (☐ 181) • Adapting the slope limitation for lowering the Eco function. (☐ 182) • Optimising the cos/phi controller. (☐ 182)
Insufficient speed constancy at high load (setpoint and motor speed are not proportional anymore)	<ul style="list-style-type: none"> • Increase slip compensation (C00021). <p>Important: Unstable drive due to overcompensation!</p> <ul style="list-style-type: none"> • With cyclic load impulses (e. g. centrifugal pump), a smooth motor characteristic is achieved by smaller values in C00021 (possibly negative values). <p>Note: The slip compensation is only active for operation without speed feedback.</p>
"Clamp operation active" error message (OC11): Inverter cannot follow dynamic processes, i.e. too short acceleration/deceleration times in terms of load ratios.	<ul style="list-style-type: none"> • Increase the gain of the I_{max} controller (C00073) • Reduce the reset time of the I_{max} controller (C00074) • Prolong the acceleration time (C00012) • Prolong the deceleration time (C00013) • Make adaptations for the Eco function: <ul style="list-style-type: none"> • Improving the behaviour at high dynamic load changes. (☐ 181) • Adapting the slope limitation for lowering the Eco function. (☐ 182)
Motor stalling in the field weakening range (adaptation especially required for small machines)	<ul style="list-style-type: none"> • If motor power < inverter power: Set C00022 to I_{max} = 2 I_{rated motor} • Reduce dynamic performance of setpoint generation • Make adaptations for the Eco function: <ul style="list-style-type: none"> • Improving the behaviour at high dynamic load changes. (☐ 181) • Adapting the slope limitation for lowering the Eco function. (☐ 182)
Speed variations in no-load operation for speeds > 1/3 rated speed.	<p>Minimise speed oscillations with oscillation damping (C00234).</p>

Drive behaviour	Remedy
Speed variations in no-load operation and with load for speeds > rated speed.	Minimise speed oscillations with increasing the oscillation damping field weakening (C00236). Caution: If C00236 is increased, the maximum output voltage of the device is reduced!
Output voltage is too low. There is a too low maximum torque in the high field weakening range.	Reduction of the oscillation damping field weakening (C00236). Caution: When C00236 = 0, oscillation damping field weakening is inactive. Thus, a maximum output voltage is available but the tendency to speed oscillations in the field weakening range at no-load operation and with load increases.

5 Motor control (MCTRL)

5.6 V/f control (VFCplus + encoder)

5.6 V/f control (VFCplus + encoder)

The V/f characteristic control (VFCplus) described above can be operated with a speed feedback. This has the following advantages:

- Steady-state accuracy of the speed
- Less parameterisation effort compared to the sensorless vector control (SLVC)
- Improved dynamics compared to V/f characteristic control without feedback or to sensorless vector control (SLVC).
- Suitability for group drives



Stop!

The V/f control requires a speed feedback!

- The speed sensor used has to be set in [C00495](#). This setting is not made automatically with the selection of the motor from the »Engineer« motor catalogue!
- If no speed sensor is set in [C00495](#) and the controller is enabled, an impermissibly high motor current occurs which may destroy the motor thermally!
- From version 14.00.00, the error response set in [C00571/2](#) (Lenze setting: "Fault") takes place if in case of controller enable it is detected that a motor control type with feedback is set in [C00006](#) but no speed encoder is set in [C00495](#).



Stop!

V/f emergency operation

From version 16.00.00, it is internally switched to the encoderless V/f characteristic control in case of an encoder open circuit in order to avoid impermissible motor movements.

- In order that this "V/f emergency operation" works properly, the parameters relevant for the V/f characteristic control (base frequency, Vmin boost, slip compensation, etc.) have to be set correctly. As an alternative, a motor parameter identification can be executed as well.
- The change-over to "V/f emergency operation" is reported via bit 4 in [C01000](#) and via the *bWirebreakUfLinearActive* status signal at the SB [LS DeviceMonitor](#).
- The change-over to "V/f emergency operation" can be suppressed by setting bit 8 to "1" in [C02864/1](#).



The descriptions in chapter "[V/f characteristic control \(VFCplus\)](#)" also apply to the V/f control. ([157](#))



Note!

- Make sure that, when the motor control with speed feedback is in use, the maximum input frequency of 100 kHz is not exceeded. ▶ [Using DI1\(5\) and DI2\(6\) as frequency inputs](#) (📖 336)
- As the slip is calculated in the feedback V/f operation and injected through the slip regulator, the slip compensation ([C00021](#)) is deactivated with V/f control.

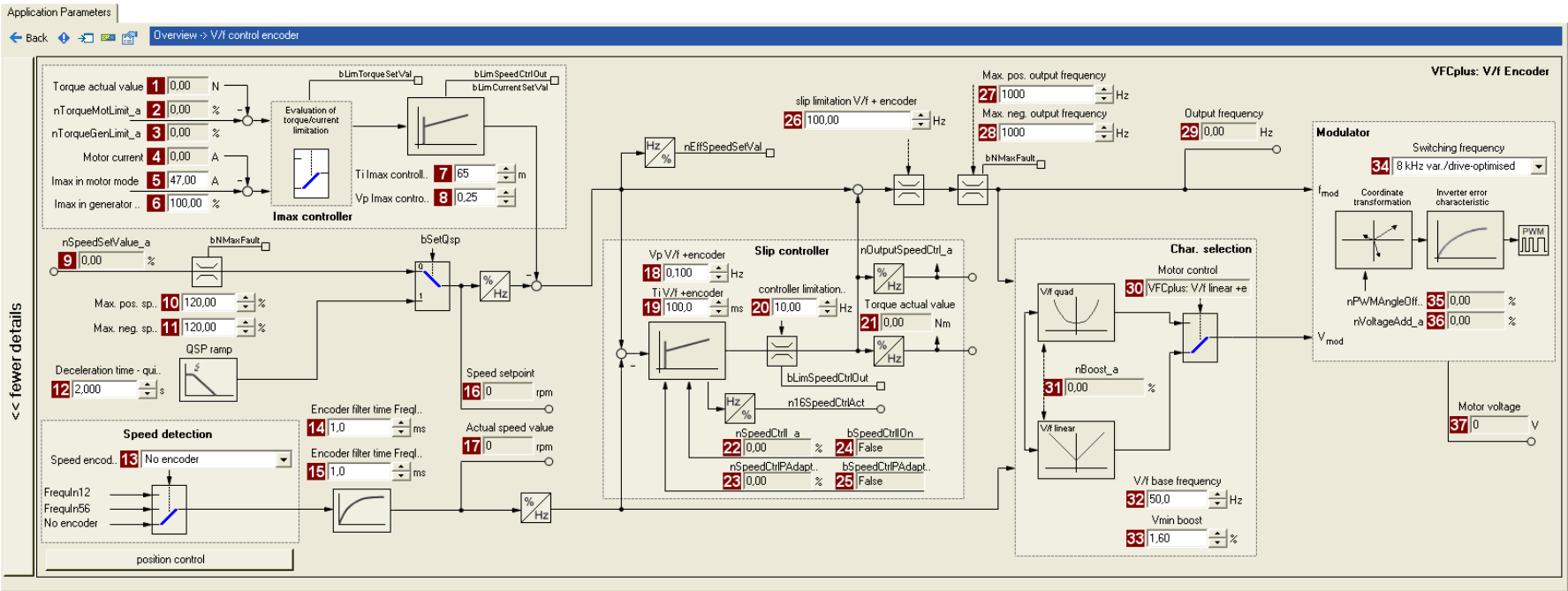
5.6.1

Parameterisation dialog/signal flow



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control from the *Overview* dialog level in the **Motor control** ([C00006](#)) list field:
 - "7: VFCplus: V/f linear +encoder" for linear characteristic or
 - "9: VFCplus: V/f quadr +encoder" for quadratic characteristic
4. Click the **Motor control V/f encoder** button to change to the *Overview → Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed, as shown in the following subchapter.



Parameters	Info	Parameters	Info	Parameters	Info
1	C00056/2 Actual torque value	16	C00050 Speed setpoint	29	C00058 Output frequency
2	C00830/29 Limitation of torque in motor mode	17	C00051 Actual speed value	30	C00006 Motor control
3	C00830/28 Limitation of torque in generator mode	18	C00972 Vp Vf+encoder	31	C00830/26 MCTRL: nBoost_a
4	C00054 Motor current	19	C00973 Ti Vf+encoder	32	C00015 V/f base frequency
5	C00022 I _{max} in motor mode	20	C00971/1 Controller limitation Vf+encoder	33	C00016 V _{min} boost
6	C00023 I _{max} in generator mode	21	C00056/2 Actual torque value	34	C00018 Switching frequency
7	C00074 Ti I _{max} controller	22	C00830/24 MCTRL: nSpeedCtrl_a	35	C00830/32 MCTRL: nPWMAngleOffset_a
8	C00073 Vp I _{max} controller	23	C00830/25 MCTRL: nSpeedCtrlPADapt_a	36	C00830/31 MCTRL: nVoltageAdd_a
9	C00830/22 Speed setpoint	24	C00833/31 MCTRL: bSpeedCtrlOn	37	C00052 Motor voltage
10	C00909/1 Max. pos. speed	25	C00833/69 MCTRL: bSpeedCtrlPADaptOn		
11	C00909/2 Max. neg. speed	26	C00971/2 Slip limitation Vf+encoder		More relevant parameters for Encoder/feedback system :
12	C00105 Decel. time - quick stop	27	C00910/1 Max. pos. output frequency		C00115 DI1/2 & DI5/6 function
13	C00495 Speed sensor selection	28	C00910/2 Max. neg. output frequency		C00420 Number of encoder increments
14	C00497/2 Encoder filter time FreqIn56				C00425 Encoder scanning time
15	C00497/1 Encoder filter time FreqIn12				C00496 Encoder evaluation method

5.6.2 Basic settings

In order to protect the drive system, carry out the commissioning of the V/f control and the slip regulator in several steps.

- Detailed information on the single steps can be found in the following subchapters or in the corresponding subchapters for V/f characteristic control.

Initial commissioning steps	
1	Define the V/f characteristic: <ul style="list-style-type: none"> • C00006 = 7: Linear characteristic • C00006 = 9: Quadratic characteristic
2.	Defining current limits (I_{max} controller) . (□ 162)
3.	Parameterise encoder/feedback system. ▶ Encoder/feedback system (□ 277)
4.	If special motors with a rated frequency other than 50 Hz or with a number of pole pairs ≠ 2 are used, set the motor parameters according to the motor nameplate. ▶ Motor selection/Motor data (□ 133)
5th	Define speed setpoint (e.g. 20 % of the rated speed) and enable inverter.
6.	Check whether the actual speed value (C00051) ≈ speed setpoint (C00050) and then inhibit the inverter again. <ul style="list-style-type: none"> • In case of a sign reversal between actual value and setpoint, check the connection of the encoder (e.g. change track A or B of the encoder or invert the actual speed value). • In case the actual value differs considerably from the setpoint (factor 2), set the motor parameters according to motor nameplate. Then repeat step 5.
6.	To protect the drive, reduce the slip regulator limitation in C00971/1 . <ul style="list-style-type: none"> • e.g. reduction to half the slip frequency (≈ 2 Hz)
8	Define speed setpoint (e.g. 20 % of the rated speed) and enable inverter.
9	In case of a semi-stable operational performance, reduce the reset time (C00972) or the proportional gain (C00973) of the slip regulator until a stable operation has been achieved. ▶ Parameterising the slip regulator (□ 189)
10	In a final step, increase the slip regulator limitation again in C00971/1 . <ul style="list-style-type: none"> • e.g. increase to twice the slip frequency



Tip!

Information on the further optimisation of the control mode and the adaptation to the real application is provided in the "[Optimising the control mode](#)" chapter for the V/f characteristic control ([□ 163](#))

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([□ 258](#))

5 Motor control (MCTRL)

5.6 V/f control (VFCplus + encoder)

5.6.2.1 Parameterising the slip regulator

The slip regulator is designed as a PI controller. In order to improve the response to setpoint changes, the setpoint speed or setpoint frequency is added to the output (correcting variable) of the slip regulator as feedforward control value.

- Unlike traditional speed controllers, the slip regulator only controls the slip.
- In the Lenze setting, the configuration of the slip regulator provides robustness and moderate dynamics.

Parameters	Info	Lenze setting	
		Value	Unit
C00971/1	VFC: Controller limitation V/f +encoder	10.00	Hz
C00971/2	VFC: Slip limitation V/f +encoder	100.00	Hz
C00972	VFC: Vp V/f +encoder	0.100	Hz/Hz
C00973	VFC: Ti V/f +encoder	100.0	ms

Slip regulator gain Vp

The setting range of the slip regulator gain Vp ([C00972](#)) which leads to a stable operational performance, mainly depends on the resolution of the speed sensor. There is a direct relationship between encoder resolution and gain:

- The higher the encoder resolution, the higher the gain can be set.

The following table provides maximum and recommended slip regulator gains for encoder with standard encoder increments:

Encoder increment [Increments/revolution]	Slip regulator gain Vp	
	maximum	recommended
8	0.09	0.06
64	0.52	0,31
100	0.79	0.47
120	0.94	0.57
128	1.00	0.60
256	1.29	0.77
386	1.63	0.98
512	1.97	1.18
640	2.31	1.38
768	2.65	1.59
896	2.99	1.79
1014	3.33	2.00
1536	4.69	2.81
2048	6.05	3.63
3072	8.77	5.26
4096	11.49	6.90

[5-1] Slip regulator gain Vp based on the encoder increment



How to adapt the slip regulator gain to the operating conditions:

1. Adapt the slip regulator gain ([C00972](#)) to the encoder increment according to table [\[5-1\]](#).
2. Set controller limitation ([C00971/1](#)) to half the slip frequency (≈ 2 Hz).
3. Select speed setpoint (e.g. 20 % of the rated speed).
4. Enable inverter.
5. Increase the slip regulator gain ([C00972](#)) until the drive is semi-stable.
 - This can be recognised by motor noises or "humming" of the motor or by a noise on the actual speed signal.
6. Reduce slip regulator gain ([C00972](#)) until the drive runs stable again (no motor "humming").
7. Reduce slip regulator gain ([C00972](#)) to approx. half the value.
 - With low encoder resolutions, another reduction of the slip regulator gain for low speeds may be necessary (speed setpoint ≈ 0).
 - We recommend to finally check the behaviour at setpoint speed = 0 and to further reduce the slip regulator gain if irregular running occurs.
8. Increase controller limitation ([C00971/1](#)) again (e.g. to twice the slip frequency).

Slip regulator time constant T_i



How to set the slip regulator time constant:

1. Set controller limitation ([C00971/1](#)) to half the slip frequency (≈ 2 Hz).
2. Select speed setpoint (e.g. 20 % of the rated speed).
3. Enable inverter.
4. Reduce the slip regulator time constant ([C00973](#)) until the drive is semi-stable.
 - This can be recognised by motor noise, "motor vibrations" or resonance on the actual speed value signal.
5. Increase slip regulator time constant ([C00973](#)) until the drive runs stable again (no motor "oscillation").
6. Increase the slip regulator time constant ([C00973](#)) to approx. twice the value.
7. Increase controller limitation ([C00971/1](#)) again (e.g. to twice the slip frequency).

Controller limitation

Max. intervention of the controller is limited by the controller limitation ([C00971/1](#)).

- The controller can be limited depending on the application.
- We recommend to limit the max. intervention to twice the rated slip of the motor.
- The rated slip is calculated as follows:

$$f_{\text{Slip}_{\text{Rated}}} [\text{Hz}] = f_{\text{Rated}} [\text{Hz}] - \left(\frac{n_{\text{Motor}_{\text{Rated}}} [\text{rpm}]}{60} \cdot p_{\text{Number of pole pairs}} \right)$$

[5-9] Calculation of the rated slip

**Note!**

A setting of [C00971/1](#) = 0 Hz deactivates the slip regulator. In this case, the structure of the V/f control corresponds to the structure of a V/f characteristic control without feedback.

Slip limitation

In addition to limiting the slip regulator, the field frequency to be injected can also be limited by another limiting element, the slip limitation ([C00971/2](#)).

- If the slip is e.g. limited to twice the rated slip of the motor, a stalling of the motor during very dynamic processes can be avoided.
- Motor stalling is caused by:
 - a high overcurrent at very steep speed ramps
 - very fast speed changes due to load, e.g. abrupt stopping of the drive due to an encounter with a stop or a load that is not moving.

5.7 Sensorless vector control (SLVC)

Sensorless vector control (SLVC) is based on a better motor current control according to a field-oriented control mode by Lenze.



Stop!

- The sensorless vector control (SLVC) is only suitable for asynchronous motors.
- The connected motor may be maximally two power classes lower than the motor assigned to the inverter.
- Operation of the sensorless vector control (SLVC) is only permissible for one single drive!
- Operation of the sensorless vector control (SLVC) is not permissible for hoists!
- The Lenze setting permits the operation of a power-adapted motor. Optimal operation is only possible if either:
 - the motor is selected via the Lenze motor catalogue
 - the motor nameplate data are entered and motor parameter identification is carried out afterwards
 - or -
 - the nameplate data and equivalent circuit data of the motor (motor leakage inductance and mutual motor inductance, slip compensation and motor stator resistance) are entered manually.
- When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the selected connection type.
 - In this context, also observe the instructions in chapter "[Adapting the V/f base frequency](#)" relating to V/f characteristic control. (164)



Note!

Optimal operation of the sensorless vector control (SLVC) can be achieved from a minimum speed of approx. 0.5-fold slip speed. At lower speed values below the 0.5-fold slip speed, the maximum torque is reduced.

The maximum field frequency with this motor control mode is 650 Hz.

In comparison to the V/f characteristic control without feedback, the following can be achieved by means of sensorless vector control SLVC:

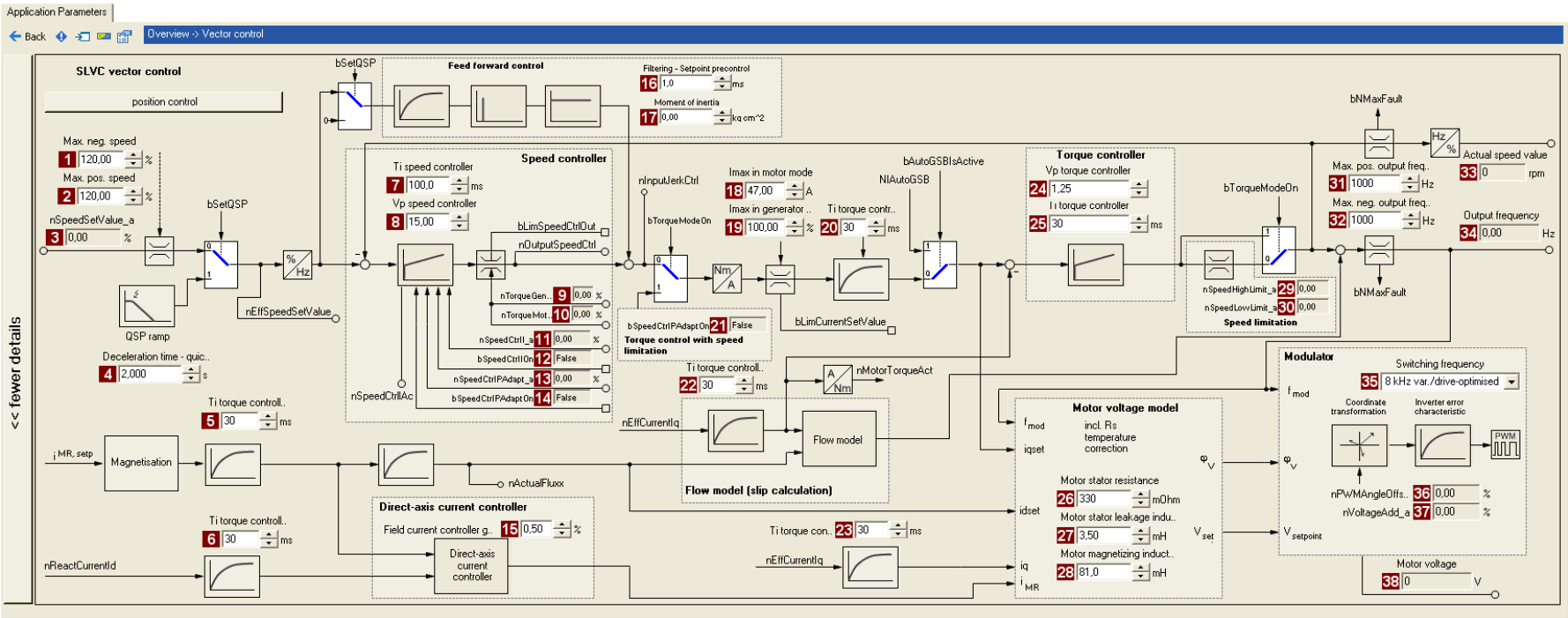
- A higher maximum torque throughout the entire speed range
- A higher speed accuracy
- A higher concentricity factor
- A higher level of efficiency
- The implementation of torque-controlled operation with speed limitation
- The limitation of the maximum torque in motor and generator mode for speed-controlled operation

5.7.1 Parameterisation dialog/signal flow



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "4: SLVC: Vector control" from the *Overview* dialog level in the **Motor control** list field ([C00006](#)):
4. Click the **Motor control vector** button to change to the *Overview → Motor control vector* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed, as shown in the following subchapter.



Parameters	Info	Parameters	Info	Parameters	Info
1	C00909/2 Max. neg. speed	16	C00275 Setpoint feedforward control filtering	24	C00073/2 SLVC: Vp torque controller
2	C00909/1 Max. pos. speed	17	C00273 Moment of inertia	25	C00074/2 SLVC: Ti torque controller
3	C00830/22 Speed setpoint	18	C00022 I _{max} in motor mode	26	C00084 Motor stator resistance
4	C00105 Decel. time - quick stop	19	C00023 I _{max} in generator mode	27	C00085 Motor stator leakage inductance
5	C00074/2 SLVC: Ti torque controller	20	C00074/2 SLVC: Ti torque controller	28	C00092 Motor magnetising inductance
6	C00074/2 SLVC: Ti torque controller	21	C00833/69 MCTRL: bSpeedCtrlPADaptOn	29	C00830/88 MCTRL: nSpeedHighLimit_a
7	C00071/1 SLVC: Ti speed controller	22	C00074/2 SLVC: Ti torque controller	30	C00830/23 MCTRL: nSpeedLowLimit_a
8	C00070/1 SLVC: Vp speed controller	23	C00074/2 SLVC: Ti torque controller	31	C00910/1 Max. pos. output frequency
9	C00830/28 Limitation of torque in generator mode			32	C00910/2 Max. neg. output frequency
10	C00830/29 Limitation of torque in motor mode			33	C00051 Actual speed value
11	C00830/24 MCTRL: nSpeedCtrlI_a			34	C00058 Output frequency
12	C00833/31 MCTRL: bSpeedCtrlIOn			35	C00018 Switching frequency
13	C00830/25 MCTRL: nSpeedCtrlPADapt_a			36	C00830/32 MCTRL: nPWMAngleOffset_a
14	C00833/69 MCTRL: bSpeedCtrlPADaptOn			37	C00830/31 MCTRL: nVoltageAdd_a
15	C00985 SLVC: Gain of field current controller			38	C00052 Motor voltage

5 Motor control (MCTRL)

5.7 Sensorless vector control (SLVC)

5.7.2 Types of control

The sensorless vector control can be operated in two different modes:

- [Speed control with torque limitation](#) ($bTorquemodeOn = FALSE$)
- [Torque control with speed limitation](#) ($bTorquemodeOn = TRUE$)

5.7.2.1 Speed control with torque limitation

When $bTorquemodeOn = FALSE$, the drive system is operated with a selected speed setpoint in a speed-controlled manner.

The operational performance can be adapted in the following ways:

- A. Overload limitation in the drive train
- B. Motor current limitation
- C. Slip compensation

Overload limitation in the drive train

The torque is limited via the torque setpoint.

- The torque setpoint is identical to the value at the output of the speed controller, $nOutputSpeedCtrl$.
- To avoid overload in the drive train, the torque in motor mode can be limited via the $nTorqueMotLimit_a$ process input signal, and the torque in generator mode can be limited via the $nTorqueGenLimit_a$ process input signal:

Designator <small>DIS code data type</small>	Information/possible settings
$nTorqueMotLimit_a$ C00830/29 INT	Torque limitation in motor mode <ul style="list-style-type: none">• Scaling: $16384 \equiv 100\% M_{max}$ (C00057)• Setting range: 0 ... +199.99 %• If keypad control is performed: Parameterisable via C00728/1. <p>From version 18.00.00 onwards: C02864: Bit 15 = 1: positive torque limitation ($nTorqueHighLimit_a$)</p>
$nTorqueGenLimit_a$ C00830/28 INT	Torque limitation in generator mode <ul style="list-style-type: none">• Scaling: $16384 \equiv 100\% M_{max}$ (C00057)• Setting range: -199.99 ... 0 %• If keypad control is performed: Parameterisable via C00728/2. <p>From version 18.00.00 onwards: C02864: Bit 15 = 1: negative torque limitation ($nTorqueLowLimit_a$)</p>



Note!

To avoid instabilities during operation, the torque limit values are internally processed as absolute values.

Motor current limitation

A cross current setpoint is calculated from the torque setpoint which is limited depending on the magnetising current, the max. current in motor mode ([C00022](#)) and the max. current in generator mode ([C00023](#)). The total current injected into the motor does not exceed the max. currents in motor mode and in generator mode.



Note!

For synchronous motors, the Lenze setting of the torque limits *nTorqueMotLimit_a* and *nTorqueGenLimit_a* to 100 % can result in the activation of the torque limitation for motor temperature < max. motor temperature before the set current limit values ([C00022](#), [C00023](#)) are reached.

- With a motor temperature of approx. 20°C and maximum load, the maximum current will then be set to approx. 15 % below the set current limit values.
- Remedy: If the torque limits *nTorqueMotLimit_a* and *nTorqueGenLimit_a* are increased to 115 %, the set current limit values can also be reached for a motor temperature of 20°C and maximum load.

Slip compensation

The slip of the machine is reconstructed using the slip model. An influencing parameter is the slip constant ([C00021](#)). ▶ [Slip compensation](#) (272)

5.7.2.2 Torque control with speed limitation

When *bTorquemodeOn* = TRUE, a torque-controlled operation is activated. The setpoint torque directly follows the default value *nTorqueSetValue_a*.

Due to its speed limitation, the torque-controlled drive can only rotate within a speed range whose positive speed is limited by *nSpeedHighLimit_a* and whose negative speed is limited by *nSpeedLowLimit_a*.



Note!

Absolute speed limitation to speed 0 rpm (*nSpeedLowLimit_a* or *nSpeedHighLimit_a* = 0) is only possible [from version 12.00.00](#).

- Quick stop (QSP) is used to switch over to [Speed control with torque limitation](#).
 - [From version 16.00.00](#), the torque setpoint *nSpeedSetValue_a* is set to 0 by quick stop (QSP) device-internally and the two torque limit values *nTorqueMotLimit_a* and *nTorqueGenLimit_a* are set to 100 % to stop the drive quickly and safely anytime. The previous behaviour can be set in [C2865/1](#) via bit 12 and bit 13.

- [From version 16.00.00](#), the *bLimSpeedTorquemodeOn* status signal is used to show that the speed limitation is active.
- The torque setpoint is calculated directly from *nTorqueSetValue_a*.
 - [From version 12.00.00 onwards](#), the torque limitation is active via *nTorqueMotLimit_a* and *nTorqueGenLimit_a* in this control mode, too, for the torque setpoint to be limited. The torque limitation can be deactivated in [C2865/1](#) via bit 0 to obtain the previous function.

Designator <small>DIS code data type</small>	Information/possible settings
<i>nTorqueSetValue_a</i> C00830/27 INT	Torque setpoint / additive torque <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % M_{max} (C00057)
<i>nSpeedHighLimit_a</i> C00830/88 INT	Upper speed limit for the speed limitation <ul style="list-style-type: none"> • During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) • Scaling: 16384 ≙ 100 % rated speed (C00011)
<i>nSpeedLowLimit_a</i> C00830/23 INT	Lower speed limit for speed limitation <ul style="list-style-type: none"> • During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) • Scaling: 16384 ≙ 100 % rated speed (C00011)
<i>nTorqueMotLimit_a</i> C00830/29 INT	Torque limitation in motor mode <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % M_{max} (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1. From version 18.00.00 onwards: C02864 : Bit 15 = 1: positive torque limitation (<i>nTorqueHighLimit_a</i>)
<i>nTorqueGenLimit_a</i> C00830/28 INT	Torque limitation in generator mode <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % M_{max} (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2. From version 18.00.00 onwards: C02864 : Bit 15 = 1: negative torque limitation (<i>nTorqueLowLimit_a</i>)

5.7.3 Basic settings

The following "Initial commissioning steps" must be performed to commission the sensorless vector control:

Initial commissioning steps			
1	Determine the motor control: C00006 = "4: SLVC: Vector control"		
2	Set the motor selection/motor data <ul style="list-style-type: none"> When selecting and parameterising the motor, the motor nameplate data and the equivalent circuit diagram data are relevant. Detailed information can be found in the "Motor selection/Motor data" chapter. (📖 133) Depending on the motor manufacturer, proceed as follows: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification </td> <td style="width: 50%; padding: 5px;"> Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram data manually: C00082: Motor rotor resistance C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance C00095: Motor magnetising current </td> </tr> </table>	Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram data manually: C00082 : Motor rotor resistance C00084 : Motor stator resistance C00085 : Motor stator leakage inductance C00092 : Motor magnetising inductance C00095 : Motor magnetising current
Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram data manually: C00082 : Motor rotor resistance C00084 : Motor stator resistance C00085 : Motor stator leakage inductance C00092 : Motor magnetising inductance C00095 : Motor magnetising current		
3	Define the type of control: <i>bTorquemodeOn</i> = FALSE: Speed control with torque limitation <i>bTorquemodeOn</i> = TRUE: Torque control with speed limitation		
4	Set the slip compensation (C00021). ▶ Slip compensation (📖 272)		



Tip!

Information on the optimisation of the control mode and the adaptation to the real application is provided in chapter "[Optimising the control mode](#)". ([📖 199](#))

We recommend to use the flying restart function for connecting/synchronising the inverter to an already rotating drive system. ▶ [Flying restart function](#) ([📖 264](#))

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([📖 258](#))

5.7.4 Optimising the control mode



Note!

From version 12.00.00:

- Following successful motor parameter identification, the current controller parameters ([C00075](#), [C00076](#)) are calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, the speed controller parameters ([C00070/1](#), [C00071/1](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "5".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

5.7.4.1 Optimising the starting performance after a controller enable

After the inverter has been enabled, the starting action of the motor is delayed due to the magnetisation of the motor. Under consideration of the motor rotor time constant ([C00083](#)), the time delay is calculated as follows:

$$\text{Magnetisation} = 1.5 * \text{motor rotor time constant}$$

If this delay cannot be tolerated for specific applications, the motor must always be operated in an energised condition. For this, select one of the following options:

Procedure without setting a controller inhibit

1. Deactivate the auto DCB function with [C00019](#) = 0.
2. Do not activate the controller inhibit. Instead, stop the drive by selecting a setpoint of 0 or by activating the quick stop function.

Procedure with setting a controller inhibit due to application requirements

1. Deactivate the auto DCB function with [C00019](#) = 0.
2. Enter a greater value for the motor rotor resistance (max. factor 2!) to reduce the magnetisation time in [C00082](#).



Note!

During the starting action, a jerk may occur in the machine due to the temporarily increased motor current!

5.7.4.2 Optimise speed controller

The speed controller is designed as a PI controller.

- In the Lenze setting, the configuration of the speed controller provides robustness and moderate dynamics.

Parameters	Info	Lenze setting	
		Value	Unit
C00070/1	SLVC: Vp speed controller	15.00	
C00071/1	SLVC: Ti speed controller	100.0	ms

Speed controller gain Vp

The gain Vp ([C00070/1](#)) of the speed controller is defined in a scaled representation which enables a comparable parameterisation almost independent of the power of the motor or inverter. Here, the speed input difference of the controller is scaled to the rated motor speed whereas the output torque refers to the rated motor torque. A gain of 10 means that a speed difference of 1 % is gained through the P component with 10 % torque.

If the rated data of the motor and the mass inertia of the drive system are known, we recommend the following setting:

$$V_p \approx 1.5 \dots 3 \cdot \frac{T_M[s]}{0.01[s]}$$

$$T_M[s] = \frac{2 \cdot \pi \cdot n_N[\text{rpm}]}{M_N[\text{Nm}] \cdot 60} \cdot J_{\text{Drive, total}}[\text{kgm}^2]$$

$$M_N[\text{Nm}] = \frac{P_N[\text{W}] \cdot 60}{2 \cdot \pi \cdot n_N[\text{rpm}]}$$

V_p = Gain of the speed controller ([C00070/1](#))
 T_M = Time constant for the acceleration of the motor
 M_N = Rated motor torque
 n_N = Rated motor speed
 J_{drive, total} = Total moment of inertia of the drive

[5-10] Recommendation for the setting of the gain of the speed controller



Tip! Values recommended by Lenze for the setting of the (proportional) gain:

- For drive systems without feedback: Vp = 6 ... 25
 - For drive systems with a good disturbance behaviour: Vp > 15
- In this case, we recommend the optimisation of the dynamic performance of the torque controller.

Speed controller reset time T_i

Apart from setting the P component, [C00071/1](#) provides the possibility to take influence on the I component of the PI controller.



Tip!

Value range recommended by Lenze for the setting of the reset time:

$$T_i = 20 \text{ ms} \dots 150 \text{ ms}$$

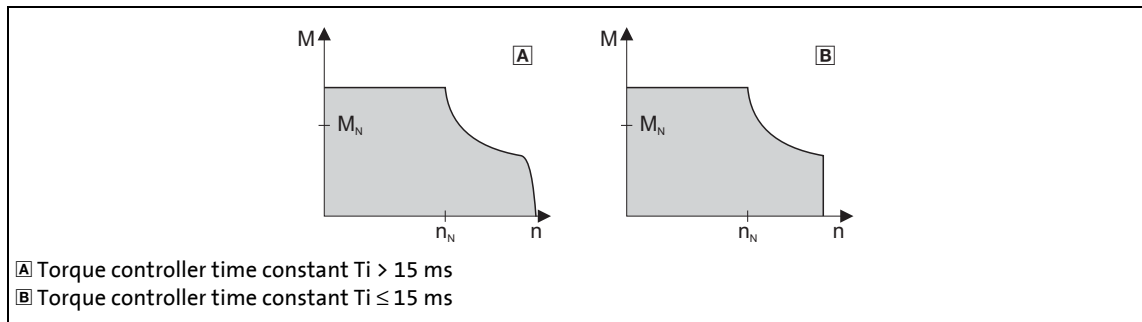
5.7.4.3 Optimising dynamic performance and field weakening behaviour

In the Lenze setting, the torque controller has been preset in such a way that robust and stable operation with a moderate dynamic response is enabled over the entire speed range. Retrospective optimisation of the controller parameters is not necessary.

Parameters	Info	Lenze setting	
		Value	Unit
C00073/2	SLVC: Vp torque controller	1.25	
C00074/2	SLVC: Ti torque controller	30	ms

A greater dynamic performance of the sensorless vector control can be achieved by reducing time constant T_i of the speed controller ([C00074/2](#)).

A greater dynamic performance of the field weakening function can be achieved by setting a time constant ≤ 15 ms. This means for actual speeds above rated speed a better torque-speed-characteristic in the field weakening range:



[5-11] Speed / torque characteristic diagram in the field weakening range

- For $T_i > 15$ ms (see A), the actual speed value slightly drops in the field weakening range if the load torque increases in the motor mode.
- For $T_i \leq 15$ ms (see B), the speed remains stable in the field weakening range if the torque is within the M/n characteristic field highlighted in grey.



Tip!

For applications with high dynamic performance and speed/torque accuracy requirements in the field weakening range, we recommend a time constant $T_i \leq 15$ ms.

In this case, the maximum torque should be limited via the $nTorqueMotLimit_a$ and $nTorqueGenLimit_a$ process input signals to $1.5 \times M_N$ to ensure stable operation in the field weakening range.

5.7.4.4 Optimising the stalling behaviour

Motor stalling due to a torque overload in the field weakening range is prevented in sensorless vector control by means of an inverter-internal stalling current monitoring. In the field weakening range, hence at frequencies above the base frequency, it reduces the maximum current to prevent the motor from stalling. The reduction depends on the current field frequency, the base frequency, the DC-bus voltage and the maximum current ([C00022](#)). Generally it applies that a higher field frequency causes a stronger limitation of the maximum current.

The field weakening behaviour of the sensorless vector control depends on the setting of the reset time T_i of the torque controller ([C00074/2](#)).

The following applies to the reset time T_i ([C00074/2](#)) > 15 ms:

The behaviour in the field weakening range can be adapted via the override point of field weakening ([C00080](#)). This parameter serves to shift the frequency-dependent maximum current characteristic:

- [C00080](#) > 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to higher field frequencies.
 - The maximally permissible current and the maximum torque increase in the field weakening range.
 - The risk of motor stalling increases.
- [C00080](#) < 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to lower field frequencies.
 - The maximally permissible current and the maximum torque are reduced in the field weakening range.
 - The risk of motor stalling is reduced.



Note!

We recommend to keep the Lenze setting (0 Hz).

The following applies to the reset time T_i ([C00074/2](#)) ≤ 15 ms:

The reduction of the magnetising current in the field weakening range can be adapted via the override point of field weakening ([C00080](#)):

- [C00080](#) > 0 Hz:

The reduction of the magnetising current is shifted to higher field frequencies. Here, there is a risk of the motor being magnetised too much and having too little voltage reserve for the torque-creating current.
- [C00080](#) < 0 Hz:

The reduction of the magnetising current is shifted to lower field frequencies.



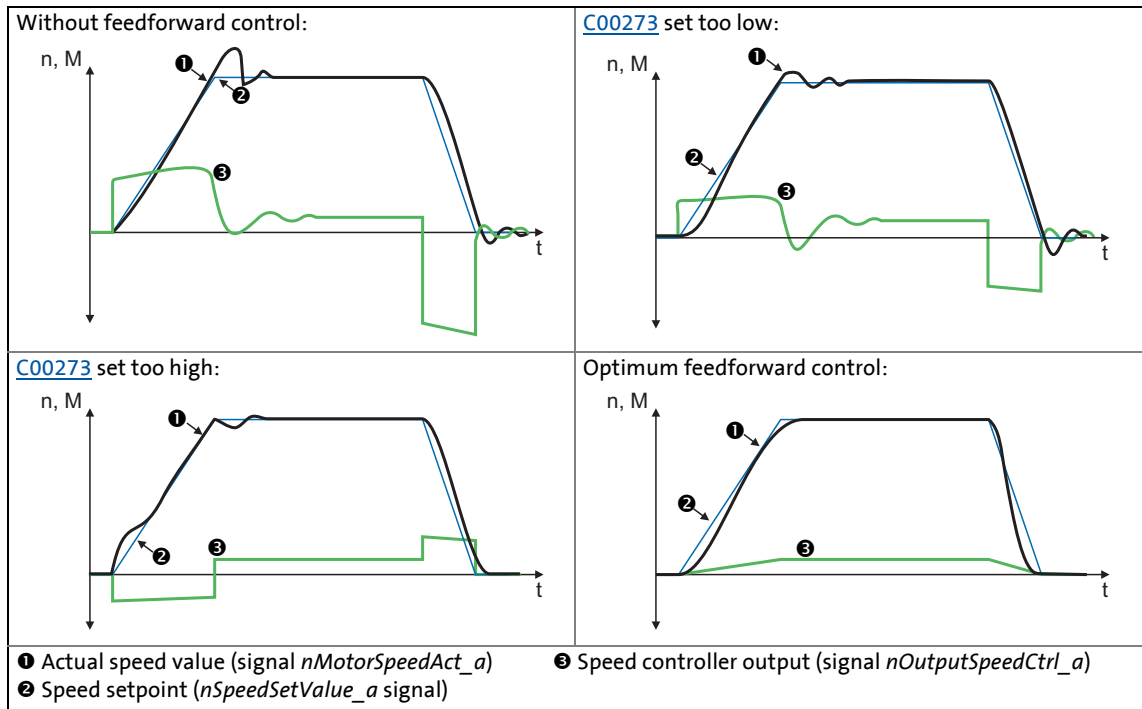
Note!

A function for enabling a stable operation can only be implemented to a limited extent with a reset time T_i ≤ 15 ms. For applications with speeds above the 2-fold rated speed, we recommend a reset time T_i ([C00074/2](#)) > 15 ms.

5.7.4.5 Optimise response to setpoint changes and determine mass inertia

Optimisation at constant mass inertia

Setting the total moment of inertia under [C00273](#) provides the optimum torque feedforward control. Depending on the application, an adjustment of the setting under [C00273](#) may be necessary to optimise the response to position/speed setpoint changes by means of the torque feedforward control.



[5-12] Typical signal characteristics for different settings of the load moment of inertia



How to optimise the torque feedforward control:

1. Run a typical speed profile and record the inputs and outputs of the speed controller with the data logger.
 - Motor control variables to be recorded:
 - nSpeedSetValue_a* (speed setpoint)
 - nMotorSpeedAct_a* (actual speed value)
 - nOutputSpeedCtrl_a* (speed controller output)
2. Estimate the moment of inertia and set it in [C00273](#) in relation to the motor end (i.e. with account being taken of the gearbox factors).
3. Repeat the data logger recording (see step 1).

Now the data logger should show that part of the required torque is generated by the feedforward control and the speed controller output signal (*nOutputSpeedCtrl_a*) is correspondingly smaller. The resulting following error decreases.
4. Change the setting in [C00273](#) and repeat the data logger recording until the intended response to setpoint changes is reached.
 - The optimisation could aim at the speed controller being completely relieved (see signal characteristics in Fig. [5-12]).
5. Save the parameter set (device command: [C00002/11](#)).

Optimisation at variable mass inertia

From version V12.00.00, mass inertia that changes during the process (e.g. a reel) can be taken into account when optimising the response to setpoint changes.

How to proceed:

1. In [C00273](#) the known constant total moment of inertia (motor, gearbox, shaft, etc.) must be set or determined according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile without variable mass inertia (e.g. reels).
2. At the [LS_MotorInterface](#) SB, the *nInertiaAdapt_a* process signal must be interconnected in a way which ensures that a value of "100 %" is applied at this input.
3. In [C00919/1](#) set the known maximum value of the variable moment of inertia or determine the value according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile including variable mass inertia (e.g. maximum reels).
4. The *nInertiaAdapt_a* process signal can be used during the process to dynamically control the percentage of the variable moment of inertia set in [C00919/1](#) which is to be considered for setpoint feedforward control.

Example :

- If there is no variable moment of inertia (e.g. no reel), the *nInertiaAdapt_a* process signal must be set to "0 %".
- If the maximally variable moment of inertia is available (e.g. maximum reels), the *nInertiaAdapt_a* process signal must be set to "100 %".



Tip!

Via the *nTorqueSetValue_a* process signal at the [LS_MotorInterface](#) SB, any differential signal can be defined for torque feedforward control. First the speed controller, then this additive torque is connected which is hence not derived from the differential change in speed setpoint.

Other functions for differential setpoint feedforward control

From version V12.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00653/1](#), the sensitivity of setpoint feedforward control can be adapted.
- In [C00654/1](#), alternatively to the *nSpeedSetValue_a* process signal, the new *nSpeedSetValueInertia_a* process signal for the setpoint feedforward control can be selected at the [LS_MotorInterface](#) SB. Via the *nSpeedSetValueInertia_a* process signal, an optional input value (e.g. setpoint of the position or process controller) for the torque feedforward control can be specified.
- For *bTorqueModeOn* = TRUE, the setpoint feedforward control is added to the torque setpoint *nTorqueSetValue_a*. In this way, feedforward control of torque is also possible for torque-controlled operation (e.g. for winder applications).

From version V18.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00654/1](#), an exact torque feedforward control can be set for the *nSpeedSetValue_a* speed setpoint. In case of a very dynamic application, set [C00654/1](#) = 2.
- From version V15.00.00 onwards, the torque feedforward control behaves differently than in version V14.00.00 or older. In order to achieve the same behaviour as in version V14.00.00 or older, set [C00654/1](#) = 3.



Stop!

In the Lenze setting of [C00654/1](#), the speed setpoint of the speed controller (*nSpeedSetValue_a*) is used for the torque feedforward control which is why it is also called "differential setpoint feedforward control". A very sharp change of the speed setpoint at the speed controller thus causes a strong torque impulse at the machine!

Causes for a very sharp change of the speed setpoint of the speed controller:

- A control creates the setpoint ramp itself and the speed setpoint is only written every 20 ms to the drive. (In this case, the speed setpoint is changed every 20 ms.)
 - Recommendation: Deactivate the torque feedforward control for the speed setpoint in [C00654/1](#) if the speed setpoint changes very sharply or the mass inertia is unknown (e.g. in case of hoists)!
- The reference speed [C0011](#) is much higher than the rated motor speed set in [C0087](#).
 - Recommendation: Deactivate the torque feedforward control for the speed setpoint in [C00654/1](#) if the reference speed [C0011](#) is 5 times higher than the rated motor speed [C0087](#).

5.7.4.6 Slip calculation from motor equivalent circuit diagram data

This function extension is available from version 12.00.00!

In order to achieve a better speed stability and torque accuracy, the slip calculation can be either derived from the motor nameplate data (e.g. rated motor speed) or the motor equivalent circuit diagram data (stator resistance, rotor resistance etc.).

The data to be used for sensorless vector control is selected via bit 0 in [C02879/1](#):

setting		Info
Bit 0	SLVC	In case of sensorless vector control: <ul style="list-style-type: none">• "0" ≙ Slip calculation from motor nameplate data (Lenze setting)• "1" ≙ Slip calculation from motor equivalent circuit diagram data
Bit 1	SC ASM	In case of servo control for asynchronous motors: <ul style="list-style-type: none">• "0" ≙ Slip calculation from motor nameplate data• "1" ≙ Slip calculation from motor equivalent circuit diagram data (Lenze setting)
Bit 2 ... 7	Reserved	



Note!

In order that the slip can be calculated from the motor equivalent circuit diagram data, the equivalent circuit data (stator resistance, rotor resistance etc.) must be known as exactly as possible.

- Selecting a motor in the »Engineer« motor catalogue loads the exact motor equivalent circuit diagram data.
- When the motor nameplate data is entered manually and the motor equivalent circuit diagram data is then detected via the motor parameter identification, the "extended identification" ([C02867/1](#) = 2) must be used. ▶ [Automatic motor data identification](#) (139)

In the slip calculation from the motor equivalent circuit diagram data, the slip compensation ([C00021](#)) has no influence anymore.

5.7.4.7 Optimising field feedforward control and torque feedforward control

At the start of an acceleration process and at the end of a deceleration process, the field current ($nReaktCurrentId_a$) may oscillate.

- Especially when accelerating via small acceleration ramps, these oscillations become obvious by the speed being unable to follow the setpoint or speed drops during acceleration.
- Oscillating can be reduced by increasing the gain of the field current controller in [C00985](#). A small increase of the cross current controller gain in [C00986](#) can further improve the starting performance for small acceleration ramps.

In the field weakening range, the cross current ($nEffCurrentIq_a$) may oscillate when an acceleration process starts or a deceleration process ends.

- In case of some motors, this cross current oscillation ($nEffCurrentIq_a$) can also occur in the motor setting range/field weakening range transitions which may also cause an overcurrent interruption.
- These oscillations can be reduced by again increasing the cross current controller gain slightly in [C00986](#).



Note!

The setting of [C00985](#) and [C00986](#) reduces the torque setting range.

5 Motor control (MCTRL)

5.7 Sensorless vector control (SLVC)

5.7.5 Remedies for undesired drive behaviour

Drive behaviour	Remedy
Deviation between no-load current and magnetising current or bad speed or torque accuracy.	<p>Adapt the motor magnetising inductance (C00092) for no-load operation.</p> <ul style="list-style-type: none"> • If the no-load current is greater than the magnetising current (C00095) at 0.5-fold rated motor speed, the magnetising inductance must be reduced until the no-load current and the magnetising current have the same values. • Otherwise, the magnetising inductance must be increased. <p>Tendency of the correction of C00092:</p> <p style="text-align: center;">PN: Rated motor power</p>
Insufficient speed constancy at high load: Setpoint and motor speed are not proportional anymore. Caution: Overcompensation of the settings mentioned under "Remedy" may result in unstable behaviour!	<p>Via the slip compensation (C00021), the speed stability under high loads can be affected:</p> <ul style="list-style-type: none"> • If $n_{act} > n_{slip}$, reduce the value in C00021 • If $n_{act} < n_{slip}$, increase the value in C00021
Unstable control with higher speeds.	<ul style="list-style-type: none"> • Check the setting of the magnetising inductance (C00092) by comparing the current consumption in no-load operation with the rated magnetising current (C00095). • Optimise oscillation damping (C00234).
"Short circuit" (OC1) or "Clamp operation active" (OC11) error messages at short acceleration time (C00012) in proportion to the load (inverter cannot follow the dynamic processes).	<ul style="list-style-type: none"> • Increase the gain of the torque controller (C00073/2). • Reduce the reset time of the torque controller (C00074/2). • Increase the acceleration (C00012)/deceleration (C00013) time.
Mechanical resonance at certain speeds.	The L_NSet_1 function block masks out those speed ranges that include resonance.
Speed variations in no-load operation for speeds > 1/3 rated speed.	Minimise speed oscillations with oscillation damping (C00234).
Drive runs unstable.	<p>Check set motor data (nameplate data and equivalent circuit diagram data).</p> <p>▶ Motor selection/Motor data (□ 133)</p>
Setpoint speed and actual speed differ strongly.	
The torque required is not generated at standstill.	Increase motor magnetising current (C00095).
Current overshoots occur when heavy loads are accelerated from standstill (OC1 or OC11 error).	
The machine runs uneven.	

5.8

Sensorless control for synchronous motors (SLPSM)

This function extension is available from version 12.00.00!

The sensorless control for synchronous motors is based on a decoupled and separated control of the torque-creating and field-creating current share of synchronous motors. In contrast to the servo control, the actual speed value and the rotor position are reconstructed via a motor model.



Stop!

- When the maximum output frequency is limited to ± 599 Hz, the devices are not subject to the export restrictions of the "EC-Dual-Use Regulation" - EC 428/2009. This applies to the devices supplied from the middle of the year 2015. The maximum possible output frequency is given on the nameplate.
 - For certain applications, the devices can be supplied with the previous maximum output frequency of ± 1000 Hz. If required, get in touch with your Lenze contact person.
- The sensorless control for synchronous motors is only possible up to a maximum output frequency of 650 Hz!
 - Depending on the number of motor pole pairs, the reference speed ([C00011](#)) may only be selected that high that the output frequency displayed in [C00059](#) is lower than 650 Hz.
- We recommend to select a power-adapted combination of inverter and motor.
- The Lenze setting permits the operation of a power-adapted motor. Optimal operation is only possible if either:
 - the motor is selected via the Lenze motor catalogue
 - the motor nameplate data are entered and motor parameter identification is carried out afterwards
 - or -
 - the nameplate data and equivalent circuit data of the motor (motor leakage inductance and motor stator resistance) are entered manually.
- When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the selected connection type.
- In order to protect the motor (e.g. from demagnetisation) we recommend setting the ultimate motor current in [C00939](#). This ensures motor protection even with an unstable operation. ▶ [Maximum current monitoring](#) (📖 319)
- Controller enable is only possible if the motor is at standstill.
 - In the Lenze setting, the rotor displacement angle is identified with every controller enable and thus a jerk in the machine after controller enable can be avoided. ▶ [Pole position identification without motion](#) (📖 227)
 - A flying restart circuit for synchronising to rotating motors is in preparation.
- The injection of a constant current may cause an unwanted heating of the motor at controlled operation.
 - We recommend using a temperature feedback via PTC or thermal contact. ▶ [Motor temperature monitoring \(PTC\)](#) (📖 313)

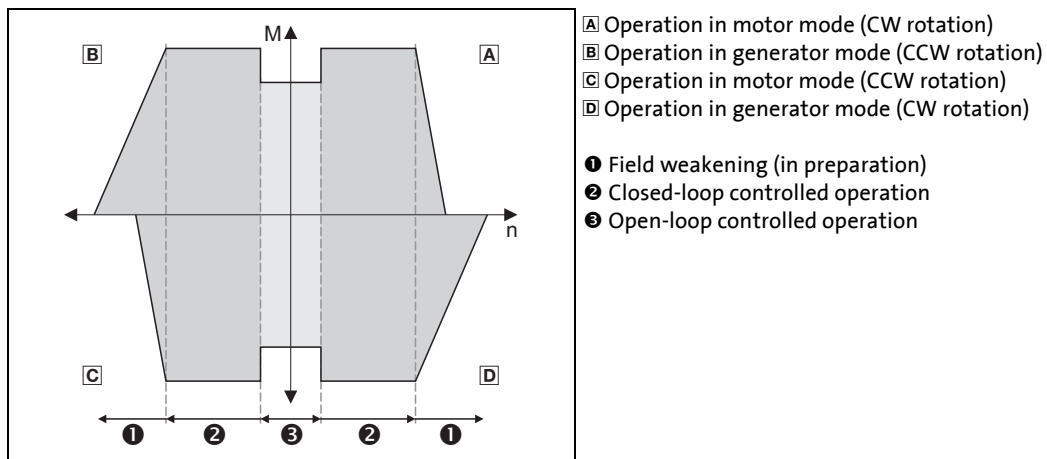
**Note!**

Currently, the sensorless control does not contain a flying restart function that enables a synchronisation of the inverter to a rotating machine.

- Thus, we recommend taking measures for preventing overvoltages at operation in generator mode (e.g. brake resistor).
- By any means, the delay time for the "DC-bus overvoltage" error trigger in [C00601/1](#) must be set to 0 s.

The motor model-based speed monitoring requires a rotating machine. Thus, the operational performance of the sensorless control for synchronous motors is divided into two categories:

1. Open-loop controlled operation ($|n_{\text{setpoint}}| < n_{C00996}$)
 - In the range of low speeds, the speed of a synchronous motor is not possible. Thus, only an adjustable and constant current is injected that enables an acceleration.
2. Closed-loop controlled operation ($|n_{\text{setpoint}}| > n_{C00996}$)
 - In this range, the rotor flux position and the speed are reconstructed via an observer. The control is carried out field-oriented. Only the current is injected that is needed for the required torque.



[5-13] Operating ranges of the sensorless control for synchronous motors

The sensorless control for synchronous motors has similar advantages for the closed-loop controlled operating range and the servo control (SC) for synchronous motors. Compared to asynchronous motors, there are the following advantages:

- Higher power density of the motor
- Higher efficiency
- Limitation of the maximum torque in motor mode and generator mode in closed-loop operating range
- Implementation of simple positioning

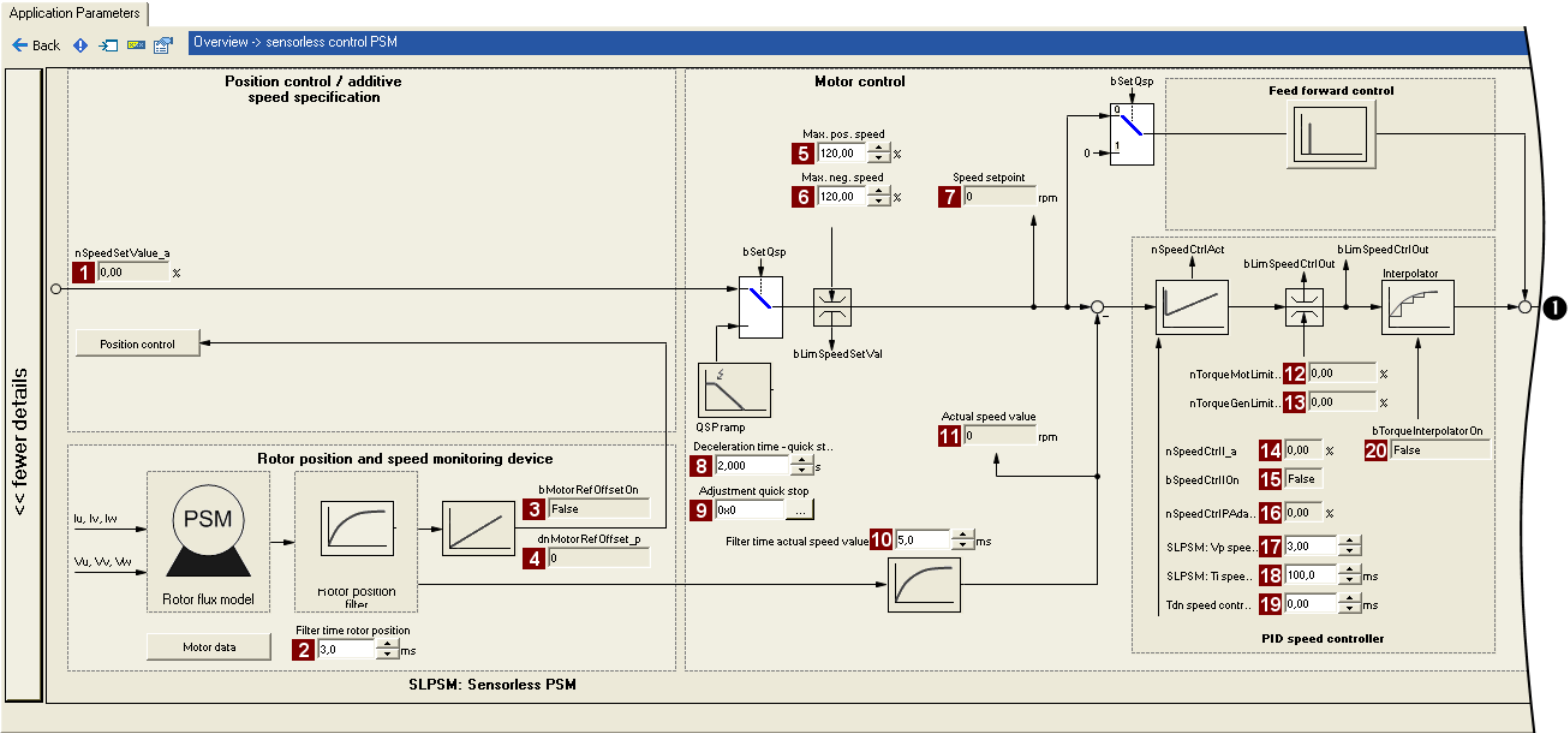
5.8.1 Parameterisation dialog/signal flow



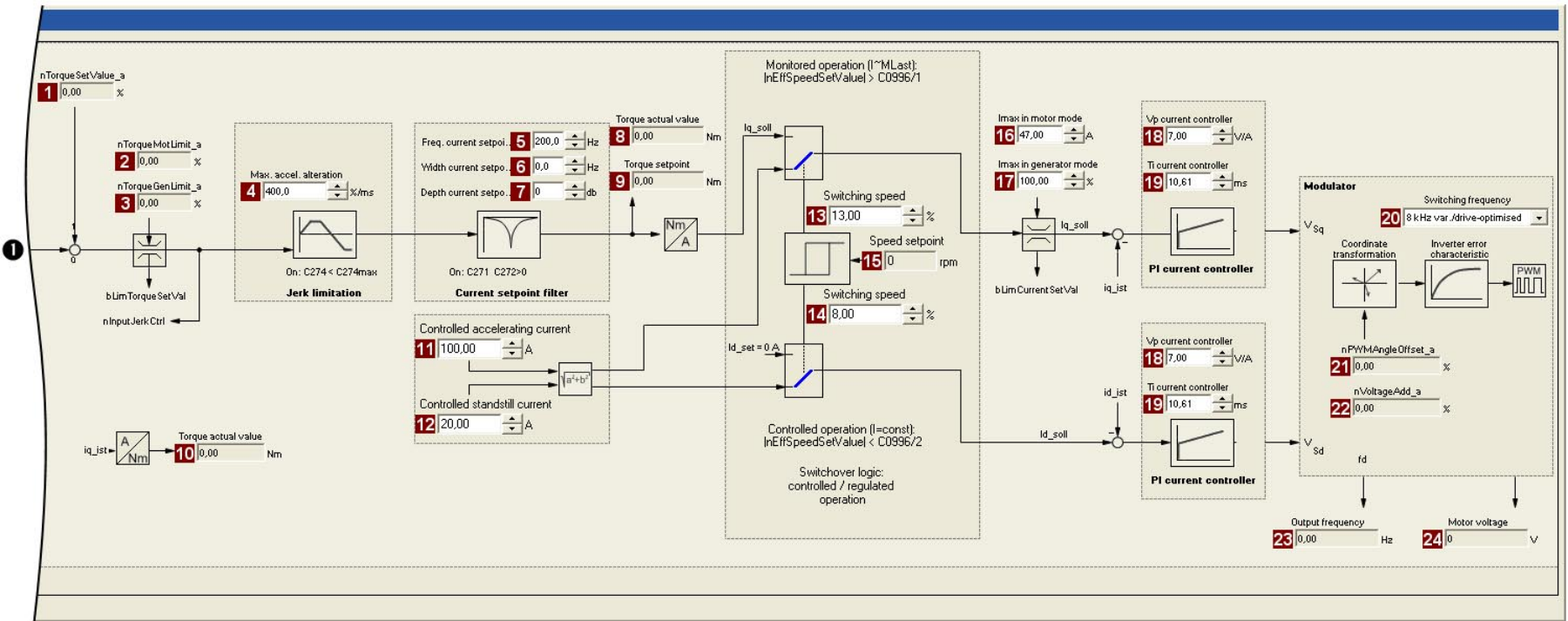
Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.

2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "3: SLPSM: Sensorless PSM" from the *Overview* dialog level in the **Motor control** list field:
4. Click the **Motor control servo SLPSM** button to change to the *Overview → Motor control vector* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed.



Parameters	Info	Parameters	Info	Parameters	Info
1	C00830/22 Speed setpoint	5	C00909/1 Max. pos. speed	12	C00830/29 Limitation of torque in motor mode
2	C00998/1 SLPSM: Filter time rotor position	6	C00909/2 Max. neg. speed	13	C00830/28 Limitation of torque in generator mode
3	C00833/68 MCTRL: bMotorRefOffsetOn	7	C00050 Speed setpoint	14	C00830/24 MCTRL: nSpeedCtrlI_a
4	C00834/6 MCTRL: dnMotorRefOffset_p	8	C00105 Decel. time - quick stop	15	C00833/31 MCTRL: bSpeedCtrlIOn
		9	C00104/1 Quick stop setting	16	C00830/25 MCTRL: nSpeedCtrlPAadapt_a
		10	C00998/2 SLPSM: Filter time actual speed value	17	C00070/3 SLPSM: Vp speed controller
		11	C00051 Actual speed value	18	C00071/3 SLPSM: Ti speed controller
				19	C00072 SC: Tdn speed controller
				20	C00833/29 MCTRL: bTorqueInterpolatorOn



Parameters	Info	Parameters	Info	Parameters	Info
1	C00830/27 MCTRL: nTorqueSetValue_a	11	C00995/1 SLPSM: Open-loop controlled accelerating current	18	C00075 Vp current controller
2	C00830/29 Limitation of torque in motor mode	12	C00995/2 SLPSM: Open-loop controlled standstill current	19	C00076 Ti current controller
3	C00830/28 Limitation of torque in generator mode	13	C00996/1 SLPSM: Closed-loop controlled switching speed	20	C00018 Switching frequency
4	C00274 SC: Max. change in acceleration	14	C00996/2 SLPSM: Open-loop controlled switching speed	21	C00830/32 MCTRL: nPWMAngleOffset_a
5	C00270 SC: Freq. current setpoint filter	15	C00050 Speed setpoint	22	C00830/31 MCTRL: nVoltageAdd_a
6	C00271 SC: Current setpoint filter width	16	C00022 Imax in motor mode	23	C00058 Output frequency
7	C00272 SC: Current setpoint filter depth	17	C00023 Imax in generator mode	24	C00052 Motor voltage
8	C00056/2 Actual torque value				
9	C00056/1 Torque demand				
10	C00056/2 Actual torque value				

5.8.2 Types of control

Sensorless control for synchronous motors can only be executed in the "Speed control with torque limitation" (*bTorquemodeOn* = FALSE) mode.

Speed control with torque limitation

A speed setpoint is selected and the drive system is operated in a speed-controlled manner. For adapting the operational performance, the overload in the drive train can be limited:

- The torque is limited via the torque setpoint.
- The torque setpoint is identical to the value at the output of the speed controller, *nOutputSpeedCtrl*.
- To avoid overload in the drive train, the torque in motor mode can be limited via the *nTorqueMotLimit_a* process input signal, and the torque in generator mode can be limited via the *nTorqueGenLimit_a* process input signal:

Designator <small>DIS code data type</small>	Information/possible settings
<i>nTorqueMotLimit_a</i> C00830/29 INT	Torque limitation in motor mode <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % M_{\max} (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1. From version 18.00.00 onwards: C02864 : Bit 15 = 1: positive torque limitation (<i>nTorqueHighLimit_a</i>)
<i>nTorqueGenLimit_a</i> C00830/28 INT	Torque limitation in generator mode <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % M_{\max} (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2. From version 18.00.00 onwards: C02864 : Bit 15 = 1: negative torque limitation (<i>nTorqueLowLimit_a</i>)



Stop!

Torque limitation is only active in the closed-loop controlled operation ($|n_{\text{Setpoint}}| > n_{\text{C00996}}!$)

- It must be prevented that the actual speed value is braked into the non-observable area due to the torque limitation!



Note!

To avoid instabilities during operation, the torque limit values are internally processed as absolute values.

5.8.3 Basic settings

The following "Initial commissioning steps" must be performed to commission the sensorless control for synchronous motors:

Initial commissioning steps			
1	Select motor control: C00006 = "3: SLPSM: Sensorless PSM"		
2.	<p>Set the motor selection/motor data</p> <ul style="list-style-type: none"> When selecting and parameterising the motor, the motor nameplate data and the equivalent circuit diagram data are relevant. Detailed information can be found in the "Motor selection/Motor data" chapter. (133) <p>Depending on the motor manufacturer, proceed as follows:</p> <table border="1"> <tr> <td> <p>Lenze motor:</p> <p>Selecting a motor from the motor catalogue in the »Engineer«</p> <p>- or -</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification </td> <td> <p>Third party manufacturer's motor:</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance </td> </tr> </table>	<p>Lenze motor:</p> <p>Selecting a motor from the motor catalogue in the »Engineer«</p> <p>- or -</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification 	<p>Third party manufacturer's motor:</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance
<p>Lenze motor:</p> <p>Selecting a motor from the motor catalogue in the »Engineer«</p> <p>- or -</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification 	<p>Third party manufacturer's motor:</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance 		
3.	<p>Set speed switching thresholds between open-loop and closed-loop controlled operation:</p> <ul style="list-style-type: none"> Set transition speed from closed-loop to open-loop operation in C00996/1 in [%] with regard to the rated motor speed (C00087). Set transition speed from closed-loop to open-loop operation in C00996/2 in [%] with regard to the rated motor speed (C00087). <p>Tip!</p> <ul style="list-style-type: none"> With voltage-adjusted motors, a speed switching threshold of 10 % is recommended. As a rule of thumb, the speed switching threshold should be selected as follows: $C00996/1...2 [\%] = \frac{U_{Rated, motor} [V]}{U_{Rated, FI} [V]} \cdot 10$		
4.	<p>Set open-loop accelerating current in C00995/1 in [%] with regard to the rated motor current (C00088).</p> <ul style="list-style-type: none"> This value defines the height of the current that is injected during the acceleration process. The accelerating current must be dimensioned so that the required torque in the lower speed range can always be reached (acceleration torque + load torque): $C00995/1 [\%] = \frac{M_{Meax} [Nm]}{M_{Rated} [Nm]} \cdot I_{Rated, motor} [A] \cdot 1.3$		
5th	<p>Set open-loop steady-state current in C00995/2 in [%] with regard to the rated motor current (C00088).</p> <ul style="list-style-type: none"> This value defines the height of the current for processes without acceleration (e.g. standstill or constant setpoint speed). 		
6.	<p>For improving the operating characteristics:</p> <p>If required, adapt the filter time for reconstructing the rotor position and the actual speed value through the motor model in C00998/1 and C00998/2.</p> <ul style="list-style-type: none"> We recommend using the Lenze setting: Filter time rotor position (C00998/1) = 3 ms Filter time actual speed value (C00998/2) = 5 ms Deviant from this, the following value range can be used: Filter time rotor position (C00998/1) = 2 ... 5 ms Filter time actual speed value (C00998/2) = 3 ... 8 ms 		
6.	<p>For protecting the motor from demagnetisation:</p> <p>Set the ultimate current in C00939.</p>		



Note!

The Lenze settings of the current controller are predefined for a power-adapted motor. For an optimal drive behaviour of a synchronous motor, we recommend to adapt the controller settings.



Information on the optimisation of the control mode and the adaptation to the real application is provided in the "[Optimising the control mode](#)" chapter.

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([📖 258](#))

5.8.4 Optimising the control mode

**Note!**

From version 12.00.00:

- Following successful motor parameter identification, the current controller parameters ([C00075](#), [C00076](#)) are calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, the speed controller parameters ([C00070/3](#), [C00071/3](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "5".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

The measures described in the following subchapters serve to further optimise the control behaviour of the sensorless control for synchronous motors and adjust it to the concrete application.

- [Optimise current controller.](#) (☞ 218)
 - The current controller should always be optimised if a motor of a third-party manufacturer with unknown motor data is used!
- [Optimise speed controller.](#) (☞ 219)
 - The setting of the speed controller must be adapted depending on the mechanical path.
- [Optimise response to setpoint changes and determine mass inertia.](#) (☞ 222)
 - For an optimal reference behaviour, the total moment of inertia can be used to make a feedforward control of the speed setpoint.
- [Current-dependent stator leakage inductance Ppp\(!\).](#) (☞ 225)
 - If the motor is operated with very low and very high currents during the process (e.g. in *Pick and place*-applications), the stator leakage inductance and current controller parameters can be tracked by means of an adjustable saturation characteristic.

**Note!****Current setpoint filter (band-stop filter) / jerk limitation**

The use of the functions is only recommended in exceptional cases.

The functions are described in chapter "[Servo control \(SC\)](#)":

- ▶ [Setting the current setpoint filter \(band-stop filter\)](#) (☞ 249)
- ▶ [Adapting the max. acceleration change \(jerk limitation\)](#) (☞ 250)

5.8.4.1 Optimise current controller

**Note!**

An optimisation of the current controller should generally be carried out unless a power-adapted standard motor is used or the motor has been selected from the motor catalogue of the »Engineer«!

An optimisation of the current controller is sensible since the two control parameters gain ([C00075](#)) and reset time ([C00076](#)) depend on the required maximum current and the set switching frequency.

Parameters	Info	Lenze setting	
		Value	Unit
C00075	Vp current controller	7.00	V/A
C00076	Ti current controller	10.61	ms

- Gain and reset time can be calculated as per the following formulae:

$$V_p = \frac{L_{ss}[H]}{T_E[s]}$$

$$T_i = \frac{L_{ss}[H]}{R_s[\Omega]}$$

V_p = Current controller gain ([C00075](#))

T_i = Current controller reset time ([C00076](#))

L_{ss} = Motor stator leakage inductance ([C00085](#))

R_s = Motor stator resistance ([C00084](#))

T_E = Equivalent time constant (= 500 μ s)

5.8.4.2 Optimise speed controller

The speed controller is in the form of a PID controller with an additional differential speed-setpoint gain. For optimum behaviour, the PID speed controller has to be optimised and the overall mass inertia of the drive train has to be determined.

- In the Lenze setting, the configuration of the speed controller provides robustness and moderate dynamics.

Parameters	Info	Lenze setting	
		Value	Unit
C00070/3	SLPSM: Vp speed controller	3.00	
C00071/3	SLPSM: Ti speed controller	100.0	ms
C00072	SC: Tdn speed controller	0.00	ms

Speed controller gain Vp

The gain Vp ([C00070/3](#)) of the speed controller is defined in a scaled representation which enables a comparable parameterisation almost independent of the power of the motor or inverter. Here, the speed input difference of the controller is scaled to the rated motor speed whereas the output torque refers to the rated motor torque. A gain of 10 means that a speed difference of 1 % is gained through the P component with 10 % torque.

If the rated data of the motor and the mass inertia of the drive system are known, we recommend the following setting:

$$V_p \approx 0.2 \dots 0.5 \cdot \frac{T_M[s]}{0.01[s]}$$

$$T_M[s] = \frac{2 \cdot \pi \cdot n_N[\text{rpm}]}{M_N[\text{Nm}] \cdot 60} \cdot J_{\text{Drive, total}}[\text{kgm}^2]$$

$$M_N[\text{Nm}] = \frac{P_N[\text{W}] \cdot 60}{2 \cdot \pi \cdot n_N[\text{rpm}]}$$

V_p = Gain of the speed controller ([C00070/3](#))
 T_M = Time constant for the acceleration of the motor
 M_N = Rated motor torque
 n_N = Rated motor speed
 $J_{\text{drive, total}}$ = Total moment of inertia of the drive

[5-14] Recommendation for the setting of the gain of the speed controller

If the mass inertia of the drive is unknown, the optimisation can be achieved as follows:

1. Specify speed setpoint.
 - A small speed just above the switching threshold is recommended in the closed-loop controlled operation.
2. Increase V_p ([C00070/3](#)) until the drive starts to oscillate (observe engine noise).
3. Reduce V_p ([C00070/3](#)) until the drive runs stable again.
4. Reduce V_p ([C00070/3](#)) to approx. half the value.
5. Afterwards check results of the optimisation in the entire speed range (one-time passing through of the speed range).



Tip!

Values recommended by Lenze for the setting of the (proportional) gain:

- For drive systems without feedback: $V_p = 2 \dots 8$
- For drive systems with a good disturbance behaviour: $V_p > 6$

Speed controller reset time T_i

Apart from setting the P component, [C00071/3](#) provides the possibility to take influence on the I component of the PI controller.

If the mass inertia of the drive is unknown, the optimisation can be achieved as follows:

1. Specify speed setpoint.
2. Reduce T_i ([C00071/3](#)) until the drive starts to oscillate (observe engine noise).
3. Increase T_i ([C00071/3](#)) until the drive runs stable again.
4. Increase T_i ([C00071/3](#)) to approx. twice the value.



Tip!

Value range recommended by Lenze for the setting of the reset time:

$T_i = 20 \text{ ms} \dots 150 \text{ ms}$

Using the ramp response for setting the speed controller

If the mechanical components cannot be operated at the stability limit, the ramp response can also be used for setting the speed controller.



Stop!

If the controller parameters are preset unfavourably, the control can tend to heavy overshoots up to instability!

- Following and speed errors can adopt very high values.
- If the mechanics are sensitive, the corresponding monitoring functions are to be activated.



Note!

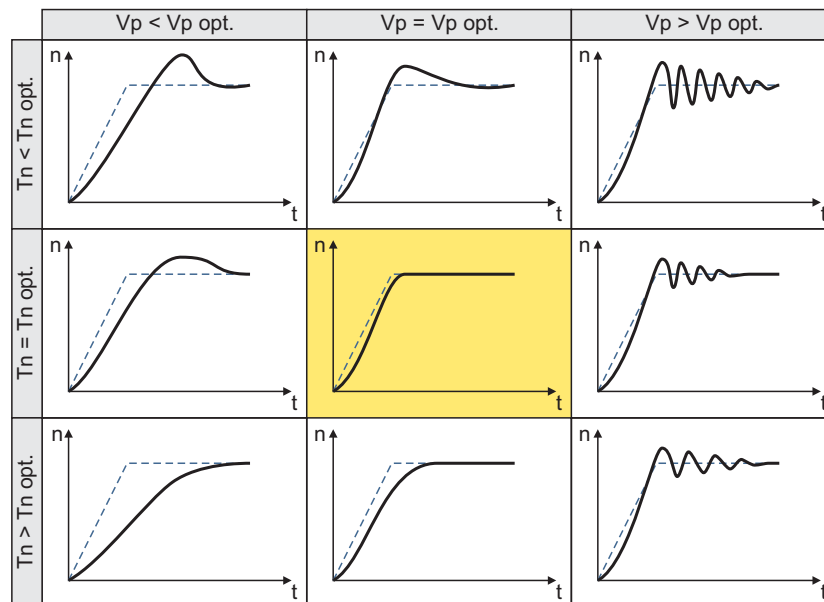
For an optimal setting, we recommend to determine the mass inertia (optimal response to setpoint changes) first.

► [Optimise response to setpoint changes and determine mass inertia](#) (📖 222)



How to optimise the speed controller setting by means of the ramp response:

- Run a typical speed profile and record the ramp response of the speed using the data logger.
 - Motor control variables to be recorded:
 - nSpeedSetValue_a* (speed setpoint)
 - nMotorSpeedAct_a* (actual speed value)
- Evaluate the ramp response:



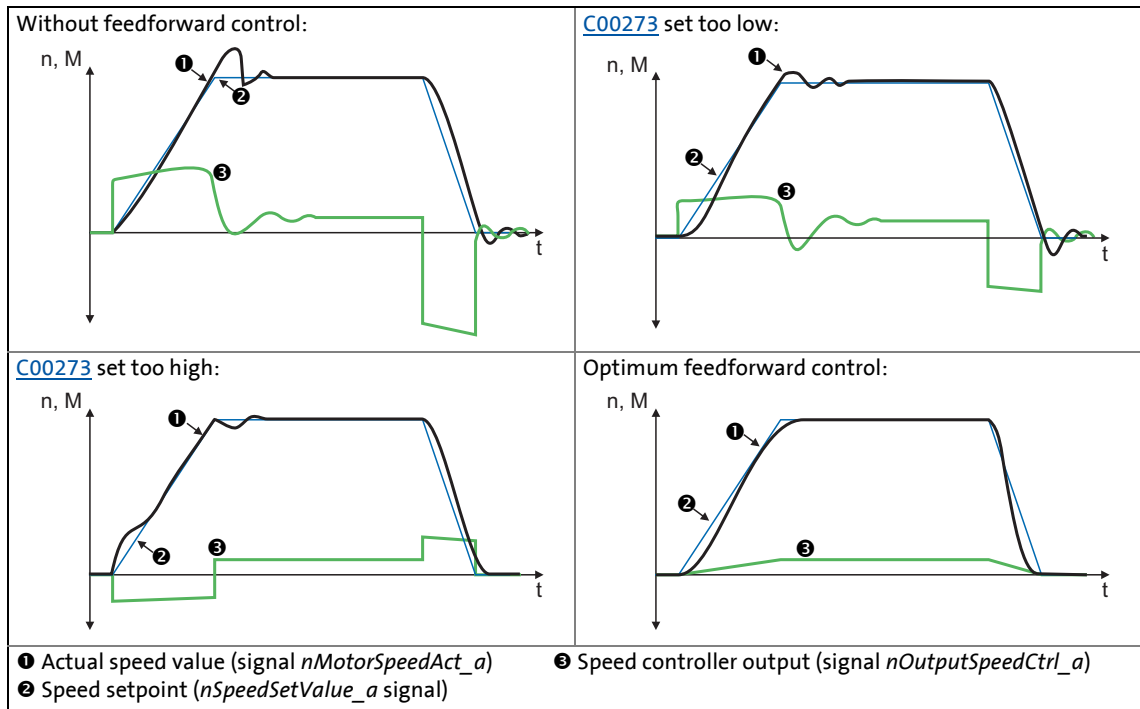
- Solid line = ramp response (actual speed value)
- Dash line = speed setpoint

- Change gain V_p in [C00070/3](#) and reset time T_n in [C00071/3](#).
- Repeat steps 1 ... 3 until the optimum ramp response is reached.

5.8.4.3 Optimise response to setpoint changes and determine mass inertia

Optimisation at constant mass inertia

Setting the total moment of inertia under [C00273](#) provides the optimum torque feedforward control. Depending on the application, an adjustment of the setting under [C00273](#) may be necessary to optimise the response to position/speed setpoint changes by means of the torque feedforward control.



[5-15] Typical signal characteristics for different settings of the load moment of inertia



How to optimise the torque feedforward control:

- Run a typical speed profile and record the inputs and outputs of the speed controller with the data logger.
 - Motor control variables to be recorded:
 - nSpeedSetValue_a* (speed setpoint)
 - nMotorSpeedAct_a* (actual speed value)
 - nOutputSpeedCtrl_a* (speed controller output)
- Estimate the moment of inertia and set it in [C00273](#) in relation to the motor end (i.e. with account being taken of the gearbox factors).
- Repeat the data logger recording (see step 1).

Now the data logger should show that part of the required torque is generated by the feedforward control and the speed controller output signal (*nOutputSpeedCtrl_a*) is correspondingly smaller. The resulting following error decreases.
- Change the setting in [C00273](#) and repeat the data logger recording until the intended response to setpoint changes is reached.
 - The optimisation could aim at the speed controller being completely relieved (see signal characteristics in Fig. [5-15]).
- Save the parameter set (device command: [C00002/11](#)).

Optimisation at variable mass inertia

From version V12.00.00, mass inertia that changes during the process (e.g. a reel) can be taken into account when optimising the response to setpoint changes.

How to proceed:

1. In [C00273](#) the known constant total moment of inertia (motor, gearbox, shaft, etc.) must be set or determined according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile without variable mass inertia (e.g. reels).
2. At the [LS_MotorInterface](#) SB, the *nInertiaAdapt_a* process signal must be interconnected in a way which ensures that a value of "100 %" is applied at this input.
3. In [C00919/1](#) set the known maximum value of the variable moment of inertia or determine the value according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile including variable mass inertia (e.g. maximum reels).
4. The *nInertiaAdapt_a* process signal can be used during the process to dynamically control the percentage of the variable moment of inertia set in [C00919/1](#) which is to be considered for setpoint feedforward control.

Example :

- If there is no variable moment of inertia (e.g. no reel), the *nInertiaAdapt_a* process signal must be set to "0 %".
- If the maximally variable moment of inertia is available (e.g. maximum reels), the *nInertiaAdapt_a* process signal must be set to "100 %".



Tip!

Via the *nTorqueSetValue_a* process signal at the [LS_MotorInterface](#) SB, any differential signal can be defined for torque feedforward control. First the speed controller, then this additive torque is connected which is hence not derived from the differential change in speed setpoint.

Other functions for differential setpoint feedforward control

From version V12.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00653/1](#), the sensitivity of setpoint feedforward control can be adapted.
- In [C00654/1](#), alternatively to the *nSpeedSetValue_a* process signal, the new *nSpeedSetValueInertia_a* process signal for the setpoint feedforward control can be selected at the [LS_MotorInterface](#) SB. Via the *nSpeedSetValueInertia_a* process signal, an optional input value (e.g. setpoint of the position or process controller) for the torque feedforward control can be specified.
- For *bTorqueModeOn* = TRUE, the setpoint feedforward control is added to the torque setpoint *nTorqueSetValue_a*. In this way, feedforward control of torque is also possible for torque-controlled operation (e.g. for winder applications).

From version V18.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00654/1](#), an exact torque feedforward control can be set for the *nSpeedSetValue_a* speed setpoint. In case of a very dynamic application, set [C00654/1](#) = 2.
- From version V15.00.00 onwards, the torque feedforward control behaves differently than in version V14.00.00 or older. In order to achieve the same behaviour as in version V14.00.00 or older, set [C00654/1](#) = 3.



Stop!

In the Lenze setting of [C00654/1](#), the speed setpoint of the speed controller (*nSpeedSetValue_a*) is used for the torque feedforward control which is why it is also called "differential setpoint feedforward control". A very sharp change of the speed setpoint at the speed controller thus causes a strong torque impulse at the machine!

Causes for a very sharp change of the speed setpoint of the speed controller:

- A control creates the setpoint ramp itself and the speed setpoint is only written every 20 ms to the drive. (In this case, the speed setpoint is changed every 20 ms.)
 - Recommendation: Deactivate the torque feedforward control for the speed setpoint in [C00654/1](#) if the speed setpoint changes very sharply or the mass inertia is unknown (e.g. in case of hoists)!
- The reference speed [C0011](#) is much higher than the rated motor speed set in [C0087](#).
 - Recommendation: Deactivate the torque feedforward control for the speed setpoint in [C00654/1](#) if the reference speed [C0011](#) is 5 times higher than the rated motor speed [C0087](#).

5.8.4.4 Current-dependent stator leakage inductance Ppp(I)

The current controller must be adjusted to the electrical characteristics of the motor stator resistance ([C00084](#)) and stator leakage inductance ([C00085](#)). In case of modern motors, the stator leakage inductance changes with the height of the current so that a new current controller setting is required for each current height.

When the motor is operated with very low and very high currents (e.g. in *Pick and place* applications), it is not always possible to achieve a satisfactory current controller setting for all operating points. For this purpose, the correction of the stator leakage inductance and current controller parameters is now possible via an adjustable saturation characteristic (17 interpolation points).

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C02853/1...17	PSM: Ppp saturation characteristic (17 interpolation points)	100	%
C02855	PSM: I _{max} L _{ss} saturation characteristic	3000.0	A
C02859	PSM: Activate Ppp saturation char.	0	Off

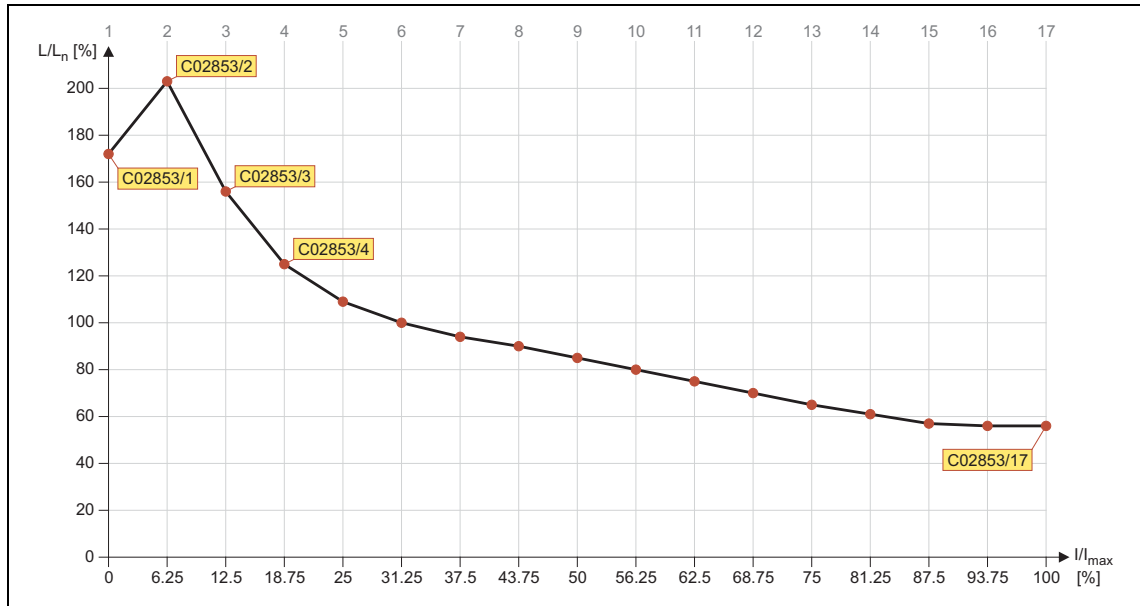


Note!

- The saturation characteristic is not only used for the correction of the current controller but also influences the current controller feedforward control ([C00079/1](#)).
- When a Lenze motor is selected from the »Engineer« motor catalogue, the corresponding saturation characteristic is set in [C02853/1...17](#) and – if required – the correction via this saturation characteristic is switched on in [C02859](#).
- For third-party motors: If the current controller becomes unstable with high currents, contact the motor manufacturer to find out whether the stator leakage inductance changes with the current level. If required, the saturation characteristic of this motor must be set in [C02853/1...17](#) and then activated in [C02859](#).

Distribution of the grid points

- The saturation characteristic is represented by 17 interpolation points linearly distributed on the X axis ([C02853/1...17](#)).
- Interpolation point 17 represents 100 % of the maximum motor current in the process ([C02855](#)).
- The following diagram shows the saturation characteristic stored in the »Engineer« motor catalogue for the Lenze motor "MCS12H15" as an example:



[5-16] Saturation characteristic: Inductance referring to the inductance for rated current

5.8.5 Pole position identification without motion

When sensorless control is active for synchronous motors (SLPSM), the rotor displacement angle is identified with every controller enable in the Lenze setting and thus a jerk in the machine after controller enable can be avoided.

The "Pole position identification without motion" is able to identify the electrical rotor displacement angle with an accuracy of up to 10°. The identification takes 1 ... 15 ms depending on the motor. The function is preset in the Lenze setting so that no further settings need to be made in the majority of cases. In order to get the same behaviour as before, the function can be deactivated in [C02874](#).

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C02874	Pole position identification	1: On	
C02872	PLI: Adaptation of time period PLI in operation	0	
C02875	PLI: Adaptation of ident angle PLI in operation	0	°
C02870	PLI: Degree of optimisation	-	%
C02871	PLI: Identification time	-	ms
C02873	PLI: Identified rotor displacement angle	-	°
Greyed out = display parameter			



Note!

In case of synchronous motors with a stator time constant < 1 ms, the pole position identification is not executed since the resulting test current pulse could exceed the permissible motor current.

- This, however, only affects very few synchronous motors with very low power (e.g. Lenze motor MDSKS-020-13-300 with rated power of 40 W).
- A non-executed pole position identification can be recognised by the display [C02870](#) = 0 % and [C02871](#) = 0 ms.

- The stator time constants can be calculated based on the following formula:

$$T_s[\text{ms}] = \frac{L_{ss}[\text{mH}]}{R_s[\Omega]}$$

T_s = stator time constant
 L_{ss} = Motor stator leakage inductance ([C00085](#))
 R_s = Motor stator resistance ([C00084](#))

Optimising the pole position identification



Stop!

In case of a too high setting in [C02872](#), an impermissible motor current may occur during pole position identification. In this case, the "Fault" error response occurs and the "ID5: Pole position identification error" error message entered in the logbook.

In case of a considerably too high setting in [C02872](#):

- The following current monitoring functions can be triggered:
 - OC7: Motor overcurrent
 - OC11: Active clamp operation
 - OC1: Power section - short circuit
- The optimisation degree "0 %" is displayed in [C02870](#).
- The time "0 ms" is displayed in [C02871](#).



How to optimise the pole position identification without motion:

1. For optimisation, enable the controller for various rotor displacement angles.
2. After every controller enable, check the optimisation degree displayed in [C02870](#).
The pole position identification is set optimally if an optimisation degree in the range 70 ... 130 % is displayed in [C02870](#) after every controller enable.
3. When the optimisation degree is > 130 %:
Reduce the setting in [C02872](#) step by step and execute controller enable for various rotor displacement angles until an optimisation degree < 130 % is displayed.
4. When the optimisation degree is < 70 %:
Increase setting in [C02872](#) step by step and execute controller enable for various rotor displacement angles until an optimisation degree > 70 % is displayed.
5. Optionally: [C02875](#) serves to increase or reduce the identified electrical rotor displacement angle. This can prevent e.g. a reversing of the motor due to the accuracy of identification if applications require it.

5.8.6 Field weakening for synchronous motors

**Note!**

In the Lenze setting, the field weakening for synchronous motors is activated in [C00079/4](#).

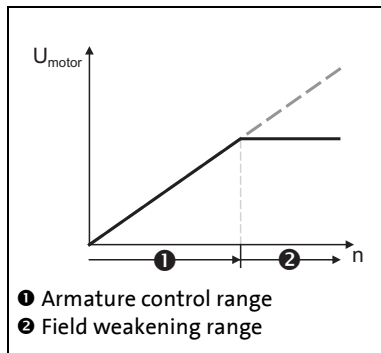
- If a high energy efficiency is required, keep the field weakening switched off or restrict the field weakening operation via [C00938](#).

**Stop!**

In the field weakening operation, a current is injected into the synchronous motor even in idle state which can rise to maximum current ([C00022](#)).

Ensure that this no-load current does not cause the motor to be heated impermissibly!

- We recommend using a temperature feedback via PTC or thermal contact. ▶ [Motor temperature monitoring \(PTC\)](#) (📖 313)

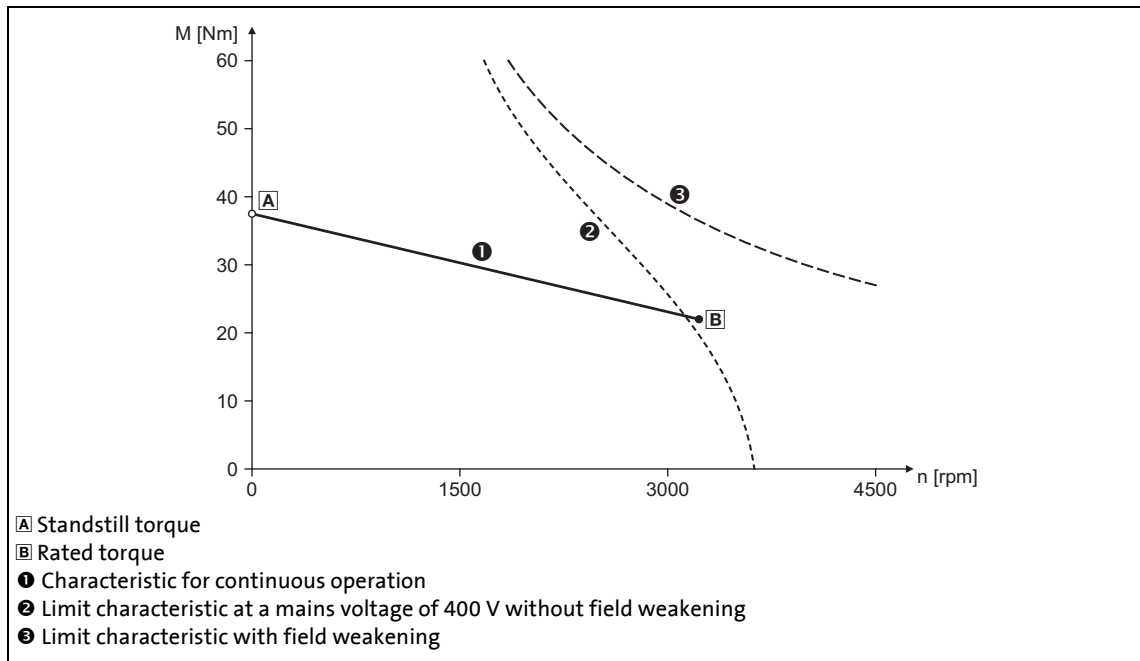


- When field weakening is switched on, the motor magnetising current is increased from 0 A to the maximally effective magnetising current via an internal control loop when the voltage limit is reached.
- As a result, a higher speed can be reached at the same motor voltage or DC-bus voltage.

[5-17] Voltage/speed characteristic with switched-on field weakening

$$n_{\text{max}} = n_{\text{nenn_mot}} \cdot \frac{800\text{V}}{\sqrt{2} \cdot U_{\text{nenn_mot}}}$$

[5-18] Calculation of the maximally reachable speed with switched-on field weakening



[5-19] Speed/torque characteristics of a synchronous servo motor with field weakening

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00079/4	Field weakening	1	On
C00938	Limitation of maximally effective field-producing motor current • With regard to rated motor current (C00088)	30	%
C00937/1	Maximally effective field-producing motor current	-	A

Greyed out = display parameter

- The maximally effective field-producing motor current is calculated based on the motor data set in [C00085](#), [C00089](#) and [C00098](#). Then, the value is internally limited to 98 % of the set maximum current ([C00022](#) or maximally permissible current for the permanent switching frequency set in [C00018](#)).
- [C00938](#) serves to limit the maximally effective field-producing motor current as well.
 - In the Lenze setting, the field weakening for synchronous motors is active ([C00079/4](#)). However, the field-producing motor current is limited via [C00938](#) to 30 % of the rated motor current ([C00088](#)). Hence, the maximum speed is limited during field weakening operation and, at the same time, the temperature rise of the motor during field weakening operation and no-load operation is also limited.
 - If a higher speed for the field weakening operation is required or the current in the field weakening operation is to be limited (e.g. since no motor temperature detection is available and/or heating in the field weakening operation is to be limited), the value must be increased or reduced accordingly in [C00938](#).

- In [C000937/1](#), the actually used maximally effective field-producing motor current is displayed.
 - With switched-on and active field weakening: 0.00 A ... -x.xx A
 - With sensorless control for synchronous motors (SLPSM), the injected current is displayed in open-loop controlled operation: 0.00 A ... +x.xx A
 - If neither field weakening nor open-loop controlled operation are active, "0.00 A" is displayed.



Note!

If a Lenze motor is used:

The inverter is automatically parameterised so that field weakening operates optimally and the maximally permissible speed is monitored.



Stop!

If an OEM motor is used:

If pulse inhibit is set in the inverter, the DC bus is loaded with the voltage that corresponds to the current speed of the machine.

Since with switched-on field weakening higher speeds can be achieved at a correspondingly higher rotor voltage of the motor, the DC bus can be loaded to a voltage higher than the set DC-bus voltage in case of pulse inhibit and a currently high motor speed and even exceed the maximally permissible voltage of 800 V!

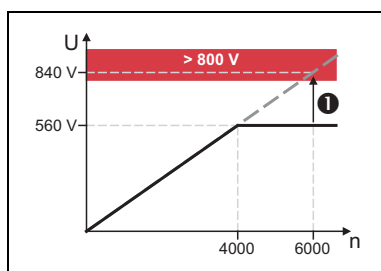
For device protection, either use a brake chopper or parameterise the motor speed monitoring via [C00965](#) in such a way that only a maximum speed is possible which would be also reachable without field weakening with a DC-bus voltage of = 800 V.

▶ [Motor speed monitoring](#) (📖 321)

Example: Voltage increase in the DC bus when field weakening is switched off

(For instance by an active setting of the controller inhibit or by tripping a fault or error at high motor speed.)

Field weakening	Speed n	Motor voltage peak value
Switched off	4000 rpm	560 V
	5700 rpm	800 V
	6000 rpm	840 V
Switched on	6000 rpm	560 V



[5-20] Example: Possible DC-bus voltage > 800 V if field weakening gets lost

- If pulse inhibit occurs at 6000 rpm and switched-on field weakening, the DC bus is loaded to more than 800 V (❶).
- A speed limitation to 5700 rpm is required since this speed causes a DC-bus voltage of 800 V if field weakening is switched off.

5.9

Servo control (SC)

Field-oriented servo control (SC) is based on a decoupled, separate control of the torque-producing and the field-producing current component. The motor control is based on a field-oriented, cascaded controller structure with feedback function and enables dynamic and stable operation in all of the four quadrants.

**Stop!**

- Servo control (SC) is only suitable for asynchronous motors.
- Servo control requires a speed feedback!
 - The speed sensor used has to be set in [C00495](#). This setting is not made automatically with the selection of the motor from the »Engineer« motor catalogue!
 - If no speed sensor is set in [C00495](#) and the controller is enabled, an impermissibly high motor current occurs which may destroy the motor thermally!
 - **From version 16.00.00**, the error response set in [C00571/2](#) (Lenze setting: "Fault") takes place if in case of controller enable it is detected that a motor control type with feedback is set in [C00006](#) but no speed encoder is set in [C00495](#).
- We recommend to select a power-adapted combination of inverter and motor.
- The Lenze setting permits the operation of a power-adapted motor. Optimal operation is only possible if either:
 - the motor is selected via the Lenze motor catalogue
 - the motor nameplate data are entered and motor parameter identification is carried out afterwards
 - or -
 - the nameplate data and equivalent circuit data of the motor (motor leakage inductance and mutual motor inductance, slip compensation and motor stator resistance) are entered manually.
- When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the selected connection type.
- Speed feedback parameterisation is required.

Generally, the servo control offers the same advantages as the sensorless vector control (SLVC), i.e. compared to the V/f characteristic control, the servo control (SC) can be used to achieve

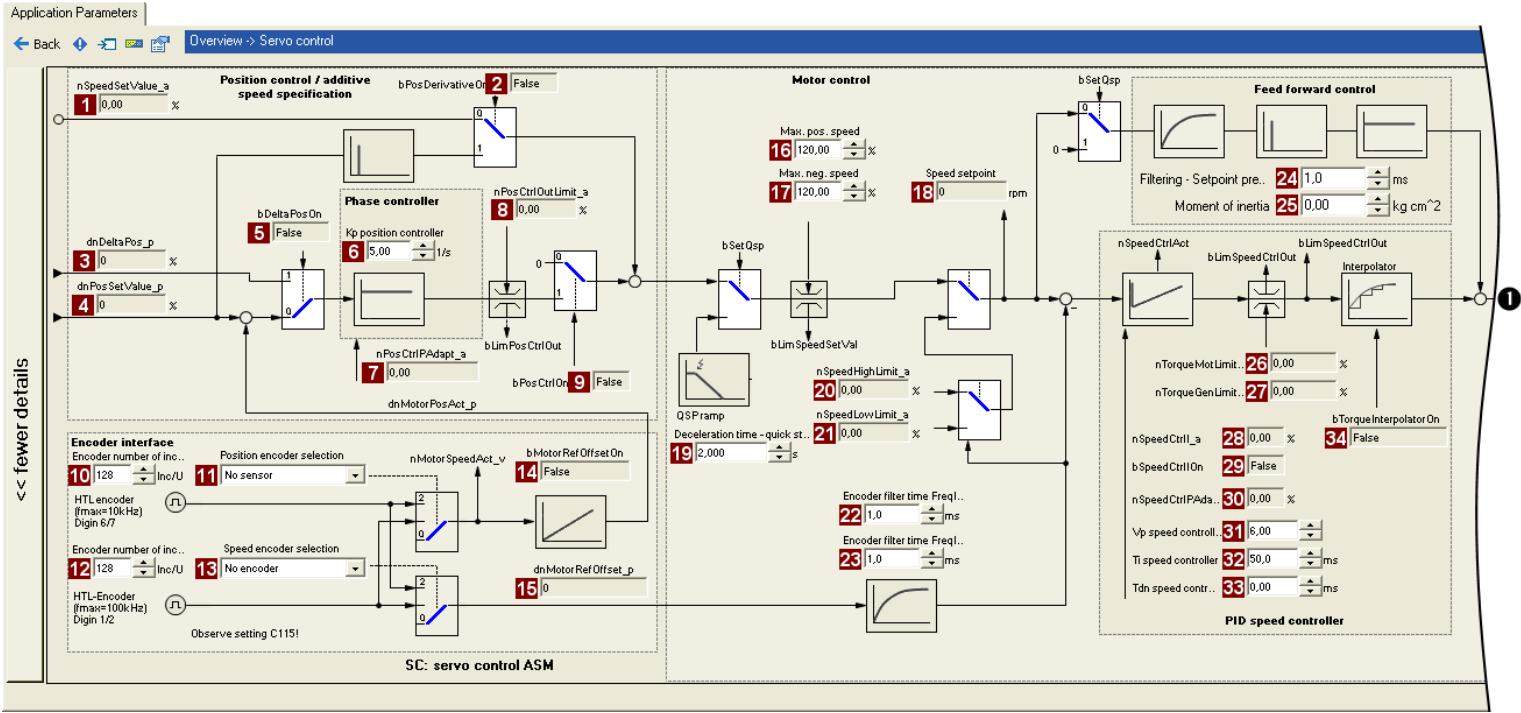
- A higher maximum torque throughout the entire speed range
- A higher speed accuracy
- A higher concentricity factor
- A higher level of efficiency
- The implementation of torque-controlled operation with speed limitation
- The limitation of the maximum torque in motor and generator mode for speed-controlled operation

5.9.1 Parameterisation dialog/signal flow

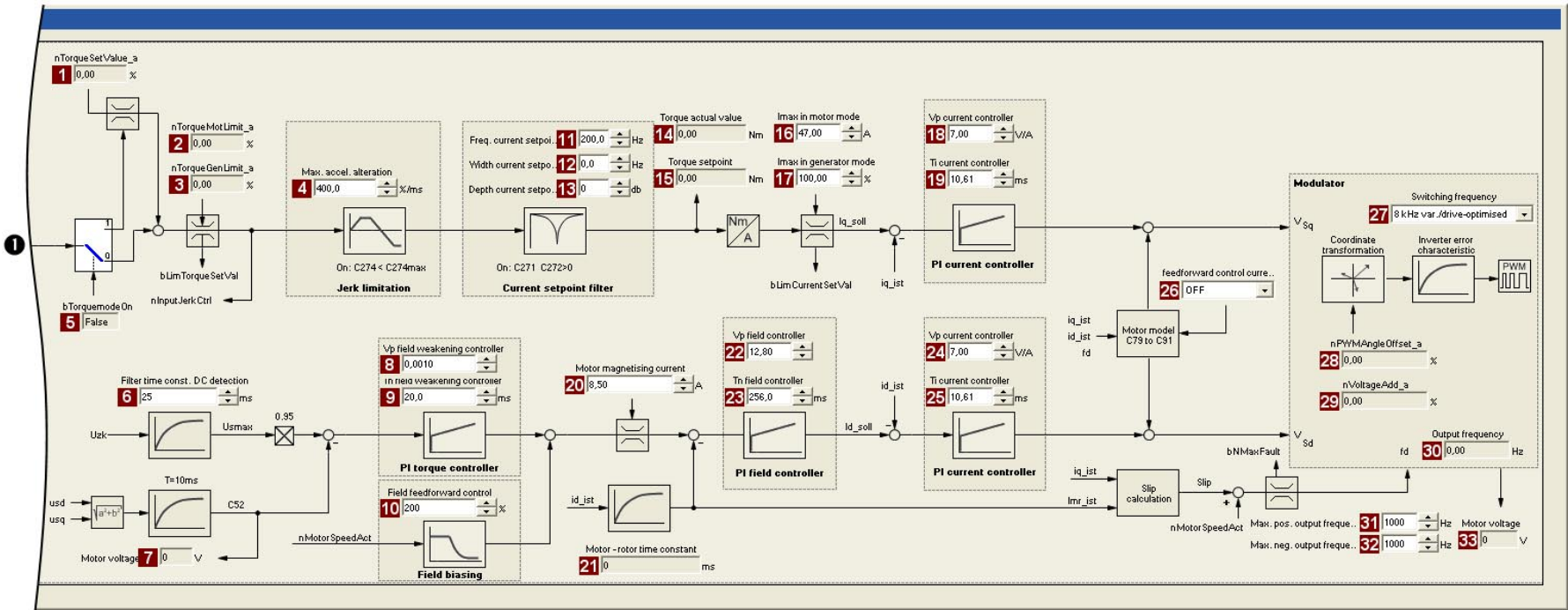


Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and the **Motor control** list field ([C00006](#)) to select the "2: SC: Servo control ASM" motor control.
4. Click the **Motor control servo** button to change to the *Overview* → *Motor control vector* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the >>**More details** button in the left-most position, a signal flow with more details/parameters is displayed, as shown in the following subchapter.



Parameters	Info	Parameters	Info	Parameters	Info
1	C00830/22 Speed setpoint	16	C00909/1 Max. pos. speed	24	C00275 Setpoint feedforward control filtering
2	C00833/67 MCTRL: bPosDerivativeOn	17	C00909/2 Max. neg. speed	25	C00273 Moment of inertia
3	C00834/4 MCTRL: dnDeltaPos_p	18	C00050 Speed setpoint	26	C00830/29 Limitation of torque in motor mode
4	C00834/5 MCTRL: dnPosSetValue_p	19	C00105 Decel. time - quick stop	27	C00830/28 Limitation of torque in generator mode
5	C00833/35 MCTRL: bDeltaPosOn	20	C00830/88 MCTRL: nSpeedHighLimit_a	28	C00830/24 MCTRL: nSpeedCtrlI_a
6	C00254 Kp position controller	21	C00830/23 MCTRL: nSpeedLowLimit_a	29	C00833/31 MCTRL: bSpeedCtrlIOn
7	C00830/20 MCTRL: nPosCtrlPADapt_a	22	C00497/1 Encoder filter time FreqIn12	30	C00830/25 MCTRL: nSpeedCtrlPADapt_a
8	C00830/21 MCTRL: nPosCtrlOutLimit_a	23	C00497/2 Encoder filter time FreqIn67	31	C00070/2 SC: Vp speed controller
9	C00833/27 MCTRL: bPosCtrlOn			32	C00071/2 SC: Ti speed controller
10	C00420/2 Encoder increments at FreqIn67			33	C00072 SC: Tdn speed controller
11	C00490 Position encoder selection			34	C00833/29 MCTRL: bTorqueInterpolatorOn
12	C00420/1 Encoder increments at FreqIn12				
13	C00495 Speed sensor selection				
14	C00833/68 MCTRL: bMotorRefOffsetOn				
15	C00834/6 MCTRL: dnMotorRefOffset_p				



Parameters	Info	Parameters	Info	Parameters	Info
1	C00830/27	MCTRL: nTorqueSetValue_a	11	C00270	SC: Freq. current setpoint filter
2	C00830/29	Limitation of torque in motor mode	12	C00271	SC: Current setpoint filter width
3	C00830/28	Limitation of torque in generator mode	13	C00272	SC: Current setpoint filter depth
4	C00274	SC: Max. change in acceleration	14	C00056/2	Actual torque value
5	C00833/30	MCTRL: bTorqueModeOn	15	C00056/1	Torque demand
6	C00280	SC: Filter time const. DC detection	16	C00022	Imax in motor mode
7	C00052	Motor voltage	17	C00023	Imax in generator mode
8	C00577	SC: Vp field weakening controller	18	C00075	Vp current controller
9	C00578	SC: Tn field weakening controller	19	C00076	Ti current controller
10	C00576	SC: Field feedforward control	20	C00095	Motor magnetising current
			21	C00083	Motor rotor time constant
			22	C00077	SC: Vp field controller
			23	C00078	SC: Tn field controller
			24	C00075	Vp current controller
			25	C00076	Ti current controller
			26	C00079/1	SC: Current controller - feedforward control
			27	C00018	Switching frequency
			28	C00830/32	MCTRL: nPWMAngleOffset_a
			29	C00830/31	MCTRL: nVoltageAdd_a
			30	C00058	Output frequency
			31	C00910/1	Max. pos. output frequency
			32	C00910/2	Max. neg. output frequency
			33	C00052	Motor voltage

5.9.2 Types of control

The servo control can be operated in two different modes:

- [Speed control with torque limitation](#) (*bTorquemodeOn* = FALSE)
- [Torque control with speed limitation](#) (*bTorquemodeOn* = TRUE)



Tip!

A position-controlled application requires a speed control with torque limitation (*bTorquemodeOn* = FALSE).

5.9.2.1 Speed control with torque limitation

When *bTorquemodeOn* = FALSE, the drive system is operated with a selected speed setpoint in a speed-controlled manner.

The operational performance can be adapted in the following ways:

- Overload limitation in the drive train
- Motor current limitation

Overload limitation in the drive train

The torque is limited via the torque setpoint.

- The torque setpoint is identical to the value at the output of the speed controller, *nOutputSpeedCtrl*.
- To avoid overload in the drive train, the torque in motor mode can be limited via the *nTorqueMotLimit_a* process input signal, and the torque in generator mode can be limited via the *nTorqueGenLimit_a* process input signal:

Designator <small>DIS code data type</small>	Information/possible settings
<i>nTorqueMotLimit_a</i> C00830/29 INT	Torque limitation in motor mode <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % M_{\max} (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1. From version 18.00.00 onwards: C02864 : Bit 15 = 1: positive torque limitation (<i>nTorqueHighLimit_a</i>)
<i>nTorqueGenLimit_a</i> C00830/28 INT	Torque limitation in generator mode <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % M_{\max} (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2. From version 18.00.00 onwards: C02864 : Bit 15 = 1: negative torque limitation (<i>nTorqueLowLimit_a</i>)



Note!

To avoid instabilities during operation, the torque limit values are internally processed as absolute values.

Motor current limitation

A cross current setpoint is calculated from the torque setpoint which is limited depending on the magnetising current, the max. current in motor mode ([C00022](#)) and the max. current in generator mode ([C00023](#)). The total current injected into the motor does not exceed the max. currents in motor mode and in generator mode.

**Note!**

For synchronous motors, the Lenze setting of the torque limits *nTorqueMotLimit_a* and *nTorqueGenLimit_a* to 100 % can result in the activation of the torque limitation for motor temperature < max. motor temperature before the set current limit values ([C00022](#), [C00023](#)) are reached.

- With a motor temperature of approx. 20°C and maximum load, the maximum current will then be set to approx. 15 % below the set current limit values.
- Remedy: If the torque limits *nTorqueMotLimit_a* and *nTorqueGenLimit_a* are increased to 115 %, the set current limit values can also be reached for a motor temperature of 20°C and maximum load.

5.9.2.2 Torque control with speed limitation

When $bTorquemodeOn = TRUE$, a torque-controlled operation is activated. The setpoint torque directly follows the default value $nTorqueSetValue_a$.

Due to its speed limitation, the torque-controlled drive can only rotate within a speed range whose positive speed is limited by $nSpeedHighLimit_a$ and whose negative speed is limited by $nSpeedLowLimit_a$.



Note!

Absolute speed limitation to speed 0 rpm ($nSpeedLowLimit_a$ or $nSpeedHighLimit_a = 0$) is only possible [from version 12.00.00](#).

- Quick stop (QSP) is used to switch over to [Speed control with torque limitation](#).
 - [From version 16.00.00](#), the torque setpoint $nSpeedSetValue_a$ is set to 0 by quick stop (QSP) device-internally and the two torque limit values $nTorqueMotLimit_a$ and $nTorqueGenLimit_a$ are set to 100 % to stop the drive quickly and safely anytime. The previous behaviour can be set in [C2865/1](#) via bit 12 and bit 13.

- [From version 16.00.00](#), the $bLimSpeedTorquemodeOn$ status signal is used to show that the speed limitation is active.
- The speed is defined by the process.
- The torque setpoint is calculated directly from $nTorqueSetValue_a$.
 - [From version 12.00.00](#), the torque limitation is active via $nTorqueMotLimit_a$ and $nTorqueGenLimit_a$ in this control mode, too, for the torque setpoint to be limited. The torque limitation can be deactivated in [C2865/1](#) to obtain the previous function.

Designator <small>DIS code data type</small>	Information/possible settings
$nTorqueSetValue_a$ C00830/27 INT	Torque setpoint / additive torque <ul style="list-style-type: none"> • Scaling: $16384 \equiv 100\% M_{max}$ (C00057)
$nSpeedHighLimit_a$ C00830/88 INT	Upper speed limit for the speed limitation <ul style="list-style-type: none"> • During torque-controlled operation only ($bTorquemodeOn = TRUE$) • Scaling: $16384 \equiv 100\%$ rated speed (C00011)
$nSpeedLowLimit_a$ C00830/23 INT	Lower speed limit for speed limitation <ul style="list-style-type: none"> • During torque-controlled operation only ($bTorquemodeOn = TRUE$) • Scaling: $16384 \equiv 100\%$ rated speed (C00011)
$nTorqueMotLimit_a$ C00830/29 INT	Torque limitation in motor mode <ul style="list-style-type: none"> • Scaling: $16384 \equiv 100\% M_{max}$ (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1. From version 18.00.00 onwards: C02864 : Bit 15 = 1: positive torque limitation ($nTorqueHighLimit_a$)
$nTorqueGenLimit_a$ C00830/28 INT	Torque limitation in generator mode <ul style="list-style-type: none"> • Scaling: $16384 \equiv 100\% M_{max}$ (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2. From version 18.00.00 onwards: C02864 : Bit 15 = 1: negative torque limitation ($nTorqueLowLimit_a$)

5.9.3 Basic settings

The following "Initial commissioning steps" must be performed to commission the servo control:

Initial commissioning steps			
1	Determine the motor control: C00006 = "2: SC: Servo control ASM"		
2	<p>Set the motor selection/motor data</p> <ul style="list-style-type: none"> When selecting and parameterising the motor, the motor nameplate data and the equivalent circuit diagram data are relevant. Detailed information can be found in the "Motor selection/Motor data" chapter. (133) <p>Depending on the motor manufacturer, proceed as follows:</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <p>Lenze motor:</p> <p>Selecting a motor from the motor catalogue in the »Engineer«</p> <p>- or -</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification </td> <td style="vertical-align: top; width: 50%;"> <p>Third party manufacturer's motor:</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification or set known equivalent circuit diagram data manually: <ul style="list-style-type: none"> C00082: Motor rotor resistance C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance C00095: Motor magnetising current </td> </tr> </table>	<p>Lenze motor:</p> <p>Selecting a motor from the motor catalogue in the »Engineer«</p> <p>- or -</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification 	<p>Third party manufacturer's motor:</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification or set known equivalent circuit diagram data manually: <ul style="list-style-type: none"> C00082: Motor rotor resistance C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance C00095: Motor magnetising current
<p>Lenze motor:</p> <p>Selecting a motor from the motor catalogue in the »Engineer«</p> <p>- or -</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification 	<p>Third party manufacturer's motor:</p> <ol style="list-style-type: none"> Set the motor nameplate data Automatic motor data identification or set known equivalent circuit diagram data manually: <ul style="list-style-type: none"> C00082: Motor rotor resistance C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance C00095: Motor magnetising current 		
3	Define the type of control: <i>bTorquemodeOn</i> = FALSE: Speed control with torque limitation <i>bTorquemodeOn</i> = TRUE: Torque control with speed limitation		
4	Parameterise the encoder/feedback system. ▶ Encoder/feedback system (277)		
5th	Set the slip compensation (C00021). ▶ Slip compensation (272)		



Note!

- The Lenze settings of the inverter are predefined for a power-adapted standard asynchronous motor. For an optimal drive behaviour, we recommend to adapt the controller settings.
- When controlling an asynchronous motor (ASM), magnetisation is carried out prior to enabling the setpoint after a controller enable in the Lenze setting. The (delayed) setpoint enabling ensures direct availability of the maximum torque at the motor.
 - The delay of the setpoint enabling associated with the magnetisation can be reduced by reducing the threshold set in [C00918](#). However, this also reduces the maximum torque which is directly available after the setpoint enabling.
 - If [C00918](#) = "0 %", magnetisation is not carried out.



Tip!

Information on the optimisation of the control mode and the adaptation to the real application is provided in chapter "[Optimising the control mode](#)". ([241](#))

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([258](#))

5.9.3.1 Parameterising the encoder/feedback system

Required settings:

1. Parameterise the function of the digital inputs 1 and 2 as the encoder input in [C00115](#).
2. Set the encoder increments in [C00420/1](#).
3. Select the speed sensor in [C00495](#).
4. Adapt the filter time of the actual speed filter in [C00497](#).
5. In the case of encoders with a very low resolution (number of increments < 120 increments):
Change the encoder evaluation procedure in [C00496](#) if necessary.

5.9.4 Optimising the control mode

**Note!**

When the inverter has been enabled, starting up is delayed by the magnetization process of the motor. The speed setpoint is only enabled for motor control if 87 % of the motor magnetising current are available. If this delay is not tolerable for certain applications, the preset percentage threshold can be reduced in [C00918](#).

From version 12.00.00:

- Following successful motor parameter identification, the current controller parameters ([C00075](#), [C00076](#)) and field controller parameters ([C00077](#), [C00078](#)) are calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, the speed controller parameters ([C00070/2](#), [C00071/2](#), [C00072](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "5".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#), [C00497](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

The "optimisation steps" given in the table below serve to further optimise the control behaviour of the servo control and adjust it to the concrete application.

- Detailed information on the individual steps can be found in the following subchapters.

Generally, the following optimisation steps are recommended:

Optimisation steps	
1	Optimise current controller . (☞ 242) <ul style="list-style-type: none"> • The current controller should always be optimised if a motor of a third-party manufacturer with unknown motor data is used!
2.	Optimise speed controller . (☞ 243) <ul style="list-style-type: none"> • The setting of the speed controller must be adapted depending on the mechanical path.
3.	Optimise response to setpoint changes and determine mass inertia . (☞ 246) <ul style="list-style-type: none"> • For an optimal reference behaviour, the total moment of inertia can be used to make a feedforward control of the speed setpoint.

Special cases may require further optimisation steps:

Optimisation steps	
1	Setting the current setpoint filter (band-stop filter) . (☞ 249) <ul style="list-style-type: none"> • In order to suppress or damp (mechanical) resonant frequencies, a current setpoint filter is integrated in the speed control loop which is switched off in the default setting but can be parameterised accordingly, if required. Then readjust the speed controller: Optimise speed controller . (☞ 243)
2.	Adapting the max. acceleration change (jerk limitation) . (☞ 250)
3.	Optimising the behaviour in the field weakening range . (☞ 252)

**Tip!**

In order to traverse a typical speed profile for optimisation of motor control, you can also use the basic function "[Manual jog](#)" with appropriately adapted manual jog parameters if this basic function is supported by the selected technology application. (☞ 540)

5.9.4.1 Optimise current controller

**Note!**

An optimisation of the current controller should generally be carried out unless a power-adapted standard asynchronous motor is used or the motor has been selected from the motor catalogue of the »Engineer«!

An optimisation of the current controller is sensible since the two control parameters gain ([C00075](#)) and reset time ([C00076](#)) depend on the required maximum current and the set switching frequency.

Parameters	Info	Lenze setting	
		Value	Unit
C00075	Vp current controller	7.00	V/A
C00076	Ti current controller	10.61	ms

- Gain and reset time can be calculated as per the following formulae:

$$V_p = \frac{L_{ss}[H]}{T_E[s]}$$

$$T_i = \frac{L_{ss}[H]}{R_s[\Omega]}$$

V_p = Current controller gain ([C00075](#))

T_i = Current controller reset time ([C00076](#))

L_{ss} = Motor stator leakage inductance ([C00085](#))

R_s = Motor stator resistance ([C00084](#))

T_E = Equivalent time constant (= 500 μ s)

5.9.4.2 Optimise speed controller

The speed controller is in the form of a PID controller with an additional differential speed-setpoint gain. For optimum behaviour, the PID speed controller has to be optimised and the overall mass inertia of the drive train has to be determined.

- In the Lenze setting, the configuration of the speed controller provides robustness and moderate dynamics.

Parameters	Info	Lenze setting	
		Value	Unit
C00070/2	SC: Vp speed controller	6.00	
C00071/2	SC: Ti speed controller	50.0	ms
C00072	SC: Tdn speed controller	0.00	ms

Speed controller gain Vp

The gain Vp ([C00070/2](#)) of the speed controller is defined in a scaled representation which enables a comparable parameterisation almost independent of the power of the motor or inverter. Here, the speed input difference of the controller is scaled to the rated motor speed whereas the output torque refers to the rated motor torque. A gain of 10 means that a speed difference of 1 % is gained through the P component with 10 % torque.

If the rated data of the motor and the mass inertia of the drive system are known, we recommend the following setting:

$$V_p \approx 1.5 \dots 3 \cdot \frac{T_M[s]}{0.01[s]}$$

$$T_M[s] = \frac{2 \cdot \pi \cdot n_N[\text{rpm}]}{M_N[\text{Nm}] \cdot 60} \cdot J_{\text{Drive, total}}[\text{kgm}^2]$$

$$M_N[\text{Nm}] = \frac{P_N[\text{W}] \cdot 60}{2 \cdot \pi \cdot n_N[\text{rpm}]}$$

V_p = Gain of the speed controller ([C00070/1](#))
 T_M = Time constant for the acceleration of the motor
 M_N = Rated motor torque
 n_N = Rated motor speed
 $J_{\text{drive, total}}$ = Total moment of inertia of the drive

[5-21] Recommendation for the setting of the gain of the speed controller

If the mass inertia of the drive is unknown, the optimisation can be achieved as follows:

1. Specify speed setpoint.
2. Increase Vp ([C00070/2](#)) until the drive is unstable (observe motor noise).
3. Reduce Vp ([C00070/2](#)) until the drive runs stable again.
4. Reduce Vp ([C00070/2](#)) to approx. half the value.

**Tip!**

Values recommended by Lenze for the setting of the (proportional) gain:

- For drive systems without feedback: $V_p = 6 \dots 20$
- For drive systems with a good disturbance behaviour: $V_p > 12$

Speed controller reset time T_i

Apart from setting the P component, [C00071/2](#) provides the possibility to take influence on the I component of the PI controller.

If the mass inertia of the drive is unknown, the optimisation can be achieved as follows:

1. Specify speed setpoint.
2. Reduce T_i ([C00071/2](#)) until the drive is unstable (observe motor noise).
3. Increase T_i ([C00071/2](#)) until the drive runs stable again.
4. Increase T_i ([C00071/2](#)) to approx. twice the value.

**Tip!**

Value range recommended by Lenze for the setting of the reset time:

$T_i = 20 \text{ ms} \dots 150 \text{ ms}$

Differential time constant T_{dn} (rate time)

The differential time constant T_{dn} of the speed controller can be set in [C00072](#).

If the mass inertia of the drive is unknown, the optimisation can be achieved as follows:

- Increase T_{dn} ([C00072](#)) during operation until optimal control mode is reached.

Using the ramp response for setting the speed controller

If the mechanical components cannot be operated at the stability limit, the ramp response can also be used for setting the speed controller.

**Stop!**

If the controller parameters are preset unfavourably, the control can tend to heavy overshoots up to instability!

- Following and speed errors can adopt very high values.
- If the mechanics are sensitive, the corresponding monitoring functions are to be activated.

**Note!**

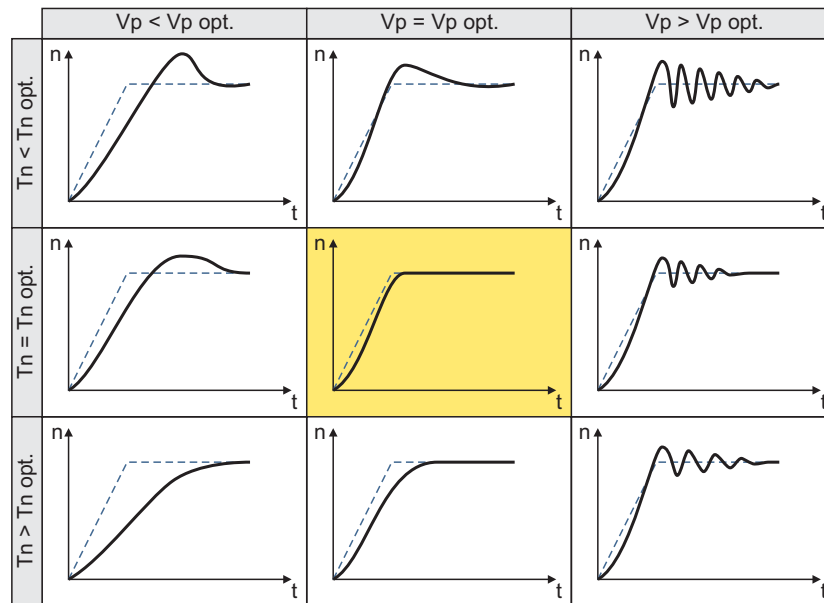
For an optimal setting, we recommend to determine the mass inertia (optimal response to setpoint changes) first.

- ▶ [Optimise response to setpoint changes and determine mass inertia](#) (p. 246)



How to optimise the speed controller setting by means of the ramp response:

1. Run a typical speed profile and record the ramp response of the speed using the data logger.
 - Motor control variables to be recorded:
 - nSpeedSetValue_a* (speed setpoint)
 - nMotorSpeedAct_a* (actual speed value)
2. Evaluate the ramp response:



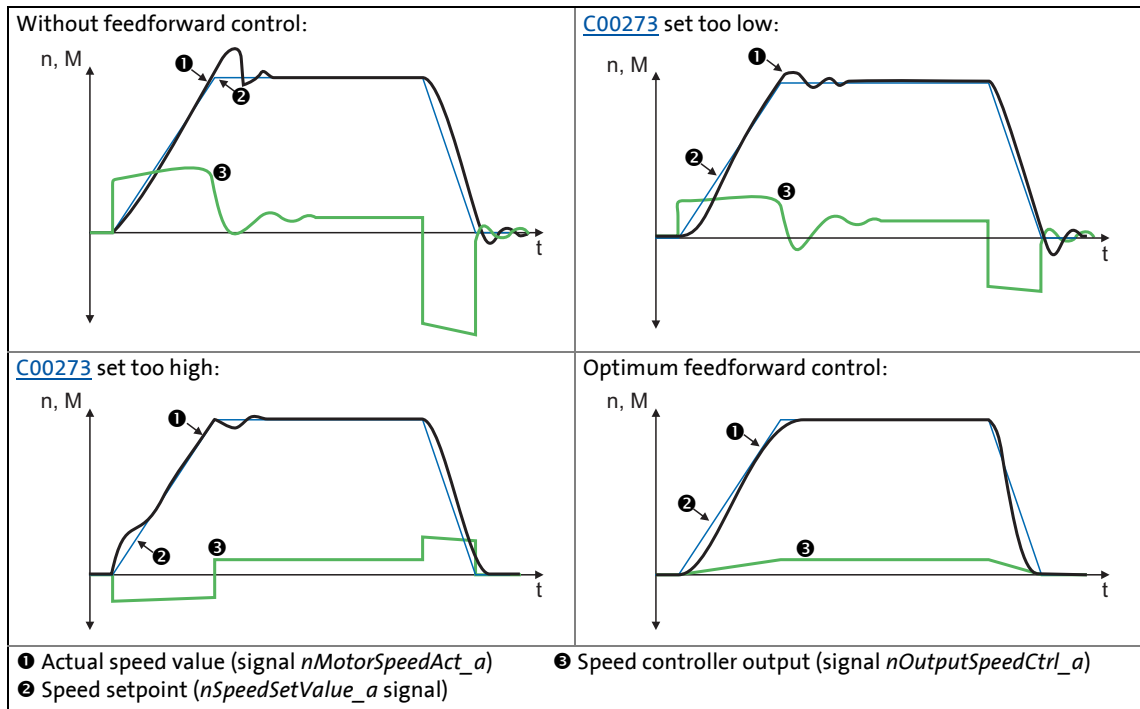
- Solid line = ramp response (actual speed value)
- Dash line = speed setpoint

3. Change gain V_p in [C00070/2](#) and reset time T_n in [C00071/2](#).
4. Repeat steps 1 ... 3 until the optimum ramp response is reached.

5.9.4.3 Optimise response to setpoint changes and determine mass inertia

Optimisation at constant mass inertia

Setting the total moment of inertia under [C00273](#) provides the optimum torque feedforward control. Depending on the application, an adjustment of the setting under [C00273](#) may be necessary to optimise the response to position/speed setpoint changes by means of the torque feedforward control.



[5-22] Typical signal characteristics for different settings of the load moment of inertia



How to optimise the torque feedforward control:

- Run a typical speed profile and record the inputs and outputs of the speed controller with the data logger.
 - Motor control variables to be recorded:
 - nSpeedSetValue_a* (speed setpoint)
 - nMotorSpeedAct_a* (actual speed value)
 - nOutputSpeedCtrl_a* (speed controller output)
- Estimate the moment of inertia and set it in [C00273](#) in relation to the motor end (i.e. with account being taken of the gearbox factors).
- Repeat the data logger recording (see step 1).

Now the data logger should show that part of the required torque is generated by the feedforward control and the speed controller output signal (*nOutputSpeedCtrl_a*) is correspondingly smaller. The resulting following error decreases.
- Change the setting in [C00273](#) and repeat the data logger recording until the intended response to setpoint changes is reached.
 - The optimisation could aim at the speed controller being completely relieved (see signal characteristics in Fig. [5-22]).
- Save the parameter set (device command: [C00002/11](#)).

Optimisation at variable mass inertia

From version V12.00.00, mass inertia that changes during the process (e.g. a reel) can be taken into account when optimising the response to setpoint changes.

How to proceed:

1. In [C00273](#) the known constant total moment of inertia (motor, gearbox, shaft, etc.) must be set or determined according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile without variable mass inertia (e.g. reels).
2. At the [LS_MotorInterface](#) SB, the *nInertiaAdapt_a* process signal must be interconnected in a way which ensures that a value of "100 %" is applied at this input.
3. In [C00919/1](#) set the known maximum value of the variable moment of inertia or determine the value according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile including variable mass inertia (e.g. maximum reels).
4. The *nInertiaAdapt_a* process signal can be used during the process to dynamically control the percentage of the variable moment of inertia set in [C00919/1](#) which is to be considered for setpoint feedforward control.

Example :

- If there is no variable moment of inertia (e.g. no reel), the *nInertiaAdapt_a* process signal must be set to "0 %".
- If the maximally variable moment of inertia is available (e.g. maximum reels), the *nInertiaAdapt_a* process signal must be set to "100 %".



Tip!

Via the *nTorqueSetValue_a* process signal at the [LS_MotorInterface](#) SB, any differential signal can be defined for torque feedforward control. First the speed controller, then this additive torque is connected which is hence not derived from the differential change in speed setpoint.

Other functions for differential setpoint feedforward control

From version V12.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00653/1](#), the sensitivity of setpoint feedforward control can be adapted.
- In [C00654/1](#), alternatively to the *nSpeedSetValue_a* process signal, the new *nSpeedSetValueInertia_a* process signal for the setpoint feedforward control can be selected at the [LS_MotorInterface](#) SB. Via the *nSpeedSetValueInertia_a* process signal, an optional input value (e.g. setpoint of the position or process controller) for the torque feedforward control can be specified.
- For *bTorqueModeOn* = TRUE, the setpoint feedforward control is added to the torque setpoint *nTorqueSetValue_a*. In this way, feedforward control of torque is also possible for torque-controlled operation (e.g. for winder applications).

From version V18.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00654/1](#), an exact torque feedforward control can be set for the *nSpeedSetValue_a* speed setpoint. In case of a very dynamic application, set [C00654/1](#) = 2.
- From version V15.00.00 onwards, the torque feedforward control behaves differently than in version V14.00.00 or older. In order to achieve the same behaviour as in version V14.00.00 or older, set [C00654/1](#) = 3.



Stop!

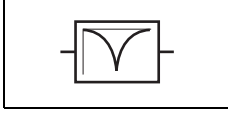
In the Lenze setting of [C00654/1](#), the speed setpoint of the speed controller (*nSpeedSetValue_a*) is used for the torque feedforward control which is why it is also called "differential setpoint feedforward control". A very sharp change of the speed setpoint at the speed controller thus causes a strong torque impulse at the machine!

Causes for a very sharp change of the speed setpoint of the speed controller:

- A control creates the setpoint ramp itself and the speed setpoint is only written every 20 ms to the drive. (In this case, the speed setpoint is changed every 20 ms.)
 - Recommendation: Deactivate the torque feedforward control for the speed setpoint in [C00654/1](#) if the speed setpoint changes very sharply or the mass inertia is unknown (e.g. in case of hoists)!
- The reference speed [C0011](#) is much higher than the rated motor speed set in [C0087](#).
 - Recommendation: Deactivate the torque feedforward control for the speed setpoint in [C00654/1](#) if the reference speed [C0011](#) is 5 times higher than the rated motor speed [C0087](#).

5.9.4.4 Setting the current setpoint filter (band-stop filter)

Due to the high dynamic performance/limit frequency of the closed current control loop, mechanical natural frequencies can be activated which may lead to an unstable speed control loop.



To mask out or at least damp these resonant frequencies, a so-called current setpoint filter is integrated into the speed control loop of the inverter.

Parameters	Info	Lenze setting	
		Value	Unit
C00270	SC: Freq. current setpoint filter	200.0	Hz
C00271	SC: Current setpoint filter width	0.0	Hz
C00272	SC: Current setpoint filter depth	0	dB

- In the default setting of 0 db of the filter depth ([C00272](#)), the current setpoint filter is switched off.

Setting of the current setpoint filter

Since the frequency response of the speed controlled system is only rarely known to such an extent that the current setpoint filter can be adjusted to the controlled system in the run-up, the following example describes how to set the current setpoint filter.



How to set the current setpoint filter:

1. [Optimise current controller](#) (☞ 242).
2. [Optimise speed controller](#) (☞ 243)
3. Measure the oscillation frequency (observe current or speed).
4. Set the measured oscillation frequency in [C00270](#) as filter frequency.
5. Set "25%" of the filter frequency in [C00271](#) as filter width.
 - Example: Filter frequency = 200 Hz → filter width = 50 Hz.
6. Set "40 dB" in [C00272](#) as filter depth.
 - If the filter depth is set to "0 dB" (default setting), the filter is not active.

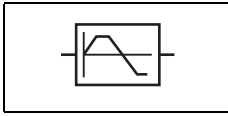


Note!

Readjust the speed controller after setting the current setpoint filter. ▶ [Optimise speed controller](#). (☞ 243)

The setting of the current setpoint filter reduces the available maximum drive torque.

5.9.4.5 Adapting the max. acceleration change (jerk limitation)



Via the max. acceleration change that can be set in [C00274](#), the change of the setpoint torque can be limited for jerk limitation. Hence, sudden torque step changes can be avoided. The entire speed characteristic is smoothed.

Parameters	Info	Lenze setting	
		Value	Unit
C00274	SC: Max. change in acceleration	400.0	%/ms

In the default setting of 400 %/ms of the max. acceleration change ([C00274](#)), jerk limitation is switched off.

The setting defines the permissible maximum torque change per ms (based on the rated motor torque).



Note!

Only activate this jerk limitation for speed-controlled applications!

If table positioning or a free function block interconnection with a positioning operating mode is selected, jerk limitation must be switched off.

- Here, jerk limitation is provided for in the travel profile generator. Setting this jerk limitation in the motor control would lead to following errors!

5.9.4.6 Slip calculation from motor equivalent circuit diagram data

This function extension is available from version 12.00.00!

In order to achieve a better speed stability and torque accuracy, the slip calculation can be either derived from the motor nameplate data (e.g. rated motor speed) or the motor equivalent circuit diagram data (stator resistance, rotor resistance etc.).

The data to be used for servo control (for asynchronous motors) is selected via bit 1 in [C02879/1](#):

setting		Info
Bit 0	SLVC	In case of sensorless vector control: <ul style="list-style-type: none"> • "0" ≙ Slip calculation from motor nameplate data (Lenze setting) • "1" ≙ Slip calculation from motor equivalent circuit diagram data
Bit 1	SC ASM	In case of servo control for asynchronous motors: <ul style="list-style-type: none"> • "0" ≙ Slip calculation from motor nameplate data • "1" ≙ Slip calculation from motor equivalent circuit diagram data (Lenze setting)
Bit 2 ... 7	Reserved	



Note!

In order that the slip can be calculated from the motor equivalent circuit diagram data, the equivalent circuit data (stator resistance, rotor resistance etc.) must be known as exactly as possible.

- Selecting a motor in the »Engineer« motor catalogue loads the exact motor equivalent circuit diagram data.
- When the motor nameplate data is entered manually and the motor equivalent circuit diagram data is then detected via the motor parameter identification, the "extended identification" ([C02867/1](#) = 2) must be used. ▶ [Automatic motor data identification](#) (139)

In case of servo control for asynchronous motors, the slip calculation can also be made from the motor nameplate data ([C02879/Bit 1](#) = "0"). In this case, the slip is too high by a factor of 1.35 as the rated motor speed ([C00087](#)) is assumed for a cold machine. This has the following consequences:

- The higher slip provides a better behaviour for the field weakening range.
- In the motor setting range, a considerably too high torque is detected (torque accuracy is worse).
- The achieved maximum torque in the motor setting range is smaller.

From version 16.00.00, the excessive slip with the activated "slip calculation from motor nameplate data" option ([C02879/bit 1](#) = "0") can be corrected by setting bit 7 to "1" in [C02864/1](#). With this setting, the rated motor speed ([C00087](#)) for a warm machine is assumed.

- By selecting the motor in the »Engineer« motor catalogue or executing the motor parameter identification, bit 7 is set to "1" in [C02864/1](#).

**Note!****Exchange of devices**

When devices with a parameterised servo control for asynchronous motors are exchanged, problems regarding the control quality may occur if motor parameters set for a device lower than version 11.00.00 are transferred to a replacement device of a higher version.

- In this case, we recommend to load the very precise motor data available from »Engineer« V2.17 or to execute the "advanced motor parameter identification" ([C02867/1](#) = 2). ▶ [Automatic motor data identification](#) (□ 139)
- As an alternative, the slip calculation from the motor nameplate data can be set again in [C02879/1](#) (bit 1 = "0") to obtain the previous behaviour.

5.9.4.7 Optimising the behaviour in the field weakening range

The behaviour in the field weakening range is influenced by:

- the field controller
- the field weakening controller
- the field feedforward control unit
- adaptive adaptation of the P component of the field and speed controllers
- An additional limitation of the I component of the controller when the voltage limit is reached

**Note!**

By default, these control parts are called every 1 ms. However, the 1-ms cycle is not always sufficient to achieve an optimum jerk-free transition to the field weakening range.

From version 16.00.00, the control parts can be called for an optimum jerk-free transition to the field weakening range in a 500-µs cycle. For this purpose, bit 5 has to be set to "1" in [C02864/1](#).

- With this setting, [C00015](#) and [C00576](#) do not have any influence anymore on the field feedforward control.
- We recommend this setting for new applications.
- In existing applications, this setting may require an increase of the reset times of the field weakening controller ([C00578](#)) and the field controller ([C00078](#)) by the factor 2 in order to achieve a stable operation.

In general, these settings are pre-optimised so that further optimisation is not required.

Optimisation for special motors (e.g. mid-frequency motors) or for motors whose power is not adapted can be carried out according to the algorithms shown in the following sections.

From version 16.00.00 onwards, the dynamics of the field weakening control can be improved with [C02864/1](#) (bit 9 = 1) by admitting also negative setpoints of the field current controller at the field controller output. Please note that this setting may cause higher torque peaks which can be reduced again by decreasing the field weakening controller gain ([C00577](#)) or increasing the reset time ([C00578](#)).

Field controller

The field controller is designed as a PI controller.

Parameters	Info	Lenze setting	
		Value	Unit
C00077	SC: Vp field controller	12.80	
C00078	SC: Tn field controller	256.0	ms

The gain V_p ([C00077](#)) of the field controller can be calculated using the motor rotor time constant and the equivalent time constant of the current-controlled motor:

$$V_{pFeld} = \frac{T_R[s]}{a^2 \cdot T_{Replacement}[ms]} \quad [\%]$$

V_{pFeld} : Gain of the field controller ([C00077](#))
 T_R : Motor rotor time constant ([C00083](#))
 $T_{Equivalent}$: Motor equivalent time constant (approx. 2.5 ms)
 a : Measure for damping (z. B. $a = 2$)

If the rated data of the motor and the mass inertia of the drive system are known, we recommend the following setting:

$$V_{pFeld} \approx \frac{T_R[s]}{4 \cdot T_{Replacement}[ms]} = \frac{T_R[s]}{0.01[s]}$$

$$T_{NFeld}[ms] = T_R[ms]$$

V_{pFeld} : Gain of the field controller ([C00077](#))
 T_R : Motor rotor time constant ([C00083](#))
 T_{Equi} : Motor equivalent time constant
 T_{NField} : Time constant of the field controller ([C00078](#))

[5-23] Recommendation for the setting of the gain and the time constant of the field controller



Tip!

The motor rotor time constant depends on the motor rotor resistance, the magnetising inductance, and the leakage inductance.

- For an optimal calculation, we recommend to select the motor from the motor catalogue of the »Engineer« first if a Lenze motor is used. ▶ [Selecting a motor from the motor catalogue in the »Engineer«](#) (137)
- If a third party manufacturer's motor is used, motor parameter identification must be carried out previously. ▶ [Automatic motor data identification](#) (139)

Field weakening controller

The field weakening controller serves to adapt the magnetising current when the maximum control voltage has been reached so that in steady operation approximately 95 % of the maximally possible control voltage is output. Thus, there is a voltage reserve for dynamic load or speed variations.

Parameters	Info	Lenze setting	
		Value	Unit
C00577	SC: Vp field weakening controller	0.0010	
C00578	SC: Tn field weakening controller	20.0	ms

$$V_{p,FS} = 4774.65 \cdot \frac{L_h[\text{mH}] + L_{ss}[\text{mH}]}{L_h[\text{mH}]^2 \cdot n_N[\text{rpm}] \cdot I_N[\text{A}]}$$

$$C00577 = 4774.65 \cdot \frac{C00092[\text{mH}] + C00085[\text{mH}]}{C00092[\text{mH}]^2 \cdot C00087[\text{rpm}] \cdot C00088[\text{A}]}$$

$$T_{n,FS} = 20 \text{ ms} \cdot \frac{0.0010}{V_{p,FS}}$$

$$C00578 = 20 \text{ ms} \cdot \frac{0.0010}{C00577}$$

L_m : Mutual motor inductance ([C00092](#))
 L_{sl} : Motor stator leakage inductance ([C00085](#))
 n_{rated} = rated motor speed ([C00087](#))
 I_{rated} = rated motor current ([C00088](#))

[5-24] Recommendation for the setting of the gain and the time constant of the field weakening controller



Tip!

A field weakening controller set too slow can be recognised by the fact that the actual speed value cannot follow the speed setpoint in the field weakening range. In this case, carry out the setting of the field weakening controller as described in the formula. If the speed setpoint still cannot follow the actual speed value, increase the setting in [C00577](#) to maximally twice the value and reduce the setting in [C00578](#) according to the formula mentioned above.

If the field weakening controller is set too fast, vibrations occur in the magnetising current, in the direct-axis current and in the cross current, in the torque and in the speed in the field weakening range. This is also audible by an increased motor noise (humming). The vibrations can be dampened by a decrease of the proportional gain of the field weakening controller.

Procedure:

- Operate the drive with max. required speed in the field weakening operation.
- Reduce Vp ([C00577](#)) of the field weakening controller until the vibration response cannot be detected anymore. Increase Tn ([C00578](#)) according to the formula.



Note!

Vp ([C00577](#)) can also be set to 0. In this case, Tn ([C00578](#)) should first be set to 2000 ms.

Field feedforward control

To have enough voltage reserve available for dynamic acceleration processes, a timely weakening of the field is required. The field weakening is controlled by the field feedforward control.

Parameters	Info	Lenze setting	
		Value	Unit
C00576	SC: Field feedforward control	200.0	%

The field feedforward control reciprocally reduces the magnetising current from the V/f base frequency ([C00015](#)) on. The starting point of the reduction can be shifted to low frequencies via the field feedforward control ([C00576](#)). Thus, more voltage reserve is available for acceleration processes.

The field feedforward control ([C00576](#)) must be specified in %, based on the rated slip of the machine.



Tip!

Generally, the Lenze setting is sufficient for most applications.

- We recommend to increase the field feedforward control for applications with very dynamic acceleration processes in the field weakening range.
- Reduce the field feedforward control for very slow applications if necessary.

Adaptive adaptation of the P component of the field and speed controllers

In the field weakening range, the properties of the drive change due to the reduction of the magnetisation and the voltage limitation of the inverter. To be able to continue to provide a stable, well dampened drive behaviour, the servo control has an automatic adaptation of the P component of the field weakening controller and speed controller.

In the Lenze setting, this function is activated. Depending on the application, this function can be deactivated via [C00079/2](#).

Parameters	Info	Lenze setting
C00079/2	SC: Adaptive field weakening controller	1: On



Tip!

Lenze recommends to always activate the adaptation of the field weakening and speed controller.

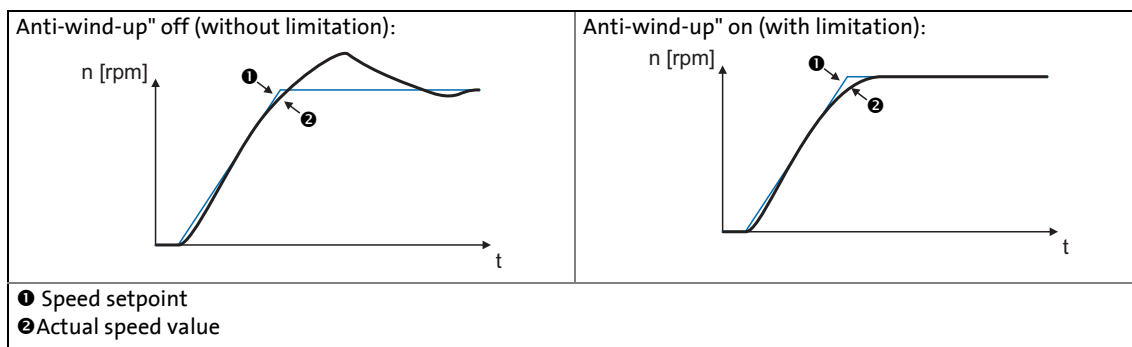
Additional limitation of the I component of the speed controller when the voltage limit is reached (anti-wind-up)

In dynamic acceleration processes in the field weakening range, the acceleration torque is limited due to the limitation of the maximum output voltage of the inverter. Acceleration ramps that are set too high ([C00012](#)) may lead to undesired charging of the integrator of the speed controller, which result in very strong overshoots of the actual speed value when the setpoint is reached.

The so-called anti-wind-up function serves to intelligently limit the integrator part in dynamic acceleration processes in the field weakening range so that an overshoot of the actual speed value can be prevented when the setpoint speed is reached.

This function is deactivated in the Lenze setting because the robustness of the drive may decrease in the field weakening range. Possible consequences are slight speed variations. If required by the application, the function can be activated via [C00079/3](#).

Parameters	Info	Lenze setting
C00079/3	SC: n-Ctrl Anti-Wind-Up	0: Off



[5-25] Typical signal characteristics for switched-on/off anti-wind-up function



Tip!

Lenze recommend to activate the additional limitation of the speed controller's I component on reaching the voltage limit ([C00079](#) = 1) if dynamic acceleration processes in the field weakening range are wanted.

- The function should be deactivated again if slight speed variations occur in the field weakening range.
- If this function is activated, the actual speed value may not follow the speed setpoint correctly in the field weakening range.

5.9.4.8 Feedforward control of the current controller

In [C00079/1](#), the feedforward control of the current controller can be switched on. The feedforward control serves to unload the current controller so that the current control loop is able to operate more stable and dynamically. The feedforward control can contribute to dampen vibrations at very high speeds.

Before the feedforward control is activated in [C00079/1](#), we recommend the execution of the motor parameter identification in order to get an optimum result with the feedforward control.

▶ [Automatic motor data identification](#) (📖 139)



Note!

If the data of the motor equivalent circuit (motor magnetising inductance, motor stator leakage inductance, motor stator resistance, motor rotor resistance) are not known, the feedforward control of the current controller must not be switched on as otherwise it might cause instabilities in the control loop!

Up to and including version 12.xx.xx the following applies:

The feedforward control of the current controller may only be switched on in [C00079/1](#) if the motor magnetising inductance set in [C00092](#) is not more than 4 % higher than the real magnetising inductance of the connected motor detected by an identification process. Otherwise, instabilities may occur at high speeds in the control loop and the motor can accelerate in an uncontrolled manner up to maximum speed.

- The magnetising inductance of a motor has a tolerance of more than 4 % so that this problem might occur when the motor parameters are loaded from the »Engineer« motor catalogue and the feedforward control of the current controller is activated.
- If the feedforward control is to be used and instabilities occur: Reduce the motor magnetising inductance ([C00092](#)) until a stable behaviour occurs or carry out a motor parameter identification.

From version 16.00.00 the following applies:

The feedforward control of the current controller operates properly within the tolerances of the motor. It is sufficient to select the motor from the »Engineer« motor catalog or enter the data of the motor equivalent circuit manually.

5 Motor control (MCTRL)

5.10 Parameterisable additional functions

5.10 Parameterisable additional functions

5.10.1 Selection of switching frequency

The switching frequency of the inverter that can be selected in [C00018](#) influences the smooth running performance and the noise generation in the connected motor as well as the power losses in the inverter.

The lower the switching frequency the higher the concentricity factor, the smaller the losses, and the higher the noise generation.



Stop!

If operated at a switching frequency of 16 kHz, the output current of the inverter must not exceed the current limit values specified in the technical data!

▶ [Defining current and speed limits](#) (□ 154)



Note!

- Operate mid-frequency motors only at a switching frequency of 8 kHz or 16 kHz (var./drive-opt.).
- If operated at a switching frequency of 16 kHz, the Ixt evaluation ([C00064](#)) is considered including the required derating to 67 % of the rated device current at switching frequencies of 2.4 and 8 kHz.
- Ensure that the value does not fall below the permissible switching frequency,
 - if the motor is not approved for the setting switching frequency
 - or -
 - if a sinusoidal filter has been connected between the output of the inverter and the motor which is not approved for the setting switching frequency. (see section "[Preventing a decrease of the switching frequency](#)")

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00018	Switching frequency	2: "8 kHz var./drive-opt."	
C00144	Switching frequency reduction (temp.)	1: On	
C00725	Current switching frequency	-	
C00910/1	Max. pos. output frequency	1000	Hz
C00910/2	Max. neg. output frequency	1000	Hz
C02864/1	MCTRL: Special settings 2 Bit 4: Option "Motor ident: Switching frequency 8 kHz" (from version 16.00.00)	0x0000 (Off)	

Greyed out = display parameter

Settable switching frequencies

Selection in C00018			
1	4 kHz var./drive-optimised	21	8 kHz var./drive-opt./4 kHz min
2	8 kHz var./drive-optimised	22	16 kHz var./drive-opt./4 kHz min
3	16 kHz var./drive-optimised	23	16 kHz var./drive-opt./8 kHz min
5	2 kHz constant/drive-optimised	31	8 kHz var./min. Pv/4 kHz min
6	4 kHz constant/drive-optimised	32	16 kHz var./min. Pv/4 kHz min
7	8 kHz constant/drive-optimised	33	16 kHz var./min. Pv/8 kHz min
8	16 kHz constant/drive-optimised	Abbreviations used: • "var.": Adaptation of the switching frequency depending on the current • "drive-opt.": drive-optimised modulation ("sine/delta modulation") • "fixed": fixed switching frequencies • "min. Pv": additional reduction of power loss	
11	4 kHz var./min. Pv		
12	8 kHz var./min. Pv		
13	16 kHz var./min. Pv		
15	2 kHz constant/min. Pv		
16	4 kHz constant/min. Pv		
17	8 kHz constant/min. Pv		
18	16 kHz constant/min. Pv		



Tip!

The Lenze setting [C00018](#) = 2 (8 kHz var./drive-opt.) is the optimal value for standard applications.

Preventing a decrease of the switching frequency

The value must not fall below the permissible switching frequency if the motor is not approved for the setting switching frequency or if a sinusoidal filter is connected between the output of the inverter and the motor that is not approved for the setting switching frequency.

In order to prevent a decrease of the switching frequency, the following settings have to be made:

1. The temporary switching frequency reduction has to be activated by the setting [C00144](#) = "0: Off".
2. The switching frequency has to be set in [C00018](#) so that the value is not fallen below the permissible switching frequency.
3. If a sinusoidal filter is available, only a drive-optimised switching frequency ("drive-opt.") is permissible.

Example: A sinusoidal filter is connected between the output of the inverter and the motor which only is to be operated with a minimum switching frequency of 8 kHz.

In this case, only the following settings in [C00018](#) are permissible:

Selection in C00018	
7	8 kHz constant/drive-optimised
8	16 kHz constant/drive-optimised
23	16 kHz var./drive-opt./8 kHz min



Note!

Switching frequency for the motor parameter identification

Up to and including version 12.xx.xx, the motor parameter identification is executed with a switching frequency of 4 kHz.

- Thus, a motor parameter identification is not permissible for the previously mentioned example as the sinusoidal filter may only be operated with a minimum switching frequency of 8 kHz!

From version 16.00.00, the motor parameter identification can also be executed with a switching frequency of 8 kHz instead of 4 kHz. For this purpose, the option "Motor ident.: Switching frequency 8 kHz" (Bit 4 = "1") has to be set in [C02864/1](#).

- With this setting, a motor parameter identification would be permissible for the previously mentioned example.

Generally, a switching frequency of 4 kHz is recommended for the motor parameter identification as it serves to obtain the most accurate results.

▶ [Automatic motor data identification](#) (139)

Lowering the switching frequency due to high heatsink temperatures

Exceeding the maximally permissible heatsink temperature would lead to an inhibited drive due to the "Overtemperature" error and a torquelessly coasting motor. Therefore, if the Lenze setting is selected, the switching frequency is reduced to the next frequency below when the heatsink temperature has risen to 5 °C below the maximally permissible temperature. After the heatsink has cooled down, the inverter automatically switches to the next frequency above until the set switching frequency is reached.

Switching frequency reduction due to high heatsink temperature can be deactivated via [C00144](#). If the switching frequency reduction is deactivated, the "OH1: Heatsink overtemperature" error message will be issued when the maximally permissible heatsink temperature is reached. An "Error" response is the result and the motor is coasting.

Parameters	Info	Lenze setting
C00144	Switching frequency reduction (temp.)	1: On

Lowering of the switching frequency depending on the output current

"Variable" switching frequencies can be selected for the inverter in [C00018](#), where the inverter automatically lowers the switching frequency depending on the inverter output current. The modulation mode will not be changed.



The changeover thresholds are listed in the **8400 hardware manual** in the rated data. The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.

When a "fixed" switching frequency is selected, no switching frequency changeover takes place. In case of fixed frequencies, the inverter output current is limited to the permissible value of the corresponding switching frequency. In case of larger load impulses, the overcurrent interruption may be activated, to which the inverter responds with "Error".

Limiting the maximum output frequency



Note!

If the servo control mode (SC) is selected, the drive assumes the 'maximum current limitation' state if the maximum output frequency ([C00910](#)) has been reached.

▶ [Defining current and speed limits](#) (□ 154)

The maximum output frequency ([C00910](#)) of the inverter is not limited depending on the switching frequency. Therefore, adapt the maximum output frequency according to our recommendation:

$$\text{Maximum output frequency} \leq \frac{1}{8} \text{ Switching frequency}$$

- At a switching frequency of 4 kHz, for instance, 500 Hz for the maximum output frequency should not be exceeded.

Carry out further measures:

- If required, deactivate the switching frequency changeover by the heatsink temperature via [C00144](#).
- If required, ensure that the changeover threshold of the inverter output current to the next switching frequency below will not be exceeded. If required, select a constant switching frequency in [C00018](#).

Operation at an ambient temperature of 45°C

The inverter is designed so that operation at an ambient temperature of 45° C without derating is permissible at a switching frequency of 4 kHz.

5.10.2 Operation with increased rated power

Under the operating conditions described here and under continuous operation, the inverter can be operated with a higher power motor (increased rated power). The remaining overload capacity of the drive system (for 60 s/3 s) is reduced accordingly to approx. 120 %/160 %.

Typical applications stand out due to low dynamic requirements, e.g. pumps and fans, general horizontal materials handling technology and line drives.



The inverters which can be operated at an increased rated power are listed in the **8400 hardware manual** in the rated data. The hardware manual is stored in electronic form on the data carrier which is supplied with the 8400 inverter.



Stop!

Operation at increased rated power is only permitted ...

- with the inverters listed in the **8400 hardware manual** for this type of operation in the stated mains voltage range.
- at switching frequencies of 2 kHz and 4 kHz.
- at a max. ambient temperature of 40 °C.
- with the types of installation stated in the **8400 hardware manual**.
- with the fuses, cable cross-sections, mains chokes, and filters as required in the **8400 hardware manual** for this operation.
- after parameterisation according to the specifications below.

Required parameterisation

Operation at increased rated power requires the following settings to be made particularly for the V/f characteristic control (VFCplus), but also for all other types of control:

Parameters	Info	Required setting
C00016	VFC: Vmin boost	adapt to motor (reduce)
C00018	Switching frequency	1: 4 kHz var./drive-opt.
C00021	Slip compensation	adapt to motor
C00120	Setting of motor overload (I ² xt)	adapt to motor
C00123	Device utilisat. threshold (Ixt)	120 %
C00173	Mains voltage	see hardware manual → Rated data

All other types of control require the following settings in addition:

Parameters	Info	Required setting
C00022	I _{max} in motor mode	higher than rated motor current (max. 160 % rated motor current)
C00081	Rated motor power	adapt motor data (see motor nameplate), then carry out identification run ▶ Automatic motor data identification (139)
C00087	Rated motor speed	
C00088	Rated motor current	
C00089	Rated motor frequency	
C00090	Rated motor voltage	
C00091	Motor cos φ	

5.10.3 Flying restart function

The flying restart circuit for asynchronous motors uses a simple motor model which requires knowledge of the motor stator resistance R_S and the rated motor current.



Note!

- Currently, the flying restart circuit is only available for asynchronous motors. (A flying restart circuit for synchronous motors is in preparation.)
- For a correct functioning of the flying restart circuit, we recommend to perform a parameter identification first. ▶ [Automatic motor data identification](#) (📖 139)
- The flying restart function works safely and reliably for drives with great centrifugal masses.
- Do not use the flying restart function if several motors with different centrifugal masses are connected to an inverter.
- After the controller is enabled, the motor can start for a short time or reverse when machines with low friction and low mass inertia are used.
- The flying restart function serves to identify max. field frequencies up to ± 200 Hz.
- When power-adapted standard asynchronous motors are used (rated motor power approximately corresponds to the rated inverter power), a motor parameter identification is not required.
- On drive systems with feedback, you do not need to use the flying restart function because the synchronisation to the speed detected by the feedback is always carried out in a jerk-free manner.
- Especially in case of very high power, very high mass inertia and a mains voltage higher than 440 V, an overvoltage in the DC bus may be caused temporarily. Using a brake resistor may avoid this behaviour.
 - From version 16.00.00, frequency can be set as a remedy in [C00989](#) which is added to the found flying restart frequency. Here, the setting in [C00989](#) has to be increased in small steps up to double the slip frequency until the behaviour does not occur anymore.



Tip!

In association with the flying restart function, we recommend information provided in this documentation on the following topic:

- ▶ [Automatic DC-injection braking \(Auto-DCB\)](#) (📖 269)

General information

This function serves to activate a mode which is used to "catch" a coasting motor during operation without speed feedback. This means that the synchronicity between inverter and motor is to be adjusted in such a way that a jerk-free transition to the rotating machines is achieved in the instant of connection.

The inverter determines the synchronicity by identifying the synchronous field frequency.

Duration

The "catching" process is completed after approx. 0.5 ... 1.5 seconds. The duration is influenced by the starting value. If the field frequency is not known, we recommend a fixed starting value of 10 Hz (or -10 Hz with systems rotating in negative direction).

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00990	Flying restart fct.: Activate	Off	
C00991	Flying restart fct.: Process	-n...+n Start: +10 Hz	
C00992	Flying restart: Start frequency	5	Hz
C00993	Flying restart: Integration time	300	ms
C00994	Flying restart: Current	25.00	%

**How to parameterise the flying restart function:**

1. Activate the flying restart circuit by selecting "1: On" in [C00990](#).
 - Every time the controller is enabled, a synchronisation to the rotating or standing drive is carried out.

When the Lenze setting is used, most applications do not require additional inverter settings.

If additional settings are necessary, proceed as follows:

2. Define the process and hence the speed range/rotational frequency range in [C00991](#) which is to be examined by the flying restart circuit:
 - positive speed range ($n \geq 0$ rpm)
 - negative speed range ($n \leq 0$ rpm)
 - entire speed range
3. Define the starting frequency.

The starting frequency which defines the starting point of the flying restart function is 10 or -10 Hz for processes 0 ... 3 and has been pre-optimised for standard motors.

If process 4 is selected in [C00991](#), an arbitrary starting frequency can be defined via [C00992](#). This is especially recommended for motors with higher rated frequencies.

- We recommend to define a starting frequency of approximately 20 % of the rated motor frequency to enable a safe and fast connection to standing drive systems.
 - For systems with a known search speed (e.g. torque-controlled drive systems which are to synchronise to a defined speed) the starting value can be adapted to reduce the flying restart time.
4. Set the flying restart current in [C00994](#).

We recommend setting a flying restart current of 10 % ... 25 % of the rated motor current.

- During a flying restart process, a current is injected into the motor to identify the speed.
- Reducing the current causes a reduction of the motor torque during the flying restart process. A short-time starting action or reversing of the motor is prevented with low flying restart currents.
- An increase of the current improves the robustness of the flying restart function.
- At too high mass inertias and high speeds at the same time, the flying restart circuit may cause an overvoltage in the DC bus ("[oU](#)") if no brake resistor is connected. In this case, reduce the flying restart current.

**Tip!****Use of motors with higher rated frequencies**

For trouble-free operation, we recommend to manually enter a starting frequency of 20 % of the rated motor frequency in [C00992](#) as well as to accelerate the flying restart process (see above) and to use a lower flying restart current (10 % of the rated motor current) if motors with higher rated frequencies are used.

Optimisation of the flying restart time

The duration of the flying restart process can be influenced via the setting of the integration time ([C00993](#)). A reduction of the integration time causes the flying restart function to accelerate and thus a reduced flying restart time.

- We recommend not to change the Lenze setting of the integration time.
- When special motor are used (e.g. multi-pole motors or ASM servo motors), a reduced integration time may improve the flying restart behaviour.

Optimising the current controller if the behaviour is unstable

During the execution of flying restart function, peak currents/torques are avoided by controlling the current amplitude.

Gain ([C00075](#)) and reset time ([C00076](#)) of the current controller can be adapted to improve the jerk-free/torque-free connection of the inverter to the supply of the rotating motor.

- We recommend not to change the Lenze setting of the current controller.
- If the behaviour of the current controller is unstable, gain and reset time can be calculated as per the following formulae:

$$V_p = \frac{L_{ss}[\text{H}]}{T_E[\text{s}]}$$

$$T_i = \frac{L_{ss}[\text{H}]}{R_s[\Omega]}$$

V_p = Current controller gain ([C00075](#))

T_i = Current controller reset time ([C00076](#))

L_{ss} = Motor stator leakage inductance ([C00085](#))

R_s = Motor stator resistance ([C00084](#))

T_E = Equivalent time constant (= 500 μs)

[5-26] Formulae for the calculation of the gain and reset time of the current controller

5.10.4 DC-injection braking



Note!

The DC-injection braking function (manually or automatically) is only possible for the following motor control modes:

- [V/f characteristic control \(VFCplus\)](#) (☞ 157)
- [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (☞ 175)
- [V/f control \(VFCplus + encoder\)](#) (☞ 185)
- [Sensorless vector control \(SLVC\)](#) (☞ 192)



Danger!

Holding braking is not possible when this braking mode is used!

- For low-wear control of a holding brake, use the basic function "[Holding brake control](#)". (☞ 571)

DC-injection braking allows the drive to be quickly braked to a standstill without the need to use an external brake resistor.

- The braking current is set in [C00036](#).
- The maximum braking torque to be generated by the DC braking current is approx. 20 ... 30 % of the rated motor torque. It is lower than that for braking in generator mode with an external brake resistor.
- The DC-injection braking can be activated manually via a control input of the application or automatically ("Auto-DCB"). The two different modes are described in the following subchapters.



Tip!

DC-injection braking has the advantage that it is possible to influence the braking time by changing the motor current or the braking torque..

The automatic DC-injection braking (Auto-DCB) improves the starting performance of the motor in case of V/f operation without speed feedback.

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00019	Auto-DCB: Threshold • Operating threshold for activating DC-injection braking	3	rpm
C00036	DC braking: Current • Braking current in [%] based on rated device current (C00098)	50	%
C00106	Auto-DCB: Hold time	0.500	s
C00107	DC braking: Hold time	999.000	s
C00701/4	LA_NCtrl: bSetDCBrake • Selection of the signal source for activating DC-injection braking	Dependent on the selected control mode	

Procedure

DC-injection braking can be carried out in two ways with different types of activation:

- ▶ [Manual DC-injection braking \(DCB\)](#) (📖 269)
- ▶ [Automatic DC-injection braking \(Auto-DCB\)](#) (📖 269)

5 Motor control (MCTRL)

5.10 Parameterisable additional functions

5.10.4.1 Manual DC-injection braking (DCB)

DC-injection braking can be activated manually for the two technology applications "Actuating drive speed" and "Switch-off positioning" by connecting the *bSetDCBrake* input of the **LA_NCtrl** or **LA_SwitchPos** application block to a digital signal source (e.g. via the digital signal source *bCtrl1_B3* of the port block LP_CANIn1).

- For HIGH-active inputs, DC-injection braking is active as long as the signal is at HIGH level.
- After the hold time ([C00107](#)) has expired, the inverter set the pulse inhibit.

Short overview of the relevant configuration parameters:

Parameters	Info	Lenze setting
C00701/4	LA_NCtrl : <i>bSetDCBrake</i> <ul style="list-style-type: none">• "Speed actuating drive" application: Selection of the signal source for manually activating DC-injection braking.	Dependent on the selected control mode
C00761/4	LA_SwitchPos : <i>bSetDCBrake</i> <ul style="list-style-type: none">• "Switch-off positioning" application: Selection of the signal source for manually activating DC-injection braking.	Dependent on the selected control mode

5.10.4.2 Automatic DC-injection braking (Auto-DCB)

"Automatic DC-injection braking" (referred to in the following as "auto DCB") can be used if there is a requirement that the drive be isolated from the supply at $n \approx 0$.



Note!

Deactivate automatic DC-injection braking when a holding brake is used!

- For this purpose, go to [C00019](#) and set the auto DCB threshold to "0".
- Background: Controller inhibit is already activated by the [Holding brake control](#).
([571](#))

Function

For understanding the auto DCB function, it is necessary to distinguish between three different types of operation:

- A. The drive has been enabled and, in the course of operation, the speed setpoint falls below the auto DCB threshold.
 - In case of V/f operation without speed feedback, a braking current ([C00036](#)) is injected. After the auto DCB hold time ([C00106](#)) has expired, the motor is deenergised via the auto DCB function, i.e. pulse inhibit is set.
 - In case of V/f operation with speed feedback, the motor is deenergised via the auto DCB function after the auto DCB hold time ([C00106](#)) has expired, i.e. pulse inhibit is set. The braking current which can be parameterised in [C00036](#) does not have any effect during operation with speed feedback.
- B. When the controller is enabled, the drive is at standstill ($n = 0$).

If the enabled drive is to start, the speed setpoint passed via the acceleration ramp must exceed the auto DCB threshold ([C00019](#)). Below this threshold, the motor will not be energised.

- C. When the controller is enabled, the motor (still) rotates at a speed which is above the auto DCB threshold. If the speed setpoint reached via the acceleration ramp exceeds the auto DCB threshold ([C00019](#)), the motor will be energised and the following action will take place:
- During V/f operation without speed feedback, the drive is "caught". ▶ [Flying restart function](#) ([□ 264](#))
 - During V/f operation with speed feedback, the drive synchronises to the current actual speed value.

**Tip!**

We recommend to deactivate the auto DCB function during V/f operation with speed feedback via a setting of [C00019](#) = 0.

Auto DCB function during V/f operation with speed feedback**Stop!**

If the DC-injection braking operation is too long and the braking current or braking voltage is too high, the connected motor may overheat.

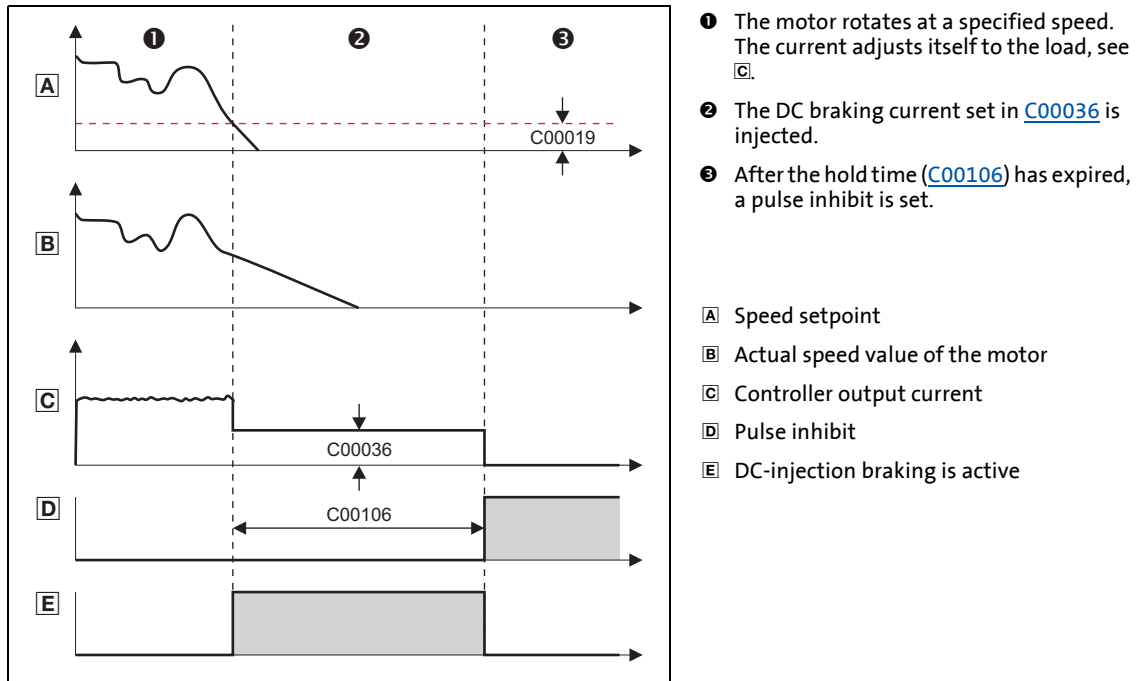
If you want to use the auto DCB function contrary to our recommendation (see above), the auto DCB threshold must not fall below the following values depending on the number of encoder increments:

Number of encoder increments (C00420)	Auto-DCB threshold (C00019)
8	16
16	8
32	4
64	2
> 128	No restrictions

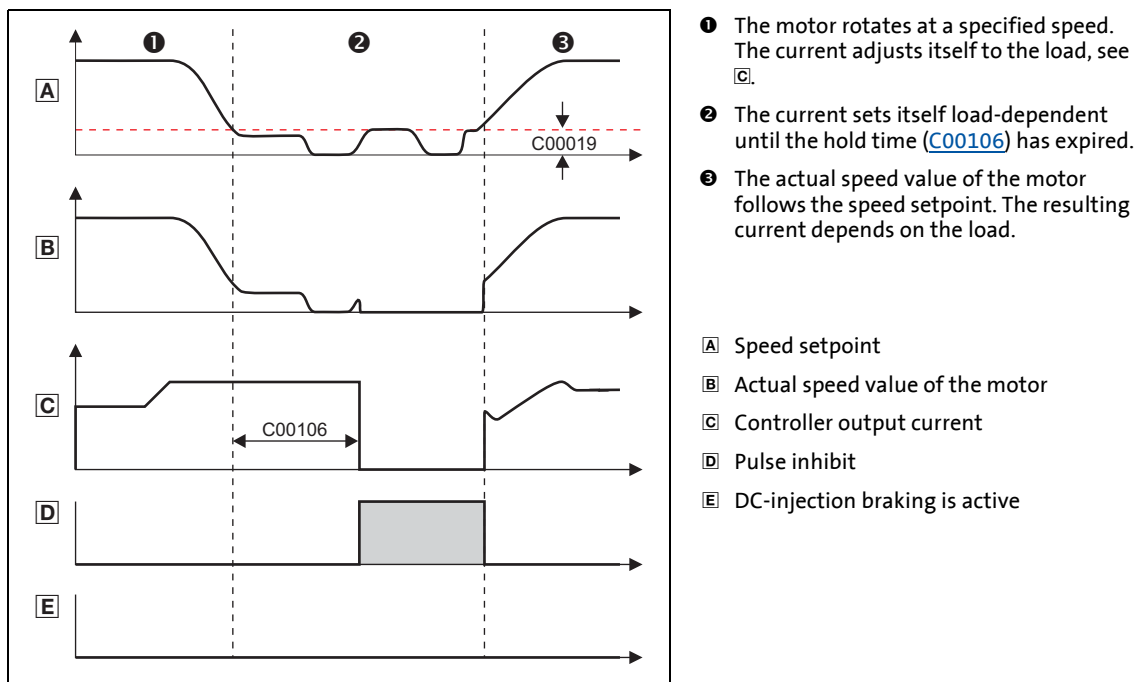
Setting the auto-DCB function**How to set the automatic DC-injection braking**

1. Set a hold time in [C00106](#) > 0 s.
 - Automatic DC-injection braking is active for the time set.
 - In case of V/f operation without speed feedback, the braking set in [C00036](#) is injected.
 - After the set hold time has expired, the inverter sets pulse inhibit.
2. Set the operating threshold in [C00019](#).
 - The operating threshold can serve to set a dead band in the setpoint. If DC-injection braking is not to be active then, [C00106](#) must be set to a value of "0".

Explanation of the automatic DC-injection braking function by means of two examples



[5-27] Example 1: Auto-GSB signal characteristic during V/f operation without speed feedback



[5-28] Example 2: Auto-GSB signal characteristic during V/f operation with speed feedback

5.10.5 Slip compensation

**Note!**

Slip compensation is only active with the following motor control modes:

- [V/f characteristic control \(VFCplus\)](#) (□ 157)
- [Sensorless vector control \(SLVC\)](#) (□ 192)

Under load, the speed of an asynchronous motor decreases. This load-dependent speed drop is called slip. The slip can partly be compensated for by the setting in [C00021](#).

Parameters	Info	Lenze setting	
		Value	Unit
C00021	Slip compensation	2.11	%

- The setting of [C00021](#) can be done automatically in the course of motor parameter identification. ▶ [Automatic motor data identification](#) (□ 139)
- The setting must be made manually if the motor parameter identification cannot be called up.

**How to set the slip compensation manually:**

1. Set rated motor current ([C00088](#)) and rated motor frequency ([C00089](#)).
2. Calculate the slip compensation according to motor nameplate data:

$$s = \frac{n_{rsyn} - n_r}{n_{rsyn}} \cdot 100\%$$

$$n_{rsyn} = \frac{f_r \cdot 60}{p}$$

- s Slip constant ([C00021](#)) [%]
- n_{rsyn} Synchronous motor speed [rpm]
- n_r Rated motor speed according to the motor nameplate [rpm]
- f_r Rated motor frequency according to the motor nameplate [Hz]
- p Number of motor pole pairs (1, 2, 3 ...)

3. Transfer the calculated slip constant s to [C00021](#).
4. Correct the setting in [C00021](#) while the drive is running until the load-dependent speed drop does not occur anymore between idling and maximum load of the motor in the desired speed range.

**Tip!**

The following guide value applies to a correctly set slip compensation:

- Deviation from the rated motor speed $\leq 1\%$ for the speed range of 10 % ... 100 % of the rated motor speed and loads \leq rated motor torque.
- Greater deviations are possible in the field weakening range.
- If [C00021](#) is set too high, the drive may get unstable.
- Negative slip ([C00021](#) < 0) with V/f characteristic control results in "smoother" drive behaviour at heavy load impulses or applications requiring a significant speed drop under load.

5.10.6 Oscillation damping

Mechanical oscillations are undesirable effects in every process and they may have an adverse effect on the single system components and/or the production output.

Mechanical oscillations in the form of speed oscillations are suppressed by the oscillation damping function.

Mechanical oscillations may occur:

- In the voltage range (output voltage is lower than max. voltage)
 - Here, the oscillations occur in no-load operation.
 - Here, speeds of 40 ... 80 % of the rated speed are typical.
 - See subchapter "[Oscillation damping voltage range](#)". (☞ 274)
- In the field weakening range (output voltage has reached maximum voltage)
 - Here, the oscillations occur in no-load operation and with load.
 - Here, speeds higher than the rated speed are typical, especially when the output frequency is close to the mains frequency.
 - See subchapter "[Oscillation damping in the field weakening range](#)". (☞ 275)



Note!

With servo control (SC), the [Oscillation damping voltage range](#) has no influence.

Mechanical natural frequencies can be suppressed or at least dampened in the speed control loop of the servo control by means of a current setpoint filter. ▶ [Setting the current setpoint filter \(band-stop filter\)](#) (☞ 249)

Oscillation dampening, especially in the field weakening range, is also possible by activating the current controller feedforward control ([C00079/1](#)).

5.10.6.1 Oscillation damping voltage range

The oscillation damping voltage range is successfully used with

- unloaded motors (no-load oscillations)
- motors whose rated power deviates from the rated power of the inverter.
 - e.g. during operation at high switching frequency including the power derating involved.
- operation with higher-pole motors
- operation with special motors
- compensation of resonance in the drive
 - At an output frequency of approx. 20 ... 40 Hz, some asynchronous motors can show resonance which causes current and speed variations and thus destabilise the running operation.

Parameters	Info	Lenze setting	
		Value	Unit
C00234	Oscillation damping influence	5.00	%
C00235	Oscillation damping filter time	32	ms



Note!

Compensate the resonance during operation with feedback (closed loop, feedback of n_{act}) via the parameters of the slip regulator.

▶ [Parameterising the slip regulator](#) (📖 189)



How to eliminate speed oscillations in no-load operation at speeds with 40 ... 80 % of the rated speed:

1. Approach the area where the speed oscillations occur.
2. Reduce the speed oscillations by changing [C00234](#) step by step (increment 1 %).
 - The filter time oscillation damping ([C00235](#)) should not be changed.
3. These can be indicators for smooth running:
 - Constant motor current characteristic
 - Reduction of the mechanical oscillations in the bearing seat

5.10.6.2 Oscillation damping in the field weakening range

When the max. possible output voltage (full modulation) has been reached, a voltage dip in the DC bus causes a voltage fluctuation in the motor. With load and during no-load operation this voltage fluctuation can cause mechanical oscillations.

The "oscillation damping field weakening" adjustable in [C00236](#) serves to limit the maximum output voltage. This can be used to always compensate voltage dips in the DC bus to the output voltage (constant output voltage). This serves to prevent mechanical oscillations due to these voltage dips.

Parameters	Info	Lenze setting	
		Value	Unit
C00236	Oscillation damping field weakening • Setting "0" ≙ 100 % output voltage can be reached	14	

- With the Lenze setting of [C00236](#) the limitation of the output voltage is set so that voltage dips in the DC bus in the output voltage for the single-phase and three-phase devices can largely be compensated so that no speed oscillations may be expected. Thus, an adaptation of [C00236](#) is not required in the majority of cases.
- Maximum output voltage to be reached with Lenze setting of [C00236](#):
 - Single-phase devices: 98.2 %
 - Three-phase devices: 99.7 %



Note!

The limitation of the output voltage via [C00236](#) in the extreme field weakening range (high speeds) causes a reduction of the max. possible output torque (stalling torque).

- If the output torque to be reached in the extreme field weakening range is not sufficient (motor is stalling too early), reduce the setting in [C00236](#).

With servo control (SC), the Lenze setting of [C00236](#) should not be reduced. Otherwise the field weakening control could not work optimally anymore (the behaviour at high speeds may get worse). When servo control (SC) has been selected, the oscillation damping in [C00236](#) should never be set to "0".



How to eliminate speed oscillations in the field weakening range:

1. Approach the area where the speed oscillations occur.
2. Reduce the speed oscillations by changing [C00236](#) step by step (increment 1).
3. These can be indicators for smooth running:
 - Constant motor current characteristic
 - Reduction of the mechanical oscillations in the bearing seat

5.10.7 Phase sequence reversal for correcting misconnected UVW motor phases



Note!

Up to and including version 06.00.00, this function may only be activated for the following motor control types:

- [V/f characteristic control \(VFCplus\)](#) (□ 157)
- [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (□ 175)

For all other motor control types, this function must not be activated because the set control mode would not work in that case!

From version 12.00.00, this function may be activated for all motor control types with the exception of the ones for synchronous motor.

The activation of this function does not affect the control types for synchronous motor since these control types require an in-phase connection of the synchronous motor.

If the motor phases are misconnected at the inverter output (e.g. phase u takes the place of phase v), the motor will rotate in the wrong direction.

To correct such misconnected motor phases, the rotating field of the inverter's output can be reversed by selecting "1: Inverted" in [C00905](#). In this case, a phase will be reversed at the output of the inverter.

This function does not have any effect on setpoints and actual values, i.e. the polarity of the speed setpoint/actual speed value, actual torque, output frequency, and AngleOffset do not change.



Tip!

Cases of application for this function:

- Phase sequence reversal in case of misconnected motor phases.
- Setting of the correctly signed direction of rotation for inversely mounted motors.

5.11 Encoder/feedback system

Various encoder/feedback systems can be used for the motor controls with speed feedback:

- Multi encoder
 - SSI absolute value encoders with Stegmann-SSI protocol) at the interface X80
 - Absolute value encoders which transfer their data as "external encoders" via a bus system
- HTL encoders at the digital input terminals (DI1/DI2 or DI5/DI6).



Danger!

- Avoid negative external influences on the encoder signals, e.g. by interference injections:
 - Use shielded motor and encoder cables
 - Use bounce-free switches
- If an HTL encoder is used at the digital input terminals:
Observe the maximum input frequencies of the digital inputs!
 - DI1/DI2: $f_{\max} = 100 \text{ kHz}$, from version 11.00.00: $f_{\max} = 200 \text{ Hz}$
 - DI5/DI6: max. 10 kHz
- Generally, we recommend the use of encoder signals with increments ≥ 4
 - With increments < 4 , the evaluation may cause implausible values or a number range overflow may occur when further processing the value.
 - Increments > 2 are at least required for encoder signals that are exclusively processed in the FB interconnection.



Note!

In the Lenze setting (e.g. when the device is delivered), the open-circuit monitoring of the encoder is activated. ▶ [Encoder open-circuit monitoring](#) (☐ 322)



Note!

The encoder position can be saved safe against mains failure in the inverter.

- For this purpose, bit 0 must be set in [C02652](#). The actual position of the motor control is then saved in the inverter (not in the memory module) and thus remains known to the drive control after mains switching.
 - ▶ [Option "Actual MCTRL position received at mains switch-off"](#) (☐ 537)
- In case of a device replacement, this information gets lost and the home position might be approached or set again once. A device replacement can be recognised by using the SB [LS RetainData](#) and a suitable function block interconnection.

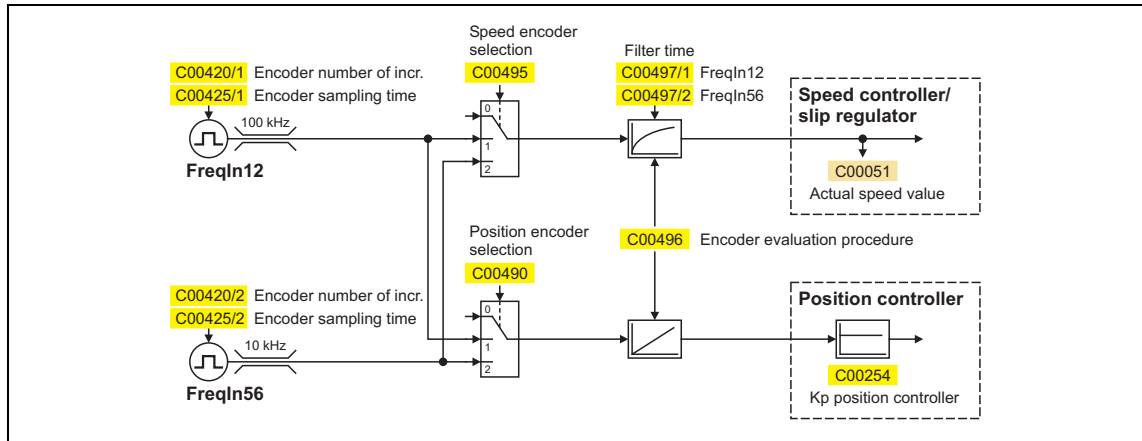


Wiring diagram, assignment and electrical data of the digital input terminals can be found in the **8400 protec hardware manual** in the chapter "Technical data".

- The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.

5 Motor control (MCTRL)

5.11 Encoder/feedback system

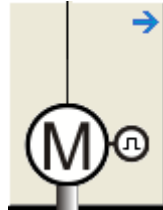


[5-29] Signal flow - encoder interface



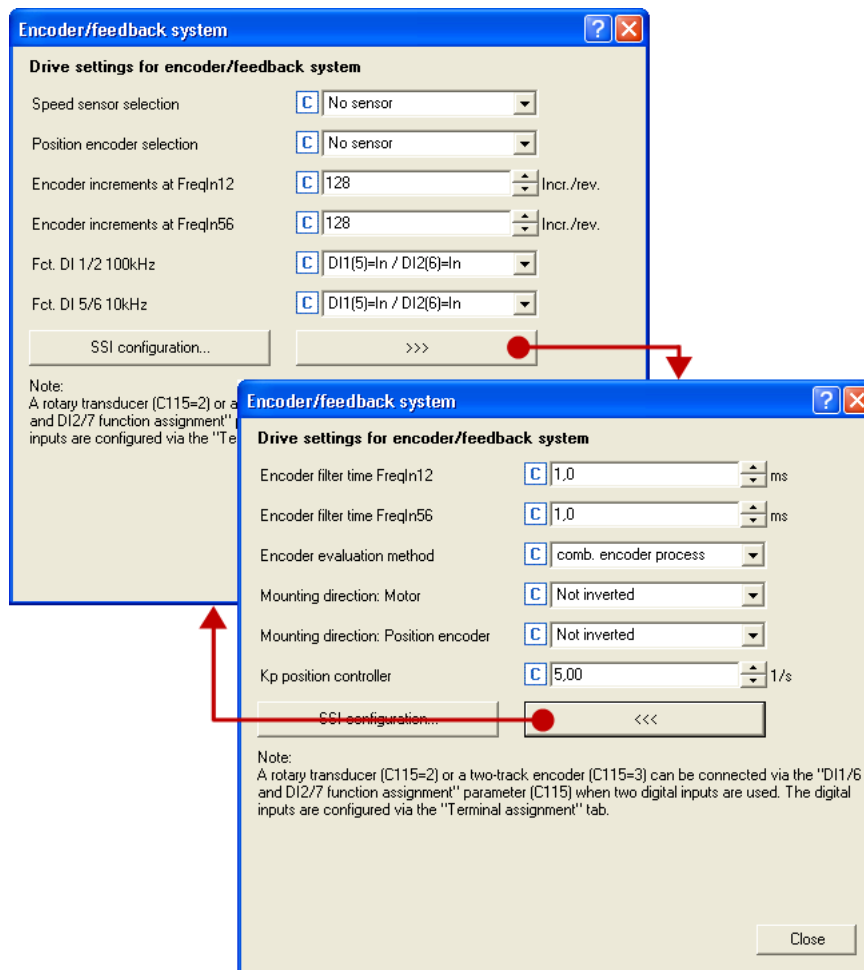
How to get to the parameterisation dialog of the encoder/feedback system:

1. Go to the *Project view* of the »Engineer« and select the 8400 inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the following button:



4. Go to the *Overview* → *Motor data* dialog level and click the **Encoder/Feedback system...** button.

Parameterisation dialog in the »Engineer«



- If an SSI encoder is connected to the synchronous serial interface (SSI):
Use the **SSI configuration...** button to get to the settings for the [SSI encoder evaluation](#). (☰ 287)

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00495	Speed sensor selection • Source of feedback signal for speed control.	No sensor	
C00490	Position encoder selection • Source of feedback signal for position control.	No sensor	
C00254	Kp position controller	5.00	1/s
C00496	▶ Encoder evaluation method (☰ 282)	Combined encoder method	
C00586	Resp. to encoder open circuit ▶ Encoder open-circuit monitoring (☰ 322)	Fault	
C01206/1	Mounting direction: Motor	not inverted	
C01206/2	Mounting direction: Position encoder	not inverted	
Settings for encoder inputs DI1/DI2			
C00115/1	Fct. DI 1/2 100kHz • Function of the digital inputs DI1 and DI2	DI1(6)=In / DI2(7)=In	
C00420/1	Encoder increments at FreqIn12 • If the digital inputs DI1 and DI2 are used as encoder inputs.	128	Incr./rev.
C00425/1	Encoder sample time FreqIn12 • If the digital inputs DI1 and DI2 are used as encoder inputs.	10	ms
C00497/1	Encoder filter time FreqIn12 • If the digital inputs DI1 and DI2 are used as encoder inputs.	1.0	ms
Settings for encoder inputs DI5/DI6			
C00115/2	Fct. DI 5/6 10kHz • Function of the digital inputs DI5 and DI6	DI1(6)=In / DI2(7)=In	
C00420/2	Encoder increments at FreqIn67 • If the digital inputs DI5 and DI6 are used as encoder inputs.	128	Incr./rev.
C00425/2	Encoder sample time FreqIn67 • If the digital inputs DI5 and DI6 are used as encoder inputs. • Only relevant for simple edge-counting procedures (C00496 = 3).	10	ms
C00497/2	Encoder filter time FreqIn67 • If the digital inputs DI5 and DI6 are used as encoder inputs.	1.0	ms

General procedure

(if the encoder is connected to the digital inputs DI1 and DI2)

1. Define the function of the digital inputs DI1 and DI2 in [C00115/1](#).
2. Set the encoder increments in [C00420/1](#).
3. Select "1: Encoder signal FreqIn12" in [C00495/1](#).
4. Adapt the filter time of the speed measurement in [C00497/1](#).
5. In the case of encoders with a very low resolution (number of increments < 120 increments):
Change the encoder evaluation procedure in [C00496](#) if necessary.

5 Motor control (MCTRL)

5.11 Encoder/feedback system

5.11.1 Parameterising digital inputs as encoder inputs

The function of the digital inputs DI1/DI2 and DI5/DI6 is defined via [DI1/1...2](#).

To be able to use the digital inputs as encoder inputs, select 2, 3, or 4 (Lenze recommendation: 2) in [C00115/1](#) or [C00115/2](#), depending on the input terminals used.

Selection in C00115/1...2	Function
2: DI1(5)&DI2(6)=FreqIn (2-track)	DI1/5 and DI2/6 = 2-track frequency input • Permits a two-track evaluation of the encoder including correct detection of the direction of rotation.
3: DI1(5)=FreqIn / DI2(6)=Direction	DI1/5 = 1-track frequency input DI2/6 = specification of direction
4: DI1(5)=CountIn / DI2(6)=In	DI1/5 = counter input DI2/6 = digital input



Danger!

For single-track evaluation, make sure that the sign is correctly specified. Otherwise, the motor may overspeed.



Note!

If the digital inputs are parameterised as encoder inputs, the corresponding output signals (*bln1/bln2* and *bln5/bln6*) at the [LS DigitalInput](#) system block are automatically set to FALSE.



The wiring diagram and the assignment of the input terminals can be found in the **8400 protec hardware manual**.

- The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.

Related topics:

- ▶ [Digital terminals](#) (📖 332)
- ▶ [Using DI1\(5\) and DI2\(6\) as frequency inputs](#) (📖 336)

5.11.2 Encoder evaluation method

Depending on the encoder used, the following table specifies which evaluation method should be selected in [C00496](#):

Selection in C00496	Encoder evaluation method
0: High-resolution encoder	<p>High-precision procedure for high-resolution encoders (≥ 512 increments)</p> <ul style="list-style-type: none"> • Method for speed measurement with automatic scan time setting (0.5 ... 500 ms). • Evaluation with automatic scanning time minimisation for an optimum dynamic performance. • Particularly suited for high-resolution encoders (≥ 1024 inc) with good signal quality, i.e. <ul style="list-style-type: none"> • good scanning ratio 1:1 • exactly 90°-phase offset between track A and B (error $\leq \pm 10^\circ$) • Not suited for encoders with poor signal quality. • Wiring according to EMC (e.g. motor and encoder cable shielding) is required!
1: Low-resolution encoder (StateLine)	<p>High-precision procedure for low-resolution encoders (≤ 128 increments)</p> <ul style="list-style-type: none"> • Exact method for speed measurement with automatic scanning time setting (0.5 ... 500 ms) for low-resolution encoders in the range of 4 ... 128 increments. • Evaluation with automatic scanning time minimisation for an optimum dynamic performance. • Method is also suited for encoders with poor signal quality, e.g. for encoders with high error rate in scanning ratio and phase offset. • This method requires an equidistant period length per encoder increment. • Wiring according to EMC (e.g. motor and encoder cable shielding) is required!
2: Comb. encoder method (Lenze setting)	<p>Combination of the first two procedures as a function of the speed (recommended procedure)</p> <ul style="list-style-type: none"> • For a high-precision speed measurement suited for encoders with an arbitrary number of increments (4 ... 1024 increments). • Low input frequencies at the encoder inputs: The method is used for low-resolution encoders. • High input frequencies at the encoder inputs: The method is used for high-resolution encoders. • This method is suited for encoders with average to good signal quality. • Evaluation with automatic scanning time minimisation for an optimum dynamic performance. • This method requires an equidistant period length per encoder increment. • Wiring according to EMC (e.g. motor and encoder cable shielding) is required!
3: Edge-counting procedure	<p>Simple edge counting procedure with adjustable scanning time (C00425)</p> <ul style="list-style-type: none"> • Speed measurement by means of the edges of tracks A and B measured per scanning interval. • Integrated correction algorithm for EMC interference. • Limited suitability for systems with unshielded encoder and/or motor cable. • Limited suitability for encoders with poor signal quality, i.e. high error rate in scanning ratio and phase offset.



Tip!

- We recommend to use the preset combined encoder method ([C00496](#) = 2).
- Use one of the first three procedures ([C00496](#) = 0, 1, or 2) for dynamic applications (e.g. operating mode: servo control).
- For dynamic speed control or positioning processes, use an HTL encoder with 1024 increments.

5.11.3 Generation of the actual speed value

...depending on the encoder selection and mounting direction:

Speed sensor (C00495)	Position encoder (C00490)	Motor mounting direction (C01206/1)	Direction of rotation of motor shaft (at setpoint = Cw)	Actual speed value (nAct_v)
<input type="checkbox"/>	<input type="checkbox"/>	not inverted	Cw	ΔSetPos
		inverted	Ccw	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	not inverted	Cw	C00495
		inverted	Ccw	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	not inverted	Cw	
		inverted	Ccw	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	not inverted	Cw	C00490 → ΔActPos
		inverted	Ccw	

no encoder Encoder set

Up to and including version 06.xx.xx the following applies:

- For motor control types without speed feedback (C00495 = "0: No encoder") a speed-proportional unit is taken for calculating the *nMotorSpeedAct_v* speed signal. This derivation, however, is very imprecise so that in case of applications with synchronous motors without speed feedback it is not possible to calculate the current position from the current *nMotorSpeedAct_v* speed signal.
- If no position encoder is available (C00490 = "0: No encoder"), the *dnMotorPosAct_p* position signal is always derived from the *nSpeedSetValue_a* speed setpoint. This derivation, however, is very imprecise since in this case, speed limitations (e.g. by overcurrent limitations) are not considered.

From version 12.00.00 the following applies:

- For applications with synchronous motors without speed feedback, an *nMotorSpeedAct_v* error-free speed signal is available. This is calculated from the electrical output angle considering the number of pole pairs of the *nMotorSpeedAct_v* speed signal.
- When synchronous or reluctance motors without feedback are used in the motor control types [V/f characteristic control \(VFCplus\)](#) and [Sensorless control for synchronous motors \(SLPSM\)](#), the *nMotorSpeedAct_v* speed signal can be used to create an error-free position signal via a control if the *nMotorSpeedAct_v* signal is read out by the control in a 1 ms cycle.
- If no position encoder is available (C00490 = "0: No encoder"), the *dnMotorPosAct_p* position signal is continued to be derived from the *nSpeedSetValue_a* speed setpoint. The extended selection text "0: No encoder:nSpeedSetValue_a" in C00490 refers to this behaviour.
- The new selection "10: No encoder: C495 or nMotorSpeedSetAct_v" in C00490 is used to calculate the *dnMotorPosAct_p* position signal either from the set speed feedback (when C00495 > 0) or from the *nMotorSpeedAct_v* speed signal (when C00495 = 0).
 - For all motor control types without speed feedback, this selection serves to improve the creation of the *dnMotorPosAct_p* position signal.
 - When synchronous or reluctance motors without feedback are used, the *dnMotorPosAct_p* position signal can be created correctly.
 - In case of the motor control types with speed feedback, the *dnMotorPosAct_p* position signal is directly created from the speed feedback signal.

5.11.4 Encoder with HTL level at DI1/DI2



Note!

At the digital terminals DI1 and DI2, only encoders with HTL level can be used.

In spite of the selected operating mode without encoder feedback, the actual speed value ([C00051](#)) is calculated if an encoder is connected and "1: Encoder signal FrqIn12" is selected in [C00495](#).

Low speeds (except for edge counting)

For the first three methods ([C00496](#) = 0, 1, or 2), the minimum speed that can be measured depends on the encoder resolution.

The quantisation error

- is independent of the encoder resolution,
- exclusively depends on the encoder quality (encoder errors).
- at least amounts to 0.5 rpm.

Internal arithmetic operations automatically maintain the minimally required value of the scanning time in order to achieve maximum dynamics.

Encoder resolution (Number of increments)	Min. measurable speed in [rpm]
8	16
16	8
32	4
64	2
128	1
256	0.5
≥ 512	0.25

5 Motor control (MCTRL)

5.11 Encoder/feedback system

Low speeds with edge counting

The minimum speed that can be measured and the quantisation error of speed measurement in the edge-counting procedure ([C00496](#) = 3) depend on the scanning time that can be set in [C00425/1](#) and the encoder resolution.

Depending on accuracy and the requirements with regard to the dynamic performance, the respective scanning time must be selected and set in [C00425/1](#):

Encoder resolution (Number of increments)	Scanning time [ms]									
	1	2	5	10	20	50	100	200	500	1000
8	1875	938	375	188	93.8	37.5	18.8	9.4	3.8	1.9
16	938	469	188	94	46.9	18.8	9.4	4.7	1.9	0.9
32	469	234	94	46.9	23.4	9.4	4.7	2.3	0.9	0.5
64	234	117	46.9	23.4	11.7	4.7	2.3	1.2	0.5	0.2
128	117	58.6	23.4	11.7	5.9	2.3	1.2	0.6	0.2	0.12
256	58.6	29.3	11.7	5.9	2.9	1.2	0.6	0.3	0.12	0.06
512	29.3	14.6	5.9	2.9	1.5	0.6	0.3	0.15	0.06	0.03
1024	14.6	7.3	2.9	1.5	0.7	0.3	0.15	0.07	0.03	0.01

5.11.5 Encoder with HTL level at DI5/DI6



Note!

Single-track evaluation of the digital DI5/DI6 terminals as speed feedback ([C0115/2](#) = 1 or 3) is not possible. Hence, a single-track encoder cannot be used for speed control at the digital DI5 terminal!

Low speeds with edge counting

The speed measurement is evaluated at the digital terminals DI5/DI6 with the edge-counting procedure and a fixed scanning time that can be set in [C00425/2](#).

The minimum speed that can be measured and the quantisation error of speed measurement in the edge-counting procedure depend on the scanning time that can be set in [C00425/2](#) and the encoder resolution.

Depending on accuracy and the requirements with regard to the dynamic performance, the respective scanning time must be selected and set in [C00425/2](#):

Encoder resolution (Number of increments)	Scanning time [ms]									
	1	2	5	10	20	50	100	200	500	1000
	Min. measurable speed in [rpm]									
8	1875	938	375	188	93.8	37.5	18.8	9.4	3.8	1.9
16	938	469	188	94	46.9	18.8	9.4	4.7	1.9	0.9
32	469	234	94	46.9	23.4	9.4	4.7	2.3	0.9	0.5
64	234	117	46.9	23.4	11.7	4.7	2.3	1.2	0.5	0.2
128	117	58.6	23.4	11.7	5.9	2.3	1.2	0.6	0.2	0.12
256	58.6	29.3	11.7	5.9	2.9	1.2	0.6	0.3	0.12	0.06
512	29.3	14.6	5.9	2.9	1.5	0.6	0.3	0.15	0.06	0.03
1024	14.6	7.3	2.9	1.5	0.7	0.3	0.15	0.07	0.03	0.01

Maximum speeds with edge counting

Due to the lower input frequency (max. 10 kHz) compared to the terminals DI1/DI2, operation with maximum speed at the terminals DI5/DI6 is limited. ▶ [Digital terminals](#) (□ 332)

Encoder resolution (Number of increments)	Max. measurable speed in [rpm]
8	No restrictions
16	37500
32	18750
64	9375
128	4688
256	2344
512	1172
1024	586

5.11.6 SSI encoder evaluation

In certain communication and device versions, the decentralised 8400 protec HighLine inverter comes with a synchronous serial interface (SSI) for evaluating SSI encoders:

CANopen	PROFIBUS	PROFINET	Ethernet IP
<ul style="list-style-type: none"> E84D HxxxxxxxxC5Sxxx 	<ul style="list-style-type: none"> E84D HxxxxxxxxP5Sxxx E84D HxxxxxxxxP7Sxxx 	<ul style="list-style-type: none"> E84D HxxxxxxxxR5Sxxx E84D HxxxxxxxxR6Sxxx E84D HxxxxxxxxR7Sxxx E84D HxxxxxxxxR8Sxxx 	<ul style="list-style-type: none"> E84D HxxxxxxxxG5Sxxx E84D HxxxxxxxxG6Sxxx E84D HxxxxxxxxG7Sxxx E84D HxxxxxxxxG8Sxxx

[5-2] 8400 protec HighLine with SSI encoder connection

All SSI encoders which use the Stegmann SSI protocol are supported.

- Supported bit rates for SSI communication: 100 ... 1000 kbits
- Supported data word widths: 1 ... 31 bits (effective)
- Supported output code of the SSI encoder: Gray or binary
- The SSI encoder can be used as position encoder or master encoder with a minimum cycle time of 1 ms.
- The received SSI data words are made available to the application via the [LS_MultiEncoder](#) system block for being further processed in the function block editor. They can also be fed automatically into the control loop with a corresponding parameterisation.



Note!

For some SSI encoder types it is common that despite a high data transfer rate a slow position detection (e.g. every 5, 10 or 20 ms) takes place. In this case, the position control, working in a 1-ms cycle, only functions with low gain and thus low dynamics since the values of the SSI encoder are only updated every x ms.

When an external SSI laser position encoder is used at X80:

Also observe the [Notes for using an SSI laser position encoder](#) at the end of this chapter. [\(p. 291\)](#)



The technical data of the synchronous serial interfaces (SSI) can be found in the **8400 hardware manual**.

- The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.



Tip!

When [C00422](#) = 7 / 8 (position encoder external/SSI), the drive system is directly connected to the position of the feedback.

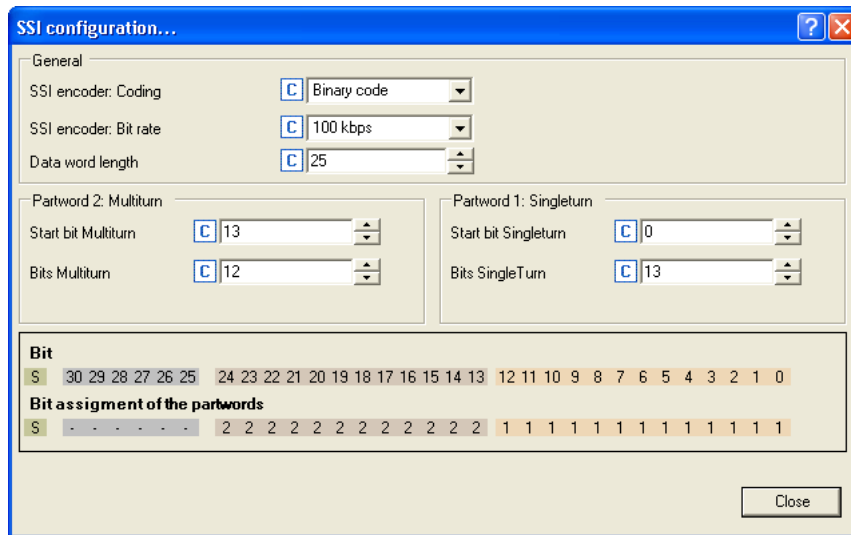
Code [C01112/1](#) ([LS MultiEncoder](#) : Position offset) does not have any impact on the encoder position.

Finally, only

- a once-only homing has to be executed
 - ▶ [Homing](#) ([521](#)), mode 100: SetRef) or
- "mains switching" can be carried out.

Parameterisation dialog in the »Engineer«

When pressing the **SSI configuration...** button in the *encoder/feedback system* dialog box, you get to the parameterisation dialog for configuring the SSI encoder:



Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
General			
C00428	SSI encoder: Coding	0:	Binary code
C00427	SSI encoder: Bit rate	1:	100 kbps
C00426/1	SSI encoder: Data word length		25
C00426/7	SSI encoder: Shift of raw value		0
C00426/6	SSI encoder: Status bit 1		0
C00426/8	SSI encoder: Status bit 2		0
C00426/9	SSI encoder: Status bit 3		0
Partword 2: Multiturn			
C00426/5	SSI encoder: Start bit Multiturn		13
C00426/4	SSI encoder: Bits Multiturn		12
Partword 1: Singleturn			
C00426/3	SSI encoder: Start bit Singleturn		0
C00426/2	SSI encoder: Bits SingleTurn		13



How to parameterise the SSI encoder:

1. As encoder type ([C00422](#)), select "4: Absolute value encoder (SSI)".
2. Set the bit rate ([C00427](#)) for SSI communication.
 - For SSI protocols, the permissible baud rate is reduced if the cable length is increased. A safe bit rate must be set, depending on the length of the used encoder cable and the electromagnetic interference level.
3. Go to [C00426/1...6](#) and set the distribution of the SSI data word according to the SSI encoder used (see the following subchapter).
4. If an SSI encoder with Gray coding is used:
Select "1: Gray code" or "2: Position Gray" in [C00428](#) to convert from Gray to binary.
 - In the Lenze setting "0: Binary code", no conversion takes place, i.e. an SSI encoder with binary coding is expected.

SSI encoder coding "Position Gray"

In version 8.00.00 and from version 16.00.00 onwards, also SSI encoders are supported that transfer the position data in Gray coding and the status bit in binary mode (uncoded). For an encoder with this coding, select "2:Position Gray" in [C00428](#). Then, only the pure position data are converted from Gray to binary code, and status bits provided by the encoder are directly evaluated. The position data converted to binary format are then added to the status bits again and provided as raw value at the outputs *wHighWord* and *wLowWord* of the [LS MultiEncoder](#). This takes place as a provision of the position raw value in gray code would not make any sense; the value, in case of a linear encoder, would feature jumps instead of a linear characteristic.

Evaluation of further status bits

In version 8.00.00 and from version 16.00.00 onwards, two more status bits of the SSI encoder can be evaluated. The bits to be evaluated in the SSI data current have to be set in [C00426/8..9](#).

If the evaluation of a status bit shall be deactivated completely, the value "32" has to be entered into the corresponding code. Thus, the status bit always has the value "0".

Left shift of raw value

The data read-in by the encoder is processed via the settings of the start bits for singleturn and multiturn and the number of bits in such a way that a position signal suitable for the inverter is created that can be fed into the function block interconnection.

The raw value of the received data coming from the SSI encoder is provided at the outputs *wHighWord* and *wLowWord* of the [LS MultiEncoder](#). It is always provided in binary format, i.e. in case of Gray code encoders after the received data is decoded. The MSB of the data is positioned at bit 14 of the *wHighWord* output.

In version 8.00.00 and from version 16.00.00 onwards, an offset can be set in [C00426/7](#) to receive a standard data format (LSB at the lowest position). The setting [C00426/7](#) = 31 - data word length serves to display the raw value of the received data telegram so that the LSB is at bit 0 of the *wLowWord* output:

Clarification of the data sequence when the data word length is = 26 bits																																									
<i>wHighWord</i>													<i>wLowWord</i>																												
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0										
Data sequence without offset (C00426/7 = 0):																																									
																25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data sequence with an offset by 5 bits (C00426/7 = 5):																																									
																25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

In version 8.00.00 and from version 16.00.00 onwards, the logically correct evaluation of the raw data received from the encoder can be activated with [C00429/1](#) (SSI encoder: Advanced settings, bit 0: "Output raw data correctly"). In the Lenze setting, bit 0 is not active in order to provide for compatibility with the previous firmware versions.

When [C00429/1](#), bit 0 = "1" and [C00426/7](#) = 0, the MSB of the raw data is at bit 15 of the *wHighWord* output.

5.11.6.1 Important notes for using an SSI laser position encoder

If you are using an SSI laser position encoder at X8 and, deviating from the Lenze setting, you have activated the position control for quick stop ([C00104/1](#) - bit 0 and/or bit 1 set), please note the following:

If the laser beam is interrupted, due to the "TroubleQuickStop" following error standard response, the drive may move unexpectedly.

- A drive that had already reached the position-controlled standstill can execute a movement.
- A drive that is ramping down can continue running.

Possible countermeasures:

- Do not use the inverter with the above-described parameter setting.
- By implementing suitable other measures, ensure that, in terms of safety aspects, the response described is acceptable for the specific application case.
- Monitor the valid position:
 - Use parameters [C01112/2](#) and [C01112/3](#) to define a value range for valid positions.
 - Configure the [LS MultiEncoder.bFail](#) output so that controller inhibit is set when the output at the drive is active. Take other requirements relating to the application into consideration (e.g. application of brake).
 - Resulting drive behaviour: If the value range set is exited, the [LS MultiEncoder.bFail](#) output activates controller inhibit. ▶ [Encoder value monitoring](#)



Note!

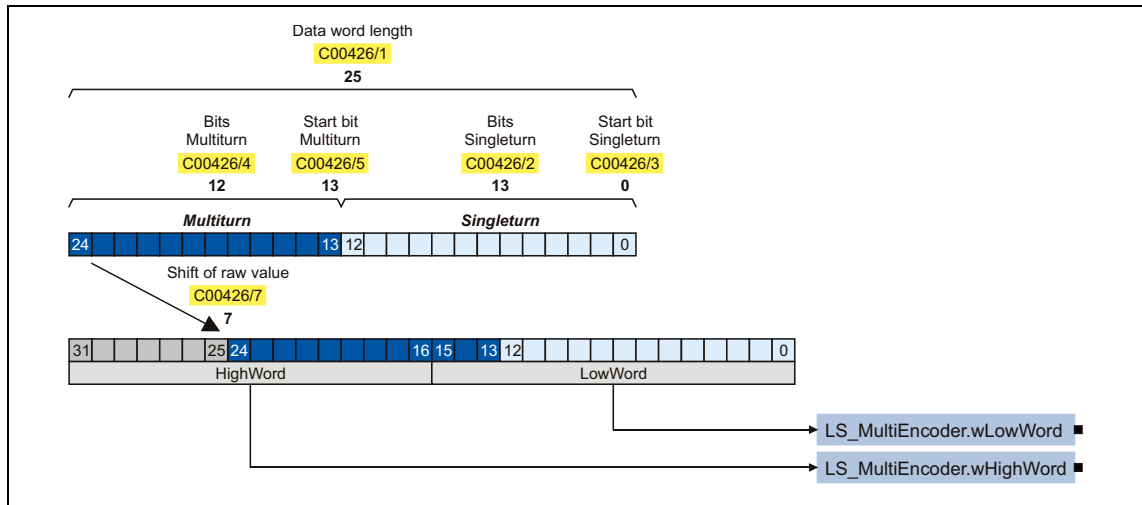
The response of the drive to interruptions of the laser beam is always part of the error scenarios to be checked during commissioning.

5 Motor control (MCTRL)

5.11 Encoder/feedback system

5.11.6.2 Configuration example 1: Optical multi-turn rotary encoder "G0M2H Z04" by Baumer

Coding: Gray code with 25 bit data word length (8192x4096)



Parameters	Info	Setting for example 1
C00426/1	SSI encoder: Data word length	25
C00426/2	SSI encoder: Bits SingleTurn	13
C00426/3	SSI encoder: Start bit Singleturn	0
C00426/4	SSI encoder: Bits Multiturn	12
C00426/5	SSI encoder: Start bit Multiturn	13
C00426/6	SSI encoder: Status bit 1	0 (32)*
C00426/7	SSI encoder: Shift of raw value	7
C00426/8	SSI encoder: Status bit 2	0 (32)*
C00426/9	SSI encoder: Status bit 3	0 (32)*
C00428	SSI encoder: Coding	1: Gray code
C01110	LS_MultiEncoder: Solid measure	0: rotatively unipolar

* As the encoder data word in this example does not contain any status bits, you the evaluation of the status bits can also be deactivated completely by entering the value "32" in [C00426/6](#), [C00426/8](#) and [C00426/9](#). Thus, the three status bit outputs of the [LS_MultiEncoder](#) always have the value "0".

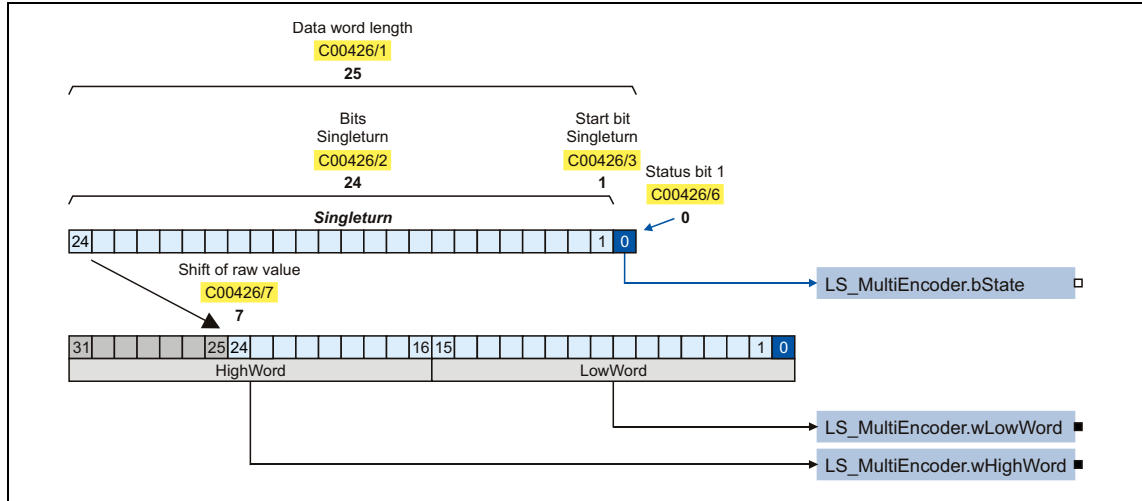
- In "[Machine parameters](#)", the feed constant and the gearbox factors for motor and position encoder must be set correctly. ([496](#))
- One encoder revolution is displayed with 65536 increments.

5 Motor control (MCTRL)

5.11 Encoder/feedback system

5.11.6.3 Configuration example 2: Distance sensor "DME5000-111" by Sick

Coding: Gray code with 25 bits of data word length
 (Bit 0 = status bit in binary format, bit 1 ...24 = position, resolution 1 bit = 0.1 mm)



Parameters	Info	Setting for example 2
C00426/1	SSI encoder: Data word length	25
C00426/2	SSI encoder: Bits SingleTurn	24
C00426/3	SSI encoder: Start bit Singleturn	1
C00426/4	SSI encoder: Bits Multiturn	0
C00426/5	SSI encoder: Start bit Multiturn	0
C00426/6	SSI encoder: Status bit 1	0
C00426/7	SSI encoder: Shift of raw value	7
C00426/8	SSI encoder: Status bit 2	0 (32)*
C00426/9	SSI encoder: Status bit 3	0 (32)*
C00428	SSI encoder: Coding	2: Position Gray
C01110	LS_MultiEncoder: Solid measure	1: linearly unipolar

* As the encoder data word in this example contains **only one** status bit, the evaluation can be deactivated completely by entering the value "32" in [C00426/8](#) and [C00426/9](#). Thus, the status bit outputs *bState2* and *bState3* of the [LS_MultiEncoder](#) always have the value "0".

In "[Machine parameters](#)", the feed constant and the gearbox factors for motors and position encoders must be set as follows:

- The position encoder gearbox factor must be set to 1:1.
- When the motor gearbox factor is set to 1:1, the path covered at one motor revolution has to be entered as feed constant in [C01204](#) in [units].
- In case of a different motor gearbox factor, the path covered at one defined "drive roll" revolution has to be entered as feed constant in [C01204](#) in [units].
- The feed of the mechanics entered in [C01204](#) is displayed with 65536 increments.

Scaling of the position value

In order to scale the position change provided by the position encoder at this feed to 65536 as well, enter the traverse path in [units] in [C1111/1](#) and the corresponding difference of the raw value provided by the encoder in [C1111/2](#).

- Only the bits that contain the position data may be taken from the data word for the raw value. If e.g. the bit 0 contains status information, the raw value must be shifted to the right by this bit since only then the SLB of the position value is positioned correctly.

Example for scaling

1 [unit] = 1 mm

Feed constant ([C01204](#)) = 4 mm/revolution

Encoder resolution = 50 µm → raw value difference = 20 [digit]/1 [unit]

→ Difference - traverse path ([C1111/1](#)) = 1 [unit]

→ Difference - encoder value ([C1111/2](#)) = 20 [digit]

Thus, at a feed of the mechanics of 4 mm, the encoder provides a position difference of 65536 increments.

$$\text{Position} = \text{Raw value} \cdot \frac{\text{Encoder feed constant}}{65536}$$

$$\text{with encoder feed constant} = \frac{C01111/1 \cdot 65536^2}{C01111/2 \cdot C01204}$$

$$\text{Position} = \text{Raw value} \cdot \frac{C01111/1 \cdot 65536}{C01111/2 \cdot C01204}$$

5.11.7 Evaluation of external absolute value encoders

External absolute value encoders transmit their information via one of the bus systems CANopen, PROFIBUS, PROFINET or Ethernet IP provided for the 8400 protec HighLine.

An actual value position of an external absolute value encoder for position control can be supplied to the following inputs of the [LS_MultiEncoder](#) system block:

- wActPosExternalHW
- wActPosExternalLW

[C00422](#) defines the use of the encoder information:

- The [C00422](#) = 3 (absolute value encoder, external):
Actual value position of the external absolute value encoder
- Via [C00422](#) = 7 (position encoder, external):
Actual value position of the external absolute value encoder for direct supply into the position control.

The supplied position signal is scaled in line with the scaling of the SSI encoder. ▶ [Scaling of the position value](#) (☞ 294)

Codes to be used: [C00426/1..5](#), [C01110](#), [C01111/1..2](#), [C01112/1](#)

- No status bits are evaluated.
- The conversion of Gray code cannot be executed.



Tip!

When [C00422](#) = 7 / 8 (position encoder external/SSI), the drive system is directly connected to the position of the feedback.

Code [C01112/1](#) ([LS_MultiEncoder](#) : Position offset) does not have any impact on the encoder position.

Finally, only

- a once-only homing has to be executed
▶ [Homing](#) (☞ 521), mode 100: SetRef) or
- "mains switching" can be carried out.

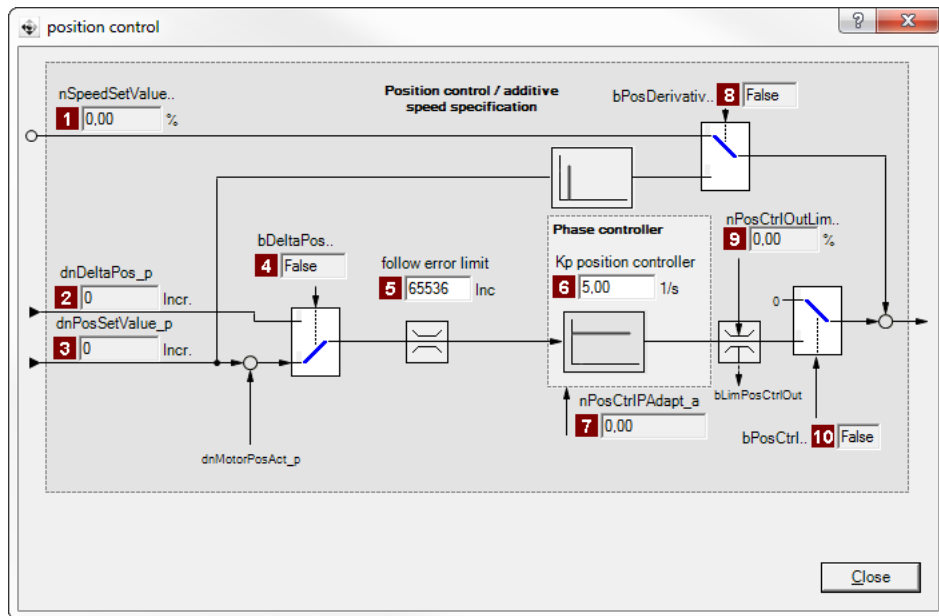
5.12 Position control/additive speed specification

In the Lenze setting, the position control is only active with [TA "Table positioning"](#).



Proceed as follows to open the dialog for parameterising the position control:

1. »Engineer« Go to the *Project* view and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the **Motor control...** button to change to the *Overview* → *motor control...* dialog level.
4. Click the **Position control** button in the displayed signal flow.



Parameters	Info
1 C00830/22	MCTRL: nSpeedSetValue_a Speed setpoint
2 C00834/4	MCTRL: dnDeltaPos_p Position difference (following error input)
3 C00834/5	MCTRL: dnPosSetValue_p Absolute position setpoint
4 C00833/35	MCTRL: bDeltaPosOn TRUE = Position difference is active as setpoint selection
5 C02556/1	Following error limit Setting of the maximum permissible correcting variable or the maximum permissible following error for the position controller
6 C00254	Kp position controller Gain for following error compensation
7 C00830/20	MCTRL: nPosCtrlPAdapt_a Adaptation of the position controller gain
8 C00833/67	MCTRL: bPosDerivativeOn TRUE = Setpoint for the speed controller is created from the position setpoint
9 C00830/21	MCTRL: nPosCtrlOutLimit_a Limitation of the position controller output

5.13 Braking operation/brake energy management

When braking electrical motors, the kinetic energy of the drive train is fed back regeneratively to the DC bus. This energy results in a boost of the DC-bus voltage.

- Several different strategies can serve to avoid DC-bus overvoltages:
 - Use of a brake resistor
 - Stopping of the ramp function generator if brake chopper threshold exceeded (RFG_Stop)
 - Use of the "Inverter motor brake" function
 - Combination of the above named options
- In the case of inverters with a 3-phase supply, the following is also possible:
 - Coupling of the inverters in a DC-bus connection
 - Recovery of regenerative energy with a regenerative module



Stop!

If the connected brake resistor is smaller than required, the brake chopper can be destroyed!

- Appropriate protective measures are described in subchapter "[Avoiding thermal overload of the brake resistor](#)". (📖 306)

If no brake resistor or regenerative module is used, the overvoltage switch-off ("OU") may respond, e.g. in the case of short deceleration times during feedback operation.

- ▶ [Error messages of the operating system](#) (📖 617)

Using the integrated brake chopper

We recommend to use the brake chopper (brake transistor) which is integrated into the inverter for the braking operation, regardless of the selected motor mode.

- Connect the required brake resistor to the R_{B1} and R_{B2} terminals of the inverter.
- In [C00175](#), a ramp function generator stop (FB [L_NSet_1](#)) can be set for instances when the brake resistor is controlled. This prevents overvoltage deactivation in the case of short deceleration times. ▶ [Selecting the response to an increase of the DC-bus voltage](#) (📖 301)

**Note!**

The brake transistor will be switched off if it remains switched on for a period of 4 seconds.

- If the DC-bus voltage falls under the brake chopper threshold for a short time again, the brake transistor can switch on again for a maximum of 4 seconds, without interruption.
- This protective function is used to prevent the brake chopper from being switched on permanently due to e.g. too high voltages at all times or incorrect interconnection of the *bBrakeChopperOn* signal (from software version V12.00.00).
- From version 16.00.00, the limitation of the operating time can be deactivated to max. 4 seconds. For this purpose, set bit 1 to "1" in [C02864/1](#).

The integrated brake chopper is always triggered via the DC-bus voltage with exceedance of the "voltage threshold for braking operation" independent of the device status.

From version 16.00.00, the brake chopper can also be switched off at pulse inhibit or when the "Fault" device status is activated.

- For a switch-off at pulse inhibit, set bit 7 to "1" in [C02865/1](#).
- For a switch-off in the "Fault" device status, set bit 2 to "1" in [C02864/1](#).

DC-bus system

For a DC-bus connection with other devices, we recommend to connect the regenerative power supply module to terminals +UG and –UG.



Note!

DC-bus system without the use of a regenerative module:

- Up to and including software version V06.xx.xx, only one internal brake chopper can be used in the DC-bus system to dissipate regenerative energy.
- From software version V12.00.00, all internal brake choppers can be used in the DC-bus system to dissipate regenerative energy ("Master-slave operation"). ▶ [Control of multiple internal brake choppers in the DC-bus system](#) (306)



To install the regenerative module, follow the instructions in the **8400 hardware manual**.

- The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.



Proceed as follows to open the dialog for parameterising the brake energy management:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the "basic functions" button.
4. Go to the *Overview* → *basic functions* dialog box and click the **Brake energy management** button.

The screenshot shows the 'Application Parameters' dialog for 'Brake Energy Control'. The main window title is 'Application Parameters' and the breadcrumb is 'Overview > Basic Functions > Brake Energy Control'. The 'Mains voltage' is set to '3ph 400V / 1ph 230V'. The 'Handling of brake energy' is set to 'Brake resistor'. The 'Brake energy management (Hlg Stop)' section includes a description: 'Stopping of the ramp function generator when the brake chopper threshold is exceeded.' The 'Inverter motor brake (F1_MotBrk)' section has 'Inverter motor bra..' set to '80 rpm' and 'Inverter motor bra..' set to '0,0 ms'. The 'Brake resistance' section includes: 'Utilisation - brake resistor' (0%), 'Brake resistance value' (39,0 Ohm), 'Rated power - brake resistor' (100 W), 'Thermal capacity - brake resistor' (10,0 kW/s), 'Reduced brake chopper threshold' (0 V), 'Threshold - brake resist. overload' (100%), and 'Resp. to brake resist. overtemp.' (No Reac). The diagram at the bottom shows a motor (M) connected to a three-phase supply (U, V, W) and a brake resistor (Rb1, Rb2) connected to the DC bus.

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00173	Mains voltage	3ph 400 V / 1ph 230 V	
C00175	Brake energy management	R_Brake (brake resistance)	
Brake resistor			
C00133	Brake resistor utilisation	-	%
C00129	Brake resistance value	39.0	Ohm
C00130	Rated brake resistor power	100	W
C00131	Thermal capacity - brake resistor	10.0	kWs
C00174	Reduced brake chopper threshold	0	V
C00572	Threshold - brake resist. overload	100	%
C00574	Resp. to brake resist. overtemp.	No response	
Inverter motor brake			
C00987	Inverter motor brake: nAdd	80	rpm
C00988	Inverter motor brake: PT1 filter time	0.0	ms
Greyed out = display parameter			

5.13.1 Setting the voltage source for braking operation

The voltage threshold for braking operation is set via the mains voltage ([C00173](#)) and the reduced brake chopper threshold ([C00174](#)). When this "brake chopper threshold" is exceeded, the response selected in [C00175](#) takes place in the DC bus. The selected function (e.g. use of a brake resistor) serves to dissipate energy in the DC bus and reduce the DC-bus voltage.

- The "brake chopper threshold" is preset as follows so that it is higher than the specified mains voltage ([C00173](#)):

C00173	Mains voltage		Brake chopper threshold	
	1-phase	3-phase	1-phase	3-phase
0	1ph 230V	3ph 400V	DC380V	DC725V
1	1ph 230V	3ph 440V	DC380V	DC735V
2	1ph 230V	3ph 480V	DC380V	DC775V
3	1ph 230V	3ph 500V	DC380V	DC790V

- This brake chopper threshold can be reduced by 0 ... 150 V by means of [C00174](#).

**Stop!**

The brake chopper threshold resulting from [C00173](#) and [C00174](#) must not exceed the stabilised DC-bus voltage!

Example :

- A 400 V device has a maximum mains voltage of 420 V AC.
 - Maximum stationary DC-bus voltage: $420 \text{ V AC} * 1.414 = 594 \text{ V DC}$
 - [C00173](#) has been set with the selection "0" for 400 V AC mains.
- This means that [C00174](#) can be set to a maximum of 131 V DC ($725 \text{ V DC} - 594 \text{ V DC}$).

5.13.2 Selecting the response to an increase of the DC-bus voltage

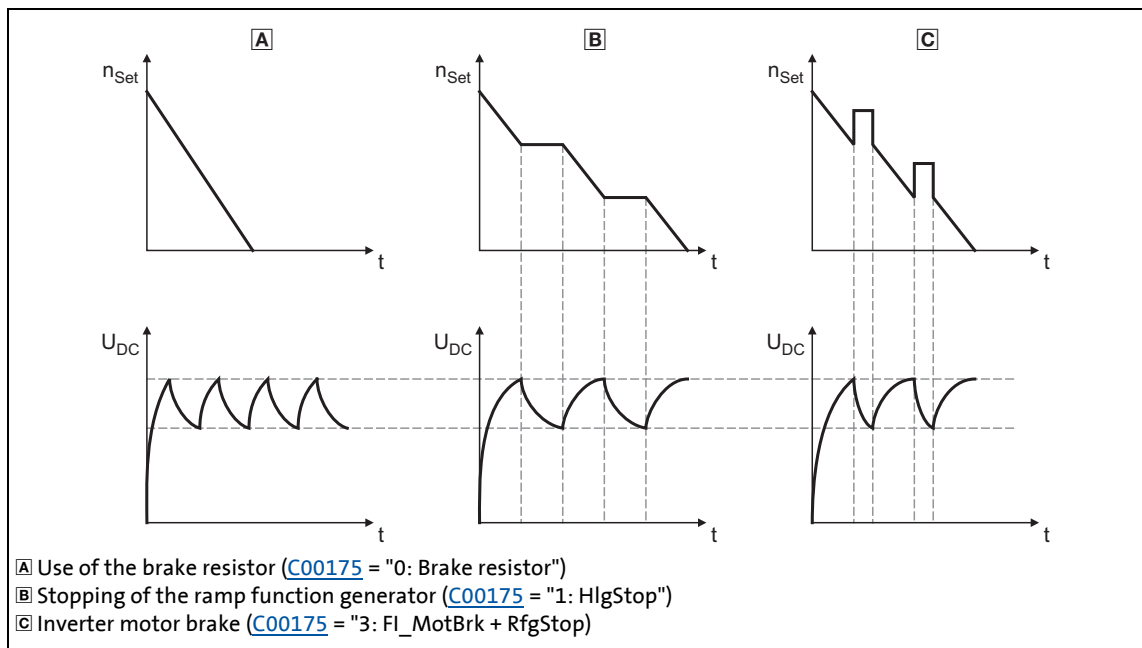
If the brake chopper threshold resulting from [C00173](#) and [C00174](#) is exceeded in the DC bus, the reaction selected in [C00175](#) takes place (use of the brake resistor and/or stop of the ramp function generator and/or inverter-motor brake).

- Optimum following of the actual speed value until the speed setpoint is reached (e.g. the motor is stopped rapidly) is always achieved with the help of a brake resistor
- Stopping the ramp function generator enables smoother deceleration with lower torque oscillation..
- The inverter-motor brake is available for selection in [C00175](#). This function enables rapid braking without a brake resistor. Torque oscillations can occur due to the traversing dynamics. ▶ [Inverter motor brake](#) (📖 303)

**Stop!**

- The two braking procedures "Stopping of the ramp function generator" and "Inverter motor brake" can only be used for speed-controlled applications without the influence of a position controller!
- When the "inverter motor brake" function is used, the [Motor overload monitoring \(I2xt\)](#) is not adapted. If it is braked too frequently, there is a risk of the motor being thermally overloaded or the motor overload monitoring does not work properly!
- The "inverter motor brake" function must not be used with vertical conveyors (hoists) or with active loads!

The way in which the different braking procedures work is demonstrated schematically in the following illustration:



[5-30] Graph of the effective speed setpoint and the DC bus voltage during braking



Tip!

Independent of the selected motor control, all procedures given in [C00175](#) can be used.

The actual speed value can optimally follow the speed setpoint when a brake resistor is used.

If it is possible to dispense with exact adherence to the deceleration ramp in simple applications, selection of a braking method without an external brake resistor enables costs to be reduced due to the avoidance of having to use a brake resistor.

With the "inverter motor brake" function, an effective braking torque of 10 ... 20 % of the rated motor torque can be achieved.

A combination of all three braking procedures is also possible, e.g. for emergency braking if the brake resistor fails

([C00175](#) = "4: Brake resistor + FI_MotBrk + RfgStop").

5.13.2.1 Inverter motor brake

With this braking method, which can be selected as an alternative in [C00175](#), the regenerative energy in the motor is converted as a result of dynamic acceleration/deceleration with down-ramping of the ramp function generator..



Stop!

- This braking method only works without intervention of a position controller in the case of speed-controlled applications!
- When the "inverter motor brake" function is used, the [Motor overload monitoring \(I2xt\)](#) is not adapted. If it is braked too frequently, there is a risk of the motor being thermally overloaded or the motor overload monitoring does not work properly!
- The "inverter motor brake" function must not be used with vertical conveyors (hoists) or with active loads!



Tip!

If no brake resistor is used, the DC injection brake can also be used for a braking process in addition to the "inverter motor brake" and "Stopping of the ramp function generator".

▶ [DC-injection braking](#) (📖 267)

In applications with high mass inertia and long braking times (> 2 s), we recommend the use of the DC injection brake.

- The DC injection brake provides for an oscillation-minimised braking. The braking process generally takes more time than the "inverter motor brake" function with an optimised setting. Moreover, the function is only recommended for braking to a standstill.

In the following cases we recommend the "inverter motor brake" function:

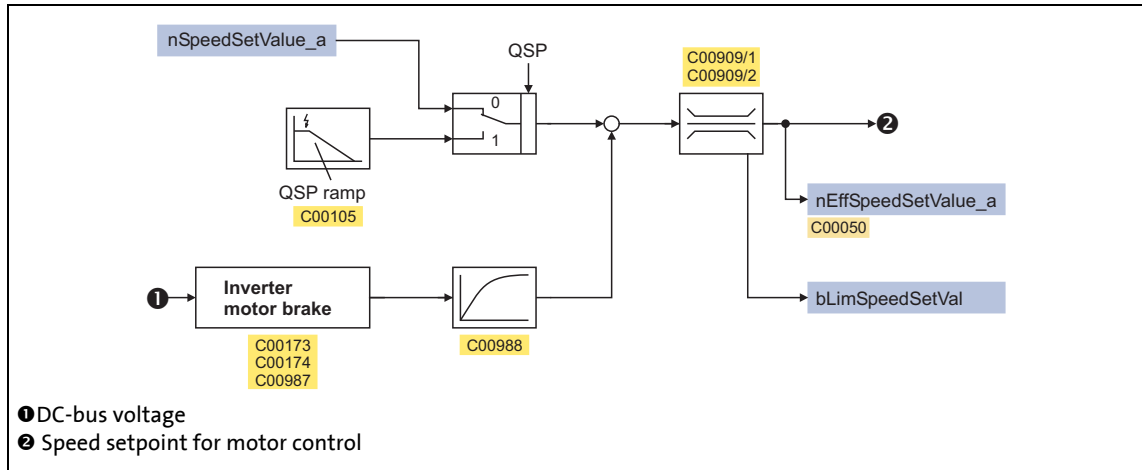
- With servo control (SC).
- For all applications that do not require braking to a standstill (e.g. braking to a lower speed setpoint) or the braking process can be interrupted by selecting a new speed setpoint.
- For applications with low mass inertias and a short braking time (< 1 s).
- For all applications where braking should be as quick as possible.

Operating mode of the inverter motor brake

The ramp function generator is stopped during acceleration. The speed set in [C00987](#) is added to the speed setpoint by means of a hysteresis-type 2-point DC bus voltage controller, whereby the sign of the current actual speed is taken into account. In addition, the ramp function generator is stopped during overvoltage.

If the DC bus voltage falls below a defined DC bus voltage potential of the hysteresis controller, the added speed is subtracted again and the ramp function generator is activated again.

The energy is converted into heat in the motor due to alternating instances of acceleration and deceleration as a result of this switching operation.



[5-31] Signal flow of the "Inverter motor brake" function

- In case of an asynchronous motor, the additive speed setpoint ([C00987](#)) should be 1 ... 4 times the slip of the machine:

$$C00987 \text{ [rpm]} = 1 \dots 4 \cdot (n_{\text{Sync}} \text{ [rpm]} - n_{\text{Rated}} \text{ [rpm]})$$

$$n_{\text{Sync}} \text{ [rpm]} = \frac{f_{\text{Rated}} \text{ Hz} \cdot 60}{p}$$

p = number of pole pairs
 n_{Rat} = Rated speed of the motor
 f_{Rat} = Rated frequency of the motor
 n_{Sync} = Synchronous speed of the motor

[5-32] Formula for calculating the additive speed setpoint for an asynchronous motor

- In case of a synchronous motor, the additive speed setpoint ([C00987](#)) should be 5 ... 20 % of the rated machine speed.

Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C00173	Mains voltage	3ph 400V / 1ph 230V	
C00174	Reduced brake chopper threshold	0	V
C00175	Resp. to brake resistor control	Brake resistor	
C00987	Inverter motor brake: nAdd • Speed lift which is connected in pulses to the brake ramp when the motor is braked.	80	rpm
C00988	Inverter motor brake: PT1 filter time • PT1 filter time for smoothing the speed lift which is added in pulses.	0.0	ms

**Note!**

When the "inverter motor brake" function is used, torque oscillations occur which may have a negative effect on the service life of the components of the mechanical drive train (e.g. gearbox).

- The extent of the occurring oscillations depends on the drive train (mass inertia, natural frequencies, etc.) and the function setting.
- We recommend optimising the "inverter motor brake" function for an oscillation-free operation as described in the following. Usually, this setting does not cause any torque oscillations which affect the service life of the gearbox.
- The settings of implementing a maximum acceleration ramp are only recommended if the inverter motor brake is used infrequently (e.g. in case of quick stop).

**How to set the "inverter motor brake" function for an oscillation-reduced operation:**

For V/f characteristic open-loop control/closed-loop control (VFCplus):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 70 V.
- Set additive speed ([C00987](#)) to rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

For sensorless vector control (SLVC) and servo control (SC):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 50 V.
- Set additive speed ([C00987](#)) to 1 ... 2-fold rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

**How to set the "inverter motor brake" function for a maximum acceleration ramp:**

For V/f characteristic open-loop control/closed-loop control (VFCplus):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 70 V.
- Set additive speed ([C00987](#)) to 1,5 ... 2,5-fold rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

For sensorless vector control (SLVC) and servo control (SC):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 70 V.
- Set additive speed ([C00987](#)) to 2 ... 4-fold rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

5.13.3 Avoiding thermal overload of the brake resistor

- Parameterisation of an error response in [C00574](#) and evaluation of the parameterised error message within the application or within the machine control system.
 - See chapter entitled "[Brake resistor monitoring \(l2xt\)](#)". ([□ 314](#))
- External interconnection using the thermal contact on the brake resistor (e.g. supply interruption via the mains contactor and activation of the mechanical brakes).

5.13.4 Control of multiple internal brake choppers in the DC-bus system

This function extension is available from version 12.00.00!

If an additional control signal is used, all internal brake choppers can be used in the DC-bus system to dissipate regenerative energy ("Master-slave operation").



Stop!

The integration of external brake choppers (e.g. brake chopper 9352) in the above-described "Master-slave operation" is not permissible since the voltage levels for the input and output of the external brake chopper are not suitable for the brake transistor control or, more precisely, for the output of the state of the brake transistor.

If the internal brake choppers of the DC-bus system are not sufficient, they should be replaced by an external brake chopper. It can be synchronised with other external brake choppers, if need be, so that simultaneous switch-on of all external brake choppers is ensured.



Note!

For trouble-free operation, the setting of the mains voltage in [C00173](#) must be identical for all inverters of the DC-bus system since this setting also influences the brake chopper threshold for switching on the brake chopper.

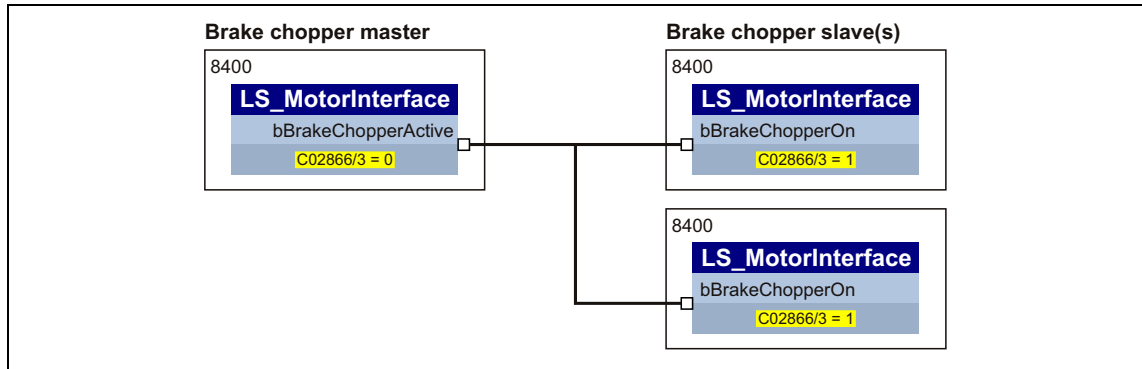
Functional principle

One of the inverters of the DC-bus system is assigned the role of the "brake chopper master".

- For logical reasons, the "brake chopper master" should be the most powerful inverter.
- The "brake chopper master" controls its internal brake chopper via the DC-bus voltage as before. In addition, the "brake chopper master" transmits the *bBrakeChopperActive* status signal of its internal brake chopper control to the other inverters of the DC-bus system via fieldbus or digital output.

All the other inverters of the DC-bus system are "brake chopper slaves".

- The "brake chopper slaves" have the *bBrakeChopperActive* status signal received from the "brake chopper master" connected to the *bBrakeChopperOn* control input.
- If the internal brake transistor of the "brake chopper master" is switched on, the internal brake transistors of the "brake chopper slaves" are switched on at the same time.



[5-33] Functional principle of the "Brake chopper master-slave operation" (simplified representation)

Procedure

1. Assign the role of the "brake chopper master" to one of the inverters of the DC-bus system.
2. Adapt the function block interconnection for the "brake chopper master" so that the *bBrakeChopperActive* status signal of the [LS_MotorInterface](#) SB is provided to the other inverters for controlling the internal brake chopper.
 - The *bBrakeChopperActive* signal can e.g. be output via port block to the fieldbus or via digital output.
 - A free output of the application block can be used to transfer the signal from application level to I/O level.
3. Configure all the other inverters of the DC-bus system as "brake chopper slaves". Select "1: Yes" in [C2866/3](#) for these inverters.
 - With this setting, the brake chopper is not controlled via the DC-bus voltage anymore. Its control now depends on the *bBrakeChopperOn* control signal.
4. Adapt the function block interconnection for the "brake chopper slaves" so that the *bBrakeChopperActive* signal received from the "brake chopper master" is connected to the *bBrakeChopperOn* input of the [LS_MotorInterface](#) SB.
 - Depending on the output at the "brake chopper master", the signal must be read in e.g. via port block or digital input.
 - A free input of the application block can be used to transfer the signal from I/O level to application level.
 - If the digital inputs/outputs are used for transmitting the signal, they must be connected electrically accordingly.



Note!

If the brake chopper master-slave operation is activated, plausibility monitoring is carried out in the "brake chopper slaves":

- The brake transistor can only be switched on via the *bBrakeChopperOn* control signal if the DC-bus voltage is greater than the brake chopper threshold minus $40 V_{DC}$.
- **Exception:** From a mains voltage of $513 V_{AC}$ (or $725 V_{DC}$) and a mains voltage of $480 V$ or $500 V$ set in [C00173](#), the plausibility monitoring is not effective anymore.

Fast discharge of the DC bus

The *bBrakeChopperOn* control input of the "brake chopper master" can be optionally used for a fast discharge of the DC bus after the supply voltage has been switched off. The FB interconnection of the "brake chopper master" has to be adapted so that the *bBrakeChopperOn* control input of the SB [LS MotorInterface](#) is connected to a digital bus or hardware signal (e.g. digital input on HIGH level).



Note!

Only the brake transistor of the "brake chopper master" is switched on with this function (max. 4 seconds, without interruption).

A complete discharge of the DC-bus cannot be achieved using this function!

From version 16.00.00, the limitation of the operating time can be deactivated to max. 4 seconds. For this purpose, set bit 1 to "1" in [C02864/1](#).

- We recommend this setting when this function is used in order to achieve a higher discharge of the DC bus - especially in case of high device power.

5 Motor control (MCTRL)

5.14 Monitoring

5.14 Monitoring

Many monitoring functions that are integrated in the inverter can detect errors and thus protect the device/motor from damage or overload.

- Detailed information on the individual monitoring functions can be found in the following subchapters.

Monitoring	Response		Error message (with activated monitoring)
	Lenze setting	Configuration	
Device overload monitoring (Ixt)	Fault	-	oC5
Motor overload monitoring (I2xt)	Warning	C00606	oC6
Motor overcurrent monitoring	Fault	-	oC7
Motor temperature monitoring (PTC)	Fault	C00585	oH3
Brake resistor monitoring (I2xt)	No Reaction	C00574	oC12
Motor phase failure monitoring	No Reaction	C00597	LP1
Motor phase error monitoring before operation	No Reaction	C02866/2	
Mains phase failure monitoring	Warning	C00565	Su02
Maximum current monitoring	No Reaction	C00609	oC10
Current monitoring for overload	No Reaction	C00584/1	oC18
Maximum torque monitoring	No Reaction	C00608	ot1
Motor speed monitoring	Fault	-	oS2
Encoder open-circuit monitoring	Fault	C00586	Sd3

Parameterisable responses

If a monitoring function trips, the response set via the corresponding parameter is carried out. The following responses can be selected:

- "No response": Response/monitoring is deactivated.
- "Fault": Change of the operating status by a pulse inhibit of the power output stage.
- "Warning": Operating status of the inverter remains unchanged. Only a message is entered into the Logbook of the inverter.

Related topics:

- ▶ [Device state machine and device states](#) (📖 111)
- ▶ [Diagnostics & error management](#) (📖 589)
- ▶ [Basics on error handling in the inverter](#) (📖 589)
- ▶ [Error messages of the operating system](#) (📖 617)

5.14.1 Device overload monitoring (Ixt)

[C00064/1...3](#) displays the device utilisation (ixt) in [%] in different time intervals:

Parameters	Info
C00064/1	Device utilisation (Ixt) <ul style="list-style-type: none"> • Maximum value of pulse utilisation (C00064/2) and permanent utilisation (C00064/3).
C00064/2	Device utilisation (Ixt) 15s <ul style="list-style-type: none"> • Pulse utilisation over the last 15 seconds (only for loads >160 %).
C00064/3	Device utilisation (Ixt) 3 min <ul style="list-style-type: none"> • Permanent utilisation over the last 3 minutes.
Greyed out = display parameter	

- If the device utilisation reaches the switch-off threshold set in [C00123](#):
 - The "Fault" error response is returned).
 - The "[oC5: Ixt overload](#)" error message will be entered into the Logbook.
 - The *bMctrlIxtOverload* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.

5.14.2 Motor overload monitoring (I2xt)

The Inverter Drives 8400 are provided with a simple, sensorless, thermal I²xt motor monitoring of self-ventilated standard motors which is based on a mathematical model.

- [C00066](#) displays the calculated motor load in [%].
- If the calculated motor load reaches the motor load setting ([C00120](#)):
 - The error response set in [C00606](#) will be carried out (Lenze setting: "Warning").
 - The "[oC6: I2xt motor overload](#)" error message will be entered into the Logbook.
 - The *bMctrlI2xtOverload* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.
- A setting of [C00606](#) = "0: No Reaction" deactivates the monitoring.



Stop!

The I²xt motor monitoring does not present full motor protection! As the motor utilisation calculated in the thermal motor model is lost after mains switching, for instance the following operating states cannot be measured correctly:

- Restarting (after mains switching) of a motor that is already very hot.
- Change of the cooling conditions (e.g. cooling air flow interrupted or too warm).

Full motor protection requires additional measures such as the evaluation of temperature sensors that are located directly in the winding or the use of thermal contacts.

For the installation according to UL or UR, the safety instructions provided in the hardware manual must be observed! Among other things, the activation of the motor overload monitoring (I2xt) is required here.



Note!

From version 07.00.00, the thermal motor load displayed in [C00066](#) can be pre-initialised when the device is connected to the mains, optionally using a fixed value or the value used last at the time when the device was switched off. The desired initialisation is selected in [C00122](#). In the Lenze setting of [C00122](#), the behaviour remains unchanged (no initialisation).

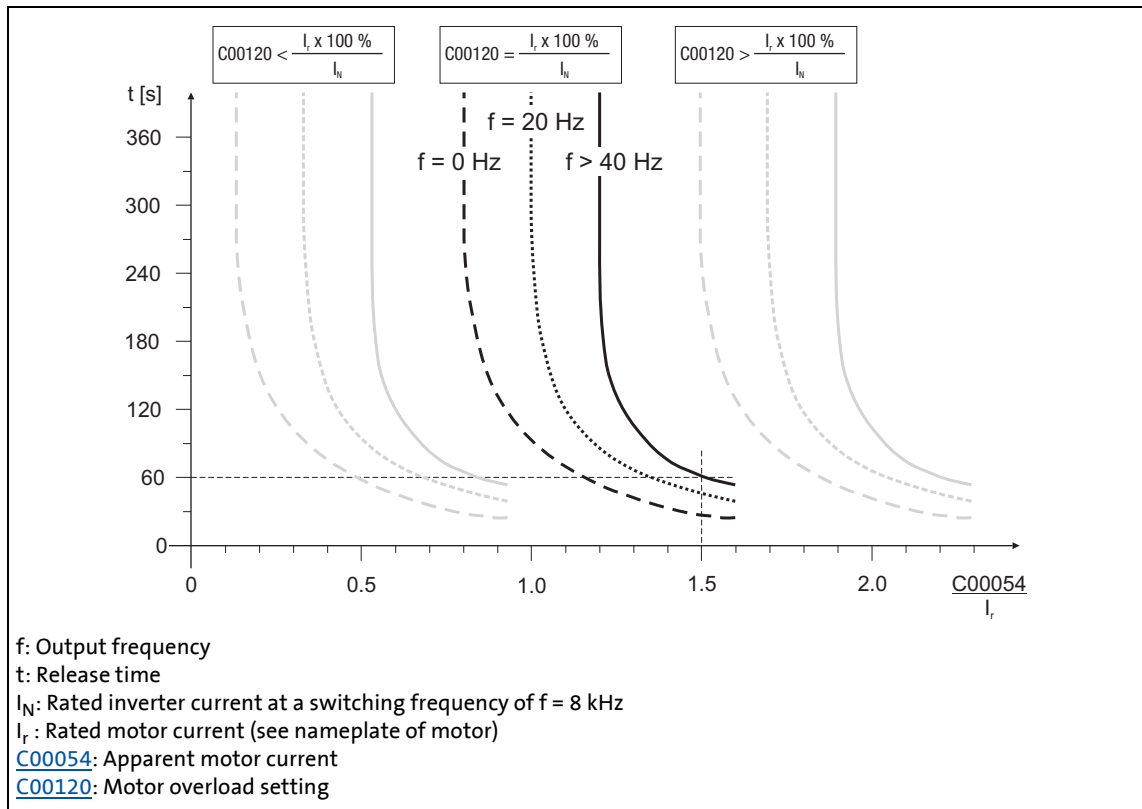
Adjustment of the motor utilisation meter

The motor utilisation meter for indicating the motor load in [C00066](#) begins to count when the apparent motor current ([C00054](#)) is greater than the motor overload setting ([C00120](#)).

The Motor overload setting ([C00120](#)) is calculated as follows:

$$C00120 = \frac{\text{Rated motor current (C00088)}}{\text{Rated device current (C00098)}} \cdot 100 \%$$

- If you reduce [C00120](#) starting from the calculated value, the motor utilisation meter will already be counted up before the rated overload threshold is reached.
- If you increase [C00120](#) starting from the calculated value, the motor utilisation meter will not be counted up until the rated overload threshold is reached.



[5-34] Tripping characteristic of the I²xt monitoring

Example :

$$C00120 = I_r / I_{rated} \times 100 \% = C00088 / C00098 \times 100 \%$$

$$C00054 = 150 \% \text{ rated motor current}$$

- After approx. 60 seconds, [C00066](#) has reached the final value (100 %) at output frequencies $f > 40$ Hz.
- The inverter outputs the "[oC6: I2xt overload motor](#)" error message and triggers the response set in [C00606](#) (default setting: "Warning").

**Tip!**

- If forced ventilated motors are used, a premature response of the overload threshold can be avoided by deactivating this function if necessary ([C00606](#) = "0: No Reaction").
- The current limits set in [C00022](#) and [C00023](#) influence the I^2xt calculation only in an indirect way. However, the operation of the motor at maximum possible load can be averted. ▶ [Defining current and speed limits \(□ 154\)](#)

5.14.3 Motor overcurrent monitoring

The ultimate motor current to be parameterised in [C00939](#) is a limit value to protect the motor from destruction, influence of the rated data and demagnetisation.

- This limit value must not be travelled cyclically in the drive process.
- If the instantaneous value of the motor current exceeds the limit value set in [C00939](#), the error response "Fault" occurs to protect the motor and the error message "[oC7: Motor overcurrent](#)" is entered into the logbook.
- The maximum currents to be parameterised in [C00022](#) and [C00023](#) should have a sufficient distance to this limit value.

**Note!**

If a Lenze motor is selected from the catalogue whose plant parameters are transferred into the inverter, the setting of the maximum current in [C00022](#) and [C00023](#) will automatically be adapted to the selected motor.

Related topics:

- ▶ [Maximum current monitoring \(□ 319\)](#)

5.14.4 Motor temperature monitoring (PTC)

For detecting and monitoring of the motor temperature, a PTC thermistor (DIN 44081/DIN 44082) or a thermal contact (NC contact) can be connected to the terminals X106/T1 and X106/T2.



Stop!

- The inverter can only evaluate one PTC thermistor!
Do not connect several PTC thermistors in series or parallel.
- If several motors are operated on one inverter, use thermal contacts (NC contacts) connected in series.
- To achieve full motor protection, an additional temperature monitoring with separate evaluation must be installed.



Note!

- In the Lenze setting ([C00585](#) = "1: Fault"), motor temperature monitoring is activated!
- There is a wire jumper between the terminals X106/T1 and X106/T2 by default.
- Lenze three-phase AC motors are provided with a thermal contact on delivery.

- If $1.6\text{ k}\Omega < R < 4\text{ k}\Omega$ at the terminals X106/T1 and X106/T2, the monitoring will respond, see functional test below.
- If the monitoring responds:
 - The error response set in [C00585](#) is activated (Lenze setting: "Fault").
 - The "[oH3: Motor temperature \(X106\) triggered](#)" error message is entered into the Logbook.
 - The *bMctrl/MotorPtc* status output of the [LS DeviceMonitor](#) system block is set to TRUE.
- A setting of [C00585](#) = "0: No Reaction" deactivates the monitoring.



Tip!

We recommend to always activate the PTC input when using motors which are equipped with PTC thermistors or thermostats. This prevents the motor from being destroyed by overheating.

Functional test

Connect a fixed resistor to the PTC input:

- $R > 4\text{ k}\Omega$: Fault message must be activated.
- $R < 1\text{ k}\Omega$: Fault message must not be activated.

5.14.5 Brake resistor monitoring (I²xt)

Due to the converted braking power, the brake resistor is thermally stressed and can even be thermally destroyed by excessive braking power.

The monitoring of the I²xt utilisation of the inverter serves to protect the brake resistor. It acts in proportion to the converted braking power.



Danger!

In the Lenze setting ([C00574](#) = "0: No Reaction"), the response of the monitoring function does not stop the braking process!

In particular for applications such as hoists or applications with a DC-bus connection, it must be checked if a stopping of the braking process due to a setting of [C00574](#) = "1: Fault" is permissible.



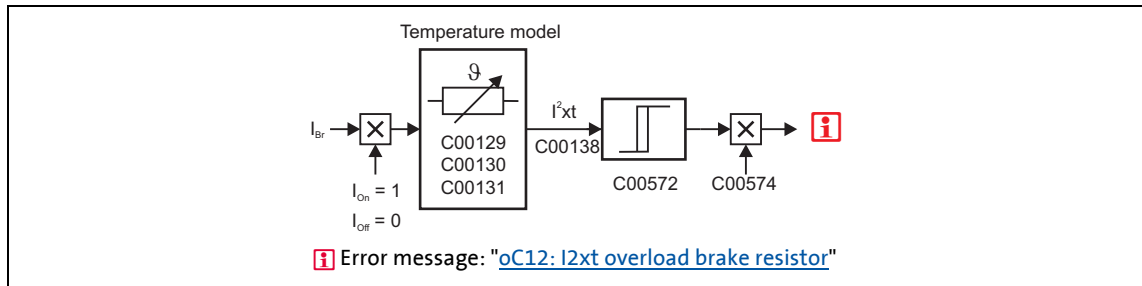
Stop!

Implement appropriate protective measures against thermal overload of the brake resistor!

Examples:

- Parameterisation of an error response in [C00574](#) and evaluation of the parameterised error message within the application or the machine control system.
 - Interruption of the mains supply by means of the temperature contact at the brake resistor and a simultaneous activation of the mechanical brake.
- If the I²xt utilisation reaches the switch-off threshold set in [C00572](#):
 - The error response set in [C00574](#) will take place.
 - The "[oC12: I2xt brake resistor overload](#)" error message is entered into the Logbook.
 - The *bMctrlBrakeChopperFault* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.
 - If the system is dimensioned correctly, the monitoring should not be activated. If individual pieces of rated data of the actually connected brake resistor are not known, they have to be identified.
 - If the DC-bus voltage exceeds the overvoltage threshold due to a braking energy that is too high, the monitoring for overvoltage in the DC bus is activated ("OU: DC-bus overvoltage" error message).
 - Apart from the threshold of the I²xt utilisation that can be set in [C00572](#), there is the switching threshold of the brake transistor which results from the mains voltage ([C00173](#)) and the reduced brake chopper threshold ([C00174](#)).

Temperature model



[5-35] Signal flow for monitoring the brake resistor

The monitoring function calculates the braking current I_{Br} from the current DC-bus voltage U_{DC_act} and the brake resistance parameterised in [C00129](#):

$$I_{Br} = \frac{U_{DC_act}}{C00129}$$



Note!

The monitoring function can also be triggered due to a value entered in [C00129](#) although a brake resistor is not even connected.

- The calculation considers the thermal utilisation of the brake resistor based on the following parameters:
 - Resistance value ([C00129](#))
 - Continuous power ([C00130](#))
 - Thermal capacity ([C00131](#))
- In the Lenze setting these parameters are preset with the corresponding power-adapted Lenze brake resistor.
- [C00133](#) indicates the calculated utilisation of the brake resistor in [%].
 - A utilisation of 100 % corresponds to the continuous power of the brake resistor depending on the maximally permissible temperature limit.

Related topics:

▶ [Braking operation/brake energy management](#) (📖 297)

5.14.6 Motor phase failure monitoring



Note!

In the Lenze setting ([C00597](#) = "0: No Reaction"), the motor phase failure monitoring is not activated!

In the case of a synchronous motor,

- the motor phase failure monitoring is basically deactivated. (Due to the low no-load current, the monitoring would be permanently activated.)
- only the [Motor phase error monitoring before operation](#) is active (for Lenze setting [C2866/2](#) = "1: Yes").

In order to safely detect the failure of a motor phase, a certain motor current must flow for the current sensor system. Thus, the response set in [C00597](#) (Lenze setting: "No Reaction") is caused after a delay time of maximally 2 s after controller enable if a current-carrying motor phase U, V, W fails or if motor connection is missing. If the current threshold value set in [C00599](#) is already exceeded within the delay time, the motor phase failure monitoring starts from this point in time.

The monitoring mode checks the current flow for each motor phase as a function of the commutation angle. Monitoring is activated if a commutation angle of approx. 140° is covered without the current set in [C00599](#) being exceeded. Monitoring is activated at an output frequency of 0 Hz if none of the three motor phases reaches the threshold value set in [C00599](#).

- If the motor phase failure detection is tripped:
 - The response set in [C00597](#) will take place.
 - The error message "[LP1: Motor phase failure](#)" is entered into the logbook.
 - The *bMctrlMotorPhaseFault* status output of the [LS DeviceMonitor](#) system block is set to TRUE.



Note!

If an error response of "1: Fault" is set in [C00597](#), the *bMctrlMotorPhaseFault* status output of the [LS DeviceMonitor](#) SB will be set to TRUE for only 1 second in the event of a motor phase failure because it is no longer possible to detect a motor phase fault via the error response with a pulse inhibit. However, the Logbook and [C00561/3...5](#) still display the cause of the motor phase failure.

- The motor phase failure detection is inactive if
 - a controller inhibit is set,
 - connection to a rotating machine is carried out (flying restart circuit or connection to actual speed value),
 - an error is pending due to a DC-bus overvoltage ("[oU:DC-bus overvoltage](#)"),
 - motor parameter identification is carried out,
 - DC-injection braking is active.

5.14.7 Motor phase error monitoring before operation

[This function extension is available from version 12.00.00!](#)

This extended motor phase failure monitoring can both detect a phase failure on the basis of test signals and check for the existence of the motor.

- The "motor phase error monitoring before operation" is only directly active after controller enable if
 - an error response is set in [C00597](#) **AND**
 - the motor phase error monitoring is switched on ([C2866/2](#) = "1: Yes").
- The following parameters show the cause of the motor phase failure:
 - [C00561/3](#): Motor phase U
 - [C00561/4](#): Motor phase V
 - [C00561/5](#): Motor phase W



Note!

The motor phase error monitoring before operation must not be connected to a rotating or coasting machine (high compensation currents and effect of the DC injection braking).

- In case of motor control with feedback, no motor phase error monitoring is executed if the actual speed value is > 10 rpm.
- In case of motor control without feedback, the user must ensure that the motor phase error monitoring will only be executed if the speed is 0.

If the motor is at quick stop and the brake is applied, no motor phase error monitoring is executed when quick stop is deactivated (same with "0" speed and applied brake).

If the rated current of the connected motor is lower than 10 % of the rated device current, the motor phase error monitoring can be activated although no motor phase error has occurred. In this case, the motor phase error monitoring must be switched off before operation ([C2866/2](#) = "0: No").

**Note!****With automatic brake control:**

In case of automatic brake control, the brake will only be released if no motor phase failure exists and the magnetisation of the field-oriented control types is completed.

With manual brake control:

In case of manual brake control and forced release of the brake, the brake will be controlled directly as before.

The user himself must ensure that the brake will only be opened if all of the following conditions are met:

- Motor phase failure monitoring ([C00597](#)) and motor phase error monitoring before operation ([C2866/2](#)) are active.
- The inverter is enabled (controller enable).
- The *bMctrlMotorPhaseFault* status output of the SB [LS DeviceMonitor](#) is set to FALSE.
- Bit 10 of the *MCTRL_Status3* status word must be set to 0 before the brake opening is triggered.
 - When the controller is enabled, this bit is set to 1 and will not be set to 0 again before the "Motor phase error monitoring before operation" is successfully completed.
 - The *MCTRL_Status3* status word can be integrated in the application via configuration parameters (e.g. [C00620](#)) (*MCTRL_Status3* = selection 34906 in [Selection list - analog signals](#)).

5.14.8 Mains phase failure monitoring



Stop!

Under load, the mains input of a three-phase inverter can be destroyed if the device is only supplied by two phases (e.g. if a mains phase fails).

The inverter has a simple mains-phase failure detection function with which a mains phase failure can be detected under load.

- In the case of power-adapted machines, approx. 50 % of the rated motor power must be exceeded so that a main-phase failure can be detected.
- If the mains phase failure monitoring is tripped:
 - The error response set in [C00565](#) will be carried out (Lenze setting: "Warning").
 - The "[Su02: One mains phase is missing](#)" error message will be entered into the logbook.
 - The *bMctrlMainsFault* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.

5.14.9 Maximum current monitoring



Note!

In the Lenze setting ([C00609](#) = "0: No Reaction"), the maximum current monitoring is not activated!

If a Lenze motor is selected from the catalogue whose plant parameters are transferred into the inverter, the setting of the maximum current in [C00022](#) and [C00023](#) will automatically be adapted to the selected motor.

If the parameterised maximum current is reached, the response set in [C00609](#) is triggered (Lenze setting: "0: No Reaction").

If the activated monitoring is tripped:

- The "[oC10: Maximum current reached](#)" error message is entered in the logbook.

Related topics:

- ▶ [Motor overcurrent monitoring](#) (📖 312)

5.14.10 Current monitoring for overload

This function extension is available in version 8.00.00 and from version 16.00.00!

If the apparent motor current exceeds a defined threshold value [C00124/1](#)) for a certain time ([C00563/1](#)) an overload has taken place.

Monitoring responds as follows:

- The *bCurrentMonitoringOverload* signal is set to TRUE
See [selection list - digital signals](#)
- The response set in [C00584/1](#) is activated (Lenze setting: "No response")
- The **OC18** error message, current monitoring overload, is entered into the logbook.
- The *bCurrentMonitoringOverload* status output of the **LS_DeviceMonitor** FB is set to TRUE.

If the overload decreases, the apparent motor current has to decrease below the value $C00124/1 - 0,05 \times I_N$ in order that the *bCurrentMonitoringOverload* signal can accept the FALSE state.

When *bCurrentMonitoringOverload* = FALSE, the delay time in the resolution is set to the value 0 s again.

5.14.11 Maximum torque monitoring



Note!

In the Lenze setting ([C00608](#) = "0: No Reaction"), the maximum torque monitoring is not activated!

If the maximum possible torque [C00057](#) is reached at the motor shaft, the response set in [C00608](#) will be carried out (Lenze setting: "0: No Reaction").

If the activated monitoring is tripped:

- The "[ot1: Maximum torque reached](#)" error message is entered into the logbook.
- The *bMctrlTorqueMax* status output of the [LS DeviceMonitor](#) system block will be set to TRUE.

5.14.12 Motor speed monitoring

This function extension is available from version 12.00.00!

If the drive reaches the maximally permissible motor speed ([C00965](#)):

- The error response "Fault" occurs, i.e. the inverter is inhibited and the motor changes to torque-free operation (coasts down).
- The error message "[oS2: Max. motor speed](#)" is entered into the logbook.

5.14.13 Encoder value monitoring

For detecting invalid encoder values, a value range can be defined via the parameter [C01112/2](#) and [C01112/3](#). When the encoder signal leaves the set value range, the *bFail* status signal of the SB [LS MultiEncoder](#) is set to TRUE and the corresponding information is displayed bit-coded in [C00451/1](#).

- **Example 1: SSI laser distance meter**
The *bFail* status signal can be used to detect an interruption of the laser beam or a dirty mirror.
- **Example 2: SSI bar code scanner**
In an application, an SSI bar code scanner is used to detect the workpiece ID and the workpiece position. A setting of sensible limit values serves to use the *bFail* status signal to determine whether the ID or the position of the SSI bar code scanner has been detected.

5.14.14 Encoder open-circuit monitoring



Note!

In the Lenze setting ([C00586](#) = "1: Fault"), open-circuit monitoring of the encoder is activated!

When does the open-circuit monitoring system respond?

The open-circuit monitoring will trigger if

- an open circuit occurs in the encoder cable.
- an extreme overload (e.g. blocked motor shaft) occurs during the start-up phase of the motor.
- highly dynamic reversion of the motor occurs.
- the motor still rotates at high speed in the "SC servo control ASM" mode when the controller enabled.

Which measured values lead to an actuation of the open-circuit monitoring system?

The following measured values checked for plausibility lead to an actuation of the open-circuit monitoring system:

1. If the total deviation between actual speed and setpoint speed is higher than $f = 40$ Hz for a time > 0.1 s.
2. If the actual speed detected is $f = 0$ Hz or $n = 0$ rpm and the I_{\max} controller or the torque limitation for servo control (SC) is active for $t \geq 0.1$ s.
3. If the sign of the injected frequency and the actual speed is not the same, the I_{\max} controller is active and this status is active for 0.1 s. Usually this is the case when A/B tracks are reversed.

Response to open circuit

- If the open-circuit monitoring is tripped:
 - The error response set in [C00586](#) is activated (Lenze setting: "Fault").
 - The "[Sd3: Open circuit - feedback system](#)" is entered into the Logbook.
 - The `bMctrlEncoderComFault` status output of the [LS_DeviceMonitor](#) SB is set to TRUE.
- A setting of [C00586](#) = "0: No Reaction" deactivates the monitoring.

Related topics:

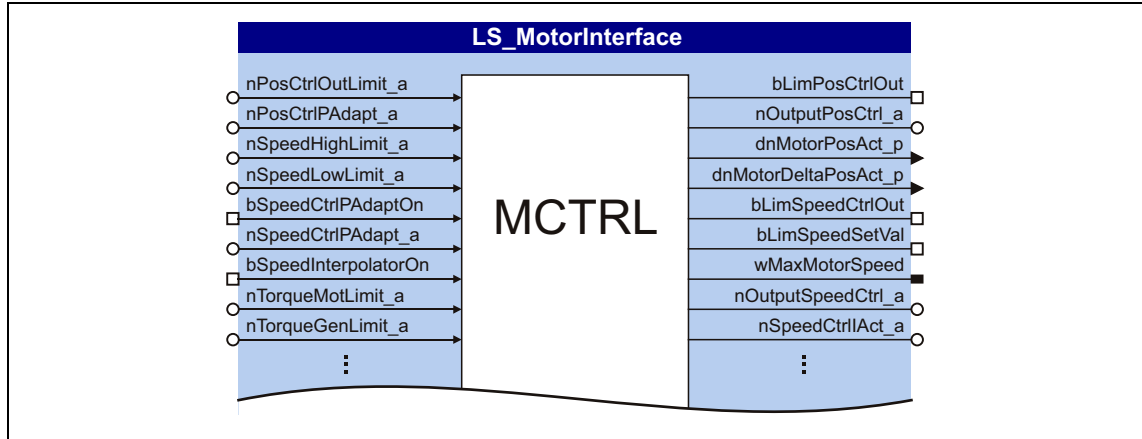
- ▶ [Encoder/feedback system](#) (□ 277)

5 Motor control (MCTRL)

5.15 Internal interfaces | System block "LS_MotorInterface"

5.15 Internal interfaces | System block "LS_MotorInterface"

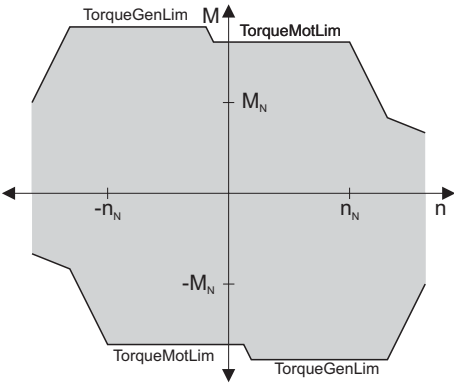
The **LS_MotorInterface** system block provides the internal interfaces to the driving machine in the function block editor.



[5-36] LS_MotorInterface system block (excerpt)

Inputs

Designator <small>DIS code data type</small>	Information/possible settings				
<code>nPosCtrlOutLimit_a</code> <small>C00830/21 INT</small>	Limitation of the position controller output <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % reference speed (C00011) 				
<code>nPosCtrlPAdapt_a</code> <small>C00830/20 INT</small>	Adaptation of the position controller gain <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % Vp (C00254) 				
<code>nSpeedHighLimit_a</code> <small>C00830/88 INT</small>	Upper speed limit for the speed limitation <ul style="list-style-type: none"> • During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) • Scaling: 16384 ≙ 100 % reference speed (C00011) 				
<code>nSpeedLowLimit_a</code> <small>C00830/23 INT</small>	Lower speed limit for speed limitation <ul style="list-style-type: none"> • During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) • Scaling: 16384 ≙ 100 % reference speed (C00011) 				
<code>bSpeedCtrlPAdaptOn</code> <small>C00833/69 BOOL</small>	Adaptation of the speed controller gain <table border="1"> <tr> <td>FALSE</td> <td>Deactivate adaptive adaptation.</td> </tr> <tr> <td>TRUE</td> <td>Activate adaptive adaptation.</td> </tr> </table>	FALSE	Deactivate adaptive adaptation.	TRUE	Activate adaptive adaptation.
FALSE	Deactivate adaptive adaptation.				
TRUE	Activate adaptive adaptation.				
<code>nSpeedCtrlPAdapt_a</code> <small>C00830/25 INT</small>	Adaptation of the speed controller gain <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % Vp (C00070) 				
<code>bSpeedInterpolatorOn</code> <small>C00833/28 BOOL</small>	Speed setpoint interpolation <table border="1"> <tr> <td>FALSE</td> <td>Deactivate interpolation</td> </tr> <tr> <td>TRUE</td> <td>Activate interpolation</td> </tr> </table>	FALSE	Deactivate interpolation	TRUE	Activate interpolation
FALSE	Deactivate interpolation				
TRUE	Activate interpolation				

Designator	Information/possible settings				
nTorqueMotLimit_a C00830/29 INT nTorqueGenLimit_a C00830/28 INT	<p>Torque limitation in motor mode and in generator mode</p> <ul style="list-style-type: none"> The drive cannot output a higher torque in motor/generator mode than set here. The applied values (any polarity) are internally interpreted as absolute values. If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called I_{max} controller. If sensorless vector control (SLVC) or servo control (SC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. Scaling: $16384 \equiv 100\% M_{max}$ (C00057) <p>From version 18.00.00 onwards: C02864: Bit 15 = 1: positive torque limitation (nTorqueHighLimit_a) and negative torque limitation (nTorqueLowLimit_a).</p> <p>Torque limits in motor and generator mode:</p> 				
bTorqueInterpolatorOn C00833/29 BOOL	<p>Torque setpoint interpolation</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">FALSE</td> <td>Deactivate interpolation</td> </tr> <tr> <td style="text-align: center;">TRUE</td> <td>Activate interpolation</td> </tr> </table>	FALSE	Deactivate interpolation	TRUE	Activate interpolation
FALSE	Deactivate interpolation				
TRUE	Activate interpolation				
nVoltageAdd_a C00830/31 INT	<p>Additive voltage impression</p> <ul style="list-style-type: none"> An additional setpoint for the motor voltage can be specified via this process input. If there are, for instance, different loads at the motor output end, it is possible to apply a voltage boost at the starting time. If the value is negative, the voltage is reduced. Scaling: $16384 \equiv 1000\text{ V}$ <p>STOP Stop! Values selected too high may cause the motor to heat up due to the resulting current!</p>				
bAutoBoostOn C00833/32 BOOL	<p>AutoBoost function</p> <ul style="list-style-type: none"> Motor voltage boost during the starting torque, controlled by process signals from the function block interconnection. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">FALSE</td> <td>Deactivate function</td> </tr> <tr> <td style="text-align: center;">TRUE</td> <td>Activate function</td> </tr> </table>	FALSE	Deactivate function	TRUE	Activate function
FALSE	Deactivate function				
TRUE	Activate function				
nBoost_a C00830/26 INT	<p>Additional setpoint for the motor voltage at speed = 0</p> <ul style="list-style-type: none"> The entire voltage-frequency characteristic is provided with an offset. Scaling: $16384 \equiv 1000\text{ V}$ <p>STOP Stop! Values selected too high may cause the motor to heat up due to the resulting current!</p>				
bPosCtrlOn C00833/27 BOOL	<p>Position/angle control</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">FALSE</td> <td>Deactivate position/angle control.</td> </tr> <tr> <td style="text-align: center;">TRUE</td> <td>Activate position/angle control.</td> </tr> </table>	FALSE	Deactivate position/angle control.	TRUE	Activate position/angle control.
FALSE	Deactivate position/angle control.				
TRUE	Activate position/angle control.				

Designator DIS code data type	Information/possible settings
bDeltaPosOn C00833/35 BOOL	Activate position difference as setpoint selection <ul style="list-style-type: none"> In order to position the motor shaft, the position control function can work within the motor control function with the absolute position setpoint <i>dnPosSetValue_p</i> or alternatively with the speed setpoint <i>nSpeedSetValue_a</i> and the position difference <i>dnDeltaPos_p</i>.
	FALSE Positioning with position setpoint <i>dnPosSetValue_p</i> .
	TRUE Positioning with speed setpoint <i>nSpeedSetValue_a</i> and position difference <i>dnDeltaPos_p</i> .
dnDeltaPos_p C00834/4 DINT	Position difference (following error input) <ul style="list-style-type: none"> Difference between setpoint position and actual position in [increments] Is used for position control if <i>bDeltaPosOn</i> = TRUE. Scaling: 65535 \equiv 1 revolution
dnPosSetValue_p C00834/5 DINT	Absolute position setpoint in [increments] <ul style="list-style-type: none"> Is used for position control if <i>bDeltaPosOn</i> = FALSE. Scaling: 65535 \equiv 1 revolution
bPosDerivativeOn C00833/67 BOOL	Create a setpoint for the speed controller from the position setpoint <ul style="list-style-type: none"> For highly dynamic control systems, the setpoint for the speed controller can be created from the absolute position setpoint <i>dnPosSetValue_p</i> instead of the speed setpoint <i>nSpeedSetValue_a</i> Position control/additive speed specification
	TRUE Create a speed setpoint from the position setpoint. <ul style="list-style-type: none"> The absolute position setpoint <i>dnPosSetValue_p</i> is differentiated and a speed value is created which is the setpoint for the speed controller. Internal limitation of 65536 increments/ms.
bSetRefValue C00833/68 BOOL (from version 18.00.00)	Trigger signal to set the actual position to the reference position if reference setting is requested or the reference signal is recognised during the referencing process.
dnPosRefValue_p C00834/6 DINT	Home position in [increments] <ul style="list-style-type: none"> Scaling: 65535 \equiv 1 revolution
bQspOn C00833/33 BOOL	Quick stop
	FALSE Deactivate quick stop
	TRUE Activate quick stop
nPWMAngleOffset_a C00830/32 INT	Angle step change of output voltage phasor <ul style="list-style-type: none"> Scaling: 65535 \equiv 1 revolution
bSpeedCtrlIOn C00833/31 BOOL	Directly set the I-component of speed controller <ul style="list-style-type: none"> In order to statically specify a minimum torque, e.g. when a load is being lifted.
	TRUE Set the I-component of the speed controller to the value <i>nSpeedCtrlI_a</i> .
nSpeedCtrlI_a C00830/24 INT	Value of the speed controller integrator <ul style="list-style-type: none"> Scaling depends on the selected motor control: <ul style="list-style-type: none"> V/f control (VFCplus + encoder): 16384 \equiv 100 % reference speed (C00011) Servo control (SC) or vector control (SLVC): 16384 \equiv 100 % M_{max} (C00057)
nSpeedSetValue_a C00830/22 INT	Speed setpoint <ul style="list-style-type: none"> Scaling: 16384 \equiv 100 % reference speed (C00011)
bTorquemodeOn C00833/30 BOOL	Selection: Speed/Torque control
	FALSE Speed control with torque limitation
	TRUE Torque control with speed limitation
nTorqueSetValue_a C00830/27 INT	Torque setpoint / additive torque <ul style="list-style-type: none"> Scaling: 16384 \equiv 100 % M_{max} (C00057)

Designator DIS code data type	Information/possible settings
bDcBrakeOn C00833/34 BOOL	Activate DC injection brake
	FALSE Deactivate DC-injection braking
	TRUE Activate DC-injection braking
bTorqueLimitAdaptOn C00833/98 BOOL	Adaptation of torque limitation
	TRUE Activate adaptation of torque limitation.
nTorqueLimitAdapt_a C00830/70 INT	Value for adaptation of torque limitation • Scaling: 16384 \equiv 100 % <i>nTorqueMotLimit_a</i> and <i>nTorqueGenLimit_a</i>
nInertiaAdapt_a C00830/96 INT (from version 12.00.00)	Adaptation of the moment of inertia • This process signal can be used during the process to dynamically control the percentage of the variable moment of inertia (e.g. a reel) set in C00919/1 which is to be considered for setpoint feedforward control. • Scaling: 16384 \equiv 100 % moment of inertia - process (C00919/1)
bBrakeChopperOn C00833/130 BOOL (from version 12.00.00)	Switch on the internal brake chopper as "brake chopper slave" (C02866/3 = "1: Yes") when the inverter is configured ▶ Control of multiple internal brake choppers in the DC-bus system (□ 306)
	TRUE Switch on internal brake chopper.
nSpeedSetValueInertia_a C00830/97 INT (from version 12.00.00)	Input for differential setpoint feedforward control (torque feedforward control) • If the selection "1: nSpeedSetValueInertia_a" is set in C00654/1 , this process signal can be used to preselect any input value (e.g. setpoint of the position or process controller) for torque feedforward control. • Scaling: 16384 \equiv 100 % reference speed (C00011)

Outputs

Designator DIS code data type	Value/meaning
bLimPosCtrlOut BOOL	"Position controller output inside the limitation" status signal
	TRUE The position controller output is internally limited
nOutputPosCtrl_a INT	Position controller output • Scaling: 16384 \equiv 100 % reference speed (C00011)
dnMotorPosAct_p DINT	Current position of the motor shaft in [increments]
dnMotorDeltaPosAct_p DINT	Current following error in [increments] • Following error = Difference between set position and actual position
bLimSpeedCtrlOut BOOL	"Speed controller or manipulating variable of the slip regulator inside the limitation" status signal
	TRUE The speed controller output is internally limited
bLimSpeedSetVal BOOL	"Reduction or increase of the setpoint speed active" status signal
	TRUE Reduction or increase of the setpoint speed by the I_{max} controller is active
wMaxMotorSpeed C00011 BOOL	Reference speed (C00011)
nOutputSpeedCtrl_a INT	Speed or slip controller output • Scaling: 16384 \equiv 100 % reference speed (C00011)
nSpeedCtrlIntAct_a INT	Current value of speed controller integrator • Scaling depends on the selected motor control: • V/f control (VFCplus + encoder): 16384 \equiv 100 % reference speed (C00011) • Servo control (SC) or vector control (SLVC): 16384 \equiv 100 % M_{max} (C00057)
nEffSpeedSetValue_a INT	Effective speed setpoint • Scaling: 16384 \equiv 100 % reference speed (C00011)

Designator DIS code data type	Value/meaning
nMotorSpeedAct_a C00051 INT	Actual speed value • Scaling: 16384 \equiv 100 % reference speed (C00011)
nMotorSpeedAct_v INT	Actual speed value • Scaling: 65535 \equiv 1 revolution
nMotorFreqAct_a C00058 INT	Current field frequency • Scaling: 16384 \equiv 327.68 Hz (24000 \equiv 480.00 Hz)
bLimTorqueSetVal BOOL	"Setpoint torque inside the limitation" status signal
	TRUE The setpoint torque is internally limited
wMaxMotorTorque C00057	Maximum motor torque • Scaling: 100 = 0.01 Nm • From version 06.00.00: $wMaxMotorTorque = 10 * M_{max}$ (C00057)
nInputTorqueCtrl_a INT	Input value of the torque control (torque setpoint) • Scaling: 16384 \equiv 100 % M_{max} (C00057)
nMotorTorqueAct_a C00056/2 INT	Actual torque • In the "VFC (+encoder)" motor control mode, this value is determined from the current motor current and only approximately corresponds to the actual torque value.. • Scaling: 16384 \equiv 100 % M_{max} (C00057)
nInputJerkCtrl_a INT	Input value of the jerk limitation • Scaling: 16384 \equiv 100 % M_{max} (C00057)
bLimCurrentSetVal BOOL	"Current setpoint inside the limitation" status signal
	TRUE The current setpoint is internally limited
nStatorCurrentIS_a INT	Current stator current/effective motor current • Scaling: 16384 \equiv 100 % I_{max_mot} (C00022)
nEffCurrentIq_a INT	Current torque-producing cross current • Scaling: 16384 \equiv 100 % I_{max_mot} (C00022)
nReaktCurrentId_a INT	Current field-producing direct-axis current • Scaling: 16384 \equiv 100 % I_{max_mot} (C00022)
nActualFluxx_a INT	Current magnetising current • Scaling: 16384 \equiv 100 % I_{max_mot} (C00022)
nDCVoltage_a INT	Actual DC-bus voltage • Scaling: 16384 \equiv 1000 V
nMotorVoltage_a INT	Current motor voltage/inverter output voltage • Scaling: 16384 \equiv 1000 V
bQspActive BOOL	"Quick stop active" status signal
	TRUE Quick stop is active
bAutoDCBActive BOOL	"Automatic DC-injection braking active" status signal ▶ DC-injection braking (□ 267)
	TRUE Automatic DC-injection braking is active
bIdentificationActive BOOL	"Motor parameter identification active" status signal ▶ Automatic motor data identification (□ 139)
	TRUE Motor parameter identification is active
bFlyingSyncActive BOOL	"Flying restart function active" status signal ▶ Flying restart function (□ 264)
	TRUE Flying restart function is active
bHlgLoad BOOL	Control signal for an additional loading function of the ramp function generator • \rightarrow L_NSet_1.bExternalCINH • To enable the ramp function generator to follow automatically when the controller is inhibited, for jerk-free setpoint connection.
	TRUE Set the ramp function generator to a setpoint of nHlgSetValue_a

Designator DIS code data type	Value/meaning		
nHlgSetValue_a INT	Setpoint for an additional loading function of the ramp function generator <ul style="list-style-type: none"> • → L_NSet_1.nClnhVal_a • For speed-controlled drive tasks, the current actual speed value (e.g. in case of an active pulse inhibit, flying restart function, controller inhibit) is provided at this output. • Scaling: 16384 ≙ 100 % reference speed (C00011) 		
bHlgStop BOOL	Control signal for stopping the ramp function generator (L_NSet_1) <table border="1"> <tr> <td>TRUE</td> <td>Stop the ramp function generator</td> </tr> </table>	TRUE	Stop the ramp function generator
TRUE	Stop the ramp function generator		
bBrakeChopperActive (from version 12.00.00) BOOL	Status signal of the internal brake chopper control <ul style="list-style-type: none"> ▶ Control of multiple internal brake choppers in the DC-bus system (306) <table border="1"> <tr> <td>TRUE</td> <td>Internal brake chopper is switched-on.</td> </tr> </table>	TRUE	Internal brake chopper is switched-on.
TRUE	Internal brake chopper is switched-on.		

5.16 Internal status signals | System block "LS_DeviceMonitor"

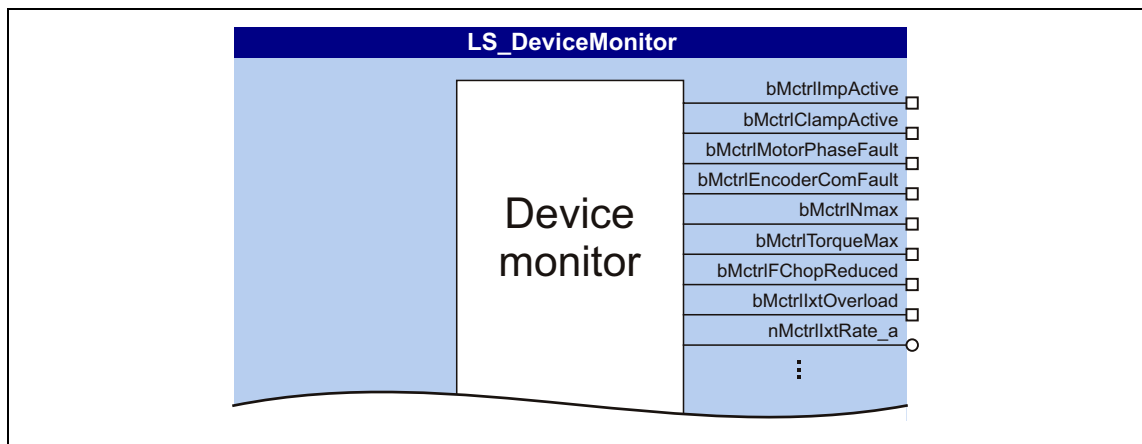
The **LS_DeviceMonitor** system block provides the status signals of the motor control in the function block editor.



Note!

The **LS_DeviceMonitor** system block can only be inserted on the application level.

If status signals of the motor control function are to be output via digital outputs or example, you can use the free *bFreeOut1 ... bFreeOut8* outputs of the application block to transfer the desired status signals from the application level to the I/O level. On the I/O level, you can then establish the logical link to the digital output terminals.



[5-37] LS_DeviceMonitor system block (excerpt)

Outputs

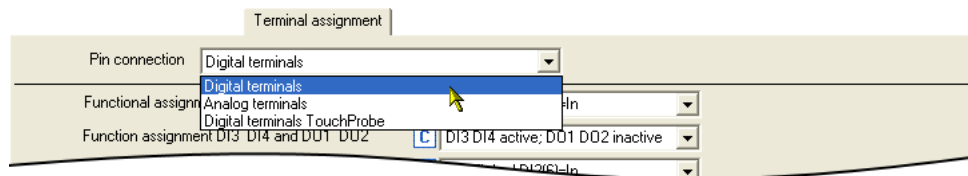
Designator <small>DIS code data type</small>	Value/meaning	
bMctrlImpActive BOOL	TRUE	Pulse inhibit is active
bMctrlClampActive BOOL	TRUE	Clamp current limitation is active
bMctrlMotorPhaseFault BOOL	Status of the Motor phase failure monitoring	
	TRUE	Motor phase fault has been detected
bMctrlEncoderComFault BOOL	TRUE	Encoder error has been detected
bMctrlNmax BOOL	TRUE	Max. speed limitation is active
bMctrlTorqueMax BOOL	Status of the Maximum torque monitoring	
	TRUE	Max. torque limitation is active
bMctrlFChopReduced BOOL	TRUE	PWM frequency reduction is active
bMctrlIxtOverload BOOL	Status of the Device overload monitoring (Ixt)	
	TRUE	Device utilisation (Ixt) \geq device utilisation threshold (C00123) • Lenze setting: C00123 = 150 %
nMctrlIxtRate_a INT	Current device utilisation (Ixt) • Scaling: 16384 \equiv 100 %	

Designator DIS code data type	Value/meaning	
bMctrlI2xtOverload BOOL	Status of the Motor overload monitoring (I2xt)	
	TRUE	Thermal motor overload (I^2xt) \geq motor overload setting (C00120) • Lenze setting: C00120 = 100 %.
nMctrlI2xtRate_a INT	Current thermal motor load (I2xt) • Scaling: 16384 \equiv 100 %	
bMctrlMotorPTC BOOL	Status of the Motor temperature monitoring (PTC)	
	TRUE	Temperature monitoring: An error has been detected
bMctrlMotorTemp BOOL	TRUE	Thermal motor overload
bMctrlHeatSinkTemp BOOL	TRUE	
	Thermal inverter overload • The heatsink temperature (display in C00061) has reached the maximally permissible temperature. The " oH1: Overtemperature heatsink " error message is pending and the "Fault" response is activated. • Furthermore, this output is set if the heatsink temperature has exceeded the maximally permissible temperature for the switching frequency set. A response with an " oH4: Heatsink temp. > switch-off temp. -5°C " error message can be set in C00582 . In the Lenze setting, no response will be effected.	
bMctrlMainsFault BOOL	Status of the Mains phase failure monitoring	
	TRUE	Mains phase failure/Mains failure
bMctrlFanFault BOOL	TRUE	Fan monitoring: An error has been detected
bMctrlNmaxForFChop BOOL	TRUE	The maximum field frequency for the respective switching frequency has been exceeded.
bMctrlShortCircuit BOOL	TRUE	Motor short circuit has been detected
bMctrlEarthFault BOOL	TRUE	Earth fault has been detected
bMctrlUVDetected BOOL	TRUE	An undervoltage has been detected
bMctrlOVDetected BOOL	TRUE	An overvoltage has been detected
bMctrlBrakeChopperFault BOOL	Status of the Brake resistor monitoring (I2xt) • This output is set independent of the set error response of the monitoring function.	
	TRUE	The I^2xt utilisation has reached the switch-off threshold set in C00572 . • Lenze setting: C00572 = 100 %.

6 I/O terminals

This chapter provides information on the function, possible parameter settings, and technical data of the input/output terminals of the inverter.

In the »Engineer«, the input and output terminals are parameterised on the **Terminal assignment** tab. To do this, go to the **Control terminals** list field and select the terminals that you wish to parameterise:



You can find further information in the respective subchapter:

- ▶ [Digital terminals](#) (📖 332)
- ▶ [Analog terminals](#) (📖 355)
- ▶ [Touch probe detection](#) (📖 360)



Note!

The input and output terminals of the inverter have already been functionally assigned in the default setting ("Lenze setting"). The preconfigured assignment depends on the technology application selected in [C00005](#) and the control mode selected in [C00007](#):

- TA "Actuating drive speed": [Terminal assignment of the control modes](#) (📖 388)
- TA "Table positioning": [Terminal assignment of the control modes](#) (📖 418)
- TA "Switch-off positioning": [Terminal assignment of the control modes](#) (📖 444)



Wiring diagram, assignment and electrical data of the input and output terminals can be found in the **8400 protec hardware manual** in the chapter "Technical data".

- The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 inverter.



Tip!

How you can alter the preconfigured assignment of the input and output terminals is described in the chapter entitled "[User-defined terminal assignment](#)". (📖 368)

6.1 Digital terminals

The inverter is equipped with six parameterisable inputs (DI1 ... DI6) at the sockets X41 ... X43 for detecting digital signals.



Tip!

The two inputs DI3 and DI4 (pin 4 and pin 2 of the X42 socket) can be reconfigured alternatively to digital outputs (DO1/DO2) by a corresponding parameter setting.
▶ [Reconfiguring DI3\(4\) to output DO1\(2\)](#) (🔑 345)



Note!

Initialisation behaviour:

- After mains switching up to the start of the application, the digital outputs remain set to FALSE.

Exception handling:

- In case of a critical exception in the application (e.g. reset), the digital outputs are set to FALSE considering the terminal polarity parameterised in [C00118](#).

Parameterisation dialog in the »Engineer«:

Terminal assignment




Pin connection: Digital terminals

Functional assignment DI1 and DI2: [C] DI1(5)=In / DI2(6)=In

Function assignment DI3 DI4 and DO1 DO2: [C] DI3 DI4 active; DO1 DO2 inactive

Function assignment DI5 and DI6: [C] DI1(5)=In / DI2(6)=In

System	Terminals	Function
	X41-X44	
System input/output signals	RFR	Release output stage
Controller inhibit	DI1	Level: [C] 0.00 ms
Digital input 1	DI2	Debounce time: [C] 0.00 ms
Digital input 2	DI3	Application input signals
Digital input 3	DI4	LA_NCtrl: bFailReset
Digital input 4	DI5	LA_NCtrl: bJogSpeed1
Digital input 5	DI6	LA_NCtrl: bJogSpeed2
Digital input 6		LA_NCtrl: bSetDCBrake
		LA_NCtrl: bSetSpeedCcw
		-
		-

Button	Function
	Indicates the polarity of the input is HIGH active. The polarity can be changed from HIGH active to LOW active by clicking this button.
	Indicates that the polarity of the input is LOW active. The polarity can be changed from LOW active to HIGH active by clicking this button.
	Open the parameterising dialog for assigning application inputs to the digital input. ▶ Changing the terminal assignment with the »Engineer« (□ 372)

Short overview of the parameters for the digital terminals:

Parameters	Info	Lenze setting	
		Value	Unit
C00115/1	Fct. DI 1/2 100kHz ▶ Change function assignment (□ 334)	0: DI1(5)=In / DI2(6)=In	
C00115/2	Fct. DI 5/6 10kHz ▶ Change function assignment (□ 334)	0: DI1(5)=In / DI2(6)=In	
C00116	DI 3/4 DO 1/2: Function ▶ Reconfiguring DI3(4) to output DO1(2) (□ 345)	0: DI3 DI4 active; DO1 DO2 inactive	
Digital inputs DI1 ... DI6			
C00114	Dlx: Polarity	Bit coded	
C02830/1...6	DI1...DI6: Debounce time	0: 0.00 ms	
C00443/1	Dlx: Terminal level	-	
C00443/2	Dlx: Output level	-	
Digital outputs DO1/DO2 (only available if DI3/DI4 have been reconfigured)			
C00118	DOx: Inversion	Bit coded	
C00423/1	DO1 ON delay	0.000	s
C00423/2	DO1 OFF delay	0.000	s
C00423/3	DO2 ON delay	0.000	s
C00423/4	DO2 OFF delay	0.000	s
C00444/1	DOx: Input level	-	
C00444/2	DOx: Terminal level	-	
Greyed out = display parameter			

Related topics:

- ▶ [Configuring exception handling of the output terminals](#) (□ 367)
- ▶ [User-defined terminal assignment](#) (□ 368)

6.1.1 Change function assignment

The internal processing function of the digital input terminals DI1/DI2 and DI5/DI6 can be reconfigured in [C00115](#) if necessary. In this way, these input terminals can alternatively be used as frequency or counting inputs in order to implement the following functions:

- Detection of the input frequency
- Detection and processing of two unipolar input frequencies to one bipolar frequency
- Counting of input pulses
- Evaluation of the speed feedback (HTL encoder) for the motor control (speed-controlled operation)

C00115/1: Function assignment DI1 and DI2 C00115/2: Function assignment of DI5 and DI6		Function assignment	
		DI1 / DI5	DI2 / DI6
0	DI1(5)=In / DI2(6)=In	Digital input	Digital input
1	DI1(5)=FreqIn / DI2(6)=In	Frequency input	Digital input
2	DI1(5)&DI2(6)=FreqIn (2-track)	Frequency input (2-track)	
3	DI1(5) = FreqIn / DI2(6)=direction	Frequency input (speed)	Frequency input (direction)
4	DI1(5)=CountIn / DI2(6)=In	Count input	Digital input



Note!

- In the Lenze setting of [C00115](#), the digital input terminals DI1/DI2 and DI5/DI6 have been configured as "normal" digital inputs.
- The digital input terminals DI3 ... DI4 are basically designed as "normal" digital inputs or as digital outputs through reconfiguration.
- Very high pulse frequencies can be measured at the DI1/DI2 and DI5/DI6 input terminals if the latter have been configured as frequency or counting inputs in [C00115](#). Scanning is then carried out within less than μs instead of the otherwise usual scanning rate of 1 kHz (1 ms).

You can find detailed information on the respective function assignment in the following subchapters:

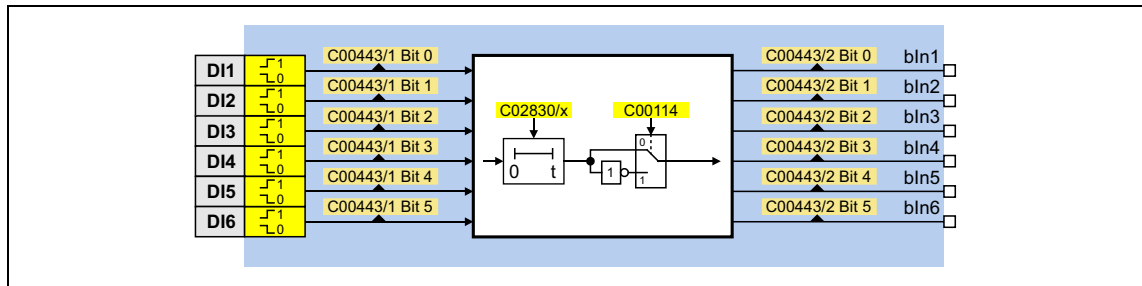
- ▶ [Using DI1\(5\) and DI2\(6\) as digital inputs](#) (□ 335)
- ▶ [Using DI1\(5\) and DI2\(6\) as frequency inputs](#) (□ 336)
- ▶ [Using DI1\(5\) as counting input](#) (□ 341)
- ▶ [Reconfiguring DI3\(4\) to output DO1\(2\)](#) (□ 345)

6.1.1.1 Using DI1(5) and DI2(6) as digital inputs

Function assignment 0: DI1(5)=In / DI2(6)=In

With this setting in [C00115](#), the digital input terminals have been configured as "normal" digital inputs.

- For each digital input, the debounce time ([C02830/1...6](#)) and the terminal polarity ([C00114](#)) can be set individually.
- The current terminal level at the input of the internal processing function is shown in [C00443/1](#) in bit-coded form.
- The output level for the application is shown in [C00443/2](#) in bit-coded form.



Internal interfaces to the application

- Relevant outputs at the [LS_DigitalInput](#) system block:

Output	Value/meaning
bln1 ... bln6 <small>DIS code data type</small> C00443/2 BOOL	Digital input DI1 ... DI6

Related topics:

- ▶ [Using DI1\(5\) and DI2\(6\) as frequency inputs](#) (336)
- ▶ [Using DI1\(5\) as counting input](#) (341)
- ▶ [Reconfiguring DI3\(4\) to output DO1\(2\)](#) (345)
- ▶ [Internal interfaces | System block "LS_DigitalInput"](#) (347)

6.1.1.2 Using DI1(5) and DI2(6) as frequency inputs

General information on using the input terminals as frequency inputs

The frequency inputs serve to detect HTL encoders with any number of increments and single-track and two-track signals. Single-track signals can be evaluated with or without rotation signal.



Note!

- Make sure that, when motor control with speed feedback is in use, the maximum input frequency of the respective input terminal is not exceeded.
 - DI1/DI2: $f_{\max} = 100 \text{ kHz}$
 - DI5/DI6: $f_{\max} = 10 \text{ kHz}$
- If the encoder signal is used as an actual speed value:
Number of encoder pulses / revolution $\leq 8192!$

Example for DI5/DI6 (in accordance with the preceding note):

- Encoder increment: 512 pulses / motor revolution
- Reference speed (C00011): 1500 rpm
- Speed setpoint: 100 %

$$\text{Input frequency} = \frac{1500 \text{ rpm}}{60 \text{ s}} \times 512 \text{ pulses} = 12800 \text{ pulses/s} = 12.8 \text{ kHz}$$

- Result: The speed or the number of increments is too high!



Tip!

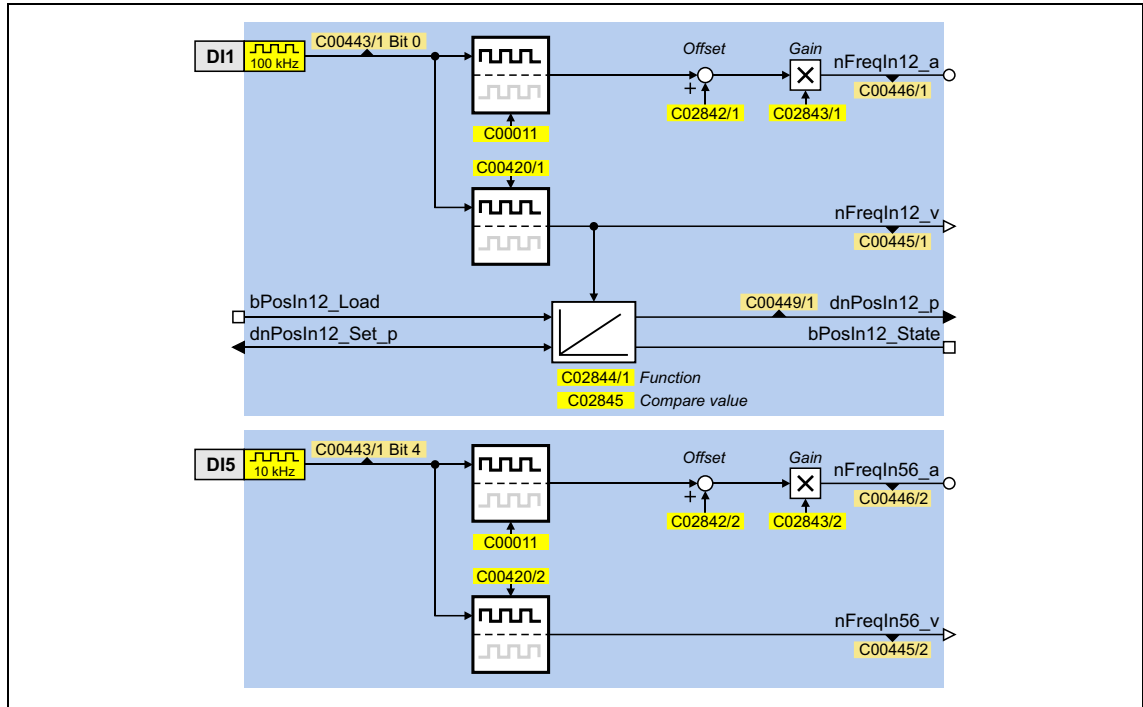
From version 06.00.00 onwards, the [LS_DigitalInput](#) system block can also provide the encoder position. Detailed information on this topic is provided in chapter "[Output of the encoder position of the DI1/DI2 frequency input](#)". (📖 350)

6 I/O terminals

6.1 Digital terminals

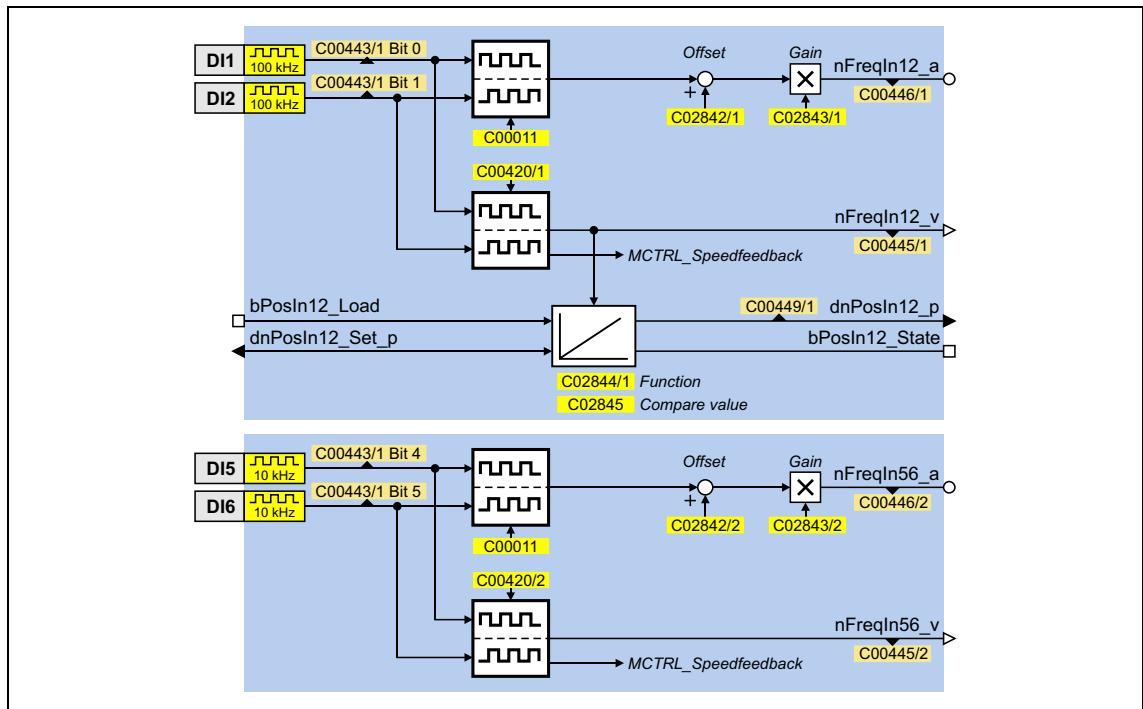
Function assignment 1: DI1(5)=FreqIn / DI2(6)=In

This setting in [C00115](#) configures the input terminal DI1(5) as frequency input. The input terminal DI2 or DI6 remains configured as "normal" digital input.



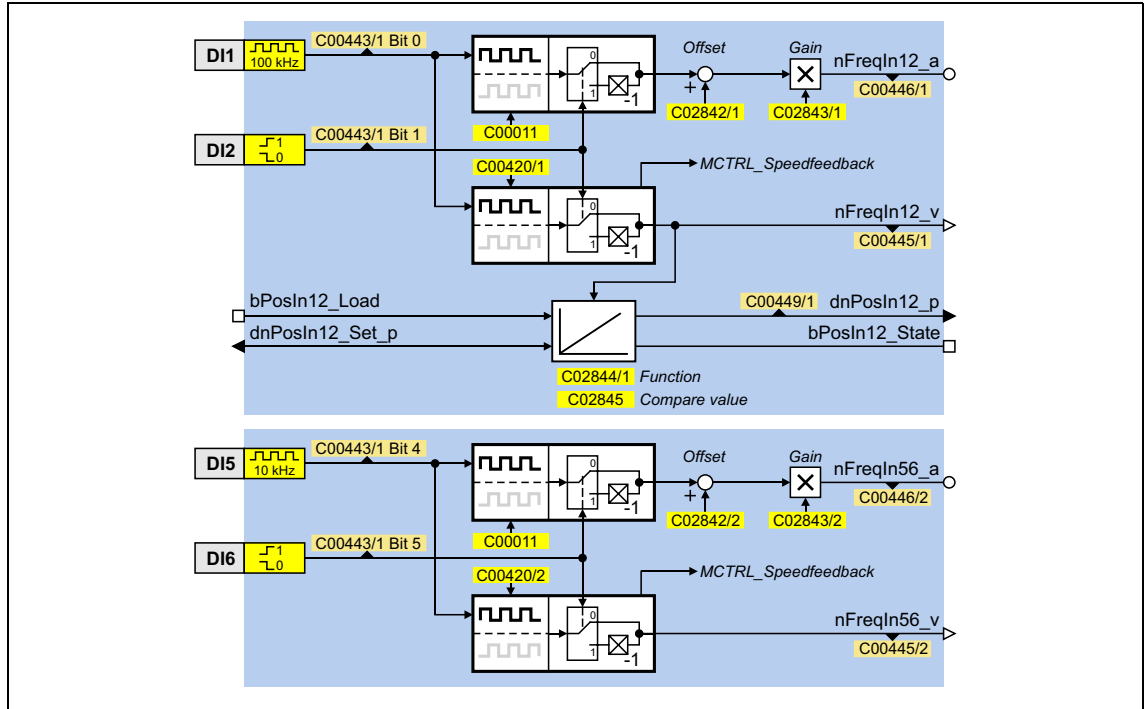
Function assignment 2: DI1(5)&DI2(6)=FreqIn (2-track)

This setting in [C00115](#) can be used to connect a two-track encoder to the DI1/DI2 or DI5/DI6 terminals.



Function assignment 3: DI1(5)=FreqIn / DI2(6)=Direction

This setting in [C00115](#) can be used to connect a single-track encoder to terminals DI1/DI2 or DI5/DI6. For this purpose, the rotation speed is evaluated via terminal DI1(5) and the direction of rotation of the encoder (LOW level \equiv CW direction of rotation) is evaluated via the DI(6) terminal.



Short overview of the parameters for the frequency inputs:

Parameters	Info	Lenze setting	
		Value	Unit
C00011	Appl.: Reference speed	1500	rpm
Frequency input DI1/DI2			
C00115/1	Fct. DI 1/2 100kHz	0: DI1(5)=In / DI2(6)=In	
C00420/1	Encoder increments at FreqIn12	128	Incr./rev.
C02842/1	FreqIn12: Offset	0.00	%
C02843/1	FreqIn12: Gain	100.00	%
C02844/1	PosIn12: Function	Loading with level	
C02845	PosIn12: Comparison value	0	
C00443/1	Dlx: Terminal level	-	
C00445/1	FreqIn12_nOut_v	-	Incr/ms
C00446/1	FreqIn12_nOut_a	-	%
C00449/1	FreqIn12_dnOut_p	-	Incr
Frequency input DI5/DI6			
C00115/2	Fct. DI 5/6 10kHz	0: DI1(5)=In / DI2(6)=In	
C00420/2	Encoder increments at FreqIn56	128	Incr./rev.
C02842/2	FreqIn56: Offset	0.00	%
C02843/2	FreqIn56: Gain	100.00	%
C00443/1	Dlx: Terminal level	-	
C00445/2	FreqIn56_nOut_v	-	Incr/ms
C00446/2	FreqIn56_nOut_a	-	%
Greyed out = display parameter			

Internal interfaces to the application

- Relevant inputs at the [LS_DigitalInput](#) system block:

Input	Data type	Information/possible settings
Frequency input DI1/DI2		
bPosIn12_Load	BOOL	Load angle integrator with starting value and reset status signal
(from version 06.00.00)		TRUE Angle integrator is loaded with the value at <i>dnPosIn12_Set_p</i> and <i>bPosIn12_State</i> is reset to FALSE.
dnPosIn12_Set_p	DINT	Starting value for angle integrator
(from version 06.00.00)		

- Relevant outputs at the [LS_DigitalInput](#) system block:

Output	Data type	Value/meaning
Frequency input DI1/DI2		
nFreqIn12_a	C00446/1 INT	Output frequency as scaled analog signal in [%]
nFreqIn12_v	C00445/1 INT	Output frequency as speed signal in [inc/ms]
dnPosIn12_p	DINT	Angle output signal
(from version 06.00.00)		<ul style="list-style-type: none"> • 65536 [incr.] \equiv 1 encoder revolution • Overflow is possible (display via <i>bPosIn12_State</i>)
bPosIn12_State	BOOL	Status signal "Overflow occurred/distance processed"
(from version 06.00.00)		<ul style="list-style-type: none"> • Status signal can be reset via <i>bPosIn12_Load</i>.
		TRUE Overflow has occurred or distance is processed.
Frequency input DI5/DI6		
nFreqIn56_a	C00446/2 INT	Output frequency as scaled analog signal in [%]
nFreqIn56_v	C00445/2 INT	Output frequency as speed signal in [inc/ms]

Related topics:

- ▶ [Output of the encoder position of the DI1/DI2 frequency input](#) (📖 350)
- ▶ [Using DI1\(5\) and DI2\(6\) as digital inputs](#) (📖 335)
- ▶ [Using DI1\(5\) as counting input](#) (📖 341)
- ▶ [Internal interfaces | System block "LS_DigitalInput"](#) (📖 347)

6.1.1.3 Using DI1(5) as counting input

General information on use as a counting input

The counting input is used for counting fast edges. A 32-bit counter counts from a parameterisable starting value up to a parameterisable comparison value and then outputs a corresponding status signal.

- Possible counting range: $0 \dots 2^{31} - 1$ (0 ... 2147483647)

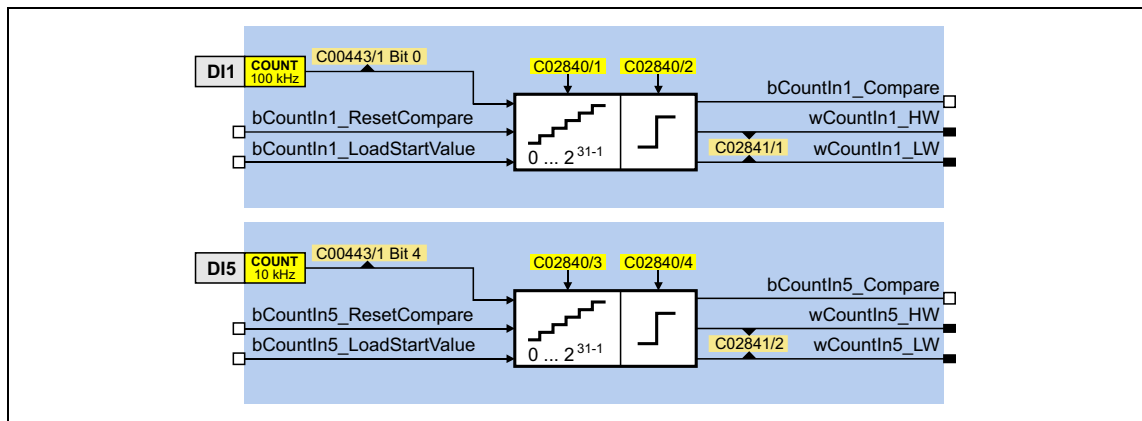


Note!

- The starting value must have been set so that it is smaller than the comparison value. Otherwise, the counter will be kept at the starting value because the condition "Count value \geq Comparison value" has been satisfied.
- Note the maximum input frequency of the respective input terminal:
 - DI1: $f_{\max} = 100 \text{ kHz}$
 - DI5: $f_{\max} = 10 \text{ kHz}$

Function assignment 4: DI1(5)=CountIn / DI2(6)=In

This setting in [C00115](#) configures the input terminal DI1 or DI5 as counting input. The input terminal DI2 or DI6 remains configured as "normal" digital input..



Short overview of parameters for the counting inputs:

Parameters	Info	Lenze setting	
		Value	Unit
Counting input DI1			
C00115/1	Fct. DI 1/2 100kHz	0: DI1(5)=In / DI2(6)=In	
C00621/3	LS_DigitalInput: bCountIn1_Reset	0: Not connected	
C00621/4	LS_DigitalInput: bCountIn1_LoadStartValue	0: Not connected	
C02840/1	CountIn1: Starting value	0	incr
C02840/2	CountIn1: Comparison value	65535	incr
C02841/1	CountIn1: Counter content	-	incr
C00443/1	Dlx: Terminal level	-	
Counting input DI5			
C00115/2	Fct. DI 5/6 10kHz	0: DI1(5)=In / DI2(6)=In	
C00621/97	LS_DigitalInput: bCountIn5_Reset	0: Not connected	
C00621/98	LS_DigitalInput: bCountIn5_LoadStartValue	0: Not connected	
C02840/3	CountIn5: Starting value	0	incr
C02840/4	CountIn5: Comparison value	65535	incr
C02841/2	CountIn5: Counter content	-	incr
C00443/1	Dlx: Terminal level	-	
Greyed out = display parameter			

Internal interfaces to the application

- Relevant inputs at the [LS_DigitalInput](#) system block:

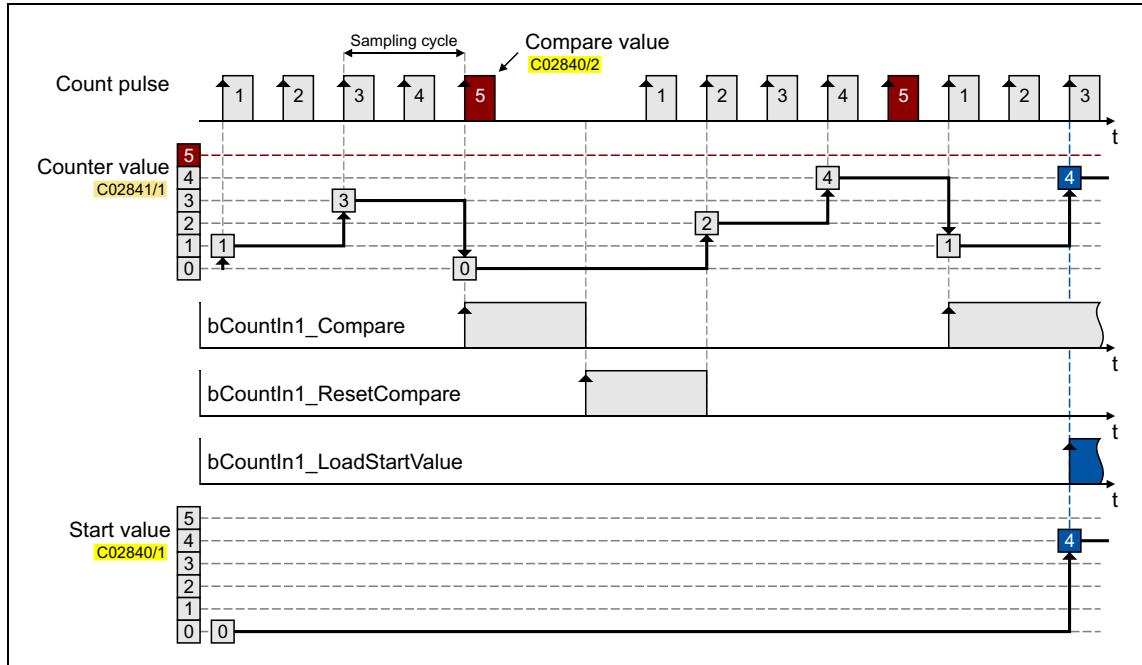
Designator <small>DIS code data type</small>	Information/possible settings
Counting input DI1	
bCountIn1_ResetCompare <small>BOOL</small>	Reset status signal "Comparison value reached"
	FALSE↗TRUE The output <i>bCountIn1_Compare</i> is reset to FALSE.
bCountIn1_LoadStartValue <small>BOOL</small>	Load starting value into counter
	FALSE↗TRUE The starting value set in C02840/1 is accepted as the current count value.
Counting input DI5	
bCountIn5_ResetCompare <small>BOOL</small>	Reset status signal "Comparison value reached"
	FALSE↗TRUE The output <i>bCountIn5_Compare</i> is reset to FALSE.
bCountIn5_LoadStartValue <small>BOOL</small>	Load starting value into counter
	FALSE↗TRUE The starting value set in C02840/3 is accepted as the current count value.

- Relevant outputs at the [LS_DigitalInput](#) system block:

Designator <small>DIS code data type</small>	Value/meaning
Counting input DI1	
bCountIn1_Compare <small>BOOL</small>	Status signal "Comparison value reached"
	FALSE Current count value < comparison value (C02840/2)
	TRUE Current count value ≥ comparison value (C02840/2)
wCountIn1_HW wCountIn1_LW <small>C02841/1 WORD</small>	Current count value <ul style="list-style-type: none"> • Output as High and Low word (without sign) • Possible counting range: 0 ... $2^{31} - 1$
Counting input DI5	
bCountIn5_Compare <small>BOOL</small>	Status signal "Comparison value reached"
	FALSE Current count value < comparison value (C02840/4)
	TRUE Current count value ≥ comparison value (C02840/4)
wCountIn5_HW wCountIn5_LW <small>C02841/2 WORD</small>	Current count value <ul style="list-style-type: none"> • Output as High and Low word (without sign) • Possible counting range: 0 ... $2^{31} - 1$

Counting behaviour

The following temporal characteristic shows the counting process depending on the signals of the interfaces described before:



[6-1] Transient characteristic of a quick counter block, sampling cycle = 1 ms

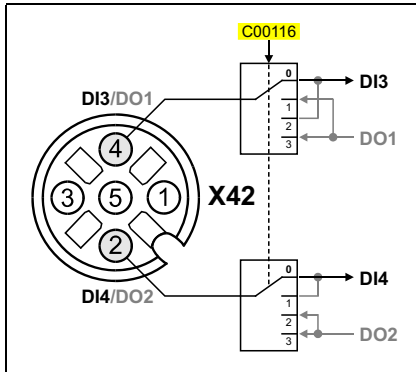
- The counter starts with the parameterised starting value.
- If the comparison value is reached or exceeded:
 - The counter jumps back to its starting value.
 - The output *bCountIn1(5)_Compare* is set to TRUE.
- If there is a FALSE-TRUE edge at the input *bCountIn1(5)_ResetCompare*, the output *bCountIn1(5)_Compare* can be reset to FALSE.
- If there is a FALSE-TRUE edge at the input *bCountIn1(5)_LoadStartValue*, the current counter content can be reset to the parameterised starting value.

Related topics:

- ▶ [Using DI1\(5\) and DI2\(6\) as digital inputs](#) (📖 335)
- ▶ [Using DI1\(5\) and DI2\(6\) as frequency inputs](#) (📖 336)
- ▶ [Internal interfaces | System block "LS_DigitalInput"](#) (📖 347)

6.1.1.4 Reconfiguring DI3(4) to output DO1(2)

Pin 2 and pin 4 of the socket X42 can be used as digital inputs or outputs.



- In the Lenze setting, both pins are configured as digital input (DI3 and DI4).
- In order to reconfigure the function assignment, set the corresponding selection in [C00116](#) (see the following table).

Setting C00116:	Active function assignment			
	DI3	DI4	DO1	DO2
0 DI3 DI4 active; DO1 DO2 inactive	●	●		
1 DO1 DI4 active; DI3 DO2 inactive		●	●	
2 DI3 DO2 active; DO1 DI4 inactive	●			●
3 DO1 DO2 active; DI3 DI4 inactive			●	●

Parameterisation dialog in the »Engineer«:

After the reconfiguration, the outputs DO1/DO2 are displayed with the corresponding parameters on the **Terminal assignment** tab instead of the inputs DI3/DI4:

Short overview of the parameters for the digital outputs

Parameters	Info	Lenze setting	
		Value	Unit
Digital outputs DO1/DO2			
C00118	DOx: Inversion	Bit coded	
C00423/1	DO1 ON delay	0.000	s
C00423/2	DO1 OFF delay	0.000	s
C00423/3	DO2 ON delay	0.000	s
C00423/4	DO2 OFF delay	0.000	s
C00444/1	DOx: Input level	-	
C00444/2	DOx: Terminal level	-	
Digital outputs - terminal configuration			
C00621/2	LS_DigitalOutput:bOut1	1000: LA_nCtrl_bDriveReady	
C00621/99	LS_DigitalOutput: bOut2	0: Not connected	
Greyed out = display parameter			

Related topics:

- ▶ [Internal interfaces | System block "LS_DigitalOutput"](#) (📖 354)
- ▶ [Configuring exception handling of the output terminals](#) (📖 367)
- ▶ [User-defined terminal assignment](#) (📖 368)

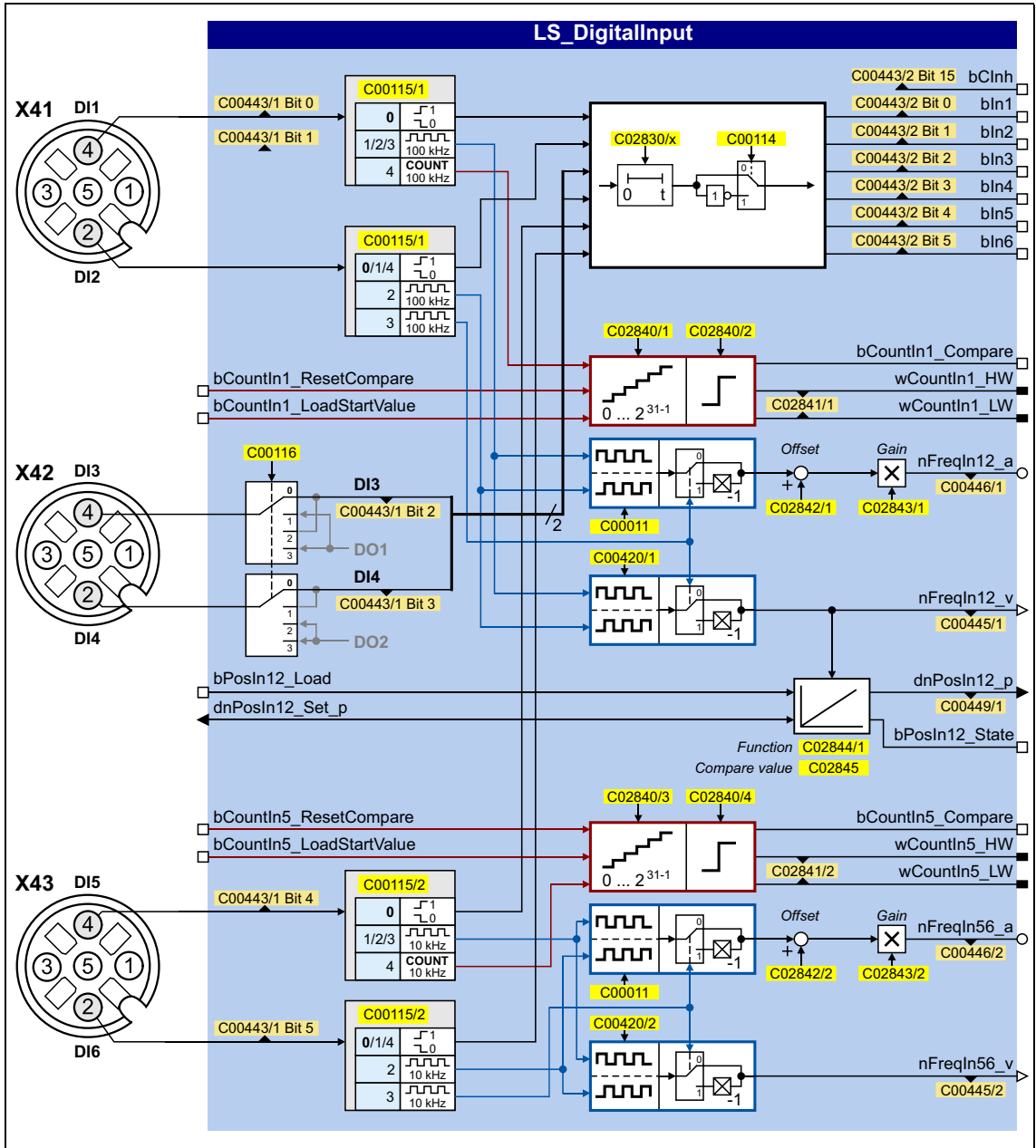
6 I/O terminals

6.1 Digital terminals

6.1.2 Internal interfaces | System block "LS_DigitalInput"

The system block **LS_DigitalInput** maps the digital input terminals in the FB editor.

- The internal processing function of the digital DI1/DI2 and DI5/DI6 input terminals can be reconfigured in [C00115](#) if necessary. These input terminals can then be alternatively used as frequency inputs or counting inputs.
- The inputs DI3/DI4 are always designed as "normal" digital inputs or as digital outputs through reconfiguration in [C00116](#).



Inputs

Designator <small>DIS code data type</small>	Information/possible settings
Counting input DI1	▶ Using DI1(5) as counting input
bCountIn1_ResetCompare <small>BOOL</small>	Reset status signal "Comparison value reached" FALSE↗TRUE The output <i>bCountIn1_Compare</i> is reset to FALSE.
bCountIn1_LoadStartValue <small>BOOL</small>	Load starting value into counter FALSE↗TRUE The starting value set in C02840/1 is accepted as the current count value.
Frequency input DI1/DI2	▶ Output of the encoder position of the DI1/DI2 frequency input
bPosIn12_Load <small>BOOL</small> <small>(from version 06.00.00)</small>	Load angle integrator with starting value and reset status signal TRUE Angle integrator is loaded with the value at <i>dnPosIn12_Set_p</i> and <i>bPosIn12_State</i> is reset to FALSE.
dnPosIn12_Set_p <small>DINT</small> <small>(from version 06.00.00)</small>	Starting value for angle integrator
Counting input DI5	▶ Using DI1(5) as counting input
bCountIn5_ResetCompare <small>BOOL</small>	Reset status signal "Comparison value reached" FALSE↗TRUE The output <i>bCountIn5_Compare</i> is reset to FALSE.
bCountIn5_LoadStartValue <small>BOOL</small>	Load starting value into counter FALSE↗TRUE The starting value set in C02840/3 is accepted as the current count value.

Outputs

Designator <small>DIS code data type</small>	Value/meaning
bCInh <small>C00443/2 BOOL</small>	RFR digital input (controller enable)
Digital inputs DI1 ... DI6	▶ Using DI1(5) and DI2(6) as digital inputs
bln1 ... bln6 <small>C00443/2 BOOL</small>	Digital input DI1 ... DI6
Counting input DI1	▶ Using DI1(5) as counting input
bCountIn1_Compare <small>BOOL</small>	Status signal "Comparison value reached" FALSE Current count value < comparison value (C02840/2) TRUE Current count value ≥ comparison value (C02840/2)
wCountIn1_HW wCountIn1_LW <small>C02841/1 WORD</small>	Current count value • Output as High and Low word (without sign) • Possible counting range: 0 ... 2 ³¹ - 1
Frequency input DI1/DI2	▶ Using DI1(5) and DI2(6) as frequency inputs
nFreqIn12_a <small>C00446/1 INT</small>	Output frequency as scaled analog signal in [%]
nFreqIn12_v <small>C00445/1 INT</small>	Output frequency as speed signal in [inc/ms]
dnPosIn12_p <small>DINT</small> <small>(from version 06.00.00)</small>	Angle output signal • 65536 [incr.] ≙ 1 encoder revolution • Overflow is possible (display via <i>bPosIn12_State</i>)
bPosIn12_State <small>BOOL</small> <small>(from version 06.00.00)</small>	Status signal "Overflow occurred/distance processed" • Status signal can be reset via <i>bPosIn12_Load</i> . TRUE Overflow has occurred or distance is processed.

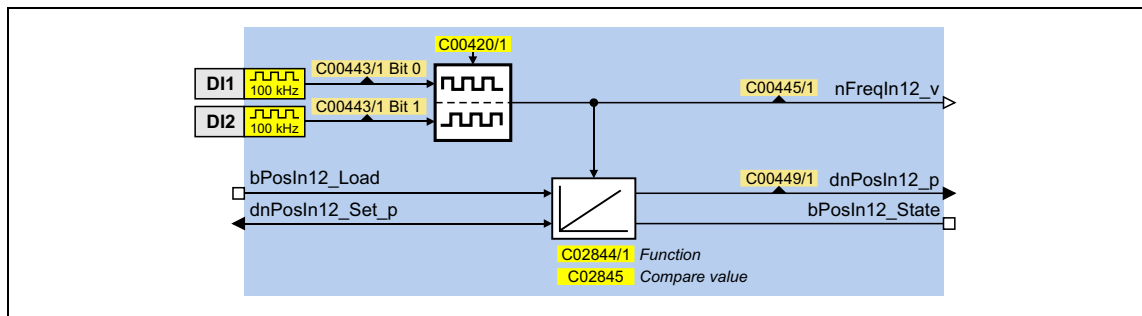
Designator DIS code data type	Value/meaning
Counting input DI5	▶ Using DI1(5) as counting input
bCountIn1_Compare BOOL	Status signal "Comparison value reached"
	FALSE Current count value < comparison value (C02840/4)
	TRUE Current count value ≥ comparison value (C02840/4)
wCountIn6_HW wCountIn6_LW C02841/2 WORD	Current count value <ul style="list-style-type: none"> • Output as High and Low word (without sign) • Possible counting range: 0 ... $2^{31} - 1$
Frequency input DI5/DI6	▶ Using DI1(5) and DI2(6) as frequency inputs
nFreqIn56_a C00446/2 INT	Output frequency as scaled analog signal in [%]
nFreqIn56_v C00445/2 INT	Output frequency as speed signal in [inc/ms]

6.1.2.1 Output of the encoder position of the DI1/DI2 frequency input

This function extension is available from version 06.00.00!

The [LS DigitalInput](#) system block has been extended by the integrator function for providing the encoder position.

- The integrator can take max. ± 32000 encoder revolutions.
- The starting position can be loaded via inputs.
- The internal function can be set via parameters.
- In addition to the encoder position, the "Overflow occurred/distance processed" status signal is provided.



Inputs

Designator DIS code data type	Information/possible settings
bPosIn12_Load BOOL	Load angle integrator with starting value and reset status signal TRUE Angle integrator is loaded with the value at <i>dnPosIn12_Set_p</i> and <i>bPosIn12_State</i> is reset to FALSE.
dnPosIn12_Set_p DINT	Starting value for angle integrator

Outputs

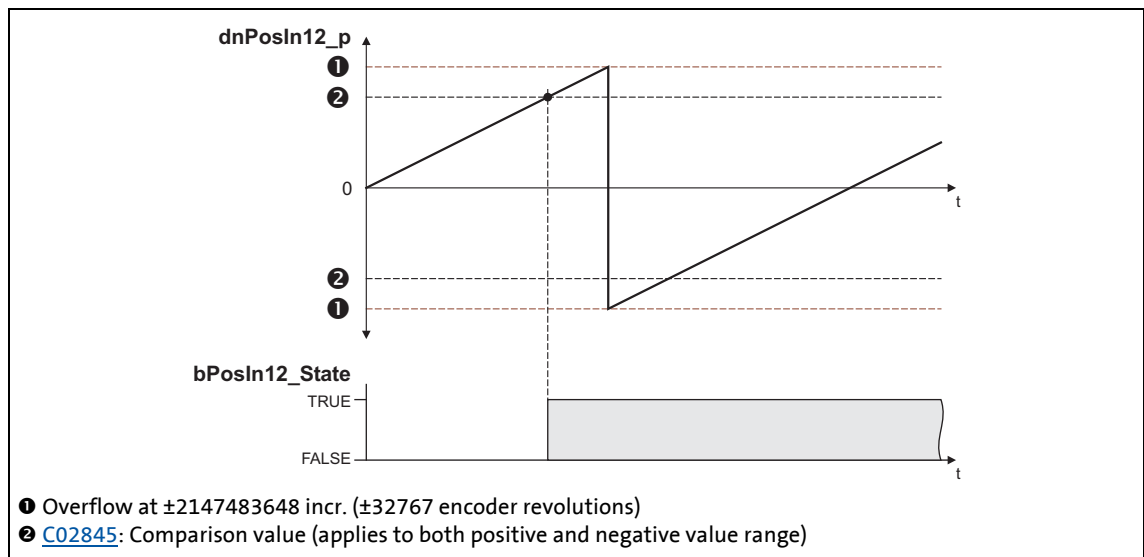
Designator DIS code data type	Value/meaning
dnPosIn12_p DINT	Angle output signal • 65536 [incr.] \equiv 1 encoder revolution • Overflow is possible (display via <i>bPosIn12_State</i>)
bPosIn12_State BOOL	Status signal "Overflow occurred/distance processed" • Status signal can be reset via <i>bPosIn12_Load</i> . TRUE Overflow has occurred or distance is processed.

Parameters

Parameters	Possible settings	Info	
C02844/1	0 Loading with level	Load integrator with TRUE level at the <i>bPosIn12_Load</i> input (Lenze setting).	
	1 Loading with edge	Load integrator with FALSE/TRUE edge at the <i>bPosIn12_Load</i> input.	
	2 Loading with level + reset	Load integrator when reaching the comparison value or with TRUE level at the <i>bPosIn12_Load</i> input.	
C02845	0	2000000000	Comparison value <ul style="list-style-type: none"> • Is valid for both the positive and the negative value range. • Lenze setting: 0

Function at constant input value

Selection: [C02844/1](#) = "0: Loading with level" or "1: Loading with edge"



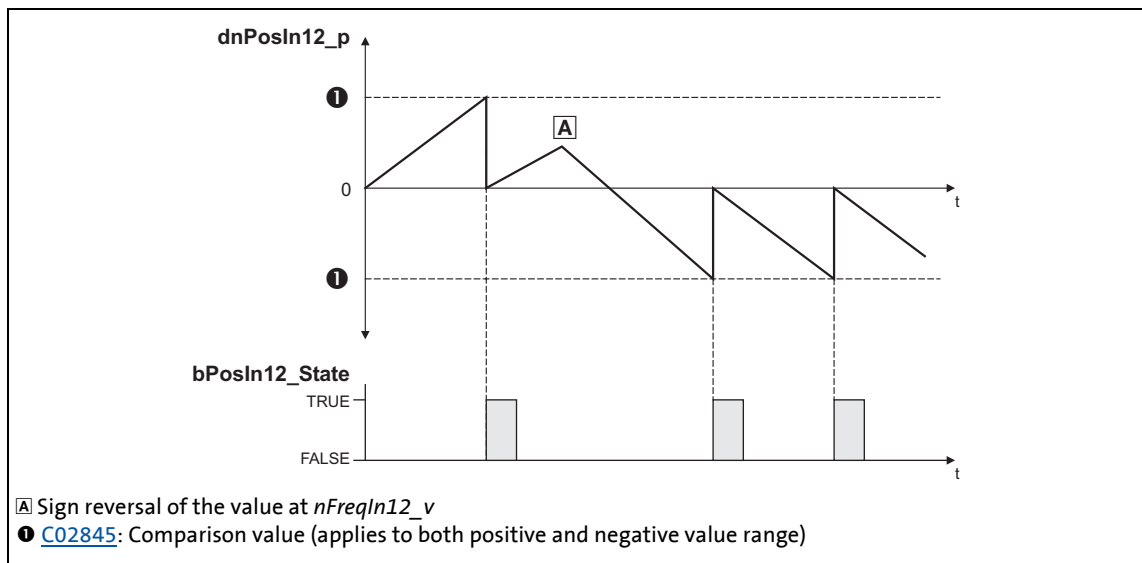
[6-2] Switching performance if the overflow is in the positive direction

- If "0: Loading with level" is selected in [C02844/1](#), the *bPosIn12_Load* input is status-controlled: In case of a TRUE signal, the integrator is loaded with the value at *dnPosIn12_Set_p* and the *bPosIn12_State* output is set to FALSE.
- If "1: Loading with edge" is selected in [C02844/1](#), the *bPosIn12_Load* input is edge-controlled: In case of a FALSE/TRUE edge, the integrator is loaded with the value at *dnPosIn12_Set_p* and then immediately continues to integrate, the *bPosIn12_State* output is set to FALSE.
- A positive *nFreqIn12_v* signal is incremented (the counter content is increased with every cycle).
- A negative *nFreqIn12_v* signal is decremented (the counter content is reduced with every cycle).

- *dnPosIn12_p* provides the counter content of the bipolar integrator.
 - If the counter content exceeds a value of +32767 encoder revolutions (corresponds to +2147483647 incr.), an overflow occurs and the counting process continues at a value of -32768 encoder revolutions.
 - If the counter content falls below a value of -32768 encoder revolutions (corresponds to -2147483648 incr.), an overflow occurs and the counting process starts at a value of +32767 encoder revolutions.
- *bPosIn12_State* is set to TRUE if the comparison value set in [C02845](#) has been reached.

Function at input value with sign reversal

Selection: [C02844/1](#) = "2: Loading with level + reset"



[6-3] Switching performance if the input signal changes signs

- If "2: Loading with level + reset" is selected in [C02844/1](#), the *bPosIn12_Load* input is status-controlled: In case of a TRUE signal, the integrator is loaded with the value at *dnPosIn12_Set_p* and the *bPosIn12_State* output is set to FALSE.
- A positive *nFreqIn12_v* signal is incremented (the counter content is increased with every cycle).
- A negative *nFreqIn12_v* signal is decremented (the counter content is reduced with every cycle).
- *dnPosIn12_p* provides the counter content of the bipolar integrator.
 - If the positive counter content is higher than the comparison value set in [C02845](#), the comparison value will be subtracted from the counter content, and *bPosIn12_State* will be set to TRUE for one task cycle.
 - If the negative counter content is lower than the comparison value set in [C02845](#), the comparison value will be added to the counter content, and *bPosIn12_State* will be set to TRUE for one task cycle.

Calculation of the output signal

The output value at $dnPosIn12_p$ is calculated as per the formula below:

$$dnPosIn12_p \text{ [incr.]} = nFreqIn12_v \text{ [rpm]} \cdot t \text{ [s]} \cdot 65535 \text{ [incr./rev.]}$$

t = integration time
 16384 \approx 15000 rpm
 1 \approx 1 incr.

Example

You want to determine the counter content of the integrator at a certain speed at the input and a certain integration time t.

Given values:

- $nFreqIn12_v = 1000 \text{ rpm} \approx \text{integer value } 1092$
- Integration time $t = 10 \text{ s}$
- Starting value of the integrator = 0

Solution:

- Conversion of the $nFreqIn12_v$ input signal:

$$1000 \text{ rpm} = \frac{1000 \text{ rev.}}{60 \text{ s}}$$

- Calculation of the output value:

$$dnPosIn12_p = \frac{1000 \text{ rev.}}{60 \text{ s}} \cdot 10 \text{ s} \cdot \frac{65535 \text{ incr.}}{\text{Rev.}} = 10922666 \text{ incr.}$$

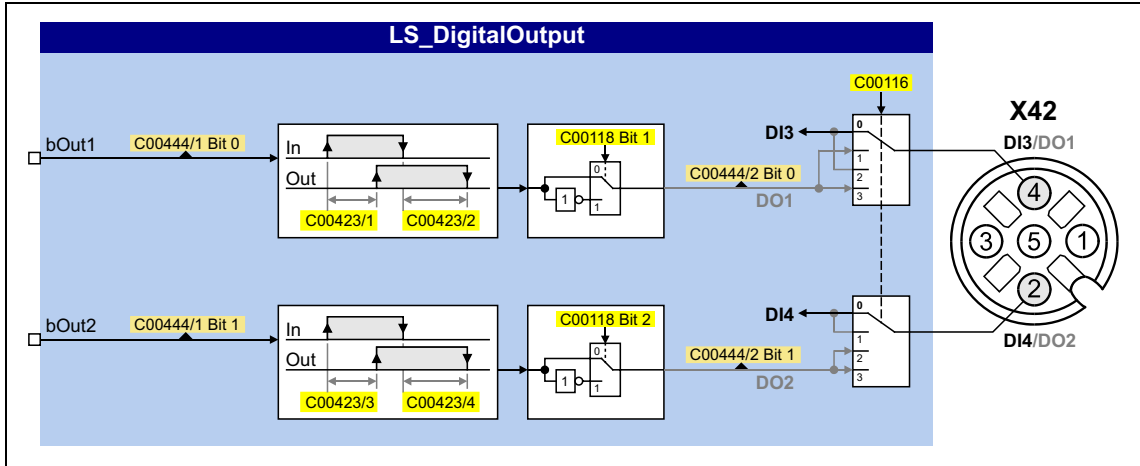
6 I/O terminals

6.1 Digital terminals

6.1.3 Internal interfaces | System block "LS_DigitalOutput"

Both terminals DI3/DO1 and DI4/DO2 of the socket X42 can be optionally used as inputs or outputs.

- In the Lenze setting, both terminals are configured as digital input (DI3 and DI4).
- With a corresponding reconfiguration in [C00116](#), the **LS_DigitalOutput** system block in the FB Editor displays the digital outputs DO1 and DO2.



Input	DIS code data type	Information/possible settings
bOut1	C00444/1 BOOL	Digital output DO1
bOut2	C00444/2 BOOL	Digital output DO2

6.2 Analog terminals

The inverter is provided with two analog input terminals (O1U and O1I) at the socket X50 for detecting a current or voltage signal.

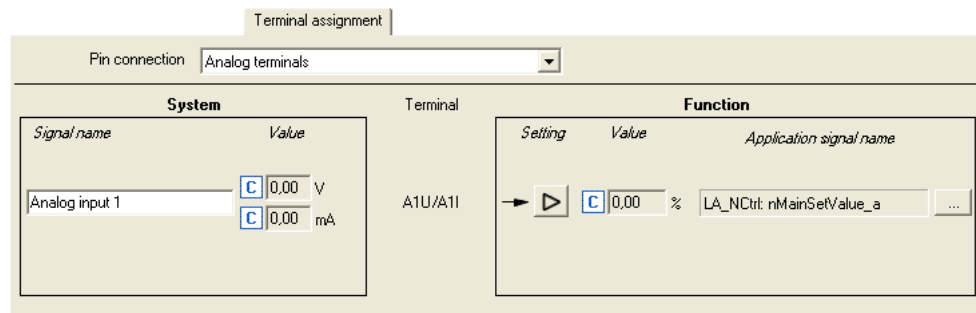
- Voltage signal in the 0 ... + 10 V range
The voltage signal can be e.g. an analog speed setpoint selection or the signal of an external sensor (temperature, pressure, etc.).
- Current signal in the 0/+ 4 ... + 20 mA range
For open-circuit monitoring, the current signal can be evaluated with regard to "Life Zero" or "Dead Zero":
 - 0 ... 20 mA, without open-circuit monitoring
 - 4 ... 20 mA, with open-circuit monitoring



Note!

To avoid undefined states, unassigned inputs of the inverter must be assigned as well, e.g. by applying 0 V to the terminal.

Parameterisation dialog in the »Engineer«:



Button	Function
	Parameterising analog input (📖 356)
	Open the parameterising dialog for assigning application inputs to the analog input. ▶ Changing the terminal assignment with the »Engineer« (📖 372)

Short overview of the parameters for the analog input:

Parameters	Info	Lenze setting	
		Value	Unit
Analog input 1			
C00028/1	AIN1: Input voltage	-	V
C00029/1	AIN1: Input current	-	mA
C00033/1	AIN1: Output value (to application)	-	%
Greyed out = display parameter			


Related topics:

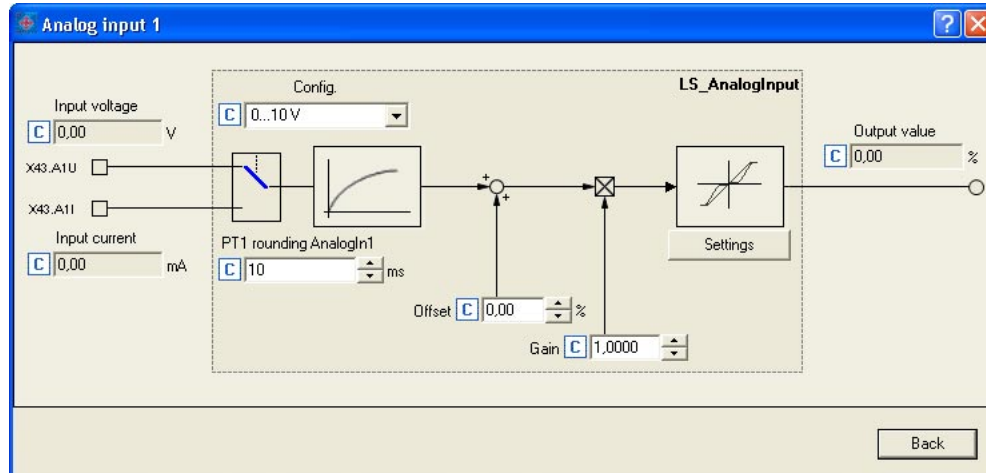
- ▶ [User-defined terminal assignment \(📖 368\)](#)

6 I/O terminals

6.2 Analog terminals

6.2.1 Parameterising analog input

By clicking on the  button on the **Terminal assignment** tab, you reach the parameterising dialog for the analog input:



Short overview of the parameters for the analog input:

Parameters	Info	Lenze setting	
		Value	Unit
Analog input 1			
C00034/1	AIN1: Config.	0: 0 V ... + 10 V	
C00026/1	AIN1: Offset	0.00	%
C00027/1	AIN1: Gain	1.0000	
C00028/1	AIN1: Input voltage	-	V
C00029/1	AIN1: Input current	-	mA
C00033/1	AIN1: Output value (to application)	-	%
C00440/1	PT1 rounding AnalogIn1	10	ms
C00598/1	Resp. to open circuit AIN1	3: TroubleQuickStop	

Greyed out = display parameter

Using current input A1I

In the Lenze setting, voltage signals in the 0 ... +10 V range are evaluated via the analog input A1U. If current signals are to be detected via the input A1I instead, the selection "1: 0...20 mA" or "2: 4...20mA" must be set in [C00034](#).



Tip!

By selecting "2: 4...20mA", you can implement a 4 ...20 mA current loop, e.g. for stipulation of the speed setpoint.

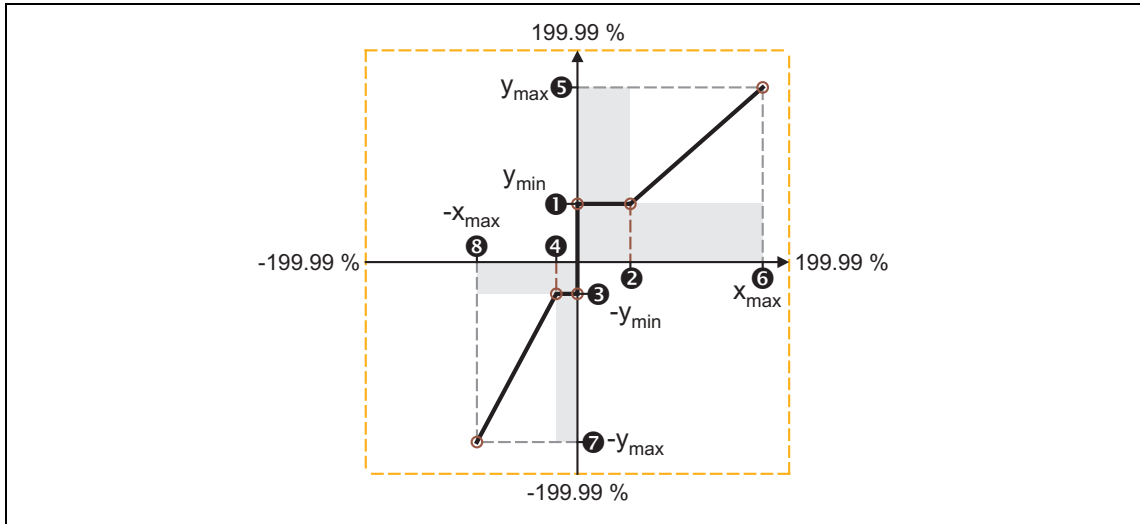
Open-circuit monitoring

In the case of configuration as a 4 ... 20 mA current loop, the fault response set in [C00598](#) takes place in the event of a wire breakage (Lenze setting: "TroubleQuickStop").

6.2.1.1 Signal adaptation by means of characteristic

This function extension is available from version 02.00.00!

According to the illustration below, an individual characteristic can be parameterised via the subcodes of [C00010](#) to provide different slopes and a dead band. Here, the input signal corresponds to the X axis and the output signal corresponds to the Y axis:




[6-4] Characteristic for analog inputs

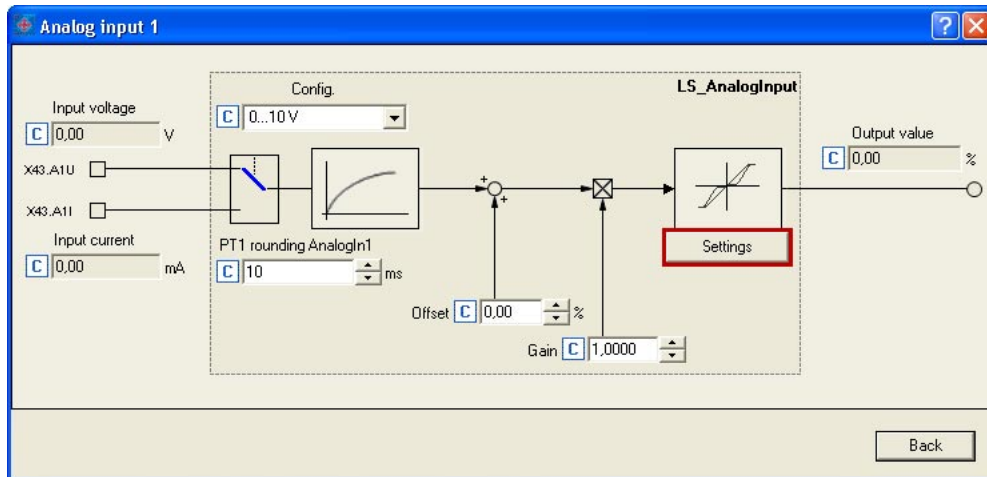
Parameters	Info	Lenze setting	
		Value	Unit
C00010/1	① AIN1: (+y0) = min	0.00	%
C00010/2	② AIN1: (+x0) = Dead band	1.00	%
C00010/3	③ AIN1: (-y0) = (-min)	0.00	%
C00010/4	④ AIN1: (-x0) = (-Dead band)	1.00	%
C00010/5	⑤ AIN1: (+ymax)	199.99	%
C00010/6	⑥ AIN1: (+xmax)	199.99	%
C00010/7	⑦ AIN1: (-ymax)	199.99	%
C00010/8	⑧ AIN1: (-xmax)	199.99	%

In the »Engineer«, there is a parameterising dialog for entering the characteristic. This dialog also displays the set characteristic graphically.

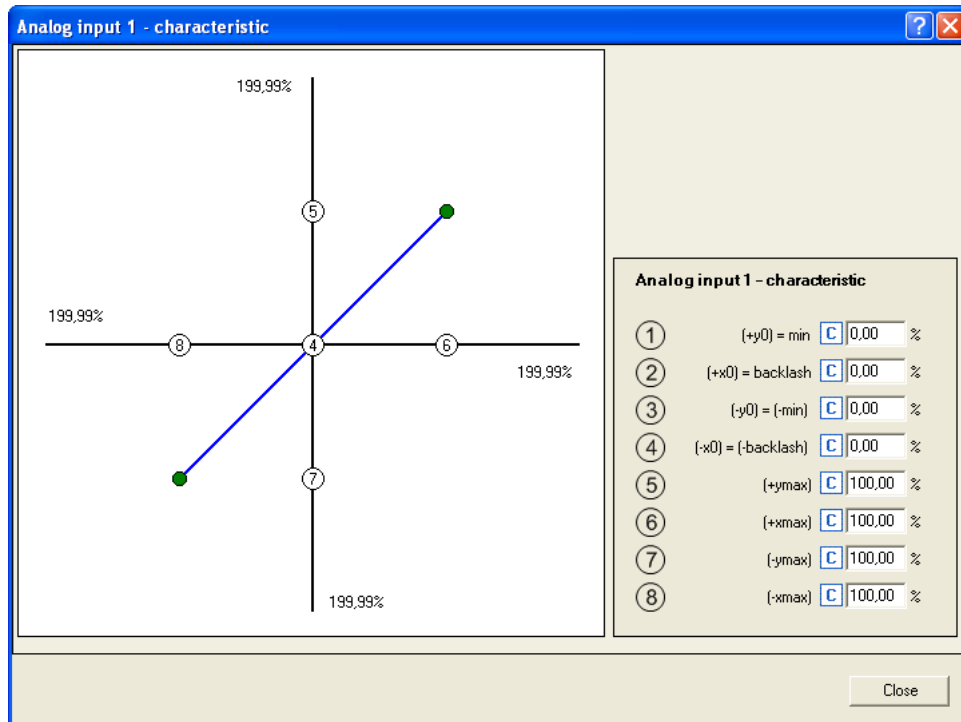


Proceed as follows to open the dialog for parameterising the characteristic:

1. Go to the **Terminal assignment** tab and select the "Analog terminals" entry in the **Control connections** list field.
2. Click on the  button for the analog input in order to open the *Analog input* dialog.



3. Click on the **Settings** button in order to open the *Analog input - Characteristic* dialog box:

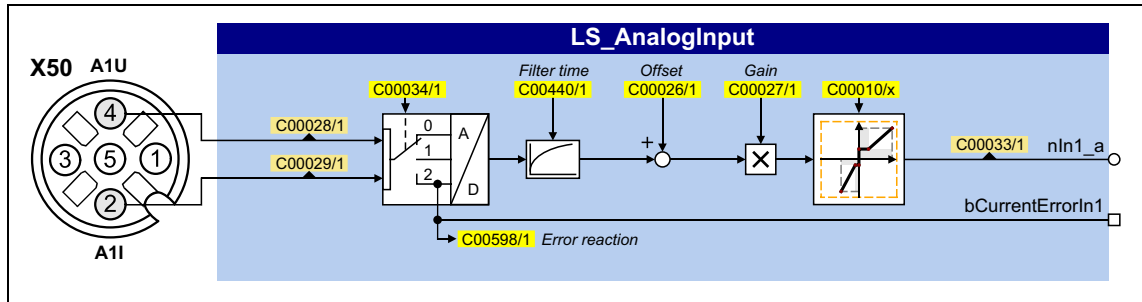


6 I/O terminals

6.2 Analog terminals

6.2.2 Internal interfaces | System block "LS_AnalogInput"

The LS_AnalogInput system block maps the analog input in the FB editor.



Output	Data type	Value/meaning
nIn1_a	C00033/1 INT	Analog input 1 <ul style="list-style-type: none"> Scaling: <ul style="list-style-type: none"> $\pm 2^{14} \equiv \pm 10 \text{ V}$ for use as voltage input $+2^{14} \equiv +20 \text{ mA}$ for use as current input
bCurrentErrorIn1	BOOL	Status signal "Current input error" <ul style="list-style-type: none"> Only when analog input 1 is used as current input. Application: Cable-breakage monitoring of the 4 ...20 mA circuit.
		TRUE $ I_{A1N1} < 4 \text{ mA}$

6.3 Touch probe detection

This function extension is available from version 06.00.00!

"Touch probe" (TP) in general means quick detection of a position by a quick sensor if the pulse duration of the sensor signal is too short to be detected by a "normal" digital input (scanning time: 1 ms).

Moreover, touch probe requires exact detection of the position. Here, the difference in position between the 1 ms position detection and the touch probe signal is considered as correction value.

Applications:

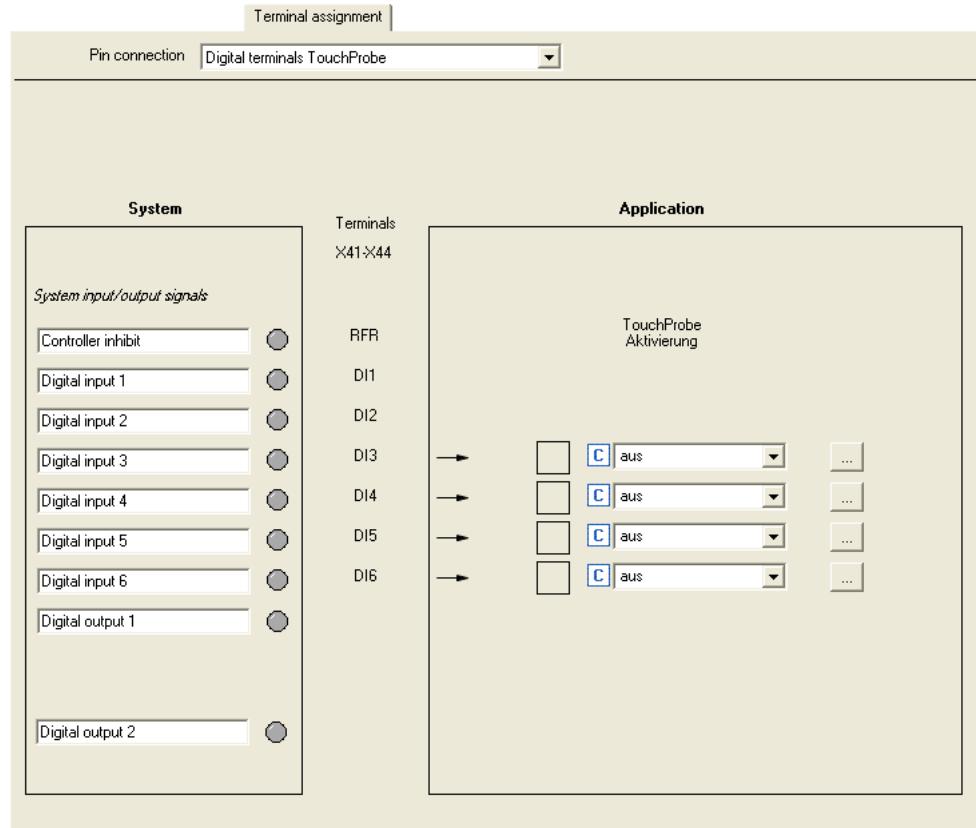
- Precise approach of a position at a previously detected signal mark
- High-precision traversing of a section starting at a previously detected signal mark
- Safe detection of signal marks with very short signal edges
- Measurement of a high-precision position at a previously detected signal mark
- Homing to touch probe (homing signal)
- Relative residual path positioning (traversing of a section starting at signal mark)
- Absolute positioning to target position, activated by a safely detected signal mark
- Position measurement of a distance between 2 signal marks


Overview of touch probe signal sources

The 8400 protec HighLine provides the following signal sources for touch probe detection which can be configured independently:

Signal source	Edge sensitivity	Applications
Digital input DI4 ... Digital input DI6	Rising edge, falling edge, rising and falling edge (parameterisable)	Homing Residual path positioning Position measurement Freely interconnectable

Parameterisation dialog in the »Engineer«:



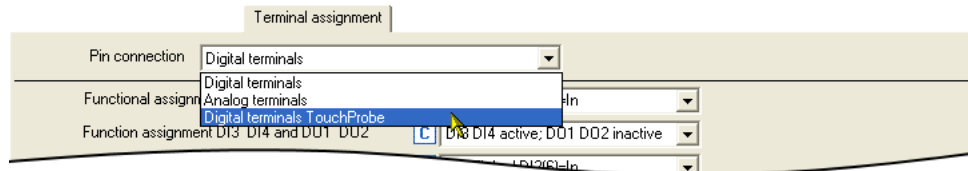
Button	Function
	Open the parameterisation dialog for the selected TP signal source. ▶ Parameter setting (□ 362)


Parameters	Info	Lenze setting	
		Value	Unit
C02810/4...6	TPDigIn4 ... TPDigIn6: Edge selection	0:	Off

6.3.1 Parameter setting

Proceed as follows to open the parameterisation dialog for setting a TP signal source:

1. Go to the **Terminal Assignment** tab and select "Digital terminals TouchProbe" in the **Control connections** list field:

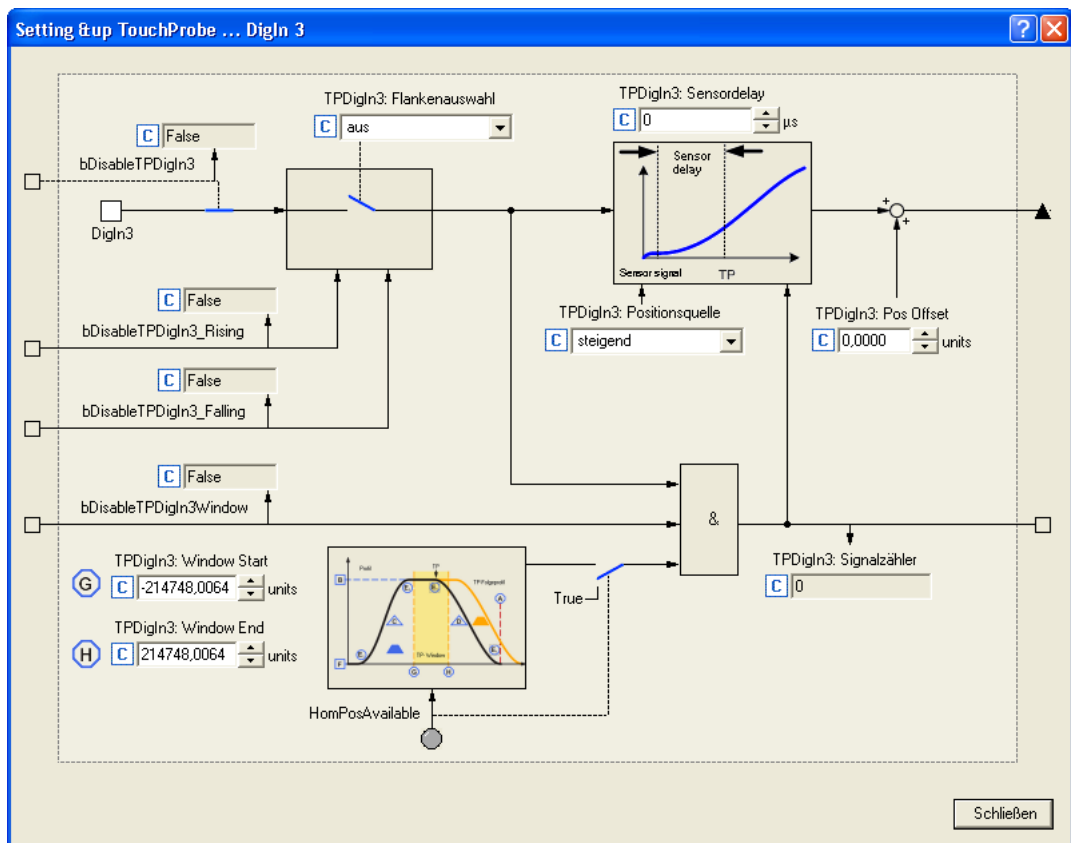


2. Click the  button for the digital input that is to be set for the touch probe detection.



Tip!

If the "Table positioning" technology application is used, the following parameterisation dialog can be opened for the selected TP signal source in the parameterisation dialogs for the [Profile entry](#) and the basic "[Homing](#)" function via the **Set up touch probe...** button:



Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C02810/4...6	TPDigIn4 ... TPDigIn6: Edge selection	0: Off	
C02811/4...6	TPDigIn4 ... TPDigIn6: Sensor delay	0	µs
C02812/4...6	TPDigIn4 ... TPDigIn6: Pos offset	0.0000	units
C02813/2...3	TPDigIn4 ... TPDigIn5: Window start	0.0000	units
C02814/2...3	TPDigIn4 ... TPDigIn5: Window end	0.0000	units
C02815/4...6	TPDigIn4 ... TPDigIn6: Position source	0: Position encoder actual value	
C02816/4...6	TPDigIn4 ... TPDigIn6: Signal counter	-	
C02817/4...6	TPDigIn4 ... TPDigIn6: TP position	-	units

Greyed out = display parameter

Edge selection

Select which edge the corresponding input is to respond to.

- In the case of signal sources DI4 ... DI5, the edge sensitivity can also be dynamically changed via inputs at the [LS_TouchProbe](#) SB.

Sensor delay

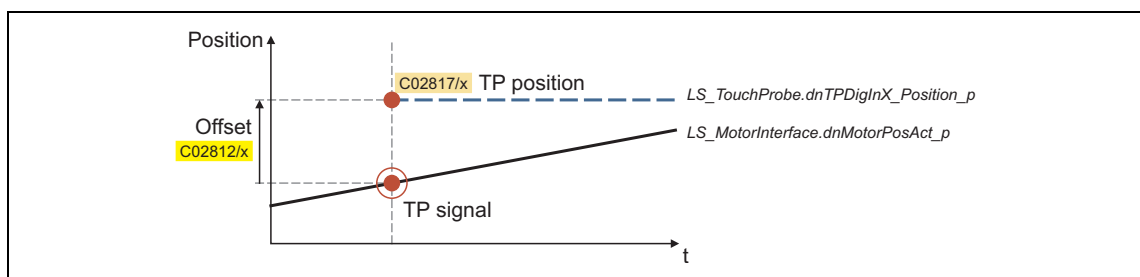
This setting serves to compensate for a sensor delay of the touch probe sensor, if any.

- Typical values for laser photoelectric barriers are e.g. 300 µs.
- Delay of the digital inputs for the 8400 device series:
 - 5 µs for a rising edge
 - 25 µs for a falling edge
- Internal automatic compensation for device-internal signal delay due to encoder zero pulse.

Pos Offset

Use this setting to add an offset to the position value measured by touch probe. This may be required if the touch probe sensor has assumed a disadvantageous position on the machine. By adding an offset the touch probe sensor can be moved to a position which is more convenient to the application.

The offset value given in [units] is added to the TP position value which depends on the position source selected in [C02815/x](#). The offset value influences the display of the TP position ([C02817/x](#)), home position values internally derived from the touch probe and the respective output *dnTpDigInX_Position_p* at the SB [LS_TouchProbe](#). For this purpose, the offset value is converted internally from [units] to [increments].



Window start / end

Via the two parameters Window start ([C02813/x](#)) and Window end ([C02814/x](#)), acceptance windows can be set for the DI4 and DI5 signal sources in which the touch probe signal is accepted.

- The acceptance windows can be dynamically activated via the inputs at the [LS TouchProbe](#) SB.
- If the actual position is outside the acceptance window, touch probe is automatically deactivated.
- If both window limits are set to " ± 214748.3647 ", the acceptance window does not have any effect.
- To properly use this function, the drive needs to know the home position (zero position).

Position source

Selection of the position signal source to be measured with touch probe. This usually is the actual position of the motor / encoder position encoder.



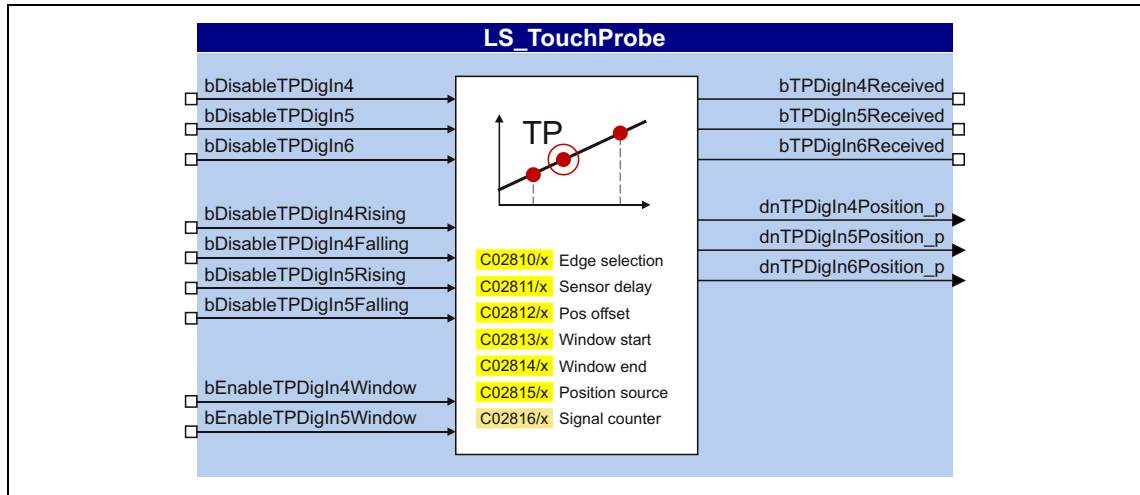
Note!

When the touch probe functionality is used in the operating modes "[Positioning](#)" and "[Homing](#)":

Make sure that the position source of the respective TP signal in [C02815/x](#) is set to "0: position encoder actual value". Otherwise, no TP correction will take place.

6.3.2 Internal interfaces | System block "LS_TouchProbe"

The **LS_TouchProbe** system block provides the internal interfaces for touch probe detection in the function block editor:



Inputs

Input	Data type	Information/possible settings
bDisableTPDigIn4...6	BOOL	DI4 ... DI6: Dynamically deactivate TP function TRUE TP function is deactivated.
bDisableTPDigIn4...5Rising	BOOL	DI4 ... DI5: Dynamically deactivate detection of rising edges TRUE Detection of rising edges is deactivated.
bDisableTPDigIn4...5Falling	BOOL	DI4 ... DI5: Dynamically deactivate detection of falling edges TRUE Detection of falling edges is deactivated.
bEnableTPDigIn4...5Window	BOOL	DI4 ... DI5: Activate acceptance window TRUE Acceptance window function is active: • If the actual position is outside the acceptance window, whose starting position is set in C02813/x and whose end position is set in C02814/x , touch probe is automatically deactivated.

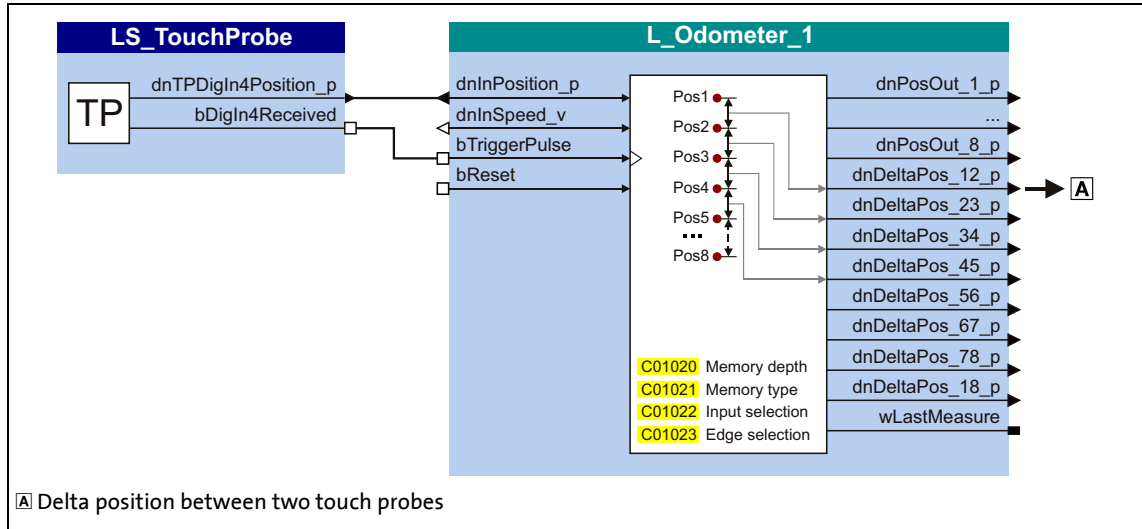
Outputs

Output	Data type	Value/meaning
bTPDigIn4...6Received	BOOL	TRUE DI4 ... DI6: Touch probe received. • The signal is only pending for one task cycle (1 ms).
dnTPDigIn4...6Position_p	DINT	DI4 ... DI6: Position measured by touch probe in [units]

6.3.2.1 Application example: "Position measurement"

The touch probe function can be combined with the [L_Odometer](#) FB for a position measurement. This FB is able to save position signals to a ring buffer and detect differences between two position signals.

In the wiring below, digital input DI3 is used to connect the touch probe sensor. For the sake of clarity, irrelevant inputs and outputs of the [LS_TouchProbe](#) SB are masked out.



[6-5] Wiring for position measurement

6.4 Configuring exception handling of the output terminals

This function extension is available from version 02.00.00!

Exception handling for the digital output terminals in the event of an error can be set via decoupling configuration and decoupling values.

- Bit coded selection is carried out in [C00447](#), defining the events that will trigger decoupling.

Bit	Event
Bit 0 <input type="checkbox"/>	SafeTorqueOff
Bit 1 <input type="checkbox"/>	ReadyToSwitchOn
Bit 2 <input type="checkbox"/>	SwitchedOn
Bit 3 <input type="checkbox"/>	Reserved
Bit 4 <input type="checkbox"/>	Trouble
Bit 5 <input type="checkbox"/>	Fault
Bit 6 <input type="checkbox"/>	Reserved
Bit 7 <input type="checkbox"/>	Reserved
Bit 8 <input type="checkbox"/>	Reserved
Bit 9 <input type="checkbox"/>	Fail CAN_Management
Bit 10 <input type="checkbox"/>	Reserved
Bit 11 <input type="checkbox"/>	Energy saving mode
...	...
Bit 15 <input type="checkbox"/>	Reserved

- Bit-coded definition is carried out in [C00448](#) specifying the status of the output terminals when being decoupled (bit set = HIGH level):

Bit	Output terminal
Bit 0 <input type="checkbox"/>	Reserved
Bit 1 <input type="checkbox"/>	DigOut1_ON
Bit 2 <input type="checkbox"/>	DigOut2_ON
Bit 3 <input type="checkbox"/>	Reserved
Bit 4 <input type="checkbox"/>	Reserved
Bit 5 <input type="checkbox"/>	BrakeRelease_ON
Bit 6 <input type="checkbox"/>	Reserved
...	...
Bit 15 <input type="checkbox"/>	Reserved

Related topics:

- ▶ [Configuring exception handling of the CAN PDOs \(702\)](#)

6.5 User-defined terminal assignment

In order to individually adapt the preconfigured assignment of the input/output terminals to your application, you can choose one of the following procedures:

- A. In the »Engineer«:
 - Change the terminal assignment on the **Terminal assignment** tab.
 - Change the signal assignment on the **Application Parameters** tab, on the dialog level *Overview* → *Signal flow*.
 - Change the interconnections in the FB editor (on the I/O level).
- B. In the »Engineer« or with the keypad:
 - Change the parameters for signal configuration in the parameters list.



Note!

If you change the preconfigured assignment of the inputs/outputs, the terminal assignment will be a user-defined one. In [C00007](#), control mode "0: Interconnection changed" will be shown.



Tip!

First of all, select a Lenze configuration useful for the purpose at hand by going to [C00005](#) and selecting a technology application that matches your drive task and then going to [C00007](#) and selecting an appropriate control mode. You will then have an application for which there is a signal flow, logical block links and terminal assignment.

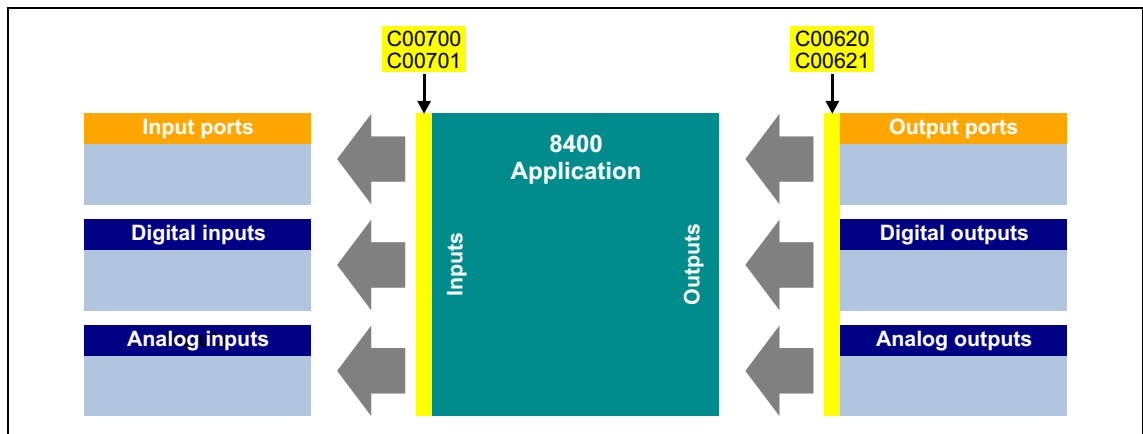
We recommend using the »Engineer« for the implementation of comprehensive user-defined drive solutions.

6.5.1 Source-destination principle

The I/O configuration of the input and output signals is carried out according to the source/destination principle:

- A connection always has a direction and therefore always has a source and a target.
- The inputs signals of the technology application are logically linked to the outputs of system blocks which represent the device input terminals.
- The inputs of system blocks that represent the device output terminals are logically linked to output signals of the technology application.

The following graphic illustrates the source/destination principle:



[6-6] Source-destination principle

Note the following:

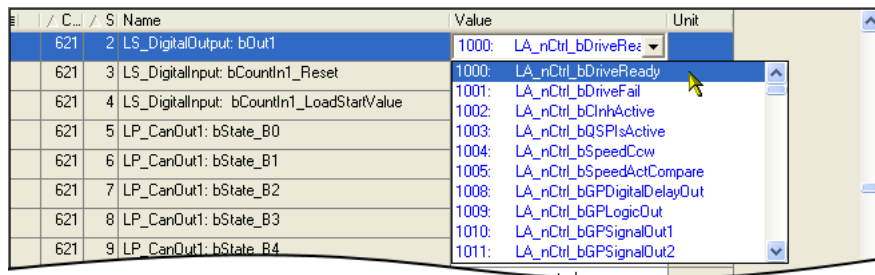
- An equipment input terminal can be logically linked to several inputs of the application block.
- Every input of the application block can only be logically linked to one input signal.
- An output of the application block can be logically linked to several device output terminals.

6.5.2 Changing the terminal assignment with the keypad

You can reconfigure the preconfigured terminal assignment with the keypad (and with the »Engineer«) by means of so-called configuration parameters.

- Each configuration parameter represents a signal input of a system block or application block.
- Each configuration parameter contains a selection list with output signals of the same type of data.
- Logical linking is thus carried out by selecting the output signal for the corresponding signal input.

In the following example, digital output 1 (**LS_DigitalOutput.bOut1** input) is logically linked to the status signal "Drive ready" (**LA_nCtrl_bDriveReady** output signal):



Configuration parameters for the digital output terminals

The subcodes of [C00621](#) serve to change the preconfigured terminal assignment of the digital output terminals:

Parameters	Info	Lenze setting	
		Value	Unit
Digital outputs - terminal assignment			
C00621/2	LS_DigitalOutput:bOut1	1000: LA_nCtrl_bDriveReady	
C00621/99	LS_DigitalOutput: bOut2	0: Not connected	

Other subcodes (not shown here) allow the configuration of input signals of different system blocks and port blocks.

Configuration parameters for the inputs of the technology application

The following parameters can be used to change the preconfigured assignment of the application inputs:

Parameters	Info
TA "Actuating drive speed": Configuration parameters (401)	
C00700/x	Analog connection list
C00701/x	Digital connection list
TA "Switch-off positioning": Configuration parameters (457)	
C00760/x	Analog connection list
C00761/x	Digital connection list

Example

Task: Starting from the preset technology application "Actuating drive speed" and the "Terminals 0" control mode, the DI2 digital input is to be used for choosing an alternative acceleration/deceleration time for the main setpoint instead of for choosing the fixed setpoint 2/3. To do this, the DI2 digital input is not to be linked to the *bJogSpeed2* input but to the *bJogRamp1* input of the application module.

Procedure:

1. Use the keypad to go to the menu level **Applications → Actuating drive speed (conf.)**. This menu level contains all the configuration parameters of the "Actuating drive speed" technology application". ▶ [Configuration parameters](#) (401)
2. Navigate to the configuration parameter LA_NCtrl: bJogSpeed2 ([C00701/10](#)) which represents the logical signal link of the application input *bJogSpeed2*.
3. Change the setting of [C00701/10](#):
Change selection "16001: DigIn_bln2" in selection "0: Not interconnected".
4. Navigate to the configuration parameter LA_NCtrl: bJogRamp1 ([C00701/13](#)) which represents the logical signal link of the application input *bJogRamp1*.
5. Change the setting of [C00701/13](#):
Change selection "0: Not interconnected" in selection "16001: DigIn_bln2".



Tip!

The example shows that, for each input of the application block, the associated configuration parameter ([C00700/x](#) or [C00701/x](#)) is only allowed to contain one source that you enter.

6.5.3 Changing the terminal assignment with the »Engineer«

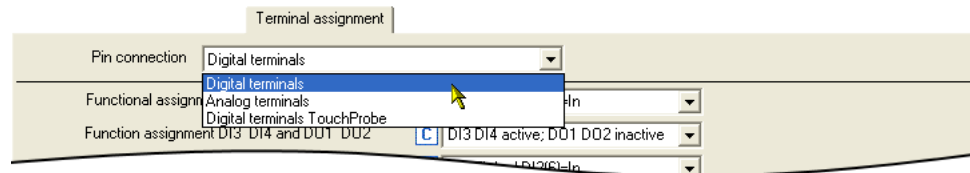
Whereas the configuration parameters referred to have to be parameterised with the keypad, implementation in the »Engineer« is much easier due to the availability of the corresponding dialogs. The following task illustrates the respective procedure.

Task: Starting from the preset technology application "Actuating drive speed" and the "Terminals 0" control mode, the DI2 digital input is to be used for choosing an alternative acceleration/deceleration time for the main setpoint instead of for choosing the fixed setpoint 2/3. To do this, the DI2 digital input is not to be linked to the *bJogSpeed2* input but to the *bJogRamp1* input of the application module.

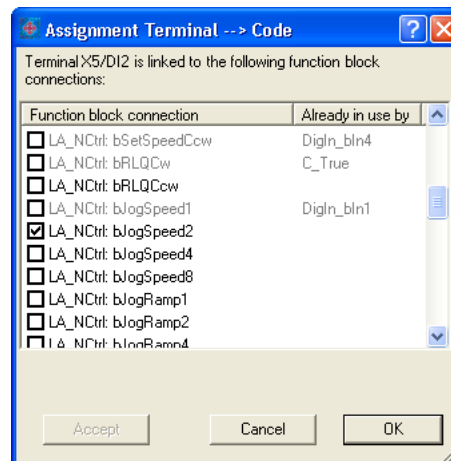
Possibility 1: Change terminal assignment by means of the Terminal Assignment tab

Procedure:

1. Go to the **Terminal Assignment** tab and select "Digital terminals" in the **Control connections** list field:



2. Click on the **...** button for the DI2 terminal in order to open the dialog box *Assignment Terminal --> Function block*.
 - In the list field, all block inputs that are currently logically linked to digital input DI2 are marked with a checkmark:



3. Remove checkmark for the connection **LA_NCtrl: bJogSpeed2** in order to cancel the existing logical link.
4. Set checkmark for connection **LA_NCtrl: bJogRamp1** in order to logically link this application input to digital input DI2.

Possibility 2: Change terminal assignment by means of the signal flow shown

Procedure:

1. Go to the **Application parameters** tab.
2. Go to the **Application Parameters** tab and click on the **Signal flow** button in order to change to the dialog level *Overview* → *Signal flow*.
3. On the dialog level *Overview* → *Signal flow*, click on the **Digital control signals** button in order to open the *Digital control signals* dialog box:

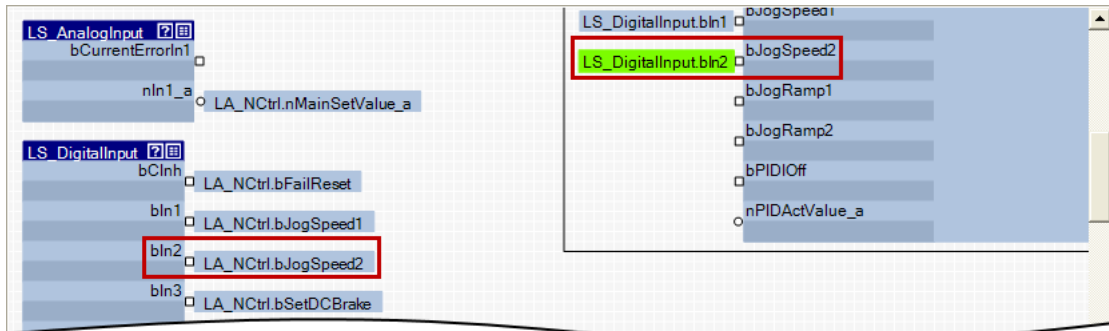
Section	Signal Name	Selected	Assignment
DCTRL	bClnh	<input checked="" type="radio"/>	Not interconnected
	bFailReset	<input checked="" type="radio"/>	DigIn_Clnh
MCTRL	bSetQuickstop	<input checked="" type="radio"/>	Not interconnected
	bSetDCBrake	<input checked="" type="radio"/>	DigIn_bln3
MCK	bMBRKRelease	<input checked="" type="radio"/>	Not interconnected
	bMANJogPos	<input checked="" type="radio"/>	Not interconnected
	bMANJogNeg	<input checked="" type="radio"/>	Not interconnected
Motor potentiometer	bMPOTUp	<input checked="" type="radio"/>	Not interconnected
	bMPOTDown	<input checked="" type="radio"/>	Not interconnected
	bMPOTInAct	<input checked="" type="radio"/>	Not interconnected
	bMPotEnable	<input checked="" type="radio"/>	Not interconnected
NSET	bSetSpeedCw	<input checked="" type="radio"/>	DigIn_bln4
	bJogSpeed1	<input checked="" type="radio"/>	DigIn_bln1
	bJogSpeed2	<input checked="" type="radio"/>	DigIn_bln2
	bJogSpeed4	<input checked="" type="radio"/>	Not interconnected
	bJogSpeed8	<input checked="" type="radio"/>	Not interconnected
	bJogRamp1	<input checked="" type="radio"/>	Not interconnected
	bJogRamp2	<input checked="" type="radio"/>	Not interconnected
	bJogRamp4	<input checked="" type="radio"/>	Not interconnected
PID/PCTRL	bPIDEEnableInfluenceRamp	<input checked="" type="radio"/>	Not interconnected

4. In the **bJogSpeed2** list field, set the selection "0: Not interconnected".
5. In the **bJogRamp1** list field, set the selection "16001: DigIn_bln2".
6. Click on the **Back** button in order to close the dialog box again.

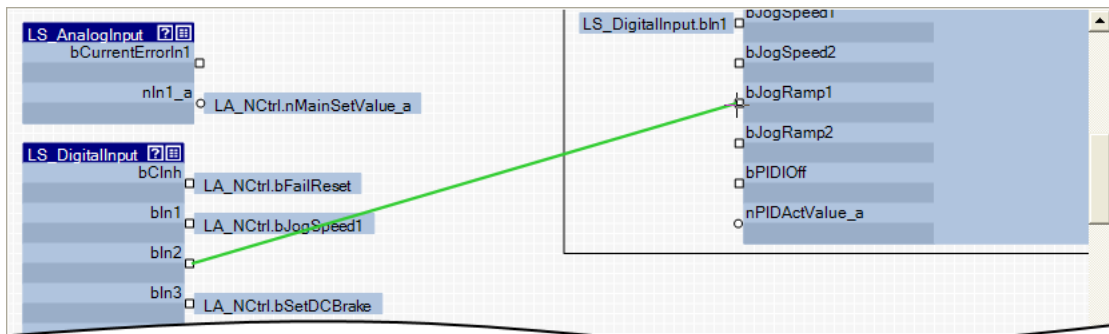
Possibility 3: Change terminal assignment with the FB editor

Procedure:

1. Go to the **FB Editor** tab.
2. Delete the existing interconnection from **LS_DigitalInput.bIn2** to **LA_NCtrl.bJogSpeed2**:



3. Establish a new interconnection from **LS_DigitalInput.bIn2** to **LA_NCtrl.bJogRamp1**:



Tip!

You can find detailed information on how to use the FB editor of the »Engineer« in the main chapter entitled "[Working with the FB Editor](#)". (📖 1170)

7 Technology applications

This chapter describes the handling and the functional range of the technology applications available for the 8400 protec HighLine inverter.



Technology application "Actuating drive speed"

This technology application preset in [C00005](#) serves to solve speed-controlled drive tasks, e.g. conveyor drives (interconnected), extruders, test benches, vibrators, travelling drives, presses, machine tools, dosing systems.

▶ [TA "Actuating drive speed"](#) (📖 377)



Technology application "Table positioning"

This technology application serves to solve position-controlled drive tasks which are normally controlled by a higher-level control via a fieldbus, e.g. transport facilities, rotary tables, storage and retrieval units, feed drives, metering units, hoists.

Note: An external sequence control is required for this TA!

▶ [TA "Table positioning"](#) (📖 404)



"Switch-off positioning" technology application

This technology application is used to solve speed-controlled drive tasks which require a pre-switch off or stopping at certain positions, e.g. roller conveyors and conveying belts. The pre-switch off is implemented by connecting switch-off sensors.

▶ [TA "Switch-off positioning"](#) (📖 433)



Note!

Please note that the "Stateline" and "HighLine" device types differ with regard to the number, functional range, and flexibility of the technology applications offered.

Related topics:

- ▶ [Integrated technology applications](#) (📖 29)
- ▶ [Commissioning of the "Actuating drive speed" technology application](#) (📖 57)
- ▶ [Commissioning of the "Table positioning" technology application](#) (📖 65)
- ▶ [Commissioning of the "Switch-off positioning" technology application](#) (📖 80)

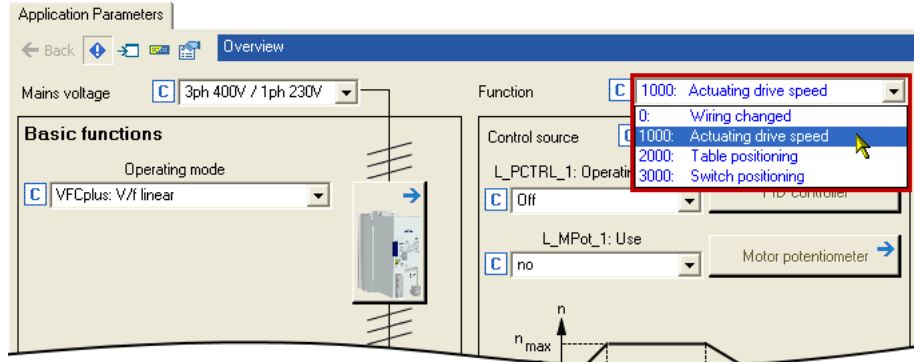
7 Technology applications

7.1 Selection of the technology application and the control mode

7.1 Selection of the technology application and the control mode

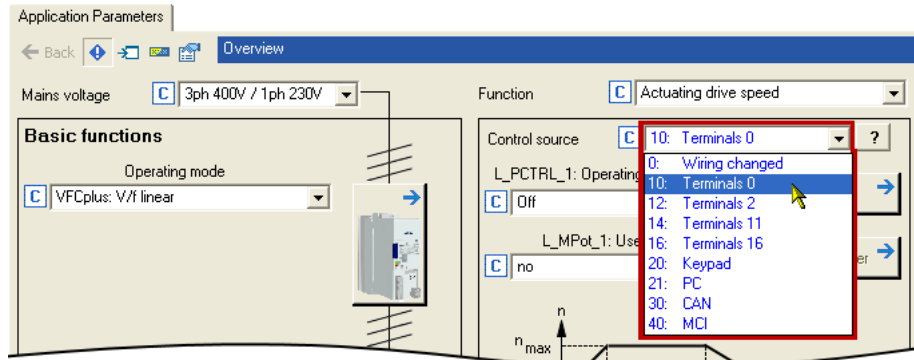
The technology application to be used is selected in [C00005](#).

- You can select the technology application in the »Engineer« on the **Application parameter** tab via the **Application** list field:



Different control modes can be selected for every application in [C00007](#). By selecting the control mode you set the way by which the technology application should be controlled, e.g. via terminals or via a fieldbus. The interconnection of the input/output terminals and ports shown in the FB editor in the I/O level changes accordingly.

- You can select the control mode in the »Engineer« on the **Application parameter** tab via the **Control mode** list field:



Tip!

You can infer the pre-configured assignment of the input/output terminals and ports for each control mode from the description of the corresponding technology application:

TA "Actuating drive speed": [Terminal assignment of the control modes](#) (📖 388)

TA "Table positioning": [Terminal assignment of the control modes](#) (📖 418)

TA "Switch-off positioning": [Terminal assignment of the control modes](#) (📖 444)

Detailed information on the individual configuration of the input/output terminals can be found in the description of the I/O terminals in the subchapter "[User-defined terminal assignment](#)". (📖 368)

7.2 TA "Actuating drive speed"

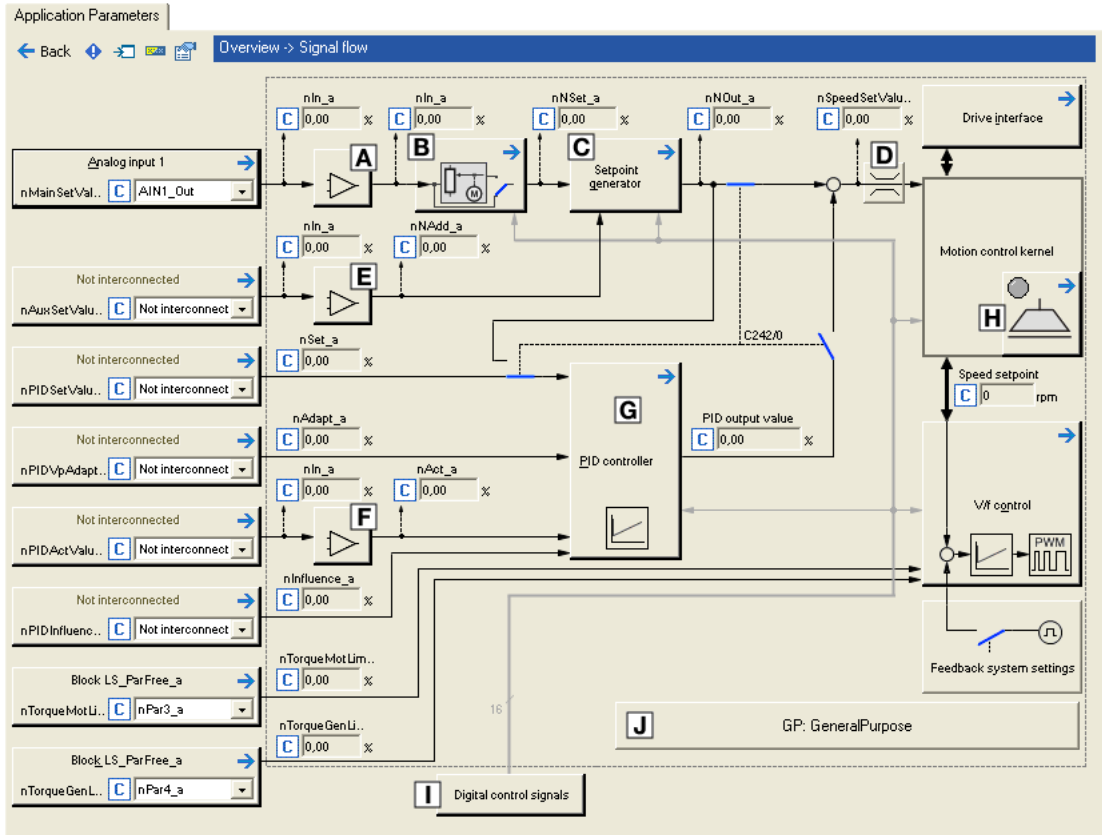
Product features

- Pre-configured control modes for terminals and bus control (with predefined process data connection to the fieldbus)
- Free configuration of input and output signals
- Offset, gain, and negation of main setpoint, additional setpoint, actual process controller value
- Up to 15 fixed setpoints for speed and ramp time
- Adjustable setpoint ramp times
- Freely selectable, variable ramp shape
- Automatic holding brake control
- Quick stop (QSP) with adjustable ramp time
- Motor potentiometer function
- Process controller
- Load monitoring (*in preparation*)
- Integrated, freely available "GeneralPurpose" functions:
Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop
- Interface to the safety module (optional)
- Integration of encoder feedback

Related topics:

- ▶ [Commissioning of the "Actuating drive speed" technology application](#) (📖 57)

7.2.1 Basic signal flow



[7-1] Signal flow of the technology application "Actuating drive speed"

- Ⓐ Main speed setpoint offset and gain ([L_OffsetGainP_1](#))
- Ⓑ Motor potentiometer function ([L_MPot_1](#))
- Ⓒ Setpoint generator ([L_NSet_1](#))
- Ⓓ Speed setpoint input limitation
- Ⓔ Additional speed setpoint offset and gain ([L_OffsetGainP_2](#))
- Ⓕ Actual speed/sensor value offset and gain ([L_OffsetGainP_3](#))
- Ⓖ Process controller ([L_PCTRL_1](#))
- Ⓗ [Holding brake control](#)
- Ⓘ Terminal assignment & display of digital control signals
- Ⓝ Integrated disposable "[GeneralPurpose](#)" functions: Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop

Selection of the main speed setpoint

The main speed setpoint is selected in the Lenze setting via the analog input 1.

- Offset and gain of this input signal can be set in [C00696](#) and [C00670](#) for a simple signal adjustment of a setpoint encoder.
- Scaling: $16384 \equiv 100\%$ reference speed ([C00011](#))
- The main setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps.
- Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective.
- For a detailed functional description see the [L_NSet](#) FB.

Motor potentiometer function

Alternatively, the main speed setpoint can be generated via a motor potentiometer function.

- In the Lenze setting, the motor potentiometer function is deactivated.
- Activation is possible via [C00806](#) or via the *bMPotEnable* input.
- The behaviour of the motor potentiometer during switch-on of the drive system can be selected in [C00805](#).
- For a detailed functional description see the [L_MPot](#) FB.

Optional selection of an additional speed setpoint

You can optionally select an additional speed setpoint (e.g. as a correcting signal).

- The additional speed setpoint can be linked arithmetically with the main speed setpoint behind the ramp function generator.
- You must set the setpoint arithmetic to "1: NOut = NSet + NAdd" in [C00190](#) in order to activate the additional speed setpoint.
- Offset and gain of this input signal can be set in [C00697](#) and [C00671](#) for a simple signal adjustment of a setpoint encoder.
- Scaling: $16384 \equiv 100\%$ reference speed ([C00011](#))
- The acceleration and deceleration time for the additional speed setpoint can be set in [C00220](#) and [C00221](#).
- For a detailed functional description see the [L_NSet](#) FB.



Tip!

In the case of a grinding machine, the additional speed setpoint can, for instance, be used to control a constant circumferential speed while the grinding disk diameter is reduced.

7.2.2 Internal interfaces | application block "LA_NCtrl"




**Note!**

The connectors greyed out in the following table are hidden in the function block editor in the Lenze setting.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

Inputs

Designator	Data type	Information/possible settings		
wCANDriveControl	WORD	Control word via system bus (CAN) for device control <ul style="list-style-type: none"> • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits. 		
wMCIDriveControl	WORD	Control word via communication module (e.g. PROFIBUS) for device control <ul style="list-style-type: none"> • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits. 		
wSMControl	WORD	Interface to the optional safety system. <ul style="list-style-type: none"> • Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). • See the subchapter "Interface to safety system" of the chapter on basic drive functions for a detailed description of the individual control bits. 		
bCInh	BOOL	Enable/inhibit inverter		
		<table border="1"> <tr> <td>FALSE</td> <td>Enable inverter: The inverter switches to the "OperationEnabled" device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. </td> </tr> <tr> <td>TRUE</td> <td>Inhibit inverter (controller inhibit): The inverter switches to the "SwitchedOn" device status.</td> </tr> </table>	FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit.
FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. 			
TRUE	Inhibit inverter (controller inhibit): The inverter switches to the " SwitchedOn " device status.			
bFailReset	BOOL	Reset error message In the Lenze setting this input is connected to the digital input controller enable so that a possibly existing error message is reset together with the controller enable (if the cause for the fault is eliminated).		
		<table border="1"> <tr> <td>TRUE</td> <td>The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged. </td> </tr> </table>	TRUE	The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged.
TRUE	The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged. 			
bSetQuickstop	BOOL	Activate quick stop (QSP) <ul style="list-style-type: none"> • Also see device command "Activate/deactivate quick stop". 		
		<table border="1"> <tr> <td>TRUE</td> <td>Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019. </td> </tr> </table>	TRUE	Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019.
		TRUE	Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019. 	
<table border="1"> <tr> <td>FALSE</td> <td>Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. </td> </tr> </table>	FALSE	Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. 		
FALSE	Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. 			

Designator	Data type	Information/possible settings
bSetDCBrake	BOOL	Manual DC-injection braking (DCB) <ul style="list-style-type: none"> Detailed information on DC-injection braking is provided in the motor control chapter, subchapter "DC-injection braking".
		 Note! Holding braking is not possible when this braking mode is used! Use the basic " Holding brake control " function for controlling the holding brake with a low rate of wear.
		FALSE Deactivate DC-injection braking.
		TRUE Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. <ul style="list-style-type: none"> The braking effect stops when the rotor is at standstill. After the hold time (C00107) has expired, the controller sets the pulse inhibit.
bRFG_Stop	BOOL	Ramp function generator: Maintain the current value of the main setpoint integrator <ul style="list-style-type: none"> The speed, for instance, of a running ramp process is immediately kept constant when <i>bRFG_Stop</i> is activated. At the same time, the acceleration/deceleration jumps to the value "0". For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is held.
bRFG_0	BOOL	Ramp function generator: Lead the main setpoint integrator to "0" within the current <i>Ti</i> times <ul style="list-style-type: none"> For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is led to "0" within the <i>Ti</i> time set.
nVoltageAdd_a	INT	Additive voltage impression <ul style="list-style-type: none"> An additional setpoint for the motor voltage can be specified via this process input. If there are, for instance, different loads at the motor output end, it is possible to apply a voltage boost at the starting time. If the value is negative, the voltage is reduced. Scaling: 16384 \equiv 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nBoost_a	INT	Additional setpoint for the motor voltage at speed = 0 <ul style="list-style-type: none"> The entire voltage-frequency characteristic is provided with an offset. Scaling: 16384 \equiv 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nPWMAngleOffset	INT	Additional offset for the electrical angle of rotation <ul style="list-style-type: none"> If a torque is connected, e.g. dynamic acceleration processes can be generated. Scaling: $\pm 32767 \equiv \pm 180^\circ$ angle of rotation

Designator	Data type	Information/possible settings				
nTorqueMotLim_a nTorqueGenLim_a	INT	<p>Torque limitation in motor mode and in generator mode</p> <ul style="list-style-type: none"> • These input signals are directly transferred to the motor control to limit the inverter's maximum torque in motor and generator mode. • The drive cannot output a higher torque in motor/generator mode than set here. • The applied values (any polarity) are internally interpreted as absolute values. • If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called I_{max} controller. • If sensorless vector control (SLVC) or servo control (SC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. • Scaling: $16384 \equiv 100 \% M_{max}$ (C00057) <p>Torque limits in motor and generator mode:</p>				
bSetSpeedCcw	BOOL	<p>Change of direction of rotation</p> <ul style="list-style-type: none"> • For instance if a motor or gearbox is fixed laterally reversed to a machine part, but the setpoint selection should still be executed for the positive direction of rotation. <table border="1"> <tr> <td>FALSE</td> <td>Clockwise rotation (Cw)</td> </tr> <tr> <td>TRUE</td> <td>Direction of rotation to the left (Ccw)</td> </tr> </table>	FALSE	Clockwise rotation (Cw)	TRUE	Direction of rotation to the left (Ccw)
FALSE	Clockwise rotation (Cw)					
TRUE	Direction of rotation to the left (Ccw)					
bRLQCw	BOOL	<p>Activate clockwise rotation (fail-safe)</p> <ul style="list-style-type: none"> • For a detailed functional description see the L_RLO FB. <table border="1"> <tr> <td>FALSE</td> <td>Quick stop</td> </tr> <tr> <td>TRUE</td> <td>CW rotation</td> </tr> </table>	FALSE	Quick stop	TRUE	CW rotation
FALSE	Quick stop					
TRUE	CW rotation					
bRLQCcw	BOOL	<p>Activate counter-clockwise rotation (fail-safe)</p> <ul style="list-style-type: none"> • For a detailed functional description see the L_RLO FB. <table border="1"> <tr> <td>FALSE</td> <td>Quick stop</td> </tr> <tr> <td>TRUE</td> <td>Counter-clockwise rotation</td> </tr> </table>	FALSE	Quick stop	TRUE	Counter-clockwise rotation
FALSE	Quick stop					
TRUE	Counter-clockwise rotation					
nMainSetValue_a	INT	<p>Main speed setpoint</p> <ul style="list-style-type: none"> • Offset and gain of this input signal can be set in C00696 and C00670 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100 \% \text{ reference speed}$ (C00011) • The main setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps. • Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective. • For a detailed functional description see the L_NSet FB. 				

Designator	Data type	Information/possible settings
nAuxSetValue_a	INT	<p>Additional speed setpoint</p> <ul style="list-style-type: none"> The additional speed setpoint can be linked arithmetically with the main speed setpoint behind the ramp function generator. You must set the setpoint arithmetic to "1: NOut = NSet + NAdd" in C00190 in order to activate the additional speed setpoint. Offset and gain of this input signal can be set in C00697 and C00671 for a simple signal adjustment of a setpoint encoder. Scaling: 16384 ≙ 100 % reference speed (C00011) The acceleration and deceleration time for the additional speed setpoint can be set in C00220 and C00221. For a detailed functional description see the L_NSet FB.
bJogSpeed1 bJogSpeed2	BOOL	<p>Inputs for overriding fixed setpoints (JOG setpoints) for the main setpoint</p> <ul style="list-style-type: none"> A fixed setpoint for the setpoint generator can be activated instead of the main setpoint via these selection inputs. The four selection inputs are binary coded, therefore 15 fixed setpoints can be selected. In the case of binary coded selection "0" (all inputs = FALSE or not assigned), main setpoint <i>nMainSetValue_a</i> is active. The selection of the fixed setpoints is carried out in C00039/1...15 in [%] based on the reference speed (C00011). For a detailed functional description see the L_NSet FB.
bJogSpeed4 bJogSpeed8	BOOL	
bJogRamp1 bJogRamp2	BOOL	<p>Selection inputs for alternative acceleration/deceleration times for the main setpoint</p> <ul style="list-style-type: none"> The four selection inputs are binary coded, therefore 15 alternative acceleration/deceleration times can be selected. For main setpoint <i>nMainSetValue_a</i>, the set acceleration time (C00012) and deceleration time (C00013) are active in the case of the binary coded selection "0" (all inputs = FALSE or not assigned). Alternative acceleration times are selected in C00101/1...15. The selection of the alternative deceleration times is carried out in C00103/1...15. For a detailed functional description see the L_NSet FB.
bJogRamp4 bJogRamp8	BOOL	
<p>Motor potentiometer</p> <p>Alternatively to the input signal <i>nMainSetValue_a</i>, the main setpoint can also be generated by a motor potentiometer function.</p> <ul style="list-style-type: none"> In the Lenze setting, the motor potentiometer function is deactivated. Activation is possible via C00806 or via the <i>bMPotEnable</i> input. The behaviour of the motor potentiometer during switch-on of the drive system can be selected in C00805. For a detailed functional description see the L_MPot FB. 		
bMPotEnable	BOOL	<p>Activating the motor potentiometer function</p> <ul style="list-style-type: none"> This input and C00806 are OR'd.
		<p>TRUE</p> <p>The motor potentiometer function is active; the speed setpoint can be changed via the <i>bMPotUp</i> and <i>bMPotDown</i> control inputs.</p>
bMPotUp	BOOL	<p>Increasing the speed setpoint</p>
		<p>TRUE</p> <p>Approach the upper speed limit value set in C00800 with the acceleration time set in C00802.</p>
bMPotInAct	BOOL	<p>Activating the inactive function</p>
		<p>TRUE</p> <p>The speed setpoint behaves according to the inactive function set in C00804.</p> <ul style="list-style-type: none"> In the Lenze setting, the speed setpoint is maintained.
bMPotDown	BOOL	<p>Decreasing the speed setpoint</p>
		<p>TRUE</p> <p>Approach the lower speed limit value set in C00801 with the deceleration time set in C00803.</p>

Designator	Data type	Information/possible settings		
Process controller				
<ul style="list-style-type: none"> In the Lenze setting, the process controller is deactivated. The activation is executed by selecting the operating mode in C00242. For a detailed functional description see FB L_PCTRL. 				
bPIDEnableInfluenceRamp	BOOL	Activate ramp for influencing factor		
		<table border="1"> <tr> <td>FALSE</td> <td>Influencing factor of the PID controller is ramped down to "0".</td> </tr> <tr> <td>TRUE</td> <td>Influencing factor of the PID controller is ramped up to the value <i>nPIDInfluence_a</i>.</td> </tr> </table>	FALSE	Influencing factor of the PID controller is ramped down to "0".
FALSE	Influencing factor of the PID controller is ramped down to "0".			
TRUE	Influencing factor of the PID controller is ramped up to the value <i>nPIDInfluence_a</i> .			
bPIDIOff	BOOL	Switch off the I-component of the process controller <ul style="list-style-type: none"> In conjunction with the operating mode set in C00242 (Lenze setting: "Off"). 		
		TRUE I-component of the process controller is switched off.		
nPIDVpAdapt_a	INT	Adaptation of gain Vp set in C00222 in percent <ul style="list-style-type: none"> Scaling: 16384 \equiv 100 % Internal limitation to \pm 199.99 % Changes can be done online. 		
nPIDSetValue_a	INT	Sensor and process setpoint for operating modes 2, 4 and 5 <ul style="list-style-type: none"> Scaling: 16384 \equiv 100 % Internal limitation to \pm 199.99 % 		
nPIDActValue_a	INT	Speed or actual sensor value (actual process value) <ul style="list-style-type: none"> Offset and gain for this input signal can be set in C00698 and C00672. Scaling: 16384 \equiv 100 % Internal limitation to \pm 199.99 % 		
nPIDInfluence_a	INT	Limitation of the influencing factor in percent <ul style="list-style-type: none"> The influence factor of the PID controller can be limited to a certain value (-199.99% ... + 199.99%) via <i>nPIDInfluence_a</i>. Scaling: 16384 \equiv 100 % Internal limitation to \pm 199.99 % 		
MCK basic functions				
bMBrakeRelease	BOOL	Holding brake control : Release/apply brake <ul style="list-style-type: none"> In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off"). 		
		FALSE Apply brake. <ul style="list-style-type: none"> During automatic operation, the internal brake logic controls the brake. 		
		TRUE Release brake manually (forced release). <ul style="list-style-type: none"> Note! The brake can also be released when the controller is inhibited! During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. In semi-automatic operation, the brake is released including feedforward control. 		

Designator	Data type	Information/possible settings				
GP: GeneralPurpose The following inputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions						
bGPFree1 ... bGPFree2 <small>(from version 12.00.00)</small>	BOOL	Free inputs for digital signals <ul style="list-style-type: none"> Digital signals can be transferred from the I/O level to the application level via these inputs. 				
nGPAnalogSwitchIn1_a nGPAnalogSwitchIn2_a	INT	Analog switch : Input signals <ul style="list-style-type: none"> The input signal selected via the selection input <i>bGPAnalogSwitchSet</i> is output at output <i>nGPAnalogSwitchOut_a</i>. 				
bGPAnalogSwitchSet	BOOL	Analog switch : Selection input <table border="1" data-bbox="758 645 1444 721"> <tr> <td>FALSE</td> <td><i>nGPAnalogSwitchOut_a = nGPAnalogSwitchIn1_a</i></td> </tr> <tr> <td>TRUE</td> <td><i>nGPAnalogSwitchOut_a = nGPAnalogSwitchIn2_a</i></td> </tr> </table>	FALSE	<i>nGPAnalogSwitchOut_a = nGPAnalogSwitchIn1_a</i>	TRUE	<i>nGPAnalogSwitchOut_a = nGPAnalogSwitchIn2_a</i>
FALSE	<i>nGPAnalogSwitchOut_a = nGPAnalogSwitchIn1_a</i>					
TRUE	<i>nGPAnalogSwitchOut_a = nGPAnalogSwitchIn2_a</i>					
nGPArithmetikIn1_a nGPArithmetikIn2_a	INT	Arithmetic : Input signals <ul style="list-style-type: none"> The arithmetic function is selected in C00338. The result is output at output <i>nGPArithmetikOut_a</i>. 				
nGPMulDivIn_a	INT	Multiplication/Division : Input signal <ul style="list-style-type: none"> The factor for the multiplication can be set in C00699/1 (numerator) and C00699/2 (denominator). The result is output at output <i>nGPMulDivOut_a</i>. 				
bGPDigitalDelayIn	BOOL	Binary delay element : Input signal <ul style="list-style-type: none"> The on-delay can be set in C00720/1. The off-delay can be set in C00720/2. The time-delayed input signal is output at output <i>bGPDigitalDelayOut</i>. 				
bGPLogicIn1 bGPLogicIn2 bGPLogicIn3	BOOL	Binary logic : Input signals <ul style="list-style-type: none"> The logic operation is selected in C00820. The result is output at output <i>bGPLogicOut</i>. 				
nGPCompareIn1_a nGPCompareIn2_a	INT	Analog comparison : Input signals <ul style="list-style-type: none"> The comparison operation is selected in C00680. Hysteresis and window size can be set in C00680 and C00682. If the comparison statement is true, the output <i>bGPCompareOut</i> will be set to TRUE. 				
bGPDFlipFlop_InD bGPDFlipFlop_InClk bGPDFlipFlop_InClr	BOOL	D-FlipFlop : Input signals <ul style="list-style-type: none"> Data, clock and reset input 				
Free inputs The following inputs can freely be interconnected on the application level. The signals can be transferred from the I/O level to the application level via these inputs.						
bFreeIn1 ... bFreeIn8	BOOL	Free inputs for digital signals				
wFreeIn1 ... wFreeIn4	WORD	Free inputs for 16-bit signals				

Outputs

Designator	Data type	Value/meaning	
wDriveControlStatus	WORD	Status word of the inverter <ul style="list-style-type: none"> The status word contains information on the currents status of the inverter. See the "wDeviceStatusWord status word" subchapter of the chapter on device control for a detailed description of the bit assignment. 	
wStateDetermFailNoLow	WORD	Display of the status determining error (LOW word)	
wStateDetermFailNoHigh	WORD	Display of the status determining error (HIGH word)	
bDriveFail	BOOL	TRUE	Inverter in error status. <ul style="list-style-type: none"> "Fault" device status is active.
bDriveReady	BOOL	TRUE	Inverter is ready for operation <ul style="list-style-type: none"> "SwitchedOn" device status is active. The drive is in this device status if the DC bus voltage is applied and the inverter is still inhibited by the user (controller inhibit).
bCInhActive	BOOL	TRUE	Controller inhibit is active.
bQSPisActive	BOOL	TRUE	Quick stop is active.
bSpeedCcw	BOOL	Current direction of rotation	
		FALSE	Clockwise rotation (Cw)
		TRUE	Direction of rotation to the left (Ccw)
bSpeedActCompare	BOOL	Result of the speed comparison (detection of speed=0)	
		TRUE	During open-loop operation: Speed setpoint < Comparison value (C00024)
			During closed-loop operation: Actual speed value < Comparison value (C00024)
bOverLoadActive	BOOL	In preparation (output is not interconnected on the application level)	
bUnderLoadActive	BOOL	In preparation (output is not interconnected on the application level)	
blmaxActive	BOOL	"Current setpoint inside the limitation" status signal	
		TRUE	The current setpoint is internally limited (the inverter operates at the maximum current limit).
bSpeedSetReached	BOOL	Status signal "setpoint = 0"	
		TRUE	Speed setpoint from the ramp function generator = 0
bSpeedActEqSet	BOOL	TRUE	Actual speed value = speed setpoint
nMotorCurrent_a	INT	Current stator current/effective motor current <ul style="list-style-type: none"> Scaling: $16384 \equiv 100\% I_{\max_mot}$ (C00022) 	
nMotorSpeedSet_a	INT	Speed setpoint <ul style="list-style-type: none"> Scaling: $16384 \equiv 100\%$ reference speed (C00011) 	
nMotorSpeedAct_a	INT	Actual speed value <ul style="list-style-type: none"> Scaling: $16384 \equiv 100\%$ reference speed (C00011) 	
nMotorTorqueAct_a	INT	Actual torque <ul style="list-style-type: none"> In the "VFC (+encoder)" operating mode of the motor control, this value is determined from the current motor current and corresponds to the actual torque only by approximation. Scaling: $16384 \equiv 100\% M_{\max}$ (C00057) 	
nDCVoltage_a	INT	Actual DC-bus voltage <ul style="list-style-type: none"> Scaling: $16384 \equiv 1000\text{ V}$ 	

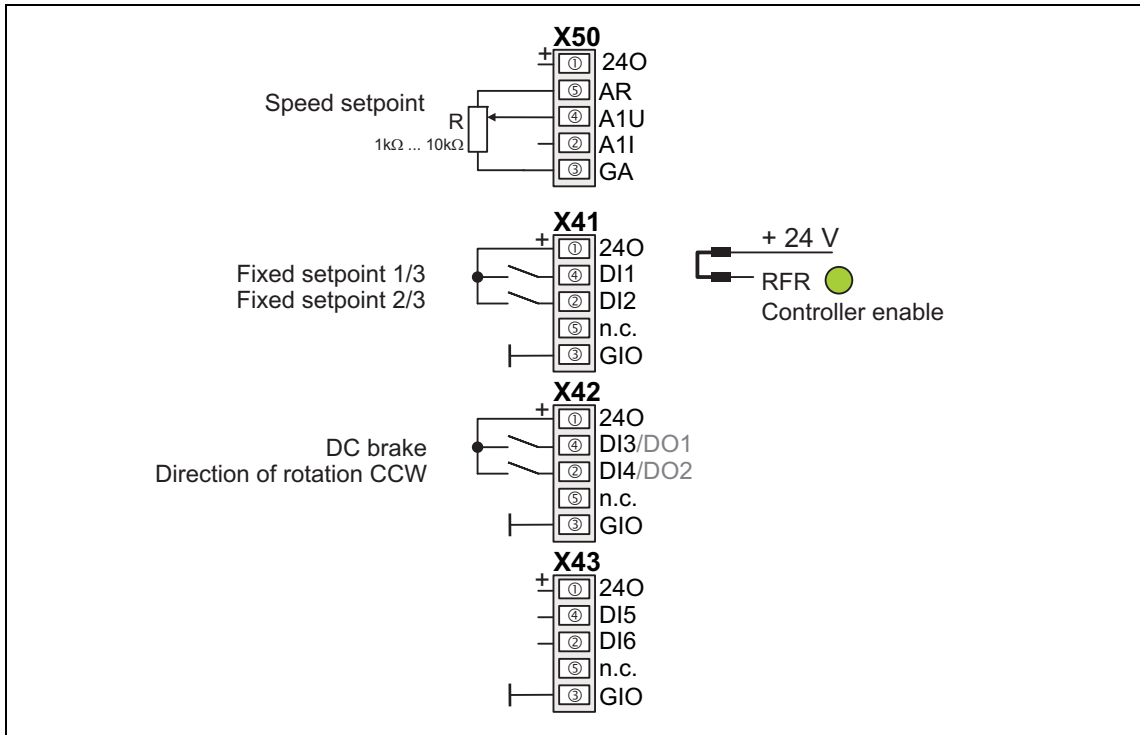
Designator	Data type	Value/meaning
nMotorVoltage_a	INT	Current motor voltage/inverter output voltage • Scaling: 16384 \equiv 1000 V
MCK basic functions		
bMBrakeReleaseOut	BOOL	Holding brake control : Trigger signal for the holding brake control switching element via a digital output • Use bit 0 in C02582 to activate inverted switching element triggering.
		FALSE Apply brake.
		TRUE Release brake.
bMBrakeReleased	BOOL	Holding brake control : "Brake released" considering the brake release time • When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed!
		TRUE Brake released (after the brake release time has expired).
GP: GeneralPurpose The following outputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions		
nGPAAnalogSwitchInOut_a	INT	Analog switch : Output signal
nGPArithmetikOut_a	INT	Arithmetic : Output signal
nGPMulDivOut_a	INT	Multiplication/Division : Output signal
bGPDigitalDelayOut	BOOL	Binary delay element : Output signal
bGPLogicOut	BOOL	Binary logic : Output signal
bGPCompareOut	BOOL	Analog comparison : Output signal
bGPSignalOut1 ... bGPSignalOut4	BOOL	Binary signal monitor : Output signals • The signal sources to be output are selected in C00411/1...4 . • A bit coded inversion of the output signals can be parameterised in C00412 .
nGPSignalOut1_a ... nGPSignalOut4_a	BOOL	Analog signal monitor : Output signals • The signal sources to be output are selected in C00410/1...4 . • Gain and offset for each output signal can be parameterised in C00413/1...8 .
bGPDFlipFlop_Out	BOOL	D-FlipFlop : Output signal
bGPDFlipFlop_NegOut	BOOL	D-FlipFlop : Negated output signal
Free outputs The following outputs can freely be interconnected on the application level. The signals from the application level can be transferred to the I/O level via these outputs.		
bFreeOut1 ... bFreeOut8	BOOL	Free outputs for digital signals
wFreeOut1 ... wFreeOut4	WORD	Free outputs for 16-bit signals

7.2.3 Terminal assignment of the control modes

The following comparison provides information about which inputs/outputs of the application block **LA_NCtrl** are interconnected to the digital and analog input/output terminals of the inverter in the different control modes.

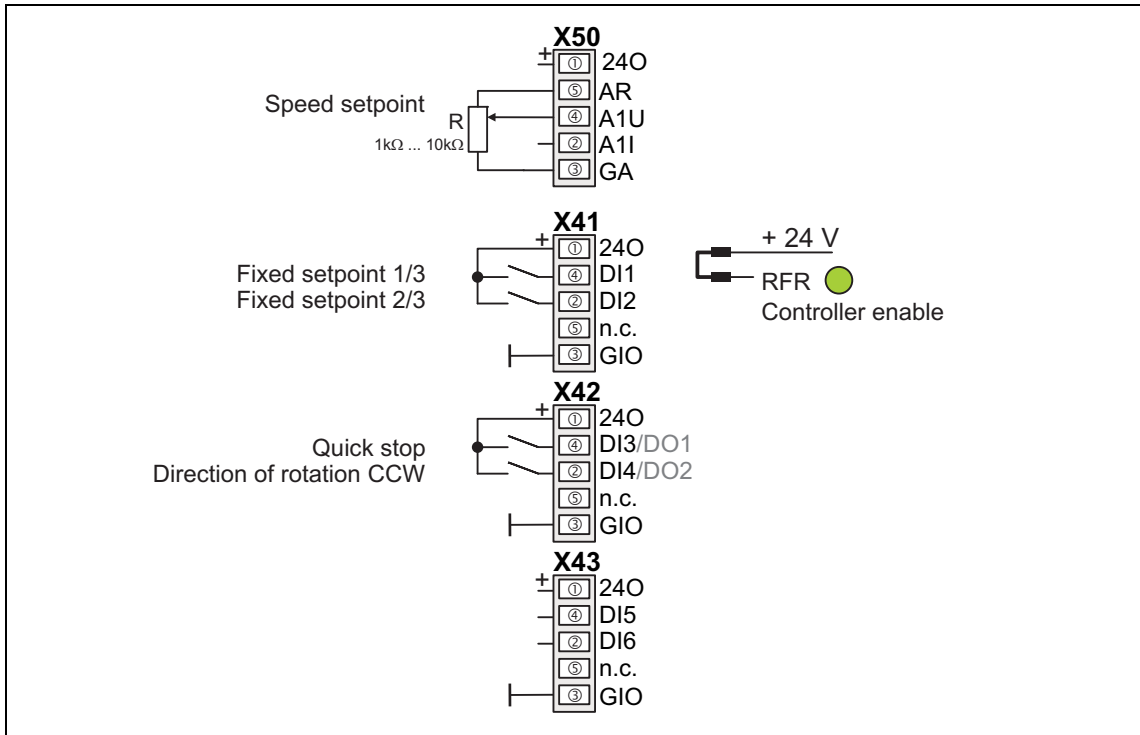
	Control mode (C00007)							
	10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminal 16	20: Keypad	21: PC	30: CAN	40: MCI
Digital input terminals								
RFR	Controller enable / Reset of error message bFailReset (In case of 8400 protec, the RFR terminal is internally set to HIGH level via wire jumper.)							
X41/DI1	Fixed setpoint 1/3 bJogSpeed1		Change of direction of rotation bSetSpeedCcw	Fixed setpoint 1/3 bJogSpeed1	-	-	Quick stop bSetQuickstop	
X41/DI2	Fixed setpoint 2/3 bJogSpeed2		Activate manual DC-injection braking (DCB) bSetDCBrake	Fixed setpoint 2/3 bJogSpeed2	-	-	-	-
X42/DI3	Activate manual DC-injection braking (DCB) bSetDCBrake	Quick stop bSetQuickstop	Motor potentiometer: Increase speed bMPotUp	CW rotation quick stop bRLQCw	-	-	-	-
X42/DI4	Change of direction of rotation bSetSpeedCcw		Motor potentiometer: Decrease speed bMPotDown	CCW rotation quick stop bRLQCcw	-	-	-	-
X43/DI5	-	-	-	-	-	-	-	-
X43/DI6	-	-	-	-	-	-	-	-
Analog input terminals								
X50/A1U	Main speed setpoint nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)				-	-	Additional speed setpoint nAuxSetValue_a 10 V ≙ 100 % reference speed (C00011)	
X50/A1I	-	-	-	-	-	-	-	-
Digital output terminals								
DO1/DO2 is only available after respective change of the function assignment in C00116 .								
X42/DO1	Status "Drive is ready" bDriveReady							
X42/DO2	-							

7.2.3.1 Terminals 0



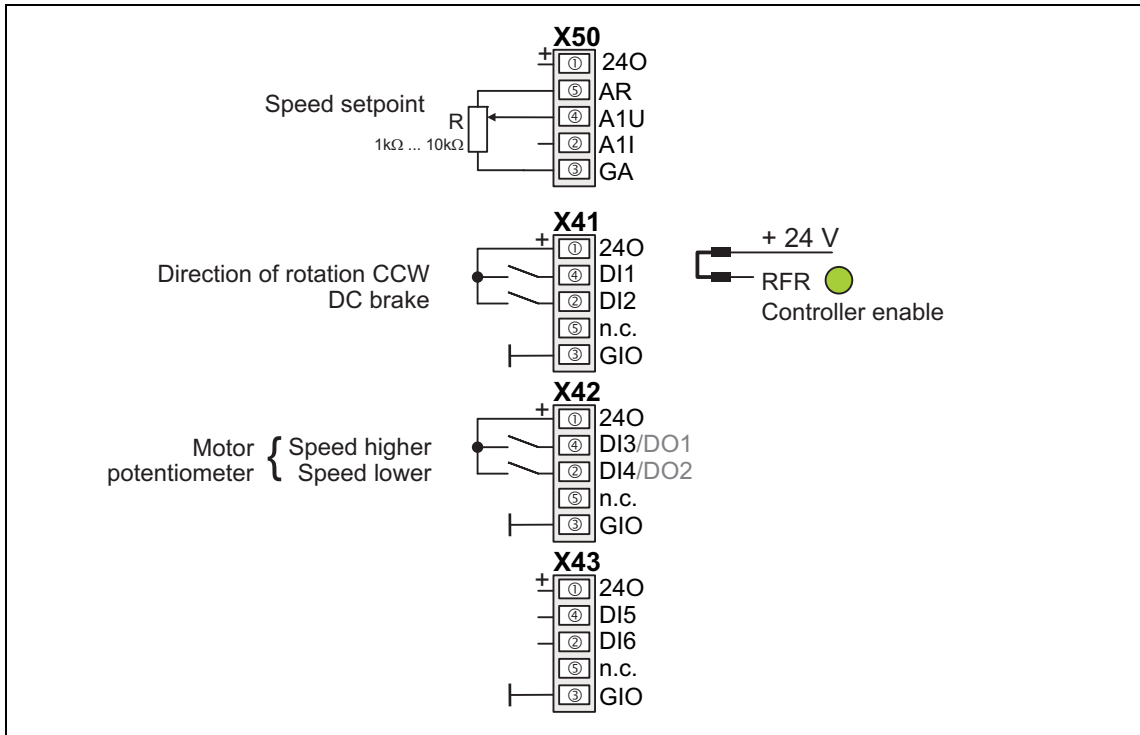
Connection	Assignment	Connection	Assignment
X41/DI1	LA_NCtrl.bJogSpeed1	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_NCtrl.bJogSpeed2		
X42/DI3	LA_NCtrl.bSetDCBrake	X42/DO1	-
X42/DI4	LA_NCtrl.bSetSpeedCcw	X42/DO2	LA_NCtrl.bDriveReady
X43/DI5	-	X50/A1U	LA_NCtrl.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	-		

7.2.3.2 Terminals 2



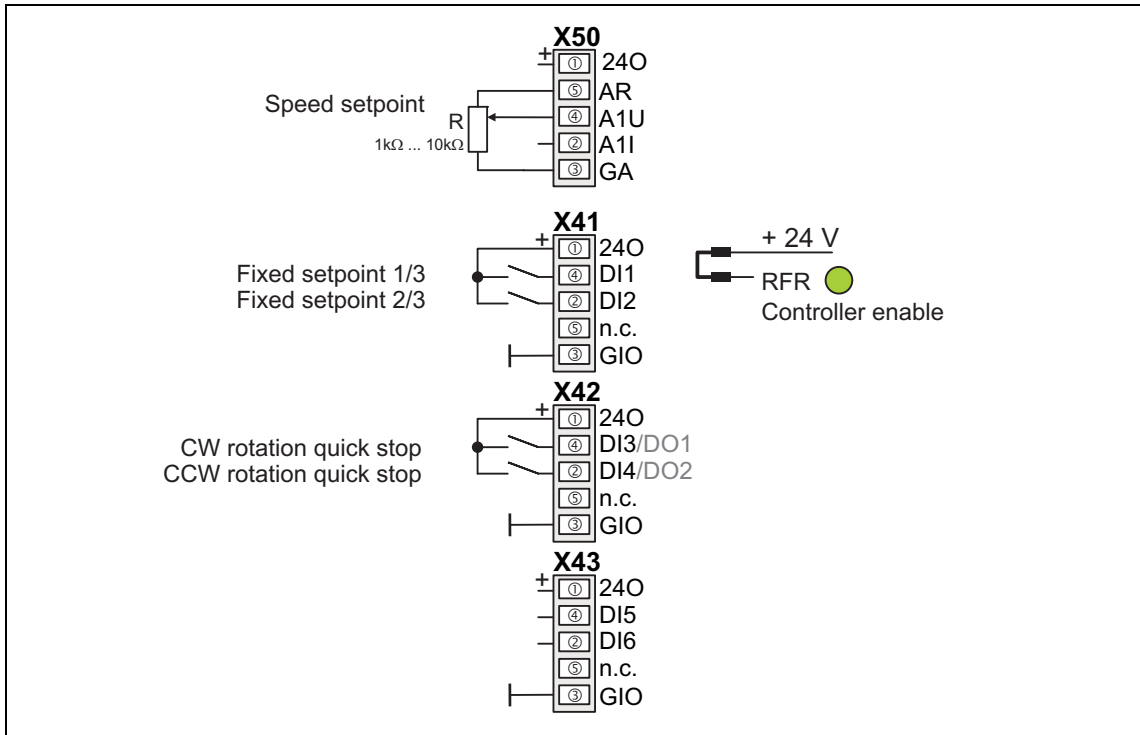
Connection	Assignment	Connection	Assignment
X41/DI1	LA_NCtrl.bJogSpeed1	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_NCtrl.bJogSpeed2		
X42/DI3	LA_NCtrl.bSetQuickstop	X42/DO1	-
X42/DI4	LA_NCtrl.bSetSpeedCcw	X42/DO2	LA_NCtrl.bDriveReady
X43/DI5	-	X50/A1U	LA_NCtrl.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	-		

7.2.3.3 Terminals 11



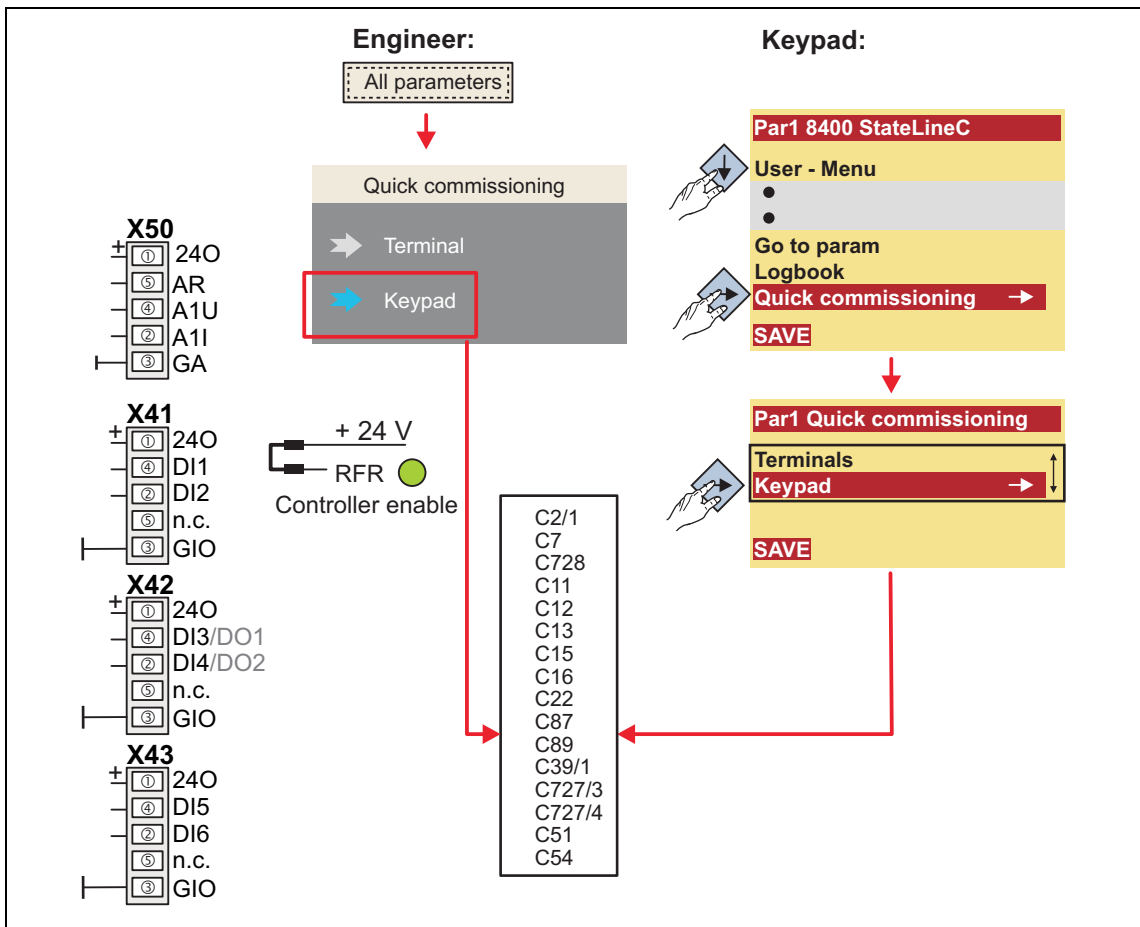
Connection	Assignment	Connection	Assignment
X41/DI1	LA_NCtrl.bSetSpeedCcw	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_NCtrl.bSetDCBrake	X42/DO1	-
X42/DI3	LA_NCtrl.bMPotUp	X42/DO2	LA_NCtrl.bDriveReady
X42/DI4	LA_NCtrl.bMPotDown	X50/A1U	LA_NCtrl.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI5	-		
X43/DI6	-		

7.2.3.4 Terminal 16



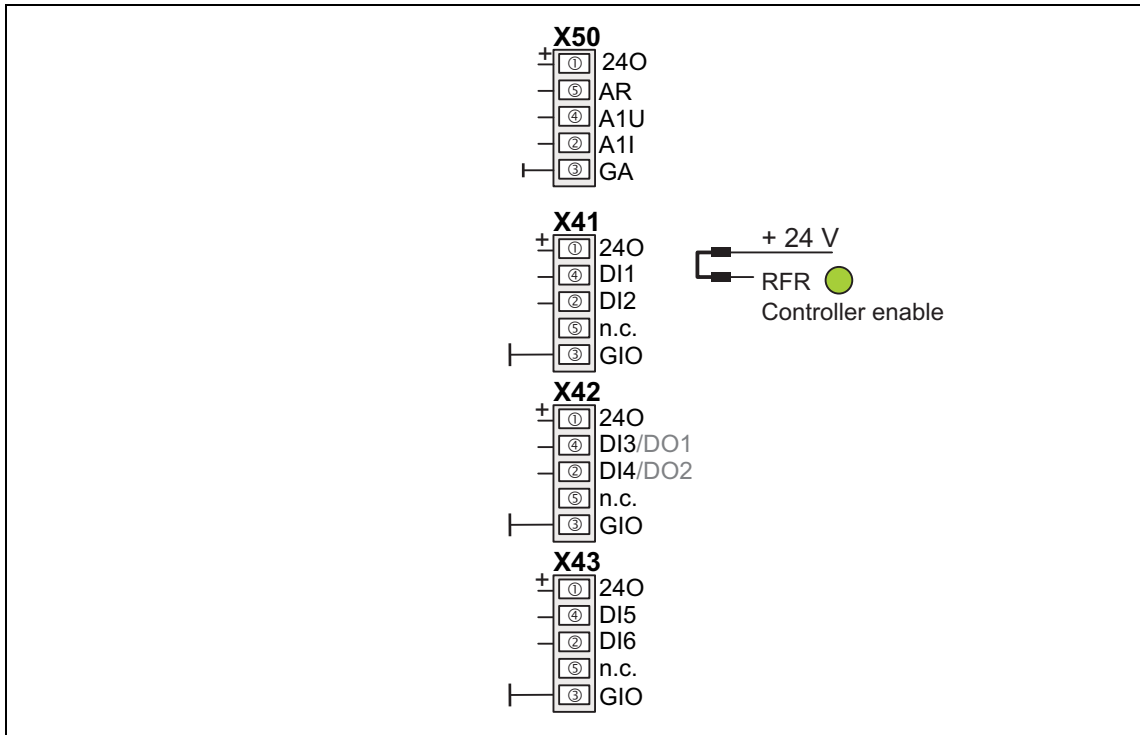
Connection	Assignment	Connection	Assignment
X41/DI1	LA_NCtrl.bJogSpeed1	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_NCtrl.bJogSpeed2		
X42/DI3	LA_NCtrl.bRLQCw	X42/DO1	-
X42/DI4	LA_NCtrl.bRLQCcw	X42/DO2	LA_NCtrl.bDriveReady
X43/DI5	-	X50/A1U	LA_NCtrl.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	-		

7.2.3.5 Keypad



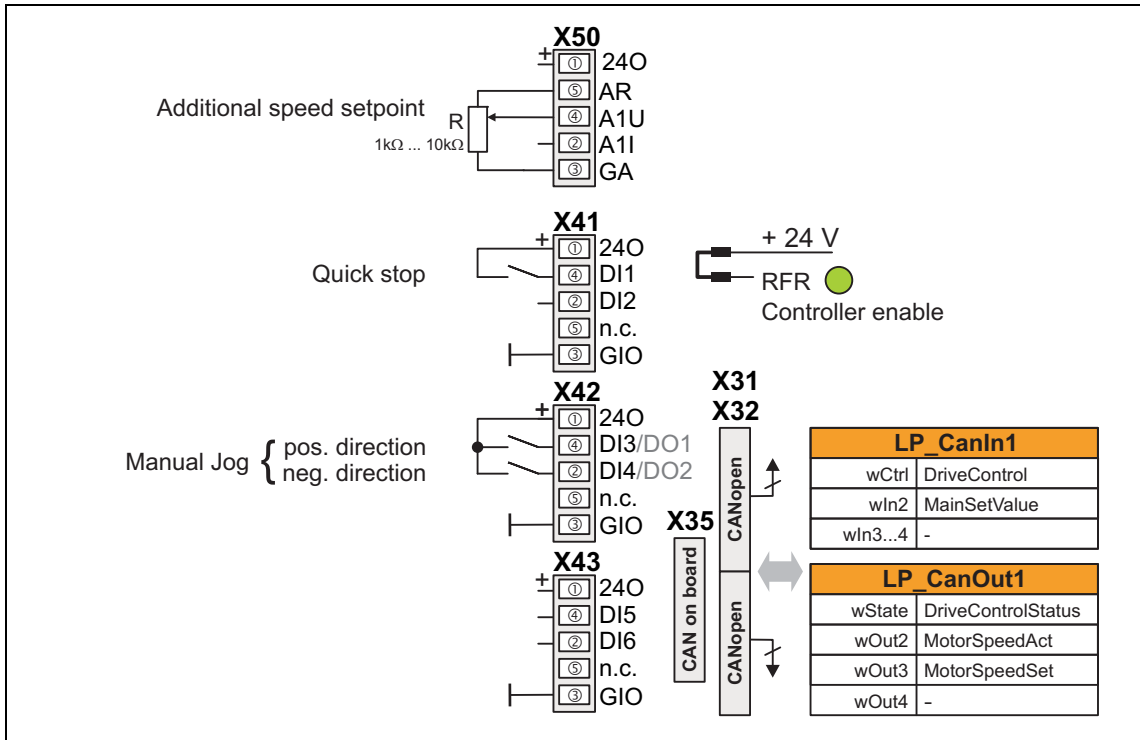
Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-	X42/DO1	-
X42/DI3	-	X42/DO2	LA_NCtrl.bDriveReady
X42/DI4	-	X50/A1U	-
X43/DI5	-		
X43/DI6	-		

7.2.3.6 PC



Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	-	X42/DO1	-
X42/DI4	-	X42/DO2	LA_NCtrl.bDriveReady
X43/DI5	-	X50/A1U	-
X43/DI6	-		

7.2.3.7 CAN



Connection	Assignment	Connection	Assignment
X41/DI1	LA_NCtrl.bSetQuickStop	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	LA_NCtrl.bMANJogPos (currently has no function)	X42/DO1	-
X42/DI4	LA_NCtrl.bMANJogNeg (currently has no function)	X42/DO2	LA_NCtrl.bDriveReady
X43/DI5	-	X50/A1U	LA_NCtrl.nAuxSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	-		

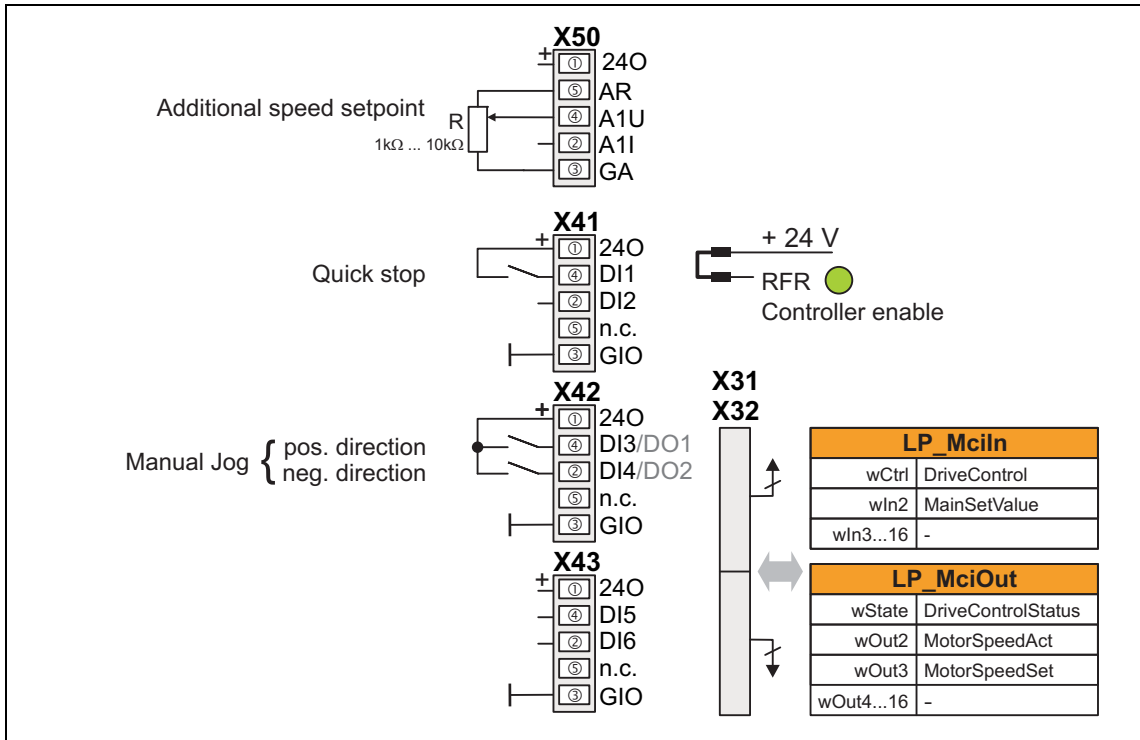
▶ [Process data assignment for fieldbus communication \(397\)](#)



Note!

- You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.
- The "manual jog" function via digital terminals is being prepared!

7.2.3.8 MCI



Connection	Assignment	Connection	Assignment
X41/DI1	LA_NCtrl.bSetQuickStop	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	LA_NCtrl.bMANJogPos (currently has no function)	X42/DO1	-
X42/DI4	LA_NCtrl.bMANJogNeg (currently has no function)	X42/DO2	LA_NCtrl.bDriveReady
X43/DI5	-	X50/A1U	LA_NCtrl.nAuxSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	-		

▶ [Process data assignment for fieldbus communication \(397\)](#)



Note!

- You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.
- The "manual jog" function via digital terminals is being prepared!

7.2.4 Process data assignment for fieldbus communication

The fieldbus communication is connected (preconfigured) to the previously selected technology application by selecting the corresponding control mode in [C00007](#):

- "30: [CAN](#)" for the connection to the system bus (CAN)
- "40: [MCI](#)" for the connection to a plugged-on communication module (e.g. PROFIBUS)

The assignment of the process data words depends only on the application, not on the bus system used:

Input words	Name	Assignment
Word 1	DriveControl	Control word • For bit assignment see the table below.
Word 2	MainSetValue	Speed setpoint • Scaling: 16384 ≙ 100 % reference speed (C00011)
Word 3	-	Not preconfigured
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Control word	Name	Function
Bit 0	SwitchOn	1 ≙ Change to the " SwitchedOn " device status • This bit must be set in the CAN/MCI control word to ensure that the device changes to the " SwitchedOn " device status after mains connection without the need for a master control specifying this bit via fieldbus. • If control via a bus system is not wanted (e.g. in the case of control via terminals), the <i>wDriveCtrl</i> output signal of the LS_ParFix system block can be connected to the control word inputs.
Bit 1	DisableVoltage	1 ≙ Inhibit inverter control (pulse inhibit)
Bit 2	SetQuickStop	1 ≙ Activate quick stop (QSP). ▶ Activate/deactivate quick stop (106)
Bit 3	EnableOperation	1 ≙ Enable inverter (RFR) • If control via terminals is performed, this bit must be set both in the CAN control word and in the MCI control word. Otherwise, the controller is inhibited. ▶ Enable/inhibit inverter (105)
Bit 4	ModeSpecific_1	Reserved (currently not assigned)
Bit 5	ModeSpecific_2	
Bit 6	ModeSpecific_3	
Bit 7	ResetFault	1 ≙ Reset fault (trip reset) • Acknowledge error message (if the error cause has been eliminated). ▶ Reset error (109)
Bit 8	SetHalt	1 ≙ Activate stop function • Stop drive via stopping ramp (in preparation).
Bit 9	reserved_1	Reserved (currently not assigned)
Bit 10	reserved_2	
Bit 11	SetDCBrake	1 ≙ Activate DC-injection braking ▶ Manual DC-injection braking (DCB) (269)
Bit 12	JogSpeed1	Activation of fixed speed 1 ... 3
Bit 13	JogSpeed2	

Control word	Name	Function
Bit 14	SetFail	1 ≙ Set error (trip set)
Bit 15	SetSpeedCcw	0 ≙ Direction of rotation to the right (Cw) 1 ≙ Direction of rotation to the left (Ccw)

Output words	Name	Assignment
Word 1	DriveControlStatus	Status word • For bit assignment see the table below.
Word 2	MotorSpeedAct	Actual speed value • Scaling: 16384 ≙ 100 % reference speed (C00011)
Word 3	MotorSpeedSet	Resulting overall setpoint • Scaling: 16384 ≙ 100 % reference speed (C00011)
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Status word	Name	Status
Bit 0	FreeStatusBit0	Free status bit 0 (not assigned, freely assignable)
Bit 1	PowerDisabled	1 ≙ Inverter control inhibited (pulse inhibit is active)
Bit 2	FreeStatusBit2	Free status bit 2 (not assigned, freely assignable)
Bit 3	FreeStatusBit3	Free status bit 3 (not assigned, freely assignable)
Bit 4	FreeStatusBit4	Free status bit 4 (not assigned, freely assignable)
Bit 5	FreeStatusBit5	Free status bit 5 (not assigned, freely assignable)
Bit 6	ActSpeedIsZero	During open-loop operation: 1 ≙ Speed setpoint < Comparison value (C00024) During closed-loop operation: 1 ≙ Actual speed value < Comparison value (C00024)
Bit 7	ControllerInhibit	1 ≙ Inverter is inhibited (controller inhibit is active)
Bit 8	StatusCodeBit0	Bit coded display of the active device status ▶ Device state machine and device states (see table [4-1])
Bit 9	StatusCodeBit1	
Bit 10	StatusCodeBit2	
Bit 11	StatusCodeBit3	
Bit 12	Warning	1 ≙ a warning is indicated
Bit 13	Trouble	1 ≙ Inverter is in the " Trouble " device status • E.g. if an overvoltage has occurred.
Bit 14	FreeStatusBit14	Free status bit 14 (not assigned, freely assignable)
Bit 15	FreeStatusBit15	Free status bit 15 (not assigned, freely assignable)

7.2.5 Setting parameters (short overview)

Parameters	Info	Lenze setting	
		Value	Unit
C00012	Accel. time - main setpoint	2.000	s
C00013	Decel. time - main setpoint	2.000	s
C00019	Auto-DCB: Threshold	3	rpm
C00024	LS_DriveInterface: bNActCompare	0.00	%
C00036	DCB braking: Current	50.00	%
C00039/1	Fixed setpoint 1	40.00	%
C00039/2	Fixed setpoint 2	60.00	%
C00039/3	Fixed setpoint 3	80.00	%
C00039/4...15	Fixed setpoint 4 ... 15	0.00	%
C00101/1...15	Add. accel. time 1 ... 15	0.000	s
C00103/1...15	Add. decel. time 1 ... 15	0.000	s
C00105	Decel. time - quick stop	2.000	s
C00106	Auto-DCB: Hold time	0.500	s
C00107	DCB braking: Hold time	999.000	s
C00134	L_NSet_1: Ramp smoothing	0: Off	
C00182	L_NSet_1: S-ramp time PT1	20.00	s
C00190	L_NSet_1: Setpoint arithmetic	0: Out = Set	
C00220	L_NSet_1: Acceleration time - add. setpoint	0.000	s
C00221	L_NSet_1: Deceleration time - add. setpoint	0.000	s
C00222	L_PCTRL_1: Vp	1.0	
C00223	L_PCTRL_1: Tn	400	ms
C00224	L_PCTRL_1: Kd	0.0	
C00225	L_PCTRL_1: MaxLimit	199.99	%
C00226	L_PCTRL_1: MinLimit	-199.99	%
C00227	L_PCTRL_1: Acceleration time	0.010	s
C00228	L_PCTRL_1: Deceleration time	0.010	s
C00233	L_PCTRL_1: Root function	0: Off	
C00241	L_NSet_1: Hyst. NSet reached	0.50	%
C00242	Operating mode of process controller	0: Off	
C00243	L_PCTRL_1: Accel. time influence	5.000	s
C00244	L_PCTRL_1: Deceleration time influence	5.000	s
C00632/1	L_NSet_1: Blocking speed 1 max	0.00	%
C00632/2	L_NSet_1: Blocking speed 2 max	0.00	%
C00632/3	L_NSet_1: Blocking speed 3 max	0.00	%
C00633/1	L_NSet_1: Blocking speed 1 min	0.00	%
C00633/2	L_NSet_1: Blocking speed 2 min	0.00	%
C00633/3	L_NSet_1: Blocking speed 3 min	0.00	%
C00635	L_NSet_1: nMaxLimit	199.99	%
C00636	L_NSet_1: nMinLimit	-199.99	%
C00670	L_OffsetGainP_1: Gain	1.0000	
C00671	L_OffsetGainP_2: Gain	1.0000	
C00672	L_OffsetGainP_3: Gain	1.0000	

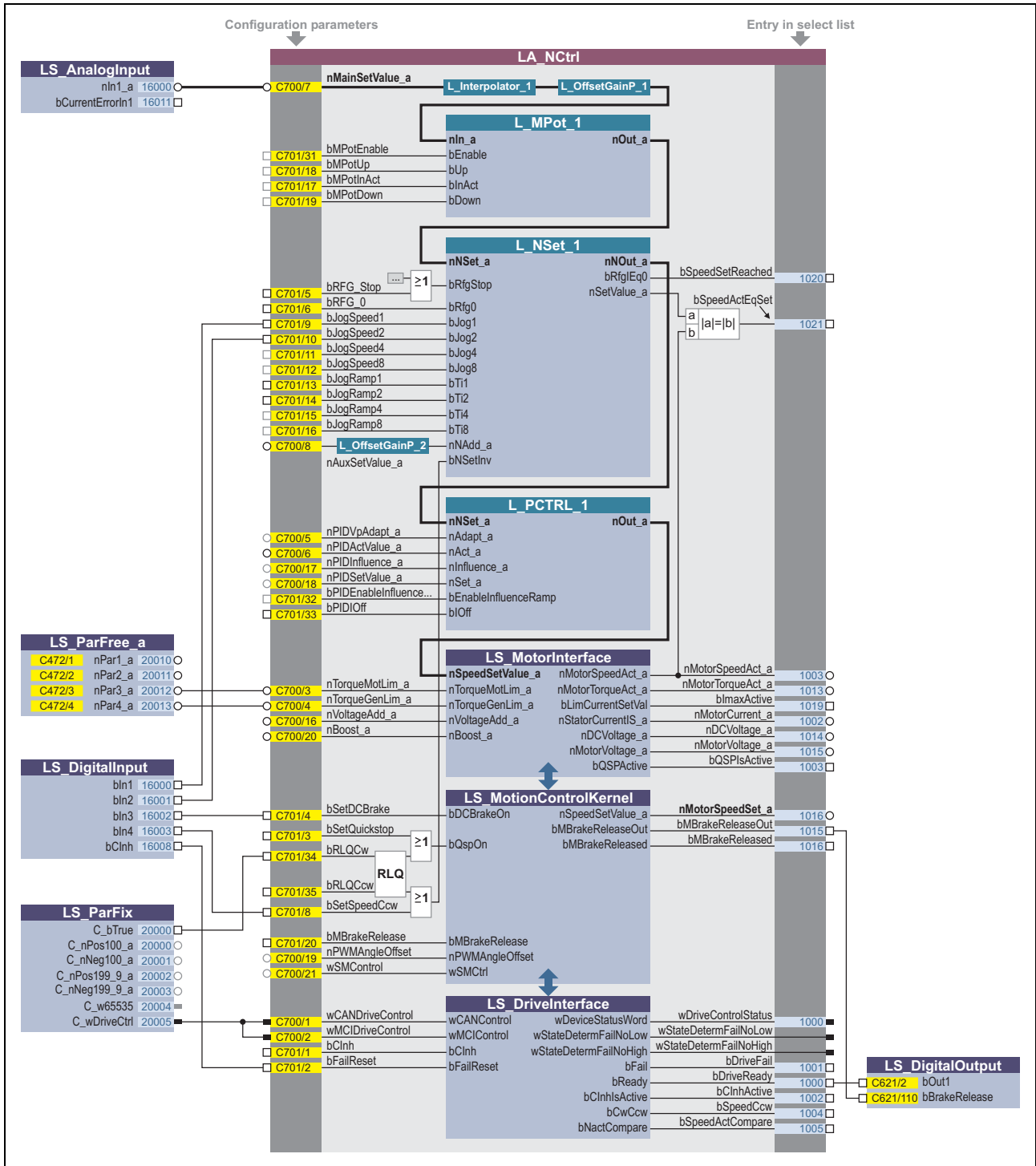
Parameters	Info	Lenze setting	
		Value	Unit
C00696	L_OffsetGainP_1: Offset	0.00	%
C00697	L_OffsetGainP_2: Offset	0.00	%
C00698	L_OffsetGainP_3: Offset	0.00	%
C00800	L_MPot_1: Upper limit	100.00	%
C00801	L_MPot_1: Lower limit	-100.00	%
C00802	L_MPot_1: Acceleration time	10.0	s
C00803	L_MPot_1: Deceleration time	10.0	s
C00804	L_MPot_1: Inactive fct.	0: Retain value	
C00805	L_MPot_1: Init fct.	0: Load last value	
C00806	Use of motor potentiometer	0: No	

Related topics:

▶ ["GeneralPurpose" functions](#) (460)

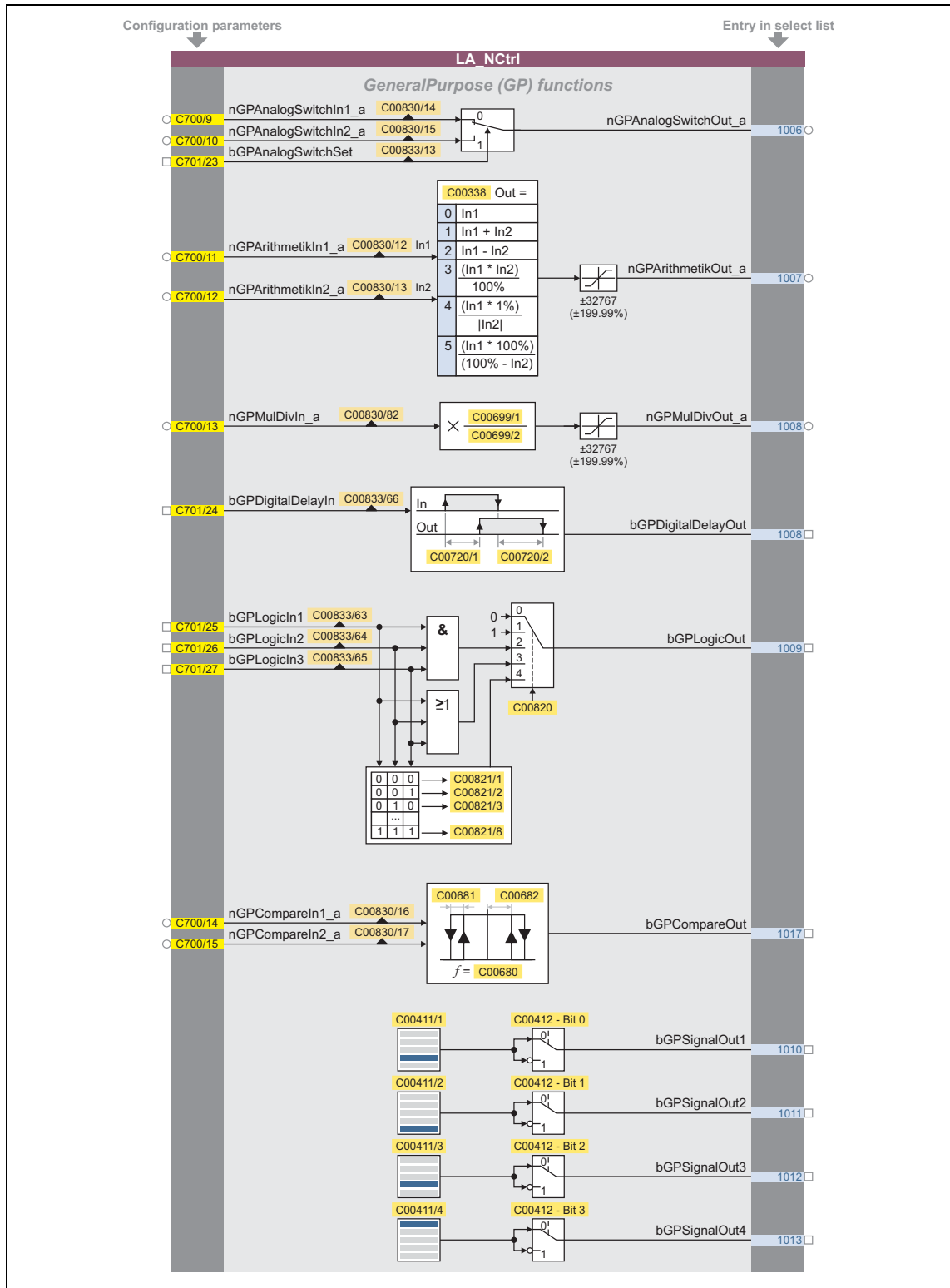
7.2.6 Configuration parameters

If required, the subcodes of [C00700](#) and [C00701](#) serve to change the pre-configured assignment of the application inputs:

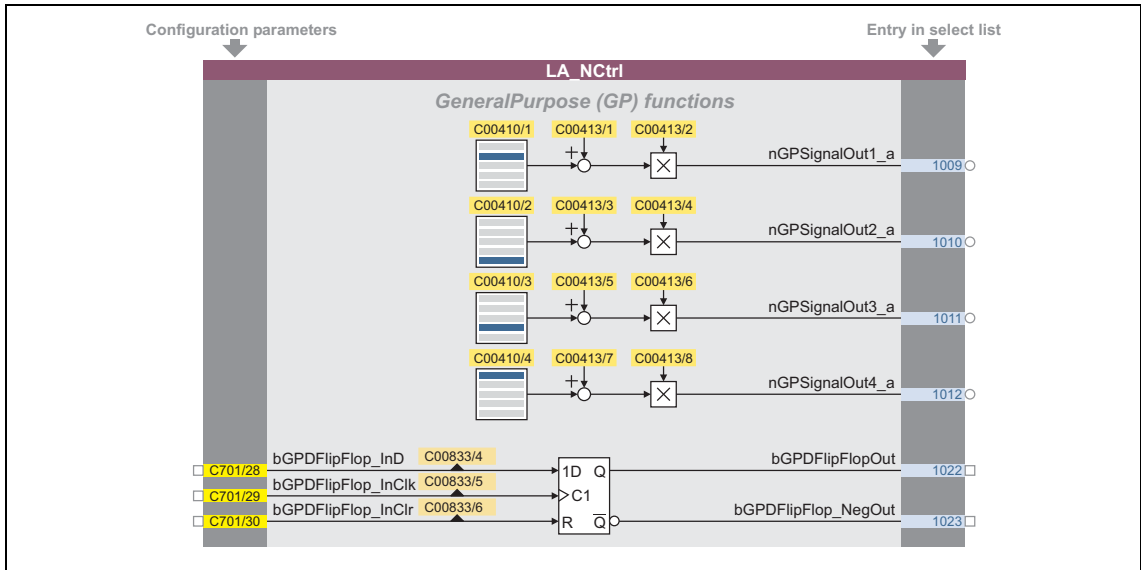


[7-2] Pre-assignment of the "Actuating drive speed" application in the "Terminals 0" control mode

Configuration parameters for "GeneralPurpose" functions



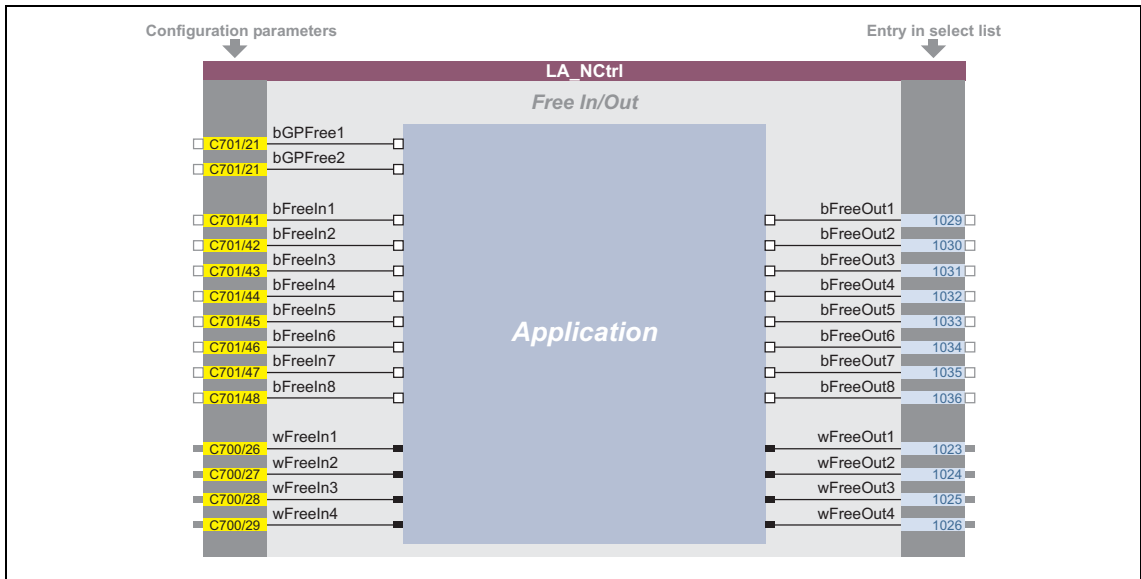
[7-3] "GeneralPurpose" functions



[7-4] "GeneralPurpose" functions (continuation)

Free inputs and outputs

These inputs can be freely interconnected in the application level. They can be used to transfer signals from the I/O level to the application level and vice versa.



[7-5] Free inputs/outputs

Related topics:

- ▶ [User-defined terminal assignment](#) (📖 368)
- ▶ ["GeneralPurpose" functions](#) (📖 460)

7.3 TA "Table positioning"

Numerous functions for the motion control of a single axis can be executed with the "Table positioning" technology application. For this, the technology application accesses the basic functions implemented in the **Motion Control Kernel** which are described in detail in the main chapter "[Basic drive functions \(MCK\)](#)". (□ 466)

- Manual jog
- Retracting from limit switches
- Reference setting/homing in 18 different modes (*in preparation*)
- Positioning (absolute, relative)
- Continuous travel (speed mode)
- Speed override
- Acceleration override
- Profile sequence block control
- Travel block restart within the profile (online profile start)
- Specification of target position via process signal interface (e.g. via fieldbus)

Further functions

- Up to 15 travel sets can be set via parameters
- Parameterisation of the profile data in physical units or relative values
- Adjustable torque limitation
- Freely selectable, variable ramp shape
- Motor potentiometer function
- Software limit position monitoring
- Following error monitoring (with static limits)
- Automatic holding brake control
- Quick stop (QSP) with adjustable ramp time
- Enable of individual functions via control word
- Status and diagnostic displays
- Operating mode changeover (manual jog, homing, speed follower, positioning)
- Integrated, freely available "GeneralPurpose" functions:
Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-FlipFlop, counter

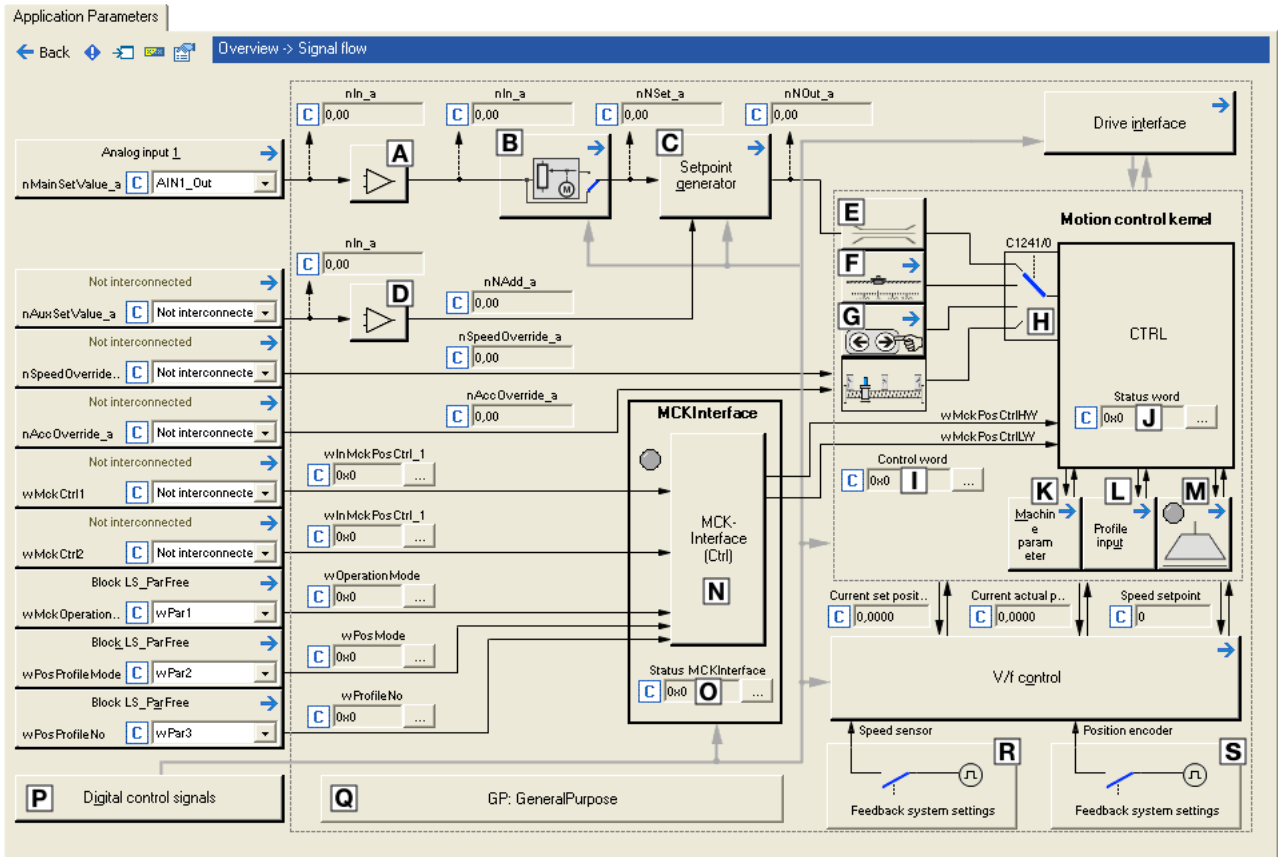
Related topics:

- ▶ [Commissioning of the "Table positioning" technology application](#) (□ 65)

7.3.1 Basic signal flow

The main element of the technology application is the **Motion Control Kernel**.

- The **Motion Control Kernel** is controlled via a 32-bit double control word. All motion profiles in the different operating modes can be controlled with this interface.
- Upstream to the **Motion Control Kernel** there is a so-called **MCKInterface** called which provides additional process inputs for the application in order to control the **Motion Control Kernel**.



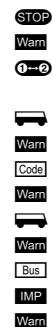
[7-6] Signal flow of the table positioning

- A Offset and gain ([L_OffsetGainP_1](#))
- B Motor potentiometer function ([L_MPot_1](#))
- C Setpoint generator ([L_NSet_1](#))
- D Offset and gain ([L_OffsetGainP_2](#))
- E Speed setpoint input limitation

- I [MCK control word](#)
- J [MCK status word](#)
- K Selection of the machine parameters
- L [Profile entry](#) for the "Positioning" basic function.
- STOP [Holding brake control](#)

- F Basic function "[Homing](#)"

- N [MCKInterface](#)



- ⓐ Basic function "[Manual jog](#)"
- ⓑ Status word of the [MCKInterface](#)
- ⓓ Operating mode changeover (is executed by the [MCKInterface](#))
- ⓔ Terminal assignment & display of digital control signals
- ⓕ Integrated disposable "[GeneralPurpose](#)" functions: Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop

7.3.1.1 Possibilities for the position selection

The following options are available for the selection of different positions:

1. Changeover of profiles
2. Changing the profile position via parameter data (SDO)
3. Changing the profile position via process data (PDO)
 - The profile position can be defined in [increments] or the application unit [units].

	Changeover of profiles	Changing the profile position via SDO	Changing the profile position via PDO	
Number of positions	max. 15	n > 15	n > 15	
Position selection	Parameterisation in the profile	Selection via SDO	Selection via PDO	
Unit	units	units	Increments	units
Remainder allowance	in the drive	in the drive	in the PLC	in the drive



Note!

Setting the machine parameters is a basic prerequisite for the operating modes "[Homing](#)", "[Manual jog](#)" and "[Positioning](#)".

The more precisely the machine parameters are set, the better the results of positioning!

▶ [Machine parameters](#) (📖 496)

Possibility 1: Changeover of profiles

A total of 15 profiles is available in the 8400 protec HighLine.

- A profile describes a motion task that can be converted into a rotary motion by the **Motion Control Kernel** in the "Positioning" operating mode.
- A detailed explanation of all profile parameters can be found in the subchapter "[Profile entry](#)". (📖 552) of the description of the "Positioning" basic drive function.
- The selection of the profile to be executed can either be executed as a data word via the input *wPosProfileNo* or binary coded via the inputs *bPosProfileNo_1* ... *bPosProfileNo_4*.
- The chosen profile is started via the process input *bPosExecute* of the FB [L_MckCtrlInterface](#) or the control bit "PosExecute" in the [MCK control word](#).

Possibility 2: Changing the profile position via parameter data (SDO)

The parameter data channel of a fieldbus can also be used to change the position in a profile.

- The position of the profiles 1 ... 15 are stored in the subcodes 1 ... 15 of the code [C01301](#).
- More than 15 positions are available via the profile changeover (as described under possibility 1).

Possibility 3: Changing the profile position via process data (PDO)

For selecting the position in [increments], the *dnPosProfilePosition_p* input at the application block is available.

**Note!**

For selecting the position in [units], the two inputs *wPosProfileUnitsLW* and *wPosProfileUnitsHW* at the application block are available.

- In the application level, the position in the FB [L_MckCtrlInterface](#) is converted from [units] to [increments] again and output to *dnPosSetOut_p*. For this purpose, the respective mode for position calculation must be selected in [C01296/1](#).
- Since the conversion is not executed within one controller cycle, the data at the *dnPosSetOut_p* output can be out-of-date. The *bPosSetDataValid* output is set to TRUE when the conversion is completed and the position in increments is valid. Then, the position can be transmitted to the profile (see the following section).

The acceptance of the position into the currently selected profile is executed with a FALSE-TRUE edge at the *bPosSetProfilePosition* input.

- If bit 2 is set in [C01297](#), the applied setpoint position is accepted into the currently selected profile and the profile is started directly when setting the process input *bPosExecute* to TRUE or setting the control bit "PosExecute" in the [MCK control word](#).
- If bit 3 is set in [C01297](#), the setpoint positions at the MCKInterface are automatically accepted into the profile with the applied profile number if a change of data is detected at the corresponding input for the setpoint position.
- The accepted position is stored in the code [C01301/x](#) in the application unit [units]. By reading out the code, you can check if the position was correctly accepted into the profile.

**Note!**

How to store changed profile parameters safely against mains failure in the memory module: Set [C00002/11](#) = "1: On / Start".

7.3.2 Internal interfaces | application block "LA_TabPos"

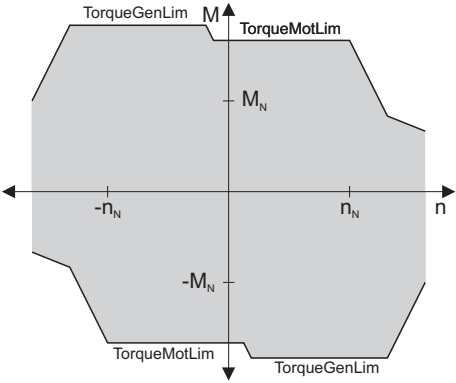
**Note!**

The connectors greyed out in the following table are hidden in the function block editor in the Lenze setting.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

Inputs

Designator	Data type	Information/possible settings		
wCANDriveControl	WORD	Control word via system bus (CAN) for device control <ul style="list-style-type: none"> • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits. 		
wMCIDriveControl	WORD	Control word via communication module (e.g. PROFIBUS) for device control <ul style="list-style-type: none"> • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits. 		
wSMControl	WORD	Interface to the optional safety system. <ul style="list-style-type: none"> • Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). • See the subchapter "Interface to safety system" of the chapter on basic drive functions for a detailed description of the individual control bits. 		
bCInh	BOOL	Enable/inhibit inverter		
		<table border="1"> <tr> <td>FALSE</td> <td>Enable inverter: The inverter switches to the "OperationEnabled" device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. </td> </tr> <tr> <td>TRUE</td> <td>Inhibit inverter (controller inhibit): The inverter switches to the "SwitchedOn" device status.</td> </tr> </table>	FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit.
FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. 			
TRUE	Inhibit inverter (controller inhibit): The inverter switches to the " SwitchedOn " device status.			
bFailReset	BOOL	Reset error message In the Lenze setting this input is connected to the digital input controller enable so that a possibly existing error message is reset together with the controller enable (if the cause for the fault is eliminated).		
		<table border="1"> <tr> <td>TRUE</td> <td>The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged. </td> </tr> </table>	TRUE	The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged.
TRUE	The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged. 			
bSetQuickstop	BOOL	Activate quick stop (QSP) <ul style="list-style-type: none"> • Also see device command "Activate/deactivate quick stop". 		
		<table border="1"> <tr> <td>TRUE</td> <td>Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019. </td> </tr> </table>	TRUE	Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019.
		TRUE	Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019. 	
<table border="1"> <tr> <td>FALSE</td> <td>Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. </td> </tr> </table>	FALSE	Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. 		
FALSE	Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. 			

Designator	Data type	Information/possible settings				
nTorqueMotLim_a nTorqueGenLim_a	INT	<p>Torque limitation in motor mode and in generator mode</p> <ul style="list-style-type: none"> • These input signals are directly transferred to the motor control to limit the inverter's maximum torque in motor and generator mode. • The drive cannot output a higher torque in motor/generator mode than set here. • The applied values (any polarity) are internally interpreted as absolute values. • If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called I_{max} controller. • If sensorless vector control (SLVC) or servo control (SC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. • Scaling: $16384 \equiv 100\% M_{max}$ (C00057) <p>Note: Setting this input is ineffective in the reference modes 14 and 15 ("Homing to positive stop").</p> <p>Torque limits in motor and generator mode:</p> 				
bSetSpeedCcw	BOOL	<p>Change of direction of rotation</p> <ul style="list-style-type: none"> • For instance if a motor or gearbox is fixed laterally reversed to a machine part, but the setpoint selection should still be executed for the positive direction of rotation. <table border="1" data-bbox="606 1243 1133 1317"> <tr> <td>FALSE</td> <td>Clockwise rotation (Cw)</td> </tr> <tr> <td>TRUE</td> <td>Direction of rotation to the left (Ccw)</td> </tr> </table>	FALSE	Clockwise rotation (Cw)	TRUE	Direction of rotation to the left (Ccw)
FALSE	Clockwise rotation (Cw)					
TRUE	Direction of rotation to the left (Ccw)					
nMainSetValue_a	INT	<p>Main speed setpoint</p> <ul style="list-style-type: none"> • Offset and gain of this input signal can be set in C00696 and C00670 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100\%$ reference speed (C00011) • The main setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps. • Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective. • For a detailed functional description see the L_NSet FB. 				
nAuxSetValue_a	INT	<p>Additional speed setpoint</p> <ul style="list-style-type: none"> • Offset and gain of this input signal can be set in C00697 and C00671 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100\%$ reference speed (C00011) • The additional speed setpoint can be linked arithmetically with the main speed setpoint behind the ramp function generator. • The additional speed setpoint can be shown via ramp times of a second ramp function generator. • For a detailed functional description see the L_NSet FB. 				
bJogSpeed1 bJogSpeed2	BOOL	<p>Inputs for overriding fixed setpoints (JOG setpoints) for the main setpoint</p> <ul style="list-style-type: none"> • Selection inputs are binary coded. 				

Designator	Data type	Information/possible settings
bJogSpeed1 bJogSpeed2	BOOL	Inputs for overriding fixed setpoints (JOG setpoints) for the main setpoint <ul style="list-style-type: none"> • A fixed setpoint for the setpoint generator can be activated instead of the main setpoint via these selection inputs. • The two selection inputs are binary coded, therefore you can select 3 fixed setpoints. • In the case of binary coded selection "0" (all inputs = FALSE or not assigned), main setpoint <i>nMainSetValue_a</i> is active. • The selection of the fixed setpoints is carried out in C00039/1...3 in [%] based on the reference speed (C00011). • For a detailed functional description see the L_NSet FB.
Motor potentiometer Alternatively to the input signal <i>nMainSetValue_a</i> , the main setpoint can also be generated by a motor potentiometer function. <ul style="list-style-type: none"> • In the Lenze setting, the motor potentiometer function is deactivated. • Activation is possible via C00806 or via the <i>bMPotEnable</i> input. • The behaviour of the motor potentiometer during switch-on of the drive system can be selected in C00805. • For a detailed functional description see the L_MPot FB. 		
bMPotEnable	BOOL	Activating the motor potentiometer function <ul style="list-style-type: none"> • This input and C00806 are OR'd.
		TRUE The motor potentiometer function is active; the speed setpoint can be changed via the <i>bMPotUp</i> and <i>bMPotDown</i> control inputs.
bMPotUp	BOOL	Increasing the speed setpoint
		TRUE Approach the upper speed limit value set in C00800 with the acceleration time set in C00802 .
bMPotDown	BOOL	Decreasing the speed setpoint
		TRUE Approach the lower speed limit value set in C00801 with the deceleration time set in C00803 .
MCK basic functions		
bMBrakeRelease	BOOL	Holding brake control : Release/apply brake <ul style="list-style-type: none"> • In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off").
		FALSE Apply brake. <ul style="list-style-type: none"> • During automatic operation, the internal brake logic controls the brake.
		TRUE Release brake manually (forced release). <ul style="list-style-type: none"> • Note! The brake can also be released when the controller is inhibited! • During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. • In semi-automatic operation, the brake is released including feedforward control.
wMckCtrl1 wMckCtrl2	WORD	<u>Direct</u> selection of MCK control words <ul style="list-style-type: none"> • E.g. via a master control which has been connected to the fieldbus, too. For this purpose, the control word inputs can directly be connected to the <i>LP_McIn</i> or <i>LP_CanIn</i> fieldbus interface. • See the "MCK control word" chapter for a detailed description of the individual control bits.

Designator	Data type	Information/possible settings														
wMckOperationMode	WORD	<p>Selection of the operating mode of the Motion Control Kernel</p> <ul style="list-style-type: none"> • Only bit 0 ... bit 3 of <i>wMckOperationMode</i> is evaluated. • If an invalid operating mode is selected, the response set in C00595/11 is activated (Lenze setting: "Warning"). • The current operating mode is displayed in C01243. <table border="1"> <tr> <td>0</td> <td>Speed follower</td> </tr> <tr> <td>1</td> <td>Homing</td> </tr> <tr> <td>2</td> <td>Manual jog</td> </tr> <tr> <td>3</td> <td>Positioning</td> </tr> <tr> <td>4</td> <td>Stop</td> </tr> <tr> <td>5</td> <td>Position follower</td> </tr> <tr> <td>6 ... 15</td> <td>Reserved for future extensions</td> </tr> </table>	0	Speed follower	1	Homing	2	Manual jog	3	Positioning	4	Stop	5	Position follower	6 ... 15	Reserved for future extensions
0	Speed follower															
1	Homing															
2	Manual jog															
3	Positioning															
4	Stop															
5	Position follower															
6 ... 15	Reserved for future extensions															
bMckOperationMode_1 ... bMckOperationMode_8	BOOL/BOOL	<p>Binary-coded selection of the operating mode of the Motion Control Kernel</p> <ul style="list-style-type: none"> • See the "MCK control word" chapter for a detailed description of the individual control bits. • If an invalid operating mode is selected, the response set in C00595/11 is activated (Lenze setting: "Warning"). • The current operating mode is displayed in C01243. 														
bPosCtrlOn	BOOL	<p>Position control/Angle control</p> <ul style="list-style-type: none"> • Pre-configured assignment: TRUE (position control active) <table border="1"> <tr> <td>FALSE</td> <td>Deactivate position control/angle control</td> </tr> <tr> <td>TRUE</td> <td>Activate position control/angle control</td> </tr> </table>	FALSE	Deactivate position control/angle control	TRUE	Activate position control/angle control										
FALSE	Deactivate position control/angle control															
TRUE	Activate position control/angle control															
nPosCtrlOutLimit_a	INT	<p>Limitation of the position controller output</p> <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % reference speed (C00011) • Pre-configured assignment: 100 % 														
nPosCtrlPAdapt_a	INT	<p>Adaptation of the position controller gain</p> <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % Vp (C00254) • Pre-configured assignment: 100 % 														
bLimitSwitchPos bLimitSwitchNeg	BOOL	Limit position monitoring : Inputs for positive/negative limit switch														
bReleaseLimitSwitch	BOOL	<p>Manual jog: Retract operated limit switch</p> <table border="1"> <tr> <td>TRUE</td> <td>Retract operated limit switch (in opposite direction)</td> </tr> </table>	TRUE	Retract operated limit switch (in opposite direction)												
TRUE	Retract operated limit switch (in opposite direction)															
bManJogPos bManJogNeg	BOOL	<p>Manual jog:</p> <p><i>bManJogPos</i> = TRUE: Manual jog right <i>bManJogNeg</i> = TRUE: Manual jog left Both inputs = TRUE: No change compared to previous state Both inputs = FALSE: Stop manual jog</p>														
bManJogExecute2ndVel	BOOL	<p>Manual jog: Changeover to speed 2</p> <table border="1"> <tr> <td>FALSE</td> <td>Speed 1 (C01231/1) active</td> </tr> <tr> <td>TRUE</td> <td>Speed 2 (C01231/2) active</td> </tr> </table>	FALSE	Speed 1 (C01231/1) active	TRUE	Speed 2 (C01231/2) active										
FALSE	Speed 1 (C01231/1) active															
TRUE	Speed 2 (C01231/2) active															
bEnableSpeedOverride	BOOL	<p>Speed override</p> <table border="1"> <tr> <td>TRUE</td> <td>Activate speed override</td> </tr> </table>	TRUE	Activate speed override												
TRUE	Activate speed override															
nSpeedOverride_a	INT	<p>Value for Speed override</p> <ul style="list-style-type: none"> • Percentage multiplier for the currently active speed. • 16384 ≙ 100 % of the maximum traversing speed (display in C01211/1). • Values > 16384 are ignored. • If the override value is 0 %, the drive is brought to a standstill. 														
bEnableAccOverride	BOOL	<p>Acceleration override</p> <table border="1"> <tr> <td>TRUE</td> <td>Activate acceleration override</td> </tr> </table>	TRUE	Activate acceleration override												
TRUE	Activate acceleration override															

Designator	Data type	Information/possible settings
nAccOverride_a	INT	Value for Acceleration override <ul style="list-style-type: none"> Percentage multiplier for the currently active acceleration. 16384 ≙ 100 % of the parameterised acceleration of the corresponding operating mode. Values > 16384 are ignored. If the override value is 0 %, acceleration ceases.
bHomeStartStop	BOOL	Homing : Start/stop homing
		TRUE Start homing
		TRUE↗FALSE Stop homing
bHomeSetPosition	BOOL	Homing : Set home position
		TRUE Set home position
bHomeResetPosition	BOOL	Homing : Reset home position
		TRUE Reset the "Reference known" status
bHomeMark	BOOL	Homing : Input for reference switch (pre-switch off mark) <ul style="list-style-type: none"> This input responds to the FALSE status (fail-safe) and is to be connected to the corresponding digital input to which the reference switch is connected.
bPosSetProfilePosition	BOOL	Position teaching : MCK setpoint position
		TRUE Teach MCK setpoint position into the selected profile.
bPosSetActualPosition	BOOL	Position teaching : Current position
		TRUE Teach current position into the selected profile.
bPosExecute	BOOL	Positioning : Start travelling
		FALSE↗TRUE Execute selected profile
bPosFinishTarget	BOOL	Positioning : Complete cancelled profile
		FALSE↗TRUE A positioning process previously cancelled, e.g. by <i>bPosStop</i> or due to a device error, is resumed by travelling to the original target.
bPosDisableFollowProfile	BOOL	Positioning : Do not execute sequence profile (switch-off profile linkage)
		TRUE Evaluation of the sequence profile number parameterised in C01307/1...15 for the selected profile is suppressed.
bPosStop	BOOL	Positioning : Cancel travelling
		TRUE Stop positioning From version 12.00.00, more travel requests will be inhibited ("PosExecute" will be blocked).

Designator	Data type	Information/possible settings																						
wPosProfileMode	WORD	<p>Override of the positioning mode set in the profile data</p> <ul style="list-style-type: none"> Via this input, an override of the positioning mode parameterised in C01300/1...15 for the selected profile is possible. The value set in C01300/1...15 is not overwritten in this case. Only bit 0 ... bit 3 of <i>wPosMode</i> are evaluated. If <i>wPosMode</i> = 0 is selected, the positioning mode set in C01300/1...15 is used. <table border="1"> <tr><td>0</td><td>Positioning mode = setting in C01300/1...15</td></tr> <tr><td>1</td><td>Absolute (shortest path)</td></tr> <tr><td>2</td><td>Continuous</td></tr> <tr><td>3</td><td>Relative</td></tr> <tr><td>4</td><td>Absolute (Cw) *</td></tr> <tr><td>5</td><td>Absolute (Ccw) *</td></tr> <tr><td>8</td><td>Absolute (shortest path) to TP *</td></tr> <tr><td>9</td><td>Continuous to TP *</td></tr> <tr><td>10</td><td>Relative to TP *</td></tr> <tr><td>11</td><td>Absolute (Cw) to TP *</td></tr> <tr><td>12</td><td>Absolute (Ccw) to TP *</td></tr> </table> <p>* From version 06.00.00 All other possible settings are reserved for future extensions!</p>	0	Positioning mode = setting in C01300/1...15	1	Absolute (shortest path)	2	Continuous	3	Relative	4	Absolute (Cw) *	5	Absolute (Ccw) *	8	Absolute (shortest path) to TP *	9	Continuous to TP *	10	Relative to TP *	11	Absolute (Cw) to TP *	12	Absolute (Ccw) to TP *
0	Positioning mode = setting in C01300/1...15																							
1	Absolute (shortest path)																							
2	Continuous																							
3	Relative																							
4	Absolute (Cw) *																							
5	Absolute (Ccw) *																							
8	Absolute (shortest path) to TP *																							
9	Continuous to TP *																							
10	Relative to TP *																							
11	Absolute (Cw) to TP *																							
12	Absolute (Ccw) to TP *																							
wPosProfileNo	WORD	<p>Stipulation of the profile to be executed</p> <ul style="list-style-type: none"> Optionally as a data word or binary coded. 																						
bPosProfileNo_1 ... bPosProfileNo_8	BOOL																							
dnPosProfilePosition_p	DINT																							
wPosProfileUnitsLW wPosProfileUnitsHW	WORD	<p>Selection of the target position in [units]</p> <ul style="list-style-type: none"> <i>wPosProfileUnitsLW</i> = Low word, <i>wPosProfileUnitsHW</i> = High word The mode for calculating the position is selected in C01296/1. 																						
<p>GP: GeneralPurpose The following inputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions</p>																								
nGPAnalogSwitchIn1_a nGPAnalogSwitchIn2_a	INT	<p>Analog switch: Input signals</p> <ul style="list-style-type: none"> The input signal selected via the selection input <i>bGPAnalogSwitchSet</i> is output at output <i>nGPAnalogSwitchOut_a</i>. 																						
bGPAnalogSwitchSet	BOOL	<p>Analog switch: Selection input</p> <table border="1"> <tr><td>FALSE</td><td><i>nGPAnalogSwitchOut_a</i> = <i>nGPAnalogSwitchIn1_a</i></td></tr> <tr><td>TRUE</td><td><i>nGPAnalogSwitchOut_a</i> = <i>nGPAnalogSwitchIn2_a</i></td></tr> </table>	FALSE	<i>nGPAnalogSwitchOut_a</i> = <i>nGPAnalogSwitchIn1_a</i>	TRUE	<i>nGPAnalogSwitchOut_a</i> = <i>nGPAnalogSwitchIn2_a</i>																		
FALSE	<i>nGPAnalogSwitchOut_a</i> = <i>nGPAnalogSwitchIn1_a</i>																							
TRUE	<i>nGPAnalogSwitchOut_a</i> = <i>nGPAnalogSwitchIn2_a</i>																							
nGPArithmetikIn1_a nGPArithmetikIn2_a	INT	<p>Arithmetic: Input signals</p> <ul style="list-style-type: none"> The arithmetic function is selected in C00338. The result is output at output <i>nGPArithmetikOut_a</i>. 																						
nGPMulDivIn_a	INT	<p>Multiplication/Division: Input signal</p> <ul style="list-style-type: none"> The factor for the multiplication can be set in C00699/1 (numerator) and C00699/2 (denominator). The result is output at output <i>nGPMulDivOut_a</i>. 																						
bGPDigitalDelayIn	BOOL	<p>Binary delay element: Input signal</p> <ul style="list-style-type: none"> The on-delay can be set in C00720/1. The off-delay can be set in C00720/2. The time-delayed input signal is output at output <i>bGPDigitalDelayOut</i>. 																						

Designator Data type	Information/possible settings		
bGPLogicIn1 bGPLogicIn2 bGPLogicIn3 BOOL	Binary logic: Input signals <ul style="list-style-type: none"> The logic operation is selected in C00820. The result is output at output <i>bGPLogicOut</i>. 		
nGPCompareIn1_a nGPCompareIn2_a INT	Analog comparison: Input signals <ul style="list-style-type: none"> The comparison operation is selected in C00680. Hysteresis and window size can be set in C00680 and C00682. If the comparison statement is true, the output <i>bGPCompareOut</i> will be set to TRUE. 		
bGPDFlipFlop_InD bGPDFlipFlop_InClk bGPDFlipFlop_InClr BOOL	D-FlipFlop: Input signals <ul style="list-style-type: none"> Data, clock and reset input 		
bGPCounter1ClkUp BOOL	Counter: Clock input <ul style="list-style-type: none"> With each edge, the module counts up by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.		
bGPCounter1ClkDown BOOL	Counter: Clock input <ul style="list-style-type: none"> With each edge, the module counts down by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.		
bGPCounter1Load BOOL	Counter: Loading input <ul style="list-style-type: none"> The input has the highest priority. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>TRUE</td> <td>Accept the starting value <i>wGPCounter1LdVal</i>.</td> </tr> </table>	TRUE	Accept the starting value <i>wGPCounter1LdVal</i> .
TRUE	Accept the starting value <i>wGPCounter1LdVal</i> .		
wGPCounter1LdVal WORD	Counter: Starting value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign. 		
wGPCounter1CmpVal WORD	Counter: Comparison value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign. 		
Free inputs The following inputs can freely be interconnected on the application level. The signals can be transferred from the I/O level to the application level via these inputs.			
bFreeIn1 ... bFreeIn8 BOOL	Free inputs for digital signals		
wFreeIn1 ... wFreeIn4 WORD	Free inputs for 16-bit signals		
dnFreeIn1_p ... dnFreeIn2_p DINT	Free inputs for 32-bit signals		

Outputs

Designator Data type	Value/meaning		
wDriveControlStatus WORD	Status word of the inverter <ul style="list-style-type: none"> The status word contains information on the currents status of the inverter. See the "wDeviceStatusWord status word" subchapter of the chapter on device control for a detailed description of the bit assignment. 		
wStateDetermFailNoLow WORD	Display of the status determining error (LOW word)		
wStateDetermFailNoHigh WORD	Display of the status determining error (HIGH word)		
bDriveFail BOOL	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>TRUE</td> <td>Inverter in error status. <ul style="list-style-type: none"> "Fault" device status is active. </td> </tr> </table>	TRUE	Inverter in error status. <ul style="list-style-type: none"> "Fault" device status is active.
TRUE	Inverter in error status. <ul style="list-style-type: none"> "Fault" device status is active. 		

Designator	Data type	Value/meaning	
bDriveReady	BOOL	TRUE	Inverter is ready for operation. <ul style="list-style-type: none"> • "SwitchedOn" device status is active. • The drive is in this device status if the DC bus voltage is applied and the inverter is still inhibited by the user (controller inhibit).
bCInhActive	BOOL	TRUE	Controller inhibit is active.
bQSPlsActive	BOOL	TRUE	Quick stop is active.
bSpeedCcw	BOOL	Current direction of rotation	
		FALSE	Clockwise rotation (Cw)
		TRUE	Direction of rotation to the left (Ccw)
bSpeedActCompare	BOOL	Result of the speed comparison (detection of speed=0)	
		TRUE	During open-loop operation: Speed setpoint < Comparison value (C00024)
			During closed-loop operation: Actual speed value < Comparison value (C00024)
blmaxActive	BOOL	"Current setpoint inside the limitation" status signal	
		TRUE	The current setpoint is internally limited (the inverter operates at the maximum current limit).
bSpeedSetReached	BOOL	Status signal "setpoint = 0"	
		TRUE	Speed setpoint from the ramp function generator = 0
nMotorCurrent_a	INT	Current stator current/effective motor current <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % I_{\max_mot} (C00022) 	
nMotorSpeedSet_a	INT	Speed setpoint <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % reference speed (C00011) 	
nMotorSpeedAct_a	INT	Actual speed value <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % reference speed (C00011) 	
nMotorTorqueAct_a	INT	Actual torque <ul style="list-style-type: none"> • In the "VFC (+encoder)" operating mode of the motor control, this value is determined from the current motor current and corresponds to the actual torque only by approximation. • Scaling: 16384 \equiv 100 % M_{\max} (C00057) 	
nDCVoltage_a	INT	Actual DC-bus voltage <ul style="list-style-type: none"> • Scaling: 16384 \equiv 1000 V 	
nMotorVoltage_a	INT	Current motor voltage/inverter output voltage <ul style="list-style-type: none"> • Scaling: 16384 \equiv 1000 V 	
MCK basic functions			
bMBrakeReleaseOut	BOOL	Holding brake control : Trigger signal for the holding brake control switching element via a digital output <ul style="list-style-type: none"> • Use bit 0 in C02582 to activate inverted switching element triggering. 	
		FALSE	Apply brake.
		TRUE	Release brake.
bMBrakeReleased	BOOL	Holding brake control : "Brake released" considering the brake release time <ul style="list-style-type: none"> • When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed! 	
		TRUE	Brake released (after the brake release time has expired).
wMckState1 wMckState2	WORD	Output of the MCK status words <ul style="list-style-type: none"> • For a detailed description of each status bit see chapter "MCK status word". 	
wMckActOperationMode	WORD	Active setpoint-generating state of the MCK. <ul style="list-style-type: none"> • Bit B0 ... B3 contain the information of the MCK status word. • Bits B4 ... B15 are fixed at "0". 	

Designator	Data type	Value/meaning	
bHomeDone	BOOL	TRUE	Homing has been executed.
bHomePosAvailable	BOOL	TRUE	Home position is known.
bProfileDone	BOOL	TRUE	Target position from the profile has been approached.
bProfileBusy	BOOL	TRUE	Profile positioning is active.
bAccelerating	BOOL	TRUE	Acceleration phase active.
bConstantDuty	BOOL	TRUE	Constant phase active.
bDecelerating	BOOL	TRUE	Braking phase active.
bDwellTime	BOOL	TRUE	Settling in target position is active
bInTarget	BOOL	TRUE	Target position (actual value) is in the target window.
wActProfileNo	WORD	Current profile number • Bit B0 ... B7 contain the information of the MCK status word . • Bits B8 ... B15 are fixed at "0".	
wActPosMode	WORD	Current positioning mode • Bit B0 ... B3 contain the information of the MCK status word . • Bits B4 ... B15 are fixed at "0".	
dnTargetPos_p	DINT	Target position in [increments] • 65535 ≙ 1 revolution of the motor shaft	
dnSetPos_p	DINT	Absolute position setpoint	
dnPosAct_p	DINT	Current position of the motor shaft in [increments]	
dnDeltaPosAct_p	DINT	Current following error in [increments] • Following error = Difference between set position and actual position	
wPosOutUnitsLW wPosOutUnitsHW	WORD	Output of the target position in [units] • <i>wPosOutUnitsLW</i> = Low-Word, <i>wPosOutUnitsHW</i> = High-Word • The mode for calculating the position is selected in C01296/2 .	

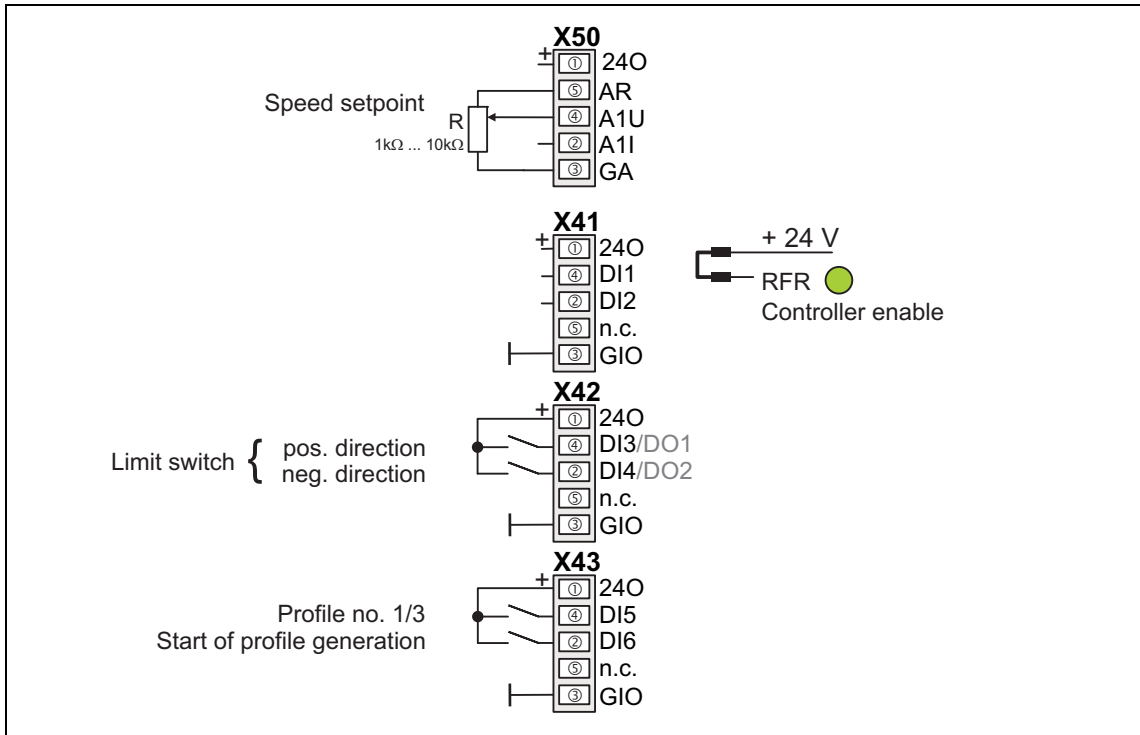
Designator	Data type	Value/meaning
GP: GeneralPurpose		
The following outputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions		
nGPAnalogSwitchInOut_a	INT	Analog switch : Output signal
nGPArithmeticOut_a	INT	Arithmetic : Output signal
nGPMulDivOut_a	INT	Multiplication/Division : Output signal
bGPDigitalDelayOut	BOOL	Binary delay element : Output signal
bGPLogicOut	BOOL	Binary logic : Output signal
bGPCompareOut	BOOL	Analog comparison : Output signal
bGPSignalOut1 ... bGPSignalOut4	BOOL	Binary signal monitor : Output signals <ul style="list-style-type: none"> • The signal sources to be output are selected in C00411/1...4. • A bit coded inversion of the output signals can be parameterised in C00412.
nGPSignalOut1_a ... nGPSignalOut4_a	BOOL	Analog signal monitor : Output signals <ul style="list-style-type: none"> • The signal sources to be output are selected in C00410/1...4. • Gain and offset for each output signal can be parameterised in C00413/1...8.
bGPDFlipFlop_Out	BOOL	D-FlipFlop : Output signal
bGPDFlipFlop_NegOut	BOOL	D-FlipFlop : Negated output signal
bGPCounter1Equal	BOOL	Counter : Status signal "Comparison value reached"
		TRUE Comparison value <i>wGPCounter1CmpVal</i> reached.
wGPCounter1Out	WORD	Counter : Counter content <ul style="list-style-type: none"> • Internal limitation to ± 32767 • The most significant bit determines the sign!
Free outputs		
The following outputs can freely be interconnected on the application level. The signals from the application level can be transferred to the I/O level via these outputs.		
bFreeOut1 ... bFreeOut8	BOOL	Free outputs for digital signals
wFreeOut1 ... wFreeOut4	WORD	Free outputs for 16-bit signals
dnFreeOut1_p dnFreeOut2_p	WORD	Free outputs for 32-bit signals

7.3.3 Terminal assignment of the control modes

The following comparison provides information about which inputs/outputs of the application block **LA_TabPos** are interconnected to the digital and analog input/output terminals of the inverter in the different control modes.

	Control mode (C00007)							
	10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminal 16	20: Keypad	21: PC	30: CAN	40: MCI
Digital input terminals								
RFR	Controller enable / Reset of error message bFailReset (In case of 8400 protec, the RFR terminal is internally set to HIGH level via wire jumper.)							
X41/DI1	-	-	Positive limit switch bLimitSwitchPos	-	-	-	-	-
X41/DI2	-	-	Negative limit switch bLimitSwitchNeg	-	-	-	-	-
X42/DI3	Positive limit switch bLimitSwitchPos	-	-	-	-	-	Positive limit switch bLimitSwitchPos	
X42/DI4	Negative limit switch bLimitSwitchNeg	Positioning profile, array bit (valency 2) bPosProfileNo_2		Quick stop bSetQuickstop	-	-	Negative limit switch bLimitSwitchNeg	
X43/DI5	Positioning profile, array bit (valency 2) bPosProfileNo_2	Positioning profile, array bit (valency 1) bPosProfileNo_1		Positioning profile, array bit (valency 2) bPosProfileNo_2	-	-	Home position bHomeMark	
X43/DI6	Start of profile generation bPosExecute				-	-	Quick stop bSetQuickstop	
Analog input terminals								
X50/A1U	Main speed setpoint nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)				-	-	Main speed setpoint nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)	
X50/A1I	-	-	-	-	-	-	-	-
Digital output terminals								
DO1/DO2 is only available after respective change of the function assignment in C00116 .								
X42/DO1	Status "Drive is ready" bDriveReady							
X42/DO2	Status "Target position (actual value) is in the target window" bInTarget							

7.3.3.1 Terminals 0

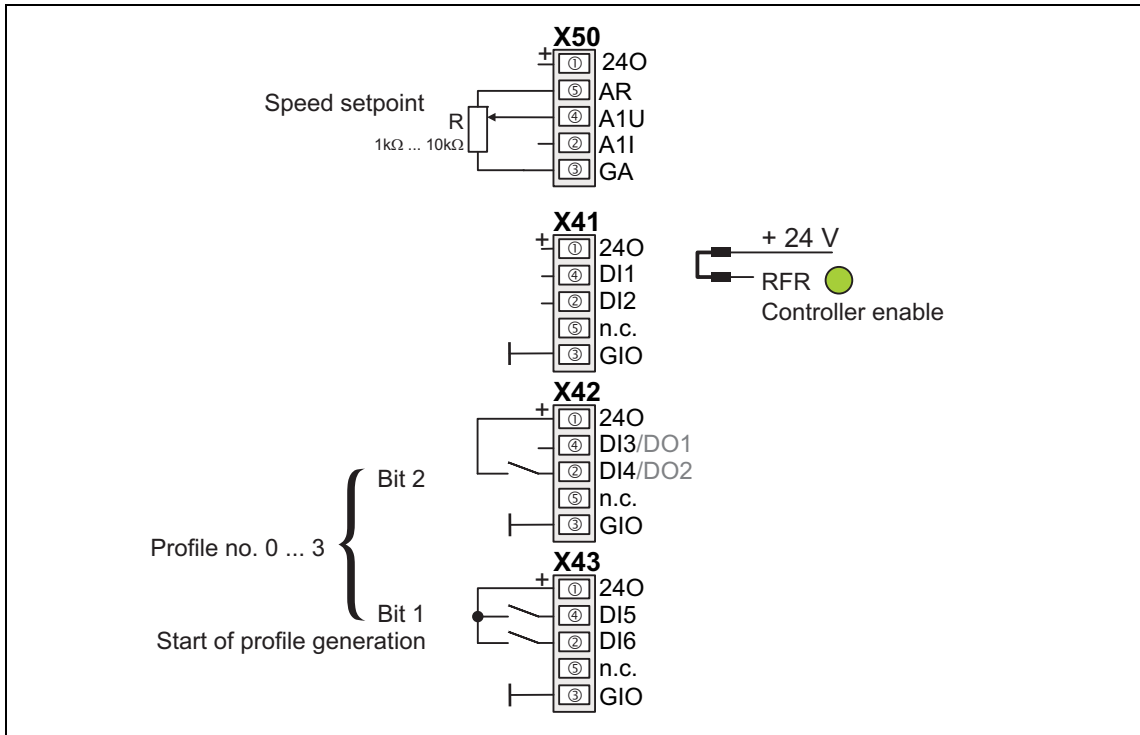


Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	LA_TabPos.bLimitSwitchPos	X42/DO1	LA_TabPos.bDriveReady
X42/DI4	LA_TabPos.bLimitSwitchNeg	X42/DO2	LA_TabPos.bInTarget
X43/DI5	LA_TabPos.bPosProfileNo_2	X50/A1U	LA_TabPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	LA_TabPos.bPosExecute		

When the profile is defined, the operating mode in the Lenze setting is changed simultaneously:

bPosProfileNo_2 (DI5)	bPosProfileNo_1 (-)	Selected profile	Activation of operating mode
FALSE	TRUE (fix)	1	Homing
TRUE	TRUE (fix)	3	Positioning

7.3.3.2 Terminals 2

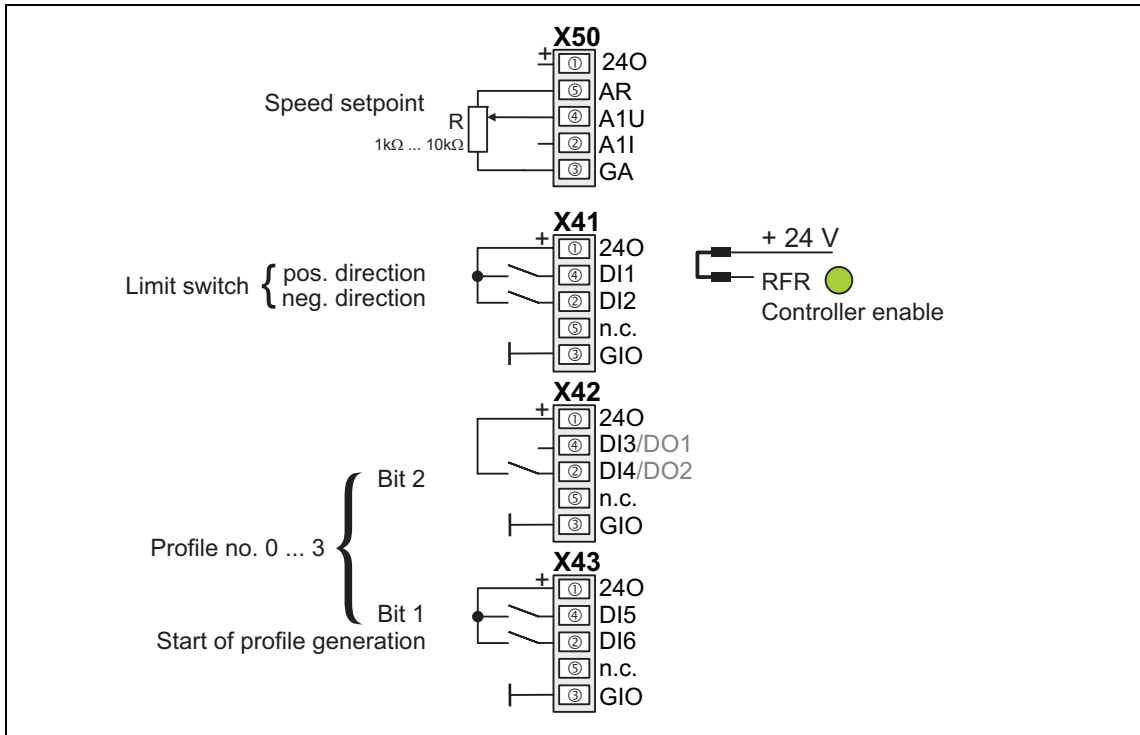


Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	-		
X42/DI4	LA_TabPos.bPosProfileNo_2	X42/DO1	LA_TabPos.bDriveReady
X43/DI5	LA_TabPos.bPosProfileNo_1	X42/DO2	LA_TabPos.bInTarget
X43/DI6	LA_TabPos.bPosExecute	X50/A1U	LA_TabPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)

When the profile is defined, the operating mode in the Lenze setting is changed simultaneously:

bPosProfileNo_2 (DI4)	bPosProfileNo_1 (DI5)	Selected profile	Activation of operating mode
FALSE	FALSE	0	Speed follower
FALSE	TRUE	1	Homing
TRUE	FALSE	2	Manual jog
TRUE	TRUE	3	Positioning

7.3.3.3 Terminals 11

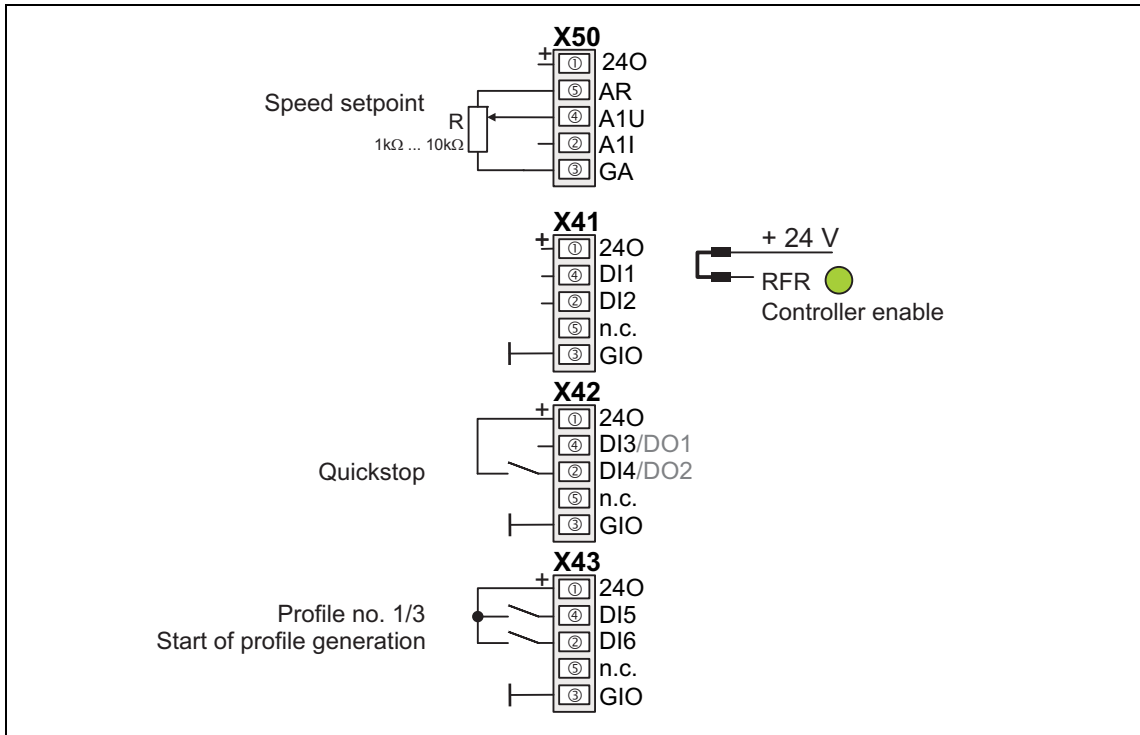


Connection	Assignment	Connection	Assignment
X41/DI1	LA_TabPos.bLimitSwitchPos	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_TabPos.bLimitSwitchNeg		
X42/DI3	-	X42/DO1	LA_TabPos.bDriveReady
X42/DI4	LA_TabPos.bPosProfileNo_2	X42/DO2	LA_TabPos.bInTarget
X43/DI5	LA_TabPos.bPosProfileNo_1	X50/A1U	LA_TabPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	LA_TabPos.bPosExecute		

When the profile is defined, the operating mode in the Lenze setting is changed simultaneously:

bPosProfileNo_2 (DI4)	bPosProfileNo_1 (DI5)	Selected profile	Activation of operating mode
FALSE	FALSE	0	Speed follower
FALSE	TRUE	1	Homing
TRUE	FALSE	2	Manual jog
TRUE	TRUE	3	Positioning

7.3.3.4 Terminal 16

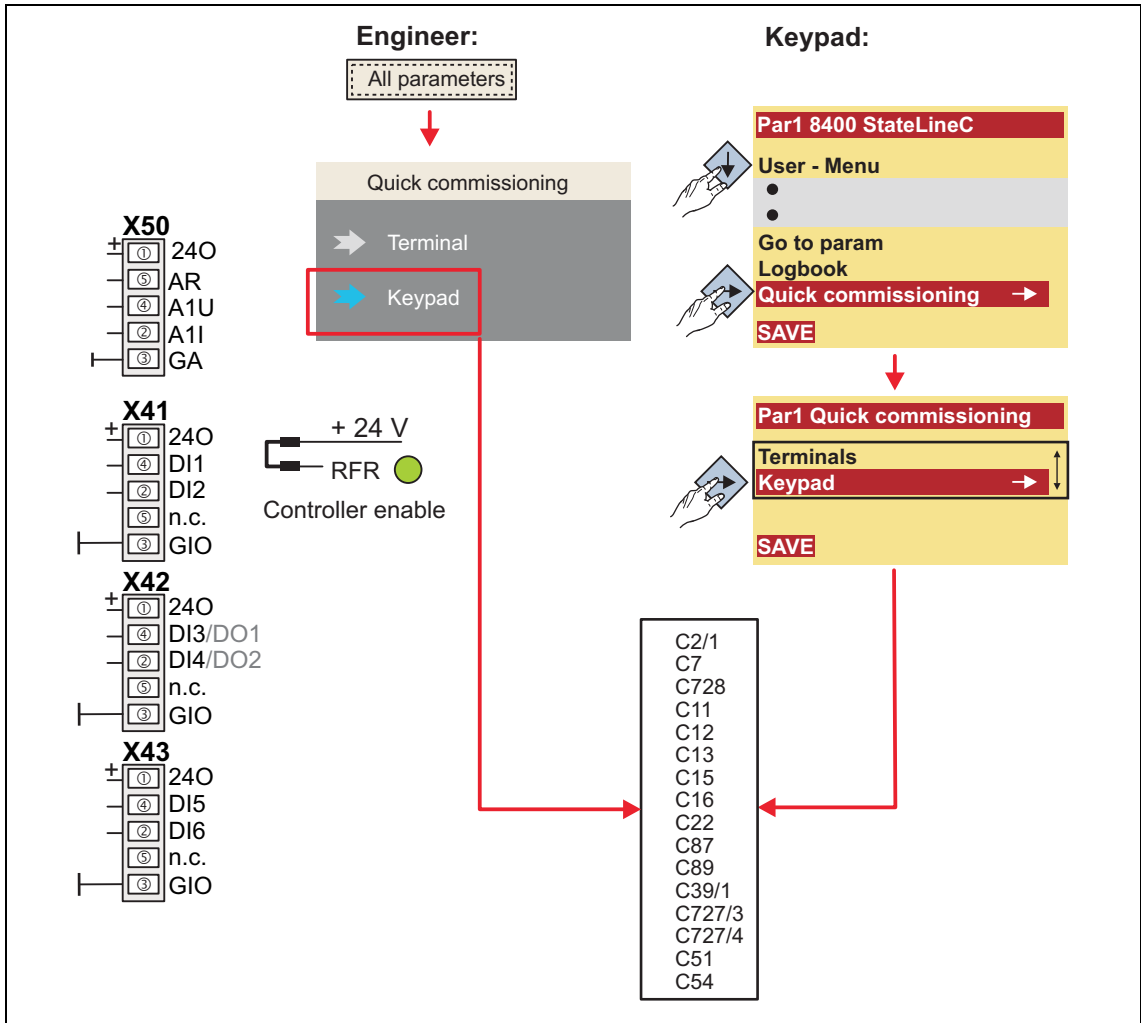


Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-	X42/DO1	LA_TabPos.bDriveReady
X42/DI3	-	X42/DO2	LA_TabPos.blInTarget
X42/DI4	LA_TabPos.bSetQuickstop	X50/A1U	LA_TabPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI5	LA_TabPos.bPosProfileNo_2		
X43/DI6	LA_TabPos.bPosExecute		

When the profile is defined, the operating mode in the Lenze setting is changed simultaneously:

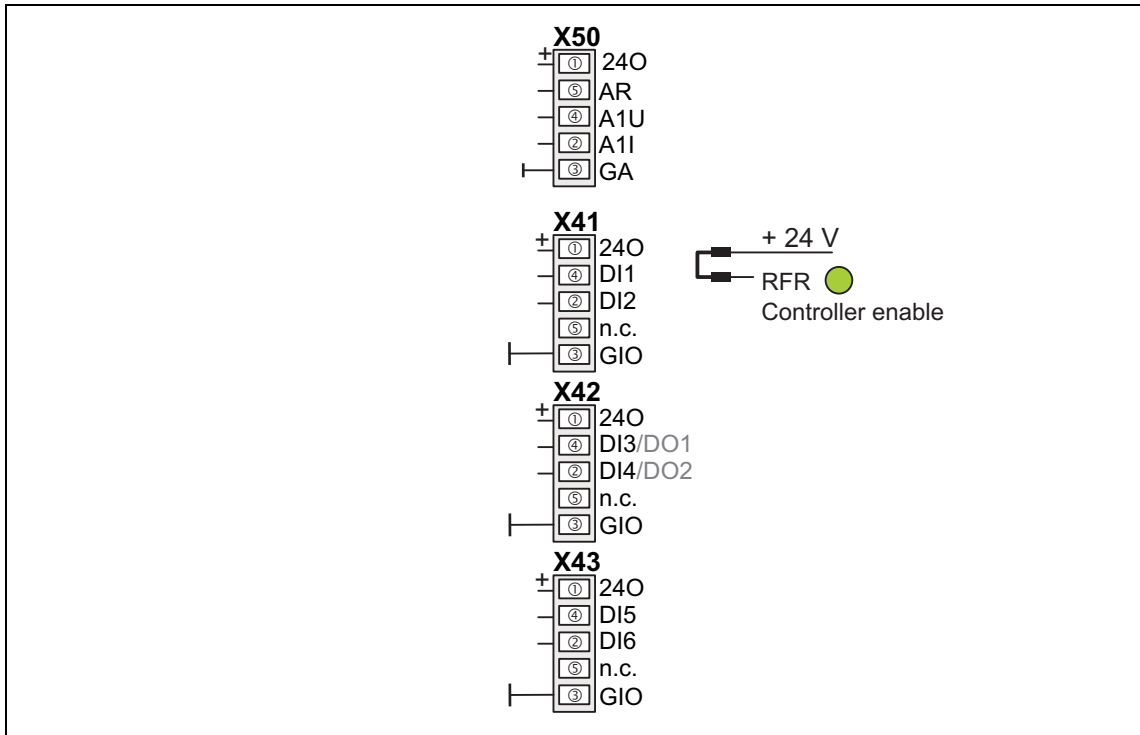
bPosProfileNo_2 (DI5)	bPosProfileNo_1 (-)	Selected profile	Activation of operating mode
FALSE	TRUE (fix)	1	Homing
TRUE	TRUE (fix)	3	Positioning

7.3.3.5 Keypad



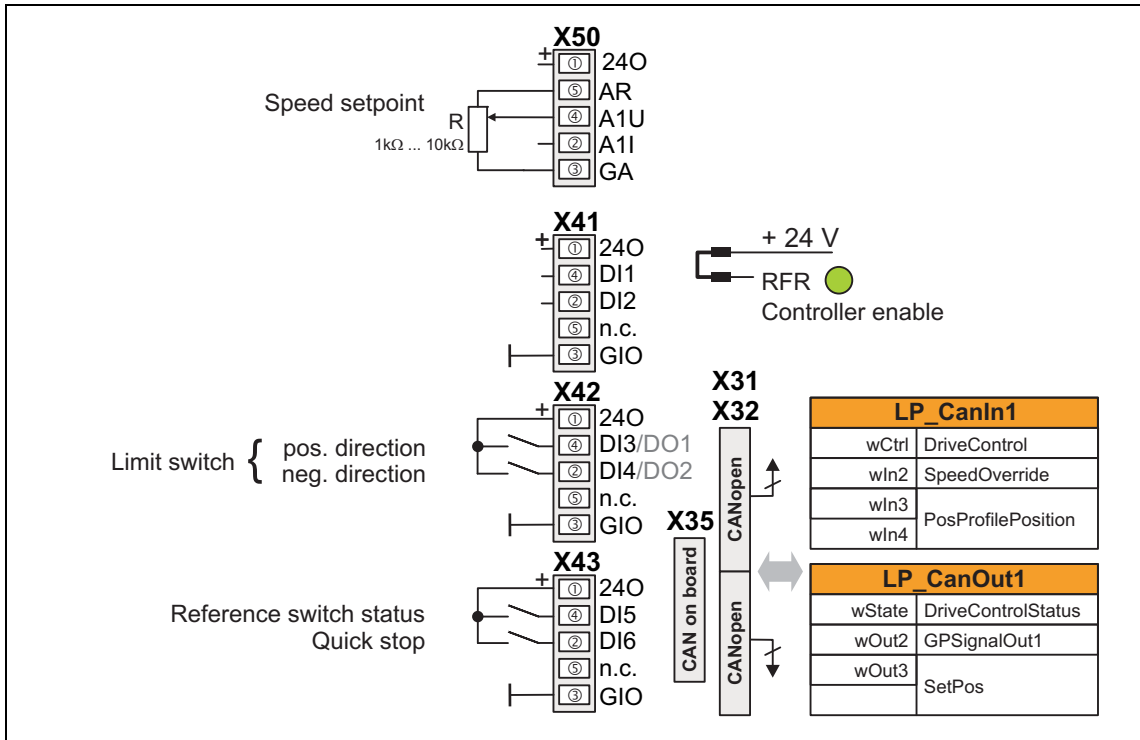
Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	-	X42/DO1	LA_TabPos.bDriveReady
X42/DI4	-	X42/DO2	LA_TabPos.blInTarget
X43/DI5	-	X50/A1U	-
X43/DI6	-		

7.3.3.6 PC



Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	-	X42/DO1	LA_TabPos.bDriveReady
X42/DI4	-	X42/DO2	LA_TabPos.bInTarget
X43/DI5	-	X50/A1U	-
X43/DI6	-		

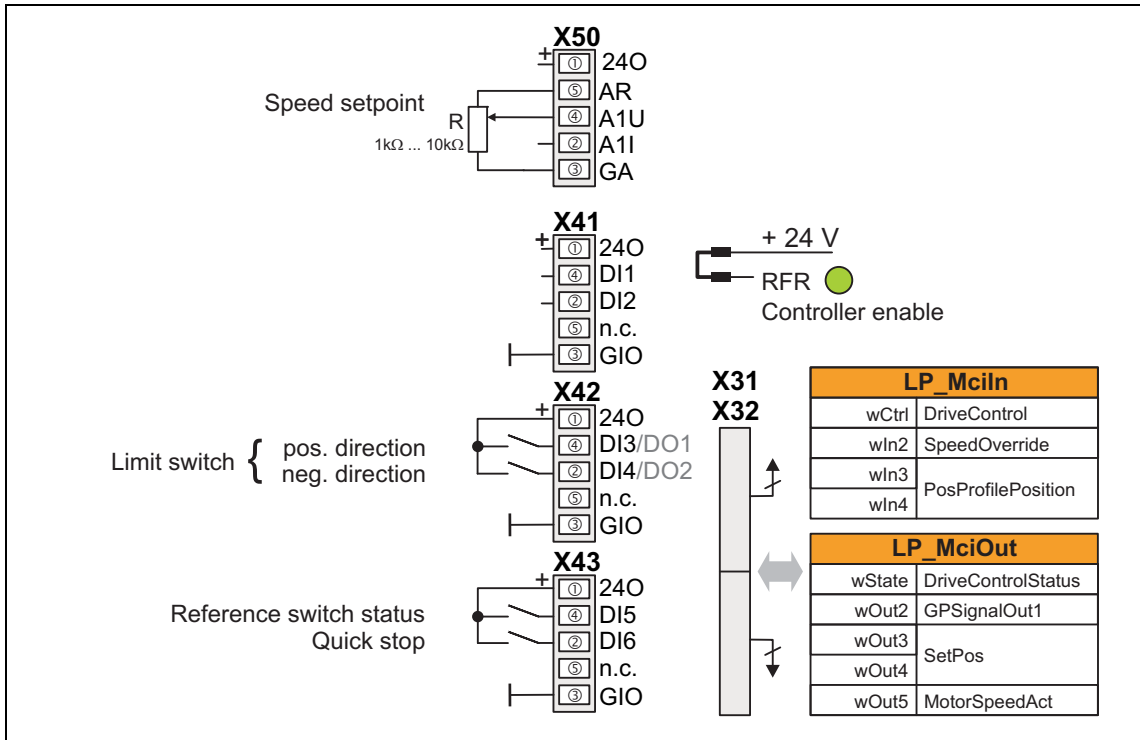
7.3.3.7 CAN



Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	LA_TabPos.bLimitSwitchPos	X42/DO1	LA_TabPos.bDriveReady
X42/DI4	LA_TabPos.bLimitSwitchNeg	X42/DO2	LA_TabPos.bInTarget
X43/DI5	LA_TabPos.bHomeMark	X50/A1U	LA_TabPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	LA_TabPos.bSetQuickstop		

► [Process data assignment for fieldbus communication](#) (427)

7.3.3.8 MCI



Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	LA_TabPos.bLimitSwitchPos	X42/DO1	LA_TabPos.bDriveReady
X42/DI4	LA_TabPos.bLimitSwitchNeg	X42/DO2	LA_TabPos.bInTarget
X43/DI5	LA_TabPos.bHomeMark	X50/A1U	LA_TabPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	LA_TabPos.bSetQuickstop		

▶ [Process data assignment for fieldbus communication \(427\)](#)

7.3.4 Process data assignment for fieldbus communication

The fieldbus communication is connected (preconfigured) to the previously selected technology application by selecting the corresponding control mode in [C00007](#):

- "30: [CAN](#)" for the connection to the system bus (CAN)
- "40: [MCI](#)" for the connection to a plugged-on communication module (e.g. PROFIBUS)

The assignment of the process data words depends only on the application, not on the bus system used:

Input words	Name	Assignment
Word 1	DriveControl	Control word <ul style="list-style-type: none"> • For bit assignment see the table below.
Word 2	SpeedOverride	Value for speed override <ul style="list-style-type: none"> • Percentage multiplier for the currently active speed. • 16384 \equiv 100 % of the maximum traversing speed (display in C01211/1). • Values > 16384 are ignored. • If the override value is 0 %, the drive is brought to a standstill. ▶ Speed override (□ 568)
Word 3 and 4	PosProfilePosition	Selection of the target position in [increments] <ul style="list-style-type: none"> • The mode for calculating the position is selected in C01296/1. • 65535 [Increments] \equiv 1 motor revolution • The position resolution, i.e. how many increments form one unit, is displayed in C01205.
Words 5 ... 16	-	Not preconfigured <ul style="list-style-type: none"> • Only available in control mode "40: MCI".

Control word	Name	Function
Bit 0	MckOperationMode_1	Binary-coded selection of the operating mode of the Motion Control Kernel <ul style="list-style-type: none"> • For a detailed description of the individual control bits, see chapter "MCK control word". (□ 474)
Bit 1	MckOperationMode_2	
Bit 2	MckOperationMode_4	
Bit 3	CINH	1 \equiv Inhibit inverter (controller inhibit): The inverter switches to the " SwitchedOn " device status. ▶ Enable/inhibit inverter (□ 105)
Bit 4	PosProfileNo_1	Selection of the profile number ▶ Stipulation of the profile to be executed (□ 559)
Bit 5	PosProfileNo_2	
Bit 6	PosProfileNo_4	
Bit 7	PosProfileNo_8	
Bit 8	PosExecute	1 \equiv Start travel job ▶ Positioning (□ 548)
Bit 9	EnableSpeedOverride	1 \equiv activate speed override ▶ Speed override (□ 568)
Bit 10	HomeSetPosition	1 \equiv Set home position ▶ Homing (□ 521)
Bit 11	FailReset	1 \equiv Reset error message ▶ Reset error message (□ 621)
Bit 12	ManJogNeg	Manual jog in positive/negative direction ▶ Manual jog (□ 540)
Bit 13	ManJogPos	
Bit 14	-	Free control bit 14 (not assigned, freely assignable)
Bit 15	-	Free control bit 15 (not assigned, freely assignable)

Output words	Name	Assignment
Word 1	DriveControlStatus	Status word <ul style="list-style-type: none"> For bit assignment see the table below.
Word 2	GPSignalOut1	Analog signal monitor: Output signal 1 <ul style="list-style-type: none"> The selection of the signal source to output is executed in C00410/1. Gain and offset for the output signal can be parameterised in C00413/1 and C00413/2. For a detailed functional description see the L_SignalMonitor_a FB.
Word 3 and 4	SetPos	Absolute position setpoint in [increments] <ul style="list-style-type: none"> 65535 [increments] \equiv 1 motor revolution The position resolution, i.e. how many increments form one unit, is displayed in C01205.
Word 5	MotorSpeedAct	Actual speed value <ul style="list-style-type: none"> Scaling: 16384 \equiv 100 % reference speed (C00011) Only available in control mode "40: MCI".
Word 6 ... 16	-	Not preconfigured <ul style="list-style-type: none"> Only available in control mode "40: MCI".

Status word	Name	Status
Bit 0	DriveFail	1 \equiv Inverter in the error status <ul style="list-style-type: none"> "Fault" device status is active.
Bit 1	GPSignalOut1	Binary signal monitor: Output signals 1 & 2 <ul style="list-style-type: none"> The signal sources to be output are selected in C00411/1...2. A bit coded inversion of the output signals can be parameterised in C00412. For a detailed functional description see FB L_SignalMonitor_b.
Bit 2	GPSignalOut2	
Bit 3	ClnhActive	1 \equiv Controller inhibit is active
Bit 4	DriveReady	1 \equiv Inverter is ready for operation <ul style="list-style-type: none"> "SwitchedOn" device status is active. The drive is in this device status if the DC bus voltage is applied and the inverter is still inhibited by the user (controller inhibit).
Bit 5	DigitalInput5	Signal from the digital input DI5
Bit 6	DigitalInput6	Signal from the digital input DI6
Bit 7	-	Free status bit 7 (not assigned, freely assignable)
Bit 8	InTarget	1 \equiv Target position (actual value) is in the target window
Bit 9	ProfileBusy	1 \equiv Profile positioning is active
Bit 10	HomePosAvailable	1 \equiv Home position is known
Bit 11	SpeedActCompare	Result of the speed comparison (detection of speed=0) <ul style="list-style-type: none"> In case of the "Open loop" operation: <ul style="list-style-type: none"> 1 \equiv Speed setpoint < comparison value (C00024) For "Closed loop" operation: <ul style="list-style-type: none"> 1 \equiv actual speed value < comparison value (C00024)
Bit 12	DigitalInput4	Signal from the digital input DI4
Bit 13	DigitalInput3	Signal from the digital input DI3
Bit 14	QSPlsActive	1 \equiv Quick stop is active
Bit 15	-	Free status bit 15 (not assigned, freely assignable)

7.3.5 Setting parameters (short overview)

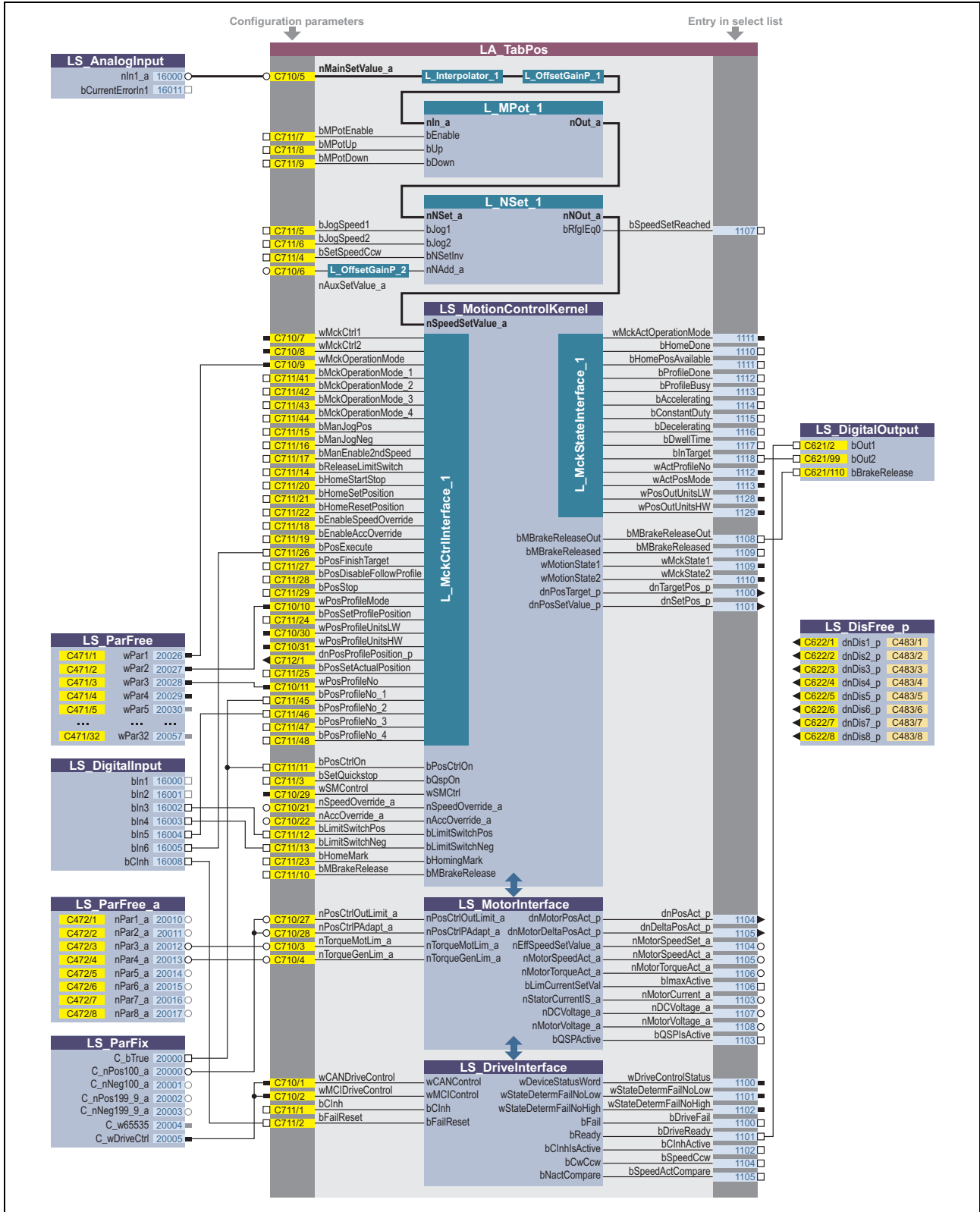
Parameters	Info	Lenze setting	
		Value	Unit
C00012	Accel. time - main setpoint	2.000	s
C00013	Decel. time - main setpoint	2.000	s
C00024	LS_DriveInterface: bNActCompare	0.00	%
C00039/1	Fixed setpoint 1	40.00	%
C00039/2	Fixed setpoint 2	60.00	%
C00182	L_NSet_1: S-ramp time PT1	20.00	s
C00190	L_NSet_1: Setpoint arithmetic	0: Out = Set	
C00220	L_NSet_1: Acceleration time - add. setpoint	0.000	s
C00221	L_NSet_1: Deceleration time - add. setpoint	0.000	s
C00632/1	L_NSet_1: Blocking speed 1 max	0.00	%
C00632/2	L_NSet_1: Blocking speed 2 max	0.00	%
C00632/3	L_NSet_1: Blocking speed 3 max	0.00	%
C00633/1	L_NSet_1: Blocking speed 1 min	0.00	%
C00633/2	L_NSet_1: Blocking speed 2 min	0.00	%
C00633/3	L_NSet_1: Blocking speed 3 min	0.00	%
C00635	L_NSet_1: nMaxLimit	199.99	%
C00636	L_NSet_1: nMinLimit	-199.99	%
C00670	L_OffsetGainP_1: Gain	1.0000	
C00671	L_OffsetGainP_2: Gain	1.0000	
C00696	L_OffsetGainP_1: Offset	0.00	%
C00697	L_OffsetGainP_2: Offset	0.00	%
C00800	L_MPot_1: Upper limit	100.00	%
C00801	L_MPot_1: Lower limit	-100.00	%
C00802	L_MPot_1: Acceleration time	10.0	s
C00803	L_MPot_1: Deceleration time	10.0	s
C00804	L_MPot_1: Inactive fct.	0: Retain value	
C00805	L_MPot_1: Init fct.	0: Load last value	
C00806	Use of motor potentiometer	0: No	
C01297	L_MckStateInterface_1: Alternative function	Bit coded	
C01298/1	MCK operating mode at profile no. 0	1: Follower	
C01298/2	MCK operating mode at profile no. 1	2: Homing	
C01298/3	MCK operating mode at profile no. 2	3: ManualJog	
C01298/4	MCK operating mode at profile no. 3...15	4: Positioning	
C01299	MCKI: Status MCKInterface	-	

Related topics:

▶ ["GeneralPurpose" functions](#) (460)

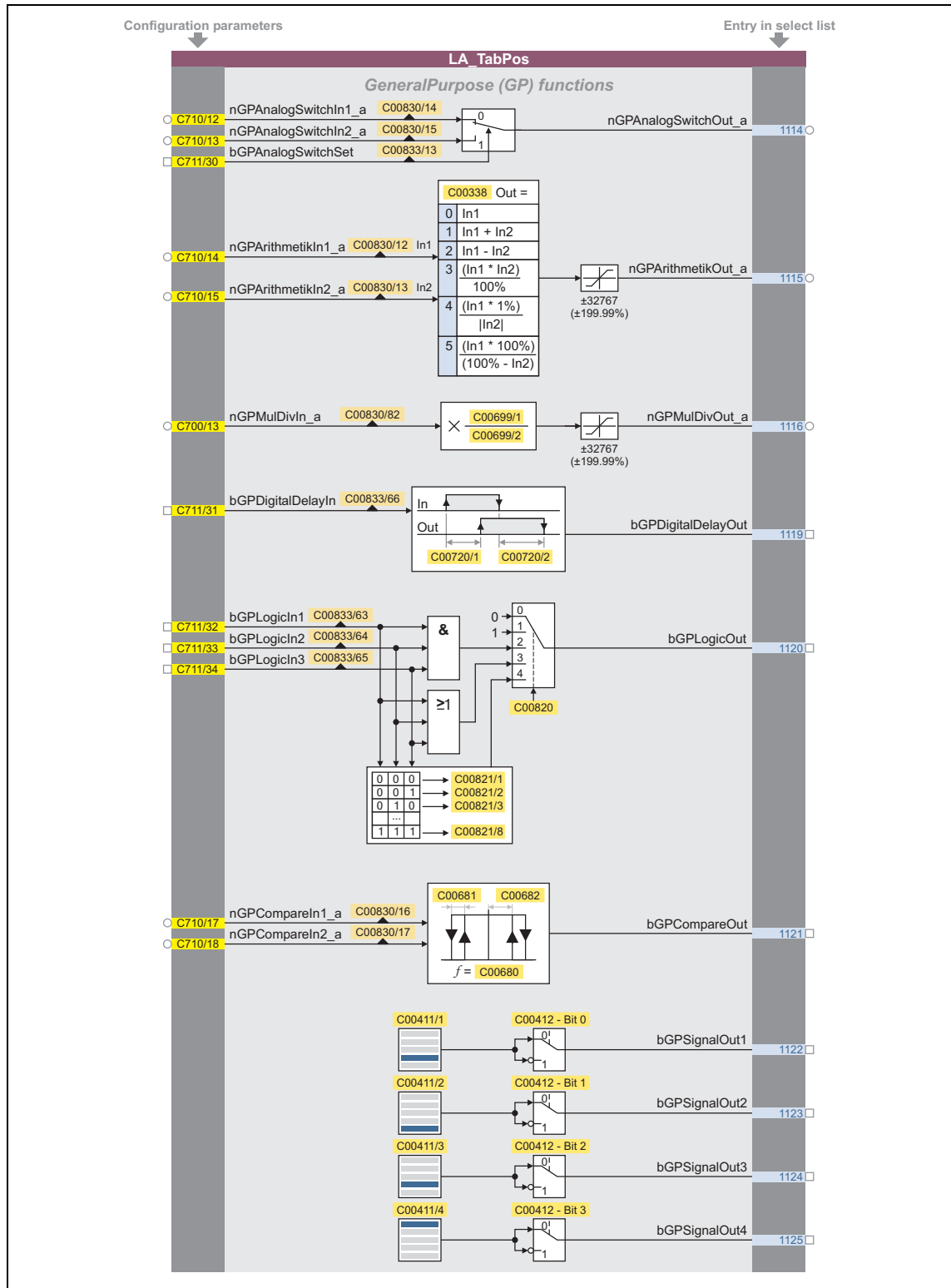
7.3.6 Configuration parameters

If required, the subcodes of [C00710](#), [C00711](#) and [C00712](#) serve to change the pre-configured assignment of the application inputs:

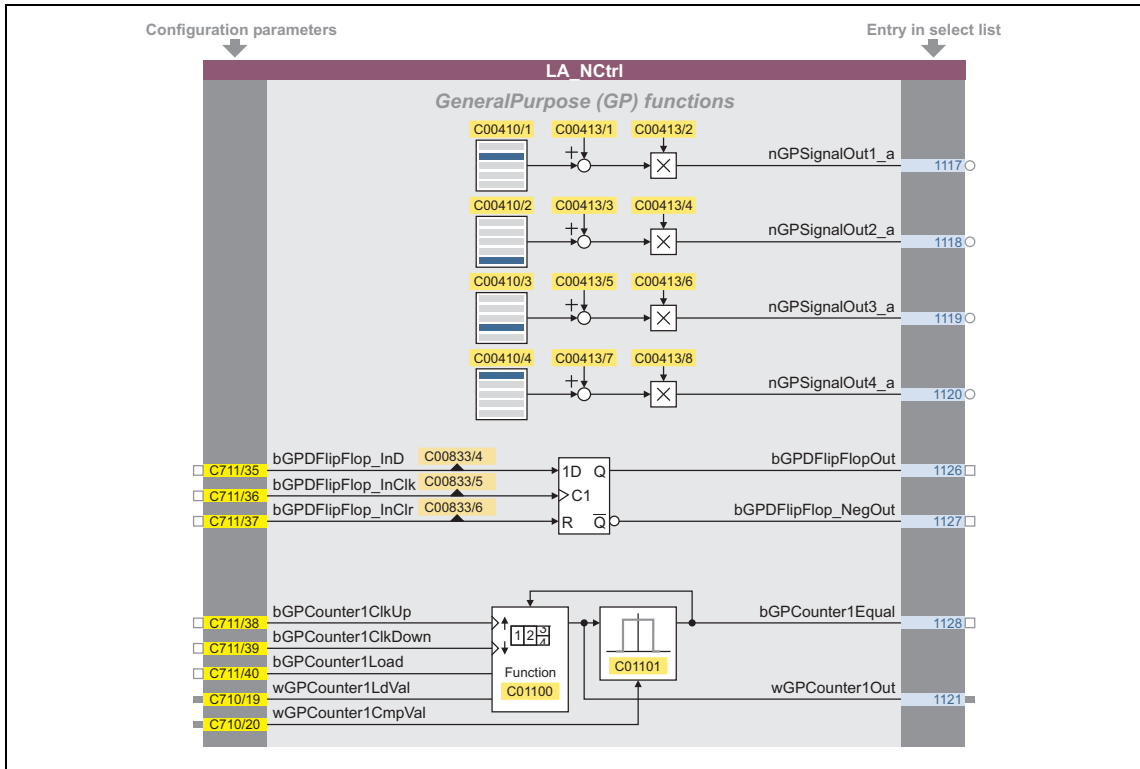


[7-7] Pre-assignment of the "Table positioning" application in the "Terminals 0" control mode

Configuration parameters for "GeneralPurpose" functions



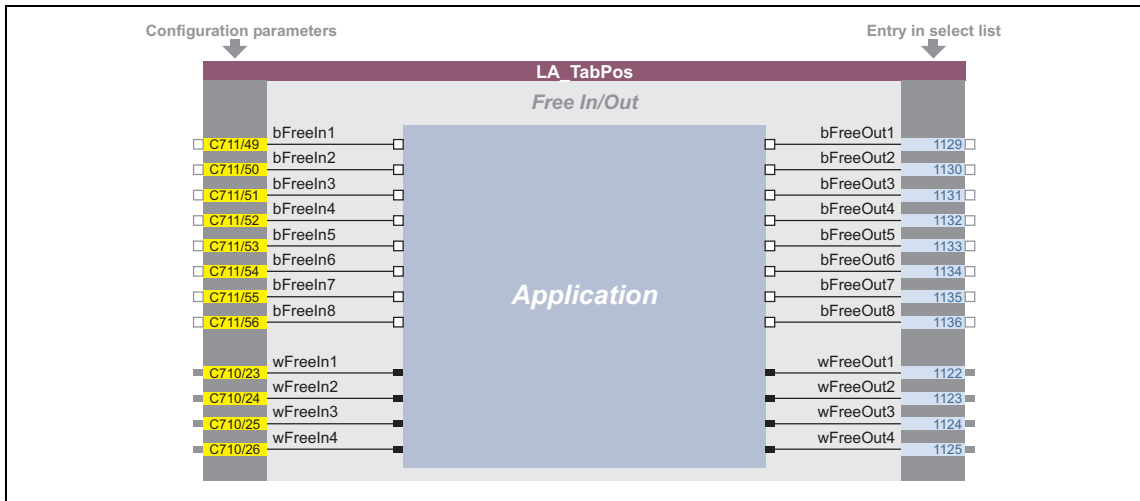
[7-8] "GeneralPurpose" functions



[7-9] "GeneralPurpose" functions (continuation)

Free inputs and outputs

These inputs can be freely interconnected in the application level. They can be used to transfer signals from the I/O level to the application level and vice versa.



[7-10] Free inputs/outputs

Related topics:

- ▶ [User-defined terminal assignment](#) (📖 368)
- ▶ ["GeneralPurpose" functions](#) (📖 460)

7.4 TA "Switch-off positioning"

The basic principle of this technology application is to travel to a switch-off sensor (e.g. a limit switch) in a speed-controlled manner and to stop as close as possible at this position. Unlike other positioning controls, the switch-off positioning neither has a position feedback nor calculates the path in advance. Thus, the accuracy that can be achieved depends on various factors such as the speed at which the switch-off sensor is advanced.

In addition, a pre-switch off can be implemented which requires a sufficient number of unassigned digital inputs on the inverter which can be used to connect other sensors for the additional stop positions. These sensors effect a reduction in speed before the last switch-off sensor is reached.

Product features

- Pre-configured control modes for terminals and bus control (with predefined process data connection to the fieldbus)
- Free configuration of input and output signals
- Offset, gain, and negation of main setpoint & additional setpoint
- Up to 15 fixed setpoints for speed and ramp time
- Adjustable setpoint ramp times
- Freely selectable, variable ramp shape
- Automatic holding brake control
- Quick stop (QSP) with adjustable ramp time
- Integrated, freely available "GeneralPurpose" functions: Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop
- Interface to the safety module (optional)
- Integration of encoder feedback
- Switch-off sensor management for the implementation of a pre-switch off

Decision criteria

Criteria	Switch-off positioning with constant load	Switch-off positioning with variable load
Operating mode	V/f characteristic without speed sensor. Alternatively for large breakaway torques: Use of a sensorless vector control (only applicable for horizontal movements).	
Limit switch evaluation	One limit switch is required per direction of movement. When the limit switch is reached, the drive is brought to a standstill led by the deceleration ramp or the QSP ramp.	One limit switch and an initiator are required for fast/slow changeover per direction of movement. When the initiator has been reached, the speed of the drive is reduced to a creeping speed (fixed setpoint 2) in a controlled way. When the limit switch is reached, the drive is brought to a standstill led by the deceleration ramp or the QSP ramp.

Criteria	Switch-off positioning with constant load	Switch-off positioning with variable load
Positioning accuracy at the motor shaft The positioning accuracy of the load depends, among other things, on the clearance and friction of the selected mechanics and has to be determined individually.	The ideal case is 5-10° at the motor shaft. Consider the influence of the motor temperature. In the case of a constant load, you can assume a good repeat accuracy during positioning. In the case of variable loads, you must take significant deviations into account.	5-10° at the motor shaft. As the positioning is executed in a creeping speed, a good repeat accuracy is reached even for variable loads.
Speed setting range	1 : 50, based on 50Hz and M_n	1 : 50, based on 50Hz and M_n
Typical applications	Switch-off positioning with constant load, e.g. travelling drive, roll-up door.	Switch-off positioning with variable load, e.g. travelling drive, conveying belt, hoists approaching a stop position.

System limits and exclusion criteria

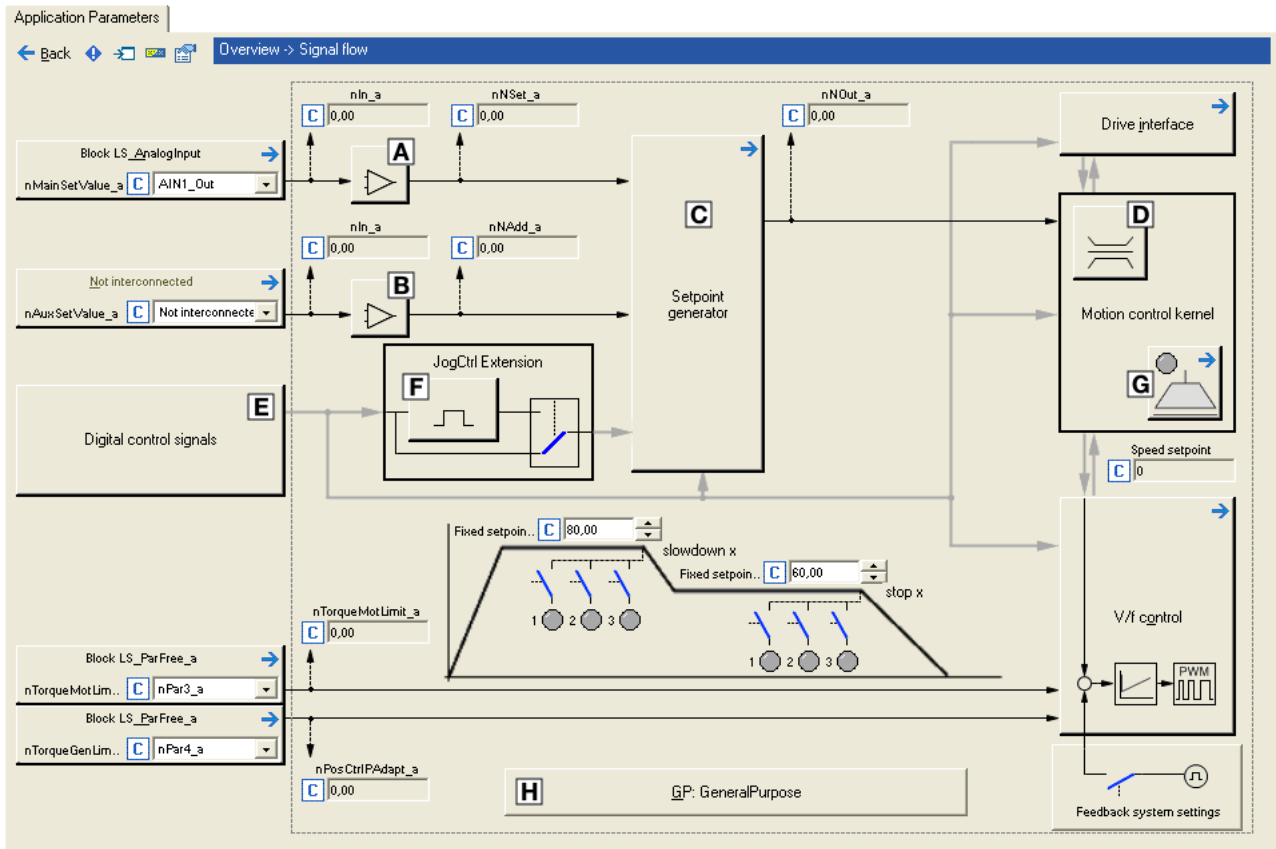
They result from the non-compliance with the decision criteria.

- Compared to systems with speed feedback, the positioning and repeat accuracy is reduced.
- Due to the mechanical hardware limit switches, this concept is only applicable for systems with only a few fixed positions. Changing the target position during the operation or the teaching is not possible.
- If necessary, additional functions like manual jog or homing must be realised externally, e.g. via a control.
- As the 8400 protec HighLine inverter does not meet safety-related functions except STO (Safe Torque Off), you must observe that all safety-related aspects are realised by the plant instructor.
- Especially in the case of an outdoor use or in wet areas, you must consider the corresponding discharge currents when operated with a fault current circuit breaker.
- A table positioning or sequential positioning control is required for highly dynamic applications and jerk-free traversing profiles which is available with the "HighLine" device version.

Related topics:

- ▶ [Commissioning of the "Switch-off positioning" technology application \(80\)](#)

7.4.1 Basic signal flow



[7-11] Signal flow of the switch-off positioning

- Ⓐ Main speed setpoint offset and gain ([L_OffsetGainP_1](#))
- Ⓑ Additional speed setpoint offset and gain ([L_OffsetGainP_2](#))
- Ⓒ Setpoint generator ([L_NSet_1](#))
- Ⓓ Speed setpoint input limitation
- Ⓔ Terminal assignment & display of digital control signals
- Ⓕ Selection of edge/level for tripping the ramp down and stop functions ([L_JogCtrlExtension_1](#))
- Ⓖ [Holding brake control](#)
- Ⓗ Integrated disposable "[GeneralPurpose](#)" functions: Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop

7.4.2 Internal interfaces | application block "LA_SwitchPos"




**Note!**

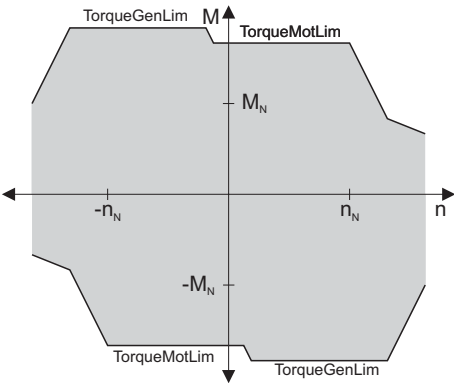
The connectors greyed out in the following table are hidden in the function block editor in the Lenze setting.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

Inputs

Designator	Data type	Information/possible settings		
wCANDriveControl	WORD	Control word via system bus (CAN) for device control <ul style="list-style-type: none"> • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits. 		
wMCIDriveControl	WORD	Control word via communication module (e.g. PROFIBUS) for device control <ul style="list-style-type: none"> • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits. 		
wSMControl	WORD	Interface to the optional safety system. <ul style="list-style-type: none"> • Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). • See the subchapter "Interface to safety system" of the chapter on basic drive functions for a detailed description of the individual control bits. 		
bCInh	BOOL	Enable/inhibit inverter		
		<table border="1"> <tr> <td>FALSE</td> <td>Enable inverter: The inverter switches to the "OperationEnabled" device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. </td> </tr> <tr> <td>TRUE</td> <td>Inhibit inverter (controller inhibit): The inverter switches to the "SwitchedOn" device status.</td> </tr> </table>	FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit.
FALSE	Enable inverter: The inverter switches to the " OperationEnabled " device status if no other source for controller inhibit is active. <ul style="list-style-type: none"> • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. 			
TRUE	Inhibit inverter (controller inhibit): The inverter switches to the " SwitchedOn " device status.			
bFailReset	BOOL	Reset error message In the Lenze setting this input is connected to the digital input controller enable so that a possibly existing error message is reset together with the controller enable (if the cause for the fault is eliminated).		
		<table border="1"> <tr> <td>TRUE</td> <td>The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged. </td> </tr> </table>	TRUE	The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged.
TRUE	The current fault is reset, if the cause for the fault is eliminated. <ul style="list-style-type: none"> • If the fault still exists, the error status remains unchanged. 			
bSetQuickstop	BOOL	Activate quick stop (QSP) <ul style="list-style-type: none"> • Also see device command "Activate/deactivate quick stop". 		
		<table border="1"> <tr> <td>TRUE</td> <td>Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019. </td> </tr> </table>	TRUE	Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019.
		TRUE	Activate quick stop <ul style="list-style-type: none"> • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019. 	
<table border="1"> <tr> <td>FALSE</td> <td>Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. </td> </tr> </table>	FALSE	Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. 		
FALSE	Deactivate quick stop <ul style="list-style-type: none"> • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop. 			

Designator	Data type	Information/possible settings
bSetDCBrake	BOOL	Manual DC-injection braking (DCB) <ul style="list-style-type: none"> Detailed information on DC-injection braking is provided in the motor control chapter, subchapter "DC-injection braking".
		 Note! Holding braking is not possible when this braking mode is used! Use the basic " Holding brake control " function for controlling the holding brake with a low rate of wear.
		FALSE Deactivate DC-injection braking.
		TRUE Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. <ul style="list-style-type: none"> The braking effect stops when the rotor is at standstill. After the hold time (C00107) has expired, the controller sets the pulse inhibit.
bRFG_Stop	BOOL	Ramp function generator: Maintain the current value of the main setpoint integrator <ul style="list-style-type: none"> The speed, for instance, of a running ramp process is immediately kept constant when <i>bRFG_Stop</i> is activated. At the same time, the acceleration/deceleration jumps to the value "0". For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is held.
nVoltageAdd_a	INT	Additive voltage impression <ul style="list-style-type: none"> An additional setpoint for the motor voltage can be specified via this process input. If there are, for instance, different loads at the motor output end, it is possible to apply a voltage boost at the starting time. If the value is negative, the voltage is reduced. Scaling: 16384 \equiv 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nBoost_a	INT	Additional setpoint for the motor voltage at speed = 0 <ul style="list-style-type: none"> The entire voltage-frequency characteristic is provided with an offset. Scaling: 16384 \equiv 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nPWMAngleOffset	INT	Additional offset for the electrical angle of rotation <ul style="list-style-type: none"> If a torque is connected, e.g. dynamic acceleration processes can be generated. Scaling: $\pm 32767 \equiv \pm 180^\circ$ angle of rotation

Designator	Data type	Information/possible settings				
nTorqueMotLim_a nTorqueGenLim_a	INT	<p>Torque limitation in motor mode and in generator mode</p> <ul style="list-style-type: none"> • These input signals are directly transferred to the motor control to limit the inverter's maximum torque in motor and generator mode. • The drive cannot output a higher torque in motor/generator mode than set here. • The applied values (any polarity) are internally interpreted as absolute values. • If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called I_{max} controller. • If sensorless vector control (SLVC) or servo control (SC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. • Scaling: $16384 \equiv 100\% M_{max}$ (C00057) <p>Torque limits in motor and generator mode:</p> 				
bSetSpeedCcw	BOOL	<p>Change of direction of rotation</p> <ul style="list-style-type: none"> • For instance if a motor or gearbox is fixed laterally reversed to a machine part, but the setpoint selection should still be executed for the positive direction of rotation. <table border="1"> <tr> <td>FALSE</td> <td>Clockwise rotation (Cw)</td> </tr> <tr> <td>TRUE</td> <td>Direction of rotation to the left (Ccw)</td> </tr> </table>	FALSE	Clockwise rotation (Cw)	TRUE	Direction of rotation to the left (Ccw)
FALSE	Clockwise rotation (Cw)					
TRUE	Direction of rotation to the left (Ccw)					
bRLQCw	BOOL	<p>Activate clockwise rotation (fail-safe)</p> <ul style="list-style-type: none"> • For a detailed functional description see the L_RLO FB. <table border="1"> <tr> <td>FALSE</td> <td>Quick stop</td> </tr> <tr> <td>TRUE</td> <td>CW rotation</td> </tr> </table>	FALSE	Quick stop	TRUE	CW rotation
FALSE	Quick stop					
TRUE	CW rotation					
bRLQCcw	BOOL	<p>Activate counter-clockwise rotation (fail-safe)</p> <ul style="list-style-type: none"> • For a detailed functional description see the L_RLO FB. <table border="1"> <tr> <td>FALSE</td> <td>Quick stop</td> </tr> <tr> <td>TRUE</td> <td>Counter-clockwise rotation</td> </tr> </table>	FALSE	Quick stop	TRUE	Counter-clockwise rotation
FALSE	Quick stop					
TRUE	Counter-clockwise rotation					
nMainSetValue_a	INT	<p>Main speed setpoint</p> <ul style="list-style-type: none"> • Offset and gain of this input signal can be set in C00696 and C00670 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100\%$ reference speed (C00011) • The main setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps. • Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective. • For a detailed functional description see the L_NSet FB. 				
nAuxSetValue_a	INT	<p>Additional speed setpoint</p> <ul style="list-style-type: none"> • Offset and gain of this input signal can be set in C00697 and C00671 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100\%$ reference speed (C00011) • The additional speed setpoint can be linked arithmetically with the main speed setpoint behind the ramp function generator. • The additional speed setpoint can be shown via ramp times of a second ramp function generator. • For a detailed functional description see the L_NSet FB. 				

Designator	Data type	Information/possible settings	
Switch-off positioning			
bJogCtrlInputSel1 bJogCtrlInputSel2	BOOL	Selection inputs for a binary coded selection of the switch-off position 1 ... 3 <ul style="list-style-type: none"> Activation of the signal pairs <i>bJogCtrlSlowDown1/bJogCtrlStop1</i>, <i>bJogCtrlSlowDown2/bJogCtrlStop2</i> or <i>bJogCtrlSlowDown3/bJogCtrlStop3</i> according to the Truth table for activating the pre-switch off. 	
bJogCtrlRfgrn	BOOL	Ramping down of the setpoint generator in the downstream L_NSet FB according to the Truth table for activating the pre-switch off	
bJogCtrlJog1 bJogCtrlJog2	BOOL	Inputs for overriding fixed setpoints (JOG setpoints) for the main setpoint <ul style="list-style-type: none"> If the pre-switch off is inactive (<i>bJogCtrlInputSel1</i> and <i>bJogCtrlInputSel2</i> are both set to FALSE), the two control signals are passed through 1:1 to the downstream FB L_NSet. To achieve the desired behaviour (starting at high speed, pre-switch off at low speed), both inputs must be set to TRUE. Fixed setpoint 2 must be less than fixed setpoint 3! Otherwise, the drive will start at a low speed and accelerate after the pre-switch off. If in addition to the inputs <i>bJogCtrlJog1</i> and <i>bJogCtrlJog2</i> the selection inputs <i>bJogSpeed4</i> and <i>bJogSpeed8</i> are assigned, different fixed setpoints can result from this and the drive may travel with different speeds than selected via <i>bJogCtrlJog1</i> and <i>bJogCtrlJog2</i>. 	
bJogCtrlSlowDown1 bJogCtrlSlowDown2 bJogCtrlSlowDown3	BOOL	Activation of fixed setpoint 2 in the downstream L_NSet FB <ul style="list-style-type: none"> These inputs only have a function if they have been previously activated via <i>bJogCtrlInputSel1</i> and <i>bJogCtrlInputSel2</i> (see Truth table for activating the pre-switch off). 	
bJogCtrlStop1 bJogCtrlStop2 bJogCtrlStop3	BOOL	Ramping down of the ramp function generator in the downstream L_NSet FB <ul style="list-style-type: none"> These inputs only have a function if they have been previously activated via <i>bJogCtrlInputSel1</i> and <i>bJogCtrlInputSel2</i> (see Truth table for activating the pre-switch off). 	
bJogSpeed4 bJogSpeed8	BOOL	Inputs for overriding fixed setpoints (JOG setpoints) for the main setpoint <ul style="list-style-type: none"> A fixed setpoint for the setpoint generator can be activated instead of the main setpoint via these selection inputs. The selection inputs are binary coded. For a detailed functional description see the L_NSet FB. 	
bJogRamp1 ... bJogRamp8	BOOL	Selection inputs for alternative acceleration/deceleration times for the main setpoint <ul style="list-style-type: none"> The four selection inputs are binary coded, therefore 15 alternative acceleration/deceleration times can be selected. For main setpoint <i>nMainSetValue_a</i>, the set acceleration time (C00012) and deceleration time (C00013) are active in the case of the binary coded selection "0" (all inputs = FALSE or not assigned). Alternative acceleration times are selected in C00101/1...15. The selection of the alternative deceleration times is carried out in C00103/1...15. For a detailed functional description see the L_NSet FB. 	
MCK basic functions			
bMBrakeRelease	BOOL	Holding brake control : Release/apply brake <ul style="list-style-type: none"> In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off"). 	
		FALSE	Apply brake. <ul style="list-style-type: none"> During automatic operation, the internal brake logic controls the brake.
		TRUE	Release brake manually (forced release). <ul style="list-style-type: none"> Note! The brake can also be released when the controller is inhibited! During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. In semi-automatic operation, the brake is released including feedforward control.

Designator Data type	Information/possible settings				
GP: GeneralPurpose The following inputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions					
nGPAAnalogSwitchIn1_a nGPAAnalogSwitchIn2_a INT	Analog switch: Input signals <ul style="list-style-type: none"> The input signal selected via the selection input <i>bGPAAnalogSwitchSet</i> is output at output <i>nGPAAnalogSwitchOut_a</i>. 				
bGPAAnalogSwitchSet BOOL	Analog switch: Selection input <table border="1"> <tr> <td>FALSE</td> <td><i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i></td> </tr> <tr> <td>TRUE</td> <td><i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i></td> </tr> </table>	FALSE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i>	TRUE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i>
FALSE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i>				
TRUE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i>				
nGPArithmetikIn1_a nGPArithmetikIn2_a INT	Arithmetic: Input signals <ul style="list-style-type: none"> The arithmetic function is selected in C00338. The result is output at output <i>nGPArithmetikOut_a</i>. 				
nGPMulDivIn_a INT	Multiplication/Division: Input signal <ul style="list-style-type: none"> The factor for the multiplication can be set in C00699/1 (numerator) and C00699/2 (denominator). The result is output at output <i>nGPMulDivOut_a</i>. 				
bGPDigitalDelayIn BOOL	Binary delay element: Input signal <ul style="list-style-type: none"> The on-delay can be set in C00720/1. The off-delay can be set in C00720/2. The time-delayed input signal is output at output <i>bGPDigitalDelayOut</i>. 				
bGPLogicIn1 bGPLogicIn2 bGPLogicIn3 BOOL	Binary logic: Input signals <ul style="list-style-type: none"> The logic operation is selected in C00820. The result is output at output <i>bGPLogicOut</i>. 				
nGPCompareIn1_a nGPCompareIn2_a INT	Analog comparison: Input signals <ul style="list-style-type: none"> The comparison operation is selected in C00680. Hysteresis and window size can be set in C00680 and C00682. If the comparison statement is true, the output <i>bGPCompareOut</i> will be set to TRUE. 				
bGPDFlipFlop_InD bGPDFlipFlop_InClk bGPDFlipFlop_InClr BOOL	D-FlipFlop: Input signals <ul style="list-style-type: none"> Data, clock and reset input 				
Free inputs The following inputs can freely be interconnected on the application level. The signals can be transferred from the I/O level to the application level via these inputs.					
bFreeIn1 ... bFreeIn8 BOOL	Free inputs for digital signals				
wFreeIn1 ... wFreeIn4 WORD	Free inputs for 16-bit signals				
dnFreeIn1_p ... dnFreeIn2_p DINT	Free inputs for 32-bit signals				

Outputs

Designator Data type	Value/meaning
wDriveControlStatus WORD	Status word of the inverter <ul style="list-style-type: none"> The status word contains information on the currents status of the inverter. See the "wDeviceStatusWord status word" subchapter of the chapter on device control for a detailed description of the bit assignment.
wStateDetermFailNoLow WORD	Display of the status determining error (LOW word)
wStateDetermFailNoHigh WORD	Display of the status determining error (HIGH word)

Designator	Data type	Value/meaning	
bDriveFail	BOOL	TRUE	Inverter in error status. • " Fault " device status is active.
bWarningActive	BOOL	TRUE	A monitoring in the inverter, for which the error response "Warning" or "Warning locked" has been parameterised, responded.
bSafeTorqueOff	BOOL	TRUE	Safe torque off. • " SafeTorqueOff " device status is active.
bDriveReady	BOOL	TRUE	Inverter is ready for operation. • " SwitchedOn " device status is active. • The drive is in this device status if the DC bus voltage is applied and the inverter is still inhibited by the user (controller inhibit).
bCInhActive	BOOL	TRUE	Controller inhibit is active.
bImplsActive	BOOL	TRUE	Pulse inhibit is active.
bQSPLsActive	BOOL	TRUE	Quick stop is active.
bSpeedCcw	BOOL	Current direction of rotation	
		FALSE	Clockwise rotation (Cw)
		TRUE	Direction of rotation to the left (Ccw)
bSpeedActCompare	BOOL	Result of the speed comparison (detection of speed=0)	
		TRUE	During open-loop operation: Speed setpoint < Comparison value (C00024)
			During closed-loop operation: Actual speed value < Comparison value (C00024)
blmaxActive	BOOL	"Current setpoint inside the limitation" status signal	
		TRUE	The current setpoint is internally limited (the inverter operates at the maximum current limit).
bSpeedSetReached	BOOL	Status signal "setpoint = 0"	
		TRUE	Speed setpoint from the ramp function generator = 0
bSpeedActEqSet	BOOL	TRUE	Actual speed value = speed setpoint
nMotorCurrent_a	INT	Current stator current/effective motor current • Scaling: 16384 \equiv 100 % I_{\max_mot} (C00022)	
nMotorSpeedSet_a	INT	Speed setpoint • Scaling: 16384 \equiv 100 % reference speed (C00011)	
nMotorSpeedAct_a	INT	Actual speed value • Scaling: 16384 \equiv 100 % reference speed (C00011)	
nMotorTorqueAct_a	INT	Actual torque • In the "VFC (+encoder)" operating mode of the motor control, this value is determined from the current motor current and corresponds to the actual torque only by approximation. • Scaling: 16384 \equiv 100 % M_{\max} (C00057)	
nDCVoltage_a	INT	Actual DC-bus voltage • Scaling: 16384 \equiv 1000 V	
nMotorVoltage_a	INT	Current motor voltage/inverter output voltage • Scaling: 16384 \equiv 1000 V	

Designator	Data type	Value/meaning	
MCK basic functions			
bMBrakeReleaseOut	BOOL	Holding brake control : Trigger signal for the holding brake control switching element via a digital output <ul style="list-style-type: none"> Use bit 0 in C02582 to activate inverted switching element triggering. 	
		FALSE	Apply brake.
		TRUE	Release brake.
bMBrakeReleased	BOOL	Holding brake control : "Brake released" considering the brake release time <ul style="list-style-type: none"> When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed! 	
		TRUE	Brake released (after the brake release time has expired).
GP: GeneralPurpose			
The following outputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions			
nGPAalogSwitchInOut_a	INT	Analog switch : Output signal	
nGPArithmetikOut_a	INT	Arithmetic : Output signal	
nGPMulDivOut_a	INT	Multiplication/Division : Output signal	
bGPDigitalDelayOut	BOOL	Binary delay element : Output signal	
bGPLogicOut	BOOL	Binary logic : Output signal	
bGPCompareOut	BOOL	Analog comparison : Output signal	
bGPSignalOut1 ... bGPSignalOut4	BOOL	Binary signal monitor : Output signals <ul style="list-style-type: none"> The signal sources to be output are selected in C00411/1...4. A bit coded inversion of the output signals can be parameterised in C00412. 	
nGPSignalOut1_a ... nGPSignalOut4_a	BOOL	Analog signal monitor : Output signals <ul style="list-style-type: none"> The signal sources to be output are selected in C00410/1...4. Gain and offset for each output signal can be parameterised in C00413/1...8. 	
bGPDFlipFlop_Out	BOOL	D-FlipFlop : Output signal	
bGPDFlipFlop_NegOut	BOOL	D-FlipFlop : Negated output signal	
Free outputs			
The following outputs can freely be interconnected on the application level. The signals from the application level can be transferred to the I/O level via these outputs.			
bFreeOut1 ... bFreeOut8	BOOL	Free outputs for digital signals	
wFreeOut1 ... wFreeOut4	WORD	Free outputs for 16-bit signals	
dnFreeOut1_p dnFreeOut2_p	WORD	Free outputs for 32-bit signals	

7.4.2.1 Truth table for activating the pre-switch off

Input		Function	Response in the setpoint generator (FB L_NSet)
bJogCtrl InputSel1	bJogCtrl InputSel2		
FALSE	FALSE	Pre-switch off inactive	No response <ul style="list-style-type: none"> The input signal <i>bJogCtrlRfgIn</i> is output directly at output <i>bRfgOut</i>. The input signals <i>bJogCtrlJog1</i> and <i>bJogCtrlJog2</i> are passed through 1:1 to the downstream FB L_NSet for the selection of fixed setpoints.
TRUE	FALSE	The <i>bJogCtrlSlowDown1</i> and <i>bJogCtrlStop1</i> inputs are evaluated.	Pre-switch off can be activated <ul style="list-style-type: none"> If the slowdown function is activated via the selected <i>bJogCtrlSlowDown</i> input, fixed setpoint 2 is activated in the setpoint generator. If the stop function is activated via the selected <i>bJogCtrlStop</i> input, the setpoint generator is deactivated.
FALSE	TRUE	The <i>bJogCtrlSlowDown2</i> and <i>bJogCtrlStop2</i> inputs are evaluated.	
TRUE	TRUE	The inputs <i>bJogCtrlSlowDown3</i> and <i>bJogCtrlStop3</i> are evaluated.	

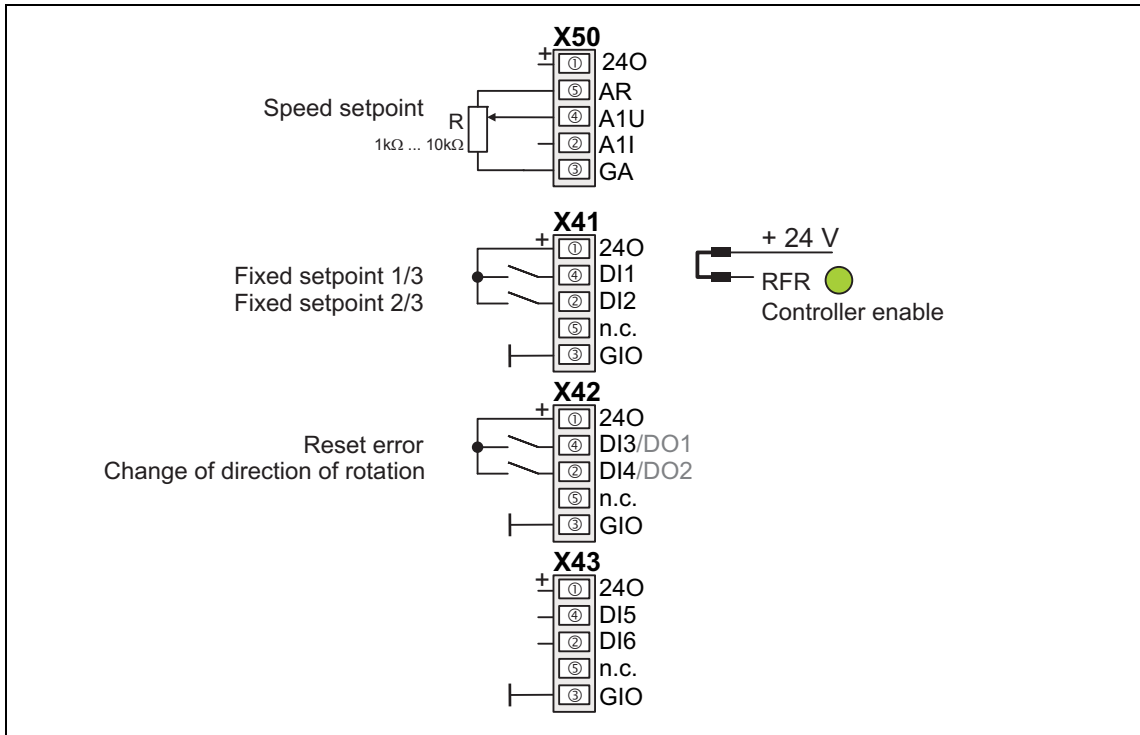
[7-1] Truth table for activating the pre-switch off

7.4.3 Terminal assignment of the control modes

The following comparison provides information about which inputs/outputs of the application block **LA_SwitchPos** are interconnected to the digital and analog input/output terminals of the inverter in the different control modes.

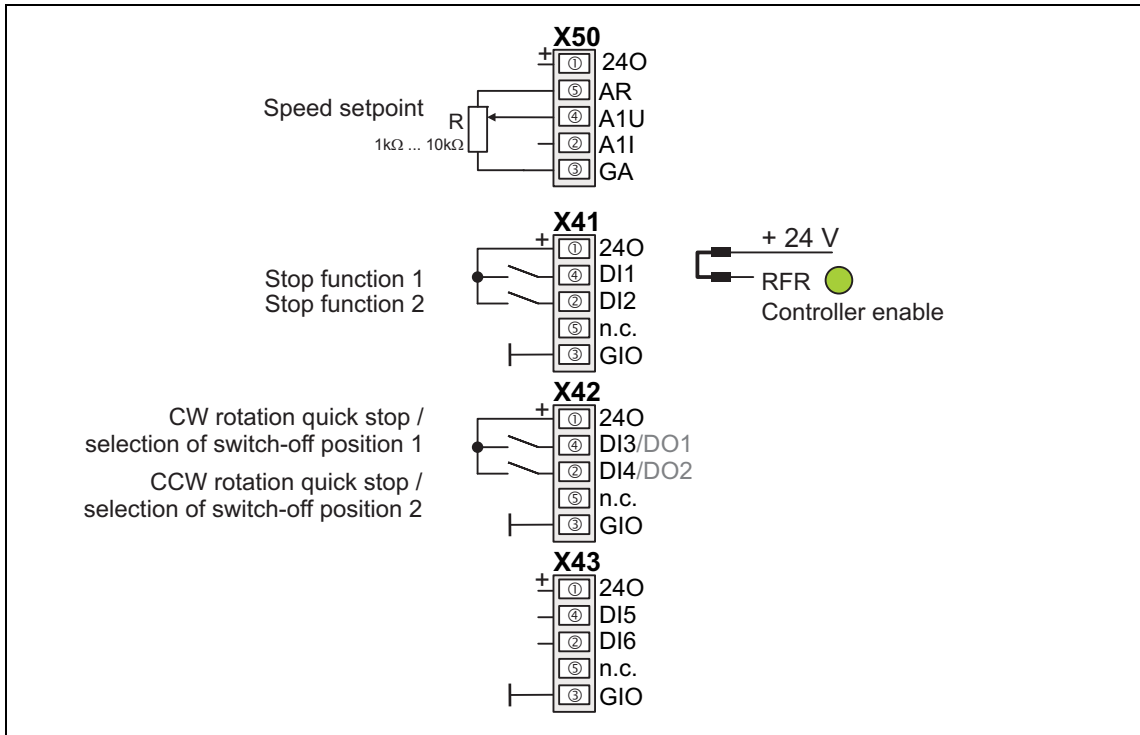
		Control mode (C00007)							
		10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminal 16	20: Keypad	21: PC	30: CAN	40: MCI
Digital input terminals									
RFR	Controller enable	Controller enable / Reset of error message bFailReset (In case of 8400 protec, the RFR terminal is internally set to HIGH level via wire jumper.)							
X41/DI1	Fixed setpoint 1/3 bJogCtrlJog1	Stop function 1 bJogCtrlStop1		Fixed setpoint 1/3 bJogCtrlJog1	-	-	Stop function 1 bJogCtrlStop1		
X41/DI2	Fixed setpoint 2/3 bJogCtrlJog2	Stop function 2 bJogCtrlStop2	Selection: Pre-switch off 1 bJogCtrlSlowDown1	Fixed setpoint 2/3 bJogCtrlJog2	-	-	Selection: Pre-switch off 1 bJogCtrlSlowDown1		
X42/DI3	Reset error message bFailReset	CW rotation quick stop bRLQCw Selection: Switch-off position 1 bJogCtrlInputSel1		CW rotation quick stop bRLQCw	-	-	Stop function 2 bJogCtrlStop2		
X42/DI4	Change of direction of rotation bSetSpeedCcw	CCW rotation quick stop bRLQCcw Selection: Switch-off position 2 bJogCtrlInputSel2		CCW rotation quick stop bRLQCcw	-	-	Selection: Pre-switch off 2 bJogCtrlSlowDown2		
X43/DI5	-	-	Stop function 2 bJogCtrlStop2	-	-	-	Stop function 3 bJogCtrlStop3		
X43/DI6	-	-	Selection: Pre-switch off 2 bJogCtrlSlowDown2	-	-	-	Selection: Pre-switch off 3 bJogCtrlSlowDown3		
Analog input terminals									
X50/A1U	Main speed setpoint nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)				-	-	Additional speed setpoint nAuxSetValue_a 10 V ≙ 100 % reference speed (C00011)		
X50/A1I	-	-	-	-	-	-	-	-	-
Digital output terminals									
DDO1/DO2 is only available after respective change of the function assignment in C00116 .									
X42/DO1	Status "Drive is ready" bDriveReady								
X42/DO2	-								

7.4.3.1 Terminals 0



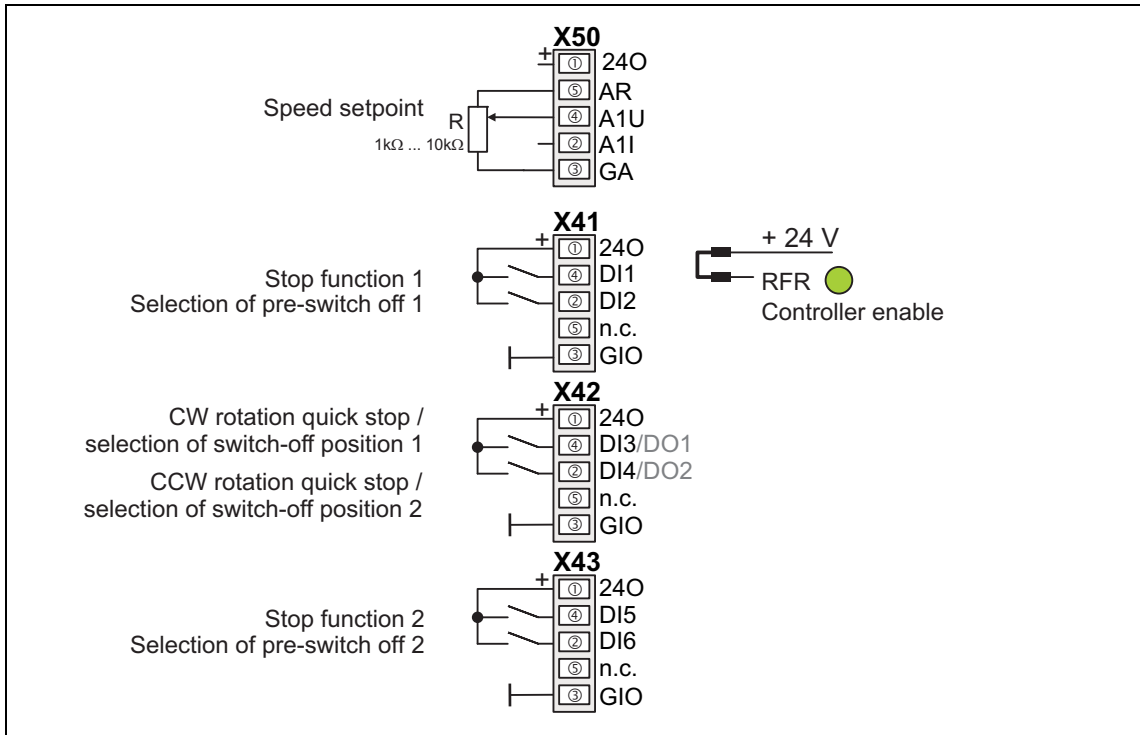
Connection	Assignment	Connection	Assignment
X41/DI1	LA_SwitchPos.bJogCtrlJog1	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_SwitchPos.bJogCtrlJog2		
X42/DI3	LA_SwitchPos.bFailReset	X42/DO1	-
X42/DI4	LA_SwitchPos.bSetSpeedCcw	X42/DO2	LA_SwitchPos.bDriveReady
X43/DI5	-	X50/A1U	LA_SwitchPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	-		

7.4.3.2 Terminals 2



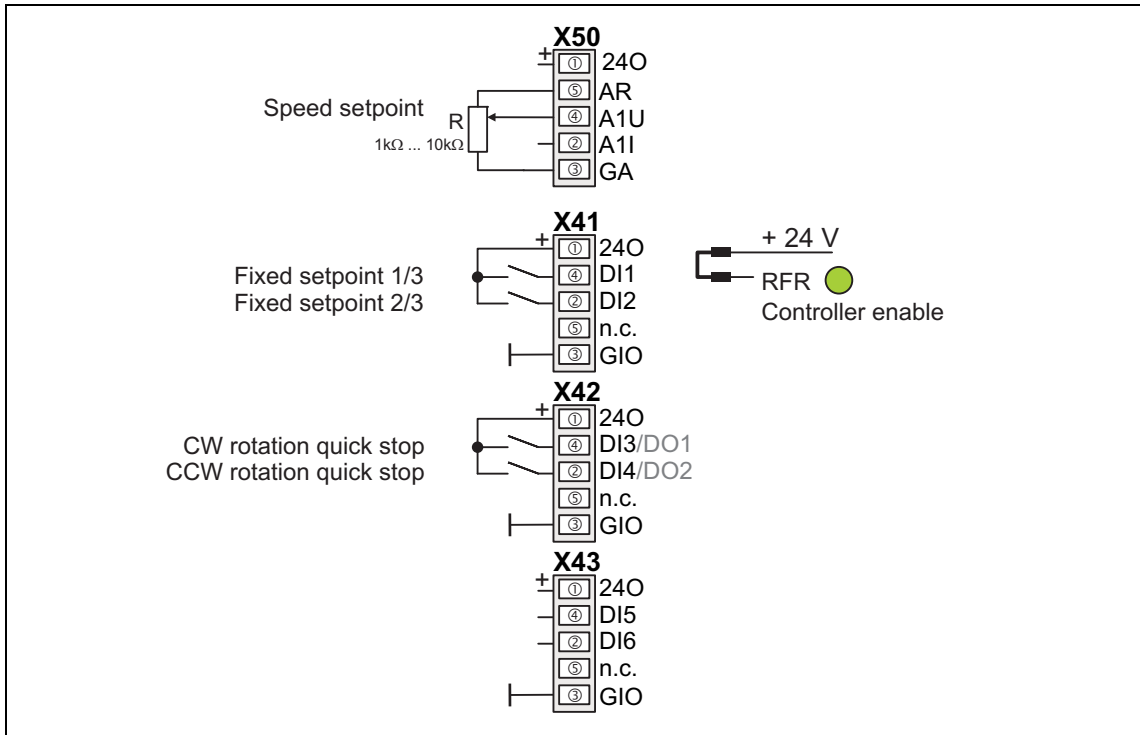
Connection	Assignment	Connection	Assignment
X41/DI1	LA_SwitchPos: bJogCtrlStop1	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_SwitchPos: bJogCtrlStop2		
X42/DI3	LA_SwitchPos: bRLQCw LA_SwitchPos: bJogCtrlInputSel1	X42/DO1	-
X42/DI4	LA_SwitchPos: bRLQCw LA_SwitchPos: bJogCtrlInputSel2	X42/DO2	LA_SwitchPos.bDriveReady
X43/DI5	-	X50/A1U LA_SwitchPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)	
X43/DI6	-		

7.4.3.3 Terminals 11



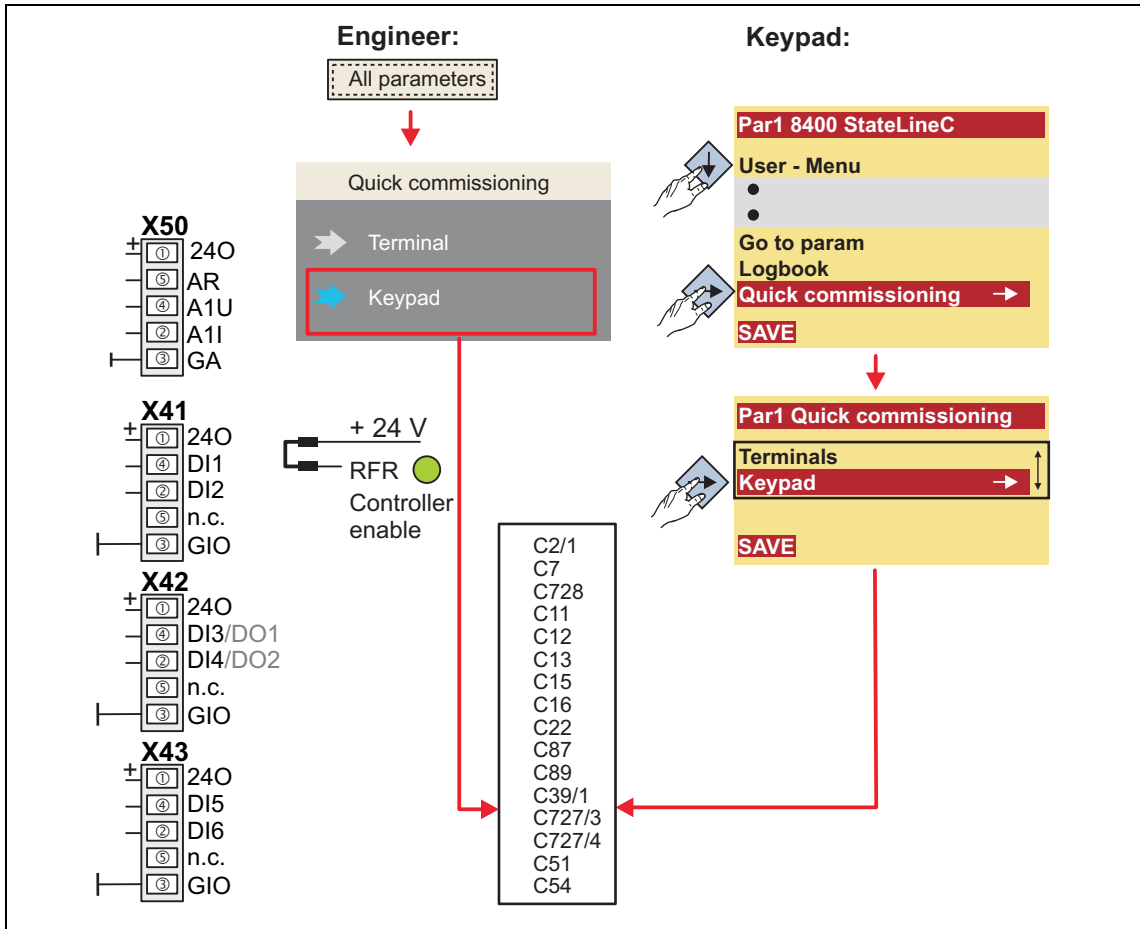
Connection	Assignment	Connection	Assignment
X41/DI1	LA_SwitchPos: bJogCtrlStop1	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_SwitchPos: bJogCtrlSlowDown1		
X42/DI3	LA_SwitchPos: bRLQCw LA_SwitchPos: bJogCtrlInputSel1	X42/DO1	-
X42/DI4	LA_SwitchPos: bRLQCw LA_SwitchPos: bJogCtrlInputSel2	X42/DO2	LA_SwitchPos.bDriveReady
X43/DI5	LA_SwitchPos: bJogCtrlStop2	X50/A1U	LA_SwitchPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)
X43/DI6	LA_SwitchPos: bJogCtrlSlowDown2		

7.4.3.4 Terminal 16



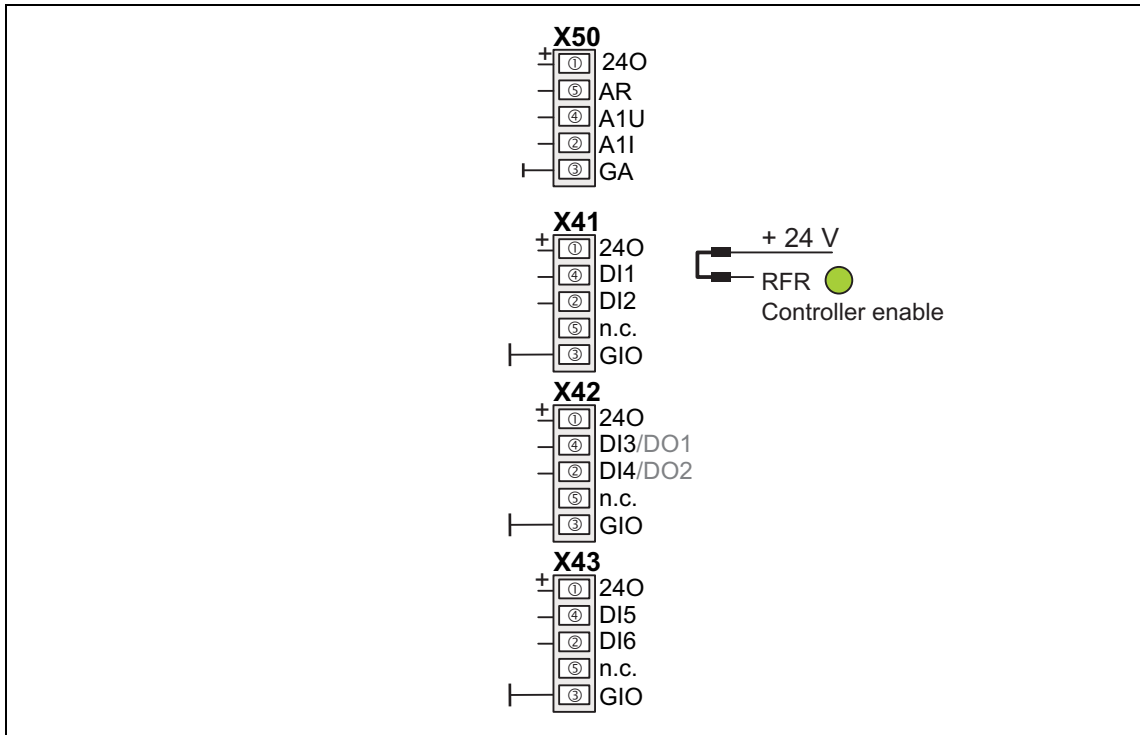
Connection	Assignment	Connection	Assignment
X41/DI1	LA_SwitchPos: bJogCtrlJog1	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	LA_SwitchPos: bJogCtrlJog2		
X42/DI3	LA_SwitchPos: bRLQCw	X42/DO1	-
X42/DI4	LA_SwitchPos: bRLQCcw	X42/DO2	LA_SwitchPos.bDriveReady
X43/DI5	-	X50/A1U LA_SwitchPos.nMainSetValue_a 10 V ≙ 100 % reference speed (C00011)	
X43/DI6	-		

7.4.3.5 Keypad



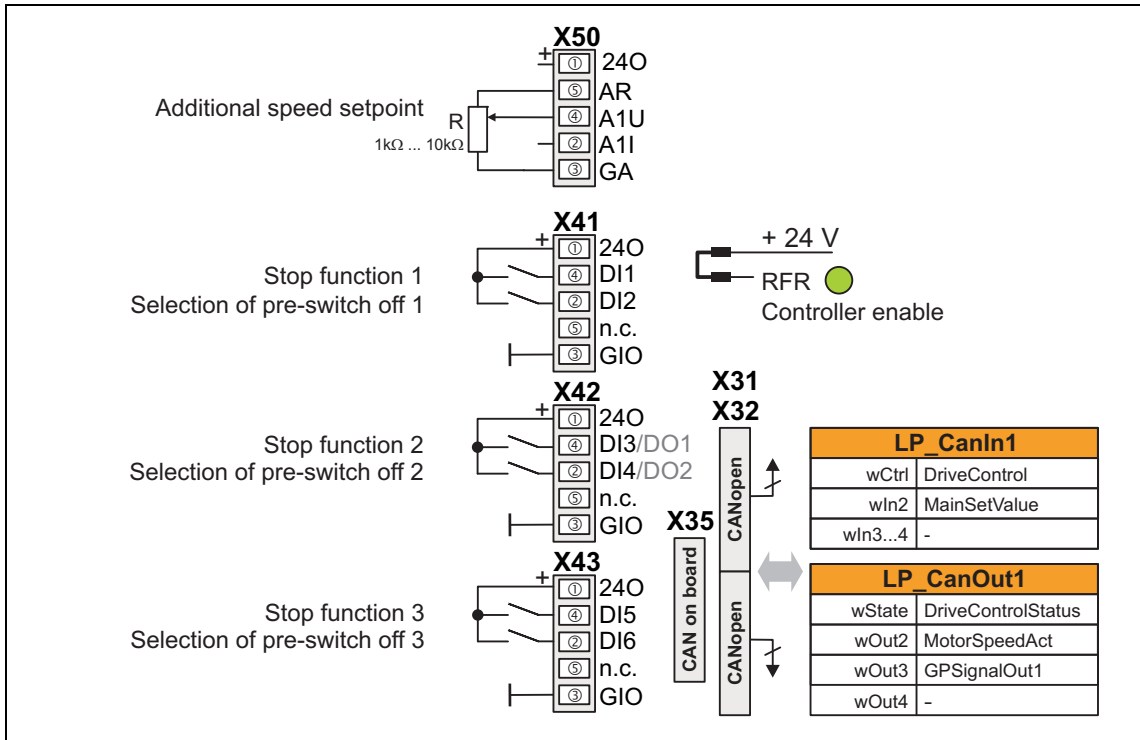
Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	-		
X42/DI4	-		
X43/DI5	-		
X43/DI6	-		
		X42/DO1	-
		X42/DO2	-
		X50/A1U	-

7.4.3.6 PC



Connection	Assignment	Connection	Assignment
X41/DI1	-	DO1/DO2 is only available after respective change of the function assignment in C00116 .	
X41/DI2	-		
X42/DI3	-	X42/DO1	-
X42/DI4	-	X42/DO2	-
X43/DI5	-	X50/A1U	-
X43/DI6	-		

7.4.3.7 CAN



Connection	Assignment	Connection	Assignment	
X41/DI1	LA_SwitchPos: bJogCtrlStop1	DO1/DO2 is only available after respective change of the function assignment in C00116 .		
X41/DI2	LA_SwitchPos: bJogCtrlSlowDown1			
X42/DI3	LA_SwitchPos: bJogCtrlStop2		X42/DO1	-
X42/DI4	LA_SwitchPos: bJogCtrlSlowDown2		X42/DO2	-
X43/DI5	LA_SwitchPos: bJogCtrlStop3	X50/A1U	LA_SwitchPos.nAuxSetValue_a 10 V ≙ 100 % reference speed (C00011)	
X43/DI6	LA_SwitchPos: bJogCtrlSlowDown3			

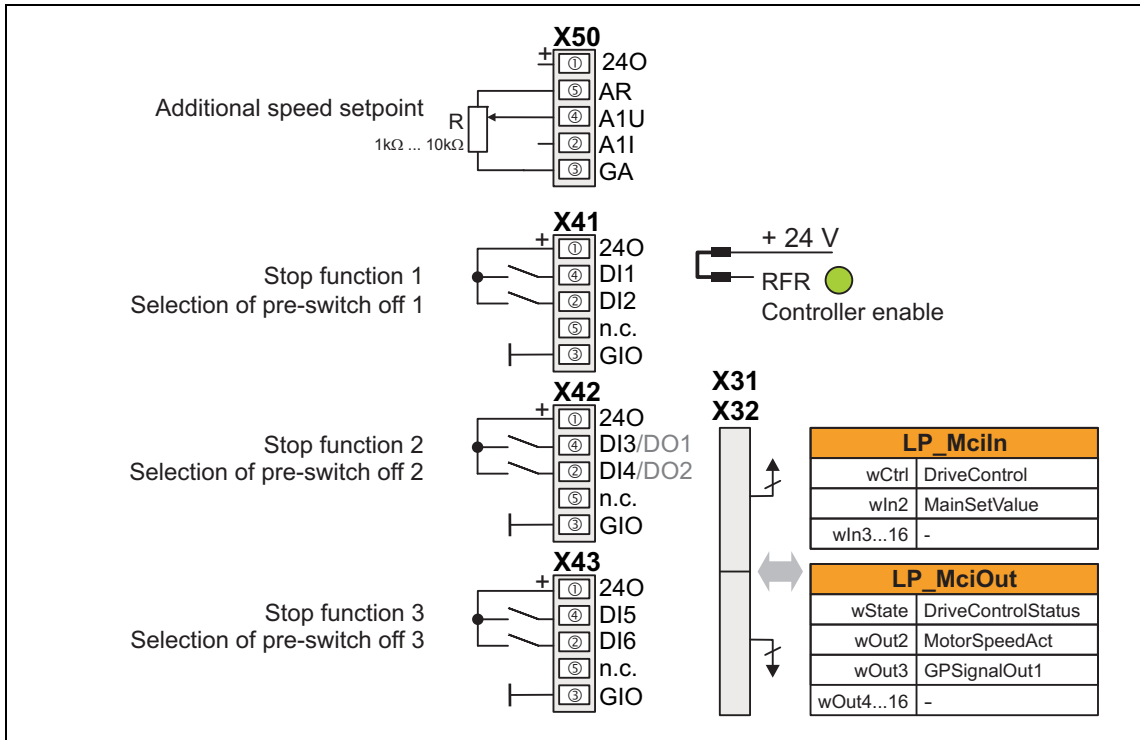
▶ [Process data assignment for fieldbus communication \(453\)](#)



Note!

You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.

7.4.3.8 MCI



▶ [Process data assignment for fieldbus communication \(453\)](#)

Connection	Assignment	Connection	Assignment	
X41/DI1	LA_SwitchPos: bJogCtrlStop1	DO1/DO2 is only available after respective change of the function assignment in C00116 .		
X41/DI2	LA_SwitchPos: bJogCtrlSlowDown1			
X42/DI3	LA_SwitchPos: bJogCtrlStop2		X42/DO1	-
X42/DI4	LA_SwitchPos: bJogCtrlSlowDown2		X42/DO2	-
X43/DI5	LA_SwitchPos: bJogCtrlStop3	X50/A1U	LA_SwitchPos.nAuxSetValue_a 10 V ≙ 100 % reference speed (C00011)	
X43/DI6	LA_SwitchPos: bJogCtrlSlowDown3			



Note!

You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.

7.4.4 Process data assignment for fieldbus communication

The fieldbus communication is connected (preconfigured) to the previously selected technology application by selecting the corresponding control mode in [C00007](#):

- "30: [CAN](#)" for the connection to the system bus (CAN)
- "40: [MCI](#)" for the connection to a plugged-on communication module (e.g. PROFIBUS)

The assignment of the process data words depends only on the application, not on the bus system used:

Input words	Name	Assignment
Word 1	DriveControl	Control word • For bit assignment see the table below.
Word 2	MainSetValue	Speed setpoint • Scaling: 16384 ≙ 100 % reference speed (C00011)
Word 3	-	Not preconfigured
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Control word	Name	Function
Bit 0	SwitchOn	1 ≙ Change to the " SwitchedOn " device status • This bit must be set in the CAN/MCI control word to ensure that the device changes to the " SwitchedOn " device status after mains connection without the need for a master control specifying this bit via fieldbus. • If control via a bus system is not wanted (e.g. in the case of control via terminals), the <i>wDriveCtrl</i> output signal of the LS_ParFix system block can be connected to the control word inputs.
Bit 1	DisableVoltage	1 ≙ Inhibit inverter control (pulse inhibit)
Bit 2	SetQuickStop	1 ≙ Activate quick stop (QSP). ▶ Activate/deactivate quick stop (☰ 106)
Bit 3	EnableOperation	1 ≙ Enable inverter (RFR) • If control via terminals is performed, this bit must be set both in the CAN control word and in the MCI control word. Otherwise, the controller is inhibited. ▶ Enable/inhibit inverter (☰ 105)
Bit 4	ModeSpecific_1	Reserved (currently not assigned)
Bit 5	JogCtrlInputSel1	Binary coded selection of the switch-off position 1 ... 3 • Activation of the signal pairs <i>bJogCtrlSlowDown1/bJogCtrlStop1</i> , <i>bJogCtrlSlowDown2/bJogCtrlStop2</i> or <i>bJogCtrlSlowDown3/bJogCtrlStop3</i> according to the Truth table for activating the pre-switch off .
Bit 6	JogCtrlInputSel2	
Bit 7	ResetFault	1 ≙ Reset fault (trip reset) • Acknowledge error message (if the error cause has been eliminated). ▶ Reset error (☰ 109)
Bit 8	bJogCtrlRfglN	Ramping down of the setpoint generator in the downstream L_NSet FB according to the Truth table for activating the pre-switch off
Bit 9	reserved_1	Reserved (currently not assigned)
Bit 10	reserved_2	

Control word	Name	Function
Bit 11	MBrkRelease	Holding brake control : 0 ≙ Apply brake 1 ≙ Release brake • In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off").
Bit 12	JogCtrlJog1	Binary coded selection of the fixed setpoints (JOG setpoints)
Bit 13	JogCtrlJog2	
Bit 14	SetFail	1 ≙ Set error (trip set)
Bit 15	SetSpeedCcw	0 ≙ Direction of rotation to the right (Cw) 1 ≙ Direction of rotation to the left (Ccw)

Output words	Name	Assignment
Word 1	DriveControlStatus	Status word • For bit assignment see the table below.
Word 2	MotorSpeedAct	Actual speed value • Scaling: 16384 ≙ 100 % reference speed (C00011)
Word 3	GPSignalOut1	Analog signal monitor: Output signal 1 • The selection of the signal source to output is executed in C00410/1 . • Gain and offset for the output signal can be parameterised in C00413/1 and C00413/2 . • For a detailed functional description see the L_SignalMonitor_a FB.
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Status word	Name	Status
Bit 0	DriveFail	1 ≙ Inverter in the error status • " Fault " device status is active.
Bit 1	PowerDisabled	1 ≙ Inverter control inhibited (pulse inhibit is active)
Bit 2	DriveReady	1 ≙ Inverter is ready for operation • " SwitchedOn " device status is active. • The drive is in this device status if the DC bus voltage is applied and the inverter is still inhibited by the user (controller inhibit).
Bit 3	SpeedCcw	0 ≙ Direction of rotation to the right (Cw) 1 ≙ Direction of rotation to the left (Ccw)
Bit 4	QSPIsActive	1 ≙ Quick stop is active
Bit 5	BrakeReleased	1 ≙ Brake released (after the brake opening time has elapsed)
Bit 6	ActSpeedIsZero	During open-loop operation: 1 ≙ Speed setpoint < Comparison value (C00024)
		During closed-loop operation: 1 ≙ Actual speed value < Comparison value (C00024)
Bit 7	ControllerInhibit	1 ≙ Inverter is inhibited (controller inhibit is active)
Bit 8	StatusCodeBit0	Bit coded display of the active device status ▶ Device state machine and device states (see table [4-1])
Bit 9	StatusCodeBit1	
Bit 10	StatusCodeBit2	
Bit 11	StatusCodeBit3	
Bit 12	Warning	

Status word	Name	Status
Bit 13	Trouble	1 ≙ Inverter is in the "Trouble" device status • E.g. if an overvoltage has occurred.
Bit 14	JogCtrlInputSel1	Binary coded selection of the switch-off position 1 ... 3 • Bit 5 and bit 6 of the control word.
Bit 15	JogCtrlInputSel2	

7.4.5 Setting parameters (short overview)

Parameters	Info	Lenze setting	
		Value	Unit
C00011	Appl.: Reference speed	1500	rpm
C00012	Accel. time - main setpoint	2.000	s
C00013	Decel. time - main setpoint	2.000	s
C00105	Decel. time - quick stop	2.000	s
C00039/1	Fixed setpoint 1	40.00	%
C00039/2	Fixed setpoint 2	60.00	%
C00039/3	Fixed setpoint 3	80.00	%
C00039/4...15	Fixed setpoint 4 ... 15	0.00	%
C00101/1...15	Add. accel. time 1 ... 15	0.000	s
C00103/1...15	Add. decel. time 1 ... 15	0.000	s
C00105	Decel. time - quick stop	2.000	s
C00106	Auto-DCB: Hold time	0.500	s
C00107	DCB braking: Hold time	999.000	s
C00134	L_NSet_1: Ramp smoothing	0: Off	
C00182	L_NSet_1: S-ramp time PT1	20.00	s
C00190	L_NSet_1: Setpoint arithmetic	0: Out = Set	
C00220	L_NSet_1: Acceleration time - add. setpoint	0.000	s
C00221	L_NSet_1: Deceleration time - add. setpoint	0.000	s
C00241	L_NSet_1: Hyst. NSet reached	0.50	%
C00488/1	InputSens.SlowDown1	0: Level	
C00488/2	InputSens.Stop1	0: Level	
C00488/3	InputSens.SlowDown2	0: Level	
C00488/4	InputSens.Stop2	0: Level	
C00488/5	InputSens.SlowDown3	0: Level	
C00488/6	InputSens.Stop3	0: Level	
C00632/1	L_NSet_1: Blocking speed 1 max	0.00	%
C00632/2	L_NSet_1: Blocking speed 2 max	0.00	%
C00632/3	L_NSet_1: Blocking speed 3 max	0.00	%
C00633/1	L_NSet_1: Blocking speed 1 min	0.00	%
C00633/2	L_NSet_1: Blocking speed 2 min	0.00	%
C00633/3	L_NSet_1: Blocking speed 3 min	0.00	%
C00635	L_NSet_1: nMaxLimit	199.99	%
C00636	L_NSet_1: nMinLimit	-199.99	%
C00670	L_OffsetGainP_1: Gain	1.0000	
C00671	L_OffsetGainP_2: Gain	1.0000	

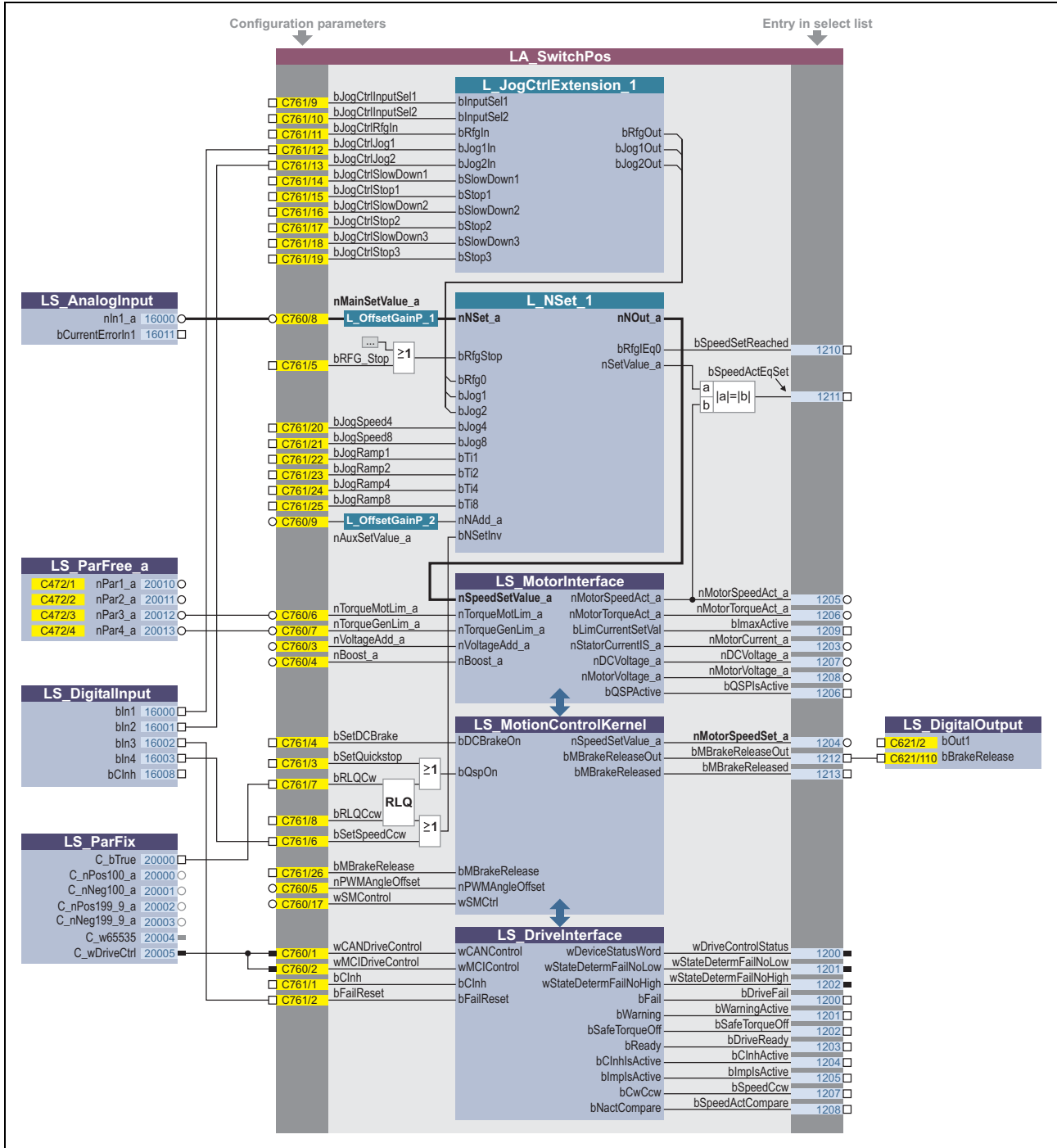
Parameters	Info	Lenze setting	
		Value	Unit
C00672	L_OffsetGainP_3: Gain	1.0000	
C00696	L_OffsetGainP_1: Offset	0.00	%
C00697	L_OffsetGainP_2: Offset	0.00	%
C00698	L_OffsetGainP_3: Offset	0.00	%
C00800	L_MPot_1: Upper limit	100.00	%
C00801	L_MPot_1: Lower limit	-100.00	%
C00802	L_MPot_1: Acceleration time	10.0	s
C00803	L_MPot_1: Deceleration time	10.0	s
C00804	L_MPot_1: Inactive fct.	0: Retain value	
C00805	L_MPot_1: Init fct.	0: Load last value	
C00806	Use of motor potentiometer	0: No	
C02610/2	MCK: Ramp time synchr. setpoint	2.000	s
C02611/1	MCK: Pos. max. speed	199.99	%
C02611/2	MCK: Pos. min. speed	0.00	%
C02611/3	MCK: Neg. min. speed	0.00	%
C02611/4	MCK: Neg. max. speed	199.99	%

Related topics:

- ▶ ["GeneralPurpose" functions](#) (460)

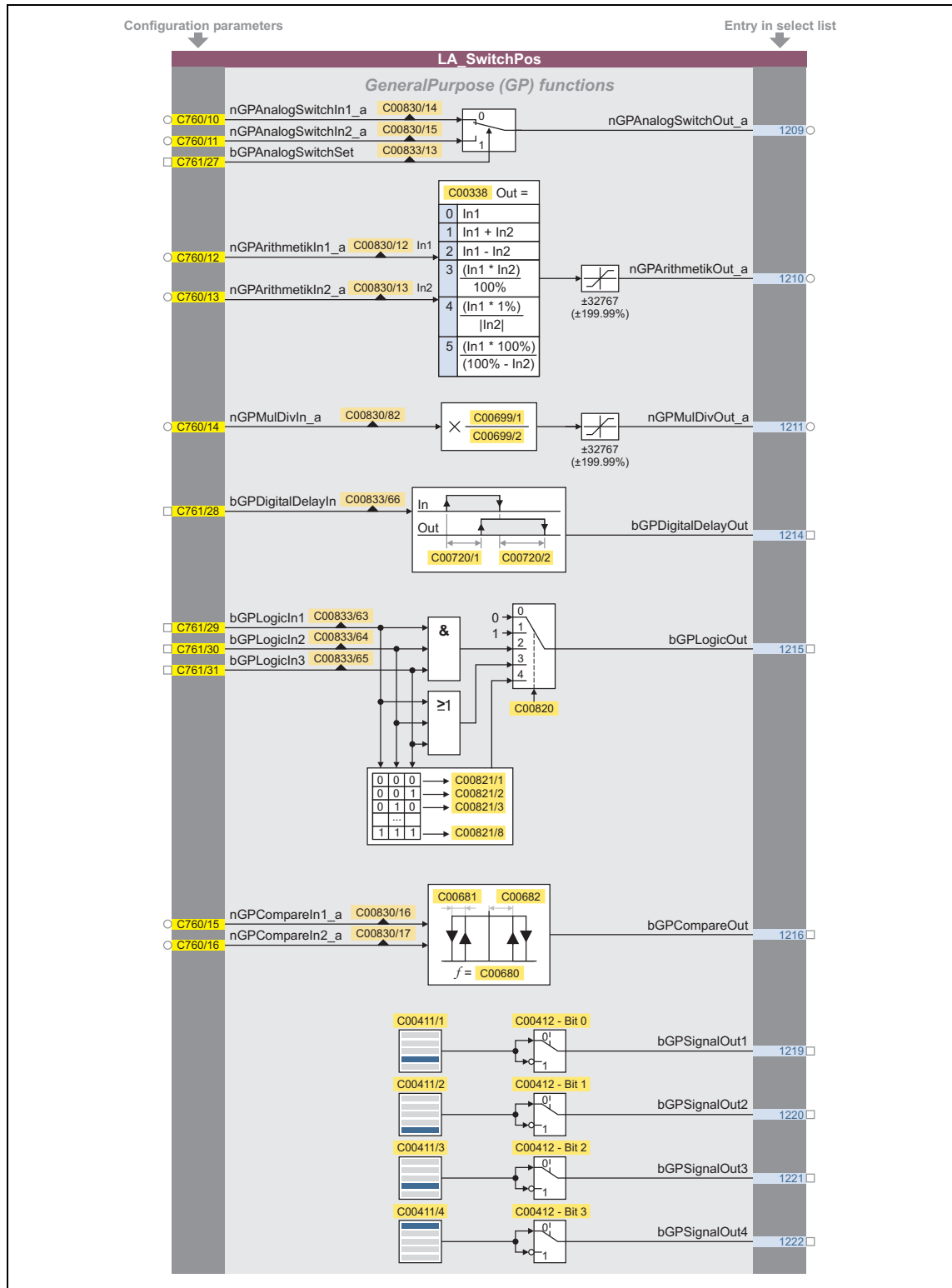
7.4.6 Configuration parameters

If required, the subcodes of [C00760](#) and [C00761](#) serve to change the pre-configured assignment of the application inputs:

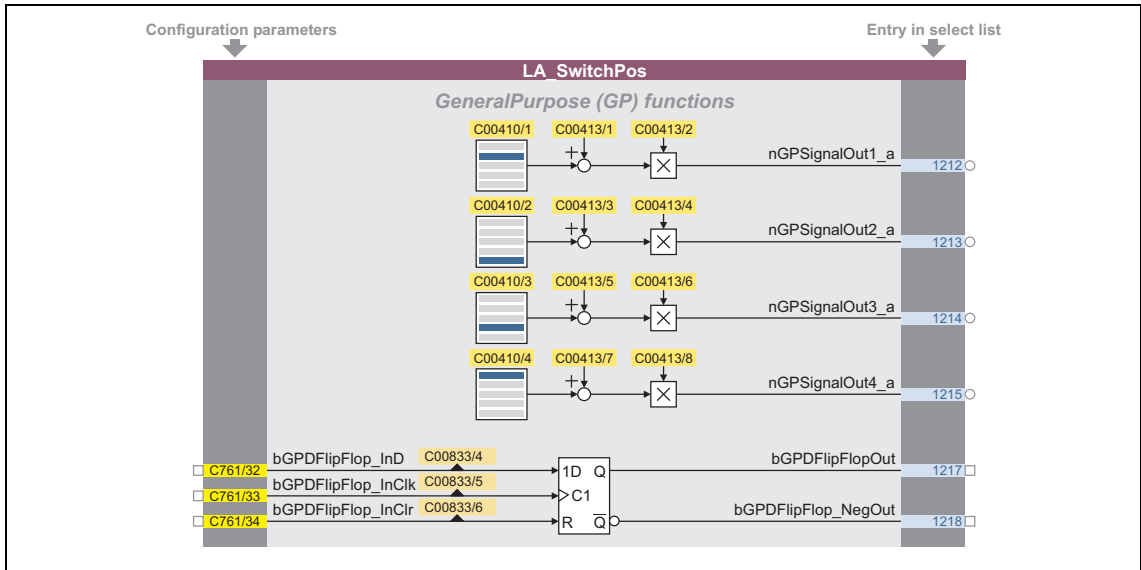


[7-12] Pre-assignment of the "Switch-off positioning" application in the "Terminals 0" control mode

Configuration parameters for "GeneralPurpose" functions



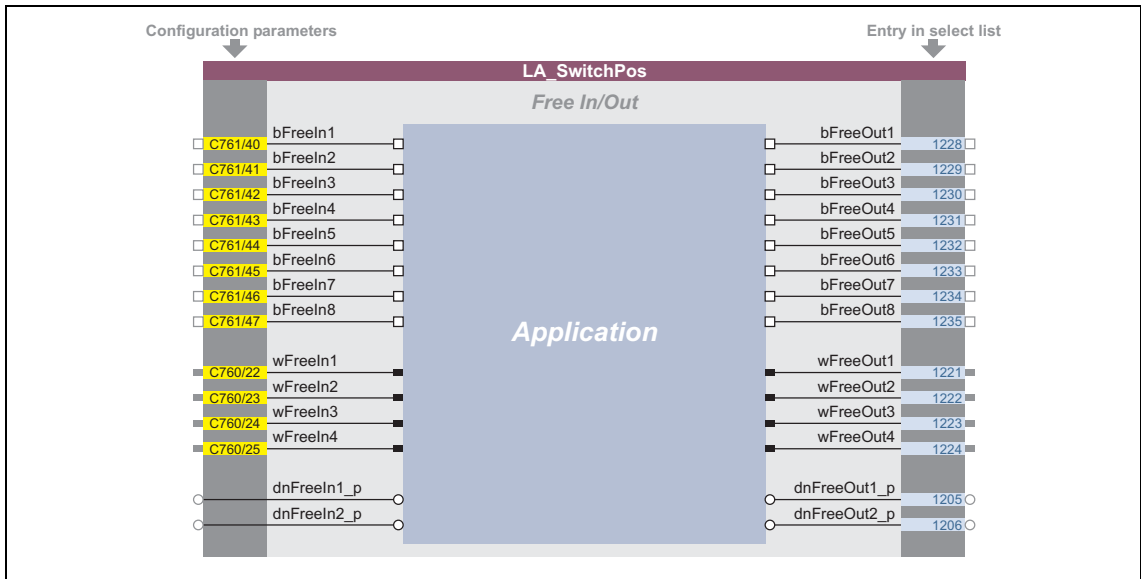
[7-13] "GeneralPurpose" functions



[7-14] "GeneralPurpose" functions (continuation)

Free inputs and outputs

These inputs can be freely interconnected in the application level. They can be used to transfer signals from the I/O level to the application level and vice versa.



[7-15] Free inputs/outputs

Related topics:

- ▶ [User-defined terminal assignment](#) (📖 368)
- ▶ ["GeneralPurpose" functions](#) (📖 460)

7.5 "GeneralPurpose" functions

Each technology application provides different free logic and arithmetic functions, so-called "GeneralPurpose" functions.

For the interconnection of these functions, the application block features inputs and outputs on the I/O level, which are linked to the logic/arithmetic function.



Note!

In the Lenze setting, the connectors for the "GeneralPurpose" functions are hidden in the function block editor.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.



Tip!

The inputs of the "GeneralPurpose" functions can also be linked to other output signals via the configuration parameters of the technology application.

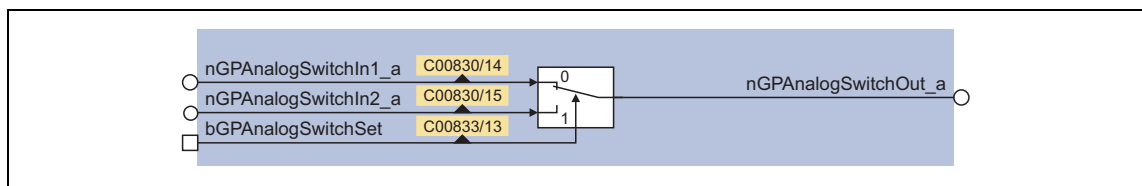
On the other hand, the outputs of the "GeneralPurpose" functions can be selected in the configuration parameters of other inputs.

Related topics:

- ▶ [User-defined terminal assignment](#) (📖 368)
- ▶ [TA "Actuating drive speed": Configuration parameters](#) (📖 401)
- ▶ [TA "Table positioning": Configuration parameters](#) (📖 430)
- ▶ [TA "Switch-off positioning": Configuration parameters](#) (📖 457)

7.5.1 Analog switch

This function switches between two analog input signals. The switch-over is controlled by a boolean input signal.

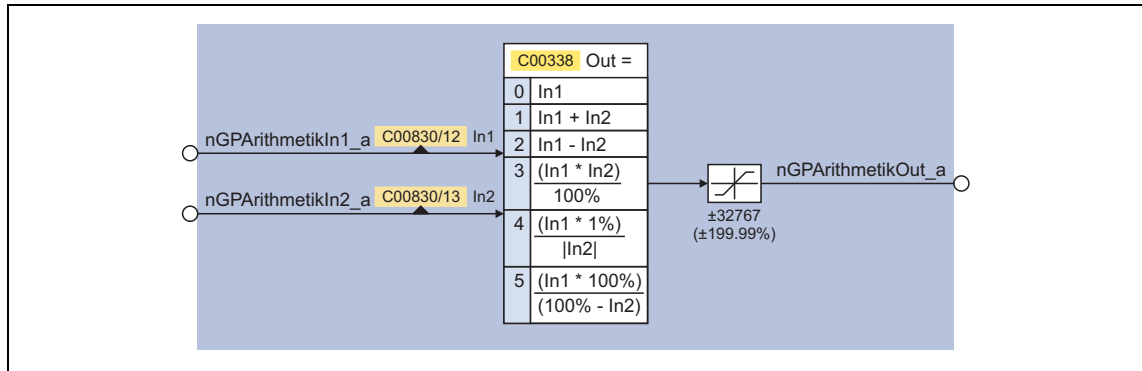


[7-16] GeneralPurpose function "Analog switch"

- For a detailed functional description see FB [L_AnalogSwitch](#).

7.5.2 Arithmetic

This function links two analog signals arithmetically. The arithmetic function can be parameterised.



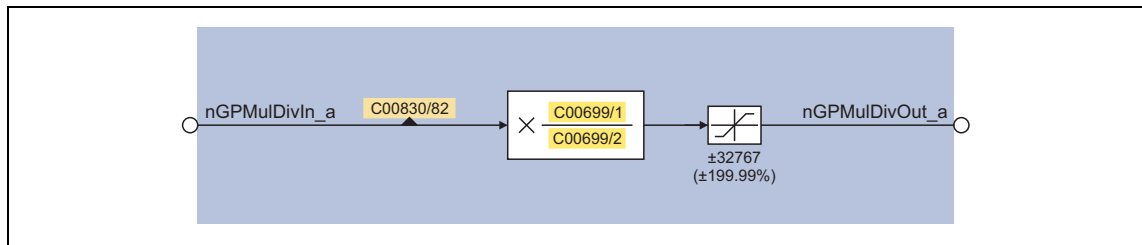
[7-17] GeneralPurpose function "Arithmetic"

Parameters	Info	Lenze setting	
		Value	Unit
C00338	L_Arithmetik_1: Function	0:	nOut_a = nIn1_a

- For a detailed functional description see the [L_Arithmetik](#) FB.

7.5.3 Multiplication/Division

This function multiplies an analog input signal with a parameterisable factor. The factor must be selected in the form of a quotient (numerator and denominator).



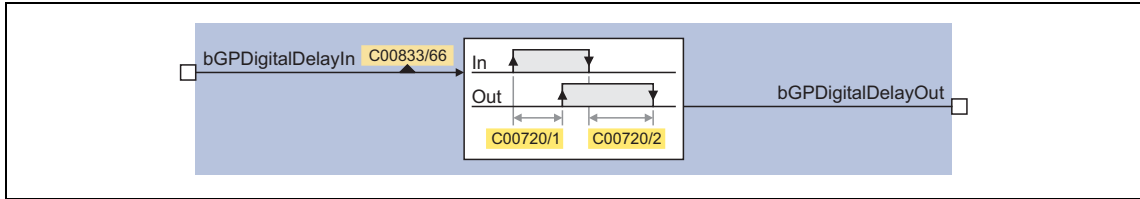
[7-18] GeneralPurpose function "Multiplication/division"

Parameters	Info	Lenze setting	
		Value	Unit
C00699/1	L_MulDiv_1: Numerator	0	
C00699/2	L_MulDiv_1: Denominator	10000	

- For a detailed functional description see FB [L_MulDiv](#).

7.5.4 Binary delay element

This function timely delays binary signals. On-delay and off-delay can be parameterised separately.



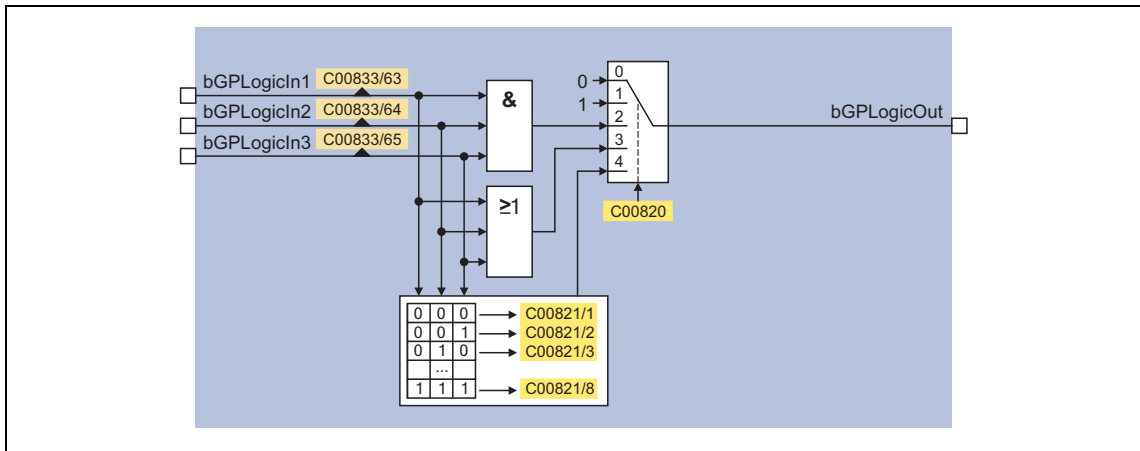
[7-19] GeneralPurpose function "Binary delay element"

Parameters	Info	Lenze setting	
		Value	Unit
C00720/1	L_DigitalDelay_1: On delay	0.000	s
C00720/2	L_DigitalDelay_1: Off delay	0.000	s

- For a detailed functional description see FB [L_DigitalDelay](#).

7.5.5 Binary logic

This function provides a binary output signal which is formed by a logic operation of the input signals. Alternatively, you can also select a fixed binary value which is independent of the input signals.



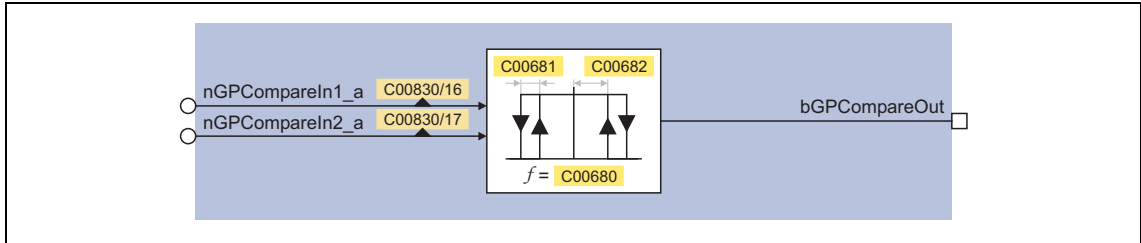
[7-20] GeneralPurpose function "Binary logic"

Parameters	Info	Lenze setting	
		Value	Unit
C00820	L_DigitalLogic_1: Function	0: bOut = 0	
C00821/1	bIn1=0/bIn2=0/bIn3=0	0: FALSE	
C00821/...	
C00821/8	bIn1=1/bIn2=1/bIn3=1	0: FALSE	

- For a detailed functional description see FB [L_DigitalLogic](#).

7.5.6 Analog comparison

This function compares two analog signals and can be used e.g. to realise a trigger. The comparison operation, hysteresis and window size can be parameterised.



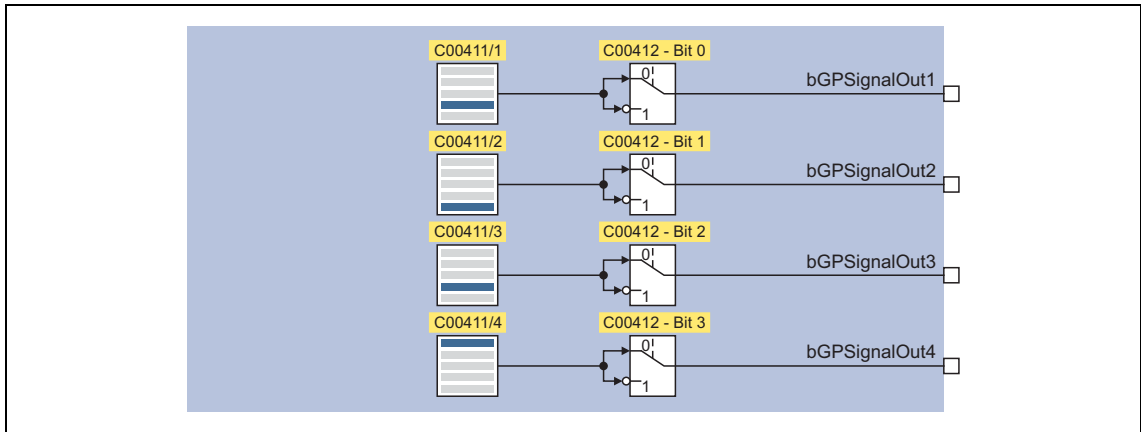
[7-21] GeneralPurpose function "Analog comparison"

Parameters	Info	Lenze setting	
		Value	Unit
C00680	L_Compare_1: Fct.	6: In1 < In2	
C00681	L_Compare_1: Hysteresis	0.50	%
C00682	L_Compare_1: Window	2.00	%

- For a detailed functional description see FB [L_Compare](#).

7.5.7 Binary signal monitor

This function serves to output four binary signals selected from a list of all binary output signals available in the inverter. You can set an inversion of the output signals.



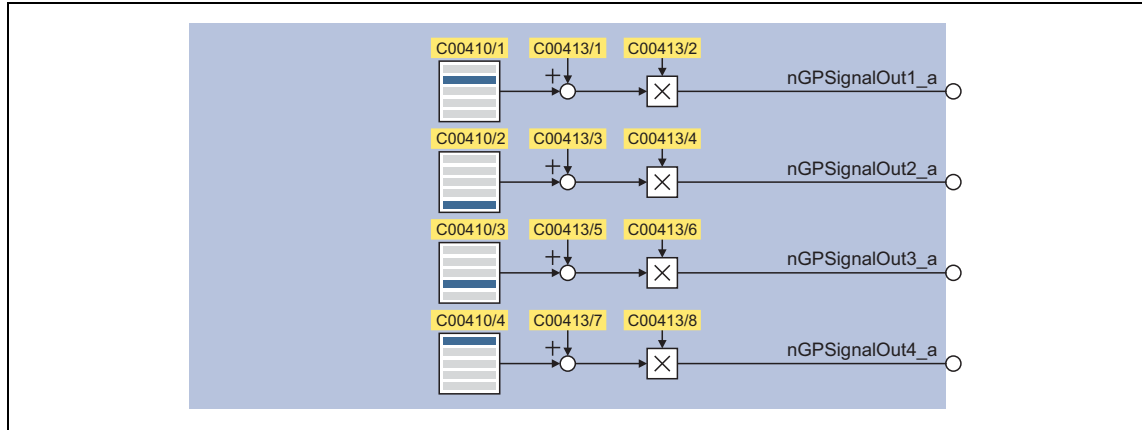
[7-22] GeneralPurpose function "Binary signal monitor"

Parameters	Info	Lenze setting	
		Value	Unit
C00411/1...4	L_SignalMonitor_b: Signal 1 ... 4	0: Not connected	
C00412	L_SignalMonitor_b: Inversion	Bit coded	

- For a detailed functional description see FB [L_SignalMonitor_b](#).

7.5.8 Analog signal monitor

This function serves to output four analog signals selected from a list of all analog output signals available in the inverter. Offset and gain of the source signals can be adjusted.



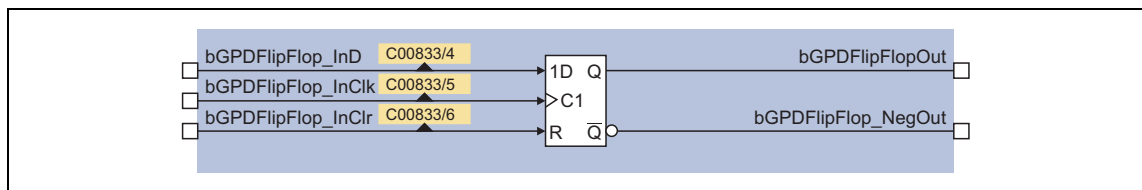
[7-23] GeneralPurpose function "Analog signal monitor"

Parameters	Info	Lenze setting	
		Value	Unit
C00410/1...4	L_SignalMonitor_a: Signal 1 ... 4	0: Not connected	
C00413/1	L_SignalMonitor_a: Signal 1 offset	0.00	%
C00413/2	L_SignalMonitor_a: Signal 1 gain	100.00	%
C00413/3	L_SignalMonitor_a: Signal 2 offset	0.00	%
C00413/4	L_SignalMonitor_a: Signal 2 gain	100.00	%
C00413/5	L_SignalMonitor_a: Signal 3 offset	0.00	%
C00413/6	L_SignalMonitor_a: Signal 3 gain	100.00	%
C00413/7	L_SignalMonitor_a: Signal 4 offset	0.00	%
C00413/8	L_SignalMonitor_a: Signal 4 gain	100.00	%

- For a detailed functional description see the [L_SignalMonitor_a](#) FB.

7.5.9 D-FlipFlop

This function saves the logic status of the data input (1D) in case of an active clock edge at the clock input (C1) and puts out its value in sequence at the output Q. If there is no active clock edge, the input value is not accepted.

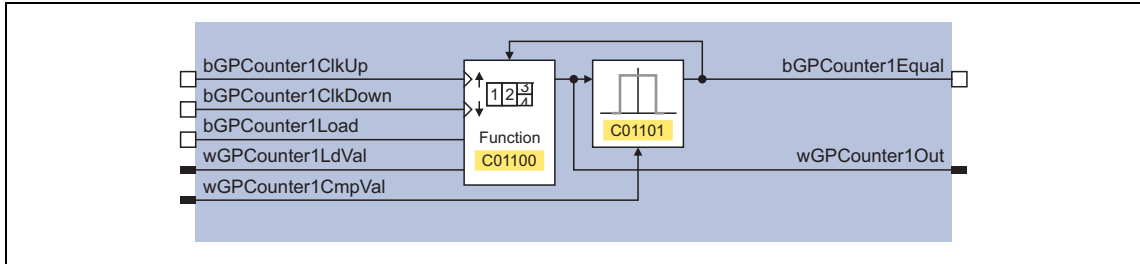


[7-24] GeneralPurpose function "D-FlipFlop" (clock-edge controlled)

- For a detailed functional description see FB [L_DFliPFlop](#).

7.5.10 Counter

This function is a digital upcounter and downcounter with a comparison operation.



[7-25] GeneralPurpose function "Counter"

Parameters	Info	Lenze setting	
		Value	Unit
C01100/1	L_Counter_1: Function	0:	Normal counting
C01101/1	L_Counter_1: Comparison	0:	Greater than or equal to

- Only available with [TA "Table positioning"](#).
- For a detailed functional description see FB [L_Counter](#).

8 Basic drive functions (MCK)

In this chapter, the standard and basic drive functions integrated in the **Motion Control Kernel (MCK)** of the 8400 protec HighLine are described to which the active technology application can gain access via defined internal interfaces. As a result, the time-consuming creation of individual FB interconnections is avoided and the amount of work and complexity involved in the implementation of standard functions is minimised.

In the **Motion Control Kernel**, for example, an automatic holding brake control function is integrated which controls the holding brake in relation to the speed setpoint and various other internal control signals. Due to integrated automatic brake operation, the user is relieved of the task of managing these control signals.

Other standard functions integrated in the **Motion Control Kernel** for the 8400 protec HighLine inverter are, for example:

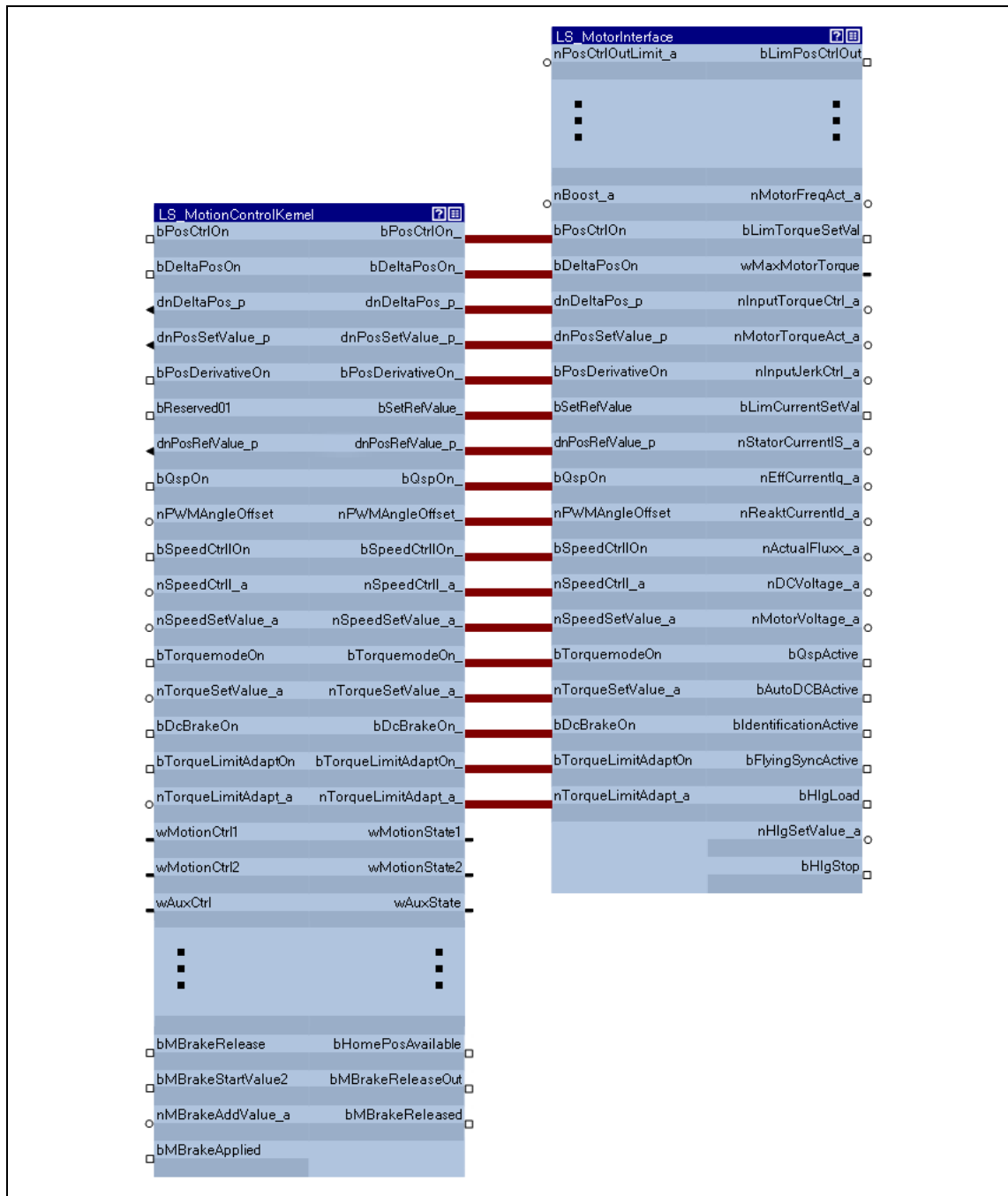
- Manual jog, e.g. for manual setting-up operation
- Homing for positioning functions of the drive
- Position profile generator for positioning functions of the drive

8 Basic drive functions (MCK)

8.1 Basic signal flow

8.1 Basic signal flow

The **Motion Control Kernel** is connected between setpoint generator (e.g. ramp generator, PID process controller, etc.) and the motor control function in the case of the available technology applications. For problem-free interaction of the **Motion Control Kernel** and motor control function, the two associated system blocks [LS_MotionControlKernel](#) and [LS_MotorInterface](#) have interfaces with corresponding inputs/outputs. These are visible in the FB Editor for monitoring purposes and must be connected to each other:



[8-1] Interconnection of Motion Control Kernel and motor control function


In the interconnection previously shown, the **Motion Control Kernel** monitors every interface. Some of the signals such as a quick stop request or a DC-injection braking request are directly passed through to the motor control. However, other signals are passed through or modified depending on the operating mode (e.g. synchronising a setpoint selection via ramp function).


8.2 Internal interfaces | System block "LS_MotionControlKernel"

In the Function Block editor, the system block **LS_MotionControlKernel** provides the interfaces to the **Motion Control Kernel**.

Inputs

Designator Data type	Information/possible settings
Control and setpoint signals for motor control The purpose of the following inputs is to transfer control signals and setpoints to the internal motor control function (LS_MotorInterface).	
bPosCtrlOn BOOL	Activation of position/angle control
	FALSE Position/angle control deactivated.
	TRUE Position/angle control activated.
bDeltaPosOn BOOL	Activate position difference as setpoint selection <ul style="list-style-type: none"> In order to position the motor shaft, the position control function can work within the motor control function with the absolute position setpoint <i>dnPosSetValue_p</i> or alternatively with the speed setpoint <i>nSpeedSetValue_a</i> and the position difference <i>dnDeltaPos_p</i>.
	FALSE Positioning with position setpoint <i>dnPosSetValue_p</i> .
	TRUE Positioning with speed setpoint <i>nSpeedSetValue_a</i> and position difference <i>dnDeltaPos_p</i> . Note: In this case, <u>no</u> position encoder should be set to ensure a correct function (C00490 = "No encoder: nSpeedSetValue_a").
dnDeltaPos_p DINT	Position difference (following error input) <ul style="list-style-type: none"> Difference between setpoint position and actual position in [increments] Is used for position control if <i>bDeltaPosOn</i> = TRUE. Scaling: A revolution is displayed with 65536 increments or steps.
dnPosSetValue_p DINT	Absolute position setpoint in [increments] <ul style="list-style-type: none"> Is used for position control if <i>bDeltaPosOn</i> = FALSE. Scaling: A revolution is displayed with 65536 increments or steps.
bPosDerivativeOn BOOL	Create a setpoint for the speed controller from the position setpoint <ul style="list-style-type: none"> For highly dynamic control systems, the setpoint for the speed controller can be created from the absolute position setpoint <i>dnPosSetValue_p</i> instead of the speed setpoint <i>nSpeedSetValue_a</i> ▶ Position control/additive speed specification
	TRUE Create a speed setpoint from the position setpoint. <ul style="list-style-type: none"> The absolute position setpoint <i>dnPosSetValue_p</i> is differentiated and a speed value is created which is the setpoint for the speed controller. Internal limitation of 65536 increments/ms.
bReserved01 BOOL	Reserved
dnPosRefValue_p DINT	Home position in [increments] <ul style="list-style-type: none"> Value is adopted when control bit 9 ("HomeSetPos") is set from "0" to "1" in the MCK control word and is sent to the motor control function via the <i>dnPosRefValue_p</i> output. Transfer is possible in any operating mode ("Homing on the fly"). For this function, the <i>dnPosRefValue_p</i> output must be connected to the input of the same name of the SB LS_MotorInterface.

Designator	Data type	Information/possible settings	
bQspOn	BOOL	Trigger quick stop (QSP) via the MCK <ul style="list-style-type: none"> Also see device command "Activate/deactivate quick stop". 	
		TRUE	Activate quick stop <ul style="list-style-type: none"> Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). A pulse inhibit is set if the auto-DCB function has been activated via C00019. The motor is kept at a standstill during closed-loop operation (function in preparation).
		FALSE	Deactivate quick stop <ul style="list-style-type: none"> The quick stop is deactivated if no other source for the quick stop is active. C00159 displays a bit code of active sources/causes for the quick stop.
nPWMAngleOffset	INT	Angular offset input <ul style="list-style-type: none"> Scaling: $16384 \equiv 100\%$ Setting range: 0 ... 199.99 % 	
bSpeedCtrlIOn	BOOL	Directly set the I-component of speed controller <ul style="list-style-type: none"> In order to statically specify a minimum torque, e.g. when a load is being lifted. 	
		TRUE	Set the I-component of the speed controller to the value <i>nSpeedCtrlI_a</i> .
nSpeedCtrlI_a	INT	I-component of the speed controller <ul style="list-style-type: none"> Value is adopted in the case of a FALSE-TRUE edge at the input <i>bSpeedCtrlIOn</i>. 	
nSpeedSetValue_a	INT	Rotation speed/velocity setpoint	
bTorquemodeOn	BOOL	TRUE	Switch on torque-controlled operation
nTorqueSetValue_a	INT		Torque setpoint
bDcBrakeOn	BOOL	Manual DC-injection braking (DCB) <ul style="list-style-type: none"> For this function, the <i>bDcBrakeOn_</i> output signal must be connected to the <i>bDcBrakeOn</i> input of the same name of the LS_MotorInterface system block. Detailed information on DC-injection braking is provided in the motor control chapter, subchapter "DC-injection braking". 	
		 Note! Holding braking is not possible when this braking mode is used! Use the basic " Holding brake control " function for controlling the holding brake with a low rate of wear.	
		FALSE	Deactivate DC-injection braking.
		TRUE	Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. <ul style="list-style-type: none"> The braking effect stops when the rotor is at standstill. After the hold time (C00107) has expired, the controller sets the pulse inhibit.
bTorqueLimitAdaptOn	BOOL	Adaptation of torque limitation	
		TRUE	Activate adaptation of torque limitation.
nTorqueLimitAdapt_a	INT	Value for adaptation of torque limitation <ul style="list-style-type: none"> Scaling: $16384 \equiv 100\%$ of the torque limit specified at the LS_MotorInterface system block via the <i>nTorqueMotLimit_a</i> and <i>nTorqueGenLimit_a</i> inputs. 	

Designator	Data type	Information/possible settings
Control words		
MCK: wMotionCtrl1 wMotionCtrl2	WORD	MCK control word 1 & 2 <ul style="list-style-type: none"> The two control words together form a 32-bit double control word with which the entire Motion Control Kernel is controlled. All motion profiles in the different operating modes can be operated via this interface. See the "MCK control word" subchapter for a detailed description of the individual control bits. Display parameter: C01240
wAuxCtrl	WORD	For future extensions - Input has no function at present time! Additional control word
wSMCtrl	WORD	Interface to the optional safety system. <ul style="list-style-type: none"> Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). See the "Interface to safety system" subchapter for a detailed description of the individual control bits.
Control and setpoint signals for Motion Control Kernel function		
dnProfilePosition_p	DINT	Profile position in [increments] <ul style="list-style-type: none"> Position which is to be entered into a profile data set selected via the MCK control word. In the "absolute" mode, this position is a target position. However, in the "relative" mode it is a relative traverse path. <p>► Consideration of residual value in case of external profile calculation</p>
nSpeedAddValue_v	INT	Additive speed setpoint in [inc/ms]
nSpeedOverride_a	INT	Value for Speed override <ul style="list-style-type: none"> Percentage multiplier (0 ... 199.99 %) for the currently active speed. 16384 ≙ 100 % of the maximum traversing speed (display in C01211/1). If the override value is 0 %, the drive is brought to a standstill.
nAccOverride_a	INT	Value for Acceleration override <ul style="list-style-type: none"> Percentage multiplier (0 ... 199.99 %) for the currently active acceleration. 16384 ≙ 100 % of the parameterised acceleration of the corresponding operating mode. If the override value is 0 %, acceleration ceases.
nSRampOverride_a	INT	Value for S-ramp smoothing override <ul style="list-style-type: none"> Percentage multiplier (0 ... 100 %) for the currently active acceleration. 16384 ≙ 100 % of the parameterised S-ramp time (C01306/1...15). Values > 16384 are ignored. <p> Note! If the <i>nSRampOverride_a</i> input remains unconnected or if an override value of "0 %" is selected, activation of the S-ramp override causes deactivation of the S-ramp time. <ul style="list-style-type: none"> Deactivation of the S-ramp time before the start of a profile with S-ramp time causes linear ramp generation. Deactivation of the S-ramp time during a traversing process, however, is not accepted immediately in the profile generator, but the profile generator checks automatically when an online change of the ramp form can be carried out and then initiates it automatically. </p>
bLimitSwitchPos	BOOL	Input for Hardware limit switches (positive)
bLimitSwitchNeg	BOOL	Input for Hardware limit switches (negative)
bHomingMark	BOOL	Input for pre-stop mark/pre-stop signal for homing

Designator	Data type	Information/possible settings
bMBrakeRelease	BOOL	Holding brake control: Releasing/applying the brake in connection with the selected operating mode
		FALSE Apply brake. • During automatic operation, the internal brake logic controls the brake.
		TRUE Release brake manually (forced release). • Note! The brake can also be released when the controller is inhibited! • During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. • In semi-automatic operation, the brake is released including feedforward control.
bMBrakeStartValue2 <small>(from version 06.00.00)</small>	BOOL	Holding brake control: Selection of the torque feedforward control value for manual specification of the feedforward control value • Only effective if bit 4 in C02582 is set to "1". ▶ Feedforward control of the motor before release
		FALSE Starting value 1 (C02581/4) active.
		TRUE Starting value 2 (C02581/5) active.
nMBrakeAddValue_a <small>(from version 06.00.00)</small>	INT	Holding brake control: Additive feedforward control value (speed or torque) in [%] for torque feedforward control when the respective control mode is started • For speed control: 100 % ≙ reference speed (C00011) • For torque control: 100 % ≙ maximum torque (C00057) ▶ Feedforward control of the motor before release
bMBrakeApplied <small>(from version 06.00.00)</small>	BOOL	Holding brake control: Input for status detection via switching contacts at the brake • Only effective if bit 5 in C02582 is set to "1".
		FALSE Brake is released.
		TRUE Brake is applied.

Outputs

Designator	Data type	Value/meaning	
Control and setpoint signals for motor control			
The following outputs are used to transfer control signals and setpoints to the internal motor control function (LS_MotorInterface).			
bPosCtrlOn_	BOOL	TRUE	Activate position control.
bDeltaPosOn_	BOOL	TRUE	Control to adjust for following errors.
dnDeltaPos_p_	DINT	Following error input	
dnPosSetValue_p_	DINT	Absolute position setpoint	
bPosDerivativeOn_	BOOL	TRUE	Activate precontrol function of speed controller.
bSetRefValue_	BOOL	TRUE	Set the actual position to the reference position. • Trigger signal, if reference setting is requested or the reference signal is recognised during the referencing process.
(from version 18.00.00)			
dnPosRefValue_p_	DINT	Home position	
bQspOn_	BOOL	TRUE	Activate quick stop
nPWMAngleOffset_a_	INT	Angular offset input	
bSpeedCtrlIOn_	BOOL	TRUE	Set I-component of speed controller.
nSpeedCtrlI_a_	INT	I-component of the speed controller	
nSpeedSetValue_a_	INT	Main setpoint of speed	
bTorqueModeOn_	BOOL	TRUE	Switch on torque-guided operation.
nTorqueSetValue_a_	INT	Torque setpoint	
bDcBrakeOn_	BOOL	TRUE	Activate DC-injection braking.
bTorqueLimitAdaptOn_	BOOL	TRUE	Activate adaptation of torque limitation.
nTorqueLimitAdapt_a_	INT	Value for adaptation of torque limitation	
Status words			
wMotionState1 wMotionState2	WORD	MCK status word 1 & 2 • For a detailed description of the individual status bits, see subchapter entitled " MCK status word ." • Display parameter: C01241	
wAuxState	WORD	For future extensions - Output has no function at present time! Additional status word	
Status signal and actual-value signals from Motion Control Kernel functions			
nSpeedSet_v	INT	Speed setpoint selection in [increments/ms] • 16384 = 15000 rpm	

Designator	Data type	Value/meaning	
dnPosCycle_p <small>(from version 17.00.00)</small>	DINT	Master cycle length (master value) in [increments]	
dnPosTarget_p	DINT	Target position in [increments] • 65535 ≙ 1 revolution of the motor shaft	
dnPosSet_p <small>(from version 06.00.00)</small>	DINT	Modulo position in [increments] • 65535 ≙ 1 revolution of the motor shaft ▶ Activation of the modulo measuring system	
dnPosSetRelative_p <small>(from version 12.00.00)</small>	DINT	Relative feed in positioning processes in [increments] • 65535 ≙ 1 revolution of the motor shaft	
wActProfileNo	WORD	Number of current profile	
wFollowProfileNo	WORD	Number of sequence profile	
bBusy	BOOL	TRUE	Setpoint profile generation is active.
bDone	BOOL	TRUE	Setpoint profile generation is completed (set position = target position).
bHomingDone	BOOL	TRUE	Homing has been carried out. • The <i>bHomingDone</i> output, in contract to the <i>bHomePosAvailable</i> output, remains set to TRUE even if a travel command that resulted in a reset of the home position has been carried out.
bHomePosAvailable	BOOL	TRUE	Home position is known.
bMBrakeReleaseOut	BOOL		Trigger signal for switching element holding brake control via a digital output • Use bit 0 in C02582 to activate inverted switching element triggering. ▶ Holding brake control
		FALSE	Apply brake.
		TRUE	Release brake.
bMBrakeReleased	BOOL		"Brake released" status signal considering the brake release time • When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed! ▶ Holding brake control
		TRUE	Brake released (after the brake release time has expired).
bFollowErrLim1 <small>(from version 12.00.00)</small>	BOOL	TRUE	The current following error has exceeded the limit 1 for the following error set in C01215/1 via the time set in C01244/2 . ▶ Following error monitoring system
bFollowErrLim2 <small>(from version 12.00.00)</small>	BOOL	TRUE	The current following error has exceeded the limit 2 for the following error set in C01244/3 via the time set in C01215/2 . ▶ Following error monitoring system
wGearNum wGearDenom <small>(from version 11.00.00)</small>	WORD	Output of the gearbox factor set in C01202/1 and C01202/2 • These outputs can be connected to the <i>GearNum-/GearDenom</i> inputs of the FBs which process a gearbox factor (FB L_PhilIntegrator_1 , FB L_DFSET_1 , FB L_CalcDiameter_1). • C01067/1...3 can be used to inform these FBs that the gearbox direction of rotation is inverted is mostly done by selecting "motor mounting position inverted").	

8.2.1 MCK control word

The motion control function implemented in the [LS_MotionControlKernel](#) system block can be controlled via the *wMotionCtrl1* and *wMotionCtrl2* control words. Together, both control words form a 32-bit control double word which serves to control the entire MotionControlKernel. All motion profiles in the various operating modes can be operated via this interface.

For direct control via a fieldbus system, the two control words can be triggered by the field bus via a port block. In addition to a few other signals (e.g. limit switch, speed override) that are connected to the digital inputs of the inverter, all control signals can therefore be activated/deactivated via the fieldbus used (CAN, PROFIBUS, etc.).

As an alternative to this, changes to the individual control bits or bit fields (e.g. for specifying the profile number) can also be carried out via separate process inputs provided by the [L_MckCtrlInterface](#) function block. The control words *wOutMckPosCtrl_1* and *wOutMckPosCtrl_2* output by this function block constitute the input information for the [LS_MotionControlKernel](#) system block in this case.

MCK control word 1 (wMotionCtrl1)

Bit	Designation	Description	Bit 3	Bit 2	Bit 1	Bit 0
0	OpMode_Bit0	Operating mode				
...	...	Speed follower	0	0	0	0
3	OpMode_Bit3	Homing	0	0	0	1
		Manual jog	0	0	1	0
		Positioning	0	0	1	1
		Stop	0	1	0	0
		Position follower	0	1	0	1
All other possible settings are reserved for future extensions!						
4	ManJogPos	Manual jog			Bit 5	Bit 4
5	ManJogNeg	Stop manual jog			0	0
		Manual jog CW			0	1
		Manual jog in counter-clockwise direction			1	0
		No change from previous status			1	1
6	ManExecute 2ndSpeed	"1" ≙ Change over to manual speed 2				
7	ReleaseLimitSwitch	"1" ≙ Retract operated hardware limit switch				
8	HomStartStop	"1" ≙ Start/stop homing process				
9	HomSetPos	"1" ≙ Set homing position				
10	HomResetPos	"1" ≙ Reset the "Reference known" status • <i>bHomePosDone</i> and <i>bHomePosAvailable</i> are reset to FALSE. • The positions remain unaffected.				
11	EnableSpeedOverride	"1" ≙ Activate speed override				
12	EnableAccOverride	"1" ≙ Activate acceleration override				
13	Enable SRampOverride	"1" ≙ Activate S-ramp override				
14	PosTeachSetPos	"1" ≙ Teach MCK set position into the selected profile				
15	PosTeachActPos	"1" ≙ Teach current position into the selected profile				

MCK control word 2 (wMotionCtrl2)

Bit	Designation	Description																																																												
16	PosExecute	"071" ≙ Start travelling																																																												
17	PosFinishTarget	"071" ≙ Complete cancelled profile																																																												
18	PosDisable FollowProfile	"1" ≙ Do not travel sequence profile																																																												
19	PosStop	"1" ≙ Cancel travelling From version 12.00.00, more travel requests will be inhibited ("PosExecute" will be blocked).																																																												
20 ... 23	PosModeBit0 ... PosModeBit3	<table border="1"> <thead> <tr> <th>Positioning mode</th> <th>Bit 3</th> <th>Bit 2</th> <th>Bit 1</th> <th>Bit 0</th> </tr> </thead> <tbody> <tr> <td>Positioning mode = setting in C01300/1...15</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Absolute (shortest path)</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>Continuous</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>Relative</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>Absolute (Cw) *</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>Absolute (Ccw) *</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>Absolute (shortest path) to TP *</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Continuous to TP *</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>Relative to TP *</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>Absolute (Cw) to TP *</td> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>Absolute (Ccw) to TP *</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>* From version 06.00.00 All other possible settings are reserved for future extensions!</p>	Positioning mode	Bit 3	Bit 2	Bit 1	Bit 0	Positioning mode = setting in C01300/1...15	0	0	0	0	Absolute (shortest path)	0	0	0	1	Continuous	0	0	1	0	Relative	0	0	1	1	Absolute (Cw) *	0	1	0	0	Absolute (Ccw) *	0	1	0	1	Absolute (shortest path) to TP *	1	0	0	0	Continuous to TP *	1	0	0	1	Relative to TP *	1	0	1	0	Absolute (Cw) to TP *	1	0	1	1	Absolute (Ccw) to TP *	1	1	0	0
Positioning mode	Bit 3	Bit 2	Bit 1	Bit 0																																																										
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24 ... 31	ProfileNo_Bit0 ... ProfileNo_Bit7	<table border="1"> <thead> <tr> <th>Profile</th> <th>Bit 7</th> <th>Bit 6</th> <th>Bit 5</th> <th>Bit 4</th> <th>Bit 3</th> <th>Bit 2</th> <th>Bit 1</th> <th>Bit 0</th> </tr> </thead> <tbody> <tr> <td>Profile 0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Profile 1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>Profile 2</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>...</td> <td colspan="8">...</td> </tr> <tr> <td>Profile 15</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table> <p>All other possible settings are reserved for future extensions!</p>	Profile	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Profile 0	0	0	0	0	0	0	0	0	Profile 1	0	0	0	0	0	0	0	1	Profile 2	0	0	0	0	0	0	1	0								Profile 15	0	0	0	0	1	1	1	1						
Profile	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0																																																						
Profile 0	0	0	0	0	0	0	0	0																																																						
Profile 1	0	0	0	0	0	0	0	1																																																						
Profile 2	0	0	0	0	0	0	1	0																																																						
...	...																																																													
Profile 15	0	0	0	0	1	1	1	1																																																						

**Note!**

The profile 0 is no valid profile for the "[Positioning](#)" operating mode.

If a driving request with an invalid profile number is started, the response set in [C00595/12](#) occurs (Lenze setting: "WarningLocked").

**Tip!**

Travel requests/profiles can also be started while the drive is running. The drive does not need to be at standstill.

8.2.2 MCK status word

MCK status word 1 (wMotionState1)

Bit	Designation	Description	Bit 3	Bit 2	Bit 1	Bit 0
0	ActOpModeBit00	Active operating mode				
...	...	Speed follower	0	0	0	0
3	ActOpModeBit03	Homing	0	0	0	1
		Manual jog	0	0	1	0
		Positioning	0	0	1	1
		Stop or Safe stop 1 (SS1)	0	1	0	0
		Position follower	0	1	0	1
		StandBy (internal operating mode in the event of quick stop, pulse inhibit, and DC-injection braking)	1	1	1	1
4	Busy	"1" ≙ Internal profile generation is active. A speed profile is being generated.				
5	Done	"1" ≙ Generation of a speed profile with the selected position has been completed.				
6	AcceleratingActive	"1" ≙ Profile generation phase is in the acceleration process.				
7	ConstSpeedDuty	"1" ≙ Profile generation phase at constant speed active.				
8	DeceleratingActive	"1" ≙ Profile generation phase is in the deceleration process.				
9	S_ShapingActive	From version 12.00.00: "1" ≙ Rounding during acceleration/deceleration active. ▶ Status bit "S_ShapingActive"				
10	Pos. HW-Limit Detected	"1" ≙ Positive limit switch has triggered. • Reset only possible via "Manual jog" mode! ▶ Hardware limit switches				
11	Neg. HW-Limit Detected	"1" ≙ Negative limit switch has triggered. • Reset only possible via "Manual jog" mode! ▶ Hardware limit switches				
12	HomPosDone	"1" ≙ Homing has been completed.				
13	HomPosAvailable	"1" ≙ The home position has been detected and is known in the drive. ▶ Status bit "HomPosAvailable"				
14	Pos. SW limit detected	"1" ≙ Positive software limit position overtravelled. ▶ Software limit positions				
15	Neg. SW limit detected	"1" ≙ Negative software limit position overtravelled. ▶ Software limit positions				

**Note!**

The internal "[StandBy](#)" operating mode is assumed if controller inhibit, pulse inhibit, quick stop and/or DC-injection braking are activated.

- In this operating mode, no setpoint generation takes place through the **Motion Control Kernel**.
- If the holding brake control sets a controller inhibit when the holding brake is closed, the internal "StandBy" operating mode is not assumed.

MCK status word 2 (wMotionState2)

Bit	Designation	Description																																																							
16	DwellTime	"1" ≙ Dwell time after reaching the setpoint position is active. ▶ Target position monitoring (status "drive in target")																																																							
17	InTarget	"1" ≙ Dwell time has expired and current actual position is in the set target window. ▶ Target position monitoring (status "drive in target")																																																							
18	PosDone	"1" ≙ Positioning profile has been completed in the "Positioning" or "Homing" mode. Setpoint position of a profile data set is in target.																																																							
19	Reserved	-																																																							
20 ... 23	ActPosMode_Bit00 ... ActPosMode_Bit03	<table border="1"> <thead> <tr> <th>Active positioning mode</th> <th>Bit 3</th> <th>Bit 2</th> <th>Bit 1</th> <th>Bit 0</th> </tr> </thead> <tbody> <tr> <td>Absolute (shortest path)</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>Continuous</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>Relative</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>Absolute (Cw) *</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>Absolute (Ccw) *</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>Absolute (shortest path) to TP *</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Continuous to TP *</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>Relative to TP *</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>Absolute (Cw) to TP *</td> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>Absolute (Ccw) to TP *</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p>* From version 06.00.00 Note: The display of the active positioning mode depends on further factors. See subchapter "Override of the parameterised positioning mode".</p>	Active positioning mode	Bit 3	Bit 2	Bit 1	Bit 0	Absolute (shortest path)	0	0	0	1	Continuous	0	0	1	0	Relative	0	0	1	1	Absolute (Cw) *	0	1	0	0	Absolute (Ccw) *	0	1	0	1	Absolute (shortest path) to TP *	1	0	0	0	Continuous to TP *	1	0	0	1	Relative to TP *	1	0	1	0	Absolute (Cw) to TP *	1	0	1	1	Absolute (Ccw) to TP *	1	1	0	0
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24 ... 31	ActProfileNo_Bit00 ... ActProfileNo_Bit07	<table border="1"> <thead> <tr> <th>Active profile</th> <th>Bit 7</th> <th>Bit 6</th> <th>Bit 5</th> <th>Bit 4</th> <th>Bit 3</th> <th>Bit 2</th> <th>Bit 1</th> <th>Bit 0</th> </tr> </thead> <tbody> <tr> <td>Profile 0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Profile 1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>Profile 2</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>...</td> <td colspan="8">...</td> </tr> <tr> <td>Profile 15</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	Active profile	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Profile 0	0	0	0	0	0	0	0	0	Profile 1	0	0	0	0	0	0	0	1	Profile 2	0	0	0	0	0	0	1	0								Profile 15	0	0	0	0	1	1	1	1	
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Profile 1	0	0	0	0	0	0	0	1																																																	
Profile 2	0	0	0	0	0	0	1	0																																																	
...	...																																																								
Profile 15	0	0	0	0	1	1	1	1																																																	

**Note!**

The effective positioning mode is generated via the MCK control word (bit 20 ... 23) and/or the parameters [C01300/1...15](#) for defining the positioning mode in the profile data. Here, the setting in the MCK control word superimposes the mode selection via the corresponding parameter. This means that the mode selection and the touch probe enable are possible via process data.

For generating the effective positioning mode, the following applies:

- Valid PosMode in the MCK control word:
→ Use positioning mode of the MCK control word
- PosMode in the MCK control word = 0:
→ Use positioning mode set in [C01300/x](#)
- Invalid PosMode in the MCK control word:
→ Error message "Ck09: Positioning mode invalid"

8.2.2.1 Status bit "HomPosAvailable"

Bit 13 ("HomPosAvailable") in the MCK status word 1 shows that the reference position has been detected and is known in the drive.

An available reference information (bit 13 = "1") and thus a valid measuring system is required for the following functions:

- Positioning in the "[Positioning](#)" operating mode in the following ([C01300/1...15](#)) positioning modes:
 - 1: absolute (beeline)
 - 4: absolute (Cw)
 - 5: absolute (Ccw)
 - 8: absolute (shortest path) to TP
 - 11: absolute (Cw) to TP
 - 12: absolute (Ccw) to TP
- Response to set software limit positions
- Stopping on breakpoints in the "[Manual jog](#)" operating mode
- Traversing of a sequence profile with absolute measuring reference in the "[Homing](#)" mode after homing is completed

Resetting the reference information

The following events reset bit 13 ("HomPosAvailable") in the MCK status word 1:

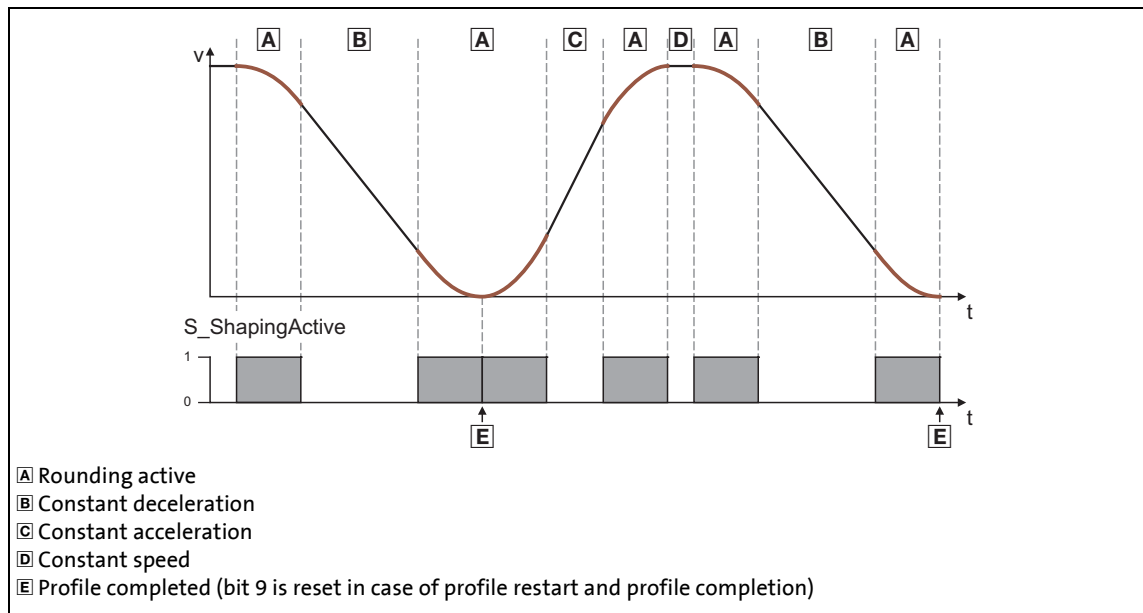
- Setting bit 10 ("HomResetPos") in the MCK control word 1
- Overtravelling the 32-bit position display area at the limit ± 2147483647 increments when the cycle ([C1201/1](#)) = "0 units".
- Change of the position encoder selection in [C00490](#)
- Change of the cycle in [C1201/1](#)
- Writing on the machine parameters if bit 1 ("delete reference when machine data is changed") is set in [C2652](#).
 - Machine parameters are cycle ([C1201/1](#)), gearbox factors ([C1202/1...2](#), [C1203/1...2](#)) and feed constant ([C1204](#)).
 - The mere writing of these parameters (even when the previous value is used) causes the reference to be deleted!
- Encoder error when a position encoder is used at the multi-encoder interface
- Resolver error when a resolver is used as position encoder
- Mains recovery at a cycle set unlike "0 units" in [C1201/1](#) and if the position difference at reference recovery is higher than 1000 cycles.

8.2.2.2 Status bit "S_ShapingActive"

This function extension is available from version 12.00.00!

Bit 9 ("S_ShapingActive") in the MCK status word 1 indicates in the operating modes "[Homing](#)", "[Manual jog](#)", "[Positioning](#)", "[Stop](#)" and "[Position follower](#)" when rounding is effective while S-shaped profiles are being carried out.

- Bit 9 is usually reset in case of profile restarts and after profiles have been completed.
- The following illustration shows this by means of a real temporal characteristic:



[8-2] Example: Display of the rounding generated via the "S_ShapingActive" status bit

8.2.2.3 Status bit "bReadyToOperate"

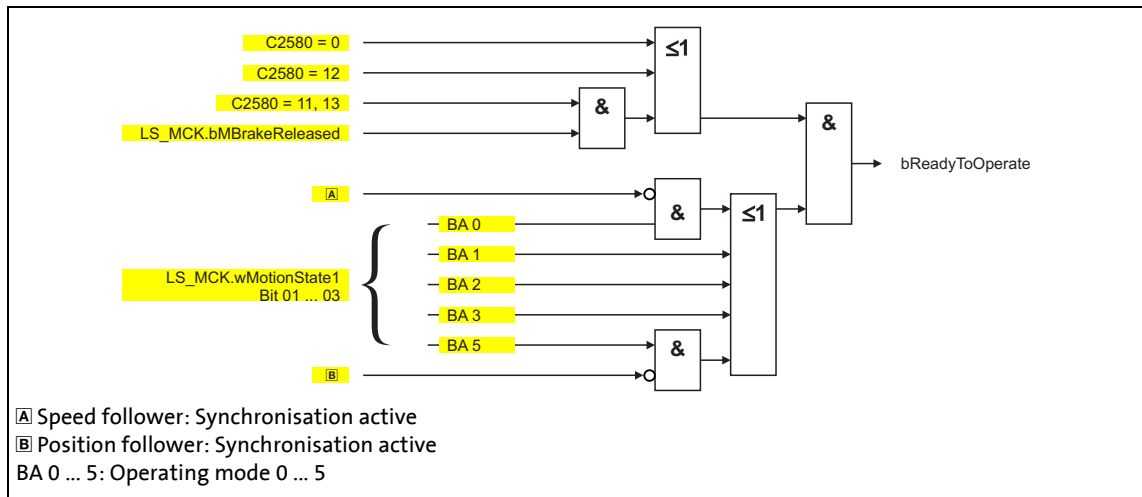
This function extension is available from version 16.00.00!

The **LS_MotionControlKernel** with status bit 19 in the status word 2 (wMotionState2) provides the signalling for the readiness to process the setpoint signals or setpoint commands. The state of bit *bReadyToOperate* provides TRUE if, for instance, a defined speed setpoint or a command (e.g. "manual jog positive") can be directly processed by the **LS_MotionControlKernel**.

The status of this bit depends on three factors:

- Operating mode of the MotionControlKernel
 - *bReadyToOperate* = FALSE if operating mode **Standby** or **Stop**
- Synchronisation status
 - *bReadyToOperate* = FALSE if **LS_MotionControlKernel** executes a synchronisation process in the operating modes **Speed follower** or **Position follower**.

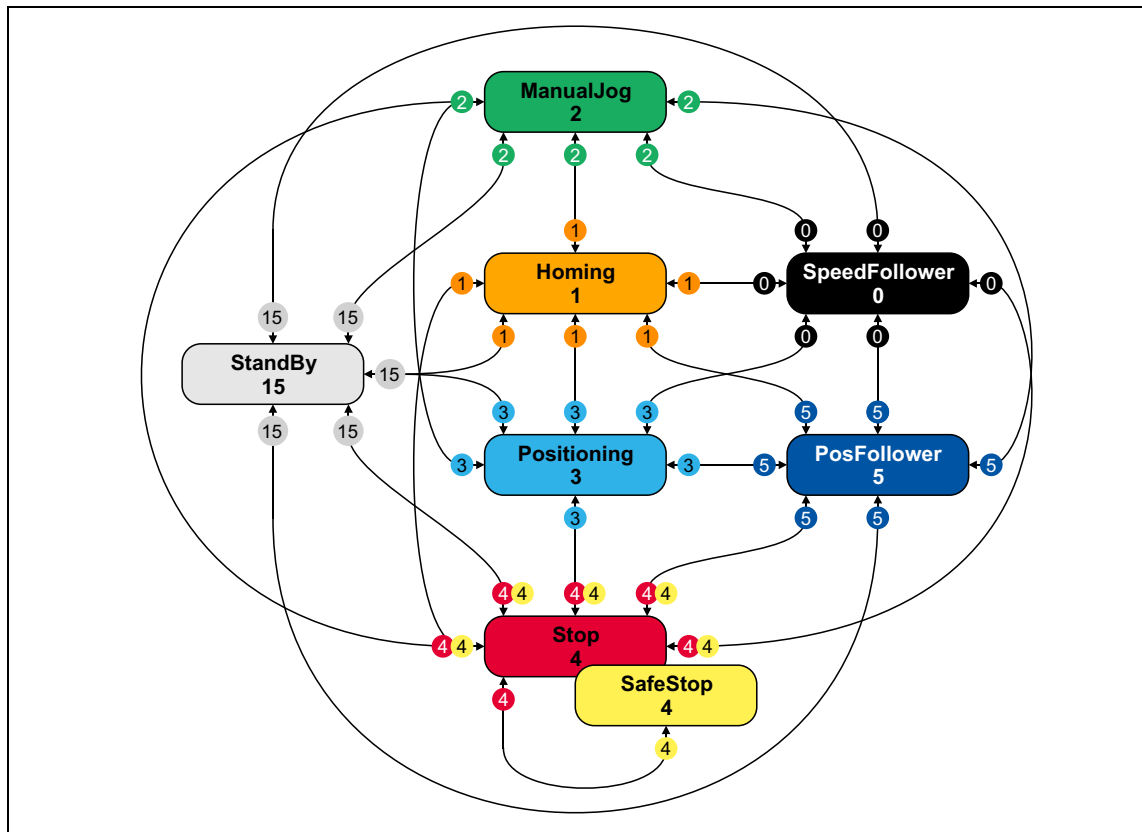
The figure shows the logical relationship:



[8-3] Creation of the status bit *bReadyToOperate*

8.2.3 MCK state machine

Prio	Condition	
Global conditions:		
1	15 Setpoint generation through Motor control (MCTRL) : • DCB = DC-injection braking • QSP = quick stop • CINH = controller inhibit	
2	4 "Safe stop 1" (SS1) requested ▶ Interface to safety system	
Conditions requested by MCK control word:		
		Bit 3 Bit 2 Bit 1 Bit 0
3	2 Manual jog requested	0 0 1 0
4	1 Homing requested	0 0 0 1
5	3 Positioning requested	0 0 1 1
6	0 Speed follower requested	0 0 0 0
7	5 Position follower requested	0 1 0 1
8	4 Stop requested	0 1 0 0



[8-4] MCK state machine

8.2.3.1 "StandBy" operating mode

The internal "StandBy" operating mode is implicitly assumed if controller inhibit, pulse inhibit, quick stop and/or DC-injection braking are activated. Thus, there is no setpoint generation by the **Motion Control Kernel** in the "StandBy" operating mode.

- If the holding brake control sets a controller inhibit when the holding brake is closed, the internal "StandBy" operating mode is not assumed.
- The "StandBy" operating mode cannot be activated via the MCK control word.
- When the "StandBy" operating mode is active, bits 0 ... 3 are set in the MCK status word.

Speed acceptance when the "StandBy" operating mode is quit

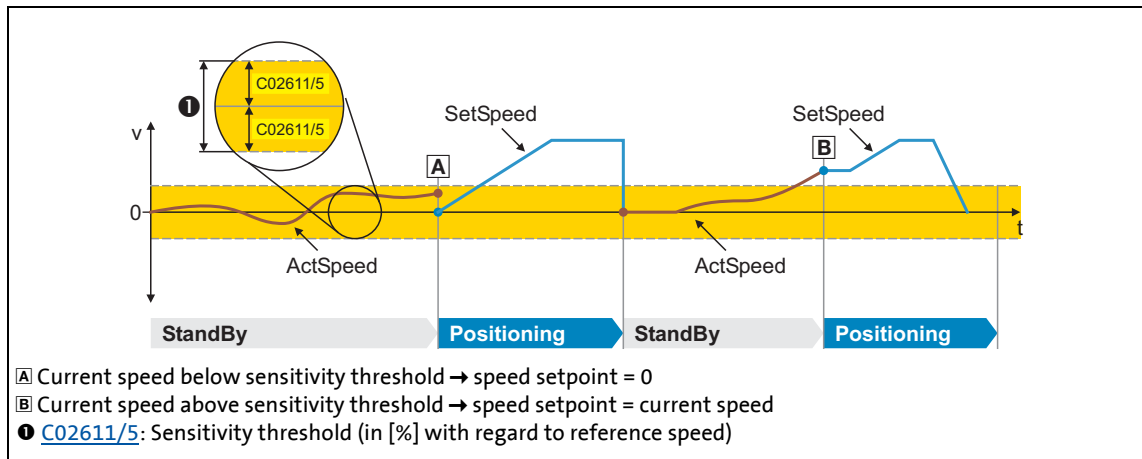
In addition to cancelling the controller inhibit, pulse inhibit, quick stop and/or DC injection braking, a change to another operating mode from "StandBy" also requires a termination of the magnetisation of the motor (not in case of synchronous motors). If there is a change to a setpoint-controlled operating mode of the **Motion Control Kernel** the current speed is transferred to the speed setpoint.



Note!

Due to a motor magnetisation of a motor normally standing still, the current speed can also be non-zero rpm when "StandBy" is quit. If the operating mode now changes to "Positioning", the transfer of this speed to the speed setpoint may cause a permanent drifting of the motor shaft, depending on the activated option in [C01216](#).

From version **V12.00.00 onwards**, a sensitivity threshold can be set for preventing a drifting of the motor shaft in [C2611/5](#). If the absolute value of the current speed is below the sensitivity threshold, the value "0" is transferred to the speed setpoint instead of the current speed. The following illustration shows the issue:



[8-5] Example: Sensitivity threshold for speed transfer from the "StandBy" operating mode

In the Lenze setting "0.5 %", the sensitivity threshold corresponds to approx. 7.5 rpm at a reference speed of 1500 rpm set in [C00011](#).

8.2.4 Interface to safety system

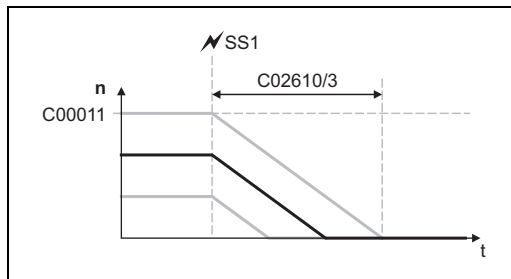
For operation with optional safety system, the [LS_MotionControlKernel](#) system block has the *wSMCtrl* input. This interface is used to transfer a control word by means of which the **Motion Control Kernel** can be supplied with information on requested or active safety functions. The **Motion Control Kernel** then initiates the necessary motion sequence (e.g. braking).

At the moment, only bit 0 in the *wSMCtrl* control word has a function. Additional functions are in preparation:

Bit	Designation	Description
0	SafeStop1	"1" ≙ Request for "Safe Stop 1" (SS1).
1	Reserved	In preparation - Still without function!
...		
15		

Behaviour in case of request for "Safe Stop 1" (SS1)

The drive is brought to a standstill with the stopping ramp set in [C02610/3](#).



- The time set in [C02610/3](#) refers to the down-ramping of the reference speed set in [C00011](#).
- If the current speed is lower, the time to standstill is accordingly lower as well.

[8-6] Ramping down to standstill

If the request is reset during the down-ramping process (bit 0 = "1↯0"), the behaviour depends on the active operating mode:

- In the "[Speed follower](#)" operating mode, direct synchronisation with the target speed takes place with the ramp time set in [C02610/2](#).
- In the "[Homing](#)" operating mode, the ramp-down is continued with the deceleration for stop set in [C01251](#) if the bit 8 ("HomStartStop") in the MCK control word = "0". If bit 8 is set, the homing process starts immediately in the selected homing mode.
- In the "[Manual jog](#)" operating mode, the behaviour depends on whether the manual jog initiator (*bManJogPos* or *bManJogNeg*) is still set:

Bit 0 (SafeStop1)	bManJogPos bManJogNeg	Behaviour
1	TRUE	Ramping down to standstill
0	TRUE	Accelerating to manual speed
0	FALSE	Ramping down to standstill

- In the "[Positioning](#)" operating mode, the behaviour depends on the setting in [C01216](#).
- In the "[Position follower](#)" operating mode, (forward) positioning to the signalled absolute position always takes place if this position differs from the internal position.

8.2.5 Consideration of residual value in case of external profile calculation

The *dnProfilePosition_p* input serves to transfer a profile position in [increments] to the SB [LS_MotionControlKernel](#). This will then be entered into the active profile data set selected in the [MCK control word](#) via the bits 24 ... 31.

For (external) calculations to be carried out before, the following blocks can be used in the FB Editor.

- From version 12.00.00 onwards, these blocks automatically consider residual values and modulo positions in case of a cycle length definition and correctly forward these internally:

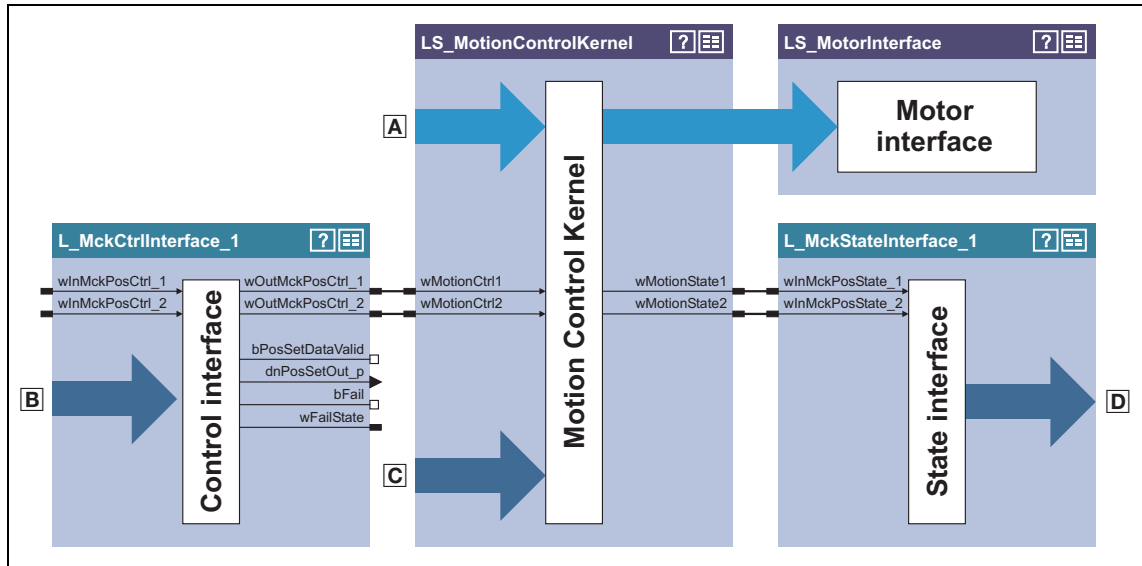
Block	Function
L_ConvUnitsToIncr_1 L_ConvUnitsToIncr_2 L_ConvUnitsToIncr_3	... converts a position value provided in the real unit of the machine into an internal 32-bit position value. • These FBs are available from version 12.00.00.
L_MckCtrlInterface_1	... provides the application with process inputs for controlling various basic functions of the Motion Control Kernel.
LS_ParFreeUnit LS_ParFreeUnit_2	Output of 16 parameterisable position signals with internal conversion of [unit] in [increments] • These SBs are available from version 12.00.00.

The following blocks also automatically consider residual values and module positions and can be used for forwarding the increment results of the previously mentioned blocks:

Block	Function
L_Mux_1	... switches one of eight selectable input signals to the output.
L_SignalSwitch32_1 L_SignalSwitch32_2 L_SignalSwitch32_3	... switches between two input signals of "DINT" data type. • These FBs are available from version 12.00.00.
LA_SwitchPos / LA_TabPos : • dnFreeIn1_p • dnFreeIn2_p	These two inputs serve to transfer 32-bit signals from the I/O level to the application level. The signals are available at the correspondent outputs of the application block LA_SwitchPosIn or LA_TabPosIn .
LA_TabPos : • dnPosProfilePosition	Selection of the target position in [increments] for the "table positioning" application. The signal is available in the application level at the correspondent output of the LA_TabPosIn application block.

8.3 MCKInterface

The so-called "MCK interface" described in this chapter consists of the two function blocks [L_MckCtrlInterface](#) and [L_MckStateInterface](#), which are connected upstream respectively downstream of the [LS_MotionControlKernel](#) system block:



[8-7] Detail of the interconnection architecture for the "table positioning" technology application

A Control and setpoint signals for motor control

B Additional process inputs for controlling the **Motion Control Kernel**, e.g.:

- Selection of the operating mode
- Selection of the profile number
- Override of the positioning mode
- Control inputs for manual jogging, homing, positioning
- Control inputs for speed/acceleration/S-ramp override

C Control and setpoint signals for the **Motion Control Kernel** such as

- Selection of speed setpoint for speed follower
- Selection of positioning setpoint for position follower
- Selection of override values
- Connection for limit switch & pre-stop mark for homing
- Holding brake control

D Output of status signals of the **Motion Control Kernel**

Control of the Motion Control Kernel

Control of the basic drive functions implemented in the Motion Control Kernel is carried out by means of

- direct specification of the control words, for example via a master control unit also connected to the fieldbus.
 - For this purpose, the control word inputs can be directly connected to the field bus interface **LP_McIn** respectively **LP_CanIn**.
 - See the "[MCK control word](#)" chapter for a detailed description of the individual control bits.
- the specification of individual process signals at the [L_MckCtrlInterface](#) FB which are then ORed with the control word.

Plausibility check

The process signals applied to the [L_MckCtrlInterface](#) FB are logically linked by means of an OR logic operation to the specified control word via the two control word inputs *wInMckPosCtrl_1* and *wInMckPosCtrl_2* and, after a plausibility check, are output via the two control word outputs *wOutMckPosCtrl_1* and *wOutMckPosCtrl_2*.

- The profile number, the operating mode, and the positioning mode are checked for plausibility.
- If implausibility is detected, only control bit information is output and the *bFail* output is set to TRUE.
- The result of the plausibility check is provided as the *wFailState* output word and displayed in [C01299](#).

The control words that are output, namely *wOutMckPosCtrl_1* and *wOutMckPosCtrl_2*, constitute the input information for the [LS_MotionControlKernel](#) system block.

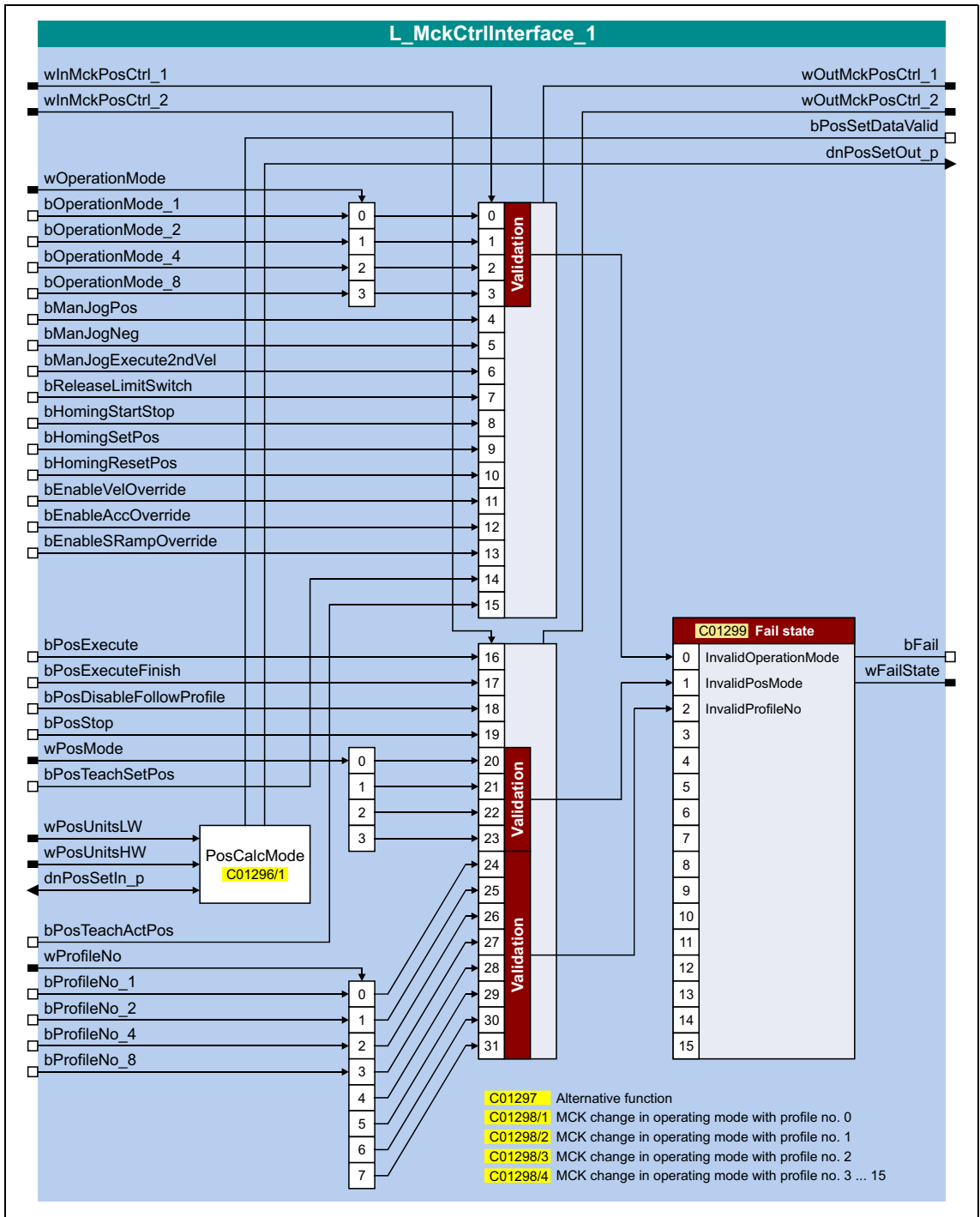
Status information of the Motion Control Kernel

Output by the [LS_MotionControlKernel](#), the status words *wMotionState1* and *wMotionState2* also constitute input information for the downstream [L_MckStateInterface](#) FB, which provides this information to the application in the form of process signals.

8.3.1 Control inputs | "L_MckCtrlInterface" function block


This FB provides process inputs for controlling different basic functions of the **Motion Control Kernel**.

In addition to the ORing of discrete input signals with the control word inputs, the FB has further functions that are described in the following subchapters.



Inputs

Designator	Data type	Information/possible settings														
wInMckPosCtrl_1 wInMckPosCtrl_2	WORD	<p>Direct specification of the MCK control word 1 & 2</p> <ul style="list-style-type: none"> For example, via a master control unit that is also connected to the fieldbus. For this purpose, the control word inputs can be directly connected to the LP_McIn1 respectively LP_CanIn1 fieldbus interface. The two control words together form a 32-bit double control word with which the entire Motion Control Kernel is controlled. All motion profiles in the different operating modes can be operated via this interface. See the "MCK control word" chapter for a detailed description of the individual control bits. 														
wOperationMode	WORD	<p>Selection of the operating mode of the Motion Control Kernel</p> <ul style="list-style-type: none"> Only bit 0 ... bit 3 of <i>wOperationMode</i> are evaluated. If an invalid operating mode is selected, the response set in C00595/11 is activated (Lenze setting: "Warning"). The current operating mode is displayed in C01243. <table border="1"> <tr> <td>0</td> <td>Speed follower</td> </tr> <tr> <td>1</td> <td>Homing</td> </tr> <tr> <td>2</td> <td>Manual jog</td> </tr> <tr> <td>3</td> <td>Positioning</td> </tr> <tr> <td>4</td> <td>Stop</td> </tr> <tr> <td>5</td> <td>Position follower</td> </tr> <tr> <td>6 ... 15</td> <td>Reserved for future extensions</td> </tr> </table>	0	Speed follower	1	Homing	2	Manual jog	3	Positioning	4	Stop	5	Position follower	6 ... 15	Reserved for future extensions
0	Speed follower															
1	Homing															
2	Manual jog															
3	Positioning															
4	Stop															
5	Position follower															
6 ... 15	Reserved for future extensions															
bOperationMode_1 ... bOperationMode_8	BOOL	<p>Binary-coded selection of the operating mode of the Motion Control Kernel</p> <ul style="list-style-type: none"> See the "MCK control word" chapter for a detailed description of the individual control bits. If an invalid operating mode is selected, the response set in C00595/11 is activated (Lenze setting: "Warning"). The current operating mode is displayed in C01243. 														
bManJogPos bManJogNeg	BOOL	<p>Manual jog:</p> <p><i>bManJogPos</i> = TRUE: Manual jog right <i>bManJogNeg</i> = TRUE: Manual jog left Both inputs = TRUE: No change compared to previous state Both inputs = FALSE: Stop manual jog</p>														
bManJogExecute2ndVel	BOOL	<p>Manual jog: Changeover to speed 2</p> <table border="1"> <tr> <td>FALSE</td> <td>Speed 1 (C01231/1) active</td> </tr> <tr> <td>TRUE</td> <td>Speed 2 (C01231/2) active</td> </tr> </table>	FALSE	Speed 1 (C01231/1) active	TRUE	Speed 2 (C01231/2) active										
FALSE	Speed 1 (C01231/1) active															
TRUE	Speed 2 (C01231/2) active															
bReleaseLimitSwitch	BOOL	<p>Manual jog: Retract operated limit switch</p> <table border="1"> <tr> <td>TRUE</td> <td>Retract operated limit switch (in opposite direction)</td> </tr> </table>	TRUE	Retract operated limit switch (in opposite direction)												
TRUE	Retract operated limit switch (in opposite direction)															

Designator	Data type	Information/possible settings
bHomingStartStop	BOOL	Homing: Start/stop homing <ul style="list-style-type: none"> Only possible in the "referencing" operating mode.
		TRUE If one of homing modes "6" ... "15" in C01221 is selected: Start reference search <ul style="list-style-type: none"> The current status of the reference search is indicated via the status outputs <i>bHomingDone</i> and <i>bHomePosAvailable</i>.
		If homing mode "100: SetRef" is selected in C01221 : Setting the home position manually <ul style="list-style-type: none"> The home position is set manually with the drive at a standstill. The current actual position now corresponds to the reference position set in C01227/2 in the machine measuring system.
TRUE↔FALSE	Stop homing. <ul style="list-style-type: none"> If the <i>bHomingStartStop</i> input is reset to FALSE during active referencing, homing is cancelled and the drive is brought to a standstill. 	
bHomingSetPos	BOOL	Homing: Set home position ("on the fly" homing) <ul style="list-style-type: none"> With referencing "on the fly", the home position of a machine can be set during ongoing movement. Jerking and compensating movements do not occur.
		FALSE↗TRUE The position at the <i>dnMotorRefOffset_p</i> input of the LS MotionControlKernel SB at the instant of activation is the set home position.
bHomingResetPos	BOOL	Homing: Delete home position Note: With this function, positions are not deleted but only the status signals <i>bHomePosAvailable</i> and <i>bHomingDone</i> are reset. Setpoints and actual positions remain untouched until a renewed reference setting or homing.
		FALSE↗TRUE The internal status "reference known" is reset. <ul style="list-style-type: none"> The inverter is no longer referenced. The process outputs <i>bHomePosAvailable</i> and <i>bHomingDone</i> are reset to FALSE.
bEnableVelOverride	BOOL	Speed override
		TRUE Activate speed override
bEnableAccOverride	BOOL	Acceleration override
		TRUE Activate acceleration override
bEnableSRampOverride	BOOL	S-ramp smoothing override
		 Note! If the <i>nSRampOverride_a</i> input on the LS MotionControlKernel remains unconnected or if "0 %" is specified as the override value, activation of the S-ramp override results in deactivation of the S-ramp time. <ul style="list-style-type: none"> Deactivation of the S-ramp time before the start of a profile with S-ramp time causes linear ramp generation. Deactivation of the S-ramp time during a traversing process, however, is not accepted immediately in the profile generator, but the profile generator checks automatically when an online change of the ramp form can be carried out and then initiates it automatically.
		TRUE Activate S-ramp smoothing override
bPosExecute	BOOL	Positioning: Start travelling
		FALSE↗TRUE Execute selected profile
bPosExecuteFinish	BOOL	Positioning: Complete cancelled profile
		FALSE↗TRUE A positioning process previously cancelled, e.g. by <i>bPosStop</i> or due to a device error, is resumed by travelling to the original target.
bPosDisableFollowProfile	BOOL	Positioning: Do not execute sequence profile (switch-off profile linkage)
		TRUE Evaluation of the sequence profile number parameterised in C01307/1...15 for the selected profile is suppressed.

Designator	Data type	Information/possible settings
bPosStop	BOOL	Positioning: Cancel travelling
		TRUE Stop positioning From version 12.00.00, more travel requests will be inhibited ("PosExecute" will be blocked).
wPosMode	WORD	Override of the positioning mode set in the profile data <ul style="list-style-type: none"> Via this input, an override of the positioning mode parameterised in C01300/1...15 for the selected profile is possible. The value set in C01300/1...15 is not overwritten in this case. Only bit 0 ... bit 3 of <i>wPosMode</i> are evaluated. If <i>wPosMode</i> = 0 is selected, the positioning mode set in C01300/1...15 is used.
		0 Positioning mode = setting in C01300/1...15
		1 Absolute (shortest path)
		2 Continuous
		3 Relative
		4 Absolute (Cw) *
		5 Absolute (Ccw) *
		8 Absolute (shortest path) to TP *
		9 Continuous to TP *
		10 Relative to TP *
		11 Absolute (Cw) to TP *
		12 Absolute (Ccw) to TP *
		* From version 06.00.00 All other possible settings are reserved for future extensions!
bPosTeachSetPos	BOOL	Position teaching: MCK setpoint position
		FALSE↗TRUE Teach MCK setpoint position into the selected profile.
wPosUnitsLW wPosUnitsHW	WORD	Selection of the target position in [units] <ul style="list-style-type: none"> <i>wPosUnitsLW</i> = LOW word, <i>wPosUnitsHW</i> = HIGH word The mode for calculating the position is selected in C01296/1.
dnPosSetIn_p	DINT	Selection of the target position in [increments] <ul style="list-style-type: none"> The mode for calculating the position is selected in C01296/1.
bPosTeachActPos	BOOL	Position teaching: Current position
		FALSE↗TRUE Teach current position into the selected profile.
wProfileNo	WORD	Stipulation of the profile to be executed <ul style="list-style-type: none"> Optionally as a data word or binary coded. When the profile is stipulated, this FB carries out a mode change in the Lenze setting at the same time: <ul style="list-style-type: none"> If profile 0 is selected: Activation of "Speed follower" operating mode If profile 1 is selected: Activation of "Homing" operating mode If profile 2 is selected: Activation of "Manual jog" operating mode If profile 3 ... 15 is selected: Activation of "Positioning" operating mode
bProfileNo_1 ... bProfileNo_8	BOOL	

Outputs

Designator	Data type	Value/meaning
wOutMckPosCtrl_1 wOutMckPosCtrl_2	WORD	Output of the MCK control word 1 & 2 <ul style="list-style-type: none"> For transfer to the LS MotionControlKernel system block. For a detailed description of the individual control bits, see chapter "MCK control word". (□ 474)
bPosSetDataValid	BOOL	Status signal "Position conversion completed, data consistent" <ul style="list-style-type: none"> This output is permanently set to TRUE if the g"0: dnPosOut_p=dnPosIn_p" mode has been set for the position calculation in C01296/1 and no modulo measuring system exists. If a cycle length has been set in C01201/1, a calculation is made under the following conditions without an immediate setting of <i>bPosSetDataValid</i>: <ul style="list-style-type: none"> Position specification is higher than or equal to the cycle length. Position specification is negative. For a correct positioning process, the <i>bPosSetDataValid</i> = TRUE status is required.
		TRUE Conversion of the target position from [units] into [increments] has been completed. <ul style="list-style-type: none"> The travel profile data are valid and the profile is ready to start.
dnPosSetOut_p	DINT	Output of the target position in [increments] <ul style="list-style-type: none"> Observe the <i>bPosSetDataValid</i> status output!
wFailState	WORD	Result of the plausibility check <ul style="list-style-type: none"> Display parameter: C01299 Result is bit coded:
		Bit 0 Invalid operating mode selection <ul style="list-style-type: none"> "1" ≡ The selected operating mode is not defined/invalid.
		Bit 1 Invalid positioning mode selection <ul style="list-style-type: none"> "1" ≡ The selected positioning mode is not defined/invalid.
		Bit 2 Invalid profile number selection <ul style="list-style-type: none"> "1" ≡ The selected profile number refers to a profile data set that does not exist.
		Bit 3 Reserved
		...
Bit 15		
bFail	BOOL	FALSE Okay, no error
		TRUE <ul style="list-style-type: none"> Plausibility check error or control information error (in this case after ORing the individual signals with the control words)

8.3.1.1 Alternative functions for control bit "PosExecute"

In [C01297](#), alternative functions for bit 16 (PosExecute) in the MCK control word can be selected with bit-coding.

PosStop with PosExecute = FALSE

If bit 0 has been set in [C01297](#), positioning can only be started/cancelled with the "PosExecute" control bit.

- If the "Positioning" operating mode has been set on the MCK, the "Pos-Execute" control bit has the following effects when being activated:

Signals at the input	Signals in the control word to the MCK
bPosExecute = TRUE	bPosExecute = TRUE bPosStop = FALSE bHomingStartStop remains unchanged
bPosExecute = FALSE	bPosExecute = FALSE bPosStop = TRUE bHomingStartStop remains unchanged

HomingStartStop with PosExecute

If bit 1 has been set in [C01297](#), homing can only be started/stopped with the "PosExecute" control bit.

- If the "Homing" operating mode has been set on the MCK, the "PosExecute" control bit has the following effect when activated:

Signals at the input	Signals in the control word to the MCK
bPosExecute = TRUE	bPosExecute = TRUE bPosStop = FALSE bHomingStartStop = TRUE
bPosExecute = FALSE	bPosExecute = FALSE bPosStop remains unchanged bHomingStartStop = FALSE

SetProfilPosition with PosExecute

If bit 2 has been set in [C01297](#) and control bit ("PosExecute") is being set, the setpoint position being applied is incorporated in the currently selected profile and then the profile is started immediately.

- If the "Positioning" operating mode has been set on the MCK, the "PosExecute" control bit has the following effect when activated:

Signals at the input	Signals in the control word to the MCK
bPosExecute = TRUE	bPosExecute = TRUE bPosStop = FALSE bHomingStartStop remains unchanged bPosTeachSetPos = TRUE (edge)
bPosExecute = FALSE	bPosExecute = FALSE bPosStop remains unchanged bHomingStartStop remains unchanged bPosTeachSetPos = FALSE

SetProfilPosition at position change

If bit 3 is set in [C01297](#), the setpoint positions at the MCKInterface are automatically accepted into the profile with the applied profile number if a change of data is detected at the corresponding input for the setpoint position.

- If the "0: dnPosOut_p=dnPosIn_p" mode has been set in [C01296/1](#) for converting the position, automatic acceptance is executed if the incremental position selection at the *dnPosIn_p* input was changed.
- If another mode (>0) has been set in [C01296/1](#), automatic acceptance is executed if the incremental position selection at the *wPosUnitsLW* and *wPosUnitsHW* inputs was changed.
- From version 12.00.00 a hysteresis can be set in [C01245/3](#) for the position change.

PosExecute at position change

(from version 12.00.00)

If bit 4 is set in [C01297](#), an automatic "PosExecute" takes place if the incremental position selection changes and this change is higher than set in the hysteresis for position change ([C01245/3](#)).

If the selection is made in units, so that in a first step it has to be converted into increments, and if this automatic function is then activated, the "PosExecute" will only be created automatically when the internal conversion is completed (*bPosSetDataValid*).



Tip!

This option serves to start travel requests very easily by simply defining the new target position.

8.3.1.2 Operating mode change with profile number

One of the operating modes of the **LS_MotionControlKernel** system block can be assigned to the positioning profiles via the four subcodes of [C01298](#):

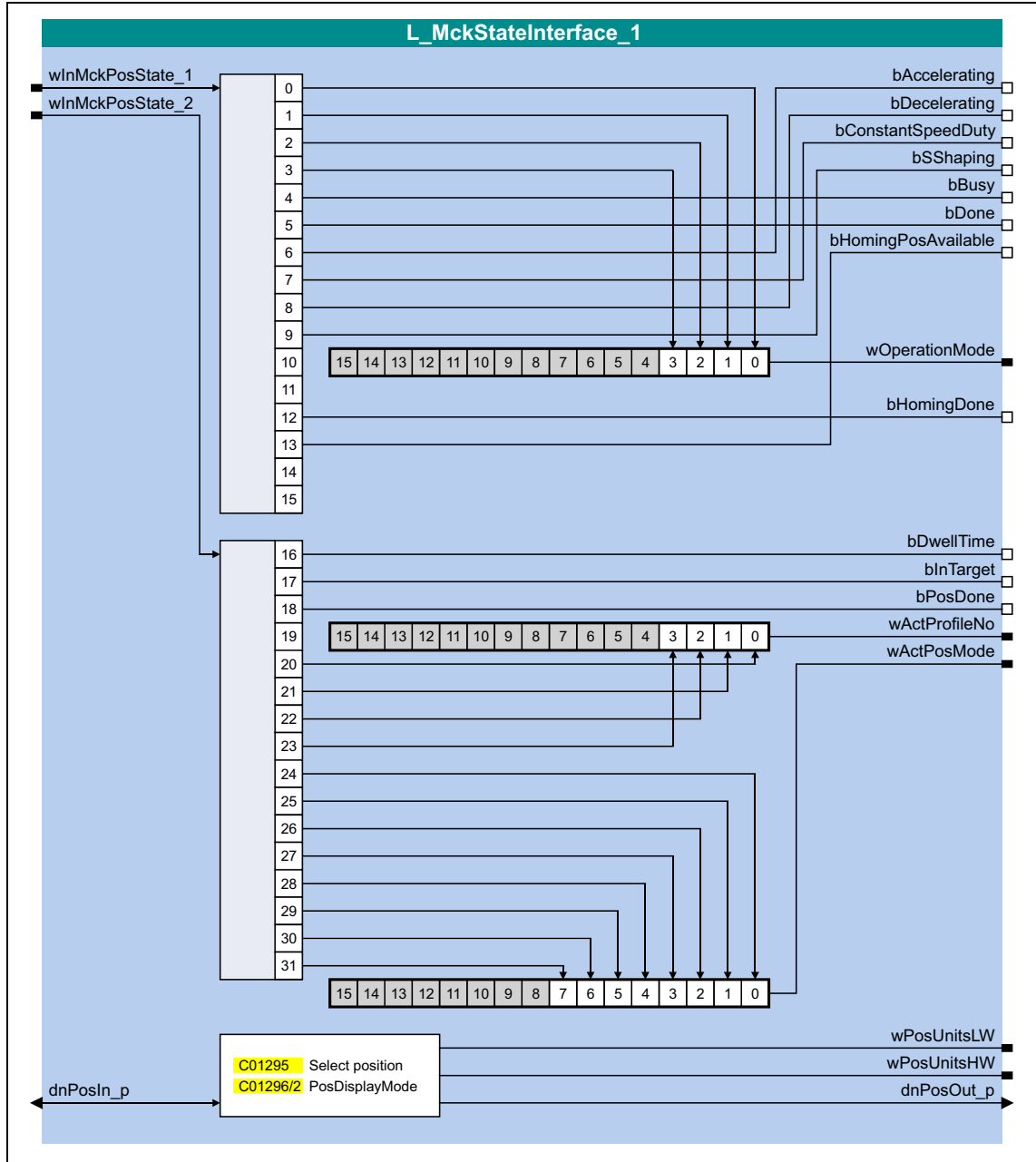
Parameters	Info	Lenze setting
C01298/1	Operating mode if profile 0 is selected	Speed follower
C01298/2	Operating mode if profile 1 is selected	Homing
C01298/3	Operating mode if profile 2 is selected	Manual jog
C01298/4	Operating mode if profile 3 ... 15 is selected	Positioning

- When a changeover to the corresponding profile is carried out, the set operating module is requested at the same time.
- With the setting "0: Op.Mode inputs", no operating modes are changed when the profile is changed. Instead, the operating mode requested "externally" applies (optionally via the inputs *wInMckPosCtrl_1*, *wOperationMode* or *bOperationMode_1...8* of the FB [L_MckCtrlInterface](#)).

Note: These inputs are internally connected via OR-logic. Only connect one of these inputs to ensure non-ambiguous operating mode changeovers!

8.3.2 Status outputs | FB "L_MckStateInterface"

This FB provides the application with different status information of the **Motion Control Kernel** via process outputs.



Inputs

Designator Data type	Information/possible settings
wInMckPosState_1 wInMckPosState_2 WORD	Inputs for accepting the status words from the LS_MotionControlKernel system block.
dnPosIn_p DINT	Position in [increments] <ul style="list-style-type: none"> Is converted into [units] if C01295 = "0: dnPosIn_p" and output at the <i>wPosUnitsLW</i> and <i>wPosUnitsHW</i> outputs. The mode for calculating the position is selected in C01296/2.

Outputs

Designator Data type	Value/meaning
bAccelerating BOOL	TRUE Acceleration phase active.
bDecelerating BOOL	TRUE Braking phase active.
bConstantSpeedDuty BOOL	TRUE Constant phase active.
bSShaping BOOL	From version 12.00.00: TRUE Profile rounding active.
bBusy BOOL	TRUE Setpoint generation active.
bDone BOOL	TRUE Target position (setpoint) has been approached.
bHomingPosAvailable BOOL	TRUE Home position is known.
wOperationMode WORD	Active setpoint-generating state of the Motion Control Kernel . <ul style="list-style-type: none"> Bit B0 ... B3 contain the information of the MCK status word. Bits B4 ... B15 are fixed at "0".
bHomingDone BOOL	TRUE Homing has been executed.
bDwellTime BOOL	TRUE Settling in target position is active
bInTarget BOOL	TRUE Target position (actual value) is in the target window.
bPosDone BOOL	TRUE Target position from the profile has been approached.
wActProfileNo WORD	Current traversing profile number <ul style="list-style-type: none"> Bit B0 ... B7 contain the information of the MCK status word. Bits B8 ... B15 are fixed at "0".
wActPosMode WORD	Current positioning mode <ul style="list-style-type: none"> Bit B0 ... B3 contain the information of the MCK status word. Bits B4 ... B15 are fixed at "0".
wPosUnitsLW wPosUnitsHW WORD	Output of the position selected in C01295 in [units] <ul style="list-style-type: none"> <i>wPosUnitsLW</i> = LOW word, <i>wPosUnitsHW</i> = HIGH word The mode for calculating the position is selected in C01296/2. These values are <u>not</u> updated in a 1-ms cycle (<u>not</u> in real time)!
dnPosOut_p DINT	Output of the position selected in C01295 in [increments] <ul style="list-style-type: none"> The mode for calculating the position is selected in C01296/2. When C01296/2 > 0, <i>dnPosOut_p</i> is updated isochronously with the outputs <i>wPosUnitsLW</i> and <i>wPosUnitsHW</i> and hence <u>not</u> in a 1-ms cycle (<u>not</u> in real time)!

8 Basic drive functions (MCK)

8.4 Basic settings

8.4 Basic settings

8.4.1 Machine parameters

The motor end, among other things, is described by the machine parameters indicated below in respect of the mechanics used.



Note!

Setting the machine parameters is a basic prerequisite for the operating modes "[Homing](#)", "[Manual jog](#)" and "[Positioning](#)".

The more precisely the machine parameters are set, the better the results of positioning!

For [TA "Table positioning"](#), you can set the machine parameters in the »Engineer« on the tab headed **Application Parameters** on the dialog level *Overview* → *Machine parameters*:

The screenshot shows the 'Application Parameters' dialog box, specifically the 'Overview -> Machine parameter' view. On the left, there is a 'Mechanics selection' section with three options: 'Conveyor drive', 'Spindle drive', and 'Rotary table', each with a question mark icon. The main area contains a mechanical diagram of a motor-driven system. The diagram shows a motor (M) connected to a gear with Z1 teeth, which meshes with a gear with Z2 teeth. The motor speed is labeled n_Motor and the plant speed is n_Plant. A position encoder is connected to the plant, with its speed labeled n_Encoder. The distance between the gears is labeled d. A feed constant is indicated as Feed constant = π * d [unit]/Revolution. Below the diagram, the text reads 'Z = Number of teeth' and 'n = Speed'. To the right of the diagram, there is a list of parameters with their values and units:

Mounting direction: Motor	[C] Not inverted	Axis Clocklength	[C] 0,0000	units
Counter (motor speed Z2xZ4)	[C] 1	Axis data: feed constant	[C] 360,0000	units/rev.
Denominator (system speed Z1xZ3)	[C] 1	Max. traversing speed 100%_C11	[C] 0,0000	units/s
Mounting direction: Position encod..	[C] Not inverted	Axis data: position resolution	[C] 0,0000	incr/unit
Counter (motor speed)	[C] 1	Positioning accuracy	[C] 0,0000	units
Denominator (encoder speed)	[C] 1	Reference speed	[C] 1500	rpm
		Maximum torque	[C] 0,00	Nm
		Max. traversing distance	[C] 0	units



Tip!

You are provided with more detailed information on the machine parameters "[Gearbox ratio](#)" and "[Feed constant](#)" in the following subchapters.

Short overview of machine parameters:

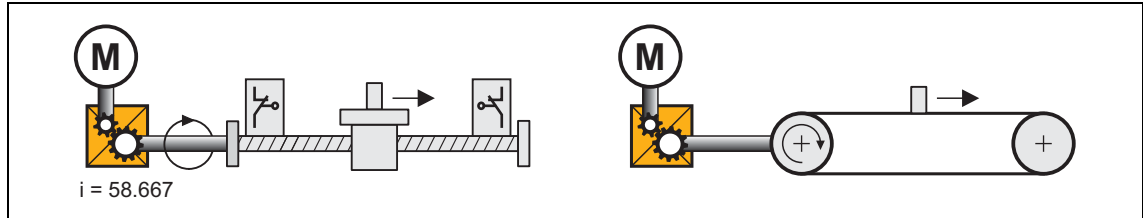
Parameters	Info	Lenze setting	
		Value	Unit
C01206/1	Mounting direction: Motor	0: Not inverted	
C01202/1	iM: Nominator of gearbox factor Z2	1	
C01202/2	iM: Denominator of gearbox factor Z1	1	
C01206/2	Mounting direction: Position encoder	0: Not inverted	
C01203/1	iG: Numerator (motor speed)	1	
C01203/2	iG: Denominator (encoder speed)	1	
C01201/1	Axis data: Axis cycle ▶ Activation of the modulo measuring system	0.0000	units
C01204	Axis data: Feed constant	360.0000	units/rev.
C00011	Appl.: Reference speed	1500	rpm

After the machine parameters have been entered, the inverter sends back application-relevant data via the following display parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C01211/1	Max. traversing speed 100%_C11 • Is used for orientation when the velocity is being set in the profile sets.	-	units/s
C01205	Axis data: Position resolution • Is needed for the incremental specification of positions.	-	incr/unit
C01210/5	MCK: Positioning accuracy • Theoretical accuracy during positioning with account being taken of the machine data and encoder data.	-	units
C00057	Maximum torque	-	Nm
C01213/1	MCK: Max. traversing distance	-	units
Greyed out = display parameter			

8.4.1.1 Gearbox ratio

The gearbox ratio indicates the number of revolutions of the motor axis it takes for exactly one revolution of the load axis (e.g. spindle or drive roll) to take place.

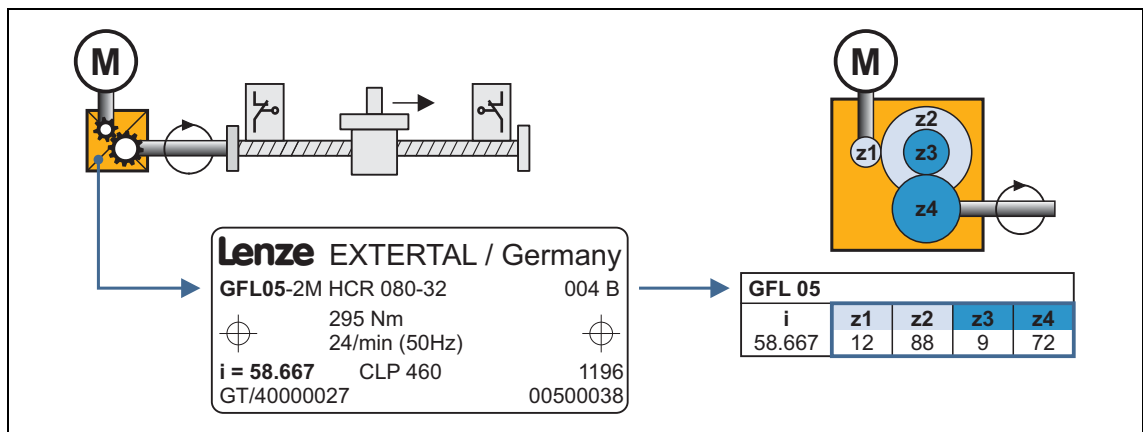


[8-8] Schematic diagram of gearbox ratio

- In the example shown in illustration [8-8] one revolution of the spindle is carried out at exactly 58,667 revolutions of the motor axis.

Specification of the gearbox ratio

- The gearbox ratio is to be defined in the form of a quotient (numerator/denominator); the data required can be found in the technical data for the gearbox:



[8-9] Example: Technical data relating to the gearbox (from gearbox catalogue)



Tip!

In order to specify the gearbox ratio exactly, use the number of teeth indicated on the data sheet or in the catalogue, if possible, instead of the information on the nameplate (see following calculation).

Example calculation on the basis of the technical gearbox data:

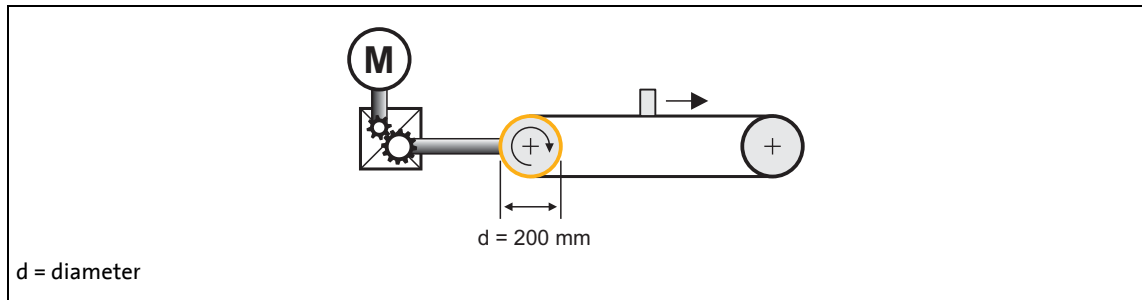
$$\begin{aligned} \text{Gearbox factor numerator (C01202/1)} &= z2 \times z4 = 88 \times 72 = 6336 \\ \text{Gearbox factor denominator (C01202/2)} &= z1 \times z3 = 12 \times 9 = 108 \end{aligned}$$

[8-10] Calculation example (for 2-stage gearbox)

8.4.1.2 Feed constant

The feed constant corresponds to the movement of the machine during one revolution of the gearbox output shaft.

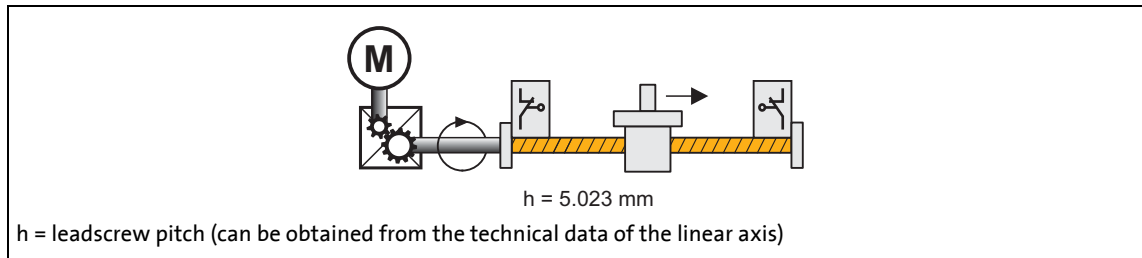
- The entry in the **Feed constant** ([C01204](#)) field is made in the user unit [units] in respect of the revolution.
- In the case of a conveyor drive, the feed constant is obtained from the drive roll's circumference, which, in the following example, is calculated on the basis of the indicated diameter:



$$\text{Feed constant} = \pi \cdot d \frac{[\text{unit}]}{\text{Revolution}} = \pi \cdot 200 \frac{\text{mm}}{\text{Revolution}} = 628.3185 \frac{\text{mm}}{\text{Revolution}}$$

[8-11] Schematic diagram: Feed constant for a conveyor driver

- In the case of a spindle drive (linear axis), the feed constant is derived from the leadscrew pitch. The feed constant indicates the distance the slide travels during one revolution of the spindle (in the following example: 5.023 mm).



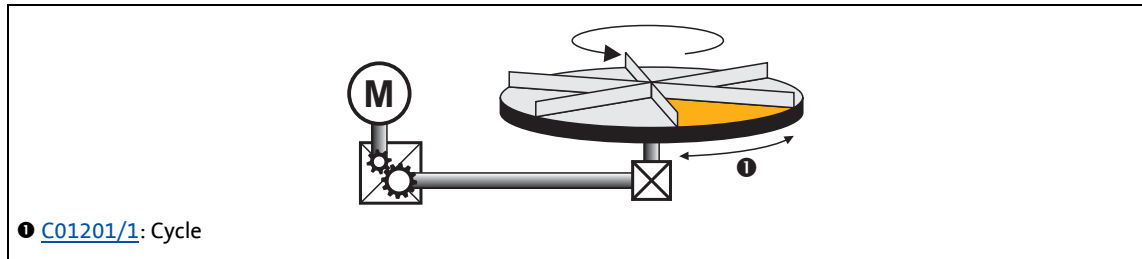
[8-12] Schematic diagram: Feed constant for a spindle drive

- In the case of a rotary table and its specification as an angle, the feed constant is = 360°/revolution.

8.4.1.3 Activation of the modulo measuring system

This function extension is available from version 06.00.00!

The modulo measuring system is also called "rotary table application".



[8-13] Example: Rotary table application

- The measuring system is repeated.
- If the set cycle is exceeded, a defined overflow takes place.
 - In a rotary system, the cycle length typically corresponds to one rotation or one tool distance.
- For positioning, the home position must be known.
 - Exception: Positioning modes relative (TP) and continuous (TP)
- Software limit positions are not effective.
- Absolute targets can be approached by exceeding the measuring system limit, e.g. from 10° via 0° to 350°.

Activating the modulo measuring system

The Modulo system is activated by setting a cycle ([C01201/1](#)) > 0 units.

- The setting of the cycle is possible when the inverter is enabled.
- When the cycle ([C01201/1](#)) is set to 0 units (Lenze setting), the traversing range is unlimited (classical measuring system).

Creation of the modulo measuring system

When the Modulo measuring system is active, it is displayed internally via an integrator. The Modulo position is provided at the *dnPosSet_p* process output of the SB [LS MotionControlKernel](#) and displayed in [C01210/7](#). When the Modulo measuring system is not active, the continuous (*dnPosSetValue_p*) setpoint position is output instead.

Blocking zone for "absolute (Cw)" and "absolute (Ccw)" positioning modes

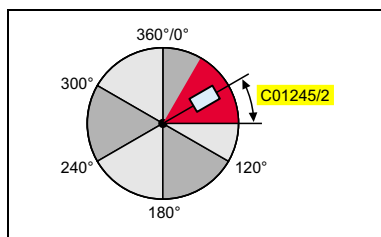
Set a blocking zone in [C01245/2](#) for the "absolute (Cw)" and "absolute (Ccw)" positioning modes in which no target positions are approached. This blocking zone around the current setpoint position serves to consider drift motions of the shaft in case of controller inhibit/enable cycles in order to prevent e.g. an unwanted motion by one cycle.



Stop!

With the "absolute (Cw)" and "absolute (Ccw)" positioning modes, target positions that are located in the set blocking zone are always approached by the shortest possible path!

If the blocking zone is set too large, the drive may travel in the opposite direction!



[8-14] Definition of the blocking zone

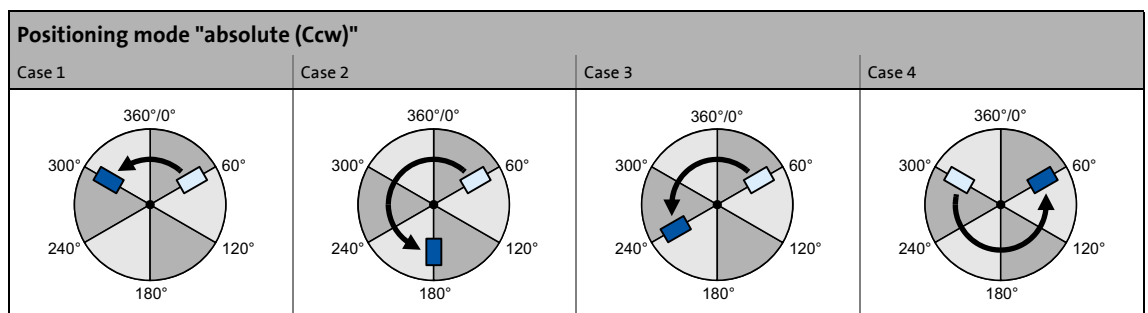
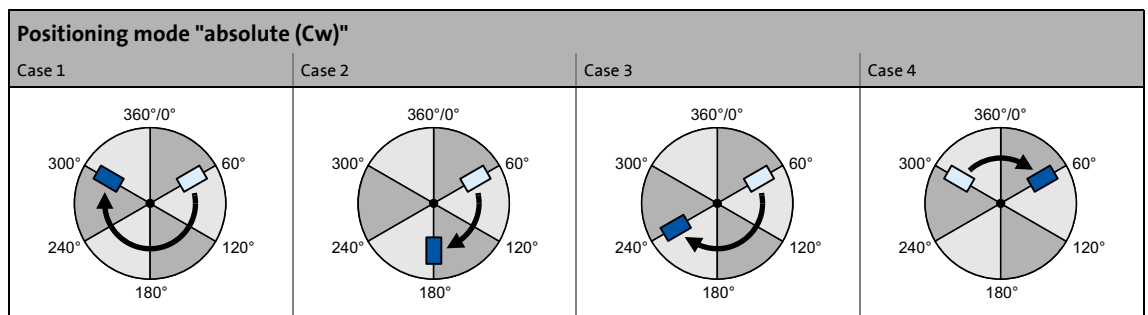
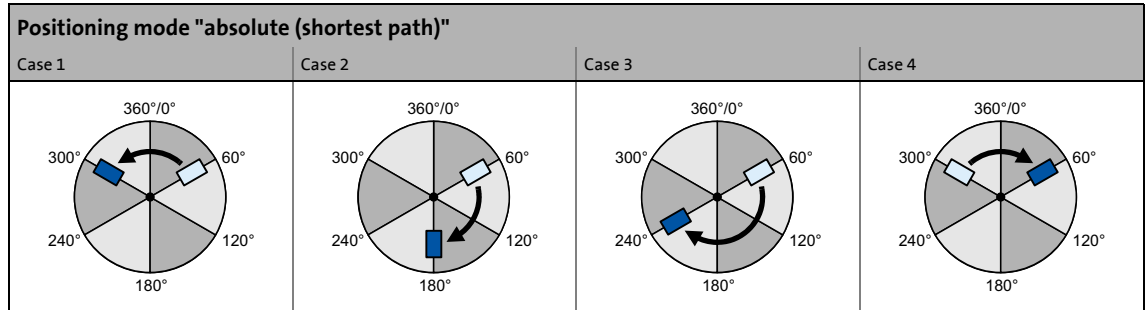
- Target positions outside the blocking zone are approached with the selected positioning mode.
- The blocking zone is internally limited to half the cycle.

Display of the target position in the "positioning" mode

Positioning mode	Target position displayed in C01210/6 in [units]	
Absolute (shortest path)	Defined position	
absolute (Cw)	Defined position	Multiple cycles are possible (target position \geq cycle length). The blocking zone in C01245/2 is taken into consideration if C02868/1 : bit 5 (optimal procedure for multiple cycles) is set.
absolute (Ccw)	Defined position	
Continuous	214748.3647	
Relative	Modulo position + defined position	

Case studies for modulo positioning

In the following, some case studies with the different positioning modes are represented. The target positions are defined by the user.



8.4.2 Min/Max speed

For the "[Speed follower](#)" operating mode, you can initially limit the speed setpoint by means of the following parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C02610/2	MCK: Ramp time synchr. setpoint	2.000	s
C02611/1	MCK: Pos. max. speed	199.99	%
C02611/2	MCK: Pos. min. speed	0.00	%
C02611/3	MCK: Neg. min. speed	0.00	%
C02611/4	MCK: Neg. max. speed	199.99	%

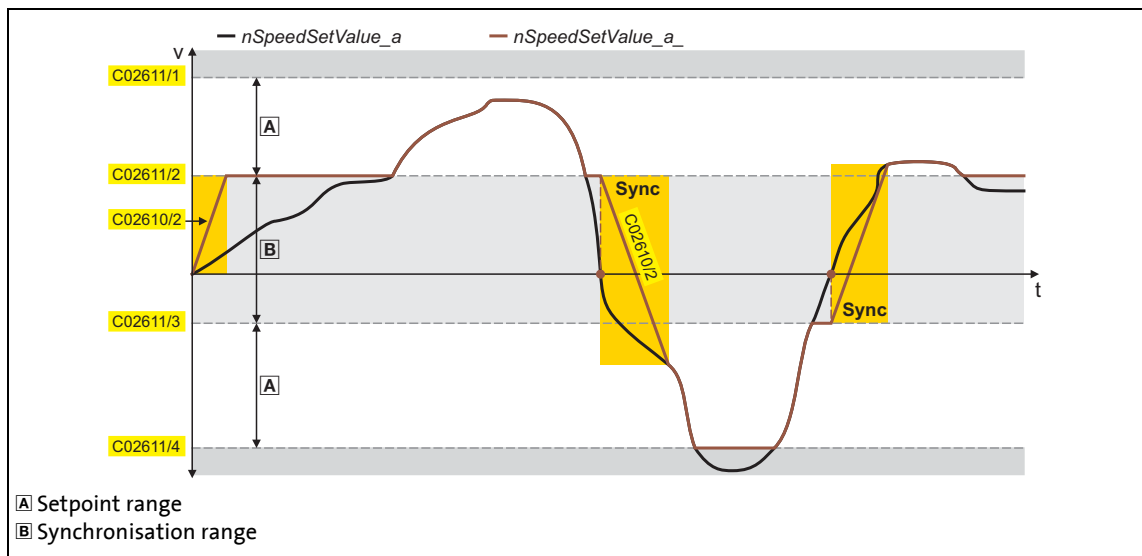
In the »Engineer«, you can set the initial limit by means of the dialog box *Min/Max speed*.

- Open the *Min/max speed* dialog box by opening the **Application Parameters** tab and clicking on the following button on the dialog level *Overview* → *Signal flow*:



Speed setpoint generation

When the speed limit values are set, the **Motion Control Kernel** influences the setpoint generation with a synchronisation mode. The synchronisation mode serves to travel the synchronisation range dynamically with the synchronisation ramp set in [C02610/2](#). Synchronisation always starts in the zero crossing of the defined speed.



[8-15] Example: Speed setpoint generation in the "Speed follower" operating mode (with $nSpeedAddValue_v = 0$)

8.4.3 Limit position monitoring

8.4.3.1 Software limit positions

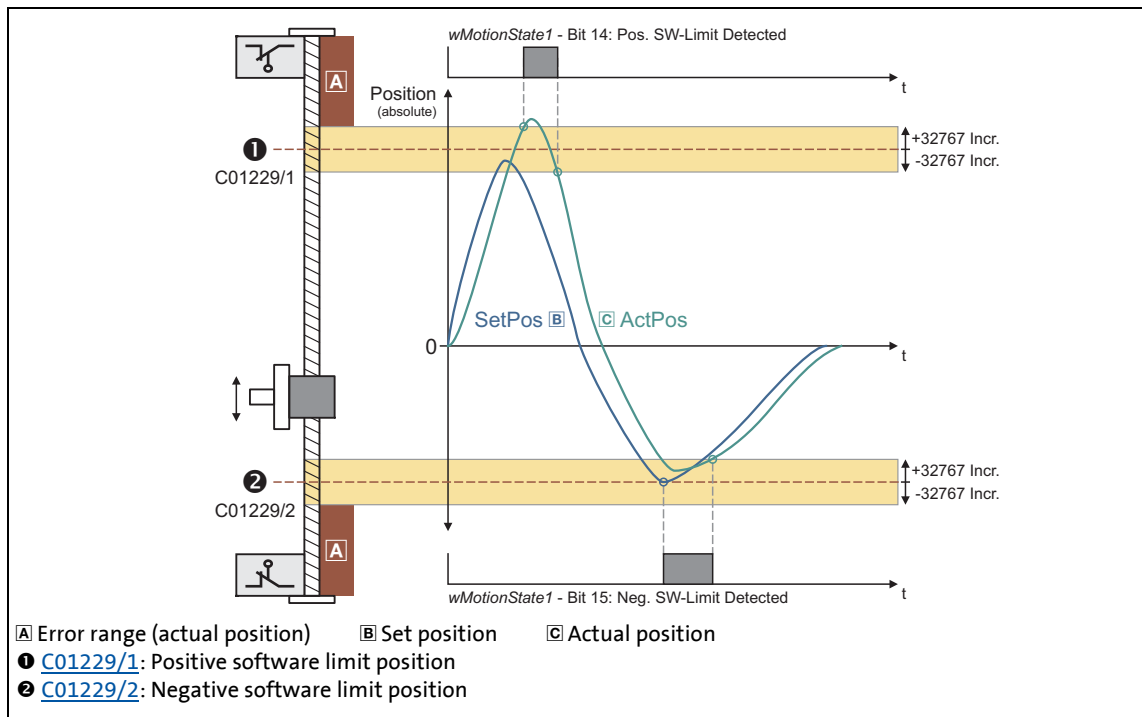
The parameterisable limit positions serve to limit the traversing range by the software.

The positive software limit position is set in [C01229/1](#) and the negative software limit position is set in [C01229/2](#).

Evaluation and monitoring of the software limit positions are only carried out if

- [C01229/1](#) - [C01229/2](#) > 32767
- no modulo measuring system is set ([C01201/1](#) = 0.0000 units)
- the drive knows the home position, and the software limit positions for the respective operating mode have been activated (see following table)!

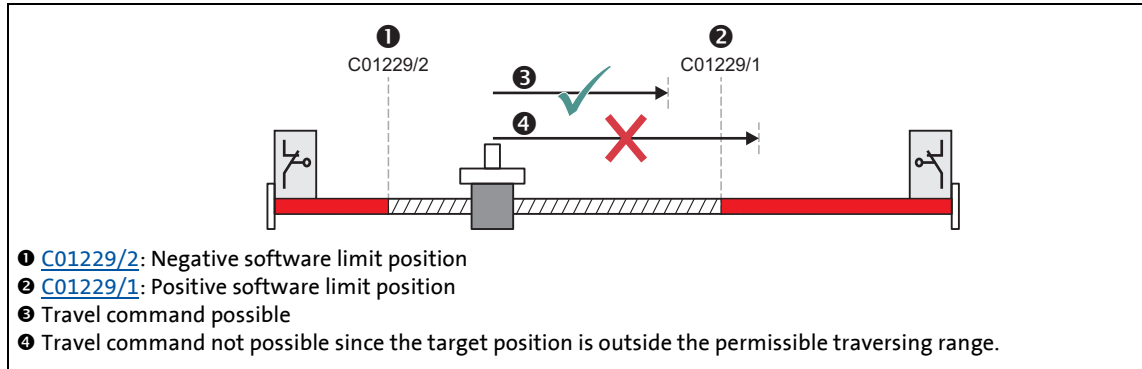
Operating mode	Software limit positions active (if home position is known)
Speed follower	Yes (adjustable in C01219 - bit 3)
Homing	Yes
Manual jog	No (adjustable in C01230 - bit 3)
Positioning	Yes
Position follower	Yes (adjustable in C01218 - bit 3)



[8-16] Definition of the software limit position trigger limits

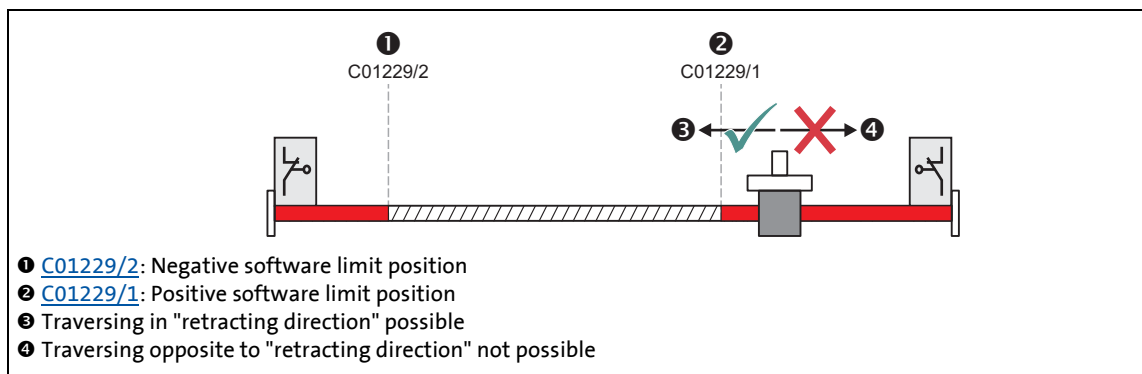
Behaviour in the case of active software limit positions

- If the software limit positions are active, travelling commands that would result in exiting from the permissible travel range can no longer be executed:



[8-17] Example: Traversing range limitation by means of software limit positions

- If the drive is already outside the permissible travel range and the software limit positions have been activated, only travel commands that result in the drive moving back into the permissible travel range can be executed:



[8-18] Example: Permissible traversing direction if software limit positions active

- If the software limit positions are active and a software limit position is passed ("overtravel"):
 - The error response "TroubleQuickStop" takes place in the Lenze setting, i.e. the drive is brought to a standstill in the deceleration time set for the quick stop function and does so irrespective of the setpoint selection. The error response can be parameterised in [C00595/3](#) and [C00595/4](#).
 - The error message "Ck03: Pos. SW limit position" or "Ck04: Neg. SW limit position" is entered in the logbook of the inverter.
 - Depending on the parameterised fault response, the drive cannot traverse until the error has been acknowledged.

Homing in case of software limit positions

From version 16.00.00 onwards:

Software limit position monitoring responds (error message "Ck04: neg. SW limit position") if homing takes place in the limited measuring system at reasonably parameterised and effective software limit positions and the hardware limit switch is used as reference signal. The sequence profile for positioning in the "homing" mode in the valid software limit position range is not started.

- By changing over to the "manual jog" mode and error acknowledgement, the drive can be travelled back into the valid software limit position range.

From version 18.00.00 onwards:

If bit 8 is set in [C01220](#) ("SW limits inactive after Ref Ok"), the software limit positions are directly deactivated after the reference signal is detected. Thus, an optionally set sequence profile can start and moves the drive into the valid software limit position range.

8.4.3.2 Hardware limit switches

The travel range limits are monitored by means of limit switches via the inputs *bLimitSwitchPos* and *bLimitSwitchNeg* of the [LS MotionControlKernel](#) system block.

- The two inputs react to the TRUE state.
- In [TA "Table positioning"](#), the two inputs are connected to the digital inputs provided for connection of the limit switches.



Stop!

The limit switches are only evaluated if the limit switches for the respective operating mode have been activated (see the following table)!

Operating mode	Hardware limit switch effective
Speed follower	Yes (adjustable in C01219 - bit 2)
Homing	Depending on the selected homing mode (see description of the homing modes)
Manual jog	No (adjustable in C01230 - bit 2)
Positioning	Yes
Stop	Yes
Position follower	Yes (adjustable in C01218 - bit 2)



Note!

If the digital inputs used for the connection of the limit switches are to be designed in a fail-safe manner (activation at LOW level), you simply change the terminal polarity of the corresponding digital inputs in [C00114](#).

Behaviour when hardware limit switches are active

- If one of the two monitoring inputs is set to TRUE:
 - The error response "TroubleQuickStop" takes place in the Lenze setting, i.e. the drive is brought to a standstill in the deceleration time set for the quick stop function and does so irrespective of the setpoint selection. The error response can be parameterised in [C00595/1](#) and [C00595/2](#).
 - The error message "Ck01: Pos. HW limit switch" or "Ck02: Neg. HW limit switch" is entered in the logbook of the inverter.
 - Bit 10 ("Pos. HW-Limit Detected") or bit 11 ("Neg. HW-Limit Detected") is set in the [MCK status word](#).
 - Depending on the parameterised fault response, the drive cannot traverse until the error has been acknowledged.



Note!

An activated limit switch can be retracted again by manual jog in the opposed direction or with the "Retract limit switch" function. ▶ [Retracting of an operated limit switch](#) (547)

Only in the "[Manual jog](#)" operating mode, retracting of the limit switch resets bit 10 ("Pos. HW-Limit Detected") or bit 11 ("Neg. HW-Limit Detected") in the [MCK status word](#).

Re-activation after acknowledging the error

When the error has been acknowledged and the limit switch is still active, the following action is required for a renewed activation of the monitoring depending on the operating mode:

Operating mode	Action for (re) activation
Speed follower	Limit switch is activated and setpoint in direction of the activated limit switch is pending Note: If the setpoint e.g. is specified via an analog potentiometer, potentiometer noise can mean an unintentional setpoint causing the error to be set again.
Homing	Limit switch is activated and <i>bHomStartStop</i> = TRUE
Manual jog	Limit switch is activated and manual jog in direction of the activated limit switch
Positioning	Limit switch is activated and setpoint command has been transmitted
Stop	Setting of the operating mode
Position follower	Limit switch is activated and setpoint in direction of the activated limit switch is pending

8.4.4 Target position monitoring (status "drive in target")

The target position monitoring detects whether the drive has reached the target.



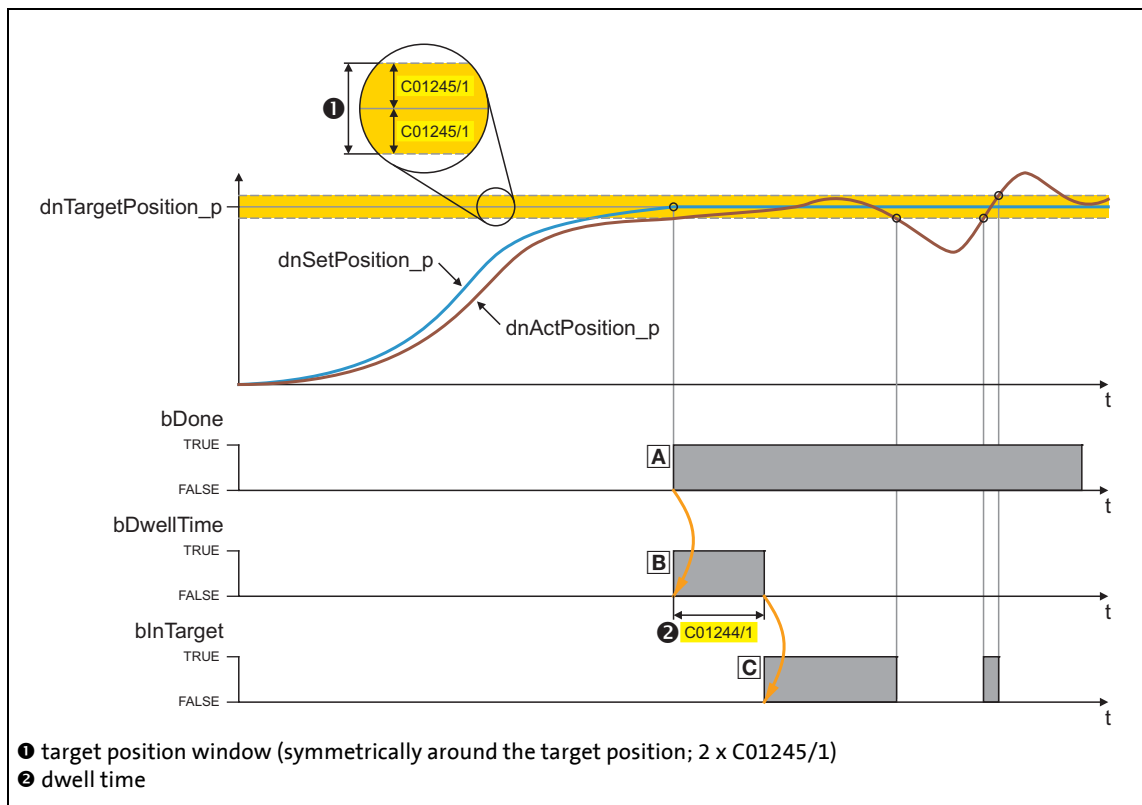
Note!

- The target position detection is active with the following operating modes/functions:
 - Operating mode "[Positioning](#)": Absolute and relative positioning mode
 - Operating mode "[Homing](#)": After approaching the starting position via start profile (if start profile has been selected)
 - Operating mode "[Manual jog](#)": When the breakpoints and the software limit positions are approached
- The target position monitoring is active until the operating mode changes or a new travel command influences the setpoint.

Short overview of the parameters for target position monitoring:

Parameters	Info	Lenze setting	
		Value	Unit
C01244/1	MCK: Dwell time - target position • For considering mechanical transient phenomena of the tool when the target position is reached.	100	ms
C01245/1	MCK: Window target position • Symmetrical window around the target position.	1.0000	units

Principal procedure of the position detection



[8-19] Signal characteristics

Status "Done" (A)

- The position setpoint has reached the target position.

Status "DwellTime" (B)

- Bit 16 in the [MCK status word](#) or the *bDwellTime* output of the [L_MckStateInterface](#) FB is set when the setpoint position has been reached after the dwell time set in [C01244/1](#) has expired.
- The status detects the time after the *bDone* signal when settling to target position is executed and actual position detection is not active yet.

Status "InTarget" (C)

- If the actual position is within the symmetrical target position window after the dwell time has expired, bit 17 is set to "1" in the [MCK status word](#) or the *bInTarget* output of the [L_MckStateInterface](#) FB is set to TRUE.

**Note!**

- The target position including the target position window has to be within the maximum traversing range.
- Please observe the following if you use *bInTarget* as stepping condition in a step sequence:
The *bInTarget* signal needs the set position to be located in the target. A profile restart immediately deletes the setpoint position in the first cycle and thus also resets *bInTarget*.

- The "InTarget" status is reset if:
 - the motor shaft leaves the target position window,
 - a new profile or a new motion process is started,
 - *bInTarget* has been set via manual jog (intermediate stops) and the "[Manual jog](#)" mode is left,
 - the target position window has been left in the "[Speed follower](#)" mode and a speed setpoint not equal to "0" is injected into the process,
 - a new homing process starts,
 - the reference is set,
 - the device is switched off/on.

8.4.5 Monitoring of the maximum travel distance

Continuous travel requests in the "[Positioning](#)" operating mode (or relative positioning with feed in the same direction) cause an overflow of the position integrators when the max. display area of the position is reached and the reference is set. The same behaviour takes place in the "[Speed follower](#)" and "[Manual jog](#)" operating modes. For this reason, a monitoring mode of the maximum travel distance is implemented in the **Motion Control Kernel**.

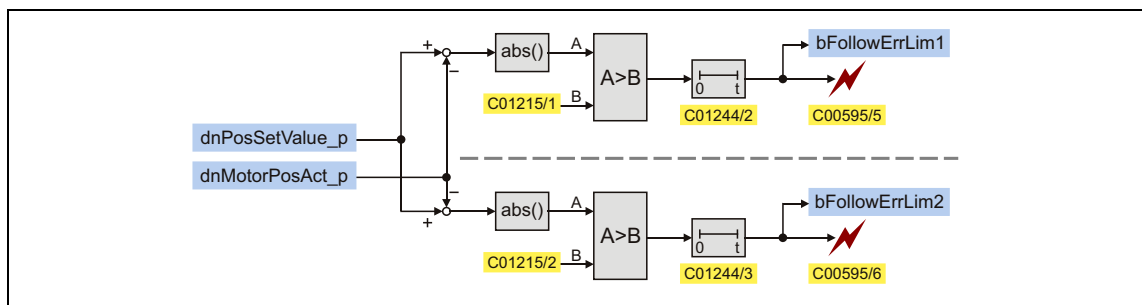
- If the maximum travel distance ([C01213/1](#)) is exceeded:
 - The error response set in [C00595/7](#) will be carried out (Lenze setting: "TroubleQuickStop").
 - The "[Ck07: Travel range limit exceeded](#)" error message is entered into the logbook.
 - The internal status "reference known" is reset (the inverter is no longer referenced).
- A setting of [C00595/7](#) = "0: No Reaction" deactivates the monitoring.

8.4.6 Following error monitoring system

The difference between set position and actual position is called the following error. Ideally, the following error should be "0". The set position is created by the internal definition of the traversing profiles of the **Motion Control Kernel**. The actual position is created by the integration of the speed supplied by the position encoder. If the position control is adjusted optimally, only a minimum following error arises which is always compensated dynamically and not increases continuously.

Certain processes, however, require that a defined limit as a difference between set position and actual position is not exceeded. If it is exceeded, it may have been caused by mechanical blocking in the machine and the system part is not situated at the position defined at that time. In such a case, it makes sense to activate the "Fault" error response to make the motor torqueless.

In the 8400 protec HighLine inverter, two independent following error monitoring systems can be parameterised:



[8-20] Two-channel following error monitoring system

Parameters	Info	Lenze setting	
		Value	Unit
C01215/1	MCK: Following error limit 1	0.0000	units
C01215/2	MCK: Following error limit 2	0.0000	units
C01244/2	MCK: Following error deceleration 1	0.000	s
C01244/3	MCK: Following error deceleration 2	0.000	s
C00595/5	MCK: Resp. to following error 1	Warning	
C00595/6	MCK: Resp. to following error 2	Warning	



Note!

If the limit for the following error is set to "0.0000 units" (Lenze setting, the following error monitoring system is not active.



Tip!

In certain situations (e.g. dynamic acceleration of the load), higher system-dependent following errors occur than while approaching the target position.

In order that no error is triggered during acceleration and a close tolerance limit can be monitored all the same at standstill in the target, the addressing of the following error monitoring system can be decelerated. Thus, dynamic processes or torque impulses occurring for short periods can be "masked out".

Operating mode

If the limit for the following error in [C01215/x](#) is set higher than "0.0000 units" and if the current following error exceeds this limit over the time set in [C01244/x](#):

- The error response set in [C00595/5](#) or [C00595/6](#) will be carried out (Lenze setting: "Warning").
- The error message "[Ck05: Error, following error 1](#)" or "[Ck06: Error, following error 2](#)" will be entered into the logbook.
- The status output bFollowErrLim1 or bFollowErrLim2 at the SB LS_MotionControlKernel is set to TRUE.

8.4.6.1 Monitoring of the following error in case of controller inhibit

Up to and including version 13.xx.xx, the setpoint position is always set = actual position in case of controller inhibit.

From version 14.00.00 onwards, the setpoint position is only set = actual position if the current following error reaches the limit value set in [C01215/3](#).

- In the Lenze setting [C01215/3](#) = "0.0000 units" the behaviour is as before, i.e. the setpoint position is immediately set = actual position in case of controller inhibit.

Parameters	Info	Lenze setting	
		Value	Unit
C01215/3	MCK: Following error SetPos=ActPos	0.0000	units



Note!

The limit value set in [C01215/3](#) should not be set higher than the drift of the actual position at standstill of the drive plus a possible safety option. Otherwise, the position controller carries out an intermittent compensation after the controller inhibit is deactivated due to the pending system deviation!

Application example

In case of a continuous relative positioning by 100 units and a setting of the controller inhibit after each positioning process (e.g. by means of the [Holding brake control](#) in the "automatically controlled" mode), it is expected that after 10 positioning processes, an absolute target of 10 x 100 units = 1000 units has been reached.

Without setting a limit value ([C01215/3](#) = 0), the continuous setting of the setpoint position to the actual position in case of controller inhibit causes a drifting of the setpoint position due to the drifting of the actual position at standstill. After ten positioning processes, only e.g. 999.5 units have been reached instead of 1000 units. If, however, the setpoint position is not set to the actual position ([C01215/3](#) < > 0) in case of controller inhibit, the setpoint position is exactly in the target after 10 positioning processes and 9 x controller inhibits (in case of 10 x relative traverse paths).

8.4.7 Setpoint holdback for bus runtime compensation

[This function extension is available from version 12.00.00!](#)

Basics of the "setpoint holdback" function

In case of a master/slave application in which a slave drive must follow a master drive with a precise angle, the data coupling from axis to axis is mostly effected via real-time capable fieldbuses (e.g. CAN).

- Here, the data is always transferred in a time-controlled way. The axes are synchronised, i.e. the reading of the process data and its internal processing are effected at the same time.

During a synchronous run between a master and several slaves, mostly a position and speed setpoint generated by the master are transferred to the slaves.

- The setpoints are generated in the master, usually by the [LS MotionControlKernel](#) system block.
- The setpoints are transferred to the slaves via PDOs.
- The output to the respective fieldbus is effected via the corresponding port blocks (e.g. [LP CanOut1](#) or [LP MciOut](#)).

Due to the bus cycle time (e.g. 1 ms or 2 ... 4 ms for buses with a higher load) and the telegram runtimes (approx. 260 µs per PDO @500 kbits), the setpoints generated by the master arrive in the slave axes with a delay. At this time, the master has already transferred the setpoints to the control loops of the motor control. This offset causes an error in the synchronism of the axes.

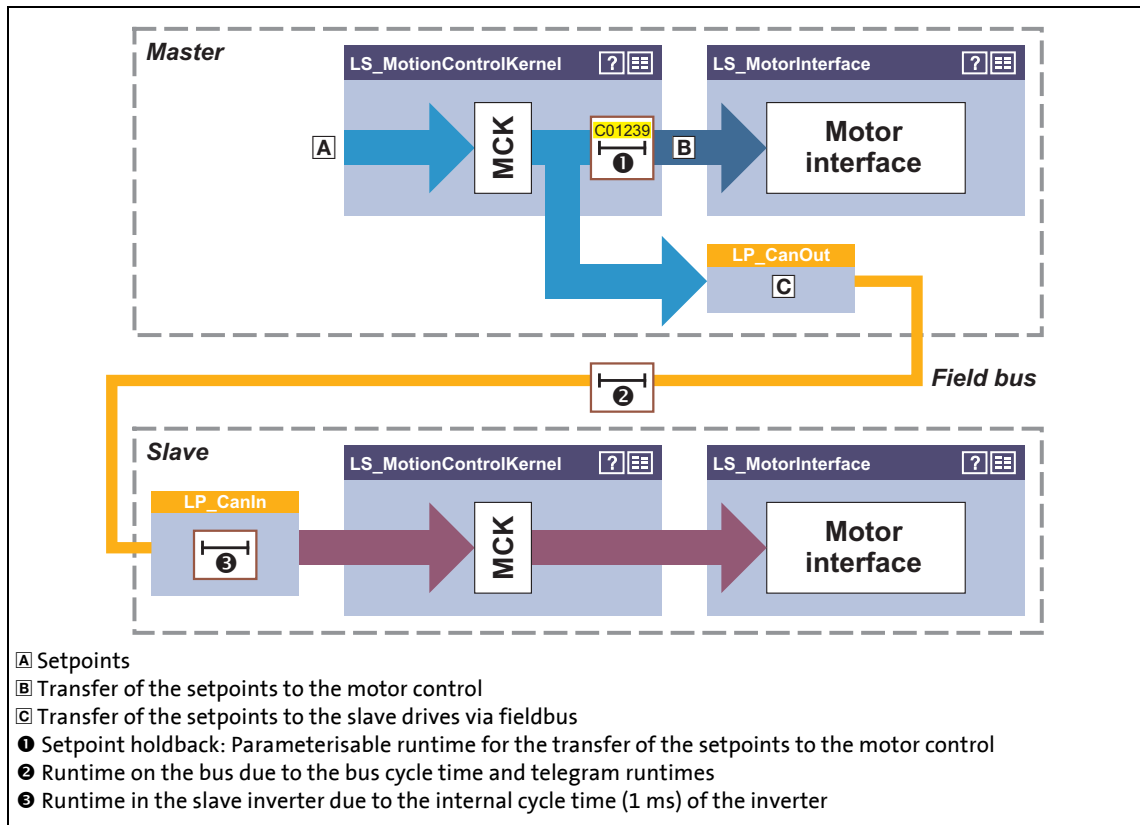
- In case of a mechanical coupling, e.g. a portal feed with two drives, an inclination of the two feed drives is caused.
- This behaviour is more or less distinctive for all serial bus systems depending on the transmission speed and cycle time.

A further delay between the reading of the received data and the forwarding to the control loops is caused by the internal cycle time of the inverters (1 ms for the 8400 device series).

Parameterising the "setpoint holdback" function

For compensating the runtimes described before, a setpoint holdback can be parameterised in [C01239](#). The function directly affects the setpoint forwarding from the **Motion Control Kernel** to the motor control.

- Internally, the setpoints are transmitted with a delay by the time set in [C01239](#) from the [LS_MotionControlKernel](#) system block to the motor control.
- Setting rule: [C01239](#) = bus cycle time + 1 ms
- The Lenze setting "0 ms" corresponds to the previous behaviour (no setpoint holdback).



[8-21] Principle of the setpoint holdback (here only in the master for "setpoint line" topology)



Note!

In which drives the function is to be parameterised, depends on the bus topology:

- Setpoint line (1 master, many slaves):
Only in the master, the setpoint holdback ([C01239](#)) has to be set.
- Setpoint cascade (setpoints from one to drive to the other):
In all drives, the setpoint holdback ([C01239](#)) has to be set.

As the setpoint holdback is implemented in the **Motion Control Kernel**, the [LS_MotionControlKernel](#) system block is required for this function independent of the setpoint source.

Behaviour when the "setpoint holdback" function is parameterised online

The setpoint holdback can also be set "online", i.e. without inhibiting the inverter before. This provides for an adjustment during commissioning while the setpoint generation is running, similar to the setting of the gain of the speed or position controller.



Stop!

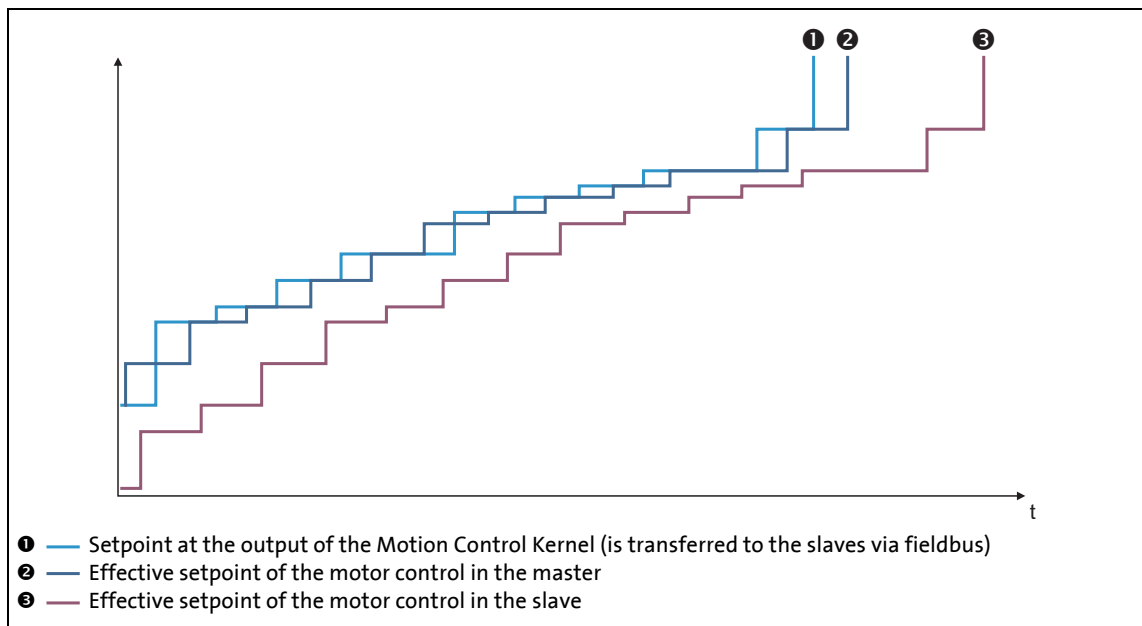
The setting while the setpoint generation is running causes a system-dependent time change of the setpoint processing so that e.g. considerable step-changes or setpoint holding processes occur.

In order to prevent setpoint step-changes which have a negative effect on the mechanics:

- Always change the setting of the setpoint holdback in 1-ms steps only.
- Make the online parameterisation at low speeds only.

Example: Runtime behaviour without and with setpoint holdback

Example 1 shows the behaviour without setpoint holdback. Due to the runtimes, there is an offset between master and slave of 2 ms.

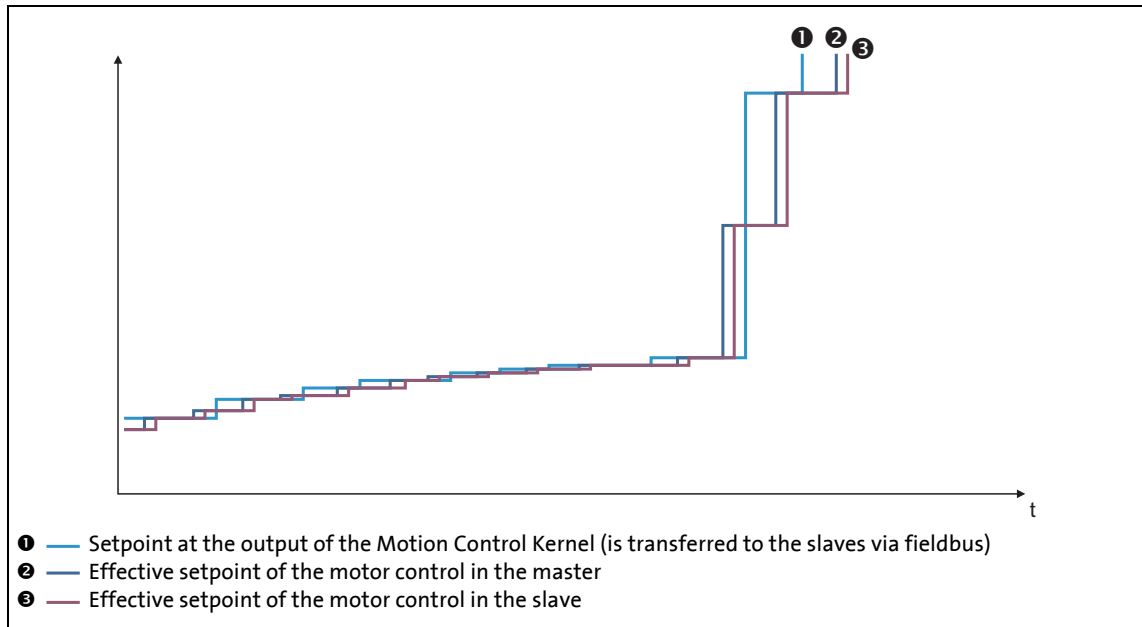


[8-22] Example 1: Runtime behaviour without setpoint holdback

8 Basic drive functions (MCK)

8.4 Basic settings

In example 2, the setpoint holdback in the master is set to 2 ms. This removes the offset between master and slave. Only time differences are visible due to the telegram runtimes on the bus.



[8-23] Example 2: Runtime behaviour with setpoint holdback = 2 ms

8.4.8 Setting or activation of maximum jerk for traversing profiles

This function extension is available from version 16.00.00!

Basics of the "maximum jerk" function

A change over of a traversing profile within an acceleration or deceleration ramp to a sequence profile which has a lower jerk than the traversing profile from the calculation of the new acceleration and S-ramp time causes an increase of the speed which may be not wanted for process technology reasons. The reason is that the new jerk reduces the acceleration in a too long time period which generates a too high speed.

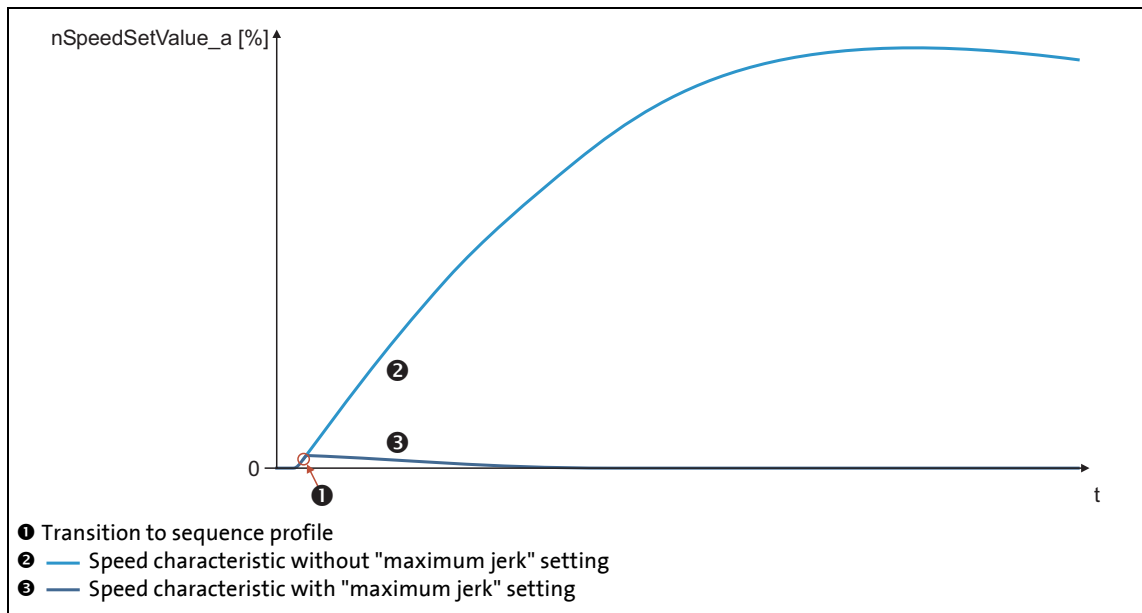
As a remedy, the "maximum jerk" function can be activated which integrates the currently pending acceleration into the acceleration of the new traversing profile or to zero.

Parameterising the "maximum jerk" function

The "maximum jerk" function can be individually activated for the operating modes "[Positioning](#)", "[Homing](#)" and "[Manual jog](#)" via the following setting parameters:

Parameters	Info	Lenze setting
C01216 - bit 5	Maximum jerk for positioning on/off	Off
C01220/1 - bit 5	Maximum jerk for homing on/off	Off
C01230 - bit 5	Maximum jerk for manual jog on/off	Off

When the function is activated, the maximum jerk is calculated from the higher value of both acceleration values and the lower value of both S-ramp time values based on the acceleration and S-ramp time of the current and sequence profile. This maximum jerk is then used for an accelerated drive in order to reduce the acceleration to 0 or to the acceleration of the sequence profile.



[8-24] Example: Behaviour during transition to sequence profile with accelerated drive

If the sequence profile is started with a non-accelerated drive, the parameters of the sequence profile are continued to be used for the jerk calculation without maximum comparison to the current profile.

8 Basic drive functions (MCK)

8.5 Speed follower

8.5 Speed follower

In the "speed follower" operating mode, the drive follows a speed setpoint.

8.5.1 Parameter setting

Short overview of parameters for the "speed follower" operating mode:

Parameters	Info	Lenze setting	
		Value	Unit
C01219	MCK: Speed follower setting	Bit coded	
C02610/2	MCK: Ramp time synchr. setpoint	2.000	s
C02611/1	MCK: Pos. max. speed	199.99	%
C02611/2	MCK: Pos. min. speed	0.00	%
C02611/3	MCK: Neg. min. speed	0.00	%
C02611/4	MCK: Neg. max. speed	199.99	%

8.5.1.1 Functional settings

In [C01219](#), various functional settings for the speed follower can be made in bit-coded form.

Function		Lenze setting
Bit 0	Reserved	Off
Bit 1	Reserved	Off
Bit 2	HW limit switch on In the "speed follower" operating mode, a travel range monitoring mode via hardware limit switch is active. ▶ Limit position monitoring (□ 504)	On
Bit 3	SW limit switch on In the "speed follower" operating mode, a travel range monitoring mode via parameterised software limit positions. ▶ Limit position monitoring (□ 504)	On
Bit 4	Reserved	Off
Bit 5	Reserved	Off
Bit 6	Reserved	Off
Bit 7	Position controller off In the "Speed follower" operating mode, the position controller is deactivated. Thus, the compensation of the following error is switched off.	Off

8 Basic drive functions (MCK)

8.5 Speed follower

8.5.2 Requesting the operating mode

Request for "speed follower" operating mode by means of the [MCK control word](#):

MCK control word						
Bit 31	...	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			OpMode_Bit3	OpMode_Bit2	OpMode_Bit1	OpMode_Bit0
X	...	X	0	0	0	0

X = Status not significant

If the **MCKInterface** is connected upstream to the **Motion Control Kernel** and if the operating mode is requested at the [L_MckCtrlInterface](#) FB, the *wOperationMode* and *bOperationMode_1...8* process inputs are available.

8.5.3 Setpoint selection

The speed setpoint is selected via the *nSpeedSetValue_a* process input and additively via the *nSpeedAddValue_v* process input.

- Usually, the ramp generator [L_NSet](#) and, optionally, the process controller [L_PCTRL](#) are upstream of the *nSpeedSetValue_a* process input.
- The speed setpoint is limited internally to the speed limits set in [C02611/1...4](#).



Note!

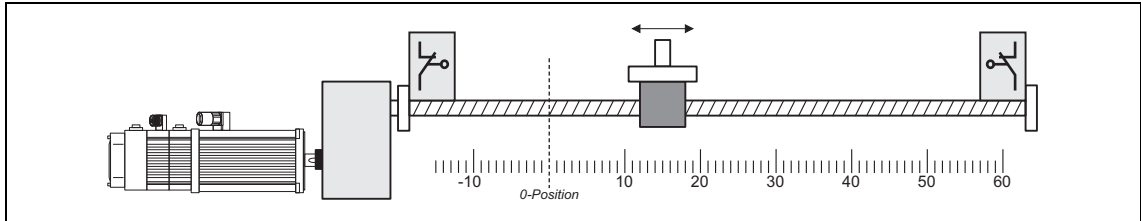
In the "[Speed follower](#)" operating mode without position control, for an "Electrical shaft" interconnection the actual position value *LS_MotorInterface.dnMotorPosAct_p* must be used as master signal if a drift is to be ruled out.

When the speed limit values are set, the **Motion Control Kernel** influences the setpoint generation with a synchronisation mode. The synchronisation mode serves to travel the synchronisation range dynamically with the synchronisation ramp set in [C02610/2](#).

▶ [Min/Max speed](#) (□ 503)

8.6 Homing

The measuring system in the machine is selected by means of homing and the 0 position is set within the possible physical travel range:



[8-25] Homing (selection of 0 position)

The zero position (home) can be defined by a reference run or by setting a home position:

- If a reference run is carried out, the drive follows a previously selected path to find the home position.
- When the reference is set, it is selected manually when the drive stands still.



Danger!

During homing operations, specially assigned profile parameters are effective. If these parameters are not set correctly, the drive may execute unexpected movements!



Tip!

A reference run is mainly used for systems with feedback via encoders, resolvers, or single-turn absolute value encoders, as in the case of these systems the home position is lost when the supply voltage is switched off.

Usually the reference is set only once during commissioning or in the event of service (e. g. if drive components are replaced), and it is mostly used for systems with feedback via absolute value encoders.

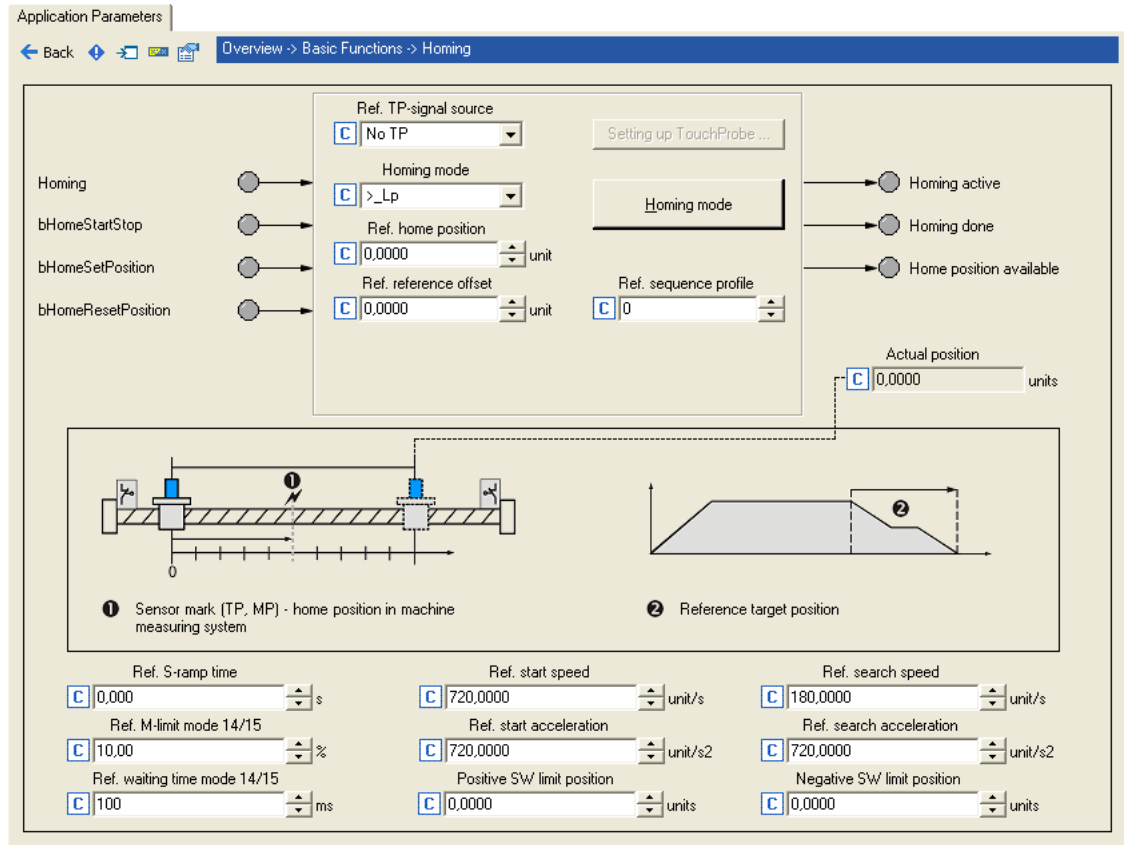


Note!

Currently, the 8400 protec HighLine inverter only supports the evaluation of incremental signals (encoder). The home position is always deleted after mains switching.

8.6.1 Parameter setting

Parameterisation dialog in the »Engineer«



Short overview of parameters for "Referencing" operating mode:

Parameters	Info	Lenze setting	
		Value	Unit
C01221	MCK: Homing mode	12:	>_Lp
C01224/1	MCK: Ref. initial speed	720.0000	unit/s
C01225/1	MCK: Ref. initial acceleration	720.0000	unit/s ²
C01224/2	MCK: Ref. search speed	180.0000	unit/s
C01225/2	MCK: Ref. search acceleration	720.0000	unit/s ²
C01226/1	MCK: Ref. S-ramp time	0.000	s
C01222	MCK: Ref. M limit mode 14/15	10.00	%
C01223	MCK: Ref. waiting time mode 14/15	100	ms
C01227/1	MCK: Ref. offset reference degree	0.0000	unit
C01227/2	MCK: Ref. home position	0.0000	unit
C01228	MCK: Ref. sequence profile	0	
C01229/1	MCK: Positive SW limit position	0.0000	units
C01229/2	MCK: Negative SW limit position	0.0000	units
C01246/1	MCK: Ref. TP signal source (from version 06.00.00)	0:	No TP
C01246/2	MCK: Set.Ref. signal source (from version 06.00.00)	0:	No TP

8 Basic drive functions (MCK)

8.6 Homing

8.6.1.1 Functional settings

From version 14.00.00, various functional settings for homing can be carried out bit-coded in [C01220/1](#).

Function		Lenze setting
Bit 0	Reserved	Off
Bit 1	Start flange-sensitive	Off
Bit 2	Reserved	Off
Bit 3	Reserved	Off
Bit 4	Start deletes bHomePosAvailable When homing is started (mode 4 ... 15), the reference information is deleted.	Off
Bit 5	Maximum jerk ▶ Setting or activation of maximum jerk for traversing profiles (📖 518)	Off
Bit 6	Reserved	Off
Bit 7	Reserved	Off
Bit 8	SW limits inactive after Ref Ok After detecting the reference signal, the software limit positions are deactivated.	Off
Bit 9		Off
...		
Bit 15		

8.6.1.2 Referencing mode

Specify the referencing mode in [C01221](#), i.e. the way in which referencing is to take place.

- For reference setting, the referencing mode "100" is to be selected in [C01221](#).
- For a reference search, [C01221](#) contains referencing modes "4"..."15" which can be selected from.

Referencing mode C01221	Evaluated signals/sensors			
	Sensor reference signal	Travel range limit switch		Pre-stop mark at <i>bHomingMark</i>
		Negative limit switch	Positive limit switch	
4 *	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
5 *	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
6	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
7	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
8	<input checked="" type="checkbox"/>			
9	<input checked="" type="checkbox"/>			
10	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
11	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
12			<input checked="" type="checkbox"/>	
13		<input checked="" type="checkbox"/>		
14	Positive direction of rotation to torque limit.			
15	Negative direction of rotation to torque limit.			
100	Set reference directly.			
* From version 16.00.00				

Internal interfaces

The switches/sensors are evaluated via the following internal interfaces:

Switch/sensor	Internal interface for digital input signal
Touch probe sensor (Sensor reference signal)	<ul style="list-style-type: none"> • Up to and including version Version 02.xx.xx, a signal at digital input DI3 is automatically interpreted as TP sensor signal with level sensitivity. • That way, TP sensitive homing modes can be used even if high TP precision is not available. • In this case, the search speed must be selected in order that the signal at DI3 will be detected. • From version 06.00.00, high-precision homing with touch probe is supported. • The touch probe signal source can be selected in C01246/1. • If the reference signal is to follow a real touch probe, configure the touch probe signal accordingly. ▶ Touch probe detection (□ 360) • Note: In case of setting "0: No TP" in C01246/1, the digital input DI3 is continued to be used as signal source. An inversion of DI3 via C00114 is considered.
Positive travel range limit switch	<i>bLimitSwitchPos</i>
Negative travel range limit switch	<i>bLimitSwitchNeg</i>
Pre-stop mark/pre-stop signal	<p><i>bHomingMark</i></p> <ul style="list-style-type: none"> • This input has to be connected to the corresponding digital input to which the pre-switch off sensor is connected. • The edge sensitivity of this input and the response to the pre-switch off signal depend on the selected homing mode (see the following description of the homing modes).

**Note!**

For a reference search with touch probe detection:

- The touch probe signal source can be selected in [C01246/1](#).
- Go to [C02810/x](#) and select the edge, the digital input used for the connection of the touch-probe sensor is to respond. In the Lenze setting of [C02810/x](#), no touch probe is detected!
- Moreover, no "acceptance window" must be set in [C2813/x](#) and [C02814/x](#) for accepting the touch probe signal in order that a touch probe will always be detected independent of the position.

▶ [Touch probe detection](#) (📖 360)

Start and search profile data set

Certain referencing modes use two different profile data sets for homing in order to shorten the homing time and, at the same time, increase accuracy.

- At first, a quick approach of the limit switch/pre-stop mark (depending on the selected mode) is carried out using the start profile data set.
- After reversing at the limit switch/pre-stop mark, the search profile data set results in slower – but more accurate – approaching of the touch probe sensor.

Start profile data set		Search profile data set	
C01224/1	Start speed	C01224/2	Search speed
C01225/1	Start acceleration (deceleration as well)	C01225/2	Search acceleration (deceleration as well)
C01226/1	S-ramp time (identical in the two profile data sets)	C01226/1	S-ramp time (identical in the two profile data sets)

**Note!**

A changeover to the search profile data set is only carried out if the search speed has been set to ([C01224/2](#)) > "0"!

The exact time of the changeover to search profile data set occurs in the respective homing mode is indicated in the process descriptions of the homing modes.

**Tip!**

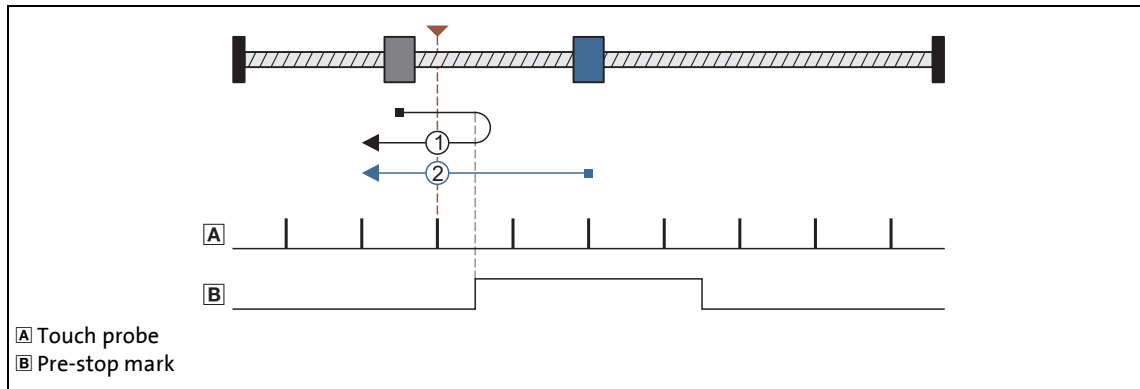
The result of setting a lower search speed in [C01224/2](#) and a high search acceleration in [C01225/2](#) is that deceleration to search speed takes place quickly and position detection is exact (at slower search speed).

Abbreviations used for the referencing modes:

Abbreviation	Meaning
>	Movement in positive direction
Set reference	Movement in negative direction
Lp	Positive travel range limit switch
Ln	Negative travel range limit switch
Rp	Positive edge pre-stop mark/pre-stop signal
Rn	Negative edge - pre-stop mark/pre-stop signal
TP	Touch probe or sensor reference signal/reference switch detected
Mlim	Torque limit value reached

Mode 4: >_Rp_<_TP

(from version 16.00.00)



Mode 4	>	Rp	Set reference	TP	Offset path	Sequence profile (optional)
	Start speed		Search speed			Profile speed
Lp	Active	Active	Active	Active	Active	Active
Ln	Inactive	Active	Active	Active	Active	Active

Process of case 1 → Axis has not yet reached the pre-stop mark (*bHomingMark* = FALSE):

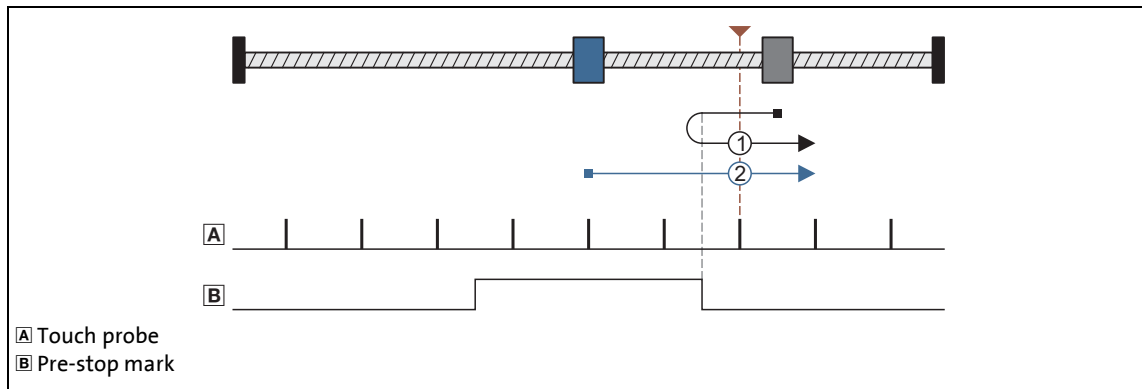
1. Movement in positive direction with start profile data set.
2. Reversing in case of positive edge at *bHomingMark* and, at the same time, activating the search profile data set for continued reference searching.
3. Negative edge at *bHomingMark* enables home position detection.
4. Following edge of the touch probe sensor sets home position.

Process of case 2 → Axis is already on the pre-stop mark (*bHomingMark* = TRUE):

1. Movement in negative direction with search profile data set.
2. Negative edge at *bHomingMark* enables home position detection.
3. Following edge of the touch probe sensor sets home position.

Mode 5: <_Rp_>_TP

(from version 16.00.00)



Mode 5	Set reference	Rp	>	TP	Offset path	Sequence profile (optional)
	Start speed		Search speed			Profile speed
Lp	Inactive	Active	Active	Active	Active	Active
Ln	Active	Active	Active	Active	Active	Active

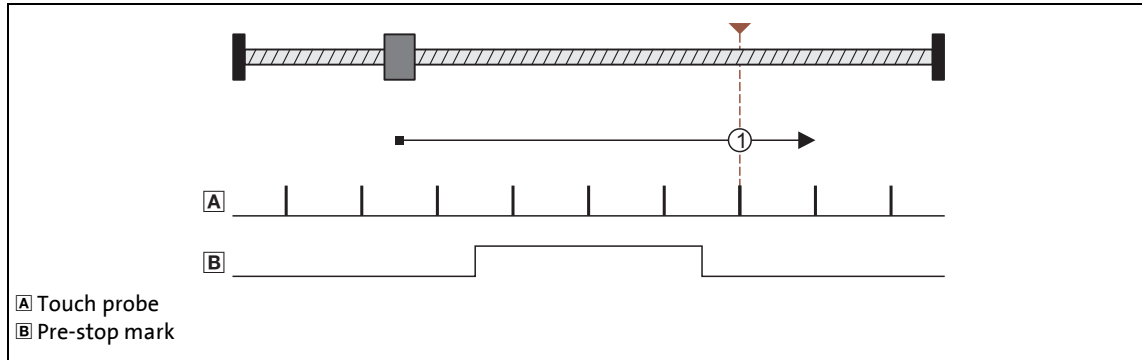
Process of case 1 → Axis has not yet reached the pre-stop mark (*bHomingMark* = FALSE):

1. Movement in negative direction with start profile data set.
2. Reversing in case of positive edge at *bHomingMark* and, at the same time, activating the search profile data set for continued reference searching.
3. Negative edge at *bHomingMark* enables home position detection.
4. Following edge of the touch probe sensor sets home position.

Process of case 2 → Axis is already on the pre-stop mark (*bHomingMark* = TRUE):

1. Movement in positive direction with search profile data set.
2. Negative edge at *bHomingMark* enables home position detection.
3. Following edge of the touch probe sensor sets home position.

Mode 6: >_Rn_>_TP

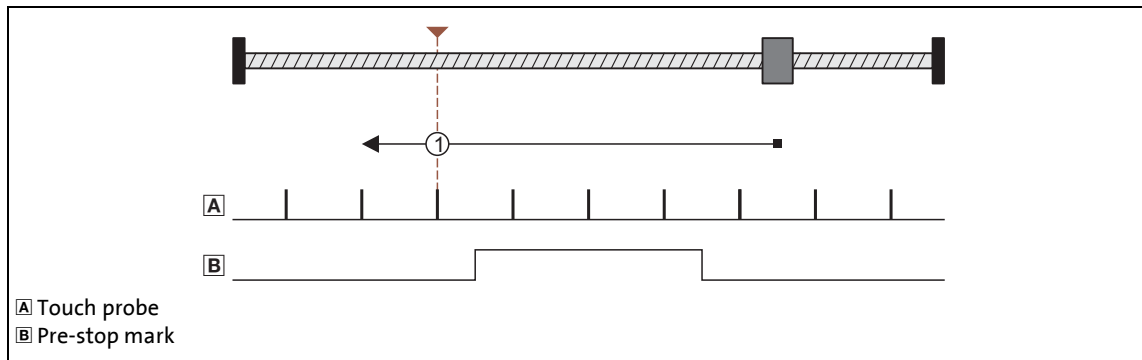


Mode 6	>	Rn	>	TP	Offset path	Sequence profile (optional)
	Start speed		Search speed			Profile speed
Lp	Active	Active	Active	Active	Active	Active
Ln	Inactive	Inactive	Inactive	Inactive	Active	Active

Procedure:

1. Movement in positive direction with start profile data set.
2. Positive edge at *bHomingMark* activates search profile data set for further reference search.
3. Negative edge at *bHomingMark* enables home position detection.
4. Following edge of the touch probe sensor sets home position.

Mode 7: <_Rn_<_TP

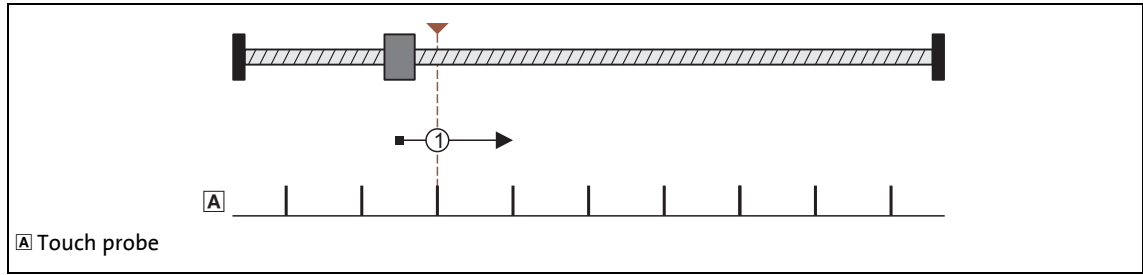


Mode 7	Set reference	Rn	Set reference	TP	Offset path	Sequence profile (optional)
	Start speed		Search speed			Profile speed
Lp	Inactive	Inactive	Inactive	Inactive	Active	Active
Ln	Active	Active	Active	Active	Active	Active

Procedure:

1. Movement in negative direction with start profile data set.
2. Positive edge at *bHomingMark* activates search profile data set for further reference search.
3. Negative edge at *bHomingMark* enables home position detection.
4. Following edge of the touch probe sensor sets home position.

Mode 8: >_TP

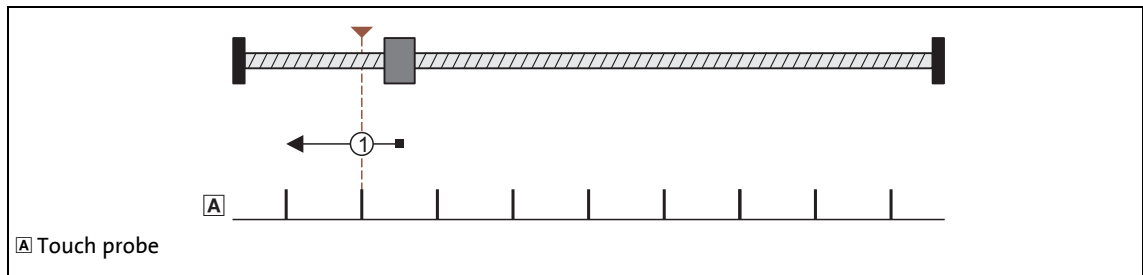


Mode 8	>	TP	Offset path	Sequence profile (optional)
	Start speed			Profile speed
Lp	Active	Active	Active	Active
Ln	Inactive	Inactive	Active	Active

Procedure:

1. Movement in positive direction with start profile data set.
2. Following edge of the touch probe sensor sets home position.

Mode 9: <_TP

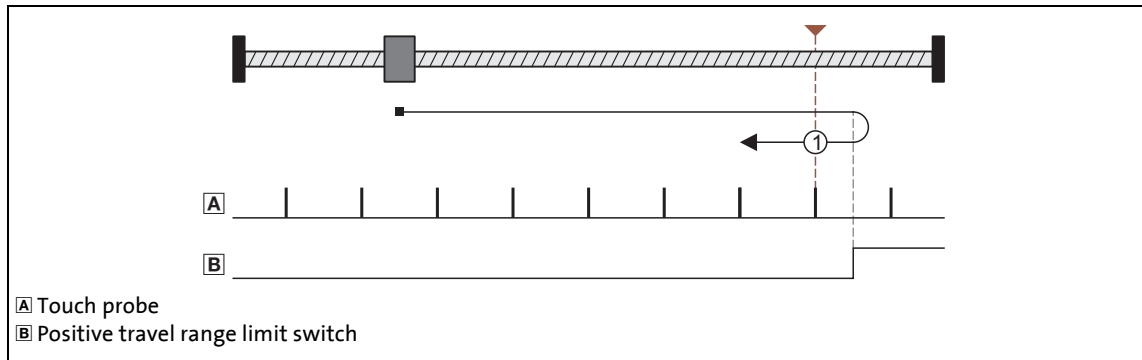


Mode 9	Set reference	TP	Offset path	Sequence profile (optional)
	Start speed			Profile speed
Lp	Inactive	Inactive	Active	Active
Ln	Active	Active	Active	Active

Procedure:

1. Movement in negative direction with start profile data set.
2. Following edge of the touch probe sensor sets home position.

Mode 10: >_Lp_<_TP

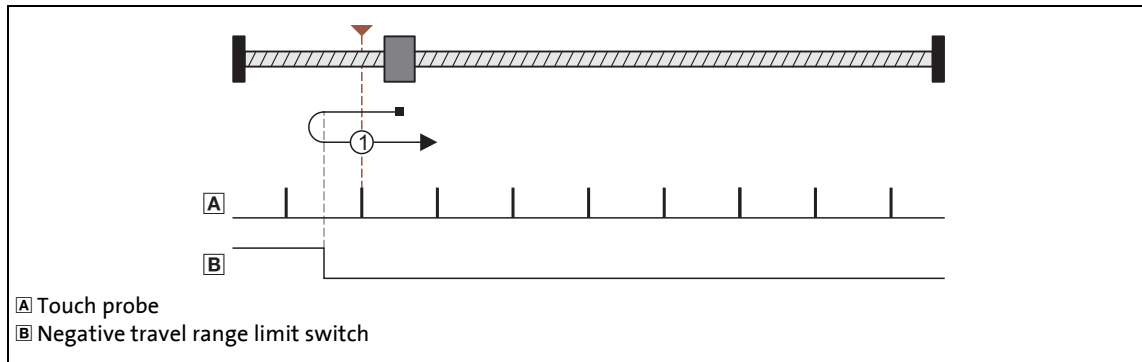


Mode 10	>	Lp	Set reference	TP	Offset path	Sequence profile (optional)
	Start speed		Search speed			Profile speed
Lp	Inactive	Inactive	Inactive	Inactive	Inactive	Active
Ln	Inactive	Inactive	Active	Active	Active	Active

Procedure:

1. Movement in positive direction with start profile data set.
2. Reversing when the edge of the positive travel range limit switch is positive and, at the same time, activation of search profile data set for continued reference searching.
3. Negative edge of the travel range limit switch enables home position detection.
4. Following edge of the touch probe sensor sets home position.

Mode 11: <_Ln_>_TP

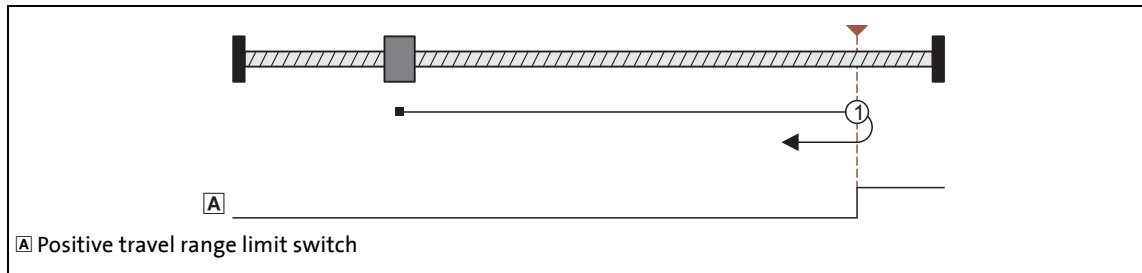


Mode 11	Set reference	Ln	>	TP	Offset path	Sequence profile (optional)
	Start speed		Search speed			Profile speed
Lp	Inactive	Inactive	Active	Active	Active	Active
Ln	Inactive	Inactive	Inactive	Inactive	Inactive	Active

Procedure:

1. Movement in negative direction with start profile data set.
2. Reversing when the edge of the negative travel range limit switch is positive and, at the same time, activation of search profile data set for continued reference searching.
3. Negative edge of the travel range limit switch enables home position detection.
4. Following edge of the touch probe sensor sets home position.

Mode 12: >_Lp



Mode 12	>	Lp	Offset path	Sequence profile (optional)
	Start speed			Profile speed
Lp	Inactive	Inactive	Inactive	Active
Ln	Inactive	Inactive	Active	Active

Procedure:

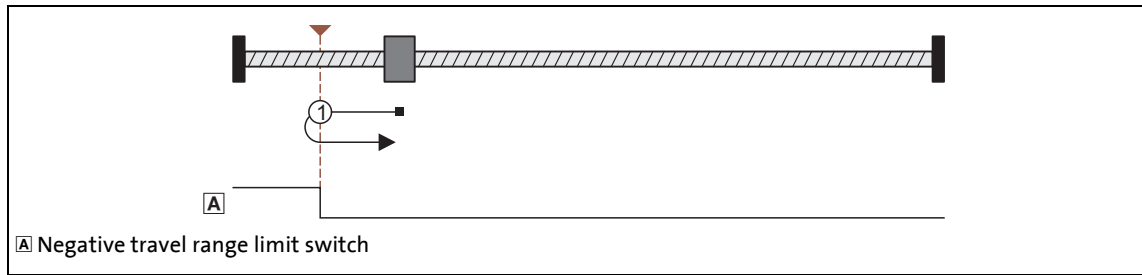
1. Movement in positive direction with start profile data set.
2. Positive edge of the travel range limit switch sets reference.

**Note!**

The load machine can also leave the travel range limit switch. There follows a return to the home position that was set with the positive edge of the travel range limit switch.

- It is possible that, as a result, the machine will remain on an operated limit switch.
- It is therefore recommended that a home value offset be set in [C01227/1](#) in order to release the operated limit switch.

Mode 13: <_Ln



Mode 13	Set reference	Ln	Offset path	Sequence profile (optional)
	Start speed			Profile speed
Lp	Inactive	Inactive	Active	Active
Ln	Inactive	Inactive	Inactive	Active

Procedure:

1. Movement in negative direction with start profile data set.
2. Positive edge of the travel range limit switch sets reference.



Note!

The load machine can also leave the travel range limit switch. There follows a return to the home position that was set with the positive edge of the travel range limit switch.

- It is possible that, as a result, the machine will remain on an operated limit switch.
- It is therefore recommended that a home value offset be set in [C01227/1](#) in order to release the operated limit switch.

Mode 14: >_Mlim



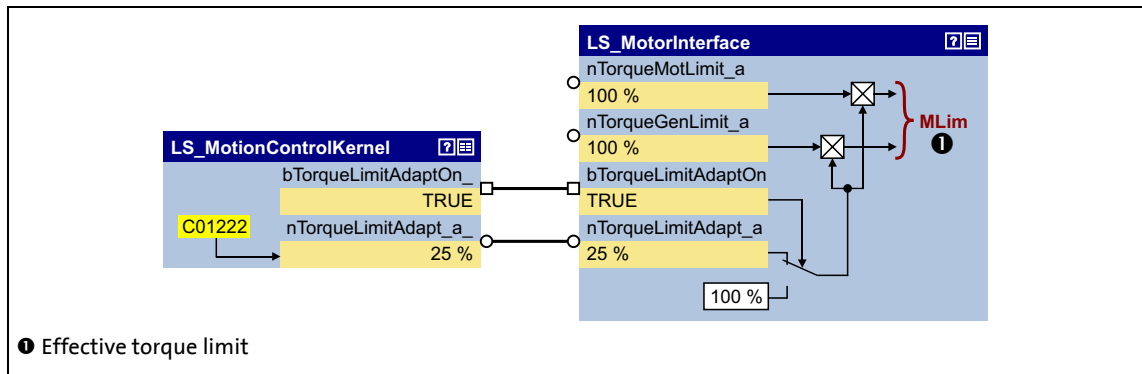
Mode 14	>	Mlim	Offset path	Sequence profile (optional)
	Start speed			Profile speed
Lp	Active	Active	Active	Active
Ln	Inactive	Inactive	Active	Active

Procedure:

1. Movement in a positive direction with reduced torque and start profile data set.
2. The reference is set if it is detected that the torque limit set in [C01222](#) is exceeded beyond the time set in [C01223](#) ("Homing to positive stop").
 - If a home value offset has not been set, this position is the home position.
 - If a home value offset has been set, correctly signed traversing by this offset takes place and the home position is set at the end of this travel distance.

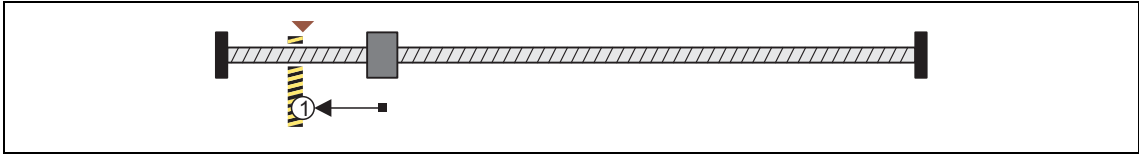


Tip! Set a home value offset in [C01227/1](#) to avoid stopping at the positive stop.



[8-26] Wiring for torque limit when homing to "Positive stop" (homing modes 14/15)

Mode 15: <_Mlim



Mode 15	Set reference	Mlim	Offset path	Sequence profile (optional)
	Start speed			Profile speed
Lp	Inactive	Inactive	Active	Active
Ln	Active	Active	Active	Active

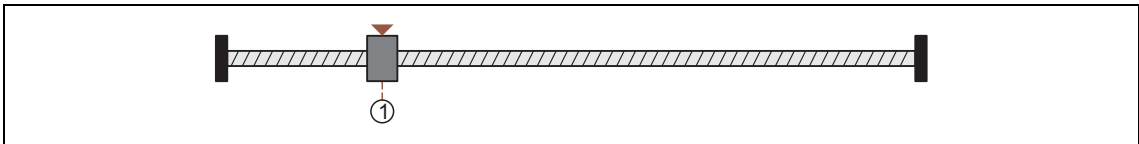
Procedure:

1. Movement in a negative direction with reduced torque and start profile data set.
2. The reference is set if it is detected that the torque limit set in [C01222](#) is exceeded beyond the time set in [C01223](#) ("Homing to positive stop").
 - If a home value offset has not been set, this position is the home position.
 - If a home value offset has been set, correctly signed traversing by this offset takes place and the home position is set at the end of this travel distance.



Tip! Set a home value offset in [C01227/1](#) to avoid stopping at the positive stop.

Mode 100: SetRef



Mode 100	SetRef	Offset path	Sequence profile (optional)
	-	Start speed	Profile speed
Lp	Active	Active	Active
Ln	Active	Active	Active

When the drive is at standstill, the measuring system is set via the bit 8 ("HomStartStop") in [MCK control word](#). The current actual position now corresponds to the home position set in [C01227/2](#) in the machine measuring system.

8.6.1.3 Home position & home value offset

If the home position is set in the course of the reference search, this determined position in the machine measuring system now corresponds to the home position set in [C01227/2](#).

If a home value offset has been set in [C01227/1](#), the drive continues correctly signed traversing by this offset at search speed after the home position has been found. The home position is not set until after this movement.

8.6.1.4 Traversing a sequence profile after completion of homing

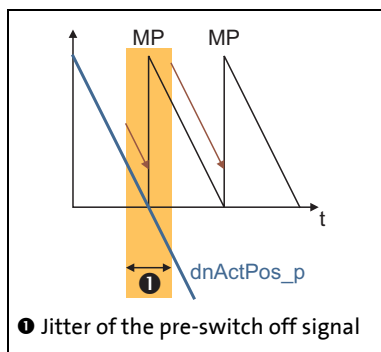
If necessary, a sequence (following or subsequent) profile can be entered in [C01228](#) in order to arrange for a positioning movement to be carried out immediately after completion of homing.



Note!

The positioning movement for the sequence profile set in [C01228](#) is also carried out in the "referencing" mode. If a second sequence (following or subsequent) profile has been defined in the sequence profile, it is not automatically started!

8.6.1.5 Measurement of the distance between pre-stop mark/limit switch and TP/MP



Depending on how close the pre-stop mark is located to the encoder zero pulse and even jittering around it, it might occur that the drive performs one more or one less revolution after the home position detection has been enabled.

From version 16.00.00, the display parameter [C01210/9](#) is available for this purpose. This parameter shows the distance between the signal which starts the home position detection and the detected touch probe signal or encoder zero pulse (MP) in [units].

The measurement is executed for the homing modes 4, 5, 6, 7, 10 and 11.

Referencing mode	Display in C01210/9 in [units]
4 / 5	$dnActPos_p_{(TP/MP)} - dnActPos_p_{(bHomingMark_TRUE_to_FALSE)}$
6 / 7	$dnActPos_p_{(TP/MP)} - dnActPos_p_{(bHomingMark_TRUE_to_FALSE)}$
10	$dnActPos_p_{(TP/MP)} - dnActPos_p_{(bLimitSwitchPos_TRUE_to_FALSE)}$
11	$dnActPos_p_{(TP/MP)} - dnActPos_p_{(bLimitSwitchNeg_TRUE_to_FALSE)}$

8.6.1.6 Option "Actual MCTRL position received at mains switch-off"

The encoder position can be saved with mains failure protection in the inverter. For this purpose, the bit 0 has to be set in [C02652](#).

- In version 8.00.00 and from version 16.00.00 onwards, the "Actual MCTRL position received at mains switch-off" can also be accessed in the »Engineer« via the parameterisation dialog for the basic function **Homing** (depending on the set position encoder system).
- If bit 0 is set in [C02652](#), the actual position of the motor control is saved in the inverter (not in the memory module) and thus remains known to the drive control after mains switching.

The following overview shows the actual position after mains connection depending on the setting [C02652](#)/bit 0:

C02652 bit 0	Reference available in case of mains switch-off (Status bit " HomePosAvailable ")	Actual position and status reference in case of mains switch-on	
		C00490 = 0, 1, 2, 10: Incremental encoder (HTL) or no encoder	
0	0	0 incr.	Reference is unknown
	1		Reference is unknown
1	0	<i>dnActPos</i> _(mains switch-off)	Reference is unknown
	1		Reference available

8.6.2 Requesting the operating mode

Request for the "referencing" operating mode by means of the [MCK control word](#):

MCK control word						
Bit 31	...	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			OpMode_Bit3	OpMode_Bit2	OpMode_Bit1	OpMode_Bit0
X	...	X	0	0	0	1

X = Status not significant

If the **MCKInterface** is connected upstream to the **Motion Control Kernel** and if the operating mode is requested at the [L_MckCtrlInterface](#) FB, the *wOperationMode* and *bOperationMode_1...8* process inputs are available.

8.6.3 Execute homing

Control is exercised by means of bits 8 ... 10 in the [MCK control word](#):

Homing	MCK control word		
	Bit 10	Bit 9	Bit 8
	HomResetPos	HomSetPos	HomStartStop
Stop homing	0	0	0
Start homing	0	0	1
Set home position	0	1	X
Delete home position	1	0	X
X = Status not significant			

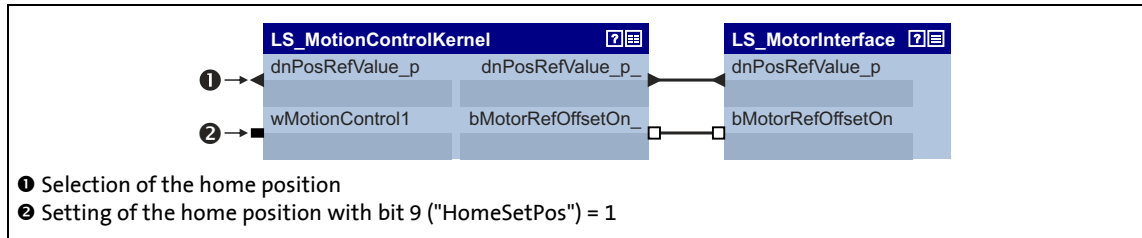
If the **Motion Control Kernel** is downstream from the **MCKInterface** in the circuit, the [L_MckCtrlInterface](#) FB provides the following process inputs for controlling the operating mode:

Designator	Data type	Information/possible settings
bHomingStartStop	BOOL	Start/stop homing <ul style="list-style-type: none"> Only possible in the "referencing" operating mode.
		TRUE <ul style="list-style-type: none"> If one of homing modes "4" ... "15" in C01221 is selected: Start reference search <ul style="list-style-type: none"> The current status of the reference search is indicated via the status outputs <i>bHomingDone</i> and <i>bHomePosAvailable</i>. If homing mode "100: SetRef" is selected in C01221: Setting the home position manually <ul style="list-style-type: none"> The home position is set manually with the drive at a standstill. The current actual position now corresponds to the reference position set in C01227/2 in the machine measuring system.
		TRUE↷FALSE <ul style="list-style-type: none"> Stop homing. <ul style="list-style-type: none"> If the <i>bHomingStartStop</i> input is reset to FALSE during active referencing, homing is cancelled and the drive is brought to a standstill.
bHomingSetPos	BOOL	Set home position (Homing on the fly) <ul style="list-style-type: none"> With referencing "on the fly", the home position of a machine can be set during ongoing movement. Jerking and compensating movements do not occur.
		FALSE↷TRUE <ul style="list-style-type: none"> The position applied at the <i>dnMotorRefOffset_p</i> input of the SB LS_MotionControlKernel at the time of activation is set as home position if C01246/2 = "0: No TP" is set.
bHomingResetPos	BOOL	Delete home position <p>Note: With this function, positions are not deleted but only the status signals <i>bHomePosAvailable</i> and <i>bHomingDone</i> are reset. Setpoints and actual positions remain untouched until a renewed reference setting or homing.</p>
		FALSE↷TRUE <ul style="list-style-type: none"> The internal status "reference known" is reset. <ul style="list-style-type: none"> The inverter is no longer referenced. The process outputs <i>bHomePosAvailable</i> and <i>bHomingDone</i> are reset to FALSE.

8.6.3.1 Homing on the fly

With referencing "on the fly", the home position of a machine can be set during ongoing movement. Jerking and compensating movements do not occur.

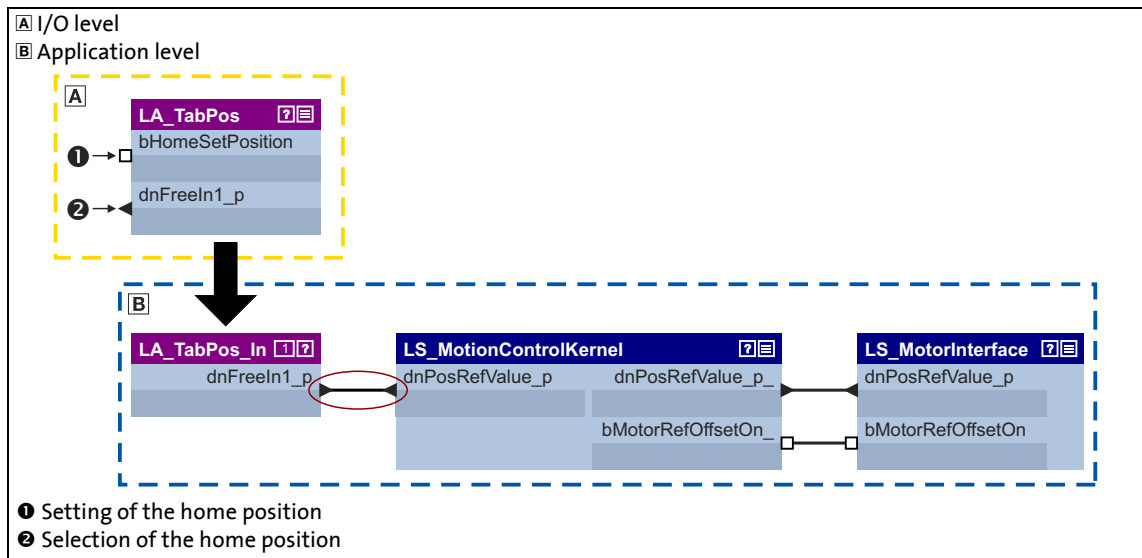
The following illustration shows the relevant interfaces for selecting the home position at the SB [LS_MotionControlKernel](#) and SB [LS_MotorInterface](#):



[8-27] Interface for selecting the home position

In order that position selections can be accepted while homing on the fly, an additional connection is required in the application level.

- The following illustration shows the required modification using the example of the "table positioning" technology application.
- For transmitting the home position from the I/O level to the application level, the "free" input `dnFreeIn1_p` is used here:



[8-28] Modified interconnection for selecting the home position

- Instead of using bit 9 in the [MCK control word](#), the home position can also be set via a touch probe signal. The setting is made in [C01246/2](#).

8.7 Manual jog

In this operating mode, the drive can be traversed manually in clockwise or anticlockwise direction ("jogging mode").

- As an option, it is possible to change over to a second speed during traversing.
- "Retraction" of operated (travel range) limit switches is also supported. Only traversing in the corresponding retracting direction is then possible.



Danger!

During manual jog, specially assigned profile parameters are effective. If these parameters are not set correctly, the drive may execute unexpected movements!



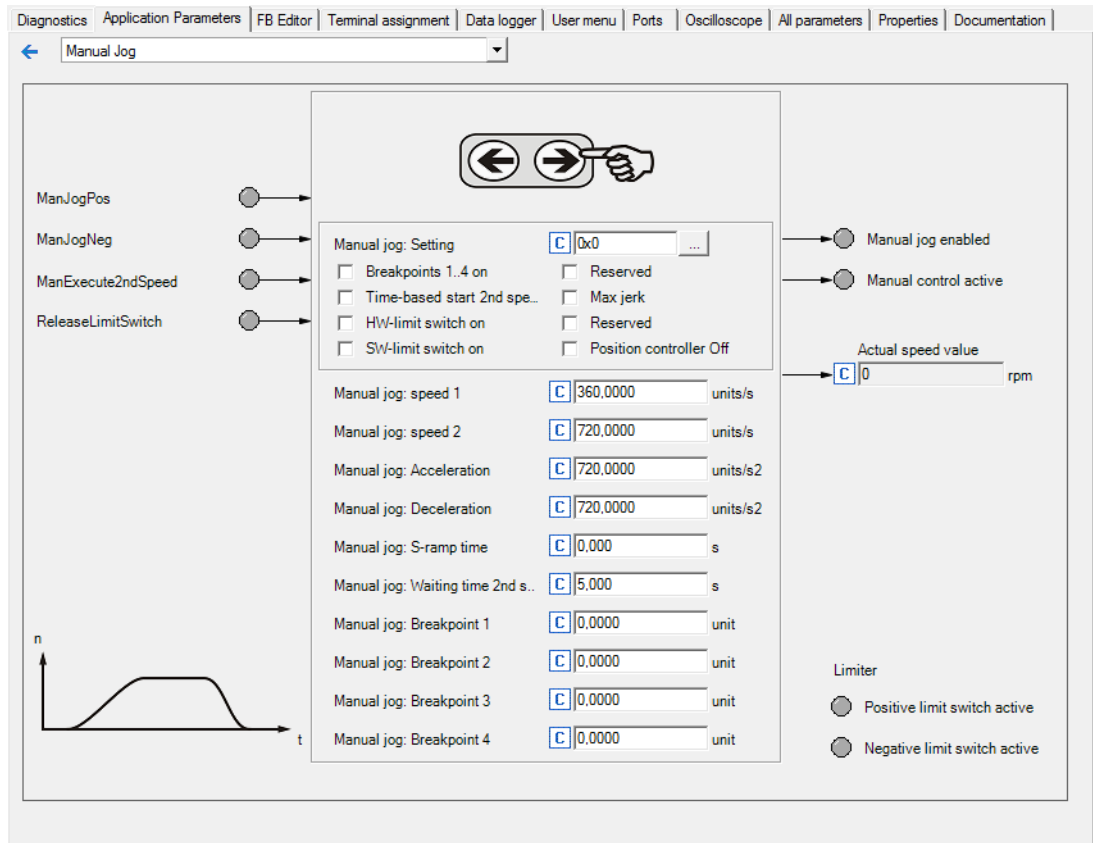
Stop!

In the Lenze setting, travel range monitoring is switched-off in [C01230](#) by means of hardware limit switches and software limit positions for the "Manual jog" operating mode!

If travel range monitoring has been deactivated, the drive can travel into a mechanical limit during manual jogging and machine parts can be destroyed or damaged!

8.7.1 Parameter setting

Parameterisation dialog in the »Engineer«



Short overview of parameters for "manual jogging" mode"

Parameters	Info	Lenze setting	
		Value	Unit
C01230	MCK: Manual jog setting	Bit coded	
C01231/1	Manual jog: speed 1	360.0000	units/s
C01231/2	Manual jog: Speed 2	720.0000	units/s
C01232/1	Manual jog: Acceleration	720.0000	units/s ²
C01232/2	Manual jog: Deceleration	720.0000	units/s ²
C01233/1	Manual jog: S-ramp time	0.000	s
C01235/1	Waiting time - 2nd speed	5.000	s
C01234/1	Manual jog: Breakpoint 1	0.0000	unit
C01234/2	Manual jog: Breakpoint 2	0.0000	unit
C01234/3	Manual jog: Breakpoint 3	0.0000	unit
C01234/4	Manual jog: Breakpoint 4	0.0000	unit



Note!

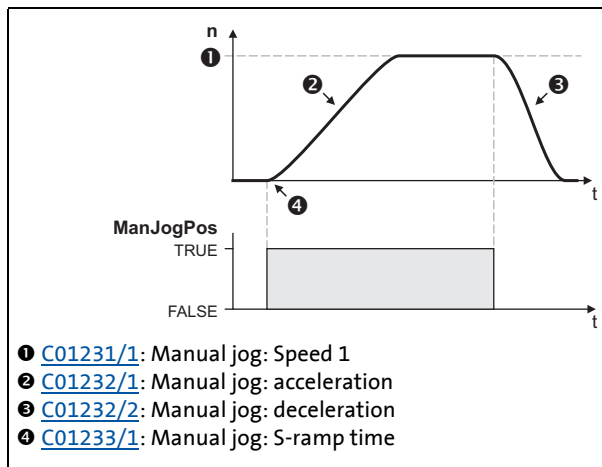
For trouble-free operation, the [Machine parameters](#) (at least gearbox factor and feed constant) must also be set correctly!

8.7.1.1 Functional settings

In [C01230](#), various functional settings for manual jogging can be carried out in bit-coded form.

Function	Lenze setting
Bit 0 Manual jog with breakpoint During manual jog, a stop is automatically made at the breakpoint positions set in C01234/1...4 . <ul style="list-style-type: none"> • The home position must be known for this function. • Travelling is continued when the pushbutton is "released" and pressed again. This button has been assigned the <i>ManJogPos</i> and/or <i>ManJogNeg</i> control function. 	Off
Bit 1 Time-based start of second speed In manual jog mode, an automatic changeover to manual speed 2 takes place after a parameterisable waiting time. ▶ Time-based start of second speed (☞ 544)	Off
Bit 2 HW limit switch on In the "manual jog" operating mode, a travel range monitoring mode via hardware limit switch is active. ▶ Limit position monitoring (☞ 504)	Off
Bit 3 SW limit switch on In the "manual jog" operating mode, a travel range monitoring mode via parameterised software limit positions. ▶ Limit position monitoring (☞ 504)	Off
Bit 4 Reserved	Off
Bit 5 Maximum jerk ▶ Setting or activation of maximum jerk for traversing profiles (☞ 518)	Off
Bit 6 Reserved	Off
Bit 7 Position controller off In the "manual jog" operating mode, the position controller is deactivated. Thus, the compensation of the following error is switched off.	Off

8.7.1.2 Smooth start and quick stop of the drive



[8-29] Example: Smooth start and quick stop

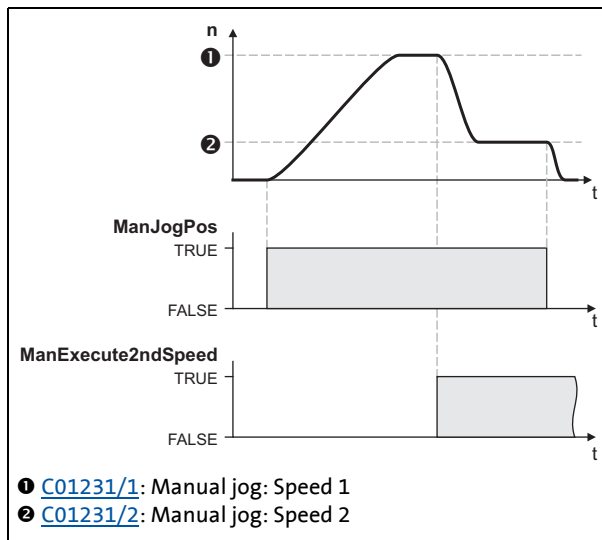


Tip!

Rapid deceleration (C01232/2) reduces the time from releasing of the "jog button" to actual stopping of the drive, with the result that it is easier to position the drive "by sight" and the desired stop position is not passed.

- For accelerating and decelerating, different values can be set in [C01232/1...2](#) so that smooth starting and quick stopping of the drive can be implemented.
- In order to reduce jerking, the two ramps can be set in such a way that they are s-shaped. This is done by entering a relative S-ramp time in [C01233/1](#).

8.7.1.3 Second speed



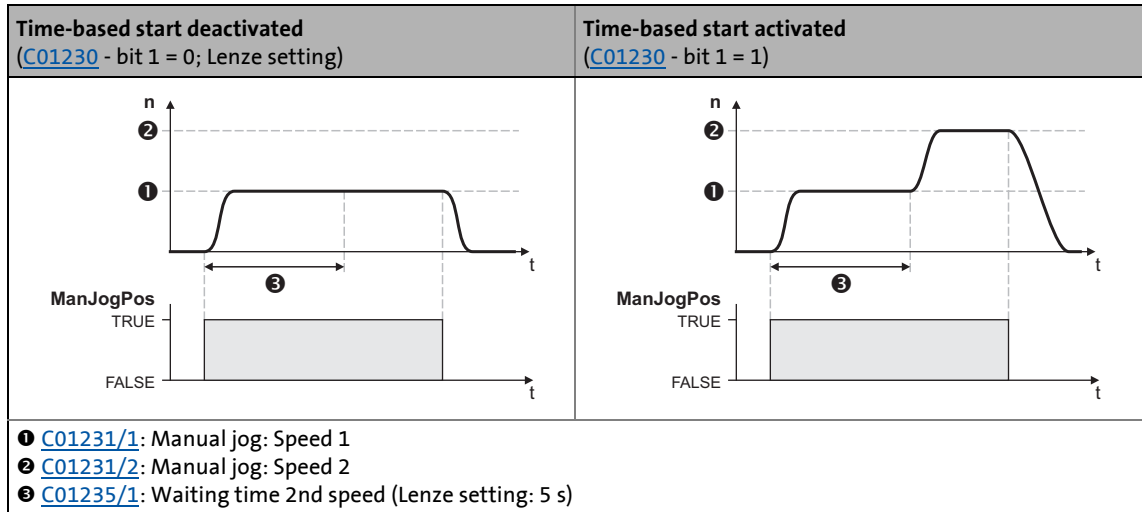
[8-30] Example: Change-over to second speed

- By setting control bit 6 (*ManExecute2ndSpeed*) in the [MCK control word](#), you can changeover to a second speed ([C01231/2](#)) during traversing.

8.7.1.4 Time-based start of second speed

If this function has been activated by means of bit 1 in [C01230](#) and a waiting time > "0 s" has been set in [C01235/1](#), an automatic change-over to manual jog speed 2 takes place when the manual jog function is activated and after the waiting time has expired.

- When the waiting time is set = 0 s, the automatic change-over is deactivated.



[8-31] Time-based start of second speed



Tip!

By leaving the corresponding button for manual jog pressed down for longer than the waiting time and parameterising manual jog speed 2 so that it is higher than manual jog speed 1, you can enable longer distances to be travelled by means of manual jogging with this function.

8 Basic drive functions (MCK)

8.7 Manual jog

8.7.2 Requesting the operating mode

Request for "manual jog" mode via the [MCK control word](#):

MCK control word						
Bit 31	...	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			OpMode_Bit3	OpMode_Bit2	OpMode_Bit1	OpMode_Bit0
X	...	X	0	0	1	0

X = Status not significant

If the **MCKInterface** is connected upstream to the **Motion Control Kernel** and if the operating mode is requested at the [L_MckCtrlInterface](#) FB, the *wOperationMode* and *bOperationMode_1...8* process inputs are available.

8.7.3 Executing manual jogging

Control is exercised by means of bits 4 ... 7 in the [MCK control word](#):

Manual jog	MCK control word			
	Bit 7	Bit 6	Bit 5	Bit 4
	Release LimitSwitch	ManExecute 2ndSpeed	ManJogNeg	ManJogPos
Stop manual jog	0	X	0	0
Manual jog CW • With speed 1 (C01231/1)		0	0	1
Manual jog CW • With speed 2 (C01231/2)		1		
Manual jog in counter-clockwise direction • With speed 1 (C01231/1)		0	1	0
Manual jog in counter-clockwise direction • With speed 2 (C01231/2)		1		
No change in relation to previous state		X	1	1
Retract operated limit switch	1	0	0	0

X = Status not significant

If the **Motion Control Kernel** is downstream from the **MCKInterface** in the circuit, the [L_MckCtrlInterface](#) FB provides the following process inputs for controlling the operating mode:

Designator	Data type	Information/possible settings
bManJogPos bManJogNeg	BOOL	bManJogPos = TRUE: Manual jog right bManJogNeg = TRUE: Manual jog left Both inputs = TRUE: No change compared to previous state Both inputs = FALSE: Stop manual jog
bManJogExecute2ndVel	BOOL	Change over to speed 2 for manual jog
		FALSE Speed 1 (C01231/1) active.
		TRUE Speed 2 (C01231/2) active.
bReleaseLimitSwitch	BOOL	Retract operated limit switch
		TRUE Retract operated limit switch (in opposite direction)

Case 1: Reference known

If the reference is known and the software limit positions have been set, i.e. at least one software limit position is > 0 , manual jogging is carried out until a position at the corresponding software limit position is reached unless manual jogging is aborted first. Overtravelling the set software limit positions is not possible.

Case 2: Reference not known

If the reference is not known, the travel range limits are only monitored via the limit switches (if connected).

If you end manual jogging manually by resetting *bManJogNeg* or *bManJogPos*, the drive is brought to a standstill at the rate of deceleration set for manual jogging.

8.7.3.1 Manual jog to limit position



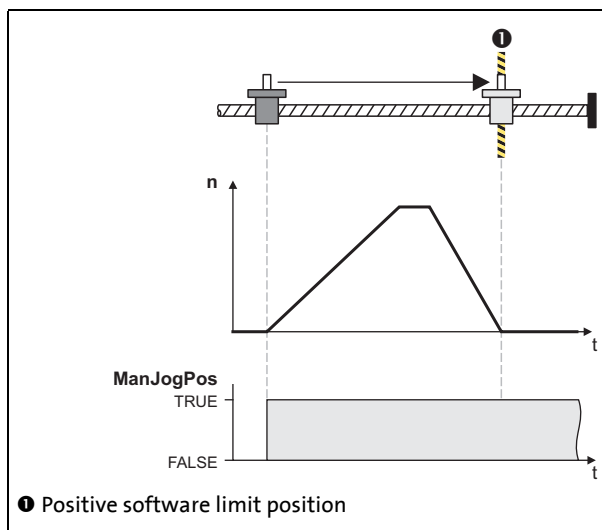
Stop!

In the Lenze setting, travel range monitoring is switched-off in [C01230](#) by means of hardware limit switches and software limit positions for the "Manual jog" operating mode!

If travel range monitoring has been deactivated, the drive can travel into a mechanical limit during manual jogging and machine parts can be destroyed or damaged!

▶ [Limit position monitoring](#) (□ 504)

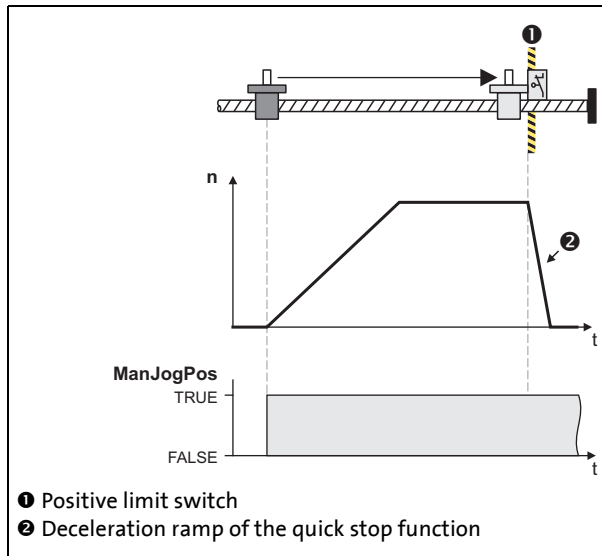
Manual jog to software limit position



[8-32] Example: Manual jog to positive software limit position

- If the reference is known and the software limit positions have been set and are active, positioning to the corresponding software limit position is carried out unless you manually stop manual jogging first by resetting control bit 4/5 (*ManJogPos/ManJogNeg*) in the [MCK control word](#).
- The drive decelerates at the set rate of deceleration ([C01232/2](#)) to the position of the corresponding software limit position.

Manual jog to hardware limit position (limit switch)



[8-33] Example: Manual jog to positive limit switch

- When monitoring of the limit switches is switched on and a limit switch is approached during manual jog, the drive is braked within the deceleration time set for the quick stop function if the "TroubleQuickStop" error response is set in [C00595/1](#) or [C00595/2](#).

8.7.3.2 Retracting of an operated limit switch

If control bit 7 (*ReleaseLimitSwitch*) in the [MCK control word](#) is set, retracting from an operated limit switch is possible. Traversing is carried out in the corresponding retracting direction until the limit switch is not longer operated.

- If a direction preselection is made for retracting by means of control bit 4/5 (*ManJogPos/ManJogNeg*) in the retracting direction, travelling is continued, even after the limit switch has been left, until the corresponding control bit is reset.
- If, instead, a direction preselection is made against the retracting direction, the drive remains at a standstill.



Note!

Retracting from a limit switch is only possible if this switch is still in the operated state, i.e. the corresponding limit switch input is still active. You must therefore make sure that, when travelling to a limit switch, its tripping mechanism is not "driven over" due to e.g. an excessively high mass or too much momentum so that the limit switch is no longer in the operated state as a result.

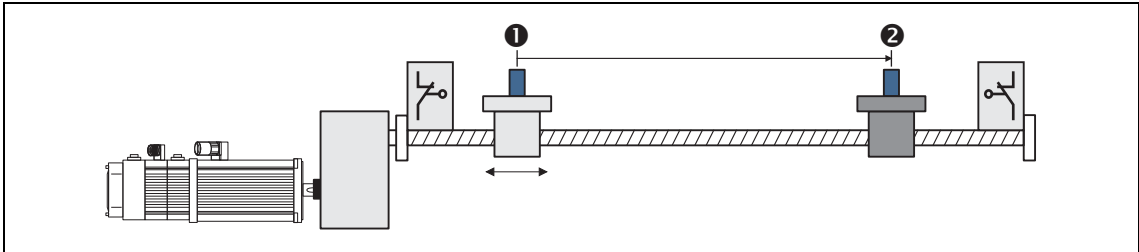


Tip!

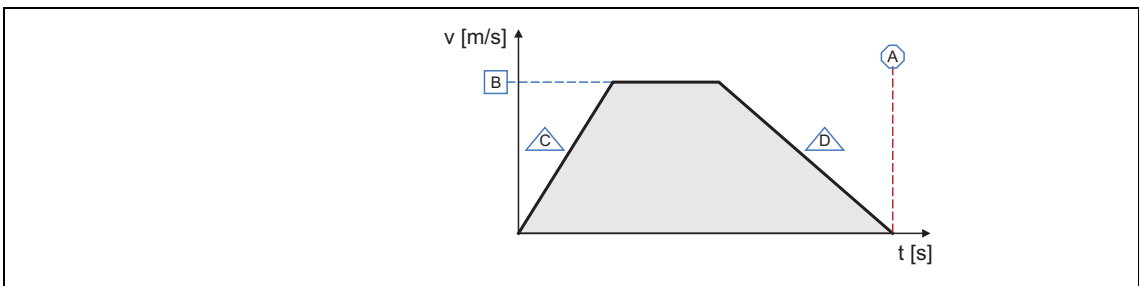
A limit switch that is in the operated state can also be moved away from again through manual jogging in the retracting direction by means of control bits 4/5 (*ManJogPos/ManJogNeg*).

8.8 Positioning

Positioning means that a workpiece/tool or material is moved from a starting position ❶ to a defined destination ❷:



To carry out positioning, a travel profile has to be stored in the inverter for at least the following profile parameter:

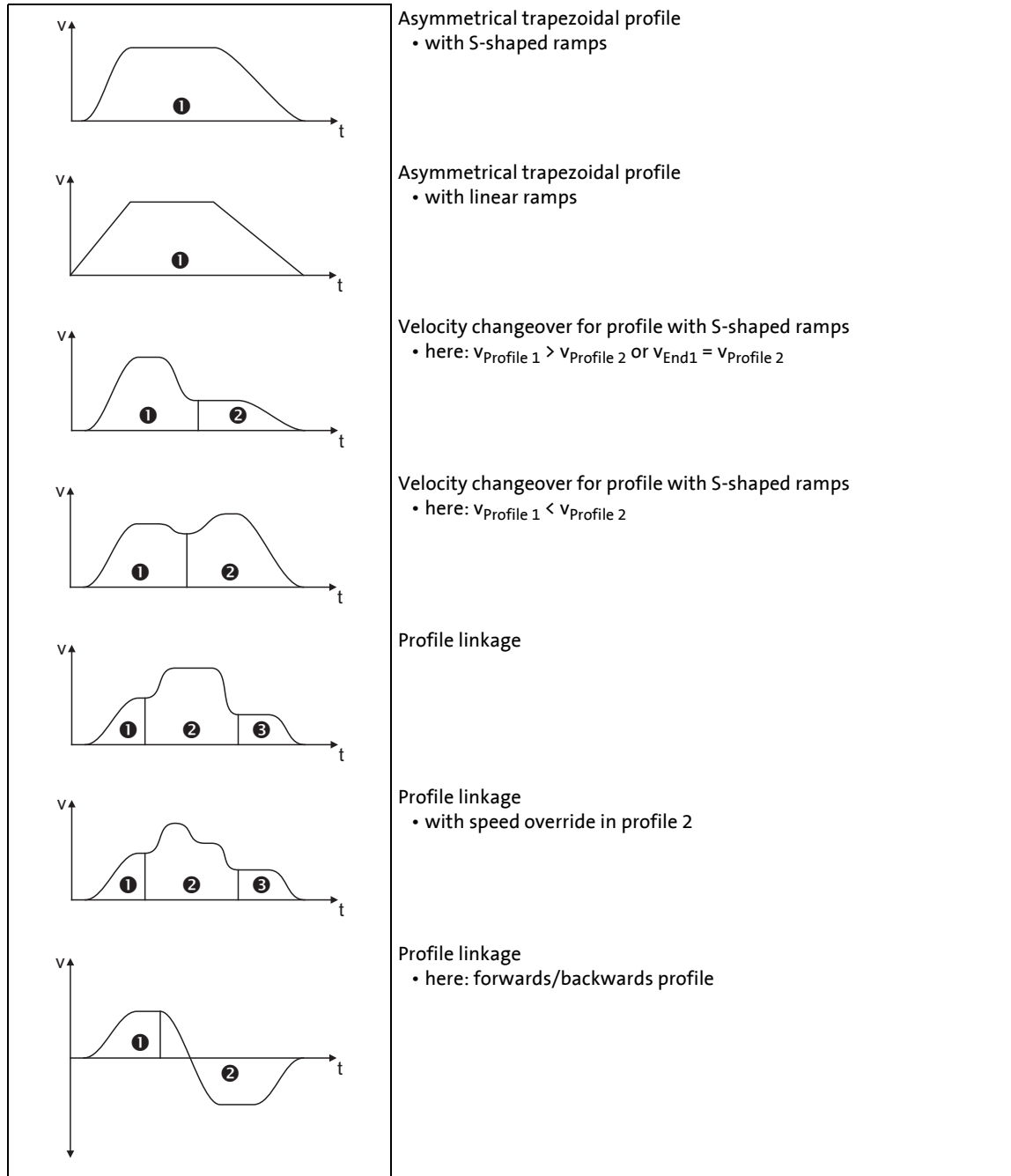


Symbol	Profile parameters
❶	Position Target position or distance to be traversed.
❷	Velocity Maximum velocity during the positioning process.
❸	Acceleration Maximum acceleration during the positioning process.
❹	Deceleration Maximum deceleration during the positioning process.

- A profile describes a motion task that can be converted to a rotary motion of the motor shaft by the **Motion Control Kernel** in the "Positioning" operating mode.
- A positioning process can be composed of a large number of profiles that are executed in a fixed manner.
- 15 different profiles can be parameterised for the 8400 protac HighLine inverter.
- You can find a detailed explanation of all profile parameters in the subchapter entitled "[Profile entry](#)". (📖 552)

8.8.1 Possible motion profiles

The following illustration shows different movement profiles that can be travelled in the "positioning" mode:



[8-34] Examples of possible motion profiles

8.8.2 Parameter setting

Short overview of parameters for "positioning" mode:

Parameters	Info	Lenze setting	
		Value	Unit
C01216	MCK: Positioning setting	Bit coded	
C01300/1...15	Profile 1 ... 15: Mode	1: absolute (beeline)	
C01301/1...15	Profiles 1 ... 15: Position	360.0000	unit
C01302/1...15	Profile 1 ... 15: Speed	360.0000	unit/s
C01303/1...15	Profile 1 ... 15: Accel.	720.0000	unit/s ²
C01304/1...15	Profile 1 ... 15: Decel.	720.0000	unit/s ²
C01305/1...15	Profile 1 ... 15: Final speed	0.0000	unit/s
C01306/1...15	Profiles 1 ... 15: S-ramp time	0.000	s
C01307/1...15	Profiles 1 ... 15: Sequence profile	0	
C01308/1...15	Profile 1 ... 15: TP profile (from version 06.00.00)	0	
C01309/1...15	Profile 1 ... 15: TP signal source (from version 06.00.00)	3: TP-DigIn3	
C00595/9	MCK: Resp. to invalid PosModus	4: WarningLocked	
C00595/10	MCK: Resp. to invalid profile data	4: WarningLocked	
C00595/12	MCK: Resp. to invalid profile no.	4: WarningLocked	
C00595/14	MCK: React target out of travel range	4: WarningLocked	
C01210/1	MCK: Curr. feed	-	units
C01210/2	MCK: Curr. set position	-	units
C01210/3	MCK: Curr. actual position	-	units
C01210/4	MCK: Curr. following error	-	units
C01210/5	MCK: Positioning accuracy	-	units
C01210/6	MCK: Target position	-	units
C01211/1	Max. traversing speed 100%_C11	-	units/s
C01213/1	MCK: Max. traversing distance	-	units
C01242	MCK: Current pos profile number	-	

Greyed out = display parameter



Note!

For trouble-free operation, the [Machine parameters](#) (at least gearbox factor and feed constant) must also be set correctly!

8.8.2.1 Functional settings

In [C01216](#), various functional settings regarding behaviour in the case of a changeover to the "positioning" mode can be made in bit-coded form.

- When this is being done, any mode change must be taken into account.
- Positioning with controller inhibit/enable is also possible if the corresponding setting is made.

Function		Lenze setting
Bit 0	PosAbort at PosInit When a changeover to "positioning" mode is made, ramping down at the rate of deceleration set in C01251 for normal stopping is carried out.	On
Bit 1	PosExecute active at PosInit When a changeover is made to the "positioning" mode, the specified profile is immediately executed if the "MCK PosExecute" control bit has also been set. If the MCK "PosExecute" control bit has not been set, the setpoint is continued.	Off
Bit 2	Reserved	Off
Bit 3	Reserved	Off
Bit 4	ProfilStart at PosInit When it is changed to the "Positioning" operating mode, the defined profile is executed immediately without the need to set the MCK control bit "PosExecute". Note: If the FB L_MckCtrlInterface writes to the MCK control word due to the setting in C01297 , a profile start may be prevented. Remedy: Set bit 0 in C01297 to "0". ▶ Alternative functions for control bit "PosExecute" (📖 492)	Off
Bit 5	Maximum jerk ▶ Setting or activation of maximum jerk for traversing profiles (📖 518)	Off
Bit 6	Reserved	Off
Bit 7	Reserved	Off



Note!

In the case of multiple selection, the "PosAbort at PosInit" function, which can be activated by means of bit 0, has priority over the other functions (see the following truth table).

Bit 4 ProfilStart	Bit 1 PosExecute active	Bit 0 PosAbort	MCK control bit "PosExecute"	Behaviour when it is changed to "Positioning" operating mode	
x	x	1	x		Ramping down the setpoint
0	0	0	x		Continuing the setpoint
0	1	0	0		
0	1	0	1		Positioning from the setpoint
1	x	0	x*		

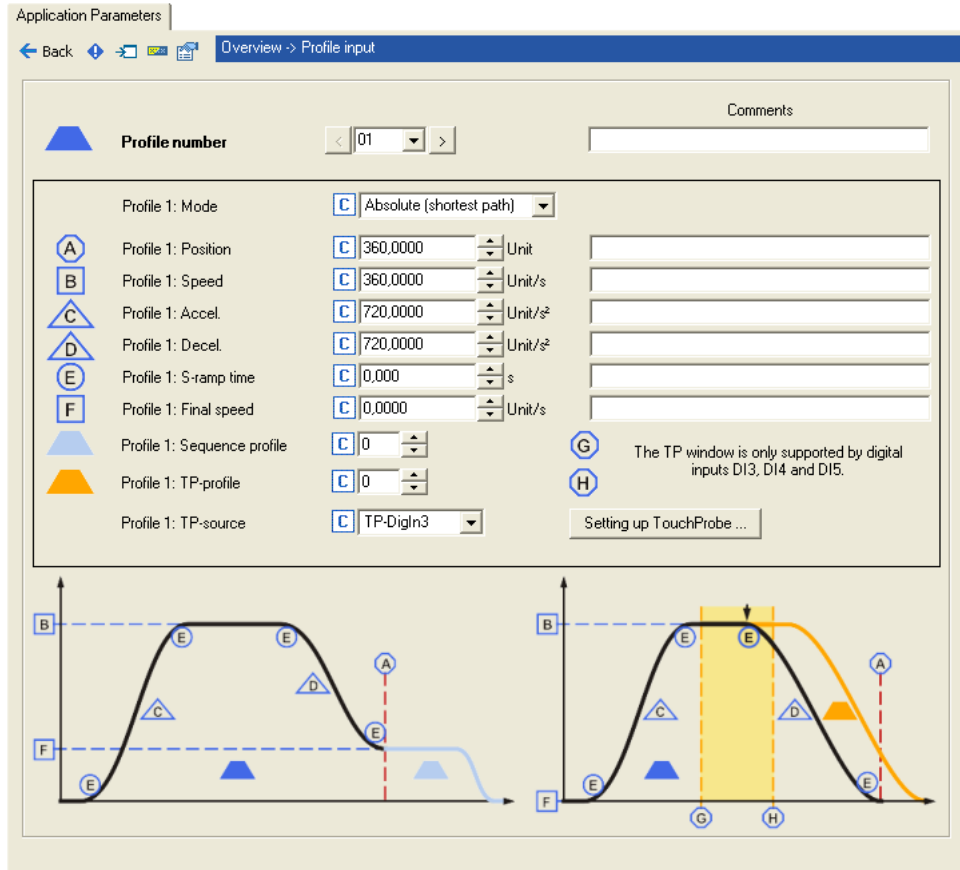
printed in bold = Lenze setting; x = any state; * see note on bit 4 in table above

Related topics:


- ▶ [Stipulation of the profile to be executed](#) (📖 559)
- ▶ [Starting/cancelling a traversing task](#) (📖 560)

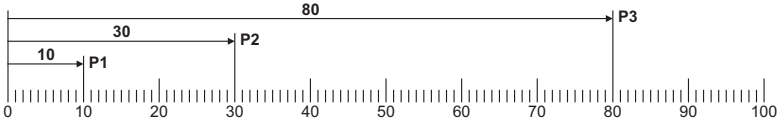
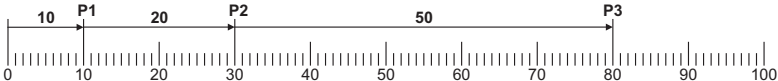
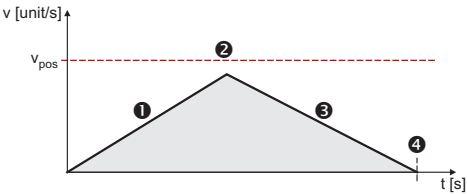
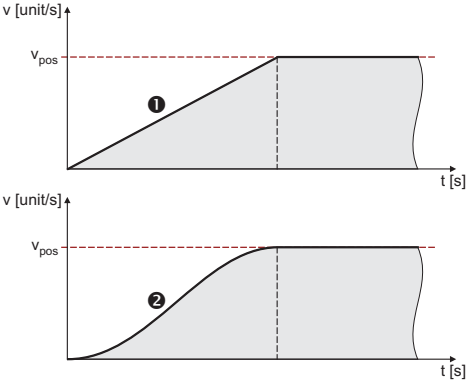
8.8.2.2 Profile entry

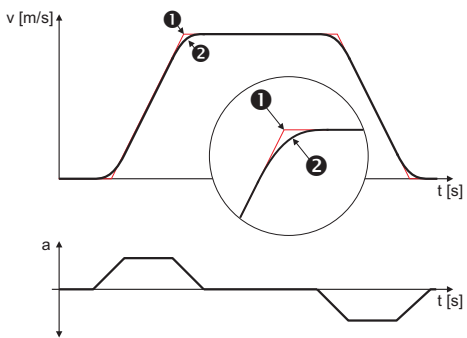
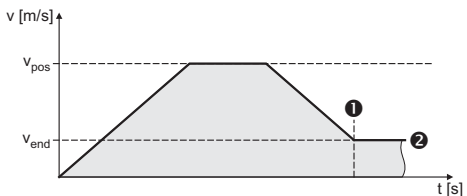
In the »Engineer«, the following parameterisation dialog is available for setting the profile parameters:



A profile is described by the following profile parameters:

Symbol	Profile parameters
	(Standard) profile Profile data set (profile numbers 1 ... 15), in which the profile data are stored.
	Mode (C01300/1...15) Selection of the way in which positioning is to be carried out. ▶ Positioning modes (📖 555)

Symbol	Profile parameters
A	<p>Position (C01301/1...15) Target position or distance to be traversed.</p> <p>When the position is indicated, a distinction is made between absolute position and relative position:</p> <ul style="list-style-type: none"> An absolute position always indicates the distance to the defined zero position: Absolute position = Target position  <ul style="list-style-type: none"> A relative position indicates the distance to the starting position (current position): Relative position = Target position - Starting position 
B	<p>Speed (C01302/1...15) Maximum velocity during the positioning process.</p> <ul style="list-style-type: none"> Depending on the profile parameters of position, acceleration and deceleration, it is possible that the drive will not even reach the maximum speed. In this case, the graphic representation will be a trapezium instead of a triangle:  <ul style="list-style-type: none"> 1 Acceleration 2 Travelling speed (is not reached in this case) 3 Deceleration 4 Target position (or traversing distance)
C	<p>Acceleration (C01303/1...15) Maximum acceleration during the positioning process.</p> <ul style="list-style-type: none"> Two types of acceleration are distinguished: <ul style="list-style-type: none"> Constant acceleration: the velocity increases linearly. Linearly increasing acceleration: Speed increases in S-shape. A linearly increasing acceleration (S-profile) results from the setting of an S-ramp time (see more below).  <ul style="list-style-type: none"> 1 Constant acceleration (L-profile) 2 Linearly increasing acceleration (S-profile)
D	<p>Deceleration (C01304/1...15) Maximum deceleration during the positioning process.</p>

Symbol	Profile parameters
<p>Ⓔ</p>	<p>S-ramp time (C01305/1...15)</p> <p>Due to stipulation of an S-ramp time for a profile, the profile is executed with S-shaped ramps, i.e. acceleration and braking processes are initiated smoothly in order to reduce jerk and thus the stress on the drive components.</p> <ul style="list-style-type: none"> • The acceleration/deceleration stipulated in the profile is not achieved until after the specified S-ramp time. • This kind of acceleration/deceleration is needed for sensitive machine parts with a certain amount of play. • The unavoidable consequence of the slower increase in acceleration in the case of the S profile is that the positioning time is longer compared to the L profile, which is more efficient in terms of time. <p>▶ S-ramp time for jerk limitation (📖 557)</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>① Without jerk limitation (L profile)</p> <p>② With jerk limitation (S profile)</p> </div> </div>
<p>Ⓕ</p>	<p>Final speed (C01305/1...15)</p> <p>This specifies the velocity at which the drive is to start the next profile after reaching the target position. With a final speed not equal to "0", "velocity changeover" or "overchange" is possible, i.e. when the target position is reached, a second positioning process is started immediately without the drive coming to a standstill at the first target position.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>① Target position</p> <p>② Final speed (in this case, not equal to "0")</p> </div> </div>
<p>▲</p>	<p>Sequence profile (C01307/1...15) for profile linkage/following block control</p> <p>A special feature is automatic advancing to subsequent profiles with and without velocity changeover. For this purpose, the profile number of the desired subsequent profile (1 to 15) is simply set in the parameter "Sequence profile" (C01307/1...15) of a profile.</p> <p>After execution of the profile (target position reached), the set following (subsequent) profile is started automatically. In this way, profile chains can be stipulated without additional control processes.</p> <ul style="list-style-type: none"> • If the profile parameter "Final speed" (C01305/1...15) is set to $\neq 0$, there is a velocity changeover leading into the following (subsequent) profile at the set final speed. • If "0" is set for the following (i.e. subsequent) profile, profile linkage does not take place. • This function can be performed in all positioning modes.
<p>▲</p>	<p>From version 06.00.00 onwards:</p> <p>TP profile (C01308/1...15)</p> <p>Profile number of the profile (1 ... 15) that is to be executed after a touch probe has been detected.</p> <ul style="list-style-type: none"> • If "0" is set, there will be no profile stepping through touch probe. • Only relevant for positioning modes with touch-probe. <p>▶ Touch probe positioning (📖 556)</p>
	<p>From version 06.00.00 onwards:</p> <p>TP signal source (C01309/1...15)</p> <p>Selection of the signal source for touch probe detection.</p> <ul style="list-style-type: none"> • Only relevant for positioning modes with touch-probe. <p>▶ Touch probe positioning (📖 556)</p>

8.8.2.3 Positioning modes

For positioning, it is possible to select from different positioning modes in relation to the type of axis/application. These modes are described in the following table.



Stop!

In the positioning modes "continuous" and "relative", the "TroubleQuickStop" error response occurs in the Lenze setting when the maximum travel distance is exceeded ([C01213/1](#)). ▶ [Monitoring of the maximum travel distance](#) (📖 511)



Note!

For absolute positioning, the home (reference) position must be known!

- If absolute positioning (positioning modes 1, 4, 5, 8, 11, 12) is started although the home position is not known:
 - The error message set in [C00595/8](#) is displayed (Lenze setting: "WarningLocked").
 - The error message "[Ck08: Home position unknown](#)" is entered into the logbook.

Positioning mode	Info
1 Absolute (shortest path)	Travelling along the axis takes place until an absolute position is reached via the shortest path. <ul style="list-style-type: none"> • Reference for the absolute position is the zero position.
8 Absolute (shortest path) to TP <small>(from version 06.00.00)</small>	
2 Continuous	In these two modes, no particular position is approached but travelling takes place at the traversing speed stipulated by means of the profile. <ul style="list-style-type: none"> • The values of the profile are used for accelerating and decelerating. • The direction of travel is determined by the sign of the traversing speed.
9 Continuous to TP <small>(from version 06.00.00)</small>	
3 Relative	The axis is traversed by a distance. <ul style="list-style-type: none"> • Reference for the distance is the target position of the previously executed profile.
10 Relative to TP <small>(from version 06.00.00)</small>	
Positioning modes for modulo measuring system (rotary table application) ▶ Activation of the modulo measuring system (📖 500)	
4 absolute (Cw) <small>(from version 06.00.00)</small>	Travelling along the axis takes place <u>clockwise</u> until an absolute position is reached. <ul style="list-style-type: none"> • Reference for the absolute position is the zero position. • In this direction, the zero position of the axis can be exceeded.
11 Absolute (Cw) on TP <small>(from version 06.00.00)</small>	
5 absolute (Ccw) <small>(from version 06.00.00)</small>	Travelling along the axis takes place <u>counter-clockwise</u> until an absolute position is reached. <ul style="list-style-type: none"> • Reference for the absolute position is the zero position. • In this direction, the zero position of the axis can be exceeded.
12 Absolute (Ccw) on TP <small>(from version 06.00.00)</small>	

8.8.2.4 Touch probe positioning

This function extension is available from version 06.00.00!

In case of a touch probe positioning, first the profile is executed according to the set profile parameters. If a touch probe is detected during the process, it is automatically changed to the profile defined in the "TP profile" profile parameter. This profile mode is also defined via the mode selection like in the following profile start processes.

If no valid TP profile is set, the travel request is aborted ("PosStop").

Preconditions for touch probe positioning

- The mode of the current profile data set contains the setting "to TP".
- For absolute positioning, the home (reference) position must be known.
- In the corresponding profile data set, the following profile parameters must be set in addition:
 - TP profile ([C1308/x](#))
 - TP signal source ([C1309/x](#))
- The touch probe interface is configured such that the selected TP signal source is enabled.
 - See chapter entitled "[Touch probe detection](#)". ([📖 360](#))



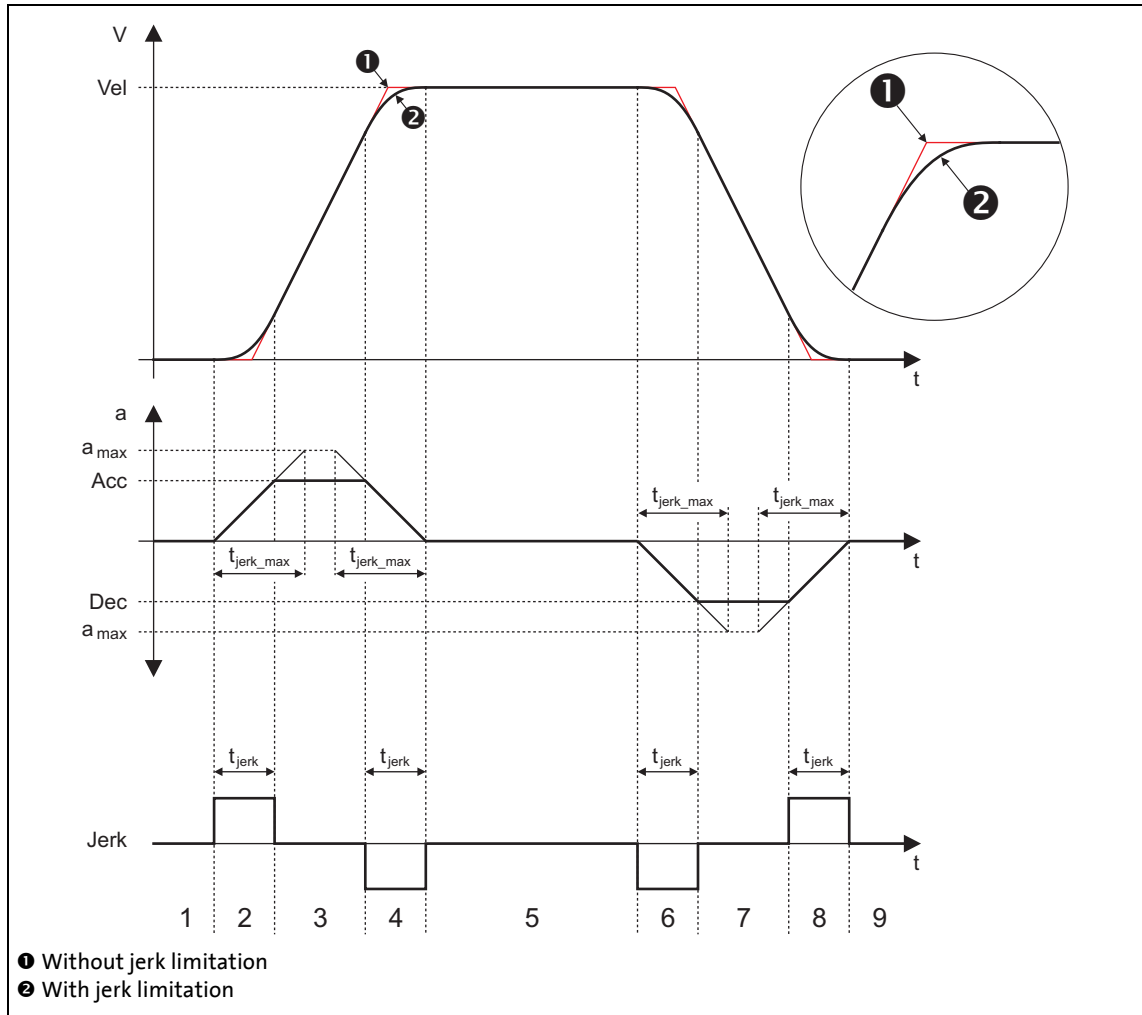
Note!

Go to [C02810/x](#) and select the edge, the digital input used for the connection of the touch-probe sensor is to respond. In the Lenze setting of [C02810/x](#), no touch probe is detected!

8.8.2.5 S-ramp time for jerk limitation

The maximum jerk is defined by the selection of an S-ramp time t_{jerk_max} , after which the max. acceleration (a_{max}) only is reached.

- The actual jerk time t_{jerk} is reduced according to the actual acceleration Acc:



- | | |
|---|---|
| 1 Standstill | 6. Deceleration with set jerk limitation |
| 2. Acceleration with set jerk limitation | 6. Deceleration according to deceleration profile (Dec) |
| 3. Acceleration according to acceleration profile (Acc) | 8 Reduce deceleration (jerk limitation) |
| 4. Reduce acceleration (jerk limitation) | 9 Standstill (position target reached) |
| 5th Traversing with Vel according to speed profile | |

**Note!**

If disproportionately high S-ramp times are set for low acceleration times, this may result in an incorrect profile generation.

Example: $v = 100 \text{ mm/s}$, $a = 1000 \text{ mm/s}^2$

→ $t_{\text{acc}} = 0.1 \text{ s}$

→ $t_{\text{jerk_max}} = 1 \text{ s}$

For this reason, you must only set plausible S-ramp times (this should not exceed half the value of t_{acc}).

8.8.3 Requesting the operating mode

Request for "positioning" mode by means of the [MCK control word](#):

MCK control word							
Bit 31	...		Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
				OpMode_Bit3	OpMode_Bit2	OpMode_Bit1	OpMode_Bit0
X	...	X	X	0	0	1	1

X = Status not significant

If the **MCKInterface** is connected upstream to the **Motion Control Kernel** and if the operating mode is requested at the [L_MckCtrlInterface](#) FB, the *wOperationMode* and *bOperationMode_1...8* process inputs are available.

8.8.4 Carrying out positioning

8.8.4.1 Stipulation of the profile to be executed

The profile to be executed is stipulated by means of the [MCK control word](#) in bit-coded form:

Bit	Designation	Description								
24	ProfileNo_Bit0	Profile	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
...	...	Profile 0	0	0	0	0	0	0	0	0
31	ProfileNo_Bit7	Profile 1	0	0	0	0	0	0	0	1
		Profile 2	0	0	0	0	0	0	1	0
								
		Profile 15	0	0	0	0	1	1	1	1
All other possible settings are reserved for future extensions!										

If the **Motion Control Kernel** is downstream from the **MCKInterface**, the [L_MckCtrlInterface](#) FB provides the following processing inputs for stipulating the profile to be executed:

Designator	Data type	Information/possible settings
wProfileNo	WORD	Selection of the profile number <ul style="list-style-type: none"> Optionally as a data word or binary coded. In the Lenze setting, an operating mode change is carried out by the L_MckCtrlInterface FB at the same time as the profile is stipulated: <ul style="list-style-type: none"> If profile 0 is selected: Activation of "Speed follower" operating mode If profile 1 is selected: Activation of "Homing" operating mode If profile 2 is selected: Activation of "Manual jog" operating mode If profile 3 ... 15 is selected: Activation of "Positioning" operating mode The operating mode change with profile number can be set in C01298/1...4.
bProfileNo_1	BOOL	
bProfileNo_8		



Note!

The profile 0 is no valid profile for the "positioning" operating mode.

If a driving request with an invalid profile number is started, the response set in [C00595/12](#) occurs (Lenze setting: "WarningLocked").

8.8.4.2 Starting/cancelling a traversing task

Control is exercised by means of bits 16 ... 19 in the [MCK control word](#):

Homing	MCK control word			
	Bit 19	Bit 18	Bit 17	Bit 16
	PosStop	Pos DisableFollowProfile	PosFinishTarget	PosExecute
Start travelling	0	0	0	011
Complete interrupted profile	0	0	011	0
Do not travel sequence profile	0	1	X	X
Cancel travelling*	1	X	X	X
*From version 12.00.00, more travel requests will be inhibited ("PosExecute" will be blocked).				
X = Status not significant				

If the **Motion Control Kernel** is downstream from the **MCKInterface** in the circuit, the [L_MckCtrlInterface](#) FB provides the following process inputs for controlling the operating mode:

Designator	Data type	Information/possible settings
bPosExecute	BOOL	Start travelling FALSE↗TRUE Execute selected profile
bPosExecuteFinish	BOOL	Complete interrupted profile FALSE↗TRUE A positioning process previously cancelled, e.g. by <i>bPosStop</i> or due to a device error, is resumed by travelling to the original target. From version 16.00.00, <i>bPosExecuteFinish</i> serves to permanently retravel to the original target even if the profile has been completed once or several times.
bPosDisableFollowProfile	BOOL	Do not execute following profile (switch off profile linkage) TRUE Evaluation of the sequence profile number parameterised in C01307/1...15 for the selected profile is suppressed.
bPosStop	BOOL	Cancel travelling TRUE Stop positioning From version 12.00.00, more travel requests will be inhibited ("PosExecute" will be blocked).



Tip!

Travel requests/profiles can also be started while the drive is running. The drive does not need to be at standstill.

Related topics:

- ▶ [Target position monitoring \(status "drive in target"\)](#) (📖 509)
- ▶ [Monitoring of the maximum travel distance](#) (📖 511)
- ▶ [Following error monitoring system](#) (📖 512)

8.8.4.3 Override of the parameterised positioning mode

The setting of the positioning mode in [MCK control word](#) superimposes the mode selection via the "Mode" profile parameter ([C1300/1...15](#)). This means that for selected profiles the mode selection and the request of a touch probe positioning via process data are possible. The value set in [C01300/1...15](#) is not overwritten. The following applies to the override:

- A. Valid positioning mode in the MCK control word:
The positioning mode set in the MCK control word is used.
- B. Positioning mode in the MCK control word = 0:
The positioning mode set in "mode" profile parameter ([C1300/1...15](#)) is used.
- C. Invalid positioning mode in the MCK control word:
Ck09Error message "Ck09: Invalid positioning mode". The response set in [C00595/9](#) occurs (Lenze setting: "WarningLocked").

Bit	Designation	Description	Bit 3	Bit 2	Bit 1	Bit 0
20	PosModeBit0	Positioning mode				
...	...	Positioning mode = setting in C01300/1...15	0	0	0	0
23	PosModeBit3	Absolute (shortest path)	0	0	0	1
		Continuous	0	0	1	0
		Relative	0	0	1	1
		Absolute (Cw) *	0	1	0	0
		Absolute (Ccw) *	0	1	0	1
		Absolute (shortest path) to TP *	1	0	0	0
		Continuous to TP *	1	0	0	1
		Relative to TP *	1	0	1	0
		Absolute (Cw) to TP *	1	0	1	1
		Absolute (Ccw) to TP *	1	1	0	0
		* From version 06.00.00 All other possible settings are reserved for future extensions!				

If the **Motion Control Kernel** is downstream from the **MCKInterface** in the circuit, the [L_MckCtrlInterface](#) FB provides the following process input for stipulating an override of the positioning mode:

Designator	Data type	Information/possible settings
wPosMode	WORD	Override of the positioning mode set in the profile data • Only bit 0 ... bit 3 of <i>wPosMode</i> are evaluated.
		0 Positioning mode = setting in C01300/1...15
		1 Absolute (shortest path)
		2 Continuous
		3 Relative
		4 Absolute (Cw) *
		5 Absolute (Ccw) *
		8 Absolute (shortest path) to TP *
		9 Continuous to TP *
		10 Relative to TP *
		11 Absolute (Cw) to TP *
		12 Absolute (Ccw) to TP *
		* From version 06.00.00 All other possible settings are reserved for future extensions!

8.8.4.4 Position teaching

The [MCK control word](#) can be used to initiate "teaching" or "latching" of the MCK setpoint position or the current position into the currently selected profile.

Bit	Designation	Description
14	PosTeachSetPos	"1" ≙ Teach MCK set position into the selected profile
15	PosTeachActPos	"1" ≙ Teach current position into the selected profile

If the **Motion Control Kernel** is downstream from the **MCKInterface**, the [L_MckCtrlInterface](#) FB provides the following process inputs for teaching:

Designator	Data type	Information/possible settings
bPosTeachSetPos	BOOL	Teach MCK setpoint position
		TRUE Teach MCK setpoint position into the selected profile.
bPosTeachActPos	BOOL	Teach current position
		TRUE Teach current position into the selected profile.



Note!

If request is made at the same time, the current position is taught.

8 Basic drive functions (MCK)

8.9 Stop

8.9 Stop

If the "normal stop" operating mode is active, the drive is brought to a standstill with a parameterisable deceleration ramp.

8.9.1 Parameter setting

Short overview of parameters for "Normal stop" operating mode:

Parameters	Info	Lenze setting	
		Value	Unit
C01251/1	Normal stop: Deceleration	720.0000	units/s ²
C01252/1	Stop: S-ramp time	0.000	s

8.9.2 Requesting the operating mode

Request for "Normal stop" operating mode by means of the [MCK control word](#):

MCK control word						
Bit 31	...	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			OpMode_Bit3	OpMode_Bit2	OpMode_Bit1	OpMode_Bit0
X	...	X	0	1	0	0

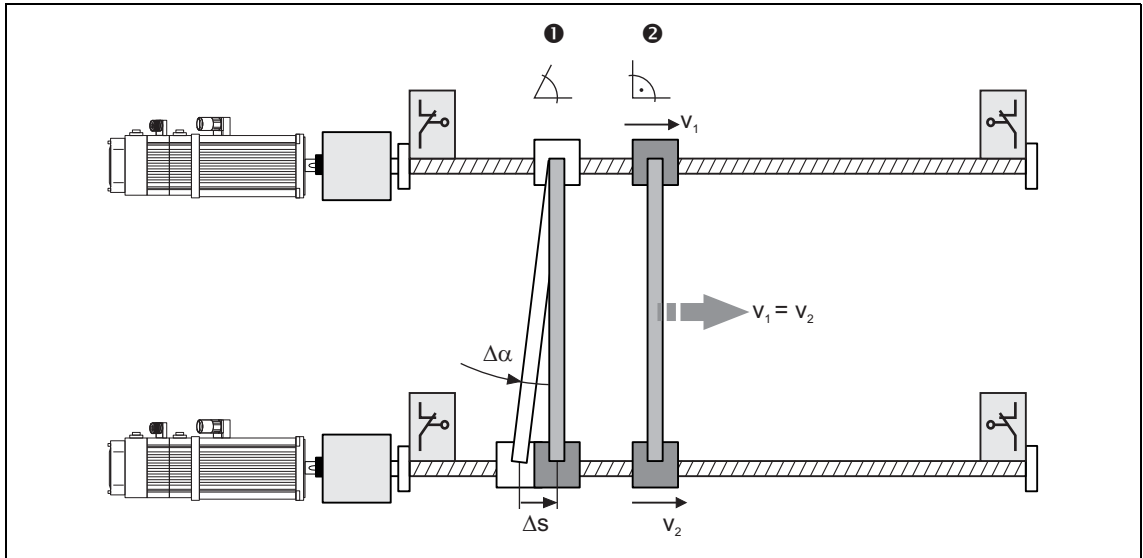
X = Status not significant

If the **MCKInterface** is connected upstream to the **Motion Control Kernel** and if the operating mode is requested at the [L_MckCtrlInterface](#) FB, the *wOperationMode* and *bOperationMode_1...8* process inputs are available.

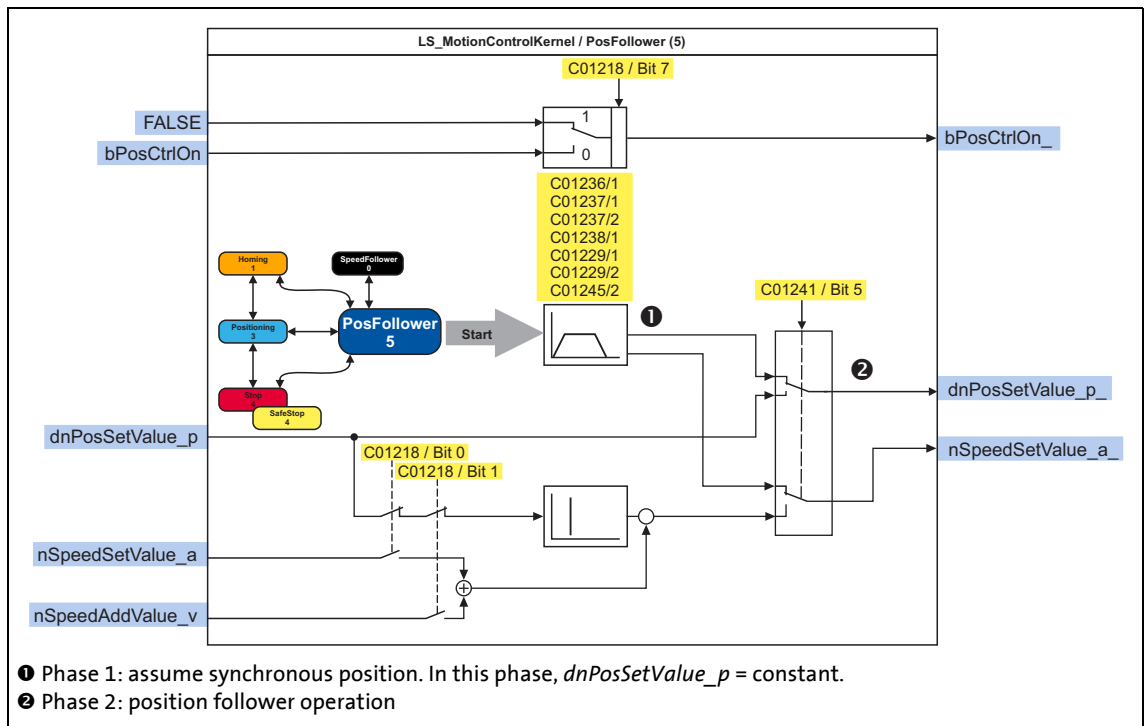
8.10 Position follower

In the "Position follower" operating mode, first one of the two drives covers a distance Δs (or an angle $\Delta\alpha$) to the synchronous position ❶.

At the time ❷, both drives follow a position setpoint with synchronous speed:



Signal flow



[8-35] Signal flow - position follower

8 Basic drive functions (MCK)

8.10 Position follower

8.10.1 Parameter setting

Short overview of parameters for "position follower" operating mode:

Parameters	Info	Lenze setting	
		Value	Unit
C01218	MCK: PosFollower setting	Bit coded	
C01236/1	PosFollower: Sync. speed	360.0000	units/s
C01237/1	Pos follower: Sync. accel.	720.0000	units/s ²
C01237/2	Pos follower: Sync. decel.	720.0000	units/s ²
C01238/1	Pos follower: Sync. S-ramp time	0.000	s

8.10.1.1 Functional settings

In [C01218](#), various functional settings for the position follower can be made in bit-coded form.

Function	Lenze setting
Bit 0 Speed FF control.: <i>nSpeedSetValue_a</i>	Off
Bit 1 Speed FF control: <i>nSpeedAddValue_v</i>	Off
Bit 2 HW limit switch on	On
Bit 3 SW limit switch on	On
Bit 4 Reserved	Off
Bit 5 Reserved	Off
Bit 6 Reserved	Off
Bit 7 Position controller off	Off

Speed feedforward control by means of *nSpeedSetValue_a*

If this function has been activated by means of bit 0 in [C01218](#), the main setpoint *nSpeedSetValue_a* is used as the speed feedforward control value.

Speed feedforward control by means of *nSpeedAddValue_v*

If this function has been activated by means of bit 1 in [C01218](#), the additive speed value *nSpeedAddValue_v* is used as the speed feedforward control value.

HW limit switch on

If this function has been activated by means of bit 2 in [C01218](#), travel range monitoring by means of hardware limit switches is active in this mode.

▶ [Limit position monitoring](#) (□ 504)

SW limit switch on

If this function has been activated by means of bit 3 in [C01218](#), travel range monitoring by means of parameterised software limit positions is active in this mode.

▶ [Limit position monitoring](#) (□ 504)

Position controller off

If this function is activated via bit 7 in [C01218](#), the position controller is deactivated in this operating mode. Hence, following error control is switched-off.

8 Basic drive functions (MCK)

8.10 Position follower

8.10.2 Requesting the operating mode

Requesting the "position follower" operating mode by means of the [MCK control word](#):

MCK control word						
Bit 31	...	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			OpMode_Bit3	OpMode_Bit2	OpMode_Bit1	OpMode_Bit0
X	...	X	0	1	0	1

X = Status not significant

If the **MCKInterface** is connected upstream to the **Motion Control Kernel** and if the operating mode is requested at the [L_MckCtrlInterface](#) FB, the *wOperationMode* and *bOperationMode_1...8* process inputs are available.

8.10.3 Setpoint selection

The absolute position setpoint is stipulated via the *dnPosSetValue_p* process input.



Note!

The *bPosCtrlOn* process input must be set to TRUE so that position/angle control is active within motor control.

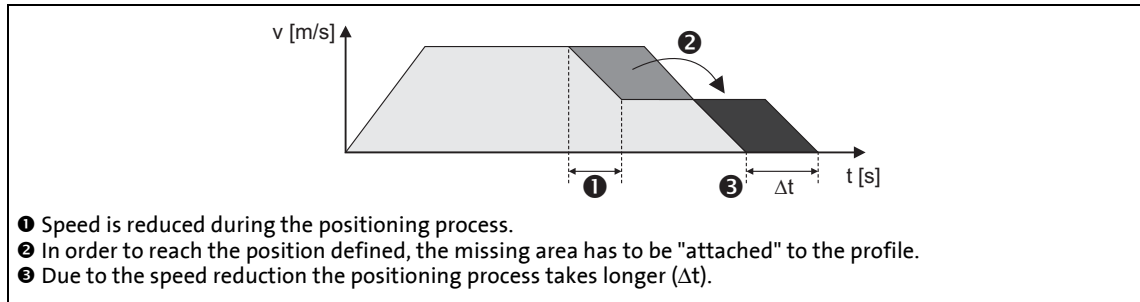
Compensating following errors

If the *bDeltaPosOn* process input is set to TRUE, a position difference (following error) is compensated for which is not internally generated from setpoint/actual positions but must be defined via the *dnDeltaPos_p* process input instead.

8.11 Override

An "Override" is the change of profile parameters and their acceptance during the positioning process.

- In this case the traversing profile has to be adapted accordingly, so that positioning is carried out exactly to the target position defined, even if for example a change in speed occurs during the positioning process ("Speed override"):



[8-36] Override (here: speed override)

- The override for speed, acceleration, and S-ramp time affects all motion profiles that are controlled by the internal profile generator:
 - Manual jog
 - Retracting from limit switches
 - Homing
 - Point-to-point positioning



Note!

The online change of speed and acceleration is in effect from the start of the profile until the deceleration phase begins. Changing the deceleration phase by means of an override is therefore not possible!

- In the case of an override value of 0 % for the speed, the drive is brought to a standstill.
- Set override value for the speed \leq speed limitation value ([C00909/x](#)). Otherwise a following error will be generated.
- In the case of an override value of 0 % for the acceleration, acceleration does not take place any longer.

The acceleration override also has the same effect on the deceleration ramp to the same extent specified, but only until the deceleration phase is initiated.

The override has no impact on:

- The "speed follower" operating mode
- Synchronising processes
- Setpoint controls via external setpoints
- Abort via input *bPosStop*
- Speed setpoint selection in case of error (e. g. "Fail-QSP")

8.11.1 Speed override

Activate override

If control bit 11 (*EnableSpeedOverride*) has been set to "1" in the [MCK control word](#), a speed override is carried out in accordance with the stipulated override value.

If the **Motion Control Kernel** is downstream from the **MCKInterface** in the circuit, the [L_MckCtrlInterface](#) provides the following process input for activating the speed override:

Designator	Data type	Information/possible settings
bEnableVelOverride	BOOL	Speed override
		TRUE Activate speed override

Stipulate override value

The override value is selected via the *nSpeedOverride_a* input at the SB [LS_MotionControlKernel](#). The override value is a percentage of the speed of the current profile.

Designator	Data type	Information/possible settings
nSpeedOverride_a	INT	Value for speed override <ul style="list-style-type: none"> • Percentage multiplier (0 ... 199.99 %) for the currently active speed. • 16384 ≙ 100 % of the maximum traversing speed (display in C01211/1). • If the override value is 0 %, the drive is brought to a standstill.

Deactivate override

If control bit 11 (*EnableSpeedOverride*) is reset to "0", travelling takes place at the speeds that have been specified by means of the profile parameters. Acceleration/deceleration from the speed defined with override to the speed set in the profile takes places immediately in this case.

Deactivating the override within the braking/deceleration ramp does not have any effect.

8.11.2 Acceleration override

Activate override

If control bit 12 (*EnableAccOverride*) in the [MCK control word](#) has been set to "1", an acceleration override takes place in accordance with the stipulated override value.

If the **Motion Control Kernel** is downstream from the **MCKInterface** in the circuit, the [L_MckCtrlInterface](#) FB provides the following process input for activating the acceleration override:

Designator	Data type	Information/possible settings
bEnableAccOverride	BOOL	Acceleration override
		TRUE Activate acceleration override

Stipulate override value

The override value is stipulated via the *nAccOverride_a* input at the [LS MotionControlKernel](#) SB. The override value is a percentage of the maximum acceleration that has been set for the respective operating mode (referencing, manual jog, positioning etc.) in the corresponding profile parameter.

The acceleration override results in a deceleration override. Both ramps are evaluated by multiplication by the acceleration override until the deceleration process sets in.

Designator	Data type	Information/possible settings
nAccOverride_a	INT	Value for acceleration override <ul style="list-style-type: none"> • Percentage multiplier (0 ... 199.99 %) for the currently active acceleration. • 16384 ≙ 100 % of the parameterised acceleration of the corresponding operating mode. • If the override value is 0 %, acceleration ceases.

Deactivate override

If control bit 12 (*EnableAccOverride*) is reset to "0", travelling takes place at the acceleration rates specified by means of the profile parameters. "Ramping up" from the acceleration defined with override to the acceleration set in the profile takes place immediately in this case.

8.11.3 S-ramp smoothing override

Activate override

If control bit 13 (*EnableSRampOverride*) in the [MCK control word](#) is set to "1", S-ramp smoothing override is executed according to the selected override value.

If the **Motion Control Kernel** is downstream from the **MCKInterface** in the circuit, the [L_MckCtrlInterface](#) FB provides the following process input for activating the S-ramp smoothing override:

Designator	Data type	Information/possible settings
bEnableSRampOverride	BOOL	S-ramp smoothing override
		TRUE Activate S-ramp smoothing override

Stipulate override value

Optional stipulation of the override value is carried out via the *nSRampOverride_a* input at the [LS_MotionControlKernel](#) SB. The override value is a percentage of the S-ramp time set in the profile data.



Note!

If the *nSRampOverride_a* input remains unconnected or if an override value of "0 %" is selected, activation of the S-ramp override causes deactivation of the S-ramp time.

- Deactivation of the S-ramp time before the start of a profile with S-ramp time causes linear ramp generation.
- Deactivation of the S-ramp time during a traversing process, however, is not accepted immediately in the profile generator, but the profile generator checks automatically when an online change of the ramp form can be carried out and then initiates it automatically.



Tip!

Thus it is possible to start a travel profile with S-ramp time and then deactivate the S-ramp time, e.g. to traverse with a linear characteristic after reaching the profile speed.

Designator	Data type	Information/possible settings
nSRampOverride_a	INT	Value for S-ramp smoothing override <ul style="list-style-type: none"> • Percentage multiplier (0 ... 100 %) for the currently active acceleration. • 16384 ≙ 100 % of the parameterised S-ramp time (C01306/1...15). • Values > 16384 are ignored.

Deactivate override

If control bit 13 (*EnableSRampOverride*) is reset to "0", the S-ramp time specified by means of the profile parameters is used for profile generation.

8.12 Holding brake control

This basic function is used for low-wear control of a holding brake.



Danger!

Please note that the holding brake is an important element of the safety concept of the machine as a whole.

Thus, proceed very carefully when commissioning this system part!



Stop!

Holding brakes on Lenze motors are not intended for braking during operation. The increased wear caused by braking during operation can destroy the motor holding brake!



Note!

- **Deactivate automatic DC-injection braking when a holding brake is used!**
 - For this purpose, go to [C00019](#) and set the [Auto DCB](#) threshold to "0".
 - Background: Controller inhibit is already activated by the holding brake control.
- If an electrically holding (self-releasing) brake is to be controlled instead of an electrically released (self-holding) brake, the trigger signal must be inverted!
 - ▶ [Functional settings](#) (□ 577)
- Detailed information on mounting and electrical installation of the motor holding brake can be found in the documentation on the motor holding brake.

Intended use

Motor holding brakes are used to lock axes if the controller is inhibited or in case of "mains off" system status. This is not only important for vertical axes but also for e.g. horizontal axes which may cause various problems if the motion is not controlled.

Examples:

- Loss of the reference information after mains OFF and further spinning of the drive.
- Collision with other moving machine parts.

8.12.1 Internal interfaces

In the function block editor, the [LS MotionControlKernel](#) system block provides the following internal interfaces for the basic function "holding brake control":

Inputs

Designator	Data type	Information/possible settings				
bMBrakeRelease	BOOL	Releasing/applying the brake in connection with the selected operating mode <table border="1"> <tr> <td>FALSE</td> <td>Apply brake. <ul style="list-style-type: none"> During automatic operation, the internal brake logic controls the brake. </td> </tr> <tr> <td>TRUE</td> <td>Release brake manually (forced release). <ul style="list-style-type: none"> Note! The brake can also be released when the controller is inhibited! During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. In semi-automatic operation, the brake is released including feedforward control. </td> </tr> </table>	FALSE	Apply brake. <ul style="list-style-type: none"> During automatic operation, the internal brake logic controls the brake. 	TRUE	Release brake manually (forced release). <ul style="list-style-type: none"> Note! The brake can also be released when the controller is inhibited! During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. In semi-automatic operation, the brake is released including feedforward control.
FALSE	Apply brake. <ul style="list-style-type: none"> During automatic operation, the internal brake logic controls the brake. 					
TRUE	Release brake manually (forced release). <ul style="list-style-type: none"> Note! The brake can also be released when the controller is inhibited! During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. In semi-automatic operation, the brake is released including feedforward control. 					
bMBrakeStartValue2 <small>(from version 06.00.00)</small>	BOOL	Selection of the torque feedforward control value ▶ Feedforward control of the motor before release <table border="1"> <tr> <td>FALSE</td> <td>Starting value 1 is active (see the following figure).</td> </tr> <tr> <td>TRUE</td> <td>Starting value 2 is active (see the following figure).</td> </tr> </table> <p>Creation of the feedforward control value for the release process of the brake:</p> <p> [A] Signal path for motor control <u>with</u> feedback [B] Signal path for motor control <u>without</u> feedback [C] Feedforward control value </p> <p> 1 C02581/1: Switching threshold 2 C02581/2: Hysteresis for release 3 C02581/3: Hysteresis for application 4 C02581/4: Starting value 1 for manual feedforward control 5 C02581/5: Starting value 2 for manual feedforward control 6 C02582/Bit 4: Selection of the feedforward control value (automatic/manual selection) </p>	FALSE	Starting value 1 is active (see the following figure).	TRUE	Starting value 2 is active (see the following figure).
FALSE	Starting value 1 is active (see the following figure).					
TRUE	Starting value 2 is active (see the following figure).					
nMBrakeAddValue_a <small>(from version 06.00.00)</small>	INT	Additive feedforward control value (speed or torque) in [%] for torque feedforward control when the respective control mode is started <ul style="list-style-type: none"> For speed control: 100 % ≙ reference speed (C00011) For torque control: 100 % ≙ maximum torque (C00057) ▶ Feedforward control of the motor before release				

8 Basic drive functions (MCK)

8.12 Holding brake control

Designator	Data type	Information/possible settings
bMBrakeApplied <small>(from version 06.00.00)</small>	BOOL	Input for status detection via switching contacts at the brake • Only effective if bit 5 in C02582 is set to "1".
		FALSE Brake is released.
		TRUE Brake is applied.

Outputs

Designator	Data type	Value/meaning
bMBrakeReleaseOut	BOOL	Trigger signal for switching element holding brake control via a digital output • Use bit 0 under C02582 to activate inverted switching element triggering. ▶ Functional settings
		FALSE Apply brake.
		TRUE Release brake.
bMBrakeReleased	BOOL	"Brake released" status signal considering the brake release time • When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed!
		TRUE Brake released (after the brake release time has expired).



Stop!

The digital outputs are not suitable for the "direct" control of a holding brake!

- Connect the digital output connected to the trigger signal *bMBrakeReleaseOut* with a relay or power contactor which switches the brake supply.
- When a power contactor is used, the response and release time of the earth contact is added to the response and release time of the brake. Both times must also be considered for parameterising the closing and opening time of the holding brake

8.12.2 Parameter setting



Danger!

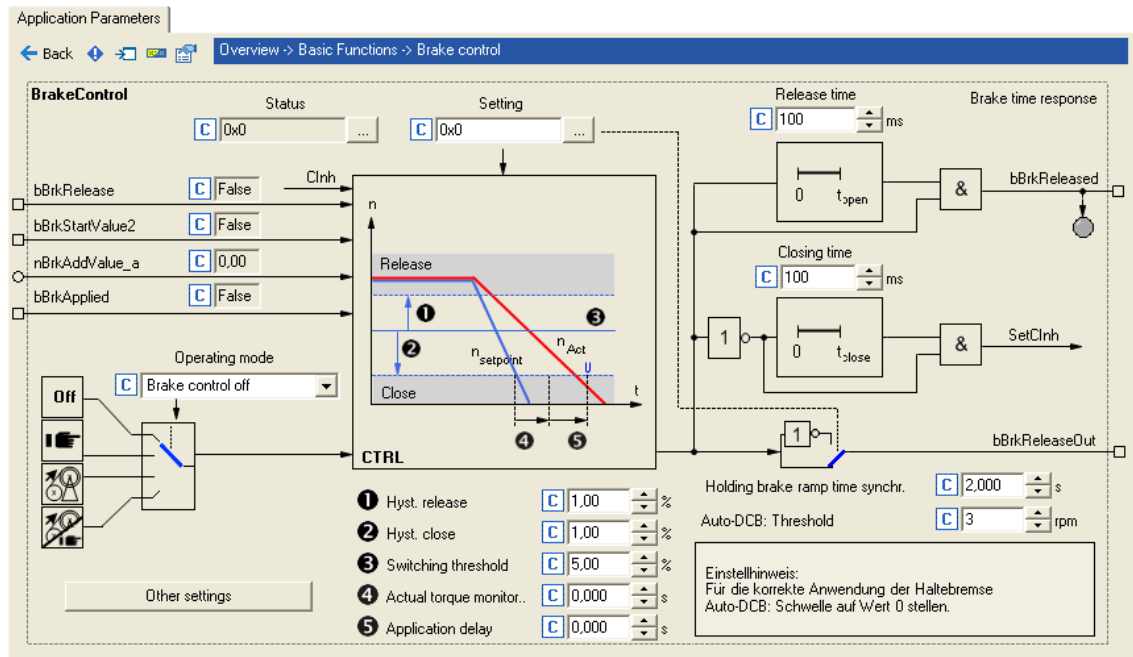
A faultless holding brake control function requires a correct setting of the different deceleration times in the following parameters!

A wrong setting of the delay times can cause a faulty control of the brake!



How to go to the parameterisation dialog of the holding brake control:

1. »Engineer« Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the "**Basic functions**" button.
4. Go to the *Overview* → *Basic functions* dialog box and click the **Holding brake control** button.



Short overview of parameters for holding brake control:

Parameters	Info	Lenze setting	
		Value	Unit
C02580	Holding brake: Operating mode	0: Brake control off	
C02581/1	Holding brake: Switching threshold	5.00	%
C02581/2	Holding brake: Hyst. release	1.00	%
C02581/3	Holding brake: Hyst. close	1.00	%
C02581/4	Holding brake: FF control starting value 1	0	%
C02581/5	Holding brake: FF control starting value 2	0	%
C02582	Holding brake: Setting	0	

Greyed out = display parameter

8 Basic drive functions (MCK)

8.12 Holding brake control

Parameters	Info	Lenze setting	
		Value	Unit
C02589/1	Holding brake: Closing time	100	ms
C02589/2	Holding brake: Release time	100	ms
C02589/3	Holding brake: Waiting time status	100	ms
C02589/4	Holding brake: Ramp FF control	0	ms
C02593/1	Holding brake: Actual value monitoring	0.000	ms
C02593/2	Holding brake: Application delay	0.000	ms
C02610/1	MCK: Holding brake ramp time synchr.	2.000	s
C02607	Holding brake: Status	-	
C00830/68	MCK: nMBrakeAddValue_a	-	%
C00833/80	MCK: bMBrakeRelease	-	
C00833/81	MCK: bMBrakeStartValue2	-	
C00833/82	MCK: bMBrakeApplied	-	
Greyed out = display parameter			

8.12.2.1 Operating mode

For different applications and tasks, different operating modes are available in [C02580](#). The selected operating mode determines whether the holding brake control is used and how the holding brake will be switched.

Mode 0: Brake control off

In this mode, brake control is switched off (not active).

- The *bMBrakeReleaseOut* trigger signal for the holding brake control switching element is set to FALSE.
- The *bMBrakeReleased* status signal is set to FALSE.



Note!

In the Lenze setting, the mode 0 is preset to get into a safe state after the mains is switched on.

Mode 11: Manual control

In this mode, brake release and brake application can be directly controlled via the *bMBrakeRelease* input without special logic or automatic.

- Setting pulse inhibit or controller inhibit has no influence on the *bMBrakeReleaseOut* trigger signal for the holding brake control switching element.
- After the brake has been activated and the brake application time has expired, the controller is inhibited automatically by the basic "Holding brake control" function.



Tip!

You can use mode 11 to easily check if the brake switches correctly.

Mode 12: Automatic control

In this mode, the brake is controlled automatically.

**Danger!**

In this mode, the input *bMBrakeRelease* should be permanently set to FALSE unless manual release (supervisor operation) is required.

If the *bMBrakeRelease* input is set to TRUE, the brake is released immediately, even if the controller is inhibited!

- If the requested speed setpoint reaches a parameterisable upper speed threshold that allows traversing of the drive, the brake will be released and operation enabled.
- On the other hand, if speed setpoint and actual speed fall below a parameterisable lower speed threshold, the brake will be applied under consideration of different time parameters.
- For operating modes with setpoint request via control signal (e.g. "PosExecute" in the [Positioning](#) operating mode), the speed thresholds do not apply. Here the control logic opens and closes the holding brake through internal commands in the **Motion Control Kernel**.
- The brake will also be activated automatically if quick stop is activated in the drive, e.g. by a device command or as response to an error, and in the event of controller inhibit or pulse inhibit.
- After automatic brake activation and expiration of the brake application time, the controller is inhibited automatically by the basic "Holding brake control" function.

**Tip!**

The 2/12 mode is the usual mode to control the brake.

Mode 13: Semi-automatic control

From version 06.00.00

In this mode, brake release and brake application can be directly controlled via the *bMBrakeRelease* input without special logic or automatic.

In contrast to the manual operation (mode 11)

- the feedforward control is active in this mode, preventing a sagging e.g. in case of a hoist.
- the brake in this mode also closes when the controller is inhibited in order to prevent the axis in a hoist from falling.

Related topics:

- ▶ [TroubleQSP](#) (📖 119)
- ▶ [Behaviour in case of pulse inhibit](#) (📖 586)

8.12.2.2 Functional settings

The following bit coded functional settings for the holding brake control can be made in [C02582](#):

Bit	Option	Info
Bit 0	bMBrakeReleaseOut invert.	Activation of inverted control <ul style="list-style-type: none"> "1" ≡ Inverted logic of the trigger signal for the holding brake control switching element
Bit 1	Horizontal brake protection	Brake response in case of pulse inhibit <ul style="list-style-type: none"> "1" ≡ In the case of a pulse inhibit, the actual speed value is monitored which must reach the "Close" threshold value to cause the holding brake to be applied. Note: <ul style="list-style-type: none"> This function is only active if bit 3 (horizontal/winding technology) is set as well. The function is used in order that, when the controller is inhibited, the holding brake of a drive with horizontal traverse path does not wear out during rotation. With vertical motion (bit 3 = 0), this function is not active. Especially with hoists and activated pulse inhibit of the inverter, an immediate application of the brake is essential for safety-related reasons!
Bit 2	with hoist inv. feedfwd. control	Direction of feedforward control with vertical/hoist technology: <ul style="list-style-type: none"> "0" ≡ Positive direction "1" ≡ Negative direction Note: Reversal (Ccw) is then considered.
Bit 3	Horizontal application	Direction of movement of the axis <ul style="list-style-type: none"> "0" ≡ The axis performs vertical movements. Gravitational acceleration causes movements. "1" ≡ The direction of the axis is horizontal or rotary. The gravitational acceleration does not cause any movement. If C002868/1 : Bit 7 is set to 1, the holding brake is released without injecting a feedforward control torque or frequency.
Bit 4	Feedforward control C2581 <small>(from version 06.00.00)</small>	Selection of the feedforward control value <ul style="list-style-type: none"> "0" ≡ Automatic selection. <ul style="list-style-type: none"> The torque saved at the last stop is used. "1" ≡ Manual selection. <ul style="list-style-type: none"> bMBrakeStartValue2 = FALSE: The feedforward control value 1 set in C02581/4 is used. bMBrakeStartValue2 = TRUE: The feedforward control value set in C02581/5 is used.
Bit 5	Feedback monitoring <small>(from version 06.00.00)</small>	Activation of status monitoring <ul style="list-style-type: none"> "1" ≡ The bMBrakeApplied input for status detection of the brake (via a switching contact at the brake) is monitored after the waiting time set in C02589/3 has expired.
Bit 6	Sync ramp L_NSet_1 <small>(from version 12.00.00)</small>	Selection of the ramp time for the synchronisation process to setpoint speed after the brake opening time has elapsed Revised behaviour from version 12.00.00: <ul style="list-style-type: none"> "1" ≡ The ramp time of the effective acceleration of the ramp function generator (L_NSet_1) is used (Lenze setting). "0" ≡ As before, the ramp time set in C02610/1 is used. Note: The changeover can be dynamically both via the ramp parameter and via bit 6.
Bit 7	Reserved	

8 Basic drive functions (MCK)

8.12 Holding brake control

Related topics:

- ▶ [Behaviour in case of pulse inhibit](#) (📖 586)
- ▶ [Feedforward control of the motor before release](#) (📖 587)

8.12.2.3 Switching thresholds



Stop!

Do not set the lower speed threshold for closing the brake too high to prevent excessive wear of the brake!



Note!

When comparing speeds, only the absolute value of the motor speed and not the direction of rotation is considered.

Upper speed threshold for brake release:

Switching threshold ([C02581/1](#)) + hysteresis for release ([C02581/2](#))

Lower speed threshold for brake application:

Switching threshold ([C02581/1](#)) - hysteresis for application ([C02581/3](#))



Tip!

The lower speed threshold for brake application should be set to approximately 5 ... 20 % of the maximum speed to minimise the wear of the brake and provide for an optimum brake reaction by a low grinding of the brake.

Related topics:

- ▶ [Process when brake is released](#) (📖 583)
- ▶ [Process when brake is closed](#) (📖 584)

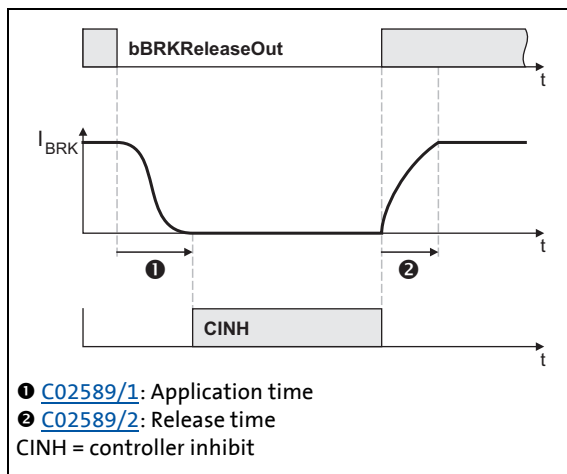
8.12.2.4 Application and release time



Danger!

A wrong setting of the application and release time can cause a faulty control of the brake!

- If the application time is set too low, the controller is inhibited and the drive becomes torqueless before the brake is applied completely.



- Every mechanical holding brake comes with a construction-conditioned application and release time which must be considered by the holding brake control and is set in [C02589](#).
- The application and release time of the Lenze holding brake is indicated in the supplied operating instructions in the "Technical data" chapter.
- If the application and release times are too long, this is uncritical in respect of safety but leads to unnecessarily long delays during cyclical braking processes.

[8-37] Definition of the application and release time with the example of the PM brake



Tip!

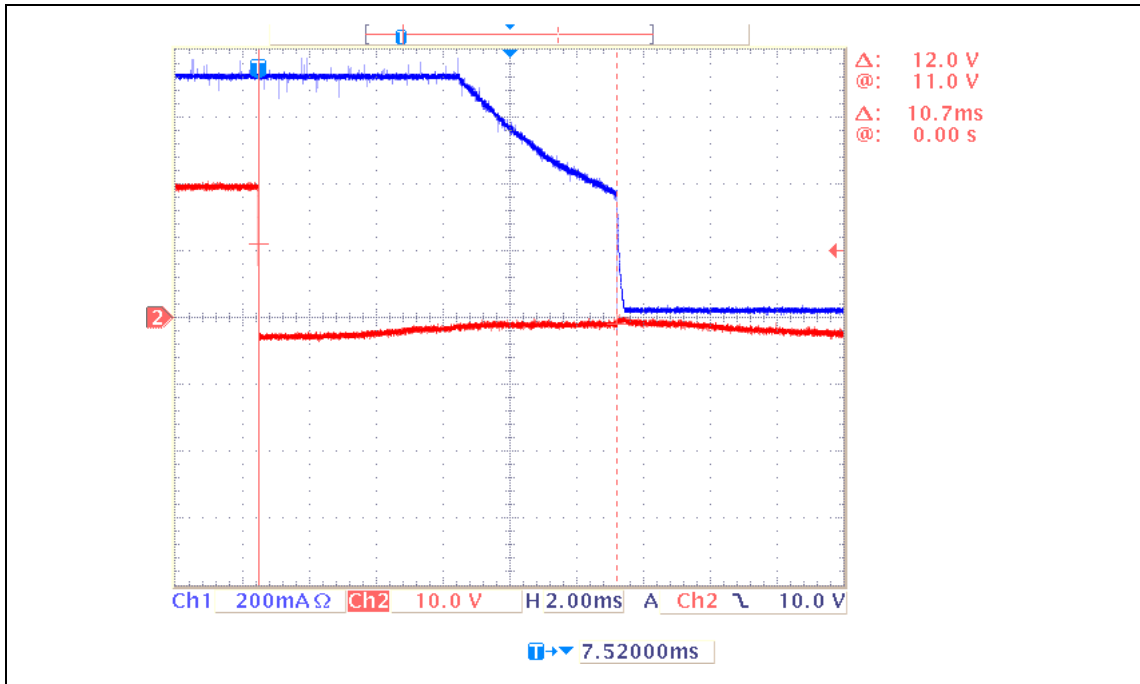
The application and release times do not only vary between the brake types but also depend on the basic conditions in the plant:

- Parameters of the hardware (cable length, temperature, level of supply voltage etc.)
- Contact elements used (brake module or contactor at the digital output)
- Type of overvoltage limitation/suppressor circuit

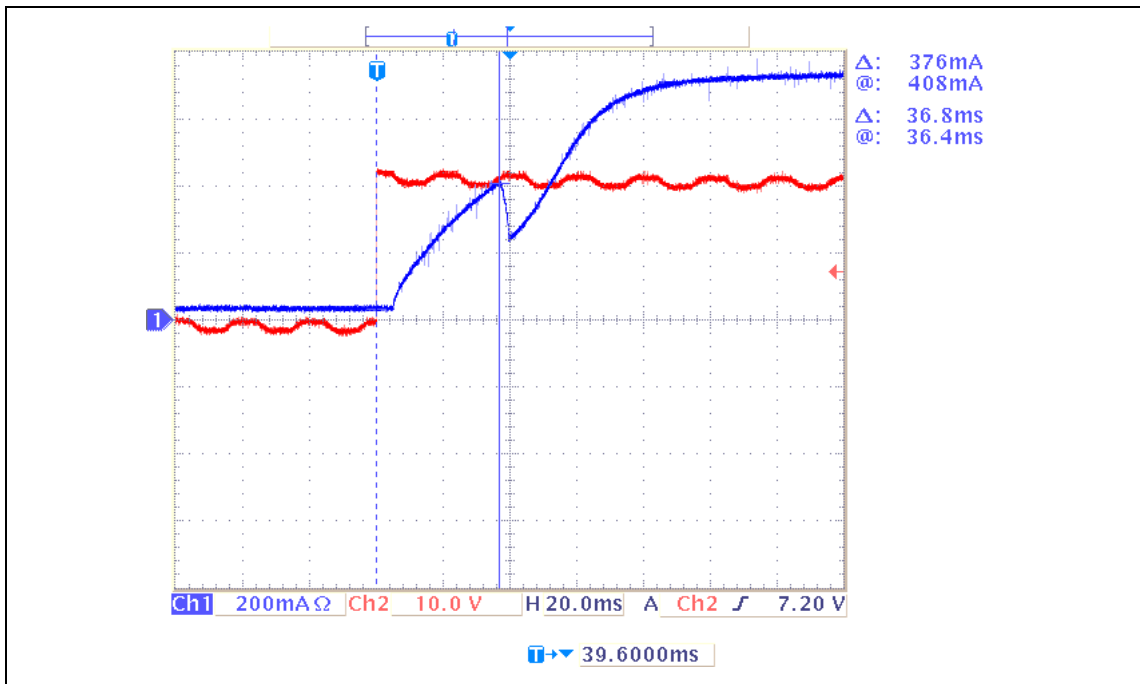
For optimisation purposes, detect in individual cases the response times by measurement.

8 Basic drive functions (MCK)

8.12 Holding brake control



[8-38] Oscillogram 1: Current characteristic for the application of a mechanical holding brake (application time: 10.7 ms)



[8-39] Oscillogram 2: Current characteristic for the release of a mechanical holding brake (release time: 36.8 ms)

Related topics:

- ▶ [Process when brake is released](#) (□ 583)
- ▶ [Process when brake is closed](#) (□ 584)

8.12.2.5 Ramp time for approaching the setpoint speed

For the "[Speed follower](#)" operating mode, a ramp time can be set in [C02610/1](#) if the setpoint is already out of reach while the holding brake is initiating the feedforward control process.



Note!

The "[Homing](#)", "[Manual jog](#)", and "[Positioning](#)" operating modes are based on a different control/release process of the holding brake. In these operating modes, the [C02610/1](#) setting parameter does not have any effect!

Example :

A setpoint of 90 % is selected via the ramp function generator while the brake is applied (controller is inhibited).

1. At the set ramp (in most cases [C00012](#)), the ramp function generator ramps up to 90 %.
2. The brake identifies the setpoint selection of 5 % (release switching threshold). The feedforward control of the brake provides 3 % of the setpoint and will not report the release of the brake after approx. 1 s has expired.

Conclusion: 90 % of the selected setpoint is already ramped up while the brake is only providing 3 % of the setpoint via the feedforward control.

Since at this point a step change from 3 % to 90 % may cause mechanical jerks, the setpoint is ramped up from 3 % to 90 %, using the ramp time set in [C02610/1](#) (Lenze setting: 2 s).

Our example is based on the V/f characteristic control (VFCplus) operating mode since the servo control (SC) operating mode does not use the switching threshold for the application of the holding brake for speed feedforward control. However, ramping up to a setpoint that is out of reach is carried out for all motor control operating modes because there is always a mechanical/electric delay when controlling a holding brake.

This delay is due to:

- Motor magnetisation (in the case of servo control only)
- Mechanical delay of all switching elements connected upstream to the holding brake
- Mechanical delay of the holding brake itself
- Generation of the holding torque by the motor

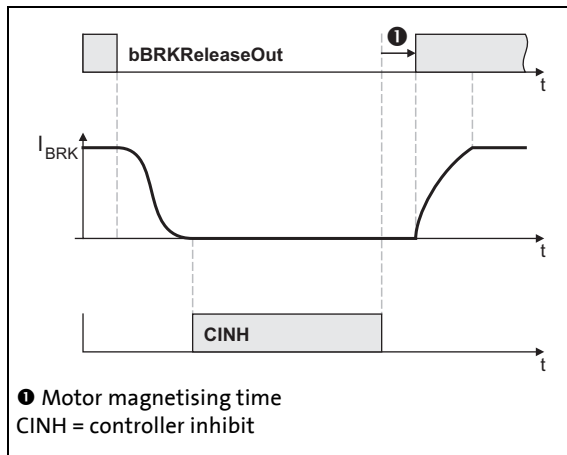
Related topics:

- ▶ [Process when brake is released](#) (📖 583)

8 Basic drive functions (MCK)

8.12 Holding brake control

8.12.2.6 Motor magnetising time (only with asynchronous motor)



[8-40] Considering the motor magnetising time taking the PM brake as an example

- When an asynchronous motor is used, first the magnetic field required for the holding torque is created (which is already available when a synchronous motor is used) after the controller inhibit is deactivated.
- The motor is internally magnetised through internal feedforward control of the lower speed threshold. The release time set in [C02589/2](#) is considered here.

Related topics:

▶ [Process when brake is released](#) (📖 583)

8.12.2.7 Actual value monitoring

If an actual value monitoring time > 0 s is selected in [C02593/1](#), the actual speed time monitoring is active.

- The monitoring time starts when the speed setpoint has reached the lower switching threshold and the actual speed is still above this threshold. (see illustration [\[8-43\]](#) in chapter "[Process when brake is closed](#)".)
- If the actual speed is still above the threshold when the monitoring time has expired, the brake will be automatically applied in the automatic brake control mode (mode 12).



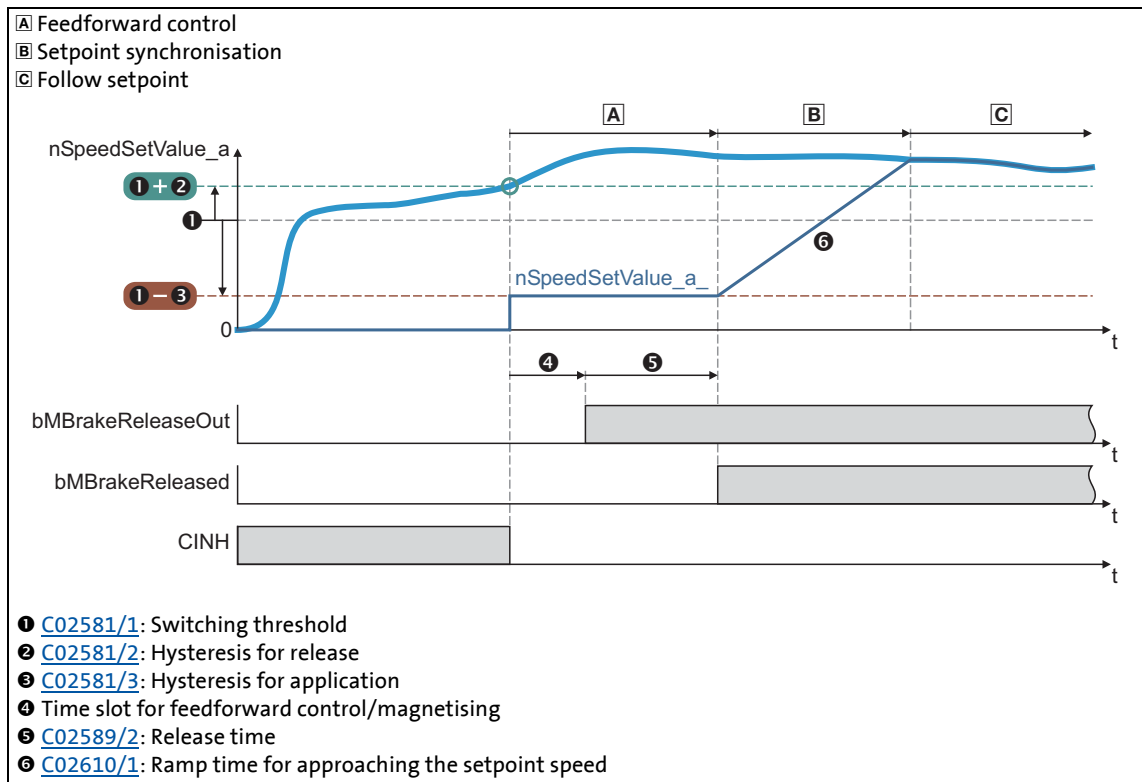
Note!

In the Lenze setting, the actual speed time monitoring is deactivated ([C02593/1](#) = "0 s"), i.e. the brake will only be applied when the actual speed has reached the lower switching threshold.

8.12.3 Process when brake is released

1. The controller inhibit is deactivated.
2. The magnetic field required for the holding torque is created in the motor (is already available when a synchronous machine is used).
3. The *bMBrakeReleaseOut* trigger signal for holding brake switching element is set to TRUE for releasing the brake.
4. After the brake opening time has elapsed:
 - The *bMBrakeReleased* status signal ("brake released") is set to TRUE.
 - In the "[Speed follower](#)" operating mode, the drive synchronises to the already accelerated speed setpoint.
 - In the operating modes with setpoint request via control signal (operating modes "[Homing](#)", "[Manual jog](#)" and "[Positioning](#)"), the ramping process starts after the brake release at 0.
5. After the waiting time set in [C02589/3](#) has additionally expired, the status monitoring starts again (if activated via bit 5 in [C02582](#)).

Time diagram



[8-41] Release holding brake in automatic mode via speed threshold

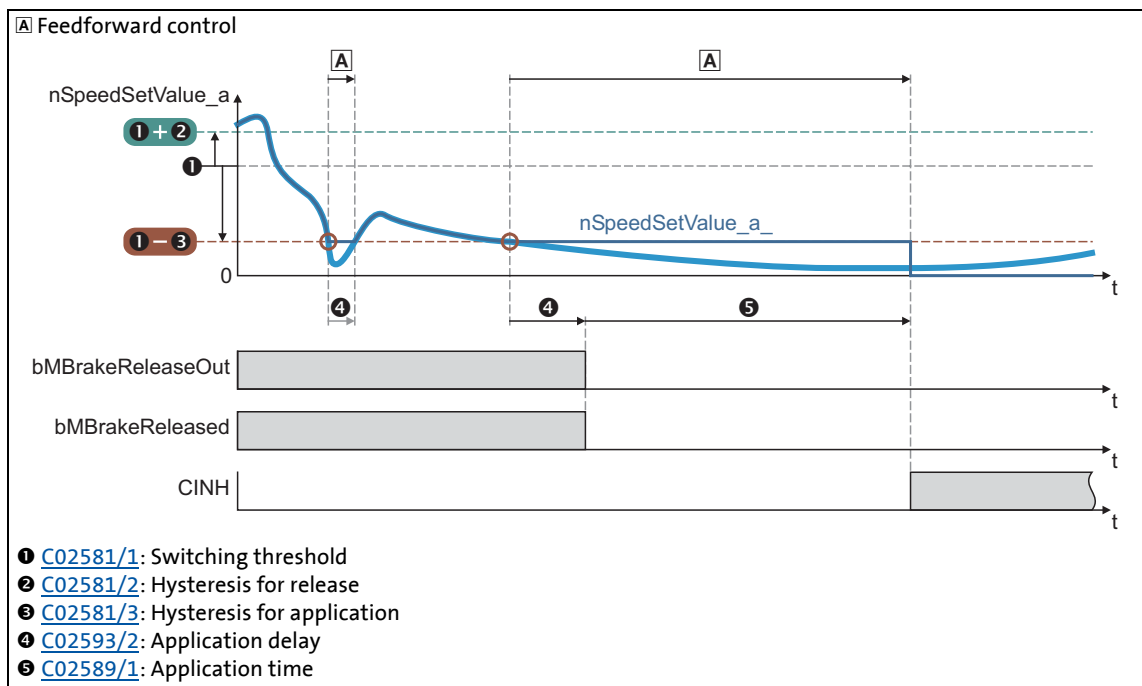
Related topics:

- ▶ [Feedforward control of the motor before release](#) (📖 587)

8.12.4 Process when brake is closed

1. The motor is decelerated when the setpoint is reduced by the user (e.g. turn down the potentiometer, setpoint selection via CAN).
 - The motor can also be decelerated by the "Quick stop" function or by "DC-injection braking", either directly requested by the user or as response to an error.
2. If the speed setpoint and the actual speed have fallen below the lower speed threshold or only the speed setpoint has fallen below the lower speed threshold and the actual value monitoring time has expired:
 - The *bMBrakeReleaseOut* trigger signal for the holding brake switching element is set to FALSE for closing the brake.
 - The *bMBrakeReleased* status signal is reset to FALSE.
 - In the operating modes with setpoint request via control signal (operating modes "[Homing](#)", "[Manual jog](#)" and "[Positioning](#)"), the brake closes depending on the internal state *bBusy* (setpoint generation through active profile generator) of the **Motion Control Kernel**.
 - The brake application time starts to expire.
3. After the brake application time has expired, the controller is inhibited.
4. After the waiting time set in [C02589/3](#) has additionally expired, the status monitoring starts again (if activated via bit 5 in [C02582](#)).
5. In order to prevent the drive from further rotating/accelerating in the event of an error of the feedback contact, controller inhibit is cancelled again and the drive is held at standstill in a speed-controlled manner.

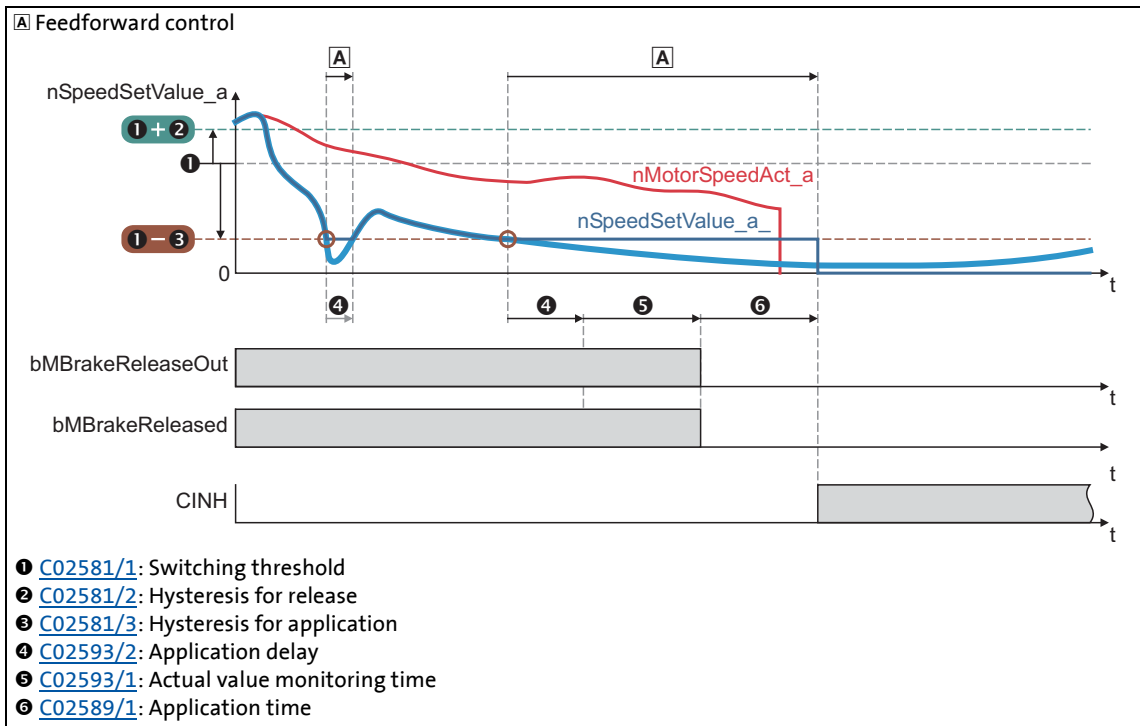
Time diagrams



[8-42] Close holding brake in automatic mode via speed threshold (actual value = setpoint)

8 Basic drive functions (MCK)

8.12 Holding brake control



[8-43] Close holding brake in automatic mode with actual value monitoring time ([C02593/1](#) > 0 s)

8.12.5 Behaviour in case of pulse inhibit

Setting the pulse inhibit causes a load-controlled coasting of the motor until the pulse is enabled again. In the enabled inverter, the pulse can be inhibited e.g. due to a DC overvoltage, DC undervoltage or the "Safe torque off" request.

The brake response to pulse inhibit can be parameterised under [C02582](#).



Stop!

For parameterising the response to pulse inhibit in [C02582](#), the energy conditions of the machine should be evaluated first.

The energy stored in the machine can be considerably higher than the permissible switching energy and thus lead to the destruction of the brake if applied directly!

Activate brake immediately when pulse is inhibited

If bit 1 is set to "0" in [C02582](#) (Lenze setting), the brake will be immediately applied when the pulse is inhibited to avoid damage to the mechanical components.

Especially in the case of hoist drives, immediate engagement of the brake is absolutely necessary for safety reasons if the pulse inhibit function of the inverter has been activated!



Danger!

This behaviour is valid in (semi) automatic operation when the *bMBrakeRelease* input is set to FALSE.

When the *bMBrakeRelease* input is set to TRUE (supervisor operation) in automatic mode, the brake is not applied at pulse inhibit!

Only activate brake below threshold for brake activation

If bit 1 and bit 3 are set to "1" in [C02582](#), the brake remains released until the lower speed threshold is reached to avoid an excessive wear of the brake.

- The braking action only takes place due to the friction in the load mechanics.
- The brake will not be applied until the motor speed has reached the threshold for brake activation. Hence, the function depends on the signal of the speed encoder.

During uncritical operation (horizontal loading condition), delayed brake application may be required to protect the brake in case of high centrifugal masses.

In case of vertical motion (bit 3 = 0), this function is not active due to safety-related reasons.

Related topics:

- ▶ [Functional settings](#) (📖 577)
- ▶ [Switching thresholds](#) (📖 578)

8.12.6 Feedforward control of the motor before release

The motor is precontrolled by selecting the lower speed threshold for applying the brake (control modes without feedback). When the upper speed threshold for brake release is reached, the motor is precontrolled with the for the release time set in [C02589](#) with the lower threshold value before the brake switches to the release mode.

Here, the direction of the feedforward control depends on two conditions:

1. On the settings selected under [C02582](#):
 - Bit 2 = feedforward control inverted (for vertical drives/hoists)
 - Bit 3 = direction of the axis
2. On the sign of the setpoint.

Truth table for the direction of the feedforward control

Setpoint	Direction	Feedforward control	Scheme	Direction	
				Feedforward control value	Start value
$n \geq 0$	vertical/hoist (C02582 : Bit 3 = 0)	not inverted (C02582 : Bit 2 = 0)		+	+
		inverted (C02582 : Bit 2 = 1)		-	+
$n < 0$		not inverted (C02582 : Bit 2 = 0)		+	-
		inverted (C02582 : Bit 2 = 1)		-	-
$n \geq 0$	horizontal/winding drive (C02582 : Bit 3 = 1)	Inversion via bit 2 with horizontal direction not effective		+	+
$n < 0$				-	-
$n \geq 0$	horizontal/winding drive (C02582 : Bit 3 = 1)	Release holding brake without injecting feedforward control torque or frequency C002868/1 : bit 7 = 1		0	+
$n < 0$				0	-



Note!

The effective direction of the torque when the drive is stopped also determines the direction of the feedforward control value. In case of emergency stop scenarios or mechanical blocking torques can be stored when the drive is stopped that act against the desired feedforward control direction. If such scenarios are not excluded in applications, you should not use the automatic storage of the holding torque.

- Alternatively use the manual selection ([C02582](#): bit 4 = 1).

Selection of the feedforward control value

From version 06.00.00 onwards, the feedforward control value can be selected via bit 4 in [C02582](#):

- Bit 4 = 0: Automatic selection
 - The torque saved at the last stop is used.
- Bit 4 = 1: Manual selection
 - *bMBrakeStartValue2* = FALSE: The feedforward control value 1 set in [C02581/4](#) is used.
 - *bMBrakeStartValue2* = TRUE: The feedforward control value set in [C02581/5](#) is used.

Additive torque

If the servo control (SC) operating mode has been selected, an additive torque value in [%] can be selected via the *nBrkTorqueAdd_a* input.

Related topics:

- ▶ [Functional settings](#) (📖 577)
- ▶ [Switching thresholds](#) (📖 578)

9 Diagnostics & error management

This chapter provides information on error handling, drive diagnostics, and fault analysis.

9.1 Basics on error handling in the inverter

Many of the functions integrated in the inverter can

- detect errors and thus protect the device from damage or overload, e.g. short-circuit detection, Ixt overload detection, overtemperature detection, etc.
- detect an operating error by the user, e.g. a missing memory module, a required or missing communication module, etc.
- output a warning signal if desired, e.g. if the speed is too high or too low, etc.

Depending on the importance, the error detection in the device responds very fast (e.g. short-circuit detection < 1 ms) or in a slower cycle (e.g. temperature monitoring approx. 100 ms).

All functions provided with an error detection (e.g. the motor control) supply information to a so-called error handler. The error handler is processed every 1 ms and evaluates all information.

In this evaluation, the so-called status determining error (display in [C00168](#)) and the current error (display in [C00170](#)) are generated, and the inverter is caused to take the respective error status (e.g. TroubleQSP).

These two types of error information serve to diagnose errors systematically and contain the following information:

1. The error type (e.g. "Warning")
2. The error subject area (e.g. "CAN generally integrated")
3. The error ID within the error subject area

Together all types of information form the real error number which is unique in the whole device system. ▶ [Structure of the 32-bit error number \(bit coding\)](#) (📖 617)

In addition to the control of the device status by the error handler, a logbook function records the errors and their histories. ▶ [Logbook](#) (📖 602)

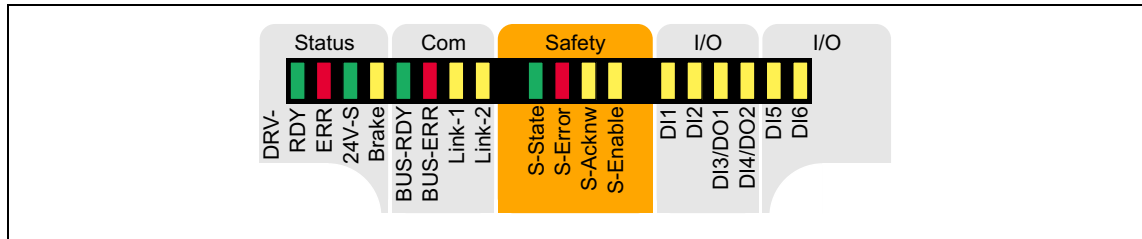


Tip!

For many device errors, the error type and hence the response of the inverter to the error can be parameterised. ▶ [Setting the error response](#) (📖 612)

9.2 LED status displays

Information on some operating statuses can quickly be obtained via LED displays:



[9-1] LED display on the inverter front panel

Labelling	Colour	Status	Description
DRV-RDY	green	On	Standard device ready for operation
DRV-ERR	red	On	Warning/trouble/fault
24V-S	green	On	24-V voltage available
Brake	Yellow	Off	Motor holding brake not triggered (applied)
		On	Motor holding brake triggered (released)
LED status displays for communication			
BUS-RDY	green	Off	Communication not initialised
		blinking	Communication has been established
		On	Communication has stopped
BUS-ERR	red	blinking	With PROFINET: Node detection
		Fast blinking	With PROFINET: Nodes not detected
		On	Communication error
Link-1 Link-2	Yellow	Off	Communication is not active
		blinking	Initialisation
		Fast blinking	With PROFINET: Communication is active, telegrams are sent.
LED status displays for integrated safety			
Note: The status of the safety option 10 is exclusively signalled via the "S-Enable" display.			
S-State	green	Off	Communication between Standard device and safety engineering is not possible
		blinking	Integrated safety is in service state
		On	Communication between standard device and safety system has been established
S-Error	red	Off	Error-free operation
		blinking	Integrated safety system is not supported by the standard device
		On	Warning/trouble/fault
S-Acknw	Yellow	On	Acknowledgement of a parameter set acceptance is required
S-Enable	Yellow	blinking	Safety function system active (unsafe display)
		On	Inverter is enabled

Labelling	Colour	Status	Description
LED status displays for I/O terminals			
DI1	Yellow	On	DI1 = HIGH
DI2	Yellow	On	DI2 = HIGH
DI3/DO1	Yellow	On	DI3/DO1 = HIGH
DI4/DO2	Yellow	On	DI4/DO2 = HIGH
DI5	Yellow	On	DI5 = HIGH
DI6	Yellow	On	DI6 = HIGH
















Related topics:

- ▶ [Device control \(DCTRL\)](#) (📖 97)
- ▶ [Device state machine and device states](#) (📖 111)
- ▶ [CANopen option](#) (📖 668)
- ▶ [PROFIBUS/PROFINET option](#) (📖 748)
- ▶ [Drive-based safety](#) (📖 757)
- ▶ [I/O terminals](#) (📖 331)

9.2.1 LED status displays of the device status

The control of the two LEDs "DRV-RDY" and "DRV-ERR" on the front of the inverter depends on the device status.

The meaning can be seen from the table below:

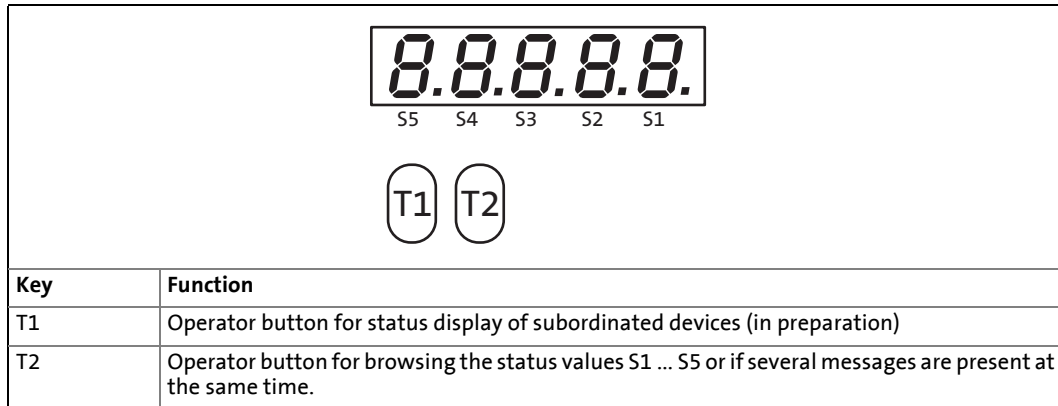
DRV-RDY	DRV-ERR	Description	Device status (Display in C00137)
OFF	OFF	OFF or initialisation active	Init
	OFF	Safe torque off is active	SafeTorqueOff
	OFF	Device is ready to start	ReadyToSwitchOn
	OFF	Device is switched on	SwitchedOn
	OFF	Motor data identification/operation	OperationEnabled
		The inverter is ready to switch on, switched on or the operation is enabled and a warning is indicated.	
		Fault active, quick stop	TroubleQSP
OFF		Trouble active	Trouble
OFF		Fault active	Fault
Legend			
Meaning of the symbols used to describe the LED states:			
	LED is flashing once approx. every 3 seconds (<i>slow flash</i>)		
	LED is flashing once approx. every 1.25 seconds (<i>flash</i>)		
	LED is flashing twice approx. every 1.25 seconds (<i>double flash</i>)		
	LED is blinking every second		
	LED is permanently on		

Related topics:

▶ [Device state machine and device states](#) (111)

9.3 Drive diagnostics via the integrated 7-segment display

The inverter comes with an integrated 7-segment display which can show 4 or 5 characters.



[9-2] 7-segment display, 5 characters (S1 S5)

The display has three different modes:

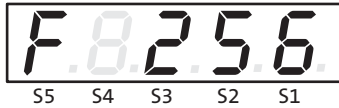
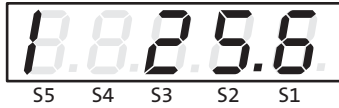



1. Automatic display
 - When the inverter is switched on, the parameter saved as status value 1 is displayed.
2. Manual operation display
 - For triggering the inverter in manual operation.
3. Message display
 - For errors or warnings.
 - This display has the highest priority and overrides the two other modes.

Detailed information on the different modes can be found in the following sections.

Automatic display

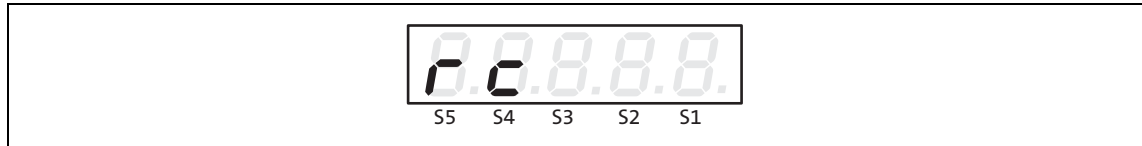
In this mode, five parameters can be displayed in a row.

- The selection key T1 serves to browse the parameters in ascending order. After the status value S5, it starts anew with status value S1.
- The parameters to be displayed as status values S1 ... S5 in the display can be configured using the »Engineer« (in preparation).
- In the Lenze setting, the following status values are displayed:

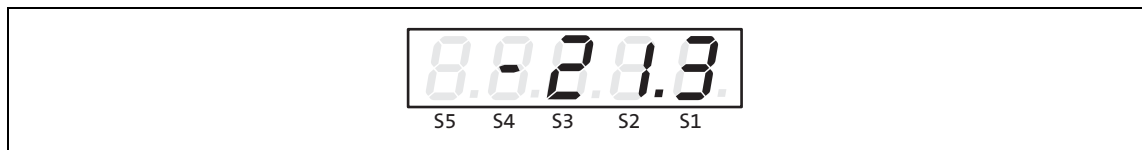
Status value	Example
S1: Motor output frequency in [Hz] <ul style="list-style-type: none"> • The output frequency is displayed as a function of the direction of rotation, i.e. in case of CCW rotation, a minus sign is displayed. • Display area: ± 999 Hz 	 <p>"F 256" = output frequency 256 Hz</p>
S2: Actual current value in [0.1 A]	 <p>"I 25.6" = actual current value 25.6 A</p>
S3: Device utilisation in [%]	 <p>"P 156" = Device utilisation 156 %</p>
S4: Motor voltage in [V]	 <p>"u 358" = Motor voltage 358 V</p>
S5: DC-bus voltage in [V]	 <p>"U 558" = DC-bus voltage 558 V</p>

Manual operation display (in preparation)

If the inverter is changed over to the manual operation mode using the operator button, "rc" is displayed (remote control):



- When it is changed over between CCW and CW rotation using the operator button, the output frequency of the motor in CW rotation is displayed without sign and in CCW rotation with minus sign.
 - Example: "-21.3" = motor rotates in CCW rotation with an output frequency of 21.3 Hz.

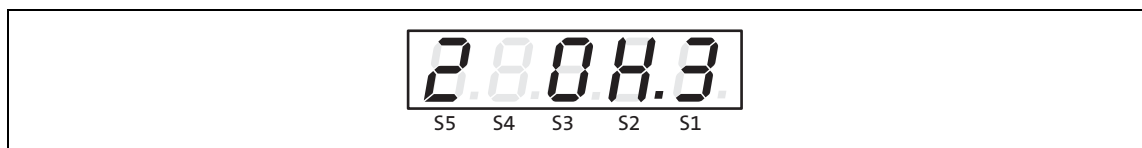
**Message display**

If warnings or errors exist, these are shown in blinking mode.

- If several errors exist, the active status determining error is displayed and all further errors will only be entered into the logbook.

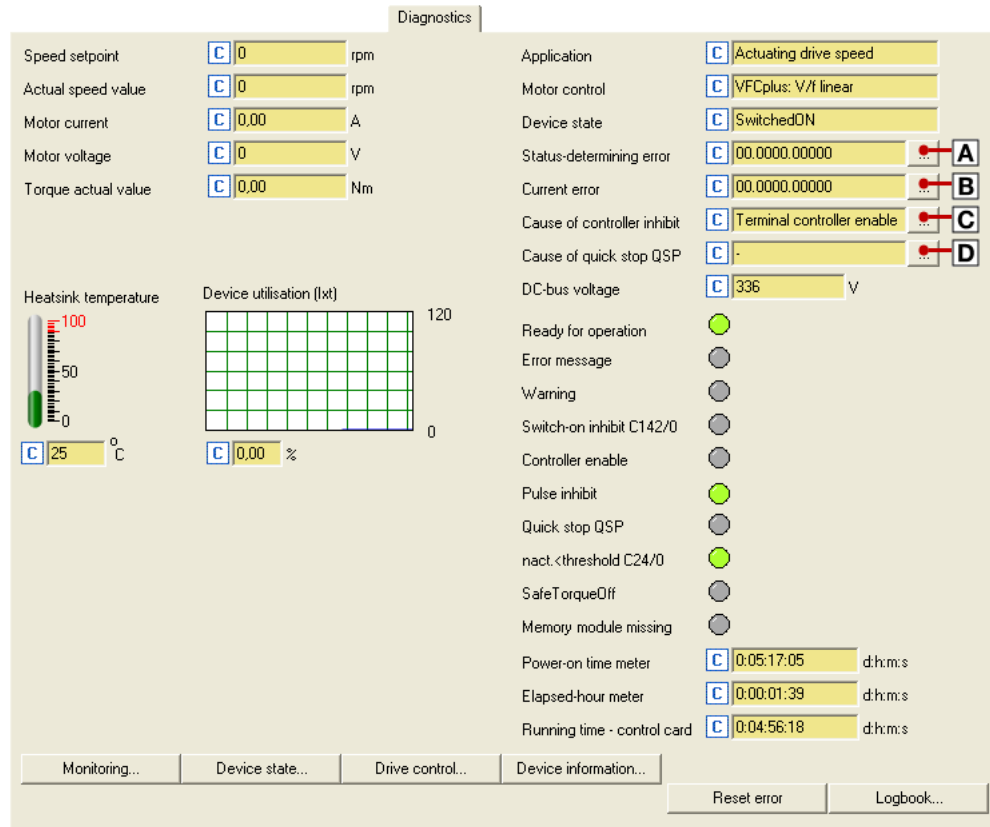
The messages are structured as follows:

- The character in position S5 indicates the device number if several subordinated device are connected to the inverter via the fieldbus interface, for example:
 - "1" = 8400 protec inverter (master)
 - "2" = 8400 protec inverter (slave 1 to node address 2)
 - "3" = 8400 protec inverter (slave 2 to node address 3), etc.
- The characters in positions S1 to S4 indicate the abbreviated warning or error. ▶ [Short overview \(A-Z\)](#) (□ 623)
- Example: "2 OH3" = In case of the device on node address 2, the warning "OH3: Motor temperature (X21) triggered" is active.




9.4 Drive diagnostics with the »Engineer«

When an online connection to the inverter has been established, the connected inverter can be diagnosed and relevant actual inverter states can be displayed in a clearly arranged visualisation using the »Engineer«:



Button	Function
	A Display details of the status determining error.
	B Display details of the current error.
	C Display all active sources of a controller inhibit.
	D Display all active sources of a quick stop.
Monitoring...	Configure the Monitoring. (↗ 610)
Device state...	Display the internal state machine including the current device status.
Drive control...	Display the bit assignment of the following control-related words: <ul style="list-style-type: none"> • MCI control word (C00136/1) • CAN control word (C00136/2) • Cause of controller inhibit (C00158) • Cause of quick stop (C00159) • Status word (C00150) • Status word 2 (C00155)
Device information...	Display identification data, e.g. firmware information or serial number of individual inverter components.
Resetting an error	Acknowledge error message (if the error cause has been eliminated).
Logbook...	Display the Logbook of the inverter. (↗ 602)

**How to diagnose a drive with the »Engineer«:**


1. Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Click the  icon or select the **Online→Go online** command to build up an online connection with the inverter.
3. Select the **Diagnostics** tab.
 - With an online connection, the **Diagnostics** tab displays current status information about the inverter.

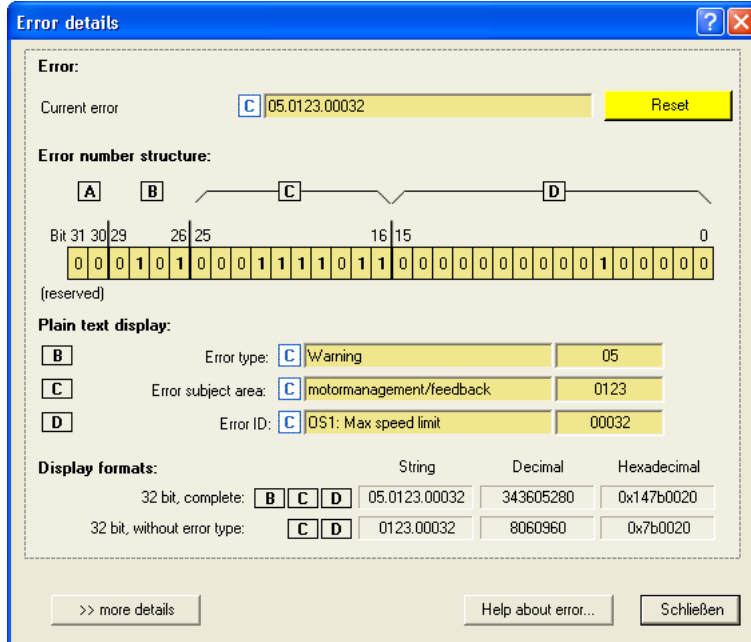
**Tip!**

The online connection to the inverter can be established via the following device interfaces:

- Diagnostic interface X70
- [CANopen option \(p 668\)](#)
- [PROFIBUS/PROFINET option \(p 748\)](#)

9.4.1 Display details of the error

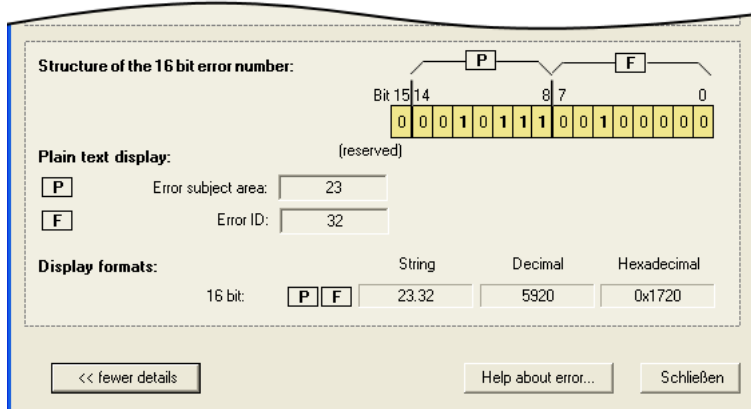
If you go to the **Diagnostics** tab and click the  button for the status determining or current error, the *Error details* dialog box displays further information on the error:



- Click the **Help about error...** button to open the online help with information on the error cause and possible remedies.

From version 06.00.00 / »Engineer V2.13« onwards:

- The **>> more details** button serves to provide more information about the structure of the 16-bit error number:

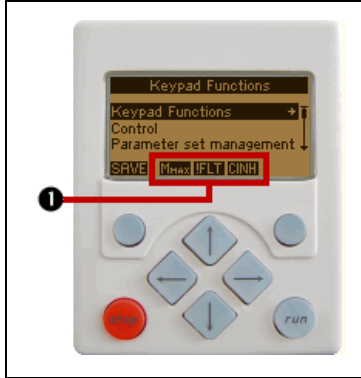


Related topics:

- ▶ [Structure of the 32-bit error number \(bit coding\)](#) (□ 617)
- ▶ [Structure of the 16 bit error number \(bit coding\)](#) (□ 620)

9.5 Drive diagnostics via keypad/bus system

Keypad display of the inverter status



- If the diagnosis terminal is connected to the diagnostic interface X70, the status of the inverter is shown via different icons on the LCD display in the area ❶.

Symbol	Meaning	Notes
RDY	Inverter is switched on.	▶ SwitchedOn (📖 117)
RUN	Inverter is enabled.	
STP	Application in the inverter is stopped.	
QSP	Quick stop active	
CINH	Inverter is inhibited.	The power outputs are inhibited.
OFF	Inverter is ready to start.	▶ ReadyToSwitchOn (📖 116)
Mmax	Speed controller 1 at the limit.	The drive is torque-controlled.
Imax	Set current limit has been exceeded in motor or generator mode.	
IMP	Pulse inhibit active	The power outputs are inhibited.
IFLT	Fault	▶ Fault (📖 121)
!TRB	Trouble	▶ Trouble (📖 120)
!Tosp	TroubleQSP	▶ TroubleQSP (📖 119)
WRN	Warning is active	

Display parameters

The parameters listed in the following tables serve to query current states and actual values of the inverter for diagnostic purposes, e.g. by using the keypad, a bus system or the »Engineer« (with an online connection to the inverter).

- These parameters are listed in the »Engineer« parameter list and the keypad in the **Diagnostics** category.
- A detailed description of these parameters can be found in the chapter "[Parameter reference](#)" (□ 779).

Parameters	Display
C00051	MCTRL: Actual speed value
C00052	Motor voltage
C00053	DC-bus voltage
C00054	Motor current
C00056/1	Torque demand
C00056/2	Actual torque value
C00058	Output frequency
C00061	Heatsink temperature
C00064/1	Device utilisation (lxt)
C00064/2	Device utilisation (lxt) 15s
C00064/3	Device utilisation (lxt) 3 min
C00133	Brake resistor utilisation
C00136/1	MCI control word
C00136/2	CAN control word
C00137	Device status
C00138/1	SYS control signals
C00138/2	MCK control signals
C00138/3	FWM control signals
C00150	Status word
C00158	Cause of controller inhibit
C00159	Cause of quick stop QSP
C00165/1	Status determining error (displayed as a numeric text)
C00165/2	Current error (displayed as a numeric text)
C00168	Status determining error (display of 32-bit number)
C00170	Current error
C00166/1	Error type, status determining
C00166/2	Error subject area, status determining
C00166/3	Error ID, status determining
C00166/4	Error type, current
C00166/5	Error subject area, current
C00166/6	Error ID, current
C00177/1	Switching cycles mains switching
C00177/2	Switching cycles output relay
C00177/3	Stress counter - short circuit
C00177/4	Stress counter - earth fault
C00177/5	Stress meter clamp

Parameters	Display
C00178	Time the inverter was enabled (elapsed-hour meter)
C00179	Power-up time (power-on time meter)
C00180/1	Runtime - control card
C00180/2	Running time - heatsink fan
C00180/3	Running time - internal fan

Identification data

The parameters listed in the following table belong to the **Identification** category of the »Engineer« parameter list and the keypad and serve to display the identification data of the inverter:

Parameters	Display
C00099	Firmware version (as a string)
C00199/1	Device name ▶ Automatic acceptance of the device name in the »Engineer«
C00200	Firmware product type
C00201/1...6	Firmware of the control card and the power section
C00203/1...9	Product type code of the individual device components
C00204/1...9	Serial numbers of the individual device components

9.6 Logbook

The integrated logbook function of the inverter chronologically logs important events within the system and plays an important role for troubleshooting and inverter diagnostics.

Events that can be logged

The following events can be logged in the logbook:

- [Error messages of the operating system](#) (📖 617)
- Error messages generated by the application (via [LS_SetError](#))
- Switching on/off of the inverter

Information saved

For each event, the following information is saved in the logbook:

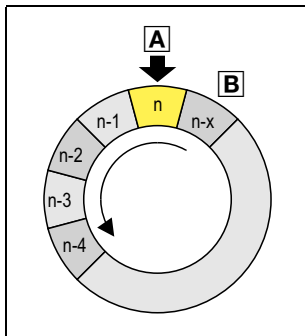
- Type of response to the event (e.g. fault, warning or information)
- Subject area that activated the event (e.g. CAN or USER).
- Event
- Value of power-on time meter
- Selected process values (analog % signals, binary signals)

Memory depth

Maximum number of logbook entries: 14 (*extension is being prepared*)

9.6.1 Functional description

The structure of the logbook corresponds to a ring buffer:



- As long as free logbook memory is available, the entry is placed in the next free position within the memory (**A**).
- If all memory units are assigned, the oldest entry (**B**) is deleted for a new entry.
- The newest entries will always remain available.



Note!

In the event of a supply voltage failure, the logbook is saved and reloaded automatically when the inverter is switched on. This ensures that the error history of the device does not get lost. For this reason it is very important to act with caution when deleting the logbook entries.

9.6.2 Filtering logbook entries

The logbook adds new entries to the ring buffer after they have been passed through a parameterisable filter. This filter helps you to exclude certain events from being entered into the logbook which would trigger a certain error response (fault, trouble, warning, information, etc.).

[C00169](#) (bit 1 ... bit 6) includes a bit-coded specification of the events which are to be entered into the logbook.

In the Lenze setting ([C00169](#) = 0x067E), all events are entered into the logbook.



Note!

Events with the "No response" setting are not entered into the logbook.

Counter for multiple entries

In order to prevent the ring buffer from overflowing with identical errors with frequent occurrence e.g. during commissioning, identical errors will not lead to new line entries in the configuration of the logbook in the Lenze setting. Instead, one counter will be counted up for this error.

The time of the error is always the time of its first occurrence. A new logbook line will only be generated if an error occurs that differs from the previous error.

In [C00169](#), bit 9 and bit 10 determine the logbook update in case of similar errors.

Meaning of bit 9 / bit 10:

- Bit 9: Error counter
- Bit 10: Update of the logbook line

In the Lenze setting ([C00169](#) = 0x067E), bits 9 and 10 are active.

The following cases can be distinguished depending of the activation of bit 9 and bit 10:

1. Bit 9 inactive, bit 10 active/inactive
 - Every time an error occurs, a new line is created in the logbook.
 - The setting of bit 10 has no effect!
2. Bit 9 active, bit 10 inactive
 - Only one line is created for the first occurrence of the error. If the error occurs again, only the error counter in the line is increased.
3. Bit 9 active / bit 10 active (Lenze setting)
 - The time of the last occurrence of similar errors is logged.
 - The time stamp and the optional measured values are updated in the error line of the logbook.
 - When the count value = 255 is reached and an error occurs again, a new line is created.

9.6.3 Automatic recording of device-internal signals at the time the error occurs

For purposes of error analysis, two optional device-internal digital signals and an analog signal (16 bit) can be recorded at the time the error occurs.


- The digital signals to be recorded are selected in [C00163/1](#) and [C00163/2](#).
 - Scaling of the value recorded: 0 ≡ FALSE; 1 ≡ TRUE
- The analog signal to be recorded is selected in [C00164/1](#).
 - Scaling of the value recorded: 16384 ≡ 100 %

9.6.4 Reading out logbook entries

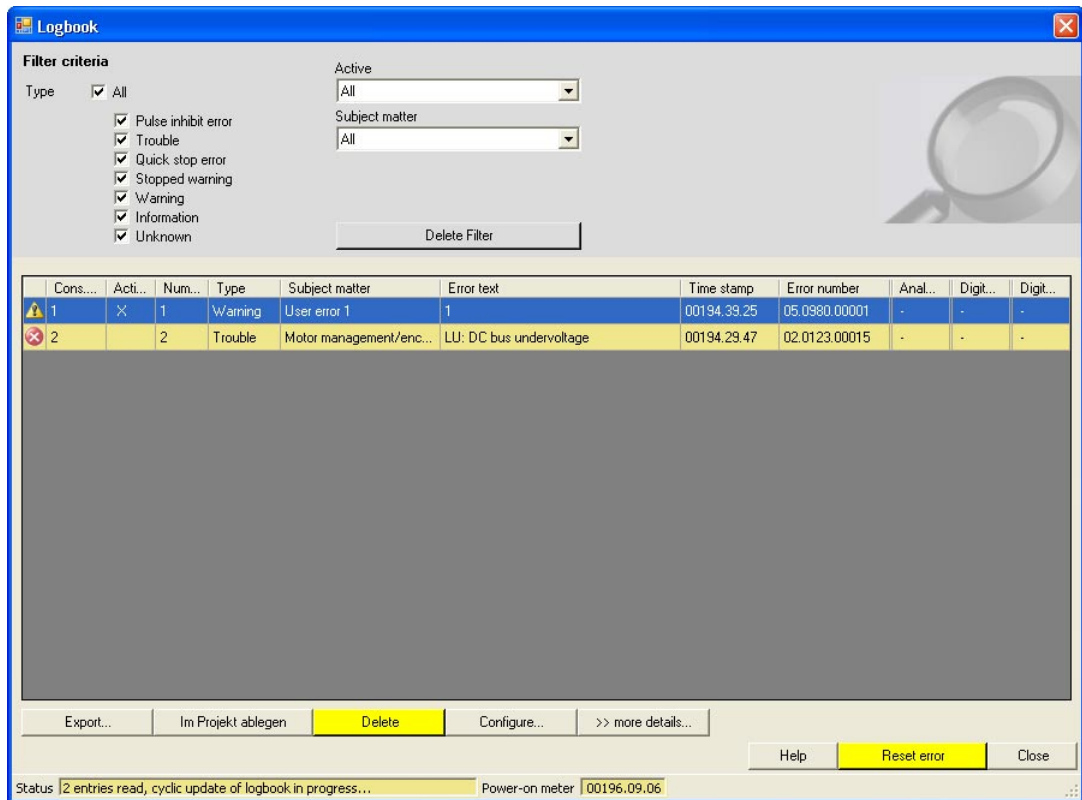
With an online connection, the existing logbook entries can easily be displayed in the »Engineer«. Alternatively, the logbook entries can also be read out via the corresponding parameters (e.g. using the keypad).



How to display logbook entries in the »Engineer«:

1. Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Click the  icon or select the **Online→Go online** command to build up an online connection with the inverter.
3. Select the **Diagnostics** tab from the *Workspace*.
4. Click **Logbook**.

Example: Representation of the logbook in the »Engineer« V2.13



Button	Function
Delete Filter	Reset set filter criteria to display all available logbook entries.
Export...	Export the entries available in the logbook into a *.log file. ▶ Exporting logbook entries to a file (□ 606)
Storing in the project	File the current logbook in the Engineer project to be able to access it offline, too. ▶ Storing the logbook in the project (□ 607)
Delete	Delete all entries available in the logbook.
Configuration of...	Open parameterisation dialog for configuring the logbook.

Button	Function
>> more details	Show more details: <ul style="list-style-type: none"> • Analog value 1, digital values 1 & 2 • More output types of the error numbers (32-bit, internal 32-bit and internal 16-bit). • Instead of the >> more details button, the << less details is now displayed via which the details can be hidden again.
Help	Open online help for the logbook.
Resetting an error	Acknowledge existing error message if the error cause has been eliminated and thus the error is not pending anymore. <ul style="list-style-type: none"> • After the reset (acknowledgement) of the current error, further errors may be pending which must also be reset.
Close	Close the <i>Logbook</i> dialog box again.

9.6.5 Exporting logbook entries to a file



How to export the logbook entries to a file:

1. Click **Export...** in the *Logbook* dialog box.
 - The *Export logbook* dialog box is displayed.
2. Specify the folder, file name, and file type for the file.
3. Click the **Save** button to export the logbook entries into the given file.
 - Hidden logbook entries are not exported, i.e. the filter criteria specified are accounted for during the export.
 - The logbook entries are written to the file in the form of a semicolon separated list.

Structure of the semicolon separated list

The list includes the following information:

- | | |
|-------------------|------------------------------|
| 1. Cons. no. | 9. Error number |
| 2. Active | 10. Source - analog value 1 |
| 3. Counter | 11. Analog value 1 |
| 4. Type | 12. Source - digital value 1 |
| 5. Subject matter | 13. Digital value 1 |
| 6. Error text | 14. Source - digital value 2 |
| 7. Time stamp | 15. Digital value 2 |
| 8. Relative time | |

9.6.6 Storing the logbook in the project

If you want to display the currently available logbook entries at a later date in offline mode, i.e. without a connection to the inverter, you can store the current logbook in the project.



How to store the logbook in the project:

Go to the *Logbook* dialog box and click the **File in project** button.

- The logbook with all the entries uploaded up to now is stored in the Engineer project independent of the set filter criteria.
- A logbook of the same device already stored before will be overwritten without querying the user.
- The filter settings are not stored in the project.
- When a logbook is filed in the project, the logbook can also be opened in offline mode via the **Logbook** button on the **Diagnostics** tab.



Note!

Storing the logbook changes the project.

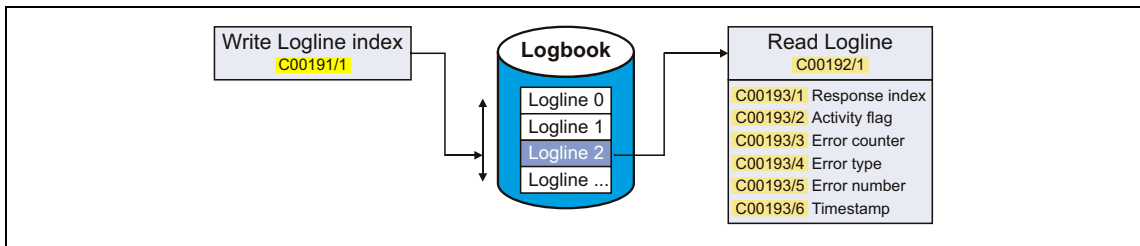
- When the project is closed, you are asked to save the changed project.
- Only if the changed project is saved, the new logbook entries stored in the project remain stored.

9.6.7 Reading out the logbook from an external control/visualisation

This function extension is available from version 12.00.00!

The parameters described in the following provide a second interface via which an external control or visualisation can exclusively access the logbook and read out logbook contents. Logbook contents can even be read out via this additional interface if the logbook is read out by the »Engineer« or »EASY Starter« at the same time.

Structure of the interface



- The line index of the logbook entry to be read out has to be set in [C00191/1](#).
- Then the logbook entry addressed is stored as "OCTET STRING" in [C00192/1](#).
 - Via this display parameter, the logbook entry can be read out by the control.
 - The "OCTET STRING" has a length of 8 double words of 4 successive bytes (= 32 bytes), starting with byte 0 in each case:

OCTET STRING	Byte 0	Byte 1	Byte 2	Byte 3
DWORD 0	Reserved	Reserved	Response index	Reserved
DWORD 1	Error activity flag	Error counter	Reserved	Reserved
DWORD 2	32-bit error number [A] Reserved [B] Error type [C] Error subject area [D] Error ID			
DWORD 3	Time in [s] during which the power was switched on (power-on time meter).			
DWORD 4	Reserved	Reserved	Reserved	Reserved
DWORD 5	Source - analog value 1	Reserved	Analog value 1 (scaling: 16384 ≙ 100 %)	
DWORD 6	Source - digital value 1	Reserved	Digital value 1	Reserved
DWORD 7	Source - digital value 2	Reserved	Digital value 2	Reserved

- Additionally, a read access to different individual elements of the logbook entry addressed can be executed via the subcodes of [C00193](#). These parameters have a uniform data format (32 bits) and represent the most important part of the logbook data:

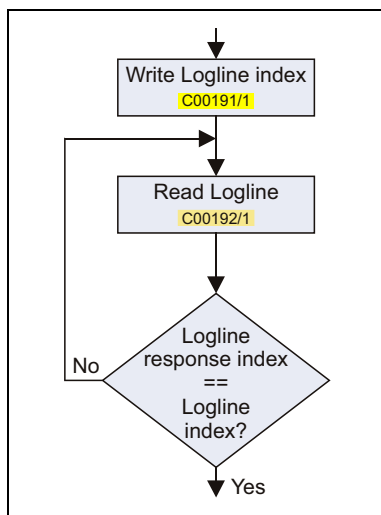
Parameters	Display
C00193/1	Response index, reference to the index requested (C00191/1)
C00193/2	Error activity flag (0 = error not active; 1 = error active)
C00193/3	Error counter (0 ... 255) <ul style="list-style-type: none"> • This information depends on the logbook configuration. In the Lenze setting the logbook configured so that identical errors do not produce a new line entry, but a counter is incremented for this error.
C00193/4	Error type (bits 26 ... 29 of the 32-bit error number)
C00193/5	Error subject area + error ID (bits 0 ... 25 of the 32-bit error number)
C00193/6	Time in [s] during which the power was switched on (power-on time meter).



Note!

- In the case of a simultaneous read access to the logbook entry ([C00192/1](#)) and its individual elements ([C00193/x](#)), the line index in [C00191/1](#) must only be reset by the control after the read process is fully completed. Otherwise the data read are inconsistent.
- Depending on the device version, the maximum number of logbook entries can vary:
 - 8400 StateLine: 15 logbook entries
 - 8400 HighLine/TopLine: 50 logbook entries

Basic workflow



- The logbook can be read out by an external control or visualisation via the procedure shown on the left.
- The "Response index" query ensures that the logbook entry read really corresponds to the logbook entry requested.

Related topics:

- ▶ [Structure of the 32-bit error number \(bit coding\)](#)

9.7 Monitoring

The inverter is provided with various monitoring functions which protect the drive against impermissible operating conditions.

- If a monitoring function responds,
 - an entry will be made into the [Logbook](#) of the inverter,
 - the response (TroubleQSP, Warning, Fault, etc.) set for this monitoring function will be triggered,
 - the status of the internal device control changes according to the selected response, controller inhibit is set, and the "DRV- ERR" LED on the front of the inverter goes on:

Response	Entry in the logbook	Display in C00168	Pulse inhibit	Disable drive function	Acknowledgement required	LED "DRV-ERR"
None						OFF
Fault	☑	☑	☑	☑	☑	■ ■ ■
Trouble	☑	☑	☑	☑		▬ ▬ ▬
TroubleQSP	☑	☑			☑	▬ ▬ ▬
WarningLocked	☑	☑			☑	▬
Warning	☑	☑				▬
Information	☑	☑				OFF

Related topics:

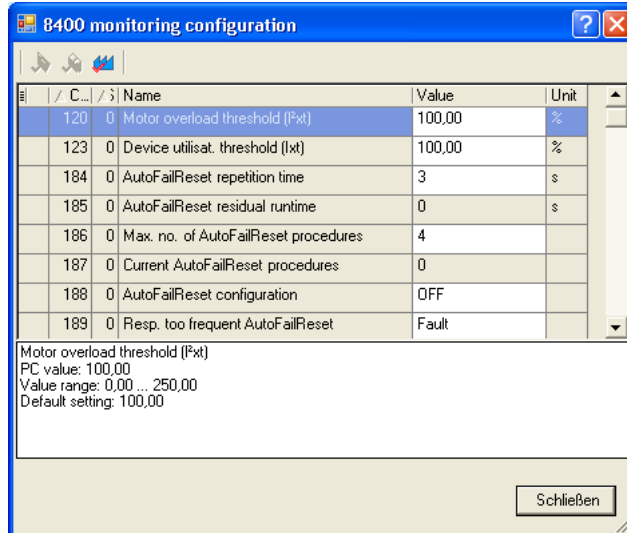
- ▶ [LED status displays of the device status](#) (📖 592)
- ▶ [Device state machine and device states](#) (📖 111)
- ▶ [Device overload monitoring \(lxt\)](#) (📖 310)
- ▶ [Motor overload monitoring \(l2xt\)](#) (📖 310)
- ▶ [Motor temperature monitoring \(PTC\)](#) (📖 313)
- ▶ [Brake resistor monitoring \(l2xt\)](#) (📖 314)
- ▶ [Motor phase failure monitoring](#) (📖 316)
- ▶ [Mains phase failure monitoring](#) (📖 319)
- ▶ [Maximum current monitoring](#) (📖 319)
- ▶ [Maximum torque monitoring](#) (📖 321)
- ▶ [Encoder open-circuit monitoring](#) (📖 322)

9.7.1 Monitoring configuration



How to configure the monitoring functions using the »Engineer«:

1. Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Select the **Diagnostics** tab from the *Workspace*.
3. Click the **Monitoring...** button.
 - The *8400 monitoring configuration* dialog box is displayed via which the desired settings can be made:



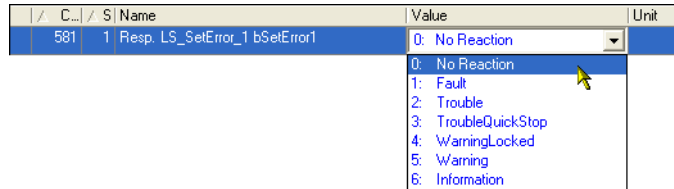
Related topics:

- ▶ [Setting the error response](#) (612)

9.7.2 Setting the error response

When a monitoring function responds, the response set for this monitoring function (TroubleQSP, Warning, Fault, etc.) will be triggered.

- For many monitoring functions the response can be individually parameterised via parameters.



Tip!

The table in the chapter "[Short overview \(A-Z\)](#)" contains the error messages for which the response can be set. ([623](#))

Warning thresholds

Some of the monitoring functions are activated if a defined warning threshold (e.g. temperature) has been exceeded.

- The corresponding preset threshold values can be changed via the following parameters:

Parameters	Info
C00120	Setting of motor overload (I ² xt)
C00123	Device utilisat. threshold (Ixt)
C00572	Brake resistor overload threshold
C00599	Motor phase failure threshold

9.7.3 AutoFailReset function

The AutoFailReset function serves to automatically reset the latching "Fault" and "TroubleQSP" errors as well as the latching "WarningLocked" warning.

The "latching" term means that the effect on the inverter remains active even after the error cause has been removed.

To reset latching errors and warnings, the following options are available:

- Manual reset
 - with device command [C00002/19](#) (activated by Low-High edge)
 - by a Low-High edge at the *bResetFail* input of the [LS DriveInterface](#) (the "FailReset" control bit in the control word must be parameterised with a value of "1").
- Automatic reset
 - using the AutoFailReset function.

Overview of the relevant parameters

Parameters	Info
C00184	Repetition time of the error reset processes
C00185	Time left until the next error reset process
C00186	Max. number of permissible <u>unsuccessful</u> error reset processes <ul style="list-style-type: none"> • When the number set is reached, the response parameterised in C00189 is executed.
C00187	Current number of <u>unsuccessful</u> error reset processes carried out
C00188	Configuration of the AutoFailReset function <ul style="list-style-type: none"> • 0: Off • 1: Fault + TroubleQSP • 2: WarningLocked • 3: All locking
C00189	Response after max. number of <u>unsuccessful</u> error reset processes has been reached
Greyed out = display parameter	

9.8 Maloperation of the drive

Maloperation	Cause	Remedy
Motor does not rotate	DC-bus voltage is too low <ul style="list-style-type: none"> Red LED is blinking every 1 s Display in the keypad: <i>LU</i> 	Check mains voltage
	Inverter is inhibited <ul style="list-style-type: none"> Green LED is blinking Display in the keypad: CINH 	Deactivate controller inhibit <ul style="list-style-type: none"> Note: Controller inhibit can be set via several sources ! C00158 displays all active sources for controller inhibit.
	Automatic start is inhibited (Bit 0 in C00142 = 1)	LOW/HIGH edge at RFR If required, correct starting condition with C00142
	DC-injection braking (DCB) is active	Deactivate DC injection brake
	Mechanical motor brake is not released	Release mechanical motor brake manually or electrically
	Quick stop (QSP) is active <ul style="list-style-type: none"> Display in the keypad: IMP 	Deactivate quick stop <ul style="list-style-type: none"> Note: Quick stop can be set via several sources! C00159 displays all active sources for quick stop.
	Setpoint = 0	Select setpoint
	JOG frequency = 0 at activated JOG setpoint	Set JOG setpoint in C00039/1...15
	Trouble active	Clear fault
	With C00006 = 4, "SLVC: Vector control" has been set, but no motor parameter identification has been carried out.	Execute automatic motor parameter identification with the C00002/23 device command
	Assignment of several mutually exclusive functions with a signal source in C00701	Correct configuration in C00701
Motor rotates irregularly	Motor cable is defective	Check motor cable
	Maximum motor current in motor or generator mode is set too low	Adjust settings to the application: C00022 : I _{max} in motor mode C00023 : I _{max} in generator mode
	Motor is underexcited or overexcited	Check parameterisation: C00006 : Motor control C00015 : VFC: V/f base frequency C00016 : VFC: V _{min} boost
	Rated motor data (stator resistance, speed, current, frequency, voltage) and cos φ and/or magnetising inductance is not adapted to the motor data	Execute automatic motor parameter identification with the C00002/23 device command - or - Adjust motor parameters manually: C00084 : Motor stator resistance C00087 : Rated motor speed C00088 : Rated motor current C00089 : Rated motor frequency C00090 : Rated motor voltage C00091 : Motor cosine phi C00092 : Motor magnetising inductance
	Motor windings are wired incorrectly	Reverse from star connection to delta connection

Maloperation	Cause	Remedy
Motor consumes too much current	V_{\min} boost has been selected too high	Correct setting with C00016
	V/f base frequency has been selected too low	Correct setting with C00015
	Rated motor data (stator resistance, speed, current, frequency, voltage) and $\cos \varphi$ and/or magnetising inductance is not adapted to the motor data	Execute automatic motor parameter identification with the C00002/23 device command - or - Adjust motor parameters manually: C00084 : Motor stator resistance C00087 : Rated motor speed C00088 : Rated motor current C00089 : Rated motor frequency C00090 : Rated motor voltage C00091 : Motor cosine phi C00092 : Motor magnetising inductance
Motor parameter identification is aborted with error LP1	Motor is too small compared to the rated device power (>1 : 3)	Use device with lower rated power
	DC injection brake (DCB) is active via terminal	Deactivate DC injection brake
Drive behaviour with vector control is not satisfactory	different	Optimise or manually adapt vector control
		Execute automatic motor parameter identification with the C00002/23 device command
Torque dip in field weakening range or motor stalling when being operated in the field weakening range	Motor is overloaded	Check motor load
	Motor windings are wired incorrectly	Reverse from star connection to delta connection
	V/f reference point is set too high	Correct setting with C00015
	Override point of field weakening is set too low	Correct setting with C00080
Mains voltage too low		Increase mains voltage
An asynchronous motor with feedback rotates without control and with too low speed	<p>Motor phases have been interchanged</p> <ul style="list-style-type: none"> • Thus the rotating field of the motor is not identical anymore with the rotating field of the feedback system. • Therefore, the drive shows the following behaviour if V/f characteristic control (C00006 = 7) is performed: <ul style="list-style-type: none"> • The motor rotates faster than the speed setpoint by the value set in C00074. • After the controller has been enabled, the inverter will not stop if the speed setpoint = 0 or a quick stop (QSP) occurs. • Among other things, the final motor current depends on the value set for the V_{\min} boost and may rise up to I_{\max} which can trigger the "OC5: Ixt overload" fault message. 	Check the phase position of the motor cable If possible: Actuate the motor with deactivated feedback (C00006 = 6) and check direction of rotation of the motor
Motor phase (LP1) monitoring does not respond if the motor phases are interrupted	Monitoring is not active (C00597 = 0)	Activate monitoring (C00597 = 1)

9 Diagnostics & error management

9.9 Operation without mains supply

9.9 Operation without mains supply

The following display parameters have a value of "0" if the mains supply is switched off and the external 24 V supply of the inverter is switched on:

Parameters	Info
C00050	MCTRL: Speed setpoint
C00051	MCTRL: Actual speed value
C00052	Motor voltage
C00053	DC-bus voltage
C00054	Motor current
C00058	Output frequency
C00061	Heatsink temperature
C00064/1...3	Device utilisation (Ixt)
C00066	Thermal motor load (I ² xt)
C00177	Switching cycles
C00725	Current switching frequency

9 Diagnostics & error management

9.10 Error messages of the operating system

9.10 Error messages of the operating system

This chapter describes all error messages of the inverter operating system and possible causes & remedies.

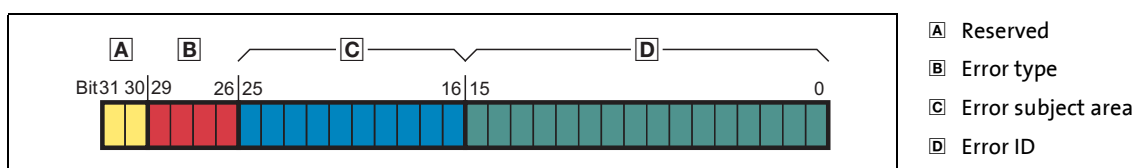


Tip!

Each error message is also saved to the logbook in chronological order. ▶ [Logbook](#) (📖 602)

9.10.1 Structure of the 32-bit error number (bit coding)

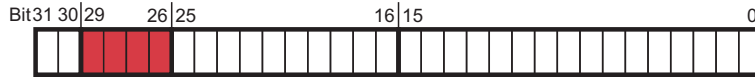
If an error occurs in the inverter, the internal fault memory saves a 32-bit value which contains the following information:



[9-3] Structure of the error number

- Display parameter: [C00168](#)
- The [LS DriveInterface](#) system block shows the 32-bit error number at the outputs *wStateDetermFailNoLow* (Low Word) and *wStateDetermFailNoHigh* (High Word).
 - **From version 06.00.00 onwards:** If the "Use 16BitFailNo." (Bit 15 = "1") option is activated in [C00148](#), the short 16-bit error number is provided by the SB [LS DriveInterface](#) at the *wStateDetermFailNoLow* output and the value "0" is provided at the *wStateDetermFailNoHigh* output (see the following chapter).
- For the sake of legibility, the error number in the logbook and in [C00165](#) is displayed with the following syntax:
[Error type].[Error subject area no.].[Error ID]

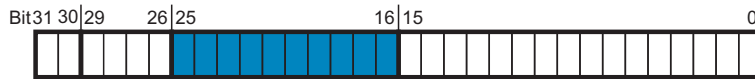
Error type



The error type gives information about the behaviour/response of the inverter to the error. The error type for some device errors can also be parameterised.

Bit 29	Bit 28	Bit 27	Bit 26	Meaning
0	0	0	0	0: No Response
0	0	0	1	1: Fault
0	0	1	0	2: Trouble
0	0	1	1	3: TroubleQSP
0	1	0	0	4: WarningLocked
0	1	0	1	5: Warning
0	1	1	0	6: Information

Error subject area



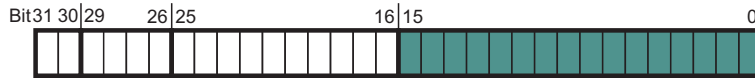
The error subject area indicates the internal "function unit" of the inverter in which the error has occurred:

Error subject area		Assigned errors	Remedy possible by user?
No.	Name		
111	Supply voltage	Errors that occur in connection with the supply voltage of the device.	Yes
119	Temperature	Errors that occur for temperature reasons.	Yes
123	Motor management / encoder	Errors that occur within the motor control or encoder evaluation.	Yes
125	Analog I/O integrated	Errors that occur in connection with the analog inputs and outputs.	Yes
127	Extension module slot 1	Errors that are reported by the extension module, and communication errors to the plugged-in extension module.	Yes if it is a fieldbus error.
131	CAN integrated (general)	Errors related to general CAN functions.	Yes
135	CAN process data object (PDO)	Errors that are explicitly only related to the CAN-PDO (process data objects).	Yes
140	Device configuration	Errors that occur due to incompatibilities of the plugged-in individual components (fieldbus module, safety module, et al.).	Yes if the error relates to a module plugged-in by the user.
144	Parameter set	Errors that occur in connection with the parameter set or the parameter set memory (memory module).	Yes if the error relates to a missing or incompatible memory module.
145	Device firmware (internal error)	Internal error of the device firmware.	No
184	MotionControlKernel	Errors that occur within the MotionControl basic functions (e.g. profile generation, brake control, positioning).	Yes
303	Safety option	Errors that occur within the integrated safety system. See the documentation for integrated safety.	Yes
400	Defective device hardware	Errors that occur due to defective device hardware.	No
444	Fieldbus	Errors that occur in connection with fieldbus communication.	Yes
980 ... 983	User error 1 ... User error 4	Errors generated by the user (by the application) via the LS_SetError_1 system block.	Yes
984 ... 987	User error 5 ... User error 8	Errors generated by the user (by the application) via the LS_SetError_2 system block.	Yes

9 Diagnostics & error management

9.10 Error messages of the operating system

Error ID

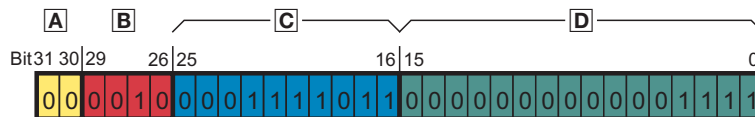


16-bit value (0 ... 65535) for error identification within the error subject area.

Example for bit coding of the error number

[C00168](#) displays the internal error number "142278671".

- This decimal value corresponds to the following bit sequence:



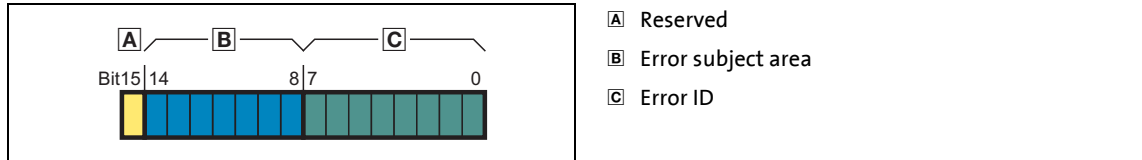
Assignment	Information	Meaning in the example
	Reserved	-
	Error type	2: Trouble
	Error subject area	123: Motor management / encoder
	Error ID	15: " LU: DC bus undervoltage "

- Thus, error number "142278671" means:
A DC bus undervoltage has been detected in the "Motor management / encoder" subject area.
The error response is a "Fault".

9.10.2 Structure of the 16 bit error number (bit coding)

This function extension is available from version 06.00.00!

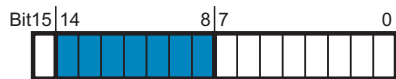
In addition to the 32-bit error number, a 16-bit error number is generated if an error occurs. It consists of the following information:



[9-4] Structure of the error number

- Display parameter: [C00160](#)
- The [LS_DriveInterface](#) system block shows the 16-bit error number at the output *wStateDetermFailNoShort*.
- If the "Use 16BitFailNo." option is activated in [C00148](#) (bit 15 = "1"), the [LS_DriveInterface](#) system block also shows the short 16-bit error number at the output *wStateDetermFailNoLow* (Low Word of the 32-bit error number).
 - The output *wStateDetermFailNoHigh* (High Word of the 32-bit error number) in this case is "0".
 - Advantage: The bus transfer of the error numbers is possible via a data word without changing the interconnection of the technology application.
- For the sake of legibility, the 16-bit error number in the logbook is displayed with the following syntax::
[Error subject area no.].[Error ID]

Error subject area



The error subject area indicates the internal "function unit" of the inverter in which the error has occurred.



Note!

Due to the smaller value range (0 ...127), the number assignment to the error subject area differs from the 32-bit error number.

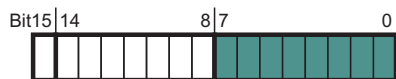
Error subject area		Assigned errors	Remedy possible by user?
No.	Name		
11	Supply voltage	Errors that occur in connection with the supply voltage of the device.	Yes
19	Temperature	Errors that occur for temperature reasons.	Yes
23	Motor management / encoder	Errors that occur within the motor control or encoder evaluation.	Yes
25	Analog I/O integrated	Errors that occur in connection with the analog inputs and outputs.	Yes
26	Defective device hardware	Errors that occur due to defective device hardware.	No
27	Extension module slot 1	Errors that are reported by the extension module, and communication errors to the plugged-in extension module.	Yes if it is a fieldbus error.
31	CAN integrated (general)	Errors related to general CAN functions.	Yes

9 Diagnostics & error management

9.10 Error messages of the operating system

Error subject area		Assigned errors	Remedy possible by user?
No.	Name		
35	CAN process data object (PDO)	Errors that are explicitly only related to the CAN-PDO (process data objects).	Yes
40	Device configuration	Errors that occur due to incompatibilities of the plugged-in individual components (fieldbus module, safety module, et al.).	Yes if the error relates to a module plugged-in by the user.
44	Parameter set	Errors that occur in connection with the parameter set or the parameter set memory (memory module).	Yes if the error relates to a missing or incompatible memory module.
45	Device firmware (internal error)	Internal error of the device firmware.	No
54	Fieldbus	Errors that occur in connection with fieldbus communication.	Yes
84	MotionControlKernel	Errors that occur within the MotionControl basic functions (e.g. profile generation, brake control, positioning).	Yes
98	Safety option	Errors that occur within the integrated safety system. See the documentation for integrated safety.	Yes
100 ... 103	User error 1 ... User error 4	Errors generated by the user (by the application) via the LS_SetError_1 system block.	Yes
104 ... 107	User error 5 ... User error 8	Errors generated by the user (by the application) via the LS_SetError_2 system block.	Yes

Error ID



8-bit value (0 ... 255) for error identification within the error subject area.



Tip!

All possible 16-bit error numbers are listed in the table entitled "[Short overview \(A-Z\)](#)" in the second column. ([623](#))

9.10.3 Reset error message

An error message with the response "Fault", "Trouble", "TroubleQSP" or "Warning locked" must be explicitly reset (acknowledged) after the cause of the error has been eliminated.



To reset (acknowledge) a pending error message, execute device command [C00002/19](#) = "1".



Tip!

When an online connection to the inverter has been established, use the **Diagnostics** tab of »Engineer« and click **Reset error** to reset a pending error message.

9.10.4 Export error texts

All error texts of the inverter can be exported into a text file (*.txt) for further processing.

- The error text is preceded with the corresponding 32-bit error number (no error type) and the 16-bit error number, both as decimal number.
- If there is no corresponding 16-bit error number for a 32-bit error number, the field remains empty.

Example

Output of the German and English error texts:

32-BitError	16-BitError	DE-de	EN-en
0	0	No error	No error
111	11	Versorgungsspannung	Supply voltage
119 / 19			
12323		: Motor management / encoder	
125	25	E/A integriert	I/O integrated
...			
26214416	6672	dH10: Lüfterausfall	dH10: Fan failure
26214505	6761	dH69: Abgleichdatenfehler	dH69: Adjustment fault



How to export the error texts into a text file:

1. Go to the *Project view* in the *Context menu* of the 8400 protec HighLine inverter and execute the **Export error texts...** command.
2. Define the following options in the *Export error texts* dialog box:
 - Output file and memory location
 - Languages to be exported (German/English/French)
 - Device/module to be exported
 - Separator (tabulator or semicolon)
 - Font (UTF8, standard font or ASCII)
3. Click **OK** to start the export.
 - After the export, a message appears indicating whether the export was successful.

9 Diagnostics & error management

9.10 Error messages of the operating system

9.10.5 Short overview (A-Z)

The table below contains all error messages of the inverter operating system in alphabetical order.



Note!

For the sake of legibility, the [Logbook](#) and [C00165](#) display the 32-bit error number with the following syntax:

[Error type].[Error subject area no.].[Error ID]

In this documentation, "xx", a wildcard, stands for the error type since it is configurable for many error messages.



Tip!

If you click the cross-reference in the first column, "Error number", you will reach the detailed description of the respective error message in the following chapter "[Cause & possible remedies](#)". (🔍 626)

Error number	Display in		Error message	Response (Lenze setting)	Adjustable in	CAN Emergency Error Code	
	32 bits	16 bits _{hex}					16 bits _{dec}
xx.0125.00001	0x1901	6401	8192001	An01: AIN1_ < 4 mA	TroubleQuickStop	C00598/1	0xF000
xx.0125.00002	0x1902	6402	8192002	An02: AIN2_ < 4 mA	TroubleQuickStop	C00598/2	0xF000
xx.0131.00006	0x1f06	7942	8585222	CA06: CAN CRC error	No Reaction	C00592/1	0x8000
xx.0131.00007	0x1f07	7943	8585223	CA07: CAN Bus Warn	No Reaction	C00592/3	0x8000
xx.0131.00008	0x1f08	7944	8585224	CA08: CAN Bus Stopped	No Reaction	C00592/4	0x8000
xx.0131.00011	0x1f0b	7947	8585227	CA0b: CAN HeartBeatEvent	No Reaction	C00592/5	0x8130
xx.0131.00015	0x1f0f	7951	8585231	CA0F: CAN control word	Fault	C00594/1	0xF000
xx.0127.00002	0x1b02	6914	8323074	CE04: MCI communication error	No Reaction	C01501/1	0x7000
xx.0127.00015	0x1b0f	6927	8323087	CE0F: MCI control word	Fault	C00594/2	0xF000
xx.0135.00001	0x2301	8961	8847361	CE1: CAN RPDO1	No Reaction	C00593/1	0x8100
xx.0135.00002	0x2302	8962	8847362	CE2: CAN RPDO2	No Reaction	C00593/2	0x8100
xx.0135.00003	0x2303	8963	8847363	CE3: CAN RPDO3	No Reaction	C00593/3	0x8100
xx.0131.00000	0x1f00	7936	8585216	CE4: CAN Bus Off	No Reaction	C00592/2	0x8000
xx.0135.00004	0x2304	8964	8847364	CE5: CAN RPDO4	No Reaction	C00593/4	0x8100
xx.0140.00013	0x280d	10253	9175053	CI01: Module missing/incompatible	No Reaction	C01501/2	0x7000
xx.0184.00001	0x5401	21505	12058625	Ck01: Pos. HW limit switch	TroubleQuickStop	C00595/1	0x8600
xx.0184.00002	0x5402	21506	12058626	Ck02: Neg. HW limit switch	TroubleQuickStop	C00595/2	0x8600
xx.0184.00007	0x5407	21511	12058631	Ck03: Pos. SW limit position	TroubleQuickStop	C00595/3	0x8600
xx.0184.00008	0x5408	21512	12058632	Ck04: Neg. SW limit position	TroubleQuickStop	C00595/4	0x8600
xx.0184.00153	0x5499	21657	12058777	Ck05: Error following error 1	Warning	C00595/5	0x8611
xx.0184.00154	0x549a	21658	12058778	Ck06: Error following error 2	Warning	C00595/6	0x8611
xx.0184.00155	0x549b	21659	12058779	Ck07: Traversing range limit exceeded	TroubleQuickStop	C00595/7	0x8612
xx.0184.00156	0x549c	21660	12058780	Ck08: Reference position unknown	WarningLocked	C00595/8	0x8612
xx.0184.08005	0x54cd	21709	12066629	Ck09: Positioning mode invalid	WarningLocked	C00595/9	0x8600
xx.0184.08007	0x54cf	21711	12066631	Ck10: Profile data implausible	WarningLocked	C00595/10	0x8600
xx.0184.08009	0x54d1	21713	12066633	Ck11: Operating mode invalid	Warning	C00595/11	0x8600
xx.0184.08014	0x54d6	21718	12066638	Ck12: Profile number invalid	WarningLocked	C00595/12	0x8600
xx.0184.08015	0x54d7	21719	12066639	Ck13: Error FB MCKCtrlInterface	Warning	C00595/13	0x8600
xx.0184.00015	0x540f	21519	12058639	Ck14: Target position outside SW limit position	WarningLocked	C00595/14	0x8600
xx.0184.00005	0x5405	21509	12058629	Ck15: Error message sig. brake	TroubleQuickStop	-	0x8600
xx.0184.00064	0x5440	21568	12058688	Ck16: Time overrun manual operation	Fault	-	

9 Diagnostics & error management

9.10 Error messages of the operating system

Error number	32 bits		Display in C00162/1	Error message	Response (Lenze setting)	Adjustable in	CAN Emergency Error Code
	16 bits _{hex}	16 bits _{dec}					
▶ xx.0184.00009	0x5409	21513	12058633	Ck17: direction conflict Ccw	Information	-	
▶ xx.0184.00010	0x540a	21514	12058634	Ck18: direction conflict Cw	Information	-	
▶ xx.0145.00001	0x2d01	11521	9502721	dF01: FW updated	No Reaction	-	
▶ xx.0145.00035	0x2d23	11555	9502755	dF10: AutoTrip reset	Fault	C00189	0xF000
▶ xx.0145.00014	0x2d0e	11534	9502734	dF14: SW-HW invalid	Fault	-	
▶ xx.0145.00024	0x2d18	11544	9502744	dF18: BU RCOM error	Fault	-	0x6100
▶ xx.0145.00033	0x2d21	11553	9502753	dF21: BU watchdog	Fault	-	0x6100
▶ xx.0145.00034	0x2d22	11554	9502754	dF22: CU Watchdog	Fault	-	0x6100
▶ xx.0145.00025	0x2d19	11545	9502745	dF25: CU RCOM error	Fault	-	0x6100
▶ xx.0145.00026	0x2d1a	11546	9502746	dF26: Appl. watchdog	No Reaction	C00580/1	0x6200
▶ xx.0145.00050	0x2d32	11570	9502770	dF50: Retain error	Fault	-	0x6100
▶ xx.0145.00051	0x2d33	11571	9502771	dF51: CuCcr error	Fault	-	0x6100
▶ xx.0145.00052	0x2d34	11572	9502772	dF52: BuCcr error	Fault	-	0x6100
▶ xx.0400.00009	0x1a09	6665	26214409	dH09: EEPROM power unit	Fault	-	0x5500
▶ xx.0400.00016	0x1a10	6672	26214416	dH10: Fan failure	Warning	C00566	0x5000
▶ xx.0400.00104	0x1a68	6760	26214504	dH68: Adjustment data error CU	Fault	-	0x5500
▶ xx.0400.00105	0x1a69	6761	26214505	dH69: Adjustment data error BU	Fault	-	0x5500
▶ xx.0400.00106	0x1a6a	6762	26214506	dH70: ControlUnit is unequal to BaseUnit	Fault	-	0x5500
▶ xx.0123.00094	0x175e	5982	8061022	FC01: Switching frequency reduction	No Reaction	C00590	0x2000
▶ xx.0123.00095	0x175f	5983	8061023	FC02: Maximum speed for Fchop	No Reaction	C00588	0xF000
▶ xx.0123.00099	0x1763	5987	8061027	FC03: Limitation field controller	No Reaction	C00570/4	0xF000
▶ xx.0123.00057	0x1739	5945	8060985	Id1: Motor data identification error	Fault	-	0xF000
▶ xx.0123.00058	0x173a	5946	8060986	Id3: CINH identification	WarningLocked	-	0xF000
▶ xx.0123.00059	0x173b	5947	8060987	Id4: Resistance identification error	Warning	-	0xF000
▶ xx.0123.00074	0x174a	5962	8061002	Id5: Pole position identification error	Fault	C00643/1	
▶ xx.0123.00060	0x173c	5948	8060988	Id7: Motor control does not match motor data	Information	C00571/1	0xF000
▶ xx.0123.00061	0x173d	5949	8060989	Id8: Speed sensor has not been set	Fault	C00571/2	0x7120
▶ xx.0123.00145	0x1791	6033	8061073	LP1: Motor phase failure	No Reaction	C00597	0x3000
▶ xx.0123.00015	0x170f	5903	8060943	LU: DC bus undervoltage	Trouble	C00600/1	0x3100
▶ xx.0123.00016	0x1710	5904	8060944	oC1: Power section - short circuit	Fault	-	0x2000
▶ xx.0123.00030	0x171e	5918	8060958	oC10: Maximum current reached	No Reaction	C00609	0x2000
▶ xx.0123.00071	0x1747	5959	8060999	oC11: Clamp operation active	Fault	-	0xF000
▶ xx.0123.00065	0x1741	5953	8060993	oC12: I2xt brake resistor overload	No Reaction	C00574	0xF000
▶ xx.0123.00090	0x175a	5978	8061018	oC13: Maximum current for Fch exceeded	Fault	-	0xF000
▶ xx.0123.00096	0x1760	5984	8061024	oC14: Direct-axis current controller limitation	No Reaction	C00570/1	0xF000
▶ xx.0123.00097	0x1761	5985	8061025	oC15: Cross current controller limitation	No Reaction	C00570/2	0xF000
▶ xx.0123.00098	0x1762	5986	8061026	oC16: Torque controller limitation	No Reaction	C00570/3	0xF000
▶ xx.0123.00031	0x171f	5919	8060959	oC17: Clamp sets pulse inhibit	No Reaction	C00569/1	0xF000
▶ xx.0123.00034	0x1722	5922	8060962	oC18: Current monitoring overload	No Reaction	C00584/1	0x2000
▶ xx.0123.00066	0x1742	5954	8060994	oC19: short circuit of brake resistor	Fault	-	0xF000
▶ xx.0123.00017	0x1711	5905	8060945	oC2: Power section - earth fault	Fault	-	0x2000
▶ xx.0119.00050	0x1332	4914	7798834	oC5: Ixt overload	Warning	C00604	0x2000
▶ xx.0123.00105	0x1769	5993	8061033	oC6: I2xt motor overload	Warning	C00606	0x2000
▶ xx.0123.00007	0x1707	5895	8060935	oC7: Motor overcurrent	Fault	-	0x2000
▶ xx.0119.00001	0x1301	4865	7798785	oH1: Heatsink overtemperature	Fault	-	0x4000
▶ xx.0119.00015	0x130f	4879	7798799	oH3: Motor temperature (X106) triggered	Fault	C00585	0x4000
▶ xx.0119.00000	0x1300	4864	7798784	oH4: Heatsink temp. > shutdown temp. -5°C	No Reaction	C00582	0x4000
▶ xx.0123.00032	0x1720	5920	8060960	oS1: Maximum speed limit reached	No Reaction	C00579	0x8400
▶ xx.0123.00033	0x1721	5921	8060961	oS2: Max. motor speed	Fault	-	0x8400
▶ xx.0123.00001	0x1701	5889	8060929	ot1: Max. torque reached	No Reaction	C00608	0x8300
▶ xx.0123.00093	0x175d	5981	8061021	ot2: Speed controller output limited	No Reaction	C00567	0xF000

9 Diagnostics & error management

9.10 Error messages of the operating system

Error number			Display in	Error message	Response (Lenze setting)	Adjustable in	CAN Emergency Error Code
32 bits	16 bits _{hex}	16 bits _{dec}	C00162/1				
▶ xx.0123.00014	0x170e	5902	8060942	OU: DC bus overvoltage	Trouble	-	0x3100
▶ xx.0144.00001	0x2c01	11265	9437185	PS01: No memory module	Warning	-	0x6300
▶ xx.0144.00002	0x2c02	11266	9437186	PS02: Par. set invalid	Fault	-	0x6300
▶ xx.0144.00003	0x2c03	11267	9437187	PS03: Par. set device invalid	Fault	-	0x6300
▶ xx.0144.00004	0x2c04	11268	9437188	PS04: Invalid MCI par. set	Fault	-	0x6300
▶ xx.0144.00007	0x2c07	11271	9437191	PS07: Par. mem. module invalid	Fault	-	0x6300
▶ xx.0144.00008	0x2c08	11272	9437192	PS08: Par. device invalid	Fault	-	0x6300
▶ xx.0144.00009	0x2c09	11273	9437193	PS09: Par. format invalid	Fault	-	0x6300
▶ xx.0144.00010	0x2c0a	11274	9437194	PS10: Memory module link invalid	Fault	-	
▶ xx.0144.00011	0x2c0b	11275	9437195	PS11: Lenze setting loaded	No Reaction	-	
▶ xx.0144.00012	0x2c0c	11276	9437196	PS12: Parameter sets loaded	No Reaction	-	
▶ xx.0144.00013	0x2c0e	11277	9437197	PS13: Parameter sets saved	No Reaction	-	
▶ xx.0123.00200	0x17c8	6088	8061128	Sd10: Speed limit for feedback system 12	Fault	C00607	0x7300
▶ xx.0123.00201	0x17c9	6089	8061129	Sd11: Speed limit for feedback system 67	Fault	C00607	0x7300
▶ xx.0123.00207	0x17cf	6095	8061135	Sd15: Open circuit HTL 4-fold	Fault	C00605/1	0x7300
▶ xx.0123.00205	0x17cd	6093	8061133	Sd3: Open circuit HTL 2-fold or 4-fold	Fault	C00586	0x7300
▶ xx.0111.00002	0x0b02	2818	7274498	Su02: One mains phase is missing	Warning	C00565	0x3000
▶ xx.0111.00003	0x0b03	2819	7274499	Su03: Too frequent mains switching	Fault	-	0x3000
▶ xx.0111.00004	0x0b04	2820	7274500	Su04: CU insufficiently supplied	Warning	-	0x3000
▶ xx.0111.00006	0x0b06	2822	7274502	Su06: Power input overload	Fault	-	0x3000
▶ xx.0111.00007	0x0b07	2823	7274503	Su07: 24V supply off	No Reaction	-	-
Freely configurable user error messages (see LS_SetError_1 and LS_SetError_2)							
▶ xx.0980.00001	25600 _{dec} + C161/1*			User error 1	No Reaction	C00581/1	0x6200
▶ xx.0981.00002	25856 _{dec} + C161/2*			User error 2	No Reaction	C00581/2	0x6200
▶ xx.0982.00003	26112 _{dec} + C161/3*			User error 3	No Reaction	C00581/3	0x6200
▶ xx.0983.00004	26368 _{dec} + C161/4*			User error 4	No Reaction	C00581/4	0x6200
▶ xx.0984.00001	26624 _{dec} + C161/5*			User error 5	No Reaction	C00581/5	0x6200
▶ xx.0985.00002	26880 _{dec} + C161/6*			User error 6	No Reaction	C00581/6	0x6200
▶ xx.0986.00003	27136 _{dec} + C161/7*			User error 7	No Reaction	C00581/7	0x6200
▶ xx.0987.00004	27392 _{dec} + C161/8*			User error 8	No Reaction	C00581/8	0x6200

* Only the lower 8 bits of the adjustable error ID ([C161/x](#)) can be used.

9.10.6 Cause & possible remedies

This chapter contains all error messages of the inverter operating system in numerical order of the error numbers. The list provides detailed information on the response to the error message as well as information on the cause & possible remedies.



Note!

For the sake of legibility, the [Logbook](#) and [C00165](#) display the error number with the following syntax:

[Error type].[Error subject area no.].[Error ID]

In this documentation, "xx", a wildcard, stands for the error type since it is configurable for many error messages.



Tip!

A list of all error messages of the inverter operating system in alphabetical order can be found in the previous chapter "[Short overview \(A-Z\)](#)" ([□ 623](#)).

User error 1 [xx.0980.00000 ... xx.0980.65535]

Response (Lenze setting printed in bold)	Setting: C00581/1 <input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 1 has been tripped via the <i>bSetError1</i> input of the LS_SetError_1 system block.	User-defined.

User error 2 [xx.0981.00000 ... xx.0981.65535]

Response (Lenze setting printed in bold)	Setting: C00581/2 <input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 2 has been tripped via the <i>bSetError2</i> input of the LS_SetError_1 system block.	User-defined.

User error 3 [xx.0982.00000 ... xx.0982.65535]

Response (Lenze setting printed in bold)	Setting: C00581/3 <input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 3 has been tripped via the <i>bSetError3</i> input of the LS_SetError_1 system block.	User-defined.

User error 4 [xx.0983.00000 ... xx.0983.65535]

Response (Lenze setting printed in bold)	Setting: C00581/4 <input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 4 has been tripped via the <i>bSetError4</i> input of the LS_SetError_1 system block.	User-defined.

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User error 5 [xx.0984.00000 ... xx.0984.65535]

Response (Lenze setting printed in bold)	Setting: C00581/5 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 5 has been tripped via the <i>bSetError1</i> input of the LS_SetError_2 system block.	User-defined.

User error 6 [xx.0985.00000 ... xx.0985.65535]

Response (Lenze setting printed in bold)	Setting: C00581/6 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 6 has been tripped via the <i>bSetError2</i> input of the LS_SetError_2 system block.	User-defined.

User error 7 [xx.0986.00000 ... xx.0986.65535]

Response (Lenze setting printed in bold)	Setting: C00581/7 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 7 has been tripped via the <i>bSetError3</i> input of the LS_SetError_2 system block.	User-defined.

User error 8 [xx.0987.00000 ... xx.0987.65535]

Response (Lenze setting printed in bold)	Setting: C00581/8 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
User error 8 has been tripped via the <i>bSetError4</i> input of the LS_SetError_2 system block.	User-defined.

Su02: One mains phase is missing [xx.0111.00002]

Response (Lenze setting printed in bold)	Setting: C00565 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
One mains phase of a three-phase supply has failed.	Check mains connection (plug X10).

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9.10 Error messages of the operating system

Su03: Too frequent mains switching [xx.0111.00003]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>Too frequent mains switching of the power section.</p> <ul style="list-style-type: none"> The device recognises if the power section is switched on and off too frequently. To protect internal charging connections from destruction, the device reports this error and prevents the controller inhibit. All other functions are active. <p>Use of a power supply module in the DC-bus connection, the DC terminals of which are connected downstream to the charging connection for the voltage DC bus (e.g. 9400 from 45 kW).</p>	<p>The error must be acknowledged by mains switching. The charging circuit can only cool down when the mains is switched off.</p> <ul style="list-style-type: none"> After switching the mains 3 times in one minute, there must be a switching pause of 9 minutes. Cyclic mains switching every 3 minutes is permissible. <p>From version 12.00.00 onwards, this power supply module can be used in the DC-bus connection by enabling it via C02865 (bit 8).</p> <p>Note: For further configuration of devices in the DC-bus connection with 8400, the DC terminals of which are connected downstream to the charging connection for the voltage DC bus (e.g. 9400 from 45 kW with 8400) contact Lenze.</p>

Su04: CU insufficiently supplied [xx.0111.00004]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>After switching on the device, the 24V supply voltage for the control electronics is too low (100 ms after switch-on U is < 19V).</p>	<p>With internal supply voltage via the power electronics, the inverter must be replaced.</p> <p>With external supply voltage, check the correct connection and/or the stability of the supply voltage.</p>

Su05: IO supply overload [xx.0111.00005]

Response (Lenze setting printed in bold)		Setting: C00598/4 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
<p>The supply of the I/Os is overloaded. The total current at pin 1 of X41 ... X43, X50 is higher than 1 A.</p>	<p>Check connected input sensors. Do not exceed maximally available total current of 1 A.</p>	

Su07: 24V supply off [xx.0111.00007]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
<p>The 24V supply has fallen below the switch-off threshold.</p>	

oH4: Heatsink temp. > shutdown temp. -5°C [xx.0119.00000]

Response (Lenze setting printed in bold)		Setting: C00582 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
<p>The heatsink temperature now only differs by 5 °C from the shutdown temperature of the motor.</p>	<p>Prevent further heating, i.e. reduce motor load or set controller inhibit so that the heatsink can cool down again.</p>	

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9.10 Error messages of the operating system

oH1: Heatsink overtemperature [xx.0119.00001]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The heatsink temperature is higher than the fixed limit temperature (90 °C). Maybe the ambient temperature of the controller is too high or the fan or its ventilation slots are dirty.	<ul style="list-style-type: none"> • Check control cabinet temperature. • Clean filter. • Clean inverter. • If required, clean or replace the fan. • Provide for sufficient cooling of the device.

oH3: Motor temperature (X21) tripped [xx.0119.00015]

Response (Lenze setting printed in bold)		Setting: C00585 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
The motor temperature monitoring at plug X21 has been tripped. Possible causes: <ul style="list-style-type: none"> • The motor is overheated so that the thermal contact integrated into the motor has been switched. • An open circuit or a loose contact at the connections mentioned above has occurred. 	<ul style="list-style-type: none"> • Check motor temperature monitoring. • Provide for sufficient cooling of the motor. • Check terminals for open circuit or loose contact. 	

oH5: Brake resistor temperature (X20) tripped [xx.0119.00016]

Response (Lenze setting printed in bold)		Setting: C00587/1 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
The brake resistor temperature monitoring at plug X20 has been tripped. Possible causes: <ul style="list-style-type: none"> • The external brake resistor is overheated so that the thermal contact integrated in the brake resistor has been switched. • An open circuit or a loose contact at the connections mentioned above has occurred. 	<ul style="list-style-type: none"> • Check brake resistor temperature monitoring. • Provide for sufficient cooling of the external brake resistor. • Check terminals for open circuit or loose contact. 	

oC5: Ixt overload [xx.0119.00050]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The Ixt overload check has tripped. Possible causes: <ul style="list-style-type: none"> • Wrong dimensioning of the device with regard to its motor load. • Load cycles are not complied with. 	<ul style="list-style-type: none"> • Check and, if required, correct dimensioning of the device and the motor load with regard to technical data. • Reduce motor load cycles (observe load cycles according to documentation).

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9.10 Error messages of the operating system

ot1: Maximum torque reached [xx.0123.00001]

Response (Lenze setting printed in bold)		Setting: C00608 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device indicates that the maximally possible torque at the motor shaft has been reached. <ul style="list-style-type: none"> • C00057 displays the current torque. 	Reduce motor load.	

oC7: Motor overcurrent [xx.0123.00007]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
Maximum current monitoring has tripped.	Check and, if required, correct dimensioning of the load with regard to the installed device power.	

oU: DC bus overvoltage [xx.0123.00014]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has detected an overvoltage in the DC bus. To protect the device hardware, the inverter control is switched off. <ul style="list-style-type: none"> • Depending on the configuration of the auto-start lock function, set C00142 so that, when this error is tripped, the inverter only restarts after the controller inhibit has been switched. • If this error message remains active longer than the time set in C00601, a "Fault" is tripped. Otherwise, the deactivation of the error message causes the inverter control to be enabled again <ul style="list-style-type: none"> • In case of the control types VFCplus and SLVC, the motor voltage is approached to the voltage setpoint alongside a ramp. • From version 15.00.00, this voltage ramp can be set in C00983/2. If the described remedies are not possible or do not have any effect, it may be required to increase this voltage ramp as otherwise an overcurrent interruption may be caused. This only happens in case of high motor power and mass inertia so that the Lenze setting of 1 s should be sufficient in the majority of cases. 	<ul style="list-style-type: none"> • Reduce load in generator mode. • Use a brake resistor. • Use a regenerative power supply unit. • Establish a DC-bus connection. • Select a braking method in C00175 which stops the ramp function generator when reaching the brake chopper threshold ("HlgStop"). • In case of servo control (SC), set the speed controller parameters correctly. 	

LU: DC bus undervoltage [xx.0123.00015]

Response (Lenze setting printed in bold)		Setting: C00600/1 (☑ Adjustable response)
☐ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has detected a DC bus undervoltage. The inverter control is switched off because the drive properties of the motor control cannot be provided anymore due to the DC bus undervoltage. <ul style="list-style-type: none"> • Depending on the configuration of the auto-start lock function, set C00142 so that, when this error is tripped, the inverter only restarts after the controller inhibit has been switched. 	<ul style="list-style-type: none"> • Switch on mains supply or ensure sufficient supply via DC bus. • Adjust setting in C00142 if required. 	

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9.10 Error messages of the operating system

oC1: Power section - short circuit [xx.0123.00016]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>The device has recognised a short circuit of the motor phases. To protect the device electronics, the inverter control is switched off.</p> <ul style="list-style-type: none"> • Mostly, incorrectly executed motor connections are the cause. • If the device is inappropriately dimensioned with regard to the motor load and the current limitation in the controller (Imax controller) is set incorrectly, this error message may also occur. <p>▶ Motor control: Defining current limits</p>	<ul style="list-style-type: none"> • Check motor connections and the corresponding plug connector on the device. • Only use permissible combinations of device power and motor power. • Do not set the dynamics of the current limitation controller too high.

oC2: Power section - earth fault [xx.0123.00017]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>The device has recognised an earth fault at one of the motor phases. To protect the device electronics, the inverter control is switched off.</p> <ul style="list-style-type: none"> • Mostly, incorrectly executed motor connections are the cause. • If motor filter, motor cable length, and cable type (shielding capacity) are dimensioned incorrectly, this error message may occur due to leakage currents to PE. • If motor filters with additional terminals for +UG and –UG and devices greater or equal 3 kW are used, the earth fault detection may be triggered due to leakage currents to +UG and –UG. • A cause can also be the use of shielded motor cables longer than 50 m. 	<ul style="list-style-type: none"> • Check motor connections and the corresponding plug connector on the device. • Use motor filters, cable lengths, and cable types recommended by Lenze. • If motor filters with additional terminals for +UG and –UG and devices greater or equal 3 kW are used: <ul style="list-style-type: none"> • Deactivate earth-fault detection during operation by setting the filter time (C01770) to 250 ms. • If motor cables longer than 50 m are used: <ul style="list-style-type: none"> • Increase filter time for earth-fault detection during operation (C01770).

oC10: Maximum current reached [xx.0123.00030]

Response (Lenze setting printed in bold)		Setting: C00609 (☑ Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
<p>The device displays that the maximum current has been reached.</p>	<ul style="list-style-type: none"> • Check and, if required, correct dimensioning of the load with regard to the installed device power. • Check the maximum current settings in C00022 (Imax in motor mode) and C00023 (Imax in generator mode). 	

oC17: Clamp sets pulse inhibit [xx.0123.00031]

Response (Lenze setting printed in bold)		Setting: C00569/1 (☑ Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
<p>Due to a short overcurrent, the inverter was switched off for a short time (clamp disconnection).</p>	<ul style="list-style-type: none"> • Check and, if required, correct dimensioning of the load with regard to the installed device power. • Reduce the dynamics of the setpoint change or speed control. 	

9 Diagnostics & error management

9.10 Error messages of the operating system

oS1: Maximum speed limit reached [xx.0123.00032]

Response (Lenze setting printed in bold)		Setting: C00579 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has recognised that the maximum speed has been reached.	<ul style="list-style-type: none"> • Limit setpoint selection to maximum values. • Adjust set speed limitation (C00909) and frequency limitation (C00910). 	

oS2: Max. motor speed [xx.0123.00033]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has recognised that the maximally permissible motor speed has been reached.	<ul style="list-style-type: none"> • Limit setpoint selection to the maximally permissible motor speed. • If required, adapt set maximum motor speed (C00965). 	

oC18: Current monitoring overload [xx.0123.00034]

Response (Lenze setting printed in bold)		Setting: C00584/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
The current monitoring overload has tripped because the apparent motor current has exceeded the switch-off threshold set in C00124/1 for the delay time set in C00563/1 C00563/1.	<ul style="list-style-type: none"> • Reduce overload. • Increase switch-off threshold (C00124/1). 	

Id1: Motor data identification error [xx.0123.00057]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
During the identification of motor parameters, an error has occurred. Possible causes: <ul style="list-style-type: none"> • Interrupted motor cable. • Switched-off power section during the identification. • Implausible start parameter settings. 	<ul style="list-style-type: none"> • Check the motor connections and the corresponding plug connector on the device and, if necessary, the motor terminal box. • Correct start parameters for the motor parameter identification (motor nameplate data). • Stable power supply of the device. 	

Id3: CINH identification [xx.0123.00058]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☑ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has detected controller inhibit during the motor data identification. <ul style="list-style-type: none"> • This cancels the identification process. The Lenze setting of the motor data is used. 	<ul style="list-style-type: none"> • Do not set controller inhibit during the motor data identification. • Do not execute any device function which may activate controller inhibit. 	

9 Diagnostics & error management

9.10 Error messages of the operating system

Id4: Resistor identification error [xx.0123.00059]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The device has recognised that an error has occurred in the calculation of the motor cable resistance. <ul style="list-style-type: none"> The parameters for cable cross-section and cable length are implausible. 	Enter sensible values for cable cross-section and motor cable length.

Id7: Motor control does not match motor data [xx.0123.00060]

Response (Lenze setting printed in bold)		Setting: C00571/1 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
At controller enable, the device has detected that the motor control type set in C00006 cannot control the motor type set. <ul style="list-style-type: none"> Example: Motor nameplate data for an asynchronous motor have been entered; however, a motor control type for a synchronous motor is set in C00006. Note: Since the "VFCplus" control types are able to control every motor to a certain extent, this error message will never occur here.	Enter correct motor nameplate data and set a matching motor control type in C00006 : <ul style="list-style-type: none"> Motor nameplate data asynchronous motor → motor control type must be ASM, SLVC or VFCplus servo control. Motor nameplate data synchronous motor → motor control type must be SLP5M or VFCplus. 	

Id8: Speed encoder has not been set [xx.0123.00061]

Response (Lenze setting printed in bold)		Setting: C00571/2 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
When being In controller enable status, the device has detected that a motor control type with feedback has been set in C00006 , but no speed sensor has been set in C00495 .	Set the speed sensor in C00495 . Note: The error can only be reset if the settings in C00006 and C00495 match.	

oC12: I2xt overload - brake resistor [xx.0123.00065]

Response (Lenze setting printed in bold)		Setting: C00574/1 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
Too frequent and too long braking processes.	Check drive dimensioning.	

oC19: Brake resistor - short circuit [xx.0123.00066]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
A short circuit has occurred at the brake resistor terminals. <ul style="list-style-type: none"> Short circuit at the terminals of the brake resistor. Low-resistance brake resistor. 	Check brake resistor connection <ul style="list-style-type: none"> Check terminals of the brake resistor. Check brake resistor.

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9.10 Error messages of the operating system

oC11: Clamp operation active [xx.0123.00071]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The device indicates that the "CLAMP" overcurrent limitation has been activated. <ul style="list-style-type: none"> • A permanent clamp operation causes an overload disconnection. 	Reduce setpoint generation dynamics or motor load.

Id5: Pole position identification error [xx.0123.00074]

Response (Lenze setting printed in bold)		Setting: C00643/1 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
Pole position identification has not been completed successfully.	Check parameter setting of the pole position identification.	

oC13: Maximum current for Fch exceeded [xx.0123.00090]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The device has detected a motor current which exceeds the maximum current limit at permanent switching frequency of the inverter. <ul style="list-style-type: none"> • If a permanent switching frequency inverter is set, a certain limit arises for the maximum current, depending on the setting. If this current limit is exceeded due to a load impulse or overload, an error message is displayed. 	<ul style="list-style-type: none"> • Observe the maximum current setting depending on the set switching frequency of the inverter. • Reduce the required load or setting of the dynamic switching frequency if necessary.

ot2: Speed controller output limited [xx.0123.00093]

Response (Lenze setting printed in bold)		Setting: C00567 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
The output of the speed controller has reached the internal limit value. In this status, the speed controller is not able anymore to correct the system deviation. <ul style="list-style-type: none"> • Only during "Closed loop" operation or with vector control (SLVC). 	<ul style="list-style-type: none"> • Observe load requirements. • Correct dimensioning or reduce setpoint generation dynamics if necessary. ▶ Motor control	

FC01: Switching frequency reduction [xx.0123.00094]

Response (Lenze setting printed in bold)		Setting: C00590 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
Load-dependent switching frequency reduction	<ul style="list-style-type: none"> • Observe load requirements. • Correct dimensioning or reduce setpoint generation dynamics if necessary. ▶ Motor control	

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9.10 Error messages of the operating system

FC02: Maximum speed for Fchop [xx.0123.00095]

Response (Lenze setting printed in bold)	Setting: C00588 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Maximum speed for chopper frequency has been reached. <ul style="list-style-type: none">• The maximum speed has been exceeded depending on the switching frequency.	Select the correct maximum speed as a function of the switching frequency. <ul style="list-style-type: none">▶ Motor control: Determine speed limits

oC14: Direct-axis current controller limitation [xx.0123.00096]

Response (Lenze setting printed in bold)	Setting: C00570/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Direct-axis current controller limitation is active.	<ul style="list-style-type: none">• Observe load requirements.• Correct dimensioning or reduce setpoint generation dynamics if necessary. ▶ Motor control

oC15: Cross current controller limitation [xx.0123.00097]

Response (Lenze setting printed in bold)	Setting: C00570/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Cross current controller limitation is active.	<ul style="list-style-type: none">• Observe load requirements.• Correct dimensioning or reduce setpoint generation dynamics if necessary.• Check parameter setting of the current controller with regard to the motor controllers (e.g. reduce Vp). ▶ Motor control

oC16: Torque controller limitation [xx.0123.00098]

Response (Lenze setting printed in bold)	Setting: C00570/3 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Actuator limitation according to speed controller.	<ul style="list-style-type: none">• Observe load requirements.• Correct dimensioning or reduce setpoint generation dynamics if necessary. ▶ Motor control

FC03: Field controller limitation [xx.0123.00099]

Response (Lenze setting printed in bold)	Setting: C00570/4 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
The output of the field controller has reached its maximum limit value. The drive is at the torque limit in the field weakening range.	<ul style="list-style-type: none">• Observe load requirements.• Correct dimensioning or reduce setpoint from the field weakening range if necessary. ▶ Motor control

9 Diagnostics & error management

9.10 Error messages of the operating system

oC6: I2xt overload - motor [xx.0123.00105]

Response (Lenze setting printed in bold)		Setting: C00606 (☑ Adjustable response)	
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information			
Cause		Remedy	
Thermal overload of the motor.		Only self-ventilated motors can be monitored using the I2xt function. <ul style="list-style-type: none"> • Check whether is it a self-ventilated motor. If not, set C00606 to "0: No Reaction". • Observe load requirements. • Correct dimensioning if necessary. • For VFCplus control type: Check Vmin boost (C00016). <ul style="list-style-type: none"> ▶ Set Vmin boost 	

LP1: Motor phase failure [xx.0123.00145]

Response (Lenze setting printed in bold)		Setting: C00599 (☑ Adjustable response)	
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information			
Cause		Remedy	
Motor phase failure - power section <ul style="list-style-type: none"> • This error message is displayed if a motor phase carries less current of one half-wave than set in C00599. 		<ul style="list-style-type: none"> • Check the motor connections and the corresponding plug connector on the device and, if necessary, the motor terminal box. • Check the trigger threshold (C00599). 	

Sd10: Speed limit - feedback system 12 [xx.0123.00200]

Response (Lenze setting printed in bold)		Setting: C00607 (☑ Adjustable response)	
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information			
Cause		Remedy	
Maximally permissible speed of the feedback system connected to DI1/DI2 reached.		Reduce speed of the rotation shaft/feedback system. $n_{\text{encoder}} \leq (f_{\text{max}} \times 60) / \text{encoder increments}$ (for $f_{\text{max}} = 100 \text{ kHz}$)	

Sd11: Speed limit for feedback system 67 [xx.0123.00201]

Response (Lenze setting printed in bold)		Setting: C00607 (☑ Adjustable response)	
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information			
Cause		Remedy	
Maximally permissible speed of the feedback system connected to DI6/DI7 reached.		Reduce speed of the rotation shaft/feedback system. $n_{\text{encoder}} \leq (f_{\text{max}} \times 60) / \text{encoder increments}$ (for $f_{\text{max}} = 5 \text{ kHz}$)	

Sd3: Open circuit HTL 2-fold or 4-fold [xx.0123.00205]

Response (Lenze setting printed in bold)		Setting: C00586 (☑ Adjustable response)	
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information			
Cause		Remedy	
<ul style="list-style-type: none"> • HTL encoder cable interrupted. • HTL encoder is defective. Note: The reason can also be a very dynamic acceleration or an approach against a blocked motor shaft, e.g. with a closed holding brake or when referencing to positive stop (mode 14/15) and a waiting time (C01223) >100 ms.		<ul style="list-style-type: none"> • Check HTL encoder cable. • Check HTL encoder. • Check related terminals. • Switch off monitoring (C00586 = "0: No reaction") when the HTL encoder is not used. 	

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9.10 Error messages of the operating system

Sd15: Open circuit TL 4-fold [xx.0123.00207]

Response (Lenze setting printed in bold)	Setting: C00605/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
From version 15.00.00 onwards, Sd15 will be tripped if due to different signal levels (quadruple evaluation of the digital inputs) an open circuit is detected. The quadruple evaluation is activated if "5: encoder signal FreqIn1267" is selected as speed or position encoder (C00495/1 or C00490/0).	<ul style="list-style-type: none"> • Check HTL encoder cable. • Check HTL encoder. • Check wiring of the input terminals for open circuit or loose contact.

An01: AIN1_I < 4 mA [xx.0125.00001]

Response (Lenze setting printed in bold)	Setting: C00598/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Open-circuit monitoring for analog input 1 has tripped. <ul style="list-style-type: none"> • Only if the analog input has been configured as a current loop of 4 ... 20 mA (C00034/1 = 2). 	<ul style="list-style-type: none"> • Check wiring of the analog X3/A11 input terminal for open circuit. • Check minimum current values of the signal sources.

An02: AIN2_I < 4 mA [xx.0125.00002]

Response (Lenze setting printed in bold)	Setting: C00598/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Open-circuit monitoring for analog input 2 has tripped. <ul style="list-style-type: none"> • Only if the analog input has been configured as a current loop of 4 ... 20 mA (C00034/2 = 2). 	<ul style="list-style-type: none"> • Check wiring of the analog X3/A21 input terminal for open circuit. • Check minimum current values of the signal sources.

Io11: DigOut level [xx.0125.00011]

Response (Lenze setting printed in bold)	Setting: C00598/3 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
The actual level of a digital output does not correspond to the setpoint level.	<ul style="list-style-type: none"> • Check wiring of the digital output terminal for short circuit to earth. • Check whether the digital output terminal is by mistake triggered externally with a HIGH signal although a LOW signal should be output.

CE04: MCI communication error [xx.0127.00002]

Response (Lenze setting printed in bold)	Setting: C01501/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
Communication error with extension module in slot 1.	<ul style="list-style-type: none"> • Eliminate EMC interference. • Switch off inverter, correctly plug in the module, switch on the inverter again. • Switch mains or restart inverter. • Replace module/inverter. • Please contact Lenze if the problem occurs again.

9 Diagnostics & error management

9.10 Error messages of the operating system

CE0F: MCI control word [xx.0127.00015]

Response (Lenze setting printed in bold)	Setting: C00594/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Bit 14 ("SetFail") of the wMciCtrl control word of the LS DriveInterface system block has been set.	Trace back signal source on the bus (e.g. PROFIBUS) that sets bit 14 ("SetFail").

CE4: CAN bus off [xx.0131.00000]

Response (Lenze setting printed in bold)	Setting: C00592/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN interface : "Bus off" status <ul style="list-style-type: none"> Received too many faulty telegrams. Damaged cable (e.g. loose contact). Two nodes with the same ID. 	<ul style="list-style-type: none"> Check wiring and bus terminating resistor. Set identical baud rate for each bus node. Assign different IDs to nodes. Eliminate electrical interference (e.g. EMC).

CA06: CAN CRC error [xx.0131.00006]

Response (Lenze setting printed in bold)	Setting: C00592/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN interface : A faulty CAN telegram has been detected.	<ul style="list-style-type: none"> Check wiring and bus terminating resistor. Eliminate electrical interference (e.g. EMC).

CA07: CAN bus warning [xx.0131.00007]

Response (Lenze setting printed in bold)	Setting: C00592/3 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN interface : Incorrect transmission or reception of more than 96 CAN telegrams. <ul style="list-style-type: none"> The current number of incorrectly transmitted CAN telegrams is displayed in C00372/1. The current number of incorrectly received CAN telegrams is displayed in C00372/2. The current CAN error status is displayed in C00345. 	<ul style="list-style-type: none"> Check wiring and bus terminating resistor. Set identical baud rate for each bus node. Assign different IDs to nodes. Eliminate electrical interference (e.g. EMC).

CA08: CAN bus stopped [xx.0131.00008]

Response (Lenze setting printed in bold)	Setting: C00592/4 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN interface : The device has received the "Stop Remote Node" NMT telegram.	Check CAN master (NMT master).

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9.10 Error messages of the operating system

CA0b: CAN HeartBeatEvent [xx.0131.00011]

Response (Lenze setting printed in bold)		Setting: C00592/5 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
<p>CAN interface: Cyclic node monitoring</p> <ul style="list-style-type: none"> • Being a Heartbeat consumer, the device has not received a Heartbeat telegram from Heartbeat producer 1 ... 15 within the defined time. • The current states of the Heartbeat producers are displayed in C00347/1...15. 	<ul style="list-style-type: none"> • Reactivate Heartbeat producers by mains switching, restarting the inverter, or a CAN Reset Node. • Reparameterise CAN Heartbeat producer time or switch off consumer monitoring and reset error status if latched. <p>▶ Heartbeat protocol</p>	

CA0F: CAN control word [xx.0131.00015]

Response (Lenze setting printed in bold)		Setting: C00594/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
<p>Bit 14 ("SetFail") in the wCANControl control word of the LS DriveInterface system block has been set.</p>	Trace back signal source on the CAN bus that sets bit 14 ("SetFail").	

CE1: CAN RPDO1 [xx.0135.00001]

Response (Lenze setting printed in bold)		Setting: C00593/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
<p>CAN interface: Time monitoring for RPDO1 has been triggered.</p> <ul style="list-style-type: none"> • RPDO1 has not been received within the monitoring time set in C00357/1 or was faulty. 	<ul style="list-style-type: none"> • Set correct telegram length for CAN master (transmitter). • Eliminate electrical interference (e.g. EMC). • Adjust monitoring time C00357/1 or switch off time monitoring. 	

CE2: CAN RPDO2 [xx.0135.00002]

Response (Lenze setting printed in bold)		Setting: C00593/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
<p>CAN interface: Time monitoring for RPDO2 has been triggered.</p> <ul style="list-style-type: none"> • RPDO2 has not been received within the monitoring time set in C00357/2 or was faulty. 	<ul style="list-style-type: none"> • Set correct telegram length for CAN master (transmitter). • Eliminate electrical interference (e.g. EMC). • Adjust monitoring time C00357/2 or switch off time monitoring. 	

CE3: CAN RPDO3 [xx.0135.00003]

Response (Lenze setting printed in bold)		Setting: C00593/3 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
<p>CAN interface: Time monitoring for RPDO3 has been triggered.</p> <ul style="list-style-type: none"> • RPDO3 has not been received within the monitoring time set in C00357/3 or was faulty. 	<ul style="list-style-type: none"> • Set correct telegram length for CAN master (transmitter). • Eliminate electrical interference (e.g. EMC). • Adjust monitoring time C00357/3 or switch off time monitoring. 	

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CE5: CAN RPDO4 [xx.0135.00004]

Response (Lenze setting printed in bold)		Setting: C00593/4 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
<p>CAN interface: Time monitoring for RPDO4 has been triggered.</p> <ul style="list-style-type: none"> RPDO4 has not been received within the monitoring time set in C00357/4 or was faulty. 	<ul style="list-style-type: none"> Set correct telegram length for CAN master (transmitter). Eliminate electrical interference (e.g. EMC). Adjust monitoring time C00357/4 or switch off time monitoring. 	

CI01: Module missing/incompatible [xx.0140.00013]

Response (Lenze setting printed in bold)		Setting: C01501/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
The optional communication module has been removed or there is a connection problem or incompatibility with the standard device.	<ul style="list-style-type: none"> Check connection between the communication module and standard device. Check if the module is plugged in correctly. In case of an incompatibility, either the module or the software of the standard device is out of date. In this case, please contact Lenze. 	

PS01: No memory module [xx.0144.00001]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
Memory module is either not available or not snapped into place correctly.	<ul style="list-style-type: none"> If a memory module has been provided: Plug the memory module into the slot of the standard device intended for this purpose. If a memory module has been provided: Check if the memory module has been plugged-in correctly. 	

PS02: Par. set invalid [xx.0144.00002]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
<p>The parameter set stored in the memory module is invalid. The reason for this can be as follows:</p> <ul style="list-style-type: none"> Incomplete storage of the parameter set due to voltage failure. The plugged-in module stems from a device with new firmware (compare C00099) or from a different device type (e.g. 8400 BaseLine). 	<p>The error can only be removed by loading the Lenze setting with the C00002/1 = "1: On / start" device command.</p> <ul style="list-style-type: none"> In order to prevent the error, do not switch off the voltage during the saving process. If the parameter set is to be transferred from one device with a higher version to a device with a lower version, use the "copy parameter set" function of the keypad. Make sure that you do not use functions that are not available in the older device. 	

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PS03: Par. set device invalid [xx.0144.00003]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>The parameter set saved to the memory module is incompatible to the standard device.</p> <ul style="list-style-type: none"> An incompatibility of the parameter set is caused e.g. when the memory module of an 8400 HighLine is plugged into an 8400 StateLine or the parameter set in the memory module has a higher version than expected by the standard device. <p>If the parameter set stored in the memory module is compatible with the standard device but has a different (lower) version, this message is only output as "Information". The message can be eliminated by saving the parameter set again.</p> <p>Note: If you save the parameter set to a higher device version, you can no longer load this parameter set to a lower device version.</p> <p>▶ Replacement of the inverter</p>	<p>When the memory modules are replaced, observe the compatibility:</p> <ul style="list-style-type: none"> OK: StateLine V2.0 to StateLine V3.0 OK: StateLine V2.0 to HighLine V2.0 Not OK: HighLine Vx.x to StateLine Vx.x Not OK: StateLine V3.0 to StateLine < V3.0

PS04: Par. set Mci invalid [xx.0144.00004]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>The parameter set saved to the communication module is incompatible to the standard device.</p> <ul style="list-style-type: none"> An incompatibility of the parameter set is caused e.g. when the MCI module parameters in the memory module do not match the plugged communication module. 	<p>When the memory modules are replaced, observe the compatibility:</p> <ul style="list-style-type: none"> Not OK: Profibus V1.0 to EtherCAT V1.0

PS07: Par. memory module invalid [xx.0144.00007]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>The parameter set saved to the memory module is invalid.</p> <ul style="list-style-type: none"> The error occurs while loading the parameter set. The memory module plugged in the device lacks a code or a code is incorrect. 	<p>Please contact Lenze.</p>

PS08: Par. device invalid [xx.0144.00008]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
<p>The parameter set in the device is invalid.</p> <ul style="list-style-type: none"> The error occurs while loading the parameter set. One code in the device is incorrect. 	<p>Please contact Lenze.</p>

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PS09: Par. format invalid [xx.0144.00009]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The code format is invalid. <ul style="list-style-type: none">• The error occurs while loading the parameter set.	Please contact Lenze.

PS10: Memory module binding invalid [xx.0144.00010]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device personalisation is active: The binding ID of the memory module does not comply with the binding ID of the inverter.	<ul style="list-style-type: none">• Use memory module/inverter with matching binding IDs.• Contact machine manufacturer. Note: It is not possible for Lenze to modify a replacement device via special accesses in such a way that it cooperates with a personalised memory module.

PS11: Lenze setting loaded [xx.0144.00011]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
The process of loading the Lenze setting is entered in the logbook.	

PS12: Parameter sets loaded [xx.0144.00012]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
The process of loading the parameter sets is entered in the logbook.	

PS13: Parameter sets saved [xx.0144.00013]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
The process of saving the parameter sets is entered in the logbook.	

dF01: FW updated [xx.0145.00001]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	<ul style="list-style-type: none">• Reduce switching frequency (C00018) to 4 kHz.• Please contact Lenze if the problem occurs again.

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dF14: SW-HW invalid [xx.0145.00014]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

dF18: BU RCOM error [xx.0145.00024]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

dF25: CU RCOM error [xx.0145.00025]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

dF26: Appl. watchdog [xx.0145.00026]

Response (Lenze setting printed in bold)		Setting: C00580/1 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
Time-out of the application. The required computing time of the application exceeds the available computing time.	Reduction of the function block interconnection or the complexity of the application.	

dF21: BU watchdog [xx.0145.00033]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

dF22: CU watchdog [xx.0145.00034]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

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dF10: AutoTrip reset [xx.0145.00035]

Response (Lenze setting printed in bold)		Setting: C00189 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input checked="" type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
Too frequent auto-trip reset.	<ul style="list-style-type: none"> • Check the error cause that activates the auto-trip reset. • Eliminate error cause and reset (acknowledge) error manually afterwards. 	

dF50: Retain error [xx.0145.00050]

Response (Lenze setting printed in bold)		
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
An error has occurred when accessing retain data. <ul style="list-style-type: none"> • Either caused by an internal hardware error or by lack of mains switching after a firmware download. 	Mains switching <ul style="list-style-type: none"> • Please contact Lenze if the problem occurs again. 	

dF51: CuCcr error [xx.0145.00051]

Response (Lenze setting printed in bold)		
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
Device error	Mains switching <ul style="list-style-type: none"> • Please contact Lenze if the problem occurs again. 	

dF52: BuCcr error [xx.0145.00052]

Response (Lenze setting printed in bold)		
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information		
Cause	Remedy	
Device error	Mains switching <ul style="list-style-type: none"> • Please contact Lenze if the problem occurs again. 	

Ck01: Pos. HW limit switch [xx.0184.00001]

Response (Lenze setting printed in bold)		Setting: C00595/1 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
MCK: The hardware limit switch in positive traversing direction has tripped. <ul style="list-style-type: none"> • The <i>bLimitSwitchPos</i> input for travel range monitoring via positive hardware limit switch has been set to FALSE (fail-safe). 	Reset error message and retract limit switch.	

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Ck02: Neg. HW limit switch [xx.0184.00002]

Response (Lenze setting printed in bold)		Setting: C00595/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☒ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
MCK: The hardware limit switch in negative traversing direction has tripped. <ul style="list-style-type: none"> The <i>bLimitSwitchNeg</i> input for travel range monitoring via negative hardware limit switch has been set to FALSE (fail-safe). 	Reset error message and retract limit switch.	

Ck15: Error status sign. brake [xx.0184.00005]

Response (Lenze setting printed in bold)		Setting: C00595/2 (☑ Adjustable response)
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☒ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
MCK: The status monitoring of the holding brake control has tripped.	<ul style="list-style-type: none"> Check configuration of the <i>bMBrakeApplied</i> input for status detection of the brake (via a switching contact at the brake). Check wiring/function of the switching contact. Adapt waiting time (C02589/3). Deactivate status monitoring (via bit 5 in C02582). 	

Ck03: Pos. SW limit position [xx.0184.00007]

Response (Lenze setting printed in bold)		Setting: C00595/3 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☒ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
MCK: The device has detected that the position is outside the positive software limit position (C01229/1).	<ul style="list-style-type: none"> Increase permissible traversing range (change setting of the software limit positions). Deactivate software limit position monitoring. 	

Ck04: Neg. SW limit position [xx.0184.00008]

Response (Lenze setting printed in bold)		Setting: C00595/4 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☒ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information		
Cause	Remedy	
MCK: The device has detected that the position is outside the negative software limit position (C01229/2).	<ul style="list-style-type: none"> Increase permissible traversing range (change setting of the software limit positions). Deactivate software limit position monitoring. 	

Ck17: Direction conflict Ccw [xx.0184.00009]

Response (Lenze setting printed in bold)		Setting: C00595/4 (☑ Adjustable response)
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☒ 6: Information		
Cause	Remedy	
Positioning profile is started in positioning mode 5 or 12 (absolute (Ccw) or absolute (Ccw) to TP); however, the Cw rotating direction is defined by the profile generation.	Start positioning with zero speed.	

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Ck18: Direction conflict Cw [xx.0184.00010]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
Positioning profile is started in positioning mode 4 or 11 (absolute (Ccw) or absolute (Ccw) to TP); however, the Ccw rotating direction is defined by the profile generation.	Start positioning with zero speed.

Ck14: Target position outside SW limit position [xx.0184.00015]

Response (Lenze setting printed in bold)		Setting: C00595/14 <input checked="" type="checkbox"/> Adjustable response
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
MCK: It has been attempted to position a target outside the software limit positions (C01229/1 and C01229/2).	<ul style="list-style-type: none"> • Select a target within the software limit positions. • Increase permissible traversing range (change setting of the software limit positions). • Deactivate software limit position monitoring. 	

Ck16: Time overflow manual operation [xx.0184.00064]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
PC manual control: The connection monitoring has tripped. <ul style="list-style-type: none"> • The online connection between the PC and the inverter has been interrupted for a longer period of time than the timeout set in C00464/1. 	<ul style="list-style-type: none"> • Check communication link between PC and inverter. • Check voltage supply/function of the inverter. • Adjust the timeout (C00464/1).

Ck05: Following error 1 [xx.0184.00153]

Response (Lenze setting printed in bold)		Setting: C00595/5 <input checked="" type="checkbox"/> Adjustable response
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
MCK: Following error limit 1 (C01215/1) has been exceeded.	<ul style="list-style-type: none"> • Optimise control mode. • Increase following error limit. • Deactivate following error monitoring. 	

Ck06: Following error 2 [xx.0184.00154]

Response (Lenze setting printed in bold)		Setting: C00595/6 <input checked="" type="checkbox"/> Adjustable response
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information		
Cause	Remedy	
MCK: Following error limit 2 (C01215/2) has been exceeded.	<ul style="list-style-type: none"> • Optimise control mode. • Increase following error limit. • Deactivate following error monitoring. 	

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Ck07: Travel range limit exceeded [xx.0184.00155]

Response (Lenze setting printed in bold)	Setting: C00595/7 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
MCK: The maximum travel distance has been exceeded. <ul style="list-style-type: none"> The maximum travel distance is displayed in C01213/1. 	<ul style="list-style-type: none"> Check profile parameters. Deactivate travel range limit monitoring.

Ck08: Home position unknown [xx.0184.00156]

Response (Lenze setting printed in bold)	Setting: C00595/8 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
MCK: Home position is unknown.	Perform homing.

Ck09: Positioning mode invalid [xx.0184.08005]

Response (Lenze setting printed in bold)	Setting: C00595/9 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
MCK: The positioning mode defined via the <i>wPosProfileMode</i> input is not supported.	Define a valid positioning mode.

Ck10: Implausible profile data [xx.0184.08007]

Response (Lenze setting printed in bold)	Setting: C00595/10 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
<p>Cause 1: The profile data result in a braking distance that is longer than the distance to be travelled.</p> <ul style="list-style-type: none"> a: Occurs if a small specified distance within a few increments is to be positioned with final speed and S rounding. b: It has been detected that the braking distance required for sizing the profile phases correctly regarding the S rounding and overchange is longer than the selected distance in the first cycle when <i>bExecute</i> = TRUE. <p>Cause 2: Reversing process in overchange profile linkage</p> <ul style="list-style-type: none"> If the linkage of two profiles with final speed causes a reversing process in the second profile and this is to smooth another sequence profile with final speed too, the error is set and ramped down to standstill. <p>Cause 3: Final speed at overchange is higher than maximum profile speed</p> <p>Cause 4: Traversing, accelerating or braking is not possible due to 0-parameters for speed, acceleration or deceleration.</p>	<p>On cause 1a:</p> <ul style="list-style-type: none"> Set the S rounding to zero for the respective profile and go to the next profile with final speed zero. <p>On cause 1b:</p> <ul style="list-style-type: none"> The error can be avoided with C02868/Bit02! <p>On cause 2:</p> <ul style="list-style-type: none"> The continuous profile linkage with overchange must not provide any reversing process due to the profile selection. Here, the profile which causes a reversing must be defined with the final speed 0. From version 16.00.00 onwards, the following modes with final speed are possible via C02868/Bit02: <ul style="list-style-type: none"> Reversing Profiles where the final speed cannot be reached <p>On cause 3:</p> <ul style="list-style-type: none"> Profiles in an overchange profile linkage with final speeds higher than their max. profile speeds are not supported. The final speed of a profile is limited internally to the max. profile speed in the profile data set. The error can be avoided with C02868/Bit02! <p>On cause 4:</p> <ul style="list-style-type: none"> Ensure that the corresponding profile parameters for speed, acceleration and deceleration are set to non-zero when starting a traversing process.

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Ck11: Invalid operating mode [xx.0184.08009]

Response (Lenze setting printed in bold)	Setting: C00595/11 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
MCK: The operating mode defined via the <i>wMckOperationMode</i> input is not supported.	Define a valid operating mode.

Ck12: Invalid profile number [xx.0184.08014]

Response (Lenze setting printed in bold)	Setting: C00595/12 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
MCK: The positioning profile number in the positioning operating mode specified via the <i>wPosProfileNo</i> input is invalid.	Define a valid profile number.

Ck13: Error - MCKCtrlInterface function block [xx.0184.08015]

Response (Lenze setting printed in bold)	Setting: C00595/13 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input checked="" type="checkbox"/> 3: TroubleQuickStop <input checked="" type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input checked="" type="checkbox"/> 6: Information	
Cause	Remedy
MCK: An error in the L_MckCtrlInterface_1 function block has occurred.	Check the configuration and parameterisation of the L_MckCtrlInterface_1 FB. In this regard, also observe the status messages of the FB (<i>wFailState</i> or C01299 output).

dH09: EEPROM power section [xx.0400.00009]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

dH10: Fan failure [xx.0400.00016]

Response (Lenze setting printed in bold)	Setting: C00566 (<input checked="" type="checkbox"/> Adjustable response)
<input checked="" type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input checked="" type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The device fan has failed. Possible causes: <ul style="list-style-type: none">• The short-circuit check of the fan connection has tripped.• The speed monitoring of the fan has tripped.	<ul style="list-style-type: none">• Check the fan for short-circuit.• Clean the fan.

dH20: Brake output failure [xx.0400.00032]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
The output for the motor holding brake has failed. Possible causes: <ul style="list-style-type: none">• Overload of the output, for instance by a short circuit.	The inverter must be replaced because the output for the motor holding brake is not available anymore.

9 Diagnostics & error management

9.10 Error messages of the operating system

dH68: Adjustment data error CU [xx.0400.00104]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

dH69: Adjustment data error BU [xx.0400.00105]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

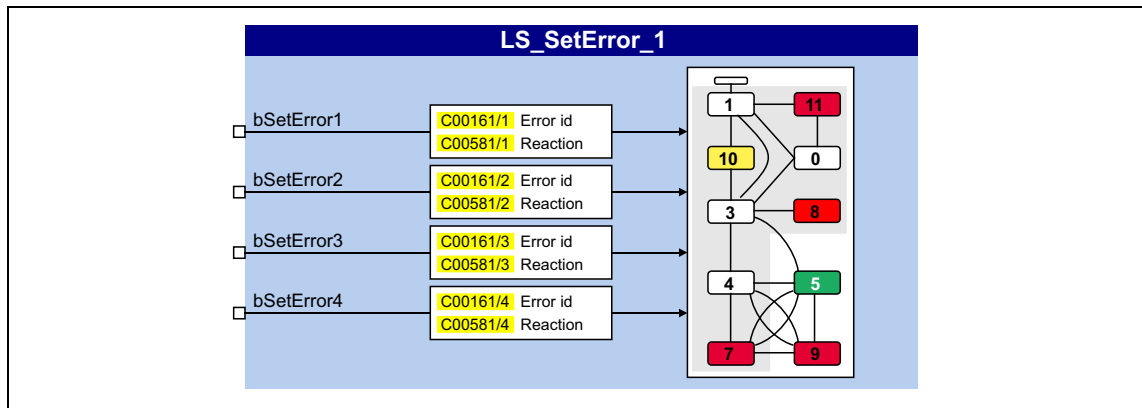
dH70: ControlUnit is unequal to BaseUnit [xx.0400.00106]

Response (Lenze setting printed in bold)	
<input type="checkbox"/> 0: No Reaction <input checked="" type="checkbox"/> 1: Fault <input type="checkbox"/> 2: Trouble <input type="checkbox"/> 3: TroubleQuickStop <input type="checkbox"/> 4: WarningLocked <input type="checkbox"/> 5: Warning <input type="checkbox"/> 6: Information	
Cause	Remedy
Device error	Please contact Lenze.

9.11 "LS_SetError_1" system block

This system block is used to implement error handling within the application.

- The application can trip up to four different user error messages with parameterisable error IDs and error responses via the four boolean inputs.
- If several inputs are set to TRUE at the same time, the input with the lowest number will trip the error message.



Inputs

Designator	Data type	Information/possible settings
bSetError1	BOOL	Input for tripping " <u>User error 1</u> " <ul style="list-style-type: none"> • Error subject number: 980 • Error number: $(C00581/1 \times 0x0400000) + (980 \times 0x10000) + (C00161/1)$
bSetError2	BOOL	Input for tripping " <u>User error 2</u> " <ul style="list-style-type: none"> • Error subject number: 981 • Error number: $(C00581/2 \times 0x0400000) + (981 \times 0x10000) + (C00161/2)$
bSetError3	BOOL	Input for tripping " <u>User error 3</u> " <ul style="list-style-type: none"> • Error subject number: 982 • Error number: $(C00581/3 \times 0x0400000) + (982 \times 0x10000) + (C00161/3)$
bSetError4	BOOL	Input for tripping " <u>User error 4</u> " <ul style="list-style-type: none"> • Error subject number: 983 • Error number: $(C00581/4 \times 0x0400000) + (983 \times 0x10000) + (C00161/4)$

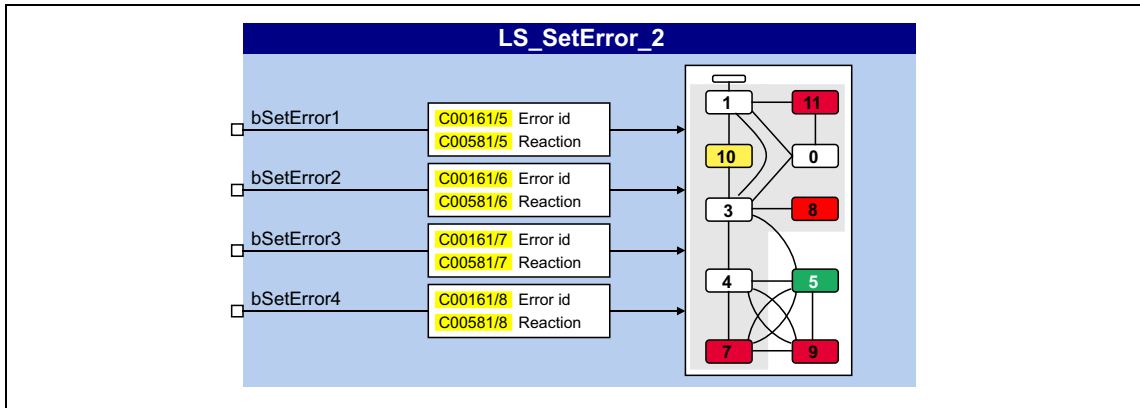
Parameters

Parameters	Possible settings	Info														
C00161/1...4	0 ... 65535	Error ID for user errors 1 ... 4														
C00581/1...4	<table border="1"> <tr><td>0</td><td>No Reaction</td></tr> <tr><td>1</td><td>Fault</td></tr> <tr><td>2</td><td>Trouble</td></tr> <tr><td>3</td><td>TroubleQuickStop</td></tr> <tr><td>4</td><td>WarningLocked</td></tr> <tr><td>5</td><td>Warning</td></tr> <tr><td>6</td><td>Information</td></tr> </table>	0	No Reaction	1	Fault	2	Trouble	3	TroubleQuickStop	4	WarningLocked	5	Warning	6	Information	Response to user errors 1 ... 4
0	No Reaction															
1	Fault															
2	Trouble															
3	TroubleQuickStop															
4	WarningLocked															
5	Warning															
6	Information															

9.12 "LS_SetError_2" system block

This system block is used to implement error handling within the application.

- The application can trip up to four different user error messages with parameterisable error IDs and error responses via the four boolean inputs.
- If several inputs are set to TRUE at the same time, the input with the lowest number will trip the error message.



Inputs

Designator	Data type	Information/possible settings
bSetError1	BOOL	Input for tripping " User error 5 " <ul style="list-style-type: none"> • Error subject number: 984 • Error number: $(C00581/5 \times 0x0400000) + (984 \times 0x10000) + (C00161/5)$
bSetError2	BOOL	Input for tripping " User error 6 " <ul style="list-style-type: none"> • Error subject number: 985 • Error number: $(C00581/6 \times 0x0400000) + (985 \times 0x10000) + (C00161/6)$
bSetError3	BOOL	Input for tripping " User error 7 " <ul style="list-style-type: none"> • Error subject number: 986 • Error number: $(C00581/7 \times 0x0400000) + (986 \times 0x10000) + (C00161/7)$
bSetError4	BOOL	Input for tripping " User error 8 " <ul style="list-style-type: none"> • Error subject number: 987 • Error number: $(C00581/8 \times 0x0400000) + (987 \times 0x10000) + (C00161/8)$

Parameters

Parameters	Possible settings	Info														
C00161/5...8	0 ... 65535	Error ID for user errors 5 ... 8														
C00581/5...8	<table border="1"> <tr><td>0</td><td>No Reaction</td></tr> <tr><td>1</td><td>Fault</td></tr> <tr><td>2</td><td>Trouble</td></tr> <tr><td>3</td><td>TroubleQuickStop</td></tr> <tr><td>4</td><td>WarningLocked</td></tr> <tr><td>5</td><td>Warning</td></tr> <tr><td>6</td><td>Information</td></tr> </table>	0	No Reaction	1	Fault	2	Trouble	3	TroubleQuickStop	4	WarningLocked	5	Warning	6	Information	Response to user errors 5 ... 8
0	No Reaction															
1	Fault															
2	Trouble															
3	TroubleQuickStop															
4	WarningLocked															
5	Warning															
6	Information															

10 Oscilloscope function

This function extension is available from version 12.00.00!

The oscilloscope function integrated in the 8400 protec HighLine can be used as support for commissioning, maintenance, and troubleshooting. It is operated via a user interface in the engineering tool.

Typical applications

- Graphic display of measured variable (e.g. speed setpoint, actual speed value and torque)
- Detection of process values without additional measuring instruments (e.g. oscilloscope, voltmeter and ammeter)
- Convenient documentation for fine tuning of control circuits or parameter changes of the controller

Special features

- Recording and saving of measured values in the 8400 protec HighLine
- Simultaneous measuring on eight independent channels
- Measuring fast and slow signals by means of adjustable sample rate
- Triggering on a channel, an application variable or system event
- Detecting measured values before and after the trigger event
- Transferring measured values to the Engineering PC for the purpose of graphic display and evaluation in the engineering tool
- The measured values represented in the form of interpolated curves can be optionally shown and hidden, represented in any colour or overlaid with the signal characteristics of other variables recorded.
- Cursor and zoom function for the measurement analysis
- Saving & loading oscilloscope configurations on the Engineering PC
- Export of measured values via the clipboard for further processing
- Linking channel values with arithmetic operations (addition, subtraction and multiplication)
- Simple signal analysis by frequency transformation of time signals with FFT ("Fast Fourier Transformation").

Functional description

When an online connection to the 8400 protec HighLine has been established, use the oscilloscope user interface of the engineering tool to set the trigger condition and the sample rate and select the signal sources to be recorded. Here, "signal sources" are the internal output signals of the function, system, application and port blocks.

The changed configuration is only then taken over by the device when pressing the "start" button in the toolbar.

The values are validated after each input acknowledgement by the "Return" key. If the check shows invalid settings, the oscilloscope triggers an error.

With an online connection, the measured values contained in the 8400 protec HighLine are transferred to the engineering tool and graphically presented on the oscilloscope user interface as soon as the measurement has been completed.

10.1 Technical data

Oscilloscope function of 8400 protec HighLine	
Number of channels	1 ... 8
Depth of the measured value memory	Max. 8192 measured values, depending on the number of channels and the size of the signal sources to be recorded
Data width of a channel	Max. 32 bits, corresponding to the data type of the signal sources to be recorded
Sample rate	1 ms or a multiple thereof
Time base	5, 10, 20, 50, 100, 200, 500 ms or 1 s
Trigger level	Corresponding to the value range of the signal sources to be triggered
Trigger selection	The trigger is activated if the trigger value set for the respective channel is fallen short of or exceeded. The trigger value "must actually pass" the threshold.
Trigger delay	- 200 % ... + 200 %
Trigger source	Channel 1 ... 8

10.2 Operation

This chapter describes step-by-step how to record the signal characteristics of 8400 protec HighLine signal sources and represent, analyse, document and process them in the oscilloscope.



Note!

Recording can only be started when an online connection has been established to the 8400 protec HighLine.

10.2.1 User interface

The oscilloscope user interface is available in the following Lenze engineering tools:

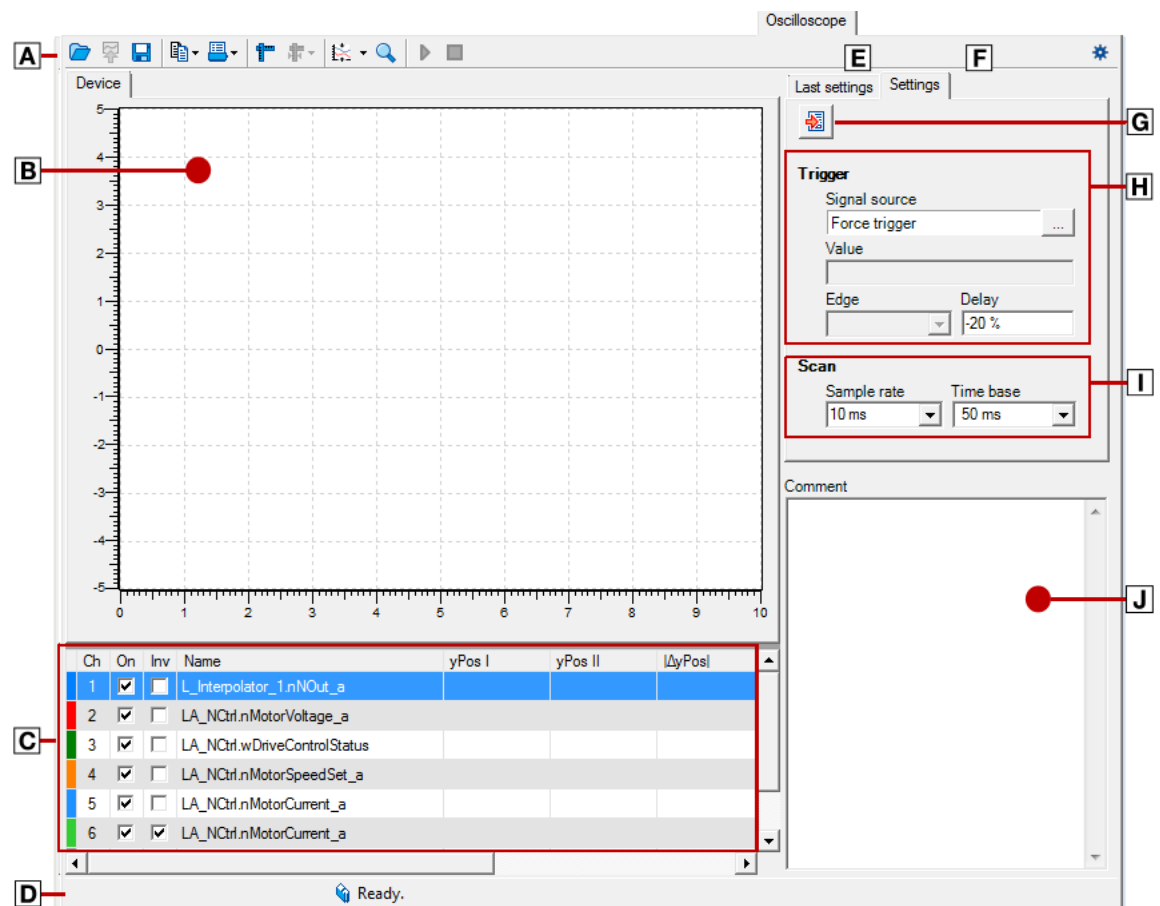
<input checked="" type="checkbox"/> »Engineer« from version 2.16	<input type="checkbox"/> »PLC Designer«	<input checked="" type="checkbox"/> »EASY Starter« from version 1.9
--	---	---



How to go to the oscilloscope user interface:












1. Go to the *Project view* and select the servo inverter.
2. Select the **Oscilloscope** tab from the *Workspace*.

The oscilloscope user interface contains the following control and function elements:



- A** [Oscilloscope toolbar](#)
- B** [Oscillogram selection](#)
- C** Channel list
 - ▶ [Selecting the signal sources to be recorded](#)
- D** Status bar
- E** [Last settings](#)
- F** Settings
- G** Import settings from a loaded oscillogram
- H** [Trigger settings](#)
- I** Input fields for [sampling rate and time base](#)
- J** Input field for [comments](#)

Oscilloscope toolbar

Symbol	Function
	Loading the oscillogram file (📖 665)
	Upload recorded oscillogram from device <ul style="list-style-type: none"> • Transmit values from the measured value memory of the 8400 protec HighLine to the Engineering PC. • Only possible when an online connection has been established to the 8400 protec HighLine.
	Saving the oscillogram in a file (📖 664)
	Copy to clipboard: Copy as text Copy as picture Copy as table <ul style="list-style-type: none"> • For documentation purposes, it is possible to copy the measured value of an oscilloscope as a table or, alternatively, the oscilloscope user interface as a picture, to the clipboard for use in other programs.
	Printer settings Print view Print
	Show cursor
	Automatically scale vertically <ul style="list-style-type: none"> • Set all Y positions to zero
	Activate zoom function <ul style="list-style-type: none"> ▶ Adjusting the representation (📖 659)
	Start recording <ul style="list-style-type: none"> • The settings are transferred to the device and the recording is started.
	Stop recording
	Oscilloscope settings <ul style="list-style-type: none"> • Cyclic recording of oscillograms • Always load oscillograms after recording is completed without a query

10.2.2 Selecting the signal sources to be recorded

The oscilloscope supports up to eight channels. Thus, the **channel list** can record maximally eight signal sources.

The **channel list** serves to configure the signal sources to be recorded. Four signal sources have already been selected in the default setting:

Ch	On	Inv	Name	yPos I	yPos II	ΔyPos	Unit	AS	1/Div	Offset	Position
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	L_Interpolator_1.nNOUt_a				%	<input checked="" type="checkbox"/>	50	0	2.63870
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LA_NCtrl.nMotorVoltage_a				V	<input type="checkbox"/>	100	0	1.5650
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LA_NCtrl.wDriveControlStatus					<input checked="" type="checkbox"/>	2 k	0	0.680
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LA_NCtrl.nMotorSpeedSet_a				rpm	<input type="checkbox"/>	2 k	0	-0.35675...
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	LA_NCtrl.nMotorCurrent_a				A	<input checked="" type="checkbox"/>	1	0	-1.460
6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	LA_NCtrl.nMotorCurrent_a				A	<input checked="" type="checkbox"/>	500 m	0	-1.370
7	<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>			
8	<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>			

Name	Meaning
-	Curve colour for representation in the oscillogram • A double-click on the colour area of the channel serves to set a user-defined colour.
Ch	Channel number
On	Cam visible / invisible
Inv	Inversion yes / no
Name	Name of the signal source
yPos I	y position of cursor I
yPos II	y position of cursor II
ΔyPos	Difference of the y positions of both cursors • Difference = yPos I - yPos II
Unit	Unit of the signal source
AS	Select/deselect channel for automatic scaling
1/Div	Vertical scaling factor
Offset	Offset value • The offset value is subtracted from the recorded raw value before scaling is executed. This serves, for instance, to make very slight value fluctuations visible within one constantly very high recording value (e.g. harmonics with low amplitude).
Position	Position value • The position value determines the vertical position of the zero point of the y axis of a curve with regard to the vertical curve scale (- 5 ... + 5).



How to select a signal source for recording:

1. Double-click a non-assigned line in the **channel list** to open the *Select signal source* dialog box.
 - Double-clicking an already pre-assigned selection enables you to assign it with another signal source.
2. Select a new variable in the *Select signal source* dialog box.
3. Click the **OK** button.
 - The dialog box is closed and the selection is accepted.



How to delete a selection:

1. Go to the **channel list** and click the signal source to be removed.
2. Right-click the *context menu* to open it.
3. Select the **Delete signal source** command in the *context menu*.

You can add so many signal sources for recording until all eight channels are assigned.

10.2.3 Selecting the recording time/sample rate




How to define the sampling rate and time base for recording:


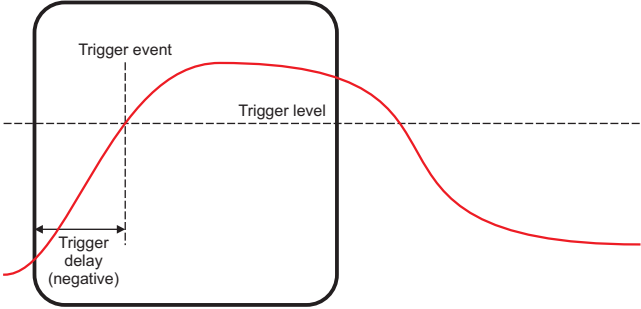
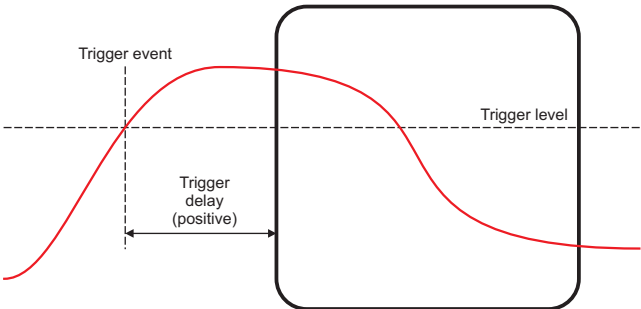
1. Select the desired time base from the **time base** list field.
 - The current time base setting multiplied by ten results in the recording time.
 - Since the measured value memory of the 8400 protec HighLine has a limited capacity, usually a compromise is made between sample rate and recording time.
2. Enter the desired sampling rate in [ms] in the **sampling rate** input field.

10.2.4 Selecting the trigger condition

The trigger condition serves to define the starting time of recording in the 8400 protec HighLine. The oscilloscope provides various trigger conditions by means of which recording of the measured values can be controlled.



If the **Last settings** tab is in the foreground, click the **Settings** tab to show the input fields for configuring the trigger condition. The **Settings** tab contains the button  which serves to import settings from a loaded oscillogram.

setting	Function
Signal source	Selection of the trigger source
Variable	Selection of an application variable as signal source
Channel	The oscilloscope triggers on a channel configured in the channel list .
System event	The following system events serve as trigger source: <ul style="list-style-type: none"> • Fault, • Warning • Error
Direct trigger	No trigger condition, recording takes place immediately after clicking the symbol  in the <i>oscilloscope toolbar</i> .
Value	Value from which on triggering is activated.
Deceleration	Delay between recording and trigger event. Unit: [%]
Trigger delay	Select a negative delay time to detect signals prior to the trigger event. <div style="text-align: center;">  </div> <ul style="list-style-type: none"> • In the oscillogram, the trigger time is marked by a dashed line. • When triggering on occurrence of an event, it is thus possible to detect the values that have caused the event. <p>Select a positive delay time to detect signals occurring a certain time after the trigger event.</p> <div style="text-align: center;">  </div>
Edge	Three trigger types are available:
Positive edge	First, the selected trigger value must be fallen below and then exceeded in order that the trigger is activated.
Negative edge	First, the selected trigger value must be exceeded and then fallen below in order that the trigger is activated.
Change	For triggering on a Boolean signal source: <ul style="list-style-type: none"> • Trigger activation requires a state change. For triggering on a different signal source: <ul style="list-style-type: none"> • The current value must be different than the last value in order that the trigger is activated.


10.2.5 Starting recording



Note!

Recording can only be started when an online connection has been established to the 8400 protec HighLine.




Go to the *oscilloscope toolbar* and click the  button to activate recording. Recording starts as a function of the settings for triggering the signal source.

To obtain a maximum sample rate when recording the signal source values, the data are first stored in the measured value memory of the 8400 protec HighLine and then transferred to the Engineering PC. The current recording status is displayed in the status bar.

10.2.6 Cyclic recording



How to record oscillogram cyclically:

1. Click the  symbol in the *oscilloscope toolbar* to open the **Oscilloscope settings** dialog box.
2. In order that the recording process is restarted automatically after the upload of an oscillogram, set the checkmark accordingly.
 - Cyclic recording is only possible for time base values ≥ 500 ms.


For monitoring certain situations, this serves, for instance, to obtain the increased view of the interesting part of a characteristic even after the cyclic update, as originally zoomed.


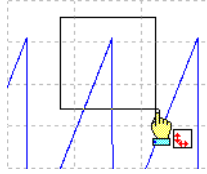





10.2.7 Adjusting the representation

After the variable values have been recorded and the oscillogram has been transferred to the PC, it is visualised. If required, the representation can now be adjusted by using the zoom or the automatic scaling function.

Zoom function



Go to the *oscilloscope toolbar* and click the  icon to activate the zoom function.



Zoom function	Procedure	
Zoom selection		<p>Hold down the left mouse button and draw the oscillogram section to be zoomed:</p>  <ul style="list-style-type: none"> • While being drawn, the selection is shown with a frame. • When the left mouse button is released, the selection is zoomed in the oscillogram.
Horizontal stretching		Hold down the left mouse button and move the mouse pointer on the horizontal scale to the left to stretch the shown selection from the right edge.
		Hold down the right mouse button and move the mouse pointer on the horizontal scale to the right to stretch the shown selection from the left edge.
	Moving the mouse pointer in opposite direction continuously reduces the stretching.	
Vertical stretching		Hold down the left mouse button and move the mouse pointer on the vertical scale to the bottom to stretch the shown selection from the top.
		Hold down the right mouse button and move the mouse pointer on the vertical scale to the top to stretch the shown selection from the bottom.
	Moving the mouse pointer in opposite direction continuously reduces the stretching.	
Return to original representation		Click the right mouse button in the oscillogram to return step by step to the original representation.

Automatic scaling function

Use the automatic scaling function to automatically scale and reposition the representation of selectable signal characteristics in the oscillogram and reset the offset to "0".



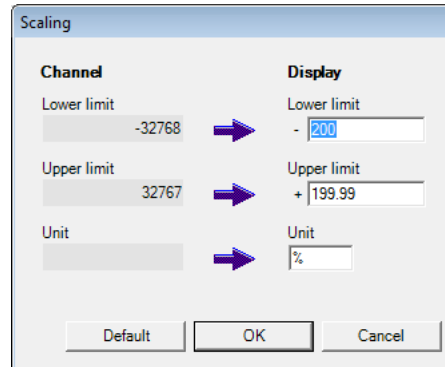
How to carry out automatic scaling:

1. Activate the automatic scaling for each channel in the **channel list** by a checkmark in the "AS" column.
2. Go to the *oscilloscope toolbar* and click the  icon to activate the automatic scaling function for the activated channels.
3. Click the **OK** button.
 - The dialog box is closed and the selected channels/signal sources are scaled automatically.
4. Go to the *oscilloscope toolbar* and click the arrow next to the  symbol to set all the displayed curves to the Y position "0". This way, the curves are displayed "above one another".



How to carry out the scaling manually for each channel:

- Go to the **channel list** and click the entry to be changed in the "unit" column (double-clicking an empty line has no effect.)
 - The dialog for entering the scaling opens which permits the entry of the lower and upper limit and the entry of the unit as shown in the example:





- Enter the lower limit, the upper limit and the unit.
 - On the right, you can enter any scaling values as upper and lower limits.
 - On the left side of the dialog, the limits of the data type of the recorded value are displayed.
- Click the **OK** button.
 - The dialog box is closed.

10.2.8 Cursor function: Reading individual measured values

In addition to the zoom and scaling function, the oscilloscope offers a "cursor function" that can be used to display individual measured values of a selectable channel or the difference between two measured values.



How to use the cursor function:

- Go to the *oscilloscope toolbar* and click the  icon to activate the cursor function.
 - Another button  is displayed which enables a centering of two vertical measuring lines that are independent of each other and can be moved.
 - The status bar displays the position of both measuring lines and the difference between them.
- Select the channel for which individual measured values are to be indicated from the **Channel list** field.

3. Hold down the left mouse button and drag the red vertical measuring line to the desired position.
 - The active measuring line is represented by a continuous line, the inactive measuring line is represented by a dashed line.
 - If you click the inactive measuring line, it automatically becomes active.
 - The value measured at the position of the active measuring line is indicated in the value group box.
 - The difference between the values measured at the two measuring lines is indicated in the Differential value group field.
 - Comparing peak values: Several values displayed in the oscillogram can be compared by means of a horizontal measuring line. This measuring line is automatically generated based on the current cursor position and thus cannot be moved separately.

10.2.9 Last settings

All information included in the **Last settings** tab refer to the oscillogram loaded into the device:

Last settings	
Uploaded from device	
-	
Trigger	
Signal source	
-	
Value	
-	
Edge	Delay
-	-
Scan	
Sample rate	Time base
-	-

The contents cannot be changed.

10.3 Managing oscillograms

If several oscillograms are loaded in the oscilloscope at the same time, the oscillogram to be displayed is selected via the corresponding tab below the toolbar. In general, the following oscillograms are to be distinguished:

Device oscillogram

The device oscillogram is the only oscillogram which can be used to establish a connection to the target system to carry out an oscilloscope measurement.

MERGE oscillogram

If two or more oscillograms are loaded in the oscilloscope, a "MERGE" tab is available.

- In the merge tab, several characteristics from the currently loaded data records can be overlaid, e.g. to compare signal characteristics from different recordings. ▶ [Overlay function](#) (📖 666)

Loaded oscillogram

An oscillogram loaded from a file.

10.3.1 Commenting the oscillogram

The **Comment** text field serves to enter a comment on the selected oscillogram.

- If you execute the  [Saving the oscillogram in a file](#) command, the comment is saved together with the oscillogram in the file.

10.3.2 Saving the oscillogram in a file

After the signal sources to be recorded have been selected and the required settings have been entered, you can save the configuration and recording, if already executed, for future use in the project or export them to a file.




Note!

The reuse of a saved configuration is only reasonable for devices of the same type, as otherwise due to a scaling of the oscilloscope channels that is not adapted, incorrect values are displayed!



How to save an oscillogram in the project:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Open oscillogram file* dialog box appears.
2. Specify a file name in the **File name** input field.
3. Click the **Filing in the project** button.
 - The dialog box is closed and the current oscillogram is filed in the project.




Note!

The oscillogram is only saved if the entire project is saved!



How to save an oscillogram as external file:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Open oscillogram file* dialog box appears.
2. Press the **Save as external file ...** button.
 - A new window opens in which the directory and the file name for the oscillogram to be saved have to be specified.
3. Click the **Save** button.
 - The dialog box is closed and the current oscillogram is saved.

10.3.3 Loading the oscillogram file

Configurations/oscillograms already saved can be reloaded into the oscilloscope any time, e.g. for the overlay function.




Note!

The reuse of a saved configuration is only possible for devices of the same type, as otherwise due to a scaling of the oscilloscope channels that is not adapted, incorrect values are displayed!




How to load an oscillogram file from the project:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Load oscillogram file* dialog box appears.
2. Select the file to be loaded from the upper list field.
3. Click the **OK** button.
 - The dialog box is closed and the oscillogram file is accepted.



How to load an oscillogram file from an external file:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Load oscillogram file* dialog box appears.
2. Press the **Load from external file...** button.
 - A new window opens in which the directory and the file name for the oscillogram file to be loaded have to be selected.
3. Click **Open**.
 - The dialog box is closed and the oscillogram file is loaded.
 - The oscillogram is displayed on an additionally appearing tab.
 - If the configuration to be loaded contains signal sources that are no longer available in the device, these variables are automatically removed from the configuration.

10.3.4 Overlay function


The overlay function serves to lay several characteristics from the currently loaded oscillogram files on top of each other, e.g. to compare signal characteristics from different recordings.

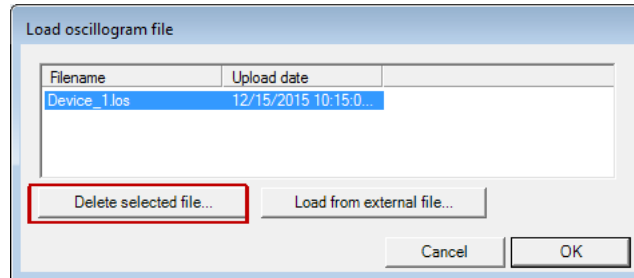
- If two or more oscillograms are loaded in the oscilloscope, e.g. the device oscillogram and an oscillogram previously saved in the project, a "MERGE" tab is available.
- If the MERGE tab is selected, the desired characteristics to be overload or compared can be selected from the loaded files in the **channel list**.
- If a device oscillogram is used in the merge tab, an update is carried out in the MERGE oscillogram in case of a renewed recording.
- Removing signal sources from the device oscillogram causes the characteristics in the MERGE oscillogram to be deleted.

10.3.5 Deleting an oscillogram file saved in the project



How to delete an oscillogram file saved in the project:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Load oscillogram file* dialog box appears.



2. Select one or several oscillogram files from the upper list field.
3. Press the **Delete selected file...** button.
 - The selected file(s) is/are deleted and the dialog box is closed.

11 CANopen option

The 8400 protec HighLine inverter has a CANopen interface which is used to exchange e.g. process data and parameter values between the nodes. Furthermore, other modules can be connected via this interface such as decentralised terminals, operator and input devices (HMIs), as well as external controls and host systems.

The interface transfers CAN objects following the CANopen communication profile (CiA DS301, version 4.02) developed by the umbrella organisation of CiA (CAN in Automation) in conformity with the CAL (CAN Application Layer).



Tip!

- In the »Engineer« parameter list, category **CAN**, you can find the parameters relevant for the CANopen interface classified in different subcategories.
- Information on CAN communication modules and CANopen interfaces of other Lenze devices is provided in the "CAN" communication manual in the Lenze library.

Short overview of CAN interfaces for 8400 protec series:

Connection	Interface	Version	
		Stateline HighLine	EMS
X31/X32	CANopen option CANopen is an isolated fieldbus und can be used for networks with multiple nodes. In case of fieldbuses, node address and baud rate can be set using the DIP switch under the service cover or parameterised with the »Engineer«.	optional	optional
X34	CANopen master PLC The control (PLC) integrated in the 8400 protec EMS inverter has an own CANopen interface (X34). This interface is configured via he CANopen manager implemented in the »PLC Designer« programming software.	-	●
X35	CAN on board "CAN on board" is exclusively suitable for short point-to-point connections between two inverters, e.g. for synchronisation. Node address and baud rate must be parameterised with the »Engineer«. <ul style="list-style-type: none"> • Without CANopen option, but only with PROFIBUS or PROFINET. • Without safety option 30 (SO30). • Pay attention to notes in the hardware manual for EMC-compliant wiring and short cable lengths as there is no isolation towards the control electronics of the inverter. 	optional	-

11.1 General information

For many years, the system bus (CAN) based on the CANopen communication profile has been integrated in Lenze inverters. Due to the lower number of data objects available, the functionality and compatibility of the previous system bus are lower as compared to CANopen. For parameter setting, two parameter data channels are always available to the user while CANopen provides only one active parameter channel.

The system bus (CANopen) of the Inverter Drives 8400 is a further development of the system bus (CAN) including the following properties:

- Full compatibility with CANopen DS301 V4.02.
- Support of the "Heartbeat" NMT slave function (DS301 V4.02)
- 1 or 2 parameterisable parameter data channels for transmitting SDOs (*Service Data Objects*)
- Up to four parameterisable process data channels (dependent on the device version) for transmitting PDOs (*Process Data Objects*)
 - All process data channels are functionally equivalent
 - Monitoring of the receive PDOs for data reception
- Adjustable error response to ...
 - physical CAN errors (frame, bit, ACK error)
 - bus-stop, bus working
 - absent PDOs
- Telegram counters for SDOs and PDOs
- Bus status diagnostics
- Boot-up telegram generation
- Emergency telegram generation
- Reset node telegram generation (for master configuration)
- Sync telegram generation and response to sync telegrams:
 - Data transmission/reception
 - Device-internal time base synchronisation
- Abort codes
- All CAN on board functions can be parameterised via codes
- Object directory (all mandatory functions, optional functions, indexes)

11.1.1 General data and application conditions

Range	Values
Communication profile	CANopen, DS301 V4.02
Communication medium	DIN ISO 11898
Network topology	Line terminated at both ends
Adjustable node addresses (max. number of nodes)	Depending on the number of SDO channels set in C00366 : <ul style="list-style-type: none"> • 1 SDO: Node address 1 ... 127 (max. 127 nodes) • 2 SDO: Node address 1 ... 63 (max. 63 nodes) • adjustable via DIP switches or via code C00350.
Adjustable baud rates	20*, 50, 125, 250, 500, 800*, 1000* kbps (* from HighLine onwards) <ul style="list-style-type: none"> • adjustable via DIP switches or via code C00351.

Range	Values
Process data	In case of "protec StateLine" and "protec HighLine" device versions: <ul style="list-style-type: none"> • Max. 3 transmit PDOs (TPDOs) with 1 ... 8 bytes (adjustable) • Max. 3 receive PDOs (RPDOs) with 1 ... 8 bytes (adjustable)
Parameter data	Max. 2 server SDO channels with 1 ... 8 bytes <ul style="list-style-type: none"> • Because of the 2 server SDO channels, the address range from 1 ... 63 is available
Transfer mode for TPDOs	<ul style="list-style-type: none"> • in case of data change (including adjustable blocking time) • Time-controlled, 1 to x ms • After the reception of 1 to 240 sync telegrams

11.1.2 Supported protocols

Protocols	
Standard PDO protocols	PDO write PDO read
SDO protocols	SDO download SDO download initiate SDO download segment
	SDO upload SDO upload initiate SDO upload segment
	SDO abort transfer
	SDO block download SDO block download initiate SDO block download end
	SDO block upload SDO block upload initiate SDO block upload end
NMT protocols	Start remote node (master and slave)
	Stop remote node (slave)
	Enter pre-operational (slave)
	Reset node (slave and local device)
	Reset communication protocol (slave)
Monitoring protocols	Heartbeat (heartbeat producer and heartbeat consumer) <ul style="list-style-type: none"> • Up to 15 Heartbeat Producers can be monitored.
	Emergency telegram (to master)
More protocols	Transmitting and receiving a sync telegram <ul style="list-style-type: none"> • Synchronisation of the internal time base to the reception of the CAN sync telegram is possible. ▶ Synchronisation of the internal time base

11.1.3 Communication time

The communication time is the time between the start of a request and the arrival of the corresponding response.

**Tip!**

The communication times in the CAN network depend on:

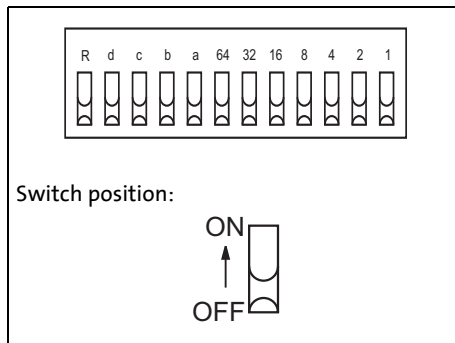
- the processing time in the device
- the telegram runtime (baud rate/telegram length)
- the bus load (especially if the bus is charged with PDOs and SDOs at a low baud rate)

Processing time in the 8400 inverter

There are no interdependencies between parameter data and process data.

- Parameter data: approx. 5 ms (typical value)
 - For parameters concerning the motor control (e.g. C00011), the processing time may be longer (up to 30 ms).
- Process data: 1 ms

11.2 Possible settings via DIP switch



[11-1] DIP switch

The following can be set via the front panel DIP switches:

- Bus terminating resistor
Switch: "R"
- Baud rate
Switch: "a" ... "d"
- Node address
Switch: "1" ... "64"

Lenze setting: All DIP switches are in the "OFF" position



Note!

- The DIP switch settings are accepted if a node address is unequal zero when the device or the 24-V supply is switched on by the DIP address.
- If all DIP switches are OFF when the device or the 24 V supply is switched on, the setting of the baud rate and node address are read out of the parameter set/parameter.



Tip!

The current DIP switch settings are displayed in code [C00349](#).

Bit 15 indicates that the setting of the DIP switches has been accepted when the device or the 24V supply has been switched on.

11.2.1 Activating the bus terminating resistor

The system bus must be terminated between CAN low and CAN high at the first and last physical node each by a resistor (120 Ω). The 8400 inverter is provided with an integrated bus terminating resistor, which can be activated via the "R" DIP switch.

DIP switch position ("R"):

- OFF = bus terminating resistor is inactive
- ON = bus terminating resistor is active

11.2.2 Setting the baud rate

The baud rate can be set via code [C00351](#) or with the DIP switches a to d.



Note!

- All DIP switches (a ... d, 1 ... 64) = OFF (Lenze setting):
 - At switching on, the settings under code [C00350](#) (node address) and [C00351](#) (baud rate) will become active.
- Preset baud rate: 500 kbps

DIP switch position				Baud rate
d	c	b	a	
OFF	OFF	ON	ON	50 kbps
OFF	OFF	ON	OFF	125 kbps
OFF	OFF	OFF	ON	250 kbps
OFF	OFF	OFF	OFF	500 kbps
ON	ON	ON	OFF	800 kbps (only effective from "HighLine" onwards)
OFF	ON	OFF	OFF	1000 kbps (only effective from "HighLine" onwards)

11.2.3 Setting the node address

The node address can be set via code [C00350](#) or with the DIP switches 1 to 64.

- The labelling on the housing corresponds to the values of the individual DIP switches for determining the node address.
- The valid address range depends on the number of SDO channels set in [C00366](#):
 - 1 SDO (Lenze setting): 1 ... 127
 - 2 SDO: 1 ... 63



Note!

- The addresses of the nodes must differ from each other.
- All DIP switches (a ... d, 1 ... 64) = OFF (Lenze setting):
 - At switching on, the settings under code [C00350](#) (node address) and [C00351](#) (baud rate) will become active.

Example: Setting of the node address 23

DIP switch	64	32	16	8	4	2	1
Switch position	OFF	OFF	ON	OFF	ON	ON	ON
Value	0	0	16	0	4	2	1
Node address	= Sum of the values = 16 + 4 + 2 + 1 = 23						

11.3 LED status displays for the system bus



Information about the status of the system bus can be obtained quickly via LED displays "BUS-RDY" and "BUS-ERR" on the front of the inverter.

- The meaning can be seen from the tables below.

Inverter is not (yet) active on the system bus

LED display	Meaning
<p>(BUS-ERR is permanently lit)</p>	Inverter is not active on the system bus / Bus Off
<p>(BUS-RDY and BUS-ERR jitter)</p>	Automatic detection of baud rate is active

Inverter is active on the system bus

- The LED "BUS-RDY" LED signals the CANopen status:

LED display	CANopen state
<p>(BUS-RDY is blinking every 0.2 seconds)</p>	Pre-Operational
<p>(BUS-RDY is permanently lit)</p>	Operational
<p>(BUS-RDY is blinking every 1 seconds)</p>	Stopped

- The "BUS-ERR" LED signals a CANopen error:

LED display	CANopen error
<p>(BUS-ERR is blinking once, then off for 1 second)</p>	Warning Limit reached
<p>(BUS-ERR is blinking twice, then off for 1 second)</p>	Node Guard Event
<p>(BUS-ERR is blinking three times, then off for 1 second)</p>	Sync Message Error (only possible in the "Operational" state)

11.4 Going online via the system bus

The system bus (CANopen) can also be used for the communication between the »Engineer« and the inverter, alternatively to the USB diagnostic adapter.

- Lenze offers the following communication accessories for connection to the PC:

Communication accessories	PC interface
PC system bus adapter 2173 incl. connection cable and voltage supply adapter <ul style="list-style-type: none"> • for DIN keyboard connection (EMF2173IB) • for PS/2 keyboard connection (EMF2173IBV002) • for PS/2 keyboard connection with electrical isolation (EMF2173IBV003) 	Parallel interface (LPT port)
PC system bus adapter 2177 incl. connection cable (EMF2177IB)	USB (Universal Serial Bus)



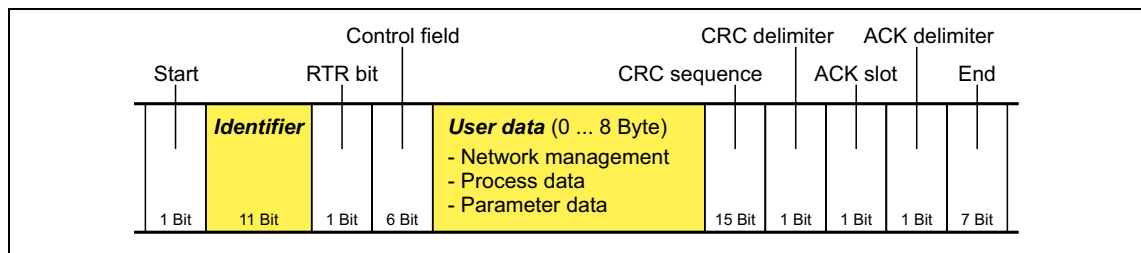
Note!

- For detailed information about the PC system bus adapter, please see the "CAN Communication Manual".
- Please observe the documentation for the PC system bus adapter!
- In the »Engineer«, go to the *Device assignment offline devices* dialog box and select the "System bus CAN" entry from the **Bus connection** list field to establish an online connection.

11.5 Reinitialising the CANopen interface

The [C00002/26](#) = "1: On / start" device command reinitialises the CANopen interface of the inverter ("Reset node"), which is required after e.g. changing the data transfer rate, the node address or the identifiers, respectively.

11.6 Structure of the CAN data telegram



[11-2] Basic structure of the CAN telegram

The following subchapters provide a detailed description of the identifier and the user data. The other signals refer to the transfer characteristics of the CAN telegram whose description is not included in the scope of this documentation.



Tip!

Please visit the homepage of the CAN user organisation CiA (CAN in automation) for further information:

<http://www.can-cia.org>

11.6.1 Identifier

The principle of the CAN communication is based on a message-oriented data exchange between a transmitter and many receivers. All nodes can transmit and receive quasi-simultaneously.

The identifier, also called COB-ID (abbr. for communication object identifier), is used to control which node is to receive a transmitted message. In addition to the addressing, the identifier contains information on the priority of the message and the type of user data.

The identifier consists of a basic identifier and the node address of the node to be addressed:

Identifier (COB-ID) = basic identifier + node address (node ID)

Exception: The identifier for process data/heartbeat/emergency objects as well as network management and sync telegrams is freely assigned by the user (either manually or automatically by the network configurator), or is permanently assigned.

Node address (node ID)

Every node of the system bus network must be assigned to a node address (also called node ID) within the valid address range (1 ... 127) for unambiguous identification.

- Assigning a node address more than once within a network is impermissible.
- The own node address can be configured via the DIP switches or via code [C00350](#). ▶ [Setting the node address](#) (☞ 673)

Identifier assignment

The system bus is message-oriented instead of node-oriented. Every message has an unambiguous identification, the identifier. For CANopen, node-oriented transfer is achieved by the fact that every message has only one transmitter.

- The basic identifiers for network management (NMT) and the basic SDO channel (SDO1) are defined in the CANopen protocol and cannot be changed.
- The basic identifiers of the PDOs are preset in the Lenze setting according to the "Predefined Connection Set" of DS301 V4.02.

Object		Basis identifier (CANBaseID)		Direction
Network management (NMT)		0	0x0000	
Sync ¹⁾		128	0x0080	
Emergency ¹⁾		128	0x0080	Device → system bus
PDO1 (Process data channel 1)	TPDO1	384	0x0180	Device → system bus
	RPDO1	512	0x0200	System bus → device
PDO2 (Process data channel 2)	TPDO2	640	0x280	Device → system bus
	RPDO2	768	0x300	System bus → device
PDO3 (Process data channel 3)	TPDO3	896	0x380	Device → system bus
	RPDO3	1024	0x400	System bus → device
PDO4 ²⁾ (Process data channel 4)	TPDO4	1152	0x480	Device → system bus
	RPDO4	1280	0x500	System bus → device
SDO1 (Parameter data channel 1)	TSDO1	1408	0x0580	Device → system bus
	RSDO1	1536	0x0600	System bus → device
SDO2 (Parameter data channel 2)	TSDO2	1472	0x05C0	Device → system bus
	RSDO2	1600	0x0640	System bus → device
Heartbeat		1792	0x0700	Device → system bus
Boot-up		1792	0x0700	Device → system bus

¹⁾ If you set the sync identifiers manually, observe the use of the emergency telegram, since it has the same COB-ID.
²⁾ From version 16.00.00



Tip!

If required, the identifiers of the PDOs and the identifiers for the sync telegram can be changed via parameters/indices.

▶ [Identifiers of the process data objects](#) (☞ 697)

▶ [Synchronisation of PDOs via sync telegram](#) (☞ 701)

The active identifiers of the PDOs are displayed in [C00355/x](#).

11.6.2 User data

All nodes communicate by exchanging data telegrams via the system bus. The user data area of the CAN telegram either contains network management data or parameter data or process data:

Network management data

(NMT data)

- Control information on start, stop, reset, etc. of communication to specific nodes or to all nodes of the CAN network.

Process data

(PDOs – process data objects)

- Process data are transferred via the process data channel.
- Process data can be used to control the inverter.
- Process data are not saved in the inverter.
- Process data are transmitted between host system and nodes to ensure continuous exchange of current input and output data.
- Process data usually are unscaled/scalable raw data.
- Process data are, for instance, setpoints and actual values.
- The exact meaning of the PDO file contents is determined via the function block editor (FB Editor) in the I/O level or via the PDO mapping.

Parameter data

(SDOs – service data objects)

- Parameter data are the CANopen indexes or, in case of Lenze devices, the codes.
- Parameters are set, for instance, when the system is initially adjusted during commissioning or when the material of the production machine is changed.
- Parameter data are transmitted as SDOs via the parameter data channel. They are acknowledged by the receiver, i.e. the transmitter gets a feedback about the transmission being successful or not.
- The parameter data channel enables access to all Lenze codes and CANopen indexes.
- Parameter changes are automatically saved to the inverter until mains switching.
- In general, the parameter transfer is not time-critical.
- Parameter data are, for instance, operating parameters, diagnostic information and motor data as well as control information on the interconnection of function blocks in the I/O level of the FB Editor.

11.7 Communication phases/network management

Regarding communication via the system bus, the inverter distinguishes between the following statuses:

Status	Explanation
"Initialisation" (Initialisation)	After switch-on, an initialisation run is carried out. <ul style="list-style-type: none"> • During this phase, the inverter is not involved in the data exchange via the bus. • The standard values are re-written to all CAN-relevant parameters. • After initialisation is completed, the inverter is automatically set to the "Pre-Operational" status.
"Pre-Operational" (before being ready for operation)	Parameter data can be received, process data are ignored.
"Operational" (ready for operation)	Parameter data and process data can be received!
"Stopped" (stopped)	Only network management telegrams can be received.

Communication object	Initialisation	Pre-Operational	Operational	Stopped
PDO			●	
SDO		●	●	
Sync		●	●	
Emergency		●	●	
Boot-up	●			
Network management (NMT)		●	●	●

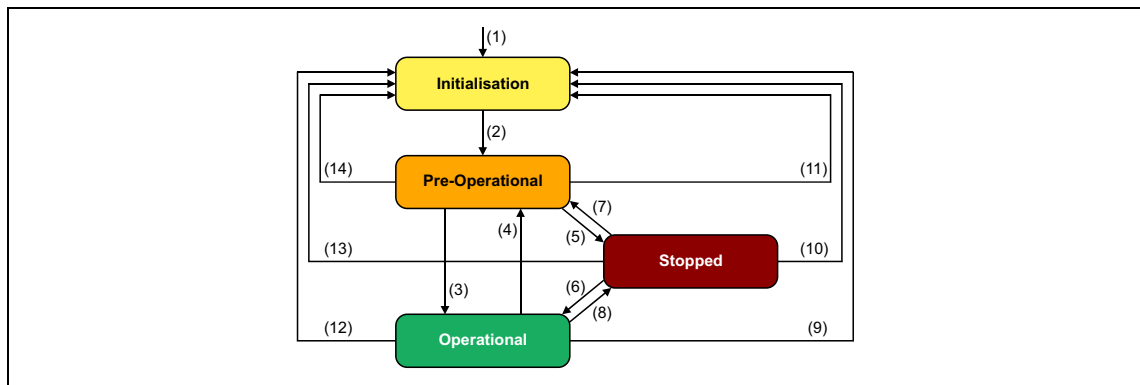


Tip!



Part of the initialisation or the entire initialisation can be carried out anew in every status by transferring the corresponding network management telegrams.

The current CAN status is displayed in [C00359](#) for diagnostic purposes.

11.7.1 Status transitions

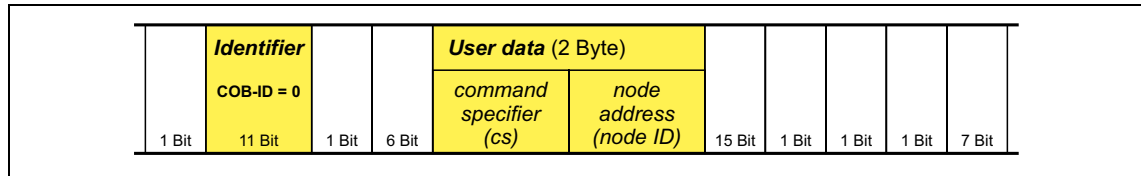


[11-3] NMT status transitions in the CAN network

Transition	NMT command	Status after change	Effects on process/parameter data after status change
(1)	-	Initialisation	Initialisation starts automatically when the mains is switched on. <ul style="list-style-type: none"> • During initialisation, the inverter is not involved in the data exchange. • After the initialisation is completed, the node sends a boot-up message with an individual identifier and automatically changes to the "pre-operational" status.
(2)	-	Pre-Operational	In this phase, the master determines the way in which the node(s) takes/take part in communication.
	From here, the master changes the statuses for the entire network. <ul style="list-style-type: none"> • A target address included in the NMT command defines the receiver(s). • If the 8400 inverter is configured as CAN master, the status is automatically changed to "Operational" after a waiting time has expired (C00356/1), and the 0x0100 ("Start remote node") NMT command is transmitted to all nodes. • Data can only be exchanged via process data objects if the status is "Operational"! 		
(3), (6)	0x01 xx Start remote node	Operational	Network management/sync/emergency telegrams as well as process data (PDO) and parameter data (SDO) are active. Optional: When the status is changed, event and time-controlled process data (PDOs) are transmitted once.
(4), (7)	0x80 xx Enter Pre-Operational	Pre-Operational	Network management/sync/emergency telegrams and parameter data (SDO) are active.
(5), (8)	0x02 xx Stop remote node	Stopped	Only network management telegrams can be received.
(9), (10), (11)	0x81 xx Reset node	Initialisation	All CAN-relevant parameters (CiA DS 301) are initialised with the saved values.
(12), (13), (14)	0x82 xx Reset communication		All CAN-relevant parameters (CiA DS 301) are initialised with the saved values.
	Meaning of the node address in the NMT command: <ul style="list-style-type: none"> • xx = 0x00: If this assignment is selected, the telegram addresses all nodes (broadcast telegram). The status of all nodes can be changed at the same time. • xx = Node ID: If a node address is specified, only the status of the node with the corresponding address changes. 		

11.7.2 Network management telegram (NMT)

The telegram for the network management contains identifier "0" and the command included in the user data which consists of the command byte and the node address:



[11-4] Network management telegram for changing over the communication phases

Command specifier (cs)		NMT command
dec	hex	
1	0x01	Start remote node
2	0x02	Stop remote node
128	0x80	Enter Pre-Operational
129	0x81	Reset node
130	0x82	Reset communication

The communication phases are changed over by a node, the CAN master, for the entire network. The CAN master can also be a inverter. ▶ [Parameterising the inverter as CAN master \(682\)](#)

Meaning of the node address in the user data:

- node ID = "0": The telegram addresses all nodes (broadcast telegram). The status of all nodes can be changed at the same time.
- node ID = "1" ... "127": If a node address is specified, only the status of the node with the corresponding address changes.

Example :

Data can only be exchanged via process data objects if the status is "Operational". If the CAN master is supposed to switch all nodes connected to the bus from the "Pre-Operational" communication status to the "Operational" communication status, the identifier and user data in the transmission telegram must be set as follows:

- Identifier: 0x00 (network management)
- User data: 0x0100 ("Start remote node" NMT command to all nodes)

11.7.3 Parameterising the inverter as CAN master

If the initialisation of the system bus and the associated status change from "Pre-Operational" to "Operational" is not effected by a superimposed host system, the inverter can instead be defined to be a "quasi" master to execute this task.

The inverter is configured as CAN master in [C00352](#).

- Being the CAN master, the inverter sets all nodes connected to the bus (broadcast telegram) to the "Operational" communication status with the "Start remote node" NMT telegram. Only in this communication status, data can be exchanged via process data objects.
- A delay time can be set in [C00356/1](#) which must expire after mains switching before the inverter transmits the "Start remote node" NMT telegram.

Parameters	Info	Lenze setting	
		Value	Unit
C00352	CAN slave/master	slave	
C00356/1	CAN delay boot-up - Operational	3000	ms



Note!

The changes of the master/slave operation in [C00352](#) will not be activated until

- another mains switching of the inverter

or

- the "Reset node" or "Reset communication" NMT telegram has been transmitted to the inverter.

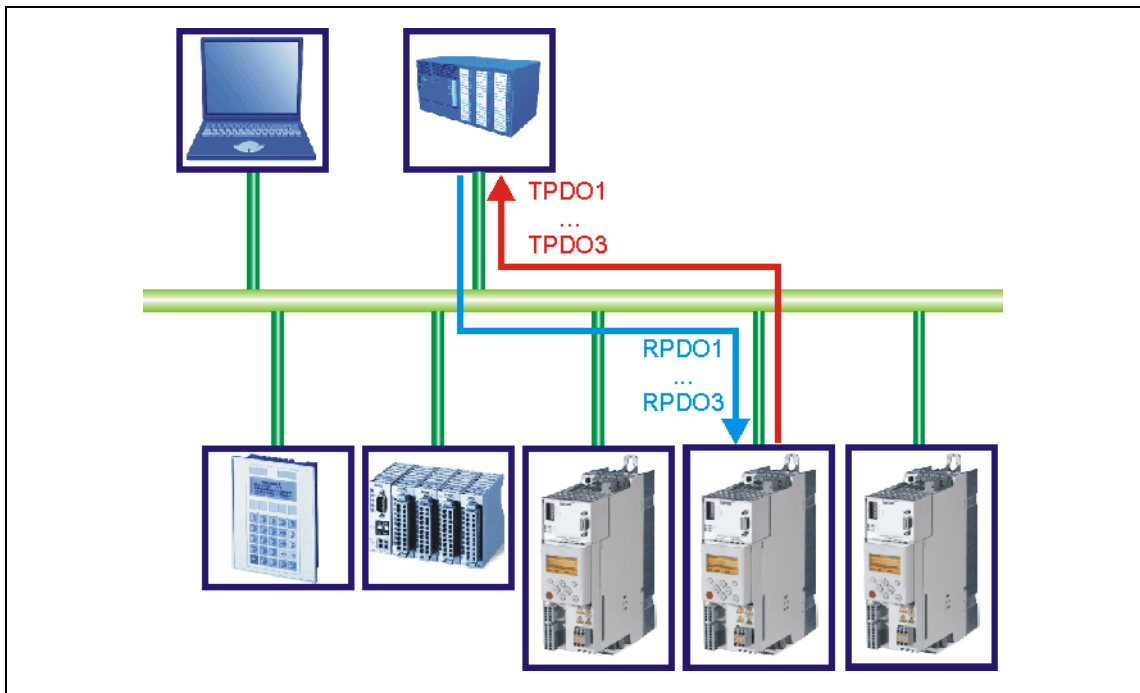
The "CAN reset node" device command ([C00002/26](#)) is provided as an alternative to the "Reset node" NMT telegram for the reinitialisation of the CAN-specific device parameters.



Tip!

Master functionality is only required during the initialisation phase of the drive system.

11.8 Process data transfer



[11-5] PDO data transfer from / to the higher-level host system

For transmitting process data, up to four separated process data channels (PDO1 ... PDO4) are available depending on the device version and software version.

Definitions

- Process data telegrams between the host system and the devices are distinguished in terms of direction as follows:
 - Process data telegrams to the device (RPDO)
 - Process data telegrams from the device (TPDO)
- The CANopen process data objects are designated as seen from the node's view:
 - Receive PDOs (RPDOx): Process data object received by a node
 - Transmit PDOs (TPDOx): Process data object sent by a node



Note!

Data can only be exchanged via process data objects if the status is "Operational"!

▶ [Communication phases/network management \(679\)](#)

11.8.1 Available process data objects

The number of available process data objects for inverters of the 8400 series depends on the device version:

Process data object	Version		
	protec StateLine	protec HighLine	protec EMS
RPDO1 "LP_CanIn1" port block	●	●	●
RPDO2 "LP_CanIn2" port block	●	●	●
RPDO3 "LP_CanIn3" port block	●	●	●
RPDO4 "LP_CanIn4" port block		● (from version 16.00.00)	
TPDO1 "LP_CanOut1" port block	●	●	●
TPDO2 "LP_CanOut2" port block	●	●	●
TPDO3 "LP_CanOut3" port block	●	●	●
TPDO4 "LP_CanOut4" port block		● (from version 16.00.00)	

Receive PDOs (RPDOs)

The process data objects transmitted from the system bus to the drive are processed via the [LP_CanIn1](#) ... [LP_CanIn3](#) port blocks.

- Every port block provides 4 words (2 bytes/word). The data of every first word are provided in a bit decoded manner (bit 0 ... 15).
- The first word of the [LP_CanIn1](#) port block is defined as control word *wCtrl*. The *wCtrl* control word does not have a permanent connection to the device control and can be used as required. The predefined assignment of the *wCtrl* control word in the [C00007](#) = "30: CAN" control mode depends on the technology application selected in [C00005](#):
 - TA "Actuating drive speed":
[Process data assignment for fieldbus communication](#) (4397)
 - TA "Table positioning":
[Process data assignment for fieldbus communication](#) (4427)
 - TA "Abschaltpositionierung":
[Process data assignment for fieldbus communication](#) (4453)

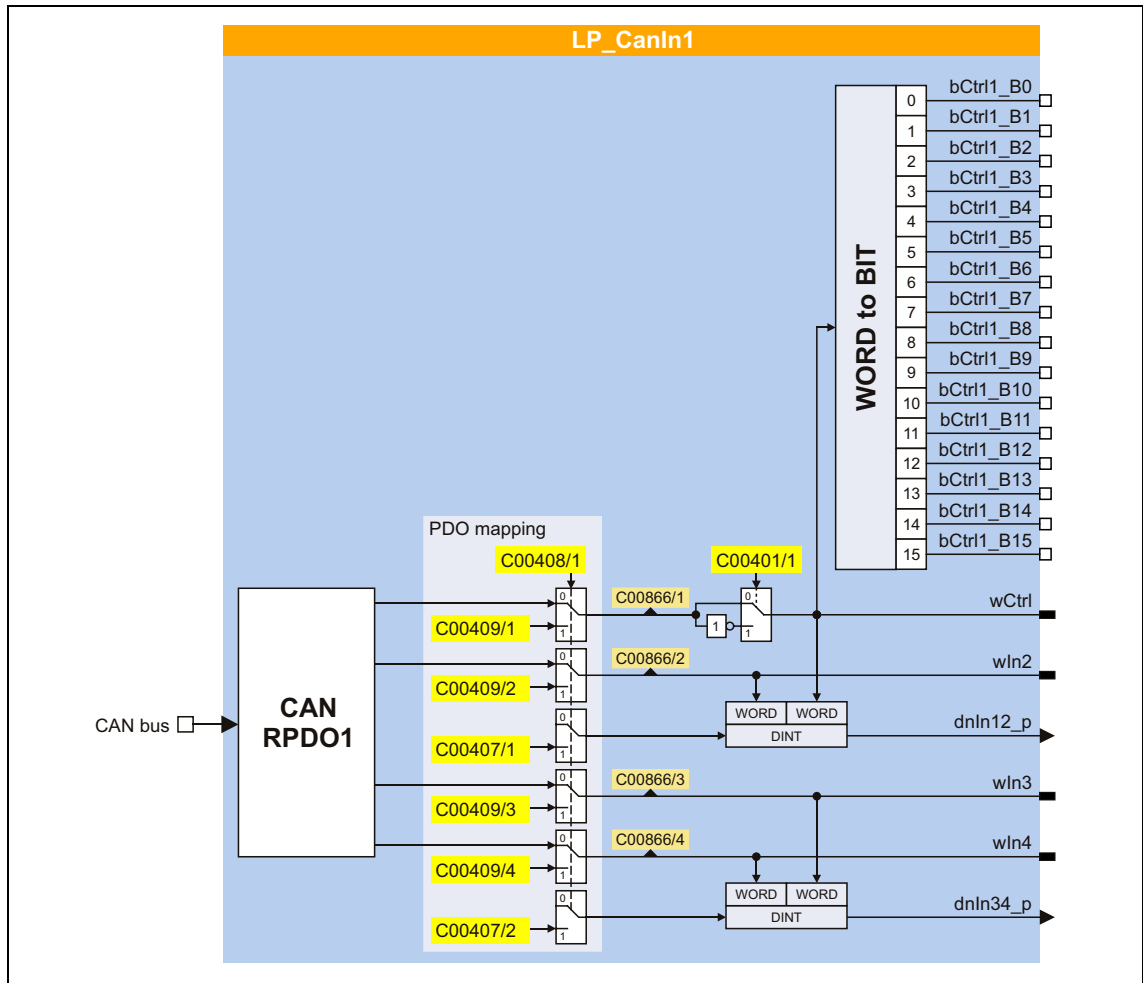
Transmit PDOs (TPDOs)

The process data transmitted from the drive to the system bus are processed via the [LP_CanOut1](#) ... [LP_CanOut3](#) port blocks.

- Every port block receives 4 words (2 bytes/word). The data of every first word are transmitted bit by bit (bit 0 ... 15).
- The first word of the [LP_CanOut1](#) port block is defined as the *wState* status word. The *wState* status word does not have a permanent connection to the device control and can be used as required.
 - For a predefined assignment, see the [wDeviceStatusWord status word](#) of the drive interface.

11.8.1.1 RPDO1 | "LP_CanIn1" port block

The LP_CanIn1 port block maps process data object RPDO1 in the FB Editor.



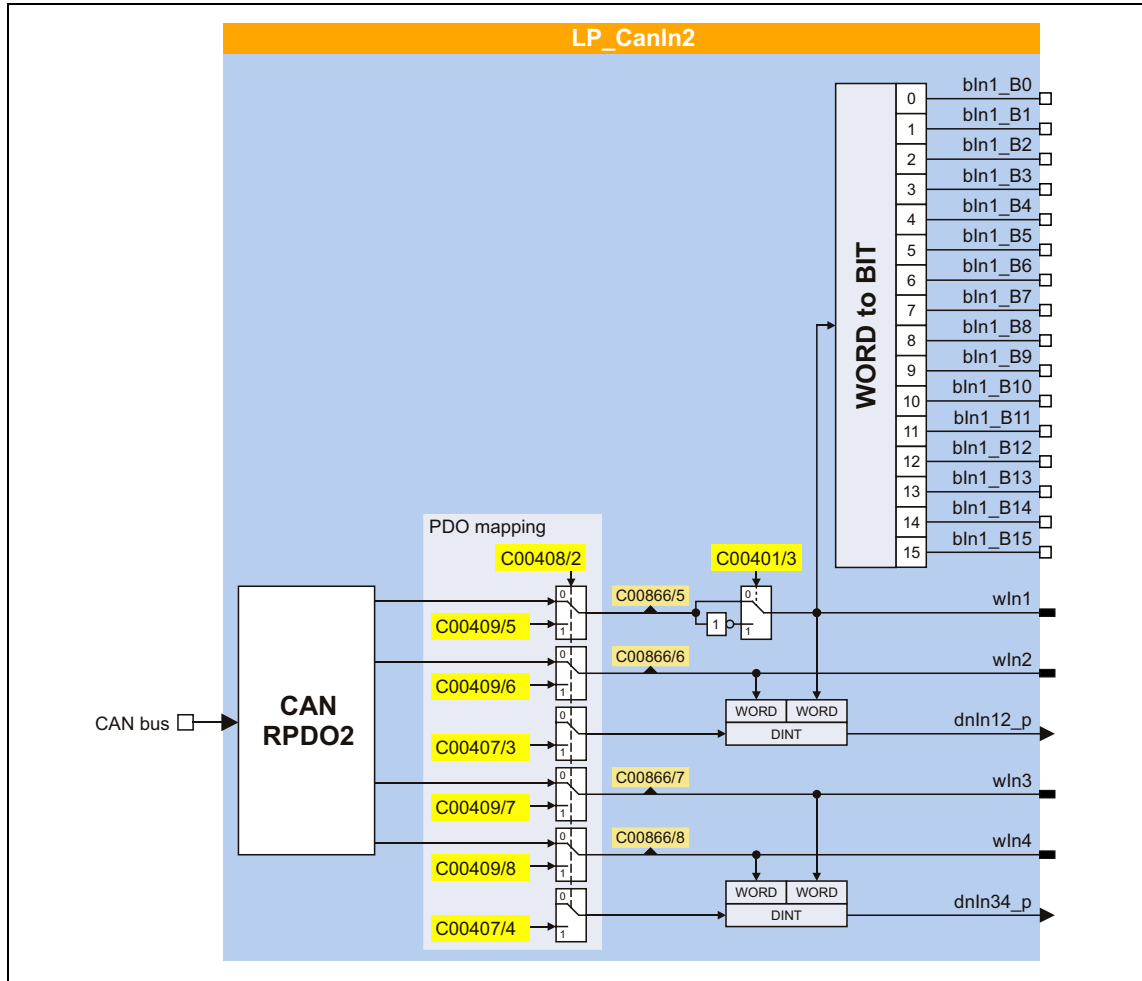
Short overview of the parameters for LP_CanIn1:

Parameters	Info	Lenze setting
C00401/1	LP_CanIn1: Inversion bCtrl1_B0..15	0x0000
C00866/1	LP_CanIn1: wCtrl	-
C00866/2	LP_CanIn1: wIn2	-
C00866/3	LP_CanIn1: wIn3	-
C00866/4	LP_CanIn1: wIn4	-
PDO mapping		
C00408/1	LP_CanIn1: Mapping selection	CanIn
C00409/1	LP_CanIn1: wCtrl MapVal	0
C00409/2	LP_CanIn1: wIn2 MapVal	0
C00409/3	LP_CanIn1: wIn3 MapVal	0
C00409/4	LP_CanIn1: wIn4 MapVal	0
Greyed out = display parameter		

Parameters	Info	Lenze setting
C00407/1	LP_CanIn1: dwIn12 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/1 and C00409/2 .	0
C00407/2	LP_CanIn1: dwIn34 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/3 and C00409/4 .	0
Greyed out = display parameter		

11.8.1.2 RPDO2 | "LP_CanIn2" port block

The LP_CanIn2 port block maps process data object RPDO2 in the FB Editor.



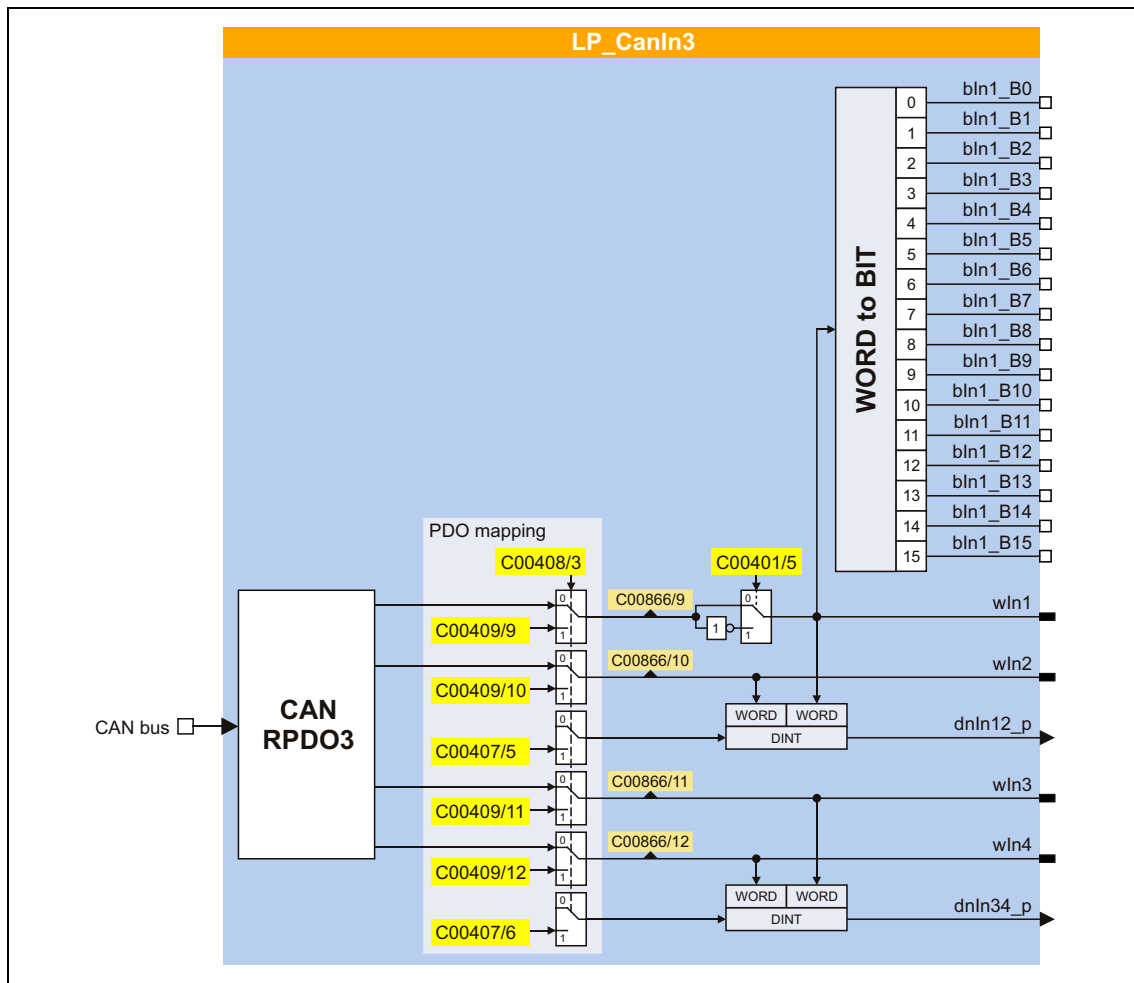
Short overview of the parameters for LP_CanIn2:

Parameters	Info	Lenze setting
C00401/3	LP_CanIn2: Inversion bln1_B0..15	0x0000
C00866/5	LP_CanIn2: wln1	-
C00866/6	LP_CanIn2: wln2	-
C00866/7	LP_CanIn2: wln3	-
C00866/8	LP_CanIn2: wln4	-
PDO mapping		
C00408/2	LP_CanIn2: Mapping selection	CanIn
C00409/5	LP_CanIn2: wln1 MapVal	0
C00409/6	LP_CanIn2: wln2 MapVal	0
C00409/7	LP_CanIn2: wln3 MapVal	0
C00409/8	LP_CanIn2: wln4 MapVal	0
Greyed out = display parameter		

Parameters	Info	Lenze setting
C00407/3	LP_CanIn2: dwIn12 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/5 and C00409/6 .	0
C00407/4	LP_CanIn2: dwIn34 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/7 and C00409/8 .	0
Greyed out = display parameter		

11.8.1.3 RPDO3 | "LP_CanIn3" port block

The LP_CanIn3 port block maps process data object RPDO3 in the FB Editor.



Short overview of the parameters for LP_CanIn3:

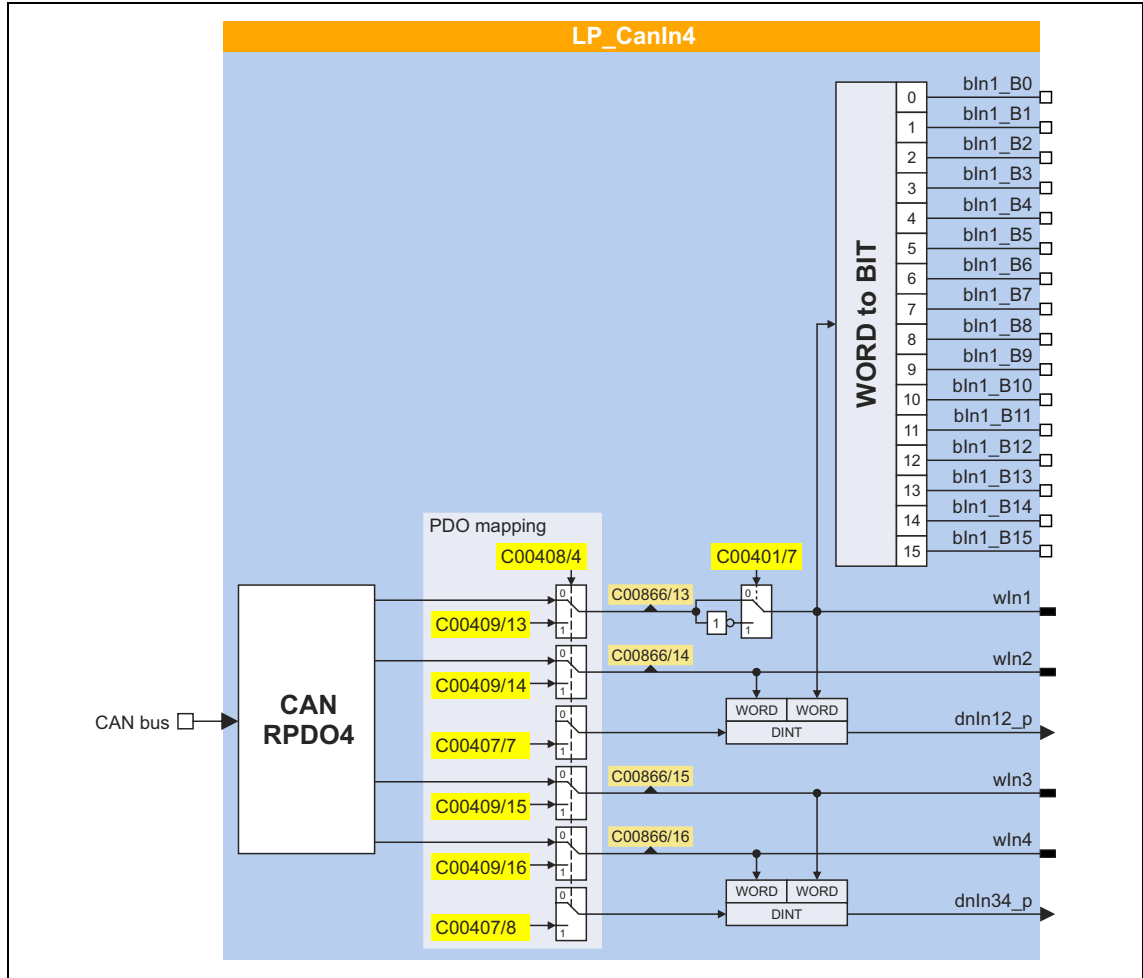
Parameters	Info	Lenze setting
C00401/5	LP_CanIn3: Inversion bln1_B0..15	0x0000
C00866/9	LP_CanIn3: wln1	-
C00866/10	LP_CanIn3: wln2	-
C00866/11	LP_CanIn3: wln3	-
C00866/12	LP_CanIn3: wln4	-
PDO mapping		
C00408/3	LP_CanIn3: Mapping selection	CanIn
C00409/9	LP_CanIn3: wln1 MapVal	0
C00409/10	LP_CanIn3: wln2 MapVal	0
C00409/11	LP_CanIn3: wln3 MapVal	0
C00409/12	LP_CanIn3: wln4 MapVal	0
Greyed out = display parameter		

Parameters	Info	Lenze setting
C00407/5	LP_CanIn3: dwIn12 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/9 and C00409/10 .	0
C00407/6	LP_CanIn3: dwIn34 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/11 and C00409/12 .	0
Greyed out = display parameter		

11.8.1.4 RPDO4 | "LP_CanIn4" port block

This function extension is available from version 16.00.00!

The LP_CanIn4 port block maps process data object RPDO4 in the FB Editor.



Short overview of the parameters for LP_CanIn4:

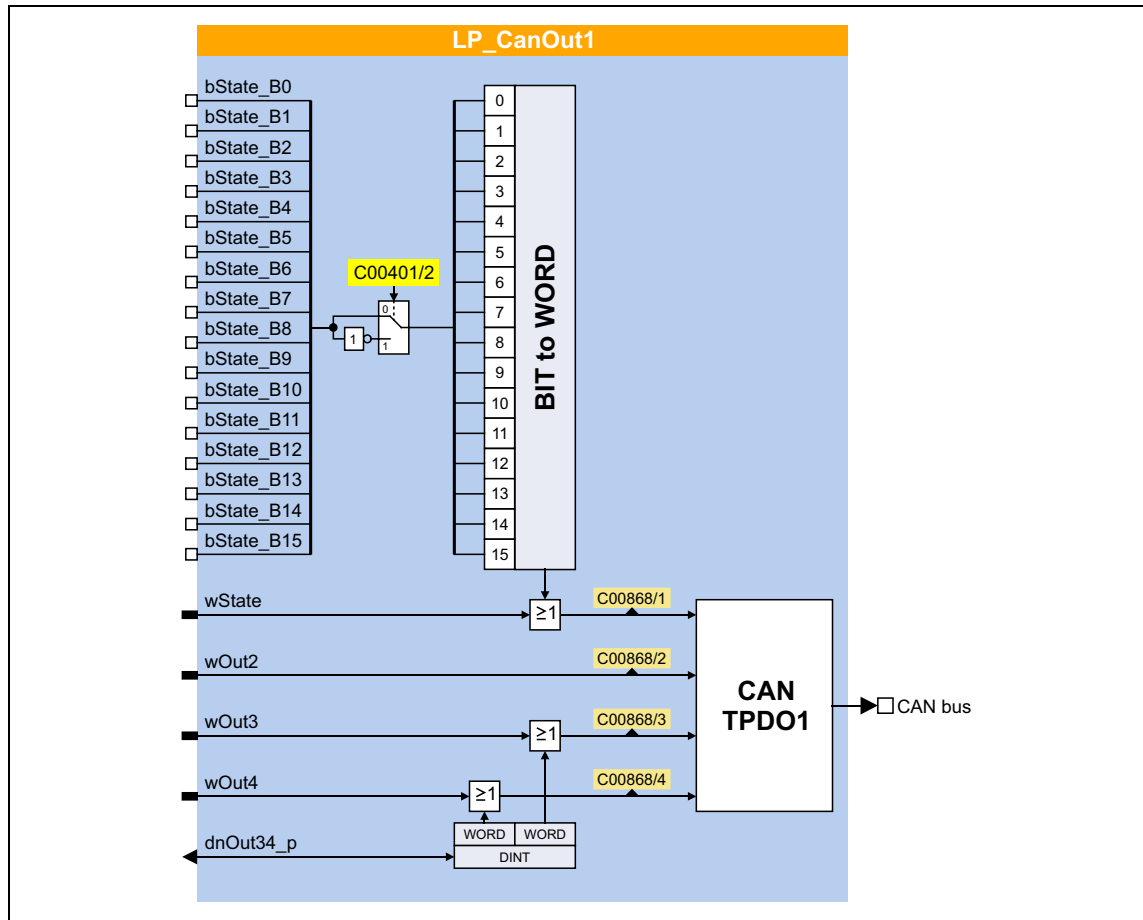
Parameters	Info	Lenze setting
C00401/7	LP_CanIn4: Inversion bIn1_B0..15	0x0000
C00866/13	LP_CanIn4: wln1	-
C00866/14	LP_CanIn4: wln2	-
C00866/15	LP_CanIn4: wln3	-
C00866/16	LP_CanIn4: wln4	-
PDO mapping		
C00408/4	LP_CanIn4: Mapping Selection	CanIn
C00409/13	LP_CanIn4: wln1 MapVal	0
C00409/14	LP_CanIn4: wln2 MapVal	0
C00409/15	LP_CanIn4: wln3 MapVal	0
C00409/16	LP_CanIn4: wln4 MapVal	0

Greyed out = display parameter

Parameters	Info	Lenze setting
C00407/7	LP_CanIn4: dwIn12 MapVal <ul style="list-style-type: none"> The mapping for the double word is ORed with the mapping setting in C00409/13 and C00409/14. 	0
C00407/8	LP_CanIn4: dwIn34 MapVal <ul style="list-style-type: none"> The mapping for the double word is ORed with the mapping setting in C00409/15 and C00409/16. 	0
Greyed out = display parameter		

11.8.1.5 TPDO1 | "LP_CanOut1" port block

The LP_CanOut1 port block maps process data object TPDO1 in the FB Editor.

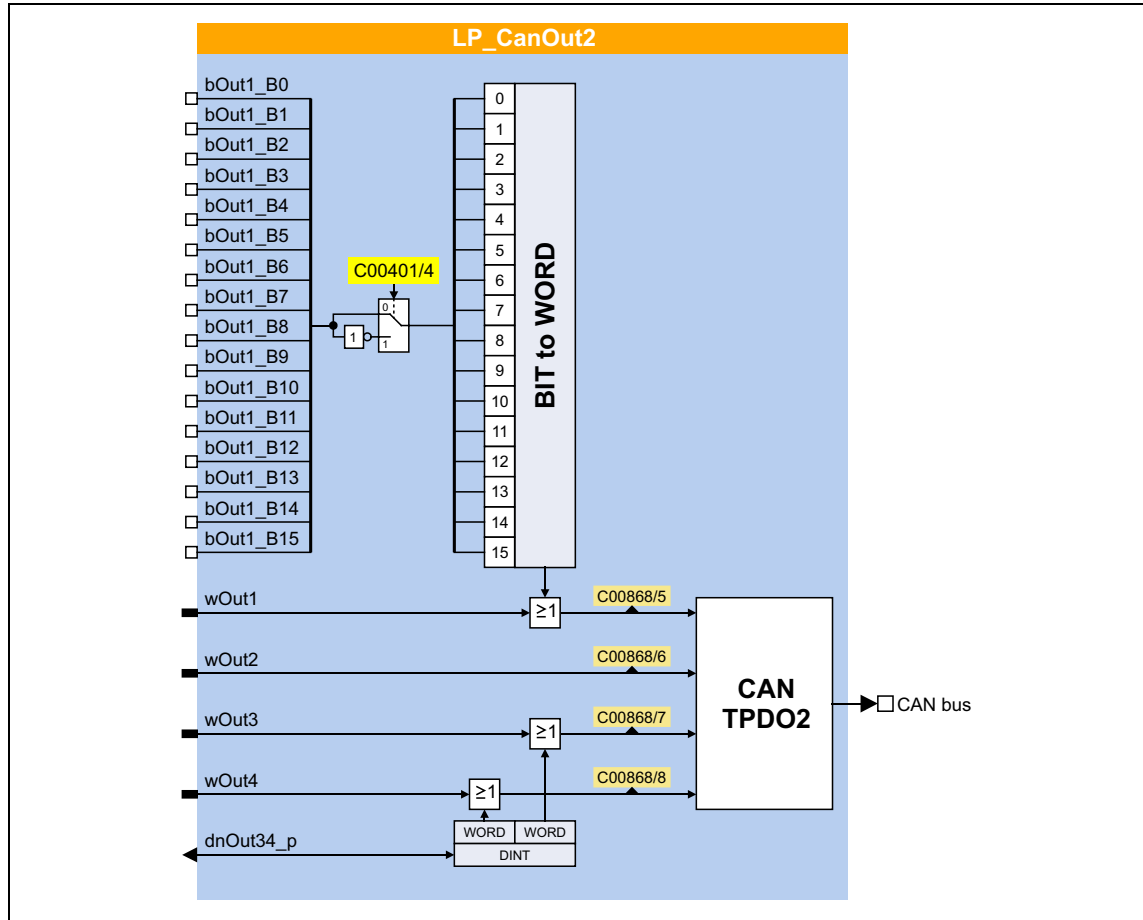


Short overview of the parameters for LP_CanOut1:

Parameters	Info	Lenze setting
C00401/2	LP_CanOut1: Inversion bState_B0..15	0x0000
C00868/1	LP_CanOut1:wState	-
C00868/2	LP_CanOut1:wOut2	-
C00868/3	LP_CanOut1:wOut3	-
C00868/4	LP_CanOut1: wOut4	-
Greyed out = display parameter		

11.8.1.6 TPDO2 | "LP_CanOut2" port block

The LP_CanOut2 port block maps process data object TPDO2 in the FB Editor.



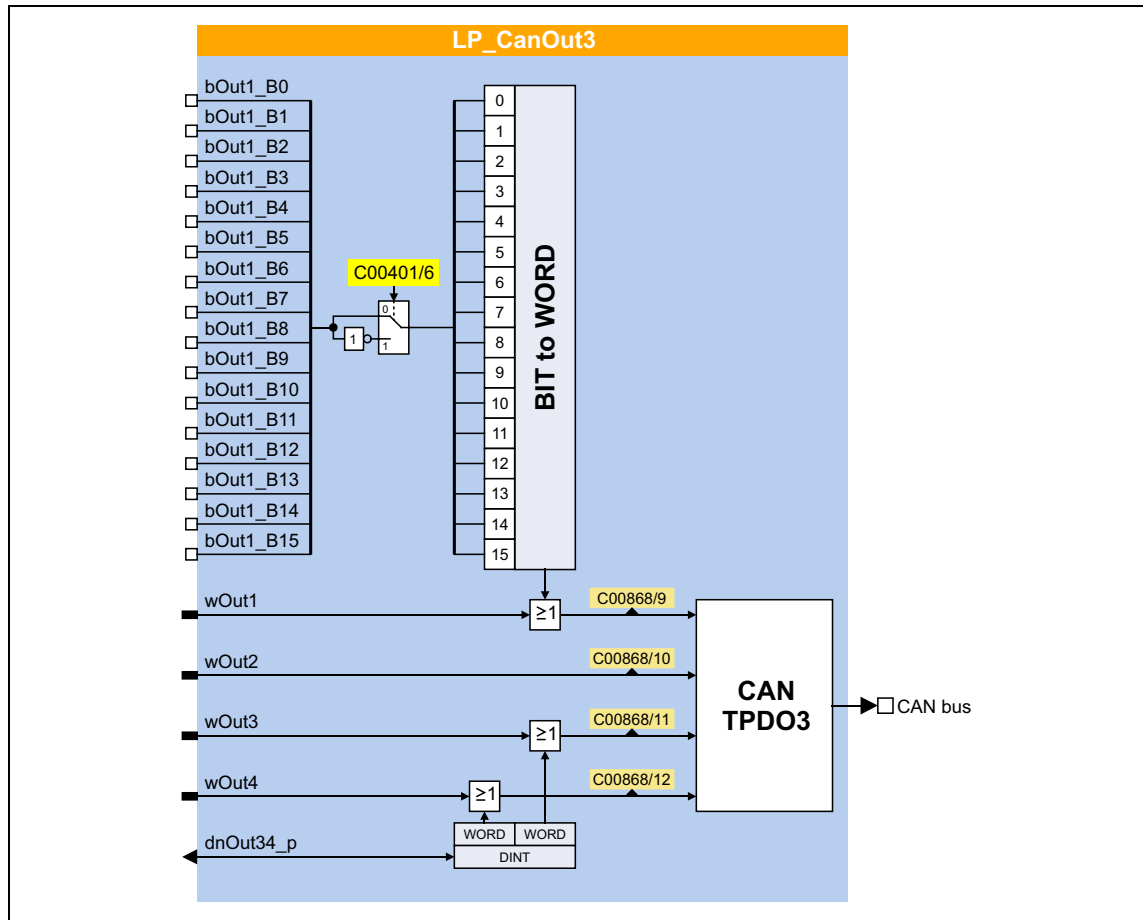
Short overview of the parameters for LP_CanOut2:

Parameters	Info	Lenze setting
C00401/4	LP_CanOut2: Inversion bOut1_B0..15	0x0000
C00868/5	LP_CanOut2: wOut1	-
C00868/6	LP_CanOut2: wOut2	-
C00868/7	LP_CanOut2: wOut3	-
C00868/8	LP_CanOut2: wOut4	-

Greyed out = display parameter

11.8.1.7 TPDO3 | "LP_CanOut3" port block

The LP_CanOut3 port block maps process data object TPDO3 in the FB Editor.



Short overview of the parameters for LP_CanOut3:

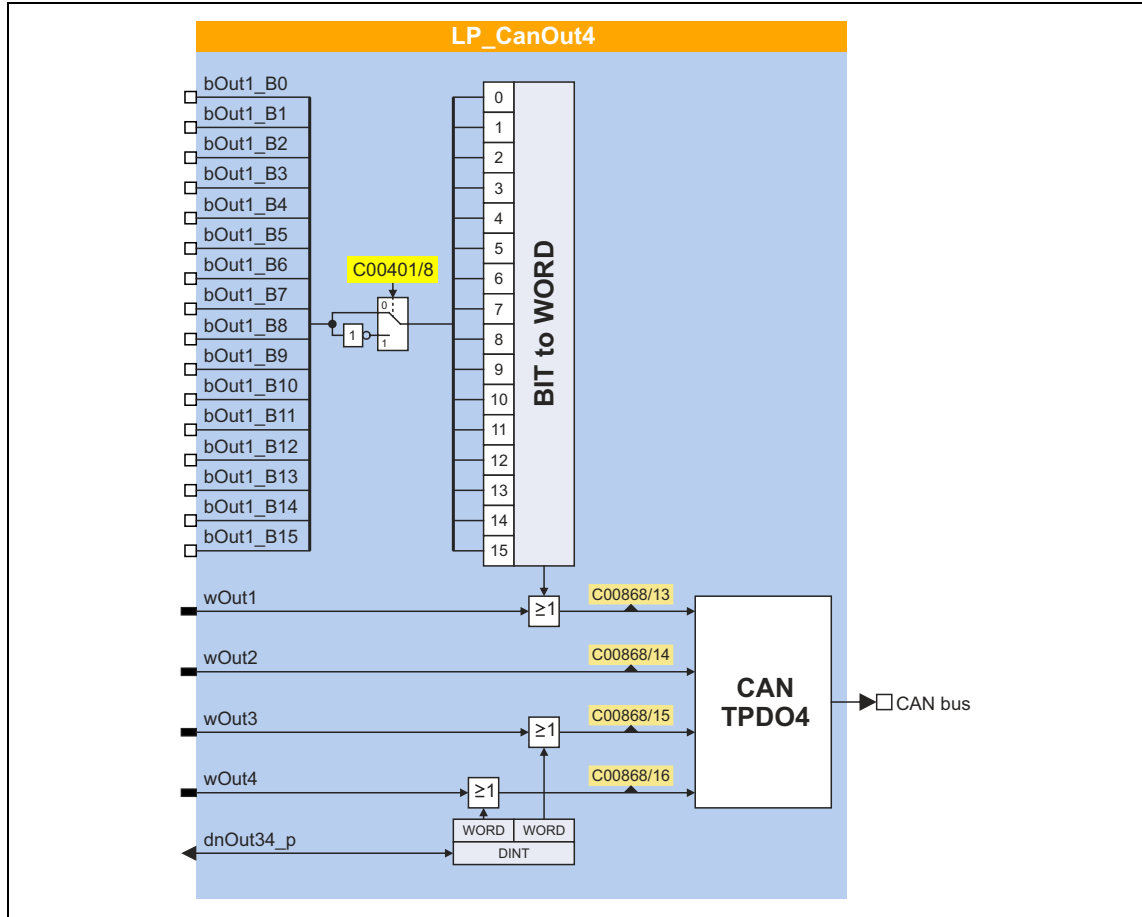
Parameters	Info	Lenze setting
C00401/6	LP_CanOut3: Inversion bOut1_B0..15	0x0000
C00868/9	LP_CanOut3: wOut1	-
C00868/10	LP_CanOut3: wOut2	-
C00868/11	LP_CanOut3: wOut3	-
C00868/12	LP_CanOut3: wOut4	-

Greyed out = display parameter

11.8.1.8 TPDO4 | "LP_CanOut4" port block

This function extension is available from version 16.00.00!

The LP_CanOut4 port block maps process data object TPDO4 in the FB Editor.



Short overview of the parameters for LP_CanOut4:

Parameters	Info	Lenze setting
C00401/8	LP_CanOut4: Inversion bOut1_B0..15	0x0000
C00868/13	LP_CanOut4: wOut1	-
C00868/14	LP_CanOut4: wOut2	-
C00868/15	LP_CanOut4: wOut3	-
C00868/16	LP_CanOut4: wOut4	-

Greyed out = display parameter

11.8.2 Identifiers of the process data objects

For the process data objects PDO1 ... PDO4, three identifier assignment procedures are available in [C00353/1...3](#) :

- Identifier (COB-ID) = node address (C00350) + CANBaseID (Lenze setting)
- Identifier (COB-ID) = node address (C00350) + LenzeBaseID
- Identifier (COB-ID) = C0354/x

Lenze setting: Basic identifiers according to the "Predefined Connection Set" of DS301 V4.02

In the Lenze setting, the identifiers for the process data objects PDO1 ... PDO4 consist of the node address set in [C00350](#) and a basic identifier (CANBaseID) which corresponds to the "Predefined Connection Set" of DS301 V4.02:

Object			Basis identifier (CANBaseID)	
PDO1	TPDO1	COB-ID = node address (C00350) +	384	0x180
	RPDO1		512	0x200
PDO2	TPDO2		640	0x280
	RPDO2		768	0x300
PDO3	TPDO3		896	0x380
	RPDO3		1024	0x400
PDO4	TPDO4		1152	0x480
	RPDO4		1280	0x500



Tip!

The active identifiers (COB-ID) are displayed in [C00355/x](#).

OPTIONAL: Use the basic identifier according to Lenze definition (LenzeBaseID)

If the basic identifiers shall be used instead according to the Lenze definition, go to [C00353/x](#) and select "0: COBID = C0350 + LenzeBaseID" for the corresponding PDO.

The basic Lenze identifiers which differ from the "Predefined Connection Set" are highlighted in colour in the following table:

Object			Basic identifier (LenzeBaseID)	
PDO1	TPDO1	COB-ID = node address (C00350) +	384	0x180
	RPDO1		512	0x200
PDO2	TPDO2		641	0x281
	RPDO2		640	0x280
PDO3	TPDO3		769	0x301
	RPDO3		768	0x300
PDO4	TPDO4		897	0x381
	RPDO4		896	0x380

OPTIONAL: Set identifier individually

When "2: COBID = C0354/x" in [C00353/x](#), the identifiers for the PDOs can be individually set via the Lenze codes and CANopen indexes listed in the table below. That way, identifiers independent of the node address can be set for specific PDOs.

- If identifiers are assigned individually, all PDOs must have basic identifier values in the range of 385 ... 1407.

Object			Lenze code	CANopen index	Default setting
PDO1	TPDO1	COB-ID =	C00354/1	I-1400/1	0x201
	RPDO1		C00354/2	I-1800/1	0x181
PDO2	TPDO2		C00354/3	I-1401/1	0x301
	RPDO2		C00354/4	I-1801/1	0x281
PDO3	TPDO3		C00354/5	I-1402/1	0x401
	RPDO3		C00354/6	I-1802/1	0x381
PDO4	TPDO4		C00354/7	I-1403/1	0x501
	RPDO4		C00354/8	I-1803/1	0x481

**Note!**

After a node address change ([C00350](#)) and a CAN reset node afterwards, the subcodes of [C00354](#) automatically resume the values which result from the respective basic identifier and the set node address.

11.8.3 Transmission type

Process data objects can be transmitted in an event-controlled or time-controlled manner. The below table shows that it is possible to combine the different methods by means of logic operations (AND, OR):

- Event-controlled
The PDO is sent when a special device-internal event has occurred, e.g. when the data contents of the TPDO have changed or when a transmission cycle time has elapsed
- Synchronous transmission
A TPDO (or RPDO) is transmitted (or received) after the device has received a sync telegram (COB-ID 0x80).
- Cyclic transmission
The cyclic transmission of PDOs takes place when the transmission cycle time has elapsed.
- Polled via RTR
A TPDO is transmitted when another device requests it by means of a data request telegram (RTR remote transmit request). For this purpose, the data requester (e.g. the master) sends the data request telegram with the COB-ID of the TPDO requested to be sent. The receiver recognises the RTR and transmits the corresponding PDO.

Transmission type	PDO transmission			Logic combination of different transmission types
	cyclic	synchronous	event-controlled	
0		●	●	AND
1 ... 240		●		-
254, 255	●		●	OR

Transmission type	Description
0	Synchronous and acyclic: The PDO is transmitted on an event-controlled basis with every sync (e.g. when a bit change occurs in the PDO).
1 ... 240	Synchronous and cyclic (sync-controlled with response): <ul style="list-style-type: none"> • Selection $n = 1$: The PDO is transmitted with <u>every</u> sync. • Selection $1 < n \leq 240$: The PDO is transmitted with <u>every n-th</u> sync. From version 16.00.00 onwards, the transmit PDOs are also sent when the sync telegram is generated. Precondition: the sync Tx identifier and sync Rx identifier have the same value.
241 ... 251	Reserved
252	Synchronous - RTR only
253	Asynchronous - RTR only
254, 255	Asynchronous - manufacturer-specific / device profile-specific: If this value is entered, the PDO transmission is event-controlled <u>or</u> cyclic. (Note: The values "254" and "255" have the same meaning). For a cyclic transmission, a cycle time must be entered for the respective PDO. In this case, cyclic transmission takes place in addition to event-controlled transmission.

The communication parameters such as the transmission mode and cycle time can be set freely for every PDO and independently of the settings of other PDOs:

Parameters	Info	Lenze setting	
		Value	Unit
CAN1_OUT			
C00322/1	Transmission mode	254	
C00324/2	Blocking time	0	ms
C00356/5	Cycle time	0	ms
C00358/1	Data length	8	Bytes
CAN2_OUT			
C00322/2	Transmission mode	254	
C00324/3	Blocking time	0	ms
C00356/2	Cycle time	0	ms
C00358/2	Data length	8	Bytes
CAN3_OUT			
C00322/3	Transmission mode	254	
C00324/4	Blocking time	0	ms
C00356/3	Cycle time	0	ms
C00358/3	Data length	8	Bytes
CAN4_OUT (from version 16.00.00)			
C00322/4	Transmission mode	254	
C00324/5	Blocking time	0	ms
C00356/6	Cycle time	0	ms
C00358/4	Data length	8	Bytes
CAN1_IN ... CAN4_IN			
C00323/1...4	Transmission mode CAN1_IN ... CAN4_IN • In the case of the RPDO serves as monitoring setting in the case of sync-controlled PDOs.	254	

Blocking time

From version 06.00.00 on, a so-called "blocking time" can be set in [C00324/x](#), which defines the shortest transmission cycle in the case of the "Asynchronous - manufacturer-specific/device profile-specific" transmission type.

Example: Cycle time = 500 ms, blocking time = 100 ms, sporadic data change:

- With a sporadic data change < 500 ms, quickest transmission takes place every 100 ms due to the set blocking time (event-controlled transmission). The transmission cycle timer is reset to 0 if the transmission has been activated in an event-controlled way.
- In the case of a sporadic data change > 500 ms, due to the cycle time set, transmission takes place every 500 ms (cyclic transmission).



Tip!

The communication parameters can also be set via the following CANopen objects:

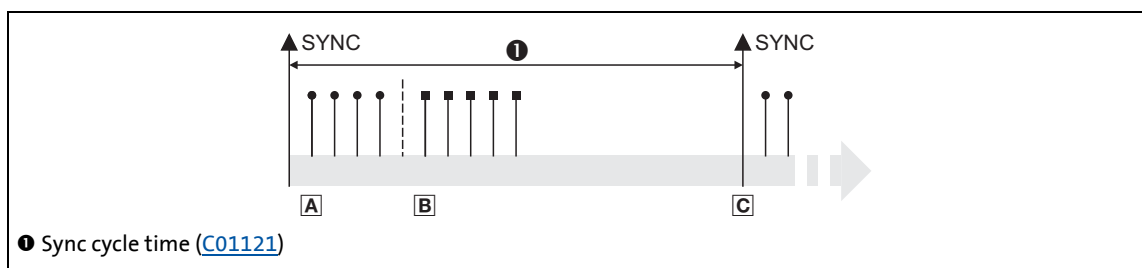
- [I-1400](#) ... [I-1403](#): Communication parameters for RPDO1 ... RPDO4
- [I-1800](#) ... [I-1803](#): Communication parameters for TPDO1 ... TPDO4

11.8.4 Synchronisation of PDOs via sync telegram

During cyclic transmission, one or more PDOs are transmitted/received in fixed time intervals. An additional specific telegram, the so-called sync telegram, is used for synchronising cyclic process data.

- The sync telegram is the trigger point for the transmission of process data from the slaves to the master and for the acceptance of process data from the master in the slaves.
- For sync-controlled process data processing, the sync telegram must be generated accordingly.
- The response to a sync telegram is determined by the transmission type selected.
 - ▶ [Transmission type](#) (📖 699)

Basic workflow



[11-6] Sync telegram

- After the sync telegram has been received, the slaves transmit the synchronous process data to the master (TPDOs). The master reads them as process input data.
- When the transmission process is completed, the slaves receive (RPDOs) the process output data (of the master).
 - All other telegrams (e.g. parameters or event-controlled process data) are accepted acyclically by the slaves after the transmission is completed.
 - Illustration [11-6] does not include acyclic data. However, they need to be considered when dimensioning the cycle time.
- The data are accepted in the slave with the next sync telegram if the Rx mode is set to 1 ... 240. If the Rx mode is 254 or 255, the data are accepted in the next device cycle, irrespective of the sync telegram.

Short overview: Parameters for the synchronisation via sync telegram

Parameters	Info	Lenze setting		Assignment	
		Value	Unit	Sync master	Sync slave
C00367	CAN SYNC Rx identifier	0x0080			●
C00368	CAN SYNC Tx identifier	0x0080		●	
C00369	CAN sync transmission cycle time	0	ms	●	

Related topics:

- ▶ [Synchronisation of the internal time base](#) (📖 755)

11.8.5 Monitoring of the RPDOs for data reception

For RPDO1 ... RPDO4 each, a monitoring time can be parameterised within which the RPDO must arrive. If the RPDO is not received within the monitoring time or not with the configured sync, the response parameterised for each RPDO takes place.

Short overview: Parameters for RPDO monitoring

Parameters	Info	Lenze setting	
		Value	Unit
C00357/1...4	CAN1...4_IN monitoring time	3000	ms
C00593/1...4	Resp. to CAN1...4_IN monitoring	No response	

11.8.6 Configuring exception handling of the CAN PDOs

This function extension is available from version 02.00.00!

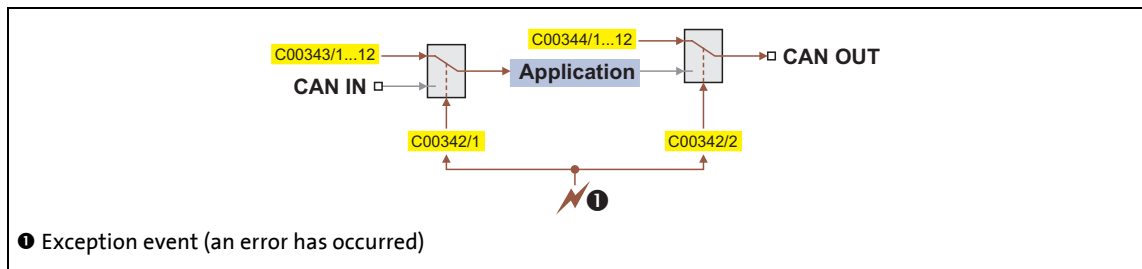
Exception handling for the CAN PDOs in the event of an error can be set via decoupling configuration and decoupling values.

- Bit coded selection is carried out in [C00342/1](#) for the process data words read by the bus, defining the events that will trigger decoupling.
- Bit coded selection is carried out in [C00342/2](#) for the process data words output by the application, defining the events that will trigger decoupling.

Bit	Event
Bit 0 <input type="checkbox"/>	BusOff_MsgErr
Bit 1 <input type="checkbox"/>	Warning
Bit 2 <input type="checkbox"/>	NodeStopped
Bit 3 <input type="checkbox"/>	HeartBeatEvent
Bit 4 <input type="checkbox"/>	CAN1_In_Überw.
Bit 5 <input type="checkbox"/>	CAN2_In_Überw.
Bit 6 <input type="checkbox"/>	CAN3_In_Überw.
Bit 7 <input type="checkbox"/>	Reserved
Bit 8 <input type="checkbox"/>	Reserved
Bit 9 <input type="checkbox"/>	Reserved
Bit 10 <input type="checkbox"/>	Reserved
Bit 11 <input type="checkbox"/>	Reserved
Bit 12 <input type="checkbox"/>	Reserved
Bit 13 <input type="checkbox"/>	Reserved
Bit 14 <input type="checkbox"/>	Trouble
Bit 15 <input type="checkbox"/>	Fault

Finally, the following parameters define the value that the process data words are to have when they are decoupled:

Parameters	Info	Lenze setting	
		Value	Unit
C00343/1	LP_CanIn1:wCtrl DiscVal	0	
C00343/2...4	LP_CanIn1:wIn2...wIn4 DiscVal	0	
C00343/5...8	LP_CanIn2:wIn1...wIn4 DiscVal	0	
C00343/9...12	LP_CanIn3:wIn1...wIn4 DiscVal	0	
C00344/1	LP_CanOut1:wState DiscVal	0	
C00344/2...4	LP_CanOut1:wOut2...wOut4 DiscVal	0	
C00344/5...8	LP_CanOut2:wOut1...wOut4 DiscVal	0	
C00344/9...12	LP_CanOut3:wOut1...wOut4 DiscVal	0	



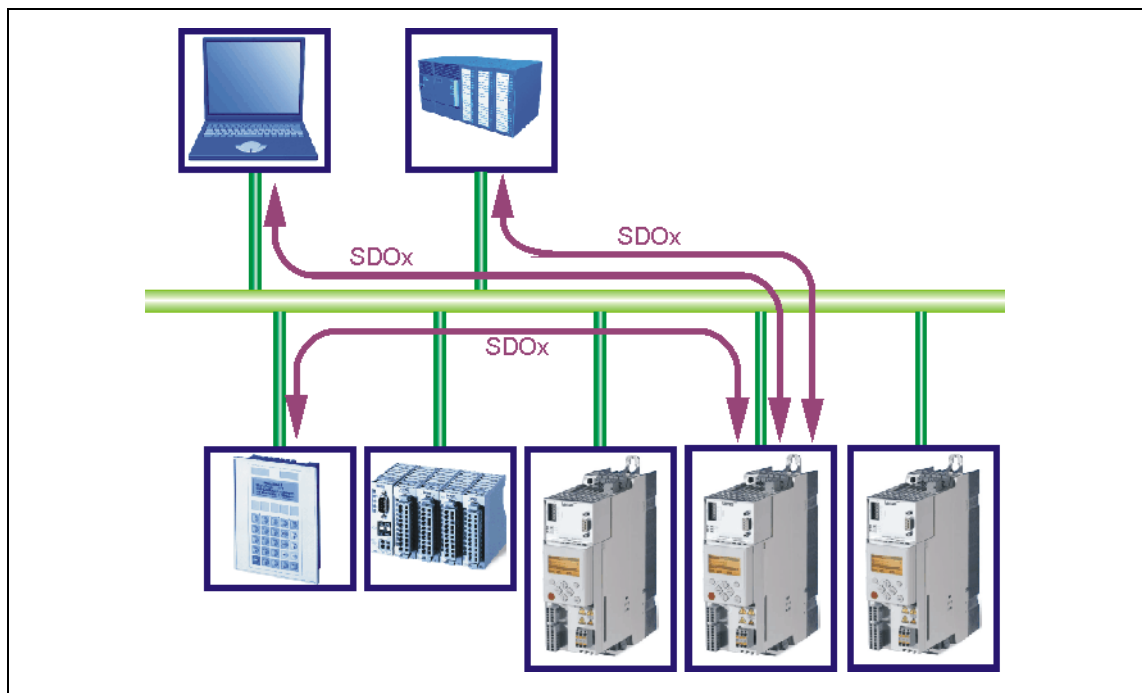
[11-7] General signal flow in the event of a configured exception

Related topics:

- ▶ [Configuring exception handling of the output terminals \(367\)](#)

11.9

Parameter data transfer



[11-8] Parameter data transfer via the available parameter data channels

Parameters are values stored in codes on Lenze controllers.

Two parameter data channels are available for parameter setting, enabling the simultaneous connection of different devices for configuration purposes.

Parameter data are transmitted via the system bus as SDOs (*Service Data Objects*) and acknowledged by the receiver. The SDO enables read and write access to all device parameters and to the CANopen object directory integrated in the device. Indices (e.g. 0x1000) ensure access to device parameters and functions included in the object directory. To transfer SDOs, the information contained in the user data must comply with the CAN SDO protocol.



Note!

In the Lenze setting, only the parameter data channel 1 is activated according to CANopen.

- In [C00366](#), set "2 SDO Lenze" to activate both parameter data channels.

11.9.1 Identifiers of the parameter data objects

In the Lenze setting, the basic identifiers of the SDOs are preset according to the "Predefined Connection Set".

The identifiers of the parameter data objects SDO1 and SDO2 result from the basic identifier and the node address set under code [C00350](#):

Identifier = basic identifier + node address

Object		Direction		Lenze-Base-ID		CANopen-Base-ID	
		from device	to device	dec	hex	dec	hex
SDO1 (Parameter data channel 1)	TSDO1	●		1408	580	1408	580
	RSDO1		●	1536	600	1536	600
SDO2 (Parameter data channel 2)	TSDO2	●		1472	5C0	1472	5C0
	RSDO2		●	1600	640	1600	640
Heartbeat		●		1792	700	1792	700
Boot-up		●		1792	700	1792	700

11.9.2 User data

Structure of the user data of the parameter data telegram

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte



Note!

For the user data, the Motorola format is used.

► [Parameter data telegram examples](#) (📖 711)

The following subchapters provide detailed information on user data.

11.9.2.1 Command

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

The following commands can be transmitted or received for writing and reading the parameters:

Command	1st byte		Data length	Info
	hex	dec		
Write request	0x23	35	4 bytes	Writing of a parameter to the inverter.
	0x2B	43	2 bytes	
	0x2F	47	1 byte	
	0x21	33	Block	
Write response	0x60	96	4 bytes	Inverter acknowledges a write request.
Read request	0x40	64	4 bytes	Reading of a parameter from the inverter.
Read response	0x43	67	4 bytes	Inverter's response to a read request with the current parameter value.
	0x4B	75	2 bytes	
	0x4F	79	1 byte	
	0x41	65	Block	
Error response	0x80	128	4 bytes	Response from the inverter when the read/write request could not be executed correctly. ▶ Error messages (709)

More precisely, the command byte comprises the following information:

Command	1st byte							
	Command specifier (cs)			Toggle (t)	Length*		e	s
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write request	0	0	1	0	0/1	0/1	1	1
Write response	0	1	1	0	0	0	0	0
Read request	0	1	0	0	0	0	0	0
Read response	0	1	0	0	0/1	0/1	1	1
Error response	1	0	0	0	0	0	0	0

*Bit coding of the length: 00 = 4 bytes, 01 = 3 bytes, 10 = 2 bytes, 11 = 1 byte
e: expedited (shortened block service)
s: segmented (normal block service)



Tip!

More commands are defined in CANopen specification DS301, V4.02 (e.g. segmented transfer).

11.9.2.2 Addressing by means of index and subindex

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

A parameter (a Lenze code) is addressed as per the following formula:
Index = 24575 - (Lenze code number)

Example

The [C00011](#) parameter (motor reference speed) is to be addressed.

Calculation:

- Index:
 - Decimal: $24575 - 11 = 24564$
 - Hexadecimal: $0x5FFF - 0xB = 0x5FF4$
- Subindex: 0x00 (subindex 0 since the parameter does not have any subcodes)

Entries:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	0xF4	0x5F	0x00				

11.9.2.3 Data 1 ... Data 4

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

Maximally 4 bytes are available for parameter value entries. Depending on the data format, they are assigned as follows:

5th byte	6. byte	7th byte	8th byte
Parameter value (1 byte)	0x00	0x00	0x00
Parameter value (2 bytes)		0x00	0x00
LOW byte	HIGH byte		
Parameter value (4 bytes)			
LOW word		HIGH word	
LOW byte	HIGH byte	LOW byte	HIGH byte

**Note!**

The "Factor" column of the [Table of attributes](#) contains a so-called scaling factor for all Lenze parameters. The scaling factor is relevant to the transfer of parameter values which have one or more decimal positions in the parameter list.

If the scaling factor is > 1, the value must be multiplied by the indicated scaling factor prior to transmission to be able to transfer the value as an integer. At the SDO client end, the integer must be divided by the scaling factor to obtain the original value including decimal positions again.

Example

A value of "123.45" is to be transmitted for a code, unit: "%" (e.g. C00039/1: "Fixed setpoint-JOG1"). In inverters of the 8400 series, parameters with the "%" unit have two decimal positions and hence a scaling factor of "100".

Calculation:

- Value to be transmitted = scaling factor x value
- Data _(1...4) = 100 x 123.45 = 12345 (0x00 00 30 39)

Entries:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
				0x39	0x30	0x00	0x00

11.9.2.4 Error messages

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Error code			
0x80 (128)	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

In the event of an error, the addressed node generates a telegram with the "Error response" (0x80) command.

- The telegram includes the index and subindex of the code where the error occurred.
- The error code is entered in bytes 5 ... 8.
 - The error codes are standardised according to DS301, V4.02.
 - The representation of the error codes is provided in reverse read direction (see example below).

Example

Representation of error code "0x06 04 00 41" in bytes 5 ... 8:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Error code			
				0x41	0x00	0x04	0x06

Meaning of the error codes

The error codes are standardised acc. to DS301, V4.02.

Error code	Explanation
0x0503 0000	Toggle bit not changed
0x0504 0000	SDO protocol expired
0x0504 0001	Invalid or unknown client/server command specifier
0x0504 0002	Invalid block size (only block mode)
0x0504 0003	Invalid sequence number (only block mode)
0x0504 0004	CRC error (only block mode)
0x0504 0005	Not sufficient memory
0x0601 0000	Object access not supported
0x0601 0001	Attempt to read a write-only object
0x0601 0002	Attempt to write to a read-only object
0x0602 0000	Object not listed in object directory
0x0604 0041	Object not mapped to PDO
0x0604 0042	Number and length of objects to be transferred longer than PDO length.
0x0604 0043	General parameter incompatibility
0x0604 0047	General internal device incompatibility
0x0606 0000	Access denied because of hardware error
0x0607 0010	Unsuitable data type, unsuitable service parameter length
0x0607 0012	Unsuitable data type, service parameter length exceeded
0x0607 0013	Unsuitable data type, service parameter length not long enough
0x0609 0011	Subindex does not exist
0x0609 0030	Parameter value range exceeded
0x0609 0031	Parameter values too high
0x0609 0032	Parameter values too low
0x0609 0036	Maximum value falls below minimum value
0x0800 0000	General error
0x0800 0020	Data cannot be transferred/saved for application.
0x0800 0021	Data cannot be transferred/saved for application due to local control.
0x0800 0022	Data cannot be transferred/saved for application due to current device status.
0x0800 0023	Dynamic generation of object directory failed or no object directory available (e.g. object directory generated from file, generation not possible because of a file error).

11.9.3 Parameter data telegram examples

11.9.3.1 Read parameters

Task: The heatsink temperature of 43 °C (code [C00061](#), data format INTEGER16, scaling factor 1) of the inverter with node address "5" is to be read.

Telegram to drive

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x0605	0x40	0xC2	0x5F	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram to the drive	
Identifier	= 1536 + node address = 1536 + 5 = 1541 = 0x0605 (1536 = SDO1 basic identifier to the inverter)
Command	= 0x40 = "Read request" (read request of a parameter from the inverter)
Index	= 24575 - code number = 24575 - 61 = 24514 = 0x5FC2
Subindex	= 0 (code C00061 does not have any subcodes)

Response telegram from drive (if data have been correctly transmitted)

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	-	-
0x0585	0x4B	0xC2	0x5F	0x00	0x2B	0x00	-	-

Explanations on the telegram from the drive	
Identifier	= 1408 + node address = 1408 + 5 = 1413 = 0x0585 (1408 = SDO1 basic identifier from the inverter)
Command	= 0x4B = "Read Response" (response to the read request with current value)
Index	as in telegram to the drive
Subindex	
Data 1 ... 2	= 0x002B = 43 [°C]

11.9.3.2 Write parameters

Task: The rated current of the connected motor is to be entered with $I_N = 10.20$ A (code [C00088](#)) into the inverter with node address "2".

Data 1 ... 4	Calculation
Value for motor current, (data type U16; display factor 1/100)	$10.20 \times 100 = 1020$ (0x03 FC)

Telegram to drive

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x0602	0x23	0xA7	0x5F	0x00	0xFC	0x03	0x00	0x00

Explanations on the telegram to the drive	
Identifier	= $1536 + \text{node address} = 1536 + 2 = 1538 = 0x0602$ (1536 = SDO1 basic identifier to the inverter)
Command	= 0x23 = "Write request" (write request of a parameter to the inverter)
Index	= $24575 - \text{code number} = 24575 - 88 = 24487 = 0x5FA7$
Subindex	= 0 (code C00088 does not have any subcodes)
Data 1 ... 4	= $10.20 \times 100 = 1020 = 0x000003FC$ (motor current value; data type U32; display factor 1/100)

Response telegram from drive (if data have been correctly transmitted)

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x0582	0x60	0xA7	0x5F	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram from the drive	
Identifier	= $1408 + \text{node address} = 1408 + 2 = 1410 = 0x0582$ (1408 = SDO1 basic identifier from the inverter)
Command	= 0x60 = "Write response" (Acknowledgement of the write access from the inverter)
Index	as in telegram to the drive
Subindex	

11.9.3.3 Read block parameters

Task: The firmware version (code [C00099](#)) is to be read from the parameter set of the inverter with node address "12". The firmware version has a length of 11 ASCII characters which are transmitted as a block parameter. Depending on the block, the data width from the 2nd to 8th byte is assigned within the user data.

Telegram 1 to the drive: Read request

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x060C	0x40	0x9C	0x5F	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram to the drive	
Identifier	= 1536 + node address = 1536 + 12 = 1548 = 0x060C (1536 = SDO1 basic identifier to the inverter)
Command	= 0x40 = "Read request" (read request of a parameter from the inverter)
Index	= 24575 - code number = 24575 - 99 = 24476 = 0x5F9C
Subindex	= 0 (code C00099 does not have any subcodes)

Response telegram 1 from the drive: Indication of the block length (11 characters)

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x058C	0x41	0x9C	0x5F	0x00	0x0B	0x00	0x00	0x00

Explanations on the telegram from the drive	
Identifier	= 1408 + node address = 1408 + 12 = 1420 = 0x058C (1408 = SDO1 basic identifier from the inverter)
Command	= 0x41 = "Read response" (response is block telegram)
Index	as in telegram to the drive
Subindex	
Data 1 ... 4	= 0x0000000B = data length of 11 characters in the ASCII format

Telegram 2 to the drive: Request of the 1st data block

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x060C	0x60	0x00	0x00	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram to the drive	
Command	= 0x60 = "Read segment request" (request: read data block) <ul style="list-style-type: none"> • Bit 4 = 0 (toggle bit)
	Influence of the toggle bit on the request command The single blocks are toggled one after another, i.e. first the request is made with the "0x60" command (= 0b0110*0000), then with the "0x70" command (= 0b0111*0000), and then again with the "0x60" command, etc. * Toggle bit

Response telegram 2 from the drive: Transmission of the 1st data block

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x058C	0x00	0x30	0x31	0x2E	0x30	0x30	0x2E	0x30
		0 _{asc}	1 _{asc}	·asc	0 _{asc}	0 _{asc}	·asc	0 _{asc}

Explanations on the telegram to the drive	
Command	= 0x00 = 0b00000000 <ul style="list-style-type: none"> • Bit 4 = 0 (toggle bit)
	Influence of the toggle bit on the transmission command <ul style="list-style-type: none"> • The 1st response of the inverter in the command byte is "0b0000*0000" if bytes 2 ... 8 are completely filled with data and other telegrams are following. • The 2nd response of the inverter in the command byte is "0b00011*0000" if bytes 2 ... 8 are completely filled with data and other telegrams are following. * Toggle bit
Data 1 ... 7	= "01.00.0" (ASCII representation)

Telegram 3 to the drive: Request of the 2nd data block

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x060C	0x70	0x00	0x00	0x00	0x00	0x00	0x00	0x00

Explanations on telegram 3 to the drive	
Command	= 0x70 = "Read segment request" (request: read data block) • Bit 4 = 1 (toggle bit)

Response telegram 3 from the drive: Transmission of the 2nd data block including end identifier

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x058C	0x17	0x30	0x2E	0x30	0x30	0x00	0x00	0x00
		0 _{asc}	·asc	0 _{asc}	0 _{asc}	-	-	-

Explanations on telegram 3 from the drive	
Command	= 0x17 = 0b00010111: • Bit 0 = 1 (end of transmission) • Bit 1 ... bit 3 = 0b011 (3 bytes do not contain any data) • Bit 4 = 1 (toggle bit)
	Influence of the final bit and the residual data length on the transmission command • The end of transmission is signalled via the set final bit 0. • Bits 1 ... 3 reveal the number of bytes that do not contain any data anymore. * Toggle bit
Data 1 ... 7	= "0.00" (ASCII representation) The result of the data block transmission is: "01.00.00.00"

11.10 Monitoring

11.10.1 Integrated error detection

If a node detects an error, it rejects the CAN telegram bits received so far and transmits an error flag. The error flag consists of 6 consecutive bits with the same logic value.

The following errors are detected:

Error	Description
Bit error	The sending node follows the transmission on the bus and interrupts the transmission if it receives a different logic value than the value transmitted. With the next bit, the sending node starts the transmission of an error flag. In the arbitration phase, the transmitter only detects a bit error if a dominantly sent bit is received as recessive bit. In the ACK slot as well, the dominant overwriting of a recessive bit is not indicated as a bit error.
Stuff-bit error	If more than 5 consecutive bits have the same logic value before the ACK delimiter in the telegram, the previously transmitted telegram will be rejected and an error flag will be sent with the next bit.
CRC error	If the received CRC checksum does not correspond to the checksum calculated in the bus controller, the bus controller will send an error flag after the ACK delimiter and the previously transmitted telegram will be annulled.
Acknowledgement error	If the sent ACK slot recessively sent by the transmitting node is not dominantly overwritten by a receiver, the transmitting node will cancel the transmission. The transmitting node will annul the transmitted telegram and will send an error flags with the next bit.
Format error	If a dominant bit is detected in the CRC delimiter, in the ACK delimiter or in the first 6 bits of the EOF field, the received telegram will be rejected and an error flag will be sent with the next bit.



Tip!

The errors mentioned before indicate that a physical error has occurred in the bus system.

Possible causes are:

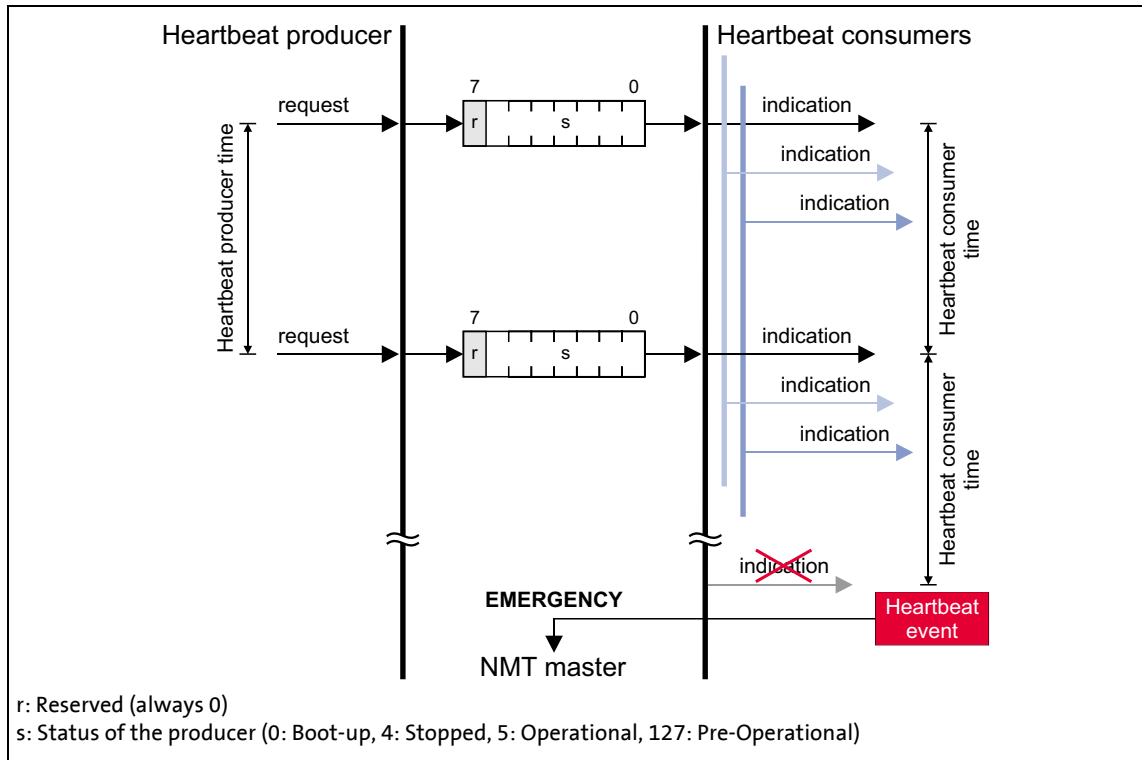
- Several nodes with identical node address
- Wrong baud rate of one or several nodes
- Too high cable length
- Too many or no terminating resistors
- Too high bus load/too many data telegrams
(e.g. since a node permanently transmits event-controlled due to data changes of an analog signal/actual value.)
- EMC interferences on the system bus
(e.g. since the CAN bus cable next to the motor cable is unshielded.)

[C00364](#) displays whether such an error is active.

11.10.2 Heartbeat protocol

The heartbeat protocol can be used for node monitoring purposes within a CAN network.

Basic workflow



[11-9] Heartbeat protocol

1. A heartbeat producer cyclically transmits a so-called heartbeat telegram to one or more consumers.
2. The consumer(s) monitor the heartbeat telegram for arrival on a regular basis.

11.10.2.1 Telegram structure

- The heartbeat telegram of the producer has the following identifier:
Identifier (COB-ID) = 1792 + producer's node address
- The user data (1 byte) contain the status (s) of the producer:

Heartbeat producer status		Data								
Communication status	Decimal value (s)	(r)	Producer status (s)							
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Boot-up	0	0	0	0	0	0	0	0	0	0
Stopped	4	0	0	0	0	0	1	0	0	0
Operational	5	0	0	0	0	0	1	0	1	1
Pre-Operational	127	0	1	1	1	1	1	1	1	1

11.10.2.2 Parameter setting

Short overview of the parameters for the "Heartbeat" monitoring function:

Parameters	Info	Lenze setting		Assignment	
		Value	Unit	Consumer	Producer
C00347/1...n	CAN status of the heartbeat producer 1 ... n	-		●	
C00381	Heartbeat producer time	0	ms		●
C00385/1...n	CAN node address of the heartbeat producer 1 ... n	0		●	
C00386/1...n	Heartbeat consumer time for the heartbeat producer 1 ... n	0	ms	●	
C00592/5	Resp. to heartbeat event	No response		●	
Greyled out = display parameter					

Heartbeat producer time

Time interval for the transmission of the heartbeat telegram to the consumer(s).

- Parameterisable in [C00381](#) or via object [I-1017](#). The parameterised time is rounded down to an integer multiple of 5 ms.
- The heartbeat telegram is sent automatically as soon as a time > 0 ms is set.

Heartbeat consumer time

Monitoring time for the nodes (producers) to be monitored.

- Parameterisable in [C00386/1...n](#) or via object [I-1016](#).
- The parameterised time is rounded down to an integer multiple of 5 ms and must have a greater value than the heartbeat producer time of the node to be monitored.
- The maximum number of the nodes to be monitored depends on the device version:
 - "StateLine": Up to 7 Heartbeat Producers can be monitored.
 - "HighLine": Up to 15 Heartbeat Producers can be monitored.
 - "EMS": Up to 15 Hearbeat Producers can be monitored.
- The node address(es) of the nodes to be monitored is/are set in [C00385/1...n](#) or via object [I-1016](#), too.

Heartbeat event

The "Heartbeat event" is activated in the consumer if it does not receive any heartbeat telegram from the producer within the heartbeat consumer time:

- The consumer changes from the "Operational" communication status to the "Pre-Operational" communication status.
- The NMT master receives an emergency telegram containing emergency error code 0x8130.
- The response parameterised in [C00592/5](#) is activated (Lenze setting: "No response").

**Note!**

The heartbeat monitoring will not start until the first heartbeat telegram of a monitored producer has been received successfully and the "Pre-Operational" NMT status has been assumed.

The boot-up telegram counts as the first heartbeat telegram.

11.10.2.3 Commissioning example**Task**

An 8400 inverter (node 2) which is configured as heartbeat consumer is to monitor another 8400 inverter (heartbeat producer, node 1).

- The heartbeat producer is to transmit a heartbeat telegram to the heartbeat consumer every 10 ms.
- The heartbeat consumer monitors the heartbeat telegram for arrival. A response is to be activated in the event of an error.

Parameterising the heartbeat producer (node 1)

1. Set the heartbeat producer time ([C00381](#)) to 10 ms.

Parameterising the heartbeat consumer (node 2)

1. Set the CAN node address of the producer in [C00385/1](#).
2. Set the heartbeat consumer time in [C00386/1](#).
 - Note: The heartbeat consumer time must be greater than the heartbeat producer time of the node to be monitored set in [C00381](#).
3. Set the desired response in [C00592/5](#) which is to be activated should a heartbeat event in the consumer occur.

**Tip!**

[C00347/1...n](#) displays the heartbeat status of the monitored nodes.

Heartbeat telegram

- The heartbeat telegram of the producer has the following identifier:
Identifier (COB-ID) = 1792 + producer's node address = 1792 + 1 = 1793 = 0x701

11.10.3 Emergency telegram

If the error status changes because an internal device error occurs or has been eliminated, the NMT master receives an emergency telegram once with the following structure:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Emergency error codes		Error register	Manufacturer-specific error message				
LOW byte	HIGH byte	I-1001	0x00 (Reserved)	LOW word		HIGH word	
See table below				LOW byte	HIGH byte	LOW byte	HIGH byte
			<ul style="list-style-type: none"> For emergency error code 0xF000: Lenze error number (value displayed in C00168) All other emergency error codes have a value of "0" here. 				

Emergency error codes	Error register	Cause
0x0000	0xXX	One of several errors eliminated
	0x00	One error has been eliminated (error-free status afterwards)
0x3100	0x01	Supply voltage of standard device faulty or failed
0x8100	0x11	Communication error (warning)
0x8130	0x11	Life guarding error or heartbeat error
0x8150	0x11	Collision of identifiers (COB-IDs): An identifier parameterised for reception is also used for transmission.
0x8210	0x11	PDO length shorter than expected
0x8220	0x11	PDO length greater than expected
0x8700	0x11	Monitoring of the sync telegram
0xF000	0x01	Generic error <ul style="list-style-type: none"> An error with a "Fault", "Trouble", "TroubleQSP", "Warning" error response occurred in the standard device. Error message is the Lenze error number (C00168).

The [Short overview \(A-Z\)](#) of error messages of the operating system includes a list of more emergency error codes. ([623](#))

Example

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Emergency error codes		Error register	Manufacturer-specific error message				
0x00	0xF0	0x01	0x00 (Reserved)	Lenze error number			
Generic error				▶ Error messages of the operating system Corresponding error-free message: Value "0x00000000"			



Tip!

A detailed description can be found in CAN specification DS301, V4.02.

11.11 CANopen objects implemented

Lenze devices can be parameterised with both Lenze codes and manufacturer-independent "CANopen objects". Fully CANopen-compliant communication can only be achieved by exclusively using CANopen objects for the parameterisation. The CANopen objects described in this chapter are defined in the DS301 V4.02 CAN specification.

Many CANopen objects can be mapped on Lenze codes. In the following table, the corresponding Lenze codes are listed in the column "Relationship to Lenze codes".



Note!

Some of the terms used here derive from the CANopen protocol.

Overview of CANopen indices and their relationship to Lenze codes

CANopen object			Relationship to Lenze code
Index	Subindex	Name	
I-1000	0	Device type	-
I-1001	0	Error register	-
I-1003	Predefined error field		
	0	Number of errors	-
	1 ... 10	Standard error field	-
I-1005	0	COB-ID SYNC message	C00367 C00368
I-1006	0	Communication cycle period	C00369
I-1014	0	COB-ID EMCY	-
I-1016	Consumer heartbeat time		
	0	Highest subindex supported	-
	1 ... n	Consumer heartbeat time • "StateLine" version: n = 7 • "HighLine" version: n = 15 • "EMS" version: n = 15	C00385/1...n C00386/1...n
I-1017	0	Producer heartbeat time	C00381
I-1018	Identity object		
	0	Highest subindex supported	-
	1	Vendor ID	-
	2	Product code	-
	3	Revision number	-
	4	Serial number	-
I-1200	SDO1 server parameter		
	0	Highest subindex supported	-
	1	COB-ID client → server (rx)	-
	2	COB-ID server → client (tx)	-
I-1201	SDO2 server parameter		
	0	Highest subindex supported	-
	1	COB-ID client → server (rx)	-
	2	COB-ID server → client (tx)	-

CANopen object			Relationship to Lenze code
Index	Subindex	Name	
I-1400	RPDO1 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/1
	2	Transmission type	C00323/1
I-1401	RPDO2 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/3
	2	Transmission type	C00323/2
I-1402	RPDO3 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/5
	2	Transmission type	C00323/3
I-1403	RPDO4 communication parameter (from version 16.00.00)		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/7
	2	Transmission type	C00323/4
I-1600	RPDO1 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/1...4 C00866/1...4
I-1601	RPDO2 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/5...8 C00866/5...8
I-1602	RPDO3 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/9...12 C00866/9...12
I-1603	RPDO4 mapping parameter (from version 16.00.00)		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/13...16 C00866/13...16
I-1800	TPDO1 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/2
	2	Transmission type	C00322/1
	3	Inhibit time	C00324/2
	5	Event timer	C00356/5 C00369

CANopen object			Relationship to Lenze code
Index	Subindex	Name	
I-1801	TPDO2 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/4
	2	Transmission type	C00322/2
	3	Inhibit time	C00324/3
	5	Event timer	C00356/2 C00369
I-1802	TPDO3 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/6
	2	Transmission type	C00322/3
	3	Inhibit time	C00324/4
	5	Event timer	C00356/3 C00369
I-1803	TPDO4 communication parameter (from version 16.00.00)		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/8
	2	Transmission type	C00322/4
	3	Inhibit time	C00324/5
	5	Event timer	C00356/4 C00369
I-1A00	TPDO1 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/1...4
I-1A01	TPDO2 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/5...8
I-1A02	TPDO3 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/9...12
I-1A03	TPDO4 mapping parameter (from version 16.00.00)		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/13...16

I-1000

Index I-1000	Name: Device type				
Subindex	Default setting	Display range (min. value unit max. value)		Access	Data type
0: Device type	0	0		4294967295	ro U32

The CANopen index I-1000 specifies the profile for this device. Furthermore, additional information defined in the device profile itself can be stored here.

8th byte	7th byte	6. byte	5th byte
Data 4	Data 3	Data 2	Data 1
HIGH word		LOW word	
HIGH byte	LOW byte	HIGH byte	LOW byte
Additional information		ECAT: Device Profile Number	

[11-1] Data telegram assignment

In case of 8400 series inverters, the four bytes contain the following values:

- 5th and 6th byte: The data content is 0x0000, i.e. no profile definition.
- 7th byte: The data content specifies the device type: Here the value is 0x00 for inverters.
- 8th byte: The data content is 0x00.

The data content for the 8400 inverter thus is: 00 00 00 00

I-1001

Index: I-1001	Name: Error register				
Subindex	Default setting	Display range (min. value unit max. value)		Access	Data type
0: Error register	-	0		255	ro U8

Error register

The error status in the data byte (U8) is bit coded. The following error states are coded in the data byte (U8):

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Error status
0	0	0	0	0	0	0	0	No error
0	0	0	0	0	0	0	1	Device error message
0	0	0	1	0	0	0	1	Communication error

I-1003

Index: I-1003	Name: Predefined error field					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of errors	0	0		255	rw	U8
1 ... 10: Standard error field	-	0		4294967295	ro	U32

Error history

This object indicates that an error has occurred in the module and in the standard device.

Subindex	Meaning
0	Number of saved error messages
1 ... 10	Display of the error list The error messages (U32) consist of a 16-bit error code and a manufacturer-specific information field comprising 16 bits.

**Note!**

The values in the "standard error field" under subindex 1 ... 10 will be deleted if the subindex "number of recorded errors" is overwritten with the value "0".

Emergency error codes	Cause	Entry in the error register (I-1001)
0x0000	One of several errors eliminated	0xXX
	Elimination of one single error (afterwards no more errors)	0x00
0x1000	Standard device is in error status (error response "fault", "message", "warning", "error", "quick stop by trouble")	0x01
0x3100	Supply voltage of standard device faulty or failed	0x01
0x8100	Communication error (warning)	0x11
0x8130	Life guard error or heartbeat error	0x11
0x8150	Collision of COB-IDs: An ID parameterised for reception is also used for transmission.	0x11
0x8210	PDO length shorter than expected	0x11
0x8220	PDO length greater than expected	0x11
0x8700	Monitoring of the sync telegram	0x11

I-1005

Index: I-1005	Name: COB-ID SYNC message				
Subindex	Default setting	Setting range (min. value unit max. value)		Access	Data type
0: COB-ID SYNC message	0x0000 0080 or 0x8000 0080	0		4294967295 rw	U32

This object can be used to activate the generation of sync telegrams and to write the identifier value.

- This object relates to codes [C00367](#) and [C00368](#).

Creating sync telegrams

Sync telegrams are created by setting bit 30 (see below) to "1". The time between the sync telegrams can be set using the object [I-1006](#).

Writing identifiers

To receive PDOs, the value 0x80 must be entered in the 11-bit identifier in the Lenze setting (and according to CANopen specification) . This means that all modules are by default set to the same sync telegram.

- If sync telegrams are only to be received by certain communication modules, their identifiers can be entered with values up to and including 0x07FF.
- The identifier can only be changed if the communication module does not send any sync telegrams (bit 30 = "0").
- How to change the identifier:
 - Deactivate identifier (set bit 30 to "0").
 - Change identifier.
 - Activate identifier (set bit 30 to "1").

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
x	0/1	Extended identifier*				11-bit identifier	
* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".							

[11-2] Data telegram assignment

I-1006

Index: I-1006	Name: Communication cycle period					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Communication cycle period	0 µs	0	µs	65535000	rw	U32

Setting the sync telegram cycle time.

- The cycle time can be selected as "1000" or as an integer multiple of it.
- If "0 µs" is set (Lenze setting), no sync telegrams are created.
- This object relates to code [C00369](#).

I-1014

Index: I-1014	Name: COB-ID EMCY					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: COB-ID EMCY	0x80 + node ID	0		4294967295	rw	U32

When communication errors occur and are acknowledged or when internal errors occur in the communication module or inverter (e.g. "fault"), the system bus sends an error message. The telegram is sent once for every error. This function can be activated or deactivated with bit 31.

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0	Extended identifier*				11-bit identifier	
* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".							

[11-3] Data telegram assignment

Bit	setting	
Bit 31	0	Emergency object is valid.
	1	Emergency object is invalid.



Note!

The identifier can only be changed in the "emergency object invalid" status (bit 31 = 1).

I-1016

Index: I-1016	Name: Consumer heartbeat time					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	StateLine: 7 HighLine: 15 EMS: 15	- (read access only)			ro	U16
1 ... n: Consumer heartbeat time	0	0		65535	rw	U16

Monitoring time for the nodes to be monitored via heartbeat. ▶ [Heartbeat protocol](#) (☞ 717)

- The parameterised time is rounded down to an integer multiple of 5 ms and must have a greater value than the heartbeat producer time of the node to be monitored.

Subindex	Meaning	Lenze code
0	Number of nodes to be monitored	
1 ... n	Node ID and heartbeat time of the node to be monitored	Node ID: C00385/x Heartbeat time: C00386/x

8th byte	7th byte	6. byte	5th byte
Data 4	Data 3	Data 2	Data 1
Bit 31 ... bit 24	Bit 23 ... Bit 16	Bit 15 ... Bit 0	
0 (Reserved)	Node ID	Heartbeat time in [ms]	

[11-4] Data telegram assignment

I-1017

Index: I-1017	Name: Producer heartbeat time					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Producer heartbeat time	0	0	ms	65535	rw	U16

Time interval for sending the heartbeat telegram to the consumer(s). ▶ [Heartbeat protocol](#) (717)

- The parameterised time is rounded down to an integer multiple of 5 ms.
- The heartbeat telegram is automatically sent as soon as a time > 0 ms is entered. In this case, the "node guarding" monitoring function is deactivated.
- This object relates to code [C00381](#).

I-1018

Index: I-1018	Name: Identity object					
Subindex	Default setting	Display range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	see below	0		4294967295	ro	U32
1: Vendor ID						
2: Product code						
3: Revision number						
4: Serial number						

Subindex	Meaning														
1	Manufacturer's identification number <ul style="list-style-type: none"> • The identification number allocated to Lenze by the organisation "CAN in Automation e. V." is "0x0000003B". 														
2	Product code <table border="1"> <tr> <td>84001</td> <td>8400 BaseLine C</td> </tr> <tr> <td>84002</td> <td>8400 StateLine C</td> </tr> <tr> <td>84003</td> <td>8400 HighLine C</td> </tr> <tr> <td>84004</td> <td>8400 TopLine C</td> </tr> <tr> <td></td> <td>8400 protec StateLine</td> </tr> <tr> <td></td> <td>8400 protec HighLine</td> </tr> <tr> <td></td> <td>8400 protec EMS</td> </tr> </table>	84001	8400 BaseLine C	84002	8400 StateLine C	84003	8400 HighLine C	84004	8400 TopLine C		8400 protec StateLine		8400 protec HighLine		8400 protec EMS
84001	8400 BaseLine C														
84002	8400 StateLine C														
84003	8400 HighLine C														
84004	8400 TopLine C														
	8400 protec StateLine														
	8400 protec HighLine														
	8400 protec EMS														
3	Main and subversion of firmware														
4	Serial number														

I-1200

Index: I-1200		Name: SDO1 server parameter			
Subindex	Default setting	Display range (min. value unit max. value)		Access	Data type
0: Highest subindex supported	2	2		2	ro U8
1: COB-ID client -> server (rx)	node ID + 0x600	0		4294967295	ro U32
2: COB-ID server -> client (tx)	node ID + 0x580	0		4294967295	ro U32

Identifiers for SDO server channel 1 (basic SDO channel).

- According to DS301 V4.02, the basic SDO channel can neither be changed nor deactivated.

Subindex	Meaning
1	Specification of receive identifier • For SDO server channel 1: node address (C00350) + 0x600
2	Specification of send identifier • For SDO server channel 1: node address (C00350) + 0x580

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0	0	Extended identifier*				11-bit identifier	

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

[11-5] Data telegram assignment

I-1201

Index: I-1201	Name: SDO2 server parameter					
Subindex	Default setting	Setting range (min. value unit max. value)		Access	Data type	
0: Highest subindex supported	3	- (read access only)		ro	U8	
1: COB-ID client -> server (rx)	0x80000000	0		4294967295	rw	U32
2: COB-ID server -> client (tx)	0x80000000	0		4294967295	rw	U32

Identifiers for SDO server channel 2.

- The SDO server parameter is only valid, if bit 31 is set to "0" for both transmission directions (subindex 1 and 2).
- In the Lenze setting, the SDO server channels 2 are deactivated (bit 31 = "1").
- The identifier can only be changed if the SDO is invalid (bit 31 = "1").

Subindex	Meaning
1	Specification of receive identifier
2	Specification of send identifier

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0	Extended identifier*				11-bit identifier	

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

[11-6] Data telegram assignment

Bit	setting	
Bit 31	0	SDO is valid.
	1	SDO is invalid.

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

Example

Parameter data channel 2 of the inverter with node address 4 shall be activated.

- For this purpose, bit 31 in the subindexes 1 and 2 of the [I-1201](#) object must be set to the value "0" (≡ "SDO valid").
- The master must send the two "write request" commands to the nodes via the basic SDO channel.

Identifier calculation

- Identifier (COB-ID) = basic identifier + node address (node ID)
- Basic identifier SDO2 from master to drive: 1600 (0x640)
→ Identifier = 0x640 + 0x4 = 0x644
- Basic identifier SDO2 from drive to master: 1472 (0x5C0)
→ Identifier = 0x5C0 + 0x4 = 0x5C4

Resulting data (data 1 ... data 4)

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0	0	Extended identifier = 0				11-bit identifier = 0x644	
0x00		0x00		0x06		0x44	

[11-7] Data telegram assignment for subindex 1

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0	0	Extended identifier = 0				11-bit identifier = 0x5C4	
0x00		0x00		0x05		0xC4	

[11-8] Data telegram assignment for subindex 2

User data assignment

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x23	0x01	0x12	0x01	0x44	0x06	0x00	0x00

[11-9] User data assignment for writing to subindex 1

1st byte	2nd byte	3rd byte	4th byte	5th byte	6. byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x23	0x01	0x12	0x02	0xC4	0x05	0x00	0x00

[11-10] User data assignment for writing to subindex 2

I-1400

Index: I-1400	Name: RPDO1 communication parameter				
Subindex	Default setting	Setting range (min. value unit max. value)		Access	Data type
0: Highest subindex supported	5	- (read access only)		ro	U8
1: COB-ID used by RPDO	0x200 + node ID	0	4294967295	rw	U32
2: Transmission type	254	0	255	rw	U8
3: Inhibit time	-	- (not used for RPDOs)		rw	U16
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)		rw	U8
5: Event timer	-	- (not used for RPDOs)		rw	U16

Communication parameter for receiving process data via RPDO1

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	RPDO1 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x200 + node ID	C00354/1
2	RPDO Transmission type according to DS301 V4.02 ▶ Transmission type (699)	C00323/1

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0/1	Extended identifier*				11-bit identifier	

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

[11-11] Data telegram assignment

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

Description of subindex 1

Bit no.	Value	Explanation
0 ... 10	0/1	11-bit identifier
(11 ... 28)*	0	*) The extended identifier (29 bits) is not supported. Any of these bits must be "0".
29*	0	
30	0	RTR to this PDO possible (cannot be set)
	1	RTR to this PDO not possible (Lenze)
31	0	PDO active
	1	PDO not active

[11-12] I-1400 ... I-1402, subindex 1

Description of subindex 2

cyclic	PDO transmission		Transmission type	Explanation
	synchronous	event-controlled		
X	X		n = 1 ... 240	When a value n is entered, this PDO will be accepted with every nth SYNC.
		X	n = 254	PDO will be accepted immediately.

[11-13] I-1400 ... I-1402, subindex 2

I-1401

Index: I-1401	Name: RPDO2 communication parameter				
Subindex	Default setting	Setting range (min. value unit max. value)		Access	Data type
0: Highest subindex supported	5	- (read access only)		ro	U8
1: COB-ID used by RPDO	0x300 + node ID	0	4294967295	rw	U32
2: Transmission type	254	0	255	rw	U8
3: Inhibit time	-	- (not used for RPDOs)		rw	U16
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)		rw	U8
5: Event timer	-	- (not used for RPDOs)		rw	U16

Communication parameter for receiving process data via RPDO2

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	RPDO2 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x300 + node ID	C00354/3
2	RPDO Transmission type according to DS301 V4.02 ▶ Transmission type (□ 699)	C00323/2

- For data telegram assignment and description of subindices 1 and 2, see object [I-1400](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1402

Index: I-1402	Name: RPDO3 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by RPDO	0x400 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	-	- (not used for RPDOs)			rw	U16
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	-	- (not used for RPDOs)			rw	U16

Communication parameter for receiving process data via RPDO3

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	RPDO3 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x400 + node ID	C00354/5
2	RPDO transmission type according to DS301 V4.02 ▶ Transmission type (☞ 699)	C00323/3

- For data telegram assignment and description of subindices 1 and 2, see object [I-1400](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1403

From version 16.00.00

Index: I-1403	Name: RPDO4 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)		Access	Data type	
0: Highest subindex supported	5	- (read access only)		ro	U8	
1: COB-ID used by RPDO	0x500 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	-	- (not used for RPDOs)		rw	U16	
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)		rw	U8	
5: Event timer	-	- (not used for RPDOs)		rw	U16	

Communication parameter for receiving process data via RPDO4

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	Identifier RPDO4 • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x500 + node ID	C00354/7
2	RPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 699)	C00323/4

- For data telegram assignment and description of subindices 1 and 2, see object [I-1400](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1600

Index: I-1600	Name: RPDO1 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1600 serves to receive parameter data as RPDO1.

- This object relates to codes [C00409/1...4](#) and [C00866/1...4](#).
- **From version 12.00.00 onwards:** For 32-bit values, this object relates to codes [C00407/1...2](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO1 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

8th byte	7th byte	6. byte	5th byte
Data 4	Data 3	Data 2	Data 1
Bit 31 ... bit 16		Bit 15 ... bit 8	Bit 7 ... bit 0
Index		Subindex	Length

[11-14] Data telegram assignment

IEC 61131 process data words are mapped. Only whole bytes can be mapped (1-byte/mapping entry).

Related topics:

- ▶ [RPDO1 | "LP_CanIn1" port block \(685\)](#)

I-1601

Index: I-1601	Name: RPDO2 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1601 serves to receive parameter data as RPDO2.

- This object relates to codes [C00409/5...8](#) and [C00866/5...8](#).
- **From version 12.00.00 onwards:** For 32-bit values, this object relates to codes [C00407/3...4](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO2 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1600](#).

Related topics:

- ▶ [RPDO2 | "LP_CanIn2" port block \(687\)](#)

I-1602

Index: I-1602	Name: RPDO3 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1602 serves to receive parameter data as RPDO3.

- This object relates to codes [C00409/9...12](#) and [C00866/9...12](#).
- **From version 12.00.00 onwards:** For 32-bit values, this object relates to codes [C00407/5...6](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO3 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1600](#).

Related topics:

- ▶ [RPDO3 | "LP_CanIn3" port block \(689\)](#)

I-1603

From version 16.00.00

Index: I-1603	Name: RPDO4 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1603 serves to receive parameter data as RPDO4.

- This object relates to codes [C00409/13...16](#) and [C00866/13...16](#).
- For 32-bit values, this object relates to the codes [C00407/7...8](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO4 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1600](#).

Related topics:

- ▶ [RPDO4 | "LP_CanIn4" port block](#) (📖 691)

I-1800

Index: I-1800		Name: TPDO1 communication parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by TPDO	0x180 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw	U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	0 ms	0	ms	65535	rw	U16

Communication parameter for sending process data via TPDO1

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	TPDO1 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x180 + node ID	C00354/2
2	TPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 699)	C00322/1
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/2
5	Cycle time for PDO transmission with transmission type "254".	C00356/5 C00369

8th byte		7th byte		6. byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0/1	Extended identifier*				11-bit identifier	

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

[11-15] Data telegram assignment

Bit	setting	
Bit 30	0	RTR to this PDO possible (Lenze).
	1	RTR to this PDO not possible (not adjustable)
Bit 31	0	PDO active
	1	PDO inactive

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

Subindex 2 - transmission type

cyclic	PDO transmission		Transmission type	Explanation
	synchronous	event-controlled		
●	●		n = 1 ... 240	When a value n is entered, this PDO will be accepted with every nth SYNC.
	●		n = 252	On sync, the PDO is filled with new data, but only sent on RTR.
		●	n = 254, 255	Event-controlled or cyclic

Subindex 3 - inhibit time**Note!**

The delay time can only be changed when the PDO is not active (see subindex 1, bit 31 = 1).

The entered value multiplied by 0.1 gives the delay time in [ms]. Only integers will be considered, i.e. fractional numbers will be **rounded down** to integers.

Example :

- Entered value: 26
- Calculated time = 26×0.1 [ms] = 2.6 [ms] → delay time = 2 [ms]

Subindex 5 - event timer

For cyclic operation (transmission type 254), the cycle time for sending the process data object on the system bus can be set under subindex 5:

The entered value corresponds to the time in [ms].

I-1801

Index: I-1801	Name: TPDO2 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by TPDO	0x280 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw	U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	0 ms	0	ms	65535	rw	U16

Communication parameter for sending process data via TPDO2

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	TPDO2 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x280 + node ID	C00354/4
2	TPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 699)	C00322/2
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/3
5	Cycle time for PDO transmission with transmission type "254".	C00356/2 C00369

- For data telegram assignment and description of subindices, see object [I-1800](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1802

Index: I-1802	Name: TPDO3 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by TPDO	0x380 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw	U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	0 ms	0	ms	65535	rw	U16

Communication parameter for sending process data via TPDO3

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	TPDO3 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x380 + node ID	C00354/6
2	TPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 699)	C00322/3
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/4
5	Cycle time for PDO transmission with transmission type "254".	C00356/3 C00369

- For data telegram assignment and description of subindices, see object [I-1800](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1803

From version 16.00.00

Index: I-1803	Name: TPDO4 communication parameter				
Subindex	Default setting	Setting range (min. value unit max. value)		Access	Data type
0: Highest subindex supported	5	- (read access only)		ro	U8
1: COB-ID used by TPDO	0x480 + node ID	0		4294967295	rw U32
2: Transmission type	254	0		255	rw U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)		rw	U8
5: Event timer	0 ms	0	ms	65535	rw U16

Communication parameter for sending process data via TPDO4

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	Identifier TPDO4 • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x480 + node ID	C00354/8
2	TPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 699)	C00322/4
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/5
5	Cycle time for PDO transmission with transmission type "254".	C00356/4 C00369

- For data telegram assignment and description of subindices, see object [I-1800](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1A00

Index: I-1A00	Name: TPDO1 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1A00 serves to send parameter data as TPDO1.

- This object relates to code [C00868/1...4](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO1 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

8th byte	7th byte	6. byte	5th byte
Data 4	Data 3	Data 2	Data 1
Bit 31 ... bit 16		Bit 15 ... bit 8	
Index		Subindex	
		Length	

[11-16] Data telegram assignment

IEC 61131 process data words are mapped. Only whole bytes can be mapped (1-byte/mapping entry).

Related topics:

- ▶ [TPDO1 | "LP_CanOut1" port block](#) (📖 693)

I-1A01

Index: I-1A01	Name: TPDO2 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1A01 serves to send parameter data as TPDO2.

- This object relates to code [C00868/5...8](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO2 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1A00](#).

Related topics:

- ▶ [TPDO2 | "LP_CanOut2" port block](#) (📖 694)

I-1A02

Index: I-1A02	Name: TPDO3 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1A02 serves to send parameter data as TPDO3.

- This object relates to code [C00868/9...12](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO3 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1A00](#).

Related topics:

- ▶ [TPDO3 | "LP_CanOut3" port block](#) (📖 695)

I-1A03

Index: I-1A03	Name: TPDO4 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1A03 serves to send parameter data as TPDO4.

- This object relates to code [C00868/13...16](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO4 <ul style="list-style-type: none"> • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

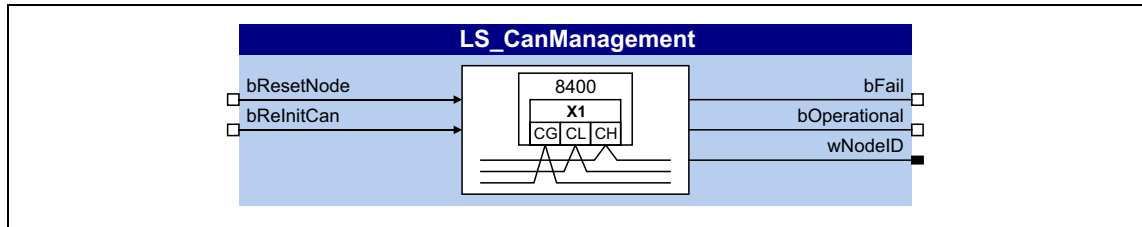
- For data telegram assignment, see object [I-1A00](#).

Related topics:

- ▶ [TPDO4 | "LP_CanOut4" port block](#) (📖 696)

11.12 Internal interfaces | System block "LS_CANManagement"

The **LS_CANManagement** system block serves to control internal functions of the CAN driver (reset node and re-initialisation) and to display the "Operational" status as well as the node address (analogous to the 9300 ServoPLC and ECS devices).



Inputs

Designator	Data type	Information/possible settings
bResetNode	BOOL	Reset node
		TRUE Carry out reset node • If the inverter is configured as CAN master in C00352 , the NMT command "Start Remote Node" is sent to all nodes at the bus (broadcast telegram). ▶ Network management telegram (NMT)
bReInitCAN	BOOL	Reinitialisation
		TRUE Reinitialise "CAN on board" interface.

Outputs

Designator	Data type	Value/meaning
bFail	BOOL	Error
		TRUE An event according to the error configuration in C00341 has occurred
bOperational	BOOL	"Operational" status signal
		TRUE The system bus is in the "Operational" status
wNodeID	WORD	Output of the node address



Note!

If a "Bus off" error is detected, the "CAN on board" interface will automatically be reinitialised after 1 second.

Hence, 1 second after the "Bus off" has occurred, the inverter will automatically be active again on the system bus ("Auto bus off recovery").

12 PROFIBUS/PROFINET option

12.1 Selection of the communication option

12 PROFIBUS/PROFINET option

The 8400 protec HighLine inverter is also available with a PROFIBUS or PROFINET interface in order to take part in the data transfer of a fieldbus system.

When using one of these options, the major advantage for the user is the possibility of parameterising, controlling, and diagnosing the drive system via the available fieldbus.

12.1 Selection of the communication option

If you insert the 8400 protec HighLine inverter via the *Insert a component* dialog into the *Project view* of the »Engineer«, you will be queried in the second dialog step **Device modules** about the communication and safety system in the device.




Select the available option in the **Communication** list field in order that the related communication parameters & parameterisation dialogs are available in the »Engineer«.



Tip!

The available communication option can also be assigned subsequently to the device in the »Engineer« any time:

1. Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Click the  icon.
3. Select the available communication option in the *Insert device module* dialog box.
4. Press **Complete** to confirm your selection.



Detailed information on PROFIBUS/PROFINET is provided in the communication manual (KHB) for the respective fieldbus and in the »Engineer« online help.

12.2 Parameter setting

All codes which must be parameterised for establishing the fieldbus communication are saved in the memory module of the inverter.

The archived data can be addressed by all bus systems supported by the inverter.

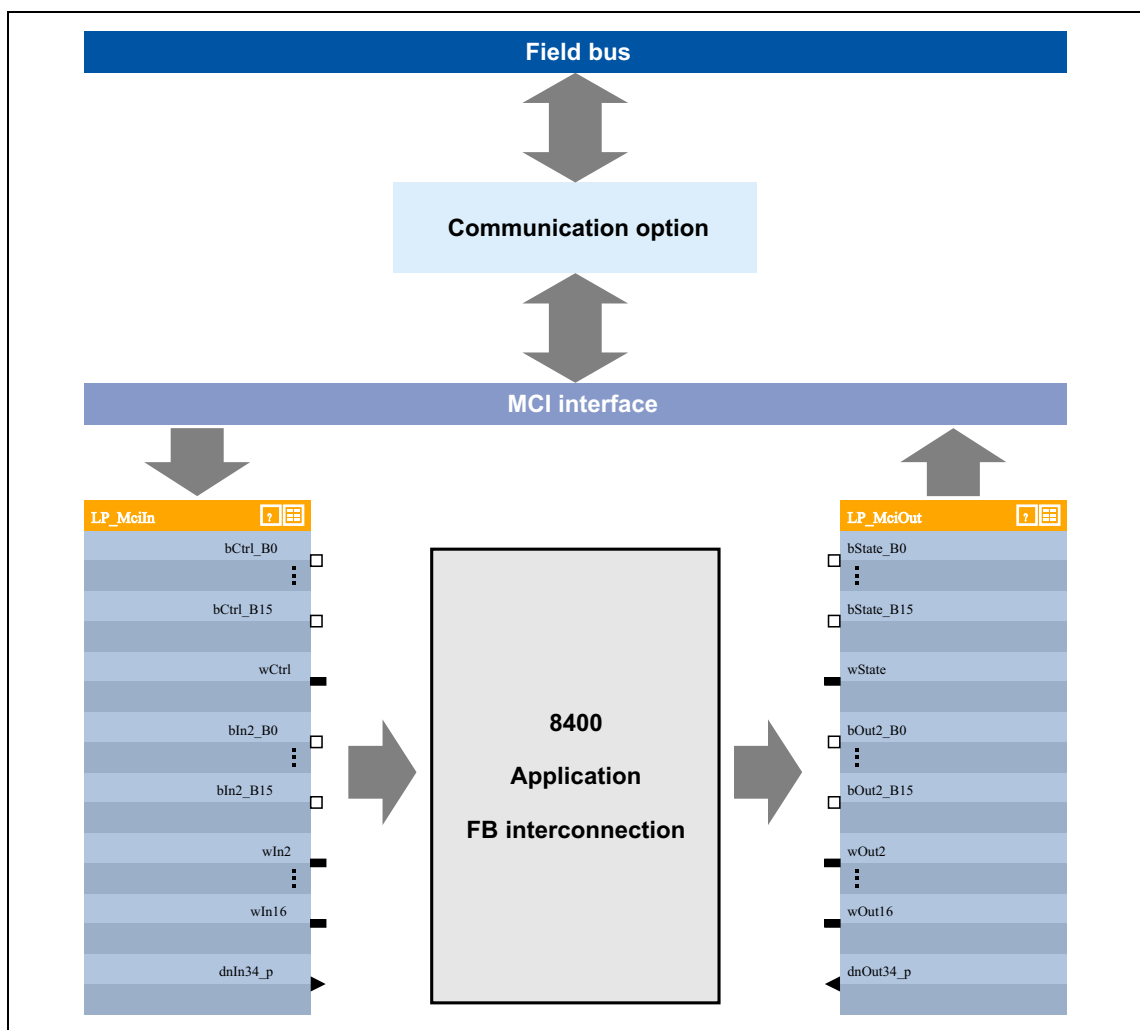


The codes of the corresponding communication option are described in the respective online help and in the communication manual (KHB).

12.3 Process data transfer

The process data serve to control the inverter. Thus the transfer of the process data is time-critical.

- The process cycle is 1ms, irrespective of the respective communication option and the type of inverter.
- The process data transfer between the host system and the inverters is cyclical.
 - This concerns the continuous exchange of current input and output data.
 - In the case of the 8400 protec HighLine inverter, 16 words per direction are exchanged.
- The master computer can directly access the process data.
Access to the process data takes place via the port blocks **LP_MciIn** and **LP_MciOut** (see FB interconnection of the »Engineer«).
These port blocks are also called process data channels.
- The process data are not saved in the inverter.



[12-1] External and internal data transfer between bus system, inverter and function block interconnection

Fieldbus-specific device profiles and PDO mapping

When specific bus systems are used, the inverter is to behave according to a defined, manufacturer-spanning standard. The following definitions have been made for this:

- Definitions of the device state machine (e.g. DSP402, DriveCOM, ProfiDrive etc.)
- Definition of the bit assignment of control and status words
- Definition of signal scaling (on a limited scale)
- Definition of parameter scaling (on a limited scale)
- Definition of the process data mapping

These device profiles are not mapped in the communication option since some definitions have a strong effect on the device-internal behaviour and the device profiles are not uniform regarding this matter.

- The task of the communication option is
 - to address parameters (SDOs),
 - to transfer PDOs and
 - the signal mapping of the PDOs.
- The process data objects (e.g. the meaning of the control word bits or the speed setpoint stipulated) are interpreted in the inverter.

12.4 Control mode "MCI"

"40: MCI" can be selected as a control mode in [C00007](#) in order to quickly and easily set-up inverter control by means of MCI-PDOs via the fieldbus interface.

Given that the technology applications are fundamentally different and have different requirements regarding the signals sent to them, predefined assignment of the MCI-PDOs depends on the technology application selected in [C00005](#):

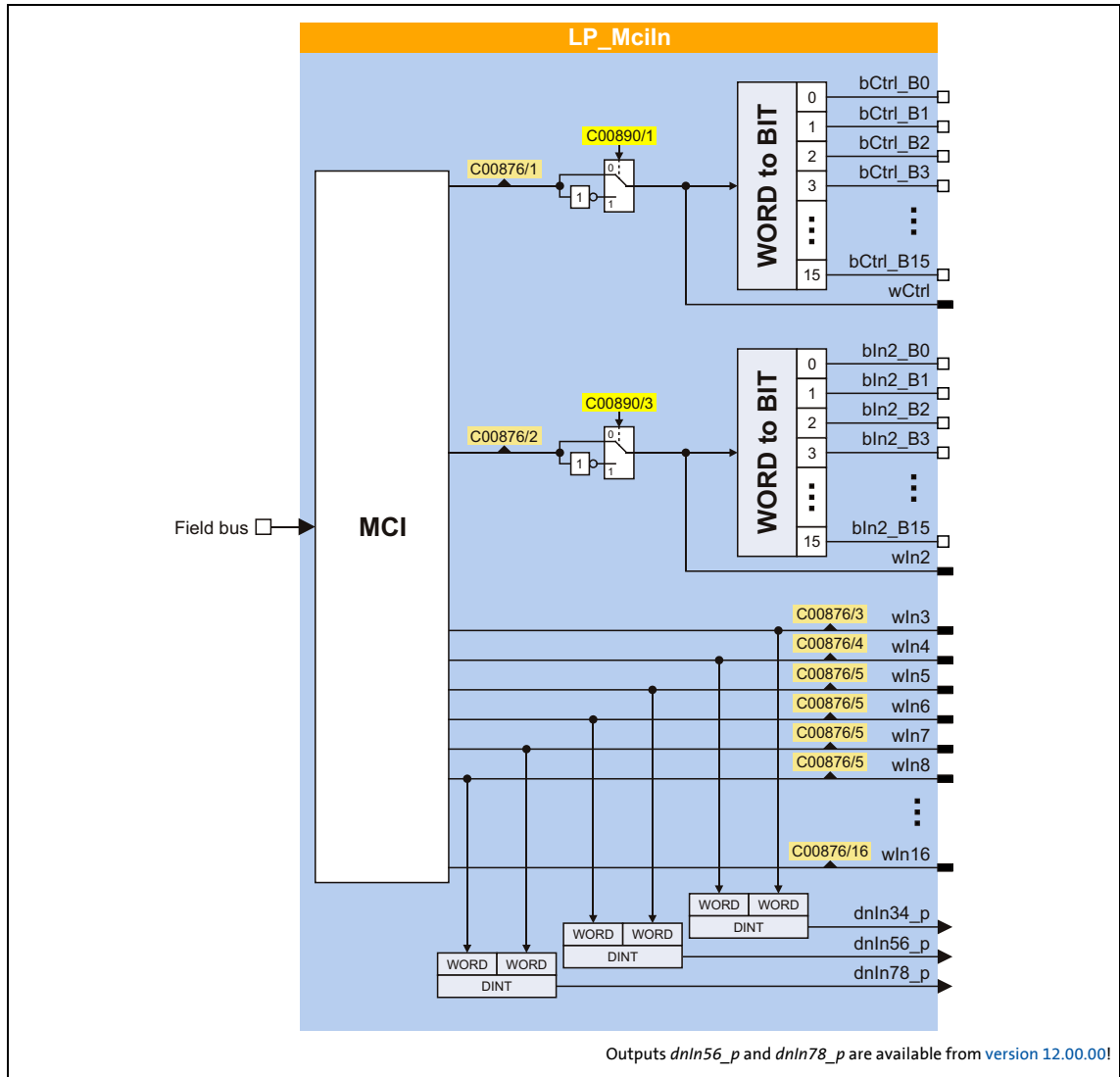
- **TA "Actuating drive speed":**
[Process data assignment for fieldbus communication](#) (4397)
- **TA "Table positioning":**
[Process data assignment for fieldbus communication](#) (427)
- **TA "Abschaltpositionierung":**
[Process data assignment for fieldbus communication](#) (453)

**Tip!**

The predefined assignment of the MCI-PDOs can be parameterised by means of PDO mapping and can be freely configured on the I/O level in the function block editor (FB editor).

12.4.1 Port block "LP_MciIn"

The LP_MciIn port block maps the received MCI-PDOs in the FB Editor.



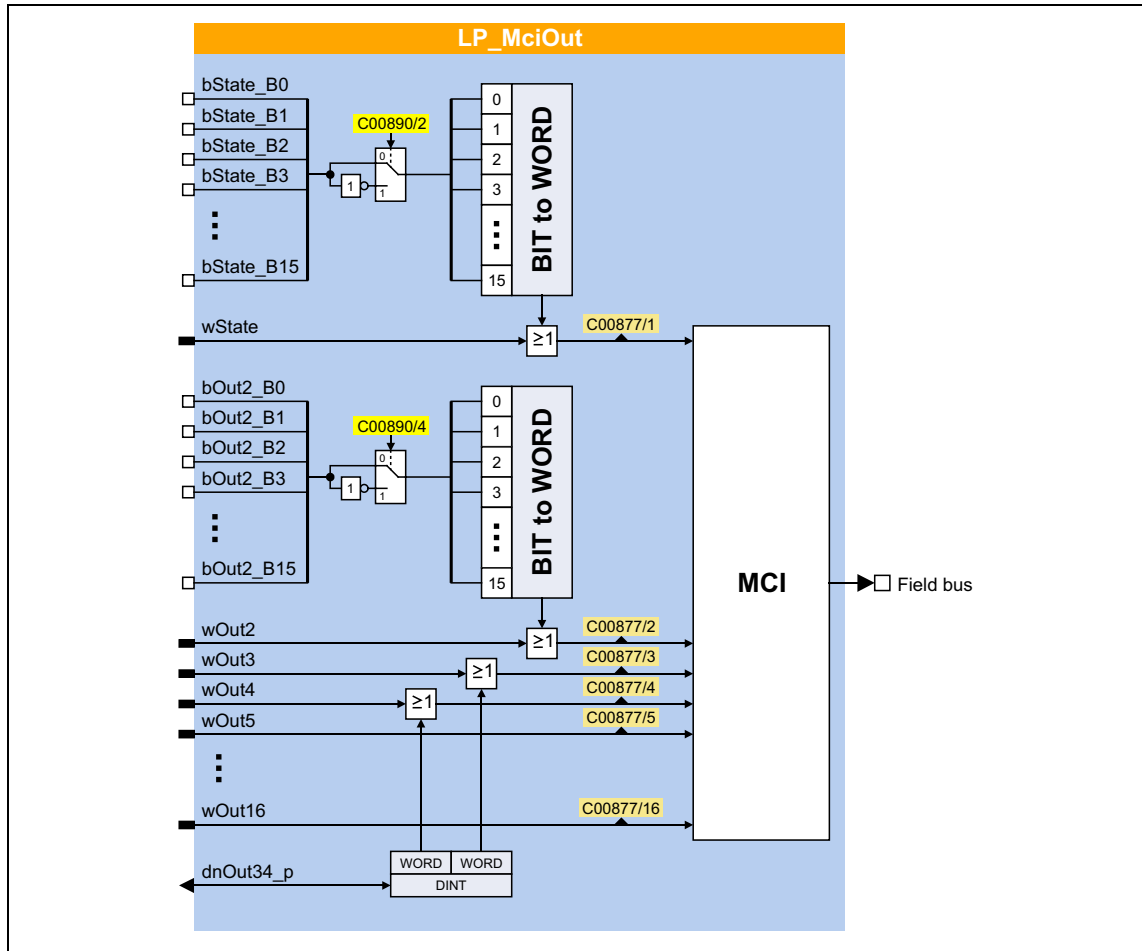
Short overview of the parameters for LP_MciIn:

Parameters	Info	Lenze setting
C00876/1	LP_MciIn:wCtrl	-
C00876/2...16	LP_MciIn: wln2 ... wln16	-
C00890/1	LP_MciIn: Inversion bCtrl_B0..15	0x0000
C00890/3	LP_MciIn: Inversion bln2_B0..15	0x0000

Greyed out = display parameter

12.4.2 Port block "LP_MciOut"

The LP_MciOut port block maps the MCI-PDOs to be transmitted in the FB Editor.



Short overview of the parameters for LP_MciOut:

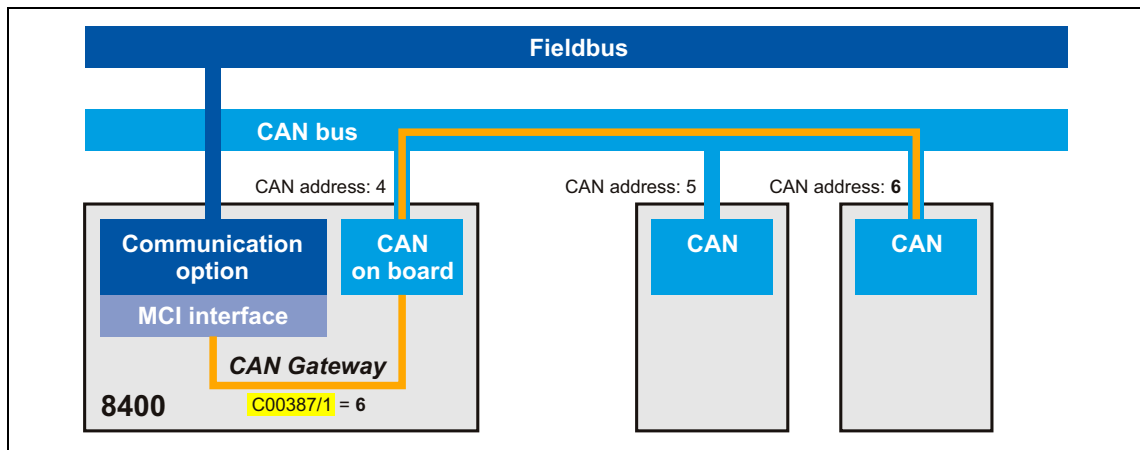
Parameters	Info	Lenze setting
C00877/1	LP_MciOut:wState	-
C00877/2...16	LP_MciOut: wOut2 ... wOut16	-
C00890/2	LP_MciOut: Inversion bState_B0..15	0x0000
C00890/4	LP_MciOut: Inversion bOut2_B0..15	0x0000
Greyed out = display parameter		

12.5 CAN gateway

This function extension is available from version 12.00.00!

The CAN gateway functionality forwards the read/write requests of the available communication option to a connected *remote* device via the "CAN on board" system bus. It also receives the responses via this way.

- From the point of view of the available communication option, the read/write requests are identical to accesses to its own standard device.
- Block services (reading/writing parameters of the "String" data type) can also be executed via the CAN gateway.



[12-2] Functional principle of "CAN gateway"

Activating the CAN gateway

To activate the CAN gateway, the CAN address (1 ... 127) of the connected *remote* device must be set in [C00387/1](#).

- In the Lenze setting [C00387/1](#) = "0", the function is switched off.
- If the CAN gateway is activated, the own inverter is the client and the *remote* device is the server.
- If the own CAN address is set, the read/write requests are forwarded to the own inverter.
- The parameters of the communication option (C13000 ... C13999) are always processed in the own inverter.
- The parameters [C00387/1](#) (CAN gateway address) and [C00350](#) (CAN node address) are not transferred to the *remote* device.

13 Synchronisation of the internal time base

In a drive system, synchronising the internal time bases of all inverters involved makes sense because cyclic process data should be processed synchronously in all drives.

- One of the following signal sources can be used for automatic synchronisation of the internal time base of the inverter:
 - CAN bus → [sync telegram](#)
 - Digital input

Short overview of the parameters for the synchronisation of the internal time base:

Parameters	Info	Lenze setting	
		Value	Unit
C00370/1	CAN Sync instant of transmission	-	µs
C00370/2	Sync instant of reception	-	µs
C01120	Sync signal source	Off	
C01121	Sync cycle time setpoint	1000	µs
C01122	Sync phase position	0	µs
C01123	Sync window	100	µs
C01124	Sync correction width	300	ns
Greyed out = display parameter			

Sync signal source

The synchronisation signal source can be selected in [C01120](#). As a general rule, only one source can be used to synchronise the internal time base.

Sync cycle time setpoint

Time with which the internal phase-locking loop (PLL) expects the synchronisation signals. The time must be set in [C01121](#) in accordance with the cycle of the synchronisation source selected in [C01120](#).



Note!

- Only integer multiples of 1000 µs can be set in [C01121](#).
- Intelligent communication modules usually define the cycle time setpoint derived from the bus cycle. In this case, a manual change is not possible.

Example: For the CAN bus, 2 ms has been selected as interval between two synchronisation signals. If the CAN bus is to be used as synchronisation source, a cycle time setpoint of 2000 µs must be selected in [C01121](#).

Sync phase position

The phase position determines the zero-time of the internal system cycle with regard to the synchronisation signal (bus cycle). Since PDO processing is an inherent part of the system part of the application, the instant of acceptance of the PDOs is postponed as well by a changed phase position.

- If "0" is set, the internal system cycle starts at the same time as the synchronisation signal.
- If a value > 0 is set, the internal system cycle starts by the set time earlier (the phase position has a negative effect) than the synchronisation signal.
- Intelligent communication modules define the optimal time with activated synchronisation by themselves. In this case, a manual change is not possible.
- For determining [C01122](#), the point in time where all bus nodes have valid PDOs is decisive.

Example: If the phase position is set to 550 µs, the system part of the application starts 550 µs before the arrival of the synchronisation signal.

Sync correction width

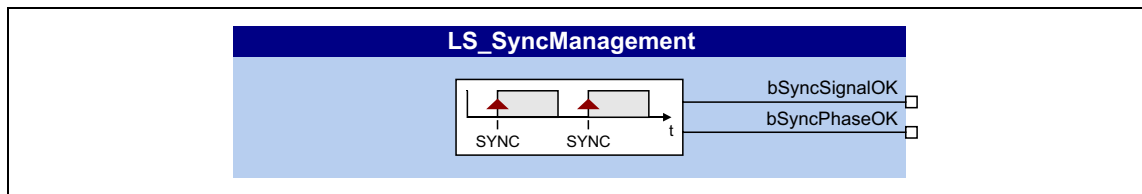
If the cycle times of the synchronisation signal and the phase-locking loop (PLL) are different, the setting in [C01124](#) defines the correction increments for the phase-locking loop.

- The recommended reset time for the CAN bus as synchronisation source in case of occurring deviations is 300 ns (Lenze setting).
- If synchronisation is not reached, select a higher correction width.
- The optimum setting depends on quartz precision and must be determined empirically if required.

13.1

Internal interfaces | System block "LS_SyncManagement"

The SB **LS_SyncManagement** provides status information for synchronising the internal time base:



Outputs

Designator	Data type	Value/meaning	
bSyncSignalOK	BOOL	TRUE	Sync signal OK
bSyncPhaseOK	BOOL	TRUE	Sync phase position OK

14 Drive-based safety

The safety concept of the 8400 protec HighLine inverter provides three safety options per design.

Safety option 10 (SO10):

- The drive-based safety implemented in the inverter permits to connect external safety components, e.g. passive sensors. Active sensors with self-testing signals can be directly connected without using further components.

Safety option 20 (SO20):

- The drive is switched off safely by a higher-level safety PLC via PROFIsafe/PROFINET.

Safety option 30 (SO30):

- The safe disconnection can both be carried out by a higher-level safety PLC via PROFIsafe/PROFINET and through the connection of active or passive sensors.



Note!

Safety options 20 and 30 can be parameterised via the »Engineer«.

The motion functions are continued to be executed by the inverter. The drive-based safety monitors the safe compliance with the limit values. When the limit values are exceeded, the drive-based safety starts the control functions according to EN 60204-1 directly in the inverter.

The safety functions are suitable for applications according to IEC 61508 to SIL 3 and achieve the performance level (PL) e according to EN ISO 13849-1.

The requirements of the EN 954-1 standard which was valid until 30 November 2009 are fulfilled for safety option 10 to control category 4 and for safety option 20 and 30 to control category 3.



Detailed information on the integrated safety system can be found in the corresponding software manual and in the »Engineer« online help.

Detailed information on technical data and electrical installation of the integrated safety system can be found in the mounting instructions of 8400 protec HighLine.

14 Drive-based safety

14.1 Selection of the safety option

14.1 Selection of the safety option

If you insert the 8400 protec HighLine inverter via the *Insert a component* dialog into the *Project view* of the »Engineer«, you will be queried in the second dialog step **Device modules** about the communication and safety system in the device.




Select the available safety option in the **Safety engineering** list field in order that the tabs of the integrated safety system are available in the »Engineer«.



Tip!

The available safety option can also be assigned subsequently to the device in the »Engineer« any time:

1. Go to the *Project view* and select the 8400 protec HighLine inverter.
2. Click the  icon.
3. Select the available safety option in the *Insert device module* dialog box.
4. Press **Complete** to confirm your selection.

14.2 Parameter setting



Note!

Safety-relevant parameters can only be transmitted to the integrated safety system via safe parameter setting with the »Engineer«.

The parameter set is stored in the memory module and in the integrated safety system with a unique module ID, which must correspond to the effective safety address in the integrated safety system.



Detailed information on safe parameter setting of the integrated safety system can be found in the online documentation "Integrated safety".

14.3 Integration into the application

When a safety function is requested, the safety technology activates the corresponding safe monitoring function. The only standstill function executed directly is the "safe torque off" (STO) function. All other safety functions require an inverter action which is safely monitored.



Note!

The execution of the corresponding action (e.g. braking, braking to standstill, holding the standstill position) requires an appropriate application interconnection which must be provided by the operator!

"LS_SMInterface" system block

The [LS_SMInterface](#) system block in the function block editor of the »Engineer« serves to transmit the control and status information from the safety system to the application. ([📖 760](#))

Basic workflow

1. Activation of the safety function (e.g. SS1 - safe stop 1).
 - Monitoring starts.
2. Via a control word, the safety system transmits the information to the inverter that the safety function has been activated.
3. The application evaluates the control word and starts the required motion sequence (e.g. braking).

Internal communication

The drive-based safety system and the standard device communicate via an internal interface.



Note!

If the communication to the inverter is interrupted, e.g. by switching off the inverter, the safety system responds with the following actions:

- Fault stop with STO is activated.
- "Warning" error message is transmitted.
- The "S_Error" LED on the front of the inverter is on.

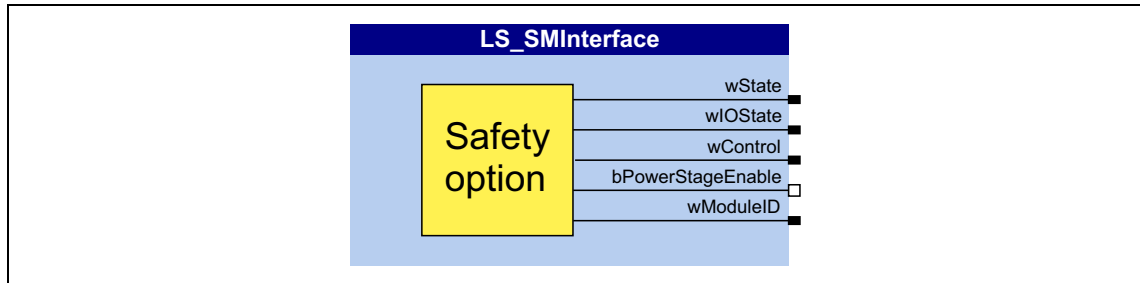
The required error acknowledgement (AIE) is possible via the safety bus and with SO30 via the error acknowledgement input (plug X62).

Related topics:

- ▶ [Transferring the control information to the application](#) ([📖 762](#))

14.4 Internal interfaces | system block "LS_SMInterface"

The system block **LS_SMInterface** is the interface to the integrated safety system in the function block editor of the »Engineer«.



Output	Data type	Value/meaning
wState	WORD	Bit coded status information of the drive-based safety ▶ Status information (☞ 760)
wIOState	WORD	Bit coded I/O information of the drive-based safety ▶ I/O status information (☞ 761)
wControl	WORD	Bit coded control information of the drive-based safety ▶ Control information (☞ 761)
bPowerStageEnable	BOOL	Status signal "Inverter enable" TRUE Inverter is enabled by the safety system.
wModuleID	WORD	ID of the safety system in the inverter
		0 No safety system available
		10 Safety option 10 (SO10):
		20 Safety option 20 (SO20):
		30 Safety option 30 (SO30):

14.4.1 Status information

The drive-based safety system transmits information about the status of the requested or active safety functions with the bit coded status signal *wState*.

Bit	Name	Meaning
0	STO	"Safe torque off (STO)" function is active. • The drive is safely switched to torqueless operation.
3	EC_STO	Error stop category 0: "Safe torque off (STO)" function is active.
4	EC_SS1	Error stop category 1: "Safe stop 1 (SS1)" function is active.
14	Fault active	Integrated safety system in error status (trouble or warning).
Bits not listed are reserved for future extensions!		

[14-1] Bit coding of the status signal *wState*

14.4.2 I/O status information

The bit-coded *wIOState* status signal serves to transfer the status the safe inputs and the safe output:

Bit	Name	Meaning
0	SD-In1	Sensor input 1 in ON state.
1	SD-In2	Sensor input 2 in ON state.
5	AIS	Restart acknowledgement via terminal effected (negative edge: 1↘0).
6	AIE	Error acknowledgement via terminal effected (negative edge: 1↘0).
8	PS_AIS	Restart acknowledgement via safety bus effected (positive edge: 0↗1)
9	PS_AIE	Error acknowledgement via safety bus effected (positive edge: 0↗1)
Bits not listed are reserved for future extensions!		

[14-2] Bit coding of the *wIOState* status signal

14.4.3 Control information

The bit coded *wControl* control signal serves to transfer information about requested or active safety functions. The application in the inverter must evaluate the control signal and carry out the corresponding action.

- It is possible to request/activate several safety functions at the same time.

Bit	Name	Meaning
0	SS1 active	Safe stop 1 (SS1) is active.
2	ES active	Enable switch (ES) for motion functions in special operations is active.
3	OMS	Operation mode selector (OMS) for special operations is requested.
4	SSE active	Emergency stop function (SSE) is active. <ul style="list-style-type: none"> • At the end of the function, bit 1 (SS1 active) or bit 0 of the status signal <i>SMI_wState</i> (STO active) is set according to the emergency stop function parameterised.
5	OMS active	Special operation is active.
Bits not listed are reserved for future extensions!		

[14-3] Bit coding of the *wControl* control signal



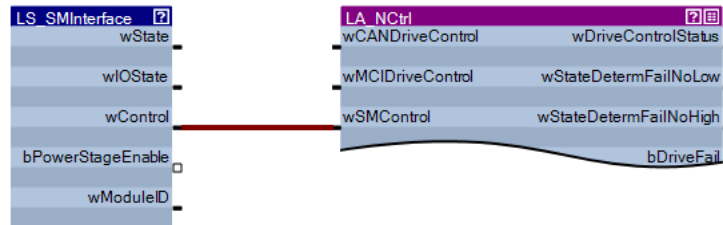
Note!

The application in the inverter has to evaluate the *wControl* control signal and execute the corresponding action. This action (e.g. braking to a standstill) has to be implemented by a corresponding application interconnection, which has to be carried out by an application engineer!

See the following subchapter "[Transferring the control information to the application](#)".
([762](#))

14.4.4 Transferring the control information to the application

In the simplest case, you only have to go to the I/O level in the FB editor and connect the *wControl* output of the **LS_SMInterface** system block with the *wSMControl* input of the application block:



On the application level, the *wSMControl* input is connected with the **motion control kernel**. The **motion control kernel** evaluates the transmitted control information and activates the required motion sequence (e.g. braking).



Note!

At present, the **Motion Control Kernel** only evaluates bit 0 (SS1). When this safety function is requested, the drive will be decelerated to standstill along the stop ramp set in [C02610/3](#).

Additional functions are in preparation.

Related topics:

- ▶ [Interface to safety system](#) (📄 483)

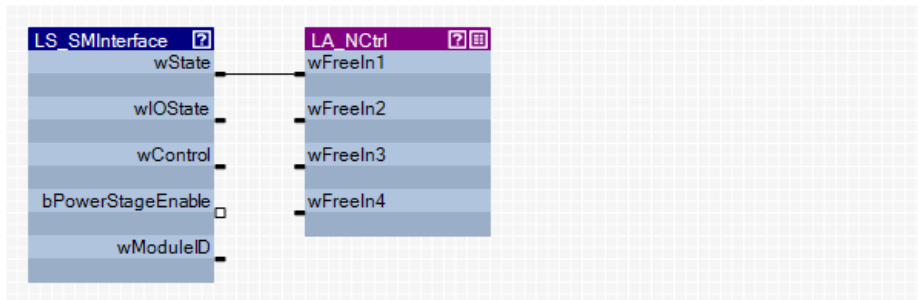
14.4.5 Interconnection examples

... for decoding the status and control information into single boolean signals.

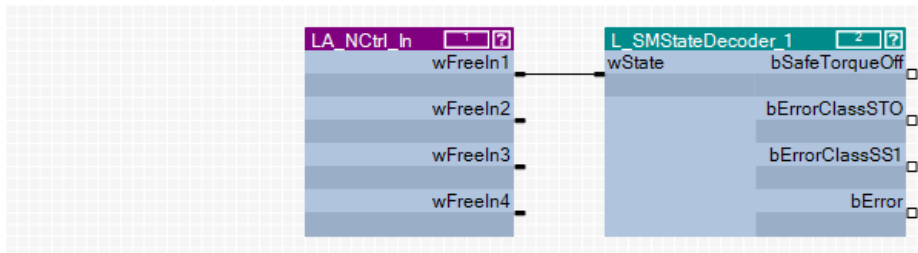


How to decode the status information into single boolean status signals:

- Go to the I/O level in the FB editor and connect the *wState* output of the **LS_SMInterface** system block with one of the free inputs *wFreeIn1* ... *wFreeIn4* of the application block.
 - In the following example, the *wState* output is connected with the free *wFreeIn1* input of the **LA_NCtrl** application block on the I/O level.
 - For a better overview, all other connections of the **LA_NCtrl** application block are not shown here.



- Go to the application level and connect the selected free input *wFreeIn* with the *wState* input of the **L_SMStateDecoder_1** function block.
 - The free inputs *wFreeIn1* ... *wFreeIn4* are outputs on the application level.

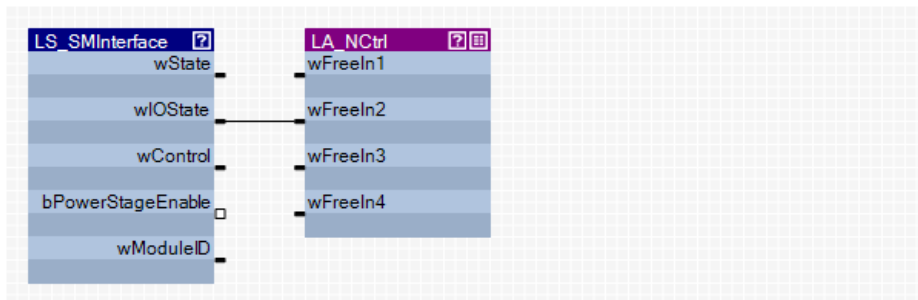


The **L_SMStateDecoder_1** function block decodes the status signal assigned to the *wState* input into single boolean status signals for further use in the FB interconnection.

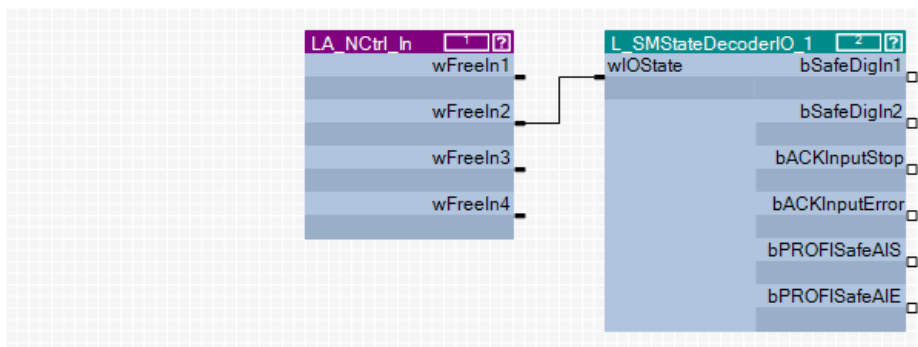


How to decode the I/O status information into single boolean status signals:

- Go to the I/O level in the FB editor and connect the *wIOState* output of the **LS_SMInterface** system block with one of the free inputs *wFreeIn1* ... *wFreeIn4* of the application block.
 - In the following example, the *wIOState* output is connected with the free *wFreeIn2* input of the **LA_NCtrl** application block on the I/O level.
 - For a better overview, all other connections of the **LA_NCtrl** application block are not shown here.



- Go to the application level and connect the selected free input *wFreeIn* with the *wIOState* input of the **L_SMStateDecoderIO_1** function block.
 - The free inputs *wFreeIn1* ... *wFreeIn4* are outputs on the application level.

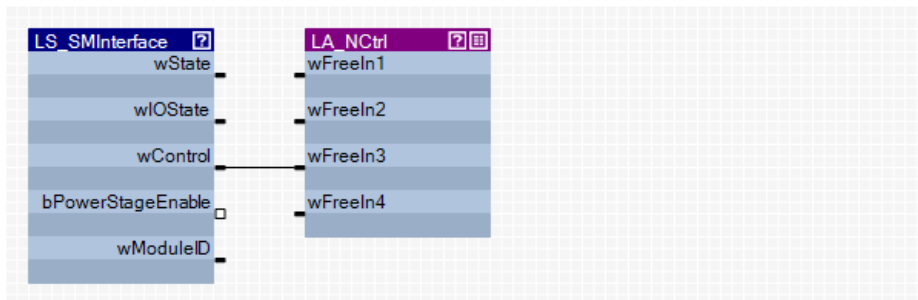


The **L_SMStateDecoderIO_1** function block decodes the status signal assigned to the *wIOState* input into single boolean status signals for further use in the FB interconnection.

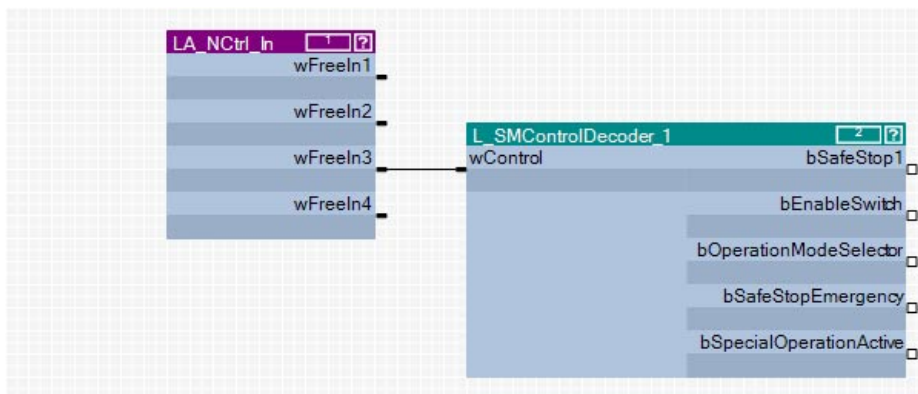


How to decode the control information into single boolean control signals:

- Go to the I/O level in the FB editor and connect the *wControl* output of the **LS_SMInterface** system block with one of the free inputs *wFreeIn1* ... *wFreeIn4* of the application block.
 - In the following example, the *wControl* output is connected with the free *wFreeIn3* input of the **LA_NCtrl** application block on the I/O level.
 - For a better overview, all other connections of the **LA_NCtrl** application block are not shown here.



- Go to the application level and connect the selected free input *wFreeIn*, which is an output on this level, with the *wControl* input of the **L_SMControlDecoder_1** function block.
 - The free inputs *wFreeIn1* ... *wFreeIn4* are outputs on the application level.



The **L_SMControlDecoder_1** function block decodes the control signal assigned to the *wControl* input into single boolean control signals for further use in the FB interconnection.

15 Parameter change-over

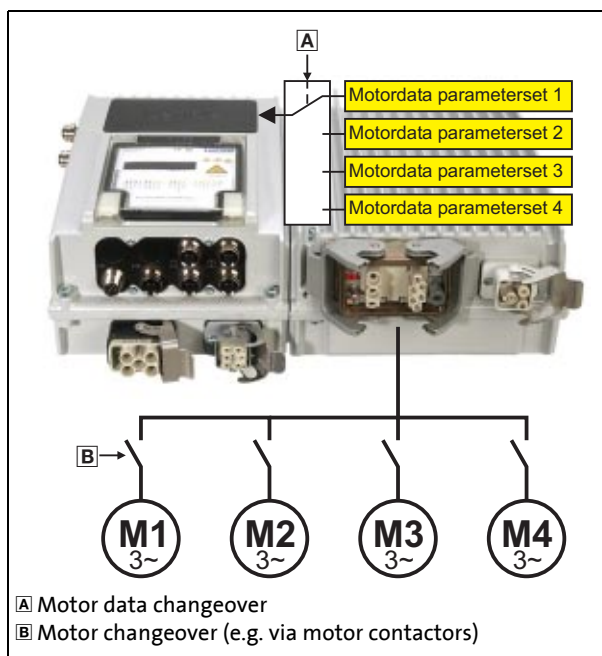
For up to 32 freely selectable parameters, this basic function provides a change-over between four sets with different parameter values.

The parameter list is created in the same way as the user menu is composed, namely by means of parameterisation. In the »Engineer«, a user-friendly parameterisation dialog with import and export functions is available for this purpose.

Motor data changeover

From version 12.00.00, an optional changeover between four parameter sets with different motor and control settings is supported in addition.

The optional motor data changeover is provided for applications/machines which have multiple axes controlled successively but which do not require the simultaneous operation of multiple motors. In this case, the very same inverter can control the motors successively. Advantages of this solution: Fewer components (inverters) and hence less energy consumption.



Principle:

- The motor which is being controlled at the moment is connected to the inverter via motor contactors. (The contactor system can e.g. be controlled via the digital outputs of the inverter.)
- At the same time, the motor data changeover serves to activate the motor and control settings suitable for the motor in the inverter.

Note:

The motor data changeover is carried out within 2 ms and hence within the opening and closing times of most motor contactors.

[15-1] Principle of the selective control of multiple motors using one inverter

15.1

Configuring parameter change-over via the »Engineer« parameterisation dialog



Proceed as follows to open the dialog for parameterising the parameter change-over:

1. »Engineer« Go to the *Project* view and select the 8400 protec HighLine inverter.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the "Basic functions" button.
4. Go to the *Overview* → *Basic functions* dialog box and click the **Parameter change-over** button.

The screenshot shows the 'Application Parameters' dialog box with the 'Overview -> Basic Functions -> WriteParamList' view selected. The dialog is divided into several sections:

- Writing to parameter list:** Three dropdown menus for 'Activate', 'Select value set - 1', and 'Select value set - 2', all currently set to 'Not connected'.
- Execute Mode:** A radio button (unselected) and three dropdown menus for 'Execute Mode' (set to '0: By Execute'), 'Definable parameter list' (set to 'ON'), and 'Motor data parameter list' (set to 'OFF').
- Error status:** Two dropdown menus for 'Error status' (set to '0') and 'Error line' (set to '0').
- Selected value:** A text input field.
- Copy values:** A button.
- Definable parameter list / Motor data parameter list:** A table with columns: Line, Code, Name, Unit, Active value, Value 1, Value 2, Value 3, Value 4.
- Buttons:** 'Configure...', 'Import...', and 'Export...'.

Line	Code	Name	Unit	Active value	Value 1	Value 2	Value 3	Value 4
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								

**Note!**

The "parameter change-over" basic function is always processed, even if the corresponding [LS WriteParamList](#) system block has been removed from the interconnection by the function block editor.

If you do not require this basic function anymore, delete the composed parameter list in order that no unwanted parameter write operations take place.

15.1.1 Configuring the parameter list(s)

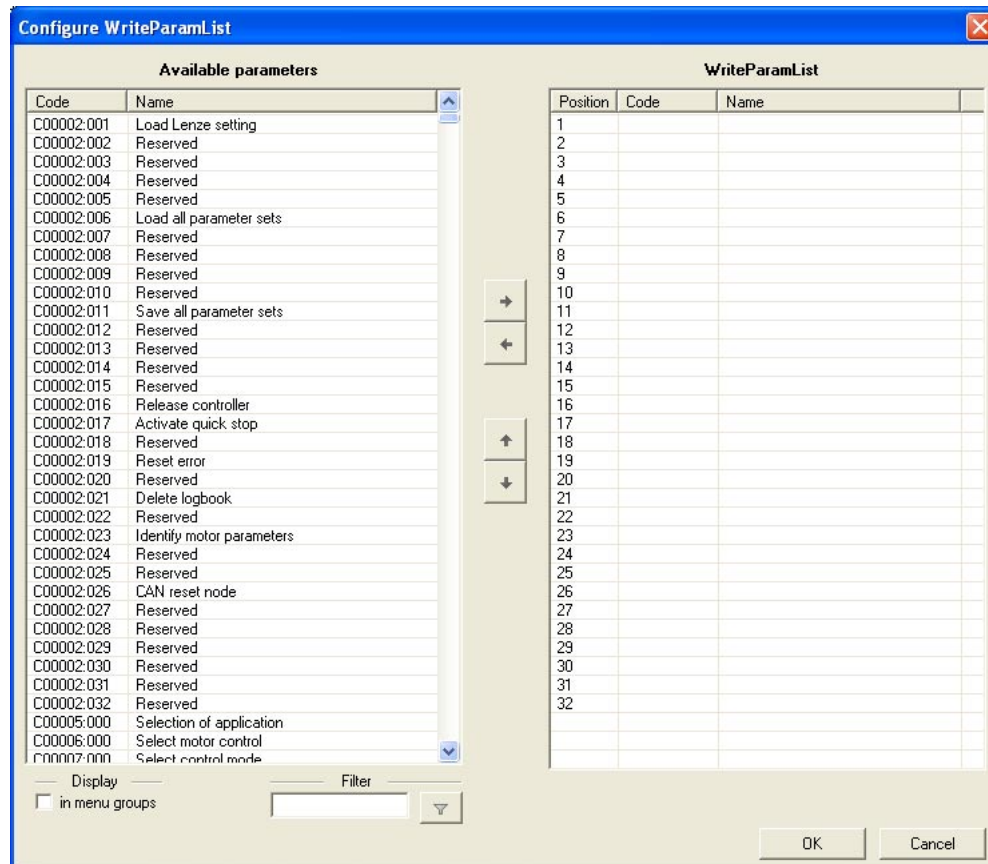
Configuring the definable parameter list


In the Lenze setting, the definable parameter list does not yet contain any parameters.






How to configure the definable parameter list:


1. Click the **Adapt...** button.
 - The dialog box entitled *Configure WriteParamList* is shown:



- On the left-hand side, all the parameters of the inverter with write and read access are shown in the list entitled **Available parameters**.
 - If the option **In menu groups** is activated, all parameters are shown assigned to their functions.
 - By clicking on the  button in the **Filter** area, you can shorten the list of available parameters. If, for example, you enter the text "ain1" and then click on the button, only those parameters whose designation contains this text are shown for selection.
2. Highlight the parameter/parameters in the **Available parameters** list that is/are to be added to the *WriteParamList*.
 - Here, you can use the <Ctrl> key and the <Shift> key for multiple selection, as in the case of general Windows functions.

3. Click on the  button in order to add the highlighted parameters to the *WriteParamList* on the right-hand side.
 - With the  and  buttons, you can alter the sequence of parameters in the *WriteParamList*.

To remove parameters from the *WriteParamList*, proceed as follows:

 - Highlight the parameter/parameters in the **WriteParamList** that is/are to be removed from the *WriteParamList*.
 - Click on the  button to remove the highlighted parameters from the *WriteParamList*.
4. Click on the **OK** button to accept the configuration and close the dialog box.
 - You can call the configuration dialog again at any time in order to change or expand the *WriteParamList* retrospectively.

Changing the values of the definable parameter list

After the compilation of the definable parameter list, the values in the columns **1st value ... 4th value** first correspond to the Lenze setting of the respective parameter.

- Just click one of the input fields in these columns to change the displayed value.
- If you place the cursor in an input field, the permitted value range for the corresponding parameter is shown under the table.

Changing the values of the motor data parameter list

Click the **Motor data parameter list** register to put it in the foreground:

Definable parameter list		Motor data parameter list				Copy values			
Line	Code	Name	Unit	Active value	Value 1	Value 2	Value 3	Value 4	
01	C0006:000	Motor control		6	6	6	6	6	
02	C0015:000	VFC: V/f base frequency	Hz	50	50	50	50	50	
03	C0016:000	VFC: V/min boost	%	1,6	1,6	1,6	1,6	1,6	
04	C0018:000	Switching frequency		2	2	2	2	2	
05	C0019:000	Auto-DCB: Threshold	rpm	3	3	3	3	3	
06	C0021:000	Slip compensation	%	2,67	2,67	2,67	2,67	2,67	
07	C0022:000	I _{max} in motor mode	A	47	47	47	47	47	
08	C0023:000	I _{max} in generator mode	%	100	100	100	100	100	

- Unlike the "definable" parameter list, the motor data parameter list has a fixed assignment to the motor and control parameters.
 - A list of the switchable motor and control parameters is provided in chapter "[Configuring the motor data parameter list by means of parameterisation](#)". (📖 774)
- The preset values are changed in the same way as the definable parameter list.

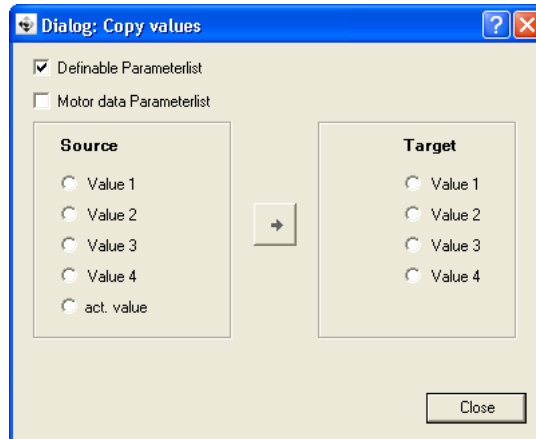
Copying values


All the settings of a value set can be copied to another value set.



To copy values, proceed as follows:

1. Click on the **Copy values** button.
 - The *Copy values* dialog box is displayed:



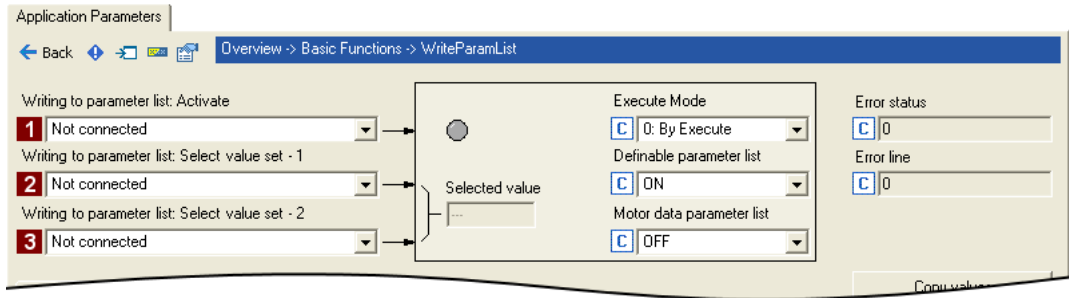
2. Define the parameter list to be copied via the two upper checkboxes.
3. Select **Source** and **Target**.
4. Click on  button in order to copy the values from **Source** to **target**.

Importing/exporting the list

For cross-device reuse of the configured *WriteParamList*, you can click on the **Export** and **Import** buttons to save the parameter selection as an *.epc file and then to re-import the saved *.epc file into another 8400 inverter.

15.1.2 Configuring control inputs

The three control inputs for parameter change-over can be configured via the following parameters:

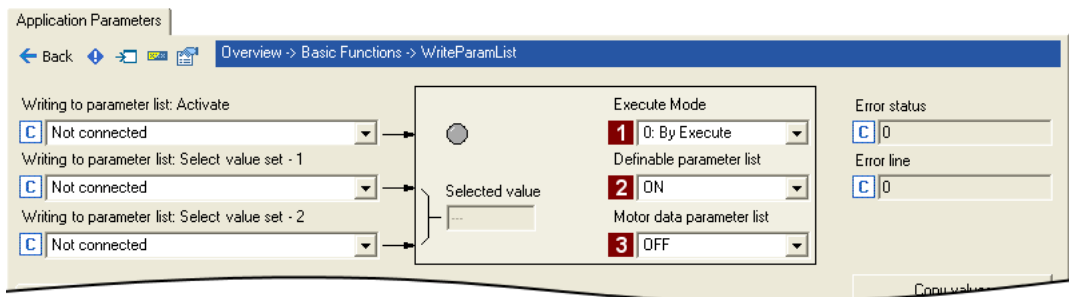


Parameters	Lenze setting	Info
1 Activate writing (C00621/123)	0: Not connected	Selection of the signal source that activates writing to the parameter list (for Execute Mode = "0: by Execute").
2 Selection value set - 1 (C00621/124)	0: Not connected	Selection of the two signal sources for the binary-coded selection of the value set 1 ... 4 to be used (see following truth table).
3 Selection value set - 2 (C00621/125)	0: Not connected	

Truth table for the selection of the value set to be used:

Selection value set - 1	Selection value set - 2	Value set used
FALSE	FALSE	Value set 1
TRUE	FALSE	Value set 2
FALSE	TRUE	Value set 3
TRUE	TRUE	Value set 4

15.1.3 Functional settings



Parameters	Lenze setting	Info
1 Execute Mode (C01082)	0: by Execute	For writing the parameter list, two modes are available: <ul style="list-style-type: none"> • 0: by Execute (Lenze setting) The writing of the parameter list is activated by a FALSE/TRUE edge at the <i>bExecute</i> control input. • 1: by Input Select The parameter list is written when the selection inputs <i>bSelectWriteValue_1</i> and <i>bSelectWriteValue_2</i> are changed and once during the initialisation of the inverter. Note: If the execute mode changes from "0: by Execute" to "1: by Input Select", the parameter list selected by the selection inputs is written once. In the execute mode "1: by Input Select", the parameter list then is only written again when a change occurs on the selection inputs .
2 Definable parameter list (C02200/1)	1: On	Switch on/off parameter changeover for the definable parameter list.
3 Motor data parameter list (C02200/2)	0: Off	Switch on/off parameter changeover for the motor data parameter list.

15.1.4 Error message

With every run through the main program, one parameter of the definable parameter list is written until the parameter list has been executed completely. If an error occurs, [C01083](#) displays an error status and [C01084](#) displays the number of the list entry causing the error (in connection with the selected value set).

- If several errors occur at the same time, only the first incorrect list entry will be displayed. Hence, after elimination of the displayed error and another activation, more errors may be displayed.
- The parameter list will always be processed from beginning to end, even if errors occur in the meantime.

15.2 Configuring the definable parameter list by means of parameterisation

The following application example shows the necessary procedure for configuring the list without using the »Engineer« parameterisation dialog.

Task:

The LS_WriteParamList SB is to be used to write to parameters [C00012](#), [C00026/1](#) and [C00027/1](#).

Compiling the parameter list

In [C01085/1 ... n](#), specify the above-named parameters in the <Code>,<Subcode> format:

- [C01085/1](#) = 12.000
- [C01085/2](#) = 26.001
- [C01085/3](#) = 27.001
- [C01085/4 ... n](#) = 0.000 (no parameter)



Note!

Gaps in the parameter list (setting = 0.000) are permissible and are skipped in the process.

Invalid parameter entries are not accepted when being entered.

Entering values for the parameters (value set 1)

In [C01086/1 ... n](#), specify the values to be used to describe the selected parameters. The values are entered according to the scaling format/scaling factor of the respective parameter.

- [C01086/1](#) = <value> for list entry 1 (in our example: for parameter [C00012](#))
- [C01086/2](#) = <value> for list entry 2 (in our example: for parameter [C00026/1](#))
- [C01086/3](#) = <value> for list entry 3 (in our example: for parameter [C00027/1](#))

These values are used in the writing process if the two *bSelectWriteValue_1* and *bSelectWriteValue_2* inputs are not assigned or both set to FALSE.

Entering other values for the parameters (value sets 2 ... 4)

If required, up to three other sets can be set in the same way in [C01087/1 ... n](#) to [C01089/1 ... n](#) which can optionally be written to the parameters. The decision as to which value set is finally used is dependent upon the assignment of the two *bSelectWriteValue_1* and *bSelectWriteValue_2* inputs:

15.3 Configuring the motor data parameter list by means of parameterisation

The setting of the values for value sets 1 ... 4 of the motor data parameter list can also be carried out directly via the codes from code [C02210](#) (see following table; columns 1st value ... 4th value).

- Unlike the "definable" parameter list, the motor data parameter list has a fixed assignment to the motor and control parameters.
- The preset values for value sets 1 ... 4 correspond to the Lenze setting of the respective motor or control parameter.
- The values are entered according to the scaling format / scaling factor of the respective motor or control parameter.

Code	Name	Lenze setting		1st value	2nd value	3rd value	4th value
C00006	Motor control	6		C02210/1	C02210/2	C02210/3	C02210/4
C00015	VFC: V/f base frequency	50.0	Hz	C02212/1	C02212/2	C02212/3	C02212/4
C00016	VFC: Vmin boost	1.60	%	C02213/1	C02213/2	C02213/3	C02213/4
C00018	Switching frequency	2		C02214/1	C02214/2	C02214/3	C02214/4
C00019	Auto-DCB: Threshold	3	rpm	C02215/1	C02215/2	C02215/3	C02215/4
C00021	Slip comp.	2.67	%	C02216/1	C02216/2	C02216/3	C02216/4
C00022	Imax in motor mode	47.00	A	C02217/1	C02217/2	C02217/3	C02217/4
C00023	Imax in generator mode	100.00	%	C02218/1	C02218/2	C02218/3	C02218/4
C00036	DC braking: Current	50.00	%	C02219/1	C02219/2	C02219/3	C02219/4
C00070/1	SLVC: Vp speed controller	15.00		C02220/1	C02220/2	C02220/3	C02220/4
C00070/2	SC: Vp speed controller	6.00		C02220/5	C02220/6	C02220/7	C02220/8
C00070/3	SLPSM: Vp speed controller	3.00		C02220/9	C02220/10	C02220/11	C02220/12
C00071/1	SLVC: Ti speed controller	100.0	ms	C02221/1	C02221/2	C02221/3	C02221/4
C00071/2	SC: Ti speed controller	50.0	ms	C02221/5	C02221/6	C02221/7	C02221/8
C00071/3	SLPSM: Ti speed controller	100.0	ms	C02221/9	C02221/10	C02221/11	C02221/12
C00072	SC: Tdn speed controller	0.00	ms	C02222/1	C02222/2	C02222/3	C02222/4
C00073/1	VFC: Vp Imax controller	0.25		C02223/1	C02223/2	C02223/3	C02223/4
C00073/2	SLVC: Vp torque controller	1.25		C02223/5	C02223/6	C02223/7	C02223/8
C00074/1	VFC: Ti Imax controller	65	ms	C02224/1	C02224/2	C02224/3	C02224/4
C00074/2	SLVC: Ti torque controller	30	ms	C02224/5	C02224/6	C02224/7	C02224/8
C00075	Vp current controller	7.00	V/A	C02225/1	C02225/2	C02225/3	C02225/4
C00076	Ti current controller	10.61	ms	C02226/1	C02226/2	C02226/3	C02226/4
C00077	SC: Vp field controller	12.80		C02227/1	C02227/2	C02227/3	C02227/4
C00078	SC: Tn field controller	256.0	ms	C02228/1	C02228/2	C02228/3	C02228/4
C00079/1	SC: Current controller - feedforward control	0		C02229/1	C02229/2	C02229/3	C02229/4
C00079/2	SC: adapt. field weak. controller	1		C02229/5	C02229/6	C02229/7	C02229/8
C00079/3	SC: n-Ctrl Anti-Wind-Up	0		C02229/9	C02229/10	C02229/11	C02229/12
C00080	Override point of field weakening	0	Hz	C02230/1	C02230/2	C02230/3	C02230/4
C00081	Rated motor power	11.00	kW	C02231/1	C02231/2	C02231/3	C02231/4
C00082	Motor rotor resistance	276	mohm	C02232/1	C02232/2	C02232/3	C02232/4
C00084	Motor stator resistance	330	mohm	C02233/1	C02233/2	C02233/3	C02233/4
C00085	Motor stator leakage inductance	3.50	mH	C02234/1	C02234/2	C02234/3	C02234/4
C00087	Rated motor speed	1460	rpm	C02236/1	C02236/2	C02236/3	C02236/4
C00088	Rated motor current	21.00	A	C02237/1	C02237/2	C02237/3	C02237/4
C00089	Rated motor frequency	50	Hz	C02238/1	C02238/2	C02238/3	C02238/4
C00090	Rated motor voltage	400	V	C02239/1	C02239/2	C02239/3	C02239/4
C00091	Motor cosine phi	0.85		C02240/1	C02240/2	C02240/3	C02240/4
C00092	Motor magnetising inductance	81.0	mH	C02241/1	C02241/2	C02241/3	C02241/4
C00095	Motor magnetising current	8.50	A	C02242/1	C02242/2	C02242/3	C02242/4
C00106	Auto-DCB: Hold time	0.500	s	C02244/1	C02244/2	C02244/3	C02244/4
C00107	DC braking: Hold time	999.000	s	C02245/1	C02245/2	C02245/3	C02245/4

Code	Name	Lenze setting	1st value	2nd value	3rd value	4th value
C00120	Setting of motor overload (I ^{xt})	100.00 %	C02246/1	C02246/2	C02246/3	C02246/4
C00234	Oscillation damping influence	5.00 %	C02249/1	C02249/2	C02249/3	C02249/4
C00235	Oscillation damping filter time	32 ms	C02250/1	C02250/2	C02250/3	C02250/4
C00236	Oscillation damping field weakening	14	C02251/1	C02251/2	C02251/3	C02251/4
C00254	Kp position controller	5.00 1/s	C02252/1	C02252/2	C02252/3	C02252/4
C00273	Motor moment of inertia	0.00 kg cm ²	C02256/1	C02256/2	C02256/3	C02256/4
C00495	Speed sensor selection	0	C02260/1	C02260/2	C02260/3	C02260/4
C00576	SC: Field feedforward control	200 %	C02261/1	C02261/2	C02261/3	C02261/4
C00577	SC: Vp field weakening controller	0.0010	C02262/1	C02262/2	C02262/3	C02262/4
C00578	SC: Tn field weakening controller	20.0 ms	C02263/1	C02263/2	C02263/3	C02263/4
C00653/1	Sensibility - Setpoint feedforward control	0	C02264/1	C02264/2	C02264/3	C02264/4
C00905	Motor phase direction of rotation	0	C02272/1	C02272/2	C02272/3	C02272/4
C00909/1	Max. pos. speed	120.00 %	C02273/1	C02273/2	C02273/3	C02273/4
C00909/2	Max. neg. speed	120.00 %	C02273/5	C02273/6	C02273/7	C02273/8
C00910/1	Max. pos. output frequency	1000 Hz	C02274/1	C02274/2	C02274/3	C02274/4
C00910/2	Max. neg. output frequency	1000 Hz	C02274/5	C02274/6	C02274/7	C02274/8
C00915	Motor cable length	5.0 m	C02275/1	C02275/2	C02275/3	C02275/4
C00916	Motor cable cross-section	6.00 mm ²	C02276/1	C02276/2	C02276/3	C02276/4
C00938	PSM: Maximum motor current field weakening	30.00 %	C02278/1	C02278/2	C02278/3	C02278/4
C00939	Ultimate motor current	3000.0 A	C02279/1	C02279/2	C02279/3	C02279/4
C00965	Max. motor speed	60000 rpm	C02280/1	C02280/2	C02280/3	C02280/4
C00966	VFC: Time const. slip comp.	100 ms	C02281/1	C02281/2	C02281/3	C02281/4
C00971/1	VFC: Controller limitation V/f +encoder	10.00 Hz	C02284/1	C02284/2	C02284/3	C02284/4
C00971/2	VFC: Slip limitation V/f +encoder	100.00 Hz	C02284/5	C02284/6	C02284/7	C02284/8
C00972	VFC: Vp V/f +encoder	0.100 Hz/Hz	C02285/1	C02285/2	C02285/3	C02285/4
C00973	VFC: Ti V/f +encoder	100.0 ms	C02286/1	C02286/2	C02286/3	C02286/4
C00975	VFC-ECO: Vp CosPhi controller	0.500 Hz/Hz	C02287/1	C02287/2	C02287/3	C02287/4
C00976	VFC-ECO: Ti CosPhi controller	200.0 ms	C02288/1	C02288/2	C02288/3	C02288/4
C00977	VFC-ECO: Minimum voltage V/f	20.00 %	C02289/1	C02289/2	C02289/3	C02289/4
C00982	VFC-ECO: Voltage reduction ramp	0.8 s	C02290/1	C02290/2	C02290/3	C02290/4
C00985	SLVC: Gain of field current controller	0.50 %	C02291/1	C02291/2	C02291/3	C02291/4
C00986	SLVC: Gain of cross current controller	0.00 %	C02292/1	C02292/2	C02292/3	C02292/4
C00987	Inverter motor brake: nAdd	80 rpm	C02293/1	C02293/2	C02293/3	C02293/4
C00988	Inverter motor brake: PT1 filter time	0.0 ms	C02294/1	C02294/2	C02294/3	C02294/4
C00990	Flying restart fct.: Activate	0	C02295/1	C02295/2	C02295/3	C02295/4
C00991	Flying restart fct.: Process	2	C02296/1	C02296/2	C02296/3	C02296/4
C00992	Flying restart: Start frequency	10 Hz	C02297/1	C02297/2	C02297/3	C02297/4
C00993	Flying restart: Integration time	300.0 ms	C02298/1	C02298/2	C02298/3	C02298/4
C00994	Flying restart: Current	25.00 %	C02299/1	C02299/2	C02299/3	C02299/4
C00995/1	SLPSM: Controlled accelerating current	100.00 %	C02300/1	C02300/2	C02300/3	C02300/4
C00995/2	SLPSM: Controlled standstill current	20.00 %	C02300/5	C02300/6	C02300/7	C02300/8
C00996/1	SLPSM: Switching speed, closed-loop control	13.00 %	C02301/1	C02301/2	C02301/3	C02301/4
C00996/2	SLPSM: Switching speed, open-loop control	8.00 %	C02301/5	C02301/6	C02301/7	C02301/8
C00997	SLPSM: Filter cutoff frequency	5.00 %	C02302/1	C02302/2	C02302/3	C02302/4
C00998/1	SLPSM: Filter time rotor position	3.0 ms	C02303/1	C02303/2	C02303/3	C02303/4
C00998/2	SLPSM: Filter time actual speed value	5.0 ms	C02303/5	C02303/6	C02303/7	C02303/8
C00999	SLPSM: PLL gain	400 %	C02304/1	C02304/2	C02304/3	C02304/4
C02853/1	PSM: Lss saturation characteristic	100 %	C02305/1	C02305/2	C02305/3	C02305/4
C02853/2	PSM: Lss saturation characteristic	100 %	C02305/5	C02305/6	C02305/7	C02305/8
C02853/3	PSM: Lss saturation characteristic	100 %	C02305/9	C02305/10	C02305/11	C02305/12
C02853/4	PSM: Lss saturation characteristic	100 %	C02305/13	C02305/14	C02305/15	C02305/16
C02853/5	PSM: Lss saturation characteristic	100 %	C02305/17	C02305/18	C02305/19	C02305/20

Code	Name	Lenze setting	1st value	2nd value	3rd value	4th value
C02853/6	PSM: Lss saturation characteristic	100 %	C02305/21	C02305/22	C02305/23	C02305/24
C02853/7	PSM: Lss saturation characteristic	100 %	C02305/25	C02305/26	C02305/27	C02305/28
C02853/8	PSM: Lss saturation characteristic	100 %	C02305/29	C02305/30	C02305/31	C02305/32
C02853/9	PSM: Lss saturation characteristic	100 %	C02305/33	C02305/34	C02305/35	C02305/36
C02853/10	PSM: Lss saturation characteristic	100 %	C02305/37	C02305/38	C02305/39	C02305/40
C02853/11	PSM: Lss saturation characteristic	100 %	C02305/41	C02305/42	C02305/43	C02305/44
C02853/12	PSM: Lss saturation characteristic	100 %	C02305/45	C02305/46	C02305/47	C02305/48
C02853/13	PSM: Lss saturation characteristic	100 %	C02305/49	C02305/50	C02305/51	C02305/52
C02853/14	PSM: Lss saturation characteristic	100 %	C02305/53	C02305/54	C02305/55	C02305/56
C02853/15	PSM: Lss saturation characteristic	100 %	C02305/57	C02305/58	C02305/59	C02305/60
C02853/16	PSM: Lss saturation characteristic	100 %	C02305/61	C02305/62	C02305/63	C02305/64
C02853/17	PSM: Lss saturation characteristic	100 %	C02305/65	C02305/66	C02305/67	C02305/68
C02855	PSM: I _{max} Lss saturation characteristic	3000.0 A	C02306/1	C02306/2	C02306/3	C02306/4
C02859	PSM: Activate Ppp saturation char.	0	C02307/1	C02307/2	C02307/3	C02307/4
C02872/1	PLI without motion: Adaptation of time duration	0	C02311/1	C02311/2	C02311/3	C02311/4
C02874/1	PLI without motion	0x0001	C02312/1	C02312/2	C02312/3	C02312/4
C02875/1	PLI without motion: Adaptation of ident angle	0 °	C02313/1	C02313/2	C02313/3	C02313/4

15.4 Internal interfaces | System block "LS_WriteParamList"

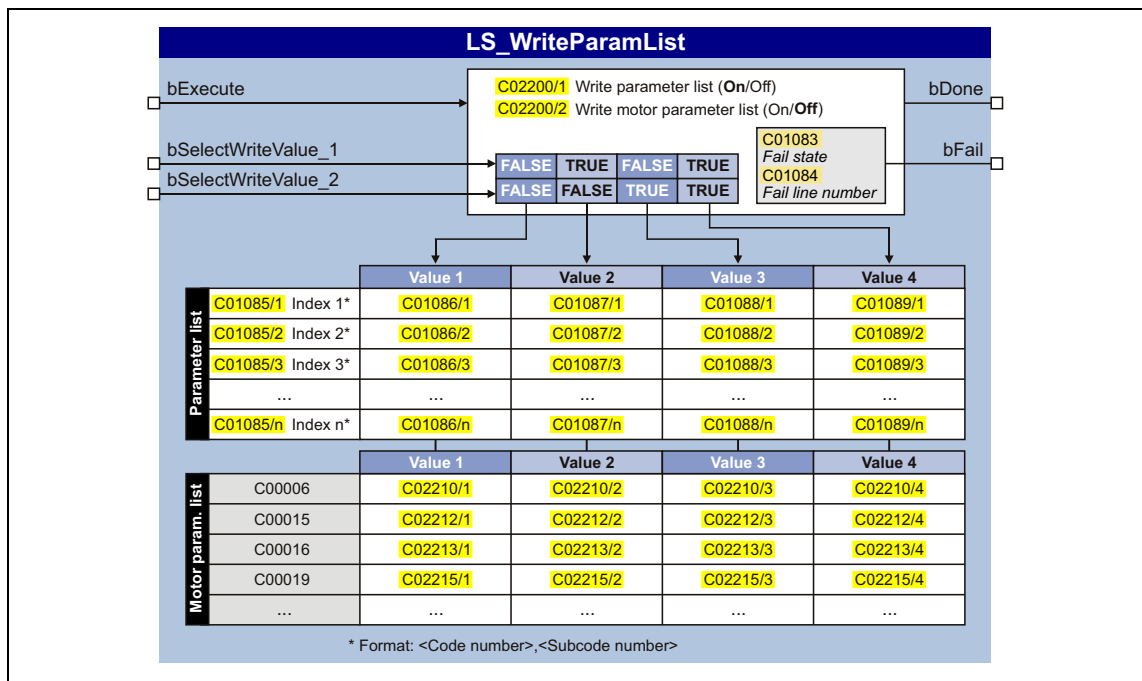
The LS_WriteParamList system block provides the internal interfaces for the basic "Parameter change-over" function.



Note!

The "parameter change-over" basic function is always processed, even if the LS_WriteParamList system block has been removed from the interconnection by the FB Editor.

If you do not require this basic function anymore, delete the composed parameter list in order that no unwanted parameter write operations take place.



Inputs

Designator	Data type	Information/possible settings															
bExecute	BOOL	FALSE → TRUE For Execute Mode (C01082) = "0: by Execute": Activate writing of the parameter list															
bSelectWriteValue_1 bSelectWriteValue_2	BOOL	Binary coded selection of the value set 1 ... 4 to be used.															
		<table border="1"> <thead> <tr> <th>bSelectWrite Value_1</th> <th>bSelectWrite Value_2</th> <th></th> </tr> </thead> <tbody> <tr> <td>FALSE</td> <td>FALSE</td> <td>Value set 1</td> </tr> <tr> <td>TRUE</td> <td>FALSE</td> <td>Value set 2</td> </tr> <tr> <td>FALSE</td> <td>TRUE</td> <td>Value set 3</td> </tr> <tr> <td>TRUE</td> <td>TRUE</td> <td>Value set 4</td> </tr> </tbody> </table>	bSelectWrite Value_1	bSelectWrite Value_2		FALSE	FALSE	Value set 1	TRUE	FALSE	Value set 2	FALSE	TRUE	Value set 3	TRUE	TRUE	Value set 4
bSelectWrite Value_1	bSelectWrite Value_2																
FALSE	FALSE	Value set 1															
TRUE	FALSE	Value set 2															
FALSE	TRUE	Value set 3															
TRUE	TRUE	Value set 4															

Outputs

Designator	Data type	Value/meaning	
bDone	BOOL	"Writing of the parameter list completed" status signal <ul style="list-style-type: none"> The output is automatically reset to FALSE if writing via <i>bExecute</i> is activated again. 	
		TRUE	Writing of the parameter list successfully completed.
		FALSE	The FALSE status can have the following meanings: <ol style="list-style-type: none"> There is no active writing of the parameter list. Writing of the parameter list has not been completed yet. An error has occurred (if <i>bFail</i> = TRUE).
bFail	BOOL	"Error" status	
		TRUE	An error has occurred (group signal). <ul style="list-style-type: none"> See display parameter (C01083) for details.

16 Parameter reference

This chapter describes all parameters which can be used for parameterising and monitoring the inverter.

Parameters which are only available in the inverter from a certain software version onwards are marked with a corresponding note in the parameter description ("from version xx.xx.xx").

The parameter descriptions are based on the software version V18.00.00



For quick reference of a parameter with a certain name simply use the **index** of the online documentation. The index always contains the corresponding code in parentheses behind the name.

General information on parameter setting can be found in the chapter "[Introduction: Parameterising the inverter](#)". (📖 27)

For general information on how to read and change parameters, please see the online documentation for the »Engineer«.

16.1 Structure of the parameter descriptions

Each parameter is described in the [Parameter list](#) in the form of a table which consists of the following three areas:

Table header

The table header contains the following general information:

- Parameter number (Cxxxxx)
- Parameter name (display text in the »Engineer« and keypad)
- [Data type](#)
- Parameter index in decimal and hexadecimal notation for access via a fieldbus (e.g. CAN system bus).



Tip!

The parameter index is calculated as follows:

- Index [dec] = 24575 - code
- Index [hex] = 0x5FFF - code

Example for code C00005:

- Index [dec] = 24575 - 5 = 24570
- Index [hex] = 0x5FFF - 0x{5} = 0x5FFA

Table contents

The table contains further general explanations & notes on the parameter and the possible settings, which are represented in different ways depending on the parameter type:

- [Parameters with read-only access](#)
- [Parameters with write access](#)

Table footer

The table footer contains the [Parameter attributes](#).

16.1.1 Data type

The following data types are available for parameters:

Data type	Meaning
INTEGER_16	16-bit value with sign
INTEGER_32	32-bit value with sign
UNSIGNED_8	8-bit value without sign
UNSIGNED_16	16-bit value without sign
UNSIGNED_32	32-bit value without sign
VISIBLE_STRING	String of characters of printable characters

16.1.2 Parameters with read-only access

Parameters for which the "write access" attribute has not been set can only be read and not be changed by the user.

Description structure

Parameter Name: Cxxxxx _____	Data type: _____ Index: _____
Description	
Display range (min. value unit max. value)	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1	

Representation in the »Engineer«

The »Engineer« displays these parameters with a grey background or, with an online connection, with a pale-yellow background:

Icon	C...	S	Name	Value	Unit
	3	0	Status of last device command	Successful	

16 Parameter reference

16.1 Structure of the parameter descriptions

16.1.3 Parameters with write access

Only parameters with a check mark (☑) in front of the "write access" attribute can be changed by the user. The Lenze setting for these parameters is **printed in bold**.

- The settings can either be selected from a selection list or the values can be entered directly.
- Values outside the valid setting range are represented in red in the »Engineer«.

16.1.3.1 Parameters with setting range

Description structure

Parameter Name: Cxxxxx _____		Data type: _____ Index: _____
Description		
Setting range (min. value unit max. value)		Lenze setting
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

Parameter setting in the »Engineer«

In the »Engineer«, parameters are set by entering the desired value into the input field:

C...	S	Name	Value	Unit
11	0	Appl.: Reference speed	1500	rpm

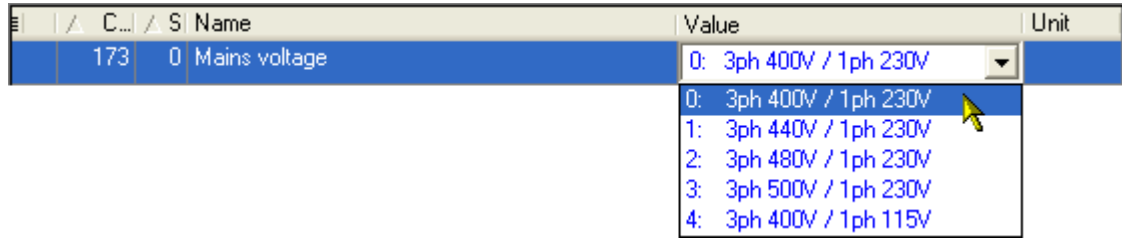
16.1.3.2 Parameters with selection list

Description structure

Parameter Name: Cxxxxx _____		Data type: _____ Index: _____
Description		
Selection list (Lenze setting printed in bold)		
1		
2		
3		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

Parameter setting in the »Engineer«

In the »Engineer«, a list field is used for parameter setting:



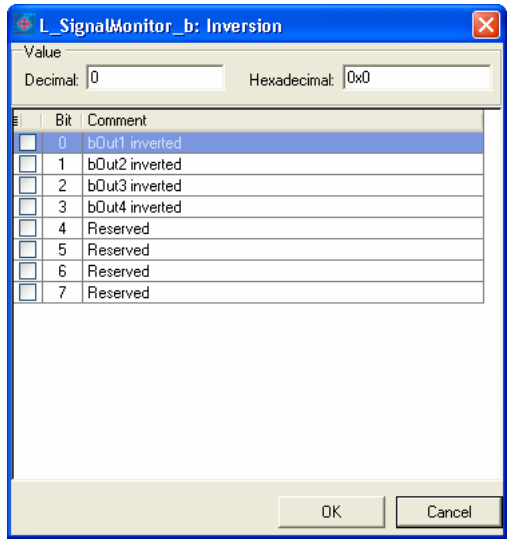
16.1.3.3 Parameters with bit-coded setting

Description structure

Parameter Name: Cxxxxx _____	Data type: _____ Index: _____
Description	
Value is bit-coded:	
Bit 0	
...	
Bit 31	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1	

Parameter setting in the »Engineer«

The »Engineer« uses a dialog box for parameter setting in which the individual bits can be set or reset. Alternatively, the value can be entered as a decimal or hexadecimal value:



16.1.3.4 Parameters with subcodes

Description structure

Parameter Name: Cxxxxx _____		Data type: _____ Index: _____
Description		
Setting range (min. value unit max. value)		
Subcodes	Lenze setting	
Cxxxxx/1		
Cxxxxx/2		
Cxxxxx/3		
Cxxxxx/4		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

Parameter setting in the »Engineer«

The »Engineer« parameter list displays each subcode individually. The parameters are set as described in the previous chapters.

	C...	S	Name	Value	Unit
	39	1	Fixed setpoint 1	40.00	%
	39	2	Fixed setpoint 2	60.00	%
	39	3	Fixed setpoint 3	80.00	%
	39	4	Fixed setpoint 4	0.00	%

16.1.4 Parameter attributes

The table footers contain the parameter attributes:

<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1

Attribute	Meaning
<input checked="" type="checkbox"/> Read access	Read access to parameter possible.
<input checked="" type="checkbox"/> Write access	Write access to parameter possible. • Please also observe the following attributes:
	<input checked="" type="checkbox"/> CINH Parameter value can only be changed when the controller is inhibited.
	<input checked="" type="checkbox"/> PLC STOP Parameter value can only be changed when the application is stopped.
<input checked="" type="checkbox"/> No transfer	Parameter is not transferred to inverter when the command <u>Download parameter set</u> is executed.
<input checked="" type="checkbox"/> COM	Communication-relevant parameter • This parameter is relevant for parameter data transfer via the (CAN) system bus.
<input checked="" type="checkbox"/> MOT	Motor control parameters

Scaling factor

The "scaling factor" is important for parameter access via a bus system.

Signal type	Scaling factor	Resolution	Value range
Analog (scaled)	100	16 bits signed	± 199.99 %
Angular velocity	1	16 bits signed	± 32767 incr./ms
Position in [units]	10000	32 bits signed	± 214748.3647 [units]
Digital (BOOL)	1	8 bits unsigned	0 ≡ FALSE; 1 ≡ TRUE
Time	1000	16 bits unsigned	0 ... 999.000 s
Selection value	1	16 bits unsigned	0 ... 65535

Example 1: The value "654" of the parameter [C00028/1](#) (AIN1: input voltage) read via a bus system must be divided by the corresponding scaling factor "100" to obtain the actual display value "6.54 V".

$$\frac{\text{Read value (via bus system)}}{\text{Scaling factor}} = \text{Indicated value (Engineer)}$$

[16-1] Conversion formula for read access via bus system

Example 2: In order to set the parameter [C00012](#) (acceleration time main setpoint) to the value "123.45 %" via a bus system, the integer value "12345" must be transferred, i.e. the value to be set must be multiplied by the corresponding scaling factor "100".

$$\text{Value to be written (via bus system)} = \text{Value to be set} \cdot \text{Scaling factor}$$

[16-2] Conversion formula for write access via bus system

Character length

In case of parameters of "VISIBLE_STRING" data type, the character length is given in addition. This is also important for the parameter access via a bus system.

16.2 Parameter list

This chapter lists all parameters of the operating system in numerically ascending order.



Note!

The parameter descriptions consider all software versions up to and including V16.00.00.

When replacing a device, observe the notes in the section [Parameter compatibility](#) (41).

C00001

Parameter Name: C00001 Keypad Userlevel		Data type: UNSIGNED_8 Index: 24574 _d = 5FFE _h
<p>From version 12.00.00 onwards, the extent of menus, submenus and codes shown in the keypad can be adapted by selecting the "userlevel".</p> <ul style="list-style-type: none"> When the userlevel has been changed, the menus of the keypad will be reconfigured according to the selected user level. Independently of the set userlevel, the parameters of the attached communication module will always be displayed completely. 		
Selection list		Info
10	Standard	Only the most important menus and codes are displayed on the keypad.
20	Expert	All menus and codes are displayed on the keypad.
30	Service	Only for servicing purposes (Lenze service).
Subcodes	Lenze setting	Info
C00001/1	20: Expert	Keypad UserLevel
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00002

Parameter Name: C00002 Device command		Data type: UNSIGNED_8 Index: 24573 _d = 5FFD _h
<p>Note:</p> <ul style="list-style-type: none"> Before switching off the supply voltage after a device command has been executed, check the successful execution of the device command via the status display in C00003! Before activating device commands by a master control, wait for the "Ready" signal of the inverter. The device will reject a write process to C00002/x if the value is >1 and issue an error message. <ul style="list-style-type: none"> ▶ Drive control (DCTRL): Device commands 		
Selection list		
0	Off / ready	
1	On / start	
4	Action cancelled	
5	No access	
6	No access controller inhibit	
20	20% working	
40	40% working	
60	60% working	
80	80% working	

Parameter Name: C00002 Device command		Data type: UNSIGNED 8 Index: 24573 _d = 5FFD _h
Subcodes	Lenze setting	Info
C00002/1	0: Off / ready	Load Lenze setting <ul style="list-style-type: none"> • All parameters are reset to the Lenze setting. • Only possible when the controller is inhibited. ▶ Load Lenze setting
C00002/2	0: Off / ready	Reserved
C00002/3	0: Off / ready	Reserved
C00002/4	0: Off / ready	Reserved
C00002/5	0: Off / ready	Reserved
C00002/6	0: Off / ready	Load all parameter sets <ul style="list-style-type: none"> • All parameter sets are loaded by the memory module. • Only possible when the controller is inhibited. ▶ Load all parameter sets
C00002/7	0: Off / ready	Reserved
C00002/8	0: Off / ready	Reserved
C00002/9	0: Off / ready	Reserved
C00002/10	0: Off / ready	Reserved
C00002/11	0: Off / ready	Save all parameter sets <ul style="list-style-type: none"> • All parameter sets are saved to the memory module safe against mains failure. ▶ Save all parameter sets
C00002/12	0: Off / ready	Reserved
C00002/13	0: Off / ready	Reserved
C00002/14	0: Off / ready	Reserved
C00002/15	0: Off / ready	Reserved
C00002/16	1: On / start	Enable inverter <ul style="list-style-type: none"> 1 ≡ Enable inverter 0 ≡ Inhibit inverter ▶ Enable/inhibit inverter
C00002/17	0: Off / ready	Activate quick stop <ul style="list-style-type: none"> 1 ≡ Activate quick stop 0 ≡ Deactivate quick stop ▶ Activate/deactivate quick stop
C00002/18	0: Off / ready	Reserved
C00002/19	0: Off / ready	Reset error <ul style="list-style-type: none"> • After the reset (acknowledgement) of the current error, further errors may be pending which must also be reset. • The status determining error is displayed in C00168. • The current error is displayed in C00170. ▶ Error messages of the operating system
C00002/20	0: Off / ready	Reserved
C00002/21	0: Off / ready	Delete logbook <ul style="list-style-type: none"> • All entries in the logbook of the inverter are deleted. • In the logbook, information on the error history is saved. ▶ Logbook
C00002/22	0: Off / ready	Reserved

Parameter Name: C00002 Device command		Data type: UNSIGNED 8 Index: 24573 _d = 5FFD _h
C00002/23	0: Off / ready	Identify motor parameter (ASM) <ul style="list-style-type: none"> • This device command serves to carry out automatic motor parameter identification. • The device command is only executed when the inverter is in the "SwitchedOn" status. • In order to identify the motor parameters, the inverter must be enabled after this device command. ▶ Automatic motor parameter identification
C00002/24	0: Off / ready	Reserved
C00002/25	0: Off / ready	Reserved
C00002/26	0: Off / ready	CAN reset node <ul style="list-style-type: none"> • Reinitialise CAN interface • Required when changing the baud rate, node address, or identifiers. ▶ CANopen Option/CAN on board
C00002/27	0: Off / ready	Device search function <ul style="list-style-type: none"> • From version 06.00.00 • This device command serves to optically locate an inverter connected online (e.g. for maintenance work). ▶ Device search function
C00002/28	0: Off / ready	Check MasterPin <ul style="list-style-type: none"> • From version 06.00.00 ▶ Unlocking the inverter with a MasterPin
C00002/29	0: Off / ready	Set binding ID <ul style="list-style-type: none"> • From version 06.00.00 ▶ Device personalisation
C00002/30	0: Off / ready	Delete binding ID <ul style="list-style-type: none"> • From version 06.00.00 ▶ Device personalisation
C00002/31	0: Off / ready	Set password <ul style="list-style-type: none"> • From version 06.00.00 ▶ Password protection
C00002/32	0: Off / ready	Check password <ul style="list-style-type: none"> • From version 06.00.00 ▶ Password protection
C00002/33	0: Off / ready	Delete password <ul style="list-style-type: none"> • From version 06.00.00 ▶ Password protection
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00003

Parameter Name: C00003 Status of last device command		Data type: UNSIGNED_8 Index: 24572 _d = 5FFC _h
Status of the device command executed last (C00002).		
Note: Before switching off the supply voltage after carrying out a device command, check whether the device command has been carried out successfully via the status display! ▶ Drive control (DCTRL): Device commands		
Selection list (read only)		Info
0	Successful	Device command has been executed successfully.
1	Command unknown	Device command implausible or unknown to the system.
2	Password protection	Unauthorised access for requested device command. ▶ Password protection
3	Time-out	Device command could not be processed in the defined time (timeout).
4	System fault	Is not used
5	Command server assigned	
6	Controller inhibit required	
7	unexpected controller inhibit	
10	Memory module binding error	▶ Device personalisation
11	Password too short	▶ Password protection
12	Wrong password	
13	Password already set	
14	Password not assigned	
15	Incorrect checksum	
30	Incorrect pole position identification	
31	Pole position identification started without encoder	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00005

Parameter Name: C00005 Application		Data type: UNSIGNED_16 Index: 24570 _d = 5FFA _h
Selection of the technology application		
Selection list (Lenze setting printed in bold)		Info
0	Wiring has changed	This display appears if the FB interconnection has been changed in the application level using the FB Editor.
1000	Actuating drive speed	This technology application is used to solve speed-controlled drive tasks, e.g. conveying belts. ▶ TA "Speed actuating drive"
2000	Table positioning	This technology application is used to solve position-controlled drive tasks which are usually controlled by a higher-level control system using a fieldbus. ▶ TA "Table positioning"
3000	Switch-off positioning	This technology application is used to solve speed-controlled drive tasks which require a pre-switch off or stopping at certain positions, e.g. roller conveyors and conveying belts. This is implemented by connecting switch-off sensors. ▶ TA "Switch-off positioning"
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00006

Parameter Name: C00006 Motor control		Data type: UNSIGNED_8 Index: 24569 _d = 5FF9 _h
Selection of the motor control mode		
▶ Motor control (MCTRL): Select control mode		
Selection list (Lenze setting printed in bold)		Info
2	SC: Servo control ASM	This control type is used for the servo control of an asynchronous motor. <ul style="list-style-type: none"> The control type requires a speed feedback via an encoder mounted to the motor! ▶ Servo control
3	SLPSM: Sensorless PSM	From version 12.00.00
4	SLVC: Vector control	This control type is used for sensorless vector control of an asynchronous motor. <ul style="list-style-type: none"> The control type requires motor parameters to be set as exactly as possible! ▶ Sensorless vector control
6	VFCplus: V/f linear	This control type is used for the speed control of an asynchronous motor via a linear V/f characteristic and is the simplest control type. <ul style="list-style-type: none"> For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ▶ V/f characteristic control
7	VFCplus: V/f linear + encoder	This control type is used for speed control of an asynchronous motor via a linear V/f characteristic. <ul style="list-style-type: none"> The control type requires a speed feedback via an encoder mounted to the motor! For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ▶ V/f control
8	VFCplus: V/f quadr	This control type is used for speed control of an asynchronous motor via a square-law V/f characteristic. <ul style="list-style-type: none"> For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ▶ V/f characteristic control
9	VFCplus: V/f quadr + encoder	This control type is used for speed control of an asynchronous motor via a square-law V/f characteristic. <ul style="list-style-type: none"> The control type requires a speed feedback via an encoder mounted to the motor! For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ▶ V/f control
10	VFCplus: V/f definable	This type of control is used for the speed control of an asynchronous motor via a user-definable characteristic with several interpolation points. <ul style="list-style-type: none"> For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ▶ V/f characteristic control

Parameter Name: C00006 Motor control		Data type: UNSIGNED_8 Index: 24569 _d = 5FF9 _h
11	VFCplusEco: V/f energy-saving	<p>From version 12.00.00</p> <p>This control type is used for energy-saving speed control of an asynchronous motor via a linear V/f characteristic.</p> <ul style="list-style-type: none"> For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. Predestinated application areas of this control type are materials handling technology and pump and fan systems. <p>► V/f characteristic control, energy-saving</p>
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00007

Parameter Name: C00007 Control mode		Data type: UNSIGNED_16 Index: 24568 _d = 5FF8 _h
<p>With this parameter the control mode for the technology application selected under C00005 is defined, i.e. how the inputs and outputs of the technology application are connected to the I/Os of the inverter.</p> <ul style="list-style-type: none"> How the inputs and outputs are connected in the individual control modes is described in the corresponding technology application: <ul style="list-style-type: none"> "Actuating drive speed" TA "TA "Table positioning" "Switch-off positioning" TA 		
Selection list (Lenze setting printed in bold)		Info
0	Wiring has changed	This is displayed when the FB interconnection has been changed in the I/O level via the FB Editor.
10	Terminals 0	The technology application is controlled via the digital and analog input terminals of the inverter. <ul style="list-style-type: none"> For a short overview of the preconfigured terminal assignment see the following section "Terminal assignment of the control modes 10 ... 16".
12	Terminals 2	
14	Terminals 11	
16	Terminal 16	
20	Keypad	The technology application is controlled via the keypad.
21	PC	The technology application is controlled via the "Free parameters" of the inverter (PC control).
30	CAN	The technology application is controlled by means of CAN-PDOs via the CAN bus. ► CANopen Option/CAN on board
40	MCI	The technology application is controlled by means of MCI-PDOs via the MCI-interface of an attached communication module (e.g. PROFIBUS).
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00008

Parameter Name: C00008 Original application control source		Data type: UNSIGNED_16 Index: 24567 _d = 5FF7 _h
<p>Display of the originally selected technology application and the originally selected control mode.</p> <ul style="list-style-type: none"> This parameter shows the selection that was set with C00005 and C00007 before a change in the I/O level or the application level was carried out. For diagnostic purposes, this display serves to determine whether there is a standard interconnection in the inverter or a change carried out by the user. 		
Selection list (read only)		Info
0	Free Free	Application: Interconnection has been changed. I/O level: Interconnection has been changed.

Parameter Name: C00008 Original application control source		Data type: UNSIGNED_16 Index: 24567 _d = 5FF7 _h
10	Free Terminal0	Application: Interconnection has been changed. I/O level: "Terminals 0" control mode
12	Free Terminal2	Application: Interconnection has been changed. I/O level: "Terminal 2" control mode
14	Free Terminal11	Application: Interconnection has been changed. I/O level: "Terminal 11" control mode
16	Free Terminal 16	Application: Interconnection has been changed. I/O level: "Terminal 16" control mode
20	Free Keypad	Application: Interconnection has been changed. I/O level: "Keypad" control mode
21	Free PC	Application: Interconnection has been changed. I/O level: "PC" control mode
30	Free CAN	Application: Interconnection has been changed. I/O level: "CAN" control mode
40	Free MCI	Application: Interconnection has been changed. I/O level: "MCI" control mode
1000	Speed Free	Application: Actuating drive speed I/O level: Interconnection has been changed.
1010	Speed Terminal0	Application: Actuating drive speed I/O level: "Terminals 0" control mode
1012	Speed Terminal2	Application: Actuating drive speed I/O level: "Terminal 2" control mode
1014	Speed Terminal11	Application: Actuating drive speed I/O level: "Terminal 11" control mode
1016	Speed Terminal16	Application: Actuating drive speed I/O level: "Terminal 16" control mode
1020	Speed Keypad	Application: Actuating drive speed I/O level: "Keypad" control mode
1021	Speed PC	Application: Actuating drive speed I/O level: "PC" control mode
1030	Speed CAN	Application: Actuating drive speed I/O level: "CAN" control mode
1040	Speed MCI	Application: Actuating drive speed I/O level: "MCI" control mode
2000	TabPos Free	Application: Table positioning I/O level: Interconnection has been changed.
2010	TabPos Terminal0	Application: Table positioning I/O level: "Terminals 0" control mode
2012	TabPos Terminal2	Application: Table positioning I/O level: "Terminal 2" control mode
2014	TabPos Terminal11	Application: Table positioning I/O level: "Terminal 11" control mode
2016	TabPos Terminal16	Application: Table positioning I/O level: "Terminal 16" control mode
2020	TabPos Keypad	Application: Table positioning I/O level: "Keypad" control mode
2021	TabPos PC	Application: Table positioning I/O level: "PC" control mode
2030	TabPos CAN	Application: Table positioning I/O level: "CAN" control mode

Parameter Name: C00008 Original application control source		Data type: UNSIGNED_16 Index: 24567 _d = 5FF7 _h
2040	TabPos MCI	Application: Table positioning I/O level: "MCI" control mode
3000	SwitchPos Free	Application: Switch-off positioning I/O level: Interconnection has been changed.
3010	SwitchPos Terminal0	Application: Switch-off positioning I/O level: "Terminals 0" control mode
3012	SwitchPos Terminal 2	Application: Switch-off positioning I/O level: "Terminal 2" control mode
3014	SwitchPos Terminal 11	Application: Switch-off positioning I/O level: "Terminal 11" control mode
3016	SwitchPos Terminal 16	Application: Switch-off positioning I/O level: "Terminal 16" control mode
3020	SwitchPos Keypad	Application: Switch-off positioning I/O level: "Keypad" control mode
3021	SwitchPos PC	Application: Switch-off positioning I/O level: "PC" control mode
3030	SwitchPos CAN	Application: Switch-off positioning I/O level: "CAN" control mode
3040	SwitchPos MCI	Application: Switch-off positioning I/O level: "MCI" control mode
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00010

Parameter Name: C00010 AIN1: Characteristic		Data type: INTEGER_16 Index: 24565 _d = 5FF5 _h
From version 02.00.00		
▶ Analog terminals: Signal adaptation via characteristic		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C00010/1	0.00 %	AIN1: (+y0) = min
C00010/2	0.00 %	AIN1: (+x0) = Dead band
C00010/3	0.00 %	AIN1: (-y0) = (-min)
C00010/4	0.00 %	AIN1: (-x0) = (-Dead band)
C00010/5	100.00 %	AIN1: (+ymax)
C00010/6	100.00 %	AIN1: (+xmax)
C00010/7	100.00 %	AIN1: (-ymax)
C00010/8	100.00 %	AIN1: (-xmax)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00011

Parameter Name: C00011 Appl.: Reference speed			Data type: UNSIGNED_16 Index: 24564 _d = 5FF4 _h
Setting the reference speed <ul style="list-style-type: none"> In the inverter, all speed-related signals are processed to one reference variable in percent. Set a reference speed here that corresponds to 100 %. The frequency that corresponds to the set reference speed is displayed in C00059. <p>Note: This is not a maximum limitation! All values in percent in the inverter may be in a range of 0 ... 199.99 %.</p> <p>Recommendation: Deactivate the torque feedforward control for the speed setpoint in C00654/1 if the reference speed C00011 is 5 times higher than the rated motor speed C00087</p>			
Setting range (min. value unit max. value)			Lenze setting
50	rpm	60000	1500 rpm
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00012

Parameter Name: C00012 Accel. time - main setpoint			Data type: UNSIGNED_32 Index: 24563 _d = 5FF3 _h
The L_NSet_1 FB: Acceleration time of the ramp generator for the main speed setpoint <ul style="list-style-type: none"> Generally, this ramp generator is used for all speed-controlled technology applications. 			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	2.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00013

Parameter Name: C00013 Decel. time - main setpoint			Data type: UNSIGNED_32 Index: 24562 _d = 5FF2 _h
The L_NSet_1 FB: Deceleration time of the ramp generator for the main speed setpoint <ul style="list-style-type: none"> Generally, this ramp generator is used for all speed-controlled technology applications. 			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	2.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00015

Parameter Name: C00015 VFC: V/f base frequency			Data type: UNSIGNED_16 Index: 24560 _d = 5FF0 _h
V/f base frequency for V/f characteristic control (VFCplus) and V/f control (VFCplus+encoder) <ul style="list-style-type: none"> The motor voltage increases linearly with the frequency until the base frequency is reached. From this value on, the motor voltage remains constant, the speed increases and the maximum torque decreases. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well. 			
Setting range (min. value unit max. value)			Lenze setting
7.5	Hz	2600.0	50.0 Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00016

Parameter Name: C00016 VFC: Vmin boost			Data type: UNSIGNED_16 Index: 24559 _d = 5FEF _h
Boost of the V/f voltage characteristic in the range of small speeds or frequencies with V/f characteristic control (VFCplus) and V/f control (VFCplus+encoder)			
<ul style="list-style-type: none"> • This may increase the starting torque. • After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well. <p style="text-align: right;">▶ Motor control (MCTRL): Setting the Vmin boost</p>			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	1.60 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00018

Parameter Name: C00018 Switching frequency			Data type: UNSIGNED_8 Index: 24557 _d = 5FED _h
Selection of the pulse width modulated switching frequency transferred from the inverter to the motor			
<ul style="list-style-type: none"> • Select between an ideal setting for the drive which provides smooth running, and an optimal setting with regard to the inverter which keeps its losses to a minimum (min. Pv). • Both possibilities offer fixed and variable switching frequencies. • When a variable switching frequency is selected, the switching frequency may change as a function of the load and rotational frequency. <p style="text-align: right;">▶ Selection of switching frequency</p>			
Selection list (Lenze setting printed in bold)			
1	4 kHz var./drive-optimised		
2	8 kHz var./drive-optimised		
3	16 kHz var./drive-optimised		
5	2 kHz constant/drive-optimised		
6	4 kHz constant/drive-optimised		
7	8 kHz constant/drive-optimised		
8	16 kHz constant/drive-optimised		
11	4 kHz var./min. Pv		
12	8 kHz var./min. Pv		
13	16 kHz var./min. Pv		
15	2 kHz constant/min. Pv		
16	4 kHz constant/min. Pv		
17	8 kHz constant/min. Pv		
18	16 kHz constant/min. Pv		
21	8 kHz var./drive-opt./4 kHz min		
22	16 kHz var./drive-opt./4 kHz min		
23	16 kHz var./drive-opt./8 kHz min		
31	8 kHz var./min. Pv/4 kHz min		
32	16 kHz var./min. Pv/4 kHz min		
33	16 kHz var./min. Pv/8 kHz min		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00019

Parameter Name: C00019 Auto DCB: Threshold		Data type: UNSIGNED_16 Index: 24556 _d = 5FECh	
Setpoint speed threshold for automatic DC injection braking <ul style="list-style-type: none"> For speed setpoints with values below the thresholds a DC current is injected or the motor is not supplied with current, depending on the setting. <p style="text-align: right;">▶ DC-injection braking</p>			
Setting range (min. value unit max. value)		Lenze setting	
0	rpm	60000	3 rpm
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00021

Parameter Name: C00021 Slip comp.		Data type: INTEGER_16 Index: 24554 _d = 5FEAh	
Slip compensation for V/f characteristic control (VFCplus) and sensorless vector control (SLVC) <ul style="list-style-type: none"> A higher slip compensation results in a higher increase in frequency and voltage when the machine is under load. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well. <p style="text-align: right;">▶ Motor control (MCTRL): Optimising the operational performance by slip compensation</p>			
Setting range (min. value unit max. value)		Lenze setting	
-100.00	%	100.00	2.67 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00022

Parameter Name: C00022 I_{max} in motor mode		Data type: UNSIGNED_16 Index: 24553 _d = 5FE9h	
Maximum current in motor mode for all motor control modes Note: The parameter has a value range depending on the device power. The device automatically limits the entered value to the corresponding value range.			
Setting range (min. value unit max. value)		Lenze setting	
0.00	A	655.35	47.00 A
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00023

Parameter Name: C00023 I_{max} in generator mode		Data type: INTEGER_16 Index: 24552 _d = 5FE8h	
Maximum current in generator mode for all motor control modes <ul style="list-style-type: none"> 100 % ≙ I_{max} in motor mode (C00022) 			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	100.00	100.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00024

Parameter Name: C00024 LS_DriveInterface: bNActCompare			Data type: INTEGER_16 Index: 24551 _d = 5FE7 _h
Threshold for the actual speed comparison <ul style="list-style-type: none"> • This parameter serves to set a threshold that is compared with the actual speed value. • If the value falls below this threshold, the <i>bNActCompare</i> output sets the LS_DriveInterface system block to TRUE. • Switching hysteresis = +1 % CAUTION: There are errors in the evaluation if the sum of 199.98 % is exceeded in case of the set value combinations.			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	199.99	0.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00025

Parameter Name: C00025 LS_DriveInterface: bNActHysteres			Data type: INTEGER_16 Index: 24550 _d = 5FE6 _h
From version 16.00.00 Selection of the switching hysteresis for the actual speed value comparison in C00024 . CAUTION: There are errors in the evaluation if the sum of 199.98 % is exceeded in case of the set value combinations.			
Setting range (min. value unit max. value)			
0.00	%	199.99	
Subcodes	Lenze setting	Info	
C00025/1	1.00 %	LS_DriveInterface: bNActHysteres	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00026

Parameter Name: C00026 AINx: Offset			Data type: INTEGER_16 Index: 24549 _d = 5FE5 _h
Offset for analog input ▶ Analog terminals			
Setting range (min. value unit max. value)			
-199.99	%	199.99	
Subcodes	Lenze setting	Info	
C00026/1	0.00 %	AIN1: Offset	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00027

Parameter Name: C00027 AINx: Gain			Data type: INTEGER_32 Index: 24548 _d = 5FE4 _h
Gain for analog input ▶ Analog terminals			
Setting range (min. value unit max. value)			
-100.0000		100.0000	
Subcodes	Lenze setting	Info	
C00027/1	1.0000	AIN1: Gain	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000			

C00028

Parameter Name: C00028 AINx: Input voltage		Data type: INTEGER_16 Index: 24547 _d = 5FE3 _h
Display of the input voltage at the analog input ▶ Analog terminals		
Display range (min. value unit max. value)		
-10.00	V	10.00
Subcodes		Info
C00028/1		AIN1: Input voltage
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00029

Parameter Name: C00029 AINx: Input current		Data type: INTEGER_16 Index: 24546 _d = 5FE2 _h
Display of the Input current at the analog input <ul style="list-style-type: none"> • When the analog input is configured for current measurement (C00034/1 = 1 or 2). • When C00034/1 is set = 2 (4 ... 20 mA), 0 ... 16 mA is displayed. ▶ Analog terminals		
Display range (min. value unit max. value)		
0.00	mA	20.00
Subcodes		Info
C00029/1		AIN1: Input current
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00033

Parameter Name: C00033 AINx: Output value		Data type: INTEGER_16 Index: 24542 _d = 5FDE _h
Display of the output value in percent of the analog input amplifier <ul style="list-style-type: none"> • 100 % ≙ 16384 ≙ +10 V / +20 mA ▶ Analog terminals		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00033/1		AIN1: Output value
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00034

Parameter Name: C00034 AINx: Configuration		Data type: UNSIGNED_8 Index: 24541 _d = 5FDD _h
Configuration of the analog input for current or voltage measurement ▶ Analog terminals		
Selection list		Info
0	0...10 V	Input signal is the voltage signal -10 V ... +10 V • -10 V ... +10 V ≡ -100 % ... +100 %
1	0...20 mA	Input signal is the current signal 0 mA ... 20 mA • 0 mA ... 20 mA ≡ 0 % ... +100 %
2	4...20 mA	Input signal is the current signal 4 mA ... 20 mA • 4 mA ... 20 mA ≡ 0 % ... +100 % • The current loop is monitored for open circuit (I < 4 mA) by the device.
10	0..10V + characteristic	
11	0..20mA + characteristic	
12	4..20mA + characteristic	
Subcodes	Lenze setting	Info
C00034/1	0: 0...10 V	AIN1: Config.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00036

Parameter Name: C00036 DC braking: Current		Data type: INTEGER_16 Index: 24539 _d = 5FDB _h
Braking current in [%] based on rated device current (C00098) • 100 % ≡ C00098 ▶ DC-injection braking		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	200.00
		50.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00039

Parameter Name: C00039 Fixed setpoint x (L_NSet_1 n-Fix)		Data type: INTEGER_16 Index: 24536 _d = 5FD8 _h
The L_NSet_1 FB: Fixed speed setpoints (JOG values) for the setpoint generator • 100 % ≡ C00011		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00039/1	40.00 %	Fixed setpoint 1
C00039/2	60.00 %	Fixed setpoint 2
C00039/3	80.00 %	Fixed setpoint 3
C00039/4	0.00 %	Fixed setpoint 4
C00039/5	0.00 %	Fixed setpoint 5
C00039/6	0.00 %	Fixed setpoint 6
C00039/7	0.00 %	Fixed setpoint 7
C00039/8	0.00 %	Fixed setpoint 8
C00039/9	0.00 %	Fixed setpoint 9

Parameter Name: C00039 Fixed setpoint x (L_NSet_1 n-Fix)		Data type: INTEGER_16 Index: 24536 _d = 5FD8 _h
C00039/10	0.00 %	Fixed setpoint 10
C00039/11	0.00 %	Fixed setpoint 11
C00039/12	0.00 %	Fixed setpoint 12
C00039/13	0.00 %	Fixed setpoint 13
C00039/14	0.00 %	Fixed setpoint 14
C00039/15	0.00 %	Fixed setpoint 15
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00050

Parameter Name: C00050 MCTRL: Speed setpoint		Data type: INTEGER_32 Index: 24525 _d = 5FCD _h
Display of the speed setpoint at the speed setpoint input of the motor control		
Display range (min. value unit max. value)		
-120000	rpm	120000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00051

Parameter Name: C00051 MCTRL: Actual speed value		Data type: INTEGER_32 Index: 24524 _d = 5FC _h
Display of the actual speed value of the motor shaft		
Note: The displayed value only corresponds to the real actual speed value of the motor shaft if an encoder is connected to the motor and the evaluation of the feedback signal has been set correctly ("Closed loop" operation). In case of operation without speed feedback, the signal is calculated from the motor control and thus may not correspond to the real actual speed.		
Display range (min. value unit max. value)		
-120000	rpm	120000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00052

Parameter Name: C00052 Motor voltage		Data type: UNSIGNED_16 Index: 24523 _d = 5FCB _h
Display of the current motor voltage/output voltage of the inverter		
Display range (min. value unit max. value)		
0	V	1000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00053

Parameter Name: C00053 DC-bus voltage		Data type: UNSIGNED_16 Index: 24522 _d = 5FCA _h
Display of the current DC-bus voltage		
Display range (min. value unit max. value)		
0	V	1000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00054

Parameter Name: C00054 Motor current		Data type: UNSIGNED_16 Index: 24521 _d = 5FC9 _h
Display of the current motor current/output current of the inverter		
Display range (min. value unit max. value)		
0.00	A	300.00
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00055

Parameter Name: C00055 Actual values		Data type: INTEGER_16 Index: 24520 _d = 5FC8 _h
From version 12.00.00		
Note: When a single-track feedback has been selected for the HTL encoder (C00115 = 1 or 3), the sign of the actual speed value is created from the sign of the speed setpoint. In C00055/1 und C00055/2, a positive speed is always displayed.		
Display range (min. value unit max. value)		
-32767	rpm	32767
Subcodes		Info
C00055/1		Actual value - HTL encoder FreqIn12
C00055/2		Actual value - HTL encoder FreqIn56
C00055/3		Actual value - multi-encoder • In version 8.00.00 and from version 16.00.00 onwards
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00056

Parameter Name: C00056 Torque		Data type: INTEGER_32 Index: 24519 _d = 5FC7 _h
Display of the current torque		
Display range (min. value unit max. value)		
-65000.00	Nm	65000.00
Subcodes		Info
C00056/1		Torque demand • Only in case of sensorless vector control (SLVC) and servo control (SC).
C00056/2		Actual torque value • Estimated actual torque for all motor control modes.
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00057

Parameter Name: C00057 Maximum torque		Data type: UNSIGNED_32 Index: 24518 _d = 5FC6 _h
Display of the maximum torque to be generated by the motor • The maximum torque to be generated by the motor depends on various factors, e.g. on I _{max} in motor mode (C00022) and the motor type used.		
Display range (min. value unit max. value)		
0.00	Nm	65000.00
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00058

Parameter Name: C00058 Output frequency		Data type: INTEGER_32 Index: 24517 _d = 5FC5 _h
Display of the current output frequency		
Display range (min. value unit max. value)		
-1300.00	Hz	1300.00
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00059

Parameter Name: C00059 Appl.: Reference frequency C11		Data type: UNSIGNED_32 Index: 24516 _d = 5FC4 _h
Display of the field frequency which corresponds to the reference speed set in C00011 .		
Display range (min. value unit max. value)		
0.00	Hz	1300.00
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00061

Parameter Name: C00061 Heatsink temperature		Data type: INTEGER_16 Index: 24514 _d = 5FC2 _h
Display of the current heatsink temperature		
Display range (min. value unit max. value)		
-50	°C	150
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00062

Parameter Name: C00062 Temperature inside the controller		Data type: INTEGER_16 Index: 24513 _d = 5FC1 _h
From version 12.00.00		
Display of the current temperature inside the controller		
Display range (min. value unit max. value)		
-200	°C	200
Subcodes		Info
C00062/1		Interior temperature of CU
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00064

Parameter Name: C00064 Device utilisation (lxt)		Data type: INTEGER_16 Index: 24511 _d = 5FBF _h
Display of the device utilisation lxt in different time resolutions		
<ul style="list-style-type: none"> If the value displayed here exceeds the threshold set in C00123, the error message "OC5: Device overload (lxt)" is output and the "Fault" error response is returned. 		
Display range (min. value unit max. value)		
0.00	%	250.00

Parameter Name: C00064 Device utilisation (lxt)		Data type: INTEGER_16 Index: 24511 _d = 5FBF _h
Subcodes	Info	
C00064/1	Device utilisation (lxt) • Maximum value of the pulse utilisation (C00064/2) and permanent utilisation (C00064/3).	
C00064/2	Device utilisation (lxt) 15s • Pulse utilisation over the last 15 seconds (only for loads >160 %).	
C00064/3	Device utilisation (lxt) 3 min • Permanent utilisation over the last 3 minutes.	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00066

Parameter Name: C00066 Thermal motor load (l²xt)		Data type: INTEGER_16 Index: 24509 _d = 5FBD _h
Display of the thermal motor load, sensorlessly determined using a motor model • If the value displayed here exceeds "100.00 %", the error message "OC6: Thermal motor overload (l2xt)" is output and the fault response set in C00606 is executed (default setting: "Warning"). ▶ Motor overload monitoring (l2xt)		
Display range (min. value unit max. value)		
0.00	%	199.99
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00070

Parameter Name: C00070 Vp speed controller		Data type: UNSIGNED_16 Index: 24505 _d = 5FB9 _h
Gain factor Vp of the speed controller for different motor control types		
Setting range (min. value unit max. value)		
0.00		600.00
Subcodes	Lenze setting	Info
C00070/1	15.00	SLVC : Vp speed controller
C00070/2	6.00	SC : Vp speed controller
C00070/3	3.00	SLPSM : Vp speed controller
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00071

Parameter Name: C00071 Ti speed controller		Data type: UNSIGNED_16 Index: 24504 _d = 5FB8 _h
Reset time Ti of the speed controller for different motor control types		
Setting range (min. value unit max. value)		
0.0	ms	6000.0

Parameter Name: C00071 Ti speed controller		Data type: UNSIGNED_16 Index: 24504 _d = 5FB8 _h
Subcodes	Lenze setting	Info
C00071/1	100.0 ms	SLVC : Ti speed controller • 0: the reset time is inactive.
C00071/2	50.0 ms	SC : Ti speed controller • 0: the reset time is inactive.
C00071/3	50.0 ms	SLPSM : Ti speed controller • 0: the reset time is inactive.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00072

Parameter Name: C00072 SC: Tdn speed controller		Data type: UNSIGNED_16 Index: 24503 _d = 5FB7 _h
Differential time constant Tdn of the speed controller for servo control (SC)		
Setting range (min. value unit max. value)		Lenze setting
0.00	ms	3.00 0.00 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00073

Parameter Name: C00073 I_{max}/M controller gain		Data type: UNSIGNED_16 Index: 24502 _d = 5FB6 _h
Amplification factor Vp of certain controllers for different motor control modes		
Setting range (min. value unit max. value)		
0.00		100.00
Subcodes	Lenze setting	Info
C00073/1	0.25	VFC : Vp I _{max} controller • After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.
C00073/2	1.25	SLVC : Vp torque controller
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00074

Parameter Name: C00074 Reset time I_{max}/M controller		Data type: UNSIGNED_16 Index: 24501 _d = 5FB5 _h
Reset time Ti of certain controllers for different motor control modes		
Setting range (min. value unit max. value)		
0	ms	9990
Subcodes	Lenze setting	Info
C00074/1	65 ms	VFC : Ti I _{max} controller
C00074/2	30 ms	SLVC : Ti torque controller
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00075

Parameter Name: C00075 Vp current controller			Data type: UNSIGNED_16 Index: 24500 _d = 5FB4 _h
Gain factor Vp of the current controller for servo control (SC) and certain inverter functions (parameter identification, flying restart circuit) <ul style="list-style-type: none"> After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. 			
Setting range (min. value unit max. value)			Lenze setting
0.00	V/A	500.00	7.00 V/A
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00076

Parameter Name: C00076 Ti current controller			Data type: UNSIGNED_16 Index: 24499 _d = 5FB3 _h
Reset time Ti of the current controller for servo control (SC) and certain inverter functions (parameter identification, flying restart circuit) <ul style="list-style-type: none"> After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. 			
Setting range (min. value unit max. value)			Lenze setting
0.00	ms	500.00	10.61 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00077

Parameter Name: C00077 SC: Vp field controller			Data type: UNSIGNED_16 Index: 24498 _d = 5FB2 _h
Gain factor Vp of the field controller for servo control (SC) <ul style="list-style-type: none"> After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. 			
Setting range (min. value unit max. value)			Lenze setting
0.00		500.00	12.80
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00078

Parameter Name: C00078 SC: Tn field controller			Data type: UNSIGNED_16 Index: 24497 _d = 5FB1 _h
Reset time Tn of the field controller for servo control (SC) <ul style="list-style-type: none"> After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. 			
Setting range (min. value unit max. value)			Lenze setting
0.0	ms	6000.0	256.0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00079

Parameter Name: C00079 SC: Settings		Data type: UNSIGNED_8 Index: 24496 _d = 5FB0 _h
Configuration of different options for servo control (SC)		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C00079/1	0: Off	SC : Current controller - feedforward control • Feedforward control/decoupling network of the current controller.
C00079/2	1: On	SC : Adapt. VP in the field weakening range • Speed-dependent adaptive field weakening controller.
C00079/3	0: Off	SC : n-ctrl anti-wind-up • "Anti-wind-up" effect of the speed controller in case of an output voltage limitation in the field weakening range.
C00079/4	1: On	Field weakening for synchronous motors • From version 12.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00080

Parameter Name: C00080 Override point of field weakening		Data type: INTEGER_16 Index: 24495 _d = 5FAF _h
Offset of the override point for field weakening • In the V/f characteristic control mode (VFCplus), the stall protection function or the max. permissible current in the field weakening range can be adapted.		
Setting range (min. value unit max. value)		Lenze setting
-500	Hz	500 0 Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00081

Parameter Name: C00081 Rated motor power		Data type: UNSIGNED_16 Index: 24494 _d = 5FAE _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.		
Note: It is mandatory to give the rated motor power for the sensorless vector control (SLVC) and the servo control (SC).		
Setting range (min. value unit max. value)		Lenze setting
0.00	kW	500.00 11.00 kW
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00082

Parameter Name: C00082 Motor rotor resistance		Data type: UNSIGNED_32 Index: 24493 _d = 5FAD _h	
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)		Lenze setting	
0	mohm	200000	276 mohms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00083

Parameter Name: C00083 Motor rotor time constant		Data type: UNSIGNED_16 Index: 24492 _d = 5FAC _h	
Display of the rotor time constant of the motor • This value is calculated from the rotor resistance and the rotor inductance (leakage and magnetising inductance).			
Display range (min. value unit max. value)			
0	ms	32767	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00084

Parameter Name: C00084 Motor stator resistance		Data type: UNSIGNED_32 Index: 24491 _d = 5FAB _h	
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)		Lenze setting	
0	mohm	200000	330 mohms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00085

Parameter Name: C00085 Motor stator leakage inductance		Data type: UNSIGNED_16 Index: 24490 _d = 5FAA _h	
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)		Lenze setting	
0.00	mH	650.00	3.50 mH
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00087

Parameter Name: C00087 Rated motor speed		Data type: UNSIGNED_16 Index: 24488 _d = 5FA8 _h	
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Note: It is mandatory to give the rated motor speed for the sensorless vector control (SLVC) and the servo control (SC).			
Setting range (min. value unit max. value)		Lenze setting	
50	rpm	60000	1460 rpm
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00088

Parameter Name: C00088 Rated motor current			Data type: UNSIGNED_16 Index: 24487 _d = 5FA7 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0.20	A	320.00	21.00 A
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00089

Parameter Name: C00089 Rated motor frequency			Data type: UNSIGNED_16 Index: 24486 _d = 5FA6 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Note: It is mandatory to give the rated motor frequency for the sensorless vector control (SLVC) and the servo control (SC).			
Setting range (min. value unit max. value)			Lenze setting
1	Hz	1000	50 Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00090

Parameter Name: C00090 Rated motor voltage			Data type: UNSIGNED_16 Index: 24485 _d = 5FA5 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0	V	5000	400 V
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00091

Parameter Name: C00091 Motor cosine phi			Data type: UNSIGNED_8 Index: 24484 _d = 5FA4 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0.20		1.00	0.85
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00092

Parameter Name: C00092 Motor magnetising inductance			Data type: UNSIGNED_16 Index: 24483 _d = 5FA3 _h
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)			Lenze setting
0.0	mH	6500.0	81.0 mH
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00093

Parameter Name: C00093 Power section identification		Data type: UNSIGNED_16 Index: 24482 _d = 5FA2 _h
Display of the identification of the detected power section of the inverter		
Display range (min. value unit max. value)		
0		65535
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00095

Parameter Name: C00095 Motor magnetising current		Data type: UNSIGNED_16 Index: 24482 _d = 5FA2 _h
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.		
Setting range (min. value unit max. value)		Lenze setting
0.00	A	320.00 8.50 A
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00097

Parameter Name: C00097 Rated motor torque		Data type: UNSIGNED_32 Index: 24478 _d = 5F9E _h
Display of the rated motor torque • The displayed value is calculated from the motor parameters.		
Display range (min. value unit max. value)		
0.00	Nm	100000.00
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00098

Parameter Name: C00098 Device rated current		Data type: UNSIGNED_16 Index: 24477 _d = 5F9D _h
Display of the rated inverter current which is defined by the integrated power section.		
Display range (min. value unit max. value)		
0.0	A	6000.0
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00099

Parameter Name: C00099 Firmware version		Data type: VISIBLE_STRING Index: 24476 _d = 5F9C _h
Display of the firmware version of the device as string		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 12		

C00100

Parameter Name: C00100 Firmware version		Data type: UNSIGNED_8 Index: 24475 _d = 5F9B _h
Display of the firmware version of the device, divided into subsections.		
Display range (min. value unit max. value)		
0		99
Subcodes	Info	
C00100/1	Firmware version - main version	
C00100/2	Firmware version - subversion	
C00100/3	Firmware version - release	
C00100/4	Firmware version - build	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00101

Parameter Name: C00101 Add. accel. time x		Data type: UNSIGNED_32 Index: 24474 _d = 5F9A _h
The L_NSet 1 FB: Additional acceleration times for the main setpoint		
<ul style="list-style-type: none"> The additional acceleration times set here can be selected via the binary inputs <i>bT11</i> ... <i>bT18</i> of the L_NSet 1 FB. 		
Setting range (min. value unit max. value)		
0.000	s	999.999
Subcodes	Lenze setting	Info
C00101/1	0.000 s	Add. accel. time 1 ... 15
C00101/...		
C00101/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00103

Parameter Name: C00103 Add. decel. time x		Data type: UNSIGNED_32 Index: 24472 _d = 5F98 _h
The L_NSet 1 FB: Additional deceleration times for the main setpoint		
<ul style="list-style-type: none"> The additional deceleration times set here can be selected via the binary inputs <i>bT11</i> ... <i>bT18</i> of the L_NSet 1 FB. 		
Setting range (min. value unit max. value)		
0.000	s	999.999
Subcodes	Lenze setting	Info
C00103/1	0.000 s	Add. decel. time 1 ... 15
C00103/...		
C00103/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00104

Parameter Name: C00104 Quick stop setting		Data type: UNSIGNED_16 Index: 24471 _d = 5F97 _h
From version 12.00.00		
▶ Quick stop: Optional settings		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Standstill position-controlled	1 ≙ At standstill the position control is activated. The basic conditions are shown in the flow diagram for the quick stop function.
Bit 1	Ramp position-controlled	1 ≙ During the ramp-down phase, the position control is activated. The basic conditions are shown in the flow diagram for the quick stop function.
Bit 2	Continue following error	From version 16.00.00 1 ≙ The current following error is continued if the quick stop with position control is activated while ramping down.
Bit 3	Starting value is the setpoint speed	From version 16.00.00 0 ≙ The starting value at quick stop is the actual speed if it derives more than 5 rpm from the setpoint. This serves to prevent a jump to a strongly differing setpoint. 1 ≙ The starting value for quick stop is the setpoint speed .
Bit 4	Use position encoder	From version 16.00.00 1 ≙ In case of quick stop with position control, the position encoder is used instead of the speed encoder. The basic conditions are shown in the flow diagram for the quick stop function.
Bit 5	Standstill depending on the actual speed	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00104/1	0x0000	Quick stop setting From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00105

Parameter Name: C00105 Decel. time - quick stop		Data type: UNSIGNED_32 Index: 24470 _d = 5F96 _h	
The set deceleration time determines the ramp slope at quick stop ▶ Activate/deactivate quick stop			
Setting range (min. value unit max. value)		Lenze setting	
0.000	s	999.900	2.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00106

Parameter Name: C00106 Auto DCB: Hold time		Data type: UNSIGNED_32 Index: 24469 _d = 5F95 _h	
Hold time of the automatic DC injection brake <ul style="list-style-type: none"> The DC injection brake is applied for the time set here if the value falls below the speed setpoint set in C00019. ▶ DC-injection braking			
Setting range (min. value unit max. value)		Lenze setting	
0.000	s	999.000	0.500 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00107

Parameter Name: C00107 DC braking: Hold time		Data type: UNSIGNED_32 Index: 24468 _d = 5F94 _h	
Maximum hold time of the manual DC injection brake <ul style="list-style-type: none"> A time can be set here after which the DC injection brake is switched off automatically to prevent the motor from thermal overload. When "999.000 s" is set, the hold time is infinite. ▶ DC-injection braking			
Setting range (min. value unit max. value)		Lenze setting	
0.000	s	999.000	999.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00114

Parameter Name: C00114 DigInX: Inversion		Data type: UNSIGNED_16 Index: 24461 _d = 5F8D _h	
The polarity of each digital input of the device can be inverted via this bit field. ▶ Digital terminals			
Setting range (min. hex value max. hex value)		Lenze setting	
0x0000		0xFFFF	0x0000 (decimal: 0)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info	
Bit 0 <input type="checkbox"/>	DI1 invert.	Inversion of digital input 1	
Bit 1 <input type="checkbox"/>	DI2 invert.	Inversion of digital input 2	
Bit 2 <input type="checkbox"/>	DI3 invert.	Inversion of digital input 3	
Bit 3 <input type="checkbox"/>	DI4 invert.	Inversion of digital input 4	
Bit 4 <input type="checkbox"/>	DI5 invert.	Inversion of digital input 5	
Bit 5 <input type="checkbox"/>	DI6 invert.	Inversion of digital input 6	
Bit 6 <input type="checkbox"/>	Reserved		
Bit 7 <input type="checkbox"/>	Reserved		
Bit 8 <input type="checkbox"/>	Reserved		

Parameter Name: C00114 DigInX: Inversion		Data type: UNSIGNED_16 Index: 24461 _d = 5F8D _h
Bit 9 <input type="checkbox"/>	Reserved	
Bit 10 <input type="checkbox"/>	Reserved	
Bit 11 <input type="checkbox"/>	Reserved	
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Reserved	
Bit 14 <input type="checkbox"/>	Reserved	
Bit 15 <input type="checkbox"/>	CInh invert.	Inversion of digital input RFR (controller enable)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00115

Parameter Name: C00115 DI 1/2 & 5/6: Fct.		Data type: UNSIGNED_8 Index: 24460 _d = 5F8C _h
Function assignment of the digital terminals DI1/2 and DI5/6 <p style="text-align: right;">▶ Digital terminals: Function assignment</p>		
Selection list		Info
0	DI1(5)=In / DI2(6)=In	DI1/5 = digital input DI2/6 = digital input
1	DI1(5)=FreqIn / DI2(6)=In	DI1/5 = 1-track frequency input DI2/6 = digital input
2	DI1(5)&DI2(6)=FreqIn (2-track)	DI1/5 and DI2/6 = 2-track frequency input
3	DI1(5)=FreqIn / DI2(6)=direction	DI1/5 = 1-track frequency input DI2/6 = specification of direction
4	DI1(5)=CountIn / DI2(6)=In	DI1/5 = counter input DI2/6 = digital input
Subcodes	Lenze setting	Info
C00115/1	0: DI1(5)=In / DI2(6)=In	Function assignment of DI1 and DI2
C00115/2	0: DI1(5)=In / DI2(6)=In	Function assignment of DI5 and DI6
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00116

Parameter Name: C00116 DI 3/4 DO 1/2: Fct.		Data type: UNSIGNED_8 Index: 24459 _d = 5F8B _h
Function assignment of the digital terminals DI3/DO1 and DI4/DO2 <ul style="list-style-type: none"> • Pin 4 of the socket X42 can either be used as digital input DI3 or as digital output DO1. • Pin 2 of the socket X42 can either be used as digital input DI4 or as digital output DO2. <p style="text-align: right;">▶ Digital terminals: Reconfiguring DI3(4) to digital output DO1(2)</p>		
Selection list (Lenze setting printed in bold)		
0	DI3 DI4 active; DO1 DO2 inactive	
1	DO1 DI4 active; DI3 DO2 inactive	
2	DI3 DO2 active; DO1 DI4 inactive	
3	DO1 DO2 active; DI3 DI4 inactive	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00118

Parameter Name: C00118 DigOutX: Inversion		Data type: UNSIGNED_8 Index: 24457 _d = 5F89 _h	
The polarity of each digital output of the device can be inverted via this bit field. ▶ Digital terminals			
Setting range (min. hex value max. hex value)		Lenze setting	
0x00		0xFF	0x00 (decimal: 0)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info	
Bit 0 <input type="checkbox"/>	Reserved		
Bit 1 <input type="checkbox"/>	DO1 inverted	Inversion of digital output 1	
Bit 2 <input type="checkbox"/>	DO2 inverted	Inversion of digital output 2	
Bit 3 <input type="checkbox"/>	Reserved		
Bit 4 <input type="checkbox"/>	Reserved		
Bit 5 <input type="checkbox"/>	Reserved		
Bit 6 <input type="checkbox"/>	Reserved		
Bit 7 <input type="checkbox"/>	Reserved		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT			

C00120

Parameter Name: C00120 Setting of motor overload (I²xt)		Data type: INTEGER_16 Index: 24455 _d = 5F87 _h	
Operating threshold for the "OC6: Motor overload (I ² xt)" error message <ul style="list-style-type: none"> • The response for reaching the threshold can be selected in C00606. • The current thermal motor load is displayed in C00066. ▶ Motor overload monitoring (I2xt)			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	250.00	100.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00122

Parameter Name: C00122 Initial value motor overload (I²xt)		Data type: UNSIGNED_16 Index: 24453 _d = 5F85 _h	
From version 07.00.00 The thermal motor load displayed in C00066 is pre-initialised with the value set here when the device is connected to the mains. <ul style="list-style-type: none"> • If "100.00 %" is set, the last value at switching off the device is used for the initialisation. • Recommended setting for operation according to UL: 30.00 % ▶ Motor overload monitoring (I2xt)			
Setting range (min. value unit max. value)			
0.00	%	100.00	
Subcodes	Lenze setting	Info	
C00122/1	0.00 %	Initial value motor overload (I ² xt)	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00123

Parameter Name: C00123 Device utilisation threshold (Ixt)			Data type: INTEGER_16 Index: 24452 _d = 5F84 _h
Operating threshold for the "OC5: Device overload (Ixt)" error message <ul style="list-style-type: none"> The current device utilisation is displayed in C00064. 			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	150.00	150.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00124

Parameter Name: C00124 Current monitoring: Breaking current			Data type: UNSIGNED_16 Index: 24451 _d = 5F83 _h
In version 8.00.00 and from version 16.00.00 onwards			Current monitoring overload
Setting range (min. value unit max. value)			
0.00	%	200.00	
Subcodes	Lenze setting	Info	
C00124/1	200.00 %	Current monitoring: Breaking current overload	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00129

Parameter Name: C00129 Brake resistance value			Data type: UNSIGNED_16 Index: 24446 _d = 5F7E _h
Resistance value of the connected brake resistor <ul style="list-style-type: none"> The value to be entered can be obtained from the nameplate of the brake resistor. For each device type, the value is preset to the adapted minimum Lenze brake resistance. 			
Setting range (min. value unit max. value)		Lenze setting	
0.0	Ohm	500.0	39.0 ohms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00130

Parameter Name: C00130 Rated power - brake resistor			Data type: UNSIGNED_16 Index: 24445 _d = 5F7D _h
Rated power of the connected brake resistor <ul style="list-style-type: none"> The value to be entered can be obtained from the nameplate of the brake resistor. 			
Setting range (min. value unit max. value)		Lenze setting	
0	W	65535	100 W
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00131

Parameter Name: C00131 Rated heat amount of brake resist.			Data type: UNSIGNED_16 Index: 24444 _d = 5F7C _h
Heat quantity of the connected brake resistor <ul style="list-style-type: none"> External brake resistor: The value to be entered can be obtained from the nameplate of the brake resistor. 			
Setting range (min. value unit max. value)		Lenze setting	
0.0	kWs	6553.5	10.0 kW
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00133

Parameter Name: C00133 Brake resistor utilisation		Data type: UNSIGNED_16 Index: 24442 _d = 5F7A _h
Display of the utilisation of the connected brake resistor		
Display range (min. value unit max. value)		
0	%	65535
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00134

Parameter Name: C00134 L_NSet_1: Ramp smoothing		Data type: UNSIGNED_8 Index: 24441 _d = 5F79 _h
The L_NSet_1 FB: Configuration of the ramp rounding for the main setpoint		
Selection list (Lenze setting printed in bold)		Info
0	Off	Ramp rounding deactivated
1	PT1 behaviour	Ramp rounding with PT1 behaviour • The corresponding S-ramp time must be set in C00182 .
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00136

Parameter Name: C00136 Communication control words		Data type: UNSIGNED_16 Index: 24439 _d = 5F77 _h
Control words of the communication interfaces		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00136 Communication control words		Data type: UNSIGNED_16 Index: 24439 _d = 5F77 _h
Value is bit-coded:		
Bit 0	SwitchOn	
Bit 1	DisableVoltage	
Bit 2	SetQuickStop	
Bit 3	EnableOperation	
Bit 4	ModeSpecific_1	
Bit 5	ModeSpecific_2	
Bit 6	ModeSpecific_3	
Bit 7	ResetFault	
Bit 8	SetHalt	
Bit 9	Reserved_1	
Bit 10	Reserved_2	
Bit 11	LenzeSpecific_1	
Bit 12	LenzeSpecific_2	
Bit 13	LenzeSpecific_3	
Bit 14	SetFail	
Bit 15	LenzeSpecific_4	
Subcodes		Info
C00136/1		MCI control word • Control word of the MCI communication interface (communication module)
C00136/2		CAN control word • Control word of the CAN communication interface (X31/X32)
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00137

Parameter Name: C00137 Device status		Data type: UNSIGNED_16 Index: 24438 _d = 5F76 _h
Display of the current device status		
Selection list (read only)		
0	FirmwareUpdate	
1	Init	
2	Ident	
3	ReadyToSwitchON	
4	SwitchedON	
5	OperationEnable	
6	Warning	
7	Trouble	
8	Fault	
9	TroubleQSP	
10	SafeTorqueOff	
11	SystemFail	
12	Reserved_1	
13	Reserved_2	
14	Reserved_3	
15	Reserved_4	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00138

Parameter Name: C00138 Internal control signals		Data type: UNSIGNED_16 Index: 24437 _d = 5F75 _h
Bit coded display of internal control signals of different sources		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Reserved	
Bit 1	DisableVoltage	
Bit 2	SetQuickStop	
Bit 3	EnableOperation	
Bit 4	InitFinishedOK	
Bit 5	ModeSpecific_2	
Bit 6	ModeSpecific_3	
Bit 7	ResetFault	
Bit 8	SetHalt	
Bit 9	FirmwareUpdate	
Bit 10	MotorIdent	
Bit 11	SetMessage	
Bit 12	SetIMP	
Bit 13	SetSystemFail	
Bit 14	SetFail	
Bit 15	SetFailQSP	
Subcodes		Info
C00138/1		SYS control signals
C00138/2		MCK control signals
C00138/3		FWM control signals
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00142

Parameter Name: C00142 Auto-start option		Data type: UNSIGNED_8 Index: 24433 _d = 5F71 _h
Starting performance of the inverter after mains connection, undervoltage, loading of the Lenze setting as well as a reset of "Trouble" or "Fault" can be parameterised individually. ⚠ Danger! In the Lenze setting, the autostart option "Inhibit at power-on" is deactivated, i. e. the motor can directly start up if the controller is enabled after mains connection! <p style="text-align: right;">▶ Automatic restart after mains connection/fault...</p>		
Setting range (min. hex value max. hex value)		Lenze setting
0x00		0xFF 0x10 (decimal: 16)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input type="checkbox"/>	Inhibit at power-on	
Bit 1 <input type="checkbox"/>	Inhibit at trouble	
Bit 2 <input type="checkbox"/>	Inhibit at fault	
Bit 3 <input type="checkbox"/>	Inhibit at undervoltage	

Parameter Name: C00142 Auto-start option		Data type: UNSIGNED_8 Index: 24433 _d = 5F71 _h
Bit 4 <input checked="" type="checkbox"/>	Inhibit at Lenze setting	From version 06.00.00
Bit 5 <input type="checkbox"/>	Reserved	
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00144

Parameter Name: C00144 Switching freq. reduct. (Temp.)		Data type: UNSIGNED_8 Index: 24431 _d = 5F6F _h
Activation of the automatic switching frequency reduction if the temperature is too high		
Selection list (Lenze setting printed in bold)		Info
0	Off	Automatic switching frequency reduction deactivated
1	On	Automatic switching frequency reduction activated
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00148

Parameter Name: C00148 LS_DriveInterface: Error message config.		Data type: UNSIGNED_16 Index: 24427 _d = 5F6B _h
From version 02.00.00		
Selection of the device statuses for which the <i>bCollectedFail</i> group error output of SB LS_DriveInterface is to be set to TRUE.		
Setting range (min. hex value max. hex value)		Lenze setting
0x0000		0xFFFF 0x0030 (decimal: 48)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input type="checkbox"/>	SafeTorqueOff	
Bit 1 <input type="checkbox"/>	ReadyToSwitchOn	
Bit 2 <input type="checkbox"/>	SwitchedOn	
Bit 3 <input type="checkbox"/>	TroubleQSP	From version 06.00.00
Bit 4 <input checked="" type="checkbox"/>	Trouble	
Bit 5 <input checked="" type="checkbox"/>	Fault	
Bit 6 <input type="checkbox"/>	Warning	
Bit 7 <input type="checkbox"/>	ImplsActive	
Bit 8 <input type="checkbox"/>	ClnHlsActive	
Bit 9 <input type="checkbox"/>	Fail CAN_Management	
Bit 10 <input type="checkbox"/>	Reserved	
Bit 11 <input type="checkbox"/>	Reserved	

Parameter Name: C00148 LS_DriveInterface: Error message config.		Data type: UNSIGNED_16 Index: 24427 _d = 5F6B _h
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Lock bCollectedFail at TroubleQSP	From version 18.00.00 onwards
Bit 14 <input type="checkbox"/>	Lock bFail at TroubleQSP	From version 12.00.00 1 ≙ The <i>bFail</i> output of the SB LS_DriveInterface is also set in the "TroubleQSP" status. • Advantage: Even in the "TroubleQSP" status, an error occurred before can still be recognised.
Bit 15 <input type="checkbox"/>	Use 16BitFailNo.	From version 06.00.00 1 ≙ The short 16-bit error number <i>wStateDetermFailNoShort</i> is provided at the <i>wStateDetermFailNoLow</i> output of the SB LS_DriveInterface . • In this case, the <i>wStateDetermFailNoHigh</i> output is "0". • Advantage: The bus transfer of the error numbers is possible via a data word without changing the interconnection of the technology application.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00150

Parameter Name: C00150 Status word		Data type: UNSIGNED_16 Index: 24425 _d = 5F69 _h
Bit coded device status word		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	FreeStatus	Free status bit 0
Bit 1	PowerDisabled	Power switched off
Bit 2	FreeStatus	Free status bit 2
Bit 3	FreeStatus	Free status bit 3
Bit 4	FreeStatus	Free status bit 4
Bit 5	FreeStatus	Free status bit 5
Bit 6	ActSpeedIsZero	Current speed is 0
Bit 7	ControllerInhibit	Controller is inhibited
Bit 8	StatusCodeBit0	Status code bit 0
Bit 9	StatusCodeBit1	Status code bit 1
Bit 10	StatusCodeBit2	Status code bit 2
Bit 11	StatusCodeBit3	Status code bit 3
Bit 12	Warning	Warning
Bit 13	Trouble	Fault
Bit 14	FreeStatus	Free status bit 14
Bit 15	FreeStatus	Free status bit 15
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00155

Parameter Name: C00155 Extended status word		Data type: UNSIGNED_16 Index: 24420 _d = 5F64 _h
Bit coded device status word 2		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Fail	Error
Bit 1	M_max	Maximum torque
Bit 2	I_max	Maximum current
Bit 3	PowerDisabled	Power switched off
Bit 4	Ready	Controller is ready for operation
Bit 5	ControllerInhibit	Controller is inhibited
Bit 6	Trouble	Fault
Bit 7	InitState	Initialisation
Bit 8	CwCcw	CW/CCW rotation
Bit 9	TroubleQSP	Quick stop due to fault is active
Bit 10	SafeTorqueOff	Safe torque off
Bit 11	AplicationRunning	Application is running
Bit 12	AplParSetBit0	Application parameter set - bit 0
Bit 13	AplParSetBit1	Application parameter set - bit 1
Bit 14	quick stop	Quick stop active
Bit 15	Motor parameter identification	Motor parameter identification is active
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00158

Parameter Name: C00158 Cause of controller inhibit		Data type: UNSIGNED_16 Index: 24417 _d = 5F61 _h
Bit coded display of the cause/source of the controller inhibit		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00158 Cause of controller inhibit		Data type: UNSIGNED_16 Index: 24417 _d = 5F61 _h
Value is bit-coded:		
Bit 0	Terminal controller enable	
Bit 1	CAN control word	
Bit 2	MCI control word	
Bit 3	SwitchOn	
Bit 4	Application	
Bit 5	Device command	
Bit 6	Error response	
Bit 7	Internal signal	
Bit 8	Reserved	
Bit 9	Energy saving mode	
Bit 10	AutoStartLock	
Bit 11	Motor parameter identification	
Bit 12	Automatic brake operation	
Bit 13	DCB-IMP	
Bit 14	Reserved	
Bit 15	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00159

Parameter Name: C00159 Cause of quick stop QSP		Data type: UNSIGNED_16 Index: 24416 _d = 5F60 _h
Bit coded display of the cause/source of the quick stop		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Reserved	
Bit 1	CAN control word	
Bit 2	MCI control word	
Bit 3	Reserved	
Bit 4	Application	
Bit 5	Device command	
Bit 6	Error response	
Bit 7	Internal signal	
Bit 8	Reserved	
Bit 9	Energy saving mode	
Bit 10	Operating system of	
Bit 11	Reserved	
Bit 12	MCK	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00160

Parameter Name: C00160 Status determining error (16bit)		Data type: UNSIGNED_16 Index: 24415 _d = 5F5F _h
From version 06.00.00 Display of the short 16-bit error number of the status determining error ▶ Structure of the 16-bit error number (bit coding)		
Display range (min. value unit max. value)		
0		65535
Subcodes		Info
C00160/1		Status determining error (16-bit)
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00161

Parameter Name: C00161 LS_SetError_x: Error number		Data type: UNSIGNED_16 Index: 24414 _d = 5F5E _h
Setting of the error number for user error messages		
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C00161/1	1	LS_SetError_1 : Error no.1
C00161/2	2	LS_SetError_1 : Error no.2
C00161/3	3	LS_SetError_1 : Error no.3
C00161/4	4	LS_SetError_1 : Error no.4
C00161/5	1	LS_SetError_2 : Error no.1
C00161/6	2	LS_SetError_2 : Error no.2
C00161/7	3	LS_SetError_2 : Error no.3
C00161/8	4	LS_SetError_2 : Error no.4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00162

Parameter Name: C00162 Error number masked		Data type: UNSIGNED_32 Index: 24413 _d = 5F5D _h
Display range (min. value unit max. value)		
0		4294967295
Subcodes		Info
C00162/1		Subject area + Id statuserror
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00163

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
Selection of two binary signals to be logged in the logbook		
Selection list		Info
0	No signal	
1	DI1: Input signal	
2	DI2: Input signal	

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
3	DI3: Input signal	
4	DI4: Input signal	
5	Controller inhibit signal	
6	Digital counter: Comparison bit	
7	CAN1 input bit 0	
8	CAN1 input bit 1	
9	CAN1 input bit 2	
10	CAN1 input bit 3	
11	CAN1 input bit 4	
12	CAN1 input bit 5	
13	CAN1 input bit 6	
14	CAN1 input bit 7	
15	CAN1 input bit 8	
16	CAN1 input bit 9	
17	CAN1 input bit 10	
18	CAN1 input bit 11	
19	CAN1 input bit 12	
20	CAN1 input bit 13	
21	CAN1 input bit 14	
22	CAN1 input bit 15	
23	CAN2 input bit 0	
24	CAN2 input bit 1	
25	CAN2 input bit 2	
26	CAN2 input bit 3	
27	CAN2 input bit 4	
28	CAN2 input bit 5	
29	CAN2 input bit 6	
30	CAN2 input bit 7	
31	CAN2 input bit 8	
32	CAN2 input bit 9	
33	CAN2 input bit 10	
34	CAN2 input bit 11	
35	CAN2 input bit 12	
36	CAN2 input bit 13	
37	CAN2 input bit 14	
38	CAN2 input bit 15	
39	CAN3 input bit 0	
40	CAN3 input bit 1	
41	CAN3 input bit 2	
42	CAN3 input bit 3	
43	CAN3 input bit 4	
44	CAN3 input bit 5	
45	CAN3 input bit 6	
46	CAN3 input bit 7	

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
47	CAN3 input bit 8	
48	CAN3 input bit 9	
49	CAN3 input bit 10	
50	CAN3 input bit 11	
51	CAN3 input bit 12	
52	CAN3 input bit 13	
53	CAN3 input bit 14	
54	CAN3 input bit 15	
55	MCI word1 input bit0	
56	MCI word1 input bit1	
57	MCI word1 input bit2	
58	MCI word1 input bit3	
59	MCI Word 1 Input bit 4	
60	MCI word1 input bit5	
61	MCI word1 input bit6	
62	MCI word1 input bit7	
63	MCI word1 input bit8	
64	MCI word1 input bit9	
65	MCI word1 input bit10	
66	MCI word1 input bit11	
67	MCI word1 input bit12	
68	MCI word1 input bit13	
69	MCI word1 input bit14	
70	MCI word1 input bit15	
71	MCI word2 input bit0	
72	MCI word2 input bit1	
73	MCI Word 2 Input bit 2	
74	MCI word2 input bit3	
75	MCI word2 input bit4	
76	MCI word2 input bit5	
77	MCI word2 input bit6	
78	MCI word 2 input bit 7	
79	MCI word2 input bit8	
80	MCI word2 input bit9	
81	MCI word2 input bit10	
82	MCI word2 input bit11	
83	MCI Word 2 Input bit 12	
84	MCI word2 input bit13	
85	MCI word2 input bit14	
86	MCI word2 input bit15	
87	Position controller: Limit	
88	Speed controller: Limit	
89	Speed setpoint: Limit	
90	Torque setpoint: Limit	

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
91	Current setpoint: Limit	
92	DC injection brake active	
93	Quick stop active	
94	Pulse inhibit active	
95	Controller inhibit active	
96	Safe status active	
97	Direction of rotation ccw	
98	Actual speed = 0	
99	L_Or_1: Out	
100	L_DFlipFlop_1: Out	
101	L_DigitalDelay_1: Out	
102	L_Compare_1: Out	
103	L_Compare_2: Out	
104	L_NSet_1: Setpoint reached	
105	L_DigitalLogic_1: Out	
106	L_SignalMonitor_b: Out1	
107	L_SignalMonitor_b: Out2	
108	L_SignalMonitor_b: Out3	
109	L_SignalMonitor_b: Out4	
110	L_PCTRL_1: act=set	
Subcodes	Lenze setting	Info
C00163/1	0: No signal	Logbook - binary element 1
C00163/2	0: No signal	Logbook - binary element 2
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00164

Parameter Name: C00164 Logbook - analog elements		Data type: UNSIGNED_16 Index: 24411 _d = 5F5B _h
Selection of an analog signal to be logged in the logbook		
Selection list		Info
0	No signal	
1	AIN1	
2	CAN1 control word	
3	CAN1 input word 2	
4	CAN1 input word 3	
5	CAN1 input word 4	
6	CAN2 input word 1	
7	CAN2 input word 2	
8	CAN2 input word 3	
9	CAN2 input word 4	
10	CAN3 input word 1	
11	CAN3 input word 2	
12	CAN3 input word 3	
13	CAN3 input word 4	

Parameter Name: C00164 Logbook - analog elements		Data type: UNSIGNED_16 Index: 24411 _d = 5F5B _h
14	Digital counter LowWord	
15	Digital counter HighWord	
16	MCI word 1	
17	MCI word 2	
18	MCI word 3	
19	MCI word 4	
20	MCI word 5	
21	MCI word 6	
22	MCI word 7	
23	MCI word 8	
24	MCI word 9	
25	MCI word 10	
26	MCI word 11	
27	MCI word 12	
28	MCI word 13	
29	MCI word 14	
30	MCI word 15	
31	MCI word 16	
32	Current motor speed	
33	Current motor torque	
34	DC-bus voltage	
35	Current motor current	
36	Current motor voltage	
37	Current motor frequency	
38	Effective speed setpoint	
39	Device utilisation	
40	Motor utilisation	
41	L_OffsetGainPar_1: Out	
42	L_OffsetGainPar_2: Out	
43	L_OffsetGainPar_3: Out	
44	L_Arithmetik_1: Out	
45	L_AnalogSwitch_1: Out	
46	L_NSet_1: Out	
47	L_MotorPoti_1: Out	
48	L_PCTRL_1: Out	
49	L_SignalMonitor_a: Out1	
50	L_SignalMonitor_a: Out2	
51	L_SignalMonitor_a: Out3	
52	L_SignalMonitor_a: Out4	
53	L_MulDiv_1: Out	
54	L_NSet_1: Target setpoint	
Subcodes	Lenze setting	Info
C00164/1	0: No signal	Logbook - analog element 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00165

Parameter Name: C00165 Error information		Data type: VISIBLE_STRING Index: 24410 _d = 5F5A _h
Display of the error number divided into sectors in the event of an error		
Subcodes	Info	
C00165/1	Status determining error	
C00165/2	Current error	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 14		

C00166

Parameter Name: C00166 Error information text		Data type: VISIBLE_STRING Index: 24409 _d = 5F59 _h
Display of details on the status determining error and on the currently pending error		
Subcodes	Info	
C00166/1	Resp. to status det. error • Response to the status determining error	
C00166/2	Subj. - status det. error • Subject area of the status determining error	
C00166/3	Mess. - status det. error • Textual message of the status determining error	
C00166/4	Resp. to curr. error • Response of the currently pending error	
C00166/5	Subj. - curr. error • Subject area of the currently pending error	
C00166/6	Mess. - curr. error • Textual message of the currently pending error	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 31		

C00167

Parameter Name: C00167 Logbook data		Data type: OCTET_STRING Index: 24408 _d = 5F58 _h
This code is for device-internal use only and must not be written to by the user!		

C00168

Parameter Name: C00168 Status determining error		Data type: UNSIGNED_32 Index: 24407 _d = 5F57 _h
Display of the 32-bit error number of the status determining error <div style="text-align: right;">▶ Structure of the 32-bit error number (bit coding)</div>		
Display range (min. value unit max. value)		
0		4294967295
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00169

Parameter Name: C00169 Logbook setting		Data type: UNSIGNED_16 Index: 24406 _d = 5F56 _h	
Configuration of the logbook which message types are to be logged in the logbook.			
Setting range (min. hex value max. hex value)		Lenze setting	
0x0000		0xFFFF	0x067E (decimal: 1662)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)			
Bit 0 <input type="checkbox"/>	Reserved		
Bit 1 <input checked="" type="checkbox"/>	Log entry: Fault		
Bit 2 <input checked="" type="checkbox"/>	Log entry: Trouble		
Bit 3 <input checked="" type="checkbox"/>	Log entry: TroubleQuickstop		
Bit 4 <input checked="" type="checkbox"/>	Log entry: WarningLocked		
Bit 5 <input checked="" type="checkbox"/>	Log entry: Warning		
Bit 6 <input checked="" type="checkbox"/>	Log entry: Information		
Bit 7 <input type="checkbox"/>	Reserved		
Bit 8 <input type="checkbox"/>	Reserved		
Bit 9 <input checked="" type="checkbox"/>	Activation: Error counter		
Bit 10 <input checked="" type="checkbox"/>	Activation: Log line refresh		
Bit 11 <input type="checkbox"/>	Reserved		
Bit 12 <input type="checkbox"/>	Reserved		
Bit 13 <input type="checkbox"/>	Reserved		
Bit 14 <input type="checkbox"/>	Reserved		
Bit 15 <input type="checkbox"/>	Reserved		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT			

C00170

Parameter Name: C00170 Current error		Data type: UNSIGNED_32 Index: 24405 _d = 5F55 _h	
Display of the internal error number of the currently pending error			
Display range (min. value unit max. value)			
0		4294967295	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00171

Parameter Name: C00171 Logbook access index		Data type: UNSIGNED_8 Index: 24404 _d = 5F54 _h	
This code is for device-internal use only and must not be written to by the user!			

C00173

Parameter Name: C00173 Mains voltage		Data type: UNSIGNED_8 Index: 24402 _d = 5F52 _h
<p>If the rated mains voltage differs from 230 V or 400 V, set the mains voltage the drive is operated with. The set mains voltage influences the brake chopper threshold, the monitoring of the device utilisation (lxt) and the switch-off threshold in case of undervoltage in the DC bus.</p> <ul style="list-style-type: none"> The brake chopper threshold must not be smaller than the stabilised DC-bus voltage 		
Selection list (Lenze setting printed in bold)		Info
0	3ph 400V / 1ph 230V	3-phase 400 V or 1-phase 230 V
1	3ph 440V / 1ph 230V	3-phase 440 V or 1-phase 230 V
2	3ph 480V / 1ph 230V	3-phase 480 V or 1-phase 230 V
3	3ph 500V / 1ph 230V	3-phase 500 V or 1-phase 230 V
4	Reserved / reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00174

Parameter Name: C00174 Reduc. brake chopper threshold		Data type: UNSIGNED_8 Index: 24401 _d = 5F51 _h
<p>The threshold from which on the brake chopper is controlled is reduced by the voltage value set here.</p> <ul style="list-style-type: none"> The brake chopper threshold must not be smaller than the stabilised DC-bus voltage 		
Setting range (min. value unit max. value)		Lenze setting
0	V	150 0 V
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00175

Parameter Name: C00175 Brake energy management		Data type: UNSIGNED_8 Index: 24400 _d = 5F50 _h
<p>Selection of the braking procedure</p> <p style="text-align: right;">▶ Select response if the brake resistor is controlled</p>		
Selection list (Lenze setting printed in bold)		Info
0	R_Brems	The brake resistor is used. When the threshold voltage (C00174) is exceeded, the brake resistor is energised.
1	RfgStop	The "Ramp function generator stop" signal (<i>MCTRL_bRfgStop</i>) is used. When the threshold voltage is exceeded (C00174), the ramp function generator is stopped.
2	R_Brems + HlgStop	The brake resistor and the "Ramp function generator stop" signal are used. When the threshold voltage is exceeded (C00174), the brake resistor is energised and the ramp function generator is stopped.
3	FI_MotBrk + RfgStop	Braking is performed by a superimposed speed setpoint vibration in conjunction with "Ramp function generator stop".
4	R_Brems + FU_MotBrk + HlgStop	Braking is performed by combining all three braking procedures.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00176

Parameter Name: C00176 Undervoltage threshold for mains OFF	Data type: UNSIGNED_16 Index: 24399 _d = 5F4F _h
This code is for device-internal use only and must not be written to by the user!	

C00177

Parameter Name: C00177 Switching cycles	Data type: UNSIGNED_32 Index: 24398 _d = 5F4E _h
Counter of different switching cycles and stressful situations	
Display range (min. value unit max. value)	
0	2147483647
Subcodes	Info
C00177/1	Number of mains switching cycles
C00177/2	Number of switching cycles of the output relay
C00177/3	Short circuit counter
C00177/4	Earth fault counter
C00177/5	"Clamp" counter
C00177/6	Counter for "safe torque off" (STO) after power-on • From version 12.00.00
C00177/7	Counter for controller inhibit via terminal after power-on • From version 12.00.00
C00177/8	Counter for pulse inhibit (IMP) after power-on • From version 12.00.00
C00177/9	Service code
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1	

C00178

Parameter Name: C00178 Elapsed-hour meter	Data type: UNSIGNED_32 Index: 24397 _d = 5F4D _h
Display of operating hours in seconds	
Display range (min. value unit max. value)	
0	s 2147483647
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1	

C00179

Parameter Name: C00179 Power-on time meter	Data type: UNSIGNED_32 Index: 24396 _d = 5F4C _h
Display of the power-on time in seconds	
Display range (min. value unit max. value)	
0	s 2147483647
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1	

C00180

Parameter Name: C00180 Running time		Data type: UNSIGNED_32 Index: 24395 _d = 5F4B _h
Display of various running times in seconds		
Display range (min. value unit max. value)		
0	s	2147483647
Subcodes		Info
C00180/1		Runtime - control card
C00180/2		Runtime - external fan DU
C00180/3		Runtime - internal fan WU
C00180/4		Runtime - internal fan DU
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00181

Parameter Name: C00181 Time settings		Data type: UNSIGNED_16 Index: 24394 _d = 5F4A _h
From version 06.00.00 Time for device search function (optical location) <div style="text-align: right;">▶ Device search function</div>		
Setting range (min. value unit max. value)		
0	s	6000
Subcodes		Info
C00181/1	5 s	Time - device search function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00182

Parameter Name: C00182 L_NSet_1: S-ramp time PT1		Data type: INTEGER_16 Index: 24393 _d = 5F49 _h
FB L_NSet_1 : PT1 S-ramp time for the main setpoint ramp function generator • Only effective with activated ramp rounding (C00134 = "1").		
Setting range (min. value unit max. value)		Lenze setting
0.01	s	50.00 20.00 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00184

Parameter Name: C00184 AutoFailReset repetition time		Data type: UNSIGNED_16 Index: 24391 _d = 5F47 _h
After the time set here has expired, an error message of an error that has occurred will be reset automatically if "AutoFailReset" had been configured correspondingly in C00188 . <div style="text-align: right;">▶ AutoFailReset function</div>		
Setting range (min. value unit max. value)		Lenze setting
1	s	600 3 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00185

Parameter Name: C00185 AutoFailReset remaining time		Data type: UNSIGNED_16 Index: 24390 _d = 5F46 _h
Display of the residual runtime of the "AutoFailReset" function		▶ AutoFailReset function
Display range (min. value unit max. value)		
0	s	600
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00186

Parameter Name: C00186 Max. number of AutoFailReset processes		Data type: UNSIGNED_8 Index: 24389 _d = 5F45 _h
Maximum number of "AutoFailReset" procedures		▶ AutoFailReset function
Setting range (min. value unit max. value)		Lenze setting
1		16 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00187

Parameter Name: C00187 Current AutoFailReset processes		Data type: UNSIGNED_8 Index: 24388 _d = 5F44 _h
Data of the current number of "AutoFailReset" procedures		▶ AutoFailReset function
Display range (min. value unit max. value)		
0		16
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00188

Parameter Name: C00188 AutoFailReset configuration		Data type: UNSIGNED_8 Index: 24387 _d = 5F43 _h
Setting which error messages are to be reset automatically.		▶ AutoFailReset function
Selection list (Lenze setting printed in bold)		Info
0	Off	No automatic error message reset
1	Fault + TroubleQSP	Error messages with the response "Fault" and "TroubleQSP" are reset automatically
2	WarningLocked	Error messages with the response "WarningLocked" are reset automatically
3	All locking	All "locking" error messages are reset automatically
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00189

Parameter Name: C00189 Resp. to too frequent AutoFailReset		Data type: UNSIGNED_8 Index: 24386 _d = 5F42 _h
Response to exceeding the maximum number of "AutoFailReset" processes set in C00186 . ▶ AutoFailReset function		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00190

Parameter Name: C00190 L_NSet_1: Setpoint arithmetic		Data type: UNSIGNED_8 Index: 24385 _d = 5F41 _h
The L_NSet_1 FB: Selection of arithmetics • To be able to influence the main setpoint (NSet) by an additional setpoint (NAdd).		
Selection list (Lenze setting printed in bold)		
0	Out = Set	
1	Out = Set + Add	
2	NOut = NSet - NAdd	
3	NOut = (NSet * NAdd) / 100%	
4	NOut = (NSet * 1%) / NAdd	
5	Out = (Set*100%)/(100%-Add)	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00191

Parameter Name: C00191 Logbook access index User		Data type: UNSIGNED_8 Index: 24384 _d = 5F40 _h
From version 12.00.00 ▶ Logbook read interface		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C00191/1	255	Logbook access index User
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00192

Parameter Name: C00192 Logbook data User		Data type: OCTET_STRING Index: 24383 _d = 5F3F _h
From version 12.00.00		▶ Logbook read interface
Display range (min. value unit max. value)		
Subcodes		Info
C00192/1		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00193

Parameter Name: C00193 Logbook element User		Data type: UNSIGNED_32 Index: 24382 _d = 5F3E _h
From version 12.00.00		▶ Logbook read interface
Display range (min. value unit max. value)		
0		2147483647
Subcodes		Info
C00193/1		Response index
C00193/2		Activity
C00193/3		Counter
C00193/4		Error type
C00193/5		Error number
C00193/6		Time stamp
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00199

Parameter Name: C00199 Description data		Data type: VISIBLE_STRING Index: 24376 _d = 5F38 _h
From version 06.00.00 Parameters for storing decription data for the inverter		▶ Device identification
Subcodes	Lenze setting	Info
C00199/1		Device name
C00199/2		User text • From version 12.00.00
C00199/3		User text • From version 12.00.00
C00199/4		User text • From version 12.00.00
C00199/5		User text • From version 12.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 32		

C00200

Parameter Name: C00200 Firmware product type	Data type: VISIBLE_STRING Index: 24375 _d = 5F37 _h
Display of the firmware product type	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 19	

C00201

Parameter Name: C00201 Firmware	Data type: VISIBLE_STRING Index: 24374 _d = 5F36 _h
Display of the firmware data of the control card and the power section	
Subcodes	Info
C00201/1	Firmware type - ctrl card
C00201/2	Firmware version - ctrl card
C00201/3	Firmware comp. file - ctrl card
C00201/4	Firmware type - power section
C00201/5	Firmware version - power sect.
C00201/6	Firmw. comp. file - power sect.
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 22	

C00203

Parameter Name: C00203 Product type code	Data type: VISIBLE_STRING Index: 24372 _d = 5F34 _h
Display of the types of the individual device components	
Subcodes	Info
C00203/1	Type: Control card
C00203/2	Type: Power section
C00203/3	Type: MCI module
C00203/4	Reserved
C00203/5	Type: Memory module
C00203/6	Type: Safety card
C00203/7	Type: Standard device
C00203/8	Type: Complete device
C00203/9	Type: Display module
C00203/10	Type: Wiring module
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 24	

C00204

Parameter Name: C00204 Serial number	Data type: VISIBLE_STRING Index: 24371 _d = 5F33 _h
Display of the serial numbers of the individual device components	
Subcodes	Info
C00204/1	Serial no.: Control card
C00204/2	Serial no.: Power section
C00204/3	Serial no.: MCI module
C00204/4	Reserved
C00204/5	Serial no.: Memory module

Parameter Name: C00204 Serial number		Data type: VISIBLE_STRING Index: 24371 _d = 5F33 _h
C00204/6	Serial no.: Safety card	
C00204/7	Serial no.: Standard device	
C00204/8	Serial no.: Complete device	
C00204/9	Serial no.: Display module	
C00204/10	Serial no.: Wiring module	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 24		

C00205

Parameter Name: C00205 Info		Data type: VISIBLE_STRING Index: 24370 _d = 5F32 _h
This code is for device-internal use only and must not be written to by the user!		

C00206

Parameter Name: C00206 Production date		Data type: VISIBLE_STRING Index: 24369 _d = 5F31 _h
This code is for device-internal use only and must not be written to by the user!		

C00210

Parameter Name: C00210 HW version		Data type: VISIBLE_STRING Index: 24365 _d = 5F2D _h
This code is for device-internal use only and must not be written to by the user!		

C00219

Parameter Name: C00219 Identity		Data type: UNSIGNED_32 Index: 24356 _d = 5F24 _h
From version 12.00.00		
Display range (min. value unit max. value)		
0		4294967295
Subcodes		Info
C00219/1	CAN manufacturer no.	
C00219/2	CAN device type	
C00219/3	CAN version	
C00219/4	CAN count no.	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00220

Parameter Name: C00220 L_NSet_1: Acceleration time - add. setpoint		Data type: UNSIGNED_32 Index: 24355 _d = 5F23 _h
The L_NSet_1 FB: Acceleration time for the additional setpoint <i>nNAdd_a</i>		
Setting range (min. value unit max. value)		Lenze setting
0.000	s	999.999 0.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00221

Parameter Name: C00221 L_NSet_1: Deceleration time - add. setpoint			Data type: UNSIGNED_32 Index: 24354 _d = 5F22 _h
The L_NSet_1 FB: Deceleration time for the additional setpoint <i>nNAdd_a</i>			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	0.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00222

Parameter Name: C00222 L_PCTRL_1: Vp			Data type: INTEGER_16 Index: 24353 _d = 5F21 _h
The L_PCTRL_1 FB: Gain factor Vp for the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.1		500.0	1.0
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10			

C00223

Parameter Name: C00223 L_PCTRL_1: Tn			Data type: UNSIGNED_16 Index: 24352 _d = 5F20 _h
The L_PCTRL_1 FB: Reset time Tn for the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
20	ms	6000	400 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00224

Parameter Name: C00224 L_PCTRL_1: Kd			Data type: UNSIGNED_16 Index: 24351 _d = 5F1F _h
The L_PCTRL_1 FB: Derivative-action coefficient Kd for the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.0		5.0	0.0
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10			

C00225

Parameter Name: C00225 L_PCTRL_1: MaxLimit			Data type: INTEGER_16 Index: 24350 _d = 5F1E _h
The L_PCTRL_1 FB: Maximum output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	199.99 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00226

Parameter Name: C00226 L_PCTRL_1: MinLimit			Data type: INTEGER_16 Index: 24349 _d = 5F1D _h
The L_PCTRL_1 FB: Minimum output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	-199.99 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00227

Parameter Name: C00227 L_PCTRL_1: Acceleration time			Data type: UNSIGNED_32 Index: 24348 _d = 5F1C _h
The L_PCTRL_1 FB: Acceleration time for the output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	0.010 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00228

Parameter Name: C00228 L_PCTRL_1: Deceleration time			Data type: UNSIGNED_32 Index: 24347 _d = 5F1B _h
The L_PCTRL_1 FB: Deceleration time for the output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	0.010 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000			

C00231

Parameter Name: C00231 L_PCTRL_1: Operating range			Data type: INTEGER_16 Index: 24344 _d = 5F18 _h
The L_PCTRL_1 FB: Operating range for the PID process controller			
Setting range (min. value unit max. value)			
0.00	%	199.99	
Subcodes	Lenze setting	Info	
C00231/1	199.99 %	L_PCTRL_1 : Pos. maximum	
C00231/2	0.00 %	L_PCTRL_1 : Pos. minimum	
C00231/3	0.00 %	L_PCTRL_1 : Neg. minimum	
C00231/4	199.99 %	L_PCTRL_1 : Neg. maximum	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00233

Parameter Name: C00233 L_PCTRL_1: Root function		Data type: UNSIGNED_8 Index: 24342 _d = 5F16 _h
The L_PCTRL_1 FB: Use of the root function at the actual value input		
Selection list (Lenze setting printed in bold)		Info
0	Off	Root function inactive • The actual value <i>nAct_a</i> remains unchanged for further processing
1	On	Root function active • The root is extracted of the actual value <i>nAct_a</i> for further processing
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00234

Parameter Name: C00234 Oscillation damping influence		Data type: UNSIGNED_16 Index: 24341 _d = 5F15 _h
▶ Oscillation damping		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	250.00 5.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00235

Parameter Name: C00235 Oscillation damping filter time		Data type: UNSIGNED_8 Index: 24340 _d = 5F14 _h
▶ Oscillation damping		
Setting range (min. value unit max. value)		Lenze setting
2	ms	250 32 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00236

Parameter Name: C00236 Field weakening oscillation damping		Data type: UNSIGNED_8 Index: 24339 _d = 5F13 _h
Oscillation damping for idling machines		
▶ Oscillation damping		
Setting range (min. value unit max. value)		Lenze setting
0		40 14
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00241

Parameter Name: C00241 L_NSet_1: Hyst. NSet reached		Data type: INTEGER_16 Index: 24334 _d = 5F0E _h
The L_NSet_1 FB: Hysteresis window for the zero detection of the speed output setpoint • The speed threshold for the zero detection is 1 %		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 0.50 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00242

Parameter Name: C00242 L_PCTRL_1: Operating mode		Data type: UNSIGNED_8 Index: 24333 _d = 5F0D _h
The L_PCTRL_1 FB: Selection of the operating mode		
<ul style="list-style-type: none"> Depending on the selection, the blue switches in the displayed signal flow are set accordingly in the Engineer on the Application parameters tab for the L_PCTRL_1 FB. 		
Selection list (Lenze setting printed in bold)		Info
0	Off	The input setpoint <i>nSet_a</i> is output without any changes at the output <i>nOut_a</i> .
1	nNSet + nNSet_PID	<i>nNSet_a</i> and <i>nAct_a</i> are used as PID input values. The arriving <i>nNSet_a</i> is additively linked to the value output by the PID element.
2	nSet_PID	<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The input <i>nNSet_a</i> is not considered.
3	nNSet_PID	<i>nNSet_a</i> and <i>nAct_a</i> are used as PID input values. The input <i>nSet_a</i> is not considered.
4	nNSet + nSet_PID	<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The arriving <i>nNSet_a</i> setpoint is additively linked to the value output by the PID element.
5	nNSet nSet_PID	<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The setpoint <i>nNSet_a</i> is output at the output <i>nOut_a</i> . The PID output value is output at the output <i>nPIDOut_a</i> .
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00243

Parameter Name: C00243 L_PCTRL_1: Acceleration time influence		Data type: UNSIGNED_32 Index: 24332 _d = 5F0C _h
The L_PCTRL_1 FB: Acceleration time for showing the PID output value		
Setting range (min. value unit max. value)		Lenze setting
0.000	s	999.999 5.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00244

Parameter Name: C00244 L_PCTRL_1: Deceleration time influence		Data type: UNSIGNED_32 Index: 24331 _d = 5F0B _h
The L_PCTRL_1 FB: Deceleration time for masking out the PID output value		
Setting range (min. value unit max. value)		Lenze setting
0.000	s	999.999 5.000 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00245

Parameter Name: C00245 L_PCTRL_1: PID output value		Data type: INTEGER_16 Index: 24330 _d = 5F0A _h
The L_PCTRL_1 FB: Display of the output value of the PID process controller		
Display range (min. value unit max. value)		
-199.99	%	199.99
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00246

Parameter Name: C00246 L_PCTRL_1: nAct_a internal		Data type: INTEGER_16 Index: 24329 _d = 5F09 _h
FB L_PCTRL_1 : Display of the internal actual value		
Display range (min. value unit max. value)		
-199.99	%	199.99
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00247

Parameter Name: C00247 L_PCTRL_1: Window setpoint reached		Data type: INTEGER_16 Index: 24328 _d = 5F08 _h
From version 06.00.00		
FB L_PCTRL_1 : Window for comparison operation "actual value = setpoint"		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 2.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00249

Parameter Name: C00249 L_PT1_1: Time constant		Data type: UNSIGNED_16 Index: 24326 _d = 5F06 _h
FB L_PT1_1 : Time constant Tn		
Setting range (min. value unit max. value)		Lenze setting
0	ms	5000 2000 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00250

Parameter Name: C00250 L_PT1 2-3: Time constant		Data type: INTEGER_16 Index: 24325 _d = 5F05 _h
Setting range (min. value unit max. value)		
0	ms	5000
Subcodes	Lenze setting	Info
C00250/1	2000 ms	L_PT1_2 : Time constant
C00250/2	2000 ms	L_PT1_3 : Time constant
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00251

Parameter Name: C00251 L_DT1_1: Time constant		Data type: INTEGER_16 Index: 24324 _d = 5F04 _h
FB L_DT1_1 : Time constant Tn		
Setting range (min. value unit max. value)		Lenze setting
10	ms	5000 1000 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00252

Parameter Name: C00252 L_DT1_1: Gain		Data type: INTEGER_16 Index: 24323 _d = 5F03 _h
FB L_DT1_1 : Gain factor Vp		
Setting range (min. value unit max. value)		Lenze setting
-320.00		320.00 1.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00253

Parameter Name: C00253 L_DT1_1: Sensitivity		Data type: UNSIGNED_8 Index: 24322 _d = 5F02 _h
FB L_DT1_1 : Selection of sensitivity		
<ul style="list-style-type: none"> Depending on the selection, the number of indicated higher-order bits is evaluated. 		
Note:		
The most significant bit determines the sign of the value, the remaining bits determine the numerical value.		
Selection list (Lenze setting printed in bold)		Info
1	15 bits	Bit 0 ... bit 14 are evaluated
2	14 bits	Bit 0 ... bit 13 are evaluated
3	13 bits	Bit 0 ... bit 12 are evaluated
4	12 bits	Bit 0 ... bit 11 are evaluated
5	11 Bit	Bit 0 ... bit 10 are evaluated
6	10 Bit	Bit 0 ... bit 9 are evaluated
7	9 Bit	Bit 0 ... bit 8 are evaluated
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00254

Parameter Name: C00254 Kp position controller		Data type: UNSIGNED_16 Index: 24321 _d = 5F01 _h
Gain for following error compensation		
Setting range (min. value unit max. value)		Lenze setting
0.00	1/s	500.00 5.00 1/s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00265

Parameter Name: C00265 SLVC: Filtering of setpoint and actual currents		Data type: UNSIGNED_8 Index: 24310 _d = 5EF6 _h
This code is for device-internal use only and must not be written to by the user!		

C00270

Parameter Name: C00270 SC: Freq. current setpoint filter		Data type: UNSIGNED_16 Index: 24305 _d = 5EF1 _h
Frequency to be inhibited by the current setpoint filter at servo control (SC).		
Setting range (min. value unit max. value)		Lenze setting
40.0	Hz	1000.0 200.0 Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00271

Parameter Name: C00271 SC: Width of current setpoint filter		Data type: UNSIGNED_16 Index: 24304 _d = 5EF0 _h	
Frequency width of the current setpoint filter at servo control (SC) • Width around the frequency to be inhibited (C00270).			
Setting range (min. value unit max. value)		Lenze setting	
0.0	Hz	500.0	0.0 Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00272

Parameter Name: C00272 SC: Depth of current setpoint filter		Data type: UNSIGNED_16 Index: 24303 _d = 5EEF _h	
Damping of the current setpoint filter at servo control (SC)			
Setting range (min. value unit max. value)		Lenze setting	
0	dB	100	0 db
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00273

Parameter Name: C00273 Moment of inertia motor		Data type: UNSIGNED_32 Index: 24304 _d = 5EEF _h	
Moment of inertia for setpoint feedforward control at servo control (SC) and sensorless vector control (SLVC)			
Setting range (min. value unit max. value)		Lenze setting	
0.00	kg cm ²	6000000.00	0.00 kg cm²
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00274

Parameter Name: C00274 SC: Max. change in acceleration		Data type: UNSIGNED_16 Index: 24301 _d = 5EED _h	
Limitation of acceleration change at servo control (SC) • Setting in % of M_Nenn per ms.			
Setting range (min. value unit max. value)		Lenze setting	
0.0	%/ms	400.0	400.0 %/ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00275

Parameter Name: C00275 Filter setpoint feedforward control		Data type: UNSIGNED_16 Index: 24300 _d = 5EEC _h	
Filter time of setpoint feedforward control at servo control (SC) and sensorless vector control (SLVC) • The setpoint feedforward control requires the entry of the moment of inertia in C00273.			
Setting range (min. value unit max. value)		Lenze setting	
0.0	ms	1000.0	1.0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00276

Parameter Name: C00276 SC: Max. output voltage		Data type: UNSIGNED_8 Index: 24299 _d = 5EEB _h	
Maximum output voltage at servo control (SC) • Regarding the current DC-bus voltage.			
Setting range (min. value unit max. value)		Lenze setting	
80	%	99	95 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00280

Parameter Name: C00280 SC: Filter time const. DC detection		Data type: UNSIGNED_16 Index: 24295 _d = 5EE7 _h	
Filter time constant for DC-bus voltage filtering • The filter time constant is e.g. used for field weakening control at servo control (SC).			
Setting range (min. value unit max. value)		Lenze setting	
1	ms	1000	25 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00290

Parameter Name: C00290 RCOM error counter		Data type: UNSIGNED_16 Index: 24285 _d = 5EDD _h	
This code is for device-internal use only and must not be written to by the user!			

C00291

Parameter Name: C00291 Error type RCOM		Data type: UNSIGNED_8 Index: 24284 _d = 5EDC _h	
This code is for device-internal use only and must not be written to by the user!			

C00295

Parameter Name: C00295 savecycle memory modul		Data type: INTEGER_32 Index: 24280 _d = 5ED8 _h	
This code is for device-internal use only and must not be written to by the user!			

C00296

Parameter Name: C00296 ICOM error number		Data type: UNSIGNED_16 Index: 24279 _d = 5ED7 _h	
This code is for device-internal use only and must not be written to by the user!			

C00297

Parameter Name: C00297 Counter Receive Error Isr		Data type: UNSIGNED_8 Index: 24278 _d = 5ED6 _h	
This code is for device-internal use only and must not be written to by the user!			

C00301

Parameter Name: C00301 DebugAccess	Data type: UNSIGNED_16 Index: 24274 _d = 5ED2 _h
This code is for device-internal use only and must not be written to by the user!	

C00302

Parameter Name: C00302 Internal Commands	Data type: UNSIGNED_8 Index: 24273 _d = 5ED1 _h
This code is for device-internal use only and must not be written to by the user!	

C00304

Parameter Name: C00304 Password1	Data type: UNSIGNED_32 Index: 24271 _d = 5ECF _h
This code is for device-internal use only and must not be written to by the user!	

C00305

Parameter Name: C00305 Password2	Data type: UNSIGNED_32 Index: 24270 _d = 5ECF _h
This code is for device-internal use only and must not be written to by the user!	

C00306

Parameter Name: C00306 Debug address	Data type: UNSIGNED_32 Index: 24269 _d = 5ECD _h
This code is for device-internal use only and must not be written to by the user!	

C00307

Parameter Name: C00307 Debug value	Data type: UNSIGNED_16 Index: 24268 _d = 5ECC _h
This code is for device-internal use only and must not be written to by the user!	

C00308

Parameter Name: C00308 PartitionOffset	Data type: UNSIGNED_16 Index: 24267 _d = 5ECB _h
This code is for device-internal use only and must not be written to by the user!	

C00309

Parameter Name: C00309 PartitionSel	Data type: UNSIGNED_8 Index: 24266 _d = 5ECA _h
This code is for device-internal use only and must not be written to by the user!	

C00310

Parameter Name: C00310 PartitionValue	Data type: UNSIGNED_16 Index: 24265 _d = 5EC9 _h
This code is for device-internal use only and must not be written to by the user!	

C00311

Parameter Name: C00311 Runtime measurement	Data type: UNSIGNED_32 Index: 24264 _d = 5EC8 _h
This code is for device-internal use only and must not be written to by the user!	

C00312

Parameter Name: C00312 System runtimes	Data type: UNSIGNED_32 Index: 24263 _d = 5EC7 _h
From version 12.00.00	
Setting range (min. value unit max. value)	
0.000	µs 1638.375
Subcodes	Lenze setting Info
C00312/1	0.000 µs System runtime reserve
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000	

C00313

Parameter Name: C00313 LS_DataAccess: Activation	Data type: UNSIGNED_8 Index: 24262 _d = 5EC6 _h
This code is for device-internal use only and must not be written to by the user!	

C00314

Parameter Name: C00314 LS_DataAccess: Address access	Data type: UNSIGNED_32 Index: 24261 _d = 5EC5 _h
This code is for device-internal use only and must not be written to by the user!	

C00315

Parameter Name: C00315 SystemFail-Adr	Data type: UNSIGNED_32 Index: 24260 _d = 5EC4 _h
This code is for device-internal use only and must not be written to by the user!	

C00316

Parameter Name: C00316 SystemFail-Info	Data type: UNSIGNED_16 Index: 24259 _d = 5EC3 _h
This code is for device-internal use only and must not be written to by the user!	

C00317

Parameter Name: C00317 WatchdogTimeMax	Data type: UNSIGNED_16 Index: 24258 _d = 5EC2 _h
This code is for device-internal use only and must not be written to by the user!	

C00320

Parameter Name: C00320 Debug information	Data type: UNSIGNED_32 Index: 24255 _d = 5EBF _h
This code is for device-internal use only and must not be written to by the user!	

C00321

Parameter Name: C00321 Main program runtime		Data type: UNSIGNED_16 Index: 24254 _d = 5EBE _h
Display of the current and the maximum runtime of the main program in the inverter		
Setting range (min. value unit max. value)		
0	ms	65535
Subcodes	Lenze setting	Info
C00321/1	0 ms	Curr. runtime of main program
C00321/2	0 ms	Max. runtime of main program
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00322

Parameter Name: C00322 Transmission mode CAN TxPDOs		Data type: UNSIGNED_8 Index: 24253 _d = 5EBD _h
TPDO transmission type according to DS301 V4.02 <ul style="list-style-type: none"> The following transmission modes are supported: <ul style="list-style-type: none"> 0: Synchronous and acyclic 1 ... 240: Synchronous and cyclic 252: Synchronous - RTR only 253: Asynchronous - RTR only 254: Asynchronous - manufacturer-specific 255: Asynchronous - device-profile specific The basic setting for all PDOs is "Asynchronous - manufacturer-specific" (254). Illustration of the CANopen objects I-1800/2 ... I-1802/2 (see DS301 V4.02). <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C00322/1	254	Transmission mode CAN1 OUT
C00322/2	254	Transmission mode CAN2 OUT
C00322/3	254	Transmission mode CAN3 OUT
C00322/4	254	Transmission mode CAN4 OUT <ul style="list-style-type: none"> • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00323

Parameter Name: C00323 Transmission mode CAN Rx PDOs		Data type: UNSIGNED_8 Index: 24252 _d = 5EBC _h
RPDO transmission type according to DS301 V4.02 <ul style="list-style-type: none"> • In the case of the RPDO serves as monitoring setting in the case of sync-controlled PDOs. • The following transmission modes are supported: <ul style="list-style-type: none"> • 0: Synchronous and acyclic • 1 ... 240: Synchronous and cyclic • 252: Synchronous - RTR only • 253: Asynchronous - RTR only • 254: Asynchronous - manufacturer-specific • 255: Asynchronous - device-profile specific • The basic setting for all PDOs is "Asynchronous - manufacturer-specific" (254). • Illustration of the CANopen objects I-1400/2 ... I-1402/2 (see DS301 V4.02). <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C00323/1	254	Transmission mode CAN1 IN
C00323/2	254	Transmission mode CAN2 IN
C00323/3	254	Transmission mode CAN3 IN
C00323/4	254	Transmission mode CAN4 IN • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00324

Parameter Name: C00324 CAN transmission blocking time		Data type: UNSIGNED_16 Index: 24251 _d = 5EBB _h
From version 06.00.00 Blocking time for the transmission of the emergency telegram and the process data		
Note: If the "Asynchronous - manufacturer-specific/device profile-specific" transmission type is set, the transmission cycle timer is reset to 0 if event-controlled transmission has been triggered. Example: Cycle time (C00356/x) = 500 ms, blocking time = 100 ms, data change sporadically: <ul style="list-style-type: none"> • In the case of a sporadic data change < 500 ms, due to the blocking time set, transmission takes place every 100 ms (event-controlled transmission) as quickly as possible. • In the case of a sporadic data change > 500 ms, due to the cycle time set, transmission takes place every 500 ms (cyclic transmission). <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Setting range (min. value unit max. value)		
0	ms	6500
Subcodes	Lenze setting	Info
C00324/1	0 ms	CAN emergency blocking time
C00324/2	0 ms	CAN1_OUT blocking time
C00324/3	0 ms	CAN2_OUT blocking time
C00324/4	0 ms	CAN3_OUT blocking time
C00324/5	0 ms	CAN4_OUT blocking time • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00338

Parameter Name: C00338 L_Arithmetik_1: Function		Data type: UNSIGNED_8 Index: 24237 _d = 5EAD _h
The L_Arithmetik_1 FB: Selection of internal arithmetics		
Selection list (Lenze setting printed in bold)		
0	Out = In1	
1	Out = In1 + In2	
2	nOut_a = nIn1_a - nIn2_a	
3	Out = (In1 * In2) / 100%	
4	nOut_a = (nIn1_a * 1%) / nIn2_a	
5	nOut_a = (nIn1_a * 100%) / (100% - nIn2_a)	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00339

Parameter Name: C00339 L_Arithmetik_2: Function		Data type: UNSIGNED_8 Index: 24236 _d = 5EAC _h
The L_Arithmetik_2 FB: Selection of internal arithmetics		
Selection list (Lenze setting printed in bold)		
0	nOut_a = nIn1_a	
1	nOut_a = nIn1_a + nIn2_a	
2	nOut_a = nIn1_a - nIn2_a	
3	nOut_a = (nIn1_a * nIn2_a) / 100%	
4	nOut_a = (nIn1_a * 1%) / nIn2_a	
5	nOut_a = (nIn1_a * 100%) / (100% - nIn2_a)	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00341

Parameter Name: C00341 CAN management - error configuration		Data type: UNSIGNED_16 Index: 24234 _d = 5EAA _h
From version 02.00.00		
Selection of the events for which the <i>bFail</i> error output of the LS_CANManagement SB must be set to TRUE.		
Setting range (min. hex value max. hex value)		Lenze setting
0x0000		0xFFFF 0x0000 (decimal: 0)

Parameter Name: C00341 CAN management - error configuration		Data type: UNSIGNED_16 Index: 24234 _d = 5EAA _h
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		
Bit 0 <input type="checkbox"/>	BusOff_MsgErr	
Bit 1 <input type="checkbox"/>	Warning	
Bit 2 <input type="checkbox"/>	NodeStopped	
Bit 3 <input type="checkbox"/>	HeartBeatEvent	
Bit 4 <input type="checkbox"/>	CAN1_In_Überw.	
Bit 5 <input type="checkbox"/>	CAN2_In_Überw.	
Bit 6 <input type="checkbox"/>	CAN3_In_Überw.	
Bit 7 <input type="checkbox"/>	CAN4_In_Überw.	
Bit 8 <input type="checkbox"/>	Reserved	
Bit 9 <input type="checkbox"/>	Reserved	
Bit 10 <input type="checkbox"/>	Reserved	
Bit 11 <input type="checkbox"/>	Reserved	
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Reserved	
Bit 14 <input type="checkbox"/>	Reserved	
Bit 15 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00342

Parameter Name: C00342 CAN decoupling PDOInOut		Data type: UNSIGNED_16 Index: 24233 _d = 5EA9 _h
From version 02.00.00 Configuration defining the events that lead to a decoupling of the process data words. ▶ Configuring exception handling of the CAN PDOs		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00342 CAN decoupling PDOInOut		Data type: UNSIGNED_16 Index: 24233 _d = 5EA9 _h
Value is bit-coded:		
Bit 0	BusOff_MsgErr	
Bit 1	Warning	
Bit 2	NodeStopped	
Bit 3	HeartBeatEvent	
Bit 4	CAN1_In_Überw.	
Bit 5	CAN2_In_Überw.	
Bit 6	CAN3_In_Überw.	
Bit 7	CAN4_In_Überw.	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Trouble	
Bit 15	Fault	
Subcodes	Lenze setting	Info
C00342/1	0x0000	CAN decoupling PDO_In from the bus
C00342/2	0x0000	CAN decoupling PDO_Out from the appl.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00343

Parameter Name: C00343 LP_CanIn decoupling value		Data type: UNSIGNED_16 Index: 24232 _d = 5EA8 _h
From version 02.00.00 Definition of the value the process data words are to have in the decoupled state. ▶ Configuring exception handling of the CAN PDOs		
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C00343/1	0	LP_CanIn1:wCtrl DiscVal
C00343/2	0	LP_CanIn1:wIn2 DiscVal
C00343/3	0	LP_CanIn1:wIn3 DiscVal
C00343/4	0	LP_CanIn1:wIn4 DiscVal
C00343/5	0	LP_CanIn2:wIn1 DiscVal
C00343/6	0	LP_CanIn2:wIn2 DiscVal
C00343/7	0	LP_CanIn2:wIn3 DiscVal
C00343/8	0	LP_CanIn2:wIn4 DiscVal
C00343/9	0	LP_CanIn3:wIn1 DiscVal
C00343/10	0	LP_CanIn3:wIn2 DiscVal
C00343/11	0	LP_CanIn3:wIn3 DiscVal
C00343/12	0	LP_CanIn3:wIn4 DiscVal

Parameter Name: C00343 LP_CanIn decoupling value		Data type: UNSIGNED_16 Index: 24232 _d = 5EA8 _h
C00343/13	0	LP_CanIn4:wIn1 DiscVal • From version 16.00.00
C00343/14	0	LP_CanIn4:wIn2 DiscVal • From version 16.00.00
C00343/15	0	LP_CanIn4:wIn3 DiscVal • From version 16.00.00
C00343/16	0	LP_CanIn4:wIn4 DiscVal • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00344

Parameter Name: C00344 LP_CanOut decoupling value		Data type: UNSIGNED_16 Index: 24231 _d = 5EA7 _h
From version 02.00.00 Definition of the value the process data words are to have in the decoupled state. ▶ Configuring exception handling of the CAN PDOs		
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C00344/1	0	LP_CanOut1:wState DiscVal
C00344/2	0	LP_CanOut1:wOut2 DiscVal
C00344/3	0	LP_CanOut1:wOut3 DiscVal
C00344/4	0	LP_CanOut1:wOut4 DiscVal
C00344/5	0	LP_CanOut2:wOut1 DiscVal
C00344/6	0	LP_CanOut2:wOut2 DiscVal
C00344/7	0	LP_CanOut2:wOut3 DiscVal
C00344/8	0	LP_CanOut2:wOut4 DiscVal
C00344/9	0	LP_CanOut3:wOut1 DiscVal
C00344/10	0	LP_CanOut3:wOut2 DiscVal
C00344/11	0	LP_CanOut3:wOut3 DiscVal
C00344/12	0	LP_CanOut3:wOut4 DiscVal
C00344/13	0	LP_CanOut4:wOut1 DiscVal • From version 16.00.00
C00344/14	0	LP_CanOut4:wOut2 DiscVal • From version 16.00.00
C00344/15	0	LP_CanOut4:wOut3 DiscVal • From version 16.00.00
C00344/16	0	LP_CanOut4:wOut4 DiscVal • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00345

Parameter Name: C00345 CAN error status		Data type: UNSIGNED_8 Index: 24230 _d = 5EA6 _h
▶ CANopen Option/CAN on board		
Selection list (read only)		
0	No Error	
1	Warning ErrActive	
2	Warning ErrPassive	
3	Bus off	
4	Reserved	
5	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00347

Parameter Name: C00347 CAN status HeartBeat producer		Data type: UNSIGNED_8 Index: 24228 _d = 5EA4 _h
▶ Heartbeat protocol		
Selection list		
0	Boot-up	
4	Stopped	
5	Operational	
127	Pre-Operat.	
250	Failed	
255	NoResponse	
Subcodes		Info
C00347/1		CAN status HeartBeat Producer 1
C00347/...		...
C00347/15		CAN status HeartBeat Producer 15
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00349

Parameter Name: C00349 Setting - DIP switch SW1		Data type: UNSIGNED_16 Index: 24226 _d = 5EA2 _h
DIP switch setting during last mains power-on		
▶ CANopen Option/CAN on board		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00349 Setting - DIP switch SW1		Data type: UNSIGNED_16 Index: 24226 _d = 5EA2 _h
Value is bit-coded:		
Bit 0	Address 1	
Bit 1	Address 2	
Bit 2	Address 4	
Bit 3	Address 8	
Bit 4	Address 16	
Bit 5	Address 32	
Bit 6	Address 64	
Bit 7	CAN baud rate 1	
Bit 8	CAN baud rate 2	
Bit 9	CAN baud rate 4	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	CAN DIP switch at 24V-ON accepted	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00350

Parameter Name: C00350 CAN node address		Data type: UNSIGNED_8 Index: 24225 _d = 5EA1 _h
Setting of the node address via parameters <ul style="list-style-type: none"> • The node address can only be parameterised if the node address "0" is set via the DIP switches. • A change in the node address will not be effective until a CAN Reset Node is performed. <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Setting range (min. value unit max. value)		Lenze setting
1		127 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00351

Parameter Name: C00351 CAN baud rate		Data type: UNSIGNED_8 Index: 24224 _d = 5EA0 _h
Setting of the baud rate via parameters <ul style="list-style-type: none"> • The baud rate can only be parameterised if the baud rate "0" is set via the DIP switches. • A change in the baud rate will not be effective until a CAN Reset Node is performed. <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Selection list (Lenze setting printed in bold)		
0	500 kbps	
1	250 kbps	
2	125 kbps	
3	50 kbps	
4	1000 kbps	
5	20 kbps	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00352

Parameter Name: C00352 CAN slave/master		Data type: UNSIGNED_8 Index: 24223 _d = 5E9F _h
The drive starts as CAN master after mains switching if a value of "1" has been entered and saved here. ▶ CANopen Option/CAN on board		
Selection list (Lenze setting printed in bold)		
0	slave	
1	master	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00353

Parameter Name: C00353 CAN IN/OUT COBID source		Data type: UNSIGNED_8 Index: 24222 _d = 5E9E _h
Identifier assignment procedure for the CANx In/Out process data ▶ CANopen Option/CAN on board		
Selection list		Info
0	COBID = C0350 + LenzeBaseID	COBID = node address + LenzeBaseID
1	COBID = C0350 + CANBaseID	COBID = node address + CANBaseID (C00354/x)
2	COBID = C0354/x	COBID = direct setting from C00354/x
Subcodes	Lenze setting	Info
C00353/1	1: COBID = C0350 + CANBaseID	COBID source CAN1_IN/OUT
C00353/2	1: COBID = C0350 + CANBaseID	COBID source CAN2_IN/OUT
C00353/3	1: COBID = C0350 + CANBaseID	COBID source CAN3_IN/OUT
C00353/4	1: COBID = C0350 + CANBaseID	COBID source CAN4_IN/OUT • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00354

Parameter Name: C00354 COBID		Data type: UNSIGNED_32 Index: 24221 _d = 5E9D _h
Setting of the default COBID according to CANopen • A change in the COBID will not be effective until a CAN reset node is performed. ▶ CANopen Option/CAN on board		
Setting range (min. hex value max. hex value)		
0x00000000		0xFFFFFFFF
Value is bit-coded:		Info
Bit 0	COBID Bit0	<ul style="list-style-type: none"> • Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: PDO invalid (is not transmitted)
...	...	
Bit 31	PDO invalid	
Subcodes	Lenze setting	Info
C00354/1	0x00000201	COBID CAN1_IN
C00354/2	0x00000181	COBID CAN1_OUT
C00354/3	0x00000301	COBID CAN2_IN
C00354/4	0x00000281	COBID CAN2_OUT

Parameter Name: C00354 COBID		Data type: UNSIGNED_32 Index: 24221 _d = 5E9D _h
C00354/5	0x00000401	COBID CAN3_IN
C00354/6	0x00000381	COBID CAN3_OUT
C00354/7	0x00000501	COBID CAN4_IN • From version 16.00.00
C00354/8	0x00000481	COBID CAN4_OUT • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT		

C00355

Parameter Name: C00355 Active COBID		Data type: UNSIGNED_16 Index: 24220 _d = 5E9C _h
Display of the COBID of the PDOs that is active in the CAN stack		
▶ CANopen Option/CAN on board		
Display range (min. value unit max. value)		
0		2047
Subcodes	Info	
C00355/1	Active COBID CAN1_IN	
C00355/2	Active COBID CAN1_OUT	
C00355/3	Active COBID CAN2_IN	
C00355/4	Active COBID CAN2_OUT	
C00355/5	Active COBID CAN3_IN	
C00355/6	Active COBID CAN3_OUT	
C00355/7	Active COBID CAN4_IN • From version 16.00.00	
C00355/8	Active COBID CAN4_OUT • From version 16.00.00	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00356

Parameter Name: C00356 CAN time settings		Data type: UNSIGNED_16 Index: 24219 _d = 5E9B _h
Different time settings for the CAN interface		
▶ CANopen Option/CAN on board		
Setting range (min. value unit max. value)		
0	ms	65000
Subcodes	Lenze setting	Info
C00356/1	3000 ms	CAN delay boot-up - operat. • Delay time for NMT state change from "Boot-up" to "Operational".
C00356/2	0 ms	CAN2_OUT cycle time

Parameter Name: C00356 CAN time settings		Data type: UNSIGNED_16 Index: 24219 _d = 5E9B _h
C00356/3	0 ms	CAN3_OUT cycle time
C00356/4	0 ms	CANx_OUT operat. - 1.transmit • When the "Operational" NMT status is reached, the delay time set here is started. After the delay time has been elapsed, the PDOs CAN2_OUT and CAN3_OUT are sent for the first time.
C00356/5	0 ms	CAN1_OUT cycle time
C00356/6	0 ms	CAN4_OUT cycle time • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00357

Parameter Name: C00357 CAN monitoring times		Data type: UNSIGNED_16 Index: 24218 _d = 5E9A _h
Mapping of the RPDO event time (see DS301 V4.02) • If a value unequal to "0" is entered, the RPDO is not expected before the set time has expired. • If the RPDO is not received within the expected time, the response set in C00593/1...3 will be triggered. ▶ CANopen Option/CAN on board		
Setting range (min. value unit max. value)		
0	ms	65000
Subcodes	Lenze setting	Info
C00357/1	3000 ms	CAN1_IN monitoring time
C00357/2	3000 ms	CAN2_IN monitoring time
C00357/3	3000 ms	CAN3_IN monitoring time
C00357/4	3000 ms	CAN4_IN monitoring time • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00358

Parameter Name: C00358 CANx_OUT data length		Data type: UNSIGNED_8 Index: 24217 _d = 5E99 _h
Setting of the data length for TX PDOs ▶ CANopen Option/CAN on board		
Setting range (min. value unit max. value)		
1		8
Subcodes	Lenze setting	Info
C00358/1	8	CAN1_OUT data length
C00358/2	8	CAN2_OUT data length
C00358/3	8	CAN3_OUT data length
C00358/4	8	CAN4_OUT data length • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00359

Parameter Name: C00359 CAN status		Data type: UNSIGNED_8 Index: 24216 _d = 5E98 _h
▶ CANopen Option/CAN on board		
Selection list (read only)		
0	Operational	
1	Pre-Operat.	
2	Reserved	
3	Reserved	
4	BootUp	
5	Stopped	
6	Reserved	
7	Reset	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00360

Parameter Name: C00360 CAN telegram counter		Data type: UNSIGNED_16 Index: 24215 _d = 5E97 _h
▶ CANopen Option/CAN on board		
Display range (min. value unit max. value)		
0		65535
Subcodes	Info	
C00360/1	All PDO/SDO sent	
C00360/2	All PDO/SDO received	
C00360/3	Telegram counter CAN1_OUT	
C00360/4	Telegram counter CAN2_OUT	
C00360/5	Telegram counter CAN3_OUT	
C00360/6	Telegram counter SDO1_OUT	
C00360/7	Telegram counter SDO2_OUT	
C00360/8	Telegram counter CAN1_IN	
C00360/9	Telegram counter CAN2_IN	
C00360/10	Telegram counter CAN3_IN	
C00360/11	Telegram counter SDO1_IN	
C00360/12	Telegram counter SDO2_IN	
C00360/13	Telegram counter CAN4_OUT • From version 16.00.00	
C00360/14	Telegram counter CAN4_IN • From version 16.00.00	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00364

Parameter Name: C00364 CAN MessageError		Data type: UNSIGNED_8 Index: 24211 _d = 5E93 _h
▶ CANopen Option/CAN on board		
Selection list (read only)		
0	No Error	
1	StuffError	
2	FormError	
3	AckError	
4	Bit1Error	
5	Bit0Error	
6	CRCErrror	
7	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00366

Parameter Name: C00366 Number of CAN SDO channels		Data type: UNSIGNED_8 Index: 24209 _d = 5E91 _h
Selection of the number of active parameter data channels <ul style="list-style-type: none"> • In the Lenze setting, only the parameter data channel 1 is activated according to CANopen. • In order to activate both parameter data channels, set the selection "2 SDO Lenze". 		
▶ CANopen Option/CAN on board		
Selection list (Lenze setting printed in bold)		
0	1 SDO CANOpen	
1	2 SDO Lenze	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00367

Parameter Name: C00367 CAN SYNC Rx identifier		Data type: UNSIGNED_16 Index: 24208 _d = 5E90 _h
Identifier by means of which the sync slave is to receive sync telegrams. <ul style="list-style-type: none"> • Mapping of the CANopen object I-1005 (see DS301 V4.02). 		
▶ CANopen Option/CAN on board		
Setting range (min. hex value max. hex value)		Lenze setting
0x0000		0xFFFF 0x0080 (decimal: 128)

Parameter Name: C00367 CAN SYNC Rx identifier		Data type: UNSIGNED_16 Index: 24208 _d = 5E90 _h
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		
Bit 0 <input type="checkbox"/>	COBID Bit0	
Bit 1 <input type="checkbox"/>	COBID Bit1	
Bit 2 <input type="checkbox"/>	COBID Bit2	
Bit 3 <input type="checkbox"/>	COBID Bit3	
Bit 4 <input type="checkbox"/>	COBID Bit4	
Bit 5 <input type="checkbox"/>	COBID Bit5	
Bit 6 <input type="checkbox"/>	COBID Bit6	
Bit 7 <input checked="" type="checkbox"/>	COBID Bit7	
Bit 8 <input type="checkbox"/>	COBID Bit8	
Bit 9 <input type="checkbox"/>	COBID Bit9	
Bit 10 <input type="checkbox"/>	COBID Bit10	
Bit 11 <input type="checkbox"/>	Reserved	
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Reserved	
Bit 14 <input type="checkbox"/>	Reserved	
Bit 15 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT		

C00368

Parameter Name: C00368 CAN SYNC Tx identifier		Data type: UNSIGNED_16 Index: 24207 _d = 5E8F _h
Identifier by means of which the sync master is to transmit sync telegrams. <ul style="list-style-type: none"> • Mapping of the CANopen object I-1005 (see DS301 V4.02). <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Setting range (min. hex value max. hex value)		Lenze setting
0x0000	0xFFFF	0x0080 (decimal: 128)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		
Bit 0 <input type="checkbox"/>	COBID Bit0	
Bit 1 <input type="checkbox"/>	COBID Bit1	
Bit 2 <input type="checkbox"/>	COBID Bit2	
Bit 3 <input type="checkbox"/>	COBID Bit3	
Bit 4 <input type="checkbox"/>	COBID Bit4	
Bit 5 <input type="checkbox"/>	COBID Bit5	
Bit 6 <input type="checkbox"/>	COBID Bit6	
Bit 7 <input checked="" type="checkbox"/>	COBID Bit7	
Bit 8 <input type="checkbox"/>	COBID Bit8	
Bit 9 <input type="checkbox"/>	COBID Bit9	
Bit 10 <input type="checkbox"/>	COBID Bit10	
Bit 11 <input type="checkbox"/>	Reserved	
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Reserved	
Bit 14 <input type="checkbox"/>	Reserved	
Bit 15 <input type="checkbox"/>	Sync-transmit off	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT		

C00369

Parameter Name: C00369 CAN sync transmission cycle time		Data type: UNSIGNED_16 Index: 24206 _d = 5E8E _h
Cycle during which the sync master is to transmit sync telegrams. <ul style="list-style-type: none"> • If "0 ms" is set (Lenze setting), no sync telegrams are generated. • Mapping of the CANopen object I-1006 (see DS301 V4.02). <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Setting range (min. value unit max. value)		Lenze setting
0	ms	65000 0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00370

Parameter Name: C00370 SyncTxRxTimes		Data type: INTEGER_16 Index: 24205 _d = 5E8D _h
From version 02.00.00 <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Display range (min. value unit max. value)		
-1638	µs	1638
Subcodes		Info
C00370/1		CAN Sync instant of transmission
C00370/2		Sync instant of reception
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00371

Parameter Name: C00371 CAN ErrorCode		Data type: UNSIGNED_16 Index: 24204 _d = 5E8C _h
From version 16.00.00 <p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Display range (min. value unit max. value)		
0		65535
Subcodes		Info
C00371/1		CAN ErrorCode
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00372

Parameter Name: C00372 CAN_Tx_Rx_Error		Data type: UNSIGNED_8 Index: 24203 _d = 5E8B _h
<p style="text-align: right;">▶ CANopen Option/CAN on board</p>		
Display range (min. value unit max. value)		
0		255
Subcodes		Info
C00372/1		CAN Tx_Error
C00372/2		CAN Rx_Error
C00372/3		CAN Tx_Overflow
C00372/4		CAN Rx_Overflow
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00381

Parameter Name: C00381 CAN Heartbeat producer time		Data type: UNSIGNED_16 Index: 24194 _d = 5E82 _h
Time interval for the transmission of the heartbeat telegram to the consumer(s). <ul style="list-style-type: none"> The heartbeat telegram is sent automatically as soon as a time > 0 ms is set. Mapping of the CANopen object I-1017 (see DS301 V4.02). <p style="text-align: right;">▶ Heartbeat protocol</p>		
Setting range (min. value unit max. value)		Lenze setting
0	ms	65535 0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00385

Parameter Name: C00385 CAN node addr. HeartBeat producer		Data type: UNSIGNED_8 Index: 24190 _d = 5E7E _h
The subcodes represent the nodes to be monitored by heartbeat. <p style="text-align: right;">▶ Heartbeat protocol</p>		
Setting range (min. value unit max. value)		
0		127
Subcodes	Lenze setting	Info
C00385/1	0	CAN node addr. HeartBeat Producer 1
C00385/...		...
C00385/15		CAN node addr. HeartBeat Producer 15
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00386

Parameter Name: C00386 CAN HeartBeat ConsumerTime		Data type: UNSIGNED_16 Index: 24189 _d = 5E7D _h
The subcodes represent the nodes to be monitored by heartbeat. <p style="text-align: right;">▶ Heartbeat protocol</p>		
Setting range (min. value unit max. value)		
0	ms	60000
Subcodes	Lenze setting	Info
C00386/1	0 ms	ConsumerTime HeartBeat Producer 1
C00386/...		...
C00386/15		ConsumerTime HeartBeat Producer 15
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00387

Parameter Name: C00387 CAN-GatewayAddr		Data type: UNSIGNED_8 Index: 24188 _d = 5E7C _h
From version 12.00.00 <p style="text-align: right;">▶ CAN gateway</p>		
Setting range (min. value unit max. value)		
0		127
Subcodes	Lenze setting	Info
C00387/1	0	CAN_Gateway: Addr.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00400

Parameter Name: C00400 LS_PulseGenerator		Data type: UNSIGNED_16 Index: 24175 _d = 5E6F _h
Time setting of the pulse to be output by the SB LS_PulseGenerator		
Note: The real length of the low or high level at the <i>bSquareWave</i> output is always 1 ms higher than set here in subcode 1 or 2. If "0 ms" is set, a level with a length of 1 ms is created length, for instance, and if "1000 ms" is set, a level with a length of 1001 ms is created.		
Setting range (min. value unit max. value)		
0	ms	60000
Subcodes	Lenze setting	Info
C00400/1	1000 ms	Length of the low level (break) + 1 ms
C00400/2	1000 ms	Length of the high level + 1 ms
C00400/3	100 ms	From version 06.00.00 Delay time for status signal <i>bFirstCycleDone</i> • The <i>bFirstCycleDone</i> status signal is set to TRUE when the first task cycle is complete and the time set here has expired.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00401

Parameter Name: C00401 CANxInOut: Inversion		Data type: UNSIGNED_16 Index: 24174 _d = 5E6E _h
This parameter serves to invert the control/status bits of the CAN port blocks. ▶ CAN port block		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Active	Bit set = bit is inverted
...	...	
Bit 15	Active	
Subcodes	Lenze setting	Info
C00401/1	0x0000	Inversion of LP_CanIn1.bCtrl1_B0...15
C00401/2	0x0000	Inversion of LP_CanOut1.bState1_B0...15
C00401/3	0x0000	Inversion of LP_CanIn2.bIn1_B0...15
C00401/4	0x0000	Inversion of LP_CanOut2.bOut1_B0...15
C00401/5	0x0000	Inversion of LP_CanIn3.bIn1_B0...15
C00401/6	0x0000	Inversion of LP_CanOut3.bOut1_B0...15
C00401/7	0x0000	Inversion of LP_CanIn4.bIn1_B0...15 • From version 16.00.00
C00401/8	0x0000	Inversion of LP_CanOut4.bOut1_B0...15 • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00407

Parameter Name: C00407 LP_CanIn Mapping		Data type: UNSIGNED_32 Index: 24168 _d = 5E68 _h
From version 12.00.00 Mapping for port blocks LP_CanIn1...3 <ul style="list-style-type: none"> These settings are ORed with the mapping settings for the single words in C00409/x. <p style="text-align: right;">▶ CAN port block</p>		
Setting range (min. value unit max. value)		
0		4294967295
Subcodes	Lenze setting	Info
C00407/1	0	LP_CanIn1 :dwIn12 MapVal
C00407/2	0	LP_CanIn1 :dwIn34 MapVal
C00407/3	0	LP_CanIn2 :dwIn12 MapVal
C00407/4	0	LP_CanIn2 :dwIn34 MapVal
C00407/5	0	LP_CanIn3 :dwIn12 MapVal
C00407/6	0	LP_CanIn3 :dwIn34 MapVal
C00407/7	0	LP_CanIn4 :dwIn12 MapVal • From version 16.00.00
C00407/8	0	LP_CanIn4 :dwIn34 MapVal • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00408

Parameter Name: C00408 LP_CanIn mapping selection		Data type: UNSIGNED_8 Index: 24167 _d = 5E67 _h
Selection of the mapping source for port blocks LP_CanIn1...3 <p style="text-align: right;">▶ CAN port block</p>		
Selection list		Info
0	CanIn	CanIn
1	Par.C409 C407	Mapping configured in C00409
Subcodes	Lenze setting	Info
C00408/1	0: CanIn	Mapping selection LP_CanIn1
C00408/2	0: CanIn	Mapping selection LP_CanIn2
C00408/3	0: CanIn	Mapping selection LP_CanIn3
C00408/4	0: CanIn	Mapping selection LP_CanIn4 • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00409

Parameter Name: C00409 LP_CanIn Mapping		Data type: UNSIGNED_16 Index: 24166 _d = 5E66 _h
Mapping for port blocks LP_CanIn1...3 <p style="text-align: right;">▶ CAN port block</p>		
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C00409/1	0	LP_CanIn1 :wCtrl MapVal
C00409/2	0	LP_CanIn1 :wIn2 MapVal

Parameter Name: C00409 LP_CanIn Mapping		Data type: UNSIGNED_16 Index: 24166 _d = 5E66 _h
C00409/3	0	LP_CanIn1:wIn3 MapVal
C00409/4	0	LP_CanIn1:wIn4 MapVal
C00409/5	0	LP_CanIn2:wIn1 MapVal
C00409/6	0	LP_CanIn2:wIn2 MapVal
C00409/7	0	LP_CanIn2:wIn3 MapVal
C00409/8	0	LP_CanIn2:wIn4 MapVal
C00409/9	0	LP_CanIn3:wIn1 MapVal
C00409/10	0	LP_CanIn3:wIn2 MapVal
C00409/11	0	LP_CanIn3:wIn3 MapVal
C00409/12	0	LP_CanIn3:wIn4 MapVal
C00409/13	0	LP_CanIn4:wIn1 MapVal • From version 16.00.00
C00409/14	0	LP_CanIn4:wIn2 MapVal • From version 16.00.00
C00409/15	0	LP_CanIn4:wIn3 MapVal • From version 16.00.00
C00409/16	0	LP_CanIn4:wIn4 MapVal • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00410

Parameter Name: C00410 L_SignalMonitor_a: Signal sources		Data type: UNSIGNED_16 Index: 24165 _d = 5E65 _h
The L_SignalMonitor_a FB: Selection of the signal sources		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00410/1	0: Not connected	Signal source for output <i>nOut1_a</i>
C00410/2	0: Not connected	Signal source for output <i>nOut2_a</i>
C00410/3	0: Not connected	Signal source for output <i>nOut3_a</i>
C00410/4	0: Not connected	Signal source for output <i>nOut4_a</i>
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00411

Parameter Name: C00411 L_SignalMonitor_b: Signal sources		Data type: UNSIGNED_16 Index: 24164 _d = 5E64 _h
The L_SignalMonitor_b FB: Selection of the signal sources		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00411/1	0: Not connected	Signal source for output <i>bOut1</i>
C00411/2	0: Not connected	Signal source for output <i>bOut2</i>
C00411/3	0: Not connected	Signal source for output <i>bOut3</i>
C00411/4	0: Not connected	Signal source for output <i>bOut4</i>
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00412

Parameter Name: C00412 L_SignalMonitor_b: Inversion		Data type: UNSIGNED_8 Index: 24163 _d = 5E63 _h
The L_SignalMonitor_b FB: Inversion of the binary outputs		
Setting range (min. hex value max. hex value)		Lenze setting
0x00		0xFF 0x00 (decimal: 0)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input type="checkbox"/>	bOut1 inverted	Bit set = inversion active
Bit 1 <input type="checkbox"/>	bOut2 inverted	
Bit 2 <input type="checkbox"/>	bOut3 inverted	
Bit 3 <input type="checkbox"/>	bOut4 inverted	
Bit 4 <input type="checkbox"/>	Reserved	
Bit 5 <input type="checkbox"/>	Reserved	
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00413

Parameter Name: C00413 L_SignalMonitor_a: Offs./gain		Data type: INTEGER_16 Index: 24162 _d = 5E62 _h
The L_SignalMonitor_a FB: Gain and offset of the analog signals		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00413/1	0.00 %	Offset for output <i>nOut1_a</i>
C00413/2	100.00 %	Gain for output <i>nOut1_a</i>
C00413/3	0.00 %	Offset for output <i>nOut2_a</i>
C00413/4	100.00 %	Gain for output <i>nOut2_a</i>
C00413/5	0.00 %	Offset for output <i>nOut3_a</i>
C00413/6	100.00 %	Gain for output <i>nOut3_a</i>
C00413/7	0.00 %	Offset for output <i>nOut4_a</i>
C00413/8	100.00 %	Gain for output <i>nOut4_a</i>
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00420

Parameter Name: C00420 Number of encoder increments		Data type: UNSIGNED_16 Index: 24155 _d = 5E5B _h
Indication of the encoder constant		
Encoder/feedback system		
Setting range (min. value unit max. value)		
1	Incr./rev.	32767
Subcodes	Lenze setting	Info
C00420/1	128 incr./rev.	FreqIn12: Number of encoder increments
C00420/2	128 incr./rev.	FreqIn56: Number of encoder increments
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00422

Parameter Name: C00422 LS_MultiEncoder: Encoder type		Data type: UNSIGNED_8 Index: 24153 _d = 5E59 _h
From version 02.00.00		
		Encoder/feedback system Evaluation of external absolute value encoders
Selection list (Lenze setting printed in bold)		
0	Off	
3	Absolute value encoder (external)	
4	Absolute value encoder (SSI)	
7	Position encoder (external)	
8	Position encoder (SSI)	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00423

Parameter Name: C00423 DOx: Delay times		Data type: UNSIGNED_16 Index: 24152 _d = 5E58 _h
Delay times for the digital output terminals		
		Digital terminals
Setting range (min. value unit max. value)		
0.000	s	65.000
Subcodes	Lenze setting	Info
C00423/1	0.000 s	DO1 ON delay
C00423/2	0.000 s	DO1 OFF delay
C00423/3	0.000 s	DO2 ON delay
C00423/4	0.000 s	DO2 OFF delay
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00425

Parameter Name: C00425 Encoder scanning time		Data type: UNSIGNED_8 Index: 24150 _d = 5E56 _h
Encoder sample time for the digital input terminals when configured as frequency inputs		
		Using DI1(5) and DI2(6) as frequency inputs

Parameter Name: C00425 Encoder scanning time		Data type: UNSIGNED_8 Index: 24150 _d = 5E56 _h
Selection list		
0	1 ms	
1	2 ms	
2	5 ms	
3	10 ms	
4	20 ms	
5	50 ms	
6	100 ms	
7	200 ms	
8	500 ms	
9	1000 ms	
Subcodes	Lenze setting	Info
C00425/1	3: 10 ms	FreqIn12: Encoder scanning time
C00425/2	3: 10 ms	FreqIn56: Encoder scanning time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00426

Parameter Name: C00426 SSI encoder: Data bits		Data type: UNSIGNED_8 Index: 24149 _d = 5E55 _h
From version 02.00.00 Example: Setting for an SSI encode with the coding "8192x4096": <ul style="list-style-type: none"> • 8192 = 2¹³ = 13 bits Multiturn → C00426/4 = 13 • 4096 = 2¹² = 12 bits Singleturn → C00426/2 = 12 • This results in a data word length of 25 bits → C00426/1 = 25 • Start bit Singleturn = bit 0 → C00426/3 = 0 • Start bit Multiturn = bit 12 → C00426/5 = 12 <p style="text-align: right;">▶ Encoder/feedback system: SSI encoder</p>		
Setting range (min. value unit max. value)		
0		32
Subcodes	Lenze setting	Info
C00426/1	25	SSI encoder: Data word length
C00426/2	13	SSI encoder: Bits SingleTurn
C00426/3	0	SSI encoder: Start bit Singleturn
C00426/4	12	SSI encoder: Bits Multiturn
C00426/5	13	SSI encoder: Start bit Multiturn
C00426/6	0	SSI encoder: Status bit 1 • From version 12.00.00
C00426/7	6	SSI encoder: Shift of raw value • From version 12.00.00
C00426/8	0	In version 8.00.00 and from version 16.00.00 onwards
C00426/9	0	In version 8.00.00 and from version 16.00.00 onwards
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00427

Parameter Name: C00427 SSI encoder: Bit rate		Data type: UNSIGNED_8 Index: 24148 _d = 5E54 _h
From version 02.00.00		
▶ Encoder/feedback system: SSI encoder		
Selection list (Lenze setting printed in bold)		
1	100 kbps	
2	200 kbps	
3	300 kbps	
4	400 kbps	
5	500 kbps	
6	750 kbps	
7	1000 kbps	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00428

Parameter Name: C00428 SSI encoder: Coding		Data type: UNSIGNED_8 Index: 24147 _d = 5E53 _h
From version 02.00.00		
▶ Encoder/feedback system: SSI encoder		
Selection list (Lenze setting printed in bold)		
0	Binary code	
1	Gray code	
2	Position Gray	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00429

Parameter Name: C00429 Advanced settings		Data type: UNSIGNED_16 Index: 24146 _d = 5E52 _h
▶ SSI encoder evaluation		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info

Parameter Name: C00429 Advanced settings		Data type: UNSIGNED_16 Index: 24146 _d = 5E52 _h
Bit 0	Output raw data correctly	Bit 0: Output raw data correctly In order to receive a standard data format (LSB at the lowest position), the raw data can be offset by the value set in C00426/7 if this setting is activated. If this setting is deactivated, the raw data are output without being offset.
Bit 1	Reserved	
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00429/1	0x0000	SSI encoder: Advanced settings In version 8.00.00 and from version 16.00.00 onwards
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C00431

Parameter Name: C00431 LS_MultiEncoder: bFail selection		Data type: UNSIGNED_16 Index: 24144 _d = 5E50 _h
In version 8.00.00 and from version 16.00.00 onwards Bit coded setting which events cause the <i>bFail</i> output to be set.		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	
Bit 1	Reserved	
Bit 2	Position beyond C1112/2..3	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Linear data overflow SSI	
Bit 7	Max. encoder speed	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	

Parameter Name: C00431 LS_MultiEncoder: bFail selection		Data type: UNSIGNED_16 Index: 24144 _d = 5E50 _h
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00431/1	0x001D	LS_MultiEncoder: bFail selection
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C00440

Parameter Name: C00440 LS_AnalogIn1: PT1 time constant		Data type: UNSIGNED_16 Index: 24135 _d = 5E47 _h
PT1 time constant (S-ramp time) for the analog inputs		
▶ Analog terminals		
Setting range (min. value unit max. value)		
0	ms	1000
Subcodes	Lenze setting	Info
C00440/1	10 ms	PT1 rounding AnalogIn1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00443

Parameter Name: C00443 DIx: Level		Data type: UNSIGNED_16 Index: 24132 _d = 5E44 _h
Bit coded display of the level of the digital inputs		
▶ Digital terminals		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	DI1	Bit set = HIGH level
Bit 1	DI2	
Bit 2	DI3	
Bit 3	DI4	
Bit 4	DI5	
Bit 5	DI6	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Manually	
Bit 12	Right	
Bit 13	Left	
Bit 14	Mains	
Bit 15	CINH	
Subcodes		Info
C00443/1		DIx: Terminal level
C00443/2		DIx: Output level
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00444

Parameter Name: C00444 DOx: Level		Data type: UNSIGNED_16 Index: 24131 _d = 5E43 _h
Bit coded display of the level of the digital outputs		
▶ Digital terminals		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	Bit set = HIGH level
Bit 1	DO1	
Bit 2	DO2	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes		Info
C00444/1		DOx: Input level
C00444/2		DOx: Terminal level
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00445

Parameter Name: C00445 FreqInxx_nOut_v		Data type: INTEGER_16 Index: 24130 _d = 5E42 _h
Display of the frequency input signals which are fed into the application.		
▶ Using DI1(5) and DI2(6) as frequency inputs		
Display range (min. value unit max. value)		
-32767	Incr/ms	32767
Subcodes		Info
C00445/1		FreqIn12_nOut_v
C00445/2		FreqIn56_nOut_v
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00446

Parameter Name: C00446 FreqInxx_nOut_a		Data type: INTEGER_16 Index: 24129 _d = 5E41 _h
Display of the frequency input signals which are fed into the application. <div style="text-align: right;">▶ Using DI1(5) and DI2(6) as frequency inputs</div>		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00446/1		FreqIn12_nOut_a
C00446/2		FreqIn56_nOut_a
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00447

Parameter Name: C00447 DigOut decoupling		Data type: UNSIGNED_16 Index: 24128 _d = 5E40 _h
From version 02.00.00 Configuration defining the events that lead to a decoupling of the digital output terminals. <div style="text-align: right;">▶ Configuring exception handling of the output terminals</div>		
Setting range (min. hex value max. hex value)		Lenze setting
0x0000		0xFFFF 0x0000 (decimal: 0)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		
Bit 0 <input type="checkbox"/>	SafeTorqueOff	
Bit 1 <input type="checkbox"/>	ReadyToSwitchOn	
Bit 2 <input type="checkbox"/>	SwitchedOn	
Bit 3 <input type="checkbox"/>	Reserved	
Bit 4 <input type="checkbox"/>	Trouble	
Bit 5 <input type="checkbox"/>	Fault	
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Reserved	
Bit 8 <input type="checkbox"/>	Reserved	
Bit 9 <input type="checkbox"/>	Fail CAN_Management	
Bit 10 <input type="checkbox"/>	Reserved	
Bit 11 <input type="checkbox"/>	Energy saving mode	
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Reserved	
Bit 14 <input type="checkbox"/>	Reserved	
Bit 15 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00448

Parameter Name: C00448 DigOut decoupling value		Data type: UNSIGNED_16 Index: 24127 _d = 5E3F _h
From version 02.00.00 Definition of the value the digital output terminals are to have in the decoupled state. • Bit set = HIGH level ▶ Configuring exception handling of the output terminals		
Setting range (min. hex value max. hex value)		Lenze setting
0x0000		0xFFFF 0x0000 (decimal: 0)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		
Bit 0 <input type="checkbox"/>	Reserved	
Bit 1 <input type="checkbox"/>	DigOut1_ON	
Bit 2 <input type="checkbox"/>	DigOut2_ON	
Bit 3 <input type="checkbox"/>	Reserved	
Bit 4 <input type="checkbox"/>	Reserved	
Bit 5 <input type="checkbox"/>	BrakeRelease_ON	
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Reserved	
Bit 8 <input type="checkbox"/>	Reserved	
Bit 9 <input type="checkbox"/>	Reserved	
Bit 10 <input type="checkbox"/>	Reserved	
Bit 11 <input type="checkbox"/>	Reserved	
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Reserved	
Bit 14 <input type="checkbox"/>	Reserved	
Bit 15 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00449

Parameter Name: C00449 FreqInxx_dnOut_p		Data type: INTEGER_32 Index: 24126 _d = 5E3E _h
From version 06.00.00 ▶ Output of the encoder position of the DI1/DI2 frequency input		
Display range (min. value unit max. value)		
-2147483647	Incr.	2147483647
Subcodes		Info
C00449/1		FreqIn12_dnOut_p
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00451

Parameter Name: C00451 LS_MultiEncoder: bFail information		Data type: UNSIGNED_16 Index: 24124 _d = 5E3C _h
In version 8.00.00 and from version 16.00.00 onwards		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00451 LS_MultiEncoder: bFail information		Data type: UNSIGNED_16 Index: 24124 _d = 5E3C _h
Value is bit-coded:		
Bit 0	Reserved	
Bit 1	Reserved	
Bit 2	Position beyond C1112/2..3	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Linear data overflow SSI	
Bit 7	Max. encoder speed	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes		Info
C00451/1		LS_MultiEncoder: Information bFail
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C00453

Parameter Name: C00453 Keypad: Default manual jog		Data type: UNSIGNED_32 Index: 24122 _d = 5E3A _h
From version 16.00.00		
Setting range (min. value unit max. value)		
0.000		16000.000
Subcodes	Lenze setting	Info
C00453/1	729.001	Keypad: Speed setpoint
C00453/2	56.002	Keypad: Display bar
C00453/3	51.000	Keypad: Def. parameter From version 18.00.00 onwards Setting of the default parameter for the keypad including the subcode. <ul style="list-style-type: none"> • Example: the value "56.002" defines the C00056/2 as default parameter. • In C00453/3 and C00466, the same code must be set. • The function is supported from keypad software V05.02 onwards.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00455

Parameter Name: C00455 FB_call table		Data type: UNSIGNED_16 Index: 24120 _d = 5E38 _h
This code is for device-internal use only and must not be written to by the user!		

C00456

Parameter Name: C00456 Editor level	Data type: UNSIGNED_8 Index: 24119 _d = 5E37 _h
This code is for device-internal use only and must not be written to by the user!	

C00458

Parameter Name: C00458 SYS_call table	Data type: UNSIGNED_16 Index: 24117 _d = 5E35 _h
This code is for device-internal use only and must not be written to by the user!	

C00459

Parameter Name: C00459 SYS_Output table	Data type: UNSIGNED_16 Index: 24116 _d = 5E34 _h
This code is for device-internal use only and must not be written to by the user!	

C00461

Parameter Name: C00461 Remote: Acceleration/deceleration time	Data type: UNSIGNED_32 Index: 24114 _d = 5E32 _h
From version 06.00.00	
▶ PC manual control	
Setting range (min. value unit max. value)	
0.000	s 999.999
Subcodes	Lenze setting Info
C00461/1	2.000 s Remote: Acceleration/deceleration time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000	

C00462

Parameter Name: C00462 Remote: Control	Data type: UNSIGNED_16 Index: 24113 _d = 5E31 _h
From version 06.00.00	
▶ PC manual control	
Setting range (min. value unit max. value)	
0	65535
Subcodes	Lenze setting Info
C00462/1	0 Remote: Control mode
C00462/2	0 Remote: Monitoring counter
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1	

C00463

Parameter Name: C00463 Remote: MCK control		Data type: UNSIGNED_32 Index: 24112 _d = 5E30 _h
From version 06.00.00		
This parameter serves to control the functions of the Motion Control Kernel for PC manual control .		
Setting range (min. hex value max. hex value)		
0x00000000		0xFFFFFFFF
Value is bit-coded:		
Bit 0	OpMode_Bit0	
Bit 1	OpMode_Bit1	
Bit 2	OpMode_Bit2	
Bit 3	OpMode_Bit3	
Bit 4	ManJogPos	
Bit 5	ManJogNeg	
Bit 6	ManExecute2ndSpeed	
Bit 7	ReleaseLimitSwitch	
Bit 8	HomStartStop	
Bit 9	HomSetPos	
Bit 10	HomResetPos	
Bit 11	EnableSpeedOverride	
Bit 12	EnableAccOverride	
Bit 13	EnableSRampOverride	
Bit 14	PosTeachSetPos	
Bit 15	PosTeachActPos	
Bit 16	PosExecute	
Bit 17	PosFinishTarget	
Bit 18	PosDisableFollowProfile	
Bit 19	PosStop	
Bit 20	PosModeBit0	
Bit 21	PosModeBit1	
Bit 22	PosModeBit2	
Bit 23	PosModeBit3	
Bit 24	ProfileNo_Bit0	
Bit 25	ProfileNo_Bit1	
Bit 26	ProfileNo_Bit2	
Bit 27	ProfileNo_Bit3	
Bit 28	ProfileNo_Bit4	
Bit 29	ProfileNo_Bit5	
Bit 30	ProfileNo_Bit6	
Bit 31	ProfileNo_Bit7	
Subcodes	Lenze setting	Info
C00463/1	0x00000000	Remote: MCK control
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00464

Parameter Name: C00464 Remote: Monitoring timeout		Data type: UNSIGNED_16 Index: 24111 _d = 5E2F _h
From version 06.00.00		
▶ PC manual control		
Setting range (min. value unit max. value)		
200	ms	5000
Subcodes	Lenze setting	Info
C00464/1	2000 ms	Remote: Monitoring timeout
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00465

Parameter Name: C00465 Keypad: Timeout welcome screen		Data type: INTEGER_32 Index: 24110 _d = 5E2E _h
Time setting for the automatic change of the keypad display to the welcome screen		
Selection list (Lenze setting printed in bold)		
0	Never show welcome screen	
5	5 min	
15	15 min	
30	30 min	
60	60 min	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00466

Parameter Name: C00466 Keypad: Default parameter		Data type: INTEGER_32 Index: 24109 _d = 5E2D _h
Setting of the default parameter for the keypad		
From version V18.00.00 onwards:		
<ul style="list-style-type: none"> In C00453/3, you can set the subcode of a code as default parameter. In C00466 and C00453/3, the same code must be set. 		
Setting range (min. value unit max. value)		Lenze setting
0		65535 51
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00467

Parameter Name: C00467 Keypad: Default welcome screen		Data type: INTEGER_32 Index: 24108 _d = 5E2C _h
Selection of the welcome screen for the keypad		
Selection list (Lenze setting printed in bold)		
0	Main menu	
1	Parameter list	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00468

Parameter Name: C00468 Service code		Data type: INTEGER_32 Index: 24107 _d = 5E2B _h
This code is for device-internal use only and must not be written to by the user!		

C00469

Parameter Name: C00469 Keypad: Fct. STOP key		Data type: INTEGER_32 Index: 24106 _d = 5E2A _h
Selection of the function for the STOP key on the keypad		
Selection list (Lenze setting printed in bold)		Info
0	No function	STOP key does not have any function
1	Inhibit inverter	STOP key sets controller inhibit in the drive
2	Activate quick stop	STOP key sets quick stop in the drive
4	Inhibit inverter and reset error	
5	Activate quick stop and reset error	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00470

Parameter Name: C00470 LS_ParFree_b		Data type: UNSIGNED_8 Index: 24105 _d = 5E29 _h
The LS_ParFree_b SB: Setting of the signal level to be output		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info
C00470/1	0: FALSE	Signal level for output <i>bPar1</i> ... <i>bPar32</i>
C00470/...		
C00470/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00471

Parameter Name: C00471 LS_ParFree		Data type: UNSIGNED_16 Index: 24104 _d = 5E28 _h
The LS_ParFree SB: Setting of the words to be output		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Bit0	
...	...	
Bit 15	Bit15	
Subcodes	Lenze setting	Info
C00471/1	0x0000	Value for output <i>wPar1</i> ... <i>wPar32</i>
C00471/...		
C00471/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00472

Parameter Name: C00472 LS_ParFree_a		Data type: INTEGER_16 Index: 24103 _d = 5E27 _h
The LS_ParFree_a SB: Setting of the analog signals to be output		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00472/1	0.00 %	Value for output <i>nPar1_a</i>
C00472/2	0.00 %	Value for output <i>nPar2_a</i>
C00472/3	100.00 %	Value for output <i>nPar3_a</i>
C00472/4	100.00 %	Value for output <i>nPar4_a</i>
C00472/5	0.00 %	Value for output <i>nPar5_a</i>
C00472/6	0.00 %	Value for output <i>nPar6_a</i>
C00472/7	0.00 %	Value for output <i>nPar7_a</i>
C00472/8	0.00 %	Value for output <i>nPar8_a</i>
C00472/9	0.00 %	Value for output <i>nPar9_a</i>
C00472/10	0.00 %	Value for output <i>nPar10_a</i>
C00472/11	0.00 %	Value for output <i>nPar11_a</i>
C00472/12	0.00 %	Value for output <i>nPar12_a</i>
C00472/13	0.00 %	Value for output <i>nPar13_a</i>
C00472/14	0.00 %	Value for output <i>nPar14_a</i>
C00472/15	0.00 %	Value for output <i>nPar15_a</i>
C00472/16	0.00 %	Value for output <i>nPar16_a</i>
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00473

Parameter Name: C00473 LS_ParFree_v		Data type: INTEGER_16 Index: 24102 _d = 5E26 _h
The LS_ParFree_v SB: Setting of the speed signals to be output		
Setting range (min. value unit max. value)		
-32767	Incr./ms	32767
Subcodes	Lenze setting	Info
C00473/1	0 incr./ms	Values for output <i>nPar1_v</i> ... <i>nPar8_v</i>
C00473/...		
C00473/8		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00474

Parameter Name: C00474 LS_ParFree_p		Data type: INTEGER_32 Index: 24101 _d = 5E25 _h
SB LS_ParFree_p : Setting of the position signals to be output		
Setting range (min. value unit max. value)		
-2147483647	Incr.	2147483647

Parameter Name: C00474 LS_ParFree_p		Data type: INTEGER_32 Index: 24101 _d = 5E25 _h
Subcodes	Lenze setting	Info
C00474/1	0 incr.	Values for output <i>dnPar1_p ... dnPar8_p</i>
C00474/...		
C00474/8		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00475

Parameter Name: C00475 LS_ParFreeUnit_1_2		Data type: INTEGER_32 Index: 24100 _d = 5E24 _h
From version 12.00.00 SB LS_ParFreeUnit / LS_ParFreeUnit 2 : Setting of the position signals to be output		
Setting range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes	Lenze setting	Info
C00475/1	0.0000 units	Values for output <i>dnC475_1 ... dnC475_32</i>
C00475/...		
C00475/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C00476

Parameter Name: C00476 LS_ParFree_a_2		Data type: INTEGER_16 Index: 24099 _d = 5E23 _h
From version 12.00.00 SB LS_ParFree_a_2 : Setting of the analog signals to be output		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00476/1	0.00 %	Value for output <i>nC476_1_a</i>
C00476/2	0.00 %	Value for output <i>nC476_2_a</i>
C00476/3	0.00 %	Value for output <i>nC476_3_a</i>
C00476/4	0.00 %	Value for output <i>nC476_4_a</i>
C00476/5	0.00 %	Value for output <i>nC476_5_a</i>
C00476/6	0.00 %	Value for output <i>nC476_6_a</i>
C00476/7	0.00 %	Value for output <i>nC476_7_a</i>
C00476/8	0.00 %	Value for output <i>nC476_8_a</i>
C00476/9	0.00 %	Value for output <i>nC476_9_a</i>
C00476/10	0.00 %	Value for output <i>nC476_10_a</i>
C00476/11	0.00 %	Value for output <i>nC476_11_a</i>
C00476/12	0.00 %	Value for output <i>nC476_12_a</i>
C00476/13	0.00 %	Value for output <i>nC476_13_a</i>
C00476/14	0.00 %	Value for output <i>nC476_14_a</i>
C00476/15	0.00 %	Value for output <i>nC476_15_a</i>
C00476/16	0.00 %	Value for output <i>nC476_16_a</i>
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00477

Parameter Name: C00477 LS_ParFree_2		Data type: UNSIGNED_16 Index: 24098 _d = 5E22 _h
From version 12.00.00 SB LS_ParFree_2 : Setting of the words to be output		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Bit0	
...	...	
Bit 15	Bit15	
Subcodes	Lenze setting	Info
C00477/1	0x0000	Value for output wC477_1 ... wC477_32
C00477/...		
C00477/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00478

Parameter Name: C00478 LS_ParFree_v_2		Data type: INTEGER_16 Index: 24097 _d = 5E21 _h
From version 12.00.00 SB LS_ParFree_v_2 : Setting of the speed signals to be output		
Setting range (min. value unit max. value)		
-32767	Incr./ms	32767
Subcodes	Lenze setting	Info
C00478/1	0 incr./ms	Values for output nC478_1_v ... nC478_8_v
C00478/...		
C00478/8		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00479

Parameter Name: C00479 LS_ParFree32		Data type: INTEGER_32 Index: 24096 _d = 5E20 _h
From version 12.00.00 SB LS_ParFree32 : Setting of the 32-bit values to be output		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C00479/1	0	Values for output dnC479_1 ... dnC479_8
C00479/...		
C00479/8		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00480

Parameter Name: C00480 LS_DisFree_b		Data type: UNSIGNED_16 Index: 24095 _d = 5E1F _h
The LS_DisFree_b SB: Display of the input values		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	bDis1	Signal level input <i>bDis1 ... bDis16</i>
...	...	
Bit 15	bDis16	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00481

Parameter Name: C00481 LS_DisFree		Data type: UNSIGNED_16 Index: 24094 _d = 5E1E _h
The LS_DisFree SB: Display of the input values		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes		Info
C00481/1		Input values <i>wDis1 ... wDis8</i>
C00481/...		
C00481/8		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00482

Parameter Name: C00482 LS_DisFree_a		Data type: INTEGER_16 Index: 24093 _d = 5E1D _h
The LS_DisFree_a SB: Display of the input values		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00482/1		Input values <i>nDis1_a ... nDis8_a</i>
C00482/...		
C00482/8		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00483

Parameter Name: C00483 LS_DisFree_p			Data type: INTEGER_32 Index: 24092 _d = 5E1C _h
SB LS_DisFree_p : Display of the input values			
Display range (min. value unit max. value)			
-2147483647	Incr.	2147483647	
Subcodes		Info	
C00483/1	Input values <i>dnDis1_p ... dnDis8_p</i>		
C00483/...			
C00483/8			
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00484

Parameter Name: C00484 Application units: Offset			Data type: INTEGER_16 Index: 24091 _d = 5E1B _h
From version 06.00.00 The LS_DisFree_a SB: Offset for display of the input variables in application unit ▶ Display of internal process factors in application units			
Setting range (min. value unit max. value)			
-199.99	%	199.99	
Subcodes	Lenze setting	Info	
C00484/1	0.00 %	Application unit 1: Offset	
C00484/2	0.00 %	Application unit 2: Offset	
C00484/3	0.00 %	Application unit 3: Offset	
C00484/4	0.00 %	Application unit 4: Offset	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00485

Parameter Name: C00485 Application units: Display factor			Data type: INTEGER_32 Index: 24090 _d = 5E1A _h
From version 06.00.00 The LS_DisFree_a SB: Display factor for display of the input variables in application unit ▶ Display of internal process factors in application units			
Setting range (min. value unit max. value)			
-65536.0000		65536.0000	
Subcodes	Lenze setting	Info	
C00485/1	1.0000	Application unit 1: Display factor	
C00485/2	1.0000	Application unit 2: Display factor	
C00485/3	1.0000	Application unit 3: Display factor	
C00485/4	1.0000	Application unit 4: Display factor	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000			

C00486

Parameter Name: C00486 Application units: Text		Data type: VISIBLE_STRING Index: 24089 _d = 5E19 _h
From version 06.00.00 The LS_DisFree_a SB: Text for the display of the input variables in application unit ▶ Display of internal process factors in application units		
Subcodes	Lenze setting	Info
C00486/1		Application unit 1: Text
C00486/2		Application unit 2: Text
C00486/3		Application unit 3: Text
C00486/4		Application unit 4: Text
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 7		

C00487

Parameter Name: C00487 - Application units		Data type: INTEGER_32 Index: 24088 _d = 5E18 _h
From version 06.00.00 SB LS_DisFree_a : Display of the input values in a configurable application unit ▶ Display of internal process factors in application units		
Display range (min. value unit max. value)		
-21474836.47	units	21474836.47
Subcodes	Info	
C00487/1	Application units 1	
C00487/2	Application units 2	
C00487/3	Application units 3	
C00487/4	Application units 4	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00488

Parameter Name: C00488 L_JogCtrlEdgeDetect		Data type: UNSIGNED_8 Index: 24087 _d = 5E17 _h
The L_JogCtrlExtension_1 FB: Signal methodology • Selection whether the corresponding function is to be activated by edge or level.		
Selection list		
0	Level	
1	Edge	
Subcodes	Lenze setting	Info
C00488/1	0: Level	InputSens.SlowDown1 • Selection of edge or level for starting slow-down function 1
C00488/2	0: Level	InputSens.Stop1 • Selection of edge or level for stop function 1

Parameter Name: C00488 L_JogCtrlEdgeDetect		Data type: UNSIGNED_8 Index: 24087 _d = 5E17 _h
C00488/3	0: Level	InputSens.SlowDown2 • Selection of edge or level for starting slow-down function 2
C00488/4	0: Level	InputSens.Stop2 • Selection of edge or level for stop function 2
C00488/5	0: Level	InputSens.SlowDown3 • Selection of edge or level for starting slow-down function 3
C00488/6	0: Level	InputSens.Stop3 • Selection of edge or level for stop function 3
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00490

Parameter Name: C00490 Position encoder selection		Data type: UNSIGNED_8 Index: 24085 _d = 5E15 _h
In version 8.00.00 and from version 16.00.00 onwards Selection of the feedback system for the generation of the actual position on the load ▶ Encoder/feedback system		
Selection list (Lenze setting printed in bold)		Info
0	No sensor: nSpeedSetValue_a	No encoder available on the load. The position signal <i>dnMotorPosAct_p</i> is derived from the speed setpoint <i>nSpeedSetValue_a</i> .
1	Sensor signal FreqIn12	Position encoder signal is fed via digital inputs DI1 and DI2
2	Encoder signal FreqIn56	Position encoder signal is fed via digital inputs DI5 and DI6
3	Multi encoder	
5	Encoder signal FreqIn1256	
10	Encoder selection C495 or nVoltageAngleAct_a	From version 12.00.00 The position signal <i>dnMotorPosAct_p</i> is either calculated from the set speed feedback (for C00495 > 0) or from the speed signal <i>nMotorSpeedAct_v</i> (for C00495 = 0).
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00495

Parameter Name: C00495 Speed sensor selection		Data type: UNSIGNED_8 Index: 24080 _d = 5E10 _h
Selection of the feedback system for the actual speed for motor control and display ▶ Encoder/feedback system		
Selection list (Lenze setting printed in bold)		Info
0	No sensor	No sensor available for the actual speed detection
1	Sensor signal FreqIn12	Speed sensor signal is fed via the digital DI1 and DI2 inputs
2	Encoder signal FreqIn56	Speed sensor signal is fed via the digital DI5 and DI6 inputs
3	Multi encoder	In version 8.00.00 and from version 16.00.00 onwards Speed encoder signal is supplied via multi-encoder interface
5	Encoder signal FreqIn1256	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00496

Parameter Name: C00496 Encoder evaluation method Dign12		Data type: UNSIGNED_8 Index: 24079 _d = 5E0F _h
▶ Encoder/feedback system		
Selection list (Lenze setting printed in bold)		Info
0	High-resolution encoders	High-precision procedure for high-resolution encoders (>=512 increments)
1	Low-resolution encoder (StateLine)	High-precision procedure for low-resolution encoders (<=128 increments)
2	Comb. encoder procedure	Combination of the first two procedures as a function of the speed (recommended procedure)
3	Edge-counting procedure	Simple edge counting procedure with adjustable scanning time (C00425)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00497

Parameter Name: C00497 Filter time constant		Data type: UNSIGNED_16 Index: 24078 _d = 5E0E _h
▶ Encoder/feedback system		
Setting range (min. value unit max. value)		
0.0	ms	500.0
Subcodes	Lenze setting	Info
C00497/1	1.0 ms	FreqIn12: Encoder filter time
C00497/2	1.0 ms	FreqIn56: Encoder filter time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00505

Parameter Name: C00505 Password data		Data type: VISIBLE_STRING Index: 24070 _d = 5E06 _h
From version 06.00.00		
▶ Device access protection		
Subcodes	Lenze setting	Info
C00505/1		MasterPin
C00505/2		Binding ID
C00505/3		Password
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Character length: 16		

C00506

Parameter Name: C00506 PW protection internal config		Data type: UNSIGNED_16 Index: 24069 _d = 5E05 _h
• From version 16.00.00 Configuration of the password protection for device-internal parameter access ▶ Individual password protection for single communication channels		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Only access to user menu	The menus in the keypad are reduced. Only the user menu can be used to change parameters.

Parameter Name: C00506 PW protection internal config		Data type: UNSIGNED_16 Index: 24069 _d = 5E05 _h
Bit 1	Parameter write protection	Via system blocks (LS_ParReadWrite1-6 and LS_WriteParamList), write/read parameters cannot be written.
Bit 2	Parameter read protection	Via system blocks (LS_ParReadWrite1-6 and LS_WriteParamList), write/read parameters cannot be read.
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00506/1	0x0007	PW protection internal config
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00507

Parameter Name: C00507 Current password protection		Data type: UNSIGNED_16 Index: 24068 _d = 5E04 _h
<p>From version 06.00.00 Display of the currently active device access protection (password protection and device personalisation) Note: As the password protection can be configured individually for each single communication channel from version 16.00.00 bit 1 and bit 2 indicate the active protection always with regard to the communication channel used. ▶ Device access protection</p>		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00507 Current password protection		Data type: UNSIGNED_16 Index: 24068 _d = 5E04 _h
Value is bit-coded:		
Bit 0	Only access to user menu	
Bit 1	Parameter write protection	
Bit 2	Parameter read protection	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Memory module binding on	
Subcodes		Info
C00507/1		Password protection - all communication channels
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00508

Parameter Name: C00508 PW protection config X6(DIAG)		Data type: UNSIGNED_16 Index: 24067 _d = 5E03 _h
From version 16.00.00 Configuration of the password protection for parameter access via diagnostic interface X6 ("DIAG") ▶ Individual password protection for single communication channels		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	
Bit 1	Parameter write protection	The diagnostics interface X6 cannot be used to write into write/read parameters.
Bit 2	Parameter read protection	The diagnostics interface X6 cannot be used to read write/read parameters.
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	

Parameter Name: C00508 PW protection config X6(DIAG)		Data type: UNSIGNED_16 Index: 24067 _d = 5E03 _h
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00508/1	0x0006	PW protection config X6(DIAG)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00509

Parameter Name: C00509 PW protection config X1(CAN)		Data type: UNSIGNED_16 Index: 24066 _d = 5E02 _h
<p>From version 16.00.00</p> <p>Configuration of the password protection for parameter access via CANopen interface X1 ("CAN on board")</p> <p style="text-align: right;">▶ Individual password protection for single communication channels</p>		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	
Bit 1	Parameter write protection	The CANopen interface X1 cannot be used to write into write/read parameters.
Bit 2	Parameter read protection	The CANopen interface X1 cannot be used to read write/read parameters.
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00509/1	0x0006	PW protection config X1 (CAN)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00510

Parameter Name: C00510 PW protection config MCI		Data type: UNSIGNED_16 Index: 24065 _d = 5E01 _h
From version 16.00.00 Configuration of the password protection for parameter access via fieldbus interface ("MCI") ▶ Individual password protection for single communication channels		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	
Bit 1	Parameter write protection	The fieldbus interface (MCI) cannot be used to write into write/read parameters.
Bit 2	Parameter read protection	The fieldbus interface (MCI) cannot be used to read write/read parameters.
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00510/1	0x0006	PW protection config. MCI
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00516

Parameter Name: C00516 Checksums		Data type: UNSIGNED_32 Index: 24059 _d = 5DFA _h
This code is for device-internal use only and must not be written to by the user!		

C00517

Parameter Name: C00517 User menu		Data type: INTEGER_32 Index: 24058 _d = 5DFA _h
When a system is installed, parameters must be changed time and again until the system runs satisfactorily. The user menu of a device serves to create a selection of frequently used parameters to be able to access and change these parameters quickly. <ul style="list-style-type: none"> • Format: <code number>,<subcode number> • If "0.000" is set, no entry will be displayed in the user menu. 		
Setting range (min. value unit max. value)		
0.000		16000.000
Subcodes	Lenze setting	Info
C00517/1	51.000	C00051 : Display of actual speed value

Parameter Name: C00517 User menu		Data type: INTEGER_32 Index: 24058 _d = 5DFA _h
C00517/2	53.000	C00053 : Display of DC-bus voltage
C00517/3	54.000	C00054 : Display of motor current
C00517/4	61.000	C00061 : Display of heatsink temperature
C00517/5	137.000	C00137 : Display of device status
C00517/6	166.003	C00166/3 : Display of current error message
C00517/7	0.000	User menu: Entry 7
C00517/8	11.000	C00011 : Reference speed
C00517/9	39.001	C00039/1 : Fixed setpoint 1
C00517/10	39.002	C00039/2 : Fixed setpoint 2
C00517/11	12.000	C00012 : Accel. time - main setpoint
C00517/12	13.000	C00013 : Decel. time - main setpoint
C00517/13	15.000	C00015 : V/f base frequency
C00517/14	16.000	C00016 : Vmin boost
C00517/15	22.000	C00022 : I _{max} in motor mode
C00517/16	120.000	C00120 : Setting of motor overload (I ² xt)
C00517/17	87.000	C00087 : Rated motor speed
C00517/18	99.000	C00099 : Display of firmware version
C00517/19	200.000	C00200 : Display of firmware product type
C00517/20	0.000	User menu: Entry 20
C00517/21	0.000	User menu: Entry 21
C00517/22	0.000	User menu: Entry 22
C00517/23	0.000	User menu: Entry 23
C00517/24	105.000	C00105 : Decel. time - quick stop
C00517/25	173.000	C00173 : Mains voltage
C00517/26	0.000	User menu: Entry 26
C00517/27	0.000	User menu: Entry 27
C00517/28	0.000	User menu: Entry 28
C00517/29	0.000	User menu: Entry 29
C00517/30	0.000	User menu: Entry 30
C00517/31	0.000	User menu: Entry 31
C00517/32	0.000	User menu: Entry 32
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00560

Parameter Name: C00560 Fan switching status		Data type: UNSIGNED_8 Index: 24015 _d = 5DCF _h
Display of the function status of the device fans		
Selection list		
0	Off	
1	On	
2	No fan	

Parameter Name: C00560 Fan switching status		Data type: UNSIGNED_8 Index: 24015 _d = 5DCF _h
Subcodes	Info	
C00560/1	Switching status - internal fan WU	
C00560/2	Switching status - internal fan DU	
C00560/3	Switching status - external fan DU	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00561

Parameter Name: C00561 Failure indication		Data type: UNSIGNED_8 Index: 24014 _d = 5DCE _h
Error status display of device fan		
Selection list		
0	No error	
1	Error	
Subcodes	Info	
C00561/1	Internal fan WU	
C00561/2	Internal fan DU	
C00561/3	Motor phase U • From version 12.00.00	
C00561/4	Motor phase V • From version 12.00.00	
C00561/5	Motor phase W • From version 12.00.00	
C00561/6	External fan DU	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00563

Parameter Name: C00563 Current monitoring: Delay time		Data type: UNSIGNED_32 Index: 24012 _d = 5DCC _h
In version 8.00.00 and from version 16.00.00 onwards		
▶ Current monitoring overload		
Setting range (min. value unit max. value)		
0.000	s	999.900
Subcodes	Lenze setting	Info
C00563/1	3.000 s	Current monitoring: Delay time overload
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00565

Parameter Name: C00565 Resp. to mains phase failure		Data type: UNSIGNED_8 Index: 24010 _d = 5DCA _h
Response to the failure of mains phases		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00566

Parameter Name: C00566 Resp. to fan failure		Data type: UNSIGNED_8 Index: 24009 _d = 5DC9 _h
Response to the detection of a fan failure		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00567

Parameter Name: C00567 Resp. to speed controller limited		Data type: UNSIGNED_8 Index: 24008 _d = 5DC8 _h
Response if speed controller output is limited (<i>bLimSpeedCtrlOut</i> = TRUE)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00569

Parameter Name: C00569 Resp. to peak current		Data type: UNSIGNED_8 Index: 24006 _d = 5DC6 _h
Configuration of monitoring of the motor control (group 1)		
Selection list		
0	No Reaction	
1	Fault	
5	Warning	
Subcodes	Lenze setting	Info
C00569/1	0: No Reaction	Response for overcurrent detection and clamp operation
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00570

Parameter Name: C00570 Resp. to controller limitations		Data type: UNSIGNED_8 Index: 24005 _d = 5DC5 _h
Configuration of monitoring of the motor control (group 2)		
Selection list		
0	No Reaction	
1	Fault	
5	Warning	
Subcodes	Lenze setting	Info

Parameter Name: C00570 Resp. to controller limitations		Data type: UNSIGNED_8 Index: 24005 _d = 5DC5 _h
C00570/1	0: No Reaction	Response if direct-axis current controller is limited • e.g. at servo control (SC)
C00570/2	0: No Reaction	Response if cross current controller is limited • e.g. at servo control (SC)
C00570/3	0: No Reaction	Response if torque setpoint is limited • Limitation of the speed controller output, the differential setpoint precontrol, and of the additive torque at (SC) servo control and (SLVC) sensorless vector control.
C00570/4	0: No Reaction	Response if field controller is limited
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00571

Parameter Name: C00571 Resp. to wrong controller setting		Data type: UNSIGNED_8 Index: 24004 _d = 5DC4 _h
From version 16.00.00		
Selection list		Info
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00571/1	6: Information	Resp. to: Motor control does not match motor data
C00571/2	1: Fault	Resp. to a non-set speed controller
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00572

Parameter Name: C00572 Brake resistor overload threshold		Data type: UNSIGNED_8 Index: 24003 _d = 5DC3 _h
Adjustable threshold for monitoring the brake resistor utilisation • The response for reaching the threshold can be selected in C00574 .		
Setting range (min. value unit max. value)		Lenze setting
0	%	100
		100 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00574

Parameter Name: C00574 Resp. to brake resist. overtemp.		Data type: UNSIGNED_8 Index: 24001 _d = 5DC1 _h
Response which is triggered if the threshold set in C00572 for monitoring brake resistor utilisation is reached.		

Parameter Name: C00574 Resp. to brake resist. overtemp.		Data type: UNSIGNED_8 Index: 24001 _d = 5DC1 _h
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00575

Parameter Name: C00575 Resp. to logbook information		Data type: UNSIGNED_8 Index: 24000 _d = 5DC0 _h
This code is for device-internal use only and must not be written to by the user!		

C00576

Parameter Name: C00576 SC: Optimisation of field feedforward control		Data type: UNSIGNED_16 Index: 23999 _d = 5DBF _h
Point of action of the direct-axis current setpoint precontrol for an early reduction of the field current. In this way, the acceleration behaviour can be improved in the field weakening range. <ul style="list-style-type: none"> The entry [%] refers to the slip of the asynchronous motor. 		
Setting range (min. value unit max. value)		Lenze setting
0	%	600 200 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00577

Parameter Name: C00577 SC: Vp field weakening controller		Data type: UNSIGNED_16 Index: 23998 _d = 5DBE _h
Proportional gain of the field weakening controller <ul style="list-style-type: none"> When "0" is set, the P component of the controller is deactivated. The recommended setting is in the range between 0 and 0.0020 		
Setting range (min. value unit max. value)		Lenze setting
0.0000		2.0000 0.0010
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C00578

Parameter Name: C00578 SC: Tn field weakening controller		Data type: UNSIGNED_16 Index: 23997 _d = 5DBD _h
Time constant of the field weakening controller <ul style="list-style-type: none"> The recommended setting is in the range between 10 and 30 ms 		
Setting range (min. value unit max. value)		Lenze setting
0.1	ms	6200.0 20.0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10		

C00579

Parameter Name: C00579 Resp. to max. speed/output freq. reached		Data type: UNSIGNED_8 Index: 23996 _d = 5DBC _h
Response when the max. speed limit (C00909) or output frequency limit (C00910) has been reached.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00580

Parameter Name: C00580 Resp. to operating system error		Data type: UNSIGNED_8 Index: 23995 _d = 5DBB _h
From version 12.00.00		
Selection list		Info
0	No Reaction	
1	Fault	
5	Warning	
Subcodes	Lenze setting	Info
C00580/1	0: No Reaction	Resp. to runtime exceedance
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00581

Parameter Name: C00581 Resp. to LS_SetError_x		Data type: UNSIGNED_8 Index: 23994 _d = 5DBA _h
Selection of the error responses for application error messages • An application error message is tripped by a FALSE/TRUE edge at the binary inputs <i>bSetError1...4</i> .		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00581/1	0: No Reaction	LS_SetError_1 : Resp. to bSetError1
C00581/2	0: No Reaction	LS_SetError_1 : Resp. to bSetError2
C00581/3	0: No Reaction	LS_SetError_1 : Resp. to bSetError3
C00581/4	0: No Reaction	LS_SetError_1 : Resp. to bSetError4
C00581/5	0: No Reaction	LS_SetError_2 : Resp. to bSetError1
C00581/6	0: No Reaction	LS_SetError_2 : Resp. to bSetError2
C00581/7	0: No Reaction	LS_SetError_2 : Resp. to bSetError3
C00581/8	0: No Reaction	LS_SetError_2 : Resp. to bSetError4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00582

Parameter Name: C00582 Resp. to heatsink temp. > shutdown temp. -5°C		Data type: UNSIGNED_8 Index: 23993 _d = 5DB9 _h
Response if the heatsink temperature has reached the switch-off temperature threshold.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00584

Parameter Name: C00584 Resp. to current monitoring		Data type: UNSIGNED_8 Index: 23991 _d = 5DB7 _h
In version 8.00.00 and from version 16.00.00 onwards		
Response in the event of current overload		
▶ Current monitoring overload		
Selection list		Info
0	No Reaction	
1	Fault	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00584/1	0: No Reaction	Resp. to current monitoring overload
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00585

Parameter Name: C00585 Resp. to motor overtemp. PTC		Data type: UNSIGNED_8 Index: 23990 _d = 5DB6 _h
Response to motor overtemperature		
• The motor temperature is measured by means of a PTC thermistor at connector X21.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00586

Parameter Name: C00586 Resp. to open circuit HTL encoder		Data type: UNSIGNED_8 Index: 23989 _d = 5DB5 _h
Response to encoder feedback system failure or encoder feedback system track failure due to open circuit		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00587

Parameter Name: C00587 Resp. to brake resistor overtemp. PTC		Data type: UNSIGNED_8 Index: 23988 _d = 5DB4 _h
From version 12.00.00 Response to overtemperature of the brake resistor • The brake resistor temperature is measured by means of a PTC thermistor at connector X20.		
Selection list		
0	No Reaction	
1	Fault	
5	Warning	
Subcodes	Lenze setting	Info
C00587/1	0: No Reaction	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00588

Parameter Name: C00588 Resp. to max. speed at switching freq.		Data type: UNSIGNED_8 Index: 23987 _d = 5DB3 _h
Response if the maximum speed for the set inverter switching frequency is reached (C00018)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00590

Parameter Name: C00590 Resp. to switching frequency red.		Data type: UNSIGNED_8 Index: 23985 _d = 5DB1 _h
Response to reduction of the inverter switching frequency (C00018)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00592

Parameter Name: C00592 Resp. to CAN bus connection		Data type: UNSIGNED_8 Index: 23983 _d = 5DAF _h
Configuration of monitoring of the CAN interface (group 1)		
▶ CANopen Option/CAN on board		

Parameter Name: C00592 Resp. to CAN bus connection		Data type: UNSIGNED_8 Index: 23983 _d = 5DAF _h
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00592/1	0: No Reaction	Response to incorrect telegram for CAN communication
C00592/2	0: No Reaction	Response to "BusOff" (bus system switched off)
C00592/3	0: No Reaction	Response to warnings of the CAN controller
C00592/4	0: No Reaction	Response to communication stop of a CAN bus node
C00592/5	0: No Reaction	Response to an event in the case of monitoring via heartbeat protocol
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00593

Parameter Name: C00593 Resp. to CANx_IN monitoring		Data type: UNSIGNED_8 Index: 23982 _d = 5DAE _h
Configuration of monitoring of the CAN interface (group 2)		
▶ CANopen Option/CAN on board		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00593/1	0: No Reaction	Response if the monitoring time set in C00357/1 for the reception of the PDO CAN1_IN is exceeded.
C00593/2	0: No Reaction	Response if the monitoring time set in C00357/2 for the reception of the PDO CAN2_IN is exceeded.
C00593/3	0: No Reaction	Response if the monitoring time set in C00357/3 for the reception of the PDO CAN3_IN is exceeded.
C00593/4	0: No Reaction	Response if the monitoring time set in C00357/4 for the reception of the PDO CAN4_IN is exceeded. • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00594

Parameter Name: C00594 Resp. to control word error		Data type: UNSIGNED_8 Index: 23981 _d = 5DAD _h
Configuration of device control monitoring		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
5	Warning	
Subcodes	Lenze setting	Info
C00594/1	1: Fault	Response if error bit 14 in the CAN control word is set.
C00594/2	1: Fault	Response if error bit 14 in the MCI control word is set.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00595

Parameter Name: C00595 MCK: Resp. to MCK error		Data type: UNSIGNED_8 Index: 23980 _d = 5DAC _h
Configuration of monitoring of the Motion Control Kernel		
Basic drive functions		
Selection list		
0	No Reaction	
1	Fault	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00595/1	3: TroubleQuickStop	Response if the input <i>bLimitSwitchPos</i> for travel range monitoring is set to FALSE (fail-safe) by the positive hardware limit switch .
C00595/2	3: TroubleQuickStop	Response if the input <i>bLimitSwitchNeg</i> for travel range monitoring is set to FALSE (fail-safe) by the negative hardware limit switch .
C00595/3	3: TroubleQuickStop	Response for detection that the position is beyond the positive software limit position (C01229/1).
C00595/4	3: TroubleQuickStop	Response for detection that the position is beyond the negative software limit position (C01229/2).
C00595/5	5: Warning	Response if following error limit 1 is exceeded (C01215/1)
C00595/6	5: Warning	Response if following error limit 2 is exceeded (C01215/2)
C00595/7	3: TroubleQuickStop	Response if the maximum travel distance (display in C01213/1) is exceeded
C00595/8	4: WarningLocked	Response to start procedures with reference condition when the reference is not set
C00595/9	4: WarningLocked	Response to a non-supported positioning mode
C00595/10	4: WarningLocked	Response to implausible profile set data
C00595/11	5: Warning	Response to the selection of an invalid operating mode of the MCK

Parameter Name: C00595 MCK: Resp. to MCK error		Data type: UNSIGNED_8 Index: 23980 _d = 5DAC _h
C00595/12	4: WarningLocked	Response to indicating an invalid profile data set
C00595/13	5: Warning	Response to an error of the FB L_MckCtrlInterface_1
C00595/14	4: WarningLocked	Response to a profile start with a target position outside the software limit positions (C01229/1 and C01229/2).
C00595/15	1: Fault	Response to activated connection monitoring in case of PC manual control • From version 06.00.00
C00595/16	6: Information	MCK: direction conflict_Ccw
C00595/17	6: Information	MCK: direction conflict_Cw
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00597

Parameter Name: C00597 Resp. to motor phase failure		Data type: UNSIGNED_8 Index: 23978 _d = 5DAA _h
Response to motor phase failure • If a phase current does not exceed the threshold set in C00599 for more than one period, the response set here will be triggered.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00598

Parameter Name: C00598 Resp. to I/O monitoring		Data type: UNSIGNED_8 Index: 23977 _d = 5DA9 _h
Configuration of monitoring of the analog inputs ▶ Analog terminals		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
5	Warning	
Subcodes	Lenze setting	Info
C00598/1	3: TroubleQuickStop	Response to open circuit at AIN1 if configured as 4 ... 20 mA current loop
C00598/2	3: TroubleQuickStop	Reserved
C00598/3	5: Warning	Resp. to digital output level
C00598/4	5: Warning	Resp. to IO supply overload
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00599

Parameter Name: C00599 Motor phase failure threshold		Data type: INTEGER_16 Index: 23976 _d = 5DA8 _h
Threshold for motor phase failure monitoring <ul style="list-style-type: none"> • 100 % ≡ rated inverter current (C00098) • If a phase current does not exceed the threshold set here for more than one period, the response to motor phase failure set in C00597 will be triggered. 		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 5.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00600

Parameter Name: C00600 Resp. to DC bus voltage		Data type: UNSIGNED_8 Index: 23975 _d = 5DA7 _h
Configuration of monitoring of the motor control (group 3)		
Selection list		
1	Fault	
2	Trouble	
Subcodes	Lenze setting	Info
C00600/1	2: Trouble	Response to DC bus undervoltage
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00601

Parameter Name: C00601 Del. resp. to fault: DC bus overvoltage		Data type: UNSIGNED_16 Index: 23974 _d = 5DA6 _h
Error response delay times		
Setting range (min. value unit max. value)		
0.000	s	65.000
Subcodes	Lenze setting	Info
C00601/1	2.000 s	Delay time for triggering the "DC-bus overvoltage" error <ul style="list-style-type: none"> • If a DC-bus overvoltage occurs, an error will not be triggered until the set delay time has elapsed.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1000		

C00602

Parameter Name: C00602 Resp. to earth fault		Data type: UNSIGNED_8 Index: 23973 _d = 5DA5 _h
Response to earth fault in the motor phase(s)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00605

Parameter Name: C00605 Resp. to feedback		Data type: UNSIGNED_8 Index: 23970 _d = 5DA2 _h
Selection list		Info
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00605/1	1: Fault	Resp. to open circuit HTL 4-fold
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00606

Parameter Name: C00606 Resp. to motor overload (I²t)		Data type: UNSIGNED_8 Index: 23969 _d = 5DA1 _h
Response when the motor load displayed in C00066 reaches the value "100.00 %".		
▶ Motor overload monitoring (I2xt)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00607

Parameter Name: C00607 Resp. to max freq. feedb. DIG12/56		Data type: UNSIGNED_8 Index: 23968 _d = 5DA0 _h
Response when the maximum input frequency has been reached via the digital inputs.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00608

Parameter Name: C00608 Resp. to maximum torque		Data type: UNSIGNED_8 Index: 23967 _d = 5D9F _h
Response if the maximum torque (C00057) is reached.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00609

Parameter Name: C00609 Resp. to maximum current	Data type: UNSIGNED_8 Index: 23966 _d = 5D9E _h
Response if the maximum current (C00022 , C00023) is reached.	
Selection list (Lenze setting printed in bold)	
0 No Reaction	
1 Fault	
5 Warning	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1	

C00610

Parameter Name: C00610 16-bit connection table	Data type: UNSIGNED_16 Index: 23965 _d = 5D9D _h
This code is for device-internal use only and must not be written to by the user!	

C00611

Parameter Name: C00611 Bool connection table	Data type: UNSIGNED_16 Index: 23964 _d = 5D9C _h
This code is for device-internal use only and must not be written to by the user!	

C00612

Parameter Name: C00612 32-bit connection table	Data type: UNSIGNED_16 Index: 23963 _d = 5D9B _h
This code is for device-internal use only and must not be written to by the user!	

C00613

Parameter Name: C00613 16-bit connection table AdditionalFBsHL	Data type: UNSIGNED_16 Index: 23962 _d = 5D9A _h
This code is for device-internal use only and must not be written to by the user!	

C00615

Parameter Name: C00615 Bool connection table AdditionalFBsHL	Data type: UNSIGNED_16 Index: 23960 _d = 5D98 _h
This code is for device-internal use only and must not be written to by the user!	

C00617

Parameter Name: C00617 32-bit connection table AdditionalFBsHL	Data type: UNSIGNED_16 Index: 23958 _d = 5D96 _h
This code is for device-internal use only and must not be written to by the user!	

C00620

Parameter Name: C00620 System connection list: 16-bit		Data type: UNSIGNED_16 Index: 23955 _d = 5D93 _h
Connection parameters: 16-bit inputs		
<ul style="list-style-type: none"> • Selection of the 16 bit output signals to be connected to the 16 bit input signals • The selection list contains all 16 bit output signals which can be assigned to the 16 bit inputs displayed by the subcodes. 		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00620/1	0: Not connected	Reserved
C00620/2	0: Not connected	LP_CanOut1 : wState
C00620/3	0: Not connected	LP_CanOut1 : wOut2
C00620/4	0: Not connected	LP_CanOut1 : wOut3
C00620/5	0: Not connected	LP_CanOut1 : wOut4
C00620/6	0: Not connected	LP_CanOut2 : wOut1
C00620/7	0: Not connected	LP_CanOut2 : wOut2
C00620/8	0: Not connected	LP_CanOut2 : wOut3
C00620/9	0: Not connected	LP_CanOut2 : wOut4
C00620/10	0: Not connected	LP_CanOut3 : wOut1
C00620/11	0: Not connected	LP_CanOut3 : wOut2
C00620/12	0: Not connected	LP_CanOut3 : wOut3
C00620/13	0: Not connected	LP_CanOut3 : wOut4
C00620/14	0: Not connected	LS_DisFree_a : nDis1_a
C00620/15	0: Not connected	LS_DisFree_a : nDis2_a
C00620/16	0: Not connected	LS_DisFree_a : nDis3_a
C00620/17	0: Not connected	LS_DisFree_a : nDis4_a
C00620/18	0: Not connected	LS_DisFree : wDis1
C00620/19	0: Not connected	LS_DisFree : wDis2
C00620/20	0: Not connected	LS_DisFree : wDis3
C00620/21	0: Not connected	LS_DisFree : wDis4
C00620/22	0: Not connected	LP_MciOut : wState
C00620/23	0: Not connected	LP_MciOut : wOut2
C00620/24	0: Not connected	LP_MciOut : wOut3
C00620/25	0: Not connected	LP_MciOut : wOut4
C00620/26	0: Not connected	LP_MciOut : wOut5
C00620/27	0: Not connected	LP_MciOut : wOut6
C00620/28	0: Not connected	LP_MciOut : wOut7
C00620/29	0: Not connected	LP_MciOut : wOut8
C00620/30	0: Not connected	LP_MciOut : wOut9
C00620/31	0: Not connected	LP_MciOut : wOut10
C00620/32	0: Not connected	LP_MciOut : wOut11
C00620/33	0: Not connected	LP_MciOut : wOut12
C00620/34	0: Not connected	LP_MciOut : wOut13
C00620/35	0: Not connected	LP_MciOut : wOut14
C00620/36	0: Not connected	LP_MciOut : wOut15

Parameter Name: C00620 System connection list: 16-bit		Data type: UNSIGNED_16 Index: 23955 _d = 5D93 _h
C00620/37	0: Not connected	LP_MciOut : wOut16
C00620/38	0: Not connected	Reserved
C00620/39	0: Not connected	Reserved
C00620/40	0: Not connected	Reserved
C00620/41	0: Not connected	LS_DisFree_a : nDis5_a
C00620/42	0: Not connected	LS_DisFree_a : nDis6_a
C00620/43	0: Not connected	LS_DisFree_a : nDis7_a
C00620/44	0: Not connected	LS_DisFree_a : nDis8_a
C00620/45	0: Not connected	LS_DisFree : wDis5
C00620/46	0: Not connected	LS_DisFree : wDis6
C00620/47	0: Not connected	LS_DisFree : wDis7
C00620/48	0: Not connected	LS_DisFree : wDis8
C00620/49	0: Not connected	LS_ParReadWrite_1 : wParIndex
C00620/50	0: Not connected	LS_ParReadWrite_1 : wParSubindex
C00620/51	0: Not connected	LS_ParReadWrite_1 : wInHWord
C00620/52	0: Not connected	LS_ParReadWrite_1 : wInLWord
C00620/53	0: Not connected	LS_ParReadWrite_2 : wParIndex
C00620/54	0: Not connected	LS_ParReadWrite_2 : wParSubindex
C00620/55	0: Not connected	LS_ParReadWrite_2 : wInHWord
C00620/56	0: Not connected	LS_ParReadWrite_2 : wInLWord
C00620/57	0: Not connected	LS_ParReadWrite_3 : wParIndex
C00620/58	0: Not connected	LS_ParReadWrite_3 : wParSubindex
C00620/59	0: Not connected	LS_ParReadWrite_3 : wInHWord
C00620/60	0: Not connected	LS_ParReadWrite_3 : wInLWord
C00620/61	0: Not connected	LS_ParReadWrite_4 : wParIndex
C00620/62	0: Not connected	LS_ParReadWrite_4 : wParSubindex
C00620/63	0: Not connected	LS_ParReadWrite_4 : wInHWord
C00620/64	0: Not connected	LS_ParReadWrite_4 : wInLWord
C00620/65	0: Not connected	LS_ParReadWrite_5 : wParIndex
C00620/66	0: Not connected	LS_ParReadWrite_5 : wParSubindex
C00620/67	0: Not connected	LS_ParReadWrite_5 : wInHWord
C00620/68	0: Not connected	LS_ParReadWrite_5 : wInLWord
C00620/69	0: Not connected	LS_ParReadWrite_6 : wParIndex
C00620/70	0: Not connected	LS_ParReadWrite_6 : wParSubindex
C00620/71	0: Not connected	LS_ParReadWrite_6 : wInHWord
C00620/72	0: Not connected	LS_ParReadWrite_6 : wInLWord
C00620/73	0: Not connected	Reserved
C00620/74	0: Not connected	Reserved
C00620/75	0: Not connected	Reserved
C00620/76	0: Not connected	Reserved
C00620/77	0: Not connected	Reserved
C00620/78	0: Not connected	Reserved
C00620/79	0: Not connected	Reserved
C00620/80	0: Not connected	Reserved

Parameter Name: C00620 System connection list: 16-bit		Data type: UNSIGNED_16 Index: 23955 _d = 5D93 _h
C00620/81	0: Not connected	Reserved
C00620/82	0: Not connected	Reserved
C00620/83	0: Not connected	Reserved
C00620/84	0: Not connected	Reserved
C00620/85	0: Not connected	Reserved
C00620/86	0: Not connected	Reserved
C00620/87	0: Not connected	Reserved
C00620/88	0: Not connected	Reserved
C00620/89	0: Not connected	LS_RetainData : wIn1
C00620/90	0: Not connected	LS_RetainData : wIn2
C00620/91	0: Not connected	LS_RetainData : wIn3
C00620/92	0: Not connected	LS_RetainData : wIn4
C00620/93	0: Not connected	Reserved
C00620/94	0: Not connected	Reserved
C00620/95	0: Not connected	Reserved
C00620/96	0: Not connected	Reserved
C00620/97	0: Not connected	Reserved
C00620/98	0: Not connected	Reserved
C00620/99	0: Not connected	Reserved
C00620/100	0: Not connected	Reserved
C00620/101	0: Not connected	Reserved
C00620/102	0: Not connected	Reserved
C00620/103	0: Not connected	Reserved
C00620/104	0: Not connected	Reserved
C00620/105	0: Not connected	Reserved
C00620/106	0: Not connected	LS_MultiEncoder: wActPosExtHW
C00620/107	0: Not connected	LS_MultiEncoder: wActPosExtLW
C00620/108	0: Not connected	LP_CanOut4 : wOut1
C00620/109	0: Not connected	LP_CanOut4 : wOut2
C00620/110	0: Not connected	LP_CanOut4 : wOut3
C00620/111	0: Not connected	LP_CanOut4 : wOut4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00621

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
Connection parameters: Binary inputs <ul style="list-style-type: none"> • Selection of the binary output signals to be connected to the binary input signals • The selection list contains all binary output signals which can be assigned to the binary inputs mapped by the subcodes. 		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00621/1	0: Not connected	Reserved
C00621/2	1000: LA_NCtrl: bDriveReady	LS_DigitalOutput : bOut1

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/3	0: Not connected	LS_DigitalInput : bCountIn1_Reset
C00621/4	0: Not connected	LS_DigitalInput : bCountIn1_LoadStartValue
C00621/5	0: Not connected	LP_CanOut1 : bState_B0
C00621/6	0: Not connected	LP_CanOut1 : bState_B1
C00621/7	0: Not connected	LP_CanOut1 : bState_B2
C00621/8	0: Not connected	LP_CanOut1 : bState_B3
C00621/9	0: Not connected	LP_CanOut1 : bState_B4
C00621/10	0: Not connected	LP_CanOut1 : bState_B5
C00621/11	0: Not connected	LP_CanOut1 : bState_B6
C00621/12	0: Not connected	LP_CanOut1 : bState_B7
C00621/13	0: Not connected	LP_CanOut1 : bState_B8
C00621/14	0: Not connected	LP_CanOut1 : bState_B9
C00621/15	0: Not connected	LP_CanOut1 : bState_B10
C00621/16	0: Not connected	LP_CanOut1 : bState_B11
C00621/17	0: Not connected	LP_CanOut1 : bState_B12
C00621/18	0: Not connected	LP_CanOut1 : bState_B13
C00621/19	0: Not connected	LP_CanOut1 : bState_B14
C00621/20	0: Not connected	LP_CanOut1 : bState_B15
C00621/21	0: Not connected	LS_DisFree_b : bDis1
C00621/22	0: Not connected	LS_DisFree_b : bDis2
C00621/23	0: Not connected	LS_DisFree_b : bDis3
C00621/24	0: Not connected	LS_DisFree_b : bDis4
C00621/25	0: Not connected	LS_DisFree_b : bDis5
C00621/26	0: Not connected	LS_DisFree_b : bDis6
C00621/27	0: Not connected	LS_DisFree_b : bDis7
C00621/28	0: Not connected	LS_DisFree_b : bDis8
C00621/29	0: Not connected	LP_CanOut2 : bOut1_B0
C00621/30	0: Not connected	LP_CanOut2 : bOut1_B1
C00621/31	0: Not connected	LP_CanOut2 : bOut1_B2
C00621/32	0: Not connected	LP_CanOut2 : bOut1_B3
C00621/33	0: Not connected	LP_CanOut2 : bOut1_B4
C00621/34	0: Not connected	LP_CanOut2 : bOut1_B5
C00621/35	0: Not connected	LP_CanOut2 : bOut1_B6
C00621/36	0: Not connected	LP_CanOut2 : bOut1_B7
C00621/37	0: Not connected	LP_CanOut2 : bOut1_B8
C00621/38	0: Not connected	LP_CanOut2 : bOut1_B9
C00621/39	0: Not connected	LP_CanOut2 : bOut1_B10
C00621/40	0: Not connected	LP_CanOut2 : bOut1_B11
C00621/41	0: Not connected	LP_CanOut2 : bOut1_B12
C00621/42	0: Not connected	LP_CanOut2 : bOut1_B13
C00621/43	0: Not connected	LP_CanOut2 : bOut1_B14
C00621/44	0: Not connected	LP_CanOut2 : bOut1_B15
C00621/45	0: Not connected	LP_CanOut3 : bOut1_B0
C00621/46	0: Not connected	LP_CanOut3 : bOut1_B1

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/47	0: Not connected	LP_CanOut3 : bOut1_B2
C00621/48	0: Not connected	LP_CanOut3 : bOut1_B3
C00621/49	0: Not connected	LP_CanOut3 : bOut1_B4
C00621/50	0: Not connected	LP_CanOut3 : bOut1_B5
C00621/51	0: Not connected	LP_CanOut3 : bOut1_B6
C00621/52	0: Not connected	LP_CanOut3 : bOut1_B7
C00621/53	0: Not connected	LP_CanOut3 : bOut1_B8
C00621/54	0: Not connected	LP_CanOut3 : bOut1_B9
C00621/55	0: Not connected	LP_CanOut3 : bOut1_B10
C00621/56	0: Not connected	LP_CanOut3 : bOut1_B11
C00621/57	0: Not connected	LP_CanOut3 : bOut1_B12
C00621/58	0: Not connected	LP_CanOut3 : bOut1_B13
C00621/59	0: Not connected	LP_CanOut3 : bOut1_B14
C00621/60	0: Not connected	LP_CanOut3 : bOut1_B15
C00621/61	0: Not connected	LP_MciOut : bState_B0
C00621/62	0: Not connected	LP_MciOut : bState_B1
C00621/63	0: Not connected	LP_MciOut : bState_B2
C00621/64	0: Not connected	LP_MciOut : bState_B3
C00621/65	0: Not connected	LP_MciOut : bState_B4
C00621/66	0: Not connected	LP_MciOut : bState_B5
C00621/67	0: Not connected	LP_MciOut : bState_B6
C00621/68	0: Not connected	LP_MciOut : bState_B7
C00621/69	0: Not connected	LP_MciOut : bState_B8
C00621/70	0: Not connected	LP_MciOut : bState_B9
C00621/71	0: Not connected	LP_MciOut : bState_B10
C00621/72	0: Not connected	LP_MciOut : bState_B11
C00621/73	0: Not connected	LP_MciOut : bState_B12
C00621/74	0: Not connected	LP_MciOut : bState_B13
C00621/75	0: Not connected	LP_MciOut : bState_B14
C00621/76	0: Not connected	LP_MciOut : bState_B15
C00621/77	0: Not connected	LP_MciOut : bOut2_B0
C00621/78	0: Not connected	LP_MciOut : bOut2_B1
C00621/79	0: Not connected	LP_MciOut : bOut2_B2
C00621/80	0: Not connected	LP_MciOut : bOut2_B3
C00621/81	0: Not connected	LP_MciOut : bOut2_B4
C00621/82	0: Not connected	LP_MciOut : bOut2_B5
C00621/83	0: Not connected	LP_MciOut : bOut2_B6
C00621/84	0: Not connected	LP_MciOut : bOut2_B7
C00621/85	0: Not connected	LP_MciOut : bOut2_B8
C00621/86	0: Not connected	LP_MciOut : bOut2_B9
C00621/87	0: Not connected	LP_MciOut : bOut2_B10
C00621/88	0: Not connected	LP_MciOut : bOut2_B11
C00621/89	0: Not connected	LP_MciOut : bOut2_B12
C00621/90	0: Not connected	LP_MciOut : bOut2_B13

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/91	0: Not connected	LP_MciOut : bOut2_B14
C00621/92	0: Not connected	LP_MciOut : bOut2_B15
C00621/93	0: Not connected	LS_SetError_1 : bSetError1
C00621/94	0: Not connected	LS_SetError_1 : bSetError2
C00621/95	0: Not connected	LS_SetError_1 : bSetError3
C00621/96	0: Not connected	LS_SetError_1 : bSetError4
C00621/97	0: Not connected	LS_DigitalInput : bCountIn5_Reset
C00621/98	0: Not connected	LS_DigitalInput : bCountIn5_LoadStartValue
C00621/99	0: Not connected	LS_DigitalOutput : bOut2
C00621/100	0: Not connected	Reserved
C00621/101	0: Not connected	Reserved
C00621/102	0: Not connected	LS_DisFree_b : bDis9
C00621/103	0: Not connected	LS_DisFree_b : bDis10
C00621/104	0: Not connected	LS_DisFree_b : bDis11
C00621/105	0: Not connected	LS_DisFree_b : bDis12
C00621/106	0: Not connected	LS_DisFree_b : bDis13
C00621/107	0: Not connected	LS_DisFree_b : bDis14
C00621/108	0: Not connected	LS_DisFree_b : bDis15
C00621/109	0: Not connected	LS_DisFree_b : bDis16
C00621/110	1015: LA_NCtrl: bMBrakeReleaseOut	LS_DigitalOutput : bBrakeRelease
C00621/111	0: Not connected	LS_ParReadWrite_1 : bExecute
C00621/112	0: Not connected	LS_ParReadWrite_1 : bReadWrite
C00621/113	0: Not connected	LS_ParReadWrite_2 : bExecute
C00621/114	0: Not connected	LS_ParReadWrite_2 : bReadWrite
C00621/115	0: Not connected	LS_ParReadWrite_3 : bExecute
C00621/116	0: Not connected	LS_ParReadWrite_3 : bReadWrite
C00621/117	0: Not connected	LS_ParReadWrite_4 : bExecute
C00621/118	0: Not connected	LS_ParReadWrite_4 : bReadWrite
C00621/119	0: Not connected	LS_ParReadWrite_5 : bExecute
C00621/120	0: Not connected	LS_ParReadWrite_5 : bReadWrite
C00621/121	0: Not connected	LS_ParReadWrite_6 : bExecute
C00621/122	0: Not connected	LS_ParReadWrite_6 : bReadWrite
C00621/123	0: Not connected	LS_WriteParamList : bExecute
C00621/124	0: Not connected	LS_WriteParamList : bSelectWriteValue_1
C00621/125	0: Not connected	LS_WriteParamList : bSelectWriteValue_2
C00621/126	0: Not connected	LS_CANManagement : bResetNode
C00621/127	0: Not connected	LS_CANManagement : bReInitCAN
C00621/128	0: Not connected	LS_DigitalInput : bPosIn12_Load
C00621/129	0: Not connected	Reserved
C00621/130	0: Not connected	Reserved
C00621/131	0: Not connected	Reserved
C00621/132	0: Not connected	Reserved
C00621/133	0: Not connected	Reserved
C00621/134	0: Not connected	Reserved

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/135	0: Not connected	Reserved
C00621/136	0: Not connected	Reserved
C00621/137	0: Not connected	Reserved
C00621/138	0: Not connected	Reserved
C00621/139	0: Not connected	Reserved
C00621/140	0: Not connected	Reserved
C00621/141	0: Not connected	Reserved
C00621/142	0: Not connected	Reserved
C00621/143	0: Not connected	Reserved
C00621/144	0: Not connected	Reserved
C00621/145	0: Not connected	Reserved
C00621/146	0: Not connected	Reserved
C00621/147	0: Not connected	Reserved
C00621/148	0: Not connected	LS_TouchProbe: bDisableTPDigIn4
C00621/149	0: Not connected	LS_TouchProbe: bDisableTPDigIn5
C00621/150	0: Not connected	LS_TouchProbe: bDisableTPDigIn6
C00621/151	0: Not connected	Reserved
C00621/152	0: Not connected	Reserved
C00621/153	0: Not connected	Reserved
C00621/154	0: Not connected	LS_TouchProbe: bDisableTPDigIn4 Rising
C00621/155	0: Not connected	LS_TouchProbe: bDisableTPDigIn4 Falling
C00621/156	0: Not connected	LS_TouchProbe: bDisableTPDigIn5 Rising
C00621/157	0: Not connected	LS_TouchProbe: bDisableTPDigIn5 Falling
C00621/158	0: Not connected	Reserved
C00621/159	0: Not connected	LS_TouchProbe: bDisableTPDigIn4Window
C00621/160	0: Not connected	LS_TouchProbe: bDisableTPDigIn5Window
C00621/161	0: Not connected	Reserved
C00621/162	0: Not connected	Reserved
C00621/163	0: Not connected	LS_IrInterface: bDisable
C00621/164	0: Not connected	Reserved
C00621/165	0: Not connected	LS_RetainData : bSetRetain_1
C00621/166	0: Not connected	LS_RetainData : bSetRetain_2
C00621/167	0: Not connected	LS_RetainData : bSetRetain_3
C00621/168	0: Not connected	LS_RetainData : bLoadParams
C00621/169	0: Not connected	LS_RetainData : bIn1
C00621/170	0: Not connected	LS_RetainData : bIn2
C00621/171	0: Not connected	LS_RetainData : bIn3
C00621/172	0: Not connected	LS_RetainData : bIn4
C00621/173	0: Not connected	Reserved
C00621/174	0: Not connected	Reserved
C00621/175	0: Not connected	Reserved
C00621/176	0: Not connected	Reserved
C00621/177	0: Not connected	Reserved
C00621/178	0: Not connected	Reserved

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/179	0: Not connected	Reserved
C00621/180	0: Not connected	Reserved
C00621/181	0: Not connected	Reserved
C00621/182	0: Not connected	Reserved
C00621/183	0: Not connected	Reserved
C00621/184	0: Not connected	LP_CanOut4 : bOut1_B0
C00621/185	0: Not connected	LP_CanOut4 : bOut1_B1
C00621/186	0: Not connected	LP_CanOut4 : bOut1_B2
C00621/187	0: Not connected	LP_CanOut4 : bOut1_B3
C00621/188	0: Not connected	LP_CanOut4 : bOut1_B4
C00621/189	0: Not connected	LP_CanOut4 : bOut1_B5
C00621/190	0: Not connected	LP_CanOut4 : bOut1_B6
C00621/191	0: Not connected	LP_CanOut4 : bOut1_B7
C00621/192	0: Not connected	LP_CanOut4 : bOut1_B8
C00621/193	0: Not connected	LP_CanOut4 : bOut1_B9
C00621/194	0: Not connected	LP_CanOut4 : bOut1_B10
C00621/195	0: Not connected	LP_CanOut4 : bOut1_B11
C00621/196	0: Not connected	LP_CanOut4 : bOut1_B12
C00621/197	0: Not connected	LP_CanOut4 : bOut1_B13
C00621/198	0: Not connected	LP_CanOut4 : bOut1_B14
C00621/199	0: Not connected	LP_CanOut4 : bOut1_B15
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00622

Parameter Name: C00622 System connection list: Angle		Data type: UNSIGNED_16 Index: 23953 _d = 5D91 _h
Connection parameters: 32-bit inputs <ul style="list-style-type: none"> • Selection of the 32-bit output signals for connection with the 32-bit input signals. • The selection list contains all 32-bit output signals which can be assigned to the 32-bit inputs mapped by the subcodes. 		
Selection list		
See selection list - angle signals		
Subcodes	Lenze setting	Info
C00622/1	0: Not connected	LS_DisFree_p : dnDis1_p
C00622/2	0: Not connected	LS_DisFree_p : dnDis2_p
C00622/3	0: Not connected	LS_DisFree_p : dnDis3_p
C00622/4	0: Not connected	LS_DisFree_p : dnDis4_p
C00622/5	0: Not connected	LS_DisFree_p : dnDis5_p
C00622/6	0: Not connected	LS_DisFree_p : dnDis6_p
C00622/7	0: Not connected	LS_DisFree_p : dnDis7_p
C00622/8	0: Not connected	LS_DisFree_p : dnDis8_p
C00622/9	0: Not connected	LP_CanOut1 : dnOut34_p
C00622/10	0: Not connected	LP_CanOut2 : dnOut34_p
C00622/11	0: Not connected	LP_CanOut3 : dnOut34_p
C00622/12	0: Not connected	LP_MciOut : dnOut34_p

Parameter Name: C00622 System connection list: Angle		Data type: UNSIGNED_16 Index: 23953 _d = 5D91 _h
C00622/13	0: Not connected	LS_DigitalInput : dnPosIn12_Set_p
C00622/14	0: Not connected	Reserved
C00622/15	0: Not connected	Reserved
C00622/16	0: Not connected	LS_RetainData : dIn1
C00622/17	0: Not connected	LS_RetainData : dIn2
C00622/18	0: Not connected	LS_RetainData : dIn3
C00622/19	0: Not connected	LS_RetainData : dIn4
C00622/20	0: Not connected	Reserved
C00622/21	0: Not connected	Reserved
C00622/22	0: Not connected	Reserved
C00622/23	0: Not connected	Reserved
C00622/24	0: Not connected	Reserved
C00622/25	0: Not connected	LP_CanOut4 : dnOut34_p CAN4 output: Data words 3 + 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00630

Parameter Name: C00630 L_Limit 1-2: Min/Max		Data type: INTEGER_16 Index: 23945 _d = 5D89 _h
Setting the limits		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00630/1	-199.99 %	L_Limit 1 : Min.Limit
C00630/2	199.99 %	L_Limit 1 : Max.Limit
C00630/3	-199.99 %	L_Limit 2 : Min.Limit
C00630/4	199.99 %	L_Limit 2 : Max.Limit
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00631

Parameter Name: C00631 L_LimitPhi 1-3: Min/Max		Data type: INTEGER_32 Index: 23944 _d = 5D88 _h
Setting the limits		
Setting range (min. value unit max. value)		
-2147483647	Incr.	2147483647
Subcodes	Lenze setting	Info
C00631/1	-2147483647 incr.	L_LimitPhi 1 : Min.Limit
C00631/2	2147483647 incr.	L_LimitPhi 1 : Max.Limit
C00631/3	-2147483647 incr.	L_LimitPhi 2 : Min.Limit
C00631/4	2147483647 incr.	L_LimitPhi 2 : Max.Limit
C00631/5	-2147483647 incr.	L_LimitPhi 3 : Min.Limit
C00631/6	2147483647 incr.	L_LimitPhi 3 : Max.Limit
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00632

Parameter Name: C00632 L_NSet_1: Max.SkipFrq.		Data type: INTEGER_16 Index: 23943 _d = 5D87 _h
Maximum limit values for the speed blocking zones • Selection of the maximum limit values for the blocking zones in which the speed must not be constant.		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C00632/1	0.00 %	L_NSet_1 : Blocking speed1 max
C00632/2	0.00 %	L_NSet_1 : Blocking speed2 max
C00632/3	0.00 %	L_NSet_1 : Blocking speed3 max
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00633

Parameter Name: C00633 L_NSet_1: Min.SkipFrq.		Data type: INTEGER_16 Index: 23944 _d = 5D88 _h
Minimum limit values for the speed blocking zones • Selection of the minimum limit values for the blocking zones in which the speed must not be constant.		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C00633/1	0.00 %	L_NSet_1 : Blocking speed1 min
C00633/2	0.00 %	L_NSet_1 : Blocking speed2 min
C00633/3	0.00 %	L_NSet_1 : Blocking speed3 min
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00634

Parameter Name: C00634 L_NSet_1: wState		Data type: UNSIGNED_16 Index: 23941 _d = 5D85 _h
The L_NSet_1 FB: Bit coded status display		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	No blocking zone active	1 ≙ No blocking zone set for constant speeds
Bit 1	Blocking zone 1 active	1 ≙ Suppression of constant speed characteristics within the limits of blocking zone 1
Bit 2	Blocking zone 2 active	1 ≙ Suppression of constant speed characteristics within the limits of blocking zone 2
Bit 3	Blocking zone 3 active	1 ≙ Suppression of constant speed characteristics within the limits of blocking zone 3
Bit 4	Jog in blocking zone	1 ≙ A ramp is used to keep the speed setpoint within a speed blocking zone
Bit 5	MaxLimit active	1 ≙ Speed setpoint is at the maximum speed limit
Bit 6	MinLimit active	1 ≙ Speed setpoint is at the minimum speed limit
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	

Parameter Name: C00634 L_NSet_1: wState		Data type: UNSIGNED_16 Index: 23941 _d = 5D85 _h
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00635

Parameter Name: C00635 L_NSet_1: nMaxLimit		Data type: INTEGER_16 Index: 23940 _d = 5D84 _h
The L_NSet_1 FB: Maximum speed setpoint for speed setpoint limitation		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99 199.99 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00636

Parameter Name: C00636 L_NSet_1: nMinLimit		Data type: INTEGER_16 Index: 23939 _d = 5D83 _h
The L_NSet_1 FB: Minimum speed setpoint for speed setpoint limitation		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99 -199.99 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00637

Parameter Name: C00637 L_NSet_1: Output blocking zones		Data type: INTEGER_16 Index: 23938 _d = 5D82 _h
The L_NSet_1 FB: Speed setpoint is displayed after being processed by blocking zone function		
Display range (min. value unit max. value)		
-199.99	%	199.99
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00638

Parameter Name: C00638 L_NSet_1: Output ramp rounding		Data type: INTEGER_16 Index: 23937 _d = 5D81 _h
The L_NSet_1 FB: Speed setpoint is displayed after being processed by PT1 filter function		
Display range (min. value unit max. value)		
-199.99	%	199.99
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00639

Parameter Name: C00639 L_NSet_1: Output additional value		Data type: INTEGER_16 Index: 23936 _d = 5D80 _h
The L_NSet_1 FB: Additional speed setpoint is displayed after being processed by the ramp generator		
Display range (min. value unit max. value)		
-199.99	%	199.99
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00640

Parameter Name: C00640 L_NSet_1: nNOut_a		Data type: INTEGER_16 Index: 23936 _d = 5D7F _h
The L_NSet_1 FB: Display of the generated main speed setpoint at the output <i>nNOut_a</i>		
Display range (min. value unit max. value)		
-199.99	%	199.99
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00643

Parameter Name: C00643 Resp. to PLI monitoring		Data type: UNSIGNED_8 Index: 23932 _d = 5D7C _h
From version 12.00.00		
▶ Pole position identification without motion		
Selection list		
0	No Reaction	
1	Fault	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00643/1	1: Fault	Response to PLI monitoring
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00650

Parameter Name: C00650 L_Arithmetik 3-5: Function		Data type: UNSIGNED_8 Index: 23925 _d = 5D75 _h
Selection of the internal arithmetics		
Selection list		
0	$nOut_a = nIn1_a$	
1	$nOut_a = nIn1_a + nIn2_a$	
2	$nOut_a = nIn1_a - nIn2_a$	
3	$nOut_a = (nIn1_a * nIn2_a) / 100\%$	
4	$nOut_a = (nIn1_a * 1\%) / nIn2_a $	
5	$nOut_a = (nIn1_a * 100\%) / (100\% - nIn2_a)$	

Parameter Name: C00650 L_Arithmetik 3-5: Function		Data type: UNSIGNED_8 Index: 23925 _d = 5D75 _h
Subcodes	Lenze setting	Info
C00650/1	0: nOut_a = nIn1_a	L_Arithmetik 3 : Function
C00650/2	0: nOut_a = nIn1_a	L_Arithmetik 4 : Function
C00650/3	0: nOut_a = nIn1_a	L_Arithmetik 5 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00653

Parameter Name: C00653 Sensibility - Setpoint feedforward control		Data type: UNSIGNED_8 Index: 23922 _d = 5D72 _h
From version 12.00.00 Selection of the sensitivity of the differential setpoint feedforward control <ul style="list-style-type: none"> Depending on the selection, the number of indicated higher-order bits is evaluated. 		
Note: The most significant bit determines the sign of the value, the remaining bits determine the numerical value.		
Selection list		Info
0	Inactive	
1	15 bits	Bit 0 ... bit 14 are evaluated
2	14 bits	Bit 0 ... bit 13 are evaluated
3	13 bits	Bit 0 ... bit 12 are evaluated
4	12 bits	Bit 0 ... bit 11 are evaluated
5	11 Bit	Bit 0 ... bit 10 are evaluated
6	10 Bit	Bit 0 ... bit 9 are evaluated
7	9 Bit	Bit 0 ... bit 8 are evaluated
Subcodes	Lenze setting	Info
C00653/1	0: Inactive	Sensibility - Setpoint feedforward control
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00654

Parameter Name: C00654 Source of diff. setpoint feedforward control		Data type: UNSIGNED_8 Index: 23921 _d = 5D71 _h
From version 12.00.00 Selection of the process signal for the setpoint feedforward control		
Selection list		Info
0	nSpeedSetValue_a	
1	nSpeedSetValueInertia_a	The new process signal <i>nSpeedSetValueInertia_a</i> at SB LS_MotorInterface can be used to define any input value (e.g. position or process controller setpoint) for torque feedforward control.

Parameter Name: C00654 Source of diff. setpoint feedforward control		Data type: UNSIGNED_8 Index: 23921 _d = 5D71 _h
2	nSpeedSetValue_a	From version V18.00.00 onwards Precise torque feedforward control for the speed setpoint. This setting must be selected for a very dynamic application.
3	nSpeedSetValue_a	From version V18.00.00 onwards From version V15.00.00 onwards, the torque feedforward control behaves differently than in version V14.00.00 or older. This selection serves to achieve the same behaviour as in version V14.00.00 or older.
Subcodes	Lenze setting	Info
C00654/1	0: nSpeedSetValue_a	Source of diff. setpoint feedforward control
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00658

Parameter Name: C00658 PRBS amplitude	Data type: INTEGER_16 Index: 23917 _d = 5D6D _h
This code is for device-internal use only and must not be written to by the user!	

C00659

Parameter Name: C00659 PRBS duration	Data type: UNSIGNED_16 Index: 23916 _d = 5D6C _h
This code is for device-internal use only and must not be written to by the user!	

C00660

Parameter Name: C00660 L_FixSet_a_1: Analog values		Data type: INTEGER_16 Index: 23915 _d = 5D6B _h
From version 02.00.00 FB L_FixSet_a_1 : Setting of the fixed values		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00660/1	0.00 %	Fixed value 0 ... 15
C00660/...		
C00660/16		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00661

Parameter Name: C00661 L_FixSet_w_1: Fixed values		Data type: UNSIGNED_16 Index: 23914 _d = 5D6A _h
From version 02.00.00 FB L_FixSet_w_1 : Setting of the fixed values		
Setting range (min. value unit max. value)		
0		65535

Parameter Name: C00661 L_FixSet_w_1: Fixed values		Data type: UNSIGNED_16 Index: 23914 _d = 5D6A _h
Subcodes	Lenze setting	Info
C00661/1	0	Fixed value 0 ... 15
C00661/...		
C00661/16		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00662

Parameter Name: C00662 L_FixSet_w_2: Fixed values		Data type: UNSIGNED_16 Index: 23913 _d = 5D69 _h
From version 02.00.00 FB L_FixSet_w_2 : Setting of the fixed values		
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C00662/1	0	Fixed value 0 ... 15
C00662/...		
C00662/16		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00670

Parameter Name: C00670 L_OffsetGainP_1: Gain		Data type: INTEGER_32 Index: 23905 _d = 5D61 _h
The L_OffsetGainP_1 FB: Gain as multiplier of the input signal + offset		
Setting range (min. value unit max. value)		Lenze setting
-100.0000		100.0000 1.0000
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C00671

Parameter Name: C00671 L_OffsetGainP_2: Gain		Data type: INTEGER_32 Index: 23904 _d = 5D60 _h
The L_OffsetGainP_2 FB: Gain as multiplier of the input signal + offset		
Setting range (min. value unit max. value)		Lenze setting
-100.0000		100.0000 1.0000
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C00672

Parameter Name: C00672 L_OffsetGainP_3: Gain		Data type: INTEGER_32 Index: 23903 _d = 5D5F _h
The L_OffsetGainP_3 FB: Gain as multiplier of the input signal + offset		
Setting range (min. value unit max. value)		Lenze setting
-100.0000		100.0000 1.0000
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C00673

Parameter Name: C00673 L_OffsetGainPhiP 1-2: Offset		Data type: INTEGER_32 Index: 23902 _d = 5D5E _h
Angular offset (is added to the angular input signal)		
Setting range (min. value unit max. value)		
-2147483647	Incr.	2147483647
Subcodes	Lenze setting	Info
C00673/1	0 incr.	L_OffsetGainPhiP 1 : Offset
C00673/2	0 incr.	L_OffsetGainPhiP 2 : Offset
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00674

Parameter Name: C00674 L_OffsetGainPhiP 1-2: Gain		Data type: INTEGER_32 Index: 23901 _d = 5D5D _h
Angular gain as multiplier of the input signal + angular offset		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C00674/1	65536	L_OffsetGainPhiP 1 : Gain
C00674/2	65536	L_OffsetGainPhiP 2 : Gain
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00677

Parameter Name: C00677 L_GainOffsetP 1-3: Parameter		Data type: INTEGER_16 Index: 23898 _d = 5D5A _h
Gain and offset		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00677/1	100.00 %	L_GainOffsetP 1 : Gain
C00677/2	0.00 %	L_GainOffsetP 1 : Offset
C00677/3	100.00 %	L_GainOffsetP 2 : Gain
C00677/4	0.00 %	L_GainOffsetP 2 : Offset
C00677/5	100.00 %	L_GainOffsetP 3 : Gain
C00677/6	0.00 %	L_GainOffsetP 3 : Offset
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00678

Parameter Name: C00678 L_GainOffsetPhiP 1-2: Parameter		Data type: INTEGER_32 Index: 23897 _d = 5D59 _h
Gain and offset		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info

Parameter Name: C00678 L_GainOffsetPhiP 1-2: Parameter		Data type: INTEGER_32 Index: 23897 _d = 5D59 _h
C00678/1	65536	L_GainOffsetPhiP 1 : Gain
C00678/2	0	L_GainOffsetPhiP 1 : Offset
C00678/3	65536	L_GainOffsetPhiP 2 : Gain
C00678/4	0	L_GainOffsetPhiP 2 : Offset
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00679

Parameter Name: C00679 L_MulDiv_2: Parameter		Data type: INTEGER_16 Index: 23896 _d = 5D58 _h
The L_MulDiv_2 FB: Numerator and denominator		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C00679/1	0	L_MulDiv_2 : Numerator
C00679/2	10000	L_MulDiv_2 : Denominator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00680

Parameter Name: C00680 L_Compare_1: Fct.		Data type: UNSIGNED_8 Index: 23895 _d = 5D57 _h
The L_Compare_1 FB: Comparison operation		
<ul style="list-style-type: none"> If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE. 		
Selection list (Lenze setting printed in bold)		
1	In1 = In2	
2	In1 > In2	
3	In1 < In2	
4	In1 = In2	
5	In1 > In2	
6	 In1 < In2 	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00681

Parameter Name: C00681 L_Compare_1: Hysteresis		Data type: INTEGER_16 Index: 23894 _d = 5D56 _h
The L_Compare_1 FB: Hysteresis for the comparison function selected in C00680		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 0.50 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00682

Parameter Name: C00682 L_Compare_1: Window		Data type: INTEGER_16 Index: 23893 _d = 5D55 _h	
The L_Compare_1 FB: Window for the comparison function selected in C00680			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	100.00	2.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00685

Parameter Name: C00685 L_Compare_2: Fct.		Data type: UNSIGNED_8 Index: 23890 _d = 5D52 _h	
The L_Compare_2 FB: Comparison operation			
<ul style="list-style-type: none"> If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE. 			
Selection list (Lenze setting printed in bold)			
1	In1 = In2		
2	In1 > In2		
3	In1 < In2		
4	 In1 = In2 		
5	In1 > In2		
6	In1 < In2		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00686

Parameter Name: C00686 L_Compare_2: Hysteresis		Data type: INTEGER_16 Index: 23889 _d = 5D51 _h	
The L_Compare_2 FB: Hysteresis for the comparison function selected in C00685			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	100.00	0.50 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00687

Parameter Name: C00687 L_Compare_2: Window		Data type: INTEGER_16 Index: 23888 _d = 5D50 _h	
The L_Compare_2 FB: Window for the comparison function selected in C00685			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	100.00	2.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00690

Parameter Name: C00690 L_Compare_3: Function		Data type: UNSIGNED_8 Index: 23885 _d = 5D4D _h
The L_Compare_3 FB: Comparison operation • If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE.		
Selection list (Lenze setting printed in bold)		
1	In1 = In2	
2	In1 > In2	
3	In1 < In2	
4	In1 = In2	
5	In1 > In2	
6	In1 < In2	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00691

Parameter Name: C00691 L_Compare_3: Hysteresis		Data type: INTEGER_16 Index: 23884 _d = 5D4C _h
FB L_Compare_3 : Hysteresis for the comparison operation selected in C00690		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 0.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00692

Parameter Name: C00692 L_Compare_3: Window		Data type: INTEGER_16 Index: 23883 _d = 5D4B _h
FB L_Compare_3 : window for the comparison operation selected in C00690		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 0.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00693

Parameter Name: C00693 L_Compare_4-5: Function		Data type: UNSIGNED_8 Index: 23882 _d = 5D4A _h
Comparison operation • If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE.		
Selection list		
1	In1 = In2	
2	In1 > In2	
3	In1 < In2	
4	In1 = In2	
5	In1 > In2	
6	In1 < In2	
Subcodes	Lenze setting	Info
C00693/1	1: In1 = In2	L_Compare_4 : Function
C00693/2	1: In1 = In2	L_Compare_5 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00694

Parameter Name: C00694 L_Compare 4-5: Hysteresis		Data type: INTEGER_16 Index: 23881 _d = 5D49 _h
Hysteresis for the comparison operation selected in C00693		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C00694/1	0.00 %	L_Compare 4 : Hysteresis
C00694/2	0.00 %	L_Compare 5 : Hysteresis
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00695

Parameter Name: C00695 L_Compare 4-5: Window		Data type: INTEGER_16 Index: 23880 _d = 5D48 _h
Window for the comparison operation selected in C00693		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C00695/1	0.00 %	L_Compare 4 : Window
C00695/2	0.00 %	L_Compare 5 : Window
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00696

Parameter Name: C00696 L_OffsetGainP_1: Offset		Data type: INTEGER_16 Index: 23879 _d = 5D47 _h
The L_OffsetGainP_1 FB: Offset (additive to the input signal)		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99 0.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00697

Parameter Name: C00697 L_OffsetGainP_2: Offset		Data type: INTEGER_16 Index: 23878 _d = 5D46 _h
The L_OffsetGainP_2 FB: Offset (additive to the input signal)		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99 0.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00698

Parameter Name: C00698 L_OffsetGainP_3: Offset		Data type: INTEGER_16 Index: 23877 _d = 5D45 _h
The L_OffsetGainP_3 FB: Offset (additive to the input signal)		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99 0.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00699

Parameter Name: C00699 L_MulDiv_1: Parameter		Data type: INTEGER_16 Index: 23876 _d = 5D44 _h
The L_MulDiv_1 FB: Numerator and denominator		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C00699/1	0	L_MulDiv_1 : Numerator
C00699/2	10000	L_MulDiv_1 : Denominator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00700

Parameter Name: C00700 LA_NCtrl: Analog connection list		Data type: UNSIGNED_16 Index: 23876 _d = 5D43 _h
Connection parameters for "Actuating drive speed" application: 16-bit inputs <ul style="list-style-type: none"> • Selection of the 16 bit output signals to be connected to the 16 bit input signals • The selection list contains all 16 bit output signals which can be assigned to the 16 bit inputs displayed by the subcodes. 		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00700/1	20005: LS_ParFix: wDriveCtrl	LA_NCtrl : wCANDriveControl Input for control word from CAN to device control
C00700/2	20005: LS_ParFix: wDriveCtrl	LA_NCtrl : wMCIDriveControl Input for control word from communication interface to device control
C00700/3	20012: LS_ParFree_a: nC472_3_a	LA_NCtrl : nTorqueMotLim_a Input for maximum torque in motor mode
C00700/4	20013: LS_ParFree_a: nC472_4_a	LA_NCtrl : nTorqueGenLim_a Input for maximum torque in generator mode
C00700/5	0: Not connected	LA_NCtrl : nPIDVpAdapt_a Input for adapting the PID controller gain
C00700/6	0: Not connected	LA_NCtrl : nPIDActValue_a Input for actual PID controller value
C00700/7	16000: LS_AnalogInput: nIn1_a	LA_NCtrl : nMainSetValue_a Input for main speed setpoint
C00700/8	0: Not connected	LA_NCtrl : nAuxSetValue_a Input for additional speed setpoint
C00700/9	0: Not connected	LA_NCtrl : nGPAnalogSwitchIn1_a Input for analog switch - analog signal 1
C00700/10	0: Not connected	LA_NCtrl : nGPAnalogSwitchIn2_a Input for analog switch - analog signal 2
C00700/11	0: Not connected	LA_NCtrl : nGPArithmetikIn1_a Input for arithmetic function - analog signal 1
C00700/12	0: Not connected	LA_NCtrl : nGPArithmetikIn2_a Input for arithmetic function - analog signal 2
C00700/13	0: Not connected	LA_NCtrl : nGPMulDivIn_a Input for analog signal for multiplication/division
C00700/14	0: Not connected	LA_NCtrl : nGPCompareIn1_a Input for comparison operation - analog signal 1

Parameter Name: C00700 LA_NCtrl: Analog connection list		Data type: UNSIGNED_16 Index: 23875 _d = 5D43 _h
C00700/15	0: Not connected	LA_NCtrl: nGPCompareIn2_a Input for comparison operation - analog signal 2
C00700/16	0: Not connected	LA_NCtrl: nVoltageAdd_a Input for additive voltage boost
C00700/17	0: Not connected	LA_NCtrl: nPIDInfluence_a Input for influence signal of PID controller correcting variable
C00700/18	0: Not connected	LA_NCtrl: nPIDSetValue_a Input for PID controller setpoint
C00700/19	0: Not connected	LA_NCtrl: nPWMAngleOffset Input for pulse width modulation phase offset
C00700/20	0: Not connected	LA_NCtrl: nBoost_a Input for additional setpoint for motor voltage at speed = 0
C00700/21	0: Not connected	LA_NCtrl: wSMCtrl Interface to the optional safety system
C00700/22	0: Not connected	Reserved
C00700/23	0: Not connected	Reserved
C00700/24	0: Not connected	Reserved
C00700/25	0: Not connected	Reserved
C00700/26	0: Not connected	LA_NCtrl: wFreeIn1 Input for user signal 1
C00700/27	0: Not connected	LA_NCtrl: wFreeIn2 Input for user signal 2
C00700/28	0: Not connected	LA_NCtrl: wFreeIn3 Input for user signal 3
C00700/29	0: Not connected	LA_NCtrl: wFreeIn4 Input for user signal 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00701

Parameter Name: C00701 LA_NCtrl: Digital connection list		Data type: UNSIGNED_16 Index: 23874 _d = 5D42 _h
Connection parameters for "Actuating drive speed" application: Binary inputs <ul style="list-style-type: none"> • Selection of the binary output signals to be connected to the binary input signals • The selection list contains all binary output signals which can be assigned to the binary inputs mapped by the subcodes. 		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00701/1	0: Not connected	LA_NCtrl: bCInh Control input for setting controller inhibit
C00701/2	16008: LS_DigitalInput: bCInh	LA_NCtrl: bFailReset Control input for error acknowledgement
C00701/3	0: Not connected	LA_NCtrl: bSetQuickstop Control input for quick stop request
C00701/4	16002: LS_DigitalInput: bIn3	LA_NCtrl: bSetDCBrake Control input for DC-injection braking request

Parameter Name: C00701 LA_NCtrl: Digital connection list		Data type: UNSIGNED_16 Index: 23874 _d = 5D42 _h
C00701/5	0: Not connected	LA_NCtrl: bRFG_Stop Control input for stopping the speed ramp function generator
C00701/6	0: Not connected	LA_NCtrl: bRFG_0 Control input for setting the speed ramp function generator to 0
C00701/7	0: Not connected	Reserved
C00701/8	16003: LS_DigitalInput: bIn4	LA_NCtrl: bSetSpeedCcw Control input for change of direction of rotation
C00701/9	16000: LS_DigitalInput: bIn1	LA_NCtrl: bJogSpeed1 Selection input for fixed setpoints
C00701/10	16001: LS_DigitalInput: bIn2	LA_NCtrl: bJogSpeed2 Selection input for fixed setpoints
C00701/11	0: Not connected	LA_NCtrl: bJogSpeed4 Selection input for fixed setpoints
C00701/12	0: Not connected	LA_NCtrl: bJogSpeed8 Selection input for fixed setpoints
C00701/13	0: Not connected	LA_NCtrl: bJogRamp1 Selection input for additional acceleration/deceleration times
C00701/14	0: Not connected	LA_NCtrl: bJogRamp2 Selection input for additional acceleration/deceleration times
C00701/15	0: Not connected	LA_NCtrl: bJogRamp4 Selection input for additional acceleration/deceleration times
C00701/16	0: Not connected	LA_NCtrl: bJogRamp8 Selection input for additional acceleration/deceleration times
C00701/17	0: Not connected	LA_NCtrl: bMPOTInAct Control input for deactivation of motor potentiometer
C00701/18	0: Not connected	LA_NCtrl: bMPOTUp Control input for motor potentiometer ramp-up
C00701/19	0: Not connected	LA_NCtrl: bMPOTDown Control input for motor potentiometer ramp-down
C00701/20	0: Not connected	LA_NCtrl: bMBRKRelease Control input for manual holding brake release request
C00701/21	0: Not connected	LA_NCtrl: bGPFree1 Input for binary user signal
C00701/22	0: Not connected	LA_NCtrl: bGPFree2 Input for binary user signal
C00701/23	0: Not connected	LA_NCtrl: bGPAnalogSwitchSet Control input for analog-value selector change-over
C00701/24	0: Not connected	LA_NCtrl: bGPDigitalDelayIn Input for digital signal with time delay
C00701/25	0: Not connected	LA_NCtrl: bGPLogicIn1 Input signal 1 for digital logic
C00701/26	0: Not connected	LA_NCtrl: bGPLogicIn2 Input signal 2 for digital logic
C00701/27	0: Not connected	LA_NCtrl: bGPLogicIn3 Input signal 3 for digital logic

Parameter Name: C00701 LA_NCtrl: Digital connection list		Data type: UNSIGNED_16 Index: 23874 _d = 5D42 _h
C00701/28	0: Not connected	LA_NCtrl: bGPDFlipFlopInD Control input for DFlipFlop setting signal
C00701/29	0: Not connected	LA_NCtrl: bGPDFlipFlopInClk Control input for DFlipFlop clock signal
C00701/30	0: Not connected	LA_NCtrl: bGPDFlipFlopInClr Control input for DFlipFlop reset signal
C00701/31	0: Not connected	LA_NCtrl: bMPotEnable Control input for activation of motor potentiometer
C00701/32	0: Not connected	LA_NCtrl: bPIDEnableInfluenceRamp Control input for activation of influence of output correcting variable of PID controller
C00701/33	0: Not connected	LA_NCtrl: bPIDIOff Control input for deactivation of PID controller I component
C00701/34	20000: LS_ParFix: bTrue	LA_NCtrl: bRLQCw Control input for activation of CW direction of rotation of speed setpoint
C00701/35	0: Not connected	LA_NCtrl: bRLQCcw Control input for activation of CCW direction of rotation of speed setpoint
C00701/36	0: Not connected	Reserved
C00701/37	0: Not connected	Reserved
C00701/38	0: Not connected	Reserved
C00701/39	0: Not connected	Reserved
C00701/40	0: Not connected	Reserved
C00701/41	0: Not connected	LA_NCtrl: bFreeIn1 Input for binary user signal 1
C00701/42	0: Not connected	LA_NCtrl: bFreeIn2 Input for binary user signal 2
C00701/43	0: Not connected	LA_NCtrl: bFreeIn3 Input for binary user signal 3
C00701/44	0: Not connected	LA_NCtrl: bFreeIn4 Input for binary user signal 4
C00701/45	0: Not connected	LA_NCtrl: bFreeIn5 Input for binary user signal 5
C00701/46	0: Not connected	LA_NCtrl: bFreeIn6 Input for binary user signal 6
C00701/47	0: Not connected	LA_NCtrl: bFreeIn7 Input for binary user signal 7
C00701/48	0: Not connected	LA_NCtrl: bFreeIn8 Input for binary user signal 8
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00705

Parameter Name: C00705 LA_NCtrl_Out: Analog signal list		Data type: UNSIGNED_16 Index: 23870 _d = 5D3E _h
This code is for device-internal use only and must not be written to by the user!		

C00706

Parameter Name: C00706 LA_NCtrl_Out digital signal list	Data type: UNSIGNED_16 Index: 23869 _d = 5D3D _h
This code is for device-internal use only and must not be written to by the user!	

C00710

Parameter Name: C00710 LA_TabPos: Analog connection list	Data type: UNSIGNED_16 Index: 23865 _d = 5D39 _h	
Connection parameters for "Table positioning" application: 16-bit inputs <ul style="list-style-type: none"> • Selection of the 16 bit output signals to be connected to the 16 bit input signals • The selection list contains all 16 bit output signals which can be assigned to the 16 bit inputs displayed by the subcodes. 		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00710/1	0: Not connected	LA_TabPos: wCanDriveControl Input for control word from CAN to device control
C00710/2	0: Not connected	LA_TabPos: wMciDriveControl Input for control word from communication interface to device control
C00710/3	0: Not connected	LA_TabPos: nTorqueMotLim_a Input for maximum torque in motor mode
C00710/4	0: Not connected	LA_TabPos: nTorqueGenLim_a Input for maximum torque in generator mode
C00710/5	0: Not connected	LA_TabPos: nMainSetValue_a Input for main speed setpoint
C00710/6	0: Not connected	LA_TabPos: nAuxSetValue_a Input for additional speed setpoint
C00710/7	0: Not connected	LA_TabPos: wMckCtrl1 Input for MCK control word 1
C00710/8	0: Not connected	LA_TabPos: wMckCtrl2 Input for MCK control word 2
C00710/9	0: Not connected	LA_TabPos: wMckOperationMode Input for selection of MCK operating mode
C00710/10	0: Not connected	LA_TabPos: wPosProfileMode Input for selection of MCK positioning mode in positioning mode
C00710/11	0: Not connected	LA_TabPos: wPosProfileNo Input for MCK positioning profile number in positioning mode
C00710/12	0: Not connected	LA_TabPos: nGPAnalogSwitchIn1_a Input for analog switch - analog signal 1
C00710/13	0: Not connected	LA_TabPos: nGPAnalogSwitchIn2_a Input for analog switch - analog signal 2
C00710/14	0: Not connected	LA_TabPos: nGPArithmetikIn1_a Input for arithmetic function - analog signal 1
C00710/15	0: Not connected	LA_TabPos: nGPArithmetikIn2_a Input for arithmetic function - analog signal 2
C00710/16	0: Not connected	LA_TabPos: nGPMulDivIn_a Input for analog signal for multiplication/division
C00710/17	0: Not connected	LA_TabPos: nGPCompareIn1_a Input for comparison operation - analog signal 1

Parameter Name: C00710 LA_TabPos: Analog connection list		Data type: UNSIGNED_16 Index: 23865 _d = 5D39 _h
C00710/18	0: Not connected	LA_TabPos: nGPCompareIn2_a Input for comparison operation - analog signal 2
C00710/19	0: Not connected	LA_TabPos: wGPCounter1LdVal Input for load value for counter module 1
C00710/20	0: Not connected	LA_TabPos: wGPCounter1CmpVal Input for comparison value for counter module 1
C00710/21	0: Not connected	LA_TabPos: nSpeedOverride_a Input for speed override
C00710/22	0: Not connected	LA_TabPos: nAccOverride_a Input for acceleration override
C00710/23	0: Not connected	LA_TabPos: wFreeIn1 Input for user signal 1
C00710/24	0: Not connected	LA_TabPos: wFreeIn2 Input for user signal 2
C00710/25	0: Not connected	LA_TabPos: wFreeIn3 Input for user signal 3
C00710/26	0: Not connected	LA_TabPos: wFreeIn4 Input for user signal 4
C00710/27	0: Not connected	LA_TabPos: nPosCtrlOutLimit Input for correcting variable limitation of position controller
C00710/28	0: Not connected	LA_TabPos: nPosCtrlPAdapt Input for adapting the position controller gain
C00710/29	0: Not connected	LA_TabPos: wSMCtrl Interface to the optional safety system
C00710/30	0: Not connected	LA_TabPos: wPosProfileUnitsLW Input for selecting the target position in [units], Low-Word
C00710/31	0: Not connected	LA_TabPos: wPosProfileUnitsHW Input for selecting the target position in [units], High-Word
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00711

Parameter Name: C00711 LA_TabPos: Digital connection list		Data type: UNSIGNED_16 Index: 23864 _d = 5D38 _h
Connection parameters for "Table positioning" application: Binary inputs <ul style="list-style-type: none"> • Selection of the binary output signals to be connected to the binary input signals • The selection list contains all binary output signals which can be assigned to the binary inputs mapped by the subcodes. 		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00711/1	0: Not connected	LA_TabPos: bCInh Control input for setting controller inhibit
C00711/2	0: Not connected	LA_TabPos: bFailReset Control input for error acknowledgement
C00711/3	0: Not connected	LA_TabPos: bSetQuickstop Control input for quick stop request
C00711/4	0: Not connected	LA_TabPos: bSetSpeedCcw Control input for negation of speed direction

Parameter Name: C00711 LA_TabPos: Digital connection list		Data type: UNSIGNED_16 Index: 23864 _d = 5D38 _h
C00711/5	0: Not connected	LA_TabPos: bJogSpeed1 Control input for fixed speed selection value 1
C00711/6	0: Not connected	LA_TabPos: bJogSpeed2 Control input for fixed speed selection value 2
C00711/7	0: Not connected	LA_TabPos: bMPotEnable Control input for activation of motor potentiometer
C00711/8	0: Not connected	LA_TabPos: bMPotUp Control input for motor potentiometer ramp-up
C00711/9	0: Not connected	LA_TabPos: bMPotDown Control input for motor potentiometer ramp-down
C00711/10	0: Not connected	LA_TabPos: bMBrakeRelease Control input for manual holding brake release request
C00711/11	0: Not connected	LA_TabPos: bPosCtrlOn Control input for activation of position controller
C00711/12	0: Not connected	LA_TabPos: bLimitSwitchPos Input for positive hardware limit switch signal
C00711/13	0: Not connected	LA_TabPos: bLimitSwitchNeg Input for negative hardware limit switch signal
C00711/14	0: Not connected	LA_TabPos: bReleaseLimitSwitch Control input for hardware limit switch retracting request
C00711/15	0: Not connected	LA_TabPos: bManJogPos Control input for manual jog in positive direction request
C00711/16	0: Not connected	LA_TabPos: bManJogNeg Control input for manual jog in negative direction request
C00711/17	0: Not connected	LA_TabPos: bManEnable2ndSpeed Control input for activation of the second manual speed for manual jog
C00711/18	0: Not connected	LA_TabPos: bEnableSpeedOverride Control input for activation of speed override
C00711/19	0: Not connected	LA_TabPos: bEnableAccOverride Control input for activation of acceleration override
C00711/20	0: Not connected	LA_TabPos: bHomeStartStop Control input for start/stop homing
C00711/21	0: Not connected	LA_TabPos: bHomeSetPosition Control input for setting the home position
C00711/22	0: Not connected	LA_TabPos: bHomeResetPosition Control input for reset of "Home position known"
C00711/23	0: Not connected	LA_TabPos: bHomeMark Input for pre-stop signal for homing
C00711/24	0: Not connected	LA_TabPos: bPosSetProfilePosition Control input for accepting the profile position in the profile data set
C00711/25	0: Not connected	LA_TabPos: bPosSetActualPosition Control input for accepting the current position in the profile data set
C00711/26	0: Not connected	LA_TabPos: bPosExecute Control input for positioning start
C00711/27	0: Not connected	LA_TabPos: bPosFinishTarget Control input for completion of positioning to target position

Parameter Name: C00711 LA_TabPos: Digital connection list		Data type: UNSIGNED_16 Index: 23864 _d = 5D38 _h
C00711/28	0: Not connected	LA_TabPos: bPosDisableFollowProfile Control input for suppression of sequence profile linkage
C00711/29	0: Not connected	LA_TabPos: bPosStop Control input for interruption of profile generation by ramp-down procedure
C00711/30	0: Not connected	LA_TabPos: bGPAnalogSwitchSet Control input for analog-value selector change-over
C00711/31	0: Not connected	LA_TabPos: bGPDigitalDelayIn Input for digital signal with time delay
C00711/32	0: Not connected	LA_TabPos: bGPLogicIn1 Input signal 1 for digital logic
C00711/33	0: Not connected	LA_TabPos: bGPLogicIn2 Input signal 2 for digital logic
C00711/34	0: Not connected	LA_TabPos: bGPLogicIn3 Input signal 3 for digital logic
C00711/35	0: Not connected	LA_TabPos: bGPDFlipFlop_InD Control input for DFlipFlop setting signal
C00711/36	0: Not connected	LA_TabPos: bGPDFlipFlop_InClk Control input for DFlipFlop clock signal
C00711/37	0: Not connected	LA_TabPos: bGPDFlipFlop_InClr Control input for DFlipFlop reset signal
C00711/38	0: Not connected	LA_TabPos: bGPCounter1ClkUp Control input for up-counting counter module 1
C00711/39	0: Not connected	LA_TabPos: bGPCounter1ClkDown Control input for down-counting counter module 1
C00711/40	0: Not connected	LA_TabPos: bGPCounter1Load Control input for load value acceptance in counter module 1
C00711/41	0: Not connected	LA_TabPos: bMckOperationMode_1 Control input for MCK operating mode changeover value 1
C00711/42	0: Not connected	LA_TabPos: bMckOperationMode_2 Control input for MCK operating mode changeover value 2
C00711/43	0: Not connected	LA_TabPos: bMckOperationMode_4 Control input for MCK operating mode changeover value 4
C00711/44	0: Not connected	LA_TabPos: bMckOperationMode_8 Control input for MCK operating mode changeover value 8
C00711/45	0: Not connected	LA_TabPos: bPosProfileNo_1 Control input for selection of profile number value 1
C00711/46	0: Not connected	LA_TabPos: bPosProfileNo_2 Control input for selection of profile number value 2
C00711/47	0: Not connected	LA_TabPos: bPosProfileNo_4 Control input for selection of profile number value 4
C00711/48	0: Not connected	LA_TabPos: bPosProfileNo_8 Control input for selection of profile number value 8
C00711/49	0: Not connected	LA_TabPos: bFreeIn1 Input for binary user signal 1
C00711/50	0: Not connected	LA_TabPos: bFreeIn2 Input for binary user signal 2

Parameter Name: C00711 LA_TabPos: Digital connection list		Data type: UNSIGNED_16 Index: 23864 _d = 5D38 _h
C00711/51	0: Not connected	LA_TabPos: bFreeIn3 Input for binary user signal 3
C00711/52	0: Not connected	LA_TabPos: bFreeIn4 Input for binary user signal 4
C00711/53	0: Not connected	LA_TabPos: bFreeIn5 Input for binary user signal 5
C00711/54	0: Not connected	LA_TabPos: bFreeIn6 Input for binary user signal 6
C00711/55	0: Not connected	LA_TabPos: bFreeIn7 Input for binary user signal 7
C00711/56	0: Not connected	LA_TabPos: bFreeIn8 Input for binary user signal 8
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00712

Parameter Name: C00712 LA_TabPos: phi connection list		Data type: UNSIGNED_16 Index: 23863 _d = 5D37 _h
Connection parameters for "Table positioning" application: 32-bit inputs <ul style="list-style-type: none"> • Selection of the 32-bit output signals for connection with the 32-bit input signals • The selection list contains all 32-bit output signals which can be assigned to the 32-bit inputs mapped by the subcodes. 		
Selection list		
See selection list - angle signals		
Subcodes	Lenze setting	Info
C00712/1	0: Not connected	LA_TabPos: dnPosProfilePosition Input for selecting the target position in [increments]
C00712/2	0: Not connected	LA_TabPos: dnFreeIn1 Input for 32-bit user signal 1
C00712/3	0: Not connected	LA_TabPos: dnFreeIn2 Input for 32-bit user signal 2
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00715

Parameter Name: C00715 LA_TabPos_Out: Analog signal list		Data type: UNSIGNED_16 Index: 23860 _d = 5D34 _h
This code is for device-internal use only and must not be written to by the user!		

C00716

Parameter Name: C00716 LA_TabPos_Out: Digital signal list		Data type: UNSIGNED_16 Index: 23859 _d = 5D33 _h
This code is for device-internal use only and must not be written to by the user!		

C00717

Parameter Name: C00717 LA_TabPos_Out: phi signal list		Data type: UNSIGNED_16 Index: 23858 _d = 5D32 _h
This code is for device-internal use only and must not be written to by the user!		

C00720

Parameter Name: C00720 L_DigitalDelay_1: Delay		Data type: UNSIGNED_32 Index: 23855 _d = 5D2F _h
Switch-on/off delay time		
Setting range (min. value unit max. value)		
0.000	s	3600.000
Subcodes	Lenze setting	Info
C00720/1	0.000 s	L_DigitalDelay_1 : ON delay
C00720/2	0.000 s	L_DigitalDelay_1 : OFF delay
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00721

Parameter Name: C00721 L_DigitalDelay 2..3: Delay		Data type: UNSIGNED_32 Index: 23854 _d = 5D2E _h
Switch-on/off delay time		
Setting range (min. value unit max. value)		
0.000	s	3600.000
Subcodes	Lenze setting	Info
C00721/1	0.000 s	L_DigitalDelay_2 : ON delay
C00721/2	0.000 s	L_DigitalDelay_2 : OFF delay
C00721/3	0.000 s	L_DigitalDelay_3 : ON delay
C00721/4	0.000 s	L_DigitalDelay_3 : OFF delay
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00725

Parameter Name: C00725 Current switching frequency		Data type: UNSIGNED_8 Index: 23850 _d = 5D2A _h
Display of the current switching frequency		
<ul style="list-style-type: none"> • In C00018 you can choose between a drive-optimised setting for good smooth-running characteristics and an inverter loss-optimised setting (min. Pv). • Both possibilities offer fixed and variable switching frequencies. • When a variable switching frequency is selected in C00018, the switching frequency may change as a function of the load and rotational frequency. 		

Parameter Name: C00725 Current switching frequency		Data type: UNSIGNED_8 Index: 23850 _d = 5D2A _h
Selection list (read only)		
1	4 kHz var./drive-optimised	
2	8 kHz var./drive-optimised	
3	16 kHz var./drive-optimised	
5	2 kHz constant/drive-optimised	
6	4 kHz constant/drive-optimised	
7	8 kHz constant/drive-optimised	
8	16 kHz constant/drive-optimised	
11	4 kHz var./min. Pv	
12	8 kHz var./min. Pv	
13	16 kHz var./min. Pv	
14	Reserved	
15	2 kHz constant/min. Pv	
16	4 kHz constant/min. Pv	
17	8 kHz constant/min. Pv	
18	16 kHz constant/min. Pv	
21	8 kHz var./drive-opt./4 kHz min	
22	16 kHz var./drive-opt./4 kHz min	
23	16 kHz var./drive-opt./8 kHz min	
31	8 kHz var./min. Pv/4 kHz min	
32	16 kHz var./min. Pv/4 kHz min	
33	16 kHz var./min. Pv/8 kHz min	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00726

Parameter Name: C00726 Current limit values		Data type: UNSIGNED_8 Index: 23849 _d = 5D29 _h
This code is for device-internal use only and must not be written to by the user!		

C00727

Parameter Name: C00727 LS_Keypad digital values		Data type: UNSIGNED_8 Index: 23848 _d = 5D28 _h
Execution of control commands for keypad operation		
Setting range (min. value unit max. value)		
0		1
Subcodes	Lenze setting	Info
C00727/1	0	1 ≙ request quick stop
C00727/2	0	1 ≙ request DC-injection braking
C00727/3	0	1 ≙ request change of direction of rotation
C00727/4	0	1 ≙ request fixed speed setpoint 1

Parameter Name: C00727 LS_Keypad digital values		Data type: UNSIGNED_8 Index: 23848 _d = 5D28 _h
C00727/5	0	1 ≙ request fixed speed setpoint 2
C00727/6	0	1 ≙ motor potentiometer: request activation
C00727/7	0	1 ≙ motor potentiometer: request pos. acceleration
C00727/8	0	1 ≙ motor potentiometer: request neg. acceleration
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00728

Parameter Name: C00728 Keypad analog values		Data type: INTEGER_16 Index: 23847 _d = 5D27 _h
Selection of different setpoints when operating via keypad		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00728/1	100.00 %	Torque limit in motor mode
C00728/2	100.00 %	Torque limit in generator mode
C00728/3	0.00 %	Setpoint speed • 100 % ≙ C00011
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00729

Parameter Name: C00729 Remote: Setpoint selection		Data type: INTEGER_16 Index: 23846 _d = 5D26 _h
Setting range (min. value unit max. value)		
-199.99		199.99
Subcodes	Lenze setting	Info
C00729/1	0.00	Remote: Setpoint keypad
C00729/2	0.00	Remote: Setpoint PC
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00730

Parameter Name: C00730 Oscilloscope scanning interval		Data type: UNSIGNED_32 Index: 23845 _d = 5D25 _h
This code is for device-internal use only and must not be written to by the user!		

C00731

Parameter Name: C00731 Oscilloscope recording length		Data type: UNSIGNED_32 Index: 23844 _d = 5D24 _h
This code is for device-internal use only and must not be written to by the user!		

C00732

Parameter Name: C00732 Oscilloscope command		Data type: UNSIGNED_8 Index: 23843 _d = 5D23 _h
This code is for device-internal use only and must not be written to by the user!		

C00734

Parameter Name: C00734 Oscilloscope trigger channel selection	Data type: UNSIGNED_16 Index: 23841 _d = 5D21 _h
This code is for device-internal use only and must not be written to by the user!	

C00735

Parameter Name: C00735 Oscilloscope channel source type	Data type: UNSIGNED_8 Index: 23840 _d = 5D20 _h
This code is for device-internal use only and must not be written to by the user!	

C00736

Parameter Name: C00736 Oscilloscope data type/data width	Data type: UNSIGNED_16 Index: 23839 _d = 5D1F _h
This code is for device-internal use only and must not be written to by the user!	

C00740

Parameter Name: C00740 Oscilloscope offset variables	Data type: UNSIGNED_32 Index: 23835 _d = 5D1B _h
This code is for device-internal use only and must not be written to by the user!	

C00741

Parameter Name: C00741 Oscilloscope trigger mode	Data type: UNSIGNED_8 Index: 23834 _d = 5D1A _h
This code is for device-internal use only and must not be written to by the user!	

C00742

Parameter Name: C00742 Oscilloscope trigger delay	Data type: INTEGER_16 Index: 23833 _d = 5D19 _h
This code is for device-internal use only and must not be written to by the user!	

C00743

Parameter Name: C00743 Oscilloscope trigger level	Data type: UNSIGNED_32 Index: 23832 _d = 5D18 _h
This code is for device-internal use only and must not be written to by the user!	

C00744

Parameter Name: C00744 Oscilloscope trigger mask	Data type: UNSIGNED_32 Index: 23831 _d = 5D17 _h
This code is for device-internal use only and must not be written to by the user!	

C00746

Parameter Name: C00746 Oscilloscope trigger counter	Data type: UNSIGNED_32 Index: 23829 _d = 5D15 _h
This code is for device-internal use only and must not be written to by the user!	

C00747

Parameter Name: C00747 Oscilloscope status word	Data type: UNSIGNED_16 Index: 23828 _d = 5D14 _h
This code is for device-internal use only and must not be written to by the user!	

C00748

Parameter Name: C00748 Oscilloscope no. of measured values	Data type: UNSIGNED_32 Index: 23827 _d = 5D13 _h
This code is for device-internal use only and must not be written to by the user!	

C00749

Parameter Name: C00749 Oscilloscope recording	Data type: UNSIGNED_32 Index: 23826 _d = 5D12 _h
This code is for device-internal use only and must not be written to by the user!	

C00750

Parameter Name: C00750 Select. of MCTRL oscillos. channels	Data type: UNSIGNED_8 Index: 23825 _d = 5D11 _h
This code is for device-internal use only and must not be written to by the user!	

C00751

Parameter Name: C00751 Oscilloscope data memory	Data type: UNSIGNED_32 Index: 23824 _d = 5D10 _h
This code is for device-internal use only and must not be written to by the user!	

C00753

Parameter Name: C00753 Oscilloscope data memory octet string	Data type: OCTET_STRING Index: 23822 _d = 5D0E _h
This code is for device-internal use only and must not be written to by the user!	

C00760

Parameter Name: C00760 LA_SwitchPos: Analog connection list	Data type: UNSIGNED_16 Index: 23815 _d = 5D07 _h	
<p>Connection parameters for "Switch-off positioning" application: 16-bit inputs</p> <ul style="list-style-type: none"> • Selection of the 16 bit output signals to be connected to the 16 bit input signals • The selection list contains all 16 bit output signals which can be assigned to the 16 bit inputs displayed by the subcodes. 		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00760/1	0: Not connected	LA_SwitchPos : wCANDriveControl Input for control word from CAN to device control
C00760/2	0: Not connected	LA_SwitchPos : wMCIDriveControl Input for control word from communication interface to device control
C00760/3	0: Not connected	LA_SwitchPos : nVoltageAdd_a Input for additive voltage impression

Parameter Name: C00760 LA_SwitchPos: Analog connection list		Data type: UNSIGNED_16 Index: 23815 _d = 5D07 _h
C00760/4	0: Not connected	LA_SwitchPos : nBoost_a Input for additional setpoint for motor voltage at speed = 0
C00760/5	0: Not connected	LA_SwitchPos : nPWMAngleOffset Input for additional offset for the electrical angle of rotation
C00760/6	0: Not connected	LA_SwitchPos : nTorqueMotLim_a Input for maximum torque in motor mode
C00760/7	0: Not connected	LA_SwitchPos : nTorqueGenLim_a Input for maximum torque in generator mode
C00760/8	0: Not connected	LA_SwitchPos : nMainSetValue_a Input for main speed setpoint
C00760/9	0: Not connected	LA_SwitchPos : nAuxSetValue_a Input for additional speed setpoint
C00760/10	0: Not connected	LA_SwitchPos : nGPAnalogSwitchIn1_a Input for analog switch - analog signal 1
C00760/11	0: Not connected	LA_SwitchPos : nGPAnalogSwitchIn2_a Input for analog switch - analog signal 2
C00760/12	0: Not connected	LA_SwitchPos : nGPArithmetikIn1_a Input for arithmetic function - analog signal 1
C00760/13	0: Not connected	LA_SwitchPos : nGPArithmetikIn2_a Input for arithmetic function - analog signal 2
C00760/14	0: Not connected	LA_SwitchPos : nGPMulDivIn_a Input for analog signal for multiplication/division
C00760/15	0: Not connected	LA_SwitchPos : nGPCompareIn1_a Input for comparison operation - analog signal 1
C00760/16	0: Not connected	LA_SwitchPos : nGPCompareIn2_a Input for comparison operation - analog signal 2
C00760/17	0: Not connected	LA_SwitchPos : wSMCtrl Interface to the optional safety system
C00760/18	0: Not connected	Reserved
C00760/19	0: Not connected	Reserved
C00760/20	0: Not connected	Reserved
C00760/21	0: Not connected	Reserved
C00760/22	0: Not connected	LA_SwitchPos : wFreeIn1 Input for user signal 1
C00760/23	0: Not connected	LA_SwitchPos : wFreeIn2 Input for user signal 2
C00760/24	0: Not connected	LA_SwitchPos : wFreeIn3 Input for user signal 3
C00760/25	0: Not connected	LA_SwitchPos : wFreeIn4 Input for user signal 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00761

Parameter Name: C00761 LA_SwitchPos: Digital connection list		Data type: UNSIGNED_16 Index: 23814 _d = 5D06 _h
Connection parameters for "Switch-off positioning" application: Binary inputs <ul style="list-style-type: none"> • Selection of the binary output signals to be connected to the binary input signals • The selection list contains all binary output signals which can be assigned to the binary inputs mapped by the subcodes. 		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00761/1	0: Not connected	LA_SwitchPos : bCI _{inh} Control input for setting controller inhibit
C00761/2	0: Not connected	LA_SwitchPos : bFailReset Control input for error acknowledgement
C00761/3	0: Not connected	LA_SwitchPos : bSetQuickstop Control input for quick stop request
C00761/4	0: Not connected	LA_SwitchPos : bSetDCBrake Control input for DC-injection braking request
C00761/5	0: Not connected	LA_SwitchPos : bRFG_Stop Control input for stopping the speed ramp function generator
C00761/6	0: Not connected	LA_SwitchPos : bSetSpeedCcw Control input for change of direction of rotation
C00761/7	0: Not connected	LA_SwitchPos : bRLQCw Control input for activation of CW rotation (fail-safe)
C00761/8	0: Not connected	LA_SwitchPos : bRLQCcw Control input for activation of CCW rotation (fail-safe)
C00761/9	0: Not connected	LA_SwitchPos : bJogCtrlInputSel1 Selection input 1 for binary coded selection of the switch-off position 1 ... 3
C00761/10	0: Not connected	LA_SwitchPos : bJogCtrlInputSel2 Selection input 2 for binary coded selection of the switch-off position 1 ... 3
C00761/11	0: Not connected	LA_SwitchPos : bJogCtrlRf _{gln} Control input for setpoint generator ramp-down
C00761/12	0: Not connected	LA_SwitchPos : bJogCtrlJog1 Selection input 1 for overriding fixed setpoints (JOG setpoints) for the main setpoint
C00761/13	0: Not connected	LA_SwitchPos : bJogCtrlJog2 Selection input 2 for overriding fixed setpoints (JOG setpoints) for the main setpoint
C00761/14	0: Not connected	LA_SwitchPos : bJogCtrlSlowDown1 Control input for selection of pre-switch off 1
C00761/15	0: Not connected	LA_SwitchPos : bJogCtrlStop1 Control input for stop function 1
C00761/16	0: Not connected	LA_SwitchPos : bJogCtrlSlowDown2 Control input for selection of pre-switch off 2
C00761/17	0: Not connected	LA_SwitchPos : bJogCtrlStop2 Control input for stop function 2
C00761/18	0: Not connected	LA_SwitchPos : bJogCtrlSlowDown3 Control input for selection of pre-switch off 3
C00761/19	0: Not connected	LA_SwitchPos : bJogCtrlStop3 Control input for stop function 3

Parameter Name: C00761 LA_SwitchPos: Digital connection list		Data type: UNSIGNED_16 Index: 23814 _d = 5D06 _h
C00761/20	0: Not connected	LA_SwitchPos: bJogSpeed4 Selection input for fixed setpoints
C00761/21	0: Not connected	LA_SwitchPos: bJogSpeed8 Selection input for fixed setpoints
C00761/22	0: Not connected	LA_SwitchPos: bJogRamp1 Selection input for additional acceleration/deceleration times
C00761/23	0: Not connected	LA_SwitchPos: bJogRamp2 Selection input for additional acceleration/deceleration times
C00761/24	0: Not connected	LA_SwitchPos: bJogRamp4 Selection input for additional acceleration/deceleration times
C00761/25	0: Not connected	LA_SwitchPos: bJogRamp8 Selection input for additional acceleration/deceleration times
C00761/26	0: Not connected	LA_SwitchPos: bMBrkRelease Control input for manual holding brake release request
C00761/27	0: Not connected	LA_SwitchPos: bGPAnalogSwitchSet Control input for analog-value selector change-over
C00761/28	0: Not connected	LA_SwitchPos: bGPDigitalDelayIn Input for digital signal with time delay
C00761/29	0: Not connected	LA_SwitchPos: bGPLogicIn1 Input signal 1 for digital logic
C00761/30	0: Not connected	LA_SwitchPos: bGPLogicIn2 Input signal 2 for digital logic
C00761/31	0: Not connected	LA_SwitchPos: bGPLogicIn3 Input signal 3 for digital logic
C00761/32	0: Not connected	LA_SwitchPos: bGPDFlipFlop_InD Control input for DFlipFlop setting signal
C00761/33	0: Not connected	LA_SwitchPos: bGPDFlipFlop_InClk Control input for DFlipFlop clock signal
C00761/34	0: Not connected	LA_SwitchPos: bGPDFlipFlop_InClr Control input for DFlipFlop reset signal
C00761/35	0: Not connected	Reserved
C00761/36	0: Not connected	Reserved
C00761/37	0: Not connected	Reserved
C00761/38	0: Not connected	Reserved
C00761/39	0: Not connected	Reserved
C00761/40	0: Not connected	LA_SwitchPos: bFreeIn1 Input for binary user signal 1
C00761/41	0: Not connected	LA_SwitchPos: bFreeIn2 Input for binary user signal 2
C00761/42	0: Not connected	LA_SwitchPos: bFreeIn3 Input for binary user signal 3
C00761/43	0: Not connected	LA_SwitchPos: bFreeIn4 Input for binary user signal 4
C00761/44	0: Not connected	LA_SwitchPos: bFreeIn5 Input for binary user signal 5
C00761/45	0: Not connected	LA_SwitchPos: bFreeIn6 Input for binary user signal 6

Parameter Name: C00761 LA_SwitchPos: Digital connection list		Data type: UNSIGNED_16 Index: 23814 _d = 5D06 _h
C00761/46	0: Not connected	LA_SwitchPos : bFreeIn7 Input for binary user signal 7
C00761/47	0: Not connected	LA_SwitchPos : bFreeIn8 Input for binary user signal 8
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00762

Parameter Name: C00762 LA_SwitchPos: phi connection list		Data type: UNSIGNED_16 Index: 23813 _d = 5D05 _h
This code is for device-internal use only and must not be written to by the user!		

C00765

Parameter Name: C00765 LA_SwitchPos_Out: Analog signal list		Data type: UNSIGNED_16 Index: 23810 _d = 5D02 _h
This code is for device-internal use only and must not be written to by the user!		

C00766

Parameter Name: C00766 LA_SwitchPos_Out: Digital signal list		Data type: UNSIGNED_16 Index: 23809 _d = 5D01 _h
This code is for device-internal use only and must not be written to by the user!		

C00767

Parameter Name: C00767 LA_SwitchPos_Out: phi signal list		Data type: UNSIGNED_16 Index: 23808 _d = 5D00 _h
This code is for device-internal use only and must not be written to by the user!		

C00800

Parameter Name: C00800 L_MPot_1: Upper limit		Data type: INTEGER_16 Index: 23775 _d = 5CDF _h
The L_MPot_1 FB: Upper limit of the motor potentiometer function		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99
		100.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00801

Parameter Name: C00801 L_MPot_1: Lower limit		Data type: INTEGER_16 Index: 23774 _d = 5CDE _h
The L_MPot_1 FB: Lower limit of the motor potentiometer function		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99
		-100.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00802

Parameter Name: C00802 L_MPot_1: Acceleration time		Data type: UNSIGNED_16 Index: 23773 _d = 5CDD _h	
The L_MPot_1 FB: Acceleration time of the motor potentiometer function			
Setting range (min. value unit max. value)		Lenze setting	
0.1	s	6000.0	10.0 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10			

C00803

Parameter Name: C00803 L_MPot_1: Deceleration time		Data type: UNSIGNED_16 Index: 23772 _d = 5CDD _h	
The L_MPot_1 FB: Deceleration time of the motor potentiometer function			
Setting range (min. value unit max. value)		Lenze setting	
0.1	s	6000.0	10.0 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10			

C00804

Parameter Name: C00804 L_MPot_1: Inactive fct.		Data type: UNSIGNED_8 Index: 23771 _d = 5CDA _h	
The L_MPot_1 FB: Selection of the response if the motor potentiometer is deactivated via input <i>blnAct</i>			
Selection list (Lenze setting printed in bold)		Info	
0	Retain value	Keep output value	
1	Deceleration to 0	Deceleration via ramp to 0	
2	Deceleration to lower limit	Deceleration via ramp to the lower limit (C00801)	
3	Without ramp to 0	Step change to 0	
4	Without ramp to lower limit	Jump to lower limit (C00800)	
5	Acceleration to upper limit	Acceleration via ramp to upper limit (C00800)	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00805

Parameter Name: C00805 L_MPot_1: Init fct.		Data type: UNSIGNED_8 Index: 23770 _d = 5CDA _h	
The L_MPot_1 FB: Selection of the response at device switch-on			
Selection list (Lenze setting printed in bold)			
0	Load last value		
1	Load lower limit		
2	Load 0		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00806

Parameter Name: C00806 L_MPot_1: Use		Data type: UNSIGNED_8 Index: 23769 _d = 5CD9 _h
The L_MPot_1 FB: Use of the motor potentiometer		
Selection list (Lenze setting printed in bold)		Info
0	No	The motor potentiometer is not used. • The analog value applied to the <i>nIn_a</i> input is looped through without any changes to the <i>nOut_a</i> output.
1	Yes	The motor potentiometer is used. • The analog value applied at the <i>nIn_a</i> input is led via the motor potentiometer and provided at the <i>nOut_a</i> output.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00807

Parameter Name: C00807 L_NLim_1: Max.SkipFrq.		Data type: INTEGER_16 Index: 23768 _d = 5CD8 _h
FB L_NLim_1 : Maximum blocking frequencies		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C00807/1	0.00 %	Maximum blocking frequency for zone 1
C00807/2	0.00 %	Maximum blocking frequency for zone 2
C00807/3	0.00 %	Maximum blocking frequency for zone 3
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00808

Parameter Name: C00808 L_NLim_1: Min.SkipFrq.		Data type: INTEGER_16 Index: 23767 _d = 5CD7 _h
FB L_NLim_1 : Minimum skip frequencies		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C00808/1	0.00 %	Minimum blocking frequency for zone 1
C00808/2	0.00 %	Minimum blocking frequency for zone 2
C00808/3	0.00 %	Minimum blocking frequency for zone 2
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00809

Parameter Name: C00809 L_NLim_2: Max.SkipFrq.		Data type: INTEGER_16 Index: 23766 _d = 5CD6 _h
FB L_NLim_2 : Maximum skip frequencies		
Setting range (min. value unit max. value)		
0.00	%	199.99

Parameter Name: C00809 L_NLim_2: Max.SkipFrq.		Data type: INTEGER_16 Index: 23766 _d = 5CD6 _h
Subcodes	Lenze setting	Info
C00809/1	0.00 %	Maximum blocking frequency for zone 1
C00809/2	0.00 %	Maximum blocking frequency for zone 2
C00809/3	0.00 %	Maximum blocking frequency for zone 3
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00810

Parameter Name: C00810 L_NLim_2: Min.SkipFrq.		Data type: INTEGER_16 Index: 23765 _d = 5CD5 _h
FB L_NLim_2 : Minimum skip frequencies		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C00810/1	0.00 %	Minimum blocking frequency for zone 1
C00810/2	0.00 %	Minimum blocking frequency for zone 2
C00810/3	0.00 %	Minimum blocking frequency for zone 3
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00811

Parameter Name: C00811 L_NLim_1: Current output value		Data type: INTEGER_16 Index: 23764 _d = 5CD4 _h
From version 12.00.00		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Info	
C00811/1	L_NLim_1 : Current output value	
C00811/2	L_NLim_2 : Current output value	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00812

Parameter Name: C00812 L_NLim: Current status		Data type: UNSIGNED_16 Index: 23763 _d = 5CD3 _h
From version 12.00.00		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00812 L_NLim: Current status		Data type: UNSIGNED_16 Index: 23763 _d = 5CD3 _h
Value is bit-coded:		
Bit 0	No blocking zone active	
Bit 1	Blocking zone 1 active	
Bit 2	Blocking zone 2 active	
Bit 3	Blocking zone 3 active	
Bit 4	Value in blocking zone	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes		Info
C00812/1		L_NLim_1 : Current status
C00812/2		L_NLim_2 : Current status
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00820

Parameter Name: C00820 L_DigitalLogic_1: Function		Data type: UNSIGNED_8 Index: 23755 _d = 5CCB _h
The L_DigitalLogic_1 FB: Selection of the internal logic function		
Selection list (Lenze setting printed in bold)		Info
0	bOut = 0	Constant value "FALSE"
1	bOut = 1	Constant value "TRUE"
2	bOut = bIn1 AND bIn2 AND bIn3	AND operation
3	bOut = bIn1 OR bIn2 OR bIn3	OR operation
4	bOut = f (truth table)	The truth table parameterised in C00821 is used.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00821

Parameter Name: C00821 L_DigitalLogic_1: Truth table		Data type: UNSIGNED_8 Index: 23754 _d = 5CCA _h
The L_DigitalLogic_1 FB: Parameterisation of the truth table		
Selection list		
0	False	
1	True	
Subcodes		Info
C00821/1	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=0 0 0
C00821/2	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=0 0 1

Parameter Name: C00821 L_DigitalLogic_1: Truth table		Data type: UNSIGNED_8 Index: 23754 _d = 5CCA _h
C00821/3	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=0 1 0
C00821/4	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=0 1 1
C00821/5	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=1 0 0
C00821/6	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=1 0 1
C00821/7	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=1 1 0
C00821/8	0: FALSE	L_DigitalLogic_1 : bOut: bIn3...bIn1=1 1 1
C00821/9	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=0 0 0
C00821/10	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=0 0 1
C00821/11	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=0 1 0
C00821/12	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=0 1 1
C00821/13	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=1 0 0
C00821/14	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=1 0 1
C00821/15	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=1 1 0
C00821/16	0: FALSE	L_DigitalLogic_1 : bOut2: bIn3...bIn1=1 1 1
C00821/17	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=0 0 0
C00821/18	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=0 0 1
C00821/19	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=0 1 0
C00821/20	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=0 1 1
C00821/21	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=1 0 0
C00821/22	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=1 0 1
C00821/23	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=1 1 0
C00821/24	0: FALSE	L_DigitalLogic_1 : bOut3: bIn3...bIn1=1 1 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00822

Parameter Name: C00822 L_DigitalLogic_2: Function		Data type: UNSIGNED_8 Index: 23753 _d = 5CC9 _h
The L_DigitalLogic_2 FB: Selection of the internal logic function		
Selection list (Lenze setting printed in bold)		Info
0	bOut = 0	Constant value "FALSE"
1	bOut = 1	Constant value "TRUE"
2	bOut = bIn1 AND ... bIn3	AND operation
3	bOut = bIn1 OR ... bIn3	OR operation
4	bOut = f (truth table)	The truth table parameterised in C00823 is used.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00823

Parameter Name: C00823 L_DigitalLogic_2: Truth table		Data type: UNSIGNED_8 Index: 23752 _d = 5CC8 _h
The L_DigitalLogic_2 FB: Parameterisation of the truth table		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info

Parameter Name: C00823 L_DigitalLogic_2: Truth table		Data type: UNSIGNED_8 Index: 23752 _d = 5CC8 _h
C00823/1	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=0 0 0
C00823/2	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=0 0 1
C00823/3	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=0 1 0
C00823/4	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=0 1 1
C00823/5	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=1 0 0
C00823/6	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=1 0 1
C00823/7	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=1 1 0
C00823/8	0: FALSE	L_DigitalLogic_2 : bOut: bIn3...bIn1=1 1 1
C00823/9	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=0 0 0
C00823/10	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=0 0 1
C00823/11	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=0 1 0
C00823/12	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=0 1 1
C00823/13	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=1 0 0
C00823/14	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=1 0 1
C00823/15	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=1 1 0
C00823/16	0: FALSE	L_DigitalLogic_2 : bOut2: bIn3...bIn1=1 1 1
C00823/17	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=0 0 0
C00823/18	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=0 0 1
C00823/19	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=0 1 0
C00823/20	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=0 1 1
C00823/21	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=1 0 0
C00823/22	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=1 0 1
C00823/23	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=1 1 0
C00823/24	0: FALSE	L_DigitalLogic_2 : bOut3: bIn3...bIn1=1 1 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00824

Parameter Name: C00824 L_DigitalLogic5_1: Function		Data type: UNSIGNED_8 Index: 23751 _d = 5CC7 _h
FB L_DigitalLogic5_1 : Selection of the interna logic operation		
Selection list (Lenze setting printed in bold)		Info
0	bOut = 0	
1	bOut = 1	
2	bOut = f (truth table)	The truth table parameterised in C00825 is used.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00825

Parameter Name: C00825 L_DigitalLogic5_1: Truth table		Data type: UNSIGNED_8 Index: 23750 _d = 5CC6 _h
FB L_DigitalLogic5_1 : Parameter setting of the truth table		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info

Parameter Name: C00825 L_DigitalLogic5_1: Truth table		Data type: UNSIGNED_8 Index: 23750 _d = 5CC6 _h
C00825/1	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 0 0 0
C00825/2	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 0 0 1
C00825/3	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 0 1 0
C00825/4	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 0 1 1
C00825/5	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 1 0 0
C00825/6	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 1 0 1
C00825/7	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 1 1 0
C00825/8	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 0 1 1 1
C00825/9	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 0 0 0
C00825/10	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 0 0 1
C00825/11	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 0 1 0
C00825/12	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 0 1 1
C00825/13	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 1 0 0
C00825/14	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 1 0 1
C00825/15	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 1 1 0
C00825/16	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=0 1 1 1 1
C00825/17	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 0 0 0
C00825/18	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 0 0 1
C00825/19	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 0 1 0
C00825/20	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 0 1 1
C00825/21	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 1 0 0
C00825/22	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 1 0 1
C00825/23	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 1 1 0
C00825/24	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 0 1 1 1
C00825/25	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 0 0 0
C00825/26	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 0 0 1
C00825/27	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 0 1 0
C00825/28	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 0 1 1
C00825/29	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 1 0 0
C00825/30	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 1 0 1
C00825/31	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 1 1 0
C00825/32	0: FALSE	L_DigitalLogic5_1 : bln5...bln1=1 1 1 1 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		Scaling factor: 1

C00826

Parameter Name: C00826 L_DigitalLogic5_2: Function		Data type: UNSIGNED_8 Index: 23749 _d = 5CC5 _h
FB L_DigitalLogic5_2 : Selection of the interna logic operation		
Selection list (Lenze setting printed in bold)		Info
0	bOut = 0	
1	bOut = 1	
2	bOut = f (truth table)	The truth table parameterised in C00827 is used.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		Scaling factor: 1

C00827

Parameter Name: C00827 L_DigitalLogic5_2: Truth table		Data type: UNSIGNED_8 Index: 23748 _d = 5CC4 _h
FB L_DigitalLogic5_2 : Parameter setting of the truth table		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info
C00827/1	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 0 0 0
C00827/2	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 0 0 1
C00827/3	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 0 1 0
C00827/4	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 0 1 1
C00827/5	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 1 0 0
C00827/6	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 1 0 1
C00827/7	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 1 1 0
C00827/8	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 0 1 1 1
C00827/9	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 0 0 0
C00827/10	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 0 0 1
C00827/11	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 0 1 0
C00827/12	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 0 1 1
C00827/13	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 1 0 0
C00827/14	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 1 0 1
C00827/15	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 1 1 0
C00827/16	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=0 1 1 1 1
C00827/17	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 0 0 0
C00827/18	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 0 0 1
C00827/19	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 0 1 0
C00827/20	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 0 1 1
C00827/21	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 1 0 0
C00827/22	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 1 0 1
C00827/23	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 1 1 0
C00827/24	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 0 1 1 1
C00827/25	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 0 0 0
C00827/26	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 0 0 1
C00827/27	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 0 1 0
C00827/28	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 0 1 1
C00827/29	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 1 0 0
C00827/30	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 1 0 1
C00827/31	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 1 1 0
C00827/32	0: FALSE	L_DigitalLogic5_2 : bln5...bln1=1 1 1 1 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00828

Parameter Name: C00828 L_DigitalLogic_3: Function		Data type: UNSIGNED_8 Index: 23747 _d = 5CC3 _h
From version 12.00.00 The L_DigitalLogic_3 FB: Selection of the internal logic function		
Selection list (Lenze setting printed in bold)		Info
0	bOut = 0	Constant value "FALSE"
1	bOut = 1	Constant value "TRUE"
2	bOut = bIn1 AND bIn2 AND bIn3	AND operation
3	bOut = bIn1 OR bIn2 OR bIn3	OR operation
4	bOut = f (truth table)	The truth table parameterised in C00829 is used.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00829

Parameter Name: C00829 L_DigitalLogic_3: Truth table		Data type: UNSIGNED_8 Index: 23746 _d = 5CC2 _h
From version 12.00.00 The L_DigitalLogic_3 FB: Parameterisation of the truth table		
Selection list		Info
0	False	
1	True	
Subcodes	Lenze setting	Info
C00829/1	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=0 0 0
C00829/2	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=0 0 1
C00829/3	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=0 1 0
C00829/4	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=0 1 1
C00829/5	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=1 0 0
C00829/6	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=1 0 1
C00829/7	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=1 1 0
C00829/8	0: FALSE	L_DigitalLogic_3 : bOut: bIn3...bIn1=1 1 1
C00829/9	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=0 0 0
C00829/10	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=0 0 1
C00829/11	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=0 1 0
C00829/12	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=0 1 1
C00829/13	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=1 0 0
C00829/14	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=1 0 1
C00829/15	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=1 1 0
C00829/16	0: FALSE	L_DigitalLogic_3 : bOut2: bIn3...bIn1=1 1 1
C00829/17	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=0 0 0
C00829/18	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=0 0 1
C00829/19	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=0 1 0
C00829/20	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=0 1 1

Parameter Name: C00829 L_DigitalLogic_3: Truth table		Data type: UNSIGNED_8 Index: 23746 _d = 5CC2 _h
C00829/21	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=1 0 0
C00829/22	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=1 0 1
C00829/23	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=1 1 0
C00829/24	0: FALSE	L_DigitalLogic_3 : bOut3: bIn3...bIn1=1 1 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00830

Parameter Name: C00830 16-bit inputs [%]		Data type: INTEGER_16 Index: 23745 _d = 5CC1 _h
Display in percent of 16-bit input values of different blocks		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00830/1		L_Absolut_1 : nIn_a
C00830/2		L_AddSub_1 : nIn1_a
C00830/3		L_AddSub_1 : nIn2_a
C00830/4		L_AddSub_1 : nIn3_a
C00830/5		L_OffsetGain_1 : nIn_a
C00830/6		L_OffsetGain_1 : nOffset_a
C00830/7		L_OffsetGain_1 : nGain_a
C00830/8		L_Negation_1 : nIn_a
C00830/9		L_GainOffset_1 : nIn_a
C00830/10		L_GainOffset_1 : nGain_a
C00830/11		L_GainOffset_1 : nOffset_a
C00830/12		L_Arithmetik_1 : nIn1_a
C00830/13		L_Arithmetik_1 : nIn2_a
C00830/14		L_AnalogSwitch_1 : nIn1_a
C00830/15		L_AnalogSwitch_1 : nIn2_a
C00830/16		L_Compare_1 : nIn1_a
C00830/17		L_Compare_1 : nIn2_a
C00830/18		MCTRL : nTorqueLimitAdapt_a
C00830/19		Reserved
C00830/20		MCTRL : nPosCtrlPAdapt_a
C00830/21		MCTRL : nPosCtrlOutLimit_a
C00830/22		MCTRL : nSpeedSetValue_a
C00830/23		MCTRL : nSpeedLowLimit_a
C00830/24		MCTRL : nSpeedCtrlI_a
C00830/25		MCTRL : nSpeedCtrlPAdapt_a
C00830/26		MCTRL : nBoost_a
C00830/27		MCTRL : nTorqueSetValue_a
C00830/28		MCTRL : nTorqueGenLimit_a
C00830/29		MCTRL : nTorqueMotLimit_a
C00830/30		Reserved
C00830/31		MCTRL : nVoltageAdd_a

Parameter Name: C00830 16-bit inputs [%]	Data type: INTEGER_16 Index: 23745 _d = 5CC1 _h
C00830/32	MCTRL : nPWMAngleOffset_a
C00830/33	L_NSet_1 : nClnhVal_a
C00830/34	L_NSet_1 : nNSet_a
C00830/35	L_NSet_1 : nSet_a
C00830/36	L_NSet_1 : nNAdd_a
C00830/37	DCTRL : wCANControl
C00830/38	DCTRL : wCCMControl
C00830/39	L_NLim_1 : nIn_a
C00830/40	Reserved
C00830/41	L_Compare_2 : nIn1_a
C00830/42	L_Compare_2 : nIn2_a
C00830/43	L_Compare_3 : nIn1_a
C00830/44	L_Compare_3 : nIn2_a
C00830/45	L_AnalogSwitch_2 : nIn1_a
C00830/46	L_AnalogSwitch_2 : nIn2_a
C00830/47	L_AnalogSwitch_3 : nIn1_a
C00830/48	L_AnalogSwitch_3 : nIn2_a
C00830/49	L_Arithmetik_2 : nIn1_a
C00830/50	L_Arithmetik_2 : nIn2_a
C00830/51	Reserved
C00830/52	Reserved
C00830/53	L_GainOffset_2 : nIn_a
C00830/54	L_GainOffset_2 : nGain_a
C00830/55	L_GainOffset_2 : nOffset_a
C00830/56	L_OffsetGainP_1 : nIn_a
C00830/57	L_OffsetGainP_2 : nIn_a
C00830/58	L_OffsetGain_2 : nIn_a
C00830/59	L_OffsetGain_2 : nOffset_a
C00830/60	L_OffsetGain_2 : nGain_a
C00830/61	L_PCTRL_1 : nAct_a
C00830/62	L_PCTRL_1 : nAdapt_a
C00830/63	L_PCTRL_1 : nSet_a
C00830/64	L_PCTRL_1 : nInfluence_a
C00830/65	MCK: nSpeedCtrlI_a
C00830/66	MCK: nPWMAngleOffset_a
C00830/67	Reserved
C00830/68	MCK: nMBrakeAddValue_a
C00830/69	MCK: nTorqueSetValue_a
C00830/70	MCK: nTorqueLimitAdapt_a
C00830/71	MCK: nSRampOverride_a
C00830/72	MCK: nSpeedSetValue_a
C00830/73	MCK: wMotionCtrl2
C00830/74	MCK: wMotionCtrl1
C00830/75	MCK: nSpeedOverride_a

Parameter Name: C00830 16-bit inputs [%]		Data type: INTEGER_16 Index: 23745 _d = 5CC1 _h
C00830/76	MCK: nAccOverride_a	
C00830/77	MCK: nSpeedAdd_v	
C00830/78	MCK: wAuxCtrl	
C00830/79	MCK: wSMCtrl	
C00830/80	L_OffsetGainP_3 : nIn_a	
C00830/81	L_MPot_1 : nIn_a	
C00830/82	L_MulDiv_1 : nIn_a	
C00830/83	LS_DataAccess: wIn1 (Lenze-internal)	
C00830/84	LS_DataAccess: wIn2 (Lenze-internal)	
C00830/85	LS_DataAccess: wIn3 (Lenze-internal)	
C00830/86	LS_DataAccess: wIn4 (Lenze-internal)	
C00830/87	L_PT1_1 : nIn_a	
C00830/88	MCTRL : nSpeedHighLimit_a	
C00830/89	L_PCTRL_1 : nNSet_a	
C00830/90	L_PCTRL_1 : nISet_a	
C00830/91	L_Interpolator_1 : nPhdIn_v	
C00830/92	L_Interpolator_1 : nNIn_a	
C00830/93	L_SMStateDecoder_1: wState	
C00830/94	L_SMStateDecoderIO_1: wIOState	
C00830/95	L_SMControlDecoder_1: wControl	
C00830/96	MCTRL : nInertiaAdapt_a	
C00830/97	MCTRL : nSpeedSetValueInertia_a	
C00830/98	Reserved	
C00830/99	Reserved	
C00830/100	Reserved	
C00830/101	Reserved	
C00830/102	Reserved	
C00830/103	Reserved	
C00830/104	Reserved	
C00830/105	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00831

Parameter Name: C00831 16-bit inputs		Data type: UNSIGNED_16 Index: 23744 _d = 5CC0 _h
Decimal/hexadecimal/bit coded display of 16 bit input values of various blocks		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF

Parameter Name: C00831 16-bit inputs		Data type: UNSIGNED_16 Index: 23744 _d = 5C0 _h
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes	Info	
C00831/1	L Absolut 1 : nIn_a	
C00831/2	L AddSub 1 : nIn1_a	
C00831/3	L AddSub 1 : nIn2_a	
C00831/4	L AddSub 1 : nIn3_a	
C00831/5	L OffsetGain 1 : nIn_a	
C00831/6	L OffsetGain 1 : nOffset_a	
C00831/7	L OffsetGain 1 : nGain_a	
C00831/8	L Negation 1 : nIn_a	
C00831/9	L GainOffset 1 : nIn_a	
C00831/10	L GainOffset 1 : nGain_a	
C00831/11	L GainOffset 1 : nOffset_a	
C00831/12	L Arithmetik 1 : nIn1_a	
C00831/13	L Arithmetik 1 : nIn2_a	
C00831/14	L AnalogSwitch 1 : nIn1_a	
C00831/15	L AnalogSwitch 1 : nIn2_a	
C00831/16	L Compare 1 : nIn1_a	
C00831/17	L Compare 1 : nIn2_a	
C00831/18	MCTRL : nTorqueLimitAdapt_a	
C00831/19	Reserved	
C00831/20	MCTRL : nPosCtrlPAdapt_a	
C00831/21	MCTRL : nPosCtrlOutLimit_a	
C00831/22	MCTRL : nSpeedSetValue_a	
C00831/23	MCTRL : nSpeedLowLimit_a	
C00831/24	MCTRL : nSpeedCtrlI_a	
C00831/25	MCTRL : nSpeedCtrlPAdapt_a	
C00831/26	MCTRL : nBoost_a	
C00831/27	MCTRL : nTorqueSetValue_a	
C00831/28	MCTRL : nTorqueGenLimit_a	
C00831/29	MCTRL : nTorqueMotLimit_a	
C00831/30	Reserved	
C00831/31	MCTRL : nVoltageAdd_a	
C00831/32	MCTRL : nPWMAngleOffset_a	
C00831/33	L NSet 1 : nCInhVal_a	
C00831/34	L NSet 1 : nNSet_a	
C00831/35	L NSet 1 : nSet_a	
C00831/36	L NSet 1 : nNAdd_a	
C00831/37	DCTRL : wCANControl	
C00831/38	DCTRL : wMCIControl	
C00831/39	L NLim 1 : nIn_a	

Parameter Name: C00831 16-bit inputs		Data type: UNSIGNED_16 Index: 23744 _d = 5C0 _h
C00831/40	Reserved	
C00831/41	L Compare 2 : nIn1_a	
C00831/42	L Compare 2 : nIn2_a	
C00831/43	L Compare 3 : nIn1_a	
C00831/44	L Compare 3 : nIn2_a	
C00831/45	L AnalogSwitch 2 : nIn1_a	
C00831/46	L AnalogSwitch 2 : nIn2_a	
C00831/47	L AnalogSwitch 3 : nIn1_a	
C00831/48	L AnalogSwitch 3 : nIn2_a	
C00831/49	L Arithmetik 2 : nIn1_a	
C00831/50	L Arithmetik 2 : nIn2_a	
C00831/51	Reserved	
C00831/52	Reserved	
C00831/53	L GainOffset 2 : nIn_a	
C00831/54	L GainOffset 2 : nGain_a	
C00831/55	L GainOffset 2 : nOffset_a	
C00831/56	L OffsetGainP 1 : nIn_a	
C00831/57	L OffsetGainP 2 : nIn_a	
C00831/58	L OffsetGain 2 : nIn_a	
C00831/59	L OffsetGain 2 : nOffset_a	
C00831/60	L OffsetGain 2 : nGain_a	
C00831/61	L PCTRL 1 : nAct_a	
C00831/62	L PCTRL 1 : nAdapt_a	
C00831/63	L PCTRL 1 : nSet_a	
C00831/64	L PCTRL 1 : nInfluence_a	
C00831/65	MCK: nSpeedCtrl_a	
C00831/66	MCK: nPWMAngleOffset_a	
C00831/67	Reserved	
C00831/68	MCK: nBrkTorqueAdd_a	
C00831/69	MCK: nTorqueSetValue_a	
C00831/70	MCK: nTorqueLimitAdapt_a	
C00831/71	MCK: nSRampOverride_a	
C00831/72	MCK: nSpeedSetValue_a	
C00831/73	MCK: wMotionCtrl2	
C00831/74	MCK: wMotionCtrl1	
C00831/75	MCK: nSpeedOverride_a	
C00831/76	MCK: nAccOverride_a	
C00831/77	MCK: nSpeedAdd_v	
C00831/78	MCK: wAuxCtrl	
C00831/79	MCK: wSMCtrl	
C00831/80	L OffsetGainP 3 : nIn_a	
C00831/81	L MPot 1 : nIn_a	
C00831/82	L MulDiv 1 : nIn_a	

Parameter Name: C00831 16-bit inputs		Data type: UNSIGNED_16 Index: 23744 _d = 5C0 _h
C00831/83	LS_DataAccess: wIn1 (Lenze-internal)	
C00831/84	LS_DataAccess: wIn2 (Lenze-internal)	
C00831/85	LS_DataAccess: wIn3 (Lenze-internal)	
C00831/86	LS_DataAccess: wIn4 (Lenze-internal)	
C00831/87	L_PT1_1 : nIn_a	
C00831/88	MCTRL : nSpeedHighLimit_a	
C00831/89	L_PCTRL_1 : nNSet_a	
C00831/90	L_PCTRL_1 : nISet_a	
C00831/91	L_Interpolator_1 : nPhdIn_v	
C00831/92	L_Interpolator_1 : nNIn_a	
C00831/93	L_SMStateDecoder_1 : wState	
C00831/94	L_SMStateDecoderIO_1 : wIOState	
C00831/95	L_SMControlDecoder_1 : wControl	
C00831/96	MCTRL : nInertiaAdapt_a	
C00831/97	MCTRL : nSpeedSetValueInertiaAdapt_a	
C00831/98	Reserved	
C00831/99	Reserved	
C00831/100	Reserved	
C00831/101	Reserved	
C00831/102	Reserved	
C00831/103	Reserved	
C00831/104	Reserved	
C00831/105	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00832

Parameter Name: C00832 16-bit inputs [incr./ms]		Data type: INTEGER_16 Index: 23743 _d = 5CB _h
Display of 16-bit input values of different blocks in [rpm]		
Display range (min. value unit max. value)		
-32767	Incr./ms	32767
Subcodes		Info
C00832/1		L_Absolut_1 : nIn_a
C00832/2		L_AddSub_1 : nIn1_a
C00832/3		L_AddSub_1 : nIn2_a
C00832/4		L_AddSub_1 : nIn3_a
C00832/5		L_OffsetGain_1 : nIn_a
C00832/6		L_OffsetGain_1 : nOffset_a
C00832/7		L_OffsetGain_1 : nGain_a
C00832/8		L_Negation_1 : nIn_a
C00832/9		L_GainOffset_1 : nIn_a

Parameter Name: C00832 16-bit inputs [incr./ms]		Data type: INTEGER_16 Index: 23743 _d = 5CBF _h
C00832/10	L_GainOffset_1 : nGain_a	
C00832/11	L_GainOffset_1 : nOffset_a	
C00832/12	L_Arithmetik_1 : nIn1_a	
C00832/13	L_Arithmetik_1 : nIn2_a	
C00832/14	L_AnalogSwitch_1 : nIn1_a	
C00832/15	L_AnalogSwitch_1 : nIn2_a	
C00832/16	L_Compare_1 : nIn1_a	
C00832/17	L_Compare_1 : nIn2_a	
C00832/18	MCTRL : nTorqueLimitAdapt_a	
C00832/19	Reserved	
C00832/20	MCTRL : nPosCtrlPAdapt_a	
C00832/21	MCTRL : nPosCtrlOutLimit_a	
C00832/22	MCTRL : nSpeedSetValue_a	
C00832/23	MCTRL : nSpeedLowLimit_a	
C00832/24	MCTRL : nSpeedCtrlI_a	
C00832/25	MCTRL : nSpeedCtrlPAdapt_a	
C00832/26	MCTRL : nBoost_a	
C00832/27	MCTRL : nTorqueSetValue_a	
C00832/28	MCTRL : nTorqueGenLimit_a	
C00832/29	MCTRL : nTorqueMotLimit_a	
C00832/30	Reserved	
C00832/31	MCTRL : nVoltageAdd_a	
C00832/32	MCTRL : nPWMAngleOffset_a	
C00832/33	L_NSet_1 : nCInhVal_a	
C00832/34	L_NSet_1 : nNSet_a	
C00832/35	L_NSet_1 : nSet_a	
C00832/36	L_NSet_1 : nNAdd_a	
C00832/37	DCTRL : wCANControl	
C00832/38	DCTRL : wCCMControl	
C00832/39	L_NLim_1 : nIn_a	
C00832/40	Reserved	
C00832/41	L_Compare_2 : nIn1_a	
C00832/42	L_Compare_2 : nIn2_a	
C00832/43	L_Compare_3 : nIn1_a	
C00832/44	L_Compare_3 : nIn2_a	
C00832/45	L_AnalogSwitch_2 : nIn1_a	
C00832/46	L_AnalogSwitch_2 : nIn2_a	
C00832/47	L_AnalogSwitch_3 : nIn1_a	
C00832/48	L_AnalogSwitch_3 : nIn2_a	
C00832/49	L_Arithmetik_2 : nIn1_a	
C00832/50	L_Arithmetik_2 : nIn2_a	
C00832/51	Reserved	
C00832/52	Reserved	
C00832/53	L_GainOffset_2 : nIn_a	

Parameter Name: C00832 16-bit inputs [incr./ms]		Data type: INTEGER_16 Index: 23743 _d = 5CBF _h
C00832/54	L_GainOffset_2 : nGain_a	
C00832/55	L_GainOffset_2 : nOffset_a	
C00832/56	L_OffsetGainP_1 : nIn_a	
C00832/57	L_OffsetGainP_2 : nIn_a	
C00832/58	L_OffsetGain_2 : nIn_a	
C00832/59	L_OffsetGain_2 : nOffset_a	
C00832/60	L_OffsetGain_2 : nGain_a	
C00832/61	L_PCTRL_1 : nAct_a	
C00832/62	L_PCTRL_1 : nAdapt_a	
C00832/63	L_PCTRL_1 : nSet_a	
C00832/64	L_PCTRL_1 : nInfluence_a	
C00832/65	MCK: nSpeedCtrl_a	
C00832/66	MCK: nPWMAngleOffset_a	
C00832/67	Reserved	
C00832/68	MCK: nBrkTorqueAdd_a	
C00832/69	MCK: nTorqueSetValue_a	
C00832/70	MCK: nTorqueLimitAdapt_a	
C00832/71	MCK: nSRampOverride_a	
C00832/72	MCK: nSpeedSetValue_a	
C00832/73	MCK: wMotionCtrl2	
C00832/74	MCK: wMotionCtrl1	
C00832/75	MCK: nSpeedOverride_a	
C00832/76	MCK: nAccOverride_a	
C00832/77	MCK: nSpeedAdd_v	
C00832/78	MCK: wAuxCtrl	
C00832/79	MCK: wSMCtrl	
C00832/80	L_OffsetGainP_3 : nIn_a	
C00832/81	L_MPot_1 : nIn_a	
C00832/82	L_MulDiv_1 : nIn_a	
C00832/83	LS_DataAccess: wIn1 (Lenze-internal)	
C00832/84	LS_DataAccess: wIn2 (Lenze-internal)	
C00832/85	LS_DataAccess: wIn3 (Lenze-internal)	
C00832/86	LS_DataAccess: wIn4 (Lenze-internal)	
C00832/87	L_PT1_1 : nIn_a	
C00832/88	MCTRL : nSpeedHighLimit_a	
C00832/89	L_PCTRL_1 : nNSet_a	
C00832/90	L_PCTRL_1 : nISet_a	
C00832/91	L_Interpolator_1 : nPhdIn_v	
C00832/92	L_Interpolator_1 : nNIn_a	
C00832/93	L_SMStateDecoder_1 : wState	
C00832/94	L_SMStateDecoderIO_1 : wIOState	

Parameter Name: C00832 16-bit inputs [incr./ms]		Data type: INTEGER_16 Index: 23743 _d = 5CBF _h
C00832/95	L_SMControlDecoder_1: wControl	
C00832/96	MCTRL : nInertiaAdapt_a	
C00832/97	MCTRL : nSpeedSetValueInertiaAdapt_a	
C00832/98	Reserved	
C00832/99	Reserved	
C00832/100	Reserved	
C00832/101	Reserved	
C00832/102	Reserved	
C00832/103	Reserved	
C00832/104	Reserved	
C00832/105	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00833

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CBE _h
Display of the signal status of the binary inputs of different blocks		
Selection list		
0	False	
1	True	
Subcodes		Info
C00833/1		L_And 1 : bIn1
C00833/2		L_And 1 : bIn2
C00833/3		L_And 1 : bIn3
C00833/4		L_DFlipFlop 1 : bD
C00833/5		L_DFlipFlop 1 : bClk
C00833/6		L_DFlipFlop 1 : bClr
C00833/7		L_Not 1 : bIn
C00833/8		L_Or 1 : bIn1
C00833/9		L_Or 1 : bIn2
C00833/10		L_Or 1 : bIn3
C00833/11		L_RLO 1 : bCw
C00833/12		L_RLO 1 : bCcw
C00833/13		L_AnalogSwitch 1 : bSet
C00833/14		L_NSet 1 : bRfgStop
C00833/15		L_NSet 1 : bRfg0
C00833/16		L_NSet 1 : bNSetInv
C00833/17		L_NSet 1 : bJog1
C00833/18		L_NSet 1 : bJog2
C00833/19		L_NSet 1 : bJog4
C00833/20		L_NSet 1 : bJog8
C00833/21		L_NSet 1 : bTi1
C00833/22		L_NSet 1 : bTi2
C00833/23		L_NSet 1 : bTi4

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CB _{Eh}
C00833/24	L_NSet_1 : bTi8	
C00833/25	L_NSet_1 : bLoad	
C00833/26	L_NSet_1 : bExternalCINH	
C00833/27	MCTRL : bPosCtrlOn	
C00833/28	MCTRL : bSpeedInterpolatorOn	
C00833/29	MCTRL : bTorqueInterpolatorOn	
C00833/30	MCTRL : bTorquemodeOn	
C00833/31	MCTRL : bSpeedCtrlOn	
C00833/32	MCTRL : bAutoBoostOn	
C00833/33	MCTRL : bQSPOn	
C00833/34	MCTRL : bDcBrakeOn	
C00833/35	MCTRL : bDeltaPosOn	
C00833/36	DCTRL : bCINH	
C00833/37	DCTRL : bFailReset	
C00833/38	DCTRL : bStatus_B0	
C00833/39	DCTRL : bStatus_B2	
C00833/40	DCTRL : bStatus_B3	
C00833/41	DCTRL : bStatus_B4	
C00833/42	DCTRL : bStatus_B5	
C00833/43	DCTRL : bStatus_B14	
C00833/44	DCTRL : bStatus_B15	
C00833/45	DCTRL : bFree_1	
C00833/46	DCTRL : bFree_2	
C00833/47	DCTRL : bFree_3	
C00833/48	DCTRL : bFree_4	
C00833/49	L_And_2 : bIn1	
C00833/50	L_And_2 : bIn2	
C00833/51	L_And_2 : bIn3	
C00833/52	L_And_3 : bIn1	
C00833/53	L_And_3 : bIn2	
C00833/54	L_And_3 : bIn3	
C00833/55	L_Or_2 : bIn1	
C00833/56	L_Or_2 : bIn2	
C00833/57	L_Or_2 : bIn3	
C00833/58	L_Or_3 : bIn1	
C00833/59	L_Or_3 : bIn2	
C00833/60	L_Or_3 : bIn3	
C00833/61	L_Not_2 : bIn	
C00833/62	L_Not_3 : bIn	
C00833/63	L_DigitalLogic_1 : bIn1	
C00833/64	L_DigitalLogic_1 : bIn2	
C00833/65	L_DigitalLogic_1 : bIn3	
C00833/66	L_DigitalDelay_1 : bIn	
C00833/67	MCTRL : bPosDerivativeOn	

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CBE _h
C00833/68	MCTRL : bMotorRefOffsetOn	
C00833/69	MCTRL : bSpeedCtrlPAadaptOn	
C00833/70	L AnalogSwitch 2 : bSet	
C00833/71	L AnalogSwitch 3 : bSet	
C00833/72	L MPot 1 : bUp	
C00833/73	L MPot 1 : bInAct	
C00833/74	L MPot 1 : bDown	
C00833/75	L PCTRL 1 : bPIDOff	
C00833/76	L PCTRL 1 : bInAct	
C00833/77	L PCTRL 1 : bOff	
C00833/78	MCK: bSpeedCtrlOn	
C00833/79	MCK: bDcBrakeOn	
C00833/80	MCK: bMBrakeRelease	
C00833/81	MCK: bMBrakeStartValue2	
C00833/82	MCK: bMBrakeApplied	
C00833/83	MCK: bLimitSwitchPos	
C00833/84	MCK: bLimitSwitchNeg	
C00833/85	MCK: bPosCtrlOn	
C00833/86	MCK: bDeltaPosOn	
C00833/87	MCK: bPosDerivativeOn	
C00833/88	MCK: bMotorRefOffsetOn	
C00833/89	MCK: bQspOn	
C00833/90	MCK: bTorquemodeOn	
C00833/91	MCK: bTorqueLimitAdaptOn	
C00833/92	MCK: bHomMark	
C00833/93	L Transient 1 : bIn	
C00833/94	L Transient 2 : bIn	
C00833/95	L Transient 3 : bIn	
C00833/96	L Transient 4 : bIn	
C00833/97	Reserved	
C00833/98	MCTRL : bTorqueLimitAdaptOn	
C00833/99	L NSet 1 : bNAddInv	
C00833/100	L MPot 1 : bEnable	
C00833/101	L NLim 1 : bEnable	
C00833/102	LS_DataAccess: bEnableIn1 (Lenze-internal)	
C00833/103	LS_DataAccess: bEnableIn2 (Lenze-internal)	
C00833/104	LS_DataAccess: bEnableIn3 (Lenze-internal)	
C00833/105	LS_DataAccess: bEnableIn4 (Lenze-internal)	
C00833/106	L PCTRL 1 : bEnableInfluenceRamp	
C00833/107	LS_SetError 2 : bSetError1	
C00833/108	LS_SetError 2 : bSetError2	

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CBE _h
C00833/109	LS_SetError_2 : bSetError3	
C00833/110	LS_SetError_2 : bSetError4	
C00833/111	L_JogCtrlExtension_1 : bInputSel1	
C00833/112	L_JogCtrlExtension_1 : bInputSel2	
C00833/113	L_JogCtrlExtension_1 : bRfgIn	
C00833/114	L_JogCtrlExtension_1 : bJog1In	
C00833/115	L_JogCtrlExtension_1 : bJog2In	
C00833/116	L_JogCtrlExtension_1 : bSlowDown1	
C00833/117	L_JogCtrlExtension_1 : bStop1	
C00833/118	L_JogCtrlExtension_1 : bSlowDown2	
C00833/119	L_JogCtrlExtension_1 : bStop2	
C00833/120	L_JogCtrlExtension_1 : bSlowDown3	
C00833/121	L_JogCtrlExtension_1 : bStop3	
C00833/122	L_PCTRL_1 : bISet	
C00833/123	L_Interpolator_1 : bSpeedAct0	
C00833/124	L_Or_4 : bIn1	
C00833/125	L_Or_4 : bIn2	
C00833/126	L_Or_4 : bIn3	
C00833/127	L_DigitalLogic_3 : bIn1	
C00833/128	L_DigitalLogic_3 : bIn2	
C00833/129	L_DigitalLogic_3 : bIn3	
C00833/130	MCTRL : bBrakeChopperOn	
C00833/131	MCTRL : bVfcEcoDisable	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00834

Parameter Name: C00834 32-bit inputs [incr]		Data type: INTEGER_32 Index: 23741 _d = 5CBD _h
Display in [increments] of 32 bit input values of various blocks		
Display range (min. value unit max. value)		
-2147483647	Incr.	2147483647
Subcodes		Info
C00834/1		MCK: dnPosSetValue_p
C00834/2		MCK: dnMotorRefOffset_p
C00834/3		MCK: dnDeltaPos_p
C00834/4		MCTRL : dnDeltaPos_p
C00834/5		MCTRL : dnPosSetValue_p
C00834/6		MCTRL : dnMotorRefOffset_p
C00834/7		MCK: dnProfilePosition_p
C00834/8		L_Interpolator_1 : dnPhiIn_p

Parameter Name: C00834 32-bit inputs [incr]		Data type: INTEGER_32 Index: 23741 _d = 5CBD _h
C00834/9	Reserved	
C00834/10	Reserved	
C00834/11	Reserved	
C00834/12	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00835

Parameter Name: C00835 16-bit inputs [%] (Set2)		Data type: INTEGER_16 Index: 23740 _d = 5CBC _h
Display in percent of 16-bit input values of different blocks		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00835/1	L Absolut 2 : nIn_a	
C00835/2	L AnalogSwitch 4 : nIn1_a	
C00835/3	L AnalogSwitch 4 : nIn2_a	
C00835/4	L AnalogSwitch 5 : nIn1_a	
C00835/5	L AnalogSwitch 5 : nIn2_a	
C00835/6	L Compare 4 : nIn1_a	
C00835/7	L Compare 4 : nIn2_a	
C00835/8	L Compare 5 : nIn1_a	
C00835/9	L Compare 5 : nIn2_a	
C00835/10	L Arithmetik 3 : nIn1_a	
C00835/11	L Arithmetik 3 : nIn2_a	
C00835/12	L Arithmetik 4 : nIn1_a	
C00835/13	L Arithmetik 4 : nIn2_a	
C00835/14	L Arithmetik 5 : nIn1_a	
C00835/15	L Arithmetik 5 : nIn2_a	
C00835/16	L Counter 2 : wLdVal	
C00835/17	L Counter 2 : wCmpVal	
C00835/18	L Counter 3 : wLdVal	
C00835/19	L Counter 3 : wCmpVal	
C00835/20	L PhaselntK 1 : nIn_v	
C00835/21	L Negation 2 : nIn_a	
C00835/22	L NLim 2 : nIn_a	
C00835/23	L OffsetGain 3 : nIn_a	
C00835/24	L OffsetGain 3 : nOffset_a	
C00835/25	L OffsetGain 3 : nGain_a	
C00835/26	L PT1 2 : nIn_a	
C00835/27	L PT1 3 : nIn_a	
C00835/28	L PhaselntK 2 : nIn_v	
C00835/29	L SampleHold 1 : nIn_a	
C00835/30	L SampleHold 2 : nIn_a	
C00835/31	L Mux 1 : wInSelect	

Parameter Name: C00835 16-bit inputs [%] (Set2)		Data type: INTEGER_16 Index: 23740 _d = 5CBC _h
C00835/32	L_GainOffset_3 : nIn_a	
C00835/33	L_GainOffset_3 : nGain_a	
C00835/34	L_GainOffset_3 : nOffset_a	
C00835/35	L_MulDiv_2 : nIn_a	
C00835/36	L_DT1_1 : nIn_a	
C00835/37	L_Counter_1 : wLdVal	
C00835/38	L_Counter_1 : wCmpVal	
C00835/39	L_GainOffsetP_1 : nIn_a	
C00835/40	L_GainOffsetP_2 : nIn_a	
C00835/41	L_GainOffsetP_3 : nIn_a	
C00835/42	L_Limit_1 : nIn_a	
C00835/43	L_Limit_2 : nIn_a	
C00835/44	L_MckCtrlInterface_1 : wOperationMode	
C00835/45	L_MckCtrlInterface_1 : wPosMode	
C00835/46	L_MckCtrlInterface_1 : wProfileNo	
C00835/47	L_MckCtrlInterface_1 : wInMckPosCtrl_1	
C00835/48	L_MckCtrlInterface_1 : wInMckPosCtrl_2	
C00835/49	L_MckStateInterface_1 : wInMckPosState_1	
C00835/50	L_MckStateInterface_1 : wInMckPosState_2	
C00835/51	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_1	
C00835/52	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_2	
C00835/53	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_3	
C00835/54	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_4	
C00835/55	L_ConvWordToBits_1 : wInput	
C00835/56	L_ConvWordToBits_2 : wInput	
C00835/57	L_ConvWordToBits_3 : wInput	
C00835/58	L_ConvWordsToDInt_1 : wInLWord	
C00835/59	L_ConvWordsToDInt_1 : wInHWord	
C00835/60	L_ConvWordsToDInt_2 : wInLWord	
C00835/61	L_ConvWordsToDInt_2 : wInHWord	
C00835/62	L_ConvWordsToDInt_3 : wInLWord	
C00835/63	L_ConvWordsToDInt_3 : wInHWord	
C00835/64	L_ConvUnitsToIncr_1 : wInLWord	
C00835/65	L_ConvUnitsToIncr_1 : wInHWord	
C00835/66	L_ConvUnitsToIncr_2 : wInLWord	
C00835/67	L_ConvUnitsToIncr_2 : wInHWord	
C00835/68	L_ConvUnitsToIncr_3 : wInLWord	
C00835/69	L_ConvUnitsToIncr_3 : wInHWord	
C00835/70	L_Curve_1 : nIn_a	
C00835/71	L_ConvW_1 : wIn	
C00835/72	L_ConvW_2 : wIn	
C00835/73	L_ConvW_3 : wIn	
C00835/74	L_ConvW_4 : wIn	
C00835/75	L_MckCtrlInterface_1 : wPosSetHW	

Parameter Name: C00835 16-bit inputs [%] (Set2)		Data type: INTEGER_16 Index: 23740 _d = 5CBC _h
C00835/76	L MckCtrlInterface 1 : wPosSetLW	
C00835/77	L PhaseDiff 1 : nIn_v	
C00835/78	L PhaseDiff 2 : nIn_v	
C00835/79	L SRFG 1 : nIn_a	
C00835/80	L SRFG 2 : nIn_a	
C00835/81	L SRFG 1 : nSet_a	
C00835/82	L SRFG 2 : nSet_a	
C00835/83	L SignalSwitch 1 : wIn1	
C00835/84	L SignalSwitch 2 : wIn1	
C00835/85	L SignalSwitch 3 : wIn1	
C00835/86	L SignalSwitch 4 : wIn1	
C00835/87	L SignalSwitch 1 : wIn2	
C00835/88	L SignalSwitch 2 : wIn2	
C00835/89	L SignalSwitch 3 : wIn2	
C00835/90	L SignalSwitch 4 : wIn2	
C00835/91	L Odometer 1 : nInSpeed_v	
C00835/92	L CalcDiameter 1 : wDMax	
C00835/93	L CalcDiameter 1 : wDMin	
C00835/94	L CalcDiameter 1 : wVMax	
C00835/95	L CalcDiameter 1 : nVLine_a	
C00835/96	L CalcDiameter 1 : nMotorSpeedAct_v	
C00835/97	L CalcDiameter 1 : wGearNum	
C00835/98	L CalcDiameter 1 : wGearDenom	
C00835/99	L CalcDiameter 1 : nSetD_a	
C00835/100	L ProcessCtrl 1 : nVpAdapt_a	
C00835/101	L ProcessCtrl 1 : nSet_a	
C00835/102	L ProcessCtrl 1 : nAct_a	
C00835/103	L ProcessCtrl 1 : nRTimeAdapt_a	
C00835/104	L ProcessCtrl 1 : nInfluence_a	
C00835/105	L PhilIntegrator 1 : nIn_v	
C00835/106	L PhilIntegrator 1 : wGearNum	
C00835/107	L PhilIntegrator 1 : wGearDenom	
C00835/108	L SwitchPoint 1 : nActSpeed_v	
C00835/109	L PhilIntegrator 1 : nSpeedAdd_v	
C00835/110	L DFSET 1 : nSpeedTrim_v	
C00835/111	L DFSET 1 : nSpeedTrim_a	
C00835/112	L DFSET 1 : wGearNum	
C00835/113	L DFSET 1 : wGainNum	
C00835/114	L DFSET 1 : nSet_v	
C00835/115	L DFSET 1 : wGainDenom	
C00835/116	L DFSET 1 : wGearDenom	
C00835/117	L DFSET 1 : nPositionTrimming	
C00835/118	L DFSET 1 : nNAct_v	
C00835/119	L DFRFG 1 : nIn_v	

Parameter Name: C00835 16-bit inputs [%] (Set2)		Data type: INTEGER_16 Index: 23740 _d = 5CBC _h
C00835/120	L GearComp 1 : nTorque_a	
C00835/121	L ConvAP 1 : nIn_a	
C00835/122	L ConvAP 2 : nIn_a	
C00835/123	L ConvAP 3 : nIn_a	
C00835/124	L ConvX 1 : nIn_a	
C00835/125	L ConvX 1 : nNum	
C00835/126	L ConvX 1 : wDenom	
C00835/127	L ConvX 2 : nIn_a	
C00835/128	L ConvX 2 : nNum	
C00835/129	L ConvX 2 : wDenom	
C00835/130	L ConvX 3 : nIn_a	
C00835/131	L ConvX 3 : nNum	
C00835/132	L ConvX 3 : wDenom	
C00835/133	L ConvPP 1 : nNum	
C00835/134	L ConvPP 1 : wDenom	
C00835/135	L ConvPP 2 : nNum	
C00835/136	L ConvPP 2 : wDenom	
C00835/137	L ConvPP 3 : nNum	
C00835/138	L ConvPP 3 : wDenom	
C00835/139	L Curve 2 : nIn_a	
C00835/140	L Curve 3 : nIn_a	
C00835/141	Reserved	
C00835/142	Reserved	
C00835/143	Reserved	
C00835/144	Reserved	
C00835/145	Reserved	
C00835/146	Reserved	
C00835/147	Reserved	
C00835/148	Reserved	
C00835/149	Reserved	
C00835/150	Reserved	
C00835/151	Reserved	
C00835/152	Reserved	
C00835/153	Reserved	
C00835/154	Reserved	
C00835/155	Reserved	
C00835/156	Reserved	
C00835/157	Reserved	
C00835/158	Reserved	
C00835/159	Reserved	
C00835/160	Reserved	
C00835/161	Reserved	
C00835/162	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT <input type="checkbox"/> Scaling factor: 100		

C00836

Parameter Name: C00836 16-bit inputs (Set2)		Data type: UNSIGNED_16 Index: 23739 _d = 5CBB _h
Decimal/hexadecimal/bit coded display of 16 bit input values of various blocks		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes	Info	
C00836/1	L Absolut 2 : nIn_a	
C00836/2	L AnalogSwitch 4 : nIn1_a	
C00836/3	L AnalogSwitch 4 : nIn2_a	
C00836/4	L AnalogSwitch 5 : nIn1_a	
C00836/5	L AnalogSwitch 5 : nIn2_a	
C00836/6	L Compare 4 : nIn1_a	
C00836/7	L Compare 4 : nIn2_a	
C00836/8	L Compare 5 : nIn1_a	
C00836/9	L Compare 5 : nIn2_a	
C00836/10	L Arithmetik 3 : nIn1_a	
C00836/11	L Arithmetik 3 : nIn2_a	
C00836/12	L Arithmetik 4 : nIn1_a	
C00836/13	L Arithmetik 4 : nIn2_a	
C00836/14	L Arithmetik 5 : nIn1_a	
C00836/15	L Arithmetik 5 : nIn2_a	
C00836/16	L Counter 2 : wLdVal	
C00836/17	L Counter 2 : wCmpVal	
C00836/18	L Counter 3 : wLdVal	
C00836/19	L Counter 3 : wCmpVal	
C00836/20	L PhaseIntK 1 : nIn_v	
C00836/21	L Negation 2 : nIn_a	
C00836/22	L NLim 2 : nIn_a	
C00836/23	L OffsetGain 3 : nIn_a	
C00836/24	L OffsetGain 3 : nOffset_a	
C00836/25	L OffsetGain 3 : nGain_a	
C00836/26	L PT1 2 : nIn_a	
C00836/27	L PT1 3 : nIn_a	
C00836/28	L PhaseIntK 2 : nIn_v	
C00836/29	L SampleHold 1 : nIn_a	
C00836/30	L SampleHold 2 : nIn_a	
C00836/31	L Mux 1 : wInSelect	
C00836/32	L GainOffset 3 : nIn_a	
C00836/33	L GainOffset 3 : nGain_a	
C00836/34	L GainOffset 3 : nOffset_a	

Parameter Name: C00836 16-bit inputs (Set2)		Data type: UNSIGNED_16 Index: 23739 _d = 5CBB _h
C00836/35	L_MulDiv_2 : nIn_a	
C00836/36	L_DT1_1 : nIn_a	
C00836/37	L_Counter_1 : wLdVal	
C00836/38	L_Counter_1 : wCmpVal	
C00836/39	L_GainOffsetP_1 : nIn_a	
C00836/40	L_GainOffsetP_2 : nIn_a	
C00836/41	L_GainOffsetP_3 : nIn_a	
C00836/42	L_Limit_1 : nIn_a	
C00836/43	L_Limit_2 : nIn_a	
C00836/44	L_MckCtrlInterface_1 : wOperationMode	
C00836/45	L_MckCtrlInterface_1 : wPosMode	
C00836/46	L_MckCtrlInterface_1 : wProfileNo	
C00836/47	L_MckCtrlInterface_1 : wInMckPosCtrl_1	
C00836/48	L_MckCtrlInterface_1 : wInMckPosCtrl_2	
C00836/49	L_MckStateInterface_1 : wInMckPosState_1	
C00836/50	L_MckStateInterface_1 : wInMckPosState_2	
C00836/51	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_1	
C00836/52	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_2	
C00836/53	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_3	
C00836/54	L_PosShaftCtrlInterface_1 : wInPosiShaftCtrl_4	
C00836/55	L_ConvWordToBits_1 : wInput	
C00836/56	L_ConvWordToBits_2 : wInput	
C00836/57	L_ConvWordToBits_3 : wInput	
C00836/58	L_ConvWordsToDInt_1 : wInLWord	
C00836/59	L_ConvWordsToDInt_1 : wInHWord	
C00836/60	L_ConvWordsToDInt_2 : wInLWord	
C00836/61	L_ConvWordsToDInt_2 : wInHWord	
C00836/62	L_ConvWordsToDInt_3 : wInLWord	
C00836/63	L_ConvWordsToDInt_3 : wInHWord	
C00836/64	L_ConvUnitsToIncr_1 : wInLWord	
C00836/65	L_ConvUnitsToIncr_1 : wInHWord	
C00836/66	L_ConvUnitsToIncr_2 : wInLWord	
C00836/67	L_ConvUnitsToIncr_2 : wInHWord	
C00836/68	L_ConvUnitsToIncr_3 : wInLWord	
C00836/69	L_ConvUnitsToIncr_3 : wInHWord	
C00836/70	L_Curve_1 : nIn_a	
C00836/71	L_ConvW_1 : wIn	
C00836/72	L_ConvW_2 : wIn	
C00836/73	L_ConvW_3 : wIn	
C00836/74	L_ConvW_4 : wIn	
C00836/75	L_MckCtrlInterface_1 : wPosSetHW	
C00836/76	L_MckCtrlInterface_1 : wPosSetLW	
C00836/77	L_PhaseDiff_1 : nIn_v	
C00836/78	L_PhaseDiff_2 : nIn_v	

Parameter Name: C00836 16-bit inputs (Set2)		Data type: UNSIGNED_16 Index: 23739 _d = 5CBB _h
C00836/79	L SRFG 1: nIn_a	
C00836/80	L SRFG 2: nIn_a	
C00836/81	L SRFG 1: nSet_a	
C00836/82	L SRFG 2: nSet_a	
C00836/83	L SignalSwitch 1: wIn1	
C00836/84	L SignalSwitch 2: wIn1	
C00836/85	L SignalSwitch 3: wIn1	
C00836/86	L SignalSwitch 4: wIn1	
C00836/87	L SignalSwitch 1: wIn2	
C00836/88	L SignalSwitch 2: wIn2	
C00836/89	L SignalSwitch 3: wIn2	
C00836/90	L SignalSwitch 4: wIn2	
C00836/91	L Odometer 1: nInSpeed_v	
C00836/92	L CalcDiameter 1: wDMax	
C00836/93	L CalcDiameter 1: wDMin	
C00836/94	L CalcDiameter 1: wVMax	
C00836/95	L CalcDiameter 1: nVLine_a	
C00836/96	L CalcDiameter 1: nMotorSpeedAct_v	
C00836/97	L CalcDiameter 1: wGearNum	
C00836/98	L CalcDiameter 1: wGearDenom	
C00836/99	L CalcDiameter 1: nSetD_a	
C00836/100	L ProcessCtrl 1: nVpAdapt_a	
C00836/101	L ProcessCtrl 1: nSet_a	
C00836/102	L ProcessCtrl 1: nAct_a	
C00836/103	L ProcessCtrl 1: nRTimeAdapt_a	
C00836/104	L ProcessCtrl 1: nInfluence_a	
C00836/105	L PhilIntegrator 1: nIn_v	
C00836/106	L PhilIntegrator 1: wGearNum	
C00836/107	L PhilIntegrator 1: wGearDenom	
C00836/108	L SwitchPoint 1: nActSpeed_v	
C00836/109	L PhilIntegrator 1: nSpeedAdd_v	
C00836/110	L DFSET 1: nSpeedTrim_v	
C00836/111	L DFSET 1: nSpeedTrim_a	
C00836/112	L DFSET 1: wGearNum	
C00836/113	L DFSET 1: wGainNum	
C00836/114	L DFSET 1: nSet_v	
C00836/115	L DFSET 1: wGainDenom	
C00836/116	L DFSET 1: wGearDenom	
C00836/117	L DFSET 1: nPositionTrimming	
C00836/118	L DFSET 1: nNAct_v	
C00836/119	L DFRFG 1: nIn_v	
C00836/120	L GearComp 1: nTorque_a	
C00836/121	L ConvAP 1: nIn_a	
C00836/122	L ConvAP 2: nIn_a	

Parameter Name: C00836 16-bit inputs (Set2)		Data type: UNSIGNED_16 Index: 23739 _d = 5CBB _h
C00836/123	L_ConvAP_3 : nIn_a	
C00836/124	L_ConvX_1 : nIn_a	
C00836/125	L_ConvX_1 : nNum	
C00836/126	L_ConvX_1 : wDenom	
C00836/127	L_ConvX_2 : nIn_a	
C00836/128	L_ConvX_2 : nNum	
C00836/129	L_ConvX_2 : wDenom	
C00836/130	L_ConvX_3 : nIn_a	
C00836/131	L_ConvX_3 : nNum	
C00836/132	L_ConvX_3 : wDenom	
C00836/133	L_ConvPP_1 : nNum	
C00836/134	L_ConvPP_1 : wDenom	
C00836/135	L_ConvPP_2 : nNum	
C00836/136	L_ConvPP_2 : wDenom	
C00836/137	L_ConvPP_3 : nNum	
C00836/138	L_ConvPP_3 : wDenom	
C00836/139	L_Curve_2 : nIn_a	
C00836/140	L_Curve_3 : nIn_a	
C00836/141	Reserved	
C00836/142	Reserved	
C00836/143	Reserved	
C00836/144	Reserved	
C00836/145	Reserved	
C00836/146	Reserved	
C00836/147	Reserved	
C00836/148	Reserved	
C00836/149	Reserved	
C00836/150	Reserved	
C00836/151	Reserved	
C00836/152	Reserved	
C00836/153	Reserved	
C00836/154	Reserved	
C00836/155	Reserved	
C00836/156	Reserved	
C00836/157	Reserved	
C00836/158	Reserved	
C00836/159	Reserved	
C00836/160	Reserved	
C00836/161	Reserved	
C00836/162	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00837

Parameter Name: C00837 16-bit inputs [incr./ms] (Set2)		Data type: INTEGER_16 Index: 23738 _d = 5CBA _h
Display of 16-bit input values of different blocks in [rpm]		
Display range (min. value unit max. value)		
-32767	Incr./ms	32767
Subcodes	Info	
C00837/1	L Absolut 2 : nIn_a	
C00837/2	L AnalogSwitch 4 : nIn1_a	
C00837/3	L AnalogSwitch 4 : nIn2_a	
C00837/4	L AnalogSwitch 5 : nIn1_a	
C00837/5	L AnalogSwitch 5 : nIn2_a	
C00837/6	L Compare 4 : nIn1_a	
C00837/7	L Compare 4 : nIn2_a	
C00837/8	L Compare 5 : nIn1_a	
C00837/9	L Compare 5 : nIn2_a	
C00837/10	L Arithmetik 3 : nIn1_a	
C00837/11	L Arithmetik 3 : nIn2_a	
C00837/12	L Arithmetik 4 : nIn1_a	
C00837/13	L Arithmetik 4 : nIn2_a	
C00837/14	L Arithmetik 5 : nIn1_a	
C00837/15	L Arithmetik 5 : nIn2_a	
C00837/16	L Counter 2 : wLdVal	
C00837/17	L Counter 2 : wCmpVal	
C00837/18	L Counter 3 : wLdVal	
C00837/19	L Counter 3 : wCmpVal	
C00837/20	L PhaseIntK 1 : nIn_v	
C00837/21	L Negation 2 : nIn_a	
C00837/22	L NLim 2 : nIn_a	
C00837/23	L OffsetGain 3 : nIn_a	
C00837/24	L OffsetGain 3 : nOffset_a	
C00837/25	L OffsetGain 3 : nGain_a	
C00837/26	L PT1 2 : nIn_a	
C00837/27	L PT1 3 : nIn_a	
C00837/28	L PhaseIntK 2 : nIn_v	
C00837/29	L SampleHold 1 : nIn_a	
C00837/30	L SampleHold 2 : nIn_a	
C00837/31	L Mux 1 : wInSelect	
C00837/32	L GainOffset 3 : nIn_a	
C00837/33	L GainOffset 3 : nGain_a	
C00837/34	L GainOffset 3 : nOffset_a	
C00837/35	L MulDiv 2 : nIn_a	
C00837/36	L DT1 1 : nIn_a	
C00837/37	L Counter 1 : wLdVal	
C00837/38	L Counter 1 : wCmpVal	

Parameter Name: C00837 16-bit inputs [incr./ms] (Set2)		Data type: INTEGER_16 Index: 23738 _d = 5CBA _h
C00837/39	L GainOffsetP 1 : nIn_a	
C00837/40	L GainOffsetP 2 : nIn_a	
C00837/41	L GainOffsetP 3 : nIn_a	
C00837/42	L Limit 1 : nIn_a	
C00837/43	L Limit 2 : nIn_a	
C00837/44	L MckCtrlInterface 1 : wOperationMode	
C00837/45	L MckCtrlInterface 1 : wPosMode	
C00837/46	L MckCtrlInterface 1 : wProfileNo	
C00837/47	L MckCtrlInterface 1 : wInMckPosCtrl_1	
C00837/48	L MckCtrlInterface 1 : wInMckPosCtrl_2	
C00837/49	L MckStateInterface 1 : wInMckPosState_1	
C00837/50	L MckStateInterface 1 : wInMckPosState_2	
C00837/51	L PosiShaftCtrlInterface 1 : wInPosiShaftCtrl_1	
C00837/52	L PosiShaftCtrlInterface 1 : wInPosiShaftCtrl_2	
C00837/53	L PosiShaftCtrlInterface 1 : wInPosiShaftCtrl_3	
C00837/54	L PosiShaftCtrlInterface 1 : wInPosiShaftCtrl_4	
C00837/55	L ConvWordToBits 1 : wInput	
C00837/56	L ConvWordToBits 2 : wInput	
C00837/57	L ConvWordToBits 3 : wInput	
C00837/58	L ConvWordsToDInt 1 : wInLWord	
C00837/59	L ConvWordsToDInt 1 : wInHWord	
C00837/60	L ConvWordsToDInt 2 : wInLWord	
C00837/61	L ConvWordsToDInt 2 : wInHWord	
C00837/62	L ConvWordsToDInt 3 : wInLWord	
C00837/63	L ConvWordsToDInt 3 : wInHWord	
C00837/64	L ConvUnitsToIncr 1 : wInLWord	
C00837/65	L ConvUnitsToIncr 1 : wInHWord	
C00837/66	L ConvUnitsToIncr 2 : wInLWord	
C00837/67	L ConvUnitsToIncr 2 : wInHWord	
C00837/68	L ConvUnitsToIncr 3 : wInLWord	
C00837/69	L ConvUnitsToIncr 3 : wInHWord	
C00837/70	L Curve 1 : nIn_a	
C00837/71	L ConvW 1 : wIn	
C00837/72	L ConvW 2 : wIn	
C00837/73	L ConvW 3 : wIn	
C00837/74	L ConvW 4 : wIn	
C00837/75	L MckCtrlInterface 1 : wPosSetHW	
C00837/76	L MckCtrlInterface 1 : wPosSetLW	
C00837/77	L PhaseDiff 1 : nIn_v	
C00837/78	L PhaseDiff 2 : nIn_v	
C00837/79	L SRFG 1 : nIn_a	
C00837/80	L SRFG 2 : nIn_a	
C00837/81	L SRFG 1 : nSet_a	
C00837/82	L SRFG 2 : nSet_a	

Parameter Name: C00837 16-bit inputs [incr./ms] (Set2)		Data type: INTEGER_16 Index: 23738 _d = 5CBA _h
C00837/83	L SignalSwitch 1 : wIn1	
C00837/84	L SignalSwitch 2 : wIn1	
C00837/85	L SignalSwitch 3 : wIn1	
C00837/86	L SignalSwitch 4 : wIn1	
C00837/87	L SignalSwitch 1 : wIn2	
C00837/88	L SignalSwitch 2 : wIn2	
C00837/89	L SignalSwitch 3 : wIn2	
C00837/90	L SignalSwitch 4 : wIn2	
C00837/91	L Odometer 1 : nInSpeed_v	
C00837/92	L CalcDiameter 1 : wDMax	
C00837/93	L CalcDiameter 1 : wDMin	
C00837/94	L CalcDiameter 1 : wVMax	
C00837/95	L CalcDiameter 1 : nVLine_a	
C00837/96	L CalcDiameter 1 : nMotorSpeedAct_v	
C00837/97	L CalcDiameter 1 : wGearNum	
C00837/98	L CalcDiameter 1 : wGearDenom	
C00837/99	L CalcDiameter 1 : nSetD_a	
C00837/100	L ProcessCtrl 1 : nVpAdapt_a	
C00837/101	L ProcessCtrl 1 : nSet_a	
C00837/102	L ProcessCtrl 1 : nAct_a	
C00837/103	L ProcessCtrl 1 : nRTIMEAdapt_a	
C00837/104	L ProcessCtrl 1 : nInfluence_a	
C00837/105	L PhilIntegrator 1 : nIn_v	
C00837/106	L PhilIntegrator 1 : wGearNum	
C00837/107	L PhilIntegrator 1 : wGearDenom	
C00837/108	L SwitchPoint 1 : nActSpeed_v	
C00837/109	L PhilIntegrator 1 : nSpeedAdd_v	
C00837/110	L DFSET 1 : nSpeedTrim_v	
C00837/111	L DFSET 1 : nSpeedTrim_a	
C00837/112	L DFSET 1 : wGearNum	
C00837/113	L DFSET 1 : wGainNum	
C00837/114	L DFSET 1 : nSet_v	
C00837/115	L DFSET 1 : wGainDenom	
C00837/116	L DFSET 1 : wGearDenom	
C00837/117	L DFSET 1 : nPositionTrimming	
C00837/118	L DFSET 1 : nNAct_v	
C00837/119	L DFRFG 1 : nIn_v	
C00837/120	L GearComp 1 : nTorque_a	
C00837/121	L ConvAP 1 : nIn_a	
C00837/122	L ConvAP 2 : nIn_a	
C00837/123	L ConvAP 3 : nIn_a	
C00837/124	L ConvX 1 : nIn_a	
C00837/125	L ConvX 1 : nNum	
C00837/126	L ConvX 1 : wDenom	

Parameter Name: C00837 16-bit inputs [incr./ms] (Set2)		Data type: INTEGER_16 Index: 23738 _d = 5CBA _h
C00837/127	L ConvX 2: nIn_a	
C00837/128	L ConvX 2: nNum	
C00837/129	L ConvX 2: wDenom	
C00837/130	L ConvX 3: nIn_a	
C00837/131	L ConvX 3: nNum	
C00837/132	L ConvX 3: wDenom	
C00837/133	L ConvPP 1: nNum	
C00837/134	L ConvPP 1: wDenom	
C00837/135	L ConvPP 2: nNum	
C00837/136	L ConvPP 2: wDenom	
C00837/137	L ConvPP 3: nNum	
C00837/138	L ConvPP 3: wDenom	
C00837/139	L Curve 2: nIn_a	
C00837/140	L Curve 3: nIn_a	
C00837/141	Reserved	
C00837/142	Reserved	
C00837/143	Reserved	
C00837/144	Reserved	
C00837/145	Reserved	
C00837/146	Reserved	
C00837/147	Reserved	
C00837/148	Reserved	
C00837/149	Reserved	
C00837/150	Reserved	
C00837/151	Reserved	
C00837/152	Reserved	
C00837/153	Reserved	
C00837/154	Reserved	
C00837/155	Reserved	
C00837/156	Reserved	
C00837/157	Reserved	
C00837/158	Reserved	
C00837/159	Reserved	
C00837/160	Reserved	
C00837/161	Reserved	
C00837/162	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00838

Parameter Name: C00838 Binary inputs (Set2)		Data type: UNSIGNED_8 Index: 23737 _d = 5CB9 _h
Display of the signal status of the binary inputs of different blocks <ul style="list-style-type: none"> • In addition to the parameter C00833. 		

Parameter Name: C00838 Binary inputs (Set2)		Data type: UNSIGNED_8 Index: 23737 _d = 5CB9 _h
Selection list		
0	False	
1	True	
Subcodes		Info
C00838/1		L_And5_1 : bIn1
C00838/2		L_And5_1 : bIn2
C00838/3		L_And5_1 : bIn3
C00838/4		L_And5_1 : bIn4
C00838/5		L_And5_1 : bIn5
C00838/6		L_And5_2 : bIn1
C00838/7		L_And5_2 : bIn2
C00838/8		L_And5_2 : bIn3
C00838/9		L_And5_2 : bIn4
C00838/10		L_And5_2 : bIn5
C00838/11		L_AnalogSwitch_4 : bSet
C00838/12		L_AnalogSwitch_5 : bSet
C00838/13		L_DFlipFlop_2 : bD
C00838/14		L_DFlipFlop_2 : bClk
C00838/15		L_DFlipFlop_2 : bClr
C00838/16		L_DigitalDelay_2 : bIn
C00838/17		L_DigitalDelay_3 : bIn
C00838/18		L_PhaseIntK_1 : bLoad
C00838/19		L_PhaseIntK_2 : bLoad
C00838/20		L_DigitalLogic_2 : bIn1
C00838/21		L_DigitalLogic_2 : bIn2
C00838/22		L_DigitalLogic_2 : bIn3
C00838/23		L_DigitalLogic5_1 : bIn1
C00838/24		L_DigitalLogic5_1 : bIn2
C00838/25		L_DigitalLogic5_1 : bIn3
C00838/26		L_DigitalLogic5_1 : bIn4
C00838/27		L_DigitalLogic5_1 : bIn5
C00838/28		L_DigitalLogic5_2 : bIn1
C00838/29		L_DigitalLogic5_2 : bIn2
C00838/30		L_DigitalLogic5_2 : bIn3
C00838/31		L_DigitalLogic5_2 : bIn4
C00838/32		L_DigitalLogic5_2 : bIn5
C00838/33		L_NLim_2 : bEnable
C00838/34		L_Or5_1 : bIn1
C00838/35		L_Or5_1 : bIn2
C00838/36		L_Or5_1 : bIn3
C00838/37		L_Or5_1 : bIn4
C00838/38		L_Or5_1 : bIn5
C00838/39		L_Or5_2 : bIn1
C00838/40		L_Or5_2 : bIn2

Parameter Name: C00838 Binary inputs (Set2)		Data type: UNSIGNED_8 Index: 23737 _d = 5CB9 _h
C00838/41	L Or5_2 : bIn3	
C00838/42	L Or5_2 : bIn4	
C00838/43	L Or5_2 : bIn5	
C00838/44	L Not_4 : bIn	
C00838/45	L Not_5 : bIn	
C00838/46	L Not_6 : bIn	
C00838/47	L Not_7 : bIn	
C00838/48	L RSFlipFlop_1 : bSet	
C00838/49	L RSFlipFlop_1 : bReset	
C00838/50	L RSFlipFlop_2 : bSet	
C00838/51	L RSFlipFlop_2 : bReset	
C00838/52	L SampleHold_1 : bLoad	
C00838/53	L SampleHold_2 : bLoad	
C00838/54	L Counter_2 : bClkUp	
C00838/55	L Counter_2 : bClkDown	
C00838/56	L Counter_2 : bLoad	
C00838/57	L Counter_3 : bClkUp	
C00838/58	L Counter_3 : bClkDown	
C00838/59	L Counter_3 : bLoad	
C00838/60	L Transient_5 : bIn	
C00838/61	L Transient_6 : bIn	
C00838/62	L Transient_7 : bIn	
C00838/63	L Transient_8 : bIn	
C00838/64	L Counter_1 : bCountUp	
C00838/65	L Counter_1 : bCountDown	
C00838/66	L Counter_1 : bLoad	
C00838/67	L ConvBitsToWord_1 : bBit0	
C00838/68	L ConvBitsToWord_1 : bBit1	
C00838/69	L ConvBitsToWord_1 : bBit2	
C00838/70	L ConvBitsToWord_1 : bBit3	
C00838/71	L ConvBitsToWord_1 : bBit4	
C00838/72	L ConvBitsToWord_1 : bBit5	
C00838/73	L ConvBitsToWord_1 : bBit6	
C00838/74	L ConvBitsToWord_1 : bBit7	
C00838/75	L ConvBitsToWord_1 : bBit8	
C00838/76	L ConvBitsToWord_1 : bBit9	
C00838/77	L ConvBitsToWord_1 : bBit10	
C00838/78	L ConvBitsToWord_1 : bBit11	
C00838/79	L ConvBitsToWord_1 : bBit12	
C00838/80	L ConvBitsToWord_1 : bBit13	
C00838/81	L ConvBitsToWord_1 : bBit14	
C00838/82	L ConvBitsToWord_1 : bBit15	
C00838/83	L ConvBitsToWord_2 : bBit0	
C00838/84	L ConvBitsToWord_2 : bBit1	

Parameter Name: C00838 Binary inputs (Set2)		Data type: UNSIGNED_8 Index: 23737 _d = 5CB9 _h
C00838/85	L_ConvBitsToWord_2 : bBit2	
C00838/86	L_ConvBitsToWord_2 : bBit3	
C00838/87	L_ConvBitsToWord_2 : bBit4	
C00838/88	L_ConvBitsToWord_2 : bBit5	
C00838/89	L_ConvBitsToWord_2 : bBit6	
C00838/90	L_ConvBitsToWord_2 : bBit7	
C00838/91	L_ConvBitsToWord_2 : bBit8	
C00838/92	L_ConvBitsToWord_2 : bBit9	
C00838/93	L_ConvBitsToWord_2 : bBit10	
C00838/94	L_ConvBitsToWord_2 : bBit11	
C00838/95	L_ConvBitsToWord_2 : bBit12	
C00838/96	L_ConvBitsToWord_2 : bBit13	
C00838/97	L_ConvBitsToWord_2 : bBit14	
C00838/98	L_ConvBitsToWord_2 : bBit15	
C00838/99	L_ConvBitsToWord_3 : bBit0	
C00838/100	L_ConvBitsToWord_3 : bBit1	
C00838/101	L_ConvBitsToWord_3 : bBit2	
C00838/102	L_ConvBitsToWord_3 : bBit3	
C00838/103	L_ConvBitsToWord_3 : bBit4	
C00838/104	L_ConvBitsToWord_3 : bBit5	
C00838/105	L_ConvBitsToWord_3 : bBit6	
C00838/106	L_ConvBitsToWord_3 : bBit7	
C00838/107	L_ConvBitsToWord_3 : bBit8	
C00838/108	L_ConvBitsToWord_3 : bBit9	
C00838/109	L_ConvBitsToWord_3 : bBit10	
C00838/110	L_ConvBitsToWord_3 : bBit11	
C00838/111	L_ConvBitsToWord_3 : bBit12	
C00838/112	L_ConvBitsToWord_3 : bBit13	
C00838/113	L_ConvBitsToWord_3 : bBit14	
C00838/114	L_ConvBitsToWord_3 : bBit15	
C00838/115	L_MckCtrlInterface_1 : bManJogPos	
C00838/116	L_MckCtrlInterface_1 : bManJogNeg	
C00838/117	L_MckCtrlInterface_1 : bManJogExecute2ndVel	
C00838/118	L_MckCtrlInterface_1 : bReleaseLimitSwitch	
C00838/119	L_MckCtrlInterface_1 : bHomingStartStop	
C00838/120	L_MckCtrlInterface_1 : bHomingSetPos	
C00838/121	L_MckCtrlInterface_1 : bHomingResetPos	
C00838/122	L_MckCtrlInterface_1 : bEnableVelOverride	
C00838/123	L_MckCtrlInterface_1 : bEnableAccOverride	
C00838/124	L_MckCtrlInterface_1 : bDisableSShaping	
C00838/125	L_MckCtrlInterface_1 : bPosExecute	
C00838/126	L_MckCtrlInterface_1 : bPosExecuteFinish	
C00838/127	L_MckCtrlInterface_1 : bPosDisableFollowProfile	
C00838/128	L_MckCtrlInterface_1 : bPosStop	

Parameter Name: C00838 Binary inputs (Set2)		Data type: UNSIGNED_8 Index: 23737 _d = 5CB9 _h
C00838/129	L MckCtrlInterface 1 : bPosTeachSetPos	
C00838/130	L MckCtrlInterface 1 : bPosTeachActPos	
C00838/131	L MckCtrlInterface 1 : bProfileNo_1	
C00838/132	L MckCtrlInterface 1 : bProfileNo_2	
C00838/133	L MckCtrlInterface 1 : bProfileNo_4	
C00838/134	L MckCtrlInterface 1 : bProfileNo_8	
C00838/135	L MckCtrlInterface 1 : bOperationMode_1	
C00838/136	L MckCtrlInterface 1 : bOperationMode_2	
C00838/137	L MckCtrlInterface 1 : bOperationMode_4	
C00838/138	L MckCtrlInterface 1 : bOperationMode_8	
C00838/139	L PhaseDiff 1 : bEnable	
C00838/140	L PhaseDiff 2 : bEnable	
C00838/141	L PhaseDiff 1 : bReset	
C00838/142	L PhaseDiff 2 : bReset	
C00838/143	L SRFG 1 : bLoad	
C00838/144	L SRFG 2 : bLoad	
C00838/145	L SignalSwitch 1 : bSet	
C00838/146	L SignalSwitch 2 : bSet	
C00838/147	L SignalSwitch 3 : bSet	
C00838/148	L SignalSwitch 4 : bSet	
C00838/149	L Odometer 1 : bTriggerPulse	
C00838/150	L Odometer 1 : bReset	
C00838/151	L FixSet a 1 : bSelect1	
C00838/152	L FixSet a 1 : bSelect2	
C00838/153	L FixSet a 1 : bSelect4	
C00838/154	L FixSet a 1 : bSelect8	
C00838/155	L FixSet w 1 : bSelect1	
C00838/156	L FixSet w 1 : bSelect2	
C00838/157	L FixSet w 1 : bSelect4	
C00838/158	L FixSet w 1 : bSelect8	
C00838/159	L FixSet w 2 : bSelect1	
C00838/160	L FixSet w 2 : bSelect2	
C00838/161	L FixSet w 2 : bSelect4	
C00838/162	L FixSet w 2 : bSelect8	
C00838/163	L CalcDiameter 1 : bResetPos	
C00838/164	L CalcDiameter 1 : bHoldD	
C00838/165	L CalcDiameter 1 : bUnidirect	
C00838/166	L CalcDiameter 1 : bUnwind	
C00838/167	L CalcDiameter 1 : bLoadDiameter	
C00838/168	L CalcDiameter 1 : bCalcRef	
C00838/169	L ProcessCtrl 1 : bLoadAct	
C00838/170	L ProcessCtrl 1 : bOff	
C00838/171	L ProcessCtrl 1 : bReset	
C00838/172	L PhilIntegrator 1 : bTPReceived	

Parameter Name: C00838 Binary inputs (Set2)		Data type: UNSIGNED_8 Index: 23737 _d = 5CB9 _h
C00838/173	L_PhilIntegrator_1 : bReset	
C00838/174	L_PhilIntegrator_1 : bLoad	
C00838/175	L_PosCtrlLin_1 : bExecute	
C00838/176	L_PosCtrlLin_1 : bSetPos0	
C00838/177	L_PosCtrlLin_1 : bPosMode	
C00838/178	L_PosCtrlLin_1 : bEnable	
C00838/179	L_PosCtrlLin_2 : bExecute	
C00838/180	L_PosCtrlLin_2 : bSetPos0	
C00838/181	L_PosCtrlLin_2 : bPosMode	
C00838/182	L_PosCtrlLin_2 : bEnable	
C00838/183	L_SwitchPoint_1 : bDisable	
C00838/184	L_DFSET_1 : bZeroPulse	
C00838/185	L_DFSET_1 : bSetTPReceived	
C00838/186	L_DFSET_1 : bActTPReceived	
C00838/187	L_DFSET_1 : bSetActIntegrator	
C00838/188	L_DFSET_1 : bResetAllIntegrators	
C00838/189	L_DFRFG_1 : bSetTPReceived	
C00838/190	L_DFRFG_1 : bRfg0	
C00838/191	L_DFRFG_1 : bRfgStop	
C00838/192	L_DFRFG_1 : bReset	
C00838/193	L_ConvX_1 : bInvers	
C00838/194	L_ConvX_2 : bInvers	
C00838/195	L_ConvX_3 : bInvers	
C00838/196	L_ConvPP_1 : bAct	
C00838/197	L_ConvPP_2 : bAct	
C00838/198	L_ConvPP_3 : bAct	
C00838/199	L_SignalSwitch32_1 : bSet	
C00838/200	L_SignalSwitch32_2 : bSet	
C00838/201	L_SignalSwitch32_3 : bSet	
C00838/202	Reserved	
C00838/203	Reserved	
C00838/204	Reserved	
C00838/205	Reserved	
C00838/206	Reserved	
C00838/207	Reserved	
C00838/208	Reserved	
C00838/209	Reserved	
C00838/210	Reserved	
C00838/211	Reserved	
C00838/212	Reserved	
C00838/213	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00839

Parameter Name: C00839 32-bit inputs [incr] (Set2)		Data type: INTEGER_32 Index: 23736 _d = 5CB8 _h
Display in [increments] of 32 bit input values of various blocks		
• In addition to the parameter C00834 .		
Display range (min. value unit max. value)		
-2147483647	Incr.	2147483647
Subcodes	Info	
C00839/1	L ComparePhi 1 : dnIn1_p	
C00839/2	L ComparePhi 1 : dnIn2_p	
C00839/3	L ComparePhi 2 : dnIn1_p	
C00839/4	L ComparePhi 2 : dnIn2_p	
C00839/5	L ComparePhi 3 : dnIn1_p	
C00839/6	L ComparePhi 3 : dnIn2_p	
C00839/7	L ComparePhi 4 : dnIn1_p	
C00839/8	L ComparePhi 4 : dnIn2_p	
C00839/9	L ComparePhi 5 : dnIn1_p	
C00839/10	L ComparePhi 5 : dnIn2_p	
C00839/11	L ArithmetikPhi 1 : dnIn1_p	
C00839/12	L ArithmetikPhi 1 : dnIn2_p	
C00839/13	L ArithmetikPhi 2 : dnIn1_p	
C00839/14	L ArithmetikPhi 2 : dnIn2_p	
C00839/15	L ArithmetikPhi 3 : dnIn1_p	
C00839/16	L ArithmetikPhi 3 : dnIn2_p	
C00839/17	L GainOffsetPhiP 1 : dnIn_p	
C00839/18	L GainOffsetPhiP 2 : dnIn_p	
C00839/19	L LimitPhi 1 : dnIn_p	
C00839/20	L LimitPhi 2 : dnIn_p	
C00839/21	L LimitPhi 3 : dnIn_p	
C00839/22	L OffsetGainPhiP 1 : dnIn_p	
C00839/23	L OffsetGainPhiP 2 : dnIn_p	
C00839/24	L PhaseIntK 1 : dnSet_p	
C00839/25	L PhaseIntK 2 : dnSet_p	
C00839/26	L Mux 1 : dnInput1_p	
C00839/27	L Mux 1 : dnInput2_p	
C00839/28	L Mux 1 : dnInput3_p	
C00839/29	L Mux 1 : dnInput4_p	
C00839/30	L Mux 1 : dnInput5_p	
C00839/31	L Mux 1 : dnInput6_p	
C00839/32	L Mux 1 : dnInput7_p	
C00839/33	L Mux 1 : dnInput8_p	
C00839/34	L SQrt 1 : dnInput_p	
C00839/35	L ConvDIntToWords 1 : dnInput_p	
C00839/36	L ConvDIntToWords 2 : dnInput_p	
C00839/37	L ConvDIntToWords 3 : dnInput_p	
C00839/38	L MckCtrlInterface 1 : dnPosSetIn_p	

Parameter Name: C00839 32-bit inputs [incr] (Set2)		Data type: INTEGER_32 Index: 23736 _d = 5CB8 _h
C00839/39	L_PhaseDiff_1 : dnSet_p	
C00839/40	L_PhaseDiff_2 : dnSet_p	
C00839/41	L_PhaseDiff_1 : dnAdd_p	
C00839/42	L_PhaseDiff_2 : dnAdd_p	
C00839/43	L_MckStateInterface_1 : dnPosIn_p	
C00839/44	L_Odometer_1 : dnInPosition_p	
C00839/45	L_PhiIntegrator_1 : dnTPPosition_p	
C00839/46	L_PhiIntegrator_1 : dnLoadVal_p	
C00839/47	L_PosCtrlLin_1 : dnSet_p	
C00839/48	L_PosCtrlLin_1 : dnAct_p	
C00839/49	L_PosCtrlLin_2 : dnSet_p	
C00839/50	L_PosCtrlLin_2 : dnAct_p	
C00839/51	L_SwitchPoint_1 : dnActPos_p	
C00839/52	L_SwitchPoint_1 : dnSwitchPoint1_p	
C00839/53	L_SwitchPoint_1 : dn2ndPoint_Size1_p	
C00839/54	L_SwitchPoint_1 : dnSwitchPoint2_p	
C00839/55	L_SwitchPoint_1 : dn2ndPoint_Size2_p	
C00839/56	L_SwitchPoint_1 : dnSwitchPoint3_p	
C00839/57	L_SwitchPoint_1 : dn2ndPoint_Size3_p	
C00839/58	L_SwitchPoint_1 : dnSwitchPoint4_p	
C00839/59	L_SwitchPoint_1 : dn2ndPoint_Size4_p	
C00839/60	L_DFSET_1 : dnSetTPPos_p	
C00839/61	L_DFSET_1 : dnActTPPos_p	
C00839/62	L_DFSET_1 : dnPosOffset	
C00839/63	L_DFRFG_1 : dnSetTPPos_p	
C00839/64	L_GearComp_1 : dnPhiln_p	
C00839/65	L_ConvPA_1 : dnIn_p	
C00839/66	L_ConvPA_2 : dnIn_p	
C00839/67	L_ConvPA_3 : dnIn_p	
C00839/68	L_ConvPP_1 : dnIn_p	
C00839/69	L_ConvPP_2 : dnIn_p	
C00839/70	L_ConvPP_3 : dnIn_p	
C00839/71	L_SignalSwitch32_1 : dnIn1	
C00839/72	L_SignalSwitch32_1 : dnIn2	
C00839/73	L_SignalSwitch32_2 : dnIn1	
C00839/74	L_SignalSwitch32_2 : dnIn2	
C00839/75	L_SignalSwitch32_3 : dnIn1	
C00839/76	L_SignalSwitch32_3 : dnIn2	
C00839/77	Reserved	
C00839/78	Reserved	
C00839/79	Reserved	
C00839/80	Reserved	
C00839/81	Reserved	
C00839/82	Reserved	

Parameter Name: C00839 32-bit inputs [incr] (Set2)		Data type: INTEGER_32 Index: 23736 _d = 5CB8 _h
C00839/83	Reserved	
C00839/84	Reserved	
C00839/85	Reserved	
C00839/86	Reserved	
C00839/87	L_DFSET_1 : dnDeltaPosIn_p	
C00839/88	Reserved	
C00839/89	Reserved	
C00839/90	Reserved	
C00839/91	Reserved	
C00839/92	Reserved	
C00839/93	Reserved	
C00839/94	Reserved	
C00839/95	Reserved	
C00839/96	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00840

Parameter Name: C00840 16-bit inputs I/O level [%]		Data type: INTEGER_16 Index: 23735 _d = 5CB7 _h
Display in percent of 16 bit input values of various blocks of the I/O level		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00840/1		Reserved
C00840/2		LP_CanOut1 : wState
C00840/3		LP_CanOut1 : wOut2
C00840/4		LP_CanOut1 : wOut3
C00840/5		LP_CanOut1 : wOut4
C00840/6		LP_CanOut2 : wOut1
C00840/7		LP_CanOut2 : wOut2
C00840/8		LP_CanOut2 : wOut3
C00840/9		LP_CanOut2 : wOut4
C00840/10		LP_CanOut3 : wOut1
C00840/11		LP_CanOut3 : wOut2
C00840/12		LP_CanOut3 : wOut3
C00840/13		LP_CanOut3 : wOut4
C00840/14		LS_DisFree_a : nDis1_a
C00840/15		LS_DisFree_a : nDis2_a
C00840/16		LS_DisFree_a : nDis3_a
C00840/17		LS_DisFree_a : nDis4_a
C00840/18		LS_DisFree : wDis1
C00840/19		LS_DisFree : wDis2
C00840/20		LS_DisFree : wDis3
C00840/21		LS_DisFree : wDis4

Parameter Name: C00840 16-bit inputs I/O level [%]		Data type: INTEGER_16 Index: 23735 _d = 5CB7 _h
C00840/22	LP_MciOut : wState	
C00840/23	LP_MciOut : wOut2	
C00840/24	LP_MciOut : wOut3	
C00840/25	LP_MciOut : wOut4	
C00840/26	LP_MciOut : wOut5	
C00840/27	LP_MciOut : wOut6	
C00840/28	LP_MciOut : wOut7	
C00840/29	LP_MciOut : wOut8	
C00840/30	LP_MciOut : wOut9	
C00840/31	LP_MciOut : wOut10	
C00840/32	LP_MciOut : wOut11	
C00840/33	LP_MciOut : wOut12	
C00840/34	LP_MciOut : wOut13	
C00840/35	LP_MciOut : wOut14	
C00840/36	LP_MciOut : wOut15	
C00840/37	LP_MciOut : wOut16	
C00840/38	Reserved	
C00840/39	Reserved	
C00840/40	Reserved	
C00840/41	LS_DisFree_a : nDis5_a	
C00840/42	LS_DisFree_a : nDis6_a	
C00840/43	LS_DisFree_a : nDis7_a	
C00840/44	LS_DisFree_a : nDis8_a	
C00840/45	LS_DisFree : wDis5	
C00840/46	LS_DisFree : wDis6	
C00840/47	LS_DisFree : wDis7	
C00840/48	LS_DisFree : wDis8	
C00840/49	LS_ParReadWrite_1 : wParIndex	
C00840/50	LS_ParReadWrite_1 : wParSubindex	
C00840/51	LS_ParReadWrite_1 : wInHWord	
C00840/52	LS_ParReadWrite_1 : wInLWord	
C00840/53	LS_ParReadWrite_2 : wParIndex	
C00840/54	LS_ParReadWrite_2 : wParSubindex	
C00840/55	LS_ParReadWrite_2 : wInHWord	
C00840/56	LS_ParReadWrite_2 : wInLWord	
C00840/57	LS_ParReadWrite_3 : wParIndex	
C00840/58	LS_ParReadWrite_3 : wParSubindex	
C00840/59	LS_ParReadWrite_3 : wInHWord	
C00840/60	LS_ParReadWrite_3 : wInLWord	
C00840/61	LS_ParReadWrite_4 : wParIndex	
C00840/62	LS_ParReadWrite_4 : wParSubindex	
C00840/63	LS_ParReadWrite_4 : wInHWord	
C00840/64	LS_ParReadWrite_4 : wInLWord	
C00840/65	LS_ParReadWrite_5 : wParIndex	

Parameter Name: C00840 16-bit inputs I/O level [%]		Data type: INTEGER_16 Index: 23735 _d = 5CB7 _h
C00840/66	LS_ParReadWrite_5 : wParSubindex	
C00840/67	LS_ParReadWrite_5 : wInHWord	
C00840/68	LS_ParReadWrite_5 : wInLWord	
C00840/69	LS_ParReadWrite_6 : wParIndex	
C00840/70	LS_ParReadWrite_6 : wParSubindex	
C00840/71	LS_ParReadWrite_6 : wInHWord	
C00840/72	LS_ParReadWrite_6 : wInLWord	
C00840/73	L_SMStateDecoder_1: wState	
C00840/74	Reserved	
C00840/75	Reserved	
C00840/76	Reserved	
C00840/77	Reserved	
C00840/78	Reserved	
C00840/79	Reserved	
C00840/80	Reserved	
C00840/81	Reserved	
C00840/82	Reserved	
C00840/83	Reserved	
C00840/84	Reserved	
C00840/85	Reserved	
C00840/86	Reserved	
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C00840/96	Reserved	
C00840/97	Reserved	
C00840/98	Reserved	
C00840/99	Reserved	
C00840/100	Reserved	
C00840/101	Reserved	
C00840/102	Reserved	
C00840/103	Reserved	
C00840/104	Reserved	
C00840/105	Reserved	
C00840/106	LS_MultiEncoder: wActPosExternalHW	
C00840/107	LS_MultiEncoder: wActPosExternalLW	
C00840/108	LP_CanOut4 : wOut1	
C00840/109	LP_CanOut4 : wOut2	

Parameter Name: C00840 16-bit inputs I/O level [%]		Data type: INTEGER_16 Index: 23735 _d = 5CB7 _h
C00840/110	LP_CanOut4 : wOut3	
C00840/111	LP_CanOut4 : wOut4	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00841

Parameter Name: C00841 16-bit inputs I/O level		Data type: UNSIGNED_16 Index: 23734 _d = 5CB6 _h
Decimal/hexadecimal/bit coded display of 16 bit input values of various blocks of the I/O level		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes	Info	
C00841/1	Reserved	
C00841/2	LP_CanOut1 : wState	
C00841/3	LP_CanOut1 : wOut2	
C00841/4	LP_CanOut1 : wOut3	
C00841/5	LP_CanOut1 : wOut4	
C00841/6	LP_CanOut2 : wOut1	
C00841/7	LP_CanOut2 : wOut2	
C00841/8	LP_CanOut2 : wOut3	
C00841/9	LP_CanOut2 : wOut4	
C00841/10	LP_CanOut3 : wOut1	
C00841/11	LP_CanOut3 : wOut2	
C00841/12	LP_CanOut3 : wOut3	
C00841/13	LP_CanOut3 : wOut4	
C00841/14	LS_DisFree_a : nDis1_a	
C00841/15	LS_DisFree_a : nDis2_a	
C00841/16	LS_DisFree_a : nDis3_a	
C00841/17	LS_DisFree_a : nDis4_a	
C00841/18	LS_DisFree : wDis1	
C00841/19	LS_DisFree : wDis2	
C00841/20	LS_DisFree : wDis3	
C00841/21	LS_DisFree : wDis4	
C00841/22	LP_MciOut : wState	
C00841/23	LP_MciOut : wOut2	
C00841/24	LP_MciOut : wOut3	
C00841/25	LP_MciOut : wOut4	
C00841/26	LP_MciOut : wOut5	
C00841/27	LP_MciOut : wOut6	
C00841/28	LP_MciOut : wOut7	
C00841/29	LP_MciOut : wOut8	

Parameter Name: C00841 16-bit inputs I/O level		Data type: UNSIGNED_16 Index: 23734 _d = 5CB6 _h
C00841/30	LP_MciOut : wOut9	
C00841/31	LP_MciOut : wOut10	
C00841/32	LP_MciOut : wOut11	
C00841/33	LP_MciOut : wOut12	
C00841/34	LP_MciOut : wOut13	
C00841/35	LP_MciOut : wOut14	
C00841/36	LP_MciOut : wOut15	
C00841/37	LP_MciOut : wOut16	
C00841/38	Reserved	
C00841/39	Reserved	
C00841/40	Reserved	
C00841/41	LS_DisFree_a : nDis5_a	
C00841/42	LS_DisFree_a : nDis6_a	
C00841/43	LS_DisFree_a : nDis7_a	
C00841/44	LS_DisFree_a : nDis8_a	
C00841/45	LS_DisFree : wDis5	
C00841/46	LS_DisFree : wDis6	
C00841/47	LS_DisFree : wDis7	
C00841/48	LS_DisFree : wDis8	
C00841/49	LS_ParReadWrite_1 : wParIndex	
C00841/50	LS_ParReadWrite_1 : wParSubindex	
C00841/51	LS_ParReadWrite_1 : wInHWord	
C00841/52	LS_ParReadWrite_1 : wInLWord	
C00841/53	LS_ParReadWrite_2 : wParIndex	
C00841/54	LS_ParReadWrite_2 : wParSubindex	
C00841/55	LS_ParReadWrite_2 : wInHWord	
C00841/56	LS_ParReadWrite_2 : wInLWord	
C00841/57	LS_ParReadWrite_3 : wParIndex	
C00841/58	LS_ParReadWrite_3 : wParSubindex	
C00841/59	LS_ParReadWrite_3 : wInHWord	
C00841/60	LS_ParReadWrite_3 : wInLWord	
C00841/61	LS_ParReadWrite_4 : wParIndex	
C00841/62	LS_ParReadWrite_4 : wParSubindex	
C00841/63	LS_ParReadWrite_4 : wInHWord	
C00841/64	LS_ParReadWrite_4 : wInLWord	
C00841/65	LS_ParReadWrite_5 : wParIndex	
C00841/66	LS_ParReadWrite_5 : wParSubindex	
C00841/67	LS_ParReadWrite_5 : wInHWord	
C00841/68	LS_ParReadWrite_5 : wInLWord	
C00841/69	LS_ParReadWrite_6 : wParIndex	
C00841/70	LS_ParReadWrite_6 : wParSubindex	
C00841/71	LS_ParReadWrite_6 : wInHWord	
C00841/72	LS_ParReadWrite_6 : wInLWord	
C00841/73	L_SMStateDecoder_1 : wState	

Parameter Name: C00841 16-bit inputs I/O level		Data type: UNSIGNED_16 Index: 23734 _d = 5CB6 _h
C00841/74	Reserved	
C00841/75	Reserved	
C00841/76	Reserved	
C00841/77	Reserved	
C00841/78	Reserved	
C00841/79	Reserved	
C00841/80	Reserved	
C00841/81	Reserved	
C00841/82	Reserved	
C00841/83	Reserved	
C00841/84	Reserved	
C00841/85	Reserved	
C00841/86	Reserved	
C00841/87	Reserved	
C00841/88	Reserved	
C00841/89	Reserved	
C00841/90	Reserved	
C00841/91	Reserved	
C00841/92	Reserved	
C00841/93	Reserved	
C00841/94	Reserved	
C00841/95	Reserved	
C00841/96	Reserved	
C00841/97	Reserved	
C00841/98	Reserved	
C00841/99	Reserved	
C00841/100	Reserved	
C00841/101	Reserved	
C00841/102	Reserved	
C00841/103	Reserved	
C00841/104	Reserved	
C00841/105	Reserved	
C00841/106	LS_MultiEncoder: wActPosExternalHW	
C00841/107	LS_MultiEncoder: wActPosExternalLW	
C00841/108	LP_CanOut4 : wOut1	
C00841/109	LP_CanOut4 : wOut2	
C00841/110	LP_CanOut4 : wOut3	
C00841/111	LP_CanOut4 : wOut4	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00843

Parameter Name: C00843 Binary inputs I/O level		Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
Display of the signal status of the binary inputs of different I/O level blocks		
Selection list		
0	False	
1	True	
Subcodes		Info
C00843/1		Reserved
C00843/2		LS_DigitalOutput : bOut1
C00843/3		LS_DigitalInput : bCountIn1_Reset
C00843/4		LS_DigitalInput : bCountIn1_LoadStartValue
C00843/5		LP_CanOut1 : bState_B0
C00843/6		LP_CanOut1 : bState_B1
C00843/7		LP_CanOut1 : bState_B2
C00843/8		LP_CanOut1 : bState_B3
C00843/9		LP_CanOut1 : bState_B4
C00843/10		LP_CanOut1 : bState_B5
C00843/11		LP_CanOut1 : bState_B6
C00843/12		LP_CanOut1 : bState_B7
C00843/13		LP_CanOut1 : bState_B8
C00843/14		LP_CanOut1 : bState_B9
C00843/15		LP_CanOut1 : bState_B10
C00843/16		LP_CanOut1 : bState_B11
C00843/17		LP_CanOut1 : bState_B12
C00843/18		LP_CanOut1 : bState_B13
C00843/19		LP_CanOut1 : bState_B14
C00843/20		LP_CanOut1 : bState_B15
C00843/21		LS_DisFree_b : bDis1
C00843/22		LS_DisFree_b : bDis2
C00843/23		LS_DisFree_b : bDis3
C00843/24		LS_DisFree_b : bDis4
C00843/25		LS_DisFree_b : bDis5
C00843/26		LS_DisFree_b : bDis6
C00843/27		LS_DisFree_b : bDis7
C00843/28		LS_DisFree_b : bDis8
C00843/29		LP_CanOut2 : bOut1_B0
C00843/30		LP_CanOut2 : bOut1_B1
C00843/31		LP_CanOut2 : bOut1_B2
C00843/32		LP_CanOut2 : bOut1_B3
C00843/33		LP_CanOut2 : bOut1_B4
C00843/34		LP_CanOut2 : bOut1_B5
C00843/35		LP_CanOut2 : bOut1_B6
C00843/36		LP_CanOut2 : bOut1_B7
C00843/37		LP_CanOut2 : bOut1_B8

Parameter Name: C00843 Binary inputs I/O level		Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
C00843/38	LP_CanOut2 : bOut1_B9	
C00843/39	LP_CanOut2 : bOut1_B10	
C00843/40	LP_CanOut2 : bOut1_B11	
C00843/41	LP_CanOut2 : bOut1_B12	
C00843/42	LP_CanOut2 : bOut1_B13	
C00843/43	LP_CanOut2 : bOut1_B14	
C00843/44	LP_CanOut2 : bOut1_B15	
C00843/45	LP_CanOut3 : bOut1_B0	
C00843/46	LP_CanOut3 : bOut1_B1	
C00843/47	LP_CanOut3 : bOut1_B2	
C00843/48	LP_CanOut3 : bOut1_B3	
C00843/49	LP_CanOut3 : bOut1_B4	
C00843/50	LP_CanOut3 : bOut1_B5	
C00843/51	LP_CanOut3 : bOut1_B6	
C00843/52	LP_CanOut3 : bOut1_B7	
C00843/53	LP_CanOut3 : bOut1_B8	
C00843/54	LP_CanOut3 : bOut1_B9	
C00843/55	LP_CanOut3 : bOut1_B10	
C00843/56	LP_CanOut3 : bOut1_B11	
C00843/57	LP_CanOut3 : bOut1_B12	
C00843/58	LP_CanOut3 : bOut1_B13	
C00843/59	LP_CanOut3 : bOut1_B14	
C00843/60	LP_CanOut3 : bOut1_B15	
C00843/61	LP_MciOut : bState_B0	
C00843/62	LP_MciOut : bState_B1	
C00843/63	LP_MciOut : bState_B2	
C00843/64	LP_MciOut : bState_B3	
C00843/65	LP_MciOut : bState_B4	
C00843/66	LP_MciOut : bState_B5	
C00843/67	LP_MciOut : bState_B6	
C00843/68	LP_MciOut : bState_B7	
C00843/69	LP_MciOut : bState_B8	
C00843/70	LP_MciOut : bState_B9	
C00843/71	LP_MciOut : bState_B10	
C00843/72	LP_MciOut : bState_B11	
C00843/73	LP_MciOut : bState_B12	
C00843/74	LP_MciOut : bState_B13	
C00843/75	LP_MciOut : bState_B14	
C00843/76	LP_MciOut : bState_B15	
C00843/77	LP_MciOut : bOut2_B0	
C00843/78	LP_MciOut : bOut2_B1	
C00843/79	LP_MciOut : bOut2_B2	
C00843/80	LP_MciOut : bOut2_B3	
C00843/81	LP_MciOut : bOut2_B4	

Parameter Name:	Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
C00843 Binary inputs I/O level	
C00843/82	LP_MciOut : bOut2_B5
C00843/83	LP_MciOut : bOut2_B6
C00843/84	LP_MciOut : bOut2_B7
C00843/85	LP_MciOut : bOut2_B8
C00843/86	LP_MciOut : bOut2_B9
C00843/87	LP_MciOut : bOut2_B10
C00843/88	LP_MciOut : bOut2_B11
C00843/89	LP_MciOut : bOut2_B12
C00843/90	LP_MciOut : bOut2_B13
C00843/91	LP_MciOut : bOut2_B14
C00843/92	LP_MciOut : bOut2_B15
C00843/93	LS_SetError_1 : bSetError1
C00843/94	LS_SetError_1 : bSetError2
C00843/95	LS_SetError_1 : bSetError3
C00843/96	LS_SetError_1 : bSetError4
C00843/97	LS_DigitalInput : bCountIn5_Reset
C00843/98	LS_DigitalInput : bCountIn5_LoadStartValue
C00843/99	LS_DigitalOutput : bOut2
C00843/100	Reserved
C00843/101	Reserved
C00843/102	LS_DisFree_b : bDis9
C00843/103	LS_DisFree_b : bDis10
C00843/104	LS_DisFree_b : bDis11
C00843/105	LS_DisFree_b : bDis12
C00843/106	LS_DisFree_b : bDis13
C00843/107	LS_DisFree_b : bDis14
C00843/108	LS_DisFree_b : bDis15
C00843/109	LS_DisFree_b : bDis16
C00843/110	LS_DigitalOutput : bBrakeRelease
C00843/111	LS_ParReadWrite_1 : bExecute
C00843/112	LS_ParReadWrite_1 : bReadWrite
C00843/113	LS_ParReadWrite_2 : bExecute
C00843/114	LS_ParReadWrite_2 : bReadWrite
C00843/115	LS_ParReadWrite_3 : bExecute
C00843/116	LS_ParReadWrite_3 : bReadWrite
C00843/117	LS_ParReadWrite_4 : bExecute
C00843/118	LS_ParReadWrite_4 : bReadWrite
C00843/119	LS_ParReadWrite_5 : bExecute
C00843/120	LS_ParReadWrite_5 : bReadWrite
C00843/121	LS_ParReadWrite_6 : bExecute
C00843/122	LS_ParReadWrite_6 : bReadWrite
C00843/123	LS_WriteParamList : bExecute
C00843/124	LS_WriteParamList : bSelectWriteValue_1
C00843/125	LS_WriteParamList : bSelectWriteValue_2

Parameter Name: C00843 Binary inputs I/O level		Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
C00843/126	LS_CANManagement : bResetNode	
C00843/127	LS_CANManagement : bReInitCAN	
C00843/128	LS_DigitalInput : bPosIn12_Load	
C00843/129	Reserved	
C00843/130	Reserved	
C00843/131	Reserved	
C00843/132	Reserved	
C00843/133	Reserved	
C00843/134	Reserved	
C00843/135	Reserved	
C00843/136	Reserved	
C00843/137	Reserved	
C00843/138	Reserved	
C00843/139	Reserved	
C00843/140	Reserved	
C00843/141	Reserved	
C00843/142	Reserved	
C00843/143	Reserved	
C00843/144	Reserved	
C00843/145	Reserved	
C00843/146	Reserved	
C00843/147	Reserved	
C00843/148	LS_TouchProbe : bDisableTPDigIn4	
C00843/149	LS_TouchProbe : bDisableTPDigIn5	
C00843/150	LS_TouchProbe : bDisableTPDigIn6	
C00843/151	Reserved	
C00843/152	Reserved	
C00843/153	Reserved	
C00843/154	LS_TouchProbe : bDisableTPDigIn4 Rising	
C00843/155	LS_TouchProbe : bDisableTPDigIn4 Falling	
C00843/156	LS_TouchProbe : bDisableTPDigIn5 Rising	
C00843/157	LS_TouchProbe : bDisableTPDigIn5 Falling	
C00843/158	Reserved	
C00843/159	LS_TouchProbe : bDisableTPDigIn4Window	
C00843/160	LS_TouchProbe : bDisableTPDigIn5Window	
C00843/161	Reserved	
C00843/162	Reserved	
C00843/163	Reserved	
C00843/164	Reserved	
C00843/165	LS_RetainData : bSetRetain_1	
C00843/166	LS_RetainData : bSetRetain_2	
C00843/167	LS_RetainData : bSetRetain_3	
C00843/168	LS_RetainData : bLoadParams	
C00843/169	LS_RetainData : bIn1	

Parameter Name: C00843 Binary inputs I/O level		Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
C00843/170	LS_RetainData : bIn2	
C00843/171	LS_RetainData : bIn3	
C00843/172	LS_RetainData : bIn4	
C00843/173	Reserved	
C00843/174	Reserved	
C00843/175	Reserved	
C00843/176	Reserved	
C00843/177	Reserved	
C00843/178	Reserved	
C00843/179	Reserved	
C00843/180	Reserved	
C00843/181	Reserved	
C00843/182	Reserved	
C00843/183	Reserved	
C00843/184	LP_CanOut4 : bOut1_B0	
C00843/185	LP_CanOut4 : bOut1_B1	
C00843/186	LP_CanOut4 : bOut1_B2	
C00843/187	LP_CanOut4 : bOut1_B3	
C00843/188	LP_CanOut4 : bOut1_B4	
C00843/189	LP_CanOut4 : bOut1_B5	
C00843/190	LP_CanOut4 : bOut1_B6	
C00843/191	LP_CanOut4 : bOut1_B7	
C00843/192	LP_CanOut4 : bOut1_B8	
C00843/193	LP_CanOut4 : bOut1_B9	
C00843/194	LP_CanOut4 : bOut1_B10	
C00843/195	LP_CanOut4 : bOut1_B11	
C00843/196	LP_CanOut4 : bOut1_B12	
C00843/197	LP_CanOut4 : bOut1_B13	
C00843/198	LP_CanOut4 : bOut1_B14	
C00843/199	LP_CanOut4 : bOut1_B15	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00844

Parameter Name: C00844 32-bit inputs I/O level [incr]		Data type: INTEGER_32 Index: 23731 _d = 5CB3 _h
Display of 32-bit input values of different I/O level blocks in [increments]		
Display range (min. value unit max. value)		
-2147483647	Incr.	2147483647
Subcodes		Info
C00844/1		LS_DisFree_p : dnDis1_p
C00844/2		LS_DisFree_p : dnDis2_p
C00844/3		LS_DisFree_p : dnDis3_p
C00844/4		LS_DisFree_p : dnDis4_p
C00844/5		LS_DisFree_p : dnDis5_p

Parameter Name: C00844 32-bit inputs I/O level [incr]		Data type: INTEGER_32 Index: 23731 _d = 5CB3 _h
C00844/6	LS_DisFree_p : dnDis6_p	
C00844/7	LS_DisFree_p : dnDis7_p	
C00844/8	LS_DisFree_p : dnDis8_p	
C00844/9	LP_CanOut1 : dnOut34_p	
C00844/10	LP_CanOut2 : dnOut34_p	
C00844/11	LP_CanOut3 : dnOut34_p	
C00844/12	LP_MciOut : dnOut34_p	
C00844/13	LS_DigitalInput : dnPosIn12_Set_p	
C00844/14	Reserved	
C00844/15	Reserved	
C00844/16	LS_RetainData : dnlIn1	
C00844/17	LS_RetainData : dnlIn2	
C00844/18	LS_RetainData : dnlIn3	
C00844/19	LS_RetainData : dnlIn4	
C00844/20	Reserved	
C00844/21	Reserved	
C00844/22	Reserved	
C00844/23	Reserved	
C00844/24	Reserved	
C00844/25	LP_CanOut4 : dnOut34_p	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00866

Parameter Name: C00866 CAN input words		Data type: UNSIGNED_16 Index: 23709 _d = 5C9D _h
Display of the 16 bit input values of the CAN interface		
		▶ CANopen Option/CAN on board
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes		Info
C00866/1		LP_CanIn1 : wCtrl
C00866/2		LP_CanIn1 : wIn2
C00866/3		LP_CanIn1 : wIn3
C00866/4		LP_CanIn1 : wIn4
C00866/5		LP_CanIn2 : wIn1
C00866/6		LP_CanIn2 : wIn2
C00866/7		LP_CanIn2 : wIn3
C00866/8		LP_CanIn2 : wIn4
C00866/9		LP_CanIn3 : wIn1
C00866/10		LP_CanIn3 : wIn2

Parameter Name: C00866 CAN input words		Data type: UNSIGNED_16 Index: 23709 _d = 5C9D _h
C00866/11		LP_CanIn3 : wIn3
C00866/12		LP_CanIn3 : wIn4
C00866/13		LP_CanIn4 : wIn1 • From version 16.00.00
C00866/14		LP_CanIn4 : wIn2 • From version 16.00.00
C00866/15		LP_CanIn4 : wIn3 • From version 16.00.00
C00866/16		LP_CanIn4 : wIn4 • From version 16.00.00
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00868

Parameter Name: C00868 CAN output words		Data type: UNSIGNED_16 Index: 23707 _d = 5C9B _h
Display of the 16 bit output values of the CAN interface		
		▶ CANopen Option/CAN on board
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
Bit 1	Active	
Bit 2	Active	
Bit 3	Active	
Bit 4	Active	
Bit 5	Active	
Bit 6	Active	
Bit 7	Active	
Bit 8	Active	
Bit 9	Active	
Bit 10	Active	
Bit 11	Active	
Bit 12	Active	
Bit 13	Active	
Bit 14	Active	
Bit 15	Active	
Subcodes		Info
C00868/1		LP_CanOut1 : wState
C00868/2		LP_CanOut1 : wOut2
C00868/3		LP_CanOut1 : wOut3
C00868/4		LP_CanOut1 : wOut4
C00868/5		LP_CanOut2 : wOut1
C00868/6		LP_CanOut2 : wOut2
C00868/7		LP_CanOut2 : wOut3
C00868/8		LP_CanOut2 : wOut4

Parameter Name: C00868 CAN output words		Data type: UNSIGNED_16 Index: 23707 _d = 5C9B _h
C00868/9	LP_CanOut3 : wOut1	
C00868/10	LP_CanOut3 : wOut2	
C00868/11	LP_CanOut3 : wOut3	
C00868/12	LP_CanOut3 : wOut4	
C00868/13	LP_CanOut4 : wOut1 • From version 16.00.00	
C00868/14	LP_CanOut4 : wOut2 • From version 16.00.00	
C00868/15	LP_CanOut4 : wOut3 • From version 16.00.00	
C00868/16	LP_CanOut4 : wOut4 • From version 16.00.00	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00876

Parameter Name: C00876 MCI input words		Data type: UNSIGNED_16 Index: 23699 _d = 5C93 _h
Display of the 16 bit input values of the communication module		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes		Info
C00876/1	LP_MciIn : wCtrl	
C00876/2	LP_MciIn : wIn2	
C00876/3	LP_MciIn : wIn3	
C00876/4	LP_MciIn : wIn4	
C00876/5	LP_MciIn : wIn5	
C00876/6	LP_MciIn : wIn6	
C00876/7	LP_MciIn : wIn7	
C00876/8	LP_MciIn : wIn8	
C00876/9	LP_MciIn : wIn9	
C00876/10	LP_MciIn : wIn10	
C00876/11	LP_MciIn : wIn11	
C00876/12	LP_MciIn : wIn12	
C00876/13	LP_MciIn : wIn13	
C00876/14	LP_MciIn : wIn14	
C00876/15	LP_MciIn : wIn15	
C00876/16	LP_MciIn : wIn16	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00877

Parameter Name: C00877 MCI output words		Data type: UNSIGNED_16 Index: 23698 _d = 5C92 _h
Display of the 16 bit output values of the communication module		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes		Info
C00877/1		LP_MciOut : wState
C00877/2		LP_MciOut : wOut2
C00877/3		LP_MciOut : wOut3
C00877/4		LP_MciOut : wOut4
C00877/5		LP_MciOut : wOut5
C00877/6		LP_MciOut : wOut6
C00877/7		LP_MciOut : wOut7
C00877/8		LP_MciOut : wOut8
C00877/9		LP_MciOut : wOut9
C00877/10		LP_MciOut : wOut10
C00877/11		LP_MciOut : wOut11
C00877/12		LP_MciOut : wOut12
C00877/13		LP_MciOut : wOut13
C00877/14		LP_MciOut : wOut14
C00877/15		LP_MciOut : wOut15
C00877/16		LP_MciOut : wOut16
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00890

Parameter Name: C00890 MCI_InOut: Inversion		Data type: UNSIGNED_16 Index: 23685 _d = 5C85 _h
This parameter serves to invert the control/status bits of the MCI port blocks.		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Active	Bit set = inversion active
...	...	
Bit 15	Active	
Subcodes	Lenze setting	Info
C00890/1	0x0000	LP_MciIn : Invert.Ctrl_B0..15
C00890/2	0x0000	LP_MciOut : Invert.State_B0..15
C00890/3	0x0000	LP_MciIn : Invert.In2_B0..15
C00890/4	0x0000	LP_MciOut : Invert.Out2_B0..15
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C00905

Parameter Name: C00905 Motor phase direction of rotation		Data type: UNSIGNED_8 Index: 23670 _d = 5C76 _h
To correct such misconnected motor phases, the rotating field of the inverter's output can be reversed by selecting "1: Inverted". In this case, a phase will be reversed at the output of the inverter.		
Note:		
Up to and including version 07.00.00, this function may only be activated for V/f characteristic control (VFCplus). For all other motor control types, this function must not be activated because the set control mode would not work in that case!		
From version 12.00.00, this function may be activated for all motor control types with the exception of the ones for synchronous motor.		
The activation of this function does not affect the control types for synchronous motor since these control types require an in-phase connection of the synchronous motor.		
Selection list (Lenze setting printed in bold)		
0	not inverted	
1	inverted	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00909

Parameter Name: C00909 Speed limitation		Data type: INTEGER_16 Index: 23666 _d = 5C72 _h
Max. positive/negative speed for all motor control modes		
Setting range (min. value unit max. value)		
0.00	%	175.00
Subcodes	Lenze setting	Info
C00909/1	120.00 %	Max. pos. speed
C00909/2	120.00 %	Max. neg. speed
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00910

Parameter Name: C00910 Frequency limitation		Data type: UNSIGNED_16 Index: 23665 _d = 5C71 _h
Max. positive/negative output frequency for all motor control modes		
Setting range (min. value unit max. value)		
0	Hz	1300
Subcodes	Lenze setting	Info
C00910/1	1000 Hz	Max. pos. output frequency
C00910/2	1000 Hz	Max. neg. output frequency
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00915

Parameter Name: C00915 Motor cable length		Data type: UNSIGNED_16 Index: 23660 _d = 5C6C _h
Single motor cable length for calculating the motor cable resistance		
• The calculated motor cable resistance is displayed in C00917 .		
Setting range (min. value unit max. value)		Lenze setting
0.0	m	1000.0 5.0 m
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00916

Parameter Name: C00916 Motor cable cross-section			Data type: UNSIGNED_16 Index: 23659 _d = 5C6B _h	
Motor cable cross-section of a phase/cable for calculating the motor cable resistance <ul style="list-style-type: none"> The calculated motor cable resistance is displayed in C00917. 				
Setting range (min. value unit max. value)			Lenze setting	
0.50	mm ²	100.00	6.00 mm ²	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100				

C00917

Parameter Name: C00917 Motor cable resistance			Data type: UNSIGNED_16 Index: 23658 _d = 5C6A _h	
Display of the motor cable resistance of a motor cable phase <ul style="list-style-type: none"> The motor cable resistance is calculated from the motor cable length set in C00915 and the motor cable cross-section set in C00916. 				
Display range (min. value unit max. value)				
0	mohm	64000		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1				

C00918

Parameter Name: C00918 SC: Start motor magnetising current			Data type: UNSIGNED_8 Index: 23657 _d = 5C69 _h	
From version 12.00.00				
Setting range (min. value unit max. value)			Lenze setting	
0	%	90	87 %	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1				

C00919

Parameter Name: C00919 Moment of inertia from load			Data type: UNSIGNED_32 Index: 23656 _d = 5C68 _h	
From version 12.00.00				
In order to take account of mass inertias changing during the process (e.g. reels) when optimising the response to setpoint changes, the maximum value of the changing moment of inertia must be set here. The process signal <i>nInertiaAdapt_a</i> of the LS_MotorInterface SB can then be used in the process to dynamically control what percentage of it is to be taken into account for the setpoint feedforward control.				
Setting range (min. value unit max. value)				
0.00	kg cm ²	6000000.00		
Subcodes		Lenze setting	Info	
C00919/1		0.00 kg cm ²	Load moment of inertia	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100				

C00920

Parameter Name: C00920 Rated device currents			Data type: UNSIGNED_16 Index: 23655 _d = 5C67 _h
Display range (min. value unit max. value)			
0.0	A	6000.0	
Subcodes		Info	
C00920/1		Rated current 3ph 400V/1ph 230V	
C00920/2		Rated current 3ph 440V	
C00920/3		Rated current 3ph 480V	
C00920/4		Rated current 3ph 500V	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00922

Parameter Name: C00922 ICM_DiagnosticCounter			Data type: UNSIGNED_16 Index: 23653 _d = 5C65 _h
This code is for device-internal use only and must not be written to by the user!			

C00937

Parameter Name: C00937 Field-oriented motor currents			Data type: INTEGER_16 Index: 23638 _d = 5C56 _h
From version 12.00.00			
▶ Field weakening for synchronous motors			
Display range (min. value unit max. value)			
-320.00	A	320.00	
Subcodes		Info	
C00937/1		Field-producing current	
C00937/2		Torque-producing current	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100			

C00938

Parameter Name: C00938 PSM: Maximum motor current field weakening			Data type: UNSIGNED_16 Index: 23637 _d = 5C55 _h
From version 12.00.00			
▶ Field weakening for synchronous motors			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	500.00	30.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00939

Parameter Name: C00939 Ultimate motor current			Data type: UNSIGNED_16 Index: 23636 _d = 5C54 _h
From version 12.00.00			
Setting range (min. value unit max. value)			Lenze setting
0.0	A	3000.0	3000.0 A
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00940

Parameter Name: C00940 L_ConvW numerator		Data type: INTEGER_16 Index: 23635 _d = 5C53 _h
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C00940/1	1	L_ConvW 1 : Numerator
C00940/2	1	L_ConvW 2 : Numerator
C00940/3	1	L_ConvW 3 : Numerator
C00940/4	1	L_ConvW 4 : Numerator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00941

Parameter Name: C00941 L_ConvW denominator		Data type: INTEGER_16 Index: 23634 _d = 5C52 _h
Setting range (min. value unit max. value)		
1		32767
Subcodes	Lenze setting	Info
C00941/1	1	L_ConvW 1 : Denominator
C00941/2	1	L_ConvW 2 : Denominator
C00941/3	1	L_ConvW 3 : Denominator
C00941/4	1	L_ConvW 4 : Denominator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00942

Parameter Name: C00942 L_ConvW conversion method		Data type: UNSIGNED_8 Index: 23633 _d = 5C51 _h
Selection list		
0	no conversion	
1	from [%] into [incr./ms]	
2	from [incr./ms] into [%]	
3	Factors signed	
4	Factors unsigned	
Subcodes	Lenze setting	Info
C00942/1	0: No conversion	L_ConvW 1 : Conversion method
C00942/2	0: No conversion	L_ConvW 2 : Conversion method
C00942/3	0: No conversion	L_ConvW 3 : Conversion method
C00942/4	0: No conversion	L_ConvW 4 : Conversion method
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00950

Parameter Name: C00950 L_Interpolator_1: Activation FB functions		Data type: UNSIGNED_8 Index: 23625 _d = 5C49 _h
The L_Interpolator_1 FB: Activation of signal interpolation and signal monitoring		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C00950/1	0: Off	L_Interpolator_1 : Signal interpolation
C00950/2	0: Off	L_Interpolator_1 : Signal monitoring
C00950/3	0: Off	L_Interpolator_1 : Master value monitoring
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00951

Parameter Name: C00951 L_Interpolator_1: No. of interpolation steps		Data type: UNSIGNED_16 Index: 23624 _d = 5C48 _h
The L_Interpolator_1 FB: No. of interpolation steps		
Setting range (min. value unit max. value)		Lenze setting
0		65535 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00952

Parameter Name: C00952 L_Interpolator_1: Limit value - error cycles		Data type: UNSIGNED_16 Index: 23624 _d = 5C47 _h
The L_Interpolator_1 FB: Limit value for missing data telegrams		
Setting range (min. value unit max. value)		Lenze setting
0		65535 5
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00953

Parameter Name: C00953 L_Interpolator_1: Speed-up		Data type: UNSIGNED_8 Index: 23622 _d = 5C46 _h
From version 02.00.00		
FB L_Interpolator_1 : Limitation of the number of correction increments per cycle (speed-up)		
Setting range (min. value unit max. value)		Lenze setting
0		100 0
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00959

Parameter Name: C00959 L_Curve: Current output value		Data type: INTEGER_16 Index: 23616 _d = 5C40 _h
From version 12.00.00 FB L_Curve_1 : Display of the current output value <i>nOut_a</i>		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00959/1		L_Curve_1 : Current output value
C00959/2		L_Curve_2 : Current output value
C00959/3		L_Curve_3 : Current output value
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00960

Parameter Name: C00960 L_Curve_1: Selected curve type		Data type: UNSIGNED_8 Index: 23615 _d = 5C3F _h
FB L_Curve_1 : Selected curve type		
Selection list		
0	Out = 0	
1	Out = In	
2	Out = f(In)	
3	Out = f(table)	
Subcodes		Info
C00960/1	1: Out = In	L_Curve_1 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00961

Parameter Name: C00961 L_Curve_1: Input limitation		Data type: INTEGER_16 Index: 23614 _d = 5C3E _h
FB L_Curve_1 : Upper and lower limit for input value		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C00961/1	199.99 %	L_Curve_1 : Max. input
C00961/2	-199.99 %	L_Curve_1 : Min. input
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00963

Parameter Name: C00963 L_Curve_1: Table X-values		Data type: INTEGER_16 Index: 23612 _d = 5C3C _h
FB L_Curve_1 : X-values for characteristic function		
Setting range (min. value unit max. value)		
-32767		32767

Parameter Name: C00963 L_Curve_1: Table X-values		Data type: INTEGER_16 Index: 23612 _d = 5C3C _h
Subcodes	Lenze setting	Info
C00963/1	0	X values 1 ... 32 for characteristic function
C00963/...		
C00963/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00964

Parameter Name: C00964 L_Curve_1: Table Y-values		Data type: INTEGER_16 Index: 23611 _d = 5C3B _h
FB L_Curve_1 : Y-value for characteristic function		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C00964/1	0	Y values 1 ... 32 for characteristic function
C00964/...		
C00964/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00965

Parameter Name: C00965 Max. motor speed		Data type: UNSIGNED_16 Index: 23610 _d = 5C3A _h
From version 12.00.00 When the drive reaches the motor speed set here: <ul style="list-style-type: none"> • The "Fault" error response takes place, i.e. the motor is shut down immediately. • The error message "oS2: Max. motor speed reached" is entered into the logbook. 		
Setting range (min. value unit max. value)		Lenze setting
50	rpm	65000
		60000 rpm
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00966

Parameter Name: C00966 VFC: Time const. slip comp.		Data type: UNSIGNED_16 Index: 23609 _d = 5C39 _h
Filter time constant of the slip compensation for V/f characteristic control (VFCplus) <ul style="list-style-type: none"> • The time constant of slip compensation serves to specify the dynamics of slip compensation for V/f characteristic control without feedback. • The lower the selected time constant, the higher the dynamic performance of the slip compensation. 		
Setting range (min. value unit max. value)		Lenze setting
1	ms	6000
		100 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00967

Parameter Name: C00967 VFC: Frequency interpol. point n		Data type: INTEGER_16 Index: 23608 _d = 5C38 _h
Selection of the interpolation points (frequency values) for the V/f characteristic control (VFCplus) with user-definable V/f characteristic (C00006 = "10")		
Setting range (min. value unit max. value)		
-2600.0	Hz	2600.0
Subcodes	Lenze setting	Info
C00967/1	-50.0 Hz	VFC : Frequency interpol. point 1
C00967/2	-40.0 Hz	VFC : Frequency interpol. point 2
C00967/3	-30.0 Hz	VFC : Frequency interpol. point 3
C00967/4	-20.0 Hz	VFC : Frequency interpol. point 4
C00967/5	-10.0 Hz	VFC : Frequency interpol. point 5
C00967/6	0.0 Hz	VFC : Frequency interpol. point 6
C00967/7	10.0 Hz	VFC : Frequency interpol. point 7
C00967/8	20.0 Hz	VFC : Frequency interpol. point 8
C00967/9	30.0 Hz	VFC : Frequency interpol. point 9
C00967/10	40.0 Hz	VFC : Frequency interpol. point 10
C00967/11	50.0 Hz	VFC : Frequency interpol. point 11
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00968

Parameter Name: C00968 VFC: Voltage interpol. point n		Data type: UNSIGNED_16 Index: 23607 _d = 5C37 _h
Selection of the interpolation points (voltage values) for the V/f characteristic control (VFCplus) with user-definable V/f characteristic (C00006 = "10")		
Setting range (min. value unit max. value)		
0.00	V	600.00
Subcodes	Lenze setting	Info
C00968/1	400.00 V	VFC : Voltage interpol. point 1
C00968/2	320.00 V	VFC : Voltage interpol. point 2
C00968/3	240.00 V	VFC : Voltage interpol. point 3
C00968/4	160.00 V	VFC : Voltage interpol. point 4
C00968/5	80.00 V	VFC : Voltage interpol. point 5
C00968/6	0.00 V	VFC : Voltage interpol. point 6
C00968/7	80.00 V	VFC : Voltage interpol. point 7
C00968/8	160.00 V	VFC : Voltage interpol. point 8
C00968/9	240.00 V	VFC : Voltage interpol. point 9
C00968/10	320.00 V	VFC : Voltage interpol. point 10
C00968/11	400.00 V	VFC : Voltage interpol. point 11
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00969

Parameter Name: C00969 Motorparameter		Data type: UNSIGNED_8 Index: 23606 _d = 5C36 _h
From version 12.00.00		
Display range (min. value unit max. value)		
1		255
Subcodes		Info
C00969/1		Motor - number of pole pairs
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00970

Parameter Name: C00970 Rated device voltage		Data type: UNSIGNED_16 Index: 23605 _d = 5C35 _h
Display range (min. value unit max. value)		
0	V	1000
Subcodes		Info
C00970/1		Rated device voltage
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C00971

Parameter Name: C00971 VFC: Limitation V/f +encoder		Data type: UNSIGNED_16 Index: 23604 _d = 5C34 _h
Limitation of the output frequency of the slip regulator and limitation of the injected stator frequency for the V/f control (VFCplus+encoder)		
Setting range (min. value unit max. value)		
0.00	Hz	100.00
Subcodes		Info
	Lenze setting	
C00971/1	10.00 Hz	Maximum output / correcting variable of the slip regulator <ul style="list-style-type: none"> The slip regulator output is limited to the value set here in motor/generator mode. We recommend defining a limit value of one or two times the motor slip frequency.
C00971/2	100.00 Hz	Maximum frequency deviation between the rotational frequency (speed) measured mechanically by the encoder and the injected stator frequency. <ul style="list-style-type: none"> A limitation may e.g. avoid overcurrent interruption when traversing to a fixed limit stop.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00972

Parameter Name: C00972 VFC: Vp V/f +encoder		Data type: UNSIGNED_16 Index: 23603 _d = 5C33 _h
Proportional gain of the slip regulator for V/f control (VFCplus+encoder)		
<ul style="list-style-type: none"> The gain must be selected depending on the drive system and the sensor resolution (range: 0.005 ... 5). A high gain requires a high number of increments. 		
Setting range (min. value unit max. value)		Lenze setting
0.000	Hz/Hz	64.000
		0.100 Hz/Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1000		

C00973

Parameter Name: C00973 VFC: Ti V/f +encoder		Data type: UNSIGNED_16 Index: 23602 _d = 5C32 _h	
Integral time constant of the slip regulator for V/f control (VFCplus+encoder) • In general, the time constant should be selected in a range of 20 ms (high dynamics) to 200 (low dynamics).			
Setting range (min. value unit max. value)		Lenze setting	
0.0	ms	6000.0	100.0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00975

Parameter Name: C00975 VFC-ECO: Vp CosPhi controller		Data type: UNSIGNED_16 Index: 23600 _d = 5C30 _h	
From version 12.00.00 Proportional gain of the Cos-Phi controller for energy-saving V/f characteristic control (VFCplusEco)			
Setting range (min. value unit max. value)		Lenze setting	
0.000	Hz/Hz	64.000	0.500 Hz/Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1000			

C00976

Parameter Name: C00976 VFC-ECO: Ti CosPhi controller		Data type: UNSIGNED_16 Index: 23599 _d = 5C2F _h	
From version 12.00.00 Reset time of the Cos-Phi controller for energy-saving V/f characteristic control (VFCplusEco)			
Setting range (min. value unit max. value)		Lenze setting	
0.0	ms	6000.0	200.0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00977

Parameter Name: C00977 VFC-ECO: Minimum voltage V/f		Data type: INTEGER_16 Index: 23598 _d = 5C2E _h	
From version 12.00.00 Minimum voltage V/f of the Cos-Phi controller for energy-saving V/f characteristic control (VFCplusEco)			
Setting range (min. value unit max. value)		Lenze setting	
20.00	%	100.00	20.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00978

Parameter Name: C00978 VFC-ECO: Voltage reduction		Data type: INTEGER_16 Index: 23597 _d = 5C2D _h	
From version 12.00.00 Display of the voltage reduction with energy-saving V/f characteristic control (VFCplusEco)			
Display range (min. value unit max. value)			
-1000	V	1000	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00979

Parameter Name: C00979 Cosine phi		Data type: INTEGER_16 Index: 23596 _d = 5C2C _h
From version 12.00.00 Display of the $\cos\phi$ setpoint and actual value with energy-saving V/f characteristic control (VFCplusEco)		
Display range (min. value unit max. value)		
-1.00		1.00
Subcodes		Info
C00979/1		Cosine phi act
C00979/2		Cosine phi set
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00980

Parameter Name: C00980 Output power		Data type: INTEGER_32 Index: 23595 _d = 5C2B _h
From version 12.00.00 Display parameter for an energy analysis in the prevailing application. From this, decisions can be deduced whether a measure for energy optimisation is economic.		
Display range (min. value unit max. value)		
-180.000	kW	180.000
Subcodes		Info
C00980/1		Active output power
C00980/2		Apparent output power
C00980/3		Rated device power • From version 17.00.00 onwards
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C00981

Parameter Name: C00981 Energy display		Data type: INTEGER_32 Index: 23594 _d = 5C2A _h
From version 12.00.00 Display parameter for an energy analysis in the prevailing application. From this, decisions can be deduced whether a measure for energy optimisation is economic. • The values are saved to the device by switching off the mains and cannot be reset.		
Display range (min. value unit max. value)		
0.00	kWh	21474836.47
Subcodes		Info
C00981/1		Output energy in motor mode
C00981/2		Output energy in generator mode
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00982

Parameter Name: C00982 VFC-ECO: Voltage reduction ramp		Data type: UNSIGNED_8 Index: 23593 _d = 5C29 _h	
From version 12.00.00 Voltage ramp for cancelling V-Sub with energy-saving V/f characteristic control (VFCplusEco)			
Setting range (min. value unit max. value)		Lenze setting	
0.0	s	5.0	0.8 s
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10			

C00983

Parameter Name: C00983 Delay		Data type: UNSIGNED_16 Index: 23592 _d = 5C28 _h	
From version 12.00.00			
Setting range (min. value unit max. value)			
0	ms	4000	
Subcodes	Lenze setting	Info	
C00983/1	50 ms	Delay I _{max}	
C00983/2	1000 ms	VFC : Voltage ramp after overvoltage oU • From version 16.00.00	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C00985

Parameter Name: C00985 SLVC: Gain of field current controller		Data type: INTEGER_16 Index: 23590 _d = 5C26 _h	
Gain of the direct-axis current difference (I _d) between setpoint and actual current for the voltage model of the sensorless vector control (SLVC) • The gain should be selected within the range 0 ...1 %.			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	20.00	0.50 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00986

Parameter Name: C00986 SLVC: Gain of cross current controller		Data type: INTEGER_16 Index: 23589 _d = 5C25 _h	
Gain of the I _Q difference for the voltage model of the sensorless vector control (SLVC)			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	20.00	0.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100			

C00987

Parameter Name: C00987 Inverter motor brake: nAdd		Data type: INTEGER_16 Index: 23588 _d = 5C24 _h	
Speed lift which is connected in pulses to the brake ramp when the motor is braked. ▶ Inverter motor brake			
Setting range (min. value unit max. value)		Lenze setting	
0	rpm	1000	80 rpm
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C00988

Parameter Name: C00988 Inverter motor brake: PT1 filter time		Data type: INTEGER_16 Index: 23587 _d = 5C23 _h
PT1 filter time for smoothing the speed lift which is added in pulses (C00987)		
▶ Inverter motor brake		
Setting range (min. value unit max. value)		Lenze setting
0.0	ms	100.0
		0.0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10		

C00989

Parameter Name: C00989 Restart on the fly: Flying restart frequency fd_add		Data type: INTEGER_16 Index: 23586 _d = 5C22 _h
• From version 16.00.00		
▶ Flying restart fct.		
Setting range (min. value unit max. value)		Lenze setting
0.00	Hz	5.00
		0.00 Hz
Subcodes	Lenze setting	Info
C00989/1	0.00 Hz	Restart on the fly: Flying restart frequency fd_add
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00990

Parameter Name: C00990 Flying restart fct.: Activation		Data type: UNSIGNED_8 Index: 23585 _d = 5C21 _h
Switch on/activate flying restart circuit for non-feedback drive systems		
▶ Flying restart fct.		
Selection list (Lenze setting printed in bold)		Info
0	Off	
1	On	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00991

Parameter Name: C00991 Flying restart fct.: Process		Data type: UNSIGNED_16 Index: 23584 _d = 5C20 _h
Selection of the starting value and the speed search range for the flying restart function		
▶ Flying restart fct.		
Selection list (Lenze setting printed in bold)		Info
0	0...+n Start: +10 Hz	Search positive speed range (0 ... +n) with a start frequency of +10 Hz
1	-n...0 Start: -10 Hz	Search negative speed range (-n ... 0) with a start frequency of -10 Hz
2	-n...+n Start: +10 Hz	Search negative and positive speed range (-n ... n) with a start frequency of +10 Hz
3	-n...+n Start: -10 Hz	Search negative and positive speed range (-n ... n) with a start frequency of -10 Hz
4	-n...+n Start: Cx992	Search the negative and positive speed range (-n ... n) with the start frequency set in C00992
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00992

Parameter Name: C00992 Flying restart fct.: Start frequency		Data type: INTEGER_16 Index: 23583 _d = 5C1F _h
Manual selection of the starting value for the flying restart function <ul style="list-style-type: none"> • Only active if C00991 = 4 <p style="text-align: right;">▶ Flying restart fct.</p>		
Setting range (min. value unit max. value)		Lenze setting
-200	Hz	200 10 Hz
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C00993

Parameter Name: C00993 Flying restart fct.: Int. time		Data type: UNSIGNED_16 Index: 23582 _d = 5C1E _h
Time constant of the angular difference controller of the flying restart function <ul style="list-style-type: none"> • The time constant is to amount between 60 ... 300 ms. <p style="text-align: right;">▶ Flying restart fct.</p>		
Setting range (min. value unit max. value)		Lenze setting
0.0	ms	6000.0 300.0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00994

Parameter Name: C00994 Flying restart fct.: Current		Data type: INTEGER_16 Index: 23581 _d = 5C1D _h
Current to be injected during the flying restart process <ul style="list-style-type: none"> • 100 % ≙ rated motor current (C00088). • The flying restart current should amount to 10 ... 25 % of the rated motor current. <p style="text-align: right;">▶ Flying restart fct.</p>		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 25.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00995

Parameter Name: C00995 SLPSM: Controlled current setpoint		Data type: UNSIGNED_16 Index: 23580 _d = 5C1C _h
From version 12.00.00 <p style="text-align: right;">▶ Sensorless control for synchronous motors (SLPSM)</p>		
Setting range (min. value unit max. value)		
5.00	%	400.00
Subcodes	Lenze setting	Info
C00995/1	100.00 %	SLPSM : Controlled accelerating current
C00995/2	20.00 %	SLPSM : Controlled standstill current
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C00996

Parameter Name: C00996 SLPSM: Switching speed		Data type: INTEGER_16 Index: 23579 _d = 5C1B _h
From version 12.00.00		
▶ Sensorless control for synchronous motors (SLPSM)		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C00996/1	13.00 %	SLPSM : Switching speed, closed-loop control
C00996/2	8.00 %	SLPSM : Switching speed, open-loop control
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00997

Parameter Name: C00997 SLPSM: Filter cutoff frequency		Data type: INTEGER_16 Index: 23578 _d = 5C1A _h
From version 12.00.00		
▶ Sensorless control for synchronous motors (SLPSM)		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 5.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C00998

Parameter Name: C00998 SLPSM: Filter time rotor position		Data type: INTEGER_16 Index: 23577 _d = 5C19 _h
From version 12.00.00		
▶ Sensorless control for synchronous motors (SLPSM)		
Setting range (min. value unit max. value)		
0.5	ms	20.0
Subcodes	Lenze setting	Info
C00998/1	3.0 ms	SLPSM : Filter time rotor position
C00998/2	5.0 ms	SLPSM : Filter time actual speed value
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C00999

Parameter Name: C00999 SLPSM: PLL gain		Data type: INTEGER_16 Index: 23576 _d = 5C18 _h
From version 12.00.00		
▶ Sensorless control for synchronous motors (SLPSM)		
Setting range (min. value unit max. value)		Lenze setting
0	%	1000 400 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C01000

Parameter Name: C01000 MCTRL: Status		Data type: UNSIGNED_16 Index: 23575 _d = 5C17 _h
From version 12.00.00		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	SLPSM: Speed closed-loop control	
Bit 1	SLPSM: Speed open-loop control	
Bit 2	Motor ASM	
Bit 3	Motor PSM	
Bit 4	Encoder open circuit: V/f linear active	
Bit 5	Speed limit. C909/C910/fdmax	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C01001

Parameter Name: C01001 Manual entry of motor type		Data type: UNSIGNED_8 Index: 23574 _d = 5C16 _h
From version 16.00.00		
Selection list		
0	Automatic	
1	ASM	
2	PSM	
Subcodes	Lenze setting	Info
C01001/1	0: Automatic	Manual entry of motor type
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C01004

Parameter Name:		Data type: UNSIGNED_16 Index: 23571 _d = 5C13 _h
C01004 Load Lenze setting without:		
From version 18.00.00		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Communication module	1 ≙ The parameters for the communication module are not reset when the Lenze setting (C00002/1) is loaded.
Bit 1	CAN OnBoard	1 ≙ The parameters for CAN onBoard are not reset when the Lenze setting (C00002/1) is loaded.
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C01004/1	0x0000	Load Lenze setting without:
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01010

Parameter Name:		Data type: UNSIGNED_8 Index: 23565 _d = 5C0D _h
C01010 L_ArithmetikPhi 1-3: Function		
Selection of the internal arithmetics		
Selection list		
0	dnln1_p	
1	dnln1_p + dnln2_p	
2	dnln1_p - dnln2_p	
3	dnln1_p * dnln2_p	
4	dnln1_p / dnln2_p	
Subcodes	Lenze setting	Info
C01010/1	0: dnln1_p	L_ArithmetikPhi 1 : Function
C01010/2	0: dnln1_p	L_ArithmetikPhi 2 : Function
C01010/3	0: dnln1_p	L_ArithmetikPhi 3 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01020

Parameter Name: C01020 L_Odometer_1: Memory length		Data type: UNSIGNED_8 Index: 23555 _d = 5C03 _h
FB L_Odometer_1 : No. of measurements		
Selection list (Lenze setting printed in bold)		
1	1 measurement	
2	2 measurements	
3	3 measurements	
4	4 measurements	
5	5 measurements	
6	6 measurements	
7	7 measurements	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01021

Parameter Name: C01021 L_Odometer_1: Memory type		Data type: UNSIGNED_8 Index: 23554 _d = 5C02 _h
FB L_Odometer_1 : If "ring buffer" is selected, it is started again after the measurements set in C01020 and the old values are overwritten. Otherwise, the measurement stops.		
Selection list (Lenze setting printed in bold)		
0	No ring buffer	
1	Ring buffer	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01022

Parameter Name: C01022 L_Odometer_1: Input selection		Data type: UNSIGNED_8 Index: 23553 _d = 5C01 _h
FB L_Odometer_1 : Selection of position or speed input		
Selection list (Lenze setting printed in bold)		
0	Pos input	
1	V input	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01023

Parameter Name: C01023 L_Odometer_1: Edge selection		Data type: UNSIGNED_8 Index: 23552 _d = 5C00 _h
FB L_Odometer_1 : No. of the edge triggering the measurement		
Selection list (Lenze setting printed in bold)		
0	High edge	
1	Low edge	
2	High and low edge	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01025

Parameter Name: C01025 L_Curve_2: Selected curve type		Data type: UNSIGNED_8 Index: 23550 _d = 5BF _{Eh}
From version 12.00.00 FB L_Curve_2 : Selected curve type		
Selection list		
0	Out = 0	
1	Out = ln	
2	Out = f(ln)	
3	Out = f(table)	
Subcodes	Lenze setting	Info
C01025/1	1: Out = ln	L_Curve_2 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01026

Parameter Name: C01026 L_Curve_2: Input limitation		Data type: INTEGER_16 Index: 23549 _d = 5BFD _h
From version 12.00.00 FB L_Curve_2 : Upper and lower limit for input value		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C01026/1	199.99 %	L_Curve_2 : Max. input
C01026/2	-199.99 %	L_Curve_2 : Min. input
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C01028

Parameter Name: C01028 L_Curve_2: Table X-values		Data type: INTEGER_16 Index: 23547 _d = 5BF _{Bh}
From version 12.00.00 FB L_Curve_2 : X-values for characteristic function		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01028/1	0	X values 1 ... 32 for characteristic function
C01028/...		
C01028/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01029

Parameter Name: C01029 L_Curve_2: Table Y-values		Data type: INTEGER_16 Index: 23546 _d = 5BF _{Ah}
From version 12.00.00 FB L_Curve_2 : Y-value for characteristic function		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01029/1	0	Y values 1 ... 32 for characteristic function
C01029/...		
C01029/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01030

Parameter Name: C01030 L_Curve_3: Selected curve type		Data type: UNSIGNED_8 Index: 23545 _d = 5BF _{9h}
From version 12.00.00 FB L_Curve_3 : Selected curve type		
Selection list		Info
0	Out = 0	
1	Out = In	
2	Out = f(In)	
3	Out = f(table)	
4	Out = f(characteristic)	From version 12.00.00
Subcodes	Lenze setting	Info
C01030/1	1: Out = In	L_Curve_3 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01031

Parameter Name: C01031 L_Curve_3: Input limitation		Data type: INTEGER_16 Index: 23544 _d = 5BF _{8h}
From version 12.00.00 FB L_Curve_3 : Upper and lower limit for input value		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C01031/1	199.99 %	L_Curve_3 : Max. input
C01031/2	-199.99 %	L_Curve_3 : Min. input
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C01033

Parameter Name: C01033 L_Curve_3: Table X-values		Data type: INTEGER_16 Index: 23542 _d = 5BF6 _h
From version 12.00.00 FB L_Curve_3 : X-values for characteristic function		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01033/1	0	X values 1 ... 32 for characteristic function
C01033/...		
C01033/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01034

Parameter Name: C01034 L_Curve_3: Table Y-values		Data type: INTEGER_16 Index: 23541 _d = 5BF5 _h
From version 12.00.00 FB L_Curve_3 : Y-value for characteristic function		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01034/1	0	Y values 1 ... 32 for characteristic function
C01034/...		
C01034/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01035

Parameter Name: C01035 L_Curve_3: SelectCurve		Data type: UNSIGNED_16 Index: 23540 _d = 5BF4 _h
From version 12.00.00 FB L_Curve_3 : Selection of the tensile force profile		
Selection list		Info
0	Linear tensile force profile	▶ Use of L_Curve_3 for tensile force characteristic
1	Linear torque profile	
2	Tensile force profile according to characteristic	
Subcodes	Lenze setting	Info
C01035/1	0: Linear tensile force profile	L_Curve_3 : SelectCurve
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01040

Parameter Name: C01040 L_SRFG_1..2 linear ramp time		Data type: UNSIGNED_32 Index: 23535 _d = 5BEF _h
Symmetrical acceleration/deceleration time for the ramp function generator		
Setting range (min. value unit max. value)		
0.001	s	999.999
Subcodes	Lenze setting	Info
C01040/1	100.000 s	L_SRFG_1 : linear ramp time
C01040/2	100.000 s	L_SRFG_2 : linear ramp time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01041

Parameter Name: C01041 L_SRFG_1..2 S-ramp time		Data type: UNSIGNED_32 Index: 23534 _d = 5BED _h
S-ramp time for jerk-free acceleration		
Setting range (min. value unit max. value)		
0.001	s	50.000
Subcodes	Lenze setting	Info
C01041/1	0.200 s	L_SRFG_1 : S-ramp time
C01041/2	0.200 s	L_SRFG_2 : S-ramp time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01042

Parameter Name: C01042 L_SRFG_1..2 limitations of output values		Data type: INTEGER_16 Index: 23533 _d = 5BED _h
From version 02.00.00 Limitation of the output values		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C01042/1	100.00 %	L_SRFG_1 : Pos. Limit
C01042/2	-100.00 %	L_SRFG_1 : Neg. Limit
C01042/3	100.00 %	L_SRFG_2 : Pos. Limit
C01042/4	-100.00 %	L_SRFG_2 : Neg. Limit
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C01045

Parameter Name: C01045 L_ConvAP 1-3: Numerator/denominator		Data type: INTEGER_16 Index: 23530 _d = 5BEA _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01045/1	1	L_ConvAP_1 : Numerator
C01045/2	1	L_ConvAP_1 : Denominator

Parameter Name: C01045 L_ConvAP 1-3: Numerator/denominator		Data type: INTEGER_16 Index: 23530 _d = 5BEA _h
C01045/3	1	L_ConvAP 2 : Numerator
C01045/4	1	L_ConvAP 2 : Denominator
C01045/5	1	L_ConvAP 3 : Numerator
C01045/6	1	L_ConvAP 3 : Denominator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01046

Parameter Name: C01046 L_ConvPA 1-3: byDivision		Data type: INTEGER_8 Index: 23529 _d = 5BE9 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0		31
Subcodes	Lenze setting	Info
C01046/1	1	L_ConvPA 1 : Division factor
C01046/2	1	L_ConvPA 2 : Division factor
C01046/3	1	L_ConvPA 3 : Division factor
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01047

Parameter Name: C01047 L_GearComp_1: Offset		Data type: INTEGER_16 Index: 23528 _d = 5BE8 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-16383		16383
Subcodes	Lenze setting	Info
C01047/1	0	L_GearComp 1 : Offset
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01048

Parameter Name: C01048 L_GearComp_1: Num_Denom		Data type: INTEGER_16 Index: 23527 _d = 5BE7 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01048/1	1	L_GearComp 1 : Numerator
C01048/2	1	L_GearComp 1 : Denominator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01049

Parameter Name: C01049 L_CalcDiameter_1: Status		Data type: INTEGER_16 Index: 23526 _d = 5BE6 _h
From version 12.00.00		
Display range (min. value unit max. value)		
-10		30
Subcodes	Lenze setting	Info
C01049/1		L_CalcDiameter_1: Status
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01050

Parameter Name: C01050 L_CalcDiameter_1: Diameter recalculation		Data type: UNSIGNED_32 Index: 23525 _d = 5BE5 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.001	Rev.	1000.000
Subcodes	Lenze setting	Info
C01050/1	1.000 rev.	L_CalcDiameter_1: Diameter recalculation 0
C01050/2	0.100 rev.	L_CalcDiameter_1: Diameter recalculation 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01051

Parameter Name: C01051 L_CalcDiameter_1: Filter time constant		Data type: UNSIGNED_16 Index: 23524 _d = 5BE4 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.010	s	3.000
Subcodes	Lenze setting	Info
C01051/1	1.000 s	L_CalcDiameter_1: Filter time constant
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01052

Parameter Name: C01052 L_CalcDiameter_1: Web break monitoring		Data type: INTEGER_16 Index: 23523 _d = 5BE3 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C01052/1	10.00 %	L_CalcDiameter_1: Permissible diameter change
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C01053

Parameter Name: C01053 L_ProcessCtrl_1: Controller times		Data type: UNSIGNED_16 Index: 23522 _d = 5BE2 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.000	s	30.000
Subcodes	Lenze setting	Info
C01053/1	0.000 s	L_ProcessCtrl_1 : Acceleration/deceleration time
C01053/2	0.000 s	L_ProcessCtrl_1 : Filter time constant
C01053/3	0.000 s	L_ProcessCtrl_1 : Rate time
C01053/4	1.000 s	L_ProcessCtrl_1 : Reset time
C01053/5	0.000 s	L_ProcessCtrl_1 : Rate action
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01054

Parameter Name: C01054 L_ProcessCtrl_1: System deviation		Data type: INTEGER_16 Index: 23521 _d = 5BE1 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C01054/1	100.00 %	L_ProcessCtrl_1 : Gain of system deviation
C01054/2	0.00 %	L_ProcessCtrl_1 : Area of system deviation
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C01055

Parameter Name: C01055 L_ProcessCtrl_1: Correcting variable limitation		Data type: UNSIGNED_8 Index: 23520 _d = 5BE0 _h
From version 12.00.00		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info
C01055/1	0: FALSE	L_ProcessCtrl_1 : Correcting variable limitation
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01056

Parameter Name: C01056 L_ProcessCtrl_1: Controller gain		Data type: UNSIGNED_16 Index: 23519 _d = 5BDF _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.00		100.00
Subcodes	Lenze setting	Info
C01056/1	0.10	L_ProcessCtrl_1 : Controller gain
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C01057

Parameter Name: C01057 L_CalcDiameter_1: Current diameter		Data type: UNSIGNED_32 Index: 23518 _d = 5BDE _h
From version 12.00.00		
Display range (min. value unit max. value)		
0.000	mm	10000.000
Subcodes		Info
C01057/1		L_CalcDiameter_1: Current diameter
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01058

Parameter Name: C01058 L_PosCtrlLin 1-2: Limit stop		Data type: UNSIGNED_8 Index: 23517 _d = 5BDD _h
From version 12.00.00		
Selection list		
0	deactivated	
1	activated	
Subcodes		Info
C01058/1	0: Deactivated	L_PosCtrlLin_1: Limit stop
C01058/2	0: Deactivated	L_PosCtrlLin_2: Limit stop
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01059

Parameter Name: C01059 L_PosCtrlLin 1-2: Positioning behaviour		Data type: UNSIGNED_8 Index: 23516 _d = 5BDC _h
From version 12.00.00		
Selection list		
0	dnOut_p = 0	
1	dnOut_p/nOut_v follow dnAct_p	
2	dnOut_p/nOut_v follow dnSet_p	
3	dnOut_p/nOut_v follow dnAct_p (without limitation)	
Subcodes		Info
C01059/1	0: dnOut_p = 0	L_PosCtrlLin_1: Positioning behaviour
C01059/2	0: dnOut_p = 0	L_PosCtrlLin_2: Positioning behaviour
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01060

Parameter Name: C01060 L_PosCtrlLin 1-2: Ramps		Data type: INTEGER_32 Index: 23515 _d = 5BDB _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.010	s	130.000
Subcodes		Info
C01060/1	1.000 s	L_PosCtrlLin_1: Deceleration of set position
C01060/2	1.000 s	L_PosCtrlLin_1: Acceleration ramp

Parameter Name: C01060 L_PosCtrlLin 1-2: Ramps		Data type: INTEGER_32 Index: 23515 _d = 5BDB _h
C01060/3	1.000 s	L_PosCtrlLin 1 : Deceleration ramp
C01060/4	1.000 s	L_PosCtrlLin 2 : Deceleration of set position
C01060/5	1.000 s	L_PosCtrlLin 2 : Acceleration ramp
C01060/6	1.000 s	L_PosCtrlLin 2 : Deceleration ramp
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01061

Parameter Name: C01061 L_PosCtrlLin 1-2: Traversing speeds		Data type: INTEGER_16 Index: 23514 _d = 5BDA _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-15000	rpm	15000
Subcodes	Lenze setting	Info
C01061/1	199 rpm	L_PosCtrlLin 1 : Forward motion
C01061/2	199 rpm	L_PosCtrlLin 1 : Return motion
C01061/3	199 rpm	L_PosCtrlLin 2 : Forward motion
C01061/4	199 rpm	L_PosCtrlLin 2 : Return motion
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01062

Parameter Name: C01062 L_SwitchPoint 1: Dead time		Data type: UNSIGNED_16 Index: 23513 _d = 5BD9 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C01062/1	0	L_SwitchPoint 1 : Dead time 1
C01062/2	0	L_SwitchPoint 1 : Dead time 2
C01062/3	0	L_SwitchPoint 1 : Dead time 3
C01062/4	0	L_SwitchPoint 1 : Dead time 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01063

Parameter Name: C01063 L_SwitchPoint 1: Hysteresis		Data type: UNSIGNED_16 Index: 23512 _d = 5BD8 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0	Incr.	65535
Subcodes	Lenze setting	Info
C01063/1	0 incr.	L_SwitchPoint 1 : Hysteresis 1
C01063/2	0 incr.	L_SwitchPoint 1 : Hysteresis 2
C01063/3	0 incr.	L_SwitchPoint 1 : Hysteresis 3
C01063/4	0 incr.	L_SwitchPoint 1 : Hysteresis 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01064

Parameter Name: C01064 L_SwitchPoint_1: CenterMode		Data type: UNSIGNED_8 Index: 23511 _d = 5BD7 _h
From version 12.00.00		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info
C01064/1	0: FALSE	L_SwitchPoint_1 : CenterMode 1
C01064/2	0: FALSE	L_SwitchPoint_1 : CenterMode 2
C01064/3	0: FALSE	L_SwitchPoint_1 : CenterMode 3
C01064/4	0: FALSE	L_SwitchPoint_1 : CenterMode 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01065

Parameter Name: C01065 L_SwitchPoint_1: Running time		Data type: UNSIGNED_16 Index: 23510 _d = 5BD6 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0	ms	60000
Subcodes	Lenze setting	Info
C01065/1	0 ms	L_SwitchPoint_1 : Running time 1
C01065/2	0 ms	L_SwitchPoint_1 : Running time 2
C01065/3	0 ms	L_SwitchPoint_1 : Running time 3
C01065/4	0 ms	L_SwitchPoint_1 : Running time 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01066

Parameter Name: C01066 L_SwitchPoint_1: Status		Data type: INTEGER_16 Index: 23509 _d = 5BD5 _h
From version 12.00.00		
Selection list		
0	OK	
10	FB not active	
100	Switching points not plausible	
Subcodes	Lenze setting	Info
C01066/1		L_SwitchPoint_1 : Status 1
C01066/2		L_SwitchPoint_1 : Status 2
C01066/3		L_SwitchPoint_1 : Status 3
C01066/4		L_SwitchPoint_1 : Status 4
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01067

Parameter Name: C01067 Inversion of gearbox stages		Data type: UNSIGNED_8 Index: 23508 _d = 5BD4 _h
From version 12.00.00		
Selection list		
0	not inverted	
1	inverted	
2	Automatically from MCK	
Subcodes	Lenze setting	Info
C01067/1	0: Not inverted	L_PhilnIntegrator_1 : Invert. gearbox nSet_v
C01067/2	0: Not inverted	L_DFSET_1 : Invert. gearbox nSet_v
C01067/3	0: Not inverted	L_CalcDiameter_1 : Invert. gearbox nMotorSpeedAct_v
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01068

Parameter Name: C01068 L_SwitchPoint_1: Invert		Data type: UNSIGNED_16 Index: 23507 _d = 5BD3 _h
From version 12.00.00		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Invert Output1	Bit set = inversion active
Bit 1	Invert Output2	
Bit 2	Invert Output3	
Bit 3	Invert Output4	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C01068/1	0x0000	L_SwitchPoint_1 : Inversion of outputs
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01069

Parameter Name: C01069 L_DFSET_1: Ramp settings		Data type: UNSIGNED_16 Index: 23506 _d = 5BD2 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0	Incr./ms	32767
Subcodes	Lenze setting	Info
C01069/1	10 incr./ms	L_DFSET_1 : Ramp SpeedTrim (1/100)
C01069/2	100 incr./ms	L_DFSET_1 : Ramp angle compensation
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01070

Parameter Name: C01070 L_DFSET_1: Angular trimming		Data type: INTEGER_32 Index: 23505 _d = 5BD1 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-134217728	Incr.	134217728
Subcodes	Lenze setting	Info
C01070/1	0 incr.	L_DFSET_1 : Speed-dependent angle adjustment
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01071

Parameter Name: C01071 L_DFSET_1: Following error limit		Data type: UNSIGNED_32 Index: 23504 _d = 5BD0 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
10	Incr.	2147483647
Subcodes	Lenze setting	Info
C01071/1	32768 incr.	L_DFSET_1 : Following error limit
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01072

Parameter Name: C01072 L_DFSET_1: Multiplier - angular trimming		Data type: INTEGER_16 Index: 23503 _d = 5BCF _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-20000		20000
Subcodes	Lenze setting	Info
C01072/1	1	L_DFSET_1 : Multiplier - angular trimming
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01073

Parameter Name: C01073 L_DFSET_1: Adjustment		Data type: UNSIGNED_8 Index: 23502 _d = 5BC _{Eh}
From version 12.00.00		
Setting range (min. hex value max. hex value)		
0x00		0xFF
Value is bit-coded:		Info
Bit 0	Setpoint angle without gearbox factor	
Bit 1	Angle correction with polynomial	
Bit 2	External angle correction	From version 16.00.00
Bit 3	Reserved	From version 16.00.00
Bit 4	Reserved	From version 16.00.00
Bit 5	Reserved	From version 16.00.00
Bit 6	Reserved	From version 16.00.00
Bit 7	Reserved	From version 16.00.00
Subcodes	Lenze setting	Info
C01073/1	0x02	L_DFSET_1: Adjustment
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01074

Parameter Name: C01074 L_DFSET_1: Zero pulse divider		Data type: UNSIGNED_16 Index: 23501 _d = 5BC _{Dh}
From version 12.00.00		
Setting range (min. value unit max. value)		
0		16384
Subcodes	Lenze setting	Info
C01074/1	0	L_DFSET_1: Divider for actual value zero pulse
C01074/2	0	L_DFSET_1: Divider for setpoint zero pulse
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01075

Parameter Name: C01075 L_DFSET_1: Synchronisation mode		Data type: UNSIGNED_8 Index: 23500 _d = 5BC _{Ch}
From version 12.00.00		

Parameter Name: C01075 L_DFSET_1: Synchronisation mode		Data type: UNSIGNED_8 Index: 23500 _d = 5BCC _h
Selection list		
0	Inactive	
1	Permanent sync. without enable (bZeroPulse)	
2	Permanent sync. with enable (bZeroPulse)	
10	1x sync. - Angular diff. shortest path setpoint	
11	1x Sync. - Angular diff. Cw	
12	1x Sync. - Angular diff. Ccw	
13	1x Sync. - Angular diff. shortest path act. value	
Subcodes		Lenze setting
C01075/1	0: Inactive	L_DFSET_1 : Synchronisation mode
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01076

Parameter Name: C01076 L_DFRFG_1: Times		Data type: UNSIGNED_32 Index: 23499 _d = 5BCB _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0.000	s	999.900
Subcodes		Lenze setting
C01076/1	1.000 s	L_DFRFG_1 : Acceleration and deceleration time
C01076/2	0.000 s	L_DFRFG_1 : Deceleration time for quick stop
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01077

Parameter Name: C01077 L_DFRFG_1: Max. speed-up		Data type: INTEGER_16 Index: 23498 _d = 5BCA _h
From version 12.00.00		
Setting range (min. value unit max. value)		
1	rpm	15000
Subcodes		Lenze setting
C01077/1	3000 rpm	L_DFRFG_1 : Max. speed-up
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01078

Parameter Name: C01078 L_DFRFG_1: Following error		Data type: UNSIGNED_32 Index: 23497 _d = 5BC9 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
10	Incr.	2000000000
Subcodes		Lenze setting
C01078/1	2000000000 incr.	L_DFRFG_1 : Following error limit
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01079

Parameter Name: C01079 L_DFRFG_1: Synchronisation window		Data type: UNSIGNED_16 Index: 23496 _d = 5BC8 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0	Incr.	65535
Subcodes	Lenze setting	Info
C01079/1	100 incr.	L_DFRFG_1 : Synchronisation window (position)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01080

Parameter Name: C01080 L_DFRFG_1: Offset		Data type: INTEGER_32 Index: 23495 _d = 5BC7 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-2147483647	Incr.	2147483647
Subcodes	Lenze setting	Info
C01080/1	0 incr.	L_DFRFG_1 : Offset
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01081

Parameter Name: C01081 L_DFRFG_1: Sync. direction / TP function		Data type: UNSIGNED_8 Index: 23494 _d = 5BC6 _h
From version 12.00.00		
Selection list		
1	cw/ccw - without TP	
2	cw - without TP	
3	ccw - without TP	
4	cw/ccw - with TP	
5	cw - with TP	
6	ccw - with TP	
Subcodes	Lenze setting	Info
C01081/1	1: cw/ccw - without TP	L_DFRFG_1 : Sync. direction / TP function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01082

Parameter Name: C01082 LS_WriteParamList: Execute Mode		Data type: UNSIGNED_8 Index: 23493 _d = 5BC5 _h
Parameter change-over : Selection of the activation method		
Selection list (Lenze setting printed in bold)		Info
0	by Execute	The writing of the parameter list is activated by a FALSE/TRUE edge at the <i>bExecute</i> input.
1	by Input Select	The writing of the parameter list is carried out if a change is made at the select inputs and if the inverter is initialised.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01083

Parameter Name: C01083 LS_WriteParamList: Error status		Data type: UNSIGNED_16 Index: 23492 _d = 5BC4 _h
Parameter change-over: Error status:		
<ul style="list-style-type: none"> • 0 = no error • 33803 0x840B = invalid data type (e.g. STRING) • 33804 0x840C = limit violation • 33806 0x840E = invalid code • 33813 0x8415 = no element of the selection list • 33815 0x8417 = writing of the parameter not permitted • 33816 0x8418 = writing of the parameter only permitted if controller is inhibited • 33829 0x8425 = invalid subcode • 33865 0x8449 = no parameter with subcodes 		
Display range (min. value unit max. value)		
0		34000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01084

Parameter Name: C01084 LS_WriteParamList: Error line		Data type: UNSIGNED_8 Index: 23491 _d = 5BC3 _h
Parameter change-over: Display of the number of list entry where the error occurred (in connection with the value set selected via <i>bSelectWriteValue_1</i> and <i>bSelectWriteValue_2</i>).		
Display range (min. value unit max. value)		
0		32
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01085

Parameter Name: C01085 LS_WriteParamList: Index		Data type: INTEGER_32 Index: 23490 _d = 5BC2 _h
Parameter change-over: Parameter for entry 1 ... 32		
Setting range (min. value unit max. value)		
0.000		16000.000
Subcodes	Lenze setting	Info
C01085/1	0.000	Parameter for entries 1 ... 32 <ul style="list-style-type: none"> • Format: <code number>.<subcode number> • Examples: "12.000" = C00012; "26.001" = C00026/1
C01085/...		
C01085/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01086

Parameter Name: C01086 LS_WriteParamList: WriteValue_1		Data type: INTEGER_32 Index: 23489 _d = 5BC1 _h
Parameter change-over: Parameter values - value set 1		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C01086/1	0	Parameter values - value set 1 <ul style="list-style-type: none"> • Parameter values for the parameters defined in C01085/1 ... 32.
C01086/...		
C01086/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01087

Parameter Name: C01087 LS_WriteParamList: WriteValue_2		Data type: INTEGER_32 Index: 23488 _d = 5BC0 _h
Parameter change-over : Parameter values - value set 2		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C01087/1	0	Parameter values - value set 2 • Parameter values for the parameters defined in C01085/1 ... 32 .
C01087/...		
C01087/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01088

Parameter Name: C01088 LS_WriteParamList: WriteValue_3		Data type: INTEGER_32 Index: 23487 _d = 5BBF _h
Parameter change-over : Parameter values - value set 3		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C01088/1	0	Parameter values - value set 3 • Parameter values for the parameters defined in C01085/1 ... 32 .
C01088/...		
C01088/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01089

Parameter Name: C01089 LS_WriteParamList: WriteValue_4		Data type: INTEGER_32 Index: 23486 _d = 5BBE _h
Parameter change-over : Parameter values - value set 4		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C01089/1	0	Parameter values - value set 4 • Parameter values for the parameters defined in C01085/1 ... 32 .
C01089/...		
C01089/32		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01090

Parameter Name: C01090 LS_ParReadWrite 1-6: Index		Data type: INTEGER_32 Index: 23485 _d = 5BBD _h
From version 06.00.00 Parameter to be read or written. <ul style="list-style-type: none"> • Format: <code number>, <subcode number> • For a setting of "0,000", inputs <i>wParIndex</i> and <i>wParSubindex</i> are effective for addressing purposes instead. 		
Setting range (min. value unit max. value)		
0.000		16000.000
Subcodes	Lenze setting	Info
C01090/1	0.000	LS_ParReadWrite 1 : Index
C01090/2	0.000	LS_ParReadWrite 2 : Index
C01090/3	0.000	LS_ParReadWrite 3 : Index
C01090/4	0.000	LS_ParReadWrite 4 : Index
C01090/5	0.000	LS_ParReadWrite 5 : Index
C01090/6	0.000	LS_ParReadWrite 6 : Index
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01091

Parameter Name: C01091 LS_ParReadWrite 1-6: Cycle time		Data type: UNSIGNED_16 Index: 23484 _d = 5BBC _h
Time interval for cyclic reading/writing		
Selection list		
0	0 (by Execute)	
20	20 ms	
50	50 ms	
100	100 ms	
200	200 ms	
500	500 ms	
1000	1 s	
2000	2 s	
5000	5 s	
10000	10 s	
Subcodes	Lenze setting	Info
C01091/1	0: 0 (by Execute)	LS_ParReadWrite 1 : Cycle time
C01091/2	0: 0 (by Execute)	LS_ParReadWrite 2 : Cycle time
C01091/3	0: 0 (by Execute)	LS_ParReadWrite 3 : Cycle time
C01091/4	0: 0 (by Execute)	LS_ParReadWrite 4 : Cycle time
C01091/5	0: 0 (by Execute)	LS_ParReadWrite 5 : Cycle time
C01091/6	0: 0 (by Execute)	LS_ParReadWrite 6 : Cycle time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01092

Parameter Name: C01092 LS_ParReadWrite 1-6: FailState		Data type: UNSIGNED_16 Index: 23483 _d = 5BBB _h
Error status:		
<ul style="list-style-type: none"> • 0 = no error • 33803 0x840B = invalid data type (e.g. STRING) • 33804 0x840C = limit violation • 33806 0x840E = invalid code • 33813 0x8415 = no element of the selection list • 33815 0x8417 = writing of the parameter not permitted • 33816 0x8418 = writing of the parameter only permitted if controller is inhibited • 33829 0x8425 = invalid subcode • 33865 0x8449 = no parameter with subcodes 		
Display range (min. value unit max. value)		
0		34000
Subcodes		Info
C01092/1		LS_ParReadWrite 1 : Error status
C01092/2		LS_ParReadWrite 2 : Error status
C01092/3		LS_ParReadWrite 3 : Error status
C01092/4		LS_ParReadWrite 4 : Error status
C01092/5		LS_ParReadWrite 5 : Error status
C01092/6		LS_ParReadWrite 6 : Error status
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01093

Parameter Name: C01093 - LS_ParReadWrite 1-6: Arithmetic mode		Data type: UNSIGNED_8 Index: 23482 _d = 5BB _h
From version 06.00.00		
The integrated arithmetic function allows for easy arithmetic conversion of the process value to be written or which was read into the format of the target parameter via parameterisable factors and without the need for an additional arithmetic FB.		
Selection list		
0	No arithmetic	
1	In16Bit: LW=+/-32767	
2	In16Bit: HW=+/-; LW=0..65535	
3	In32Bit: HW_LW=+/-2147483647	
Subcodes		Info
C01093/1	0: no arithmetic	LS_ParReadWrite 1 : Arithmetic mode
C01093/2	0: no arithmetic	LS_ParReadWrite 2 : Arithmetic mode
C01093/3	0: no arithmetic	LS_ParReadWrite 3 : Arithmetic mode
C01093/4	0: no arithmetic	LS_ParReadWrite 4 : Arithmetic mode
C01093/5	0: no arithmetic	LS_ParReadWrite 5 : Arithmetic mode
C01093/6	0: no arithmetic	LS_ParReadWrite 6 : Arithmetic mode
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01094

Parameter Name: C01094 - LS_ParReadWrite 1-6: Numerator		Data type: INTEGER_16 Index: 23481 _d = 5BB9 _h
From version 06.00.00 Arithmetic function : Factor (numerator) for internal conversion in arithmetic modes 1 ... 3.		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01094/1	1	LS_ParReadWrite_1 : Numerator
C01094/2	1	LS_ParReadWrite_2 : Numerator
C01094/3	1	LS_ParReadWrite_3 : Numerator
C01094/4	1	LS_ParReadWrite_4 : Numerator
C01094/5	1	LS_ParReadWrite_5 : Numerator
C01094/6	1	LS_ParReadWrite_6 : Numerator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01095

Parameter Name: C01095 - LS_ParReadWrite 1-6: Denominator		Data type: INTEGER_16 Index: 23480 _d = 5BB8 _h
From version 06.00.00 Arithmetic function : Factor (denominator) for internal conversion in arithmetic modes 1 ... 3.		
Setting range (min. value unit max. value)		
1		32767
Subcodes	Lenze setting	Info
C01095/1	1	LS_ParReadWrite_1 : Denominator
C01095/2	1	LS_ParReadWrite_2 : Denominator
C01095/3	1	LS_ParReadWrite_3 : Denominator
C01095/4	1	LS_ParReadWrite_4 : Denominator
C01095/5	1	LS_ParReadWrite_5 : Denominator
C01095/6	1	LS_ParReadWrite_6 : Denominator
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01096

Parameter Name: C01096 LS_IRInterface: Dial-in code		Data type: UNSIGNED_16 Index: 23479 _d = 5BB7 _h
From version 12.00.00 Infrared remote control : Dial-in code for activating the remote control		
Setting range (min. value unit max. value)		Lenze setting
0		9999 0
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01097

Parameter Name: C01097 LS_IRInterface CtrlWord1_2		Data type: UNSIGNED_16 Index: 23478 _d = 5BB6 _h
<p>In version 08.00.00 and from version 12.00.00 onwards Infrared remote control: Individual key codes</p> <ul style="list-style-type: none"> Two individual values can be set for each key that are provided at the outputs <i>wlCtrl1</i> and <i>wlCtrl2</i> of the SB LS_IRInterface when the key is pressed. 		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Subcodes	Lenze setting	Info
C01097/1	0x0000	IrCtrlWord1_F1
C01097/2	0x0000	IrCtrlWord2_F1
C01097/3	0x0000	IrCtrlWord1_F2
C01097/4	0x0000	IrCtrlWord2_F2
C01097/5	0x0000	IrCtrlWord1_F3
C01097/6	0x0000	IrCtrlWord2_F3
C01097/7	0x0000	IrCtrlWord1_Down
C01097/8	0x0000	IrCtrlWord2_Down
C01097/9	0x0000	IrCtrlWord1_Up
C01097/10	0x0000	IrCtrlWord2_Up
C01097/11	0x0000	IrCtrlWord1_0
C01097/12	0x0000	IrCtrlWord2_0
C01097/13	0x0000	IrCtrlWord1_1
C01097/14	0x0000	IrCtrlWord2_1
C01097/15	0x0000	IrCtrlWord1_2
C01097/16	0x0000	IrCtrlWord2_2
C01097/17	0x0000	IrCtrlWord1_3
C01097/18	0x0000	IrCtrlWord2_3
C01097/19	0x0000	IrCtrlWord1_4
C01097/20	0x0000	IrCtrlWord2_4
C01097/21	0x0000	IrCtrlWord1_5
C01097/22	0x0000	IrCtrlWord2_5
C01097/23	0x0000	IrCtrlWord1_6
C01097/24	0x0000	IrCtrlWord2_6
C01097/25	0x0000	IrCtrlWord1_7
C01097/26	0x0000	IrCtrlWord2_7
C01097/27	0x0000	IrCtrlWord1_8
C01097/28	0x0000	IrCtrlWord2_8
C01097/29	0x0000	IrCtrlWord1_9
C01097/30	0x0000	IrCtrlWord2_9
C01097/31	0x0000	IrCtrlWord1_NoKey
C01097/32	0x0000	IrCtrlWord2_NoKey
C01097/33	0x0000	In version 8.00.00 and from version 16.00.00 onwards
C01097/34	0x0000	In version 8.00.00 and from version 16.00.00 onwards
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01098

Parameter Name: C01098 LS_ParReadWrite 1-6: Configuration		Data type: UNSIGNED_16 Index: 23477 _d = 5BB5 _h
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Keeping the value	
Bit 1	Keeping the value in the event of an error	
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C01098/1	0x0000	LS_ParReadWrite 1 : Configuration
C01098/2	0x0000	LS_ParReadWrite 2 : Configuration
C01098/3	0x0000	LS_ParReadWrite 3 : Configuration
C01098/4	0x0000	LS_ParReadWrite 4 : Configuration
C01098/5	0x0000	LS_ParReadWrite 5 : Configuration
C01098/6	0x0000	LS_ParReadWrite 6 : Configuration
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01100

Parameter Name: C01100 Function L_Counter 1-3		Data type: UNSIGNED_8 Index: 23475 _d = 5BB3 _h
Selection of reset function		
Selection list		
0	Normal counting	
1	Auto reset	
2	Manual reset	
Subcodes	Lenze setting	Info
C01100/1	0: Normal counting	L_Counter 1 : Function
C01100/2	0: Normal counting	L_Counter 2 : Function
C01100/3	0: Normal counting	L_Counter 3 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01101

Parameter Name: C01101 Comparison L_Counter 1-3		Data type: UNSIGNED_8 Index: 23474 _d = 5BB2 _h
Selection of comparison operation		
Selection list		
0	Greater than or equal to	
1	Less than or equal to	
2	equal to	
Subcodes	Lenze setting	Info
C01101/1	0: Greater than or equal to	L_Counter_1 : Comparison
C01101/2	0: Greater than or equal to	L_Counter_2 : Comparison
C01101/3	0: Greater than or equal to	L_Counter_3 : Comparison
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01108

Parameter Name: C01108 L_SwitchPoint_1: Dead time factor		Data type: UNSIGNED_8 Index: 23467 _d = 5BAB _h
From version 16.00.00		
Selection list		
1	1 µs	
2	10 µs	
3	100 µs	
4	1000 µs	
Subcodes	Lenze setting	Info
C01108/1	2 µs: 10	L_SwitchPoint_1 : Deadtime factor 1
C01108/2	2 µs: 10	L_SwitchPoint_1 : Deadtime factor 2
C01108/3	2 µs: 10	L_SwitchPoint_1 : Deadtime factor 3
C01108/4	2 µs: 10	L_SwitchPoint_1 : Deadtime factor 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01110

Parameter Name: C01110 LS_MultiEncoder: Solid measure		Data type: UNSIGNED_8 Index: 23465 _d = 5BA9 _h
In version 8.00.00 and from version 16.00.00 onwards		
Configuration examples can be found in the following chapter:		
<ul style="list-style-type: none"> • SSI absolute value encoder with Stegmann-SSI protocol 		
Selection list (Lenze setting printed in bold)		Info
0	rotatively unipolar	Single and Multiturn bits are given in C426/2...5
1	linearly unipolar	Bits are given in C426/2 and converted with C1111/1..2
2	rotatively bipolar	Single and Multiturn bits are given in C426/2...5 . Negative representation in the upper half of the data range.
3	linearly bipolar	Bits are given in C426/2 and converted with C1111/1..2 . Negative representation in the upper half of the data range.

Parameter Name: C01110 LS_MultiEncoder: Solid measure		Data type: UNSIGNED_8 Index: 23465 _d = 5BA9 _h
4	Inverted rotatively in unipolar mode	Single and Multiturn bits are given in C426/2...5 . Conversion via position offset C1112/1 .
5	Inverted linearly in unipolar mode	Bits are given in C426/2 and converted with C1111/1..2 . Conversion via position offset C1112/1 .
6	Inverted rotatively in bipolar mode	Single and Multiturn bits are given in C426/2..5 . Negative representation in the upper half of the data range. Conversion via position offset C1112/1 .
7	Inverted linearly in bipolar mode	Bits are given in C426/2 and converted with C1111/1..2 . Negative representation in the upper half of the data range. Conversion via position offset C1112/1 .
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C01111

Parameter Name: C01111 LS_MultiEncoder: Encoder constant		Data type: INTEGER_32 Index: 23464 _d = 5BA8 _h
In version 8.00.00 and from version 16.00.00 onwards Configuration examples can be found in the following chapter: • SSI absolute value encoder with Stegmann-SSI protocol		
Setting range (min. value unit max. value)		
1		2147483647
Subcodes	Lenze setting	Info
C01111/1	1	LS_MultiEncoder: Difference - traverse path
C01111/2	1	LS_MultiEncoder: Difference - encoder value
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C01112

Parameter Name: C01112 LS_MultiEncoder: Position values		Data type: INTEGER_32 Index: 23463 _d = 5BA7 _h
In version 8.00.00 and from version 16.00.00 onwards		
Setting range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes	Lenze setting	Info
C01112/1	0.0000 units	LS_MultiEncoder: Position offset
C01112/2	-214748.3647 units	LS_MultiEncoder: Data area min
C01112/3	214748.3647 units	LS_MultiEncoder: Data area max
C01112/4	0.0000 units	LS_MultiEncoder: Max. position jump
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10000		

C01119

Parameter Name: C01119 LS_MultiEncoder: Current position		Data type: INTEGER_32 Index: 23456 _d = 5BA0 _h
In version 8.00.00 and from version 16.00.00 onwards		
Display range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes		Info
C01119/1		LS_MultiEncoder: Current position
C01119/2		LS_MultiEncoder: Maximum travel distance
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01120

Parameter Name: C01120 Sync signal source		Data type: UNSIGNED_8 Index: 23455 _d = 5B9F _h
Selection of the signal source for device synchronisation		
<ul style="list-style-type: none"> The drive can only be synchronised by one source. 		
Selection list (Lenze setting printed in bold)		Info
0	Off	Synchronisation off
1	CAN on board	Synchronisation via CAN bus ▶ Sync telegram
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01121

Parameter Name: C01121 Sync cycle time setpoint		Data type: UNSIGNED_16 Index: 23454 _d = 5B9E _h
Cycle time setpoint for device synchronisation		
<ul style="list-style-type: none"> Time interval at which the phase control loop (PLL) in the inverter expects the synchronisation signals. The cycle time setpoint must be set according to the cycle of the respective synchronisation source. 		
Note:		
<ul style="list-style-type: none"> Only integer multiples of 1000 µs can be set. Intelligent communication modules usually define the cycle time setpoint derived from the bus cycle. In this case, a manual change is not possible. 		
Example: For the CAN bus, a distance of 2 ms has been set between two synchronisation signals. If the CAN bus is to be used as synchronisation source, a synchronisation cycle of 2000 µs must be set in C01121.		
Setting range (min. value unit max. value)		Lenze setting
1000	µs	20000 1000 µs
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01122

Parameter Name: C01122 Sync phase position		Data type: UNSIGNED_16 Index: 23453 _d = 5B9D _h
Phase position for device synchronisation <ul style="list-style-type: none"> • The phase position determines the zero-time of the internal system cycle with regard to the synchronisation signal (bus cycle). Since PDO processing is an inherent part of the system part of the application, the instant of acceptance of the PDOs is postponed as well by a changed phase position. • With a setting = 0, the system cycle starts simultaneously with the synchronisation signal. • With a setting > 0, the internal system cycle starts earlier by the set time with regard to the synchronisation signal (the phase position acts negatively). • Intelligent communication modules define the optimal time with activated synchronisation by themselves. In this case, a manual change is not possible. • The decisive factor for defining C01122 is the time where all nodes are provided with valid PDOs. <p>Example: If the phase position is set to 550 µs, the system part of the application starts 550 µs before the arrival of the synchronisation signal.</p>		
Setting range (min. value unit max. value)		Lenze setting
0	µs	1000 0 µs
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01123

Parameter Name: C01123 Sync window		Data type: UNSIGNED_16 Index: 23452 _d = 5B9C _h
Time slot for monitoring the synchronisation signal or the phase position <ul style="list-style-type: none"> • The synchronisation signal or the current phase position must be within this time slot around the corresponding expected value (C01122). • With the setting "1000 µs" there will be no monitoring. 		
Setting range (min. value unit max. value)		Lenze setting
0	µs	10000 100 µs
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01124

Parameter Name: C01124 Sync correction width		Data type: UNSIGNED_8 Index: 23451 _d = 5B9B _h
Correction increment for device synchronisation <ul style="list-style-type: none"> • If the cycle times of the synchronisation signal differs and phase-locked loop (PLL) differ from each other, this setting defines the measure the phase-locking loop is reset with. • If synchronisation is not reached, select a higher correction constant. • The optimum setting depends on quartz precision and must be determined empirically if required. 		
Selection list (Lenze setting printed in bold)		
1	100ns	
2	200ns	
3	300ns	
4	400ns	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01130

Parameter Name: C01130 LS_RetainData: Selection		Data type: UNSIGNED_16 Index: 23445 _d = 5B95 _h
From version 12.00.00		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	wIn1	
Bit 1	wIn2	
Bit 2	wIn3	
Bit 3	wIn4	
Bit 4	dnIn1	
Bit 5	dnIn2	
Bit 6	dnIn3	
Bit 7	dnIn4	
Bit 8	bln1	
Bit 9	bln2	
Bit 10	bln3	
Bit 11	bln4	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C01130/1	0x000F	LS_RetainData : Selection bSetRetain_1
C01130/2	0x00F0	LS_RetainData : Selection bSetRetain_2
C01130/3	0x0F00	LS_RetainData : Selection bSetRetain_3
C01130/4	0x0FFF	LS_RetainData : Selection bLoadParams
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01131

Parameter Name: C01131 LS_RetainData: 16Bit data		Data type: UNSIGNED_16 Index: 23444 _d = 5B94 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C01131/1	0	LS_RetainData : wInitValue1
C01131/2	0	LS_RetainData : wInitValue2
C01131/3	0	LS_RetainData : wInitValue3
C01131/4	0	LS_RetainData : wInitValue4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01132

Parameter Name: C01132 LS_RetainData: 32Bit data		Data type: INTEGER_32 Index: 23443 _d = 5B93 _h
From version 12.00.00		
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C01132/1	0	LS_RetainData : dnInitValue1
C01132/2	0	LS_RetainData : dnInitValue2
C01132/3	0	LS_RetainData : dnInitValue3
C01132/4	0	LS_RetainData : dnInitValue4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01133

Parameter Name: C01133 LS_RetainData: Bool data		Data type: UNSIGNED_8 Index: 23442 _d = 5B92 _h
From version 12.00.00		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info
C01133/1	0: FALSE	LS_RetainData : bInitValue1
C01133/2	0: FALSE	LS_RetainData : bInitValue2
C01133/3	0: FALSE	LS_RetainData : bInitValue3
C01133/4	0: FALSE	LS_RetainData : bInitValue4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01134

Parameter Name: C01134 LS_RetainData: 16bit data		Data type: UNSIGNED_16 Index: 23441 _d = 5B91 _h
Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C01134/1	0	LS_RetainData : wValue1
C01134/2	0	LS_RetainData : wValue2
C01134/3	0	LS_RetainData : wValue3
C01134/4	0	LS_RetainData : wValue4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01135

Parameter Name: C01135 LS_RetainData: 32bit data		Data type: INTEGER_32 Index: 23440 _d = 5B90 _h
Setting range (min. value unit max. value)		
-2147483647		2147483647
Subcodes	Lenze setting	Info
C01135/1	0	LS_RetainData : dnValue1
C01135/2	0	LS_RetainData : dnValue2
C01135/3	0	LS_RetainData : dnValue3
C01135/4	0	LS_RetainData : dnValue4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01136

Parameter Name: C01136 LS_RetainData: Bool data		Data type: UNSIGNED_8 Index: 23439 _d = 5B8F _h
Selection list		Info
0	False	
1	True	
Subcodes	Lenze setting	Info
C01136/1	0: FALSE	LS_RetainData : bValue1
C01136/2	0: FALSE	LS_RetainData : bValue2
C01136/3	0: FALSE	LS_RetainData : bValue3
C01136/4	0: FALSE	LS_RetainData : bValue4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01138

Parameter Name: C01138 L_Transient 1-4: Function		Data type: UNSIGNED_8 Index: 23437 _d = 5B8D _h
Selection of edge evaluation		
Selection list		
0	High edge	
1	Low edge	
2	High and low edge	
Subcodes	Lenze setting	Info
C01138/1	0: High edge	L_Transient_1 : Function
C01138/2	0: High edge	L_Transient_2 : Function
C01138/3	0: High edge	L_Transient_3 : Function
C01138/4	0: High edge	L_Transient_4 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01139

Parameter Name: C01139 L_Transient 1-4: Pulse duration		Data type: UNSIGNED_16 Index: 23436 _d = 5B8C _h
Setting range (min. value unit max. value)		
0.000	s	60.000
Subcodes	Lenze setting	Info
C01139/1	0.000 s	L_Transient 1 : Pulse duration
C01139/2	0.000 s	L_Transient 2 : Pulse duration
C01139/3	0.000 s	L_Transient 3 : Pulse duration
C01139/4	0.000 s	L_Transient 4 : Pulse duration
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01140

Parameter Name: C01140 L_Transient 5-8: Function		Data type: UNSIGNED_8 Index: 23435 _d = 5B8B _h
Selection of edge evaluation		
Selection list		
0	High edge	
1	Low edge	
2	High and low edge	
Subcodes	Lenze setting	Info
C01140/1	0: High edge	L_Transient 5 : Function
C01140/2	0: High edge	L_Transient 6 : Function
C01140/3	0: High edge	L_Transient 7 : Function
C01140/4	0: High edge	L_Transient 8 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01141

Parameter Name: C01141 L_Transient 5-8 pulse duration		Data type: UNSIGNED_16 Index: 23434 _d = 5B8A _h
Setting range (min. value unit max. value)		
0.000	s	60.000
Subcodes	Lenze setting	Info
C01141/1	0.000 s	L_Transient 5 : Pulse duration
C01141/2	0.000 s	L_Transient 6 : Pulse duration
C01141/3	0.000 s	L_Transient 7 : Pulse duration
C01141/4	0.000 s	L_Transient 8 : Pulse duration
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01150

Parameter Name: C01150 L_PhaseIntK: Function		Data type: UNSIGNED_8 Index: 23425 _d = 5B81 _h
Loading behaviour of the integrator		
Selection list		Info
0	Loading with level	Load integrator with TRUE level at the input <i>bLoad</i>
1	Loading with edge	Load integrator with FALSE/TRUE edge at the input <i>bLoad</i>
2	Loading with level + reset	Load integrator when the comparison value (C01151) is reached or with TRUE level at the <i>bLoad</i> input
Subcodes	Lenze setting	Info
C01150/1	0: Loading with level	L_PhaseIntK_1 : Function
C01150/2	0: Loading with level	L_PhaseIntK_2 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01151

Parameter Name: C01151 L_PhaseIntK: Compare		Data type: INTEGER_32 Index: 23424 _d = 5B80 _h
Comparison value		
Setting range (min. value unit max. value)		
0		2147418112
Subcodes	Lenze setting	Info
C01151/1	0	L_PhaseIntK_1 : Comparison value
C01151/2	0	L_PhaseIntK_2 : Comparison value
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01201

Parameter Name: C01201 MCK: Cycle		Data type: INTEGER_32 Index: 23374 _d = 5B4E _h
From version 06.00.00 Cycle for Modulo measuring system <ul style="list-style-type: none"> When the cycle is set to 0 units (Lenze setting), the traversing range is unlimited (classical measuring system). ▶ Activation of the Modulo measuring system 		
Setting range (min. value unit max. value)		
0.0000	units	214748.3647
Subcodes	Lenze setting	Info
C01201/1	0.0000 units	MCK: Cycle
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01202

Parameter Name: C01202 MCK: iM motor/process		Data type: UNSIGNED_16 Index: 23373 _d = 5B4D _h
Gearbox factor - motor <ul style="list-style-type: none"> Entry of the gearbox factor as numerator/denominator ratio (numerator = motor speed and denominator = output speed of gearbox) or from the number of teeth of the gearbox arrangement. <p style="text-align: right;">▶ Machine parameter</p>		
Setting range (min. value unit max. value)		
1		65535
Subcodes	Lenze setting	Info
C01202/1	1	MCK: iM: Numerator gearbox factor Z2
C01202/2	1	MCK: iM: Denominator gearbox factor Z1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01203

Parameter Name: C01203 MCK: iG motor/position encoder		Data type: UNSIGNED_16 Index: 23372 _d = 5B4C _h
Gearbox factor - position encoder <ul style="list-style-type: none"> Entry of the gearbox factor as numerator/denominator ratio, with numerator = motor speed and denominator = position encoder speed. <p style="text-align: right;">▶ Machine parameter</p>		
Setting range (min. value unit max. value)		
1		65535
Subcodes	Lenze setting	Info
C01203/1	1	MCK: iG: Numerator (motor speed)
C01203/2	1	MCK: iG: Denominator (encoder speed)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01204

Parameter Name: C01204 MCK: Feed constant		Data type: INTEGER_32 Index: 23371 _d = 5B4B _h
The feed constant corresponds to the movement of the machine during one revolution of the gearbox output shaft. <ul style="list-style-type: none"> The value is entered in application units referred to one revolution. <p style="text-align: right;">▶ Machine parameter</p>		
Setting range (min. value unit max. value)		Lenze setting
0.0001	units/rev.	214748.3647 360.0000 units/rev.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01205

Parameter Name: C01205 MCK: Position resolution		Data type: INTEGER_32 Index: 23370 _d = 5B4A _h
Display of the number of increments corresponding to one unit. <ul style="list-style-type: none"> 1 motor revolution \equiv 65536 increments <p style="text-align: right;">▶ Machine parameter</p>		
Display range (min. value unit max. value)		
0.0000	Incr./unit	214748.3647
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01206

Parameter Name: C01206 MCK: Mounting direction		Data type: UNSIGNED_8 Index: 23369 _d = 5B49 _h
Inversion for mirrored motor and encoder mounting ▶ Machine parameter		
Selection list		
0	not inverted	
1	inverted	
Subcodes	Lenze setting	Info
C01206/1	0: Not inverted	Motor mounting direction • Setting for motor mounting turned by 180°.
C01206/2	0: Not inverted	Position encoder mounting direction • Setting for position encoder system mounting turned by 180°.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C01210

Parameter Name: C01210 MCK: Current positions		Data type: INTEGER_32 Index: 23365 _d = 5B45 _h
Display of current position data of the Motion Control Kernel		
Display range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes	Info	
C01210/1	MCK: Feed • Display of the current feed for positioning profiles as a relative distance.	
C01210/2	MCK: Set position • Display of the current setpoint position calculated by the MCK.	
C01210/3	MCK: Actual position • Display of the current actual position calculated by an optional encoder system.	
C01210/4	MCK: Following error • Display of the current following error as a difference between setpoint position and actual position.	
C01210/5	MCK: Positioning accuracy • Display of the current positioning accuracy referred to the actual number of increments of the position encoder.	
C01210/6	MCK: Target position	
C01210/7	MCK: Set position modulo • From version 06.00.00	
C01210/8	MCK: Actual position modulo • From version 12.00.00	
C01210/9	MCK: Dist. ref. mark and Ref-TP • In version 8.00.00 and from version 16.00.00 onwards • Display of the distance between pre-stop mark/limit switch and TP/MP while homing. ▶ Distance measurement	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01211

Parameter Name: C01211 MCK: Speed		Data type: INTEGER_32 Index: 23364 _d = 5B44 _h
Display of the current speed data		
Display range (min. value unit max. value)		
-214748.3647	units/s	214748.3647
Subcodes		Info
C01211/1		MCK: Max. traversing speed 100%_C11 • Display of the maximum traversing speed based on the reference speed set in C00011 .
C01211/2		MCK: Set speed • From version 12.00.00
C01211/3		MCK: Actual speed • From version 12.00.00
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01213

Parameter Name: C01213 MCK: Max. traversing distance		Data type: INTEGER_32 Index: 23362 _d = 5B42 _h
Display of current position limits		
Display range (min. value unit max. value)		
-2147480000	units	2147480000
Subcodes		Info
C01213/1		MCK: Max. traversing distance • Display of the maximum distance to be traversed referred to the 32-bit display area (max. 2147483647 increments).
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01215

Parameter Name: C01215 MCK: Following error		Data type: INTEGER_32 Index: 23360 _d = 5B40 _h
Limits for following error monitoring system ▶ Following error monitoring system		
Setting range (min. value unit max. value)		
0.0000	units	214748.0000
Subcodes	Lenze setting	Info
C01215/1	0.0000 units	MCK: Following error limit 1 • First limit of the maximum following error for monitoring and response activation.
C01215/2	0.0000 units	MCK: Following error limit 2 • Second limit of the maximum following error for monitoring and response activation.
C01215/3	0.0000 units	MCK: Following error SetPos=ActPos • From version 16.00.00 ▶ Monitoring of the following error in case of controller inhibit
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01216

Parameter Name: C01216 MCK: Positioning setting		Data type: UNSIGNED_8 Index: 23359 _d = 5B3F _h
▶ Positioning		
Setting range (min. hex value max. hex value)		Lenze setting
0x00		0xFF 0x01 (decimal: 1)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input checked="" type="checkbox"/>	PosAbort at PosInit	1 ≙ When a changeover to "positioning" mode is made, ramping down at the rate of deceleration set in C01251 for normal stopping is carried out.
Bit 1 <input type="checkbox"/>	PosExecute active at PosInit	1 ≙ When a changeover is made to the "positioning" mode, the specified profile is immediately executed if the "MCK PosExecute" control bit has also been set. If the MCK "PosExecute" control bit has not been set, the setpoint is continued.
Bit 2 <input type="checkbox"/>	Reserved	
Bit 3 <input type="checkbox"/>	Reserved	
Bit 4 <input type="checkbox"/>	ProfilStart at PosInit	1 ≙ When it is changed to the "Positioning" operating mode, the defined profile is executed immediately without the need to set the MCK control bit "PosExecute".
Bit 5 <input type="checkbox"/>	Maximum jerk	1 ≙ The maximum jerk is calculated based on the acceleration and S-ramp time of the current profile and the sequence profile. This is then used in an accelerated drive for reducing the acceleration to 0 or for acceleration of the sequence profile. • From version 14.00.00 ▶ Setting or activation of maximum jerk for traversing profiles
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01218

Parameter Name: C01218 MCK: Position follower setting		Data type: UNSIGNED_8 Index: 23357 _d = 5B3D _h
Settings for "Position follower" mode		
▶ Position follower		
Setting range (min. hex value max. hex value)		Lenze setting
0x00		0xFF 0x0C (decimal: 12)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input type="checkbox"/>	Speed FF control.: nSpeedSetValue_a	1 ≙ speed feedforward control value comes from main setpoint <i>nSpeedSetValue_a</i>
Bit 1 <input type="checkbox"/>	Speed FF control: nSpeedAddValue_v	1 ≙ speed feedforward control value comes from additive speed value <i>nSpeedAddValue_v</i>
Bit 2 <input checked="" type="checkbox"/>	HW limit switch on	1 ≙ Travel range monitoring via hardware limit switch is active. The error response can be parameterised in C00595/1 and C00595/2 .
Bit 3 <input checked="" type="checkbox"/>	SW limit switch on	1 ≙ Travel range monitoring via parameterised software limit positions is active. The error response can be parameterised in C00595/3 and C00595/4 .

Parameter Name: C01218 MCK: Position follower setting		Data type: UNSIGNED_8 Index: 23357 _d = 5B3D _h
Bit 4 <input type="checkbox"/>	Reserved	
Bit 5 <input type="checkbox"/>	Reserved	
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Position controller off	1 ≙ Position controller is deactivated. Thus, the compensation of the following error is switched off.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01219

Parameter Name: C01219 MCK: Speed follower setting		Data type: UNSIGNED_8 Index: 23356 _d = 5B3C _h
Settings for "Speed follower" mode		▶ Speed follower
Setting range (min. hex value max. hex value)		Lenze setting
0x00		0xFF 0x0C (decimal: 12)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input type="checkbox"/>	Reserved	
Bit 1 <input type="checkbox"/>	Reserved	
Bit 2 <input checked="" type="checkbox"/>	HW limit switch on	1 ≙ Travel range monitoring via hardware limit switch is active. The error response can be parameterised in C00595/1 and C00595/2 .
Bit 3 <input checked="" type="checkbox"/>	SW limit switch on	1 ≙ Travel range monitoring via parameterised software limit positions is active. The error response can be parameterised in C00595/3 and C00595/4 .
Bit 4 <input type="checkbox"/>	Reserved	
Bit 5 <input type="checkbox"/>	Reserved	
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Position controller off	1 ≙ Position controller is deactivated. Thus, the compensation of the following error is switched off.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01220

Parameter Name: C01220 MCK: Ref. setting		Data type: UNSIGNED_16 Index: 23355 _d = 5B3B _h
From version 16.00.00 Settings for "homing" mode		▶ Homing
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	
Bit 1	Reserved	
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Start deletes bHomePosAvailable	1 ≙ When homing is started (mode 4 ... 15), the reference information is deleted.

Parameter Name: C01220 MCK: Ref. setting		Data type: UNSIGNED_16 Index: 23355 _d = 5B3B _h
Bit 5	Maximum jerk	1 ≙ The maximum jerk is calculated based on the acceleration and S-ramp time of the current profile and the sequence profile. This is then used in an accelerated drive for reducing the acceleration to 0 or for acceleration of the sequence profile. ▶ Setting or activation of maximum jerk for traversing profiles
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	SW limits inactive after Ref Ok	From version 18.00.00 onwards: 1 ≙ After detecting the reference signal, the software limit positions are deactivated. Afterwards, an optionally set sequence profile can start and move the drive into the value software limit position range.
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C01220/1	0x0000	MCK: Ref. setting
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01221

Parameter Name: C01221 MCK: Ref. mode		Data type: UNSIGNED_8 Index: 23354 _d = 5B3A _h
Selection of the homing mode.		▶ Homing
Selection list (Lenze setting printed in bold)	Info	
4 >_Rp_<_TP	Positive direction - reversing on pre-stop mark (pos. edge) - to touch probe • From version 14.00.00	
5 <_Rp_>_TP	Negative direction - reversing on pre-stop mark (pos. edge) - to touch probe • From version 14.00.00	
6 >_Rn_>_TP	Positive direction - via pre-stop mark (neg. edge) - continuing in positive direction - to touch probe	
7 <_Rn_<_TP	Negative direction - via pre-stop mark (neg. edge) - continuing in negative direction - to touch probe	
8 >_TP	Positive direction - to touch probe	
9 <_TP	Negative direction - to touch probe	
10 >_Lp_<_TP	Positive direction - reversing on pos. limit switch - to touch probe	
11 <_Ln_>_TP	Negative direction - reversing on neg. limit switch - to touch probe	
12 >_Lp	Positive direction - to pos. limit switch	

Parameter Name: C01221 MCK: Ref. mode		Data type: UNSIGNED_8 Index: 23354 _d = 5B3A _h
13	<_Ln	Negative direction - to neg. limit switch
14	>_Mlim	Positive direction towards torque limit (C01222)
15	<_Mlim	Negative direction towards torque limit (C01222)
100	SetRef	Direct acceptance and setting of the home position • The measuring system is set based on the home position parameterised in C01227/2 when the drive is at standstill.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01222

Parameter Name: C01222 MCK: Ref. M limit mode 14/15		Data type: INTEGER_16 Index: 23353 _d = 5B39 _h
Torque limit for homing modes 14 and 15 (homing towards positive stop) • 100 % ≙ maximum torque (C00057)		
▶ Homing		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	199.99
		10.00 %
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C01223

Parameter Name: C01223 MCK: Ref. waiting time mode 14/15		Data type: UNSIGNED_16 Index: 23352 _d = 5B38 _h
Blocking time for homing modes 14 and 15 (homing towards positive stop) • The reference is set if an excess of the torque limit set in C01222 has been detected over a time period defined here.		
▶ Homing		
Setting range (min. value unit max. value)		Lenze setting
0	ms	65000
		100 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01224

Parameter Name: C01224 MCK: Ref. speeds		Data type: INTEGER_32 Index: 23351 _d = 5B37 _h
Speeds for reference search/homing		
▶ Homing		
Setting range (min. value unit max. value)		
0.0000	unit/s	214748.3647
Subcodes	Lenze setting	Info
C01224/1	720.0000 unit/s	MCK: Ref. initial speed • Start speed for quick approach of the limit switch/pre-stop mark (depending on the selected homing mode).
C01224/2	180.0000 unit/s	MCK: Ref. search speed • Search speed for slower - but more precise - approaching of the touch probe sensor (sensor reference signal).
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01225

Parameter Name: C01225 MCK: Ref. accelerations		Data type: INTEGER_32 Index: 23350 _d = 5B36 _h
Accelerations for reference search/homing ▶ Homing		
Setting range (min. value unit max. value)		
0.0000	unit/s ²	214748.3647
Subcodes	Lenze setting	Info
C01225/1	720.0000 unit/s ²	MCK: Ref. initial acceleration • Starting acceleration for the starting speed ramps.
C01225/2	720.0000 unit/s ²	MCK: Ref. search acceleration • Search acceleration for the search speed ramps.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01226

Parameter Name: C01226 MCK: Ref. S-ramp time		Data type: UNSIGNED_16 Index: 23349 _d = 5B35 _h
S-ramp time for reference search/homing • Setting "0 s" ≡ no rounding ▶ Homing		
Setting range (min. value unit max. value)		
0.000	s	10.000
Subcodes	Lenze setting	Info
C01226/1	0.000 s	MCK: Ref. S-ramp time • S-ramp time for the starting and search speed ramps.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01227

Parameter Name: C01227 MCK: Ref. positions		Data type: INTEGER_32 Index: 23348 _d = 5B34 _h
Positions for determining the zero position of the reference measuring system ▶ Homing		
Setting range (min. value unit max. value)		
-214748.3647	unit	214748.3647
Subcodes	Lenze setting	Info
C01227/1	0.0000 unit	MCK: Ref. offset reference degree • Relative traverse path by which the drive traverses correctly signed with search speed after detection of the sensor reference signal.
C01227/2	0.0000 unit	MCK: Ref. home position • Position with which setpoint and actual position are loaded after completion of homing.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01228

Parameter Name: C01228 MCK: Ref. sequence profile		Data type: UNSIGNED_8 Index: 23347 _d = 5B33 _h	
Number of the sequence profile the absolute position of which will be approached after homing. ▶ Homing			
Setting range (min. value unit max. value)		Lenze setting	
0		15	0
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1			

C01229

Parameter Name: C01229 MCK: Position limiting values		Data type: INTEGER_32 Index: 23346 _d = 5B32 _h	
Software limit position for limiting the valid traversing range <ul style="list-style-type: none"> The error response to leaving the valid traversing range can be parameterised in C00595/3 and C00595/4. Note: For limiting the traversing range by means of software limit positions, the home position must be known and the positive software limit position must be higher than the negative software limit position! ▶ Limit position monitoring			
Setting range (min. value unit max. value)			
-214748.3647	units	214748.3647	
Subcodes	Lenze setting	Info	
C01229/1	0.0000 units	MCK: Positive SW limit position (positive travel range limit)	
C01229/2	0.0000 units	MCK: Negative SW limit position (negative travel range limit)	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000			

C01230

Parameter Name: C01230 Manual jog: Setting		Data type: UNSIGNED_8 Index: 23345 _d = 5B31 _h	
Settings for "Manual jog" mode ▶ Manual jog			
Setting range (min. hex value max. hex value)		Lenze setting	
0x00		0xFF	0x00 (decimal: 0)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info	
Bit 0 <input type="checkbox"/>	Breakpoints 1..4 on	1 ≙ approach of the parameterised breakpoint in manual jog direction	
Bit 1 <input type="checkbox"/>	Time-based start of 2nd speed	1 ≙ Automatic change-over to second manual speed after the waiting time set in C01235/1 .	
Bit 2 <input type="checkbox"/>	HW limit switch on	1 ≙ Travel range monitoring via hardware limit switch is active. The error response can be parameterised in C00595/1 and C00595/2 .	
Bit 3 <input type="checkbox"/>	SW limit switch on	1 ≙ Travel range monitoring via parameterised software limit positions is active. The error response can be parameterised in C00595/3 and C00595/4 .	

Parameter Name: C01230 Manual jog: Setting		Data type: UNSIGNED_8 Index: 23345 _d = 5B31 _h
Bit 4 <input type="checkbox"/>	Reserved	
Bit 5 <input type="checkbox"/>	Maximum jerk	1 ≙ The maximum jerk is calculated based on the acceleration and S-ramp time of the current profile and the sequence profile. This is then used in an accelerated drive for reducing the acceleration to 0 or for acceleration of the sequence profile. • From version 14.00.00 ▶ Setting or activation of maximum jerk for traversing profiles
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Position controller off	1 ≙ Position controller is deactivated. Thus, the compensation of the following error is switched off.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01231

Parameter Name: C01231 MCK: Manual jog speeds		Data type: INTEGER_32 Index: 23344 _d = 5B30 _h
Manual jog speeds		▶ Manual jog
Setting range (min. value unit max. value)		
-214748.3647	units/s	214748.3647
Subcodes	Lenze setting	Info
C01231/1	360.0000 units/s	Manual jog: speed 1 • Regular manual speed
C01231/2	720.0000 units/s	Manual jog: Speed 2 • Second manual speed (can be activated via MCK control word)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01232

Parameter Name: C01232 MCK: Manual jog accelerations		Data type: INTEGER_32 Index: 23343 _d = 5B2F _h
Acceleration/deceleration for manual jog		▶ Manual jog
Setting range (min. value unit max. value)		
-214748.3647	units/s ²	214748.3647
Subcodes	Lenze setting	Info
C01232/1	720.0000 units/s ²	Manual jog: Acceleration • Acceleration for ramp-up to manual speed.
C01232/2	720.0000 units/s ²	Manual jog: Deceleration • Deceleration for manual speed ramp-down to standstill.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01233

Parameter Name: C01233 MCK: Manual jog S-ramp time		Data type: UNSIGNED_16 Index: 23342 _d = 5B2E _h
S-ramp time for manual jog • Setting "0 s" ≡ no rounding ▶ Manual jog		
Setting range (min. value unit max. value)		
0.000	s	10.000
Subcodes	Lenze setting	Info
C01233/1	0.000 s	Manual jog: S-ramp time • S-ramp time for the manual speed ramps.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01234

Parameter Name: C01234 MCK: Manual jog breakpoints		Data type: INTEGER_32 Index: 23341 _d = 5B2D _h
Breakpoint positions for manual jog • The drive stops at the parameterised positions if these are located in the manual jog direction and the approaching of the breakpoints is switched on in C01230 via bit 0. ▶ Manual jog		
Setting range (min. value unit max. value)		
-214748.3647	unit	214748.3647
Subcodes	Lenze setting	Info
C01234/1	0.0000 unit	Manual jog: Breakpoint 1
C01234/2	0.0000 unit	Manual jog: Breakpoint 2
C01234/3	0.0000 unit	Manual jog: Breakpoint 3
C01234/4	0.0000 unit	Manual jog: Breakpoint 4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01235

Parameter Name: C01235 MCK: Manual jog waiting times		Data type: UNSIGNED_16 Index: 23340 _d = 5B2C _h
Waiting times for manual jog ▶ Manual jog		
Setting range (min. value unit max. value)		
0.000	s	65.000
Subcodes	Lenze setting	Info
C01235/1	5.000 s	Manual jog: Waiting time 2nd speed • Time after which the first manual speed (C01231/1) is accelerated to the second manual speed (C01231/2).
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01236

Parameter Name: C01236 MCK: Speed follower		Data type: INTEGER_32 Index: 23339 _d = 5B2B _h
Speeds for position follower		▶ Position follower
Setting range (min. value unit max. value)		
-214748.3647	units/s	214748.3647
Subcodes	Lenze setting	Info
C01236/1	360.0000 units/s	PosFollower: Sync. speed • Synchronisation speed for approaching the setpoint position of the master.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01237

Parameter Name: C01237 MCK: Acceleration follower		Data type: INTEGER_32 Index: 23338 _d = 5B2A _h
Accelerations for position follower		▶ Position follower
Setting range (min. value unit max. value)		
-214748.3647	units/s ²	214748.3647
Subcodes	Lenze setting	Info
C01237/1	720.0000 units/s ²	Pos follower: Sync. accel. • Acceleration for ramp-up to synchronisation speed.
C01237/2	720.0000 units/s ²	Pos follower: Sync. decel. • Deceleration for synchronisation speed ramp-down to standstill (to the setpoint position of the master).
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01238

Parameter Name: C01238 MCK: S-ramp time follower		Data type: UNSIGNED_16 Index: 23337 _d = 5B29 _h
S-ramp times for position follower • Setting "0 s" ≡ no rounding		▶ Position follower
Setting range (min. value unit max. value)		
0.000	s	10.000
Subcodes	Lenze setting	Info
C01238/1	0.000 s	Pos follower: Sync. S-ramp time • S-ramp time for the synchronisation speed ramps.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01239

Parameter Name: C01239 Setpoint holding		Data type: UNSIGNED_32 Index: 23336 _d = 5B28 _h
From version 12.00.00		▶ Setpoint holding for bus runtime compensation
Setting range (min. value unit max. value)		Lenze setting
0	ms	32 0 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01240

Parameter Name: C01240 MCK: Control word		Data type: UNSIGNED_32 Index: 23335 _d = 5B27 _h
Bit-coded status of the MCK control word		
<ul style="list-style-type: none"> The MCK control word is used to control the functions of the Motion Control Kernel. <p style="text-align: right;">▶ MCK control word</p>		
Display area (min. hex value max. hex value)		
0x00000000		0xFFFFFFFF
Value is bit-coded:		Info
Bit 0	OpMode_Bit0	Active operating mode - control bit 0
Bit 1	OpMode_Bit1	Active operating mode - control bit 1
Bit 2	OpMode_Bit2	Active operating mode - control bit 2
Bit 3	OpMode_Bit3	Active operating mode - control bit 4
Bit 4	ManJogPos	Control bit for manual jog in positive direction
Bit 5	ManJogNeg	Control bit for manual jog in negative direction
Bit 6	ManExecute2ndSpeed	Control bit for activation of second manual speed
Bit 7	ReleaseLimitSwitch	Control bit for retracting the hardware limit positions
Bit 8	HomStartStop	Control bit for start/stop homing
Bit 9	HomSetPos	Control bit for setting of home position <ul style="list-style-type: none"> 0->1 ≡ sets position setpoint and actual position value to the home position at the MCK. This function is independent of the operating modes.
Bit 10	HomResetPos	Control bit for reset of home position <ul style="list-style-type: none"> 0->1 ≡ resets the information bit for the status "Home position known" (home position not known). The position displays are not influenced by this.
Bit 11	EnableSpeedOverride	Control bit for activation of speed override <ul style="list-style-type: none"> 1 ≡ activation of the override speed at the MCK for acceptance in a running speed profile.
Bit 12	EnableAccOverride	Control bit for activation of acceleration override <ul style="list-style-type: none"> 1 ≡ activation of the override acceleration at the MCK for acceptance in a running speed profile.
Bit 13	EnableSRampOverride	Control bit for deactivation of S-shaping for speed profiles <ul style="list-style-type: none"> 1 ≡ deactivates S-shaping for speed profiles
Bit 14	PosTeachSetPos	Control bit for accepting the selected setpoint position in the selected profile <ul style="list-style-type: none"> 0->1 ≡ accepts the setpoint position at the MCK in the profile with the profile number defined via the MCK control word.
Bit 15	PosTeachActPos	Control bit for accepting the current actual position in the selected profile <ul style="list-style-type: none"> 0->1 ≡ accepts the current actual position in the profile with the profile number defined via the MCK control word.
Bit 16	PosExecute	Control bit for starting a positioning profile <ul style="list-style-type: none"> 0->1 ≡ starts a positioning profile selected via the control word in the "Positioning" mode.

Parameter Name: C01240 MCK: Control word		Data type: UNSIGNED_32 Index: 23335 _d = 5B27 _h
Bit 17	PosFinishTarget	Control bit for completing processing of an interrupted positioning profile <ul style="list-style-type: none"> • 0->1 ≡ processing of a positioning profile which has already been started and has been interrupted because of a cancellation condition or a change of the operating mode is completed in the "Positioning" mode when the home position is known. Note: Completion of profile processing through this control is based on the target position detected at the profile start!
Bit 18	PosDisableFollowProfile	Control bit for suppression of the sequence profile <ul style="list-style-type: none"> • 1 ≡ positioning profiles whose profile numbers are entered in profile data sets for sequence profiles are not started after completion of the corresponding profile.
Bit 19	PosStop	Control bit for stopping the positioning profile <ul style="list-style-type: none"> • 0->1 ≡ ("Positioning" mode): Interrupts a running profile through deceleration along the set deceleration ramp to standstill. • 0->1 ≡ ("Stop" mode): Starts a new deceleration to standstill with the parameterised stop ramp.
Bit 20	PosModeBit0	Active positioning mode - control bit 0
Bit 21	PosModeBit1	Active positioning mode - control bit 1
Bit 22	PosModeBit2	Active positioning mode - control bit 2
Bit 23	PosModeBit3	Active positioning mode - control bit 3
Bit 24	ProfileNo_Bit0	Active positioning profile number - control bit 0
Bit 25	ProfileNo_Bit1	Active positioning profile number - control bit 1
Bit 26	ProfileNo_Bit2	Active positioning profile number - control bit 2
Bit 27	ProfileNo_Bit3	Active positioning profile number - control bit 3
Bit 28	ProfileNo_Bit4	Active positioning profile number - control bit 4
Bit 29	ProfileNo_Bit5	Active positioning profile number - control bit 5
Bit 30	ProfileNo_Bit6	Active positioning profile number - control bit 6
Bit 31	ProfileNo_Bit7	Active positioning profile number - control bit 7
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01241

Parameter Name: C01241 MCK: Status word		Data type: UNSIGNED_32 Index: 23334 _d = 5B26 _h
Bit-coded status of the MCK status word <ul style="list-style-type: none"> • The MCK status word is used to output status messages of the MotionControlKernel. <p style="text-align: right;">▶ MCK status word</p>		
Display area (min. hex value max. hex value)		
0x00000000		0xFFFFFFFF
Value is bit-coded:		Info
Bit 0	ActOpModeBit00	Active operating mode - status bit 0
Bit 1	ActOpModeBit01	Active operating mode - status bit 1
Bit 2	ActOpModeBit02	Active operating mode - status bit 2
Bit 3	ActOpModeBit03	Active operating mode - status bit 4
Bit 4	Busy	Status bit - profile generation active <ul style="list-style-type: none"> • 1 ≡ Internal profile generation is active. A speed profile is being generated.

Parameter Name: C01241 MCK: Status word		Data type: UNSIGNED_32 Index: 23334 _d = 5B26 _h
Bit 5	Done	Status bit - profile generation completed • 1 ≙ Generation of a speed profile with the selected position has been completed.
Bit 6	AcceleratingActive	Status bit - acceleration process for profile generation active • 1 ≙ Profile generation phase is in the acceleration process.
Bit 7	ConstSpeedDuty	Status bit - constant speed for profile generation active • 1 ≙ Profile generation phase at constant speed active.
Bit 8	DeceleratingActive	Status bit - deceleration process for profile generation active • 1 ≙ Profile generation phase is in the deceleration process.
Bit 9	S_ShapingActive	Status bit - rounding for profile generation active • 1 ≙ Rounding during acceleration/deceleration active.
Bit 10	Pos. HW-Limit Detected	Status bit - positive hardware limit detected • 1 ≙ Positive limit switch has triggered. • Reset only possible via "Manual jog" mode!
Bit 11	Neg. HW-Limit Detected	Status bit - negative hardware limit detected • 1 ≙ Negative limit switch has triggered. • Reset only possible via "Manual jog" mode!
Bit 12	HomPosDone	Status bit - homing completed • 1 ≙ Homing has been completed.
Bit 13	HomPosAvailable	Status bit - home position known • 1 ≙ The home position has been detected and is known in the drive.
Bit 14	Pos. SW-Limit Detected	Status bit - positive software limit detected • 1 ≙ Positive software limit position overtravelled.
Bit 15	Neg. SW-Limit Detected	Status bit - negative software limit detected • 1 ≙ Negative software limit position overtravelled.
Bit 16	DwellTime	Status bit - transient effects in target position active • 1 ≙ Dwell time after reaching the setpoint position is active.
Bit 17	InTarget	Status bit - actual position is in the target window • 1 ≙ Dwell time has expired and current actual position is in the set target window.
Bit 18	PosDone	Status bit - positioning process completed • 1 ≙ Positioning profile has been completed in the "Positioning" mode. Setpoint position is in target.
Bit 19	ReadyToOperate	Status bit - readiness to process setpoint signals or setpoint commands
Bit 20	ActPosMode_Bit00	Active positioning mode - status bit 0
Bit 21	ActPosMode_Bit01	Active positioning mode - status bit 1
Bit 22	ActPosMode_Bit02	Active positioning mode - status bit 2
Bit 23	ActPosMode_Bit03	Active positioning mode - status bit 3
Bit 24	ActProfileNo_Bit00	Active positioning profile - status bit 0
Bit 25	ActProfileNo_Bit01	Active positioning profile - status bit 1
Bit 26	ActProfileNo_Bit02	Active positioning profile - status bit 2
Bit 27	ActProfileNo_Bit03	Active positioning profile - status bit 3
Bit 28	ActProfileNo_Bit04	Active positioning profile - status bit 4
Bit 29	ActProfileNo_Bit05	Active positioning profile - status bit 5
Bit 30	ActProfileNo_Bit06	Active positioning profile - status bit 6

Parameter Name: C01241 MCK: Status word		Data type: UNSIGNED_32 Index: 23334 _d = 5B26 _h
Bit 31	ActProfileNo_Bit07	Active positioning profile - status bit 7
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01242

Parameter Name: C01242 MCK: Current pos profile number		Data type: UNSIGNED_8 Index: 23333 _d = 5B25 _h
Display of the current profile number of the active profile in the "Positioning" mode		► Positioning
Display range (min. value unit max. value)		
0		255
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01243

Parameter Name: C01243 MCK: Current operating mode		Data type: UNSIGNED_8 Index: 23332 _d = 5B24 _h
Display of the active operating mode of the Motion Control Kernel		► Basic drive functions
Selection list (read only)		Info
0	Speed follower	Drive traverses according to a preselected speed setpoint
1	Homing	Drive finds its reference measuring system by setting the home position or homing
2	ManualJog	Drive can be traversed manually via initiators, e.g. for cleaning purposes or tool changes.
3	Positioning	Drive traverses according to defined travel profiles and motion processes
4	Stop	Drive is decelerated to standstill along a parameterised deceleration ramp
5	Position follower	Drive traverses according to a preselected position setpoint
15	StandBy	Internal operating mode for quick stop and pulse inhibit
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01244

Parameter Name: C01244 MCK: Target detection - times		Data type: UNSIGNED_16 Index: 23331 _d = 5B23 _h
Timing for various MCK functions		
Setting range (min. value unit max. value)		
0	ms	60000

Parameter Name: C01244 MCK: Target detection - times		Data type: UNSIGNED_16 Index: 23331 _d = 5B23 _h
Subcodes	Lenze setting	Info
C01244/1	100 ms	MCK: Dwell time - target position • Time expiring after reaching the setpoint position for positioning processes and enabling the actual position detection in the target position window. ▶ Target position monitoring
C01244/2	0 ms	MCK: Waiting time following error 1 • From version 12.00.00 ▶ Following error monitoring system
C01244/3	0 ms	MCK: Waiting time following error 2 • From version 12.00.00 ▶ Following error monitoring system
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01245

Parameter Name: C01245 MCK: Target detection - positions		Data type: INTEGER_32 Index: 23330 _d = 5B22 _h
Position settings for various MCK functions		
Setting range (min. value unit max. value)		
0.0000	units	214748.3647
Subcodes	Lenze setting	Info
C01245/1	1.0000 units	MCK: Window target position • Window around the target position for comparison with the actual position to see whether the drive is in target. ▶ Target position monitoring
C01245/2	1.0000 units	MCK: Blocking zone Modulo • From version 06.00.00 ▶ Activation of the Modulo measuring system
C01245/3	0.0000 units	MCKI: Hysteresis position change • From version 12.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01246

Parameter Name: C01246 MCK: Select signal source		Data type: UNSIGNED_8 Index: 23329 _d = 5B21 _h
From version 06.00.00 Selection of the touch probe signal source for reference search with touch probe detection • If the reference signal is to follow a real touch probe, the Touch-Probe-Interface must be configured accordingly. ▶ Homing		
Selection list		
0	No TP	
4	TP-DigIn4	
5	TP-DigIn5	
6	TP-DigIn6	
Subcodes	Lenze setting	Info
C01246/1	0: No TP	MCK: Ref. TP signal source
C01246/2	0: No TP	MCK: Set.Ref. signal source
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01247

Parameter Name: C01247 MCK: Diagnostic word		Data type: UNSIGNED_32 Index: 23328 _d = 5B20 _h
From version 16.00.00		
Display area (min. hex value max. hex value)		
0x00000000		0xFFFFFFFF
Value is bit-coded:		Info
Bit 0	Traversing range: Limited	1 ≙ The traversing range is limited: <ul style="list-style-type: none"> The software limit positions are set. The reference is known. There is no modulo measuring system available (C01201/1 = 0). Note: This status does not consider whether the software limit positions are activated or deactivated by the settings in the prevailing operating mode.
Bit 1	Traversing range: Modulo	1 ≙ A modulo measuring system is available as a cycle length has been set in C01201/1 .
Bit 2	Pos. HW limit switch active	Evaluation of travel range limit switch active in positive direction
Bit 3	Neg. HW limit switch active	Evaluation of travel range limit switch active in negative direction
Bit 4	Pos. SW-Limit active	Evaluation of software limit positions active in positive direction
Bit 5	Neg. SW-Limit active	Evaluation of software limit positions active in negative direction
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	SpeedNormConstant: Low-Limit	1 ≙ Due to the set machine parameters, an internal calculation constant is limited to a possible minimum. Remedy: Increase reference speed in C00011 .
Bit 9	SpeedNormConstant: Up-Limit	1 ≙ Due to the set machine parameters, an internal calculation constant is limited to a possible maximum. Remedy: Reduce reference speed in C00011 .
Bit 10	Max. speed limit	1 ≙ Due to the set machine parameters, the maximum speed for specifications in [units/s] are limited to the factor 150 %.
Bit 11	Quick stop is active	1 ≙ Quick stop function is active.
Bit 12	Quick stop standstill is active	1 ≙ Standstill during active quick stop function (no ramp generation).
Bit 13	Max. speed is pending	1 ≙ The speed setpoint has exceeded the limit of ± 199.99 %. Possible cause: <ul style="list-style-type: none"> Too high influence due to speed override Increased speed by reduced acceleration with little jerk
Bit 14	Position resolution limit	1 ≙ The position resolution calculated by machine data entries has been limited to the maximum display area of 214748.3647 [Incr./Unit] with reference to the display in C01205/0 . The real value is higher!
Bit 15	Modulo buffer overflow	1 ≙ The internal position memory for creating the saw tooth could not be emptied in one cycle. The speed provides a position difference per cycle that is larger than the cycle length.

Parameter Name: C01247 MCK: Diagnostic word		Data type: UNSIGNED_32 Index: 23328 _d = 5B20 _h
Bit 16	Ck10: position > cycle length	Positioning mode: • The position selected for the positioning profile with process data interface is higher than the cycle length when the Modulo measuring system is activated. Homing mode: • The position selected for the sequence profile with process data interface is higher than the cycle length when the Modulo measuring system is activated.
Bit 17	Ck10: invalid speed	Cause 1: • When an infinite profile starts at a current speed = 0, the parameterised profile speed is specified with 0. Cause 2: • When a positioning profile is started for approaching a target position, the parameterised profile speed is specified with 0.
Bit 18	Ck10: invalid acceleration	When a profile is started, the parameterised deceleration is specified with 0.
Bit 19	Ck10: invalid deceleration	When a profile is started, the parameterised deceleration is specified with 0. While a positioning profile is executed to target position (current speed ≠ 0), the profile deceleration is written to 0, e.g. by Acc/Dec override.
Bit 20	Ck10: invalid final speed	If C02868/1 Bit 2 = FALSE, it is detected while crossing the finish line of a positioning process that the final profile speed is higher than the current speed. The final profile speed is not reached.
Bit 21	Ck10: reversal at overchange	If C02868/1 Bit 2 = FALSE, the reversing phase is requested during a positioning process to the target position with final profile speed ≠ 0.
Bit 22	Ck10: distance calculation error	During the profile start of a positioning profile, the profile data result in a longer distance than the defined distance (optimised by C02868/1 bit 6).
Bit 23	Reserved	
Bit 24	Reserved	
Bit 25	Reserved	
Bit 26	Reserved	
Bit 27	Reserved	
Bit 28	Reserved	
Bit 29	Reserved	
Bit 30	Reserved	
Bit 31	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01248

Parameter Name: C01248 MCK: Ref. step		Data type: UNSIGNED_8 Index: 23327 _d = 5B1F _h
From version 16.00.00		
Selection list		Info
0	No Operation	Initial step when changing to the homing mode
1	RefMarke: Search	Search travel until reference pre-stop mark
2	RefMarke: Stop	Stop when reference pre-stop mark has been detected
3	RefMarke: Reversal	Reversal of reference pre-stop mark

Parameter Name: C01248 MCK: Ref. step		Data type: UNSIGNED_8 Index: 23327 _d = 5B1F _h
4	HW-Limit: Search	Search travel until limit switch
5	HW-Limit: Stop	Stop when limit switch has been detected
6	HW-Limit: Reversal	Reversal of limit switch
7	M-Limit: Search	Search travel until torque limit has been detected
8	M-Limit: Stop	Detection of torque limit, tolerance time is running
9	Reference: Search	Search travel until reference initiator
10	Reference: Stop	Stop when reference initiator has been detected
11	Reference: Offset	Travel offset path active
12	Reference: Sequence profile	Travel sequence profile after homing
13	Reference: Position	Travel to home position
14	Reference: Abort	Homing process aborted
15	Finish	Homing process executed
Subcodes		Info
C01248/1		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01251

Parameter Name: C01251 MCK: Acceleration stop		Data type: INTEGER_32 Index: 23324 _d = 5B1C _h
Acceleration parameter for stop ▶ Stop		
Setting range (min. value unit max. value)		
-214748.3647	units/s ²	214748.3647
Subcodes		Info
C01251/1	720.0000 units/s ²	MCK: Stop: Decel. • Deceleration for setpoint speed ramp-down to standstill.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01252

Parameter Name: C01252 MCK: S-ramp times stop		Data type: UNSIGNED_16 Index: 23323 _d = 5B1B _h
S-ramp times for stop • Setting "0 s" ≡ no rounding ▶ Stop		
Setting range (min. value unit max. value)		
0.000	s	10.000
Subcodes		Info
C01252/1	0.000 s	MCK: Stop: S-ramp time • S-ramp time for setpoint speed ramp-down to standstill.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01294

Parameter Name: C01294 Mode: Position calculation		Data type: UNSIGNED_8 Index: 23281 _d = 5AF1 _h
From version 12.00.00 Selection of the conversion mode		
Selection list		
0	dnOut_p=ConvWordsToDInt(HW_LW)	
1	16 bits: LW=+/-32767	
2	16 bits: HW=+/-; LW=0..65535	
3	32Bit: HW_LW=+/-214748.3647	
Subcodes	Lenze setting	Info
C01294/1	0: dnOut_p=ConvWordsToDInt(HW_LW)	L_ConvUnitsToIncr_1 : PosCalcMode
C01294/2	0: dnOut_p=ConvWordsToDInt(HW_LW)	L_ConvUnitsToIncr_2 : PosCalcMode
C01294/3	0: dnOut_p=ConvWordsToDInt(HW_LW)	L_ConvUnitsToIncr_3 : PosCalcMode
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01295

Parameter Name: C01295 L_MCKStateInterface_1: Pos. selection		Data type: UNSIGNED_8 Index: 23280 _d = 5AF0 _h
Selection of the position to be provided at the <i>dnPosOut_p</i> output of the FB L_MckStateInterface		
Selection list (Lenze setting printed in bold)		
0	dnPosIn_p	
1	Current feed	
2	dnSetPos_p	
3	dnActPos_p	
4	dnDeltaPos_p	
5	dnTargetPos_p	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01296

Parameter Name: C01296 Mode: Position calculation		Data type: UNSIGNED_8 Index: 23279 _d = 5AEF _h
MCKInterface		

Parameter Name: C01296 Mode: Position calculation		Data type: UNSIGNED_8 Index: 23279 _d = 5AEF _h
Selection list		
0	dnPosOut_p=dnPosIn_p	
1	16 bits: LW=+/-32767	
2	16 bits: HW=+/-; LW=0..65535	
3	32Bit: HW_LW=+/-214748.3647	
Subcodes	Lenze setting	Info
C01296/1	0: dnPosOut_p=dnPosIn_p	L_MckCtrlInterface_1 : PosCalcMode
C01296/2	1: 16Bit: LW=+/-32767	L_MckStateInterface_1 : PosDisplayMode
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01297

Parameter Name: C01297 L_MckCtrlInterface_1: Alternative function		Data type: UNSIGNED_8 Index: 23278 _d = 5AEF _h
Selection of the alternative function for bit 16 (PosExecute) in the MCK control word ▶ Alternative functions for "PosExecute" control bit		
Setting range (min. hex value max. hex value)		Lenze setting
0x00	0xFF	0x03 (decimal: 3)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input checked="" type="checkbox"/>	PosStop with PosExecute = FALSE	1 ≙ Abort positioning with PosExecute • PosExecute="0" stops a running positioning process by ramp-down to standstill.
Bit 1 <input checked="" type="checkbox"/>	HomingStartStop with PosExecute	1 ≙ Start/stop homing with PosExecute • PosExecute="1" starts homing, PosExecute="0" stops homing in the "Homing" mode.
Bit 2 <input type="checkbox"/>	SetProfilPosition with PosExecute	1 ≙ Teach set position with PosExecute • PosExecute="0->1" accepts the setpoint position at the MCK in the profile with the specified profile number.
Bit 3 <input type="checkbox"/>	SetProfilPosition at position change	1 ≙ Automatic acceptance of set position • The set position pending at the MCKInterface is automatically transferred to the profile with the preset profile number if a data change at the corresponding input for the setpoint is detected.
Bit 4 <input type="checkbox"/>	Profile start at position change	From version 12.00.00 1 ≙ Automatic profile start at position change • An automatic PosExecute takes place if the incremental position selection changes and this change is higher than set in the hysteresis for position change (C01245/3).
Bit 5 <input type="checkbox"/>	Reserved	From version 16.00.00
Bit 6 <input type="checkbox"/>	Reserved	From version 16.00.00
Bit 7 <input type="checkbox"/>	Reserved	From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01298

Parameter Name: C01298 MCK: Operating mode change with profile no.		Data type: UNSIGNED_8 Index: 23277 _d = 5AED _h
FB L_MckCtrlInterface_1 : Assignment of an operating mode to a profile		
Selection list		Info
0	Op.Mode inputs	There will be no changed operating mode when the profile is changed. Instead, the operating mode requested "from outside" via the MCK control word applies.
1	Speed follower	Change to the "Speed follower" mode
2	Homing	Change to the "Homing" mode
3	Manual jog	Change to the "Manual jog" mode
4	Positioning	Change to the "Positioning" mode
5	Stop	Change to the "Stop" mode
6	Position follower	Change to the "Position follower" mode
Subcodes	Lenze setting	Info
C01298/1	1: Speed follower	MCK operating mode at profile no. 0 • Selection of the operating mode for profile 0 at L_MckCtrlInterface_1.
C01298/2	2: Homing	MCK operating mode at profile no. 1 • Selection of the operating mode for profile 1 at L_MckCtrlInterface_1.
C01298/3	3: Manual jog	MCK operating mode at profile no. 2 • Selection of the operating mode for profile 2 at L_MckCtrlInterface_1.
C01298/4	4: Positioning	MCK operating mode at profile no. 3...15 • Selection of the operating mode for profile 3 ... 15 at L_MckCtrlInterface_1.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01299

Parameter Name: C01299 MCKI: Status MCKInterface		Data type: UNSIGNED_8 Index: 23276 _d = 5AEC _h
FB L_MckCtrlInterface_1 : Status messages		
Display area (min. hex value max. hex value)		
0x00		0xFF
Value is bit-coded:		Info
Bit 0	InvalidOperationMode	Invalid operating mode selection • 1 ≙ The selected operating mode is not defined/invalid.
Bit 1	InvalidPosMode	Invalid positioning mode selection • 1 ≙ The selected positioning mode is not defined/invalid.
Bit 2	InvalidProfileNo	Invalid profile number selection • 1 ≙ The selected profile number refers to a profile data set that does not exist.
Bit 3	Reserved	

Parameter Name: C01299 MCKI: Status MCKInterface		Data type: UNSIGNED 8 Index: 23276 _d = 5AEC _h
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01300

Parameter Name: C01300 Profile data: Positioning mode		Data type: UNSIGNED 8 Index: 23275 _d = 5AEB _h
Selection of the positioning mode for profiles 1 ... 15		▶ Profile entry
Selection list		Info
1	Absolute (shortest path)	Absolute positioning <ul style="list-style-type: none"> The profile position corresponds to the target position.
2	Continuous	Continuous positioning without approaching a target position
3	Relative	Relative positioning <ul style="list-style-type: none"> The profile position determines the distance to be traversed.
4	absolute (Cw)	From version 06.00.00 Clockwise absolute positioning <ul style="list-style-type: none"> The zero position of the axis can be exceed in this direction. The profile position corresponds to the target position.
5	absolute (Ccw)	From version 06.00.00 Counter-clockwise absolute positioning <ul style="list-style-type: none"> The zero position of the axis can be exceed in this direction. The profile position corresponds to the target position.
8	Absolute (shortest path) to TP	From version 06.00.00 Absolute positioning <ul style="list-style-type: none"> The profile position corresponds to the target position. After a touch probe is detected, the TP profile (C01308/1...15) is executed.
9	Continuous to TP	From version 06.00.00 Continuous positioning without approaching a target position <ul style="list-style-type: none"> After a touch probe is detected, the TP profile (C01308/1...15) is executed.
10	Relative to TP	From version 06.00.00 Relative positioning <ul style="list-style-type: none"> The profile position determines the distance to be traversed. After a touch probe is detected, the TP profile (C01308/1...15) is executed.

Parameter Name: C01300 Profile data: Positioning mode		Data type: UNSIGNED_8 Index: 23275 _d = 5AE _h
11	Absolute (Cw) on TP	From version 06.00.00 Clockwise absolute positioning <ul style="list-style-type: none"> • The zero position of the axis can be exceeded in this direction. • The profile position corresponds to the target position. • After a touch probe is detected, the TP profile (C01308/1...15) is executed.
12	Absolute (Ccw) on TP	From version 06.00.00 Counter-clockwise absolute positioning <ul style="list-style-type: none"> • The zero position of the axis can be exceeded in this direction. • The profile position corresponds to the target position. • After a touch probe is detected, the TP profile (C01308/1...15) is executed.
Subcodes	Lenze setting	Info
C01300/1	1: absolute (beeline)	Profiles 1 ... 15: Positioning mode
C01300/...		
C01300/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01301

Parameter Name: C01301 Profile data: Position		Data type: INTEGER_32 Index: 23274 _d = 5AE _h
Selection of the positions for profiles 1 ... 15		
▶ Profile entry		
Setting range (min. value unit max. value)		
-214748.3647	unit	214748.3647
Subcodes	Lenze setting	Info
C01301/1	360.0000 unit	Profiles 1 ... 15: Position
C01301/...		
C01301/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01302

Parameter Name: C01302 Profile data: Speed		Data type: INTEGER_32 Index: 23273 _d = 5AE _h
Selection of the maximum speeds for profiles 1 ... 15		
▶ Profile entry		
Setting range (min. value unit max. value)		
-214748.3647	unit/s	214748.3647
Subcodes	Lenze setting	Info
C01302/1	360.0000 unit/s	Profiles 1 ... 15: Speed
C01302/...		
C01302/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01303

Parameter Name: C01303 Profile data: Acceleration		Data type: INTEGER_32 Index: 23272 _d = 5AE8 _h
Selection of the accelerations for profiles 1 ... 15 ▶ Profile entry		
Setting range (min. value unit max. value)		
-214748.3647	unit/s ²	214748.3647
Subcodes	Lenze setting	Info
C01303/1	720.0000 unit/s ²	Profiles 1 ... 15: Acceleration
C01303/...		
C01303/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01304

Parameter Name: C01304 Profile data: Deceleration		Data type: INTEGER_32 Index: 23271 _d = 5AE7 _h
Selection of the decelerations for profiles 1 ... 15 ▶ Profile entry		
Setting range (min. value unit max. value)		
-214748.3647	unit/s ²	214748.3647
Subcodes	Lenze setting	Info
C01304/1	720.0000 unit/s ²	Profiles 1 ... 15: Deceleration
C01304/...		
C01304/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01305

Parameter Name: C01305 Profile data: Final speed		Data type: INTEGER_32 Index: 23270 _d = 5AE6 _h
Selection of the final speeds for profiles 1 ... 15 • For profile linkage with overchange. ▶ Profile entry		
Setting range (min. value unit max. value)		
-214748.3647	unit/s	214748.3647
Subcodes	Lenze setting	Info
C01305/1	0.0000 unit/s	Profiles 1 ... 15: Final speed
C01305/...		
C01305/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C01306

Parameter Name: C01306 Profile data: S-ramp time		Data type: UNSIGNED_16 Index: 23269 _d = 5AE5 _h
Selection of the S-ramp times for profiles 1 ... 15 • The maximum S-ramp time is the time in which the maximum acceleration or the maximum deceleration is reached along a ramp (jerk limitation). ▶ Profile entry		
Setting range (min. value unit max. value)		
0.000	s	10.000
Subcodes	Lenze setting	Info
C01306/1	0.000 s	Profiles 1 ... 15: S-ramp time
C01306/...		
C01306/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01307

Parameter Name: C01307 Profile data: Sequence profile		Data type: UNSIGNED_8 Index: 23268 _d = 5AE4 _h
Selection of the sequence profile numbers for profiles 1 ... 15 • For profile linkage ▶ Profile entry		
Setting range (min. value unit max. value)		
0		15
Subcodes	Lenze setting	Info
C01307/1	0	Profiles 1 ... 15: Sequence profile
C01307/...		
C01307/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01308

Parameter Name: C01308 Profile data: TP profile		Data type: UNSIGNED_8 Index: 23267 _d = 5AE3 _h
From version 06.00.00 Selection of the touch-probe profile numbers for profile 1 ... 15 • Only relevant for positioning modes with touch-probe. ▶ Profile entry		
Setting range (min. value unit max. value)		
0		15
Subcodes	Lenze setting	Info
C01308/1	0	Profile 1 ... 15: TP profile
C01308/...		
C01308/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01309

Parameter Name: C01309 Profile data: TP signal source		Data type: UNSIGNED_8 Index: 23266 _d = 5AE2 _h
From version 06.00.00 Selection of the touch-probe signal sources for profile 1 ... 15 • Only relevant for positioning modes with touch-probe. ▶ Profile entry		
Selection list		
4	TP-DigIn4	
5	TP-DigIn5	
6	TP-DigIn6	
Subcodes	Lenze setting	Info
C01309/1	4: TP-DigIn4	Profiles 1 ... 15: Sequence profile
C01309/...		
C01309/15		
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01469

Parameter Name: C01469 L_MFail: Vp		Data type: UNSIGNED_16 Index: 23106 _d = 5A42 _h
From version 16.00.00		
Setting range (min. value unit max. value)		
0.001		31.000
Subcodes	Lenze setting	Info
C01469/1	1.000	L_MFail 1 : Vp
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C01470

Parameter Name: C01470 L_MFail: Tn		Data type: UNSIGNED_16 Index: 23105 _d = 5A41 _h
From version 16.00.00		
Setting range (min. value unit max. value)		
0	ms	60000
Subcodes	Lenze setting	Info
C01470/1	20 ms	L_MFail 1 : U DC-bus controller reset time
C01470/2	20 ms	L_MFail 1 : Acceleration time
C01470/3	20 ms	L_MFail 1 : Retrigger time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01501

Parameter Name: C01501 Resp. to communication error with MCI		Data type: UNSIGNED_8 Index: 23074 _d = 5A22 _h
Configuration of monitoring functions for the communication module		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C01501/1	0: No Reaction	Resp. to MCI connection error • Response to a communication error of the attached communication module.
C01501/2	0: No Reaction	Resp. to MCI invalid module • Response to an unplugged or incompatible communication module
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01670

Parameter Name: C01670 L_ComparePhi 1-5: Function		Data type: UNSIGNED_8 Index: 22905 _d = 5979 _h
Selection of comparison operation • If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE.		
Selection list		
1	In1 = In2	
2	In1 > In2	
3	In1 < In2	
4	In1 = In2	
5	In1 > In2	
6	In1 < In2	
Subcodes	Lenze setting	Info
C01670/1	1: In1 = In2	L_ComparePhi 1 : Function
C01670/2	1: In1 = In2	L_ComparePhi 2 : Function
C01670/3	1: In1 = In2	L_ComparePhi 3 : Function
C01670/4	1: In1 = In2	L_ComparePhi 4 : Function
C01670/5	1: In1 = In2	L_ComparePhi 5 : Function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01671

Parameter Name: C01671 L_ComparePhi 1-5: Hysteresis		Data type: INTEGER_32 Index: 22904 _d = 5978 _h
Hysteresis for the comparison function		
Setting range (min. value unit max. value)		
0	Incr.	1073741824
Subcodes	Lenze setting	Info
C01671/1	0 incr.	L_ComparePhi 1 : Hysteresis
C01671/2	0 incr.	L_ComparePhi 2 : Hysteresis
C01671/3	0 incr.	L_ComparePhi 3 : Hysteresis
C01671/4	0 incr.	L_ComparePhi 4 : Hysteresis
C01671/5	0 incr.	L_ComparePhi 5 : Hysteresis
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01672

Parameter Name: C01672 L_ComparePhi 1-5: Window		Data type: INTEGER_32 Index: 22903 _d = 5977 _h
Window for the comparison operation		
Setting range (min. value unit max. value)		
0	Incr.	1073741824
Subcodes	Lenze setting	Info
C01672/1	0 incr.	L_ComparePhi 1 : Window
C01672/2	0 incr.	L_ComparePhi 2 : Window
C01672/3	0 incr.	L_ComparePhi 3 : Window
C01672/4	0 incr.	L_ComparePhi 4 : Window
C01672/5	0 incr.	L_ComparePhi 5 : Window
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01700

Parameter Name: C01700 Energy saving mode: Mode		Data type: UNSIGNED_8 Index: 22875 _d = 595B _h
From version 17.00.00 onwards		
Display of the energy saving modes maximally provided		
Display range (min. value unit max. value)		
0		1
Subcodes	Info	
C01700/1	Number of energy saving modes maximally provided = 1	
C01700/2	Current mode <ul style="list-style-type: none"> • 1 ≙ Energy saving mode is active • 0 ≙ Energy saving mode is not active 	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01701

Parameter Name: C01701 Energy saving mode: toff min		Data type: UNSIGNED_16 Index: 22874 _d = 595A _h
From version 17.00.00 onwards Minimum time for which the inverter is to remain in the energy saving mode (TPm, Time Pause min).		
Setting range (min. value unit max. value)		
0	s	65535
Subcodes	Lenze setting	Info
C01701/1	0 s	Energy saving mode 1: toff min
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01702

Parameter Name: C01702 Energy saving mode: toff		Data type: UNSIGNED_16 Index: 22873 _d = 5959 _h
From version 17.00.00 onwards Time required until entering the energy saving mode (TtP, Time to Pause) If the "quick stop" energy saving function is to be used, this time must always be set to a greater value than the maximum time required for braking via the quick stop function.		
Setting range (min. value unit max. value)		
0	s	65535
Subcodes	Lenze setting	Info
C01702/1	0 s	Energy saving mode 1: toff
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01703

Parameter Name: C01703 Energy saving mode: ton		Data type: UNSIGNED_16 Index: 22872 _d = 5958 _h
From version 17.00.00 onwards Time used for exiting the energy saving mode (TtO, Time to Operate).		
Setting range (min. value unit max. value)		
0	s	65535
Subcodes	Lenze setting	Info
C01703/1	0 s	Energy saving mode 1: ton
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01704

Parameter Name: C01704 Energy saving mode: Function		Data type: UNSIGNED_16 Index: 22871 _d = 5957 _h
From version 17.00.00 onwards		
Response of the device in energy saving mode		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	CINH	With entering the energy saving mode, controller inhibit is set. Controller inhibit is reset when the "Pause-End" command is received. <ul style="list-style-type: none"> • Diagnostics of active controller inhibit with C00158/0, bit 9 • Display: "Energy saving mode"
Bit 1	QSP	When the "Pause-Req" command is received, the inverter executes a quick stop. <ul style="list-style-type: none"> • Quick stop is cancelled when the "Pause-End" command has been received. • Quick stop diagnostics with C00159/0, bit 9 • Display: "Energy saving mode"
Bit 2	Dimming the LEDs	Most of the LEDs of the inverter are switched off or their lighting intensity is reduced. <ul style="list-style-type: none"> • Only a few LEDs remain active in order to check the vitality of the inverter, e.g. the "DRV-RDY" LED.
Bit 3	Reserved	
Bit 4	Decoupling the IOs	The digital output terminals are decoupled from the application (FB Editor). The output levels for these outputs can be defined via the decoupling values. In order to render the decoupling values effective, decoupling must be activated via the following parameters: <ul style="list-style-type: none"> • Digital outputs: C00447/0 and C00448/0
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Off	Deactivate energy saving mode.
Subcodes	Lenze setting	Info
C01704/1	0x0000	Energy saving mode: Comp. to be switched off
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C01709

Parameter Name: C01709 Energy saving mode: Status		Data type: UNSIGNED_8 Index: 22866 _d = 5952 _h
From version 17.00.00 onwards		
Display range (min. value unit max. value)		
0		255
Subcodes		Info
C01709/1		Energy saving mode: Status
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01751

Parameter Name: C01751 Service code inverter characteristic		Data type: UNSIGNED_8 Index: 22824 _d = 5928 _h
This code is for device-internal use only and must not be written to by the user!		

C01752

Parameter Name: C01752 Service par. inverter charact. function		Data type: UNSIGNED_8 Index: 22823 _d = 5927 _h
This code is for device-internal use only and must not be written to by the user!		

C01755

Parameter Name: C01755 Service par. inverter charact. factor		Data type: INTEGER_16 Index: 22820 _d = 5924 _h
This code is for device-internal use only and must not be written to by the user!		

C01763

Parameter Name: C01763 Service code -clamp threshold		Data type: INTEGER_16 Index: 22812 _d = 591C _h
This code is for device-internal use only and must not be written to by the user!		

C01764

Parameter Name: C01764 Service par. clamp time		Data type: UNSIGNED_8 Index: 22811 _d = 591B _h
This code is for device-internal use only and must not be written to by the user!		

C01765

Parameter Name: C01765 Service code - difference threshold UG		Data type: UNSIGNED_16 Index: 22810 _d = 591A _h
This code is for device-internal use only and must not be written to by the user!		

C01770

Parameter Name: C01770 Filter time - earth-fault detect. is running		Data type: UNSIGNED_8 Index: 22805 _d = 5915 _h	
Setting range (min. value unit max. value)		Lenze setting	
0	ms	250	2 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1			

C01771

Parameter Name: C01771 BU-Osc: Cycle time selection		Data type: UNSIGNED_8 Index: 22804 _d = 5914 _h	
This code is for device-internal use only and must not be written to by the user!			

C01772

Parameter Name: C01772 BU-Osc: Trigger channel selection		Data type: UNSIGNED_8 Index: 22803 _d = 5913 _h	
This code is for device-internal use only and must not be written to by the user!			

C01773

Parameter Name: C01773 BU-Osc: Trigger command		Data type: UNSIGNED_8 Index: 22802 _d = 5912 _h	
This code is for device-internal use only and must not be written to by the user!			

C01774

Parameter Name: C01774 BU-Osc: Trigger mode		Data type: UNSIGNED_8 Index: 22801 _d = 5911 _h	
This code is for device-internal use only and must not be written to by the user!			

C01775

Parameter Name: C01775 BU-Osc: Trigger		Data type: INTEGER_16 Index: 22800 _d = 5910 _h	
This code is for device-internal use only and must not be written to by the user!			

C01902

Parameter Name: C01902 Diagnostics X70: Max. baud rate		Data type: UNSIGNED_16 Index: 22673 _d = 5891 _h	
Maximally permissible baud rate in the standard device after determination of the baud rate at the diagnostic interface X70			

Parameter Name: C01902 Diagnostics X70: Max. baud rate		Data type: UNSIGNED_16 Index: 22673 _d = 5891 _h
Selection list (Lenze setting printed in bold)		
192	19.200 Bd	
384	38.400 Bd	
576	57.600 Bd	
750	75.000 Bd	
1152	115.200 Bd	
1500	150.000 Bd	
2500	250.000 Bd	
3750	375.000 Bd	
7500	750.000 Bd	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01903

Parameter Name: C01903 Diagnostics X70: Change baud rate		Data type: UNSIGNED_8 Index: 22672 _d = 5890 _h
New baud rate determination at the diagnostic interface X70		
Selection list (Lenze setting printed in bold)		
0	Ignore changes	
1	Negotiate baud rate	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C01905

Parameter Name: C01905 Diagnostics X70: Current baud rate		Data type: UNSIGNED_32 Index: 22670 _d = 588E _h
Current baud rate at the diagnostic interface X70		
Display range (min. value unit max. value)		
0	Bd	3000000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02200

Parameter Name: C02200 LS_WriteParamList: Function		Data type: UNSIGNED_8 Index: 22375 _d = 5767 _h
From version 12.00.00 Configuration of which parameter lists are to be subject to the " Parameter change-over " function.		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C02200/1	1: On	Definable parameter list
C02200/2	0: Off	Motor data parameter list
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02210

Parameter Name: C02210 LS_WriteParamList: Motor control		Data type: UNSIGNED_8 Index: 22365 _d = 575D _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
2	SC: Servo control ASM	
3	SLPSM: Sensorless PSM	
4	SLVC: Vector control	
6	VFCplus: V/f linear	
7	VFCplus: V/f linear + encoder	
8	VFCplus: V/f quadr	
9	VFCplus: V/f quadr + encoder	
10	VFCplus: V/f definable	
11	VFCplusEco: V/f energy-saving	
Subcodes	Lenze setting	Info
C02210/1	6: VFCplus: V/f linear	LS_WriteParamList: c6_val1
C02210/2	6: VFCplus: V/f linear	LS_WriteParamList: c6_val2
C02210/3	6: VFCplus: V/f linear	LS_WriteParamList: c6_val3
C02210/4	6: VFCplus: V/f linear	LS_WriteParamList: c6_val3
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02212

Parameter Name: C02212 LS_WriteParamList: VFC: V/f base frequency		Data type: UNSIGNED_16 Index: 22362 _d = 575B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
7.5	Hz	2600.0
Subcodes	Lenze setting	Info
C02212/1	50.0 Hz	LS_WriteParamList: c15_val1
C02212/2	50.0 Hz	LS_WriteParamList: c15_val2
C02212/3	50.0 Hz	LS_WriteParamList: c15_val3
C02212/4	50.0 Hz	LS_WriteParamList: c15_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02213

Parameter Name: C02213 LS_WriteParamList: VFC: Vmin boost		Data type: UNSIGNED_16 Index: 22362 _d = 575A _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C02213/1	1.60 %	LS_WriteParamList: c16_val1
C02213/2	1.60 %	LS_WriteParamList: c16_val2
C02213/3	1.60 %	LS_WriteParamList: c16_val3
C02213/4	1.60 %	LS_WriteParamList: c16_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02214

Parameter Name: C02214 LS_WriteParamList: Switching frequency		Data type: UNSIGNED_8 Index: 22361 _d = 5759 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
1	4 kHz var./drive-optimised	
2	8 kHz var./drive-optimised	
3	16 kHz var./drive-optimised	
5	2 kHz constant/drive-optimised	
6	4 kHz constant/drive-optimised	
7	8 kHz constant/drive-optimised	
8	16 kHz constant/drive-optimised	
11	4 kHz var./min. Pv	
12	8 kHz var./min. Pv	
13	16 kHz var./min. Pv	
15	2 kHz constant/min. Pv	
16	4 kHz constant/min. Pv	
17	8 kHz constant/min. Pv	
18	16 kHz constant/min. Pv	
21	8 kHz var./drive-opt./4 kHz min	
22	16 kHz var./drive-opt./4 kHz min	
23	16 kHz var./drive-opt./8 kHz min	
31	8 kHz var./min. Pv/4 kHz min	
32	16 kHz var./min. Pv/4 kHz min	
33	16 kHz var./min. Pv/8 kHz min	
Subcodes	Lenze setting	Info
C02214/1	2: 8 kHz var./drive-opt.	LS_WriteParamList: c18_val1
C02214/2	2: 8 kHz var./drive-opt.	LS_WriteParamList: c18_val2
C02214/3	2: 8 kHz var./drive-opt.	LS_WriteParamList: c18_val3
C02214/4	2: 8 kHz var./drive-opt.	LS_WriteParamList: c18_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02215

Parameter Name: C02215 LS_WriteParamList: Auto-DCB: Threshold		Data type: UNSIGNED_16 Index: 22360 _d = 5758 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	rpm	60000
Subcodes	Lenze setting	Info
C02215/1	3 rpm	LS_WriteParamList: c19_val1
C02215/2	3 rpm	LS_WriteParamList: c19_val2
C02215/3	3 rpm	LS_WriteParamList: c19_val3
C02215/4	3 rpm	LS_WriteParamList: c19_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02216

Parameter Name: C02216 LS_WriteParamList: Slip compensation		Data type: INTEGER_16 Index: 22359 _d = 5757 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
-100.00	%	100.00
Subcodes	Lenze setting	Info
C02216/1	2.67 %	LS_WriteParamList: c21_val1
C02216/2	2.67 %	LS_WriteParamList: c21_val2
C02216/3	2.67 %	LS_WriteParamList: c21_val3
C02216/4	2.67 %	LS_WriteParamList: c21_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02217

Parameter Name: C02217 LS_WriteParamList: I_{max} in motor mode		Data type: UNSIGNED_16 Index: 22359 _d = 5756 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	A	655.35
Subcodes	Lenze setting	Info
C02217/1	47.00 A	LS_WriteParamList: c22_val1
C02217/2	47.00 A	LS_WriteParamList: c22_val2
C02217/3	47.00 A	LS_WriteParamList: c22_val3
C02217/4	47.00 A	LS_WriteParamList: c22_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02218

Parameter Name: C02218 LS_WriteParamList: I_{max} in generator mode		Data type: INTEGER_16 Index: 22357 _d = 5755 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C02218/1	100.00 %	LS_WriteParamList: c23_val1
C02218/2	100.00 %	LS_WriteParamList: c23_val2
C02218/3	100.00 %	LS_WriteParamList: c23_val3
C02218/4	100.00 %	LS_WriteParamList: c23_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02219

Parameter Name: C02219 LS_WriteParamList: DC braking: Current		Data type: INTEGER_16 Index: 22356 _d = 5754 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	200.00
Subcodes	Lenze setting	Info
C02219/1	50.00 %	LS_WriteParamList: c36_val1
C02219/2	50.00 %	LS_WriteParamList: c36_val2
C02219/3	50.00 %	LS_WriteParamList: c36_val3
C02219/4	50.00 %	LS_WriteParamList: c36_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02220

Parameter Name: C02220 LS_WriteParamList: Vp speed controller		Data type: UNSIGNED_16 Index: 22355 _d = 5753 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00		600.00
Subcodes	Lenze setting	Info
C02220/1	15.00	LS_WriteParamList: c70_s1_val1
C02220/2	15.00	LS_WriteParamList: c70_s1_val2
C02220/3	15.00	LS_WriteParamList: c70_s1_val3
C02220/4	15.00	LS_WriteParamList: c70_s1_val4
C02220/5	6.00	LS_WriteParamList: c70_s2_val1
C02220/6	6.00	LS_WriteParamList: c70_s2_val2
C02220/7	6.00	LS_WriteParamList: c70_s2_val3
C02220/8	6.00	LS_WriteParamList: c70_s2_val4
C02220/9	3.00	LS_WriteParamList: c70_s3_val1
C02220/10	3.00	LS_WriteParamList: c70_s3_val2
C02220/11	3.00	LS_WriteParamList: c70_s3_val3
C02220/12	3.00	LS_WriteParamList: c70_s3_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02221

Parameter Name: C02221 LS_WriteParamList: Ti speed controller		Data type: UNSIGNED_16 Index: 22354 _d = 5752 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	ms	6000.0
Subcodes	Lenze setting	Info
C02221/1	100.0 ms	LS_WriteParamList: c71_s1_val1
C02221/2	100.0 ms	LS_WriteParamList: c71_s1_val2
C02221/3	100.0 ms	LS_WriteParamList: c71_s1_val3
C02221/4	100.0 ms	LS_WriteParamList: c71_s1_val4
C02221/5	50.0 ms	LS_WriteParamList: c71_s2_val1

Parameter Name: C02221 LS_WriteParamList: Ti speed controller		Data type: UNSIGNED_16 Index: 22354 _d = 5752 _h
C02221/6	50.0 ms	LS_WriteParamList: c71_s2_val2
C02221/7	50.0 ms	LS_WriteParamList: c71_s2_val3
C02221/8	50.0 ms	LS_WriteParamList: c71_s2_val4
C02221/9	50.0 ms	LS_WriteParamList: c71_s3_val1
C02221/10	50.0 ms	LS_WriteParamList: c71_s3_val2
C02221/11	50.0 ms	LS_WriteParamList: c71_s3_val3
C02221/12	50.0 ms	LS_WriteParamList: c71_s3_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02222

Parameter Name: C02222 LS_WriteParamList: SC: Tdn speed controller		Data type: UNSIGNED_16 Index: 22353 _d = 5751 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	ms	3.00
Subcodes	Lenze setting	Info
C02222/1	0.00 ms	LS_WriteParamList: c72_val1
C02222/2	0.00 ms	LS_WriteParamList: c72_val2
C02222/3	0.00 ms	LS_WriteParamList: c72_val3
C02222/4	0.00 ms	LS_WriteParamList: c72_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02223

Parameter Name: C02223 LS_WriteParamList: Imax/M controller gain		Data type: UNSIGNED_16 Index: 22352 _d = 5750 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00		100.00
Subcodes	Lenze setting	Info
C02223/1	0.25	LS_WriteParamList: c73_s1_val1
C02223/2	0.25	LS_WriteParamList: c73_s1_val2
C02223/3	0.25	LS_WriteParamList: c73_s1_val3
C02223/4	0.25	LS_WriteParamList: c73_s1_val4
C02223/5	1.25	LS_WriteParamList: c73_s2_val1
C02223/6	1.25	LS_WriteParamList: c73_s2_val2
C02223/7	1.25	LS_WriteParamList: c73_s2_val3
C02223/8	1.25	LS_WriteParamList: c73_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02224

Parameter Name: C02224 LS_WriteParamList: Imax/M controller reset time		Data type: UNSIGNED_16 Index: 22351 _d = 574F _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	ms	9990
Subcodes	Lenze setting	Info
C02224/1	65 ms	LS_WriteParamList: c74_s1_val1
C02224/2	65 ms	LS_WriteParamList: c74_s1_val2
C02224/3	65 ms	LS_WriteParamList: c74_s1_val3
C02224/4	65 ms	LS_WriteParamList: c74_s1_val4
C02224/5	30 ms	LS_WriteParamList: c74_s2_val1
C02224/6	30 ms	LS_WriteParamList: c74_s2_val2
C02224/7	30 ms	LS_WriteParamList: c74_s2_val3
C02224/8	30 ms	LS_WriteParamList: c74_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02225

Parameter Name: C02225 LS_WriteParamList: Vp current controller		Data type: UNSIGNED_16 Index: 22350 _d = 574E _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	V/A	500.00
Subcodes	Lenze setting	Info
C02225/1	7.00 V/A	LS_WriteParamList: c75_val1
C02225/2	7.00 V/A	LS_WriteParamList: c75_val2
C02225/3	7.00 V/A	LS_WriteParamList: c75_val3
C02225/4	7.00 V/A	LS_WriteParamList: c75_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02226

Parameter Name: C02226 LS_WriteParamList: Ti current controller		Data type: UNSIGNED_16 Index: 22349 _d = 574D _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	ms	500.00
Subcodes	Lenze setting	Info
C02226/1	10.61 ms	LS_WriteParamList: c76_val1
C02226/2	10.61 ms	LS_WriteParamList: c76_val2
C02226/3	10.61 ms	LS_WriteParamList: c76_val3
C02226/4	10.61 ms	LS_WriteParamList: c76_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02227

Parameter Name: C02227 LS_WriteParamList: SC: Vp field controller		Data type: UNSIGNED_16 Index: 22348 _d = 574C _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00		500.00
Subcodes	Lenze setting	Info
C02227/1	12.80	LS_WriteParamList: c77_val1
C02227/2	12.80	LS_WriteParamList: c77_val2
C02227/3	12.80	LS_WriteParamList: c77_val3
C02227/4	12.80	LS_WriteParamList: c77_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02228

Parameter Name: C02228 LS_WriteParamList: SC: Tn field controller		Data type: UNSIGNED_16 Index: 22347 _d = 574B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	ms	6000.0
Subcodes	Lenze setting	Info
C02228/1	256.0 ms	LS_WriteParamList: c78_val1
C02228/2	256.0 ms	LS_WriteParamList: c78_val2
C02228/3	256.0 ms	LS_WriteParamList: c78_val3
C02228/4	256.0 ms	LS_WriteParamList: c78_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02229

Parameter Name: C02229 LS_WriteParamList: SC: Settings		Data type: UNSIGNED_8 Index: 22346 _d = 574A _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C02229/1	0: Off	LS_WriteParamList: c79_s1_val1
C02229/2	0: Off	LS_WriteParamList: c79_s1_val2
C02229/3	0: Off	LS_WriteParamList: c79_s1_val3
C02229/4	0: Off	LS_WriteParamList: c79_s1_val4
C02229/5	1: On	LS_WriteParamList: c79_s2_val1
C02229/6	1: On	LS_WriteParamList: c79_s2_val2
C02229/7	1: On	LS_WriteParamList: c79_s2_val3
C02229/8	1: On	LS_WriteParamList: c79_s2_val4
C02229/9	0: Off	LS_WriteParamList: c79_s3_val1
C02229/10	0: Off	LS_WriteParamList: c79_s3_val2
C02229/11	0: Off	LS_WriteParamList: c79_s3_val3
C02229/12	0: Off	LS_WriteParamList: c79_s3_val4

Parameter Name: C02229 LS_WriteParamList: SC: Settings		Data type: UNSIGNED_8 Index: 22346 _d = 574A _h
C02229/13	1: On	LS_WriteParamList: c79_s4_val1
C02229/14	1: On	LS_WriteParamList: c79_s4_val2
C02229/15	1: On	LS_WriteParamList: c79_s4_val3
C02229/16	1: On	LS_WriteParamList: c79_s4_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02230

Parameter Name: C02230 LS_WriteParamList: Override point of field weakening		Data type: INTEGER_16 Index: 22345 _d = 5749 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
-500	Hz	500
Subcodes	Lenze setting	Info
C02230/1	0 Hz	LS_WriteParamList: c80_val1
C02230/2	0 Hz	LS_WriteParamList: c80_val2
C02230/3	0 Hz	LS_WriteParamList: c80_val3
C02230/4	0 Hz	LS_WriteParamList: c80_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02231

Parameter Name: C02231 LS_WriteParamList: Rated motor power		Data type: UNSIGNED_16 Index: 22344 _d = 5748 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	kW	500.00
Subcodes	Lenze setting	Info
C02231/1	11.00 kW	LS_WriteParamList: c81_val1
C02231/2	11.00 kW	LS_WriteParamList: c81_val2
C02231/3	11.00 kW	LS_WriteParamList: c81_val3
C02231/4	11.00 kW	LS_WriteParamList: c81_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02232

Parameter Name: C02232 LS_WriteParamList: Motor rotor resistance		Data type: UNSIGNED_32 Index: 22343 _d = 5747 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	mohm	200000
Subcodes	Lenze setting	Info
C02232/1	276 mohms	LS_WriteParamList: c82_val1
C02232/2	276 mohms	LS_WriteParamList: c82_val2
C02232/3	276 mohms	LS_WriteParamList: c82_val3
C02232/4	276 mohms	LS_WriteParamList: c82_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02233

Parameter Name: C02233 LS_WriteParamList: Motor stator resistance		Data type: UNSIGNED_32 Index: 22342 _d = 5746 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	mohm	200000
Subcodes	Lenze setting	Info
C02233/1	330 mohms	LS_WriteParamList: c84_val1
C02233/2	330 mohms	LS_WriteParamList: c84_val2
C02233/3	330 mohms	LS_WriteParamList: c84_val3
C02233/4	330 mohms	LS_WriteParamList: c84_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02234

Parameter Name: C02234 LS_WriteParamList: Motor stator leakage inductance		Data type: UNSIGNED_16 Index: 22341 _d = 5745 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	mH	650.00
Subcodes	Lenze setting	Info
C02234/1	3.50 mH	LS_WriteParamList: c85_val1
C02234/2	3.50 mH	LS_WriteParamList: c85_val2
C02234/3	3.50 mH	LS_WriteParamList: c85_val3
C02234/4	3.50 mH	LS_WriteParamList: c85_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02236

Parameter Name: C02236 LS_WriteParamList: Rated motor speed		Data type: UNSIGNED_16 Index: 22339 _d = 5743 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
50	rpm	60000
Subcodes	Lenze setting	Info
C02236/1	1460 rpm	LS_WriteParamList: c87_val1
C02236/2	1460 rpm	LS_WriteParamList: c87_val2
C02236/3	1460 rpm	LS_WriteParamList: c87_val3
C02236/4	1460 rpm	LS_WriteParamList: c87_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02237

Parameter Name: C02237 LS_WriteParamList: Rated motor current		Data type: UNSIGNED_16 Index: 22338 _d = 5742 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.20	A	320.00
Subcodes	Lenze setting	Info
C02237/1	21.00 A	LS_WriteParamList: c88_val1
C02237/2	21.00 A	LS_WriteParamList: c88_val2
C02237/3	21.00 A	LS_WriteParamList: c88_val3
C02237/4	21.00 A	LS_WriteParamList: c88_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02238

Parameter Name: C02238 LS_WriteParamList: Rated motor frequency		Data type: UNSIGNED_16 Index: 22337 _d = 5741 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
1	Hz	1000
Subcodes	Lenze setting	Info
C02238/1	50 Hz	LS_WriteParamList: c89_val1
C02238/2	50 Hz	LS_WriteParamList: c89_val2
C02238/3	50 Hz	LS_WriteParamList: c89_val3
C02238/4	50 Hz	LS_WriteParamList: c89_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02239

Parameter Name: C02239 LS_WriteParamList: Rated motor voltage		Data type: UNSIGNED_16 Index: 22336 _d = 5740 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	V	5000
Subcodes	Lenze setting	Info
C02239/1	400 V	LS_WriteParamList: c90_val1
C02239/2	400 V	LS_WriteParamList: c90_val2
C02239/3	400 V	LS_WriteParamList: c90_val3
C02239/4	400 V	LS_WriteParamList: c90_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02240

Parameter Name: C02240 LS_WriteParamList: Motor cosine phi		Data type: UNSIGNED_8 Index: 22335 _d = 573F _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.20		1.00
Subcodes	Lenze setting	Info
C02240/1	0.85	LS_WriteParamList: c91_val1
C02240/2	0.85	LS_WriteParamList: c91_val2
C02240/3	0.85	LS_WriteParamList: c91_val3
C02240/4	0.85	LS_WriteParamList: c91_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02241

Parameter Name: C02241 LS_WriteParamList: Motor magnetizing inductance		Data type: UNSIGNED_16 Index: 22334 _d = 573E _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	mH	6500.0
Subcodes	Lenze setting	Info
C02241/1	81.0 mH	LS_WriteParamList: c92_val1
C02241/2	81.0 mH	LS_WriteParamList: c92_val2
C02241/3	81.0 mH	LS_WriteParamList: c92_val3
C02241/4	81.0 mH	LS_WriteParamList: c92_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02242

Parameter Name: C02242 LS_WriteParamList: Motor magnetising current		Data type: UNSIGNED_16 Index: 22333 _d = 573D _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	A	320.00
Subcodes	Lenze setting	Info
C02242/1	8.50 A	LS_WriteParamList: c95_val1
C02242/2	8.50 A	LS_WriteParamList: c95_val2
C02242/3	8.50 A	LS_WriteParamList: c95_val3
C02242/4	8.50 A	LS_WriteParamList: c95_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02244

Parameter Name: C02244 LS_WriteParamList: Auto-DCB: Hold time		Data type: UNSIGNED_32 Index: 22331 _d = 573B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.000	s	999.000
Subcodes	Lenze setting	Info
C02244/1	0.500 s	LS_WriteParamList: c106_val1
C02244/2	0.500 s	LS_WriteParamList: c106_val2
C02244/3	0.500 s	LS_WriteParamList: c106_val3
C02244/4	0.500 s	LS_WriteParamList: c106_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C02245

Parameter Name: C02245 LS_WriteParamList: DC braking: Hold time		Data type: UNSIGNED_32 Index: 22330 _d = 573A _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.000	s	999.000
Subcodes	Lenze setting	Info
C02245/1	998.999 s	LS_WriteParamList: c107_val1
C02245/2	998.999 s	LS_WriteParamList: c107_val2
C02245/3	998.999 s	LS_WriteParamList: c107_val3
C02245/4	998.999 s	LS_WriteParamList: c107_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C02246

Parameter Name: C02246 LS_WriteParamList: Setting of motor overload (I³xt)		Data type: INTEGER_16 Index: 22329 _d = 5739 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	250.00
Subcodes	Lenze setting	Info
C02246/1	100.00 %	LS_WriteParamList: c120_val1
C02246/2	100.00 %	LS_WriteParamList: c120_val2
C02246/3	100.00 %	LS_WriteParamList: c120_val3
C02246/4	100.00 %	LS_WriteParamList: c120_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02249

Parameter Name: C02249 LS_WriteParamList: Oscillation damping influence		Data type: UNSIGNED_16 Index: 22326 _d = 5736 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	250.00
Subcodes	Lenze setting	Info
C02249/1	5.00 %	LS_WriteParamList: c234_val1
C02249/2	5.00 %	LS_WriteParamList: c234_val2
C02249/3	5.00 %	LS_WriteParamList: c234_val3
C02249/4	5.00 %	LS_WriteParamList: c234_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02250

Parameter Name: C02250 LS_WriteParamList: Filter time - oscill. damping		Data type: UNSIGNED_8 Index: 22325 _d = 5735 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
2	ms	250
Subcodes	Lenze setting	Info
C02250/1	32 ms	LS_WriteParamList: c235_val1
C02250/2	32 ms	LS_WriteParamList: c235_val2
C02250/3	32 ms	LS_WriteParamList: c235_val3
C02250/4	32 ms	LS_WriteParamList: c235_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02251

Parameter Name: C02251 LS_WriteParamList: Oscillation damping field weakening		Data type: UNSIGNED_8 Index: 22324 _d = 5734 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0		40
Subcodes	Lenze setting	Info
C02251/1	14	LS_WriteParamList: c236_val1
C02251/2	14	LS_WriteParamList: c236_val2
C02251/3	14	LS_WriteParamList: c236_val3
C02251/4	14	LS_WriteParamList: c236_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02252

Parameter Name: C02252 LS_WriteParamList: Kp position controller		Data type: UNSIGNED_16 Index: 22323 _d = 5733 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	1/s	500.00
Subcodes	Lenze setting	Info
C02252/1	5.00 1/s	LS_WriteParamList: c254_val1
C02252/2	5.00 1/s	LS_WriteParamList: c254_val2
C02252/3	5.00 1/s	LS_WriteParamList: c254_val3
C02252/4	5.00 1/s	LS_WriteParamList: c254_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02256

Parameter Name: C02256 LS_WriteParamList: Moment of inertia		Data type: UNSIGNED_32 Index: 22319 _d = 572F _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	kg cm ²	6000000.00
Subcodes	Lenze setting	Info
C02256/1	0.00 kg cm ²	LS_WriteParamList: c273_val1
C02256/2	0.00 kg cm ²	LS_WriteParamList: c273_val2
C02256/3	0.00 kg cm ²	LS_WriteParamList: c273_val3
C02256/4	0.00 kg cm ²	LS_WriteParamList: c273_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02260

Parameter Name: C02260 LS_WriteParamList: Speed sensor selection		Data type: UNSIGNED_8 Index: 22315 _d = 572B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	No sensor	
1	Sensor signal FreqIn12	
2	Encoder signal FreqIn56	
3	Encoder signal MultiEncoder	
5	Encoder signal FreqIn1267	
Subcodes	Lenze setting	Info
C02260/1	0: No sensor	LS_WriteParamList: c495_val1
C02260/2	0: No sensor	LS_WriteParamList: c495_val2
C02260/3	0: No sensor	LS_WriteParamList: c495_val3
C02260/4	0: No sensor	LS_WriteParamList: c495_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02261

Parameter Name: C02261 LS_WriteParamList: SC: Field feedforward control		Data type: UNSIGNED_16 Index: 22314 _d = 572A _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	%	600
Subcodes	Lenze setting	Info
C02261/1	200 %	LS_WriteParamList: c576_val1
C02261/2	200 %	LS_WriteParamList: c576_val2
C02261/3	200 %	LS_WriteParamList: c576_val3
C02261/4	200 %	LS_WriteParamList: c576_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02262

Parameter Name: C02262 LS_WriteParamList: SC: Vp field weakening controller		Data type: UNSIGNED_16 Index: 22314 _d = 572A _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0000		2.0000
Subcodes	Lenze setting	Info
C02262/1	0.0010	LS_WriteParamList: c577_val1
C02262/2	0.0010	LS_WriteParamList: c577_val2
C02262/3	0.0010	LS_WriteParamList: c577_val3
C02262/4	0.0010	LS_WriteParamList: c577_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C02263

Parameter Name: C02263 LS_WriteParamList: SC: Tn field weakening controller		Data type: UNSIGNED_16 Index: 22312 _d = 5728 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.1	ms	6200.0
Subcodes	Lenze setting	Info
C02263/1	20.0 ms	LS_WriteParamList: c578_val1
C02263/2	20.0 ms	LS_WriteParamList: c578_val2
C02263/3	20.0 ms	LS_WriteParamList: c578_val3
C02263/4	20.0 ms	LS_WriteParamList: c578_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10		

C02264

Parameter Name:		Data type: UNSIGNED_8 Index: 22311 _d = 5727 _h
C02264 LS_WriteParamList: Empfindlichkeit Sollwertvorsteuerung		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Inactive	
1	15 bits	
2	14 bits	
3	13 bits	
4	12 bits	
5	11 Bit	
6	10 Bit	
7	9 Bit	
Subcodes	Lenze setting	Info
C02264/1	0: Inactive	LS_WriteParamList: C653_s1_val1
C02264/2	0: Inactive	LS_WriteParamList: C653_s1_val2
C02264/3	0: Inactive	LS_WriteParamList: C653_s1_val3
C02264/4	0: Inactive	LS_WriteParamList: C653_s1_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02272

Parameter Name:		Data type: UNSIGNED_8 Index: 22303 _d = 571F _h
C02272 LS_WriteParamList: Motor phase direction of rotation		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	not inverted	
1	inverted	
Subcodes	Lenze setting	Info
C02272/1	0: Not inverted	LS_WriteParamList: c905_val1
C02272/2	0: Not inverted	LS_WriteParamList: c905_val2
C02272/3	0: Not inverted	LS_WriteParamList: c905_val3
C02272/4	0: Not inverted	LS_WriteParamList: c905_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02273

Parameter Name:		Data type: INTEGER_16 Index: 22302 _d = 571E _h
C02273 LS_WriteParamList: Speed limitation		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	175.00
Subcodes	Lenze setting	Info
C02273/1	120.00 %	LS_WriteParamList: c909_s1_val1
C02273/2	120.00 %	LS_WriteParamList: c909_s1_val2
C02273/3	120.00 %	LS_WriteParamList: c909_s1_val3
C02273/4	120.00 %	LS_WriteParamList: c909_s1_val4

Parameter Name: C02273 LS_WriteParamList: Speed limitation		Data type: INTEGER_16 Index: 22302 _d = 571E _h
C02273/5	120.00 %	LS_WriteParamList: c909_s2_val1
C02273/6	120.00 %	LS_WriteParamList: c909_s2_val2
C02273/7	120.00 %	LS_WriteParamList: c909_s2_val3
C02273/8	120.00 %	LS_WriteParamList: c909_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02274

Parameter Name: C02274 LS_WriteParamList: Frequency limitation		Data type: UNSIGNED_16 Index: 22301 _d = 571D _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	Hz	1300
Subcodes	Lenze setting	Info
C02274/1	1000 Hz	LS_WriteParamList: c910_s1_val1
C02274/2	1000 Hz	LS_WriteParamList: c910_s1_val2
C02274/3	1000 Hz	LS_WriteParamList: c910_s1_val3
C02274/4	1000 Hz	LS_WriteParamList: c910_s1_val4
C02274/5	1000 Hz	LS_WriteParamList: c910_s2_val1
C02274/6	1000 Hz	LS_WriteParamList: c910_s2_val2
C02274/7	1000 Hz	LS_WriteParamList: c910_s2_val3
C02274/8	1000 Hz	LS_WriteParamList: c910_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02275

Parameter Name: C02275 LS_WriteParamList: Motor cable length		Data type: UNSIGNED_16 Index: 22300 _d = 571C _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	m	1000.0
Subcodes	Lenze setting	Info
C02275/1	5.0 m	LS_WriteParamList: c915_val1
C02275/2	5.0 m	LS_WriteParamList: c915_val2
C02275/3	5.0 m	LS_WriteParamList: c915_val3
C02275/4	5.0 m	LS_WriteParamList: c915_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02276

Parameter Name: C02276 LS_WriteParamList: Motor cable cross-section		Data type: UNSIGNED_16 Index: 22299 _d = 571B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.50	mm ²	100.00
Subcodes	Lenze setting	Info

Parameter Name: C02276 LS_WriteParamList: Motor cable cross-section		Data type: UNSIGNED_16 Index: 22299 _d = 571B _h
C02276/1	6.00 mm ²	LS_WriteParamList: c916_val1
C02276/2	6.00 mm ²	LS_WriteParamList: c916_val2
C02276/3	6.00 mm ²	LS_WriteParamList: c916_val3
C02276/4	6.00 mm ²	LS_WriteParamList: c916_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02278

Parameter Name: C02278 LS_WriteParamList: PSM: Maximum motor current field weakening		Data type: UNSIGNED_16 Index: 22297 _d = 5719 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	500.00
Subcodes	Lenze setting	Info
C02278/1	30.00 %	LS_WriteParamList: c938_val1
C02278/2	30.00 %	LS_WriteParamList: c938_val2
C02278/3	30.00 %	LS_WriteParamList: c938_val3
C02278/4	30.00 %	LS_WriteParamList: c938_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02279

Parameter Name: C02279 LS_WriteParamList: Ultimate motor current		Data type: UNSIGNED_16 Index: 22296 _d = 5718 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	A	3000.0
Subcodes	Lenze setting	Info
C02279/1	3000.0 A	LS_WriteParamList: c939_val1
C02279/2	3000.0 A	LS_WriteParamList: c939_val2
C02279/3	3000.0 A	LS_WriteParamList: c939_val3
C02279/4	3000.0 A	LS_WriteParamList: c939_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02280

Parameter Name: C02280 LS_WriteParamList: Max. motor speed		Data type: UNSIGNED_16 Index: 22295 _d = 5717 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
50	rpm	65000
Subcodes	Lenze setting	Info
C02280/1	60000 rpm	LS_WriteParamList: c965_val1
C02280/2	60000 rpm	LS_WriteParamList: c965_val2
C02280/3	60000 rpm	LS_WriteParamList: c965_val3
C02280/4	60000 rpm	LS_WriteParamList: c965_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02281

Parameter Name: C02281 LS_WriteParamList: VFC: Time const. slip comp.		Data type: UNSIGNED_16 Index: 22294 _d = 5716 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
1	ms	6000
Subcodes	Lenze setting	Info
C02281/1	100 ms	LS_WriteParamList: c966_val1
C02281/2	100 ms	LS_WriteParamList: c966_val2
C02281/3	100 ms	LS_WriteParamList: c966_val3
C02281/4	100 ms	LS_WriteParamList: c966_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02284

Parameter Name: C02284 LS_WriteParamList: VFC: limitation V/f +encoder		Data type: UNSIGNED_16 Index: 22294 _d = 5713 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	Hz	100.00
Subcodes	Lenze setting	Info
C02284/1	10.00 Hz	LS_WriteParamList: c971_s1_val1
C02284/2	10.00 Hz	LS_WriteParamList: c971_s1_val2
C02284/3	10.00 Hz	LS_WriteParamList: c971_s1_val3
C02284/4	10.00 Hz	LS_WriteParamList: c971_s1_val4
C02284/5	100.00 Hz	LS_WriteParamList: c971_s2_val1
C02284/6	100.00 Hz	LS_WriteParamList: c971_s2_val2
C02284/7	100.00 Hz	LS_WriteParamList: c971_s2_val3
C02284/8	100.00 Hz	LS_WriteParamList: c971_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02285

Parameter Name: C02285 LS_WriteParamList: VFC: Vp V/f +encoder		Data type: UNSIGNED_16 Index: 22290 _d = 5712 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.000	Hz/Hz	64.000
Subcodes	Lenze setting	Info
C02285/1	0.100 Hz/Hz	LS_WriteParamList: c972_val1
C02285/2	0.100 Hz/Hz	LS_WriteParamList: c972_val2
C02285/3	0.100 Hz/Hz	LS_WriteParamList: c972_val3
C02285/4	0.100 Hz/Hz	LS_WriteParamList: c972_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1000		

C02286

Parameter Name: C02286 LS_WriteParamList: VFC: Ti V/f +encoder		Data type: UNSIGNED_16 Index: 22289 _d = 5711 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	ms	6000.0
Subcodes	Lenze setting	Info
C02286/1	100.0 ms	LS_WriteParamList: c973_val1
C02286/2	100.0 ms	LS_WriteParamList: c973_val2
C02286/3	100.0 ms	LS_WriteParamList: c973_val3
C02286/4	100.0 ms	LS_WriteParamList: c973_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02287

Parameter Name: C02287 LS_WriteParamList: VFC-ECO: Vp CosPhi controller		Data type: UNSIGNED_16 Index: 22289 _d = 5710 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.000	Hz/Hz	64.000
Subcodes	Lenze setting	Info
C02287/1	0.500 Hz/Hz	LS_WriteParamList: c975_val1
C02287/2	0.500 Hz/Hz	LS_WriteParamList: c975_val2
C02287/3	0.500 Hz/Hz	LS_WriteParamList: c975_val3
C02287/4	0.500 Hz/Hz	LS_WriteParamList: c975_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1000		

C02288

Parameter Name: C02288 LS_WriteParamList: VFC-ECO: Ti CosPhi controller		Data type: UNSIGNED_16 Index: 22288 _d = 570F _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	ms	6000.0
Subcodes	Lenze setting	Info
C02288/1	200.0 ms	LS_WriteParamList: c976_val1
C02288/2	200.0 ms	LS_WriteParamList: c976_val2
C02288/3	200.0 ms	LS_WriteParamList: c976_val3
C02288/4	200.0 ms	LS_WriteParamList: c976_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02289

Parameter Name: C02289 LS_WriteParamList: VFC-ECO: Minimum voltage U/f		Data type: INTEGER_16 Index: 22286 _d = 570E _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
20.00	%	100.00
Subcodes	Lenze setting	Info
C02289/1	20.00 %	LS_WriteParamList: c977_val1
C02289/2	20.00 %	LS_WriteParamList: c977_val2
C02289/3	20.00 %	LS_WriteParamList: c977_val3
C02289/4	20.00 %	LS_WriteParamList: c977_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02290

Parameter Name: C02290 LS_WriteParamList: VFC-ECO: Voltage reduction ramp		Data type: UNSIGNED_8 Index: 22285 _d = 570D _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	s	5.0
Subcodes	Lenze setting	Info
C02290/1	0.8 s	LS_WriteParamList: c982_val1
C02290/2	0.8 s	LS_WriteParamList: c982_val2
C02290/3	0.8 s	LS_WriteParamList: c982_val3
C02290/4	0.8 s	LS_WriteParamList: c982_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02291

Parameter Name: C02291 LS_WriteParamList: SLVC: Field current controller gain		Data type: INTEGER_16 Index: 22284 _d = 570C _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	20.00
Subcodes	Lenze setting	Info
C02291/1	0.50 %	LS_WriteParamList: c985_val1
C02291/2	0.50 %	LS_WriteParamList: c985_val2
C02291/3	0.50 %	LS_WriteParamList: c985_val3
C02291/4	0.50 %	LS_WriteParamList: c985_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02292

Parameter Name: C02292 LS_WriteParamList: SLVC: Cross current controller gain		Data type: INTEGER_16 Index: 22283 _d = 570B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	20.00
Subcodes	Lenze setting	Info
C02292/1	0.00 %	LS_WriteParamList: c986_val1
C02292/2	0.00 %	LS_WriteParamList: c986_val2
C02292/3	0.00 %	LS_WriteParamList: c986_val3
C02292/4	0.00 %	LS_WriteParamList: c986_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02293

Parameter Name: C02293 LS_WriteParamList: Inverter motor brake: nAdd		Data type: INTEGER_16 Index: 22283 _d = 570B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	rpm	1000
Subcodes	Lenze setting	Info
C02293/1	80 rpm	LS_WriteParamList: c987_val1
C02293/2	80 rpm	LS_WriteParamList: c987_val2
C02293/3	80 rpm	LS_WriteParamList: c987_val3
C02293/4	80 rpm	LS_WriteParamList: c987_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02294

Parameter Name: C02294 LS_WriteParamList: Inverter motor brake: PT1 filter time		Data type: INTEGER_16 Index: 22281 _d = 5709 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	ms	100.0
Subcodes	Lenze setting	Info
C02294/1	0.0 ms	LS_WriteParamList: c988_val1
C02294/2	0.0 ms	LS_WriteParamList: c988_val2
C02294/3	0.0 ms	LS_WriteParamList: c988_val3
C02294/4	0.0 ms	LS_WriteParamList: c988_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10		

C02295

Parameter Name: C02295 LS_WriteParamList: Flying restart fct.: Activation		Data type: UNSIGNED_8 Index: 22280 _d = 5708 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C02295/1	0: Off	LS_WriteParamList: c990_val1
C02295/2	0: Off	LS_WriteParamList: c990_val2
C02295/3	0: Off	LS_WriteParamList: c990_val3
C02295/4	0: Off	LS_WriteParamList: c990_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02296

Parameter Name: C02296 LS_WriteParamList: Flying restart fct.: process		Data type: UNSIGNED_16 Index: 22279 _d = 5707 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	0...+n Start: +10 Hz	
1	-n...0 Start: -10 Hz	
2	-n...+n Start: +10 Hz	
3	-n...+n Start: -10 Hz	
4	-n...+n Start: Cx992	
Subcodes	Lenze setting	Info
C02296/1	2: -n...+n Start: +10 Hz	LS_WriteParamList: c991_val1
C02296/2	2: -n...+n Start: +10 Hz	LS_WriteParamList: c991_val2
C02296/3	2: -n...+n Start: +10 Hz	LS_WriteParamList: c991_val3
C02296/4	2: -n...+n Start: +10 Hz	LS_WriteParamList: c991_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02297

Parameter Name: C02297 LS_WriteParamList: Flying restart: Start frequency		Data type: INTEGER_16 Index: 22278 _d = 5706 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
-200	Hz	200
Subcodes	Lenze setting	Info
C02297/1	10 Hz	LS_WriteParamList: c992_val1
C02297/2	10 Hz	LS_WriteParamList: c992_val2
C02297/3	10 Hz	LS_WriteParamList: c992_val3
C02297/4	10 Hz	LS_WriteParamList: c992_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02298

Parameter Name: C02298 LS_WriteParamList: Flying restart fct: Int. time		Data type: UNSIGNED_16 Index: 22277 _d = 5705 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	ms	6000.0
Subcodes	Lenze setting	Info
C02298/1	300.0 ms	LS_WriteParamList: c993_val1
C02298/2	300.0 ms	LS_WriteParamList: c993_val2
C02298/3	300.0 ms	LS_WriteParamList: c993_val3
C02298/4	300.0 ms	LS_WriteParamList: c993_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02299

Parameter Name: C02299 LS_WriteParamList: Flying restart fct.: Current		Data type: INTEGER_16 Index: 22276 _d = 5704 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C02299/1	25.00 %	LS_WriteParamList: c994_val1
C02299/2	25.00 %	LS_WriteParamList: c994_val2
C02299/3	25.00 %	LS_WriteParamList: c994_val3
C02299/4	25.00 %	LS_WriteParamList: c994_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02300

Parameter Name: C02300 LS_WriteParamList: SLPSM: Controlled current setpoint		Data type: UNSIGNED_16 Index: 22275 _d = 5703 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
5.00	%	400.00
Subcodes	Lenze setting	Info
C02300/1	100.00 %	LS_WriteParamList: c995_s1_val1
C02300/2	100.00 %	LS_WriteParamList: c995_s1_val2
C02300/3	100.00 %	LS_WriteParamList: c995_s1_val3
C02300/4	100.00 %	LS_WriteParamList: c995_s1_val4
C02300/5	20.00 %	LS_WriteParamList: c995_s2_val1
C02300/6	20.00 %	LS_WriteParamList: c995_s2_val2
C02300/7	20.00 %	LS_WriteParamList: c995_s2_val3
C02300/8	20.00 %	LS_WriteParamList: c995_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 100		

C02301

Parameter Name: C02301 LS_WriteParamList: SLPSM: Switching speed		Data type: INTEGER_16 Index: 22274 _d = 5702 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C02301/1	13.00 %	LS_WriteParamList: c996_s1_val1
C02301/2	13.00 %	LS_WriteParamList: c996_s1_val2
C02301/3	13.00 %	LS_WriteParamList: c996_s1_val3
C02301/4	13.00 %	LS_WriteParamList: c996_s1_val4
C02301/5	8.00 %	LS_WriteParamList: c996_s2_val1
C02301/6	8.00 %	LS_WriteParamList: c996_s2_val2
C02301/7	8.00 %	LS_WriteParamList: c996_s2_val3
C02301/8	8.00 %	LS_WriteParamList: c996_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02302

Parameter Name: C02302 LS_WriteParamList: SLPSM: Filter time - rotor position		Data type: INTEGER_16 Index: 22273 _d = 5701 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.00	%	100.00
Subcodes	Lenze setting	Info
C02302/1	5.00 %	LS_WriteParamList: c997_val1
C02302/2	5.00 %	LS_WriteParamList: c997_val2
C02302/3	5.00 %	LS_WriteParamList: c997_val3
C02302/4	5.00 %	LS_WriteParamList: c997_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02303

Parameter Name: C02303 LS_WriteParamList: SLPSM: Filter time rotor position		Data type: INTEGER_16 Index: 22272 _d = 5700 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.5	ms	20.0
Subcodes	Lenze setting	Info
C02303/1	3.0 ms	LS_WriteParamList: c998_s1_val1
C02303/2	3.0 ms	LS_WriteParamList: c998_s1_val2
C02303/3	3.0 ms	LS_WriteParamList: c998_s1_val3
C02303/4	3.0 ms	LS_WriteParamList: c998_s1_val4
C02303/5	5.0 ms	LS_WriteParamList: c998_s2_val1
C02303/6	5.0 ms	LS_WriteParamList: c998_s2_val2
C02303/7	5.0 ms	LS_WriteParamList: c998_s2_val3
C02303/8	5.0 ms	LS_WriteParamList: c998_s2_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02304

Parameter Name: C02304 LS_WriteParamList: SLPsm: PLL gain		Data type: INTEGER_16 Index: 22271 _d = 56FF _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	%	1000
Subcodes	Lenze setting	Info
C02304/1	400 %	LS_WriteParamList: c999_val1
C02304/2	400 %	LS_WriteParamList: c999_val2
C02304/3	400 %	LS_WriteParamList: c999_val3
C02304/4	400 %	LS_WriteParamList: c999_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02305

Parameter Name: C02305 LS_WriteParamList: PSM: Ppp saturation characteristic		Data type: UNSIGNED_8 Index: 22270 _d = 56FE _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	%	255
Subcodes	Lenze setting	Info
C02305/1	100 %	LS_WriteParamList: c2853_s1_val1
C02305/2	100 %	LS_WriteParamList: c2853_s1_val2
C02305/3	100 %	LS_WriteParamList: c2853_s1_val3
C02305/4	100 %	LS_WriteParamList: c2853_s1_val4
C02305/5	100 %	LS_WriteParamList: c2853_s2_val1
C02305/6	100 %	LS_WriteParamList: c2853_s2_val2
C02305/7	100 %	LS_WriteParamList: c2853_s2_val3
C02305/8	100 %	LS_WriteParamList: c2853_s2_val4
C02305/9	100 %	LS_WriteParamList: c2853_s3_val1
C02305/10	100 %	LS_WriteParamList: c2853_s3_val2
C02305/11	100 %	LS_WriteParamList: c2853_s3_val3
C02305/12	100 %	LS_WriteParamList: c2853_s3_val4
C02305/13	100 %	LS_WriteParamList: c2853_s4_val1
C02305/14	100 %	LS_WriteParamList: c2853_s4_val2
C02305/15	100 %	LS_WriteParamList: c2853_s4_val3
C02305/16	100 %	LS_WriteParamList: c2853_s4_val4
C02305/17	100 %	LS_WriteParamList: c2853_s5_val1
C02305/18	100 %	LS_WriteParamList: c2853_s5_val2
C02305/19	100 %	LS_WriteParamList: c2853_s5_val3
C02305/20	100 %	LS_WriteParamList: c2853_s5_val4
C02305/21	100 %	LS_WriteParamList: c2853_s6_val1
C02305/22	100 %	LS_WriteParamList: c2853_s6_val2
C02305/23	100 %	LS_WriteParamList: c2853_s6_val3
C02305/24	100 %	LS_WriteParamList: c2853_s6_val4
C02305/25	100 %	LS_WriteParamList: c2853_s7_val1
C02305/26	100 %	LS_WriteParamList: c2853_s7_val2

Parameter Name: C02305 LS_WriteParamList: PSM: Ppp saturation characteristic		Data type: UNSIGNED_8 Index: 22270 _d = 56FE _h
C02305/27	100 %	LS_WriteParamList: c2853_s7_val3
C02305/28	100 %	LS_WriteParamList: c2853_s7_val4
C02305/29	100 %	LS_WriteParamList: c2853_s8_val1
C02305/30	100 %	LS_WriteParamList: c2853_s8_val2
C02305/31	100 %	LS_WriteParamList: c2853_s8_val3
C02305/32	100 %	LS_WriteParamList: c2853_s8_val4
C02305/33	100 %	LS_WriteParamList: c2853_s9_val1
C02305/34	100 %	LS_WriteParamList: c2853_s9_val2
C02305/35	100 %	LS_WriteParamList: c2853_s9_val3
C02305/36	100 %	LS_WriteParamList: c2853_s9_val4
C02305/37	100 %	LS_WriteParamList: c2853_s10_val1
C02305/38	100 %	LS_WriteParamList: c2853_s10_val2
C02305/39	100 %	LS_WriteParamList: c2853_s10_val3
C02305/40	100 %	LS_WriteParamList: c2853_s10_val4
C02305/41	100 %	LS_WriteParamList: c2853_s11_val1
C02305/42	100 %	LS_WriteParamList: c2853_s11_val2
C02305/43	100 %	LS_WriteParamList: c2853_s11_val3
C02305/44	100 %	LS_WriteParamList: c2853_s11_val4
C02305/45	100 %	LS_WriteParamList: c2853_s12_val1
C02305/46	100 %	LS_WriteParamList: c2853_s12_val2
C02305/47	100 %	LS_WriteParamList: c2853_s12_val3
C02305/48	100 %	LS_WriteParamList: c2853_s12_val4
C02305/49	100 %	LS_WriteParamList: c2853_s13_val1
C02305/50	100 %	LS_WriteParamList: c2853_s13_val2
C02305/51	100 %	LS_WriteParamList: c2853_s13_val3
C02305/52	100 %	LS_WriteParamList: c2853_s13_val4
C02305/53	100 %	LS_WriteParamList: c2853_s14_val1
C02305/54	100 %	LS_WriteParamList: c2853_s14_val2
C02305/55	100 %	LS_WriteParamList: c2853_s14_val3
C02305/56	100 %	LS_WriteParamList: c2853_s14_val4
C02305/57	100 %	LS_WriteParamList: c2853_s15_val1
C02305/58	100 %	LS_WriteParamList: c2853_s15_val2
C02305/59	100 %	LS_WriteParamList: c2853_s15_val3
C02305/60	100 %	LS_WriteParamList: c2853_s15_val4
C02305/61	100 %	LS_WriteParamList: c2853_s16_val1
C02305/62	100 %	LS_WriteParamList: c2853_s16_val2
C02305/63	100 %	LS_WriteParamList: c2853_s16_val3
C02305/64	100 %	LS_WriteParamList: c2853_s16_val4
C02305/65	100 %	LS_WriteParamList: c2853_s17_val1
C02305/66	100 %	LS_WriteParamList: c2853_s17_val2
C02305/67	100 %	LS_WriteParamList: c2853_s17_val3
C02305/68	100 %	LS_WriteParamList: c2853_s17_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02306

Parameter Name: C02306 LS_WriteParamList: PSM: Imax Ppp saturation characteristic		Data type: UNSIGNED_16 Index: 22269 _d = 56FD _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0.0	A	3000.0
Subcodes	Lenze setting	Info
C02306/1	3000.0 A	LS_WriteParamList: c2855_val1
C02306/2	3000.0 A	LS_WriteParamList: c2855_val2
C02306/3	3000.0 A	LS_WriteParamList: c2855_val3
C02306/4	3000.0 A	LS_WriteParamList: c2855_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02307

Parameter Name: C02307 LS_WriteParamList: PSM: Activate Ppp saturation char.		Data type: UNSIGNED_8 Index: 22268 _d = 56FC _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C02307/1	0: Off	LS_WriteParamList: c2859_val1
C02307/2	0: Off	LS_WriteParamList: c2859_val
C02307/3	0: Off	LS_WriteParamList: c2859_val
C02307/4	0: Off	LS_WriteParamList: c2859_val
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02311

Parameter Name: C02311 LS_WriteParamList: PLI without motion: Adaptation of time duration		Data type: INTEGER_8 Index: 22264 _d = 56F8 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
-10		10
Subcodes	Lenze setting	Info
C02311/1	0	LS_WriteParamList: c2872_s1_val1
C02311/2	0	LS_WriteParamList: c2872_s1_val2
C02311/3	0	LS_WriteParamList: c2872_s1_val3
C02311/4	0	LS_WriteParamList: c2872_s1_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02312

Parameter Name: C02312 LS_WriteParamList: PLI without motion		Data type: UNSIGNED_16 Index: 22263 _d = 56F7 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	for SLPSM with controller enable	
Bit 1	for SC PSM with mains on	
Bit 2	for SC PSM with controller enable	
Bit 3	for SC PSM once after fault reset	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C02312/1	0x0001	LS_WriteParamList: c2874_s1_val1
C02312/2	0x0001	LS_WriteParamList: c2874_s1_val2
C02312/3	0x0001	LS_WriteParamList: c2874_s1_val3
C02312/4	0x0001	LS_WriteParamList: c2874_s1_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C02313

Parameter Name: C02313 LS_WriteParamList: PLI without motion: Adaptation of ident angle		Data type: INTEGER_8 Index: 22262 _d = 56F6 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
-100	°	100
Subcodes	Lenze setting	Info
C02313/1	0 °	LS_WriteParamList: c2875_s1_val1
C02313/2	0 °	LS_WriteParamList: c2875_s1_val2
C02313/3	0 °	LS_WriteParamList: c2875_s1_val3
C02313/4	0 °	LS_WriteParamList: c2875_s1_val4
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02314

Parameter Name: C02314 Reserved	Data type: UNSIGNED_8 Index: 22261 _d = 56F5 _h
This code is for device-internal use only and must not be written to by the user!	

C02315

Parameter Name: C02315 LS_WriteParamList: Manual entry of motor type	Data type: UNSIGNED_8 Index: 22260 _d = 56F4 _h	
From version 14.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Automatic	
1	ASM	
2	PSM	
Subcodes	Lenze setting	Info
C02315/1	0: Automatic	LS_WriteParamList: c1001_s1_val1 From version 16.00.00
C02315/2	0: Automatic	LS_WriteParamList: c1001_s1_val2
C02315/3	0: Automatic	From version 16.00.00
C02315/4	0: Automatic	From version 16.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02556

Parameter Name: C02556 Position controller: Limitation	Data type: INTEGER_32 Index: 22019 _d = 5603 _h	
Setting range (min. value unit max. value)		
0	Incr. 2147483647	
Subcodes	Lenze setting	Info
C02556/1	65536 incr.	Following error limit
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02580

Parameter Name: C02580 Holding brake: Operating mode	Data type: UNSIGNED_8 Index: 21995 _d = 55EB _h
Selection of the operating mode for holding brake control ▶ Holding brake control	
Selection list (Lenze setting printed in bold)	Info

Parameter Name: C02580 Holding brake: Operating mode		Data type: UNSIGNED_8 Index: 21995 _d = 55EB _h
0	Brake control off	No holding brake is used. Internal control is switched off.
11	Manually controlled	The holding brake is released and closed via a control bit in the MCK control word.
12	Autom. controlled	The holding brake is automatically released and closed via speed setpoint comparisons.
13	Semi-automat. controlled	<p>From version 06.00.00</p> <p>The holding brake is released and closed via a control bit in the MCK control word.</p> <ul style="list-style-type: none"> • In contrast to the manual operation (mode 11) <ul style="list-style-type: none"> • the feedforward control is active in this mode, preventing a sagging e.g. in case of a hoist. • the brake in this mode also closes when the controller is inhibited in order to prevent the axis in a hoist from falling.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02581

Parameter Name: C02581 Holding brake: Speed thresholds		Data type: INTEGER_16 Index: 21994 _d = 55EA _h
Speed setpoint threshold and hysteresis for automatic holding brake control		
▶ Holding brake control		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C02581/1	5.00 %	Holding brake: Switching threshold <ul style="list-style-type: none"> • Switching threshold of the speed setpoint from which on the holding brake is released/applied automatically.
C02581/2	1.00 %	Holding brake: Hyst.release <ul style="list-style-type: none"> • Hysteresis for holding brake release. • Release threshold = switching threshold + release hysteresis
C02581/3	1.00 %	Holding brake: Hyst. close <ul style="list-style-type: none"> • Hysteresis for holding brake application. • Application threshold = switching threshold - application hysteresis
C02581/4	0.00 %	Holding brake: FF control starting value 1 <ul style="list-style-type: none"> • From version 06.00.00
C02581/5	0.00 %	Holding brake: FF control starting value 2 <ul style="list-style-type: none"> • From version 06.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02582

Parameter Name: C02582 Holding brake: Setting		Data type: UNSIGNED_8 Index: 21993 _d = 55E9 _h
Activation of functional holding brake control options		
▶ Holding brake control		
Setting range (min. hex value max. hex value)		Lenze setting
0x00		0xFF 0x40 (decimal: 64)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info

Parameter Name: C02582 Holding brake: Setting		Data type: UNSIGNED 8 Index: 21993 _d = 55E9 _h
Bit 0 <input type="checkbox"/>	bMBrakeReleaseOut invert.	Activation of inverted control <ul style="list-style-type: none"> • 1 ≡ Inverted logic of the control signal for the holding brake control switching element.
Bit 1 <input type="checkbox"/>	Horizontal brake protection	Brake response in case of pulse inhibit <ul style="list-style-type: none"> • 1 ≡ In the case of a pulse inhibit, the actual speed value is monitored which must reach the "Close" threshold value to cause the holding brake to be applied. Note: <ul style="list-style-type: none"> • This function is only active if bit 3 (horizontal/winding technology) is set as well. The function is used in order that, when the controller is inhibited, the holding brake of a drive with horizontal traverse path does not wear out during rotation. • With vertical motion (bit 3 = 0), this function is not active. Especially with hoists and activated pulse inhibit of the inverter, an immediate application of the brake is essential for safety-related reasons!
Bit 2 <input type="checkbox"/>	with hoist inv. feedfwd. control	Direction of feedforward control with vertical/hoist technology: <ul style="list-style-type: none"> • 0 ≡ Positive direction • 1 ≡ Negative direction Note: <ul style="list-style-type: none"> • Reversal (Ccw) is then considered.
Bit 3 <input type="checkbox"/>	Horizontal application	Direction of movement of the axis <ul style="list-style-type: none"> • 0 ≡ The axis performs vertical movements. Gravitational acceleration causes movements. • 1 ≡ The direction of the axis is horizontal or rotary. The gravitational acceleration does not cause any movement.
Bit 4 <input type="checkbox"/>	Feedforward control C2581	From version 06.00.00 Selection of the feedforward control value <ul style="list-style-type: none"> • 0 ≡ Automatic selection. <ul style="list-style-type: none"> • The torque saved at the last stop is used. • 1 ≡ Manual selection. <ul style="list-style-type: none"> • <i>bMBrakeStartValue2</i> = FALSE: The feedforward control value 1 set in C02581/4 is used. • <i>bMBrakeStartValue2</i> = TRUE: The feedforward control value set in C02581/5 is used.
Bit 5 <input type="checkbox"/>	Feedback monitoring	From version 06.00.00 Activation of status monitoring <ul style="list-style-type: none"> • 1 ≡ The <i>bMBrakeApplied</i> input for status detection of the brake (via a switching contact at the brake) is monitored after the waiting time set in C02589/3 has expired.
Bit 6 <input checked="" type="checkbox"/>	SyncRampe L_NSet_1	From version 12.00.00 Selection of the ramp time for the synchronisation process to setpoint speed after the brake opening time has elapsed Revised behaviour from version 12.00.00: <ul style="list-style-type: none"> • 1 ≡ The ramp time of the effective acceleration of the ramp function generator (L_NSet_1) is used (Lenze setting). • 0 ≡ As before, the ramp time set in C02610/1 is used. Note: <ul style="list-style-type: none"> • The changeover can be dynamically both via the ramp parameter and via bit 6.
Bit 7 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C02589

Parameter Name: C02589 Holding brake: Time system		Data type: UNSIGNED_16 Index: 21986 _d = 55E2 _h
Operating times of the holding brake <ul style="list-style-type: none"> The electromechanical delay times of the holding brake are specified in the data sheets or on the holding brake nameplate. <p style="text-align: right;">▶ Holding brake control</p>		
Setting range (min. value unit max. value)		
0	ms	60000
Subcodes	Lenze setting	Info
C02589/1	100 ms	Holding brake: Application time <ul style="list-style-type: none"> Time in which the holding brake is completely applied from the beginning of control and in which the controller is inhibited.
C02589/2	100 ms	Holding brake: Release time <ul style="list-style-type: none"> Time in which the holding brake is completely released from the beginning of control.
C02589/3	100 ms	Holding brake: Waiting time status <ul style="list-style-type: none"> Time after which all transient reactions are completed and the switching status of the holding brake is stable. Beginning of monitoring the feedback signal for the switching status of the holding brake.
C02589/4	0 ms	Holding brake: Ramp time FF ctrl <ul style="list-style-type: none"> From version 06.00.00
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02593

Parameter Name: C02593 Holding brake: Activation time		Data type: UNSIGNED_32 Index: 21982 _d = 55DE _h
Time parameter for the delay of trigger signals of the holding brake control <p style="text-align: right;">▶ Holding brake control</p>		
Setting range (min. value unit max. value)		
0.000	s	3600.000
Subcodes	Lenze setting	Info
C02593/1	0.000 s	Holding brake: Actual value monitoring <ul style="list-style-type: none"> Time in which the actual value is supposed to reach the threshold for closing the brake if the setpoint has already reached the threshold. Time > 0 s: If the actual speed value has not reached the threshold within the time for brake application, the holding brake is applied by control. Time = 0 s: The brake is only applied by control when the actual speed has reached the application threshold.
C02593/2	0.000 s	Holding brake: Application delay
C02593/3	0.000 s	Holding brake: Reserved
C02593/4	0.000 s	Holding brake: Reserved
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C02607

Parameter Name: C02607 Holding brake: Status		Data type: UNSIGNED_16 Index: 21968 _d = 55D0 _h
Switching status of the holding brake control		
▶ Holding brake control		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Brake applied	1 ≙ Holding brake is completely applied
Bit 1	Brake released	1 ≙ Holding brake is completely released
Bit 2	Feedforward control active	1 ≙ Feedforward control for holding of the load via the motor is active before the holding brake releases.
Bit 3	Closing active	1 ≙ The brake closing time (C02589/1) expires
Bit 4	Forced release active	1 ≙ In case of automatic operation of the holding brake control, the brake is directly released via the MCK input <i>bMBrakeRelease</i> = TRUE
Bit 5	Release active	1 ≙ The brake release time (C02589/2) expires
Bit 6	Setpoint synchronisation active	1 ≙ A speed setpoint at the MCK is approached along a defined ramp after brake release
Bit 7	Signalling contact error	1 ≙ The status monitoring has tripped
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C02610

Parameter Name: C02610 MCK: Accel./decel. times		Data type: UNSIGNED_32 Index: 21965 _d = 55CD _h
Ramp times for speed setpoint synchronisation		
Setting range (min. value unit max. value)		
0.000	s	999.999

Parameter Name: C02610 MCK: Accel./decel. times		Data type: UNSIGNED_32 Index: 21965 _d = 55C _h
Subcodes	Lenze setting	Info
C02610/1	2.000 s	Holding brake: ramp time synchr. <ul style="list-style-type: none"> Ramp time for the synchronisation process to setpoint speed after the brake opening time has elapsed Revised behaviour from version 12.00.00: <ul style="list-style-type: none"> The setting made here is only effective if bit 6 "SyncRampe L_NSet_1" in C02582 is set to "0". In the Lenze setting of C02582 (Bit 6 = "1"), the ramp time of the effective acceleration of the ramp function generator (L_NSet_1) is used. ▶ Holding brake control
C02610/2	2.000 s	MCK: Ramp time synchr. setpoint <ul style="list-style-type: none"> Time for synchronisation ramps between setpoint jumps occurring through the exceedance of minimum and maximum speed setpoint limit ranges.
C02610/3	2.000 s	MCK: SM stopping ramp
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1000		

C02611

Parameter Name: C02611 MCK: Limitations		Data type: INTEGER_16 Index: 21964 _d = 55C _h
Speed setpoint limits for the determination of limited validity ranges		
Note: Traversing with setpoints through resulting blocking zones is executed with the ramp set in C02610/2 . ▶ Speed Min/Max		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C02611/1	199.99 %	MCK: Pos. max. speed <ul style="list-style-type: none"> Upper limit of the speed setpoint limitation in positive direction of rotation.
C02611/2	0.00 %	MCK: Pos. min. speed <ul style="list-style-type: none"> Lower limit of the speed setpoint limitation in positive direction of rotation.
C02611/3	0.00 %	MCK: Neg. min. speed <ul style="list-style-type: none"> Lower limit of the speed setpoint limitation in negative direction of rotation.
C02611/4	199.99 %	MCK: Neg. max. speed <ul style="list-style-type: none"> Upper limit of the speed setpoint limitation in negative direction of rotation.
C02611/5	0.50 %	MCK: Max. speed <ul style="list-style-type: none"> From version 12.00.00 Maximum value for transferring the current speed to the speed setpoint when the internal operating mode "StandBy" is exited.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02652

Parameter Name: C02652 Settings of measuring system		Data type: UNSIGNED_16 Index: 21923 _d = 55A3 _h
In version 08.00.00 and from version 12.00.00 onwards		
Setting range (min. hex value max. hex value)		Lenze setting
0x0000	0xFFFF	0x0000 (decimal: 0)
Value is bit-coded: (<input checked="" type="checkbox"/> = bit set)		Info
Bit 0 <input type="checkbox"/>	Actual MCTRL position received at mains switch-off	MCTRL actual position received at "mains switch-off" The activation of this bit causes the actual position to be saved at "mains switch-off". Provided that the drive has not been moved, for instance by a holding brake during the switched-off period, the actual position can be reconstructed again at mains power-up.
Bit 1 <input type="checkbox"/>	Delete reference when machine data is changed	Delete reference when machine data is changed The activation of this bit automatically resets the reference as soon as the machine data is changed. Thus the user is forced to execute a new homing to avoid machine damage. ▶ Status bit "HomPosAvailable"
Bit 2 <input type="checkbox"/>	Reserved	
Bit 3 <input type="checkbox"/>	Reserved	
Bit 4 <input type="checkbox"/>	Reserved	
Bit 5 <input type="checkbox"/>	Reserved	
Bit 6 <input type="checkbox"/>	Reserved	
Bit 7 <input type="checkbox"/>	Reserved	
Bit 8 <input type="checkbox"/>	Reserved	
Bit 9 <input type="checkbox"/>	Reserved	
Bit 10 <input type="checkbox"/>	Reserved	
Bit 11 <input type="checkbox"/>	Reserved	
Bit 12 <input type="checkbox"/>	Reserved	
Bit 13 <input type="checkbox"/>	Reserved	
Bit 14 <input type="checkbox"/>	Reserved	
Bit 15 <input type="checkbox"/>	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C02810

Parameter Name: C02810 TP: Edge selection		Data type: UNSIGNED_8 Index: 21765 _d = 5505 _h
From version 06.00.00		
▶ Touch-probe detection		
Selection list		
0	Off	
1	Rising	
2	Falling	
3	Rising and falling	
Subcodes	Lenze setting	Info
C02810/1	0: Off	Reserved
C02810/2	0: Off	Reserved

Parameter Name: C02810 TP: Edge selection		Data type: UNSIGNED_8 Index: 21765 _d = 5505 _h
C02810/3	0: Off	Reserved
C02810/4	0: Off	TPDigIn4: Edge selection
C02810/5	0: Off	TPDigIn5: Edge selection
C02810/6	0: Off	TPDigIn6: Edge selection
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02811

Parameter Name: C02811 TP: Sensor delay		Data type: UNSIGNED_16 Index: 21764 _d = 5504 _h
From version 06.00.00		
▶ Touch-probe detection		
Setting range (min. value unit max. value)		
0	µs	6999
Subcodes	Lenze setting	Info
C02811/1	0 µs	Reserved
C02811/2	0 µs	Reserved
C02811/3	0 µs	Reserved
C02811/4	0 µs	TPDigIn4: Sensor delay
C02811/5	0 µs	TPDigIn5: Sensor delay
C02811/6	0 µs	TPDigIn6: Sensor delay
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02812

Parameter Name: C02812 TP: Position offset		Data type: INTEGER_32 Index: 21763 _d = 5503 _h
From version 06.00.00		
▶ Touch-probe detection		
Setting range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes	Lenze setting	Info
C02812/1	0.0000 units	Reserved
C02812/2	0.0000 units	Reserved
C02812/3	0.0000 units	Reserved
C02812/4	0.0000 units	TPDigIn4: Pos offset
C02812/5	0.0000 units	TPDigIn5: Pos offset
C02812/6	0.0000 units	TPDigIn6: Pos offset
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C02813

Parameter Name: C02813 TP: Pos. window start		Data type: INTEGER_32 Index: 21762 _d = 5502 _h
From version 06.00.00		
▶ Touch-probe detection		
Setting range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes	Lenze setting	Info
C02813/1	-214748.3647 units	Reserved
C02813/2	-214748.3647 units	TPDigIn4: Window start
C02813/3	-214748.3647 units	TPDigIn5: Window start
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C02814

Parameter Name: C02814 TP: Pos. window end		Data type: INTEGER_32 Index: 21761 _d = 5501 _h
From version 06.00.00		
▶ Touch-probe detection		
Setting range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes	Lenze setting	Info
C02814/1	214748.3647 units	Reserved
C02814/2	214748.3647 units	TPDigIn4: Window end
C02814/3	214748.3647 units	TPDigIn5: Window end
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C02815

Parameter Name: C02815 TP: Position source		Data type: UNSIGNED_8 Index: 21760 _d = 5500 _h
From version 06.00.00		
▶ Touch-probe detection		
Selection list		
0	Position encoder actual value	
1	Pos DigIn1/2	
Subcodes	Lenze setting	Info
C02815/1	0: Position encoder actual value	Reserved
C02815/2	0: Position encoder actual value	Reserved
C02815/3	0: Position encoder actual value	Reserved
C02815/4	0: Position encoder actual value	TPDigIn4: Position source
C02815/5	0: Position encoder actual value	TPDigIn5: Position source
C02815/6	0: Position encoder actual value	TPDigIn6: Position source
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02816

Parameter Name: C02816 TP: Signal counter		Data type: UNSIGNED_16 Index: 21759 _d = 54FF _h
From version 06.00.00		▶ Touch-probe detection
Display range (min. value unit max. value)		
0		65535
Subcodes		Info
C02816/1		Reserved
C02816/2		Reserved
C02816/3		Reserved
C02816/4		TPDigIn4: Signal counter
C02816/5		TPDigIn5: Signal counter
C02816/6		TPDigIn6: Signal counter
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02817

Parameter Name: C02817 TP: TouchProbe position		Data type: INTEGER_32 Index: 21758 _d = 54FE _h
From version 06.00.00		▶ Touch-probe detection
Display range (min. value unit max. value)		
-214748.3647	units	214748.3647
Subcodes		Info
C02817/1		Reserved
C02817/2		Reserved
C02817/3		Reserved
C02817/4		TPDigIn4: TP position
C02817/5		TPDigIn5: TP position
C02817/6		TPDigIn6: TP position
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 10000		

C02830

Parameter Name: C02830 DIx: Debounce time		Data type: UNSIGNED_8 Index: 21745 _d = 54F1 _h
Debounce times for the digital inputs		▶ Digital terminals

Parameter Name: C02830 Dlx: Debounce time		Data type: UNSIGNED_8 Index: 21745 _d = 54F1 _h
Selection list		
0	0.00 ms	
4	1.00 ms	
8	2.00 ms	
12	3.00 ms	
16	4.00 ms	
20	5.00 ms	
24	6.00 ms	
28	7.00 ms	
32	8.00 ms	
36	9.00 ms	
40	10.0 ms	
44	11.0 ms	
48	12.0 ms	
52	13.0 ms	
56	14.0 ms	
64	16.0 ms	
72	18.0 ms	
80	20.0 ms	
88	22.0 ms	
96	24.0 ms	
104	26.0 ms	
112	28.0 ms	
120	30.0 ms	
128	32.0 ms	
Subcodes	Lenze setting	Info
C02830/1	0: 0.00 ms	DigIn1: Debounce time
C02830/2	0: 0.00 ms	DigIn2: Debounce time
C02830/3	0: 0.00 ms	DigIn3: Debounce time
C02830/4	0: 0.00 ms	DigIn4: Debounce time
C02830/5	0: 0.00 ms	DigIn5: Debounce time
C02830/6	0: 0.00 ms	DigIn6: Debounce time
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02840

Parameter Name: C02840 CountInx: Parameter		Data type: UNSIGNED_32 Index: 21735 _d = 54E7 _h
Starting and comparison values for digital count inputs		
▶ Use DI1(5) as counting input		
Setting range (min. value unit max. value)		
0	Incr.	2147483647
Subcodes	Lenze setting	Info

Parameter Name: C02840 CountInx: Parameter		Data type: UNSIGNED_32 Index: 21735 _d = 54E7 _h
C02840/1	0 incr.	CountIn1: Starting value
C02840/2	65535 incr.	CountIn1: Comparison value
C02840/3	0 incr.	CountIn5: Starting value
C02840/4	65535 incr.	CountIn5: Comparison value
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02841

Parameter Name: C02841 CountInx: Counter content		Data type: UNSIGNED_32 Index: 21734 _d = 54E6 _h
Display of the current counter content of the digital count inputs ▶ Use DI1(5) as counting input		
Display range (min. value unit max. value)		
0	Incr.	2147483647
Subcodes		Info
C02841/1		CountIn1: Counter content
C02841/2		CountIn5: Counter content
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input checked="" type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02842

Parameter Name: C02842 FreqInxx: Offset		Data type: INTEGER_16 Index: 21733 _d = 54E5 _h
Offset for digital frequency inputs ▶ Using DI1(5) and DI2(6) as frequency inputs		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C02842/1	0.00 %	FreqIn12: Offset
C02842/2	0.00 %	FreqIn56: Offset
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02843

Parameter Name: C02843 FreqInxx: Gain		Data type: INTEGER_16 Index: 21732 _d = 54E4 _h
Gain for digital frequency inputs ▶ Using DI1(5) and DI2(6) as frequency inputs		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes		Info
C02843/1	100.00 %	FreqIn12: Gain
C02843/2	100.00 %	FreqIn56: Gain
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02844

Parameter Name: C02844 FreqIn12: Function		Data type: UNSIGNED_8 Index: 21731 _d = 54E3 _h
From version 06.00.00		
▶ Output of the encoder position of the DI1/DI2 frequency input		
Selection list		
0	Loading with level	
1	Loading with edge	
2	Loading with level + reset	
Subcodes	Lenze setting	Info
C02844/1	0: Loading with level	FreqIn12: PosIn function
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02845

Parameter Name: C02845 FreqIn12: PosIn comparison value		Data type: INTEGER_32 Index: 21730 _d = 54E2 _h
From version 06.00.00		
▶ Output of the encoder position of the DI1/DI2 frequency input		
Setting range (min. value unit max. value)		Lenze setting
0	Incr.	2147418112
		0 incr.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02853

Parameter Name: C02853 PSM: Lss saturation characteristic		Data type: UNSIGNED_8 Index: 21722 _d = 54DA _h
From version 12.00.00		
▶ Current-dependent stator leakage inductance Lss(l)		
Setting range (min. value unit max. value)		
0	%	255
Subcodes	Lenze setting	Info
C02853/1	100 %	PSM: Lss saturation characteristic
C02853/2	100 %	PSM: Lss saturation characteristic
C02853/3	100 %	PSM: Lss saturation characteristic
C02853/4	100 %	PSM: Lss saturation characteristic
C02853/5	100 %	PSM: Lss saturation characteristic
C02853/6	100 %	PSM: Lss saturation characteristic
C02853/7	100 %	PSM: Lss saturation characteristic
C02853/8	100 %	PSM: Lss saturation characteristic
C02853/9	100 %	PSM: Lss saturation characteristic
C02853/10	100 %	PSM: Lss saturation characteristic
C02853/11	100 %	PSM: Lss saturation characteristic
C02853/12	100 %	PSM: Lss saturation characteristic
C02853/13	100 %	PSM: Lss saturation characteristic

Parameter Name: C02853 PSM: Lss saturation characteristic		Data type: UNSIGNED_8 Index: 21722 _d = 54DA _h
C02853/14	100 %	PSM: Lss saturation characteristic
C02853/15	100 %	PSM: Lss saturation characteristic
C02853/16	100 %	PSM: Lss saturation characteristic
C02853/17	100 %	PSM: Lss saturation characteristic
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02855

Parameter Name: C02855 PSM: I_{max} Lss saturation characteristic		Data type: UNSIGNED_16 Index: 21720 _d = 54D8 _h
From version 12.00.00		
▶ Current-dependent stator leakage inductance Lss(l)		
Setting range (min. value unit max. value)		Lenze setting
0.0	A	3000.0 3000.0 A
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 10		

C02859

Parameter Name: C02859 PSM: Activate Lss saturation char.		Data type: UNSIGNED_8 Index: 21716 _d = 54D4 _h
From version 12.00.00		
▶ Current-dependent stator leakage inductance Lss(l)		
Selection list (Lenze setting printed in bold)		
0	Off	
1	On	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02864

Parameter Name: C02864 MCTRL: Optimisations		Data type: UNSIGNED_16 Index: 21711 _d = 54CF _h
From version 14.00.00		
Activation of special functions of the internal motor control		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Motor temp. 90° for operation without KTY	1 ≡ Warm machine. In case the temperature tracking is not active, a motor temperature of 90 °C is assumed.
Bit 1	No switch-off of the brake chopper after 4s	1 ≡ Limitation of the operating time of the brake chopper (brake transistor) is deactivated. ▶ Braking operation/brake energy management
Bit 2	Brake chopper off in case of trip	0 ≡ No response of the brake chopper in the "Fault" device status. 1 ≡ In the "Fault" device status, the brake chopper is permanently switched off without any delay. ▶ Braking operation/brake energy management
Bit 3	Reserved (do not change!)	
Bit 4	Motor ident: Switching frequency 8kHz	Switching frequency for motor parameter identification: 0 ≡ 4 kHz 1 ≡ 8 kHz ▶ Preventing a decrease of the switching frequency

Parameter Name: C02864 MCTRL: Optimisations		Data type: UNSIGNED_16 Index: 21711 _d = 54CF _h
Bit 5	Field/field weakening control in 500us	Cycle time for field weakening control: 0 ≡ 1 ms 1 ≡ 500 μs ▶ Optimising the behaviour of the asynchronous motor in the field weakening range
Bit 6	Motor ident.: No calculation C577 C578 C2864	From version 16.00.00: Following successful motor parameter identification, the field weakening controller parameters for ASM servo control are calculated as well. If these parameters are not to be calculated, bit 6 must be set to "1". 0 ≡ Calculate parameter 1 ≡ Do not calculate parameter ▶ Automatic motor data identification
Bit 7	If C2879 Bit1=0: C087 is warm	From version 16.00.00, the too high slip with the activated option "Slip calculation from motor nameplate data" can be corrected for the ASM servo control by setting bit 7 to "1". 1 ≡ Rated motor speed (C00087) is assumed for a warm machine. ▶ Slip calculation for SC
Bit 8	Suppress V/f emergency operation	From version 16.00.00, it is internally switched to the encoderless V/f characteristic control in case of a motor control type with feedback and an encoder open circuit in order to avoid impermissible motor movements. • In order that this "V/f emergency operation" works properly, the parameters relevant for the V/f characteristic control (base frequency, Vmin boost, slip compensation, etc.) have to be set correctly. As an alternative, a motor parameter identification can be executed as well. • The change-over to "V/f emergency operation" is reported via bit 4 in C01000 and via the <i>bWirebreakUfLinearActive</i> status signal at the SB LS_DeviceMonitor . • The setting in C00006 is not affected by the change-over. The "V/f emergency operation" can be suppressed by setting bit 8 to "1". 0 ≡ V/f emergency operation in case of encoder open circuit 1 ≡ No V/f emergency operation in case of encoder open circuit
Bit 9	Optimisation of field weakening control	
Bit 10	V/f+encoder without adaptation of voltage	
Bit 11	Latching of open circuit FreqIn12 or 67	
Bit 12	SLVC: No smoothing of nMotorTorqueAct_a	
Bit 13	Reserved	

Parameter Name: C02864 MCTRL: Optimisations		Data type: UNSIGNED_16 Index: 21711 _d = 54CF _h
Bit 14	When C173=3: OUon 810V OUoff=800V	From version V18.00.00 onwards Boost of the thresholds OU _{on} and OU _{off} at a mains voltage of 500 V. 1 ≡ boost operating threshold OU _{on} and reset threshold OU _{off} by 10 V.
Bit 15	Activate nTorqueHigh Limit_a and nTorqueLowLimit_a	From version V18.00.00 onwards Limitation of the positive and negative torque. <ul style="list-style-type: none"> • 0 ≡ no limitation • 1 ≡ nTorqueMotLimit_a acts as nTorqueHighLimit_a (positive torque limitation) and nTorqueGenLimit_a acts as nTorqueLowLimit_a (negative torque limitation)
Subcodes	Lenze setting	Info
C02864/1	0x0000	MCTRL: Optimisations
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C02865

Parameter Name: C02865 MCTRL: Special settings		Data type: UNSIGNED_16 Index: 21710 _d = 54CE _h
Only version 08.00.00 Apart from bit 8, all other bits are "reserved"! From version 12.00.00 Activation of special functions of the internal motor control		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	No TorqueLimit if TorquemodeOn	From version 12.00.00 onwards: If sensorless vector control (SLVC) or servo control (SC) are used, in the "torque control with speed limitation" mode the torque limitation via <i>nTorqueMotLimit_a</i> and <i>nTorqueGenLimit_a</i> is also active to limit the torque setpoint. If you want to deactivate the torque limitation to retain the former function, set bit 0 to "1". 0 ≡ Torque limitation is active 1 ≡ Torque limitation is not active
Bit 1	250ms IMP before DCB	
Bit 2	1000ms IMP before DCB	
Bit 3	DCB: Current controller and C036 app. to C088	
Bit 4	Motorident.: No calculation C73 C75 C76 C77 C78	From version 12.00.00 onwards: Following successful motor parameter identification, the current controller and field controller parameters are calculated as well. If these parameters are not to be calculated, bit 4 must be set to "1". 0 ≡ Calculate parameter 1 ≡ Do not calculate parameter ▶ Automatic motor data identification

Parameter Name: C02865 MCTRL: Special settings		Data type: UNSIGNED_16 Index: 21710 _d = 54CE _h
Bit 5	Motorident.: Calculation C70 C71 C72	From version 12.00.00 onwards: Following successful motor parameter identification, the speed controller parameters can automatically be calculated as well. If these parameters are to be calculated, bit 5 must be set to "1". 0 ≡ Do not calculate parameter 1 ≡ Calculate parameter ▶ Automatic motor data identification
Bit 6	Motorident.: Calculation C11 C22 C497 C966 C982	From version 12.00.00 onwards: Following successful motor parameter identification, further controller parameters can be calculated automatically. If these parameters are to be calculated, bit 6 must be set to "1". 0 ≡ Do not calculate parameter 1 ≡ Calculate parameter ▶ Automatic motor data identification
Bit 7	Brake chopper off in case of pulse inhibit	
Bit 8	DC-bus supply with DC charging connection	
Bit 9	Inverter characteristics inactive	
Bit 10	SCPSM: Extrapolation - actual speed value inactive	
Bit 11	TopLine: Speed encoder signal cycle 500us	
Bit 12	In case of QSP - nTorqueSetValue_a active	
Bit 13	In case of QSP - nTorquexxxLimit_a active	
Bit 14	Sensitivity of setpoint feedf. ctrl. 16 bits	
Bit 15	SC: Dead time of speed setpoint 500us	
Subcodes	Lenze setting	Info
C02865/1	0x0000	MCTRL: Special settings
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C02866

Parameter Name: C02866 MCTRL: Special settings		Data type: UNSIGNED_8 Index: 21709 _d = 54CD _h
From version 12.00.00		
Selection list		
0	No	
1	Yes	

Parameter Name: C02866 MCTRL: Special settings		Data type: UNSIGNED 8 Index: 21709 _d = 54CD _h
Subcodes	Lenze setting	Info
C02866/1	1: Yes	Motor ident.: Current controller par. from C075 C076 ▶ Automatic motor data identification
C02866/2	0: No	Motor phase error monitoring before operation ▶ Motor phase error monitoring before operation
C02866/3	0: No	Brake chopper DC-bus slave ▶ Control of multiple internal brake choppers in the DC-bus system
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02867

Parameter Name: C02867 - Identification procedure		Data type: UNSIGNED 8 Index: 21708 _d = 54CC _h
From version 12.00.00 Selection of the identification procedure for motor parameter identification ▶ Automatic motor parameter identification		
Selection list		Info
0	automatic	Automatic selection of the optimum identification procedure: <ul style="list-style-type: none"> • For synchronous motors, the extended identification procedure is always used. • For asynchronous motors with a rated motor power of up to 11 kW, the basic identification procedure is used. • For asynchronous motors with a rated motor power of more than 11 kW, the extended identification procedure is used.
1	standard identification	<ul style="list-style-type: none"> • Only for asynchronous motors. • Duration approx. 30 s
2	extended identification	<ul style="list-style-type: none"> • Stands out due to increased accuracy of the determined motor parameters. • Also supports synchronous motors and asynchronous motors with a power of more than 11 kW. • Duration approx. 80 s
Subcodes	Lenze setting	Info
C02867/1	0: automatic	Motor parameter identification: Process
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input checked="" type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02868

Parameter Name: C02868 Setting of compatibility		Data type: UNSIGNED_32 Index: 21707 _d = 54CB _h
<p>From version 16.00.00</p> <p>This parameter serves to activate corrections and optimisations in various functions of the inverter. The activation causes a deviation of the respective functionality from the previous firmware versions! In each case, the changed functionality has to be checked after the activation took place. For a detailed explanation, the version information in the AKB has to be used.</p>		
Setting range (min. hex value max. hex value)		
0x00000000		0xFFFFFFFF
Value is bit-coded:		Info
Bit 0	xx.01: MCK stop ramp opt.	<p>0 ≡ (Maloperation): Profile stop activation with corresponding machine and profile data causes a rotation in the opposite direction and setpoint oscillations around zero speed.</p> <p>1 ≡ (Correction): Corrected traversing of stop ramp may reduce the stopping times.</p>
Bit 1	xx.02: MCK deceleration ramp opt.	<p>0 ≡ (Maloperation): When corresponding profile parameters are entered, an impermissible jerk is caused during the braking phase when entering into the target position within a traversing profile.</p> <p>1 ≡ (Correction): Depending on the profile data constellation, corrected traversing extends the respective traversing process towards the target position.</p>
Bit 2	xx.03: MCK Overchange opt.	<p>0 ≡ (error CK10 occurs):</p> <ul style="list-style-type: none"> Traversing profile with final speed ≠ 0 needs a reversing process after reaching the target position. Parameterised final speed in profile parameters cannot be reached at the target approach (final speed too high). Position target cannot be approached if <ul style="list-style-type: none"> the initial speed of the traversing profile ± final speed <p>1 ≡ (Correction): Ck10 does not occur anymore in this setting.</p> <ul style="list-style-type: none"> Travelling profiles with final speed is always executed in such a way that the target position will be reached if the parameterised final speed is neglected. Expected Ck10 errors do not occur anymore, traversing blocks are executed.
Bit 3	xx.04: MCK PosFollower TargetPos	<p>0 ≡ (Previous procedure):</p> <ul style="list-style-type: none"> No information on target position <i>LS_MotionControlKernel.dnPosTarget_p</i> when a synchronisation process is started in the position follower mode. Previous display of the target position remains unchanged. <p>1 ≡ Display of the target position and thus the rejection of the previously saved values in <i>LS_MotionControlKernel.dnPosTarget_p</i>.</p>
Bit 4	xx.05: MCK speed, change in op. mode, opt.	<p>From version 17.00.00 onwards</p> <p>0 ≡ (Previous procedure):</p> <ul style="list-style-type: none"> The change from "StandBy" mode to a different operating mode (except for "SpeedFollower") causes the speed to jump to 0 if C02611/51 <i>LS_MotorInterface.nHlgSetValue_a</i> is set. <p>1 ≡ Instead of a speed jump, the "Stop" ramp is used to decelerate the motor to standstill. This applies to the state transition from "StandBy" to "Homing", "ManualJog" or "Stop" if no further actions take place in the new operating mode.</p>

Parameter Name: C02868 Setting of compatibility		Data type: UNSIGNED_32 Index: 21707 _d = 54CB _h
Bit 5	xx.06: MCK modulo multi, opt.	<p>From version 17.00.00 onwards</p> <p>0 ≡ (Previous procedure):</p> <ul style="list-style-type: none"> Modulo multiple clocking with one clock cycle too many. <p>1 ≡ Involvement of the blocking zone for a defined multiple clocking in case of positioning AbsCw and AbsCcw.</p> <p>▶ Activation of the Modulo measuring system</p>
Bit 6	xx.07: MCK suppression Ck10	<p>From version 17.00.00 onwards</p> <p>0 = (previous behaviour)</p> <ul style="list-style-type: none"> Tripping of the error Ck10 (error distance calculation). <p>1 ≡ Change-over to linear profile generation in the next calculation cycle. Positioning takes place without S-rounding. If no profile linkage is parameterised, bit 22 in C01247/0 is set to TRUE after positioning is completed. This makes it possible to recognise that the originally intended course of the profile generation with S-rounding takes place without jerk limitation due to a linear profile generation.</p>
Bit 7	xx.08: MCK h brake feedf. ctrl off	<p>From version 18.00.00 onwards</p> <p>0 ≡ (Previous procedure):</p> <ul style="list-style-type: none"> Injection of feedforward control torque or frequency. Holding brake is released with feedforward control. <p>1 ≡ No injection of feedforward control torque or frequency. Holding brake is released without feedforward control.</p>
Bit 8	xx.09: Reserved	
Bit 9	xx.10: Reserved	
Bit 10	xx.11: Reserved	
Bit 11	xx.12: Reserved	
Bit 12	xx.13: Reserved	
Bit 13	xx.14: Reserved	
Bit 14	xx.15: Reserved	
Bit 15	xx.16: Reserved	
Bit 16	xx.17: Reserved	
Bit 17	xx.18: Reserved	
Bit 18	xx.19: Reserved	
Bit 19	xx.20: Reserved	
Bit 20	xx.21: Reserved	
Bit 21	xx.22: Reserved	
Bit 22	xx.23: Reserved	
Bit 23	xx.24: Reserved	
Bit 24	xx.25: Reserved	
Bit 25	xx.26: Reserved	
Bit 26	xx.27: Reserved	
Bit 27	xx.28: Reserved	
Bit 28	xx.29: Reserved	
Bit 29	xx.30: Reserved	

Parameter Name: C02868 Setting of compatibility		Data type: UNSIGNED_32 Index: 21707 _d = 54CB _h
Bit 30	xx.31: Reserved	
Bit 31	xx.32: Reserved	
Subcodes	Lenze setting	Info
C02868/1	0x00000000	List of modifications 01
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C02870

Parameter Name: C02870 PLI without motion: Optimisation factor		Data type: INTEGER_16 Index: 21705 _d = 54C9 _h
From version 12.00.00		
▶ Pole position identification without motion		
Display range (min. value unit max. value)		
0.00	%	300.00
Subcodes	Info	
C02870/1	PLI without motion: Optimisation factor	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02871

Parameter Name: C02871 PLI without motion: Running time		Data type: INTEGER_16 Index: 21704 _d = 54C8 _h
From version 12.00.00		
▶ Pole position identification without motion		
Display range (min. value unit max. value)		
0.00	ms	300.00
Subcodes	Info	
C02871/1	PLI without motion: Running time	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 100		

C02872

Parameter Name: C02872 PLI without motion: Adaptation of time duration		Data type: INTEGER_8 Index: 21703 _d = 54C7 _h
From version 12.00.00		
▶ Pole position identification without motion		
Setting range (min. value unit max. value)		
-10		10
Subcodes	Lenze setting	Info
C02872/1	0	PLI without motion: Adaptation of time duration
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02873

Parameter Name: C02873 PLI without motion: Ident. el. rotor displ. angle		Data type: INTEGER_16 Index: 21702 _d = 54C6 _h
From version 12.00.00		
▶ Pole position identification without motion		
Display range (min. value unit max. value)		
0	°	360
Subcodes		Info
C02873/1		PLI without motion: Ident. el. rotor displ. angle
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input type="checkbox"/> MOT Scaling factor: 1		

C02874

Parameter Name: C02874 PLI without motion		Data type: UNSIGNED_16 Index: 21701 _d = 54C5 _h
From version 12.00.00		
▶ Pole position identification without motion		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	for SLPSM with controller enable	
Bit 1	for SC PSM with mains on	
Bit 2	for SC PSM with controller enable	
Bit 3	for SC PSM once after fault reset	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C02874/1	0x0001	PLI without motion
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C02875

Parameter Name: C02875 PLI without motion: Adaptation of ident angle		Data type: INTEGER_8 Index: 21700 _d = 54C4 _h
From version 12.00.00		
▶ Pole position identification without motion		
Setting range (min. value unit max. value)		
-100	°	100
Subcodes	Lenze setting	Info
C02875/1	0 °	PLI without motion: Adaptation of ident angle
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT Scaling factor: 1		

C02879

Parameter Name: C02879 Slip calculation from equivalent circuit diagram		Data type: UNSIGNED_16 Index: 21696 _d = 54C0 _h
From version 12.00.00		
In order to achieve a better speed stability and torque accuracy, the slip calculation can be either derived from the motor nameplate data (e.g. rated motor speed) or the motor equivalent circuit diagram data (stator resistance, rotor resistance etc.).		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	SLVC	▶ Slip calculation for SLVC
Bit 1	SC ASM	▶ Slip calculation for SC
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C02879/1	0x0000	Slip calculation from equivalent circuit diagram
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> COM <input checked="" type="checkbox"/> MOT		

C02993

Parameter Name: C02993 FB xy position		Data type: UNSIGNED_32 Index: 21582 _d = 544E _h
This code is for device-internal use only and must not be written to by the user!		

C02994

Parameter Name: C02994 FB xy position	Data type: UNSIGNED_32 Index: 21581 _d = 544D _h
This code is for device-internal use only and must not be written to by the user!	

C02995

Parameter Name: C02995 FB display InputOutput	Data type: UNSIGNED_32 Index: 21580 _d = 544C _h
This code is for device-internal use only and must not be written to by the user!	

C02996

Parameter Name: C02996 FB display InputOutput2	Data type: UNSIGNED_32 Index: 21579 _d = 544B _h
This code is for device-internal use only and must not be written to by the user!	

C02998

Parameter Name: C02998 FB displayinputoutput3	Data type: UNSIGNED_32 Index: 21577 _d = 5449 _h
This code is for device-internal use only and must not be written to by the user!	

16.3 Selection list - analog signals

This selection list is relevant for the following configuration parameters:

Parameters	
C00410	L_SignalMonitor_a: Signal sources
C00620	System connection list: 16-bit
C00700	LA_NCtrl: Analog connection list
C00710	LA_TabPos: Analog connection list
C00760	LA_SwitchPos: Analog connection list

Selection list - analog signals	
0	Not connected
1000	LA_NCtrl: wDriveControlStatus
1001	LA_NCtrl: wFailNumber
1002	LA_NCtrl: nMotorCurrent_a
1003	LA_NCtrl: nMotorSpeedAct_a
1006	LA_NCtrl: nGPAnalogSwitchOut_a
1007	LA_NCtrl: nGPArithmetikOut_a
1008	LA_NCtrl: nGPMulDivOut_a
1009	LA_NCtrl: nGPSignalOut1_a
1010	LA_NCtrl: nGPSignalOut2_a
1011	LA_NCtrl: nGPSignalOut3_a
1012	LA_NCtrl: nGPSignalOut4_a
1013	LA_NCtrl: nMotorTorqueAct_a
1014	LA_NCtrl: nDCVoltage_a
1015	LA_NCtrl: nMotorVoltage_a
1016	LA_NCtrl: nMotorSpeedSet_a
1017	LA_NCtrl: wFailTypeDomain
1023	LA_NCtrl: wFreeOut1
1024	LA_NCtrl: wFreeOut2
1025	LA_NCtrl: wFreeOut3
1026	LA_NCtrl: wFreeOut4
1100	LA_TabPos: wDriveControlStatus
1101	LA_TabPos: wFailNoLow
1102	LA_TabPos: wFailNoHigh
1103	LA_TabPos: nMotorCurrent_a
1104	LA_TabPos: nMotorSpeedSet_a
1105	LA_TabPos: nMotorSpeedAct_a
1106	LA_TabPos: nMotorTorqueAct_a
1107	LA_TabPos: nDCVoltage_a
1108	LA_TabPos: nMotorVoltage_a
1109	LA_TabPos: wMckState1
1110	LA_TabPos: wMckState2
1111	LA_TabPos: wMckActOperationMode
1112	LA_TabPos: wActProfileNo
1113	LA_TabPos: wActPosMode
1114	LA_TabPos: nGPAnalogSwitchOut_a
1115	LA_TabPos: nGPArithmetikOut_a
1116	LA_TabPos: nGPMulDivOut_a
1117	LA_TabPos: nGPSignalOut1_a
1118	LA_TabPos: nGPSignalOut2_a

Selection list - analog signals	
1119	LA_TabPos: nGPSignalOut3_a
1120	LA_TabPos: nGPSignalOut4_a
1121	LA_TabPos: wGPCounter1Out
1122	LA_TabPos: wFreeOut1
1123	LA_TabPos: wFreeOut2
1124	LA_TabPos: wFreeOut3
1125	LA_TabPos: wFreeOut4
1126	LA_TabPos: nPosCtrlOutLimit_a
1127	LA_TabPos: nPosCtrlPAadapt_a
1128	LA_TabPos: wPosOutUnitsLW
1129	LA_TabPos: wPosOutUnitsHW
1200	LA_SwitchPos: wDriveControlStatus
1201	LA_SwitchPos: wFailNoLow
1202	LA_SwitchPos: wFailNoHigh
1203	LA_SwitchPos: nMotorCurrent_a
1204	LA_SwitchPos: nMotorSpeedSet_a
1205	LA_SwitchPos: nMotorSpeedAct_a
1206	LA_SwitchPos: nMotorTorqueAct_a
1207	LA_SwitchPos: nDCVoltage_a
1208	LA_SwitchPos: nMotorVoltage_a
1209	LA_SwitchPos: nGPAnalogSwitchOut_a
1210	LA_SwitchPos: nGPArithmetikOut_a
1211	LA_SwitchPos: nGPMulDivOut_a
1212	LA_SwitchPos: nGPSignalOut1_a
1213	LA_SwitchPos: nGPSignalOut2_a
1214	LA_SwitchPos: nGPSignalOut3_a
1215	LA_SwitchPos: nGPSignalOut4_a
1221	LA_SwitchPos: wFreeOut1
1222	LA_SwitchPos: wFreeOut2
1223	LA_SwitchPos: wFreeOut3
1224	LA_SwitchPos: wFreeOut4
16000	LS_AnalogInput: nIn1_a
16002	LP_CanIn1: wCtrl
16003	LP_CanIn1: wIn2
16004	LP_CanIn1: wIn3
16005	LP_CanIn1: wIn4
16006	LP_CanIn2: wIn1
16007	LP_CanIn2: wIn2
16008	LP_CanIn2: wIn3
16009	LP_CanIn2: wIn4
16010	LP_CanIn3: wIn1
16011	LP_CanIn3: wIn2
16012	LP_CanIn3: wIn3
16013	LP_CanIn3: wIn4
16014	LS_DigitalInput: wCountIn1_LW
16015	LS_DigitalInput: wCountIn1_HW
16016	LS_DigitalInput: nFreqIn12_a
16017	LS_DigitalInput: nFreqIn12_v
16018	LS_DigitalInput: wCountIn5_LW
16019	LS_DigitalInput: wCountIn5_HW

Selection list - analog signals	
16020	LS_DigitalInput: nFreqIn56_a
16021	LS_DigitalInput: nFreqIn56_v
16100	LS_DataAccess: wOut1
16101	LS_DataAccess: wOut2
16102	LS_DataAccess: wOut3
16103	LS_DataAccess: wOut4
16104	LP_Mciln:wCtrl
16105	LP_Mciln: wln2
16106	LP_Mciln: wln3
16107	LP_Mciln: wln4
16108	LP_Mciln: wln5
16109	LP_Mciln: wln6
16110	LP_Mciln: wln7
16111	LP_Mciln: wln8
16112	LP_Mciln: wln9
16113	LP_Mciln: wln10
16114	LP_Mciln: wln11
16115	LP_Mciln: wln12
16116	LP_Mciln: wln13
16117	LP_Mciln: wln14
16118	LP_Mciln: wln15
16119	LP_Mciln: wln16
16120	LS_Keypad: nTorqueMotLim_a
16121	LS_Keypad: nTorqueGenLim_a
16122	LS_Keypad: nMainSetValue_a
16123	LS_CANManagement: wNodeID
16125	LS_IRInterface: wIRcWord
16126	LS_IRInterface: wIRCtrl1
16127	LS_IRInterface: wIRCtrl2
16130	LS_ParReadWrite_1: wOutHWord
16131	LS_ParReadWrite_1: wOutLWord
16132	LS_ParReadWrite_2: wOutHWord
16133	LS_ParReadWrite_2: wOutLWord
16134	LS_ParReadWrite_3: wOutHWord
16135	LS_ParReadWrite_3: wOutLWord
16136	LS_ParReadWrite_4: wOutHWord
16137	LS_ParReadWrite_4: wOutLWord
16138	LS_ParReadWrite_5: wOutHWord
16139	LS_ParReadWrite_5: wOutLWord
16140	LS_ParReadWrite_6: wOutHWord
16141	LS_ParReadWrite_6: wOutLWord
16200	LS_SMInterface: wState
16201	LS_SMInterface: wOState
16202	LS_SMInterface: wControl
16203	LS_SMInterface: wModuleID
16300	LS_MultiEncoder: nActSpeed_v
16301	LS_MultiEncoder: nActSpeed_a
16302	LS_MultiEncoder: wHighWord
16303	LS_MultiEncoder: wLowWord
16350	LS_RetainData: wOut1
16351	LS_RetainData: wOut2
16352	LS_RetainData: wOut3

Selection list - analog signals	
16353	LS_RetainData: wOut4
16360	LP_CanIn4: wln1
16361	LP_CanIn4: wln2
16362	LP_CanIn4: wln3
16363	LP_CanIn4: wln4
20000	LS_ParFix: nPos100_a
20001	LS_ParFix: nNeg100_a
20002	LS_ParFix: nPos199_99_a
20003	LS_ParFix: nNeg199_99_a
20004	LS_ParFix: w65535
20005	LS_ParFix: wDriveCtrl
20010	LS_ParFree_a: nC472_1_a
20011	LS_ParFree_a: nC472_2_a
20012	LS_ParFree_a: nC472_3_a
20013	LS_ParFree_a: nC472_4_a
20014	LS_ParFree_a: nC472_5_a
20015	LS_ParFree_a: nC472_6_a
20016	LS_ParFree_a: nC472_7_a
20017	LS_ParFree_a: nC472_8_a
20018	LS_ParFree_v: nC473_1_v
20019	LS_ParFree_v: nC473_2_v
20020	LS_ParFree_v: nC473_3_v
20021	LS_ParFree_v: nC473_4_v
20022	LS_ParFree_v: nC473_5_v
20023	LS_ParFree_v: nC473_6_v
20024	LS_ParFree_v: nC473_7_v
20025	LS_ParFree_v: nC473_8_v
20026	LS_ParFree: wC471_1
20027	LS_ParFree: wC471_2
20028	LS_ParFree: wC471_3
20029	LS_ParFree: wC471_4
20030	LS_ParFree: wC471_5
20031	LS_ParFree: wC471_6
20032	LS_ParFree: wC471_7
20033	LS_ParFree: wC471_8
20034	LS_ParFree: wC471_9
20035	LS_ParFree: wC471_10
20036	LS_ParFree: wC471_11
20037	LS_ParFree: wC471_12
20038	LS_ParFree: wC471_13
20039	LS_ParFree: wC471_14
20040	LS_ParFree: wC471_15
20041	LS_ParFree: wC471_16
20042	LS_ParFree: wC471_17
20043	LS_ParFree: wC471_18
20044	LS_ParFree: wC471_19
20045	LS_ParFree: wC471_20
20046	LS_ParFree: wC471_21
20047	LS_ParFree: wC471_22
20048	LS_ParFree: wC471_23
20049	LS_ParFree: wC471_24
20050	LS_ParFree: wC471_25

Selection list - analog signals	
20051	LS_ParFree: wC471_26
20052	LS_ParFree: wC471_27
20053	LS_ParFree: wC471_28
20054	LS_ParFree: wC471_29
20055	LS_ParFree: wC471_30
20056	LS_ParFree: wC471_31
20057	LS_ParFree: wC471_32
20058	LS_ParFree_a: nC472_9_a
20059	LS_ParFree_a: nC472_10_a
20060	LS_ParFree_a: nC472_11_a
20061	LS_ParFree_a: nC472_12_a
20062	LS_ParFree_a: nC472_13_a
20063	LS_ParFree_a: nC472_14_a
20064	LS_ParFree_a: nC472_15_a
20065	LS_ParFree_a: nC472_16_a
20066	LS_ParFree_a_2: nC476_1_a
20067	LS_ParFree_a_2: nC476_2_a
20068	LS_ParFree_a_2: nC476_3_a
20069	LS_ParFree_a_2: nC476_4_a
20070	LS_ParFree_a_2: nC476_5_a
20071	LS_ParFree_a_2: nC476_6_a
20072	LS_ParFree_a_2: nC476_7_a
20073	LS_ParFree_a_2: nC476_8_a
20074	LS_ParFree_a_2: nC476_9_a
20075	LS_ParFree_a_2: nC476_10_a
20076	LS_ParFree_a_2: nC476_11_a
20077	LS_ParFree_a_2: nC476_12_a
20078	LS_ParFree_a_2: nC476_13_a
20079	LS_ParFree_a_2: nC476_14_a
20080	LS_ParFree_a_2: nC476_15_a
20081	LS_ParFree_a_2: nC476_16_a
20082	LS_ParFix_2: nPos100_a
20083	LS_ParFix_2: nNeg100_a
20084	LS_ParFix_2: nPos199_99_a
20085	LS_ParFix_2: nNeg199_99_a
20086	LS_ParFix_2: 65535
20087	LS_ParFix_2: wDriveCtrl
20088	LS_ParFree_2: wC477_1
20089	LS_ParFree_2: wC477_2
20090	LS_ParFree_2: wC477_3
20091	LS_ParFree_2: wC477_4
20092	LS_ParFree_2: wC477_5
20093	LS_ParFree_2: wC477_6
20094	LS_ParFree_2: wC477_7
20095	LS_ParFree_2: wC477_8
20096	LS_ParFree_2: wC477_9
20097	LS_ParFree_2: wC477_10
20098	LS_ParFree_2: wC477_11
20099	LS_ParFree_2: wC477_12
20100	LS_ParFree_2: wC477_13
20101	LS_ParFree_2: wC477_14
20102	LS_ParFree_2: wC477_15

Selection list - analog signals	
20103	LS_ParFree_2: wC477_16
20104	LS_ParFree_2: wC477_17
20105	LS_ParFree_2: wC477_18
20106	LS_ParFree_2: wC477_19
20107	LS_ParFree_2: wC477_20
20108	LS_ParFree_2: wC477_21
20109	LS_ParFree_2: wC477_22
20110	LS_ParFree_2: wC477_23
20111	LS_ParFree_2: wC477_24
20112	LS_ParFree_2: wC477_25
20113	LS_ParFree_2: wC477_26
20114	LS_ParFree_2: wC477_27
20115	LS_ParFree_2: wC477_28
20116	LS_ParFree_2: wC477_29
20117	LS_ParFree_2: wC477_30
20118	LS_ParFree_2: wC477_31
20119	LS_ParFree_2: wC477_32
20120	LS_ParFree_v_2: nC478_1_v
20121	LS_ParFree_v_2: nC478_2_v
20122	LS_ParFree_v_2: nC478_3_v
20123	LS_ParFree_v_2: nC478_4_v
20124	LS_ParFree_v_2: nC478_5_v
20125	LS_ParFree_v_2: nC478_6_v
20126	LS_ParFree_v_2: nC478_7_v
20127	LS_ParFree_v_2: nC478_8_v
32000	LS_MotorInterface: nMotorSpeedAct_a
32001	LS_MotorInterface: nOutputSpeedCtrl_a
32002	LS_MotorInterface: nInputJerkCtrl_a
32003	LS_MotorInterface: nInputTorqueCtrl_a
32004	LS_MotorInterface: nMotorTorqueAct_a
32005	LS_MotorInterface: nActualFluxx_a
32006	LS_MotorInterface: nDCVoltage_a
32007	LS_MotorInterface: nStatorCurrentIS_a
32008	LS_MotorInterface: nEffCurrentIq_a
32009	LS_MotorInterface: nReaktCurrentId_a
32010	LS_MotorInterface: wMaxMotorSpeed
32011	LS_MotorInterface: wMaxMotorTorque
32012	LS_MotorInterface: nMotorVoltage_a
32013	LS_MotorInterface: nMotorFreqAct_a
32014	LS_MotorInterface: nEffSpeedSetValue_a
32015	LS_DeviceMonitor_MCTRL: nI1Rate_a
32016	LS_DeviceMonitor_MCTRL: nI2Rate_a
32017	LS_MotorInterface: nOutputPosCtrl_a
32018	LS_MotorInterface: nHlgSetValue_a
32019	LS_MotorInterface: nMotorSpeedAct_v
32020	LS_MotorInterface: nSpeedCtrlAct_a
32021	LS_MotorInterface: nVoltageAngleAct_a
32022	LS_DeviceMonitor_MCTRL: nActiveOuputPower_a
32023	LS_DeviceMonitor_MCTRL: nApparentOuputPower_a
32024	LS_DeviceMonitor_MCTRL: nMctrlCosinePhiAct_a
32100	LS_DriveInterface: wDeviceStateWord
32101	LS_DriveInterface: wDeviceAuxStateWord

Selection list - analog signals	
32102	LS_DriveInterface: wDetermFailNoLow
32103	LS_DriveInterface: wDetermFailNoHigh
32104	LS_DriveInterface: wDetermFailNoShort
32200	LS_MotionControlKernel: nSpeedSet_v
32201	LS_MotionControlKernel: nSpeedCtrl_a
32202	LS_MotionControlKernel: nSpeedSetValue_a
32203	LS_MotionControlKernel: nTorqueSetValue_a
32204	LS_MotionControlKernel: wActProfileNo
32205	LS_MotionControlKernel: wFollowProfileNo
32206	LS_MotionControlKernel: wMotionState1
32207	LS_MotionControlKernel: wMotionState2
32208	LS_MotionControlKernel: wAuxState
32209	LS_MotionControlKernel: nPWMAngleOffset
32210	LS_MotionControlKernel: nTorqueLimitAdapt_a
32211	Reserved: a32211
34900	MCTRL: OszCh1
34901	MCTRL: OszCh2
34902	MCTRL: OszCh3
34903	MCTRL: OszCh4
34904	MCTRL: Status1
34905	MCTRL: Status2
34906	MCTRL: Status3
34907	LS_DeviceMonitor: wUB_24V
36000	L_Absolut_1: nOut_a
36001	L_AddSub_1: nOut_a
36002	L_OffsetGain_1: nOut_a
36003	L_OffsetGain_2: nOut_a
36004	L_OffsetGainP_1: nOut_a
36005	L_OffsetGainP_2: nOut_a
36006	L_GainOffset_1: nOut_a
36007	L_GainOffset_2: nOut_a
36008	L_GainOffsetP_1: nOut_a
36009	L_GainOffsetP_2: nOut_a
36010	L_Negation_1: nOut_a
36011	L_Arithmetik_1: nOut_a
36012	L_Arithmetik_2: nOut_a
36013	L_AnalogSwitch_1: nOut_a
36014	L_AnalogSwitch_2: nOut_a
36015	L_AnalogSwitch_3: nOut_a
36016	L_Limit_1: nOut_a
36017	L_Limit_2: nOut_a
36018	L_NSet_1: nOut
36019	L_MPot_1: nOut_a
36020	L_PCTRL_1: nOut_a
36021	L_SignalMonitor_a: nOut1_a
36022	L_SignalMonitor_a: nOut2_a
36023	L_NLim_1: nOut_a
36024	L_Counter_1: wOut
36025	L_OffsetGainP_3: nOut_a
36026	L_GainOffsetP_3: nOut_a
36027	L_SignalMonitor_a: nOut3_a
36028	L_SignalMonitor_a: nOut4_a

Selection list - analog signals	
36029	L_MulDiv_1: nOut_a
36030	L_NLim_1: wState
36031	L_NSet_1: wState
36032	L_NSet_1: nSetValue
36033	L_PT1_1: nOut_a
36034	L_Absolut_2: nOut_a
36035	L_AnalogSwitch_4: nOut_a
36036	L_AnalogSwitch_5: nOut_a
36037	L_Arithmetik_3: nOut_a
36038	L_Arithmetik_4: nOut_a
36039	L_Arithmetik_5: nOut_a
36045	L_GainOffset_3: nOut_a
36053	L_MulDiv_2: nOut_a
36054	L_Negation_2: nOut_a
36055	L_NLim_2: nOut_a
36056	L_NLim_2: wState
36057	L_OffsetGain_3: nOut_a
36058	L_PT1_2: nOut_a
36059	L_PT1_3: nOut_a
36064	L_SampleHold_1: nOut_a
36065	L_SampleHold_2: nOut_a
36068	L_Counter_2: wOut
36069	L_Counter_3: wOut
36073	L_DT1_1: nOut_a
36074	L_ConvBitsToWorld_1: wOut
36075	L_ConvBitsToWorld_2: wOut
36076	L_ConvBitsToWorld_3: wOut
36077	L_ConvDIntToWords_1: wOutLWord
36078	L_ConvDIntToWords_1: wOutHWord
36079	L_ConvDIntToWords_2: wOutLWord
36080	L_ConvDIntToWords_2: wOutHWord
36081	L_ConvDIntToWords_3: wOutLWord
36082	L_ConvDIntToWords_3: wOutHWord
36083	L_MckCtrlInterface_1: wOutMckPosCtrl_1
36084	L_MckCtrlInterface_1: wOutMckPosCtrl_2
36085	L_MckCtrlInterface_1: wFailState
36086	L_MckStateInterface_1: wOperationMode
36087	L_MckStateInterface_1: wActProfileNo
36088	L_MckStateInterface_1: wActPosMode
36089	L_PosShaftCtrlInterface_1: wOutMckPosCtrl_1
36090	L_PosShaftCtrlInterface_1: wOutMckPosCtrl_2
36091	L_PCTRL_1: nPIDOut1_a
36092	L_PCTRL_1: nPIDOut2_a
36093	L_PCTRL_1: nInfluenceOut_a
36094	L_Curve_1: nOut_a
36095	L_Interpolator_1: nPhdOut_v
36096	L_Interpolator_1: nNOut_a
36097	L_ConvW_1: wOut
36098	L_ConvW_2: wOut
36099	L_ConvW_3: wOut
36100	L_ConvW_4: wOut
36101	L_SRFG_1: nOut_a

Selection list - analog signals	
36102	L_SRFG_2: nOut_a
36103	L_MckStaterInterface_1: wPosUnitsLW
36104	L_MckStaterInterface_1: wPosUnitsHW
36105	L_SignalSwitch_1: wOut
36106	L_SignalSwitch_2: wOut
36107	L_SignalSwitch_3: wOut
36108	L_SignalSwitch_4: wOut
36109	L_SRFG_1: nDeltaOut_a
36110	L_SRFG_2: nDeltaOut_a
36111	L_Odometer_1: wLastMeasure
36112	L_FixSet_a_1: nOut_a
36113	L_FixSet_a_1: wSelect
36114	L_FixSet_w_1: wOut
36115	L_FixSet_w_1: wSelect
36116	L_FixSet_w_2: wOut
36117	L_FixSet_w_2: wSelect
36120	L_CalcDiameter_1: nDiameter_a
36121	L_CalcDiameter_1: nReziprDiameter_a
36122	L_CalcDiameter_1: nNReel_v
36123	L_CalcDiameter_1: nDMin_a
36124	L_ProcessCtrl_1: nOut_a
36125	L_ProcessCtrl_1: nOutRed_a
36126	L_ProcessCtrl_1: nDeviation_a
36127	L_ProcessCtrl_1: nDComponent
36128	L_Philntegrator_1: nOut16
36129	L_Philntegrator_1: nSpeedGearAdd_v
36130	L_PosCtrlLin_1: nNOut_v
36131	L_PosCtrlLin_2: nNOut_v
36132	L_Philntegrator_1: nSpeedGear_v
36133	L_DFSET_1: nSetGain_v
36134	L_DFSET_1: nSetGearTrim_v
36135	L_DFSET_1: nSetGearTrim_a
36136	L_DFRFG_1: nOut_v
36137	L_ConvPA_1: nOut
36138	L_ConvPA_2: nOut
36139	L_ConvPA_3: nOut
36140	L_ConvX_1: nOut
36141	L_ConvX_2: nOut
36142	L_ConvX_3: nOut
36143	LS_MotionControlKernel: wGearNum
36144	LS_MotionControlKernel: wGearDenom
36145	L_DFSET_1: nSpeedSetOut_v
36146	L_Curve_2: nOut_a
36147	L_Curve_3: nOut_a
36148	L_Curve_3: nCurveValue_a
42000	LA_NCtrl_In: wCANDriveControl
42001	LA_NCtrl_In: nTorqueMotLim
42002	LA_NCtrl_In: nTorqueGenLim
42004	LA_NCtrl_In: nPIDVpAdapt_a
42005	LA_NCtrl_In: nPIDActValue_a
42006	LA_NCtrl_In: nMainSetValue

Selection list - analog signals	
42007	LA_NCtrl_In: nAuxSetValue
42008	LA_NCtrl_In: nGPAnalogSwitchIn1_a
42009	LA_NCtrl_In: nGPAnalogSwitchIn2_a
42010	LA_NCtrl_In: nGPArithmetikIn1_a
42011	LA_NCtrl_In: nGPArithmetikIn2_a
42012	LA_NCtrl_In: nGPMulDivIn_a
42013	LA_NCtrl_In: nGPCCompareIn1_a
42014	LA_NCtrl_In: nGPCCompareIn2_a
42015	LA_NCtrl_In: nVoltageAdd_a
42016	LA_NCtrl_In: nPIDInfluence_a
42017	LA_NCtrl_In: nPIDSetValue_a
42018	LA_NCtrl_In: nPWMAngleOffset
42019	LA_NCtrl_In: nBoost_a
42020	LA_NCtrl_In: wSMControl
42025	LA_NCtrl_In: wFreel1
42026	LA_NCtrl_In: wFreel2
42027	LA_NCtrl_In: wFreel3
42028	LA_NCtrl_In: wFreel4
42100	LA_TabPos_In: wCanDriveControl
42101	LA_TabPos_In: wMciDriveControl
42102	LA_TabPos_In: nTorqueMotLim_a
42103	LA_TabPos_In: nTorqueGenLim_a
42104	LA_TabPos_In: nMainSetValue_a
42105	LA_TabPos_In: nAuxSetValue_a
42106	LA_TabPos_In: wMckCtrl1
42107	LA_TabPos_In: wMckCtrl2
42108	LA_TabPos_In: wMckOperationMode
42109	LA_TabPos_In: wPosProfileMode
42110	LA_TabPos_In: wPosProfileNo
42111	LA_TabPos_In: nGPAnalogSwitchIn1_a
42112	LA_TabPos_In: nGPAnalogSwitchIn2_a
42113	LA_TabPos_In: nGPArithmetikIn1_a
42114	LA_TabPos_In: nGPArithmetikIn2_a
42115	LA_TabPos_In: nGPMulDivIn_a
42116	LA_TabPos_In: nGPCCompareIn1_a
42117	LA_TabPos_In: nGPCCompareIn2_a
42118	LA_TabPos_In: wGPCounter1LdVal
42119	LA_TabPos_In: wGPCounter1CmpVal
42120	LA_TabPos_In: nSpeedOverride_a
42121	LA_TabPos_In: nAccOverride_a
42122	LA_TabPos_In: wFreel1
42123	LA_TabPos_In: wFreel2
42124	LA_TabPos_In: wFreel3
42125	LA_TabPos_In: wFreel4
42126	LA_TabPos_In: wSMControl
42127	LA_TabPos_In: wPosProfileUnitsLW
42128	LA_TabPos_In: wPosProfileUnitsHW
42200	LA_SwitchPos_In: wCANDriveControl
42201	LA_SwitchPos_In: wMciDriveControl
42202	LA_SwitchPos_In: nVoltageAdd_a
42203	LA_SwitchPos_In: nBoost_a
42204	LA_SwitchPos_In: nPWMAngleOffset

Selection list - analog signals	
42205	LA_SwitchPos_In: nTorqueMotLim_a
42206	LA_SwitchPos_In: nTorqueGenLim_a
42207	LA_SwitchPos_In: nMainSetValue_a
42208	LA_SwitchPos_In: nAuxSetValue_a
42209	LA_SwitchPos_In: nGPAnalogSwitchIn1_a
42210	LA_SwitchPos_In: nGPAnalogSwitchIn2_a
42211	LA_SwitchPos_In: nGPArithmetikIn1_a
42212	LA_SwitchPos_In: nGPArithmetikIn2_a
42213	LA_SwitchPos_In: nGPMulDivIn_a
42214	LA_SwitchPos_In: nGPCompareIn1_a
42215	LA_SwitchPos_In: nGPCompareIn2_a
42216	LA_SwitchPos_In: wSMControl
42221	LA_SwitchPos_In: wFreeln1
42222	LA_SwitchPos_In: wFreeln2
42223	LA_SwitchPos_In: wFreeln3
42224	LA_SwitchPos_In: wFreeln4

16.4 Selection list - digital signals

This selection list is relevant for the following configuration parameters:

Parameters	
C00411	L_SignalMonitor_b: Signal sources
C00621	System connection list: Bool
C00701	LA_NCtrl: Digital connection list
C00711	LA_TabPos: Digital connection list
C00761	LA_SwitchPos: Digital connection list

Selection list - digital signals	
0	Not connected
1000	LA_NCtrl: bDriveReady
1001	LA_NCtrl: bDriveFail
1002	LA_NCtrl: bClnhActive
1003	LA_NCtrl: bQSPlsActive
1004	LA_NCtrl: bSpeedCcw
1005	LA_NCtrl: bSpeedActCompare
1008	LA_NCtrl: bGPDigitalDelayOut
1009	LA_NCtrl: bGLogicOut
1010	LA_NCtrl: bGPSignalOut1
1011	LA_NCtrl: bGPSignalOut2
1012	LA_NCtrl: bGPSignalOut3
1013	LA_NCtrl: bGPSignalOut4
1014	LA_NCtrl: bOverLoadActive
1015	LA_NCtrl: bBrakeReleaseOut
1016	LA_NCtrl: bBrakeReleased
1017	LA_NCtrl: bGPCCompareOut
1018	LA_NCtrl: bUnderLoadActive
1019	LA_NCtrl: blmaxActive
1020	LA_NCtrl: bSpeedSetReached
1021	LA_NCtrl: bSpeedActEqSet
1022	LA_NCtrl: bGPDFlipFlopOut
1023	LA_NCtrl: bGPDFlipFlopNegOut
1029	LA_NCtrl: bFreeOut1
1030	LA_NCtrl: bFreeOut2
1031	LA_NCtrl: bFreeOut3
1032	LA_NCtrl: bFreeOut4
1033	LA_NCtrl: bFreeOut5
1034	LA_NCtrl: bFreeOut6
1035	LA_NCtrl: bFreeOut7
1036	LA_NCtrl: bFreeOut8
1100	LA_TabPos: bDriveFail
1101	LA_TabPos: bDriveReady
1102	LA_TabPos: bClnhActive
1103	LA_TabPos: bQSPlsActive
1104	LA_TabPos: bSpeedCcw
1105	LA_TabPos: bSpeedActCompare
1106	LA_TabPos: blmaxActive
1107	LA_TabPos: bSpeedSetReached
1108	LA_TabPos: bBrakeReleaseOut

Selection list - digital signals	
1109	LA_TabPos: bBrakeReleased
1110	LA_TabPos: bHomeDone
1111	LA_TabPos: bHomePosAvailable
1112	LA_TabPos: bProfileDone
1113	LA_TabPos: bProfileBusy
1114	LA_TabPos: bAccelerating
1115	LA_TabPos: bConstantDuty
1116	LA_TabPos: bDecelerating
1117	LA_TabPos: bDwellTime
1118	LA_TabPos: blnTarget
1119	LA_TabPos: bGPDigitalDelayOut
1120	LA_TabPos: bGLogicOut
1121	LA_TabPos: bGPCCompareOut
1122	LA_TabPos: bGPSignalOut1
1123	LA_TabPos: bGPSignalOut2
1124	LA_TabPos: bGPSignalOut3
1125	LA_TabPos: bGPSignalOut4
1126	LA_TabPos: bGPDFlipFlop_Out
1127	LA_TabPos: bGPDFlipFlop_NegOut
1128	LA_TabPos: bGPCounter1Equal
1129	LA_TabPos: bFreeOut1
1130	LA_TabPos: bFreeOut2
1131	LA_TabPos: bFreeOut3
1132	LA_TabPos: bFreeOut4
1133	LA_TabPos: bFreeOut5
1134	LA_TabPos: bFreeOut6
1135	LA_TabPos: bFreeOut7
1136	LA_TabPos: bFreeOut8
1200	LA_SwitchPos: bDriveFail
1201	LA_SwitchPos: bWarningActive
1202	LA_SwitchPos: bSafeTorqueOff
1203	LA_SwitchPos: bDriveReady
1204	LA_SwitchPos: bClnhActive
1205	LA_SwitchPos: blmplsActive
1206	LA_SwitchPos: bQSPlsActive
1207	LA_SwitchPos: bSpeedCcw
1208	LA_SwitchPos: bSpeedActCompare
1209	LA_SwitchPos: blmaxActive
1210	LA_SwitchPos: bSpeedSetReached
1211	LA_SwitchPos: bSpeedActEqSet
1212	LA_SwitchPos: bBrakeReleaseOut
1213	LA_SwitchPos: bBrakeReleased
1214	LA_SwitchPos: bGPDigitalDelayOut
1215	LA_SwitchPos: bGLogicOut
1216	LA_SwitchPos: bGPCCompareOut
1217	LA_SwitchPos: bGPDFlipFlop_Out
1218	LA_SwitchPos: bGPDFlipFlop_NegOut
1219	LA_SwitchPos: bGPSignalOut1
1220	LA_SwitchPos: bGPSignalOut2
1221	LA_SwitchPos: bGPSignalOut3

Selection list - digital signals	
1222	LA_SwitchPos: bGPSignalOut4
1228	LA_SwitchPos: bFreeOut1
1229	LA_SwitchPos: bFreeOut2
1230	LA_SwitchPos: bFreeOut3
1231	LA_SwitchPos: bFreeOut4
1232	LA_SwitchPos: bFreeOut5
1233	LA_SwitchPos: bFreeOut6
1234	LA_SwitchPos: bFreeOut7
1235	LA_SwitchPos: bFreeOut8
16000	LS_DigitalInput: bln1
16001	LS_DigitalInput: bln2
16002	LS_DigitalInput: bln3
16003	LS_DigitalInput: bln4
16004	LS_DigitalInput: bln5
16005	LS_DigitalInput: bln6
16008	LS_DigitalInput: bCInh
16009	LS_DigitalInput: bCountIn1_Compare
16010	LS_DigitalInput: bCountIn5_Compare
16011	LS_AnalogInput: bCurrentErrorIn1
16012	LS_AnalogInput: bCurrentErrorIn2
16013	LP_CanIn1: bCtrl1_B0
16014	LP_CanIn1: bCtrl1_B1
16015	LP_CanIn1: bCtrl1_B2
16016	LP_CanIn1: bCtrl1_B3
16017	LP_CanIn1: bCtrl1_B4
16018	LP_CanIn1: bCtrl1_B5
16019	LP_CanIn1: bCtrl1_B6
16020	LP_CanIn1: bCtrl1_B7
16021	LP_CanIn1: bCtrl1_B8
16022	LP_CanIn1: bCtrl1_B9
16023	LP_CanIn1: bCtrl1_B10
16024	LP_CanIn1: bCtrl1_B11
16025	LP_CanIn1: bCtrl1_B12
16026	LP_CanIn1: bCtrl1_B13
16027	LP_CanIn1: bCtrl1_B14
16028	LP_CanIn1: bCtrl1_B15
16029	LP_CanIn2: bln1_B0
16030	LP_CanIn2: bln1_B1
16031	LP_CanIn2: bln1_B2
16032	LP_CanIn2: bln1_B3
16033	LP_CanIn2: bln1_B4
16034	LP_CanIn2: bln1_B5
16035	LP_CanIn2: bln1_B6
16036	LP_CanIn2: bln1_B7
16037	LP_CanIn2: bln1_B8
16038	LP_CanIn2: bln1_B9
16039	LP_CanIn2: bln1_B10
16040	LP_CanIn2: bln1_B11
16041	LP_CanIn2: bln1_B12
16042	LP_CanIn2: bln1_B13
16043	LP_CanIn2: bln1_B14
16044	LP_CanIn2: bln1_B15

Selection list - digital signals	
16045	LP_CanIn3: bln1_B0
16046	LP_CanIn3: bln1_B1
16047	LP_CanIn3: bln1_B2
16048	LP_CanIn3: bln1_B3
16049	LP_CanIn3: bln1_B4
16050	LP_CanIn3: bln1_B5
16051	LP_CanIn3: bln1_B6
16052	LP_CanIn3: bln1_B7
16053	LP_CanIn3: bln1_B8
16054	LP_CanIn3: bln1_B9
16055	LP_CanIn3: bln1_B10
16056	LP_CanIn3: bln1_B11
16057	LP_CanIn3: bln1_B12
16058	LP_CanIn3: bln1_B13
16059	LP_CanIn3: bln1_B14
16060	LP_CanIn3: bln1_B15
16061	LP_Mciln: bCtrl_B0
16062	LP_Mciln: bCtrl_B1
16063	LP_Mciln: bCtrl_B2
16064	LP_Mciln: bCtrl_B3
16065	LP_Mciln: bCtrl_B4
16066	LP_Mciln: bCtrl_B5
16067	LP_Mciln: bCtrl_B6
16068	LP_Mciln: bCtrl_B7
16069	LP_Mciln: bCtrl_B8
16070	LP_Mciln: bCtrl_B9
16071	LP_Mciln: bCtrl_B10
16072	LP_Mciln: bCtrl_B11
16073	LP_Mciln: bCtrl_B12
16074	LP_Mciln: bCtrl_B13
16075	LP_Mciln: bCtrl_B14
16076	LP_Mciln: bCtrl_B15
16077	LP_Mciln: bln2_B0
16078	LP_Mciln: bln2_B1
16079	LP_Mciln: bln2_B2
16080	LP_Mciln: bln2_B3
16081	LP_Mciln: bln2_B4
16082	LP_Mciln: bln2_B5
16083	LP_Mciln: bln2_B6
16084	LP_Mciln: bln2_B7
16085	LP_Mciln: bln2_B8
16086	LP_Mciln: bln2_B9
16087	LP_Mciln: bln2_B10
16088	LP_Mciln: bln2_B11
16089	LP_Mciln: bln2_B12
16090	LP_Mciln: bln2_B13
16091	LP_Mciln: bln2_B14
16092	LP_Mciln: bln2_B15
16093	LS_Keypad: bSetQuickstop
16094	LS_Keypad: bSetDCBrake
16095	LS_Keypad: bSetSpeedCcw
16096	LS_Keypad: bJogSpeed1

Selection list - digital signals	
16097	LS_Keypad: bJogSpeed2
16098	LS_Keypad: bMPotEnable
16099	LS_Keypad: bMPotUp
16100	LS_Keypad: bMPotDown
16101	LS_DigitalInput: bPosIn12_State
16110	LS_ParReadWrite_1: bDone
16111	LS_ParReadWrite_1: bFail
16112	LS_ParReadWrite_2: bDone
16113	LS_ParReadWrite_2: bFail
16114	LS_ParReadWrite_3: bDone
16115	LS_ParReadWrite_3: bFail
16116	LS_ParReadWrite_4: bDone
16117	LS_ParReadWrite_4: bFail
16118	LS_ParReadWrite_5: bDone
16119	LS_ParReadWrite_5: bFail
16120	LS_ParReadWrite_6: bDone
16121	LS_ParReadWrite_6: bFail
16122	LS_WriteParamList: bDone
16123	LS_WriteParamList: bFail
16124	LS_SMInterface: bPowerStageEnable
16125	L_SMStateDecoder_1: bSafeTorqueOff
16126	L_SMStateDecoder_1: bErrorClassSTO
16127	L_SMStateDecoder_1: bErrorClassSS1
16128	L_SMStateDecoder_1: bError
16129	L_SMStateDecoderIO_1: bSafeDigIn1
16130	L_SMStateDecoderIO_1: bSafeDigIn2
16131	L_SMStateDecoderIO_1: bACKInputStop
16132	L_SMStateDecoderIO_1: bACKInputError
16133	L_SMStateDecoderIO_1: bPROFISafeAIS
16134	L_SMStateDecoderIO_1: bPROFISafeAIE
16135	L_SMControlDecoder_1: bSafeStop1
16136	L_SMControlDecoder_1: bEnableSwitch
16137	L_SMControlDecoder_1: bOperationModeSelector
16138	L_SMControlDecoder_1: bSafeStopEmergency
16139	L_SMControlDecoder_1: bSpecialOperationActive
16140	LS_IRInterface: bIRSignal_F1
16141	LS_IRInterface: bIRSignal_F2
16142	LS_IRInterface: bIRSignal_F3
16144	LS_IRInterface: bIRSignal_Down
16145	LS_IRInterface: bIRSignal_Up
16148	LS_IRInterface: bIRSignal_0
16149	LS_IRInterface: bIRSignal_1
16150	LS_IRInterface: bIRSignal_2
16151	LS_IRInterface: bIRSignal_3
16152	LS_IRInterface: bIRSignal_4
16153	LS_IRInterface: bIRSignal_5
16154	LS_IRInterface: bIRSignal_6
16155	LS_IRInterface: bIRSignal_7
16156	LS_IRInterface: bIRSignal_8
16157	LS_IRInterface: bIRSignal_9
16158	LS_ServiceSwitch: bSwitch_left
16159	LS_ServiceSwitch: bSwitch_right

Selection list - digital signals	
16160	LS_ServiceSwitch: bSwitch_middle
16161	LS_CANManagement: bFail
16162	LS_CANManagement: bOperational
16163	LS_IRInterface: bRcActive
16164	LS_IRInterface: bLoginActive
16165	LS_MultiEncoder: bFail
16167	LS_ServiceSwitch: bSwitch_Manual
16168	LS_ServiceSwitch: bSwitch_MainOff
16200	LS_SyncManagement: bSyncSignalOK
16201	LS_SyncManagement: bSyncPhaseOK
16202	LS_MultiEncoder: bState
16205	LS_MultiEncoder: bState2
16206	LS_MultiEncoder: bState3
16303	LS_TouchProbe: bTPDigIn3Received
16304	LS_TouchProbe: bTPDigIn4Received
16305	LS_TouchProbe: bTPDigIn5Received
16306	LS_TouchProbe: bTPDigIn6Received
16310	LS_RetainData: bOut1
16311	LS_RetainData: bOut2
16312	LS_RetainData: bOut3
16313	LS_RetainData: bOut4
16400	LP_CanIn4: bIn1_B0
16401	LP_CanIn4: bIn1_B1
16402	LP_CanIn4: bIn1_B2
16403	LP_CanIn4: bIn1_B3
16404	LP_CanIn4: bIn1_B4
16405	LP_CanIn4: bIn1_B5
16406	LP_CanIn4: bIn1_B6
16407	LP_CanIn4: bIn1_B7
16408	LP_CanIn4: bIn1_B8
16409	LP_CanIn4: bIn1_B9
16410	LP_CanIn4: bIn1_B10
16411	LP_CanIn4: bIn1_B11
16412	LP_CanIn4: bIn1_B12
16413	LP_CanIn4: bIn1_B13
16414	LP_CanIn4: bIn1_B14
16415	LP_CanIn4: bIn1_B15
20000	LS_ParFix: bTrue
20001	LS_ParFree_b: bC470_1
20002	LS_ParFree_b: bC470_2
20003	LS_ParFree_b: bC470_3
20004	LS_ParFree_b: bC470_4
20005	LS_ParFree_b: bC470_5
20006	LS_ParFree_b: bC470_6
20007	LS_ParFree_b: bC470_7
20008	LS_ParFree_b: bC470_8
20009	LS_ParFree_b: bC470_9
20010	LS_ParFree_b: bC470_10
20011	LS_ParFree_b: bC470_11
20012	LS_ParFree_b: bC470_12
20013	LS_ParFree_b: bC470_13
20014	LS_ParFree_b: bC470_14

Selection list - digital signals	
20015	LS_ParFree_b: bC470_15
20016	LS_ParFree_b: bC470_16
20017	LS_ParFree_b: bC470_17
20018	LS_ParFree_b: bC470_18
20019	LS_ParFree_b: bC470_19
20020	LS_ParFree_b: bC470_20
20021	LS_ParFree_b: bC470_21
20022	LS_ParFree_b: bC470_22
20023	LS_ParFree_b: bC470_23
20024	LS_ParFree_b: bC470_24
20025	LS_ParFree_b: bC470_25
20026	LS_ParFree_b: bC470_26
20027	LS_ParFree_b: bC470_27
20028	LS_ParFree_b: bC470_28
20029	LS_ParFree_b: bC470_29
20030	LS_ParFree_b: bC470_30
20031	LS_ParFree_b: bC470_31
20032	LS_ParFree_b: bC470_32
20033	LS_PulseGenerator: b100Hz
20034	LS_PulseGenerator: b10Hz
20035	LS_PulseGenerator: b2Hz
20036	LS_PulseGenerator: b1Hz
20037	LS_PulseGenerator: b1HzFlash
20038	LS_PulseGenerator: b2HzFlash
20039	LS_PulseGenerator: bSingleFlash1
20040	LS_PulseGenerator: bSingleFlash2
20041	LS_PulseGenerator: bDoubleFlash
20042	LS_PulseGenerator: bSquareWave
20043	LS_PulseGenerator: bFirstCycle
20044	LS_ParFix_2: bTrue
20045	LS_ParFreeUnit_1: bDataValid
20046	LS_ParFreeUnit_2: bDataValid
32000	LS_DeviceMonitor_MCTRL: bFanFault
32001	LS_DeviceMonitor_MCTRL: bHeatSinkTemp
32002	LS_MotorInterface: bLimPosCtrlOut
32003	LS_MotorInterface: bLimSpeedCtrlOut
32004	LS_MotorInterface: bLimSpeedSetVal
32005	LS_MotorInterface: bLimTorqueSetVal
32006	LS_MotorInterface: bLimCurrentSetVal
32007	LS_DeviceMonitor_MCTRL: bUVDetected
32008	LS_DeviceMonitor_MCTRL: bOVDetected
32009	LS_DeviceMonitor_MCTRL: bMotorPhaseFault
32010	LS_DeviceMonitor_MCTRL: bEncoderComFault
32011	LS_DeviceMonitor_MCTRL: bIxtOverload
32012	LS_DeviceMonitor_MCTRL: bI2xtOverload
32013	LS_MotorInterface: bIdentificationActive
32014	LS_MotorInterface: bFlyingSyncActive
32015	LS_DeviceMonitor_MCTRL: bTorqueMax
32016	LS_DeviceMonitor_MCTRL: bNMax
32017	LS_DeviceMonitor_MCTRL: bFChopReduced
32018	LS_DeviceMonitor_MCTRL: bMotorPTC
32019	LS_DeviceMonitor_MCTRL: bMotorTemp

Selection list - digital signals	
32020	LS_MotorInterface: bDcbActive
32021	LS_DeviceMonitor_MCTRL: bBrakeChopperFault
32022	LS_MotorInterface: bQspIsActive
32023	LS_MotorInterface: bHlgLoad
32024	LS_MotorInterface: bHlgStop
32025	LS_DeviceMonitor_MCTRL: bImpActive
32026	LS_DeviceMonitor_MCTRL: bClampActive
32027	LS_DeviceMonitor_MCTRL: bMainsFault
32028	LS_DeviceMonitor_MCTRL: bNmaxForFChop
32029	LS_DeviceMonitor_MCTRL: bShortCircuit
32030	LS_DeviceMonitor_MCTRL: bEarthFault
32031	LS_DeviceMonitor_MCTRL: bWirebreakUflinearActive
32032	LS_DeviceMonitor_MCTRL: bCurrentMonitoringOverload
32100	LS_DriveInterface: bInIt
32101	LS_DriveInterface: bReady
32102	LS_DriveInterface: bReadyToSwitchOn
32103	LS_DriveInterface: bOperationEnable
32104	LS_DriveInterface: bWarning
32105	LS_DriveInterface: bTrouble
32106	LS_DriveInterface: bFail
32107	LS_DriveInterface: bCollectedFail
32108	LS_DriveInterface: bSafeTorqueOff
32109	LS_DriveInterface: bIMPIsActive
32110	LS_DriveInterface: bCINHIsActive
32111	LS_DriveInterface: bSafetyIsActive
32112	LS_DriveInterface: bCwCcw
32113	LS_DriveInterface: bNactCompare
32200	LS_MotionControlKernel: bPosCtrlOn
32201	LS_MotionControlKernel: bSpeedCtrlOn
32202	LS_MotionControlKernel: bTorquemodeOn
32203	LS_MotionControlKernel: bDcBrakeOn
32204	LS_MotionControlKernel: bBrkReleaseOut
32205	LS_MotionControlKernel: bBrkReleased
32206	LS_MotionControlKernel: bDeltaPosOn
32207	LS_MotionControlKernel: bPosDerivativeOn
32208	LS_MotionControlKernel: bMotorRefOffsetOn
32209	LS_MotionControlKernel: bQspOn
32210	LS_MotionControlKernel: bPosBusy
32211	LS_MotionControlKernel: bPosDone
32212	LS_MotionControlKernel: bHomDone
32213	LS_MotionControlKernel: bHomAvailable
32214	LS_MotionControlKernel: bTorqueLimitAdaptOn
32215	Reserved: b32215
32216	Reserved: b32216
32217	Reserved: b32217
32218	Reserved: b32218
32219	LS_MotionControlKernel: bFollowErrLim1
32220	LS_MotionControlKernel: bFollowErrLim2
32221	LS_MotionControlKernel: bReadyToOperate
36000	L_And_1: bOut

Selection list - digital signals	
36001	L_And_2: bOut
36002	L_And_3: bOut
36003	L_Or_1: bOut
36004	L_Or_2: bOut
36005	L_Or_3: bOut
36006	L_Not_1: bOut
36007	L_Not_2: bOut
36008	L_Not_3: bOut
36009	L_DFlipFlop_1: bOut
36010	L_RLQ_1: bQsp
36011	L_RLQ_1: CwCcw
36012	L_DigitalDelay_1: bOut
36013	L_Compare_1: bOut
36014	L_Compare_2: bOut
36015	L_Compare_3: bOut
36016	L_NSet_1: bRfgEq0
36017	L_DigitalLogic_1: bOut
36018	L_Counter_1: bEqual
36019	L_SignalMonitor_b: bOut1
36020	L_SignalMonitor_b: bOut2
36021	L_SignalMonitor_b: bOut3
36022	L_SignalMonitor_b: bOut4
36023	L_PCTRL_1: bActEqSet
36024	L_NLim_1: bLimitActive
36025	L_DFlipFlop_1: bNegOut
36026	L_And5_1: bOut
36027	L_And5_2: bOut
36028	L_Compare_4: bOut
36029	L_Compare_5: bOut
36030	L_ComparePhi_1: bOut
36031	L_ComparePhi_2: bOut
36032	L_ComparePhi_3: bOut
36033	L_ComparePhi_4: bOut
36034	L_ComparePhi_5: bOut
36035	L_DFlipFlop_2: bOut
36036	L_DFlipFlop_2: bNegOut
36037	L_DigitalDelay_2: bOut
36038	L_DigitalDelay_3: bOut
36039	L_Or_4: bOut
36040	L_DigitalLogic_3: bOut
36041	L_DigitalLogic_2: bOut
36042	L_DigitalLogic5_1: bOut
36043	L_DigitalLogic5_2: bOut
36044	L_NLim_2: bLimitActive
36045	L_Or5_1: bOut
36046	L_Or5_2: bOut
36047	L_Not_4: bOut
36048	L_Not_5: bOut
36049	L_Not_6: bOut
36050	L_Not_7: bOut
36055	L_PhaseIntK_1: bState
36056	L_PhaseIntK_2: bState

Selection list - digital signals	
36057	L_Counter_2: bEqual
36058	L_Counter_3: bEqual
36059	L_RSFlipFlop_1: bOut
36060	L_RSFlipFlop_1: bNegOut
36061	L_RSFlipFlop_2: bOut
36062	L_RSFlipFlop_2: bNegOut
36063	L_Transient_5: bOut
36064	L_Transient_6: bOut
36065	L_Transient_7: bOut
36066	L_Transient_8: bOut
36067	L_ConvWordToBits_1: bBit0
36068	L_ConvWordToBits_1: bBit1
36069	L_ConvWordToBits_1: bBit2
36070	L_ConvWordToBits_1: bBit3
36071	L_ConvWordToBits_1: bBit4
36072	L_ConvWordToBits_1: bBit5
36073	L_ConvWordToBits_1: bBit6
36074	L_ConvWordToBits_1: bBit7
36075	L_ConvWordToBits_1: bBit8
36076	L_ConvWordToBits_1: bBit9
36077	L_ConvWordToBits_1: bBit10
36078	L_ConvWordToBits_1: bBit11
36079	L_ConvWordToBits_1: bBit12
36080	L_ConvWordToBits_1: bBit13
36081	L_ConvWordToBits_1: bBit14
36082	L_ConvWordToBits_1: bBit15
36083	L_ConvWordToBits_2: bBit0
36084	L_ConvWordToBits_2: bBit1
36085	L_ConvWordToBits_2: bBit2
36086	L_ConvWordToBits_2: bBit3
36087	L_ConvWordToBits_2: bBit4
36088	L_ConvWordToBits_2: bBit5
36089	L_ConvWordToBits_2: bBit6
36090	L_ConvWordToBits_2: bBit7
36091	L_ConvWordToBits_2: bBit8
36092	L_ConvWordToBits_2: bBit9
36093	L_ConvWordToBits_2: bBit10
36094	L_ConvWordToBits_2: bBit11
36095	L_ConvWordToBits_2: bBit12
36096	L_ConvWordToBits_2: bBit13
36097	L_ConvWordToBits_2: bBit14
36098	L_ConvWordToBits_2: bBit15
36099	L_ConvWordToBits_3: bBit0
36100	L_ConvWordToBits_3: bBit1
36101	L_ConvWordToBits_3: bBit2
36102	L_ConvWordToBits_3: bBit3
36103	L_ConvWordToBits_3: bBit4
36104	L_ConvWordToBits_3: bBit5
36105	L_ConvWordToBits_3: bBit6
36106	L_ConvWordToBits_3: bBit7
36107	L_ConvWordToBits_3: bBit8
36108	L_ConvWordToBits_3: bBit9

Selection list - digital signals	
36109	L_ConvWordToBits_3: bBit10
36110	L_ConvWordToBits_3: bBit11
36111	L_ConvWordToBits_3: bBit12
36112	L_ConvWordToBits_3: bBit13
36113	L_ConvWordToBits_3: bBit14
36114	L_ConvWordToBits_3: bBit15
36115	L_MckCtrlInterface_1: bFail
36116	L_MckStateInterface_1: bAccelerating
36117	L_MckStateInterface_1: bDecelerating
36118	L_MckStateInterface_1: bConstantSpeedDuty
36119	L_MckStateInterface_1: bSShaping
36120	L_MckStateInterface_1: bBusy
36121	L_MckStateInterface_1: bDone
36122	L_MckStateInterface_1: bHomingPosAvailable
36123	L_MckStateInterface_1: bHomingDone
36124	L_MckStateInterface_1: bDwellTime
36125	L_MckStateInterface_1: bInTarget
36126	L_MckStateInterface_1: bPosDone
36127	L_PosShaftCtrlInterface_1: bQsp
36128	L_PosShaftCtrlInterface_1: bRsp
36129	L_PosShaftCtrlInterface_1: bTripSet
36130	L_PosShaftCtrlInterface_1: bTripReset
36131	L_JogCtrlExtension_1: bRfgOut
36132	L_JogCtrlExtension_1: bJog1Out
36133	L_JogCtrlExtension_1: bJog2Out
36134	L_Curve_1: bLimit
36135	L_Interpolator_1: bIPulse
36136	L_Interpolator_1: bSignalError
36137	L_MckCtrlInterface_1: bPosSetDataValid
36138	L_Transient_1: bOut
36139	L_Transient_2: bOut
36140	L_Transient_3: bOut
36141	L_Transient_4: bOut
36142	L_CalcDiameter_1: bDMaxLimit
36143	L_CalcDiameter_1: bDMinLimit
36144	L_CalcDiameter_1: bWebBreak
36145	L_PhilIntegrator_1: bOvfl32
36146	L_PhilIntegrator_1: bOvfl16
36147	L_PhilIntegrator_1: bInitDone
36148	L_PosCtrlLin_1: bInTarget
36149	L_PosCtrlLin_2: bInTarget
36150	L_SwitchPoint_1: bOut1
36151	L_SwitchPoint_1: bOut2
36152	L_SwitchPoint_1: bOut3
36153	L_SwitchPoint_1: bOut4
36154	L_DFSET_1: bAck
36155	L_DFSET_1: bFollowingErr
36156	L_DFSET_1: bPosOverflow
36157	L_DFRFG_1: bSync
36158	L_DFRFG_1: bFail
36159	L_Curve_2: bLimit
36160	L_Curve_3: bLimit

Selection list - digital signals	
36171	L_ConvUnitsToIncr_1: bDataValid
36172	L_ConvUnitsToIncr_2: bDataValid
36173	L_ConvUnitsToIncr_3: bDataValid
36179	L_Curve_3: bLimit
36284	L_MckStateInterface_1: bReadyToOperate
36293	L_DigitalLogic_1: bOut2
36294	L_DigitalLogic_1: bOut3
36295	L_DigitalLogic_2: bOut2
36296	L_DigitalLogic_2: bOut3
36297	L_DigitalLogic_3: bOut2
36298	L_DigitalLogic_3: bOut3
42000	LA_NCtrl_In: bClnh
42001	LA_NCtrl_In: bFailReset
42002	LA_NCtrl_In: bSetQuickstop
42003	LA_NCtrl_In: bSetDCBrake
42004	LA_NCtrl_In: bRFG_Stop
42005	LA_NCtrl_In: bRFG_0
42007	LA_NCtrl_In: bSetSpeedCcw
42008	LA_NCtrl_In: bJogSpeed1
42009	LA_NCtrl_In: bJogSpeed2
42010	LA_NCtrl_In: bJogSpeed4
42011	LA_NCtrl_In: bJogSpeed8
42012	LA_NCtrl_In: bJogRamp1
42013	LA_NCtrl_In: bJogRamp2
42014	LA_NCtrl_In: bJogRamp4
42015	LA_NCtrl_In: bJogRamp8
42017	LA_NCtrl_In: bMPOTInAct
42018	LA_NCtrl_In: bMPOTUp
42019	LA_NCtrl_In: bMPOTDown
42020	LA_NCtrl_In: bMBRKRelease
42021	LA_NCtrl_In: bGPFree1
42022	LA_NCtrl_In: bGPFree2
42023	LA_NCtrl_In: bGPAnalogSwitchSet
42024	LA_NCtrl_In: bGPDigitalDelayIn
42025	LA_NCtrl_In: bGPLogicIn1
42026	LA_NCtrl_In: bGPLogicIn2
42027	LA_NCtrl_In: bGPLogicIn3
42028	LA_NCtrl_In: bGPDFlipFlopInD
42029	LA_NCtrl_In: bGPDFlipFlopInClk
42030	LA_NCtrl_In: bGPDFlipFlopInClr
42031	LA_NCtrl_In: bMPotEnable
42032	LA_NCtrl_In: bPIDEnableInfluenceRamp
42033	LA_NCtrl_In: bPIDIOff
42034	LA_NCtrl_In: bRLQCw
42035	LA_NCtrl_In: bRLQCcw
42041	LA_NCtrl_In: bFreeln1
42042	LA_NCtrl_In: bFreeln2
42043	LA_NCtrl_In: bFreeln3
42044	LA_NCtrl_In: bFreeln4
42045	LA_NCtrl_In: bFreeln5
42046	LA_NCtrl_In: bFreeln6
42047	LA_NCtrl_In: bFreeln7

Selection list - digital signals	
42048	LA_NCtrl_In: bFreeln8
42100	LA_TabPos_In: bClnh
42101	LA_TabPos_In: bFailReset
42102	LA_TabPos_In: bSetQuickstop
42103	LA_TabPos_In: bSetSpeedCcw
42104	LA_TabPos_In: bJogSpeed1
42105	LA_TabPos_In: bJogSpeed2
42106	LA_TabPos_In: bMPotEnable
42107	LA_TabPos_In: bMPotUp
42108	LA_TabPos_In: bMPotDown
42109	LA_TabPos_In: bMBrakeRelease
42110	LA_TabPos_In: bPosCtrlOn
42111	LA_TabPos_In: bLimitSwitchPos
42112	LA_TabPos_In: bLimitSwitchNeg
42113	LA_TabPos_In: bReleaseLimitSwitch
42114	LA_TabPos_In: bManJogPos
42115	LA_TabPos_In: bManJogNeg
42116	LA_TabPos_In: bManEnable2ndSpeed
42117	LA_TabPos_In: bEnableSpeedOverride
42118	LA_TabPos_In: bEnableAccOverride
42119	LA_TabPos_In: bHomeStartStop
42120	LA_TabPos_In: bHomeSetPosition
42121	LA_TabPos_In: bHomeResetPosition
42122	LA_TabPos_In: bHomeMark
42123	LA_TabPos_In: bPosSetProfilePosition
42124	LA_TabPos_In: bPosSetActualPosition
42125	LA_TabPos_In: bPosExecute
42126	LA_TabPos_In: bPosFinishTarget
42127	LA_TabPos_In: bPosDisableFollowProfile
42128	LA_TabPos_In: bPosStop
42129	LA_TabPos_In: bGPAnalogSwitchSet
42130	LA_TabPos_In: bGPDigitalDelayIn
42131	LA_TabPos_In: bGPLogicIn1
42132	LA_TabPos_In: bGPLogicIn2
42133	LA_TabPos_In: bGPLogicIn3
42134	LA_TabPos_In: bGPDFlipFlop_InD
42135	LA_TabPos_In: bGPDFlipFlop_InClk
42136	LA_TabPos_In: bGPDFlipFlop_InClr
42137	LA_TabPos_In: bGPCounterIClkUp
42138	LA_TabPos_In: bGPCounterIClkDown
42139	LA_TabPos_In: bGPCounter1Load
42140	LA_TabPos_In: bMckOperationMode_1
42141	LA_TabPos_In: bMckOperationMode_2
42142	LA_TabPos_In: bMckOperationMode_4
42143	LA_TabPos_In: bMckOperationMode_8
42144	LA_TabPos_In: bPosProfileNo_1
42145	LA_TabPos_In: bPosProfileNo_2
42146	LA_TabPos_In: bPosProfileNo_4
42147	LA_TabPos_In: bPosProfileNo_8
42148	LA_TabPos_In: bFreeln1
42149	LA_TabPos_In: bFreeln2
42150	LA_TabPos_In: bFreeln3

Selection list - digital signals	
42151	LA_TabPos_In: bFreeln4
42152	LA_TabPos_In: bFreeln5
42153	LA_TabPos_In: bFreeln6
42154	LA_TabPos_In: bFreeln7
42155	LA_TabPos_In: bFreeln8
42200	LA_SwitchPos_In: bClnh
42201	LA_SwitchPos_In: bFailReset
42202	LA_SwitchPos_In: bSetQuickstop
42203	LA_SwitchPos_In: bSetDCBrake
42204	LA_SwitchPos_In: bRFG_Stop
42205	LA_SwitchPos_In: bSetSpeedCcw
42206	LA_SwitchPos_In: bRLQCw
42207	LA_SwitchPos_In: bRLQCcw
42208	LA_SwitchPos_In: bJogCtrlInputSel1
42209	LA_SwitchPos_In: bJogCtrlInputSel2
42210	LA_SwitchPos_In: bJogCtrlRfgIn
42211	LA_SwitchPos_In: bJogCtrlJog1
42212	LA_SwitchPos_In: bJogCtrlJog2
42213	LA_SwitchPos_In: bJogCtrlSlowDown1
42214	LA_SwitchPos_In: bJogCtrlStop1
42215	LA_SwitchPos_In: bJogCtrlSlowDown2
42216	LA_SwitchPos_In: bJogCtrlStop2
42217	LA_SwitchPos_In: bJogCtrlSlowDown3
42218	LA_SwitchPos_In: bJogCtrlStop3
42219	LA_SwitchPos_In: bJogSpeed4
42220	LA_SwitchPos_In: bJogSpeed8
42221	LA_SwitchPos_In: bJogRamp1
42222	LA_SwitchPos_In: bJogRamp2
42223	LA_SwitchPos_In: bJogRamp4
42224	LA_SwitchPos_In: bJogRamp8
42225	LA_SwitchPos_In: bMBrakeRelease
42226	LA_SwitchPos_In: bGPAnalogSwitchSet
42227	LA_SwitchPos_In: bGPDigitalDelayIn
42228	LA_SwitchPos_In: bGPLogicIn1
42229	LA_SwitchPos_In: bGPLogicIn2
42230	LA_SwitchPos_In: bGPLogicIn3
42231	LA_SwitchPos_In: bGPDFlipFlop_InD
42232	LA_SwitchPos_In: bGPDFlipFlop_InClk
42233	LA_SwitchPos_In: bGPDFlipFlop_InClr
42239	LA_SwitchPos_In: bFreeln1
42240	LA_SwitchPos_In: bFreeln2
42241	LA_SwitchPos_In: bFreeln3
42242	LA_SwitchPos_In: bFreeln4
42243	LA_SwitchPos_In: bFreeln5
42244	LA_SwitchPos_In: bFreeln6
42245	LA_SwitchPos_In: bFreeln7
42246	LA_SwitchPos_In: bFreeln8
42247	LS_MotorInterface: bBrakeChopperActive
42248	LS_MotorInterface: bLimSpeedTorquemodeOn

16.5 Selection list - angle signals

This selection list is relevant for the following configuration parameters:

Parameters	
C00622	System connection list: Angle
C00712	LA_TabPos: phi connection list

Selection list - angle signals	
0	Not connected
1005	LA_NCtrl: dnFreeOut1_p
1006	LA_NCtrl: dnFreeOut2_p
1100	LA_TabPos: dnTargetPos_p
1101	LA_TabPos: dnSetPos_p
1102	LA_TabPos: dnFreeOut1_p
1103	LA_TabPos: dnFreeOut2_p
1104	LA_TabPos: dnPosAct_p
1105	LA_TabPos: dnDeltaPosAct_p
1205	LA_SwitchPos: dnFreeOut1_p
1206	LA_SwitchPos: dnFreeOut2_p
16000	LP_CanIn1: dnIn34_p
16001	LP_CanIn2: dnIn34_p
16002	LP_CanIn3: dnIn34_p
16003	LP_Mciln: dnIn34_p
16006	LP_CanIn1: dnIn12_p
16007	LP_CanIn2: dnIn12_p
16008	LP_CanIn3: dnIn12_p
16009	LP_Mciln: dnIn56_p
16010	LP_Mciln: dnIn78_p
16011	LP_CanIn4: dnIn12_p
16012	LP_CanIn4: dnIn34_p
17000	LS_MultiEncoder: dnPosition_p
17020	LS_DigitalInput: dnPosIn12_p
17101	LS_TouchProbe: dnTPDigIn1_Position_p
17102	LS_TouchProbe: dnTPDigIn2_Position_p
17103	LS_TouchProbe: dnTPDigIn3_Position_p
17104	LS_TouchProbe: dnTPDigIn4_Position_p
17105	LS_TouchProbe: dnTPDigIn5_Position_p
17106	LS_TouchProbe: dnTPDigIn6_Position_p
17107	LS_TouchProbe: dnTPDigIn7_Position_p
17120	LS_RetainData: dnOut1
17121	LS_RetainData: dnOut2
17122	LS_RetainData: dnOut3
17123	LS_RetainData: dnOut4
20000	LS_ParFree_p: dnC474_1_p
20001	LS_ParFree_p: dnC474_2_p
20002	LS_ParFree_p: dnC474_3_p
20003	LS_ParFree_p: dnC474_4_p
20004	LS_ParFree_p: dnC474_5_p
20005	LS_ParFree_p: dnC474_6_p
20006	LS_ParFree_p: dnC474_7_p
20007	LS_ParFree_p: dnC474_8_p

Selection list - angle signals	
20008	LS_ParFree32: dnC479_1
20009	LS_ParFree32: dnC479_2
20010	LS_ParFree32: dnC479_3
20011	LS_ParFree32: dnC479_4
20012	LS_ParFree32: dnC479_5
20013	LS_ParFree32: dnC479_6
20014	LS_ParFree32: dnC479_7
20015	LS_ParFree32: dnC479_8
20016	LS_ParFreeUnit_1: dnC475_1
20017	LS_ParFreeUnit_1: dnC475_2
20018	LS_ParFreeUnit_1: dnC475_3
20019	LS_ParFreeUnit_1: dnC475_4
20020	LS_ParFreeUnit_1: dnC475_5
20021	LS_ParFreeUnit_1: dnC475_6
20022	LS_ParFreeUnit_1: dnC475_7
20023	LS_ParFreeUnit_1: dnC475_8
20024	LS_ParFreeUnit_1: dnC475_9
20025	LS_ParFreeUnit_1: dnC475_10
20026	LS_ParFreeUnit_1: dnC475_11
20027	LS_ParFreeUnit_1: dnC475_12
20028	LS_ParFreeUnit_1: dnC475_13
20029	LS_ParFreeUnit_1: dnC475_14
20030	LS_ParFreeUnit_1: dnC475_15
20031	LS_ParFreeUnit_1: dnC475_16
20032	LS_ParFreeUnit_2: dnC475_17
20033	LS_ParFreeUnit_2: dnC475_18
20034	LS_ParFreeUnit_2: dnC475_19
20035	LS_ParFreeUnit_2: dnC475_20
20036	LS_ParFreeUnit_2: dnC475_21
20037	LS_ParFreeUnit_2: dnC475_22
20038	LS_ParFreeUnit_2: dnC475_23
20039	LS_ParFreeUnit_2: dnC475_24
20040	LS_ParFreeUnit_2: dnC475_25
20041	LS_ParFreeUnit_2: dnC475_26
20042	LS_ParFreeUnit_2: dnC475_27
20043	LS_ParFreeUnit_2: dnC475_28
20044	LS_ParFreeUnit_2: dnC475_29
20045	LS_ParFreeUnit_2: dnC475_30
20046	LS_ParFreeUnit_2: dnC475_31
20047	LS_ParFreeUnit_2: dnC475_32
32000	LS_MotorInterface: dnMotorPosAct_p
32001	LS_MotorInterface: dnMotorDeltaPosAct_p
32200	LS_MotionControlKernel: dnPosTarget_p
32201	LS_MotionControlKernel: dnPosSetValue_p
32202	LS_MotionControlKernel: dnDeltaPos_p
32203	LS_MotionControlKernel: dnMotorRefOffset_p
32204	LS_MotionControlKernel: dnPosSet_p
32205	LS_MotionControlKernel: dnPosSetRelative_p
36040	L_ArithmetikPhi_1: dnOut_p
36046	L_GainOffsetPhiP_1: dnOut_p

Selection list - angle signals	
36047	L_GainOffsetPhiP_2: dnOut_p
36050	L_LimitPhi_1: dnOut_p
36051	L_LimitPhi_2: dnOut_p
36052	L_LimitPhi_3: dnOut_p
36060	L_OffsetGainPhiP_1: dnOut_p
36061	L_OffsetGainPhiP_2: dnOut_p
36066	L_PhaseIntK_1: dnOut_p
36067	L_PhaseIntK_2: dnOut_p
36070	L_ArithmetikPhi_2: dnOut_p
36071	L_ArithmetikPhi_3: dnOut_p
36072	L_SQrt_1: dnOut_p
36073	L_Mux_1: dnOut_p
36074	L_ConvWordsToDInt_1: dnOut_p
36075	L_ConvWordsToDInt_2: dnOut_p
36076	L_ConvWordsToDInt_3: dnOut_p
36077	L_ConvUnitsToIncr_1: dnOut_p
36078	L_ConvUnitsToIncr_2: dnOut_p
36079	L_ConvUnitsToIncr_3: dnOut_p
36080	L_Interpolator_1: dnPhiOut_p
36081	L_MckCtrlInterface_1: dnPosSetOut_p
36082	L_PhaseDiff_1: dnOut_p
36083	L_PhaseDiff_2: dnOut_p
36086	L_MckStateInterface_1: dnPosOut_p
36087	L_Odometer_1: dnPosOut_1_p
36088	L_Odometer_1: dnPosOut_2_p
36089	L_Odometer_1: dnPosOut_3_p
36090	L_Odometer_1: dnPosOut_4_p
36091	L_Odometer_1: dnPosOut_5_p
36092	L_Odometer_1: dnPosOut_6_p

16.6 Table of attributes

The table of attributes contains information that is required for communication with the inverter via parameters.

How to read the table of attributes:

Column	Meaning		Entry	
Code	Parameter name		Cxxxxx	
Name	Parameter short text (display text)		Text	
Type	Parameter type		Selection list	Value from selection list
			Bit coded	Bit coded value
			Linear value	Value with setting range
			String	String
Index	dec	Index under which the parameter is addressed. The subindex for array variables corresponds to the Lenze subcode number.	24575 - Lenze code number	Is only required for access via a bus system.
	hex		5FFF _n - Lenze code number	
Data	DS	Data structure	E	Single variable (only one parameter element)
			A	Array variable (several parameter elements)
	DA	Number of array elements (subcodes)	Number	
	DT	Data type	INTEGER_16	2 bytes with sign
			INTEGER_32	4 bytes with sign
			UNSIGNED_8	1 byte without sign
			UNSIGNED_16	2 bytes without sign
			UNSIGNED_32	4 bytes without sign
VISIBLE_STRING [xx]	ASCII string (with character length xx)			
Factor	Factor for data transmission via a bus system, depending on the number of decimal positions	Factor	1 ≙ No decimal positions 10 ≙ 1 decimal position 100 ≙ 2 decimal positions 1000 ≙ 3 decimal positions 10000 ≙ 4 decimal positions	
CINH	Writing is only possible if the controller is inhibited	CINH		

Code	Name	Parameter type	Index		Data				
			dec	hex	DS	DA	Data type	Factor	CINH
C00001	Keypad UserLevel	Selection list	24574	5FFE	A	1	UNSIGNED_8	1	
C00002	Device commands	Selection list	24573	5FFD	A	33	UNSIGNED_8	1	
C00003	Status of the last device command	Selection list	24572	5FFC	E	1	UNSIGNED_8	1	
C00005	Application	Selection list	24570	5FFA	E	1	UNSIGNED_16	1	
C00006	Motor control	Selection list	24569	5FF9	E	1	UNSIGNED_8	1	
C00007	Control mode	Selection list	24568	5FF8	E	1	UNSIGNED_16	1	
C00008	Original application control source	Selection list	24567	5FF7	E	1	UNSIGNED_16	1	
C00010	AIN1: Characteristic	Linear value	24565	5FF5	A	8	INTEGER_16	100	
C00011	Appl.: Reference speed	Linear value	24564	5FF4	E	1	UNSIGNED_16	1	
C00012	Accel. time - main setpoint	Linear value	24563	5FF3	E	1	UNSIGNED_32	1000	
C00013	Decel. time - main setpoint	Linear value	24562	5FF2	E	1	UNSIGNED_32	1000	
C00015	VFC: V/f base frequency	Linear value	24560	5FF0	E	1	UNSIGNED_16	10	
C00016	VFC: Vmin boost	Linear value	24559	5FEF	E	1	UNSIGNED_16	100	
C00018	Switching frequency	Selection list	24557	5FED	E	1	UNSIGNED_8	1	
C00019	Auto-DCB: Threshold	Linear value	24556	5FEC	E	1	UNSIGNED_16	1	
C00021	Slip comp.	Linear value	24554	5FEA	E	1	INTEGER_16	100	
C00022	Imax in motor mode	Linear value	24553	5FE9	E	1	UNSIGNED_16	100	
C00023	Imax in generator mode	Linear value	24552	5FE8	E	1	INTEGER_16	100	
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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00024	LS_DriveInterface: bNActCompare	Linear value	24551	5FE7	E	1	INTEGER_16	100	
C00025	LS_DriveInterface: bNActHysteresis	Linear value	24550	5FE6	A	1	INTEGER_16	100	
C00026	AINx: Offset	Linear value	24549	5FE5	A	1	INTEGER_16	100	
C00027	AINx: Gain	Linear value	24548	5FE4	A	1	INTEGER_32	10000	
C00028	AINx: Input voltage	Linear value	24547	5FE3	A	1	INTEGER_16	100	
C00029	AINx: Input current	Linear value	24546	5FE2	A	1	INTEGER_16	100	
C00033	AINx: Output value	Linear value	24542	5FDE	A	1	INTEGER_16	100	
C00034	AINx: Configuration	Selection list	24541	5FDD	A	1	UNSIGNED_8	1	
C00036	DC braking: Current	Linear value	24539	5FDB	E	1	INTEGER_16	100	
C00039	Fixed setpoint x (L_NSet_1 n-Fix)	Linear value	24536	5FD8	A	15	INTEGER_16	100	
C00050	MCTRL: Speed setpoint	Linear value	24525	5FCD	E	1	INTEGER_32	1	
C00051	MCTRL: Actual speed value	Linear value	24524	5FCC	E	1	INTEGER_32	1	
C00052	Motor voltage	Linear value	24523	5FCB	E	1	UNSIGNED_16	1	
C00053	DC-bus voltage	Linear value	24522	5FCA	E	1	UNSIGNED_16	1	
C00054	Motor current	Linear value	24521	5FC9	E	1	UNSIGNED_16	100	
C00055	Actual values	Linear value	24520	5FC8	A	3	INTEGER_16	1	
C00056	Torque	Linear value	24519	5FC7	A	2	INTEGER_32	100	
C00057	Maximum torque	Linear value	24518	5FC6	E	1	UNSIGNED_32	100	
C00058	Output frequency	Linear value	24517	5FC5	E	1	INTEGER_32	100	
C00059	Appl.: Reference frequency C11	Linear value	24516	5FC4	E	1	UNSIGNED_32	100	
C00061	Heatsink temperature	Linear value	24514	5FC2	E	1	INTEGER_16	1	
C00062	Interior temperature	Linear value	24513	5FC1	A	1	INTEGER_16	1	
C00064	Device utilisation (lxt)	Linear value	24511	5FBF	A	3	INTEGER_16	100	
C00066	Thermal motor load (lxt)	Linear value	24509	5FBD	E	1	INTEGER_16	100	
C00070	Vp speed controller	Linear value	24505	5FB9	A	3	UNSIGNED_16	100	
C00071	Ti speed controller	Linear value	24504	5FB8	A	3	UNSIGNED_16	10	
C00072	SC: Tdn speed controller	Linear value	24503	5FB7	E	1	UNSIGNED_16	100	
C00073	lmax/M controller gain	Linear value	24502	5FB6	A	2	UNSIGNED_16	100	
C00074	Reset time lmax/M controller	Linear value	24501	5FB5	A	2	UNSIGNED_16	1	
C00075	Vp current controller	Linear value	24500	5FB4	E	1	UNSIGNED_16	100	
C00076	Ti current controller	Linear value	24499	5FB3	E	1	UNSIGNED_16	100	
C00077	SC: Vp field controller	Linear value	24498	5FB2	E	1	UNSIGNED_16	100	
C00078	SC: Tn field controller	Linear value	24497	5FB1	E	1	UNSIGNED_16	10	
C00079	SC: Settings	Selection list	24496	5FB0	A	4	UNSIGNED_8	1	
C00080	Override point of field weakening	Linear value	24495	5FAF	E	1	INTEGER_16	1	
C00081	Rated motor power	Linear value	24494	5FAE	E	1	UNSIGNED_16	100	
C00082	Motor rotor resistance	Linear value	24493	5FAD	E	1	UNSIGNED_32	1	
C00083	Motor rotor time constant	Linear value	24492	5FAC	E	1	UNSIGNED_16	1	
C00084	Motor stator resistance	Linear value	24491	5FAB	E	1	UNSIGNED_32	1	
C00085	Motor stator leakage inductance	Linear value	24490	5FAA	E	1	UNSIGNED_16	100	
C00087	Rated motor speed	Linear value	24488	5FA8	E	1	UNSIGNED_16	1	
C00088	Rated motor current	Linear value	24487	5FA7	E	1	UNSIGNED_16	100	
C00089	Rated motor frequency	Linear value	24486	5FA6	E	1	UNSIGNED_16	1	
C00090	Rated motor voltage	Linear value	24485	5FA5	E	1	UNSIGNED_16	1	
C00091	Motor cosine phi	Linear value	24484	5FA4	E	1	UNSIGNED_8	100	
C00092	Motor magnetising inductance	Linear value	24483	5FA3	E	1	UNSIGNED_16	10	
C00093	Power section ID	Linear value	24482	5FA2	E	1	UNSIGNED_16	1	
C00095	Motor magnetising current	Linear value	24480	5FA0	E	1	UNSIGNED_16	100	
C00097	Rated motor torque	Linear value	24478	5F9E	E	1	UNSIGNED_32	100	
C00098	Rated device current	Linear value	24477	5F9D	E	1	UNSIGNED_16	10	

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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00099	Firmware version	String	24476	5F9C	E	1	VISIBLE_STRING [12]		
C00100	Firmware version	Linear value	24475	5F9B	A	4	UNSIGNED_8	1	
C00101	Add. acceleration time x	Linear value	24474	5F9A	A	15	UNSIGNED_32	1000	
C00103	Add. deceleration time x	Linear value	24472	5F98	A	15	UNSIGNED_32	1000	
C00104	Quick stop setting	Bit coded	24471	5F97	A	1	UNSIGNED_16	1	
C00105	Decel. time - quick stop	Linear value	24470	5F96	E	1	UNSIGNED_32	1000	
C00106	Auto-DCB: Hold time	Linear value	24469	5F95	E	1	UNSIGNED_32	1000	
C00107	DC braking: Hold time	Linear value	24468	5F94	E	1	UNSIGNED_32	1000	
C00114	DigInX: Inversion	Bit coded	24461	5F8D	E	1	UNSIGNED_16	1	
C00115	DI 1/2 & 5/6: Function	Selection list	24460	5F8C	A	2	UNSIGNED_8	1	
C00116	DI 3/4 DO 1/2: Function	Selection list	24459	5F8B	E	1	UNSIGNED_8	1	CINH
C00118	DigOutX: Inversion	Bit coded	24457	5F89	E	1	UNSIGNED_8	1	
C00120	Setting of motor overload (I ^{xt})	Linear value	24455	5F87	E	1	INTEGER_16	100	
C00122	Initial value motor overload (I ^{xt})	Linear value	24453	5F85	A	1	UNSIGNED_16	100	
C00123	Device utilisat. threshold (I _{xt})	Linear value	24452	5F84	E	1	INTEGER_16	100	
C00124	Current monitoring: Breaking current	Linear value	24451	5F83	A	1	UNSIGNED_16	100	
C00129	Brake resistance value	Linear value	24446	5F7E	E	1	UNSIGNED_16	10	
C00130	Rated brake resistor power	Linear value	24445	5F7D	E	1	UNSIGNED_16	1	
C00131	Rated heat amount of brake resist.	Linear value	24444	5F7C	E	1	UNSIGNED_16	10	
C00133	Brake resistor utilisation	Linear value	24442	5F7A	E	1	UNSIGNED_16	1	
C00134	L_NSet_1: Ramp smoothing	Selection list	24441	5F79	E	1	UNSIGNED_8	1	
C00136	Communication control words	Bit coded	24439	5F77	A	2	UNSIGNED_16	1	
C00137	Device status	Selection list	24438	5F76	E	1	UNSIGNED_16	1	
C00138	Internal control signals	Bit coded	24437	5F75	A	3	UNSIGNED_16	1	
C00142	Auto-start option	Bit coded	24433	5F71	E	1	UNSIGNED_8	1	
C00144	Thermal switching frequency reduction	Selection list	24431	5F6F	E	1	UNSIGNED_8	1	
C00148	LS_DriveInterface: Error message config.	Bit coded	24427	5F6B	E	1	UNSIGNED_16	1	
C00150	Status word	Bit coded	24425	5F69	E	1	UNSIGNED_16	1	
C00155	Extended status word	Bit coded	24420	5F64	E	1	UNSIGNED_16	1	
C00158	Cause of controller inhibit	Bit coded	24417	5F61	E	1	UNSIGNED_16	1	
C00159	Cause of quick stop QSP	Bit coded	24416	5F60	E	1	UNSIGNED_16	1	
C00160	Status determining error (16-bit)	Linear value	24415	5F5F	A	1	UNSIGNED_16	1	
C00161	LS_SetError_x: Error number	Linear value	24414	5F5E	A	8	UNSIGNED_16	1	
C00162	Error number masked	Linear value	24413	5F5D	A	1	UNSIGNED_32	1	
C00163	Logbook - binary elements	Selection list	24412	5F5C	A	2	UNSIGNED_16	1	
C00164	Logbook - analog elements	Selection list	24411	5F5B	A	1	UNSIGNED_16	1	
C00165	Error information	String	24410	5F5A	A	2	VISIBLE_STRING [14]		
C00166	Error information text	String	24409	5F59	A	6	VISIBLE_STRING [31]		
C00168	Status determining error	Linear value	24407	5F57	E	1	UNSIGNED_32	1	
C00169	Logbook setting	Bit coded	24406	5F56	E	1	UNSIGNED_16	1	
C00170	Current error	Linear value	24405	5F55	E	1	UNSIGNED_32	1	
C00173	Mains voltage	Selection list	24402	5F52	E	1	UNSIGNED_8	1	CINH
C00174	Reduced brake chopper threshold	Linear value	24401	5F51	E	1	UNSIGNED_8	1	
C00175	Brake energy management	Selection list	24400	5F50	E	1	UNSIGNED_8	1	CINH
C00177	Switching cycles	Linear value	24398	5F4E	A	9	UNSIGNED_32	1	
C00178	Elapsed-hour meter	Linear value	24397	5F4D	E	1	UNSIGNED_32	1	
C00179	Power-on time meter	Linear value	24396	5F4C	E	1	UNSIGNED_32	1	
C00180	Running time	Linear value	24395	5F4B	A	4	UNSIGNED_32	1	
C00181	Time settings	Linear value	24394	5F4A	A	1	UNSIGNED_16	1	
C00182	L_NSet_1: S-ramp time PT1	Linear value	24393	5F49	E	1	INTEGER_16	100	

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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00184	AutoFailReset repetition time	Linear value	24391	5F47	E	1	UNSIGNED_16	1	
C00185	AutoFailReset residual runtime	Linear value	24390	5F46	E	1	UNSIGNED_16	1	
C00186	Max. number of AutoFailReset processes	Linear value	24389	5F45	E	1	UNSIGNED_8	1	
C00187	Current AutoFailReset processes	Linear value	24388	5F44	E	1	UNSIGNED_8	1	
C00188	AutoFailReset configuration	Selection list	24387	5F43	E	1	UNSIGNED_8	1	
C00189	Resp. to too frequent AutoFailReset	Selection list	24386	5F42	E	1	UNSIGNED_8	1	
C00190	L_NSet_1: Setpoint arithmetic	Selection list	24385	5F41	E	1	UNSIGNED_8	1	
C00191	Logbook access index User	Linear value	24384	5F40	A	1	UNSIGNED_8	1	
C00192	Logbook data User	String	24383	5F3F	A	1	OCTET_STRING [32]		
C00193	Logbook element User	Linear value	24382	5F3E	A	6	UNSIGNED_32	1	
C00199	Description data	String	24376	5F38	A	5	VISIBLE_STRING [32]		
C00200	Firmware product type	String	24375	5F37	E	1	VISIBLE_STRING [19]		
C00201	Firmware	String	24374	5F36	A	6	VISIBLE_STRING [22]		
C00203	Product type code	String	24372	5F34	A	10	VISIBLE_STRING [24]		
C00204	Serial number	String	24371	5F33	A	10	VISIBLE_STRING [24]		
C00219	Identification	Linear value	24356	5F24	A	4	UNSIGNED_32	1	
C00220	L_NSet_1: Acceleration time - add. setpoint	Linear value	24355	5F23	E	1	UNSIGNED_32	1000	
C00221	L_NSet_1: Deceleration time - add. setpoint	Linear value	24354	5F22	E	1	UNSIGNED_32	1000	
C00222	L_PCTRL_1: Vp	Linear value	24353	5F21	E	1	INTEGER_16	10	
C00223	L_PCTRL_1: Tn	Linear value	24352	5F20	E	1	UNSIGNED_16	1	
C00224	L_PCTRL_1: Kd	Linear value	24351	5F1F	E	1	UNSIGNED_16	10	
C00225	L_PCTRL_1: MaxLimit	Linear value	24350	5F1E	E	1	INTEGER_16	100	
C00226	L_PCTRL_1: MinLimit	Linear value	24349	5F1D	E	1	INTEGER_16	100	
C00227	L_PCTRL_1: Acceleration time	Linear value	24348	5F1C	E	1	UNSIGNED_32	1000	
C00228	L_PCTRL_1: Deceleration time	Linear value	24347	5F1B	E	1	UNSIGNED_32	1000	
C00231	L_PCTRL_1: Operating range	Linear value	24344	5F18	A	4	INTEGER_16	100	
C00233	L_PCTRL_1: Root function	Selection list	24342	5F16	E	1	UNSIGNED_8	1	
C00234	Oscillation damping influence	Linear value	24341	5F15	E	1	UNSIGNED_16	100	
C00235	Oscillation damping filter time	Linear value	24340	5F14	E	1	UNSIGNED_8	1	
C00236	Oscillation damping field weakening	Linear value	24339	5F13	E	1	UNSIGNED_8	1	
C00241	L_NSet_1: Hyst. NSet reached	Linear value	24334	5F0E	E	1	INTEGER_16	100	
C00242	L_PCTRL_1: Operating mode	Selection list	24333	5F0D	E	1	UNSIGNED_8	1	
C00243	L_PCTRL_1: Accel. time influence	Linear value	24332	5F0C	E	1	UNSIGNED_32	1000	
C00244	L_PCTRL_1: Deceleration time influence	Linear value	24331	5F0B	E	1	UNSIGNED_32	1000	
C00245	L_PCTRL_1: PID output value	Linear value	24330	5F0A	E	1	INTEGER_16	100	
C00246	L_PCTRL_1: nAct_a internal	Linear value	24329	5F09	E	1	INTEGER_16	100	
C00247	L_PCTRL_1: Window setpoint reached	Linear value	24328	5F08	E	1	INTEGER_16	100	
C00249	L_PT1_1: Time constant	Linear value	24326	5F06	E	1	UNSIGNED_16	1	
C00250	L_PT1 2-3: Time constant	Linear value	24325	5F05	A	2	INTEGER_16	1	
C00251	L_DT1_1: Time constant	Linear value	24324	5F04	E	1	INTEGER_16	1	
C00252	L_DT1_1: Gain	Linear value	24323	5F03	E	1	INTEGER_16	100	
C00253	L_DT1_1: Sensitivity	Selection list	24322	5F02	E	1	UNSIGNED_8	1	
C00254	Kp position controller	Linear value	24321	5F01	E	1	UNSIGNED_16	100	
C00270	SC: Freq. current setpoint filter	Linear value	24305	5EF1	E	1	UNSIGNED_16	10	
C00271	SC: Current setpoint filter width	Linear value	24304	5EF0	E	1	UNSIGNED_16	10	
C00272	SC: Current setpoint filter depth	Linear value	24303	5EEF	E	1	UNSIGNED_16	1	
C00273	Motor moment of inertia	Linear value	24302	5EEE	E	1	UNSIGNED_32	100	
C00274	SC: Max. change in acceleration	Linear value	24301	5EED	E	1	UNSIGNED_16	10	
C00275	Setpoint feedforward control filtering	Linear value	24300	5EEC	E	1	UNSIGNED_16	10	

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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00276	SC: max. output voltage	Linear value	24299	5EEB	E	1	UNSIGNED_8	1	
C00280	SC: Filter time const. DC detection	Linear value	24295	5EE7	E	1	UNSIGNED_16	1	
C00312	System runtimes	Linear value	24263	5EC7	A	1	UNSIGNED_32	1000	
C00321	Main program runtime	Linear value	24254	5EBE	A	2	UNSIGNED_16	1	
C00322	Transmission mode CAN TxPDOs	Linear value	24253	5EBD	A	4	UNSIGNED_8	1	
C00323	Transmission mode CAN Rx PDOs	Linear value	24252	5EBE	A	4	UNSIGNED_8	1	
C00324	CAN transmit blocking time	Linear value	24251	5EBB	A	5	UNSIGNED_16	1	
C00338	L_Arithmetik_1: Function	Selection list	24237	5EAD	E	1	UNSIGNED_8	1	
C00339	L_Arithmetik_2: Function	Selection list	24236	5EAC	E	1	UNSIGNED_8	1	
C00341	CAN management - error configuration	Bit coded	24234	5EAA	E	1	UNSIGNED_16	1	
C00342	CAN decoupling PDOInOut	Bit coded	24233	5EA9	A	2	UNSIGNED_16	1	
C00343	LP_CanIn decoupling value	Linear value	24232	5EA8	A	16	UNSIGNED_16	1	
C00344	LP_CanOut decoupling value	Linear value	24231	5EA7	A	16	UNSIGNED_16	1	
C00345	CAN error status	Selection list	24230	5EA6	E	1	UNSIGNED_8	1	
C00347	CAN status HeartBeat producer	Selection list	24228	5EA4	A	15	UNSIGNED_8	1	
C00349	Setting- DIP switch SW1	Bit coded	24226	5EA2	E	1	UNSIGNED_16	1	
C00350	CAN node address	Linear value	24225	5EA1	E	1	UNSIGNED_8	1	
C00351	CAN baud rate	Selection list	24224	5EA0	E	1	UNSIGNED_8	1	
C00352	CAN slave/master	Selection list	24223	5E9F	E	1	UNSIGNED_8	1	
C00353	CAN IN/OUT COBID source	Selection list	24222	5E9E	A	4	UNSIGNED_8	1	
C00354	COBID	Bit coded	24221	5E9D	A	8	UNSIGNED_32	1	
C00355	Active COBID	Linear value	24220	5E9C	A	8	UNSIGNED_16	1	
C00356	CAN time settings	Linear value	24219	5E9B	A	6	UNSIGNED_16	1	
C00357	CAN monitoring times	Linear value	24218	5E9A	A	4	UNSIGNED_16	1	
C00358	CANx_OUT data length	Linear value	24217	5E99	A	4	UNSIGNED_8	1	
C00359	CAN status	Selection list	24216	5E98	E	1	UNSIGNED_8	1	
C00360	CAN telegram counter	Linear value	24215	5E97	A	14	UNSIGNED_16	1	
C00364	CAN MessageError	Selection list	24211	5E93	E	1	UNSIGNED_8	1	
C00366	Number of CAN SDO channels	Selection list	24209	5E91	E	1	UNSIGNED_8	1	
C00367	CAN SYNC Rx identifier	Bit coded	24208	5E90	E	1	UNSIGNED_16	1	
C00368	CAN SYNC Tx identifier	Bit coded	24207	5E8F	E	1	UNSIGNED_16	1	
C00369	CAN sync transmission cycle time	Linear value	24206	5E8E	E	1	UNSIGNED_16	1	
C00370	SyncTxRxTimes	Linear value	24205	5E8D	A	2	INTEGER_16	1	
C00371	CAN ErrorCode	Linear value	24204	5E8C	A	1	UNSIGNED_16	1	
C00372	CAN_Tx_Rx_Error	Linear value	24203	5E8B	A	4	UNSIGNED_8	1	
C00381	CAN Heartbeat producer time	Linear value	24194	5E82	E	1	UNSIGNED_16	1	
C00385	CAN node addr. HeartBeat producer	Linear value	24190	5E7E	A	15	UNSIGNED_8	1	
C00386	CAN HeartBeat-ConsumerTime	Linear value	24189	5E7D	A	15	UNSIGNED_16	1	
C00387	CAN-GatewayAddr	Linear value	24188	5E7C	A	1	UNSIGNED_8	1	
C00400	LS_PulseGenerator	Linear value	24175	5E6F	A	3	UNSIGNED_16	1	
C00401	CANxInOut: Inversion	Bit coded	24174	5E6E	A	8	UNSIGNED_16	1	
C00407	LP_CanIn mapping	Linear value	24168	5E68	A	8	UNSIGNED_32	1	
C00408	LP_CanIn mapping selection	Selection list	24167	5E67	A	4	UNSIGNED_8	1	
C00409	LP_CanIn mapping	Linear value	24166	5E66	A	16	UNSIGNED_16	1	
C00410	L_SignalMonitor_a: Signal sources	Selection list	24165	5E65	A	4	UNSIGNED_16	1	
C00411	L_SignalMonitor_b: Signal sources	Selection list	24164	5E64	A	4	UNSIGNED_16	1	
C00412	L_SignalMonitor_b: Inversion	Bit coded	24163	5E63	E	1	UNSIGNED_8	1	
C00413	L_SignalMonitor_a: Offs./gain	Linear value	24162	5E62	A	8	INTEGER_16	100	
C00420	Number of encoder increments	Linear value	24155	5E5B	A	2	UNSIGNED_16	1	
C00422	LS_MultiEncoder: Encoder type	Selection list	24153	5E59	E	1	UNSIGNED_8	1	CINH
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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00423	DOx: Delay times	Linear value	24152	5E58	A	4	UNSIGNED_16	1000	
C00425	Encoder scanning time	Selection list	24150	5E56	A	2	UNSIGNED_8	1	CINH
C00426	SSI encoder: Data bits	Linear value	24149	5E55	A	9	UNSIGNED_8	1	CINH
C00427	SSI encoder: Bit rate	Selection list	24148	5E54	E	1	UNSIGNED_8	1	CINH
C00428	SSI encoder: Coding	Selection list	24147	5E53	E	1	UNSIGNED_8	1	CINH
C00429	Advanced settings	Bit coded	24146	5E52	A	1	UNSIGNED_16	1	CINH
C00431	LS_MultiEncoder: bFail selection	Bit coded	24144	5E50	A	1	UNSIGNED_16	1	
C00440	LS_AnalogIn1: PT1 time constant	Linear value	24135	5E47	A	1	UNSIGNED_16	1	
C00443	Dix: Level	Bit coded	24132	5E44	A	2	UNSIGNED_16	1	
C00444	DOx: Level	Bit coded	24131	5E43	A	2	UNSIGNED_16	1	
C00445	FreqInxx_nOut_v	Linear value	24130	5E42	A	2	INTEGER_16	1	
C00446	FreqInxx_nOut_a	Linear value	24129	5E41	A	2	INTEGER_16	100	
C00447	DigOut decoupling	Bit coded	24128	5E40	E	1	UNSIGNED_16	1	
C00448	DigOut decoupling value	Bit coded	24127	5E3F	E	1	UNSIGNED_16	1	
C00449	FreqInxx_dnOut_p	Linear value	24126	5E3E	A	1	INTEGER_32	1	
C00451	LS_MultiEncoder: Information bFail	Bit coded	24124	5E3C	A	1	UNSIGNED_16	1	
C00453	Keypad: Default manual jog	Linear value	24122	5E3A	A	2	UNSIGNED_32	1000	
C00461	Remote: Acceleration/deceleration time	Linear value	24114	5E32	A	1	UNSIGNED_32	1000	
C00462	Remote: Control	Linear value	24113	5E31	A	2	UNSIGNED_16	1	
C00463	Remote: MCK control	Bit coded	24112	5E30	A	1	UNSIGNED_32	1	
C00464	Remote: Monitoring timeout	Linear value	24111	5E2F	A	1	UNSIGNED_16	1	
C00465	Keypad: Time-out welcome screen	Selection list	24110	5E2E	E	1	INTEGER_32	1	
C00466	Keypad: Default parameter	Linear value	24109	5E2D	E	1	INTEGER_32	1	
C00467	Keypad: Default welcome screen	Selection list	24108	5E2C	E	1	INTEGER_32	1	
C00469	Keypad: Fct. STOP key	Selection list	24106	5E2A	E	1	INTEGER_32	1	CINH
C00470	LS_ParFree_b	Selection list	24105	5E29	A	32	UNSIGNED_8	1	
C00471	LS_ParFree	Bit coded	24104	5E28	A	32	UNSIGNED_16	1	
C00472	LS_ParFree_a	Linear value	24103	5E27	A	16	INTEGER_16	100	
C00473	LS_ParFree_v	Linear value	24102	5E26	A	8	INTEGER_16	1	
C00474	LS_ParFree_p	Linear value	24101	5E25	A	8	INTEGER_32	1	
C00475	LS_ParFreeUnit_1_2	Linear value	24100	5E24	A	32	INTEGER_32	10000	
C00476	LS_ParFree_a_2	Linear value	24099	5E23	A	16	INTEGER_16	100	
C00477	LS_ParFree_2	Bit coded	24098	5E22	A	32	UNSIGNED_16	1	
C00478	LS_ParFree_v_2	Linear value	24097	5E21	A	8	INTEGER_16	1	
C00479	LS_ParFree32	Linear value	24096	5E20	A	8	INTEGER_32	1	
C00480	LS_DisFree_b	Bit coded	24095	5E1F	E	1	UNSIGNED_16	1	
C00481	LS_DisFree	Bit coded	24094	5E1E	A	8	UNSIGNED_16	1	
C00482	LS_DisFree_a	Linear value	24093	5E1D	A	8	INTEGER_16	100	
C00483	LS_DisFree_p	Linear value	24092	5E1C	A	8	INTEGER_32	1	
C00484	Application units: Offset	Linear value	24091	5E1B	A	4	INTEGER_16	100	
C00485	Application units: Display factor	Linear value	24090	5E1A	A	4	INTEGER_32	10000	
C00486	Application units: Text	String	24089	5E19	A	4	VISIBLE_STRING [7]		
C00487	Application units	Linear value	24088	5E18	A	4	INTEGER_32	100	
C00488	L_JogCtrlEdgeDetect_1	Selection list	24087	5E17	A	6	UNSIGNED_8	1	
C00490	Position encoder selection	Selection list	24085	5E15	E	1	UNSIGNED_8	1	
C00495	Speed sensor selection	Selection list	24080	5E10	E	1	UNSIGNED_8	1	
C00496	Encoder evaluation method DigIn12	Selection list	24079	5E0F	E	1	UNSIGNED_8	1	CINH
C00497	Filter time constant	Linear value	24078	5E0E	A	2	UNSIGNED_16	10	
C00505	Password data	String	24070	5E06	A	3	VISIBLE_STRING [16]		
C00506	PW protection internal config	Bit coded	24069	5E05	A	1	UNSIGNED_16	1	

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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00507	Current password protection	Bit coded	24068	5E04	A	1	UNSIGNED_16	1	
C00508	PW protection config X6(DIAG)	Bit coded	24067	5E03	A	1	UNSIGNED_16	1	
C00509	PW protection config X1 (CAN)	Bit coded	24066	5E02	A	1	UNSIGNED_16	1	
C00510	PW protection config. MCI	Bit coded	24065	5E01	A	1	UNSIGNED_16	1	
C00517	User menu	Linear value	24058	5DFA	A	32	INTEGER_32	1000	
C00560	Fan switching status	Selection list	24015	5DCF	A	3	UNSIGNED_8	1	
C00561	Failure indication	Selection list	24014	5DCE	A	6	UNSIGNED_8	1	
C00563	Current monitoring: Delay time	Linear value	24012	5DCC	A	1	UNSIGNED_32	1000	
C00565	Resp. to mains phase failure	Selection list	24010	5DCA	E	1	UNSIGNED_8	1	
C00566	Resp. to fan failure	Selection list	24009	5DC9	E	1	UNSIGNED_8	1	
C00567	Resp. to speed controller limited	Selection list	24008	5DC8	E	1	UNSIGNED_8	1	
C00569	Resp. to peak current	Selection list	24006	5DC6	A	1	UNSIGNED_8	1	
C00570	Resp. to controller limitations	Selection list	24005	5DC5	A	4	UNSIGNED_8	1	
C00571	Resp. to wrong controller setting	Selection list	24004	5DC4	A	2	UNSIGNED_8	1	
C00572	Brake resistor overload threshold	Linear value	24003	5DC3	E	1	UNSIGNED_8	1	
C00574	Resp. to brake resist. overtemp.	Selection list	24001	5DC1	E	1	UNSIGNED_8	1	
C00576	SC: Optimisation of field feedforward control	Linear value	23999	5DBF	E	1	UNSIGNED_16	1	
C00577	SC: Vp field weakening controller	Linear value	23998	5DBE	E	1	UNSIGNED_16	10000	
C00578	SC: Tn field weakening controller	Linear value	23997	5DBD	E	1	UNSIGNED_16	10	
C00579	Resp. to max. speed/output freq. reached	Selection list	23996	5DBC	E	1	UNSIGNED_8	1	
C00580	Resp. to operating system error	Selection list	23995	5DBB	A	1	UNSIGNED_8	1	
C00581	Resp. to LS_SetError_x	Selection list	23994	5DBA	A	8	UNSIGNED_8	1	
C00582	Resp. to heatsink temp.> shutdown temp. -5°C	Selection list	23993	5DB9	E	1	UNSIGNED_8	1	
C00584	Resp. to current monitoring	Selection list	23991	5DB7	A	1	UNSIGNED_8	1	
C00585	Resp. to motor overtemp. PTC	Selection list	23990	5DB6	E	1	UNSIGNED_8	1	
C00586	Resp. open circuit HTL encoder	Selection list	23989	5DB5	E	1	UNSIGNED_8	1	
C00587	Resp. to brake resist. overtemp. PTC	Selection list	23988	5DB4	A	1	UNSIGNED_8	1	
C00588	Resp. to max. speed at switching freq.	Selection list	23987	5DB3	E	1	UNSIGNED_8	1	
C00590	Resp. to switch. frequency red.	Selection list	23985	5DB1	E	1	UNSIGNED_8	1	
C00592	Resp. to CAN bus connection	Selection list	23983	5DAF	A	5	UNSIGNED_8	1	
C00593	Resp. to CANx_IN monitoring	Selection list	23982	5DAE	A	4	UNSIGNED_8	1	
C00594	Resp. to control word error	Selection list	23981	5DAD	A	2	UNSIGNED_8	1	
C00595	MCK: Resp. to MCK error	Selection list	23980	5DAC	A	17	UNSIGNED_8	1	
C00597	Resp. to motor phase failure	Selection list	23978	5DAA	E	1	UNSIGNED_8	1	
C00598	Resp. to I/O monitoring	Selection list	23977	5DA9	A	4	UNSIGNED_8	1	
C00599	Motor phase failure threshold	Linear value	23976	5DA8	E	1	INTEGER_16	100	
C00600	Resp. to DC bus voltage	Selection list	23975	5DA7	A	1	UNSIGNED_8	1	
C00601	Delayed resp. to fault: DC bus overvoltage	Linear value	23974	5DA6	A	1	UNSIGNED_16	1000	
C00602	Resp. to earth fault	Selection list	23973	5DA5	E	1	UNSIGNED_8	1	
C00605	Resp. to feedback	Selection list	23970	5DA2	A	1	UNSIGNED_8	1	
C00606	Resp. to motor overload (I*xt)	Selection list	23969	5DA1	E	1	UNSIGNED_8	1	
C00607	Resp. to max. freq. feedb. DIG12/56	Selection list	23968	5DA0	E	1	UNSIGNED_8	1	
C00608	Resp. to maximum torque	Selection list	23967	5D9F	E	1	UNSIGNED_8	1	
C00609	Resp. to maximum current	Selection list	23966	5D9E	E	1	UNSIGNED_8	1	
C00620	System connection list: 16-bit	Selection list	23955	5D93	A	111	UNSIGNED_16	1	
C00621	System connection list: Bool	Selection list	23954	5D92	A	199	UNSIGNED_16	1	
C00622	System connection list: Angle	Selection list	23953	5D91	A	25	UNSIGNED_16	1	
C00630	L_Limit 1-2: Min/Max	Linear value	23945	5D89	A	4	INTEGER_16	100	
C00631	L_LimitPhi 1-3: Min/Max	Linear value	23944	5D88	A	6	INTEGER_32	1	

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C00632	L_NSet_1: Max. skip freq.	Linear value	23943	5D87	A	3	INTEGER_16	100	
C00633	L_NSet_1: Min. skip freq.	Linear value	23942	5D86	A	3	INTEGER_16	100	
C00634	L_NSet_1: wState	Bit coded	23941	5D85	E	1	UNSIGNED_16	1	
C00635	L_NSet_1: nMaxLimit	Linear value	23940	5D84	E	1	INTEGER_16	100	
C00636	L_NSet_1: nMinLimit	Linear value	23939	5D83	E	1	INTEGER_16	100	
C00637	L_NSet_1: Output blocking zones	Linear value	23938	5D82	E	1	INTEGER_16	100	
C00638	L_NSet_1: Output ramp rounding	Linear value	23937	5D81	E	1	INTEGER_16	100	
C00639	L_NSet_1: Output add.value	Linear value	23936	5D80	E	1	INTEGER_16	100	
C00640	L_NSet_1: nNOut_a	Linear value	23935	5D7F	E	1	INTEGER_16	100	
C00643	Resp. to PLL monitoring	Selection list	23932	5D7C	A	1	UNSIGNED_8	1	
C00650	L_Arithmetik 3-5: Function	Selection list	23925	5D75	A	3	UNSIGNED_8	1	
C00653	Sensibility - Setpoint feedforward control	Selection list	23922	5D72	A	1	UNSIGNED_8	1	
C00654	Source of diff. setpoint feedforward control	Selection list	23921	5D71	A	1	UNSIGNED_8	1	
C00660	L_FixSet_a_1: Analog values	Linear value	23915	5D6B	A	16	INTEGER_16	100	
C00661	L_FixSet_w_1: Fixed values	Linear value	23914	5D6A	A	16	UNSIGNED_16	1	
C00662	L_FixSet_w_2: Fixed values	Linear value	23913	5D69	A	16	UNSIGNED_16	1	
C00670	L_OffsetGainP_1: Gain	Linear value	23905	5D61	E	1	INTEGER_32	10000	
C00671	L_OffsetGainP_2: Gain	Linear value	23904	5D60	E	1	INTEGER_32	10000	
C00672	L_OffsetGainP_3: Gain	Linear value	23903	5D5F	E	1	INTEGER_32	10000	
C00673	L_OffsetGainPhiP 1-2: Offset	Linear value	23902	5D5E	A	2	INTEGER_32	1	
C00674	L_OffsetGainPhiP 1-2: Gain	Linear value	23901	5D5D	A	2	INTEGER_32	1	
C00677	L_GainOffsetP 1-3: Parameter	Linear value	23898	5D5A	A	6	INTEGER_16	100	
C00678	L_GainOffsetPhiP 1-2: Parameter	Linear value	23897	5D59	A	4	INTEGER_32	1	
C00679	L_MulDiv_2: Parameter	Linear value	23896	5D58	A	2	INTEGER_16	1	
C00680	L_Compare_1: Fct.	Selection list	23895	5D57	E	1	UNSIGNED_8	1	
C00681	L_Compare_1: Hysteresis	Linear value	23894	5D56	E	1	INTEGER_16	100	
C00682	L_Compare_1: Window	Linear value	23893	5D55	E	1	INTEGER_16	100	
C00685	L_Compare_2: Fct.	Selection list	23890	5D52	E	1	UNSIGNED_8	1	
C00686	L_Compare_2: Hysteresis	Linear value	23889	5D51	E	1	INTEGER_16	100	
C00687	L_Compare_2: Window	Linear value	23888	5D50	E	1	INTEGER_16	100	
C00690	L_Compare_3: Fct.	Selection list	23885	5D4D	E	1	UNSIGNED_8	1	
C00691	L_Compare_3: Hysteresis	Linear value	23884	5D4C	E	1	INTEGER_16	100	
C00692	L_Compare_3: Window	Linear value	23883	5D4B	E	1	INTEGER_16	100	
C00693	L_Compare 4-5: Fct.	Selection list	23882	5D4A	A	2	UNSIGNED_8	1	
C00694	L_Compare 4-5: Hysteresis	Linear value	23881	5D49	A	2	INTEGER_16	100	
C00695	L_Compare 4-5: Window	Linear value	23880	5D48	A	2	INTEGER_16	100	
C00696	L_OffsetGainP_1: Offset	Linear value	23879	5D47	E	1	INTEGER_16	100	
C00697	L_OffsetGainP_2: Offset	Linear value	23878	5D46	E	1	INTEGER_16	100	
C00698	L_OffsetGainP_3: Offset	Linear value	23877	5D45	E	1	INTEGER_16	100	
C00699	L_MulDiv_1: Parameter	Linear value	23876	5D44	A	2	INTEGER_16	1	
C00700	LA_NCtrl: Analog connection list	Selection list	23875	5D43	A	29	UNSIGNED_16	1	
C00701	LA_NCtrl: Digital connection list	Selection list	23874	5D42	A	48	UNSIGNED_16	1	
C00710	LA_TabPos: Analog connection list	Selection list	23865	5D39	A	31	UNSIGNED_16	1	
C00711	LA_TabPos: Digital connection list	Selection list	23864	5D38	A	56	UNSIGNED_16	1	
C00712	LA_TabPos: phi connection list	Selection list	23863	5D37	A	3	UNSIGNED_16	1	
C00720	L_DigitalDelay_1: Delay	Linear value	23855	5D2F	A	2	UNSIGNED_32	1000	
C00721	L_DigitalDelay 2..3: Delay	Linear value	23854	5D2E	A	4	UNSIGNED_32	1000	
C00725	Current switching frequency	Selection list	23850	5D2A	E	1	UNSIGNED_8	1	
C00727	LS_Keypad digital values	Linear value	23848	5D28	A	8	UNSIGNED_8	1	
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C00728	Analog values - keypad	Linear value	23847	5D27	A	3	INTEGER_16	100	
C00729	Remote: Setpoint selection	Linear value	23846	5D26	A	2	INTEGER_16	100	
C00760	LA_SwitchPos: Analog connection list	Selection list	23815	5D07	A	25	UNSIGNED_16	1	
C00761	LA_SwitchPos: Digital connection list	Selection list	23814	5D06	A	47	UNSIGNED_16	1	
C00800	L_MPot_1: Upper limit	Linear value	23775	5CDF	E	1	INTEGER_16	100	
C00801	L_MPot_1: Lower limit	Linear value	23774	5CDE	E	1	INTEGER_16	100	
C00802	L_MPot_1: Acceleration time	Linear value	23773	5CDD	E	1	UNSIGNED_16	10	
C00803	L_MPot_1: Deceleration time	Linear value	23772	5CDC	E	1	UNSIGNED_16	10	
C00804	L_MPot_1: Inactive fct.	Selection list	23771	5CDB	E	1	UNSIGNED_8	1	
C00805	L_MPot_1: Init fct.	Selection list	23770	5CDA	E	1	UNSIGNED_8	1	
C00806	L_MPot_1: Use	Selection list	23769	5CD9	E	1	UNSIGNED_8	1	
C00807	L_NLim_1: Max.SkipFrq.	Linear value	23768	5CD8	A	3	INTEGER_16	100	
C00808	L_NLim_1: Min.SkipFrq.	Linear value	23767	5CD7	A	3	INTEGER_16	100	
C00809	L_NLim_2: Max.SkipFrq.	Linear value	23766	5CD6	A	3	INTEGER_16	100	
C00810	L_NLim_2: Min.SkipFrq.	Linear value	23765	5CD5	A	3	INTEGER_16	100	
C00811	L_NLim_1: Current output value	Linear value	23764	5CD4	A	2	INTEGER_16	100	
C00812	L_NLim: Current status	Bit coded	23763	5CD3	A	2	UNSIGNED_16	1	
C00820	L_DigitalLogic_1: Function	Selection list	23755	5CCB	E	1	UNSIGNED_8	1	
C00821	L_DigitalLogic_1: Truth table	Selection list	23754	5CCA	A	24	UNSIGNED_8	1	
C00822	L_DigitalLogic_2: Function	Selection list	23753	5CC9	E	1	UNSIGNED_8	1	
C00823	L_DigitalLogic_2: Truth table	Selection list	23752	5CC8	A	24	UNSIGNED_8	1	
C00824	L_DigitalLogic5_1: Function	Selection list	23751	5CC7	E	1	UNSIGNED_8	1	
C00825	L_DigitalLogic5_1: Truth table	Selection list	23750	5CC6	A	32	UNSIGNED_8	1	
C00826	L_DigitalLogic5_2: Function	Selection list	23749	5CC5	E	1	UNSIGNED_8	1	
C00827	L_DigitalLogic5_2: Truth table	Selection list	23748	5CC4	A	32	UNSIGNED_8	1	
C00828	L_DigitalLogic_3: Function	Selection list	23747	5CC3	E	1	UNSIGNED_8	1	
C00829	L_DigitalLogic_3: truth table	Selection list	23746	5CC2	A	24	UNSIGNED_8	1	
C00830	16-bit inputs [%]	Linear value	23745	5CC1	A	105	INTEGER_16	100	
C00831	16-bit inputs	Bit coded	23744	5CC0	A	105	UNSIGNED_16	1	
C00832	16-bit inputs [incr./ms]	Linear value	23743	5CBF	A	105	INTEGER_16	1	
C00833	Binary inputs	Selection list	23742	5CBE	A	131	UNSIGNED_8	1	
C00834	32-bit inputs [incr]	Linear value	23741	5CBD	A	12	INTEGER_32	1	
C00835	16-bit inputs [%] (Set2)	Linear value	23740	5CBC	A	162	INTEGER_16	100	
C00836	16-bit inputs (Set2)	Bit coded	23739	5CBB	A	162	UNSIGNED_16	1	
C00837	16-bit inputs [incr./ms] (Set2)	Linear value	23738	5CBA	A	162	INTEGER_16	1	
C00838	Binary inputs (Set2)	Selection list	23737	5CB9	A	213	UNSIGNED_8	1	
C00839	32-bit inputs [incr] (Set2)	Linear value	23736	5CB8	A	96	INTEGER_32	1	
C00840	16-bit inputs I/O level [%]	Linear value	23735	5CB7	A	111	INTEGER_16	100	
C00841	16-bit inputs I/O level	Bit coded	23734	5CB6	A	111	UNSIGNED_16	1	
C00843	Binary inputs I/O level	Selection list	23732	5CB4	A	199	UNSIGNED_8	1	
C00844	32-bit inputs I/O level [incr]	Linear value	23731	5CB3	A	25	INTEGER_32	1	
C00866	CAN input words	Bit coded	23709	5C9D	A	16	UNSIGNED_16	1	
C00868	CAN output words	Bit coded	23707	5C9B	A	16	UNSIGNED_16	1	
C00876	MCI input words	Bit coded	23699	5C93	A	16	UNSIGNED_16	1	
C00877	MCI output words	Bit coded	23698	5C92	A	16	UNSIGNED_16	1	
C00890	MCI_InOut: Inversion	Bit coded	23685	5C85	A	4	UNSIGNED_16	1	
C00905	Motor phase direction of rotation	Selection list	23670	5C76	E	1	UNSIGNED_8	1	CINH
C00909	Speed limitation	Linear value	23666	5C72	A	2	INTEGER_16	100	
C00910	Frequency limitation	Linear value	23665	5C71	A	2	UNSIGNED_16	1	
C00915	Motor cable length	Linear value	23660	5C6C	E	1	UNSIGNED_16	10	

Greyed out = display parameter (read only access)

Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00916	Motor cable cross-section	Linear value	23659	5C6B	E	1	UNSIGNED_16	100	
C00917	Motor cable resistance	Linear value	23658	5C6A	E	1	UNSIGNED_16	1	
C00918	SC: Start motor magnetising current	Linear value	23657	5C69	E	1	UNSIGNED_8	1	
C00919	Load moment of inertia	Linear value	23656	5C68	A	1	UNSIGNED_32	100	
C00920	Rated device currents	Linear value	23655	5C67	A	4	UNSIGNED_16	10	
C00937	Field-oriented motor currents	Linear value	23638	5C56	A	2	INTEGER_16	100	
C00938	PSM: Maximum motor current field weakening	Linear value	23637	5C55	E	1	UNSIGNED_16	100	
C00939	Ultimate motor current	Linear value	23636	5C54	E	1	UNSIGNED_16	10	
C00940	L_ConvW numerator	Linear value	23635	5C53	A	4	INTEGER_16	1	
C00941	L_ConvW denominator	Linear value	23634	5C52	A	4	INTEGER_16	1	
C00942	L_ConvW conversion method	Selection list	23633	5C51	A	4	UNSIGNED_8	1	
C00950	L_Interpolator_1: Activation FB functions	Selection list	23625	5C49	A	3	UNSIGNED_8	1	
C00951	L_Interpolator_1: No. of interpolation steps	Linear value	23624	5C48	E	1	UNSIGNED_16	1	
C00952	L_Interpolator_1: Limit value - error cycles	Linear value	23623	5C47	E	1	UNSIGNED_16	1	
C00953	L_Interpolator_1: Speed-up	Linear value	23622	5C46	E	1	UNSIGNED_8	1	
C00959	L_Curve: Current output value	Linear value	23616	5C40	A	3	INTEGER_16	100	
C00960	L_Curve_1: Selected curve type	Selection list	23615	5C3F	A	1	UNSIGNED_8	1	
C00961	L_Curve_1: Input limitation	Linear value	23614	5C3E	A	2	INTEGER_16	100	
C00963	L_Curve_1: Table X-values	Linear value	23612	5C3C	A	32	INTEGER_16	1	
C00964	L_Curve_1: Table Y-values	Linear value	23611	5C3B	A	32	INTEGER_16	1	
C00965	Max. motor speed	Linear value	23610	5C3A	E	1	UNSIGNED_16	1	
C00966	VFC: Time const. slip comp.	Linear value	23609	5C39	E	1	UNSIGNED_16	1	
C00967	VFC: Frequency interpol. point n	Linear value	23608	5C38	A	11	INTEGER_16	10	
C00968	VFC: Voltage interpol. point n	Linear value	23607	5C37	A	11	UNSIGNED_16	100	
C00969	Motor parameters	Linear value	23606	5C36	A	1	UNSIGNED_8	1	
C00970	Rated device voltage	Linear value	23605	5C35	A	1	UNSIGNED_16	1	
C00971	VFC: V/f +encoder limitation	Linear value	23604	5C34	A	2	UNSIGNED_16	100	
C00972	VFC: Vp V/f +encoder	Linear value	23603	5C33	E	1	UNSIGNED_16	1000	
C00973	VFC: Ti V/f +encoder	Linear value	23602	5C32	E	1	UNSIGNED_16	10	
C00975	VFC-ECO: Vp CosPhi controller	Linear value	23600	5C30	E	1	UNSIGNED_16	1000	
C00976	VFC-ECO: Ti CosPhi controller	Linear value	23599	5C2F	E	1	UNSIGNED_16	10	
C00977	VFC-ECO: Minimum voltage V/f	Linear value	23598	5C2E	E	1	INTEGER_16	100	
C00978	VFC-ECO: Voltage reduction	Linear value	23597	5C2D	E	1	INTEGER_16	1	
C00979	Cosine phi	Linear value	23596	5C2C	A	2	INTEGER_16	100	
C00980	Output power	Linear value	23595	5C2B	A	3	INTEGER_32	1000	
C00981	Energy display	Linear value	23594	5C2A	A	2	INTEGER_32	100	
C00982	VFC-ECO: Voltage reduction ramp	Linear value	23593	5C29	E	1	UNSIGNED_8	10	
C00983	Delay	Linear value	23592	5C28	A	2	UNSIGNED_16	1	
C00985	SLVC: Gain of field current controller	Linear value	23590	5C26	E	1	INTEGER_16	100	
C00986	SLVC: Gain of cross current controller	Linear value	23589	5C25	E	1	INTEGER_16	100	
C00987	Inverter motor brake: nAdd	Linear value	23588	5C24	E	1	INTEGER_16	1	
C00988	Inverter motor brake: PT1 filter time	Linear value	23587	5C23	E	1	INTEGER_16	10	
C00989	Restart on the fly: Flying restart frequency fd_add	Linear value	23586	5C22	A	1	INTEGER_16	100	
C00990	Flying restart fct.: Activate	Selection list	23585	5C21	E	1	UNSIGNED_8	1	CINH
C00991	Flying restart fct.: Process	Selection list	23584	5C20	E	1	UNSIGNED_16	1	
C00992	Flying restart: Start frequency	Linear value	23583	5C1F	E	1	INTEGER_16	1	
C00993	Flying restart: Integration time	Linear value	23582	5C1E	E	1	UNSIGNED_16	10	
C00994	Flying restart: Current	Linear value	23581	5C1D	E	1	INTEGER_16	100	

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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C00995	SLPSM: Controlled current setpoint	Linear value	23580	5C1C	A	2	UNSIGNED_16	100	
C00996	SLPSM: Switching speed	Linear value	23579	5C1B	A	2	INTEGER_16	100	
C00997	SLPSM: Filter cutoff frequency	Linear value	23578	5C1A	E	1	INTEGER_16	100	
C00998	SLPSM: Filter time rotor position	Linear value	23577	5C19	A	2	INTEGER_16	10	
C00999	SLPSM: PLL gain	Linear value	23576	5C18	E	1	INTEGER_16	1	
C01000	MCTRL: Status	Bit coded	23575	5C17	E	1	UNSIGNED_16	1	
C01001	Manual entry of motor type	Selection list	23574	5C16	A	1	UNSIGNED_8	1	
C01010	L_ArithmetikPhi 1-3: Function	Selection list	23565	5C0D	A	3	UNSIGNED_8	1	
C01020	L_Odometer_1: Memory length	Selection list	23555	5C03	E	1	UNSIGNED_8	1	
C01021	L_Odometer_1: Memory type	Selection list	23554	5C02	E	1	UNSIGNED_8	1	
C01022	L_Odometer_1: Input selection	Selection list	23553	5C01	E	1	UNSIGNED_8	1	
C01023	L_Odometer_1: Edge selection	Selection list	23552	5C00	E	1	UNSIGNED_8	1	
C01025	L_Curve_2: Selected curve type	Selection list	23550	5BFE	A	1	UNSIGNED_8	1	
C01026	L_Curve_2: Input limitation	Linear value	23549	5BFD	A	2	INTEGER_16	100	
C01028	L_Curve_2: Table X-values	Linear value	23547	5BFB	A	32	INTEGER_16	1	
C01029	L_Curve_2: Table Y-values	Linear value	23546	5BFA	A	32	INTEGER_16	1	
C01030	L_Curve_3: Selected curve type	Selection list	23545	5BF9	A	1	UNSIGNED_8	1	
C01031	L_Curve_3: Input limitation	Linear value	23544	5BF8	A	2	INTEGER_16	100	
C01033	L_Curve_3: Table X-values	Linear value	23542	5BF6	A	32	INTEGER_16	1	
C01034	L_Curve_3: Table Y-values	Linear value	23541	5BF5	A	32	INTEGER_16	1	
C01035	L_Curve_3: SelectCurve	Selection list	23540	5BF4	A	1	UNSIGNED_16	1	
C01040	L_SRFG_1.2 linear ramp time	Linear value	23535	5BEF	A	2	UNSIGNED_32	1000	
C01041	L_SRFG_1.2 S-ramp time	Linear value	23534	5BEE	A	2	UNSIGNED_32	1000	
C01042	L_SRFG_1.2 limitations of output values	Linear value	23533	5BED	A	4	INTEGER_16	100	
C01045	L_ConvAP 1-3: numerator/denominator	Linear value	23530	5BEA	A	6	INTEGER_16	1	
C01046	L_ConvPA 1-3: byDivision	Linear value	23529	5BE9	A	3	INTEGER_8	1	
C01047	L_GearComp_1: Offset	Linear value	23528	5BE8	A	1	INTEGER_16	1	
C01048	L_GearComp_1: Num_Denom	Linear value	23527	5BE7	A	2	INTEGER_16	1	
C01049	L_CalcDiameter_1: Status	Linear value	23526	5BE6	A	1	INTEGER_16	1	
C01050	L_CalcDiameter_1: Diameter recalculation	Linear value	23525	5BE5	A	2	UNSIGNED_32	1000	
C01051	L_CalcDiameter_1: Filter time constant	Linear value	23524	5BE4	A	1	UNSIGNED_16	1000	
C01052	L_CalcDiameter_1: Web break monitoring	Linear value	23523	5BE3	A	1	INTEGER_16	100	
C01053	L_ProcessCtrl_1: Controller times	Linear value	23522	5BE2	A	5	UNSIGNED_16	1000	
C01054	L_ProcessCtrl_1: System deviation	Linear value	23521	5BE1	A	2	INTEGER_16	100	
C01055	L_ProcessCtrl_1: Correcting variable limitation	Selection list	23520	5BE0	A	1	UNSIGNED_8	1	
C01056	L_ProcessCtrl_1: Controller gain	Linear value	23519	5BDF	A	1	UNSIGNED_16	100	
C01057	L_CalcDiameter_1: Current diameter	Linear value	23518	5BDE	A	1	UNSIGNED_32	1000	
C01058	L_PosCtrlLin 1-2: bDisable	Selection list	23517	5BDD	A	2	UNSIGNED_8	1	
C01059	L_PosCtrlLin 1-2: Positioning behaviour	Selection list	23516	5BDC	A	2	UNSIGNED_8	1	
C01060	L_PosCtrlLin 1-2: Ramps	Linear value	23515	5BDB	A	6	INTEGER_32	1000	
C01061	L_PosCtrlLin 1-2: Traversing speed	Linear value	23514	5BDA	A	4	INTEGER_16	1	
C01062	L_SwitchPoint_1: Dead time	Linear value	23513	5BD9	A	4	UNSIGNED_16	1	
C01063	L_SwitchPoint_1: Hysteresis	Linear value	23512	5BD8	A	4	UNSIGNED_16	1	
C01064	L_SwitchPoint_1: CenterMode	Selection list	23511	5BD7	A	4	UNSIGNED_8	1	
C01065	L_SwitchPoint_1: Running time	Linear value	23510	5BD6	A	4	UNSIGNED_16	1	
C01066	L_SwitchPoint_1: Status	Selection list	23509	5BD5	A	4	INTEGER_16	1	
C01067	Inversion of gearbox stages	Selection list	23508	5BD4	A	3	UNSIGNED_8	1	
C01068	L_SwitchPoint_1: Invert	Bit coded	23507	5BD3	A	1	UNSIGNED_16	1	
C01069	L_DFSET_1: Ramp settings	Linear value	23506	5BD2	A	2	UNSIGNED_16	1	

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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C01070	L_DFSET_1: Angular trimming	Linear value	23505	5BD1	A	1	INTEGER_32	1	
C01071	L_DFSET_1: Following error limit	Linear value	23504	5BD0	A	1	UNSIGNED_32	1	
C01072	L_DFSET_1: Multiplier - angular trimming	Linear value	23503	5BCF	A	1	INTEGER_16	1	
C01073	L_DFSET_1: Adjustment	Bit coded	23502	5BCE	A	1	UNSIGNED_8	1	
C01074	L_DFSET_1: Zero pulse divider	Linear value	23501	5BCD	A	2	UNSIGNED_16	1	
C01075	L_DFSET_1: Synchronisation mode	Selection list	23500	5BCC	A	1	UNSIGNED_8	1	
C01076	L_DFRFG_1: Times	Linear value	23499	5BCB	A	2	UNSIGNED_32	1000	
C01077	L_DFRFG_1: Max. speed-up	Linear value	23498	5BCA	A	1	INTEGER_16	1	
C01078	L_DFRFG_1: Following error	Linear value	23497	5BC9	A	1	UNSIGNED_32	1	
C01079	L_DFRFG_1: Synchronisation window	Linear value	23496	5BC8	A	1	UNSIGNED_16	1	
C01080	L_DFRFG_1: Offset	Linear value	23495	5BC7	A	1	INTEGER_32	1	
C01081	L_DFRFG_1: Sync. direction / TP function	Selection list	23494	5BC6	A	1	UNSIGNED_8	1	
C01082	LS_WriteParamList: Execute Mode	Selection list	23493	5BC5	E	1	UNSIGNED_8	1	
C01083	LS_WriteParamList: Error status	Linear value	23492	5BC4	E	1	UNSIGNED_16	1	
C01084	LS_WriteParamList: Error line	Linear value	23491	5BC3	E	1	UNSIGNED_8	1	
C01085	LS_WriteParamList: Index	Linear value	23490	5BC2	A	32	INTEGER_32	1000	
C01086	LS_WriteParamList: WriteValue_1	Linear value	23489	5BC1	A	32	INTEGER_32	1	
C01087	LS_WriteParamList: WriteValue_2	Linear value	23488	5BC0	A	32	INTEGER_32	1	
C01088	LS_WriteParamList: WriteValue_3	Linear value	23487	5BBF	A	32	INTEGER_32	1	
C01089	LS_WriteParamList: WriteValue_4	Linear value	23486	5BBE	A	32	INTEGER_32	1	
C01090	LS_ParReadWrite 1-6: Index	Linear value	23485	5BBD	A	6	INTEGER_32	1000	
C01091	LS_ParReadWrite 1-6: Cycle time	Selection list	23484	5BBC	A	6	UNSIGNED_16	1	
C01092	LS_ParReadWrite 1-6: FailState	Linear value	23483	5BBB	A	6	UNSIGNED_16	1	
C01093	LS_ParReadWrite 1-6: Arithmetic mode	Selection list	23482	5BBA	A	6	UNSIGNED_8	1	
C01094	LS_ParReadWrite 1-6: Numerator	Linear value	23481	5BB9	A	6	INTEGER_16	1	
C01095	LS_ParReadWrite 1-6: Denominator	Linear value	23480	5BB8	A	6	INTEGER_16	1	
C01096	LS_IRInterface: Dial-in code	Linear value	23479	5BB7	E	1	UNSIGNED_16	1	
C01097	LS_IRInterface CtrlWord1_2	Bit coded	23478	5BB6	A	34	UNSIGNED_16	1	
C01098	LS_ParReadWrite 1-6: Configuration	Bit coded	23477	5BB5	A	6	UNSIGNED_16	1	
C01100	Function L_Counter 1-3	Selection list	23475	5BB3	A	3	UNSIGNED_8	1	
C01101	Comparison L_Counter 1-3	Selection list	23474	5BB2	A	3	UNSIGNED_8	1	
C01108	L_SwitchPoint_1: Deadtime factor	Selection list	23467	5BAB	A	4	UNSIGNED_8	1	
C01110	LS_MultiEncoder: Solid measure	Selection list	23465	5BA9	E	1	UNSIGNED_8	1	
C01111	LS_MultiEncoder: Encoder constant	Linear value	23464	5BA8	A	2	INTEGER_32	1	
C01112	LS_MultiEncoder: Position values	Linear value	23463	5BA7	A	4	INTEGER_32	10000	
C01119	LS_MultiEncoder: Current position	Linear value	23456	5BA0	A	2	INTEGER_32	10000	
C01120	Sync signal source	Selection list	23455	5B9F	E	1	UNSIGNED_8	1	
C01121	Sync cycle time setpoint	Linear value	23454	5B9E	E	1	UNSIGNED_16	1	
C01122	Sync phase position	Linear value	23453	5B9D	E	1	UNSIGNED_16	1	
C01123	Sync window	Linear value	23452	5B9C	E	1	UNSIGNED_16	1	
C01124	Sync correction width	Selection list	23451	5B9B	E	1	UNSIGNED_8	1	
C01130	LS_RetainData: Selection	Bit coded	23445	5B95	A	4	UNSIGNED_16	1	
C01131	LS_RetainData: 16Bit data	Linear value	23444	5B94	A	4	UNSIGNED_16	1	
C01132	LS_RetainData: 32Bit data	Linear value	23443	5B93	A	4	INTEGER_32	1	
C01133	LS_RetainData: Bool data	Selection list	23442	5B92	A	4	UNSIGNED_8	1	
C01134	LS_RetainData: 16Bit data	Linear value	23441	5B91	A	4	UNSIGNED_16	1	
C01135	LS_RetainData: 32Bit data	Linear value	23440	5B90	A	4	INTEGER_32	1	
C01136	LS_RetainData: Bool data	Selection list	23439	5B8F	A	4	UNSIGNED_8	1	
C01138	L_Transient 1-4: Function	Selection list	23437	5B8D	A	4	UNSIGNED_8	1	
C01139	L_Transient 1-4: Pulse duration	Linear value	23436	5B8C	A	4	UNSIGNED_16	1000	

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Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C01140	L_Transient 5-8: Function	Selection list	23435	5B8B	A	4	UNSIGNED_8	1	
C01141	L_Transient 5-8 pulse duration	Linear value	23434	5B8A	A	4	UNSIGNED_16	1000	
C01150	L_PhaseIntK: Function	Selection list	23425	5B81	A	2	UNSIGNED_8	1	
C01151	L_PhaseIntK: Compare	Linear value	23424	5B80	A	2	INTEGER_32	1	
C01201	MCK: Cycle	Linear value	23374	5B4E	A	1	INTEGER_32	10000	
C01202	MCK: iM motor/process	Linear value	23373	5B4D	A	2	UNSIGNED_16	1	
C01203	MCK: iG motor/position encoder	Linear value	23372	5B4C	A	2	UNSIGNED_16	1	
C01204	MCK: Feed constant	Linear value	23371	5B4B	E	1	INTEGER_32	10000	
C01205	MCK: Position resolution	Linear value	23370	5B4A	E	1	INTEGER_32	10000	
C01206	MCK: Mounting direction	Selection list	23369	5B49	A	2	UNSIGNED_8	1	CINH
C01210	MCK: Current positions	Linear value	23365	5B45	A	9	INTEGER_32	10000	
C01211	MCK: Speed	Linear value	23364	5B44	A	3	INTEGER_32	10000	
C01213	MCK: Max. traversing distance	Linear value	23362	5B42	A	1	INTEGER_32	1	
C01215	MCK: Following error	Linear value	23360	5B40	A	3	INTEGER_32	10000	
C01216	MCK: Positioning setting	Bit coded	23359	5B3F	E	1	UNSIGNED_8	1	
C01218	MCK: Position follower setting	Bit coded	23357	5B3D	E	1	UNSIGNED_8	1	
C01219	MCK: Speed follower setting	Bit coded	23356	5B3C	E	1	UNSIGNED_8	1	
C01220	MCK: Ref. setting	Bit coded	23355	5B3B	A	1	UNSIGNED_16	1	
C01221	MCK: Homing mode	Selection list	23354	5B3A	E	1	UNSIGNED_8	1	
C01222	MCK: Ref. M limit mode 14/15	Linear value	23353	5B39	E	1	INTEGER_16	100	
C01223	MCK: Ref. waiting time mode 14/15	Linear value	23352	5B38	E	1	UNSIGNED_16	1	
C01224	MCK: Ref. speeds	Linear value	23351	5B37	A	2	INTEGER_32	10000	
C01225	MCK: Ref. accelerations	Linear value	23350	5B36	A	2	INTEGER_32	10000	
C01226	MCK: Ref. S-ramp time	Linear value	23349	5B35	A	1	UNSIGNED_16	1000	
C01227	MCK: Ref. positions	Linear value	23348	5B34	A	2	INTEGER_32	10000	
C01228	MCK: Ref. sequence profile	Linear value	23347	5B33	E	1	UNSIGNED_8	1	
C01229	MCK: Position limiting values	Linear value	23346	5B32	A	2	INTEGER_32	10000	
C01230	Manual jog: Setting	Bit coded	23345	5B31	E	1	UNSIGNED_8	1	
C01231	MCK: Manual jog speeds	Linear value	23344	5B30	A	2	INTEGER_32	10000	
C01232	MCK: Manual jog accelerations	Linear value	23343	5B2F	A	2	INTEGER_32	10000	
C01233	MCK: Manual jog S-ramp time	Linear value	23342	5B2E	A	1	UNSIGNED_16	1000	
C01234	MCK: Manual jog breakpoints	Linear value	23341	5B2D	A	4	INTEGER_32	10000	
C01235	MCK: Manual jog waiting times	Linear value	23340	5B2C	A	1	UNSIGNED_16	1000	
C01236	MCK: Speed follower	Linear value	23339	5B2B	A	1	INTEGER_32	10000	
C01237	MCK: Acceleration follower	Linear value	23338	5B2A	A	2	INTEGER_32	10000	
C01238	MCK: S-ramp time follower	Linear value	23337	5B29	A	1	UNSIGNED_16	1000	
C01239	Setpoint holding	Linear value	23336	5B28	E	1	UNSIGNED_32	1	
C01240	MCK: Control word	Bit coded	23335	5B27	E	1	UNSIGNED_32	1	
C01241	MCK: Status word	Bit coded	23334	5B26	E	1	UNSIGNED_32	1	
C01242	MCK: Current pos profile number	Linear value	23333	5B25	E	1	UNSIGNED_8	1	
C01243	MCK: Current operating mode	Selection list	23332	5B24	E	1	UNSIGNED_8	1	
C01244	MCK: Target detection - times	Linear value	23331	5B23	A	3	UNSIGNED_16	1	
C01245	MCK: Target detection - positions	Linear value	23330	5B22	A	3	INTEGER_32	10000	
C01246	MCK: Select signal source	Selection list	23329	5B21	A	2	UNSIGNED_8	1	
C01247	MCK: Diagnostic word	Bit coded	23328	5B20	E	1	UNSIGNED_32	1	
C01248	MCK: Ref. step	Selection list	23327	5B1F	A	1	UNSIGNED_8	1	
C01251	MCK: Acceleration stop	Linear value	23324	5B1C	A	1	INTEGER_32	10000	
C01252	MCK: S-ramp times stop	Linear value	23323	5B1B	A	1	UNSIGNED_16	1000	
C01294	Mode: Position calculation	Selection list	23281	5AF1	A	3	UNSIGNED_8	1	
C01295	L_MCKStateInterface_1: Pos. selection	Selection list	23280	5AF0	E	1	UNSIGNED_8	1	

Greyed out = display parameter (read only access)

Code	Name	Parameter type	Index		DS	DA	Data		
			dec	hex			Data type	Factor	CINH
C01296	Mode: Position calculation	Selection list	23279	5AEF	A	2	UNSIGNED_8	1	
C01297	L_MckCtrlInterface_1: Alternative function	Bit coded	23278	5AEE	E	1	UNSIGNED_8	1	
C01298	MCK: Operating mode change with profile no.	Selection list	23277	5AED	A	4	UNSIGNED_8	1	
C01299	MCKI: Status MCKInterface	Bit coded	23276	5AEC	E	1	UNSIGNED_8	1	
C01300	Profile data: Positioning mode	Selection list	23275	5AEB	A	15	UNSIGNED_8	1	
C01301	Profile data: Position	Linear value	23274	5AEA	A	15	INTEGER_32	10000	
C01302	Profile data: Speed	Linear value	23273	5AE9	A	15	INTEGER_32	10000	
C01303	Profile data: Acceleration	Linear value	23272	5AE8	A	15	INTEGER_32	10000	
C01304	Profile data: Deceleration	Linear value	23271	5AE7	A	15	INTEGER_32	10000	
C01305	Profile data: Final speed	Linear value	23270	5AE6	A	15	INTEGER_32	10000	
C01306	Profile data: S-ramp time	Linear value	23269	5AE5	A	15	UNSIGNED_16	1000	
C01307	Profile data: Sequence profile	Linear value	23268	5AE4	A	15	UNSIGNED_8	1	
C01308	Profile data: TP profile	Linear value	23267	5AE3	A	15	UNSIGNED_8	1	
C01309	Profile data: TP signal source	Selection list	23266	5AE2	A	15	UNSIGNED_8	1	
C01469	L_MFail: Vp	Linear value	23106	5A42	A	1	UNSIGNED_16	1000	
C01470	L_MFail: Tn	Linear value	23105	5A41	A	3	UNSIGNED_16	1	
C01501	Resp. to communication error with MCI	Selection list	23074	5A22	A	2	UNSIGNED_8	1	
C01670	L_ComparePhi 1-5: Function	Selection list	22905	5979	A	5	UNSIGNED_8	1	
C01671	L_ComparePhi 1-5: Hysteresis	Linear value	22904	5978	A	5	INTEGER_32	1	
C01672	L_ComparePhi 1-5: Window	Linear value	22903	5977	A	5	INTEGER_32	1	
C01700	Energy saving mode: Mode	Linear value	22875	595B	A	2	UNSIGNED_8	1	
C01701	Energy saving mode: toff min	Linear value	22874	595A	A	1	UNSIGNED_16	1	
C01702	Energy saving mode: toff	Linear value	22873	5959	A	1	UNSIGNED_16	1	
C01703	Energy saving mode: ton	Linear value	22872	5958	A	1	UNSIGNED_16	1	
C01704	Energy saving mode: Function	Bit coded	22871	5957	A	1	UNSIGNED_16	1	
C01709	Energy saving mode: Status	Linear value	22866	5952	A	1	UNSIGNED_8	1	
C01770	Filter time - earth-fault detect. is running	Linear value	22805	5915	E	1	UNSIGNED_8	1	
C01902	Diagnostics X70: Max. baud rate	Selection list	22673	5891	E	1	UNSIGNED_16	1	
C01903	Diagnostics X70: Change baud rate	Selection list	22672	5890	E	1	UNSIGNED_8	1	
C01905	Diagnostics X70: Current baud rate	Linear value	22670	588E	E	1	UNSIGNED_32	1	
C02200	LS_WriteParamList: Function	Selection list	22375	5767	A	2	UNSIGNED_8	1	
C02210	LS_WriteParamList: Motor control	Selection list	22365	575D	A	4	UNSIGNED_8	1	
C02212	LS_WriteParamList: VFC: V/f base frequency	Linear value	22363	575B	A	4	UNSIGNED_16	10	
C02213	LS_WriteParamList: VFC: Vmin boost	Linear value	22362	575A	A	4	UNSIGNED_16	100	
C02214	LS_WriteParamList: Switching frequency	Selection list	22361	5759	A	4	UNSIGNED_8	1	
C02215	LS_WriteParamList: Auto-DCB: Threshold	Linear value	22360	5758	A	4	UNSIGNED_16	1	
C02216	LS_WriteParamList: Slip compensation	Linear value	22359	5757	A	4	INTEGER_16	100	
C02217	LS_WriteParamList: Imax in motor mode	Linear value	22358	5756	A	4	UNSIGNED_16	100	
C02218	LS_WriteParamList: Imax in generator mode	Linear value	22357	5755	A	4	INTEGER_16	100	
C02219	LS_WriteParamList: DC braking: Current	Linear value	22356	5754	A	4	INTEGER_16	100	
C02220	LS_WriteParamList: Vp speed controller	Linear value	22355	5753	A	12	UNSIGNED_16	100	
C02221	LS_WriteParamList: Ti speed controller	Linear value	22354	5752	A	12	UNSIGNED_16	10	
C02222	LS_WriteParamList: SC: Tdn speed controller	Linear value	22353	5751	A	4	UNSIGNED_16	100	
C02223	LS_WriteParamList: Imax/M controller gain	Linear value	22352	5750	A	8	UNSIGNED_16	100	
C02224	LS_WriteParamList: Imax/M controller reset time	Linear value	22351	574F	A	8	UNSIGNED_16	1	
C02225	LS_WriteParamList: Vp current controller	Linear value	22350	574E	A	4	UNSIGNED_16	100	

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Code	Name	Parameter type	Index		Data				
			dec	hex	DS	DA	Data type	Factor	CINH
C02226	LS_WriteParamList: Ti current controller	Linear value	22349	574D	A	4	UNSIGNED_16	100	
C02227	LS_WriteParamList: SC: Vp field controller	Linear value	22348	574C	A	4	UNSIGNED_16	100	
C02228	LS_WriteParamList: SC: Tn field controller	Linear value	22347	574B	A	4	UNSIGNED_16	10	
C02229	LS_WriteParamList: SC: settings	Selection list	22346	574A	A	16	UNSIGNED_8	1	
C02230	LS_WriteParamList: Override point of field weakening	Linear value	22345	5749	A	4	INTEGER_16	1	
C02231	LS_WriteParamList: Rated motor power	Linear value	22344	5748	A	4	UNSIGNED_16	100	
C02232	LS_WriteParamList: Motor rotor resistance	Linear value	22343	5747	A	4	UNSIGNED_32	1	
C02233	LS_WriteParamList: Motor stator resistance	Linear value	22342	5746	A	4	UNSIGNED_32	1	
C02234	LS_WriteParamList: Motor stator leakage inductance	Linear value	22341	5745	A	4	UNSIGNED_16	100	
C02236	LS_WriteParamList: Rated motor speed	Linear value	22339	5743	A	4	UNSIGNED_16	1	
C02237	LS_WriteParamList: Rated motor current	Linear value	22338	5742	A	4	UNSIGNED_16	100	
C02238	LS_WriteParamList: Rated motor frequency	Linear value	22337	5741	A	4	UNSIGNED_16	1	
C02239	LS_WriteParamList: Rated motor voltage	Linear value	22336	5740	A	4	UNSIGNED_16	1	
C02240	LS_WriteParamList: Motor cosine phi	Linear value	22335	573F	A	4	UNSIGNED_8	100	
C02241	LS_WriteParamList: Motor magnetizing inductance	Linear value	22334	573E	A	4	UNSIGNED_16	10	
C02242	LS_WriteParamList: Motor magnetising current	Linear value	22333	573D	A	4	UNSIGNED_16	100	
C02244	LS_WriteParamList: Auto-DCB: hold time	Linear value	22331	573B	A	4	UNSIGNED_32	1000	
C02245	LS_WriteParamList: DC braking: Hold time	Linear value	22330	573A	A	4	UNSIGNED_32	1000	
C02246	LS_WriteParamList: Setting of motor overload (I ² xt)	Linear value	22329	5739	A	4	INTEGER_16	100	
C02249	LS_WriteParamList: Oscillation damping influence	Linear value	22326	5736	A	4	UNSIGNED_16	100	
C02250	LS_WriteParamList: Filter time - oscill. damping	Linear value	22325	5735	A	4	UNSIGNED_8	1	
C02251	LS_WriteParamList: Oscillation damping field weakening	Linear value	22324	5734	A	4	UNSIGNED_8	1	
C02252	LS_WriteParamList: Kp position controller	Linear value	22323	5733	A	4	UNSIGNED_16	100	
C02256	LS_WriteParamList: Moment of inertia	Linear value	22319	572F	A	4	UNSIGNED_32	100	
C02260	LS_WriteParamList: Speed sensor selection	Selection list	22315	572B	A	4	UNSIGNED_8	1	
C02261	LS_WriteParamList: SC: Field feedforward control	Linear value	22314	572A	A	4	UNSIGNED_16	1	
C02262	LS_WriteParamList: SC: Vp field weakening controller	Linear value	22313	5729	A	4	UNSIGNED_16	10000	
C02263	LS_WriteParamList: SC: Tn field weakening controller	Linear value	22312	5728	A	4	UNSIGNED_16	10	
C02264	LS_WriteParamList: Sensibility - Setpoint feedforward control	Selection list	22311	5727	A	4	UNSIGNED_8	1	
C02272	LS_WriteParamList: Motor phase direction of rotation	Selection list	22303	571F	A	4	UNSIGNED_8	1	CINH
C02273	LS_WriteParamList: Speed limitation	Linear value	22302	571E	A	8	INTEGER_16	100	
C02274	LS_WriteParamList: Frequency limitation	Linear value	22301	571D	A	8	UNSIGNED_16	1	
C02275	LS_WriteParamList: Motor cable length	Linear value	22300	571C	A	4	UNSIGNED_16	10	
C02276	LS_WriteParamList: Motor cable cross-section	Linear value	22299	571B	A	4	UNSIGNED_16	100	
C02278	LS_WriteParamList: PSM: Maximum motor current field weakening	Linear value	22297	5719	A	4	UNSIGNED_16	100	
C02279	LS_WriteParamList: Ultimate motor current	Linear value	22296	5718	A	4	UNSIGNED_16	10	
C02280	LS_WriteParamList: Max. motor speed	Linear value	22295	5717	A	4	UNSIGNED_16	1	
C02281	LS_WriteParamList: VFC: Time const. slip comp.	Linear value	22294	5716	A	4	UNSIGNED_16	1	

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Code	Name	Parameter type	Index		Data				
			dec	hex	DS	DA	Data type	Factor	CINH
C02284	LS_WriteParamList: VFC: limitation V/f +encoder	Linear value	22291	5713	A	8	UNSIGNED_16	100	
C02285	LS_WriteParamList: VFC: Vp V/f +encoder	Linear value	22290	5712	A	4	UNSIGNED_16	1000	
C02286	LS_WriteParamList: VFC: Ti V/f +encoder	Linear value	22289	5711	A	4	UNSIGNED_16	10	
C02287	LS_WriteParamList: VFC-ECO: Vp CosPhi controller	Linear value	22288	5710	A	4	UNSIGNED_16	1000	
C02288	LS_WriteParamList: VFC-ECO: Ti CosPhi controller	Linear value	22287	570F	A	4	UNSIGNED_16	10	
C02289	LS_WriteParamList: VFC-ECO: Minimum voltage U/f	Linear value	22286	570E	A	4	INTEGER_16	100	
C02290	LS_WriteParamList: VFC-ECO: Voltage reduction ramp	Linear value	22285	570D	A	4	UNSIGNED_8	10	
C02291	LS_WriteParamList: SLVC: Field current controller gain	Linear value	22284	570C	A	4	INTEGER_16	100	
C02292	LS_WriteParamList: SLVC: Cross current controller gain	Linear value	22283	570B	A	4	INTEGER_16	100	
C02293	LS_WriteParamList: Inverter motor brake: nAdd	Linear value	22282	570A	A	4	INTEGER_16	1	
C02294	LS_WriteParamList: Inverter motor brake: PT1 filter time	Linear value	22281	5709	A	4	INTEGER_16	10	
C02295	LS_WriteParamList: Flying restart fct.: activation	Selection list	22280	5708	A	4	UNSIGNED_8	1	CINH
C02296	LS_WriteParamList: Flying restart fct.: process	Selection list	22279	5707	A	4	UNSIGNED_16	1	
C02297	LS_WriteParamList: Flying restart: start frequency	Linear value	22278	5706	A	4	INTEGER_16	1	
C02298	LS_WriteParamList: Flying restart fct: int. time	Linear value	22277	5705	A	4	UNSIGNED_16	10	
C02299	LS_WriteParamList: Flying restart fct.: current	Linear value	22276	5704	A	4	INTEGER_16	100	
C02300	LS_WriteParamList: SLPSM: Controlled current setpoint	Linear value	22275	5703	A	8	UNSIGNED_16	100	
C02301	LS_WriteParamList: SLPSM: Switching speed	Linear value	22274	5702	A	8	INTEGER_16	100	
C02302	LS_WriteParamList: SLPSM: Filter time - rotor position	Linear value	22273	5701	A	4	INTEGER_16	100	
C02303	LS_WriteParamList: SLPSM: Filter time rotor position	Linear value	22272	5700	A	8	INTEGER_16	10	
C02304	LS_WriteParamList: SLPSM: PLL gain	Linear value	22271	56FF	A	4	INTEGER_16	1	
C02305	LS_WriteParamList: PSM: Ppp saturation characteristic	Linear value	22270	56FE	A	68	UNSIGNED_8	1	
C02306	LS_WriteParamList: PSM: Imax Ppp saturation characteristic	Linear value	22269	56FD	A	4	UNSIGNED_16	10	
C02307	LS_WriteParamList: PSM: Activate Ppp saturation char.	Selection list	22268	56FC	A	4	UNSIGNED_8	1	
C02311	LS_WriteParamList: PLI without motion: Adaptation of time duration	Linear value	22264	56F8	A	4	INTEGER_8	1	
C02312	LS_WriteParamList: PLI without motion	Bit coded	22263	56F7	A	4	UNSIGNED_16	1	
C02313	LS_WriteParamList: PLI without motion: Adaptation of ident angle	Linear value	22262	56F6	A	4	INTEGER_8	1	
C02315	LS_WriteParamList: Manual entry of motor type	Selection list	22260	56F4	A	4	UNSIGNED_8	1	
C02556	Position controller: Limitation	Linear value	22019	5603	A	1	INTEGER_32	1	
C02580	Holding brake: Operating mode	Selection list	21995	55EB	E	1	UNSIGNED_8	1	
C02581	Holding brake: Speed thresholds	Linear value	21994	55EA	A	5	INTEGER_16	100	
C02582	Holding brake: Setting	Bit coded	21993	55E9	E	1	UNSIGNED_8	1	
C02589	Holding brake: Time system	Linear value	21986	55E2	A	4	UNSIGNED_16	1	
C02593	Holding brake: Activation time	Linear value	21982	55DE	A	4	UNSIGNED_32	1000	
C02607	Holding brake: Status	Bit coded	21968	55D0	E	1	UNSIGNED_16	1	

Greyed out = display parameter (read only access)

Code	Name	Parameter type	Index		Data				
			dec	hex	DS	DA	Data type	Factor	CINH
C02610	MCK: Accel./decel. times	Linear value	21965	55CD	A	3	UNSIGNED_32	1000	
C02611	MCK: Limitations	Linear value	21964	55CC	A	5	INTEGER_16	100	
C02652	Settings of measuring system	Bit coded	21923	55A3	E	1	UNSIGNED_16	1	
C02810	TP: Edge selection	Selection list	21765	5505	A	6	UNSIGNED_8	1	
C02811	TP: Sensor delay	Linear value	21764	5504	A	6	UNSIGNED_16	1	
C02812	TP: Position offset	Linear value	21763	5503	A	6	INTEGER_32	10000	
C02813	TP: Pos window start	Linear value	21762	5502	A	3	INTEGER_32	10000	
C02814	TP: Pos window end	Linear value	21761	5501	A	3	INTEGER_32	10000	
C02815	TP: Position source	Selection list	21760	5500	A	6	UNSIGNED_8	1	
C02816	TP: Signal counter	Linear value	21759	54FF	A	6	UNSIGNED_16	1	
C02817	TP: TouchProbe position	Linear value	21758	54FE	A	6	INTEGER_32	10000	
C02830	Dlx: Debounce time	Selection list	21745	54F1	A	6	UNSIGNED_8	1	
C02840	CountInx: Parameter	Linear value	21735	54E7	A	4	UNSIGNED_32	1	
C02841	CountInx: Counter content	Linear value	21734	54E6	A	2	UNSIGNED_32	1	
C02842	FreqInx: Offset	Linear value	21733	54E5	A	2	INTEGER_16	100	
C02843	FreqInx: Gain	Linear value	21732	54E4	A	2	INTEGER_16	100	
C02844	FreqIn12: Function	Selection list	21731	54E3	A	1	UNSIGNED_8	1	
C02845	FreqIn12: PosIn comparison value	Linear value	21730	54E2	E	1	INTEGER_32	1	
C02853	PSM: Lss saturation characteristic	Linear value	21722	54DA	A	17	UNSIGNED_8	1	
C02855	PSM: Imax Lss saturation characteristic	Linear value	21720	54D8	E	1	UNSIGNED_16	10	
C02859	PSM: Activate Ppp saturation char.	Selection list	21716	54D4	E	1	UNSIGNED_8	1	
C02864	MCTRL: Optimisations	Bit coded	21711	54CF	A	1	UNSIGNED_16	1	
C02865	MCTRL: Special settings	Bit coded	21710	54CE	A	1	UNSIGNED_16	1	
C02866	MCTRL: Special settings	Selection list	21709	54CD	A	3	UNSIGNED_8	1	CINH
C02867	Identification process	Selection list	21708	54CC	A	1	UNSIGNED_8	1	CINH
C02868	Setting of compatibility	Bit coded	21707	54CB	A	1	UNSIGNED_32	1	
C02870	PLI without motion: Optimisation factor	Linear value	21705	54C9	A	1	INTEGER_16	100	
C02871	PLI without motion: Running time	Linear value	21704	54C8	A	1	INTEGER_16	100	
C02872	PLI without motion: Adaptation of time duration	Linear value	21703	54C7	A	1	INTEGER_8	1	
C02873	PLI without motion: Ident. el. rotor displ. angle	Linear value	21702	54C6	A	1	INTEGER_16	1	
C02874	PLI without motion	Bit coded	21701	54C5	A	1	UNSIGNED_16	1	
C02875	PLI without motion: Adaptation of ident angle	Linear value	21700	54C4	A	1	INTEGER_8	1	
C02879	Slip calculation from equivalent circuit diagram	Bit coded	21696	54C0	A	1	UNSIGNED_16	1	

Greyed out = display parameter (read only access)

17 Working with the FB Editor

The function block editor (in the following called "FB Editor") is available in the »Engineer« from the "StateLine" device version.

The FB Editor can be used to:

- carry out an online monitoring of the technology application running in the device (e.g. for diagnostic purposes).
- reconfigure the I/O interconnection of the technology application.
- implement an individual drive solution (from "HighLine" version).



Note!

The illustrations of the FB Editor user interface and the dialog boxes in this documentation are based on the »Engineer« V2.10.

17.1

Basics

Using the function block interconnection, any signal interconnection can be implemented. Various FBs are available for digital signal processing, signal conversion and logic modules.

For special tasks it has proved of value to use the integrated technology applications as a basis for modifications or extensions of the available FB interconnections. Moreover, from the "HighLine" version onwards, the experienced user has the opportunity to implement own drive solutions independent of the predefined technology applications by using the "free interconnection".

For this purpose, the FB Editor provides the following functions:

- Copying & pasting of interconnection elements (also device-independent)
- Export & import of the interconnection
- Comparison of two interconnections (also online <-> offline comparison)
- Overview window and zoom functions
- Comments on the signal flow
- Online monitoring

The option to mask out non-used inputs and outputs of modules is also sensible to minimise the complexity of the FB interconnection and to adapt the clarity of the interconnection to the customers need.

All graphical information of the FB interconnection view (positions of the FBs, line or flag presentation of the connection, visibility of the inputs/outputs) are saved with the parameter set in the memory module of the inverter and can be uploaded any time into the FB Editor of the »Engineer« even if the Engineer project is not available.



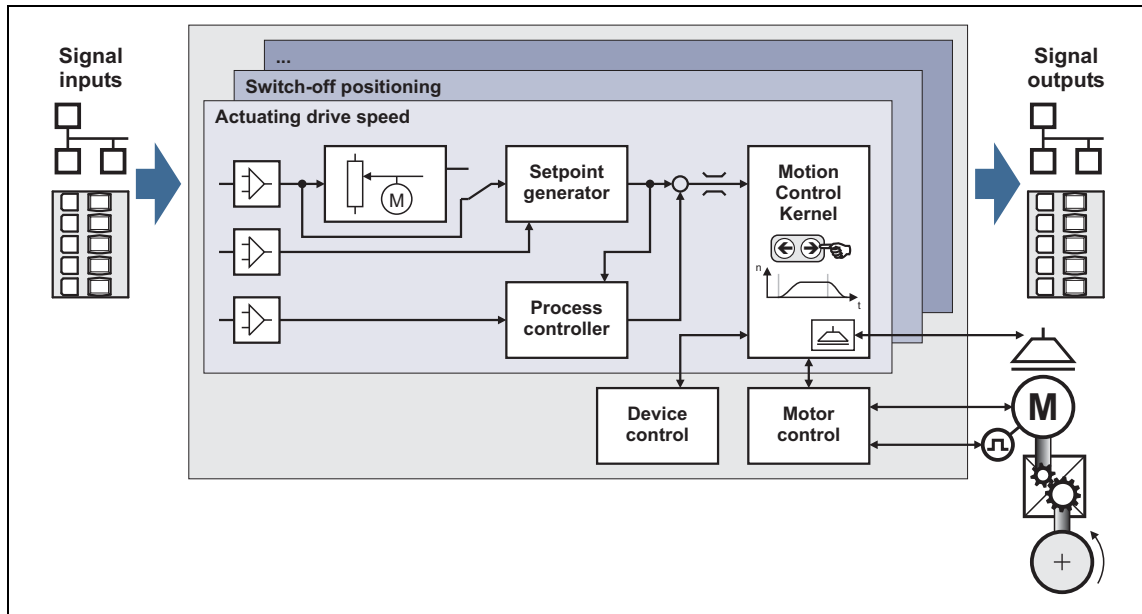
Note!

With the "StateLine" version, the interconnection shown in the application level cannot be edited.

17.1.1 Basic components of a drive solution

A drive solution consists of the following basic components:

- Signal inputs (for control and setpoint signals)
- Signal flow of the technology application
- Signal outputs (for status and actual value signals)



[17-1] Basic components of a drive solution

Regarding the 8400 device series, these three components are available for the FB interconnection and classified as follows:

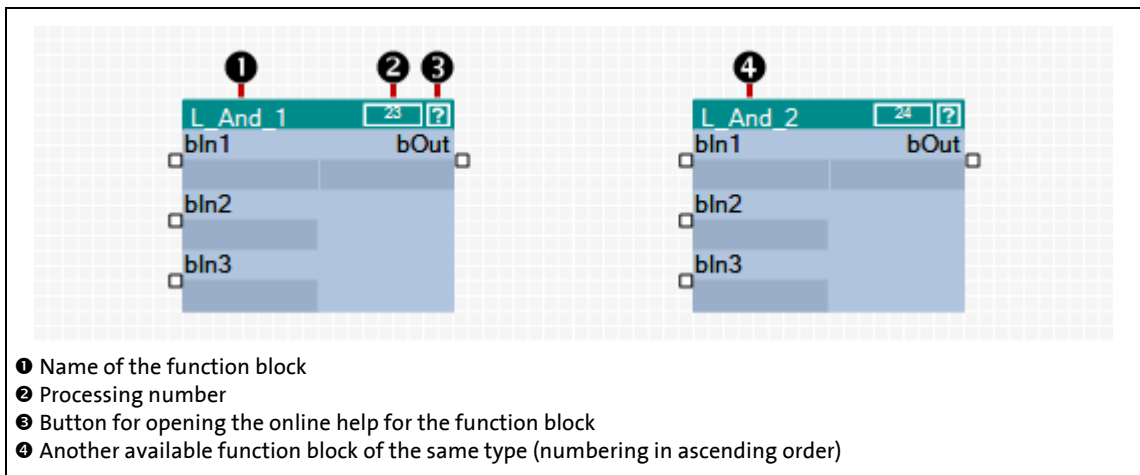
Module type	Name	Task	Example
Function block	L_name	General function block for free interconnection (only HighLine)	L_Compare_1 L_PCTRL_1
System block	LS_name	Signal interface to inverter-internal functions	LS_DigitalInput LS_DriveInterface
Port block	LP_name	<ul style="list-style-type: none"> • Process data communication via a fieldbus using a communication module • Process data communication via CAN on board 	LP_CanIn1 LP_CanOut1 LP_MciIn LP_MciOut
Application block	LA_name	Block for a technology application	LA_NCtrl LA_SwitchPos

Further information on the individual modules can be obtained from the following subchapters!

17.1.1.1 What is a function block?

A function block (FB) can be compared with an integrated circuit that contains a certain control logic and provides one or several values when being executed.

- The function blocks are classified alphabetically in a "function library".
- Each function block has a unique identifier and a processing number which defines the position at which the function block is calculated during runtime.



[17-2] Information on a function block in the FB Editor




Tip!

A detailed description of all available function blocks can be found in the main chapter "[Function library](#)". ([1222](#))

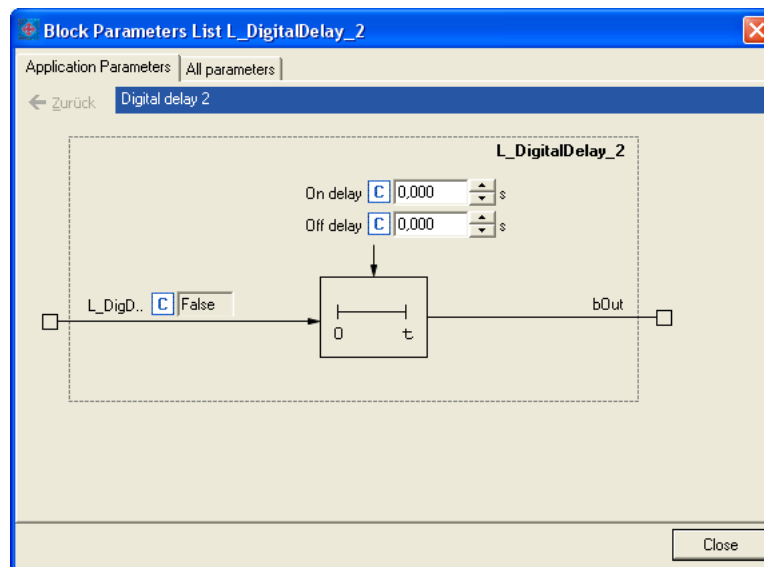
17.1.1.2 Parameterisable function blocks

Some function blocks have parameters which serve to change particular settings during operation, if required, or which display actual values & status information.

- The  icon in the head of the module, a double-click on the module, or the **Parameter...** command in the *Context menu* of the module serve to open the parameterisation dialog or the parameter list for the module.

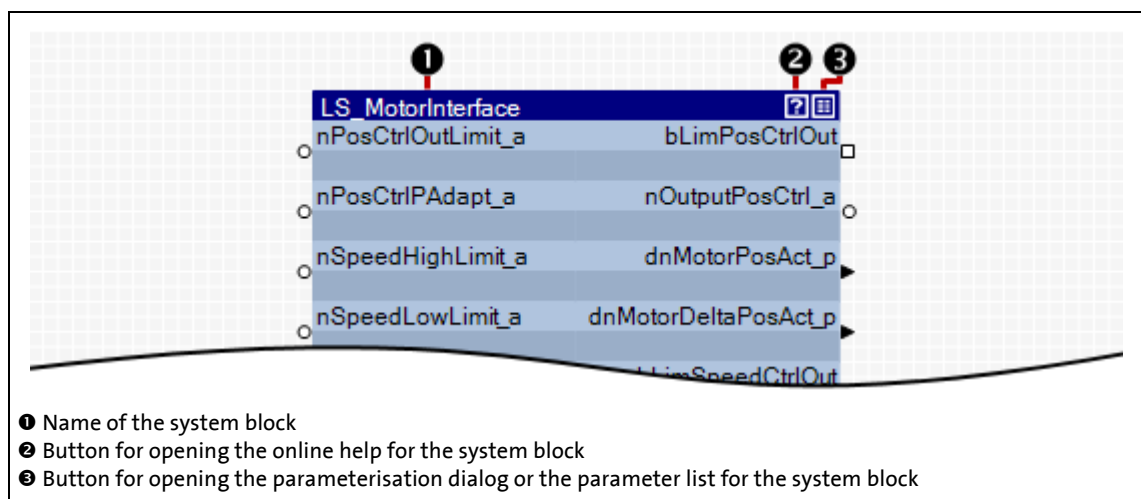
Example

Parameterisation dialog for the FB **L_DigitalDelay_2**:



17.1.1.3 What is a system block?

System blocks are a special variant of a function block. They partly activate real hardware, e. g. the digital and analog inputs/outputs and the motor control.



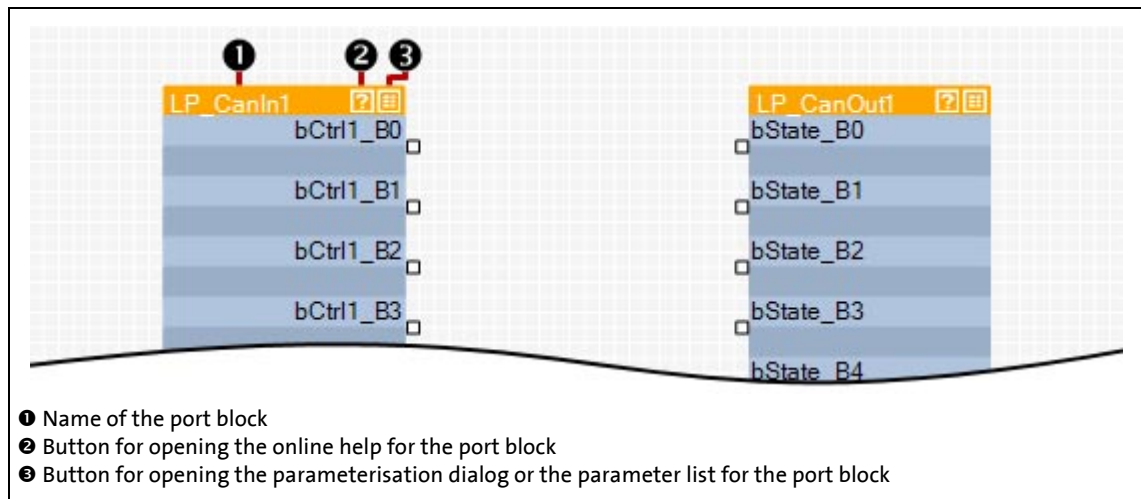
[17-3] Example: System block "LS_MotorInterface" for mapping the motor control

17.1.1.4 What is a port block?

A port block is a signal interface to a fieldbus. Input/output ports represent the input and output process data of the fieldbus.

- Port blocks LP_CanIn/LP_CanOut: Signal interface to the CAN bus
- Port blocks LP_MciIn/LP_MciOut: Signal interface for communication option

If, for instance, the inverter is to be controlled via CAN bus or a communication option (PROFIBUS or PROFINET), the input/output ports are connected to the application block (device-internal signal processing) in the I/O level of the FB Editor.



[17-4] Example: Input port "LP_CanIn1" and output port "LP_CanOut1"

17.1.1.5 What is an application block?

The application/technology function set in [C00005](#) is shown as application block in the I/O level of the FB Editor.

The application block comprises the signal flow processing generated via function block interconnection for the selected application in each case (e.g. "actuating drive speed" or "switch-off positioning"). The function block interconnection is shown in detail on the application level.



Tip!

Every application block features so-called "free inputs and outputs" which you can use to transfer signals from the I/O level to the application level and vice versa.

- In the Lenze setting, these connectors are hidden in the function block editor.
- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

17.1.2 Conventions used for input/output identifiers

This chapter describes the conventions used for the identifiers of the inputs/outputs of the blocks. The conventions ensure a uniform and consistent terminology and make reading and comprehending the interconnection and application easier.



Tip!

The conventions used by Lenze are based on the "Hungarian Notation". This ensures that the most significant characteristics of the corresponding input/output (e.g. the data type) can be instantly recognised from its identifier.

An identifier consists of

- a data type entry
- an identifier (the "proper" name of the input/output)
- an (optional) signal type specification

Data type entry

The data type entry provides information about the data type of the corresponding input/output:

Data type entry	Meaning	Resolution	Value range
b	BOOL	1 bit	0 ≡ FALSE / 1 ≡ TRUE
dn	DINT	32 bits	-2147483647 ... 2147483647
n	INT	16 bits	-32767 ... 32767
w	WORD	16 bits	0 ... 65535

Identifier

The identifier is the proper name of the input/output and should indicate the application or function.

- Identifiers always start with a capital letter.
- If an identifier consists of several "words", then each "word" must start with a capital letter.
- All other letters are written in lower case.

Signal type entry

In general, it is possible to assign a certain signal type to the inputs and outputs of the Lenze function blocks. There are e.g. digital, scaled, position, acceleration and speed signals.

- A corresponding ending (preceded by an underscore) is added to the identifier of the corresponding input/output to indicate the signal type.

Signal type entry & port symbol in the FB Editor	Meaning	Resolution	Value range	
_a	○	Analog/scaled	16 bits	± 199.99 %
_v	◀/▶	Angular velocity	16 bits	± 30000.0 rpm
_p	◀/▶	Position	32 bits	$-2^{31} \dots 2^{31}-1$ increments
	□	Digital (BOOL)	8 bits	0 ≡ FALSE; 1 ≡ TRUE
	■	Other (WORD)	16 bits	0 ... 65535
	■	Other (DINT)	32 bits	-2147483647 ... 2147483647

17.1.3 Scaling of physical units

With regard to the parameter setting & configuration of the inverter it is very helpful to know the signal types and their scaling listed in the following table, which are used to process physical values (e.g. an angular velocity or position) in the function block interconnection.

Signal type entry & port symbol in the FB Editor	Meaning	Scaling		
		External value	≡ internal value	
_a	○	Analog/scaled	100 %	≡ $2^{14} \equiv 16384$
_v	◀/▶	Angular velocity	15000 rpm	≡ $2^{14} \equiv 16384$
_p	◀/▶	Position	1 encoder revolution	≡ 2^{16} increments

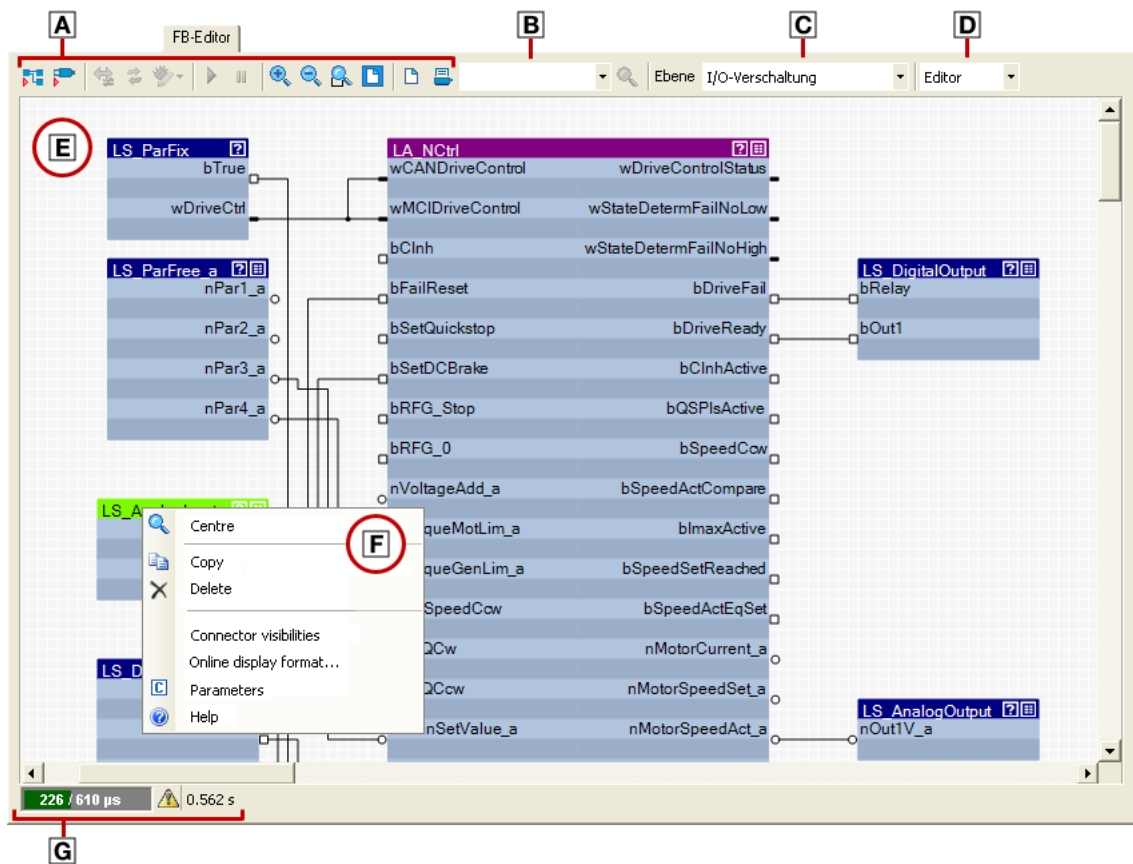
17.2 User interface

**How to access the FB Editor:**

1. Go to the *Project view* and select the 8400 inverter.
2. Go to *Workspace* and select the **FB Editor** tab.

The FB Editor displays the wiring of the technology function selected in [C00005](#). The interconnection of the I/Os of the inverter depends on the control mode selected in [C00007](#).

The user interface of the FB Editor includes the following control and function elements:



A [Toolbar](#)

B [Search function](#)

C [Plane selection](#)

D [Editor view/overview](#)

E [Drawing area](#)

F [Context menu](#)

G [Status bar](#)

Not shown:
[Overview](#)
















**Tip!**

Go to the »*Engineer*« toolbar and click the  icon to hide the *Project View* and the *Message Window*. This increases the *Workspace* available for the FB Editor. A renewed click on the symbol shows the *Project View* and the *Message Window* again.

17.2.1 Toolbar

The FB Editor is provided with an individual toolbar in the upper position which in the following text is called *FB Editor toolbar*.

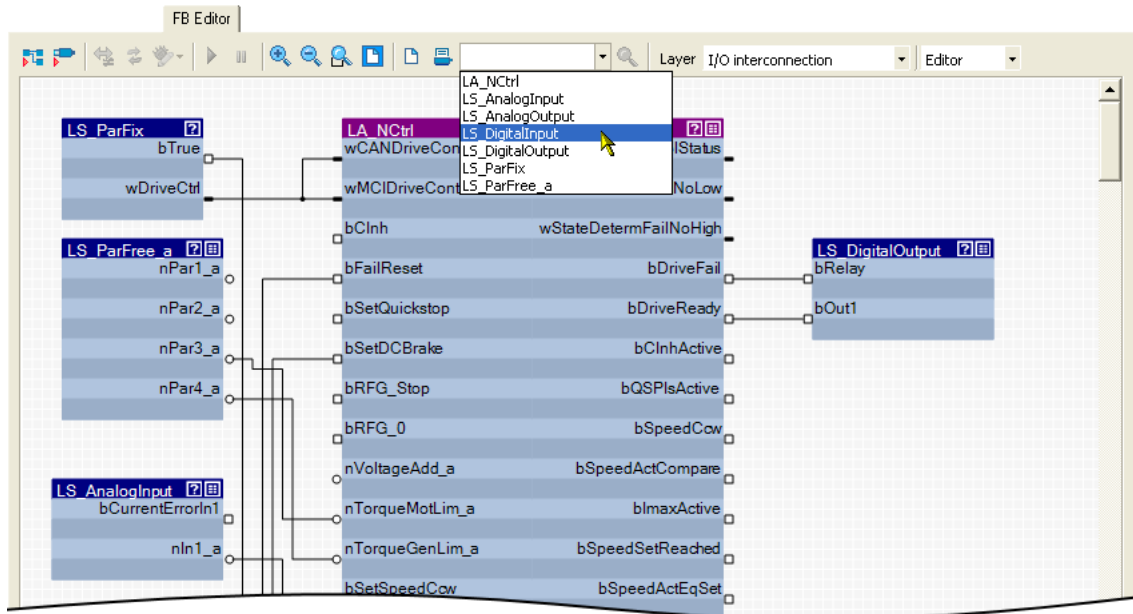
- Click on an icon to execute the corresponding function.

Symbol	Function
	Insert function block or system block <ul style="list-style-type: none"> ▶ Inserting a function block (📖 1192) ▶ Inserting a system block (📖 1194)
	Insert port block (📖 1196)
	Adjusting online and offline interconnection (📖 1215)
	Acknowledge error in the interconnection / reload interconnection
	Correct interconnection
	Start online monitoring
	Interrupt online monitoring
	Close online monitoring
	Enlarge view of interconnection
	Reduce view of interconnection
	Enlarge cutout of interconnection
	Show entire interconnection in the drawing area
	Show print view
	Printing the interconnection (📖 1216)
	Search function (📖 1179)

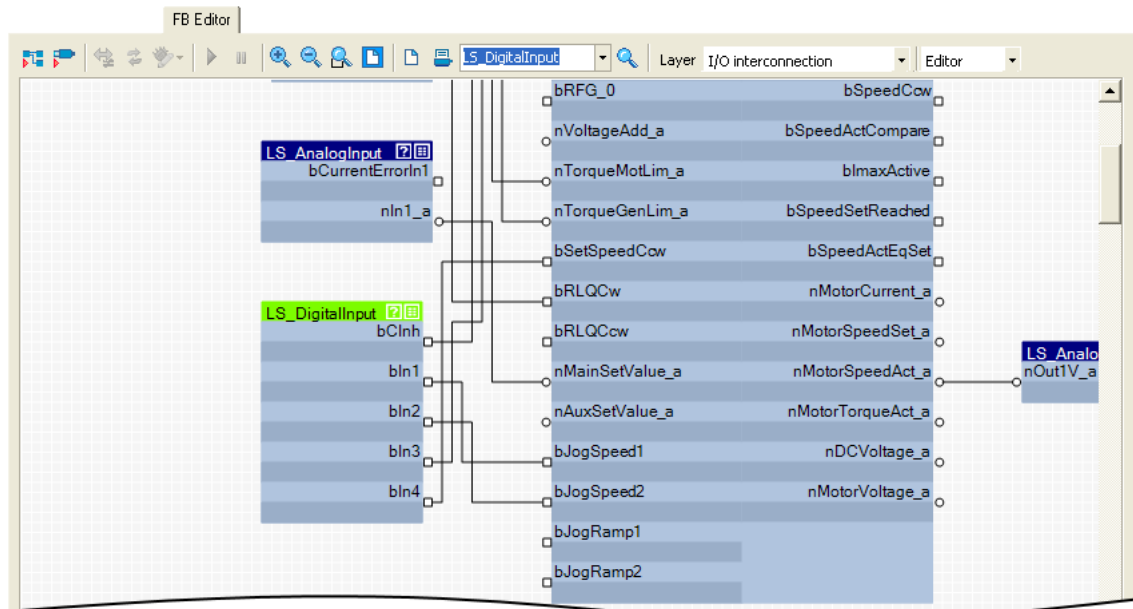
17.2.2 Search function

Use the search function to get quickly to a certain module of the interconnection.

- The list field of the search function contains all function blocks, system blocks, and port blocks of the interconnection:





- When you select a module in the list field, this module is zoomed in and selected at the same time (the following example shows the **LS_DigitalInput** system block):



**Tip!**

You can also enter any search text in the input field.

- If you click the  icon, the cutout is moved to the object which contains this search text.
- Another click on the  icon leads to a new search. Thus, you can navigate successively to all objects which contain the entered search text.
- The search text does not consider case sensitivity.

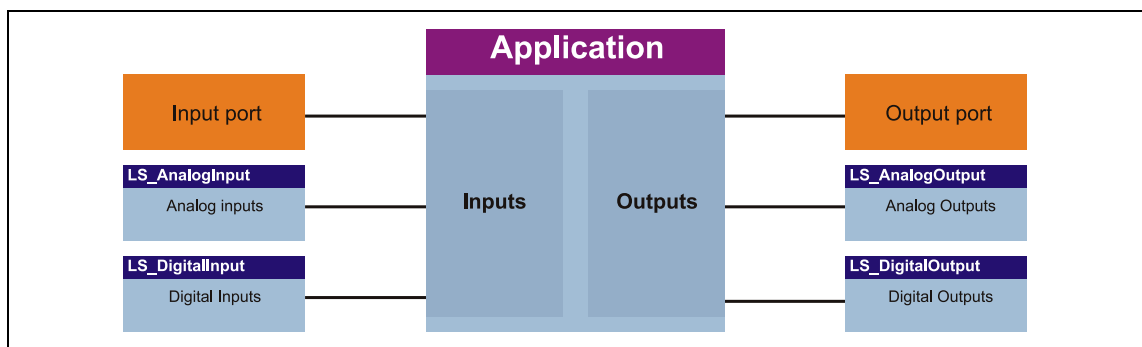
17.2.3 Plane selection

Go to the **Level selection** list field and select the interconnection level to be displayed.

"I/O interconnection" level

This level displays only the I/O interconnection of the currently selected technology application for a better overview.

- Details of the application are masked out in this level.
- The interconnection of the I/Os of the inverter with the inputs and outputs of the application in detail depends on the control mode selected in [C00007](#).
- The parameterisation dialogs on the **Application parameter** tab correspond to the application block displayed in this level.

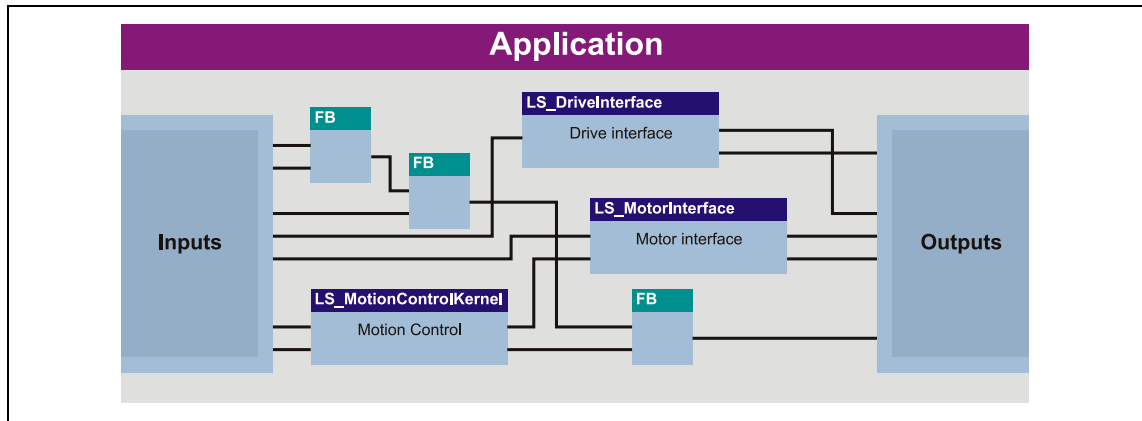


[17-5] Schematic diagram of "I/O interconnection"

"Application interconnection" level

This level displays the interconnection of the application selected in [C00005](#) in detail. All function blocks used in the application and the system blocks which provide the interfaces to the drive and motor interface and to the MotionControlKernel (MCK) are displayed with their connections.

- The interconnection of the I/Os of the inverter with the inputs and outputs of the application is masked out in this level.



[17-6] Schematic diagram of "Application interconnection"



Note!

With the "StateLine" version, the interconnection shown in the application level cannot be edited.



Tip!

Every application block features so-called "free inputs and outputs" which you can use to transfer signals from the I/O level to the application level and vice versa.

- In the Lenze setting, these connectors are hidden in the function block editor.
- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

"Free interconnection" level

This level serves to implement an individual drive solution for the "HighLine" version.



Note!

When you select the "Free interconnection" level for the first time, you are prompted to confirm whether the interconnection from the I/O level and the application level are to be combined and copied into this level.

When you confirm this confirmation prompt with **Yes**, the I/O level and the application level are not available anymore. This action can only be undone by resetting the application to a predefined Lenze application! ▶ [Resetting changed interconnection](#) (1214)

17.2.4 Editor view/overview

Use the list field at the top right to change from the Editor to the overview and vice versa.

The overview shows all function blocks used of the interconnection in the upper list field in the order of their processing. The lower list field shows all used system blocks.

O...	Name	Time
1	LA_NCtrl_In	20 µs
2	L_RLQ_1	3 µs
3	L_Dr_2	2 µs
4	L_Dr_3	2 µs
5	L_OffsetGainP_1	17 µs
6	L_OffsetGainP_2	17 µs
7	L_OffsetGainP_3	17 µs
8	L_MPot_1	10 µs
9	L_Dr_1	2 µs
10	L_NSet_1	50 µs
11	L_PCTRL_1	20 µs
12	L_AnalogSwitch_1	2 µs
13	L_Arithmetik_1	7 µs
14	L_DigitalDelay_1	2 µs
15	L_DigitalLogic_1	2 µs
16	L_MulDiv_1	4 µs

Optimisation of the processing order via

Name
LS_MotorInterface
LS_DriveInterface
LS_DigitalInput
LS_DigitalOutput
LS_AnalogInput
LS_AnalogOutput
LS_MotionControlKernel
LS_ParFix
LS_ParFree_a
LA_NCtrl

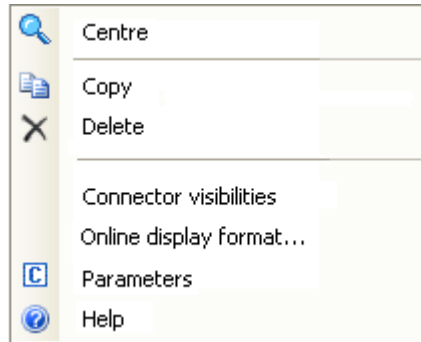
226 / 610 µs 0.563 s

- The processing order of the function blocks can be optimised manually or according to an automatically generated selection. ▶ [Changing the processing order](#) (1209)

17.2.5 Context menu

You can open a *context menu* via the right mouse button for each object (function block, system block, line, comment, etc.) and for the drawing area:

- The contents of the *context menu* depend on the type of object you click on.
- Example: *Context menu* for a function block:



17.2.6 Status bar

The status bar of the FB Editor shows, among other things, information about the system load and the error status of the interconnection:



Symbol	Meaning
A System load	
	Here: out of the available computing time of 610 µs, 226 µs are required by the application.
B Error status of the interconnection	
	The interconnection has no errors and no warnings
	The interconnection has errors and/or warnings
C Communication status	
	Offline
	Online
	Communication error
D Adjustment status	
	Offline and online interconnection match
	Offline and online interconnection are different
E Update rate for monitoring values	

17.2.7 Overview

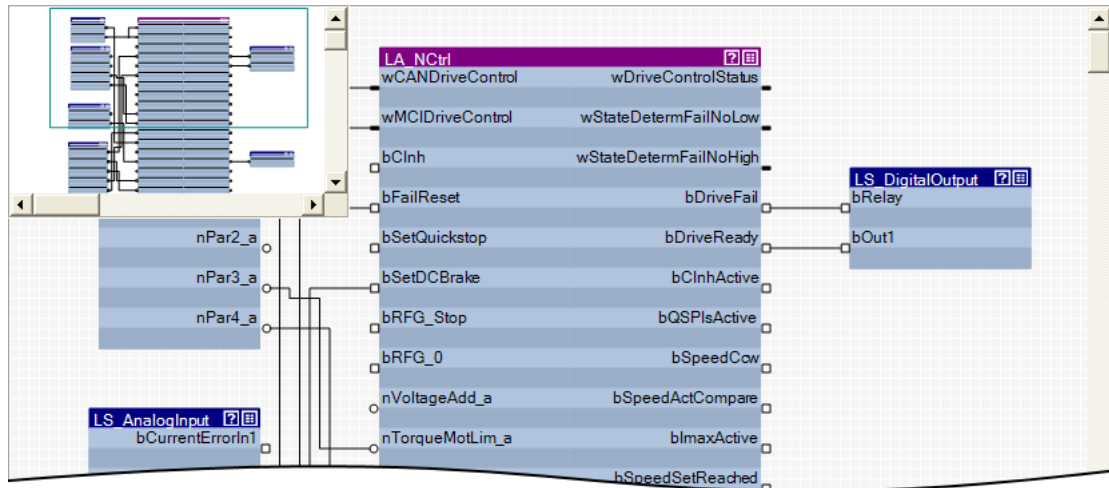
The overview window shows the drawing area in a reduced view. The overview window serves to e.g. move quickly through a more complex interconnection.



How to show the monitor window:

Go to the *Context Menu* of the drawing area and select the **Overview Window**.

- If you execute this command again, the overview window is hidden again.



- The green frame in the overview window indicates the interconnection cutout that is currently displayed in the drawing area.
- Use the mouse pointer to shift and resize the cutout to be displayed.



How to shift the cutout presented in the drawing area:

1. Position the mouse pointer to the green frame in the overview window.
 - The mouse pointer symbol becomes a positioning cross.
2. Click left mouse button and shift the green frame to its new position by keeping the mouse button pressed, so that the desired cutout of the interconnection is displayed in the drawing area.



How to redefine the cutout to be presented:


In the overview window draw a frame around the area of the interconnection which is to be presented in the drawing window by keeping the left mouse button pressed:



- The aspect ratio of the frame is automatically adapted to the aspect ratio of the drawing area.
- According to the size of the frame that is drawn, also the presentation size of the objects in the drawing area changes.



Tip!

Go to the *FB Editor toolbar* and click the  icon to adapt the view size so that all objects included in the interconnection are visible in the drawing area.

Automatic scroll ("AutoScroll function")

If you reach a window limitation in the drawing area when shifting an object or in the overview window when shifting the green frame, and if you then shortly hold the mouse pointer in this position, an automatic scrolling into the corresponding direction is carried out:

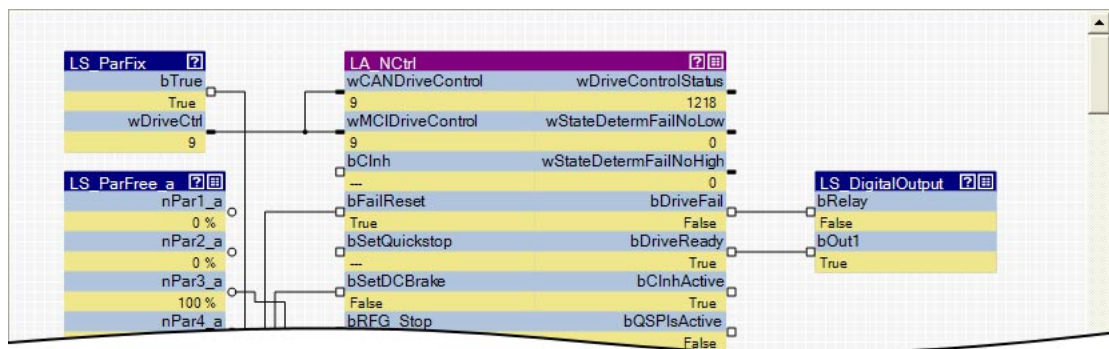
17.3 Using the FB Editor as "Viewer"

The main purpose of the FB Editor is the individual configuration of the selected technology application. However, you can also use the FB Editor to

- make a diagnosis of the application (when an online connection has been established),
- get a better understanding for the operating mode of the application,
- use the interconnection as an alternative parameterisation access.

Diagnostics of the application

When an online connection to the inverter has been established, the current values are displayed at the inputs and outputs of the objects:




- Process-scaled signals can be scaled in a "user-defined" way for easy diagnostics in the FB Editor.
 - ▶ [Change online display format](#) (📖 1189)

Getting a better understanding for the operating mode of the application

Make yourself familiar with the signal flow of the interconnection to get a better understanding of the operating mode of the application or individual functional areas.

- The  symbol in the head of the block or the **Help** command in the *context menu* for the block serve to open the online help for the block.

Using the interconnection as an alternative parameterisation access

- The  icon in the head of the module, a double-click on the module, or the **Parameter...** command in the *Context menu* of the module serve to open the parameterisation dialog or the parameter list for the module.

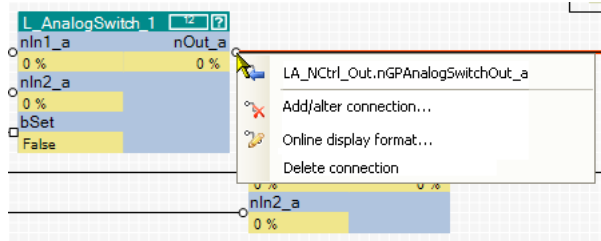
17.3.1 Following connections of inputs and outputs


In addition to the [Search function](#) you can use the *context menu* of inputs and outputs to follow connections and quickly reach certain signals.

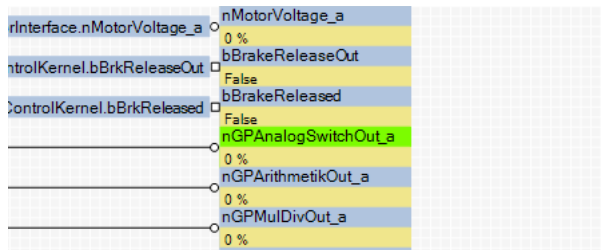


How to navigate from one output to another connected input:

1. Open the *context menu* (right mouse button) of the port symbol at the output.
 - The *context menu* for the port symbol contains all inputs which are connected to the output:



2.  Select input in the *context menu* to which you want to navigate.
 - As a result, the selected input is displayed in the centre of the drawing area (in this example: nGPAnalogSwitchOut_a):

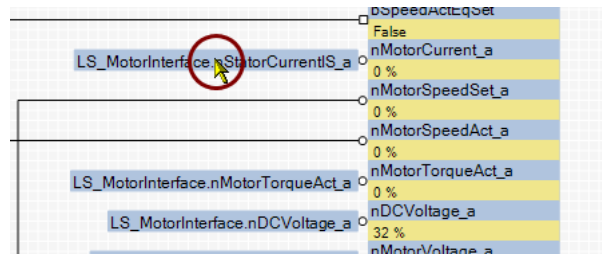




How to navigate from one input to another connected output:

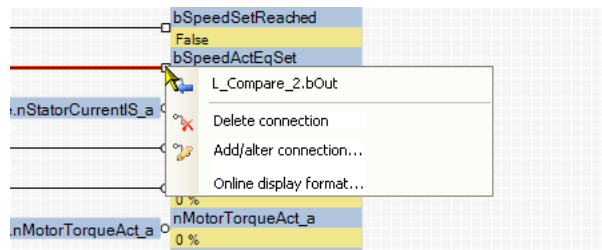
If the input is connected to a flag:


- Double-click the flag:



If the input is connected to a line:

1. Open the *context menu* (right mouse button) of the port symbol at the output:



2.  Select output in the *context menu*.
 - Since an output can only be connected to an input, the *context menu* contains only an output.

The output is displayed in the centre of the drawing area.

17.3.2 Keyboard commands for navigation

Keyboard command	Function
<Picture ▲ >	Scroll up
<Picture ▼ >	Scroll down
<Shift> + <picture ▲ >	Scroll to the left
<Shift> + <picture ▼ >	Scroll to the right
<POS1>	Scroll to the left edge of the interconnection
<END>	Scroll to the right edge of the interconnection
<Ctrl> + <Pos1>	Scroll to the left upper corner of the interconnection
<Ctrl> + <End>	Scroll to the right lower corner of the interconnection

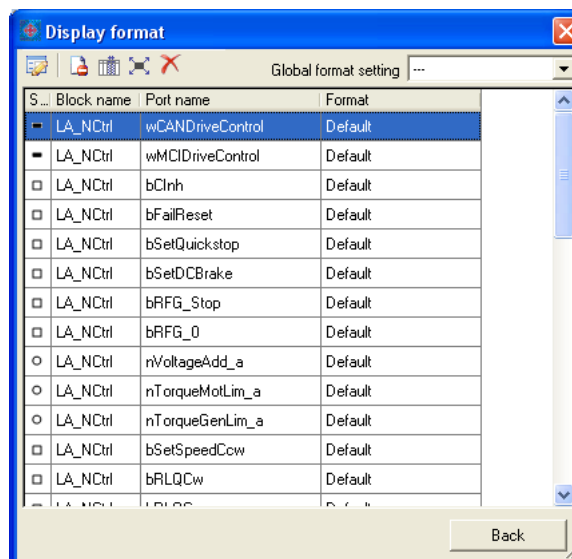
17.3.3 Change online display format





For online monitoring in the FB Editor the display format of the input and output data of a block can be adapted individually. Process-scaled signals can be scaled in a "user-defined" way for easy diagnostics in the FB Editor. Thus, the display of these signals gets a process reference.




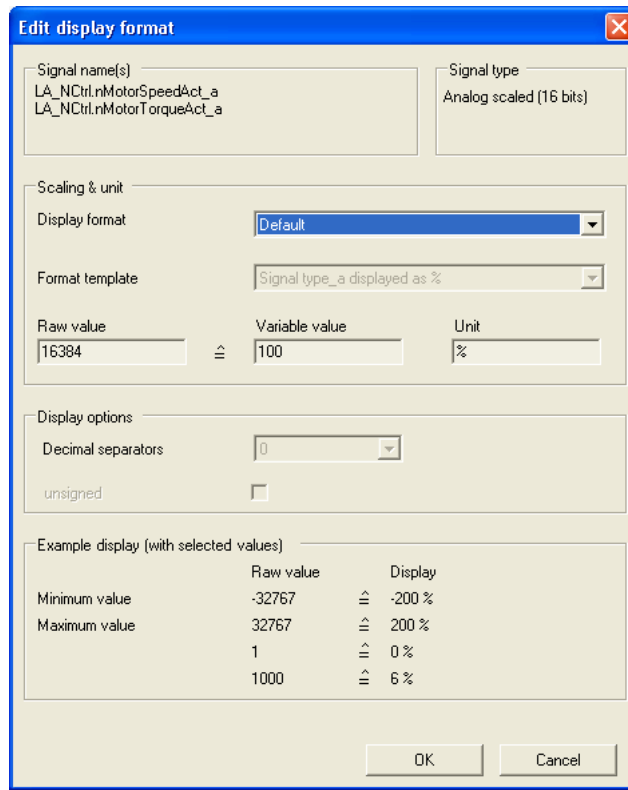
How to change the data display format of block inputs/outputs:

- Go to the *context menu* of the block and select the **Online display format** command.
 - Tip:** You can call the *context menu* of a block by clicking with the right mouse button on the header of the block.
 - The *Display format* dialog box is displayed:



- Select the inputs/outputs from the list the display format of which is to be changed.
 - Note:** In the **Global format setting** list field the "---" entry must be selected so that the display format can be changed.
 - If you click further inputs/outputs while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - The **<Shift>** key serves to select a related area of inputs/outputs.
 - More functions:
 -  Display masked out connections
 -  Display additional information
 -  Select all inputs/outputs
 -  Reset all format information

3. Click the  symbol to edit the display format of the selected inputs/outputs.
 - The *Edit display format* dialog box is displayed:



Example display (with selected values)		
	Raw value	Display
Minimum value	-32767	≙ -200 %
Maximum value	32767	≙ 200 %
	1	≙ 0 %
	1000	≙ 6 %

4. Go to the **Display format** list field and select the "User-defined" entry.
5. Go to the **Format template** list field and select "No template".
6. Select the required scaling, unit, number of decimal positions, and sign handling.
7. Click **OK** to accept the settings and close the *Edit display format* dialog box.
 - The *Display format* dialog box now displays the text "User-defined" for the changed inputs/outputs in the **Format** column.

After all required formats have been changed:

8. Click **Back** to close the *Display format* dialog box.
 - For online monitoring, the changed format is used.

17.4 Reconfiguring the predefined interconnection

How to proceed:

1. Insert additionally required objects into the interconnection.
2. Hide unneeded inputs/outputs of function blocks and system blocks to obtain a clearly arranged interconnection.
3. Arrange the objects in the drawing area in a reasonable manner.
4. Establish the connections required for the desired function.
5. If required, change (optimise) the processing order of the function blocks.



Tip!

Detailed information on the individual steps can be obtained from the following subchapters!





Note!

With the "StateLine" version, the interconnection shown in the application level cannot be edited.

17.4.1 Inserting/Deleting objects

Objects can be inserted in the interconnection via the *FB Editor toolbar* and the *context menu* of the drawing area. The following subchapters provide detailed information on how to insert/delete the different objects.

Symbol	Function
	Inserting a function block (📖 1192)
	Inserting a system block (📖 1194)
	Insert port block (📖 1196)
	Inserting a comment (📖 1198)



Tip!

Use the *context menu* of the drawing area to insert a function block, system block, port block or comment directly to the current position of the mouse pointer in the drawing area.

If you insert an object via the corresponding icon in the *FB Editor toolbar*, the object is always placed at the top left corner in the drawing area.

Interconnection elements cannot only be copied within the same interconnection but also across all devices within the same project, as long as the devices stem from the same product family. ▶ [Copying interconnection elements \(across all devices\)](#) (📖 1211)

17.4.1.1 Inserting a function block




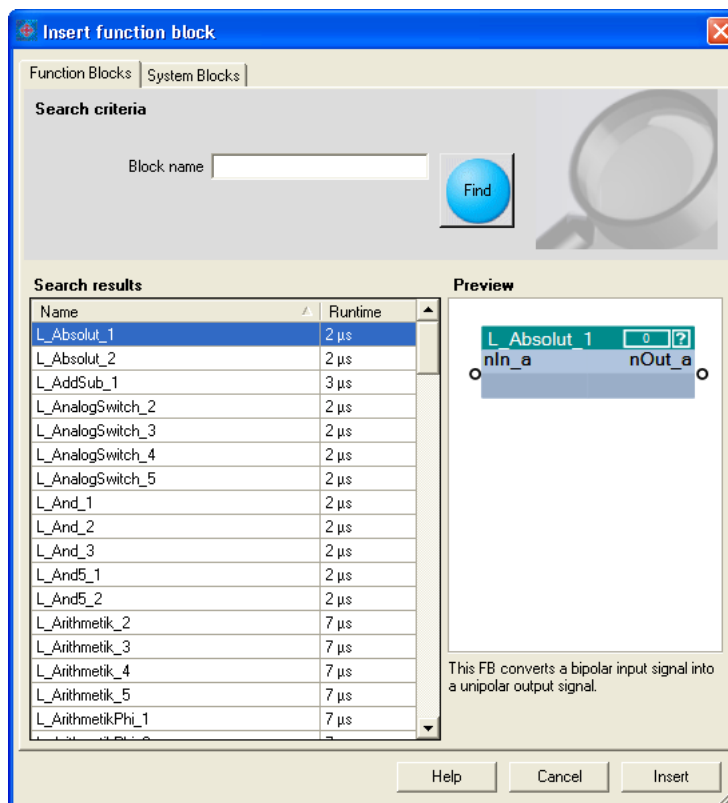
Note!

In the FB Editor, function blocks are only available in the "Application interconnection" level!



How to insert a function block into the interconnection:

1. In the *FB Editor toolbar*, click the  icon.
 - The *Insert Function Block* dialog box appears:
2. Unless it is already displayed, select the **Function Blocks** tab.
 - All function blocks available are displayed in the **Search results** list field.






- A preview of the selected function block is displayed.
 - A detailed description of all available function blocks can be found in the main chapter "[Function library](#)". ([1222](#))
3. If required, define **Search criteria** to narrow down the available function blocks:
 - **Block name:**
String which must be contained in the name of the function block.
 4. After changing the search criteria, press the **Find** button to update the selection.
 - Then, only the function blocks complying with the features set in the search criteria are shown in the **Search Results** list field.
 - If no search criteria are set, all function blocks available are shown.
 5. Select the function block to be inserted in the **Search results** list field.

6. Click the **Insert** button.
 - The dialog box is closed and the selected function block is inserted into the interconnection.

Context menu for the function block

If you right-click on the header of a function block, a *context menu* opens via which you can execute the following functions in addition to the general processing functions (Copy, Insert, Delete):

Command	Function
 Centre	Move the visible cutout of the drawing area so that the block is centred.
Connector visibilities...	Define visible inputs and outputs of the block. ▶ Changing connector visibilities (📖 1201)
Online display format...	Adapt the display format of the input and output data of the block individually for online monitoring. ▶ Change online display format (📖 1189)
 Parameters...	Open the parameter list/parameterisation dialog for the block. <ul style="list-style-type: none"> • Only if function block is parameterisable.
 Help	Show online help for the block.

Related topics


- ▶ [Deleting objects that are no longer required](#) (📖 1200)
- ▶ [Changing connector visibilities](#) (📖 1201)
- ▶ [Arranging objects in the drawing area](#) (📖 1202)
- ▶ [Creating/deleting connections](#) (📖 1203)
- ▶ [Changing the processing order](#) (📖 1209)

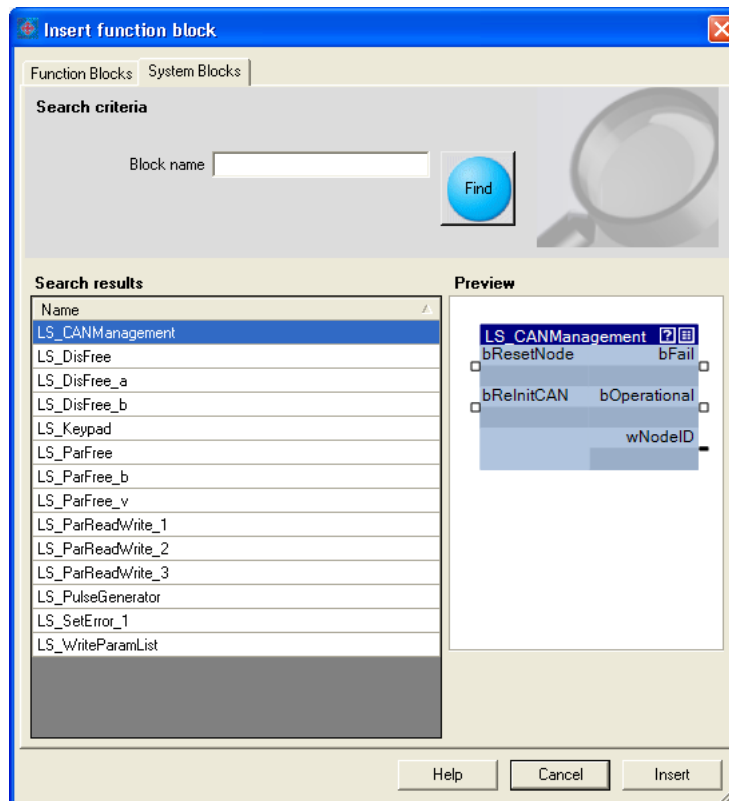
17.4.1.2 Inserting a system block

A system block is inserted similarly to the way a function block is inserted.



How to insert a system block into the interconnection:

1. In the *FB Editor toolbar*, click the  icon.
 - The *Insert Function Block* dialog box appears:
2. Unless it is already displayed, select the **System Blocks** tab.
 - All system blocks available are displayed in the **Search results** list field.






- A preview of the selected function block is displayed.
3. If required, define **Search criteria** to accordingly narrow down the system blocks available:
 - **Block name:**
String which must be contained in the name of the system block.
 4. After changing the search criteria, press the **Find** button to update the selection.
 - Then, only the system blocks complying with the features set in the search criteria are shown in the **Search Results** list field.
 - If no search criteria are set, all system blocks available are shown.

5. Select the system block to be inserted in the **Search results** list field.
6. Click the **Insert** button.
 - The dialog box is closed and the selected system block is inserted into the interconnection.

Context menu for the system block

If you right-click on the header of a system block, a *context menu* opens via which you can execute the following functions in addition to the general processing functions (Copy, Insert, Delete):

Command	Function
 Centre	Move the visible cutout of the drawing area so that the block is centred.
Connector visibilities...	Define visible inputs and outputs of the block. ▶ Changing connector visibilities (📖 1201)
Online display format...	Adapt the display format of the input and output data of the block individually for online monitoring. ▶ Change online display format (📖 1189)
 Parameters...	Open the parameter list/parameterisation dialog for the block.
 Help	Show online help for the block.

Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 1200)
- ▶ [Changing connector visibilities](#) (📖 1201)
- ▶ [Arranging objects in the drawing area](#) (📖 1202)
- ▶ [Creating/deleting connections](#) (📖 1203)

17.4.1.3 Insert port block

All input/output ports defined for the application on the **Ports** tab can be inserted into the interconnection in the form of port blocks in order to get access to the associated element variables.




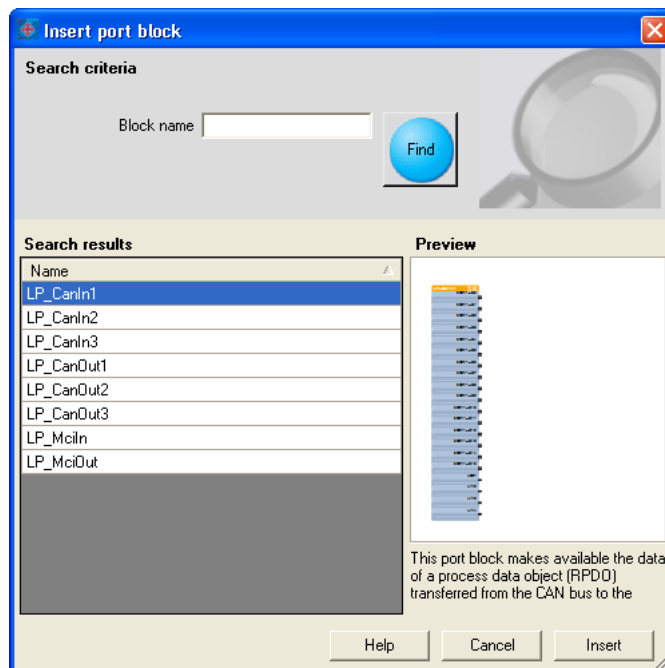
Tip!

You can change between the **Ports** and **FB Editor** tabs at any time to define new ports and afterwards insert them into the interconnection.



How to insert a port block into the interconnection:




1. In the *FB Editor toolbar*, click the  icon.
 - The *Insert port block* dialog box appears.
 - All port blocks available are displayed in the **Search results** list field.



- A preview of the selected port block is displayed.
2. If required, define **search criteria** to accordingly narrow down the port blocks available:
 - **Block name:**
String which must be contained in the name of the port block.
 3. After changing the search criteria, press the **Find** button to update the selection.
 - Then, only the port blocks complying with the features set in the search criteria are shown in the **Search Results** list field.
 - If no search criteria are set, all port blocks available are shown.
 4. Select the port block to be inserted in the **Search results** list field.
 5. Click the **Insert** button.
 - The dialog box is closed and the selected port block is inserted into the interconnection.

Context menu for the port block

If you right-click on the header of a port block, a *context menu* opens via which you can execute the following functions in addition to the general processing functions (Copy, Insert, Delete):

Command	Function
 Centre	Move the visible cutout of the drawing area so that the block is centred.
Connector visibilities...	Define visible inputs and outputs of the block. ▶ Changing connector visibilities (📖 1201)
Online display format...	Adapt the display format of the input and output data of the block individually for online monitoring. ▶ Change online display format (📖 1189)
 Parameters...	Open the parameter list/parameterisation dialog for the block.
 Help	Show online help for the block.

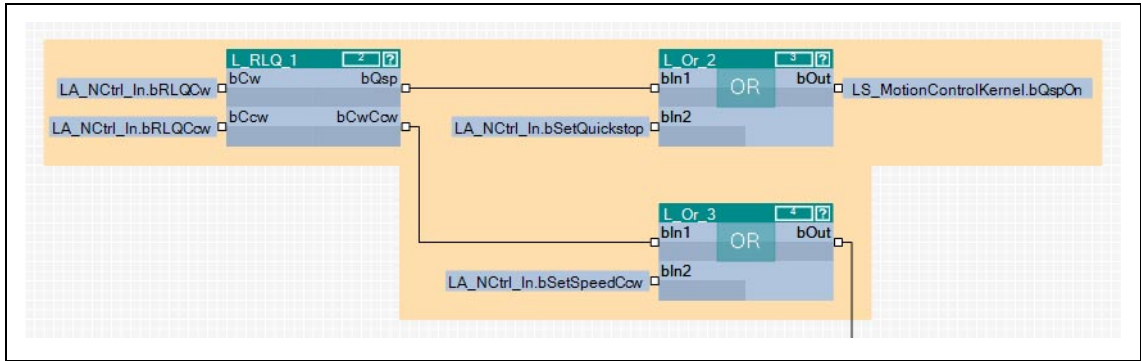
Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 1200)
- ▶ [Changing connector visibilities](#) (📖 1201)
- ▶ [Arranging objects in the drawing area](#) (📖 1202)
- ▶ [Creating/deleting connections](#) (📖 1203)

17.4.1.4 Inserting a comment

Comments can be inserted at any position in the drawing area.

As of the »Engineer« V2.10, the interior colour and text alignment of a comment can be changed via a properties dialog. Now the sizes of comments can also be changed using the mouse pointer. When using different interior colours you can use comments to graphically arrange areas that belong together in terms of function or separate them from other areas:



[17-7] Example: Graphical arrangement of FBs by means of two comments that overlap.



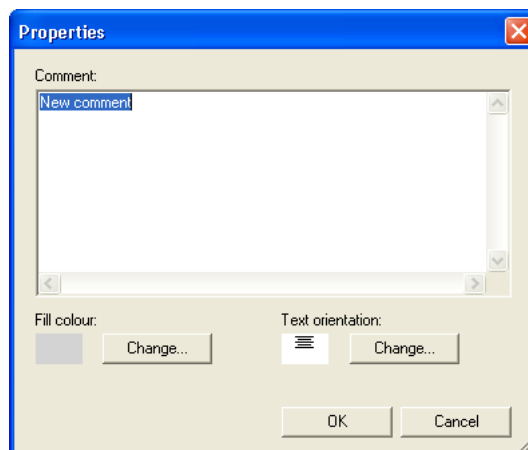
Note!

The term "Arrangement" does not mean a logical arrangement of the function blocks. The comments are only graphical presentation elements of the FB Editor.



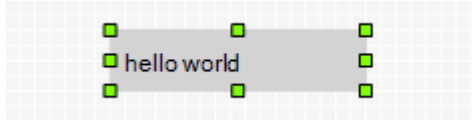
How to insert a new comment into the interconnection:

1. Move the mouse pointer to the (free) position in the drawing area where the comment is to be inserted.
2. Go to the *Context menu* (right mouse key) and select the **New comment** command.
 - The *Properties* dialog box is displayed:



3. Enter the required comment into the text field.
4. Optional: Change preset interior colour.
 - For this purpose, click the left **Change...** button to open the *Colour* dialog box to select another interior colour.

-
5. Optional: Change preset text alignment.
 - For this purpose, click the right **Change...** button to open the *Text alignment* dialog box to select another text alignment.
 6. Press **OK** to close the *Properties* dialog box and insert the comment.
 - After being inserted, the corner points of the comment are shown:



7. Optional: Change size of the comment.
 - For this purpose click one of the corner points with the left mouse button and enlarge the comment to the required size with the mouse button pressed.



8. Optional: Drag comment.
 - For this purpose click the comment with the left mouse button and move the comment to the required position with the mouse button pressed.

**Tip!**

The *Properties* dialog box for a comment already available can be opened by double-clicking the comment.

Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 1200)
- ▶ [Arranging objects in the drawing area](#) (📖 1202)
- ▶ [Creating/deleting connections](#) (📖 1203)

17.4.1.5 Deleting objects that are no longer required

Objects that are no longer required can be easily deleted again. "Delete" only means that the object is removed from the drawing area. If you have deleted an object from the drawing area, you can reinsert it any time into the interconnection.



Note!

Deleting an object cannot be undone.

Together with the object, all available connections to this object are deleted.



How to delete objects that are no longer required:

1. Select objects to be deleted.
 - You can select a single object by clicking the header of the object.
 - You can select objects that are placed together by drawing a frame around these objects while keeping the mouse button pressed.
 - If you click the header of further objects while pressing **<Ctrl>**, these will be added to an already existing selection (multi-selection).
 - All selected objects are highlighted by a light green header.
2. Press ****.

Related topics

- ▶ [Deleting connections that are no longer required \(1208\)](#)

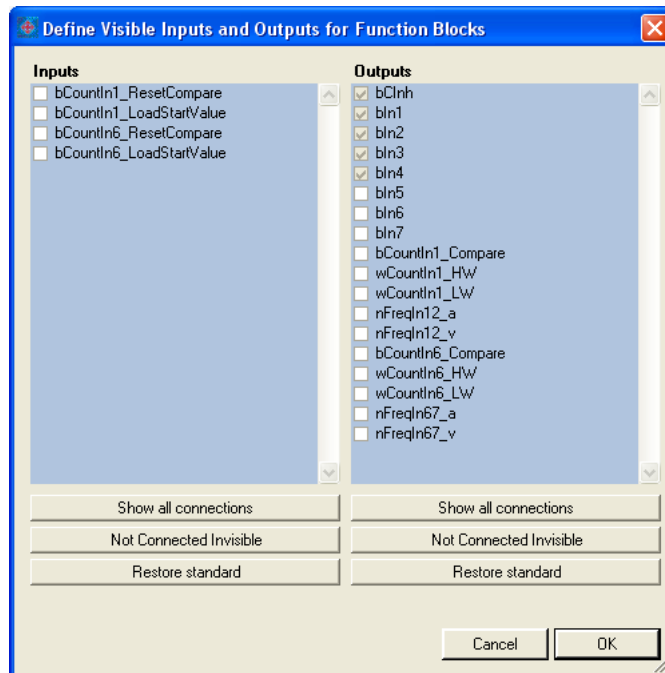
17.4.2 Changing connector visibilities

Inputs and outputs that are not connected can be hidden for each block. This serves to reduce the dimension of the block. The interconnection becomes clearer.



How to define the visible inputs and outputs:

- Go to the context menu of the block and select the **Connector visibilities** command.
 - The *Define Visible Inputs and Outputs for Function Blocks* is displayed:



- All visible connections have a checkmark.
 - In case of a block that is inserted anew, all inputs and outputs are visible at first.
 - Inputs and outputs with a light grey checkbox are already connected and thus cannot be hidden.
- By setting/removing the checkmarks or via the buttons you can define the visible inputs and outputs.
 - Press **OK** to accept the selected definition and close the dialog box.

17.4.3 Arranging objects in the drawing area

All objects can be freely arranged in the drawing area by dragging with the mouse.

We recommend to make an arrangement in which the required connections between the inputs and outputs can be created easily. A division into functional areas may also be sensible to get a better understanding of the application.

Objects which are already connected, can also be dragged to another (free) position in the drawing area. The available connections will be automatically re-routed after dragging.



How to drag an object:

1. Click the header of the object (and keep the button pressed).
2. Keep the button pressed and drag the object to the required position in the drawing area.
 - Via **<Esc>** you can cancel this action.



How to drag several objects at the same time:

1. Select the objects to be dragged.
 - You can select a single object by clicking the header of the object.
 - If you click the header of further objects while pressing **<Ctrl>**, these will be added to an already existing selection (multi-selection).
 - You can easily select objects that are placed together by drawing a frame around these objects while keeping the mouse button pressed.
 - All selected objects are highlighted by a light green header.
2. Keep the mouse button pressed on the header of one of the selected objects and drag it to the required position in the drawing area.
 - Via **<Esc>** you can cancel this action.



Note!

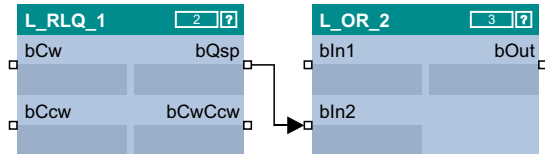
A red header indicates that the object overlaps with other objects in the drawing area!
Arrange the objects so that no overlap occurs.

17.4.4 Creating/deleting connections

After adding objects and arranging them in a reasonable manner within the drawing area, you can create the connections between the available objects which are required for the desired function.

A connection always has a direction and therefore always has a source and a target.

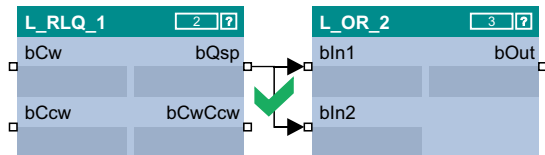
- An output represents a possible source in the interconnection.
- An input represents a possible target in the interconnection.



Permissible/impermissible connections

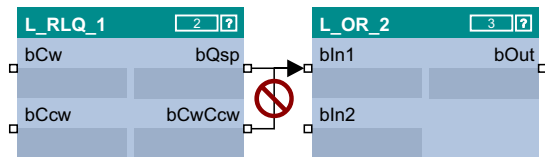
Several connections can lead from one output.

- Therefore it is always possible to start a new connection from an output.



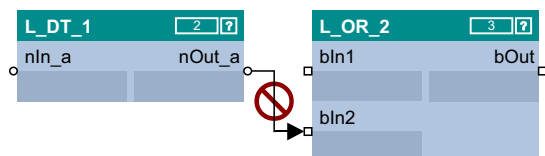
However, maximally one connection may end in an input.

- Therefore it is only possible to start a new connection from an input if there is no connection already ending in this input.



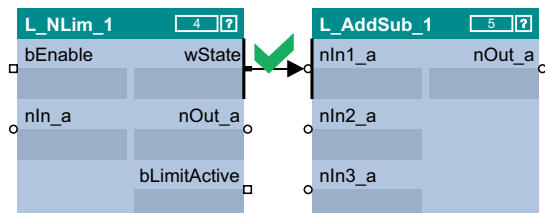
Only inputs/outputs of the same signal type can be connected.

- Thus, a connection between different port symbols cannot be established.



From the »Engineer« V2.12 "Analog/scaled" (_a) and "Miscellaneous (WORD)" signal types can also be interconnected.

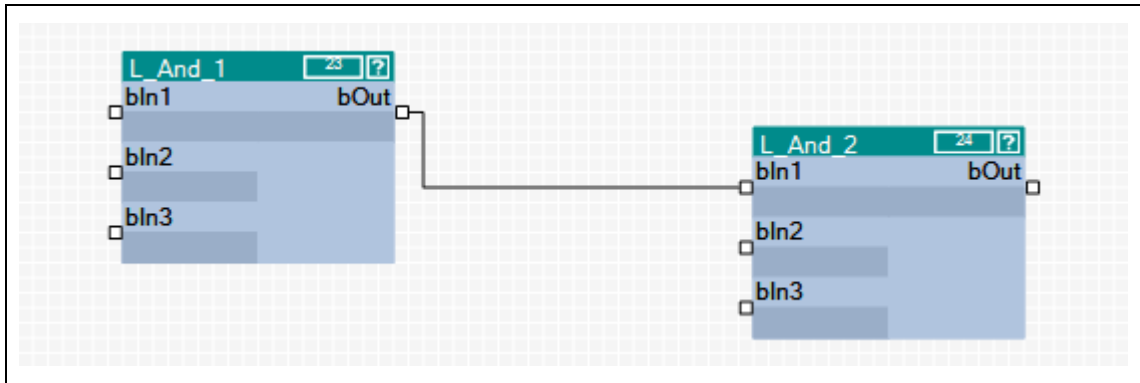
- The implicit type conversion is indicated by a vertical black bar at the port symbol.



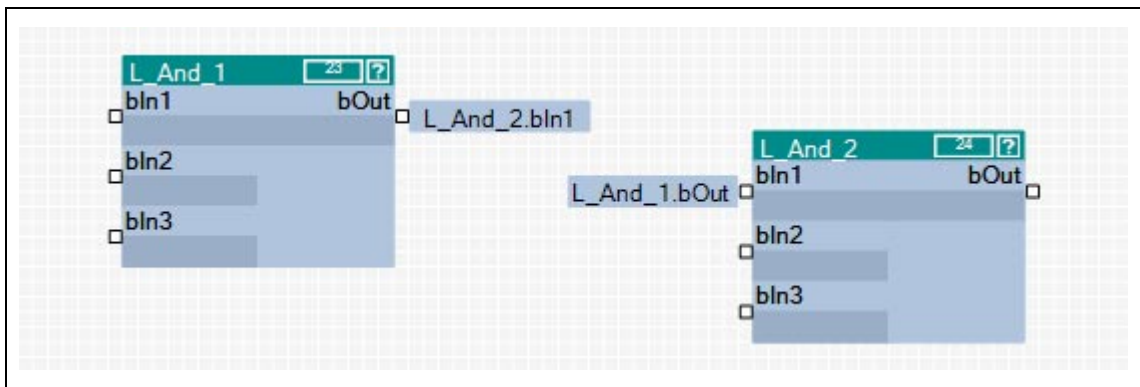
From the »Engineer« V2.13 "Analog/scaled" (_a) and "Angular velocity" (_v) signal types can also be interconnected.

Connection types

Connections can either be created by means of connection lines or port identifiers ("flags")



[17-8] Example 1: Connection via connection line



[17-9] Example 2: Connection via flags



Tip!

The commands **Show as flag** or **Show as line** in the *context menu* of a connection serve to change the representation of the connection at any time.

When an output is connected to several inputs via flags, three points are displayed ("...") at the output instead of the concrete input identifier. The *context menu* of the port symbol shows all inputs which are connected to the output.

17.4.4.1 Creating a connection using the connection line



How to create a connection using the connection line:

1. Click the port symbol from which the new connection is to be started.
 - It is only possible to start a new connection from an input if there is no connection already ending in this input.
 - If you then move the mouse pointer away from the port symbol, a new connection is "drawn" from this port symbol.
 - Via <Esc> you can cancel this action.
2. Click the port symbol where the connection is to end.
 - Thereupon the corresponding connection is routed automatically if the connection is permissible.



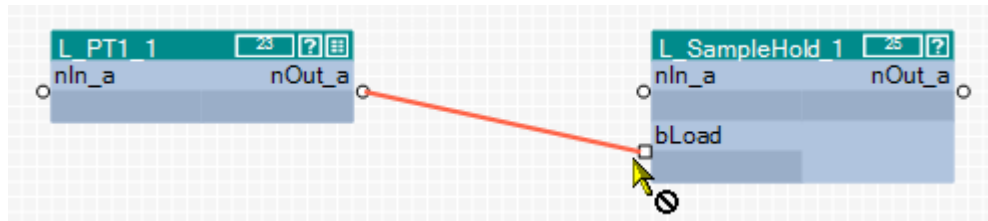
Tip!

If you move the mouse pointer across the port symbol while drawing a new connection, you can see whether the connection is permissible or not from the colour of the drawn line and from the mouse pointer symbol.

- Permissible connection:



- Impermissible connection (different port symbol):



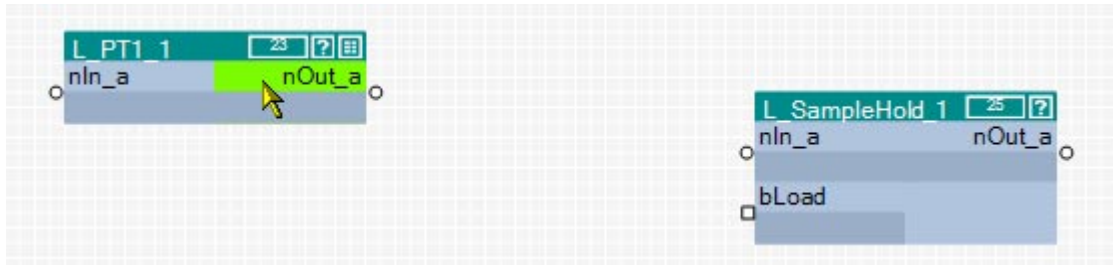
The command **Show as flag** in the *context menu* of a line serves to change the representation of the connection at any time.

17.4.4.2 Creating a connection using port identifiers

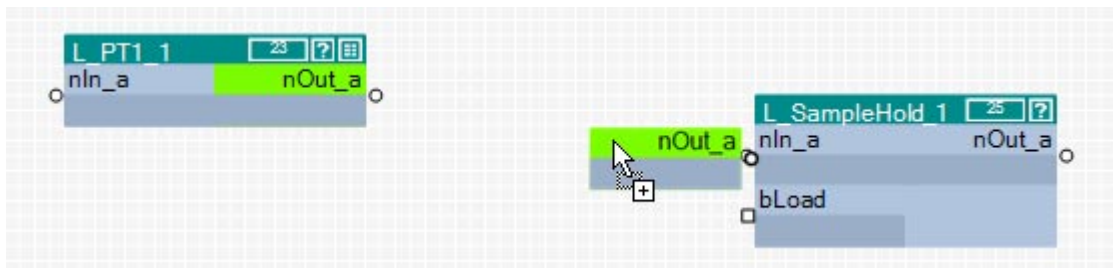


How to create a connection with port identifiers:

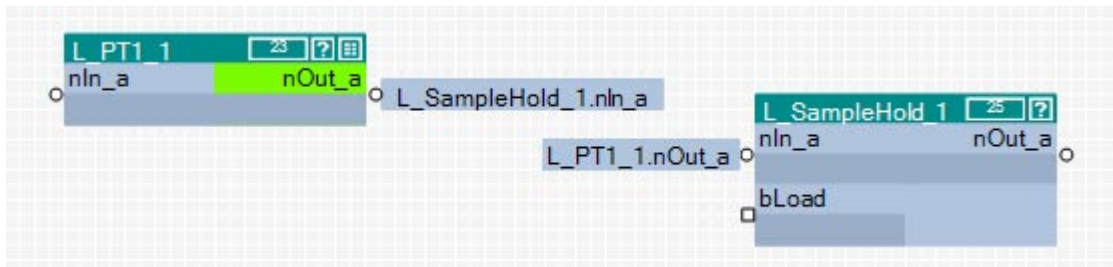
1. Click the port identifier.
 - The selected port is highlighted in light green:



2. Drag the port segment to the required port while keeping the left mouse button pressed:



After releasing the mouse button, the connection via port identifiers (flags) is created. The corresponding port identifier consists of the block name and the name of the input/output:



Tip!

The command **Show as line** in the *context menu* of a flag serves to change the representation of the connection at any time.

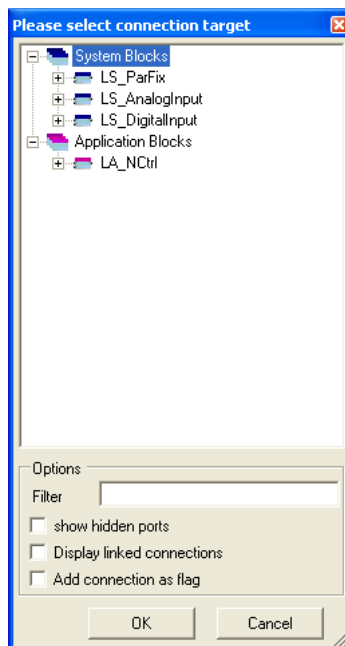
17.4.4.3 Creating a connection via connection dialog

You can also create connections by means of a selection dialog instead of dragging by mouse. This especially makes sense if there is a great distance between the ports to be connected in the drawing area.



How to create a connection using the selection dialog:

1. Right-click the port identifier or click the port symbol from which the connection is to start.
 - The *context menu* for the port is displayed.
2. Go to the *context menu* for the port and select the **Add/change connection...** command.
 - The *Add/change connection* dialog box is displayed:



- In a tree structure all inputs and outputs of the application are shown to which a connection is permissible.
 - You can enter an optional text into the **Filter** input field to reduce the selection to the blocks or ports which contain the entered text.
 - If you activate the **Show hidden ports** control field, the hidden ports for system and function blocks are shown as well.
3. Select the port where the connection is to end from the tree structure.
 4. Activate the **Add connection as flag** control field if a port identifier (flag) is to be inserted instead of a connection line.
 5. Press **OK** to create the connection to the selected port and close the dialog box.

17.4.4.4 Deleting connections that are no longer required

**How to delete connection lines:**

1. Select connection lines to be deleted.
 - Select a single connection line by directly clicking on the connection line with the right mouse button.
 - If you click further connection lines while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - All connection lines are highlighted in red.
2. Press ****.

**How to delete port identifiers/flags:**

1. Select the port identifiers to be deleted.
 - Select a single port identifier by directly clicking on the port identifier with the left mouse button.
 - If you click further port identifiers while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - All selected port identifiers are highlighted by a light green header.
2. Press ****.

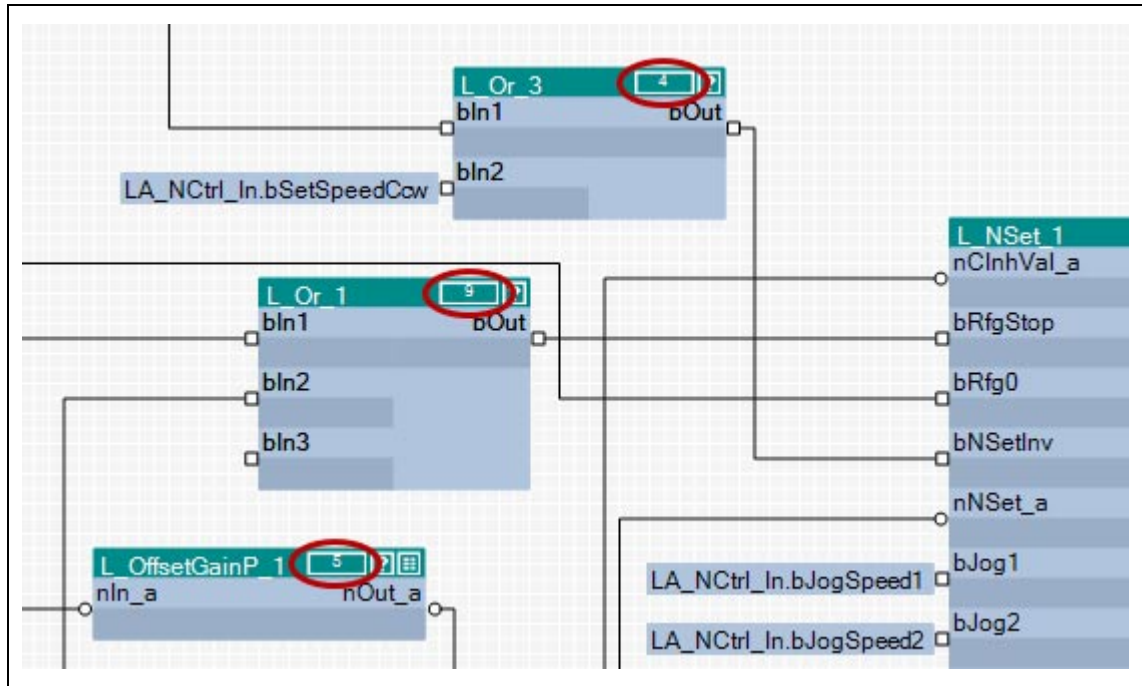
Related topics

- ▶ [Deleting objects that are no longer required \(□ 1200\)](#)

17.4.5 Changing the processing order

If you insert a function block into the interconnection, an order index is automatically assigned to this function block. By means of this order index it is defined in which order the individual function blocks are calculated at runtime.

- The first function block inserted contains the order index "1", the next function block inserted contains the order index "2", etc.
- The respective order index is displayed in the header of the function block in the rectangle after the block name.



[17-10] Example: Function blocks with order index



Note!

When a function block is shifted, its order index is maintained.

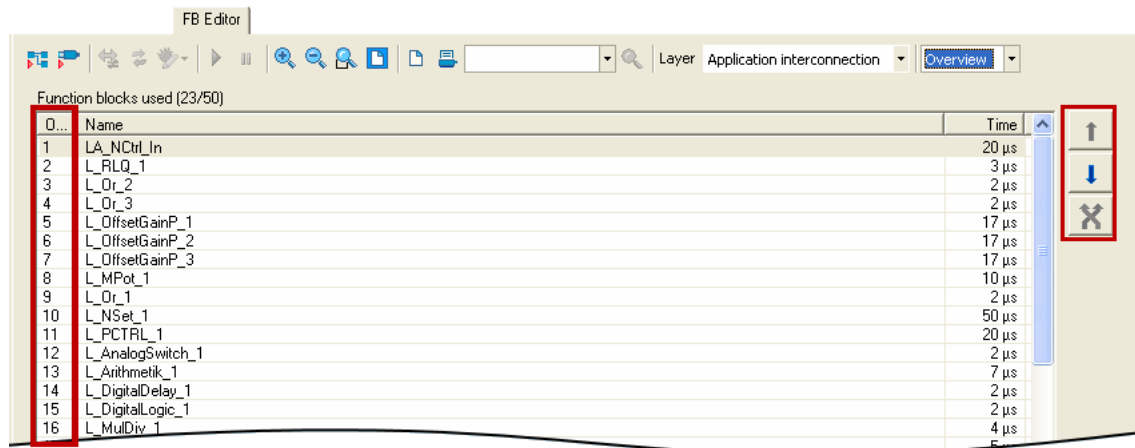
The processing order influences the result!

- In certain cases it may be sensible to change the processing order, but if you select an unfavourable processing order, errors may arise!



How to change the processing order manually:

- Use the list field at the top right to change from the Editor to the overview.
 - The overview displays all function blocks of the interconnection in the order of their processing
 - In the first "Order" column the order index of each function block is listed.
- Unless already selected, select the entry "Manual selection" in the **Optimisation...** list field.



- Select the function block which is to receive a different position within the processing order.
 - If you click further function blocks while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - The **<Shift>** key serves to select a related area of function blocks.
- Move the function block(s) to the desired position using the and buttons.
 - The button serves to exchange two selected function blocks with regard to their order.
- Repeat steps 3 and 4 until the required processing order has been established.

Changing the processing order according to an automatically generated selection

In addition to the manual selection, the **Optimisation...** list field also offers two options for an automatic adaptation of the processing order:

- Signal flow:** The processing order is optimised according to the signal flow.
- Topology:** The processing order is optimised according to the x/y arrangement of the function blocks in the FB Editor.

As long as an automatic adaptation has been selected, a manual change of the processing order is not possible.

17.4.6 Copying interconnection elements (across all devices)

Interconnection elements can be copied across the devices within the project if the devices belong to the same product family (e.g. Inverter Drives 8400).

All types of blocks and comments can be copied to the clipboard via the **Copy** command or the **<Ctrl>+<c>** shortcut and then be inserted into the FB interconnection of the same or another project device of the same product family using the **Paste** command or the **<Ctrl>+<v>** shortcut.

- During the copy process into the clipboard, existing connections between copied blocks are copied as well, and the layout is kept too. Moreover, the separate technical objects (e.g. port definition) are copied. Selected connections cannot be copied on their own.
- The **Paste** command is available if the clipboard is not empty and if it was copied from a device of the same product family. Within this product family, all device types (e.g. 8400 xxxxLine Vxx.xx) are permitted.
- After the **Paste** command has been selected, a dialog box is displayed which serves to select which elements are to be inserted from the clipboard and how to solve name conflicts, if any.
- After inserting the elements, they are marked in the target interconnection in order to be repositioned or deleted again to undo the insertion.
- Inserting from the clipboard can be repeated. The originally copied contents of the clipboard remains unchanged when it is inserted.



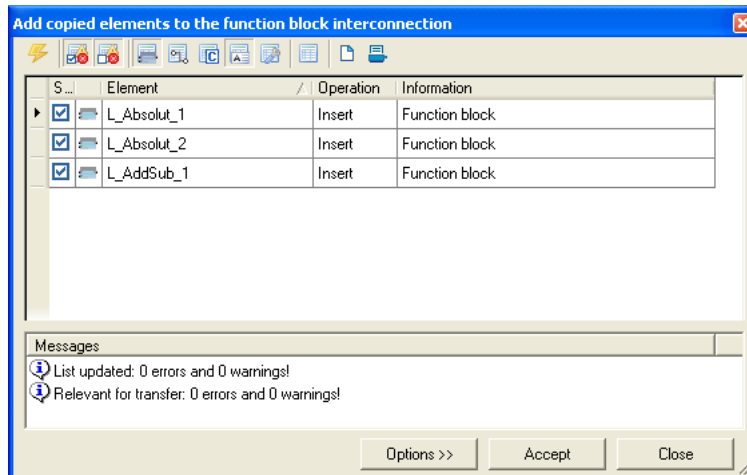
How to copy one or several interconnection elements:

1. Select the objects to be copied.
 - You can select a single object by clicking the header of the object.
 - If you click the header of further objects while pressing **<Ctrl>**, these will be added to an already existing selection (multi-selection).
 - You can easily select elements that are placed together by drawing a frame around these elements while keeping the mouse button pressed.
 - All selected objects are highlighted by a light green header.
2. Go to the *context menu* and select the **Copy** command (or **<Ctrl>+<c>**).
 - The selected elements are copied into the clipboard of the FB Editor.
3. If the elements are to be copied into a function block interconnection of another project device, change to the corresponding interconnection via the *project view*.
4. Go to the *context menu* and select the **Paste** command (or **<Ctrl>+<v>**).
5. Go to the *Insert FB interconnection* dialog box and select the elements to be inserted from the clipboard.
 - Detailed information on this dialog box can be obtained from the following subchapter "[Insert options for copied elements](#)". (📄 1213)
6. Click **Insert** to insert the selected elements into the target interconnection as defined.
 - Only possible if at least one element in the list has been selected for insertion.
 - Insertion is also possible via the **<Enter>** button if at least one element is selected from the list for insertion.
 - The original layout and the relative position of the inserted blocks to each other are maintained.
 - When copying across the devices, you also insert the corresponding separate technical objects (e.g. port definition).
 - The inserted elements are deleted from the list. If the list is empty, the dialog box is closed and the connections are inserted depending on the selected option.

-
7. If there are still elements to be entered in the list, repeat steps 5 and 6 until all elements are inserted as intended.
 8. Press **Close** to stop the insertion and close the dialog box.
 - You can also use **<Esc>** or **<Enter>** to close the dialog box if "Insert" is not active.
 - The elements inserted into the target interconnection so far are maintained.
 - The connections for the blocks inserted so far are inserted depending on the selected option.

17.4.6.1 Insert options for copied elements

If interconnection elements have been copied to the clipboard, the »Engineer« will display a list of all elements contained in the clipboard when selecting the command **Insert** in the *Insert FB interconnection* dialog box:



The list shows the elements which can be added to the target interconnection, and the elements which cannot be added.

- In the "Selection" column, you can check/uncheck the elements to be added.
- Connections are only inserted when the dialog box is closed, which applies to all modules inserted so far. They are displayed as lines or flags, like in the original, but re-routed.
- The symbols in the *Toolbar* serve to execute the following functions:

Symbol	Function
	Add the selected elements to the interconnection
	Show the elements to be added but are marked with an error or warning.
	Show the elements not to be added and marked with an error or warning.
	Show blocks
	Show connections
	Show parameters
	Show comments
	Show system elements
	Show all
	Print Preview
	Print list

- The buttons serve to execute the following functions:

Button	Function
Paste	Add elements selected in the list to the target interconnection <ul style="list-style-type: none"> • Only possible if at least one element in the list has been selected for insertion. • Insertion is also possible via the <Enter> button if at least one element is selected from the list for insertion. • The original layout and the relative position of the inserted blocks to each other are maintained. • When copying across the devices, you also insert the corresponding separate technical objects (e.g. port definition). • The added elements are simultaneously deleted from the list. The connections are added depending on the selected option.
Close	Close dialog box. <ul style="list-style-type: none"> • You can also use <Esc> or <Enter> to close the dialog box if "Insert" is not active. • The elements inserted into the target interconnection so far are maintained. • The connections for the blocks inserted so far are inserted depending on the selected option.

17.4.7 Resetting changed interconnection

If you only made changes on the I/O level, you can reset them by selecting a predefined control scheme in [C00007](#). If you have also made changes on the application level, you must first reset the changed application to a predefined application in [C00005](#).



How to reset the application interconnection to a predefined application:

1. Go to the **Application parameters** tab.
2. Select the required application in the **Application** list field.

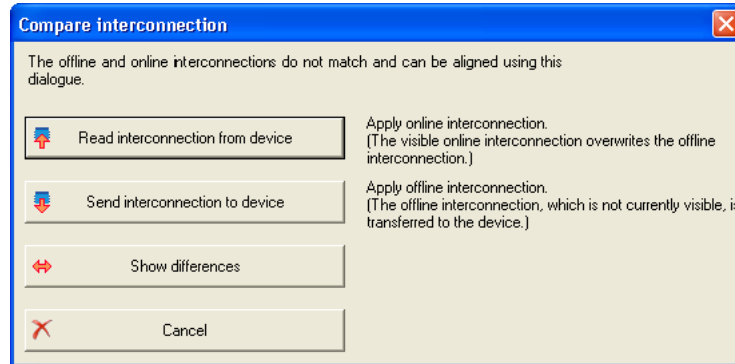


How to reset the I/O interconnection to a predefined control scheme:


1. Go to the **Application parameters** tab.
2. Select the required control scheme in the **Control source** list field.

17.5 Adjusting online and offline interconnection

If the »Engineer« detects that online and offline interconnection differ from each other, the *Compare interconnection* dialog box is displayed with various options for the adjustment:



Tip!

The dialog box can also be opened via the  symbol in the *FB Editor toolbar*.


Button	Function
Read interconnection from device	Add the interconnection in the device to the FB Editor. The interconnection existing in the FB Editor will be overwritten by this action.
Send interconnection to device	Transfer the offline interconnection which is currently not visible in the FB Editor to the device. The interconnection existing in the device will be overwritten by this action.
Show differences	Showing differences between online and offline interconnection.
Cancel	Close the <i>Adjust interconnection</i> dialog box without making an adjustment.

17.6 Printing the interconnection

The interconnection can be printed for documentation purposes, optionally on one page, on four pages, or not scaled.




Tip!

By clicking the  icon in the *FB Editor toolbar*, you can get a print view before printing.



How to print the interconnection:

1. In the *FB Editor toolbar*, click the  icon.
 - The *Circuit print size* dialog box is displayed.
2. Select the desired size and press **OK**.
 - The standard dialog box *Print* appears.
3. Press **OK** to start the printing process.

17.7 Comparing interconnections

The comparison operation serves to compare FB interconnections of 8400 devices within the project. An offline<>online comparison and the comparison of two online devices are possible.



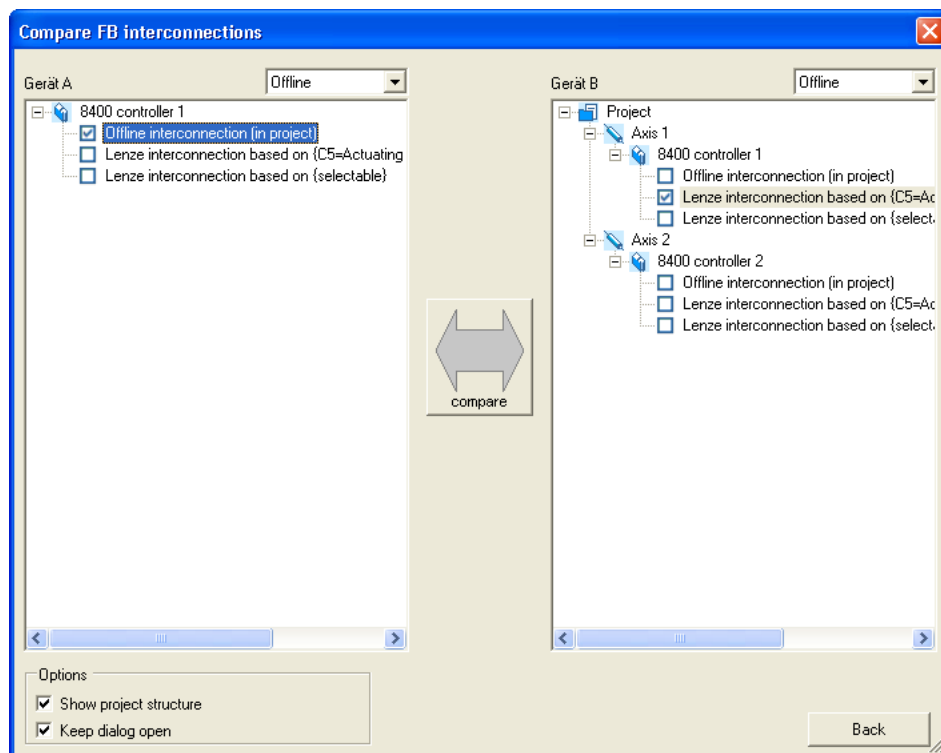
Note!

Only applications can be compared which have been enabled in the FB Editor!
Block positions, line representations, and connector visibilities are not compared.



How to compare two FB interconnections:

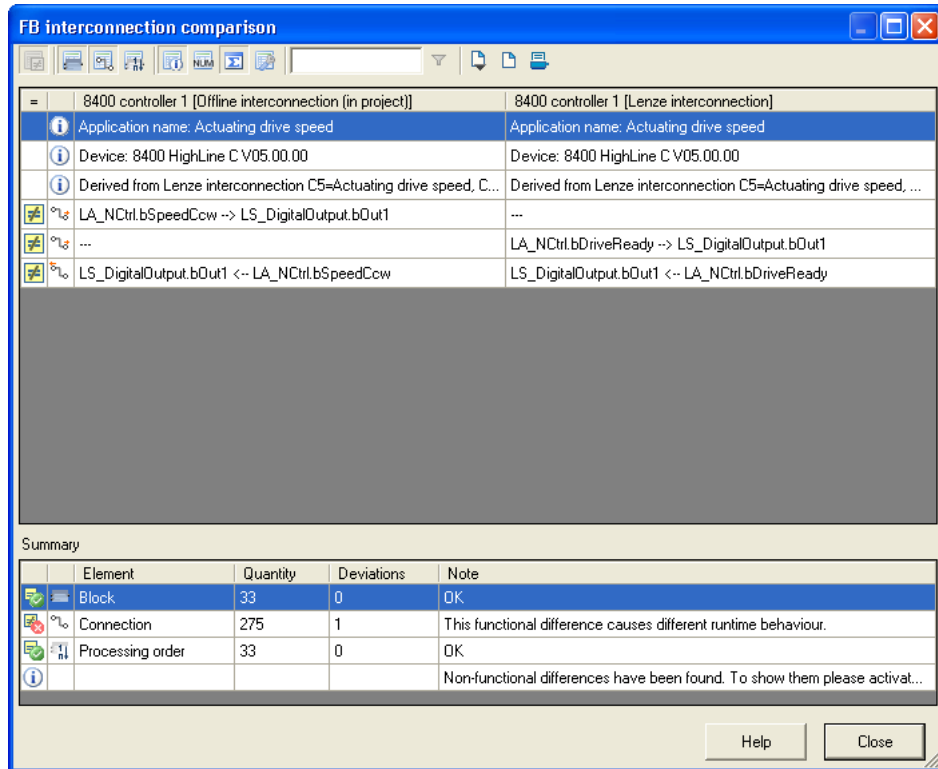
1. Select the command **Application data**→**Compare FB interconnections...**
 - The *Compare FB interconnections* dialog box is displayed:



2. Select the interconnections to be compared in the project view represented on the left and right.
 - In order to execute a comparison with an online device, select "Online" in one of the two upper list fields. Then all available online devices are displayed for selection.
 - If you select "Online" in one of the two upper list fields, you can also compare the interconnections of two available online devices.
3. Click **Compare**.
 - If the comparison was executed successfully, the comparison result is displayed as a list (see the following section).
 - If a comparison of the selected interconnections is not possible, a corresponding message is displayed.
4. In order to stop the comparison operation and close the dialog box: Press **Back**.






Representation of the comparison result

The comparison result is displayed in the form of a list in the *FB interconnection comparison* dialog box:



- The symbols in the *Toolbar* serve to show or hide different details and export and print the shown list.

Symbol	Function
	Only show differences • Button can only be activated in expert mode.
	Show blocks
	Show connections
	Show processing sequence
	Show properties for blocks and connections • Function is only available in expert mode.
	Show comments • Function is only available in expert mode.
	Show block parameters • Function is only available in expert mode.
	Show application parameters • Function is only available in expert mode.
	Show all • Function is only available in expert mode.
	Show general information
	Show summary

Symbol	Function
	Activate expert mode • In the expert mode, also non-functional differences are shown.
	Use filter • Only show list entries which contain the text entered in the input field. • Function is only available in expert mode.
	Export shown list as comma-separated list (*.csv)
	Print Preview
	Print list

17.8 Copying an interconnection

In contrast to copying/inserting selected interconnection elements via the clipboard, the function described in this chapter serves to replace the current FB interconnection of a device completely by the FB interconnection of another project device.



Note!

The complete FB interconnection can only be copied between devices of the same device type and version (e.g. 8400 HighLine C V1.0).

A complete interconnection comprises:

- Function blocks (use and parameter values)
- System blocks (application and parameter values)
- Port blocks (use and parameter values)
- Connections
- Comments
- Interconnection layout (arrangement of the modules)
- Port definition of the ports used in the FB interconnection



How to copy the complete interconnection into another project device:

1. Select the application with the FB interconnection to be copied in the *project view*.
2. Select the command **Application data→Copy FB interconnections...**
3. Go to *project view* and select the application which is to be inserted into the copied FB interconnection.
4. Select the command **Application data→Add FB interconnection...**
 - The command can only be activated if an FB interconnection has been copied from a device of the same device type and version.
 - After the command has been executed, the module assembly is compared. If there are relevant deviations, the insertion is refused and a corresponding message is displayed.
 - If an insertion is possible, you are asked if the FB interconnection is to be inserted.
5. Confirm the question if the copied FB interconnection is to be inserted with **Yes**.
 - After the insertion, an update of the project is required.

17.9 Exporting/Importing an interconnection

The interconnection existing in the project can be exported to a file for reuse/transfer to other devices.



Note!

The file can only be imported to devices of the same device type and version (e.g. 8400 HighLine C V1.0).



How to export the interconnection from the project to a file:

1. Go to the *Project view* in the *context menu* of the inverter and select the **Export FB interconnection...** command.
2. Enter the memory location and the file name for the interconnection to be exported in the *Export FB interconnection* dialog box.
3. Click **Save** to export the interconnection and close the dialog box.



How to import the interconnection from a file to the project:

1. Go to the *Project view* in the *context menu* of the inverter and select the **Import FB interconnection...** command.
2. Select the file with the interconnection to be imported in the *Import FB interconnection* dialog box.
3. Click **Open** to import the interconnection and close the dialog box.

18 Function library

18.1 Function blocks

18 Function library

18.1 Function blocks

This chapter describes the function blocks which are available for the inverter in the FB Editor.



The system blocks are described in the chapter "[System blocks](#)". (📄 1510)



Note!

From version 06.00.00, a maximum of 65 function blocks instead of 50 can be used in the function block interconnection. The computing power remains unchanged, i.e. the max. computing time is approx. 300 μ s.

Overview of function blocks available

Function block	Runtime	Function
L Absolute 1 L Absolute 2	2 μ s	... converts a bipolar input signal into a unipolar output signal.
L AddSub 1	3 μ s	... adds / subtracts analog input signals.
L AnalogSwitch 1 L AnalogSwitch 2 L AnalogSwitch 3 L AnalogSwitch 4 L AnalogSwitch 5	2 μ s	... switches between two analog input signals.
L And 1 L And 2 L And 3	2 μ s	... ANDs three binary signals.
L And5 1 L And5 2	2 μ s	... ANDs five binary signals.
L Arithmetik 1 L Arithmetik 2 L Arithmetik 3 L Arithmetik 4 L Arithmetik 5	7 μ s	... combines two analog signals arithmetically.
L ArithmetikPhi 1 L ArithmetikPhi 2 L ArithmetikPhi 3	7 μ s	... combines two angle signals arithmetically.
L CalcDiameter 1	2 μ s	... can calculate the reel diameter from line speed and winding speed. • This FB is available from version 12.00.00.
L Compare 1 L Compare 2 L Compare 3 L Compare 4 L Compare 5	5 μ s	... compares two analog signals and can be used e.g. to implement a trigger.
L ComparePhi 1 L ComparePhi 2 L ComparePhi 3 L ComparePhi 4 L ComparePhi 5	5 μ s	... compares two angle signals.

Function block	Runtime	Function
L_ConvAP_1 L_ConvAP_2 L_ConvAP_3	0 µs	... converts an analog value into a position. • These FBs are available from version 12.00.00.
L_ConvBitsToWorld_1 L_ConvBitsToWorld_2 L_ConvBitsToWorld_3	3 µs	... converts 16 bit input values of the type "BOOL" into an output value of the type "WORD".
L_ConvDIntToWords_1 L_ConvDIntToWords_2 L_ConvDIntToWords_3	3 µs	... converts an input value of the type "DINT" into two output values of the type "WORD".
L_ConvPA_1 L_ConvPA_2 L_ConvPA_3	3 µs	... converts a position into an analog value. • These FBs are available from version 12.00.00.
L_ConvPP_1 L_ConvPP_2 L_ConvPP_3	3 µs	... converts a position with dynamic fraction. • These FBs are available from version 12.00.00.
L_ConvUnitsToIncr_1 L_ConvUnitsToIncr_2 L_ConvUnitsToIncr_3	3 µs	... converts a position value provided in the real unit of the machine into an internal 32-bit position value considering the machine parameters. • These FBs are available from version 12.00.00.
L_ConvW_1 L_ConvW_2 L_ConvW_3 L_ConvW_4	2 µs	... enables parameterisable conversion between analog signal forms. • Division is remainder considered.
L_ConvWordsToDInt_1 L_ConvWordsToDInt_2 L_ConvWordsToDInt_3	3 µs	... converts two inputs values of the type "WORD" into an output value of the type "DINT".
L_ConvWordToBits_1 L_ConvWordToBits_2 L_ConvWordToBits_3	3 µs	... converts an input value of "WORD" type into 16 individual binary signals.
L_ConvX_1 L_ConvX_2 L_ConvX_3	0 µs	... scales an analog value. • These FBs are available from version 12.00.00.
L_Counter_1 L_Counter_2 L_Counter_3	3 µs	... is a digital upcounter and downcounter.
L_Curve_1 L_Curve_2 L_Curve_3	4 µs	... can optionally display a characteristic function or a curve function $y=f(x)$, the X axis being the input signal and the Y axis being the output signal. From version 12.00.00 , the FB L_Curve_3 for winding applications can also be used for creating a tensile force profile depending on the diameter. • L_Curve_2 and L_Curve_3 are available from version 12.00.00.
L_DFliPFlOp_1 L_DFliPFlOp_2	3 µs	... provides two stable states depending on the input signals.
L_DFRFG_1	3 µs	... synchronises a drive (slave) to the master value of a master drive and then executes a angular synchronism with regard to the digital frequency. • This FB is available from version 12.00.00.
L_DFSET_1	3 µs	... prepares the master value for a slave drive. This FB enables the inverter to follow the master drive true to speed and angle. • This FB is available from version 12.00.00.
L_DigitalDelay_1 L_DigitalDelay_2 L_DigitalDelay_3	2 µs	... delays binary signals.
L_DigitalLogic_1 L_DigitalLogic_2 L_DigitalLogic_3	2 µs	... provides a binary output signal which is generated by the logic combination of three input signals. • L_DigitalLogic_3 is available from version 12.00.00.

Function block	Runtime	Function
L_DigitalLogic5_1 L_DigitalLogic5_2	2 µs	... provides a binary output signal which is generated by the logic combination of five input signals.
L_DT1_1	3 µs	...differentiates signals. The function block can, for instance, be used to apply an acceleration (dv/dt).
L_FixSet_a_1	2 µs	... outputs one of 16 parameterisable analog signals.
L_FixSet_w_1 L_FixSet_w_2	2 µs	... outputs one of 16 parameterisable data words.
L_GainOffset_1 L_GainOffset_2 L_GainOffset_3	3 µs	... can amplify an analog input signal and then add an offset to it. • Gain and offset can be set via FB inputs.
L_GainOffsetP_1 L_GainOffsetP_2 L_GainOffsetP_3	3 µs	... can amplify an analog input signal and then add an offset to it. • Gain and offset can be set via parameters.
L_GainOffsetPhiP_1 L_GainOffsetPhiP_2	3 µs	... can amplify an angle signal and then add an offset to it. • Gain and offset can be set via parameters.
L_GearComp_1	3 µs	... compensates elasticities in the drive train (gearbox compensation). • This FB is available from version 12.00.00.
L_Interpolator_1	5 µs	... can interpolate a position setpoint and/or an analog value e.g. to compensate for larger bus transmission cycles or to continue signal characteristics if data telegrams are missing.
L_JogCtrlExtension_1	5 µs	... can be connected upstream to the L_NSet ramp generator to implement a switch-off positioning at limit switch.
L_Limit_1 L_Limit_2	3 µs	... limits an analog input signal to an adjustable value range.
L_LimitPhi_1 L_LimitPhi_2 L_LimitPhi_3	3 µs	... limits an angle signal to an adjustable value range.
L_MckCtrlInterface_1	5 µs	... provides the application with process inputs for controlling various basic functions of the Motion Control Kernel. ▶ MCKInterface (□ 485)
L_MckStateInterface_1	5 µs	... provides the application with various items of status information of the Motion Control via process outputs. ▶ MCKInterface (□ 485)
L_MFail_1	0 µs	... can be used for implementing a mains failure control. • This FB is available from version 14.00.00.
L_MPot_1	10 µs	... replaces a hardware motor potentiometer as setpoint source.
L_MulDiv_1 L_MulDiv_2	4 µs	... multiplies the analog input signal with a factor.
L_Mux_1	3 µs	... switches one of eight selectable input signals to the output.
L_Negation_1 L_Negation_2	2 µs	... negates an analog input signal.
L_NLim_1 L_NLim_2	3 µs	... can suppress up to three parameterisable blocking zones within a continuous signal characteristic of an analog input signal.
L_Not_1 L_Not_2 L_Not_3 L_Not_4 L_Not_5 L_Not_6 L_Not_7	2 µs	... inverts a digital input signal.
L_NSet_1	50 µs	... contains a ramp generator with comprehensive parameterisation and control options to condition a setpoint signal.
L_Odometer_1	2 µs	... detects positions and calculates distances.

Function block	Runtime	Function
L_OffsetGain_1 L_OffsetGain_2 L_OffsetGain_3	4 µs	... can add an offset to an analog input signal and amplify it afterwards. • Offset and gain can be set via FB inputs.
L_OffsetGainP_1 L_OffsetGainP_2 L_OffsetGainP_3	17 µs	... can add an offset to an analog input signal and amplify it afterwards. • Offset and gain can be set via parameters.
L_OffsetGainPhiP_1 L_OffsetGainPhiP_2	17 µs	... can add an offset to an angle signal and amplify it afterwards. • Offset and gain can be set via parameters.
L_Or_1 L_Or_2 L_Or_3 L_Or_4	2 µs	... ORs three binary signals. • L_Or_4 is available from version 12.00.00.
L_Or5_1 L_Or5_2	2 µs	... ORs five binary signals.
L_PCTRL_1	20 µs	... is a PID inverter and can be used for various control tasks.
L_PhaseDiff_1 L_PhaseDiff_2	2 µs	... generates a position difference for the defined position setpoint from a position value and a speed signal.
L_PhaseIntK_1 L_PhaseIntK_2	5 µs	... integrates a speed to an angle.
L_PhiIntegrator_1	2 µs	... evaluates a speed with a gearbox factor and adds them in an integrator. • This FB is available from version 12.00.00.
L_PosCtrlLin_1 L_PosCtrlLin_2	2 µs	... is a simple linear profile generator. • These FBs are available from version 12.00.00.
L_PosShaftCtrlInterface_1	5 µs	FB in preparation!
L_ProcessCtrl_1	2 µs	... can realise a dancer position or tension control. • This FB is available from version 12.00.00.
L_PT1_1 L_PT1_2 L_PT1_3	3 µs	... filters and delays analog signals.
L_RLO_1	3 µs	... links a selected direction of rotation to the QSP function with wire-break protection.
L_RSFlipFlop_1 L_RSFlipFlop_2	3 µs	... saves a binary input information element and resets it on command..
L_SampleHold_1 L_SampleHold_2	3 µs	... saves a value.
L_SignalMonitor_a	15 µs	... serves to output analog output signals of other FBs, SBs or LAs.
L_SignalMonitor_b	3 µs	... serves to output binary output signals of other FBs, SBs or LAs.
L_SignalSwitch_1 L_SignalSwitch_2 L_SignalSwitch_3 L_SignalSwitch_4	2 µs	... switches between two input signals of the "WORD" data type.
L_SignalSwitch32_1 L_SignalSwitch32_2 L_SignalSwitch32_3	2 µs	... switches between two input signals of "DINT" data type. • These FBs are available from version 12.00.00.
L_SMControlDecoder_1	2 µs	... decodes the control word of the integrated safety system into individual binary control signals for further processing in the application.
L_SMStateDecoder_1	2 µs	... decodes the status word of the integrated safety system into individual binary status signals for further processing in the application.
L_SMStateDecoderIO_1	2 µs	... decodes the I/O status word of the integrated safety system into individual binary status signals for further processing in the application.
L_SQrt_1	3 µs	... outputs the square root for a DINT input value.

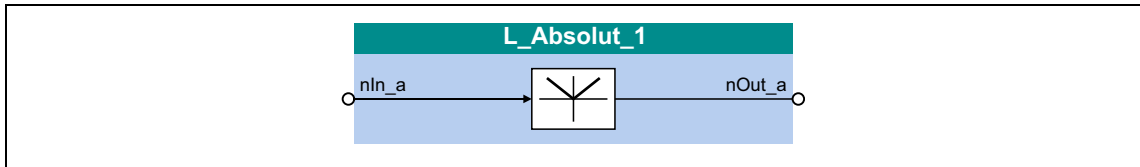
Function block	Runtime	Function
L SRFG 1 L SRFG 2	2 μ s	... is a ramp function generator with S-shaped ramps for limiting the temporal rise of analog signals.
L SwitchPoint 1	3 μ s	... provides four position switch points, i.e. digital switches the binary statuses (FALSE/TRUE) of which depend on the actual position. • This FB is available from version 12.00.00.
L Transient 1 L Transient 2 L Transient 3 L Transient 4 L Transient 5 L Transient 6 L Transient 7 L Transient 8	3 μ s	... evaluates digital signal edges and converts them into timed pulses.

Related topics:

- ▶ [Overview of system blocks available](#) (📖 1510)
- ▶ [Working with the FB Editor](#) (📖 1170)

18.1.1 L_Absolut_1

This FB converts a bipolar input signal into a unipolar output signal.



Inputs

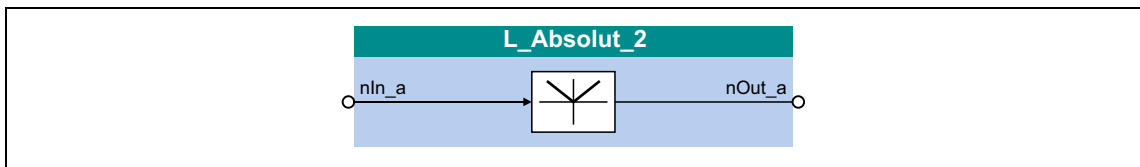
Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.2 L_Absolut_2

This FB converts a bipolar input signal into a unipolar output signal.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

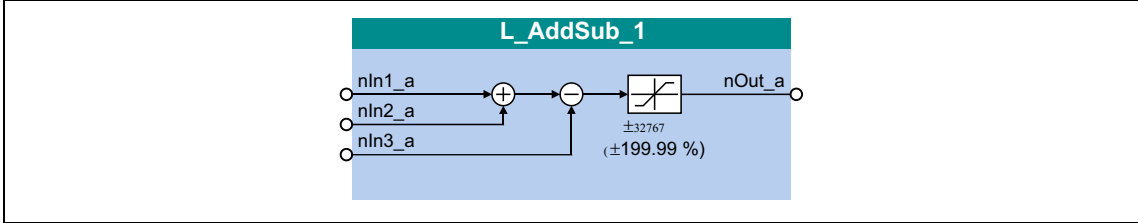
Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.3 L_AddSub_1

This FB has two adding inputs and one subtracting input.

- The value provided at the *nOut_a* output is internally limited to ± 32767 .



Inputs

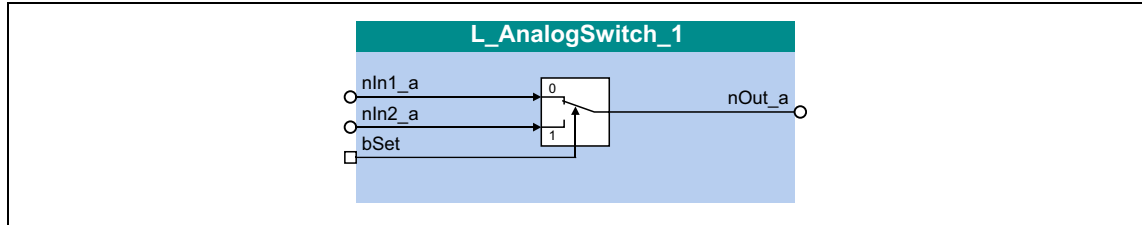
Designator	Data type	Information/possible settings
nIn1_a	INT	Input signal 1 • This input is added
nIn2_a	INT	Input signal 2 • This input is added
nIn3_a	INT	Input signal 3 • This input is subtracted

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • $nOut_a = nIn1_a + nIn2_a - nIn3_a$ • Internal limitation to ± 32767 ($\pm 199.99\%$)

18.1.4 L_AnalogSwitch_1

This FB changes over between two analog input signals. The change-over is controlled via a boolean input signal.



Inputs

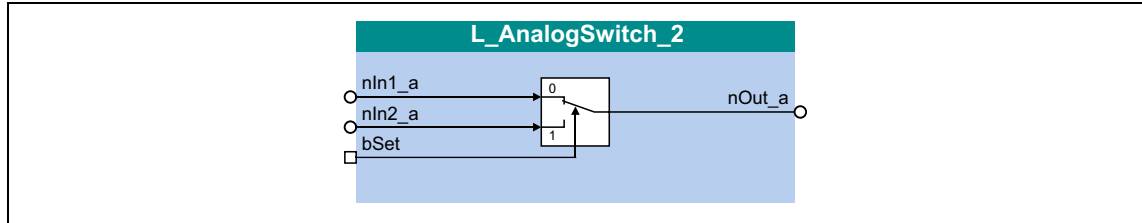
Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2
bSet	BOOL	Selection of the input signal for the output to <i>nOut_a</i>
		FALSE <i>nln1_a</i>
		TRUE <i>nln2_a</i>

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.5 L_AnalogSwitch_2

This FB changes over between two analog input signals. The change-over is controlled via a boolean input signal.



Inputs

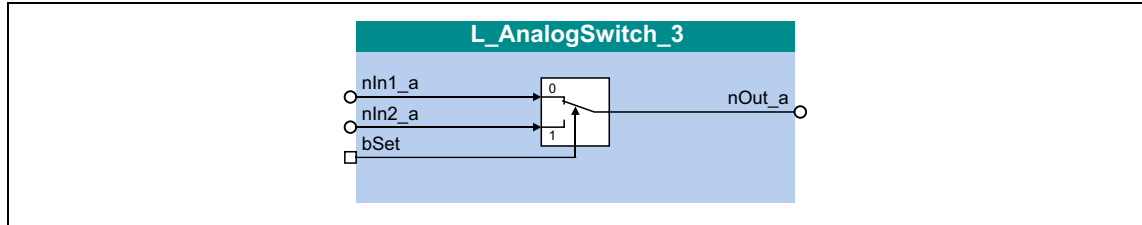
Designator	Data type	Information/possible settings	
nln1_a	INT	Input signal 1	
nln2_a	INT	Input signal 2	
bSet	BOOL	Selection of the input signal for the output to <i>nOut_a</i>	
		FALSE	<i>nln1_a</i>
		TRUE	<i>nln2_a</i>

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.6 L_AnalogSwitch_3

This FB changes over between two analog input signals. The change-over is controlled via a boolean input signal.



Inputs

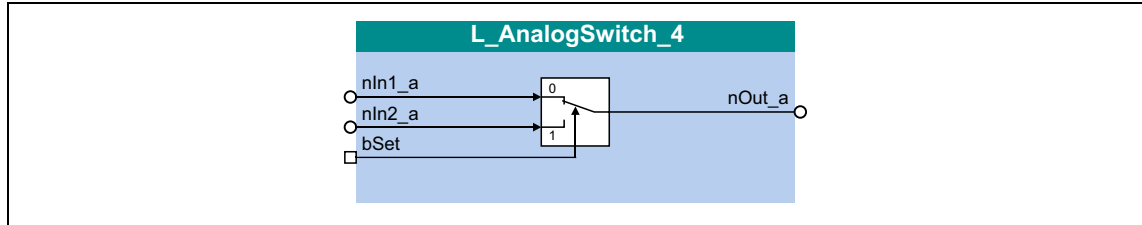
Designator	Data type	Information/possible settings	
nln1_a	INT	Input signal 1	
nln2_a	INT	Input signal 2	
bSet	BOOL	Selection of the input signal for the output to <i>nOut_a</i>	
		FALSE	<i>nln1_a</i>
		TRUE	<i>nln2_a</i>

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.7 L_AnalogSwitch_4

This FB changes over between two analog input signals. The change-over is controlled via a boolean input signal.



Inputs

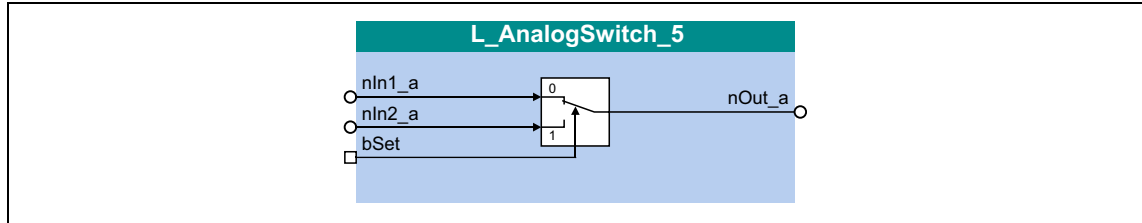
Designator	Data type	Information/possible settings	
nln1_a	INT	Input signal 1	
nln2_a	INT	Input signal 2	
bSet	BOOL	Selection of the input signal for the output to <i>nOut_a</i>	
		FALSE	<i>nln1_a</i>
		TRUE	<i>nln2_a</i>

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.8 L_AnalogSwitch_5

This FB changes over between two analog input signals. The change-over is controlled via a boolean input signal.



Inputs

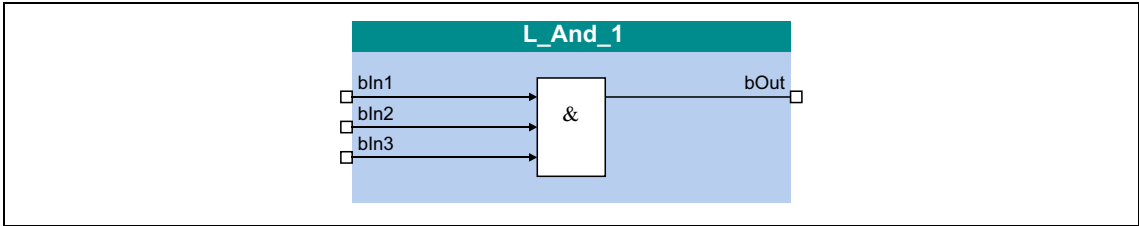
Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2
bSet	BOOL	Selection of the input signal for the output to <i>nOut_a</i>
		FALSE <i>nln1_a</i>
		TRUE <i>nln2_a</i>

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.9 L_And_1

This FB implements AND operations for input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

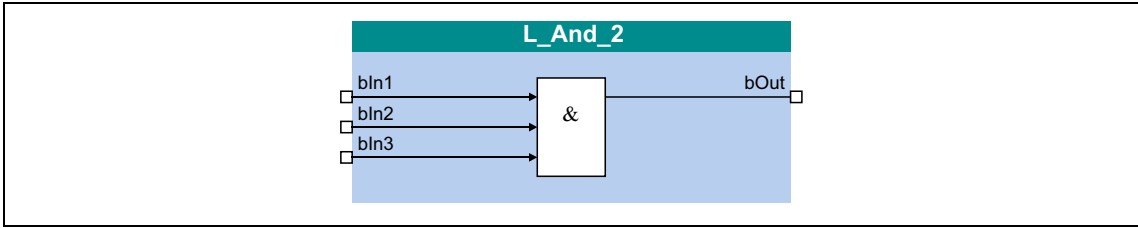
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE

[18-1] Truth table of the FB L_And_1

18.1.10 L_And_2

This FB implements AND operations for input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

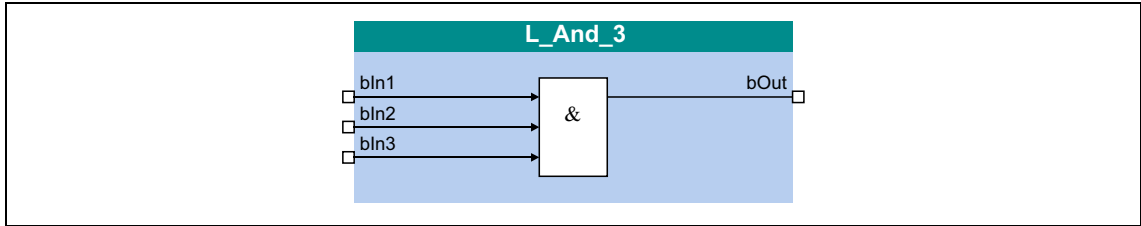
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE

[18-2] Truth table of the FB L_And_2

18.1.11 L_And_3

This FB implements AND operations for input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

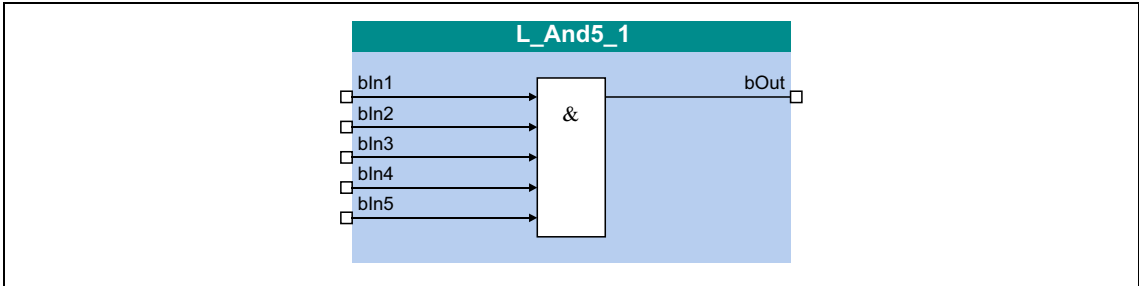
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE

[18-3] Truth table of the FB L_And_3

18.1.12 L_And5_1

This FB implements AND operations for input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 ... bIn5	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

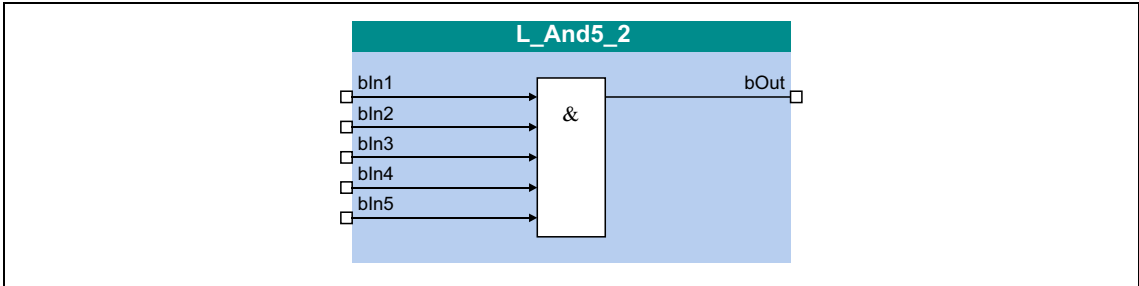
Function

Inputs					Output	
bIn5	bIn4	bIn3	bIn2	bIn1	bOut	
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	
FALSE	FALSE	FALSE	FALSE	TRUE		
FALSE	FALSE	FALSE	TRUE	FALSE		
FALSE	FALSE	FALSE	TRUE	TRUE		
FALSE	FALSE	TRUE	FALSE	FALSE		
...						
TRUE	TRUE	TRUE	FALSE	TRUE		
TRUE	TRUE	TRUE	TRUE	FALSE		
TRUE	TRUE	TRUE	TRUE	TRUE		TRUE

[18-4] Truth table of the FB L_And5_1

18.1.13 L_And5_2

This FB implements AND operations for input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 ... bIn5	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

Function

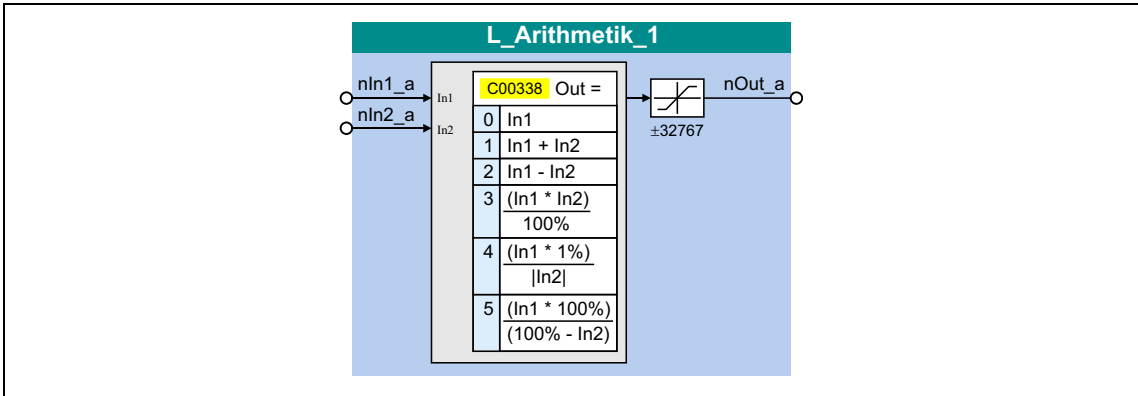
Inputs					Output	
bIn5	bIn4	bIn3	bIn2	bIn1	bOut	
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE	
FALSE	FALSE	FALSE	FALSE	TRUE		
FALSE	FALSE	FALSE	TRUE	FALSE		
FALSE	FALSE	FALSE	TRUE	TRUE		
FALSE	FALSE	TRUE	FALSE	FALSE		
...						
TRUE	TRUE	TRUE	FALSE	TRUE		
TRUE	TRUE	TRUE	TRUE	FALSE		
TRUE	TRUE	TRUE	TRUE	TRUE		TRUE

[18-5] Truth table of the FB L_And5_2

18.1.14 L_Arithmetik_1

This FB can implement an arithmetic link between two analog signals.

- The arithmetic function is selected in [C00338](#).
- All internal intermediate results and the value output at the *nOut_a* output are internally limited to ±32767.
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±32767 (±199.99 %)

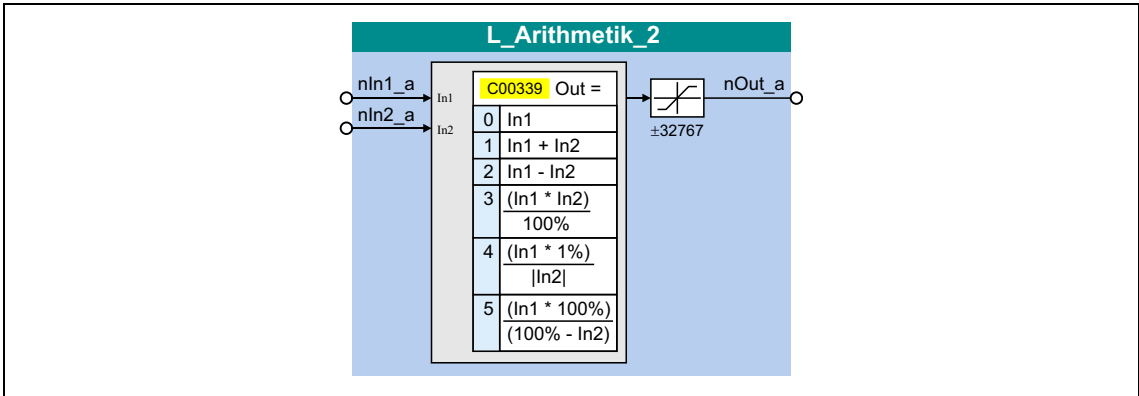
Parameters

Parameters	Possible settings	Info
C00338		Function selection
	0 nOut_a = nln1_a	
	1 nOut_a = nln1_a + nln2_a	
	2 nOut_a = nln1_a - nln2_a	
	3 $nOut_a = \frac{nln1_a \cdot nln2_a}{16384}$	
	4 $nOut_a = \frac{nln1_a}{ nln2_a } \cdot 164$	When the denominator has the value "0", it will be set to "1".
	5 $nOut_a = \frac{nln1_a}{16384 - nln2_a} \cdot 16384$	

18.1.15 L_Arithmetik_2

This FB can implement an arithmetic link between two analog signals.

- The arithmetic function is selected in [C00339](#).
- All internal intermediate results and the value output at the *nOut_a* output are internally limited to ±32767.
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
<i>nln1_a</i>	INT	Input signal 1
<i>nln2_a</i>	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
<i>nOut_a</i>	INT	Output signal • Internal limitation to ±32767 (±199.99 %)

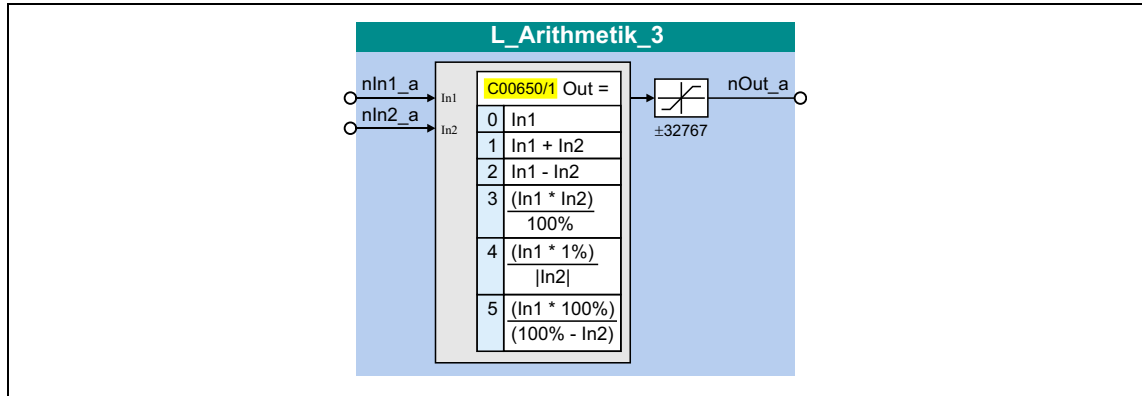
Parameters

Parameters	Possible settings	Info
C00339		Function selection
	0 $nOut_a = nln1_a$	
	1 $nOut_a = nln1_a + nln2_a$	
	2 $nOut_a = nln1_a - nln2_a$	
	3 $nOut_a = \frac{nln1_a \cdot nln2_a}{16384}$	
	4 $nOut_a = \frac{nln1_a}{ nln2_a } \cdot 164$	When the denominator has the value "0", it will be set to "1".
	5 $nOut_a = \frac{nln1_a}{16384 - nln2_a} \cdot 16384$	

18.1.16 L_Arithmetik_3

This FB can implement an arithmetic link between two analog signals.

- The arithmetic function is selected in [C00650/1](#).
- All internal intermediate results and the value output at the *nOut_a* output are internally limited to ±32767.
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±32767 (±199.99 %)

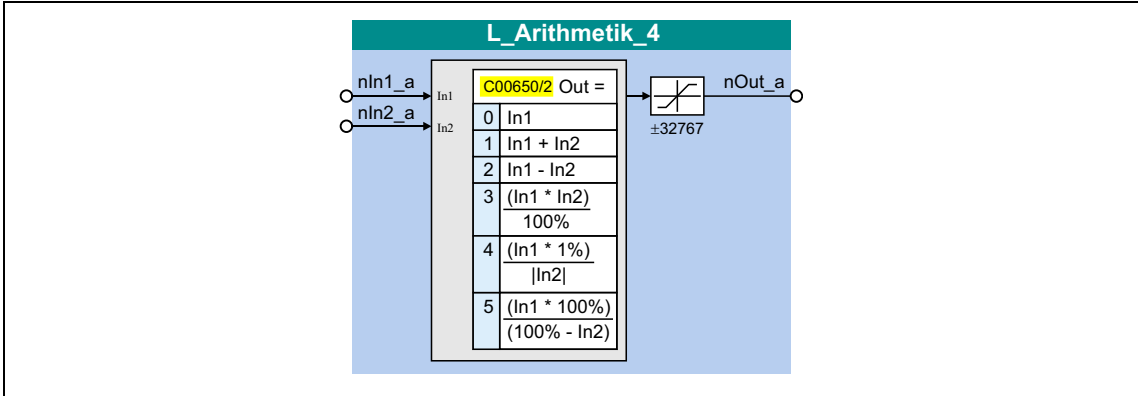
Parameters

Parameters	Possible settings	Info
C00650/1		Function selection
	0 $nOut_a = nln1_a$	
	1 $nOut_a = nln1_a + nln2_a$	
	2 $nOut_a = nln1_a - nln2_a$	
	3 $nOut_a = \frac{nln1_a \cdot nln2_a}{16384}$	
	4 $nOut_a = \frac{nln1_a}{ nln2_a } \cdot 164$	When the denominator has the value "0", it will be set to "1".
	5 $nOut_a = \frac{nln1_a}{16384 - nln2_a} \cdot 16384$	

18.1.17 L_Arithmetik_4

This FB can implement an arithmetic link between two analog signals.

- The arithmetic function is selected in [C00650/2](#).
- All internal intermediate results and the value output at the *nOut_a* output are internally limited to ±32767.
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±32767 (±199.99 %)

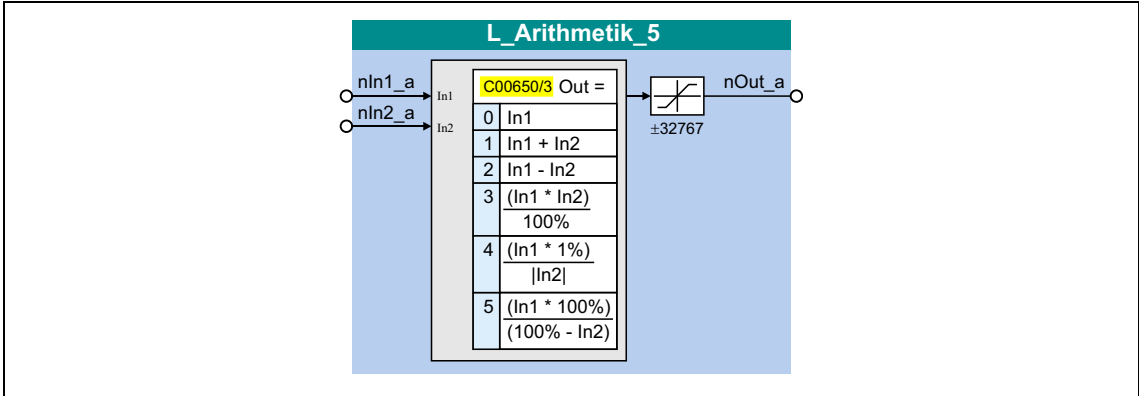
Parameters

Parameters	Possible settings	Info
C00650/2		Function selection
	0 nOut_a = nln1_a	
	1 nOut_a = nln1_a + nln2_a	
	2 nOut_a = nln1_a - nln2_a	
	3 $nOut_a = \frac{nln1_a \cdot nln2_a}{16384}$	
	4 $nOut_a = \frac{nln1_a}{ nln2_a } \cdot 164$	When the denominator has the value "0", it will be set to "1".
	5 $nOut_a = \frac{nln1_a}{16384 - nln2_a} \cdot 16384$	

18.1.18 L_Arithmetik_5

This FB can implement an arithmetic link between two analog signals.

- The arithmetic function is selected in [C00650/3](#).
- All internal intermediate results and the value output at the *nOut_a* output are internally limited to ±32767.
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±32767 (±199.99 %)

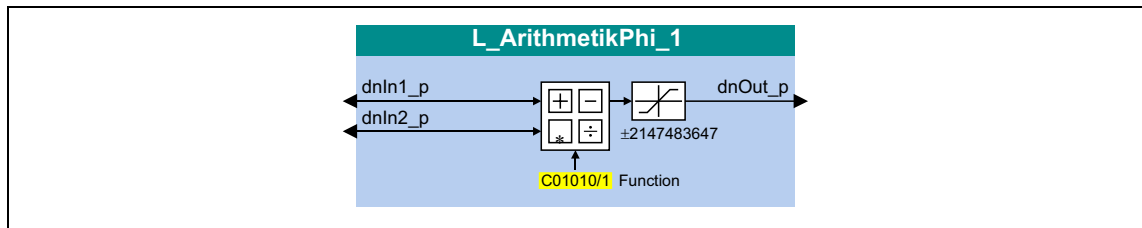
Parameters

Parameters	Possible settings	Info
C00650/3		Function selection
	0 nOut_a = nln1_a	
	1 nOut_a = nln1_a + nln2_a	
	2 nOut_a = nln1_a - nln2_a	
	3 $nOut_a = \frac{nln1_a \cdot nln2_a}{16384}$	
	4 $nOut_a = \frac{nln1_a}{ nln2_a } \cdot 164$	When the denominator has the value "0", it will be set to "1".
	5 $nOut_a = \frac{nln1_a}{16384 - nln2_a} \cdot 16384$	

18.1.19 L_ArithmetikPhi_1

This FB can implement an arithmetic link between two angle signals.

- The arithmetic function is selected in [C01010/1](#).
- All internal intermediate results and the value provided at the *dnOut_p* output are internally limited to ± 2147483647 ($\pm 2^{31} - 1$).
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
dnIn1_p	DINT	Input signal 1
dnIn2_p	DINT	Input signal 2

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to ± 2147483647

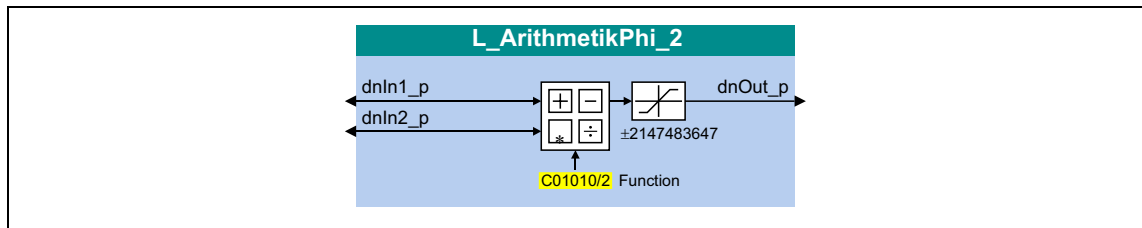
Parameters

Parameters	Possible settings	Info
C01010/1	0	$dnOut_p = dnIn1_p$
	1	$dnOut_p = dnIn1_p + dnIn2_p$
	2	$dnOut_p = dnIn1_p - dnIn2_p$
	3	$dnOut_p = dnIn1_p * dnIn2_p$
	4	$dnOut_p = dnIn1_p / dnIn2_p$
		Function selection

18.1.20 L_ArithmetikPhi_2

This FB can implement an arithmetic link between two angle signals.

- The arithmetic function is selected in [C01010/2](#).
- All internal intermediate results and the value provided at the *dnOut_p* output are internally limited to ± 2147483647 ($\pm 2^{31} - 1$).
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
dnln1_p	DINT	Input signal 1
dnln2_p	DINT	Input signal 2

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to ± 2147483647

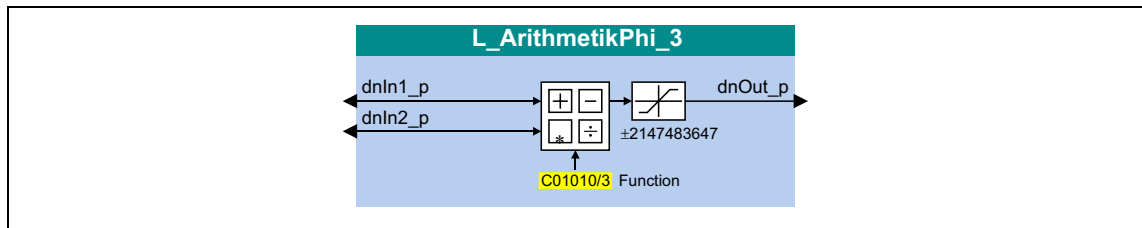
Parameters

Parameters	Possible settings	Info	
C01010/2	0	$dnOut_p = dnln1_p$	Function selection
	1	$dnOut_p = dnln1_p + dnln2_p$	
	2	$dnOut_p = dnln1_p - dnln2_p$	
	3	$dnOut_p = dnln1_p * dnln2_p$	
	4	$dnOut_p = dnln1_p / dnln2_p$	

18.1.21 L_ArithmetikPhi_3

This FB can implement an arithmetic link between two angle signals.

- The arithmetic function is selected in [C01010/3](#).
- All internal intermediate results and the value provided at the *dnOut_p* output are internally limited to ± 2147483647 ($\pm 2^{31} - 1$).
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
dnIn1_p	DINT	Input signal 1
dnIn2_p	DINT	Input signal 2

Outputs

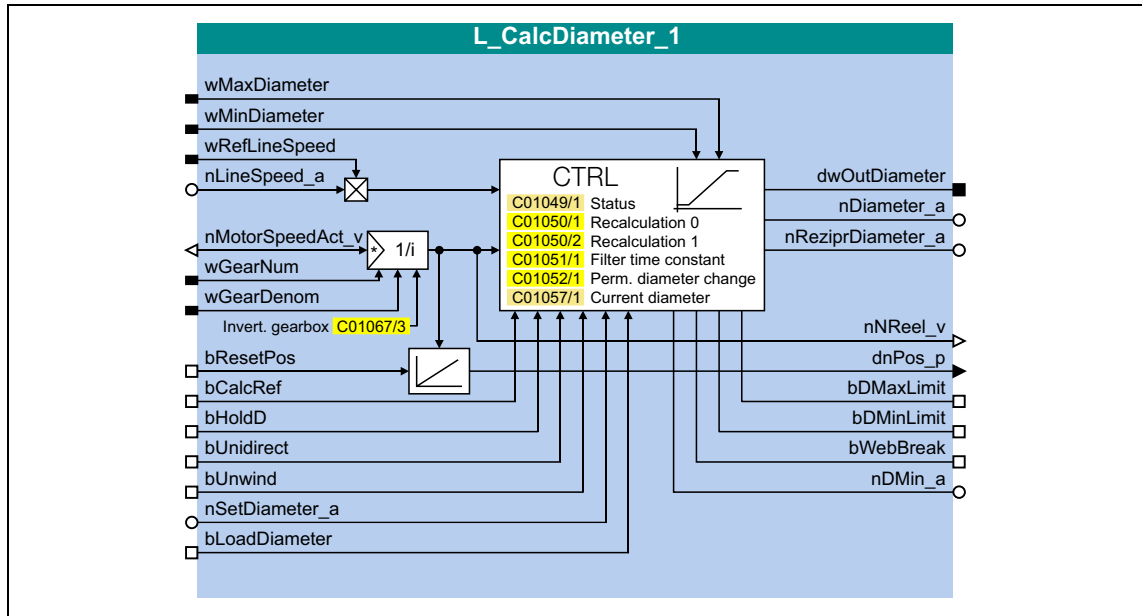
Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to ± 2147483647

Parameters

Parameters	Possible settings	Info
C01010/3	0	$dnOut_p = dnIn1_p$
	1	$dnOut_p = dnIn1_p + dnIn2_p$
	2	$dnOut_p = dnIn1_p - dnIn2_p$
	3	$dnOut_p = dnIn1_p * dnIn2_p$
	4	$dnOut_p = dnIn1_p / dnIn2_p$
		Function selection

18.1.22 L_CalcDiameter_1

This FB serves to calculate the reel diameter from line speed and winding speed.



Inputs

Designator	Data type	Information/possible settings
wMaxDiameter	WORD	Maximum diameter in [mm] • Internal limitation to 10000 mm (≅ 10 m)
wMinDiameter	WORD	Minimum diameter in [mm] • Internal limitation to 10000 mm (≅ 10 m)
wRefLineSpeed	WORD	Maximum material speed in [0.1 m/min] • Scaling: 2500 ≅ 250.0 m/min • Internal limitation to 3000 m/min
nLineSpeed_a	INT	Material speed setpoint • Scaling: 16384 ≅ maximum material speed (<i>wRefLineSpeed</i>)
nMotorSpeedAct_v	INT	Current motor speed in [increments/ms] • Scaling: 16384 ≅ 15000 rpm
wGearNum	WORD	Gearbox factor (numerator) • Internal limitation to -32767 ... -1 / 1 ... 32767
wGearDenom	WORD	Gearbox factor (denominator) • Internal limitation to 1 ... 32767
bResetPos	BOOL	Reset angle of rotation <i>dnPos_p</i> TRUE The angle of rotation <i>dnPos_p</i> is reset.
bCalcRef	BOOL	FALSE Use diameter recalculation 0 (C01050/1).
		TRUE Use diameter recalculation 1 (C01050/2).
bHoldD	BOOL	TRUE The diameter value output last is not overwritten with new values.
		FALSE
bUnidirect	BOOL	TRUE Only the change of direction defined via <i>bUnwind</i> is enabled.
		FALSE

Designator	Data type	Information/possible settings	
bUnwind	BOOL	Selection of the enabled change or direction <ul style="list-style-type: none"> • Only when <i>bUnidirect</i> = TRUE 	
		FALSE	Clockwise rotation (Cw)
		TRUE	Counter-clockwise rotation (Ccw)
nSetDiameter_a	DINT	Selection of an initial value/external diameter signal <ul style="list-style-type: none"> • Scaling: 16384 \equiv maximum diameter (<i>wMaxDiameter</i>) • The value is accepted by setting <i>bLoadDiameter</i> to TRUE. 	
bLoadDiameter	BOOL	Accept initial value <i>nSetDiameter_a</i> <ul style="list-style-type: none"> • This input has a higher priority than the <i>bHoldDinput</i>. 	
		TRUE	Accept the value at <i>nSetDiameter_a</i> .

Outputs

Designator	Data type	Value/meaning
dwOutDiameter	DWORD	Current diameter in [μ m] <ul style="list-style-type: none"> • Internal limitation to 10 m • Unfiltered
nDiameter_a	INT	Current diameter in [%] <ul style="list-style-type: none"> • 100 % \equiv Maximum diameter (<i>wMaxDiameter</i>) • filtered via PT1 element (filter time constant can be set in C01051/1)
nReziprDiameter_a	INT	Reciprocal value of the current diameter in [%] <ul style="list-style-type: none"> • 100 % \equiv Minimum diameter (<i>wMinDiameter</i>)
nNReel_v	INT	Current winding speed in [increments/ms] <ul style="list-style-type: none"> • Scaling: 16384 \equiv 15000 rpm
bDMaxLimit	BOOL	Limit value monitoring
		TRUE
bDMinLimit	BOOL	Limit value monitoring
		TRUE
bWebBreak	BOOL	Web break monitoring
		TRUE
nDMin_a	INT	Minimum diameter in [%] <ul style="list-style-type: none"> • 100 % \equiv Maximum diameter (<i>wMaxDiameter</i>)

Parameters

Parameters	Possible settings	Info
C01049/1		Status
	-10	Line speed overflow
	-1	<i>wMinDiameter</i> > <i>wMaxDiameter</i>
	0	OK - diameter has been recalculated
	10	Diameter has been initialised with minimum diameter (<i>wMinDiameter</i>)
	20	Diameter is loaded (<i>bLoadDiameter</i> active)
30	Diameter is held (<i>bHoldD</i> active)	

Parameters	Possible settings			Info
C01050/1	0.001	Rev.	2.000	Diameter recalculation 0 <ul style="list-style-type: none"> • Number of revolutions after which a diameter calculation is executed. • Setting is effective when <i>bCalcRef</i> = FALSE. • Initialisation: 1.000
C01050/2	0.001	Rev.	2.000	Diameter recalculation 1 <ul style="list-style-type: none"> • Number of revolutions after which a diameter calculation is executed. • Setting is effective when <i>bCalcRef</i> = TRUE. • Initialisation: 0.100
C01051/1	0.010	s	3.000	Filter time constant for calculated diameter values <ul style="list-style-type: none"> • Initialisation: 1.000 s
C01052/1	0.00	%	100.00	Permissible diameter change in opposite direction (web break monitoring) <ul style="list-style-type: none"> • Only relevant when <i>bUnidirect</i> = TRUE. • Referring to the maximum diameter (<i>wMaxDiameter</i>). • Initialisation: 10.00 %
C01057/1	0.000	mm	10000.000	Current diameter <ul style="list-style-type: none"> • Read only
C01067/3				Invert. gearbox nMotorSpeedAct_v
	0	not inverted		
	1	inverted		
	2	Automatically from MCK		

18.1.22.1 Set initial value

An initial value or an external diameter signal can be defined at the *nSetDiameter_a* input.

- this value is accepted if *bLoadDiameter* is set to TRUE.
- In case of acceptance, the diameter calculation will be reset and the filter for diameter calculation is loaded with the defined initial value.

18.1.22.2 Calculate diameter

For reel diameter calculation, the material speed and the current winding speed are integrated cyclically.

- The material speed is defined via *nLineSpeed_a*.
- The winding speed is calculated from the *nMotorSpeedAct_v* motor speed and the current *wGearNum/wGearDenom* gearbox factor.
- [C01050/1...2](#) can be used to define two different calculation cycles. The setting to be used is selected via *bCalcRef*.
- At the end of each integration interval, a new diameter value results from the division of the integrator values.
- An absolute value generation and smoothing via a first order low pass is carried out. The time constant of this filter can be set in [C01051/1](#). The *dwOutDiameter* output is not filtered.

18.1.22.3 Select change direction, web break monitoring

By setting *bUnidirect* to TRUE, you only enable one change direction for diameter calculation and simultaneously activate the web break monitoring.

- The permissible change direction can be defined via *bUnwind*.
- A recalculated value is only accepted if it exceeds the value saved last in the permissible direction.

After a web break, the diameter values calculated successively mostly run very quickly in the opposite direction.

- [C01052/1](#) serves to define the maximally permissible deviation in the opposite direction. If it is exceeded, the *bWebBreak* output is set to TRUE.
- If *bUnidirect* is set to FALSE, both change directions are enabled and the internal memory is always overwritten with the recalculated value which switches off the web break monitoring.

18.1.22.4 Holding the current value

By setting *bHoldD* to TRUE, you fix the diameter value *nDiameter_a* output last.

- The diameter calculation is reset and the filter for diameter calculation is loaded with the internally held diameter value.

18.1.22.5 Limit value monitoring

wMinDiameter and *wMaxDiameter* serve to define the limit values for the given diameter values. If they are reached/exceeded, the corresponding output (*bDMaxLimit/bDminLimit*) is set to TRUE.

- The unfiltered diameter value *dwOutDiameter* and the filtered diameter value *nDiameter_a* are limited.
- The limit values are entered in [mm].
- The hysteresis for resetting *bDMaxLimit/bDminLimit* is permanently set to 1 % of *wMaxDiameter*.
- For parameter setting of further FBs, the value in *wMinDiameter* with regard to *wMaxDiameter* is provided via the *nDMin_a* output.

18.1.22.6 Converting diameter in 1/D

For evaluating the material speed with 1/D (speed-controlled winder), the reciprocal value of the reel diameter is provided via *nReziprDiameter_a*.

- This value refers to the limitation value *wMinDiameter*.

18.1.22.7 Physical state variables

The *dwOutDiameter* output provides the current diameter as physical quantity (1 LSB \equiv 1 m).

nNReel_v outputs the winding speed which results from the *nMotorSpeedAct_v* motor speed and the current (*wGearNum/wGearDenom*) gearbox factor.

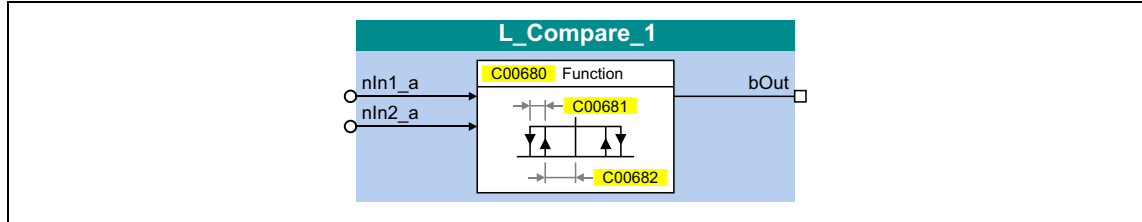
For supporting further functions (e.g. a traversing control), the winding speed is integrated additionally.

- The angle of rotation is output via *dnPos_p*.
- By setting *bResetPos* to TRUE, the angle of rotation is reset.

18.1.23 L_Compare_1

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

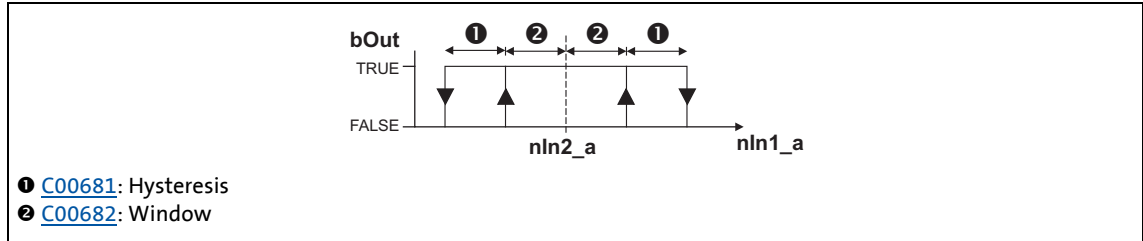
Parameters

Parameters	Possible settings			Info
C00680				Function selection
	1	nln1 = nln2		
	2	nln1 > nln2		
	3	nln1 < nln2		
	4	nln1 = nln2		
	5	nln1 > nln2		
	6	nln1 < nln2		
C00681	0.00	%	100.00	Hysteresis • Lenze setting: 0.50 %
C00682	0.00	%	100.00	Window • Lenze setting: 2.00 %

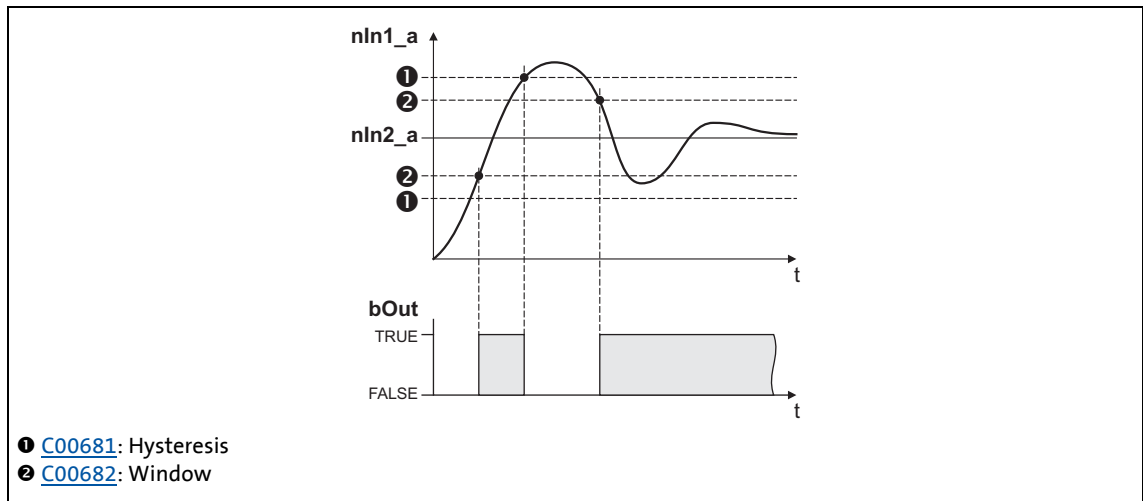
18.1.23.1 Function 1: nln1 = nln2

This function compares two signals with regard to equality. It can, for instance, provide the comparison "actual speed equals setpoint speed" ($n_{act} = n_{set}$).

- Use [C00682](#) to set the window within which the equality is to apply.
- Use [C00681](#) to set a hysteresis if the input signals are not stable and the output oscillates.



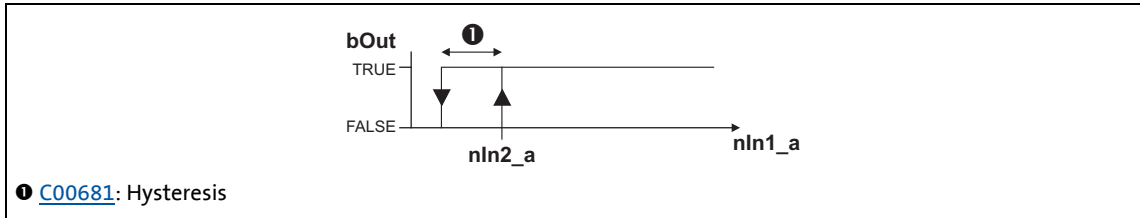
[18-6] Function 1: Switching performance



[18-7] Function 1: Example

18.1.23.2 Function 2: $nIn1 > nIn2$

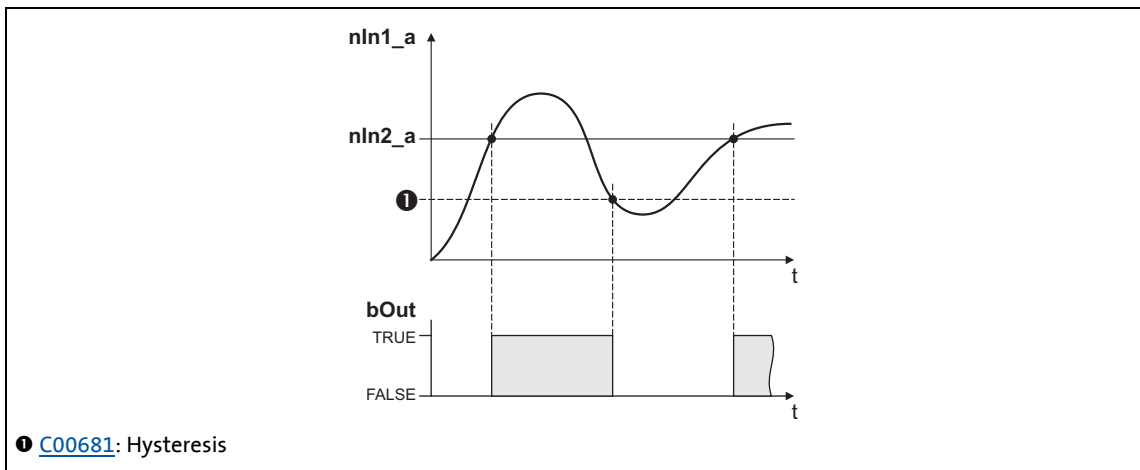
This function serves, for instance, to implement the comparison "actual speed is higher than a limit value" ($n_{act} > n_x$) for one direction of rotation.



[18-8] Function 2: Switching performance

Functional sequence

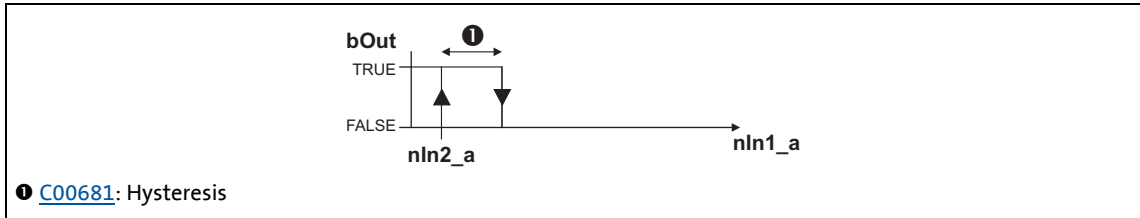
1. If the value at $nIn1_a$ exceeds the value $nIn2_a$, $bOut$ changes from FALSE to TRUE.
2. Only if the signal at $nIn1_a$ falls below the value of $nIn2_a - \text{hysteresis}$ again, $bOut$ changes back from TRUE to FALSE.



[18-9] Function 2: Example

18.1.23.3 Function 3: $nIn1 < nIn2$

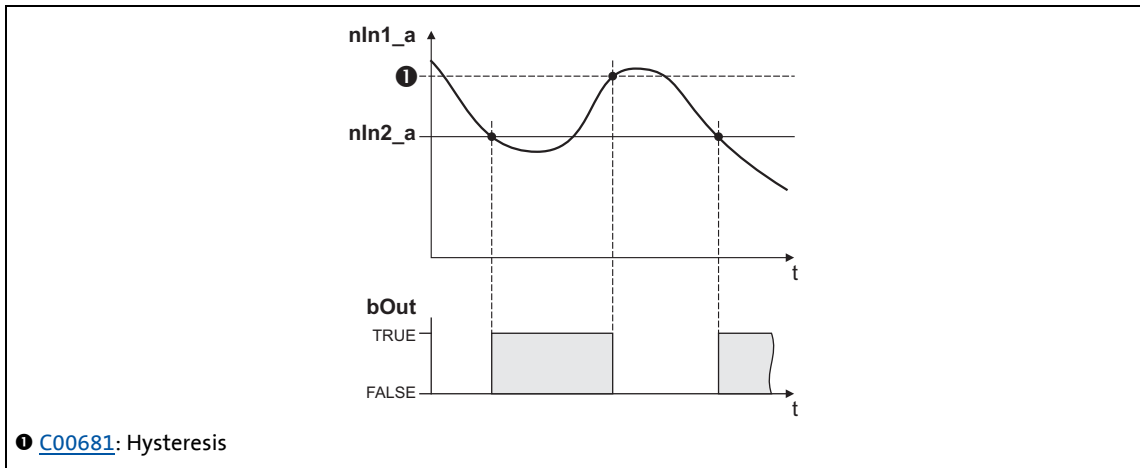
This function serves, for instance, to implement the comparison "actual speed is lower than a limit value" ($n_{act} < n_x$) for one direction of rotation.



[18-10] Function 3: Switching performance

Functional sequence

1. If the value at $nIn1_a$ falls below the value at $nIn2_a$, $bOut$ changes from FALSE to TRUE.
2. Only if the signal at $nIn1_a$ exceeds the value of $nIn2_a$ - *hysteresis* again, $bOut$ changes back from TRUE to FALSE.



[18-11] Function 3: Example

18.1.23.4 Function 4: $|n_{ln1}| = |n_{ln2}|$

This function serves to implement e.g. the comparison " $n_{act} = 0$ ". This function is similar to function 1. However, the amount is generated by the input signals before signal processing (without sign).

▶ [Function 1: \$n_{ln1} = n_{ln2}\$](#)

18.1.23.5 Function 5: $|n_{ln1}| > |n_{ln2}|$

This function serves to implement e.g. the comparison " $|n_{act}| > |n_x|$ " irrespective of the direction of rotation. This function is similar to function 2. However, the amount is generated by the input signals before signal processing (without sign).

▶ [Function 2: \$n_{ln1} > n_{ln2}\$](#)

18.1.23.6 Function 6: $|n_{ln1}| < |n_{ln2}|$

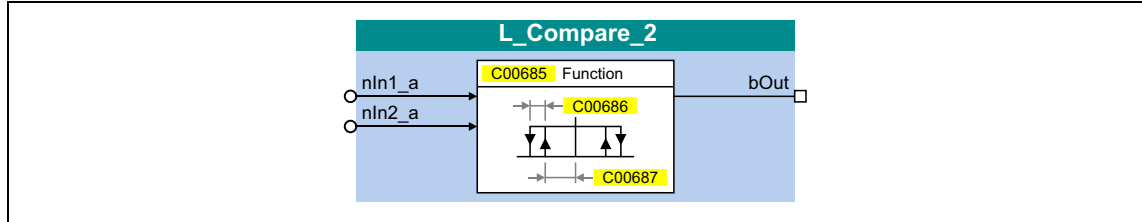
This function serves to implement the comparison " $|n_{act}| < |n_x|$ " independent of the direction of rotation. This function is similar to function 3. However, the amount is generated by the input signals before signal processing (without sign).

▶ [Function 3: \$n_{ln1} < n_{ln2}\$](#)

18.1.24 L_Compare_2

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

Parameters	Possible settings			Info												
C00685	<table border="1"> <tr><td>1</td><td>nln1 = nln2</td></tr> <tr><td>2</td><td>nln1 > nln2</td></tr> <tr><td>3</td><td>nln1 < nln2</td></tr> <tr><td>4</td><td> nln1 = nln2 </td></tr> <tr><td>5</td><td> nln1 > nln2 </td></tr> <tr><td>6</td><td> nln1 < nln2 </td></tr> </table>			1	nln1 = nln2	2	nln1 > nln2	3	nln1 < nln2	4	nln1 = nln2	5	nln1 > nln2	6	nln1 < nln2	Function selection
1	nln1 = nln2															
2	nln1 > nln2															
3	nln1 < nln2															
4	nln1 = nln2															
5	nln1 > nln2															
6	nln1 < nln2															
C00686	0.00	%	100.00	Hysteresis • Lenze setting: 0.50 %												
C00687	0.00	%	100.00	Window • Lenze setting: 2.00 %												

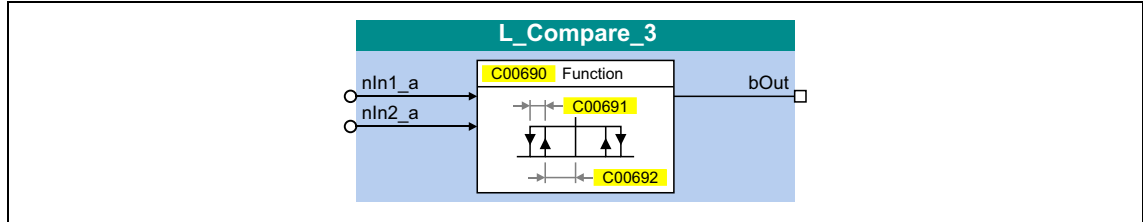


For a detailed functional description see [L_Compare_1](#).

18.1.25 L_Compare_3

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

Parameters	Possible settings			Info
C00690				Function selection
	1	nln1 = nln2		
	2	nln1 > nln2		
	3	nln1 < nln2		
	4	nln1 = nln2		
	5	nln1 > nln2		
	6	nln1 < nln2		
C00691	0.00	%	100.00	Hysteresis • Lenze setting: 0.50 %
C00692	0.00	%	100.00	Window • Lenze setting: 2.00 %

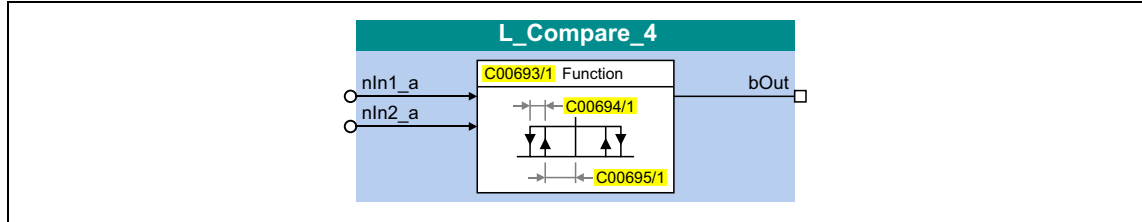


For a detailed functional description see [L_Compare_1](#).

18.1.26 L_Compare_4

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

Parameters	Possible settings			Info
C00693/1				Function selection
	1	nln1 = nln2		
	2	nln1 > nln2		
	3	nln1 < nln2		
	4	nln1 = nln2		
	5	nln1 > nln2		
	6	nln1 < nln2		
C00694/1	0.00	%	100.00	Hysteresis • Lenze setting: 0.00 %
C00695/1	0.00	%	100.00	Window • Lenze setting: 0.00 %

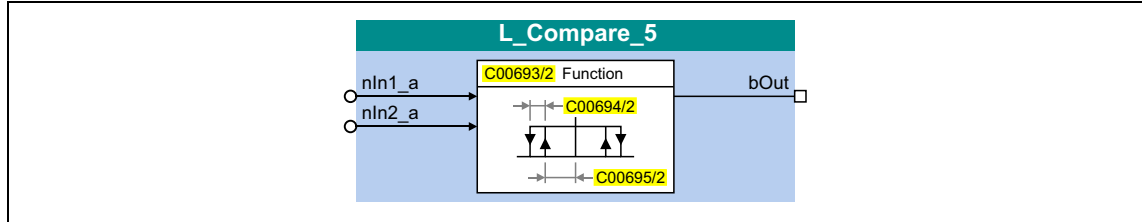


For a detailed functional description see [L_Compare_1](#).

18.1.27 L_Compare_5

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

Parameters	Possible settings			Info												
C00693/2	<table border="1"> <tr><td>1</td><td>nln1 = nln2</td></tr> <tr><td>2</td><td>nln1 > nln2</td></tr> <tr><td>3</td><td>nln1 < nln2</td></tr> <tr><td>4</td><td> nln1 = nln2 </td></tr> <tr><td>5</td><td> nln1 > nln2 </td></tr> <tr><td>6</td><td> nln1 < nln2 </td></tr> </table>			1	nln1 = nln2	2	nln1 > nln2	3	nln1 < nln2	4	nln1 = nln2	5	nln1 > nln2	6	nln1 < nln2	Function selection
1	nln1 = nln2															
2	nln1 > nln2															
3	nln1 < nln2															
4	nln1 = nln2															
5	nln1 > nln2															
6	nln1 < nln2															
C00694/2	0.00	%	100.00	Hysteresis • Lenze setting: 0.00 %												
C00695/2	0.00	%	100.00	Window • Lenze setting: 0.00 %												

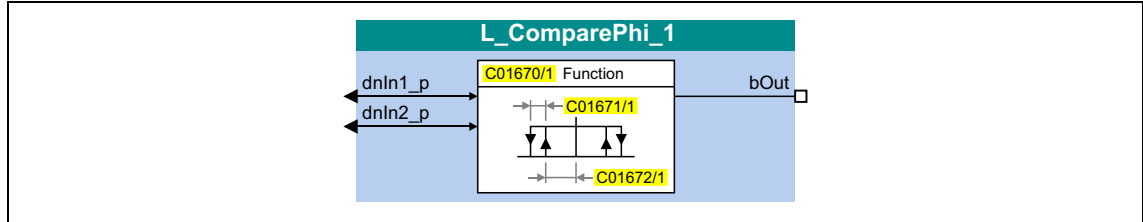


For a detailed functional description see [L_Compare_1](#).

18.1.28 L_ComparePhi_1

This FB compares two angle signals.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
dnln1_p	DINT	Input signal 1
dnln2_p	DINT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

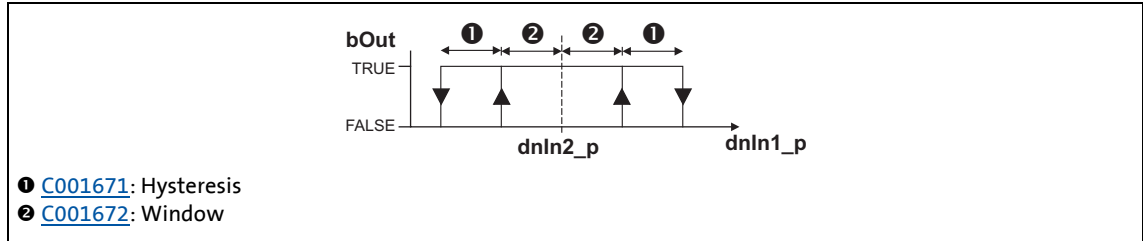
Parameters

Parameters	Possible settings			Info
C01670/1	1	dnln1 = dnln2		Function selection
	2	dnln1 > dnln2		
	3	dnln1 < dnln2		
	4	dnln1 = dnln2		
	5	dnln1 > dnln2		
	6	dnln1 < dnln2		
C01671/1	0	Incr.	1073741824	Hysteresis • Lenze setting: 0 incr.
C01672/1	0	Incr.	1073741824	Window • Lenze setting: 0 incr.

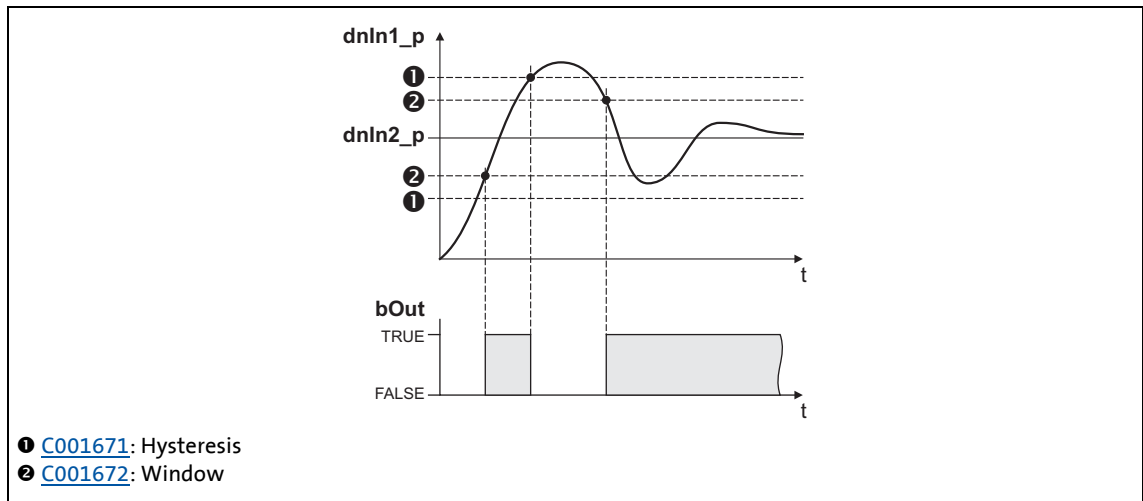
18.1.28.1 Function 1: dnln1 = dnln2

This function compares two signals with regard to equality. It can, for instance, provide the comparison "actual speed equals setpoint speed" ($n_{act} = n_{set}$).

- Use [C001672](#) to set the window within which the equality is to apply.
- Use [C001671](#) to set a hysteresis if the input signals are not stable and the output oscillates.



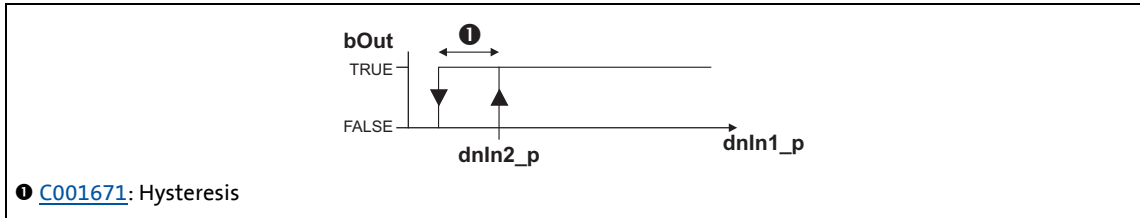
[18-12] Function 1: Switching performance



[18-13] Function 1: Example

18.1.28.2 Function 2: $dnln1 > dnln2$

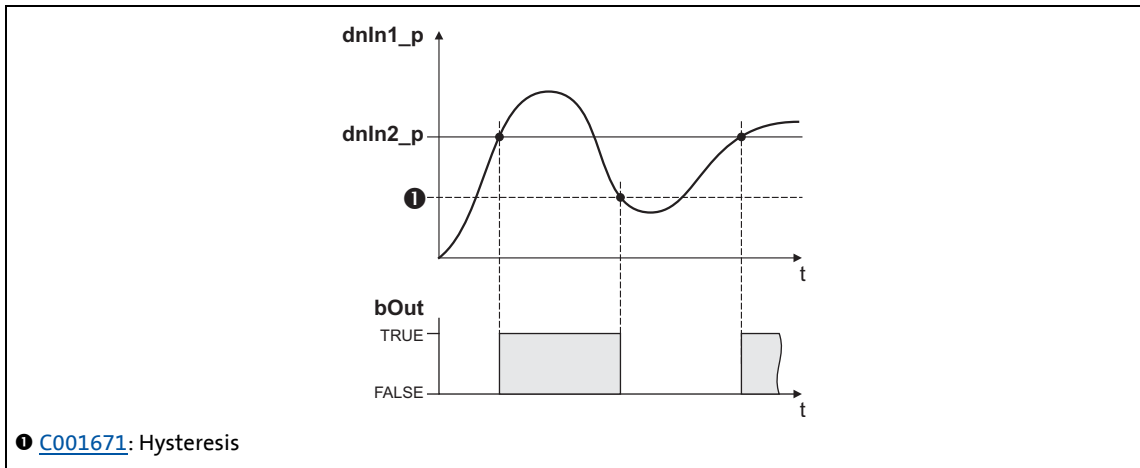
This function serves, for instance, to implement the comparison "actual speed is higher than a limit value" ($n_{act} > n_x$) for one direction of rotation.



[18-14] Function 2: Switching performance

Functional sequence

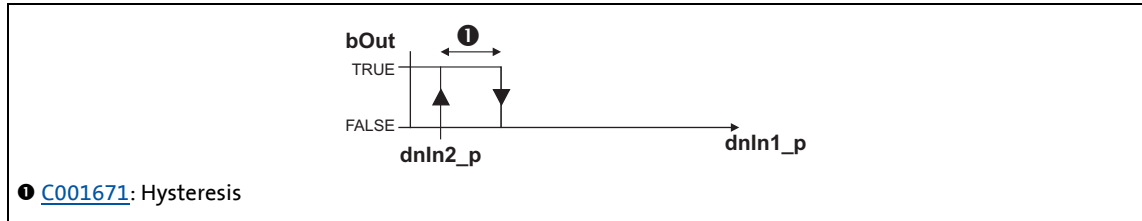
1. If the value at $dnln1_p$ exceeds the value at $dnln2_p$, $bOut$ changes from FALSE to TRUE.
2. Only if the signal at $dnln1_p$ falls below the value of $dnln2_p - \text{hysteresis}$ again, $bOut$ changes back from TRUE to FALSE.



[18-15] Function 2: Example

18.1.28.3 Function 3: dnln1 < dnln2

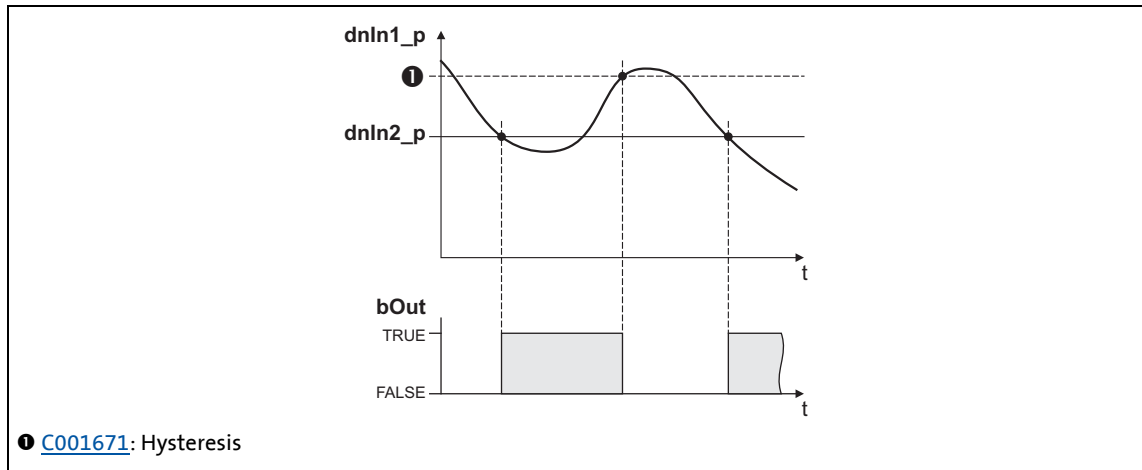
This function serves, for instance, to implement the comparison "actual speed is lower than a limit value" ($n_{act} < n_x$) for one direction of rotation.



[18-16] Function 3: Switching performance

Functional sequence

1. If the value at $dnln1_p$ falls below the value at $dnln2_p$, $bOut$ changes from FALSE to TRUE.
2. Only if the signal at $dnln1_p$ exceeds the value of $dnln2_p$ - *hysteresis* again, $bOut$ changes back from TRUE to FALSE.



[18-17] Function 3: Example

18.1.28.4 Function 4: $|\text{dnIn1}| = |\text{dnIn2}|$

This function serves to implement e.g. the comparison " $n_{\text{act}} = 0$ ". This function is similar to function 1. However, the amount is generated by the input signals before signal processing (without sign).

▶ [Function 1: \$\text{dnIn1} = \text{dnIn2}\$](#)

18.1.28.5 Function 5: $|\text{dnIn1}| > |\text{dnIn2}|$

This function serves to implement e.g. the comparison " $|n_{\text{act}}| > |n_x|$ " irrespective of the direction of rotation. This function is similar to function 2. However, the amount is generated by the input signals before signal processing (without sign).

▶ [Function 2: \$\text{dnIn1} > \text{dnIn2}\$](#)

18.1.28.6 Function 6: $|\text{dnIn1}| < |\text{dnIn2}|$

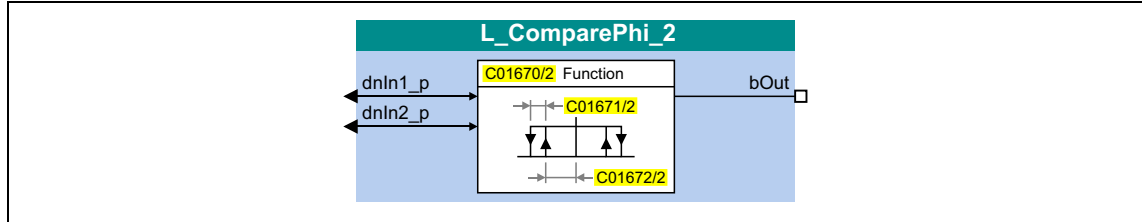
This function serves to implement the comparison " $|n_{\text{act}}| < |n_x|$ " independent of the direction of rotation. This function is similar to function 3. However, the amount is generated by the input signals before signal processing (without sign).

▶ [Function 3: \$\text{dnIn1} < \text{dnIn2}\$](#)

18.1.29 L_ComparePhi_2

This FB compares two angle signals.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
dnln1_p	DINT	Input signal 1
dnln2_p	DINT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

Parameters	Possible settings			Info
C01670/2	1	dnln1 = dnln2		Function selection
	2	dnln1 > dnln2		
	3	dnln1 < dnln2		
	4	dnln1 = dnln2		
	5	dnln1 > dnln2		
	6	dnln1 < dnln2		
C01671/2	0	Incr.	1073741824	Hysteresis • Lenze setting: 0 incr.
C01672/2	0	Incr.	1073741824	Window • Lenze setting: 0 incr.

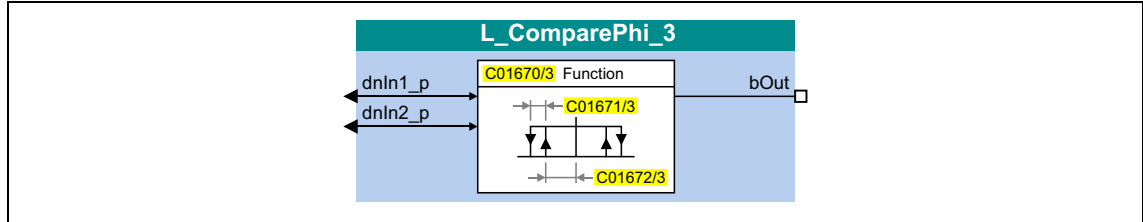


For a detailed functional description see [L_ComparePhi_1](#).

18.1.30 L_ComparePhi_3

This FB compares two angle signals.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
dnln1_p	DINT	Input signal 1
dnln2_p	DINT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

Parameters	Possible settings			Info												
C01670/3	<table border="1"> <tr><td>1</td><td>dnln1 = dnln2</td></tr> <tr><td>2</td><td>dnln1 > dnln2</td></tr> <tr><td>3</td><td>dnln1 < dnln2</td></tr> <tr><td>4</td><td> dnln1 = dnln2 </td></tr> <tr><td>5</td><td> dnln1 > dnln2 </td></tr> <tr><td>6</td><td> dnln1 < dnln2 </td></tr> </table>			1	dnln1 = dnln2	2	dnln1 > dnln2	3	dnln1 < dnln2	4	dnln1 = dnln2	5	dnln1 > dnln2	6	dnln1 < dnln2	Function selection
1	dnln1 = dnln2															
2	dnln1 > dnln2															
3	dnln1 < dnln2															
4	dnln1 = dnln2															
5	dnln1 > dnln2															
6	dnln1 < dnln2															
C01671/3	0	Incr.	1073741824	Hysteresis • Lenze setting: 0 incr.												
C01672/3	0	Incr.	1073741824	Window • Lenze setting: 0 incr.												

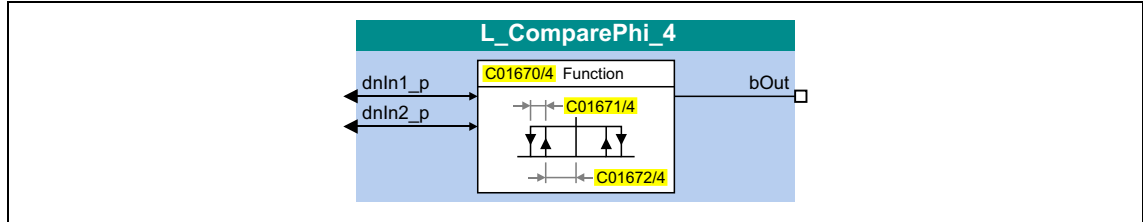


For a detailed functional description see [L_ComparePhi_1](#).

18.1.31 L_ComparePhi_4

This FB compares two angle signals.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
dnln1_p	DINT	Input signal 1
dnln2_p	DINT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

Parameters	Possible settings			Info
C01670/4	1	dnln1 = dnln2		Function selection
	2	dnln1 > dnln2		
	3	dnln1 < dnln2		
	4	dnln1 = dnln2		
	5	dnln1 > dnln2		
	6	dnln1 < dnln2		
C01671/4	0	Incr.	1073741824	Hysteresis • Lenze setting: 0 incr.
C01672/4	0	Incr.	1073741824	Window • Lenze setting: 0 incr.

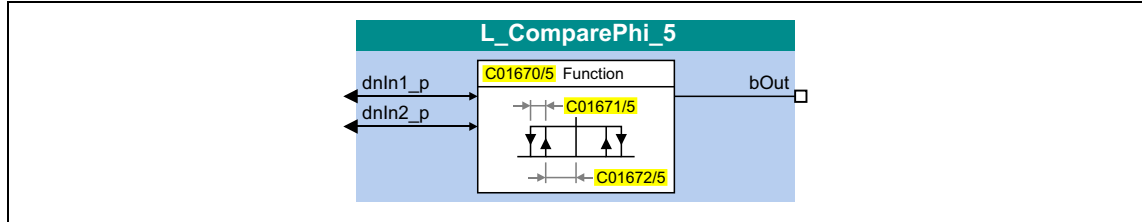


For a detailed functional description see [L_ComparePhi_1](#).

18.1.32 L_ComparePhi_5

This FB compares two angle signals.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Designator	Data type	Information/possible settings
dnln1_p	DINT	Input signal 1
dnln2_p	DINT	Input signal 2

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameters

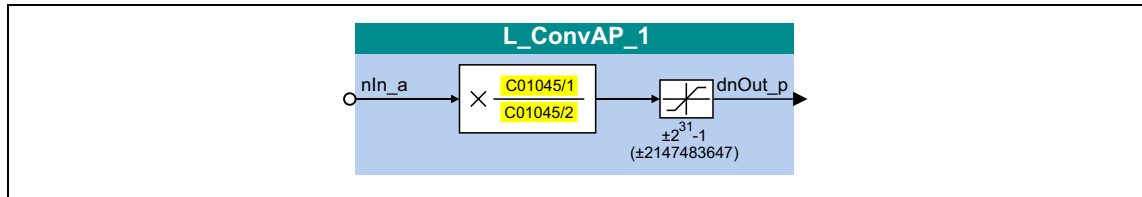
Parameters	Possible settings			Info
C01670/5	1	dnln1 = dnln2		Function selection
	2	dnln1 > dnln2		
	3	dnln1 < dnln2		
	4	dnln1 = dnln2		
	5	dnln1 > dnln2		
	6	dnln1 < dnln2		
C01671/5	0	Incr.	1073741824	Hysteresis • Lenze setting: 0 incr.
C01672/5	0	Incr.	1073741824	Window • Lenze setting: 0 incr.



For a detailed functional description see [L_ComparePhi_1](#).

18.1.33 L_ConvAP_1

This FB converts an analog value into a position.



Inputs

Designator	Data type	Information/possible settings
nln_a	INT	Input value • Scaling: 16384 ≙ 100 %

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

Parameters

Parameters	Possible settings	Info
C01045/1	-32767	32767 Counter • Lenze setting: 1
C01045/2	-32767	32767 Denominator • Lenze setting: 1

Function



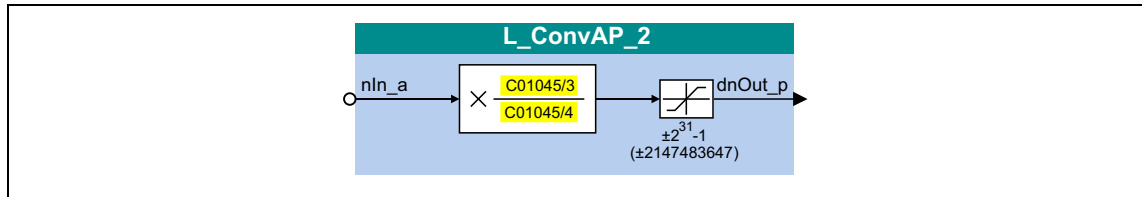
Note!

Conversion is remainder considered.

$$dnOut_p = nln_a \cdot \frac{C01045/1}{C01045/2}$$

18.1.34 L_ConvAP_2

This FB converts an analog value into a position.



Inputs

Designator	Data type	Information/possible settings
nln_a	INT	Input value • Scaling: 16384 ≙ 100 %

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

Parameters

Parameters	Possible settings	Info
C01045/3	-32767	32767 Counter • Lenze setting: 1
C01045/4	-32767	32767 Denominator • Lenze setting: 1

Function



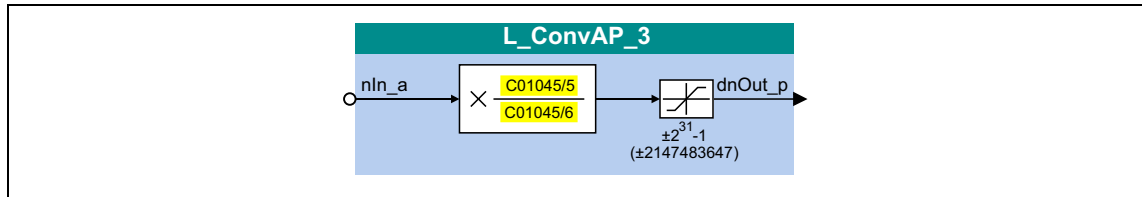
Note!

Conversion is remainder considered.

$$dnOut_p = nln_a \cdot \frac{C01045/3}{C01045/4}$$

18.1.35 L_ConvAP_3

This FB converts an analog value into a position.



Inputs

Designator	Data type	Information/possible settings
nln_a	INT	Input value • Scaling: 16384 ≡ 100 %

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

Parameters

Parameters	Possible settings	Info
C01045/5	-32767	32767 Counter • Lenze setting: 1
C01045/6	-32767	32767 Denominator • Lenze setting: 1

Function



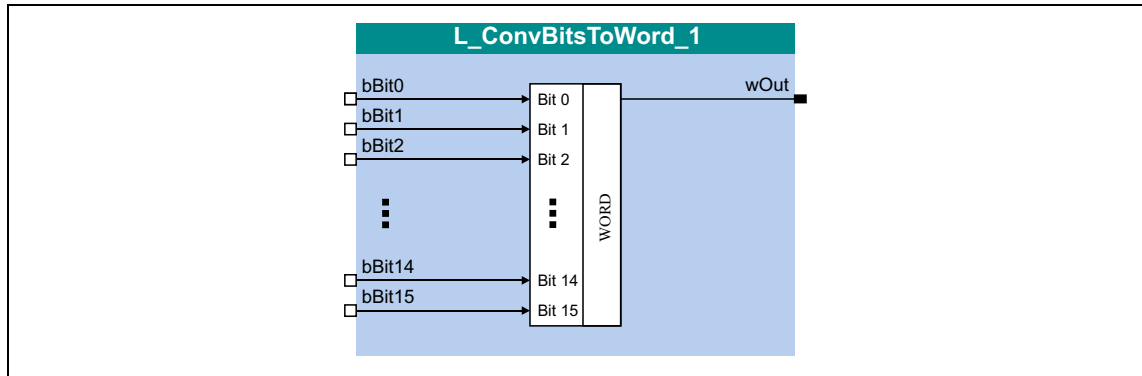
Note!

Conversion is remainder considered.

$$dnOut_p = nln_a \cdot \frac{C01045/5}{C01045/6}$$

18.1.36 L_ConvBitsToWorld_1

This FB converts 16 bit input values of the type "BOOL" into an output value of the type "WORD".



Inputs

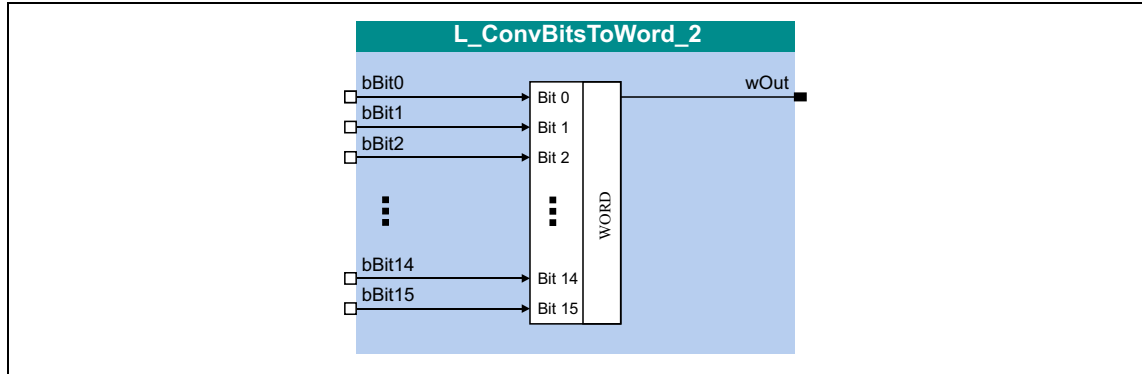
Designator	Data type	Information/possible settings
bBit0 ... bBit15	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

18.1.37 L_ConvBitsToWord_2

This FB converts 16 bit input values of the type "BOOL" into an output value of the type "WORD".



Inputs

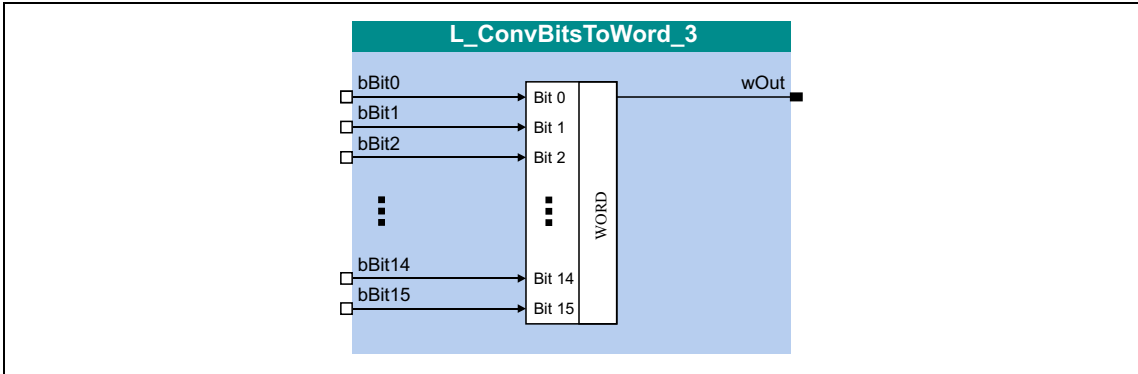
Designator	Data type	Information/possible settings
bBit0 ... bBit15	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

18.1.38 L_ConvBitsToWord_3

This FB converts 16 bit input values of the type "BOOL" into an output value of the type "WORD".



Inputs

Designator	Data type	Information/possible settings
bBit0 ... bBit15	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

18.1.39 L_ConvDIntToWords_1

This FB converts an input value of the type "DINT" into two output values of the type "WORD".

**Inputs**

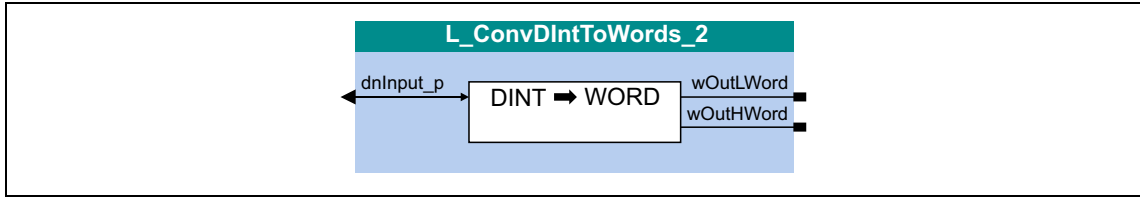
Designator	Data type	Information/possible settings
dnInput_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
wOutLWord	WORD	Output signal Low Word
wOutHWord	WORD	Output signal High Word

18.1.40 L_ConvDIntToWords_2

This FB converts an input value of the type "DINT" into two output values of the type "WORD".



Inputs

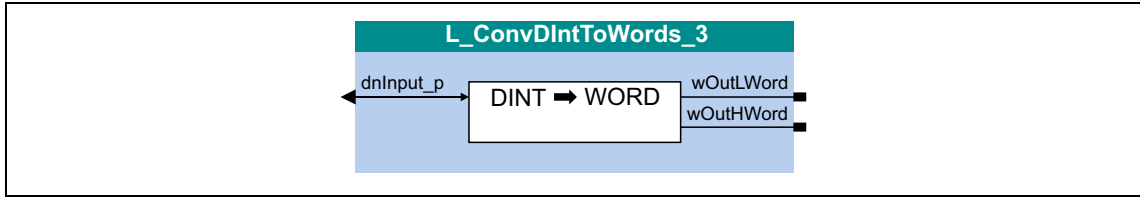
Designator	Data type	Information/possible settings
dnInput_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
wOutLWord	WORD	Output signal Low Word
wOutHWord	WORD	Output signal High Word

18.1.41 L_ConvDIntToWords_3

This FB converts an input value of the type "DINT" into two output values of the type "WORD".



Inputs

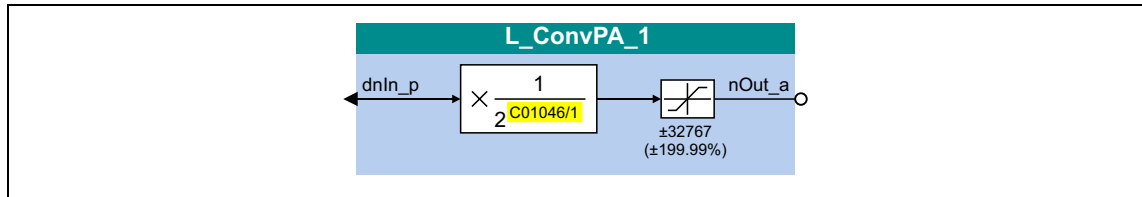
Designator	Data type	Information/possible settings
dnInput_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
wOutLWord	WORD	Output signal Low Word
wOutHWord	WORD	Output signal High Word

18.1.42 L_ConvPA_1

This FB converts a position into an analog value.



Inputs

Designator	Data type	Information/possible settings
dnln_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199 % (100 % ≙ 16384)

Parameters

Parameters	Possible settings	Info
C01046/1	0	31 Division factor • Lenze setting: 1

Function



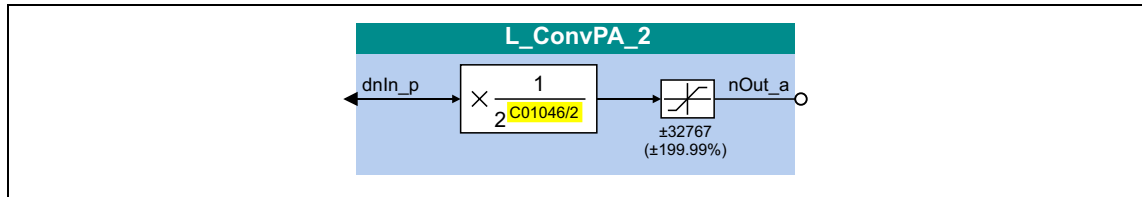
Note!

Conversion is remainder considered.

$$nOut_a = dnln_p \cdot \frac{1}{2^{C01046/1}}$$

18.1.43 L_ConvPA_2

This FB converts a position into an analog value.



Inputs

Designator	Data type	Information/possible settings
dnln_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199 % (100 % ≙ 16384)

Parameters

Parameters	Possible settings	Info
C01046/2	0	31 Division factor • Lenze setting: 1

Function



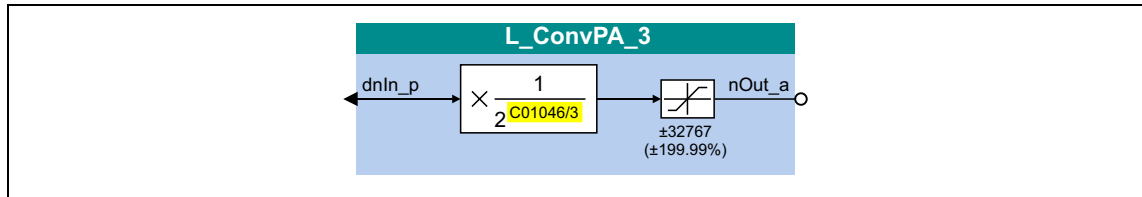
Note!

Conversion is remainder considered.

$$nOut_a = dnln_p \cdot \frac{1}{2^{C01046/2}}$$

18.1.44 L_ConvPA_3

This FB converts a position into an analog value.



Inputs

Designator	Data type	Information/possible settings
dnln_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199 % (100 % ≙ 16384)

Parameters

Parameters	Possible settings	Info
C01046/3	0	31 Division factor • Lenze setting: 1

Function



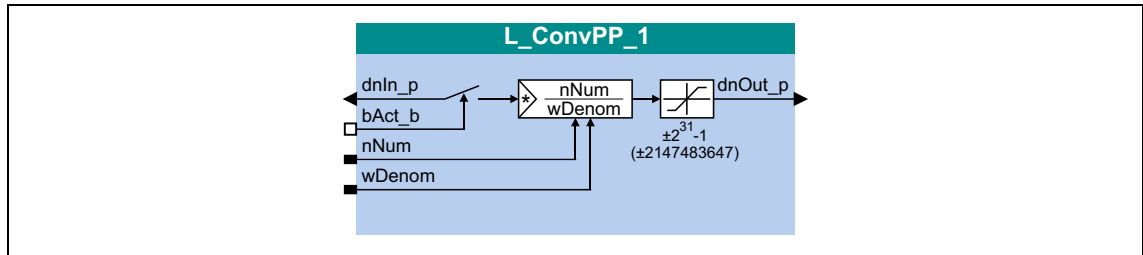
Note!

Conversion is remainder considered.

$$nOut_a = dnln_p \cdot \frac{1}{2^{C01046/3}}$$

18.1.45 L_ConvPP_1

This FB converts a position with dynamic fraction.



Inputs

Designator	Data type	Information/possible settings		
dnIn_p	DINT	Input signal		
bAct_b	BOOL	Conversion mode		
		<table border="1"> <tr> <td>FALSE</td> <td>$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$</td> </tr> <tr> <td>TRUE</td> <td>$dnOut_p = dnIn_p \cdot \frac{nNum}{wDenom}$</td> </tr> </table>	FALSE	$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$
FALSE	$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$			
TRUE	$dnOut_p = dnIn_p \cdot \frac{nNum}{wDenom}$			
nNum	INT	Factor (numerator) • Internal limitation to -32767 ... -1 / 1 ... 32767		
wDenom	WORD	Factor (denominator) • Internal limitation to 1 ... 32767		

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

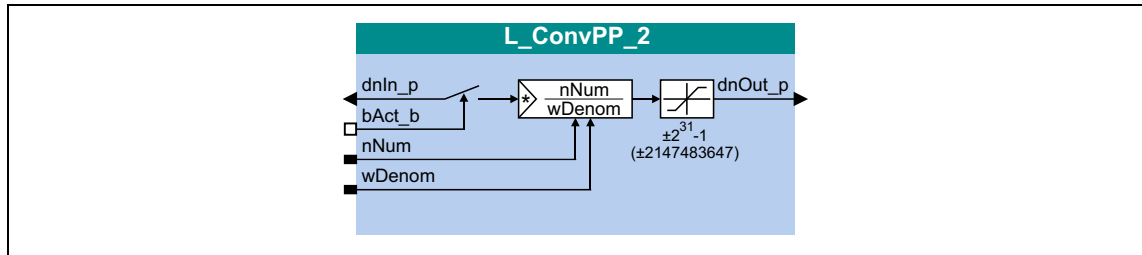


Note!

Conversion is remainder considered.

18.1.46 L_ConvPP_2

This FB converts a position with dynamic fraction.



Inputs

Designator	Data type	Information/possible settings		
dnIn_p	DINT	Input signal		
bAct_b	BOOL	Conversion mode		
		<table border="1"> <tr> <td>FALSE</td> <td>$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$</td> </tr> <tr> <td>TRUE</td> <td>$dnOut_p = dnIn_p \cdot \frac{nNum}{wDenom}$</td> </tr> </table>	FALSE	$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$
FALSE	$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$			
TRUE	$dnOut_p = dnIn_p \cdot \frac{nNum}{wDenom}$			
nNum	INT	Factor (numerator) • Internal limitation to -32767 ... -1 / 1 ... 32767		
wDenom	WORD	Factor (denominator) • Internal limitation to 1 ... 32767		

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

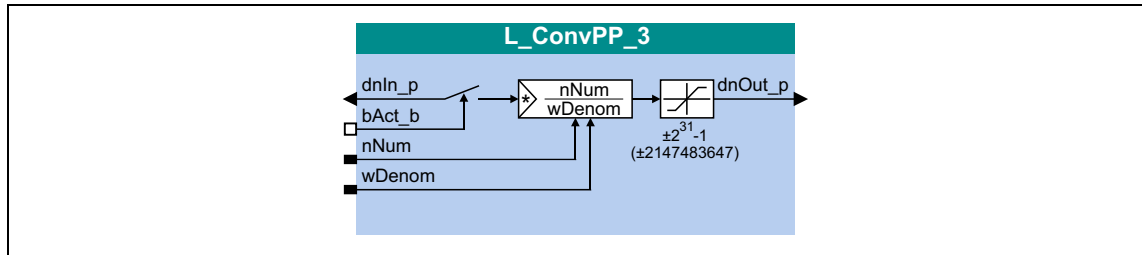


Note!

Conversion is remainder considered.

18.1.47 L_ConvPP_3

This FB converts a position with dynamic fraction.



Inputs

Designator	Data type	Information/possible settings		
dnIn_p	DINT	Input signal		
bAct_b	BOOL	Conversion mode		
		<table border="1"> <tr> <td>FALSE</td> <td>$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$</td> </tr> <tr> <td>TRUE</td> <td>$dnOut_p = dnIn_p \cdot \frac{nNum}{wDenom}$</td> </tr> </table>	FALSE	$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$
FALSE	$dnOut_p = \text{Remainder} \cdot \frac{nNum}{wDenom}$			
TRUE	$dnOut_p = dnIn_p \cdot \frac{nNum}{wDenom}$			
nNum	INT	Factor (numerator) • Internal limitation to -32767 ... -1 / 1 ... 32767		
wDenom	WORD	Factor (denominator) • Internal limitation to 1 ... 32767		

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (±2147483647)



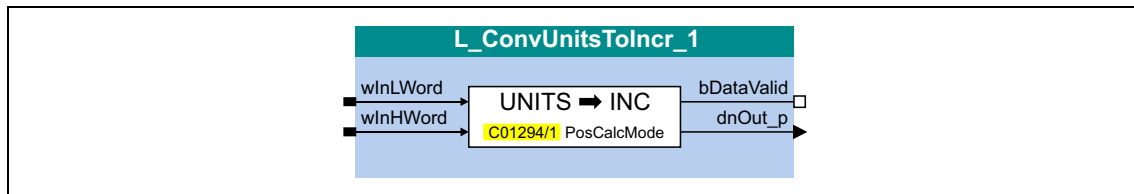
Note!

Conversion is remainder considered.

18.1.48 L_ConvUnitsToIncr_1

Taking into account the machine parameters, this FB converts a position value provided in the real unit of the machine into an internal 32-bit position value.

- The conversion mode has to be set in [C01294/1](#). In the Lenze setting, no conversion takes place due to compatibility reasons.
- Conversion and provision of the result to *dnOut_p* do not take place in real time! Hence, the *bDataValid* output signalises when the conversion has been completed and the *dnOut_p* output value is consistent for transfer to following processes.



Inputs

Designator	Data type	Information/possible settings
wInLWord / wInHWord	WORD	Input signal Low Word / High Word

Outputs

Designator	Data type	Value/meaning	
bDataValid	BOOL	FALSE	Conversion is active, <i>dnOut_p</i> is not valid.
		TRUE	Conversion is completed, <i>dnOut_p</i> is valid (consistent).
dnOut_p	DINT	Result of conversion in [increments]	

Parameters

Parameters	Possible settings	Info
C01294/1		Mode: Position calculation
	0 dnOut_p=HW+LW	No conversion • Lenze setting
	1 16 bits: LW=+/-32767	<i>wInLWord</i> = ±32767 [Unit]
	2 16 bits: HW=+/-; LW=0..65535	<i>wInLWord</i> = 0 ... 65535 [Unit] <i>wInHWord</i> = sign (0 = positive; ≠0 = negative)
3 32 bits: HW_LW=+/-214748_3647	<i>wInHWord</i> and <i>wInLWord</i> = ±214748.3647 [Unit]	

Conversion formula for modes 1 ... 3

$$dnOut_p [incr.] = Input\ value [Unit] \cdot \frac{C01202/1}{C01202/2} \cdot \frac{C01203/2}{C01203/1} \cdot \frac{65536 [Incr./rev.]}{C01204}$$

[C01202/1](#): Gearbox factor (numerator)
[C01202/2](#): Gearbox factor (denominator)
[C01203/1](#): Encoder gearbox factor (numerator)
[C01203/2](#): Encoder gearbox factor (denominator)
[C01204](#): Feed constant

[18-18] Conversion formula for [Unit] → [increments]

Example

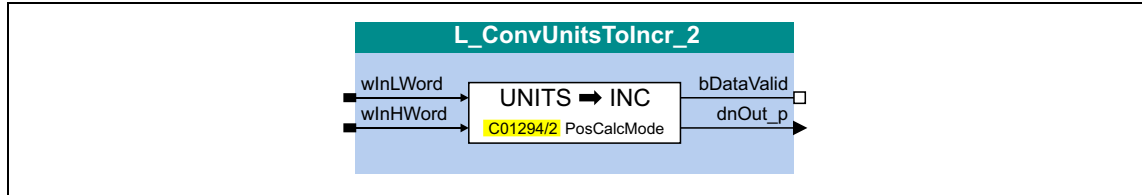
- All gearbox factors = 1
- Feed constant = 360°/revolution

Conversion mode (C01294)		wInHWord	wInLWord	Input value [Unit]	dnOut_p [Increments]
0	dnOut_p=HW+LW (no conversion)	32-bit input value*		-32000	-32000
		65535	33536		
1	16 bits: LW=+/-32767	No meaning	16-bit input value*	-32000	-5825422
		65535	33536		
2	16 bits: HW=+/-; LW=0..65535	Sign	16-bit input value	-33536	-6105042
		65535 ≡ negative	33536		
3	32 bits: HW_LW=+/-214748_3647	32-bit input value**		-3.2000	-582
		65535	33536		
* Two's complement ** Two's complement with four decimal positions					

18.1.49 L_ConvUnitsToIncr_2

Taking into account the machine parameters, this FB converts a position value provided in the real unit of the machine into an internal 32-bit position value.

- The conversion mode has to be set in [C01294/2](#). In the Lenze setting, no conversion takes place due to compatibility reasons.
- Conversion and provision of the result to *dnOut_p* do not take place in real time! Hence, the *bDataValid* output signalises when the conversion has been completed and the *dnOut_p* output value is consistent for transfer to following processes.



Inputs

Designator	Data type	Information/possible settings
wInLWord / wInHWord	WORD	Input signal Low Word / High Word

Outputs

Designator	Data type	Value/meaning
bDataValid	BOOL	FALSE Conversion is active, <i>dnOut_p</i> is not valid.
		TRUE Conversion is completed, <i>dnOut_p</i> is valid (consistent).
dnOut_p	DINT	Result of conversion in [increments]

Parameters

Parameters	Possible settings	Info
C01294/2		Mode: Position calculation
	0 dnOut_p=HW+LW	No conversion • Lenze setting
	1 16 bits: LW=+/-32767	wInLWord = ±32767 [Unit]
	2 16 bits: HW=+/-; LW=0..65535	wInLWord = 0 ... 65535 [Unit] wInHWord = sign (0 = positive; ≠0 = negative)
3 32 bits: HW_LW=+/-214748_3647	wInHWord and wInLWord = ±214748.3647 [Unit]	

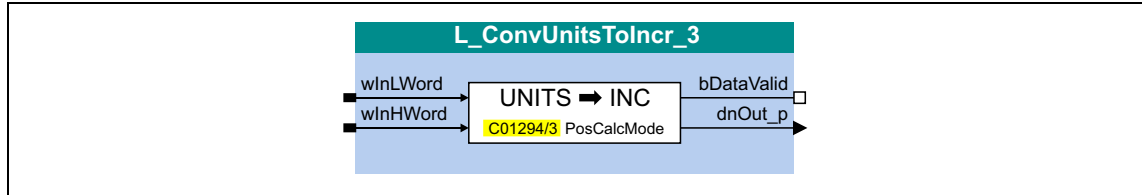


For a detailed functional description see [L_ConvUnitsToIncr_1](#).

18.1.50 L_ConvUnitsToIncr_3

Taking into account the machine parameters, this FB converts a position value provided in the real unit of the machine into an internal 32-bit position value.

- The conversion mode has to be set in [C01294/3](#). In the Lenze setting, no conversion takes place due to compatibility reasons.
- Conversion and provision of the result to *dnOut_p* do not take place in real time! Hence, the *bDataValid* output signalises when the conversion has been completed and the *dnOut_p* output value is consistent for transfer to following processes.



Inputs

Designator	Data type	Information/possible settings
wInLWord / wInHWord	WORD	Input signal Low Word / High Word

Outputs

Designator	Data type	Value/meaning
bDataValid	BOOL	FALSE Conversion is active, <i>dnOut_p</i> is not valid.
		TRUE Conversion is completed, <i>dnOut_p</i> is valid (consistent).
dnOut_p	DINT	Result of conversion in [increments]

Parameters

Parameters	Possible settings	Info
C01294/3		Mode: Position calculation
	0 dnOut_p=HW+LW	No conversion • Lenze setting
	1 16 bits: LW=+/-32767	wInLWord = ±32767 [Unit]
	2 16 bits: HW=+/-; LW=0..65535	wInLWord = 0 ... 65535 [Unit] wInHWord = sign (0 = positive; ≠0 = negative)
3 32 bits: HW_LW=+/-214748_3647	wInHWord and wInLWord = ±214748.3647 [Unit]	

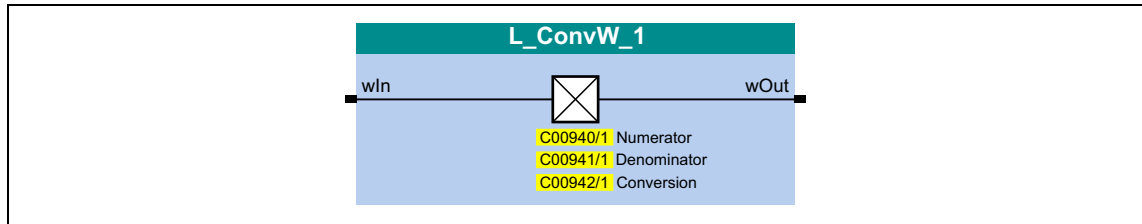


For a detailed functional description see [L_ConvUnitsToIncr_1](#).

18.1.51 L_ConvW_1

This FB serves to convert analog signal forms. The following conversions per parameter can be selected:

- [%] → [incr/ms]
- [incr/ms] → [%]
- Conversion via parameterisable factors
- Input signal is passed through without conversion



Inputs

Designator	Data type	Information/possible settings
wIn	WORD	Input signal

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

Parameters

Parameters	Possible settings			Info
C00940/1	-2147483647		2147483647	Numerator • Lenze setting: 1
C00941/1	-2147483647		2147483647	Denominator • Lenze setting: 1
C00942/1	0	$wOut = wIn$ (no conversion)		Selection of the conversion
	1	[%] → [incr/ms]		
	2	[incr/ms] → [%]		
	3	$wOut = wIn[signed] * \frac{C00940}{C00941}$		
	4	$wOut = wIn[unsigned] * \frac{C00940}{C00941}$		

Conversion formula for selection 1**Note!**

Division is remainder considered.

$$w_{\text{Out}} [\text{incr/ms}] = \frac{w_{\text{In}} [\%] \cdot C00011 [\text{rpm}] \cdot 65536 [\text{incr/rev.}]}{100 \% \cdot 60 [\text{s/min}] \cdot 1000 [\text{ms/s}]}$$

[18-19] Conversion formula for selection 1: [%] → [incr/ms]

Conversion formula for selection 2

$$w_{\text{Out}} [\%] = \frac{w_{\text{In}} [\text{incr/ms}] \cdot 100 \% \cdot 60 [\text{s/min}] \cdot 1000 [\text{ms/s}]}{C00011 [\text{rpm}] \cdot 65536 [\text{incr/rev.}]}$$

[18-20] Conversion formula for selection 2: [incr/ms] → [%]

Conversion formula for selection 3



Note!

In the internal processing, the double number display range is taken into account.

$$wOut = wIn \cdot \frac{C00940}{C00941}$$

[18-21] Conversion formula for selection 3: Parameterisable factors with the evaluation of the wIn input variable as signed value

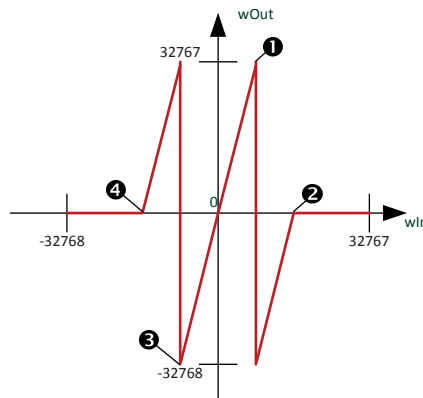
Use this setting to scale analog signals (e.g. $L_MPot_1.nOut_a$ // output variable of the motor potentiometer).



Note!

In the internal processing, the double number display range is taken into account. This causes a one-time overflow when the analog display area is reached for the first time.

- In order to avoid this effect, you can use the e.g. the $L_OffsetGain_x$ function block for scaling analog values.



Selected numerator: [C00940](#) = 4

Selected denominator: [C00941](#) = 1

- ① Overflow of positive number range
- ② Limitation to -1
- ③ Overflow of negative number range
- ④ Limitation to -1

[18-22] Selection 3: Example

Conversion formula for selection 4

$$wOut = wIn \cdot \frac{C00940}{C00941}$$

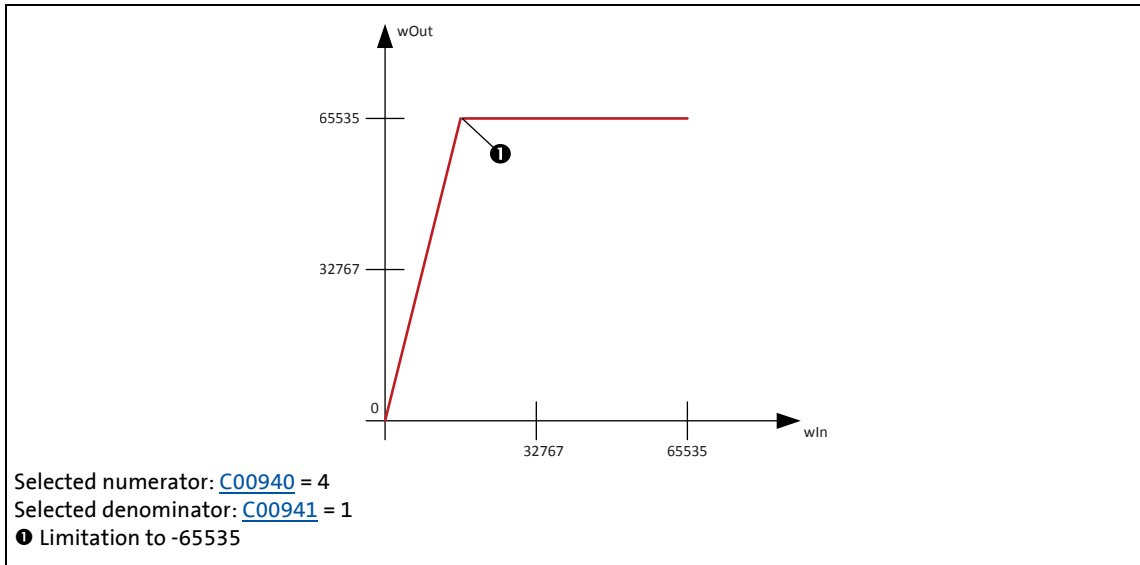
[18-23] Conversion formula for selection 4: Parameterisable factors with the evaluation of the wIn input variable as unsigned value

Use this setting to scale unsigned signals (e.g. *LS_ParFree.wC471_1* // output variable of the free parameter [471/1](#)).



Note!

The output value is limited to the number range and no overflow takes place.

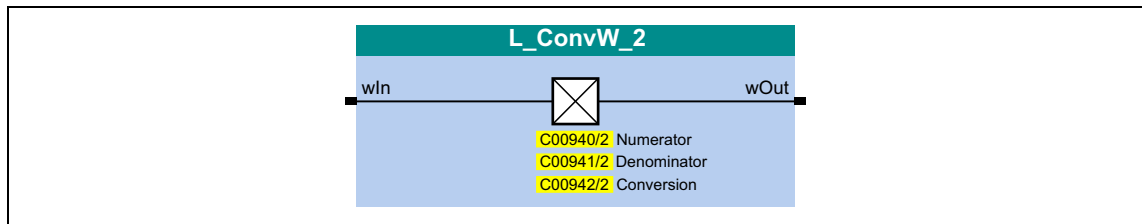


[18-24] Selection 4: Example

18.1.52 L_ConvW_2

This FB serves to convert analog signal forms. The following conversions per parameter can be selected:

- [%] → [incr/ms]
- [incr/ms] → [%]
- Conversion via parameterisable factors
- Input signal is passed through without conversion



Inputs

Designator	Data type	Information/possible settings
wIn	WORD	Input signal

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

Parameters

Parameters	Possible settings	Info
C00940/2	-2147483647	2147483647 Numerator • Lenze setting: 1
C00941/2	-2147483647	2147483647 Denominator • Lenze setting: 1
C00942/2	0 $wOut = wIn$ (no conversion) 1 [%] → [incr/ms] 2 [incr/ms] → [%] 3 $wOut = wIn[signed] * \frac{C00940}{C00941}$ 4 $wOut = wIn[unsigned] * \frac{C00940}{C00941}$	Selection of the conversion

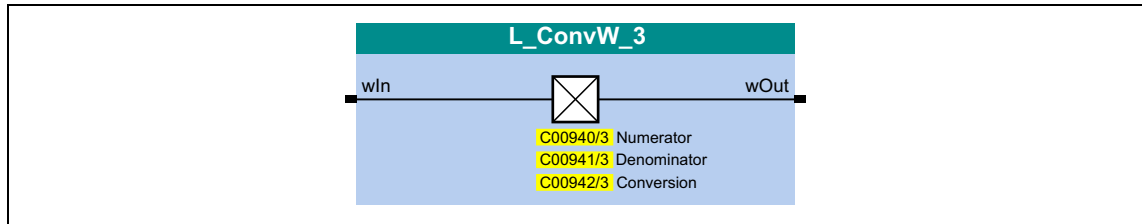


For conversion formulae see [L_ConvW_1](#).

18.1.53 L_ConvW_3

This FB serves to convert analog signal forms. The following conversions per parameter can be selected:

- [%] → [incr/ms]
- [incr/ms] → [%]
- Conversion via parameterisable factors
- Input signal is passed through without conversion



Inputs

Designator	Data type	Information/possible settings
wIn	WORD	Input signal

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

Parameters

Parameters	Possible settings	Info
C00940/3	-2147483647	2147483647 Numerator • Lenze setting: 1
C00941/3	-2147483647	2147483647 Denominator • Lenze setting: 1
C00942/3	0 $wOut = wIn$ (no conversion) 1 [%] → [incr/ms] 2 [incr/ms] → [%] 3 $wOut = wIn[signed] * \frac{C00940}{C00941}$ 4 $wOut = wIn[unsigned] * \frac{C00940}{C00941}$	Selection of the conversion

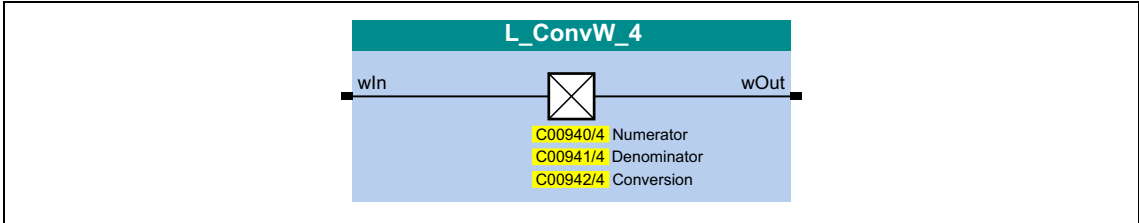


For conversion formulae see [L_ConvW_1](#).

18.1.54 L_ConvW_4

This FB serves to convert analog signal forms. The following conversions per parameter can be selected:

- [%] → [incr/ms]
- [incr/ms] → [%]
- Conversion via parameterisable factors
- Input signal is passed through without conversion



Inputs

Designator	Data type	Information/possible settings
wIn	WORD	Input signal

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

Parameters

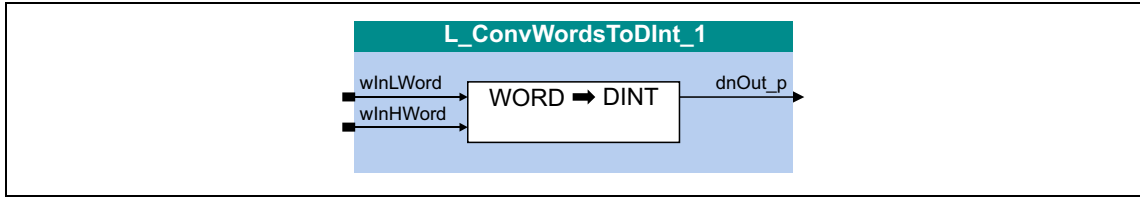
Parameters	Possible settings	Info
C00940/4	-2147483647	2147483647 Numerator • Lenze setting: 1
C00941/4	-2147483647	2147483647 Denominator • Lenze setting: 1
C00942/4	0 $wOut = wIn$ (no conversion) 1 [%] → [incr/ms] 2 [incr/ms] → [%] 3 $wOut = wIn[signed] * C00940 / C00941$ 4 $wOut = wIn[unsigned] * C00940 / C00941$	Selection of the conversion



For conversion formulae see [L_ConvW_1](#).

18.1.55 L_ConvWordsToDInt_1

This FB converts two input values of the type "WORD" into one output value of the type "DINT".



Inputs

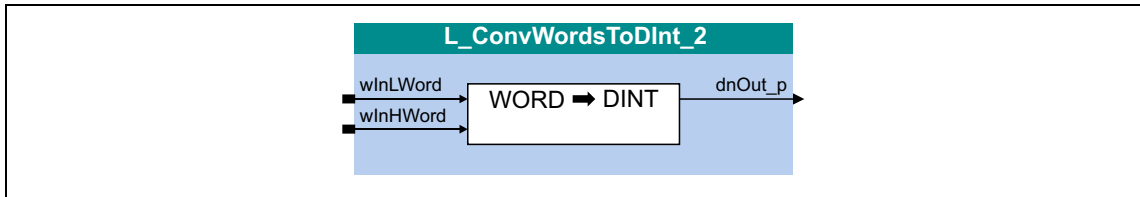
Designator	Data type	Information/possible settings
wInLWord	WORD	Input signal Low Word
wInHWord	WORD	Input signal High Word

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal

18.1.56 L_ConvWordsToDInt_2

This FB converts two input values of the type "WORD" into one output value of the type "DINT".



Inputs

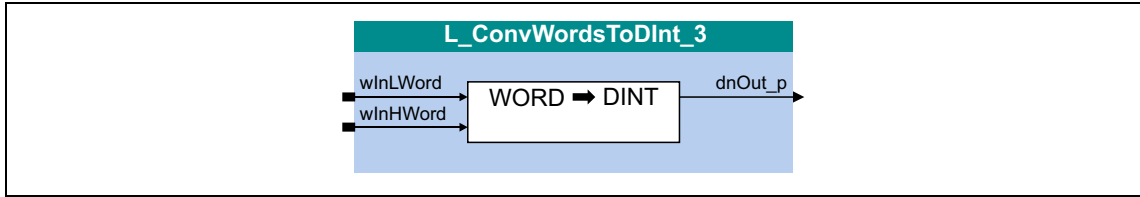
Designator	Data type	Information/possible settings
wInLWord	WORD	Input signal Low Word
wInHWord	WORD	Input signal High Word

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal

18.1.57 L_ConvWordsToDInt_3

This FB converts two input values of the type "WORD" into one output value of the type "DINT".



Inputs

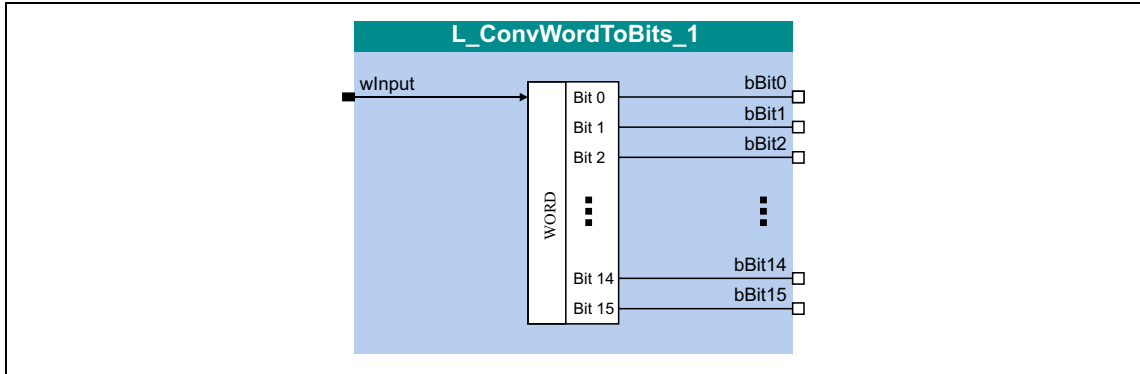
Designator	Data type	Information/possible settings
wInLWord	WORD	Input signal Low Word
wInHWord	WORD	Input signal High Word

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal

18.1.58 L_ConvWordToBits_1

This FB converts an input value of "WORD" type into 16 individual binary signals.



Inputs

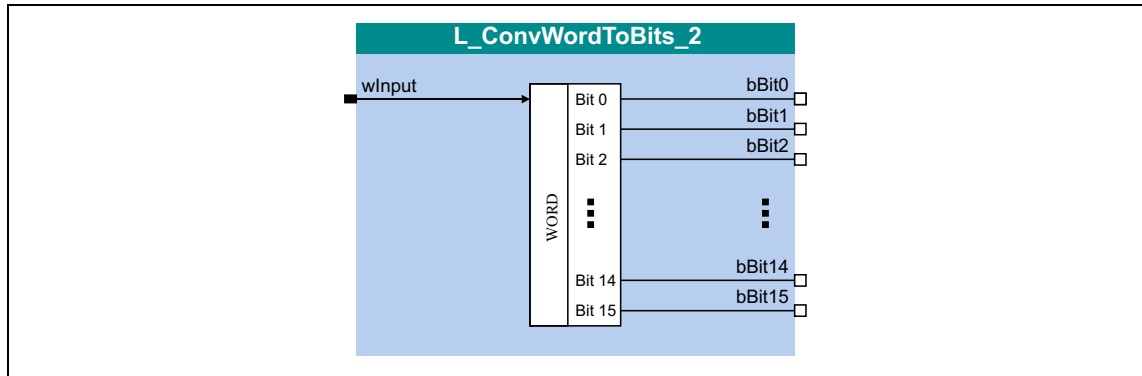
Designator	Data type	Information/possible settings
wInput	WORD	Input signal

Outputs

Designator	Data type	Value/meaning
bBit0 ... bBit15	BOOL	Output signal

18.1.59 L_ConvWordToBits_2

This FB converts an input value of "WORD" type into 16 individual binary signals.



Inputs

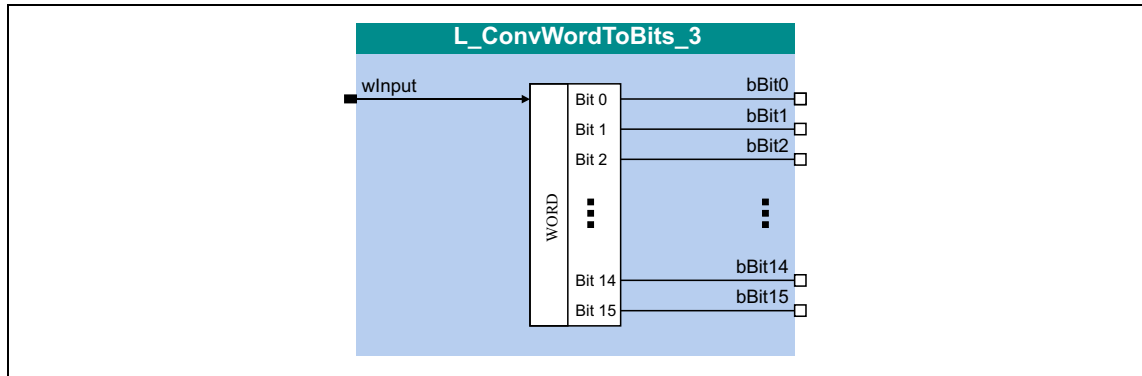
Designator	Data type	Information/possible settings
wInput	WORD	Input signal

Outputs

Designator	Data type	Value/meaning
bBit0 ... bBit15	BOOL	Output signal

18.1.60 L_ConvWordToBits_3

This FB converts an input value of "WORD" type into 16 individual binary signals.



Inputs

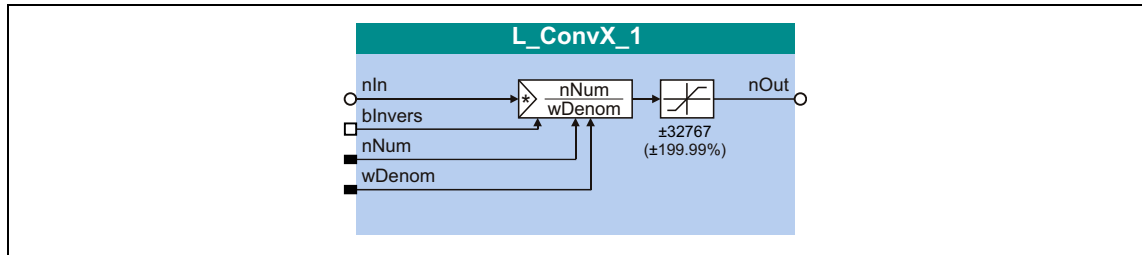
Designator	Data type	Information/possible settings
wInput	WORD	Input signal

Outputs

Designator	Data type	Value/meaning
bBit0 ... bBit15	BOOL	Output signal

18.1.61 L_ConvX_1

This FB scales an analog value.



Inputs

Designator	Data type	Information/possible settings		
nIn	INT	Input signal		
blInvers	BOOL	Invert sign of the output signal		
		<table border="1"> <tr> <td>FALSE</td> <td>$nOut = nIn \cdot \frac{nNum}{wDenom}$</td> </tr> <tr> <td>TRUE</td> <td>$nOut = nIn \cdot \frac{nNum}{wDenom} \cdot (-1)$</td> </tr> </table>	FALSE	$nOut = nIn \cdot \frac{nNum}{wDenom}$
FALSE	$nOut = nIn \cdot \frac{nNum}{wDenom}$			
TRUE	$nOut = nIn \cdot \frac{nNum}{wDenom} \cdot (-1)$			
nNum	INT	Factor (numerator) • Internal limitation to -32767 ... -1 / 1 ... 32767		
wDenom	WORD	Factor (denominator) • Internal limitation to 1 ... 32767		

Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal • Internal limitation to ±199 % (100 % ≙ 16384)

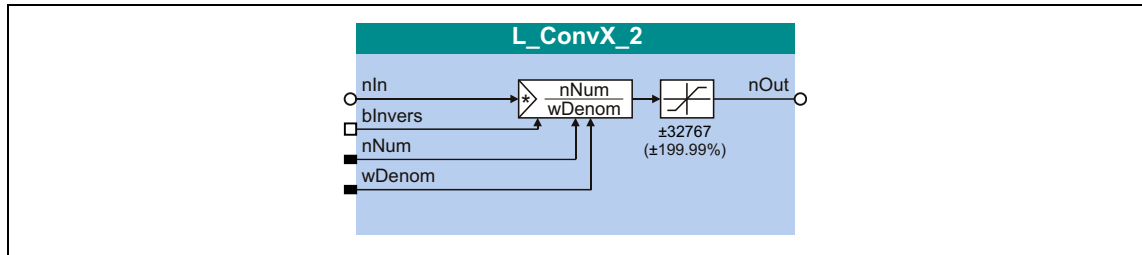


Note!

Conversion is remainder considered.

18.1.62 L_ConvX_2

This FB scales an analog value.



Inputs

Designator	Data type	Information/possible settings		
nIn	INT	Input signal		
blInvers	BOOL	Invert sign of the output signal		
		<table border="0"> <tr> <td style="text-align: center;">FALSE</td> <td>$nOut = nIn \cdot \frac{nNum}{wDenom}$</td> </tr> <tr> <td style="text-align: center;">TRUE</td> <td>$nOut = nIn \cdot \frac{nNum}{wDenom} \cdot (-1)$</td> </tr> </table>	FALSE	$nOut = nIn \cdot \frac{nNum}{wDenom}$
FALSE	$nOut = nIn \cdot \frac{nNum}{wDenom}$			
TRUE	$nOut = nIn \cdot \frac{nNum}{wDenom} \cdot (-1)$			
nNum	INT	Factor (numerator) • Internal limitation to -32767 ... -1 / 1 ... 32767		
wDenom	WORD	Factor (denominator) • Internal limitation to 1 ... 32767		

Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal • Internal limitation to ±199 % (100 % ≙ 16384)

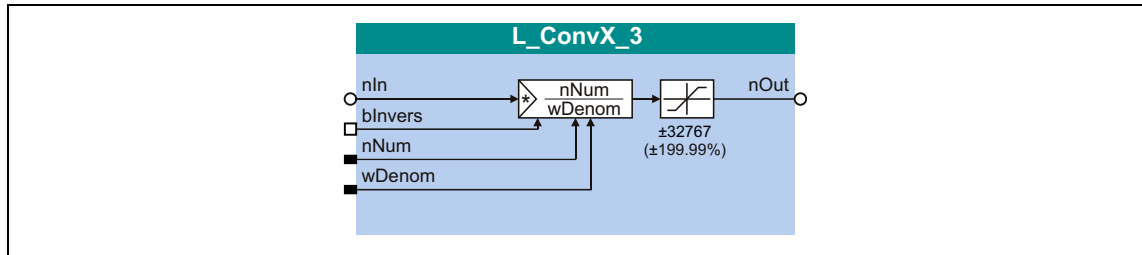


Note!

Conversion is remainder considered.

18.1.63 L_ConvX_3

This FB scales an analog value.



Inputs

Designator	Data type	Information/possible settings		
nIn	INT	Input signal		
blInvers	BOOL	Invert sign of the output signal		
		<table border="1"> <tr> <td>FALSE</td> <td>$nOut = nIn \cdot \frac{nNum}{wDenom}$</td> </tr> <tr> <td>TRUE</td> <td>$nOut = nIn \cdot \frac{nNum}{wDenom} \cdot (-1)$</td> </tr> </table>	FALSE	$nOut = nIn \cdot \frac{nNum}{wDenom}$
FALSE	$nOut = nIn \cdot \frac{nNum}{wDenom}$			
TRUE	$nOut = nIn \cdot \frac{nNum}{wDenom} \cdot (-1)$			
nNum	INT	Factor (numerator) • Internal limitation to -32767 ... -1 / 1 ... 32767		
wDenom	WORD	Factor (denominator) • Internal limitation to 1 ... 32767		

Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal • Internal limitation to ±199 % (100 % ≙ 16384)

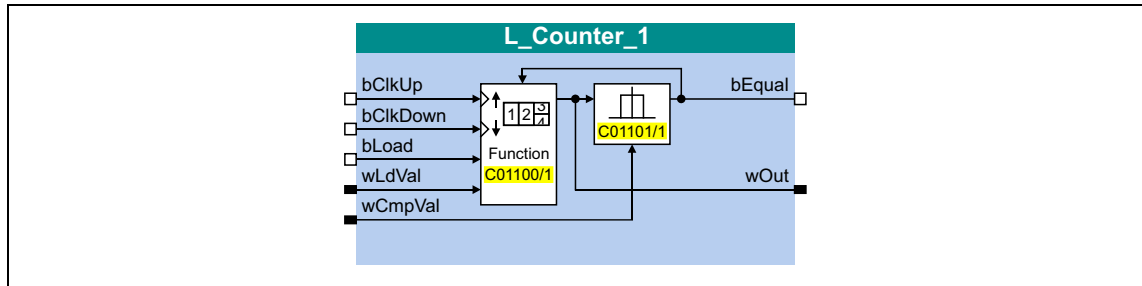


Note!

Conversion is remainder considered.

18.1.64 L_Counter_1

This FB is a digital upcounter and downcounter with a parameterisable comparison operation.



Inputs

Designator	Data type	Information/possible settings
bClkUp	BOOL	Clock input <ul style="list-style-type: none"> With each edge, the module counts up by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.
bClkDown	BOOL	Clock input <ul style="list-style-type: none"> With each edge, the module counts down by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.
bLoad	BOOL	Load input <ul style="list-style-type: none"> The input has the highest priority. TRUE Accept starting value <i>wLdVal</i> .
wLdVal	WORD	Starting value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign.
wCmpVal	WORD	Comparison value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign.

Outputs

Designator	Data type	Value/meaning
bEqual	BOOL	Status signal "Comparison statement is true" <ul style="list-style-type: none"> The TRUE output is active in the Lenze setting if the current counter content is greater than or equal to the comparison value <i>wCmpVal</i>. TRUE The statement of the comparison mode selected in C01101/1 is true.
wOut	WORD	Counter content <ul style="list-style-type: none"> Internal limitation to ± 32767 The most significant bit determines the sign!

Parameters

Parameters	Possible settings	Info						
C01100/1	<table border="1"> <tr> <td>0</td> <td>Normal counting</td> </tr> <tr> <td>1</td> <td>Auto reset</td> </tr> <tr> <td>2</td> <td>Manual reset</td> </tr> </table>	0	Normal counting	1	Auto reset	2	Manual reset	Function selection <ul style="list-style-type: none"> Lenze setting: Normal counting
0	Normal counting							
1	Auto reset							
2	Manual reset							

Parameters	Possible settings	Info
C01101/1		Selection of comparison operation • Lenze setting: Counter content \geq comparison value
	0 Counter content \geq comparison value	
	1 Counter content \leq comparison value	
	2 Counter content = comparison value	

General function

- Every FALSE/TRUE edge at the *bClkUp* input causes the block to count upwards by "1".
- Every FALSE/TRUE edge at the *bClkDown* input causes the block to count downwards by "1".

Function "Normal counting"

If the statement of the comparison mode selected in [C01101/1](#) is true, the *bCompare* output is set to TRUE.

Function "Auto reset"

If the statement of the comparison mode selected in [C01101/1](#) is true, the *bCompare* output is set to TRUE for 1 ms and the counter is reset to the *wLdVal* starting value.

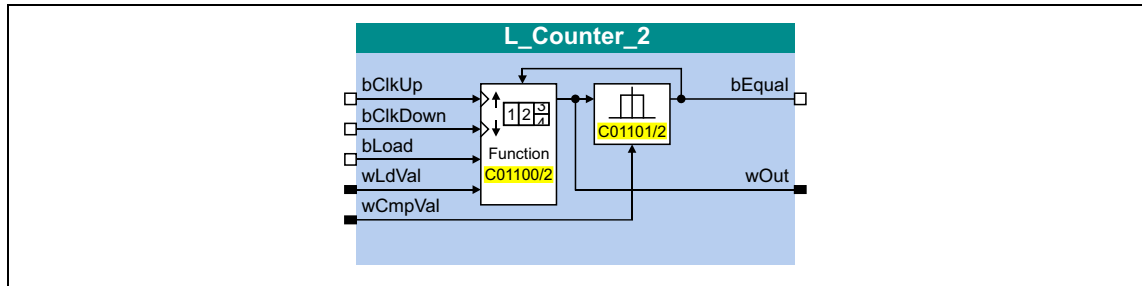
Function "Manual reset"

If the statement of the comparison mode selected in [C01101/1](#) is true, the *bCompare* output is set to TRUE and the counter stops.

- Edges at *bClkUp* and *bClkDown* are ignored.
- The counter must be reset via the *bLoad* input.

18.1.65 L_Counter_2

This FB is a digital upcounter and downcounter with a parameterisable comparison operation.



Inputs

Designator	Data type	Information/possible settings
bClkUp	BOOL	Clock input <ul style="list-style-type: none"> With each edge, the module counts up by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.
bClkDown	BOOL	Clock input <ul style="list-style-type: none"> With each edge, the module counts down by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.
bLoad	BOOL	Load input <ul style="list-style-type: none"> The input has the highest priority. <p style="text-align: center;">TRUE Accept starting value <i>wLdVal</i>.</p>
wLdVal	WORD	Starting value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign.
wCmpVal	WORD	Comparison value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign.

Outputs

Designator	Data type	Value/meaning
bEqual	BOOL	Status signal "Comparison statement is true" <ul style="list-style-type: none"> The TRUE output is active in the Lenze setting if the current counter content is greater than or equal to the comparison value <i>wCmpVal</i>. <p style="text-align: center;">TRUE The statement of the comparison mode selected in C01101/2 is true.</p>
wOut	WORD	Counter content <ul style="list-style-type: none"> Internal limitation to ± 32767 The most significant bit determines the sign!

Parameters

Parameters	Possible settings	Info
C01100/2	0 Normal counting	Function selection • Lenze setting: Normal counting
	1 Auto reset	
	2 Manual reset	
C01101/2	0 Counter content \geq comparison value	Selection of comparison operation • Lenze setting: Counter content \geq comparison value
	1 Counter content \leq comparison value	
	2 Counter content = comparison value	

General function

- Every FALSE/TRUE edge at the *bClkUp* input causes the block to count upwards by "1".
- Every FALSE/TRUE edge at the *bClkDown* input causes the block to count downwards by "1".

Function "Normal counting"

If the statement of the comparison mode selected in [C01101/2](#) is true, the *bCompare* output is set to TRUE.

Function "Auto reset"

If the statement of the comparison mode selected in [C01101/2](#) is true, the *bCompare* output is set to TRUE for 1 ms and the counter is reset to the *wLdVal* starting value.

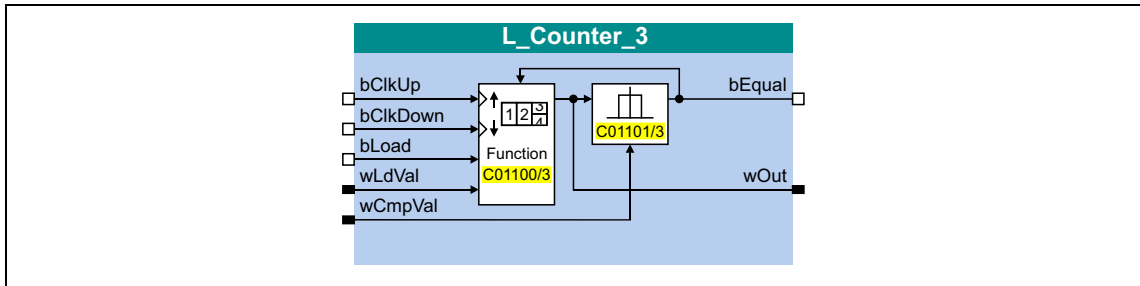
Function "Manual reset"

If the statement of the comparison mode selected in [C01101/2](#) is true, the *bCompare* output is set to TRUE and the counter stops.

- Edges at *bClkUp* and *bClkDown* are ignored.
- The counter must be reset via the *bLoad* input.

18.1.66 L_Counter_3

This FB is a digital upcounter and downcounter with a parameterisable comparison operation.



Inputs

Designator	Data type	Information/possible settings
bClkUp	BOOL	Clock input <ul style="list-style-type: none"> With each edge, the module counts up by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.
bClkDown	BOOL	Clock input <ul style="list-style-type: none"> With each edge, the module counts down by "1". Only FALSE-TRUE edges are evaluated. Note: The static state "1" is not permissible at this input.
bLoad	BOOL	Load input <ul style="list-style-type: none"> The input has the highest priority. <p style="text-align: center;">TRUE Accept starting value <i>wLdVal</i>.</p>
wLdVal	WORD	Starting value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign.
wCmpVal	WORD	Comparison value <ul style="list-style-type: none"> Assigned value is internally interpreted as "INT" data type (-32767 ... +32767), i.e. the most significant bit determines the sign.

Outputs

Designator	Data type	Value/meaning
bEqual	BOOL	Status signal "Comparison statement is true" <ul style="list-style-type: none"> The TRUE output is active in the Lenze setting if the current counter content is greater than or equal to the comparison value <i>wCmpVal</i>. <p style="text-align: center;">TRUE The statement of the comparison mode selected in C01101/3 is true.</p>
wOut	WORD	Counter content <ul style="list-style-type: none"> Internal limitation to ± 32767 The most significant bit determines the sign!

Parameters

Parameters	Possible settings	Info
C01100/3	0 Normal counting	Function selection • Lenze setting: Normal counting
	1 Auto reset	
	2 Manual reset	
C01101/3	0 Counter content \geq comparison value	Selection of comparison operation • Lenze setting: Counter content \geq comparison value
	1 Counter content \leq comparison value	
	2 Counter content = comparison value	

General function

- Every FALSE/TRUE edge at the *bClkUp* input causes the block to count upwards by "1".
- Every FALSE/TRUE edge at the *bClkDown* input causes the block to count downwards by "1".

Function "Normal counting"

If the statement of the comparison mode selected in [C01101/3](#) is true, the *bCompare* output is set to TRUE.

Function "Auto reset"

If the statement of the comparison mode selected in [C01101/3](#) is true, the *bCompare* output is set to TRUE for 1 ms and the counter is reset to the *wLdVal* starting value.

Function "Manual reset"

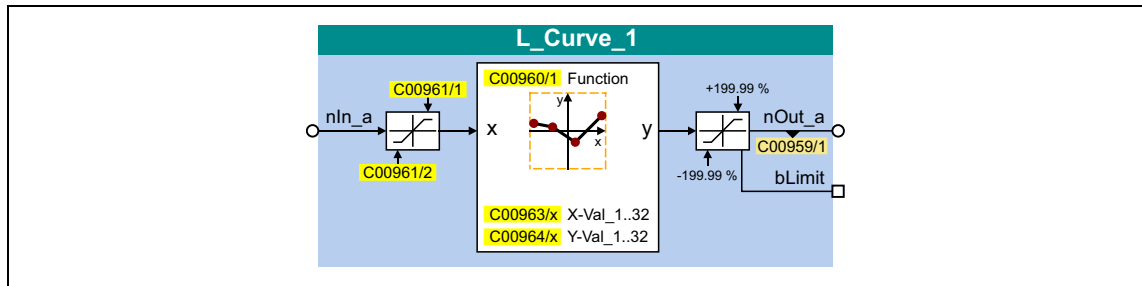
If the statement of the comparison mode selected in [C01101/3](#) is true, the *bCompare* output is set to TRUE and the counter stops.

- Edges at *bClkUp* and *bClkDown* are ignored.
- The counter must be reset via the *bLoad* input.

18.1.67 L_Curve_1

Alternatively, this FB represents a characteristic curve or cam function $y=f(x)$, whereby the input signal of the X-axis and the output signal of the Y-axis correspond.

- A limitation of the input value can be set in [C00961/1](#) (upper limit) and [C00961/2](#) (lower limit).
- The output value is internally limited to $\pm 199.99\%$. If a limitation of the output value is active, *bLimit* is set to TRUE.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input value (x) <ul style="list-style-type: none"> • $\pm 16384 \equiv \pm 100\%$ • A limitation of the input value can be set in C00961/1 (upper limit) and C00961/2 (lower limit).

Outputs

Designator	Data type	Value/meaning		
nOut_a	INT	Output value (y) <ul style="list-style-type: none"> • $\pm 16384 \equiv \pm 100\%$ • Internal limitation to ± 32767 ($\pm 199.99\%$) 		
bLimit	BOOL	"Limitation active" status signal <table border="1" style="margin-left: 20px;"> <tr> <td>TRUE</td> <td>The output value is limited to $\pm 199.99\%$.</td> </tr> </table>	TRUE	The output value is limited to $\pm 199.99\%$.
TRUE	The output value is limited to $\pm 199.99\%$.			

Parameters

Parameters	Possible settings			Info
C00959 From version 12.00.00	-199.99	%	199.99	Output value <ul style="list-style-type: none"> • Read only
C00960				Function selection
	0	$nOut_a = 0$ (FB deactivated)		Lenze setting
	1	$nOut_a = nIn_a$		
	2	$nOut_a = f(x)$		
	3	$nOut_a = f(\text{table})$		► Function 3: nOut_a = f(table)
C00961/1	-199.99	%	199.99	Upper limit for input value <ul style="list-style-type: none"> • Lenze setting: 199.99 %
C00961/2	-199.99	%	199.99	Lower limit for input value <ul style="list-style-type: none"> • Lenze setting: -199.99 %

Parameters	Possible settings			Info
C00963/1...32	-32767		32767	X values for characteristic function • Subcodes 1 ... 32 correspond to interpolation point values X1 ... X32. • $\pm 16384 \equiv \pm 100\%$ • Lenze setting: 0 ▶ Function 3: nOut_a = f(table)
C00964/1...32	-32767		32767	Y values for characteristic function • Subcodes 1 ... 32 correspond to interpolation point values Y1 ... Y32. • $\pm 16384 \equiv \pm 100\%$ • Lenze setting: 0 ▶ Function 3: nOut_a = f(table)

18.1.67.1 Function 3: nOut_a = f(table)

If function 3 has been selected in [C00960](#), the output value is calculated according to a characteristic.

- The characteristic may comprise up to 32 interpolation points which are defined by parameters.
- If the *nIn_a* input value is equal to one of the X interpolation points, the corresponding Y interpolation point will be output to *nOut_a*.
- If the *nIn_a* input value lies between two X interpolation points, the *nOut_a* output value will be interpolated linearly:

As per the equation,

$$\frac{X_{n+1} - X_n}{Y_{n+1} - Y_n} = \frac{nIn_a - X_n}{nOut_a - Y_n}$$

output value *nOut_a* for *nIn_a* is calculated as follows:

$$nOut_a = \frac{(nIn_a - X_n) \cdot (Y_{n+1} - Y_n)}{X_{n+1} - X_n} + Y_n$$

[18-25] Linear interpolation between two interpolation points

Selection of the characteristic

The max. 32 interpolation points of the characteristic are selected via the subcodes of [C00963](#) and [C00964](#).

- The values are to be set as raw values ($\pm 16384 \equiv \pm 100\%$).
- The same subcodes of [C00963](#) and [C00964](#) correspond to one pair of variates/interpolation point (x_n, y_n).

	1	2	...	32
X	C00963/1	C00963/2	C00963/...	C00963/32
Y	C00964/1	C00964/2	C00964/...	C00964/32

- The first pair of variates ([C00963/1](#) and [C00964/1](#)) is always valid.
- The X values of the characteristic must be entered in ascending order ($X_1 < X_2 < \dots < X_{32}$).
- An interruption of the ascending order of the X values represents the end of the characteristic (in our example: $X_5 < X_4$):

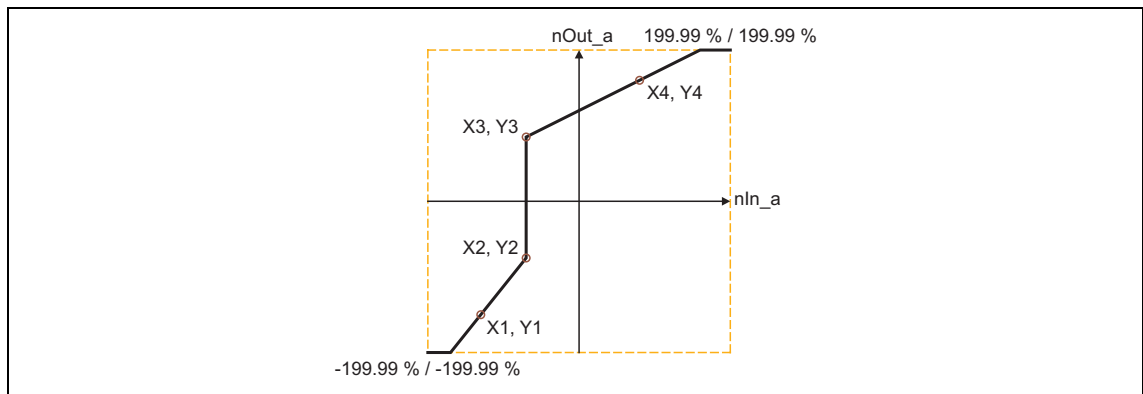
	1	2	3	4	5	6	7	...	32
X	-22938 (-140 %)	-14746 (-90 %)	11469 (70 %)	23757 (145 %)	0	0	0	0	0
Y	-22938 (-140 %)	-6554 (-40 %)	18842 (115 %)	26215 (160 %)	0	0	0	0	0

- Starting at the last valid pairs of variates, extrapolation is performed on both sides until the end of the X value range ($\pm 199.99\%$).

Special cases

- Step changes/discontinuities can be displayed by using the same parameter setting for two consecutive X values. A step change is only valid if it has a valid pair of variates. Otherwise, extrapolation continues, starting at the last valid pair of variates.

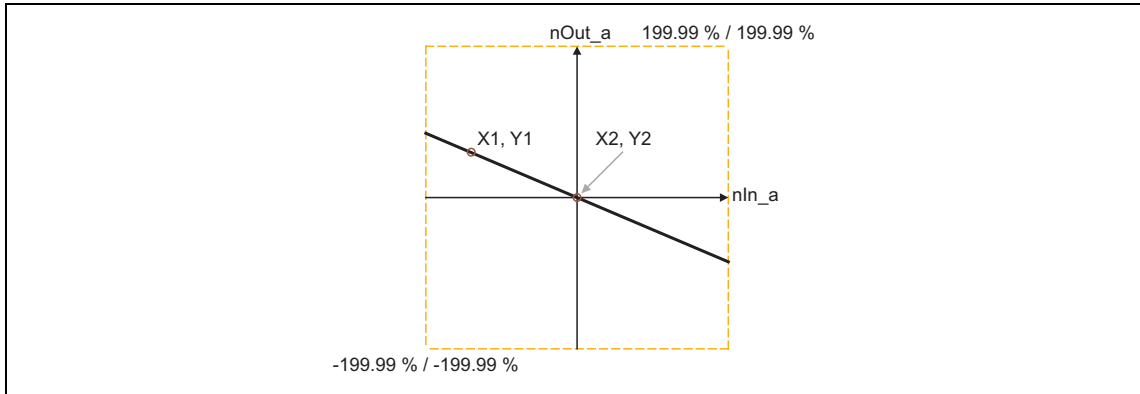
	1	2	3	4	5	6	7	...	32
X	-21300 (-130 %)	-11469 (-70 %)	-11469 (-70 %)	13107 (80 %)	0	0	0	0	0
Y	-24576 (-150 %)	-12288 (-75 %)	13927 (85 %)	26215 (160 %)	0	0	0	0	0



[18-26] Example: Characteristic with step change

- If only one interpolation point, X1, in the negative range is defined, X2 exists with the "0" Lenz setting being the valid interpolation point ($X2 > X1$), and a line is drawn through both interpolation points:

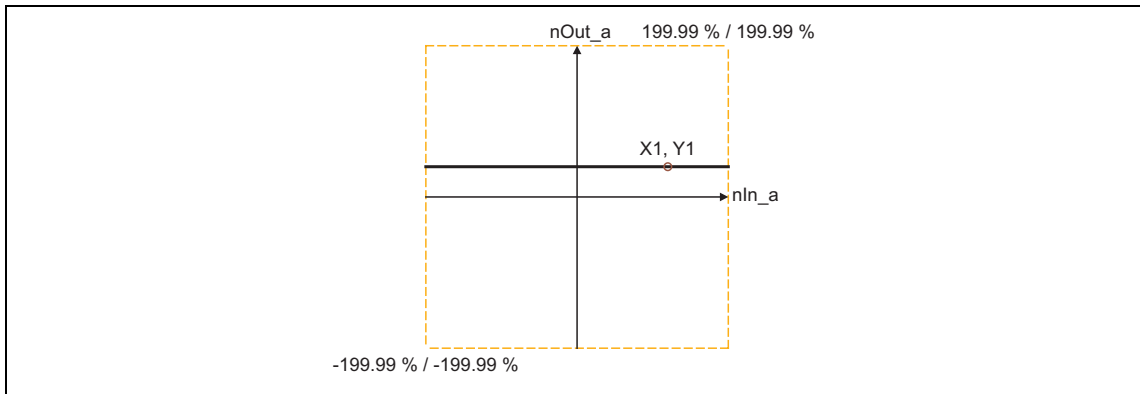
	1	2	3	4	5	6	7	...	32
X	-21300 (-130 %)	0 (0 %)	0	0	0	0	0	0	0
Y	6554 (40 %)	0 (0 %)	0	0	0	0	0	0	0



[18-27] Example: Characteristic with only one defined interpolation point and $X1 < 0$

- If only one interpolation point, X1, is defined in the positive range, a line is extrapolated:

	1	2	3	4	5	6	7	...	32
X	19661 (120 %)	0	0	0	0	0	0	0	0
Y	6554 (40 %)	0	0	0	0	0	0	0	0

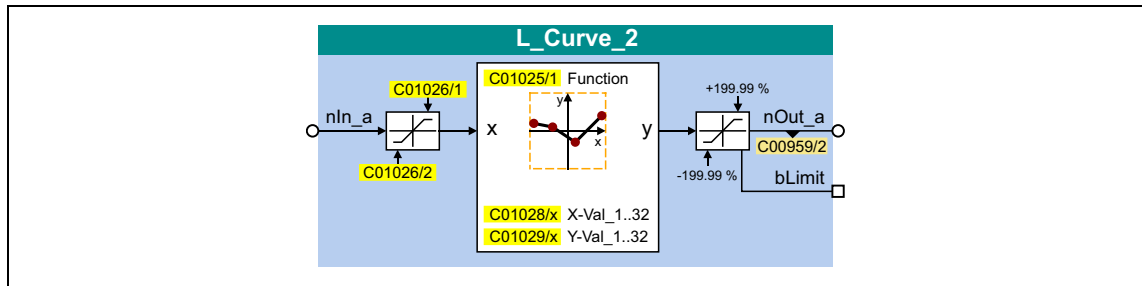


[18-28] Example: Characteristic with only one defined interpolation point and $X1 > 0$

18.1.68 L_Curve_2

Alternatively, this FB represents a characteristic curve or cam function $y=f(x)$, whereby the input signal of the X-axis and the output signal of the Y-axis correspond.

- A limitation of the input value can be set in [C01026/1](#) (upper limit) and [C01026/2](#) (lower limit).
- The output value is internally limited to $\pm 199.99\%$. If a limitation of the output value is active, *bLimit* is set to TRUE.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input value (x) <ul style="list-style-type: none"> • $\pm 16384 \equiv \pm 100\%$ • A limitation of the input value can be set in C01026/1 (upper limit) and C01026/2 (lower limit).

Outputs

Designator	Data type	Value/meaning		
nOut_a	INT	Output value (y) <ul style="list-style-type: none"> • $\pm 16384 \equiv \pm 100\%$ • Internal limitation to $\pm 32767 (\pm 199.99\%)$ 		
bLimit	BOOL	"Limitation active" status signal <table border="1" style="margin-left: 20px;"> <tr> <td>TRUE</td> <td>The output value is limited to $\pm 199.99\%$.</td> </tr> </table>	TRUE	The output value is limited to $\pm 199.99\%$.
TRUE	The output value is limited to $\pm 199.99\%$.			

Parameters

Parameters	Possible settings			Info
C00959/2	-199.99	%	199.99	Output value <ul style="list-style-type: none"> • Read only
C001025/1				Function selection
	0	$nOut_a = 0$ (FB deactivated)		Lenze setting
	1	$nOut_a = nIn_a$		
	2	$nOut_a = f(x)$		
	3	$nOut_a = f(\text{table})$		See description of L_Curve_1: ▶ Function 3: $nOut_a = f(\text{table})$
C01026/1	-199.99	%	199.99	Upper limit for input value <ul style="list-style-type: none"> • Lenze setting: 199.99 %
C01026/2	-199.99	%	199.99	Lower limit for input value <ul style="list-style-type: none"> • Lenze setting: -199.99 %

Parameters	Possible settings			Info
C01028/1...32	-32767		32767	X values for characteristic function <ul style="list-style-type: none"> • Subcodes 1 ... 32 correspond to interpolation point values X1 ... X32. • $\pm 16384 \equiv \pm 100\%$ • Lenze setting: 0 See description of L_Curve_1: ▶ Function 3: nOut_a = f(table)
C01029/1...32	-32767		32767	Y values for characteristic function <ul style="list-style-type: none"> • Subcodes 1 ... 32 correspond to interpolation point values Y1 ... Y32. • $\pm 16384 \equiv \pm 100\%$ • Lenze setting: 0 See description of L_Curve_1: ▶ Function 3: nOut_a = f(table)



For a detailed functional description see [L_Curve_1](#).

18.1.69 L_Curve_3

Alternatively, this FB represents a characteristic curve or cam function $y=f(x)$, whereby the input signal of the X-axis and the output signal of the Y-axis correspond.

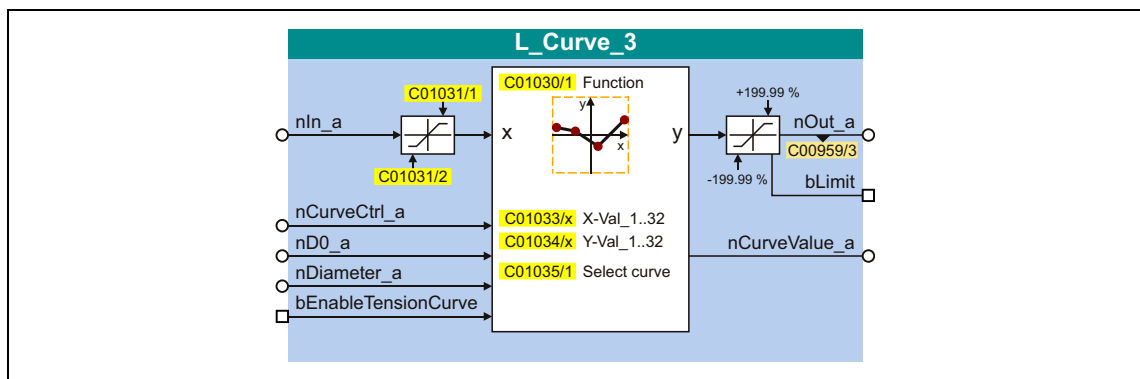
- A limitation of the input value can be set in [C01031/1](#) (upper limit) and [C01031/2](#) (lower limit).
- The output value is internally limited to $\pm 199.99\%$. If a limitation of the output value is active, *bLimit* is set to TRUE.



Tip!

From version 12.00.00 onwards the FB **L_Curve_3** can be used to create a tensile force depending on the diameter for winding applications. For this purpose, the FB has been extended by further inputs/outputs and parameters.

► [Use of the L_Curve_3 for tensile force characteristic](#)



Inputs

Designator	Data type	Information/possible settings				
nIn_a	INT	Input value (x) <ul style="list-style-type: none"> • $\pm 16384 \equiv \pm 100\%$ • A limitation of the input value can be set in C01031/1 (upper limit) and C01031/2 (lower limit). <p>When using the FB for tensile force characteristic (from V12.00.00): Maximum tensile force setpoint in [%]</p>				
The following inputs are only relevant when the FB is used for tensile force characteristic:						
nCurveCtrl_a	INT	Slope of the characteristic (torque characteristic) in [%] <ul style="list-style-type: none"> • $\pm 16384 \equiv \pm 100\%$ • Internal limitation to -100 ... +200 % • With 100 %, there is a constant tensile force curve and thus a torque proportionally rising with D. 				
nD0_a	INT	Initial point of the characteristic <ul style="list-style-type: none"> • $16384 \equiv 100\% \equiv$ maximum diameter 				
nDiameter_a	INT	Current diameter in [%] <ul style="list-style-type: none"> • $16384 \equiv 100\% \equiv$ maximum diameter 				
bEnableTensionCurve	BOOL	Activate tensile force setpoint <table border="1"> <tr> <td>FALSE</td> <td>Tensile force setpoint is not influenced.</td> </tr> <tr> <td>TRUE</td> <td>Tensile force setpoint is multiplied by the characteristic value.</td> </tr> </table>	FALSE	Tensile force setpoint is not influenced.	TRUE	Tensile force setpoint is multiplied by the characteristic value.
FALSE	Tensile force setpoint is not influenced.					
TRUE	Tensile force setpoint is multiplied by the characteristic value.					

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output value (y) <ul style="list-style-type: none"> • $\pm 16384 \equiv \pm 100\%$ • Internal limitation to ± 32767 ($\pm 199.99\%$)
		When using the FB for tensile force characteristic (from V12.00.00): Current tensile force setpoint in [%] <ul style="list-style-type: none"> • $16384 \equiv 100\%$
bLimit	BOOL	"Limitation active" status signal
		TRUE The output value is limited to $\pm 199.99\%$.
nCurveValue_a	INT	Current characteristic value of the tensile force characteristic in [%] <small>From version 12.00.00</small>

Parameters

Parameters	Possible settings			Info
C00959/3	-199.99	%	199.99	Output value <ul style="list-style-type: none"> • Read only
C01030/1				Function selection
	0	Out = 0		FB deactivated (Lenze setting)
	1	Out = In		
	2	Out = f(In)		
	3	Out = f(table)		See description of L_Curve_1 : ▶ Function 3: nOut_a = f(table)
	4	Out = f(characteristic)		▶ Use of the L_Curve_3 for tensile force characteristic
C01031/1	-199.99	%	199.99	Upper limit for input value <ul style="list-style-type: none"> • Lenze setting: 199.99 %
C01031/2	-199.99	%	199.99	Lower limit for input value <ul style="list-style-type: none"> • Lenze setting: -199.99 %
C01033/1...32	-32767		32767	X values for characteristic function <ul style="list-style-type: none"> • Subcodes 1 ... 32 correspond to interpolation point values X1 ... X32. • $\pm 16384 \equiv \pm 100\%$ • Lenze setting: 0 See description of L_Curve_1 : ▶ Function 3: nOut_a = f(table)
C01034/1...32	-32767		32767	Y values for characteristic function <ul style="list-style-type: none"> • Subcodes 1 ... 32 correspond to interpolation point values Y1 ... Y32. • $\pm 16384 \equiv \pm 100\%$ • Lenze setting: 0 See description of L_Curve_1 : ▶ Function 3: nOut_a = f(table)

Parameters	Possible settings	Info	
C01035/1 (from V12.00.00)		Selection of the tensile force profile ▶ Use of the L_Curve_3 for tensile force characteristic	
	0	Linear tensile force profile	Lenze setting
	1	Linear torque profile	
	2	Tensile force profile according to characteristic	

18.1.69.1 Use of the L_Curve_3 for tensile force characteristic

In case of centre winders, the drive torque is transmitted from the centre via the individual layers up to the winder surface. In case of smooth materials and high diameter areas, it is mostly required to reduce the tensile force depending on the diameter.

The FB **L_Curve_3** can be used to generate a tensile force profile depending on the diameter. For this purpose, the selection "4: Out = f(characteristic)" has to be set in [C01030/1](#).

The characteristic is marked by an initial range with constant evaluation (100 %) and a second range where the tensile force is adapted to the diameter.

The part of the characteristic that depends on the diameter can be generated for a linear tensile force profile, a linear torque profile or based on a specified characteristic. The respective selection is made in [C01035/1](#).

Linear tensile force profile

Characteristic for a linear tensile force profile ([C01035/1](#) = 1)

Characteristic
 ① Tensile force
 ② Diameter

$$100\% - \frac{D - D0}{100\% - D0} \cdot (100\% - HW)$$

D	Current diameter (<i>nDiameter_a</i>)
D0	Initial point for diameter dependency (<i>nD0_a</i>)
HW	Tensile force valuation (<i>nCurveCtrl_a</i>)

- *nD0_a* serves to define at which diameter the tensile force decrease is to start.

Linear torque profile

Characteristic for a linear torque profile ([C01035/1](#) = 2)

Characteristic
 ① Tensile force
 ② Diameter

Function for $D > D0$:

$$HW + \frac{(100\% - HW) \cdot D0}{D}$$

D	Current diameter (<i>nDiameter_a</i>)
D0	Initial point for diameter dependency (<i>nD0_a</i>)
HW	Tensile force valuation (<i>nCurveCtrl_a</i>)

- *nD0_a* serves to define at which diameter the tensile force decrease is to start.
- Since in this characteristic selection, the linear torque profile is in the focus, define in this case the slope of the torque curve via *dnCurveCtrl_n*:
 - When *nCurveCtrl_a* = 100 %, the tensile force remains unchanged.
 - When *nCurveCtrl_a* = 0 %, the tensile force is reduced up to D0/DMax.

Example: Steepness of the torque curve

Characteristic
 ① Torque
 ② Diameter

D	Current diameter (<i>nDiameter_a</i>)
D0	Initial point for diameter dependency (<i>nD0_a</i>)

Tensile force profile according to characteristic

The characteristic (A) can be parameterised in [C01033/1...32](#).

- The characteristic comprises 32 values, regularly distributed over the diameter range of D0 ... DMax.
- The values are to be set as raw values ($\pm 16384 \equiv \pm 100\%$).

Tensile force profile according to defined characteristic ([C01035/3](#) = 6)

Characteristic
 ① Tensile force
 ② Diameter

Function for $D > D0$:

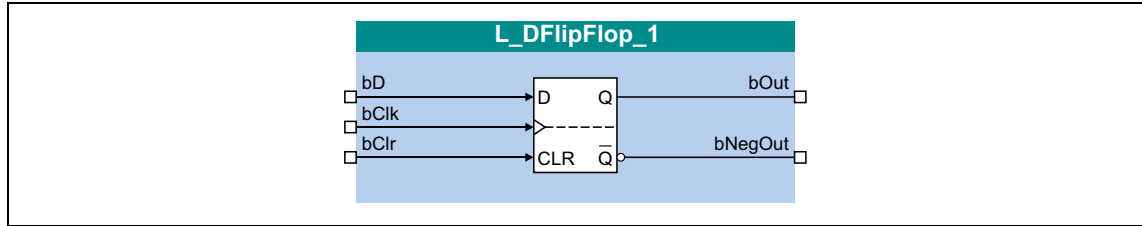
$$100\% - \frac{(100\% - TAB[D-D0]) \cdot (100\% - HW)}{100\%}$$

A	Table function (e.g. line)
TAB[D-D0]	Table value [1...32] for D-D0
D0	Initial point for diameter dependency ($nD0_a$)
HW	Tensile force valuation ($nCurveCtrl_a$)

- $nD0_a$ serves to define the start of the table range (D0).
- $nCurveCtrl_a$ serves to change the slope of the characteristic.
 - When $nCurveCtrl_a = 0\%$, the slope of the characteristic remains unchanged.

18.1.70 L_DFliPfloP_1

The FB saves binary signals (DFliPfloP) in a clock-controlled way.



Inputs

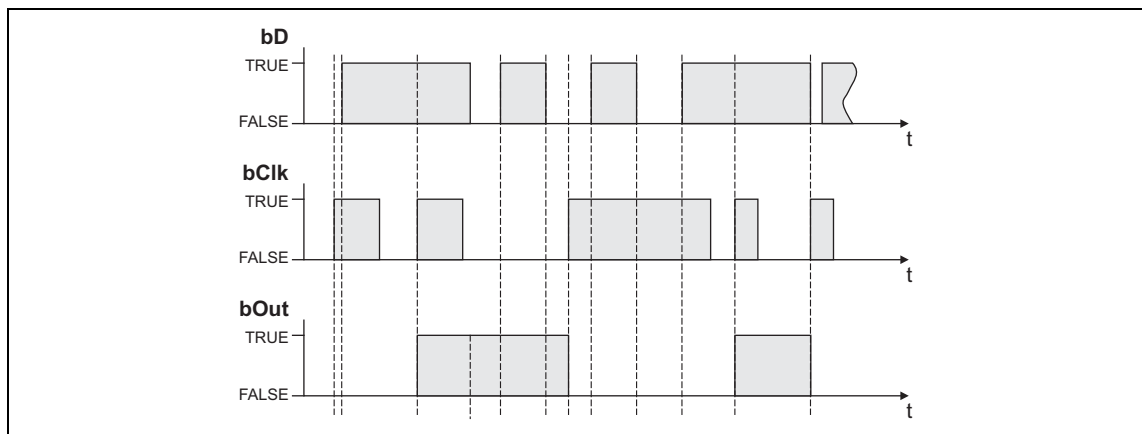
Designator	Data type	Information/possible settings
bD	BOOL	Data input
bClk	BOOL	Clock input • Only FALSE/TRUE edges are evaluated
bClr	BOOL	Reset input
		TRUE • The <i>bOut</i> output is set to FALSE. • The <i>bNegOut</i> output is set to TRUE.

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal
bNegOut	BOOL	Output signal, inverted

Function

If the *bClr* input = FALSE, a signal edge at the *bClk* input switches the static input signal *bD* to the *bOut* output, where it is retained:

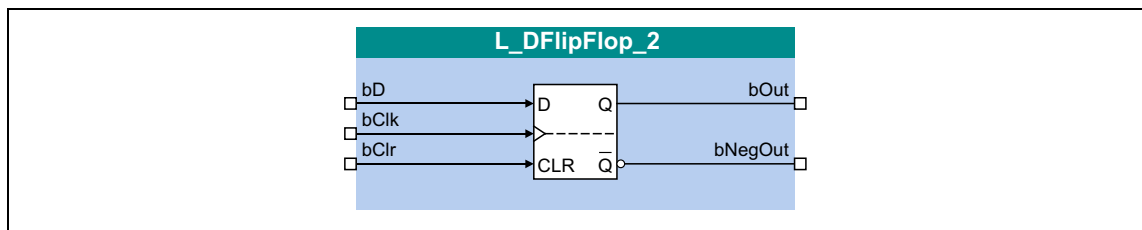


If the *bClr* input = TRUE:

- Due to the priority $bClr > bClk, bD$ the *bOut* output signal can be set any time to the *FALSE* status by the *bClr* input signal = TRUE.
- The output signal is kept in this status independent of the other input signals.

18.1.71 L_DFliPlop_2

The FB saves binary signals (DFliPlop) in a clock-controlled way.



Inputs

Designator	Data type	Information/possible settings
bD	BOOL	Data input
bClk	BOOL	Clock input • Only FALSE/TRUE edges are evaluated
bClr	BOOL	Reset input
		TRUE

Outputs

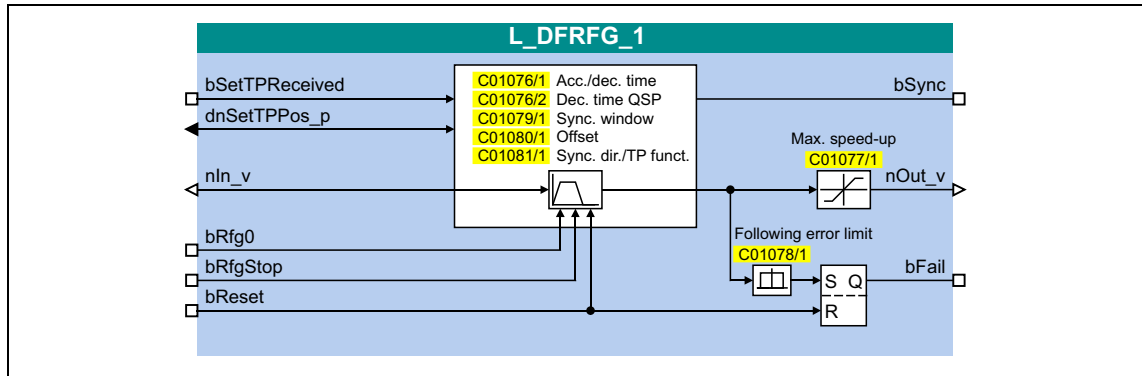
Designator	Data type	Value/meaning
bOut	BOOL	Output signal
bNegOut	BOOL	Output signal, inverted



For a detailed functional description see [L_DFliPlop_1](#).

18.1.72 L_DFRFG_1

This FB synchronises a drive (slave) to the master value of a master drive and then executes a angular synchronism with regard to the digital frequency.



Inputs

Designator	Data type	Information/possible settings
bSetTPReceived	BOOL	Input for status signal "Touch probe detected"
		FALSE↗TRUE Touch probe or zero pulse received.
dnSetTPPos_p	DINT	Input for accepting the position measured via touch probe
nIn_v	INT	Speed setpoint of the master • Scaling: 16384 ≙ 15000 rpm
bRfg0	BOOL	Ramp down ramp function generator to "0" (quick stop function) • This input can, for instance, be connected to the status signal "quick stop active".
		TRUE Ramp down the ramp function generator to "0" • The drive is brought to a standstill with the deceleration time set in C01076/2 .
bRfgStop	BOOL	Stop ramp function generator
		TRUE Stop ramp function generator • The last status is output to <i>nOut_v</i> . • The speed/angle setpoint <i>nIn_v</i> is saved. • After <i>bStop</i> is reset to FALSE, the setpoint angle is approached via the ramp function generator.
bReset	BOOL	Reset added angle setpoint
		TRUE The internally added angle setpoint is reset and the ramp function generator is activated. If the status signal <i>bFail</i> is set, it will also be reset.
		TRUE↘FALSE Detect speed/angle setpoint.

Outputs

Designator	Data type	Value/meaning
bSync	BOOL	Status signal "Drive is running synchronously"
		TRUE The drive is running synchronously, the speed input id directly applied to the speed output.
nOut_v	INT	Speed/angle setpoint • Scaling: 16384 \equiv 15000 rpm
bFail	BOOL	Status signal "Angular difference exceeded"
		TRUE The angular difference set in C01078/1 has been exceeded.

Parameters

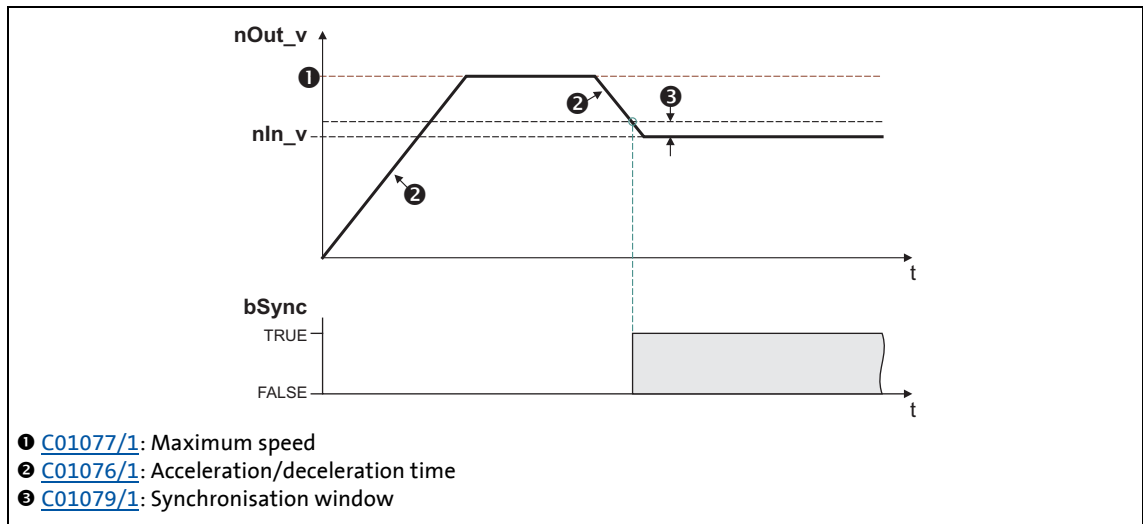
Parameters	Possible settings			Info
C01076/1	0.000	s	999.900	Acceleration and deceleration time • Relating to the reference speed (constant acceleration and deceleration) set in C00011 . • It is a maximum value which limits the acceleration of the ramp function generator. • Lenze setting: 1.000 s
C01076/2	0.000	s	999.900	Deceleration time for quick stop of the slave drive • Relating to the reference speed (constant acceleration and deceleration) set in C00011 . • It is a maximum value which limits the deceleration of the ramp function generator. • Lenze setting: 0.000 s
C01077/1	1	rpm	15000	Max. speed-up • Lenze setting: 3000 rpm
C01078/1	10	Incr.	2000000000	Following error limit • Scaling: A revolution is displayed with 65536 increments or steps. • Lenze setting: 2000000000 incr.
C01079/1	0	Incr.	65535	Synchronisation window (position) • If the difference between the master and the slave is lower than the synchronisation window, the <i>bSync</i> status signal is set to TRUE. • Lenze setting: 100 incr.
C01080/1	-2147483647	Incr.	2147483647	Offset • Angular offset for the internal actual position of the FB • Scaling: A revolution is displayed with 65536 increments or steps. • Lenze setting: 0 incr.

Parameters	Possible settings	Info
C01081/1		Sync. direction/TP function • Selection of the direction of rotation for synchronising • With high offset values and low input speed, the drive may change its direction of rotation. In order to prevent this, a direction of rotation can be permanently defined via this parameter.
	1 cw/ccw - without TP (Lenze setting)	
	2 cw - without TP	
	3 ccw - without TP	
	4 cw/ccw - with TP	
	5 cw - with TP	
	6 ccw - with TP	

18.1.72.1 Ramp function generator (profile generator)

The ramp function generator accelerates the slave drive to the input master speed.

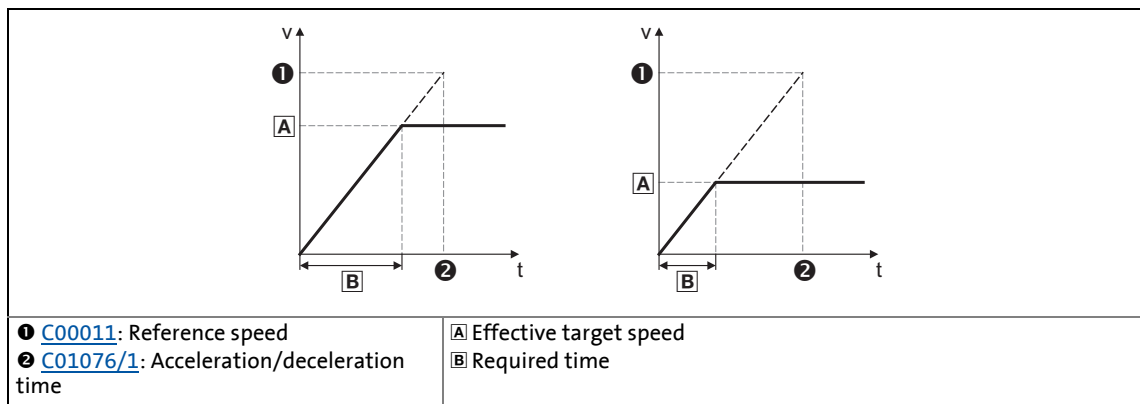
- Synchronising starts when the FB receives a touch probe edge from the master axis (e.g. a conveying belt) at the *bSetTPReceived* input.
- When the slave reaches the setpoint speed of the master and the made up path difference is lower than the synchronisation window set in [C01079/1](#), the *bSync* output is set to TRUE. At the same time, the FB switches the profile generator to inactive and outputs the *nIn_v* input speed to *nOut_v*.



[18-29] Example: Synchronisation

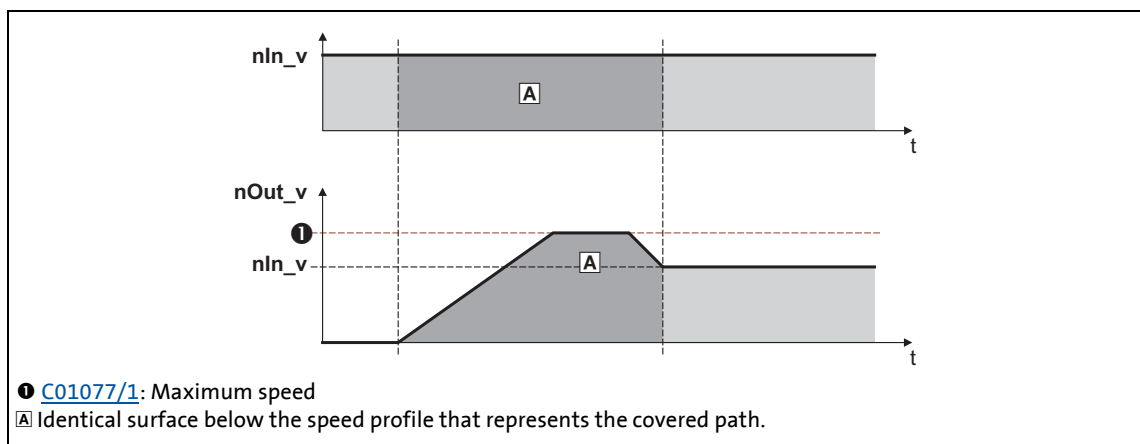
- [C01077/1](#) serves to set a maximum speed which limits the speed of the slave.

- The acceleration or deceleration in the synchronous point results from the acceleration/deceleration time set in [C01076/1](#).
 - Reference for the acceleration/deceleration time is the reference speed ([C00011](#)):



[18-30] Connection between acceleration time and acceleration

- Based on the input speed of the master axis, a setpoint angle is calculated from the starting time onwards which leads the actual angle of the slave.
- Dependent on the master speed and the settings for acceleration and offset, the FB may travel oversynchronously for reducing the angular difference, i.e. $nOut_v$ is higher than nIn_v :



[18-31] Speed/time diagram

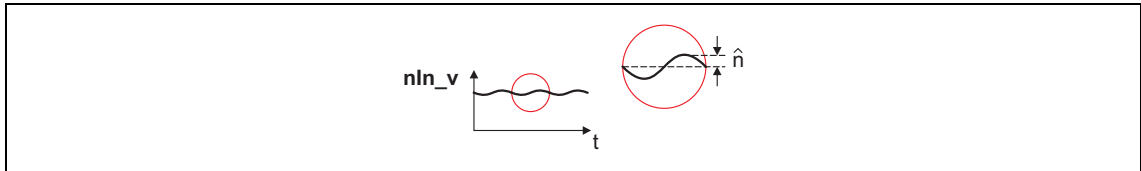


Note!

- Set the maximum speed in [C01077/1](#) higher than the master speed to be expected. The speed is selected on the motor side and is independent of the reference speed ([C00011](#)). The higher the difference between maximum speed and master speed, the less time to the synchronous time is required.
- In case of a heavily oscillating input speed it may occur that directly after setting the *bSync* status signal to TRUE the FB still executes slight angle corrections.
- Generally avoid acceleration or deceleration processes of the master axis while the slave axes are synchronising.

**Tip!**

Set the synchronisation window in [C01079/1](#) higher than the amplitude of beat available on the input signal:

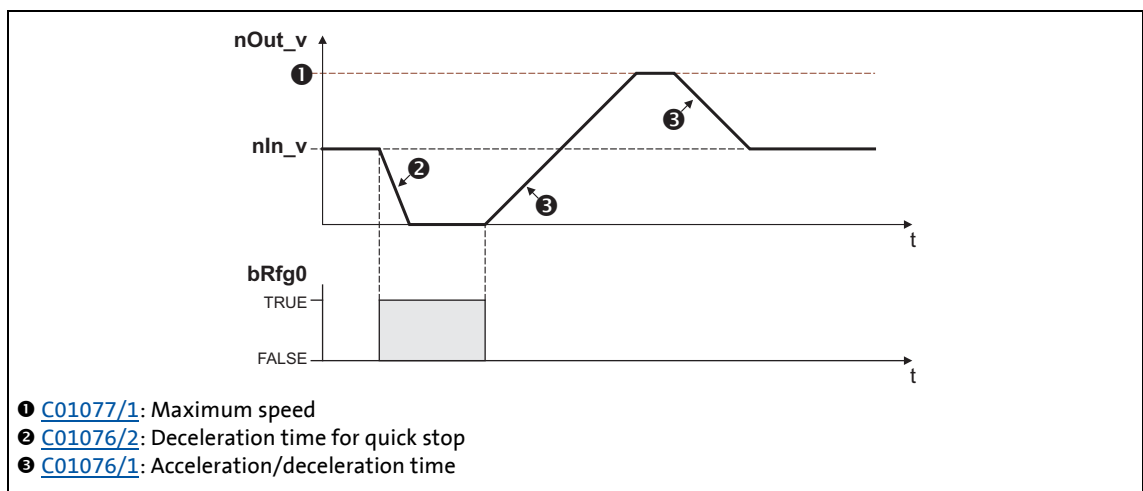


[18-32] Example: Beat on the input signal

18.1.72.2 Quick stop

The quick stop function removes the drive from the interconnection and leads it to standstill.

- Quick stop is activated by setting *bRfg0* to TRUE.
- [C01076/2](#) is used to set the delay time in [s] which refers as the acceleration/deceleration time to the reference speed ([C00011](#)).
- The angle setpoint created internally on the basis of the input signal *nIn_v* is saved.
- After *bRfg0* is reset to FALSE, the angle setpoint is approached via the ramp function generator again.

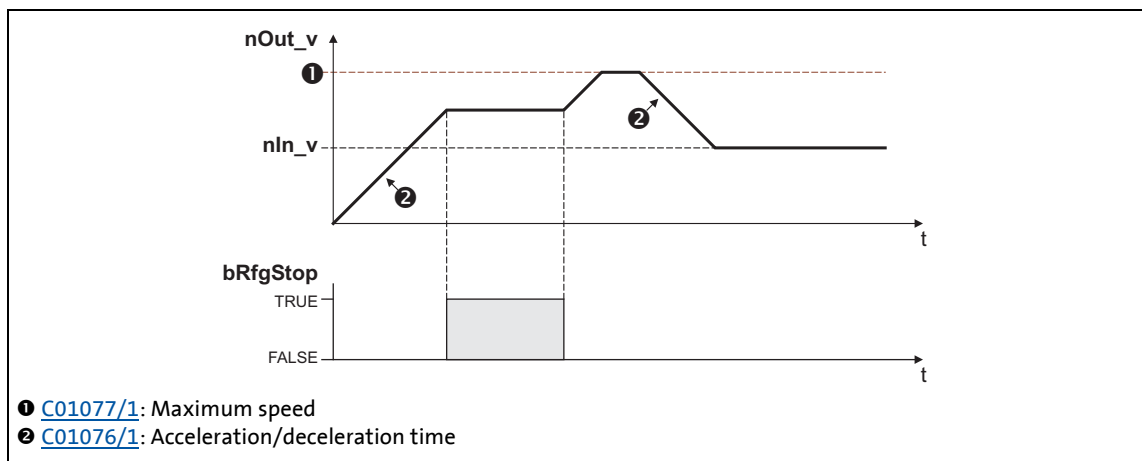


[18-33] Example: Quick stop function (QSP)

18.1.72.3 Ramp function generator stop

The stop function holds the status of the ramp function generator during operation.

- The stop function is activated by setting *bRfgStop* to TRUE.
- The last status is output to *nOut_v* (16384 \equiv 15000 rpm).
- The angle setpoint created internally on the basis of the input signal *nIn_v* is saved, thus the monitoring function of the angular difference between the created setpoint angle and actual angle cannot be activated.
- After *bRfgStop* is reset to FALSE, the angle setpoint is approached via the ramp function generator again.



[18-34] Example: Stop function

18.1.72.4 Reset angle setpoint

By setting *bReset* to TRUE, the internally created angle setpoint is set to "0" and the ramp function generator is activated.

18.1.72.5 Detecting the angular difference

In [C01078/1](#), a limit value for monitoring the angular difference between the created setpoint and actual angles can be set.

- Scaling: A revolution is displayed with 65536 increments or steps.
- The ramp function generator can accept a angular difference of up to ± 2140000000 increments (≈ 32000 revolutions).
- If monitoring responds, the status signal *bFail* is set to TRUE.
- If the internally added angle setpoint is reset by setting *bReset* to TRUE, the *bFail* status signal is reset to FALSE.

18.1.72.6 Offset setting

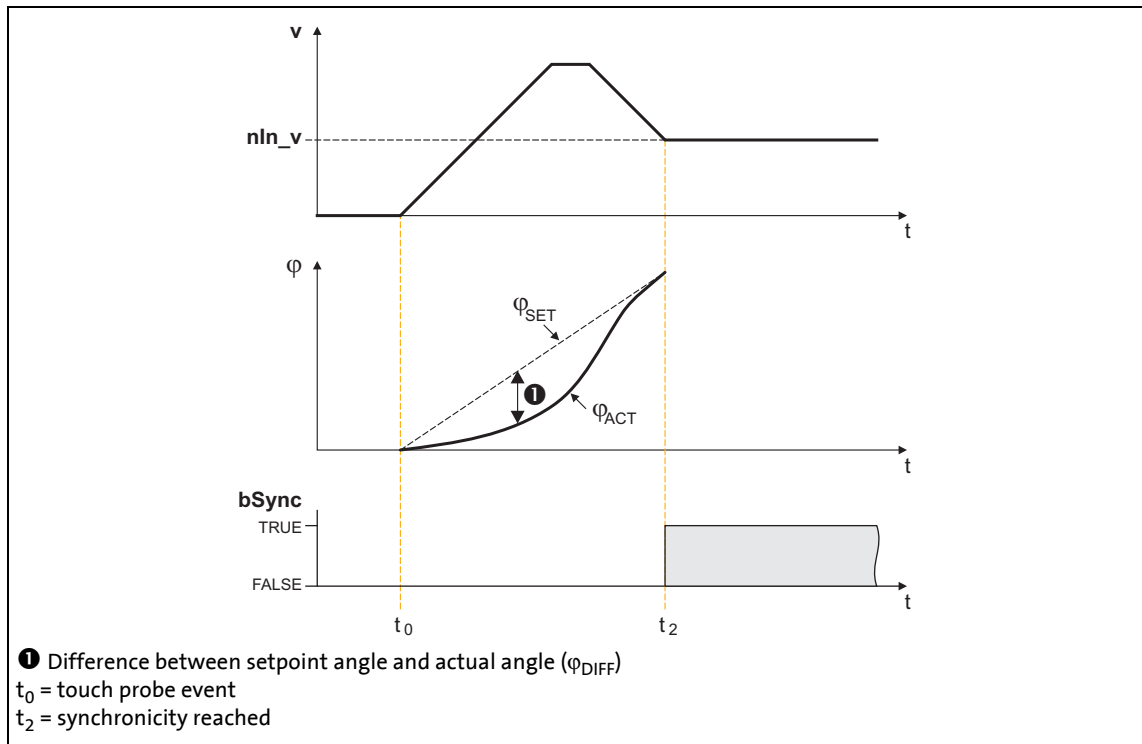
If the time to synchronicity is too long or the slave drive must not be operated oversynchronously, either the acceleration can be adapted or the touch probe initiator can be shifted. Since this is only possible to a limited extent due to construction conditions, in this case the better solution is selecting a virtual angular offset.

- In order to reach angle synchronicity, the difference between created setpoint and actual angle must be zero:

$$\varphi_{\text{DIFF}} = \varphi_{\text{SET}} - \varphi_{\text{ACT}} = 0$$

Behaviour without offset

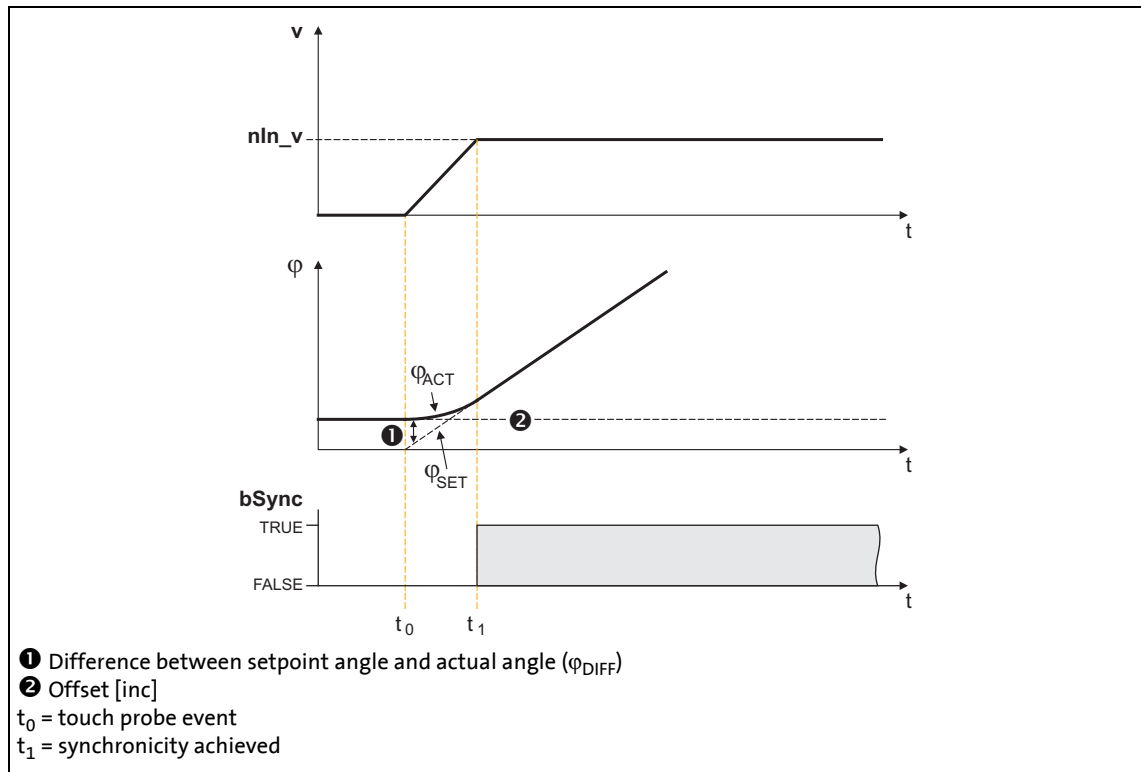
If the actual angle starts with an offset = 0, a higher difference between setpoint angle and actual angle develops:



[18-35] Example: Without offset selection (offset = 0)

Behaviour with offset

By selecting an offset, the actual position is preloaded with a non-zero value. This reduces the distance and the time to synchronicity.



[18-36] Example 1: With offset selection

- When a positive offset is selected, the sign of the distance between setpoint and actual value changes. This distance is reduced due to the acceleration of the slave from the input of the touch probe pulse. Thus, the time to synchronicity is shorter.
- The offset refers to the master value selection and is scaled with an encoder revolution ($\equiv 65536$ increments).
- The offset can be determined empirically, but it is sensible to calculate the required acceleration distance and select this value as offset:

$$\varphi_{ACC} = \frac{1}{2} \cdot \frac{(v_{SET})^2}{C00011 [rpm]} \cdot C01076/1 [ms] \cdot \frac{16384 [incr./ms]}{15000 [rpm]}$$

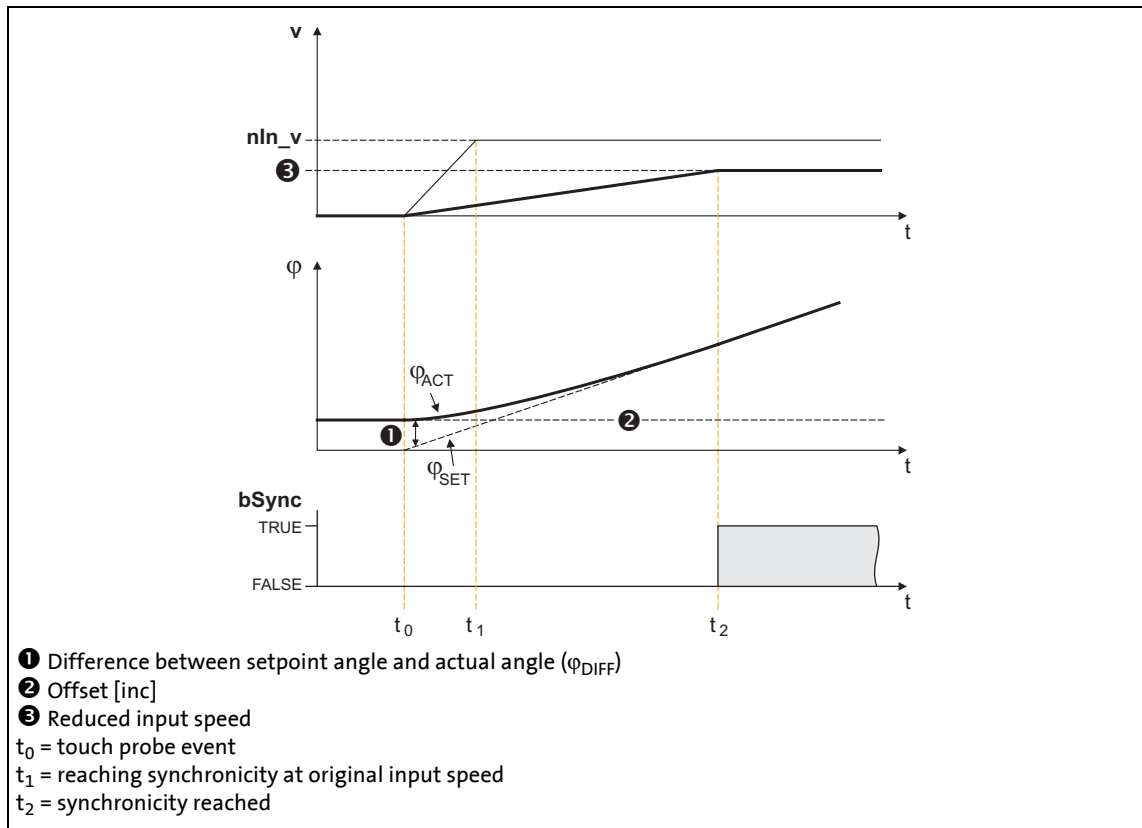
φ_{ACC} = acceleration distance in [increments]

v_{SET} = setpoint speed in [rpm]

[C00011](#) = reference speed of the motor in [rpm]

[C01076/1](#) = acceleration/deceleration time of the ramp generator in [ms]

The acceleration calculated from the acceleration/deceleration time ([C01076/1](#)) is a maximum acceleration that will not be reached if the input speed is reduced and the FB has to reach its target with a too high offset.



[18-37] Example 2: With offset selection and reduced input speed



Note!

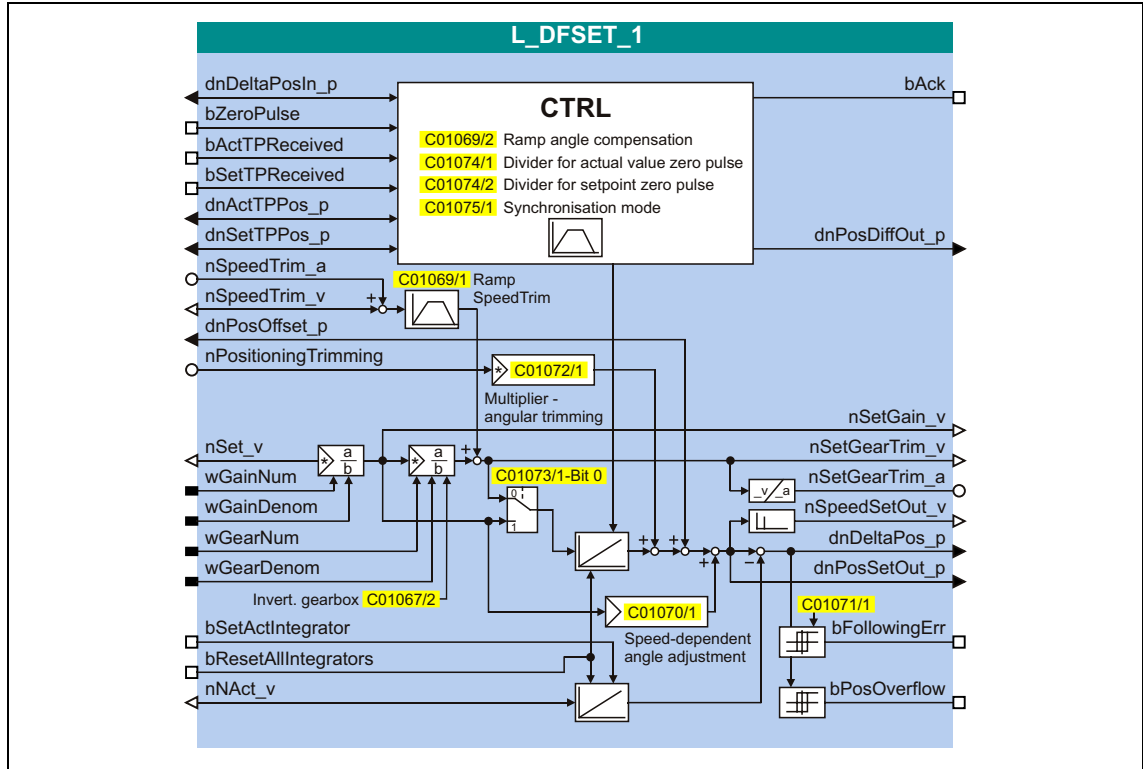
With a very low input speed, the acceleration can also get negative which causes the slave drive to change its direction of rotation.

In order to prevent a change of the direction of rotation, [C01069/1](#) serves to select a permanent direction of rotation.

18.1.73 L_DFSET_1

This FB prepares the master value for a slave drive. This FB enables the inverter to follow the master drive true to speed and angle.

- You can select values for the stretch factor and gearbox factor of the slave.
- A speed trimming or angular trimming is possible.



Inputs

Designator	Data type	Information/possible settings
dnDeltaPosIn_p	DINT	Input for considering a following error for the mark correction • The value of this input is used for the following error compensation if the nNAct_v input is not assigned.
bZeroPulse	BOOL	FALSE ∇ TRUE Synchronisation enabled.
		TRUE
bActTPReceived	BOOL	FALSE ∇ TRUE Actual value touch probe or zero pulse received.
		TRUE
bSetTPReceived	BOOL	FALSE ∇ TRUE Touch probe or zero pulse received.
		TRUE
dnActTPPos_p	DINT	Input for accepting the position measured via touch probe at bActTPReceived
dnSetTPPos_p	DINT	Input for accepting the position measured via touch probe at bSetTPReceived
nSpeedTrim_a	INT	Speed trimming in [%] • Scaling: 16384 \equiv 100 %

Designator	Data type	Information/possible settings
nSpeedTrim_v	INT	Speed trimming in [increments/ms] <ul style="list-style-type: none"> • Scaling: 16384 \equiv 15000 rpm • Speed trimming via this input is more precise.
dnPosOffset_p	DINT	Angular offset in [increments] <ul style="list-style-type: none"> • Scaling: A motor revolution is mapped with 65536 increments or steps.
nPositionTrimming	INT	Angular trimming in [increments] <ul style="list-style-type: none"> • Scaling: A motor revolution is mapped with 65536 increments or steps. • When analog values are selected: 100 % \equiv 1/4 revolution \equiv 16384 increments • The setting range can be extended via C01072/1.
nSet_v	INT	Speed setpoint <ul style="list-style-type: none"> • Scaling: 16384 \equiv 15000 rpm
wGainNum	WORD	Stretch factor (numerator)
wGainDenom	WORD	Stretch factor (denominator)
wGearNum	WORD	Gearbox factor (numerator)
wGearDenom	WORD	Gearbox factor (denominator)
bSetActIntegrator	BOOL	Equalise angle integrators (current position = set position) <ul style="list-style-type: none"> • This input has a higher priority than the <i>bResetAllIntegrators</i> input.
		FALSE \rightarrow TRUE Set following error <i>dnDeltaPos_p</i> = 0.
		TRUE Equalise angle integrators.
bResetAllIntegrators	BOOL	Reset angle integrators
		TRUE Positional deviation, <i>dnPosSetOut_p</i> and <i>dnDeltaPos_p</i> are set to "0".
nNAct_v	INT	Actual value in [increments/ms] for calculating the actual position <ul style="list-style-type: none"> • Scaling: 16384 \equiv 15000 rpm • If this input is connected or assigned to an output, the following error created from integration of this input and difference with the set position is used for the following error compensation in case of mark correction.

Outputs

Designator	Data type	Value/meaning
bAck	BOOL	Status signal "Synchronising is executed"
		TRUE Synchronising is executed.
dnPosDiffOut_p	DINT	Angular offset in [increments] <ul style="list-style-type: none"> • Difference between two positions measured by means of touch probe.
nSetGain_v	INT	Speed setpoint in [increments/ms] evaluated with stretch factor <ul style="list-style-type: none"> • Scaling: 16384 \equiv 15000 rpm
nSetGearTrim_v	INT	Speed setpoint in [increments/ms] evaluated with stretch factor and gearbox factor <ul style="list-style-type: none"> • Scaling: 16384 \equiv 15000 rpm
nSetGearTrim_a	INT	Speed setpoint in [%] evaluated with stretch factor and gearbox factor <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % reference speed (C00011)
nSpeedSetOut_v	INT	Speed setpoint in [increments/ms] <ul style="list-style-type: none"> • Scaling: 16384 \equiv 15000 rpm • Derived from angle setpoint <i>dnPosSetOut_p</i>. • Can change abruptly if e.g. the angular offset changes abruptly.
dnDeltaPos_p	DINT	Following error between setpoint position and actual position in [increments] <ul style="list-style-type: none"> • This output can be used for display purposes.

Designator	Data type	Value/meaning
dnPosSetOut_p	DINT	Angle setpoint in [increments] • Scaling: A revolution is displayed with 65536 increments or steps.
bFollowingErr	BOOL	Status signal "Following error"
		TRUE Following error occurred. • The limit value set in C01071/1 has been exceeded.
bPosOverflow	BOOL	Status signal "angle controller overflow" • An angle controller overflow occurs from a limit value of 2130706432 increments.
		TRUE Angle controller overflow occurred.

Parameters

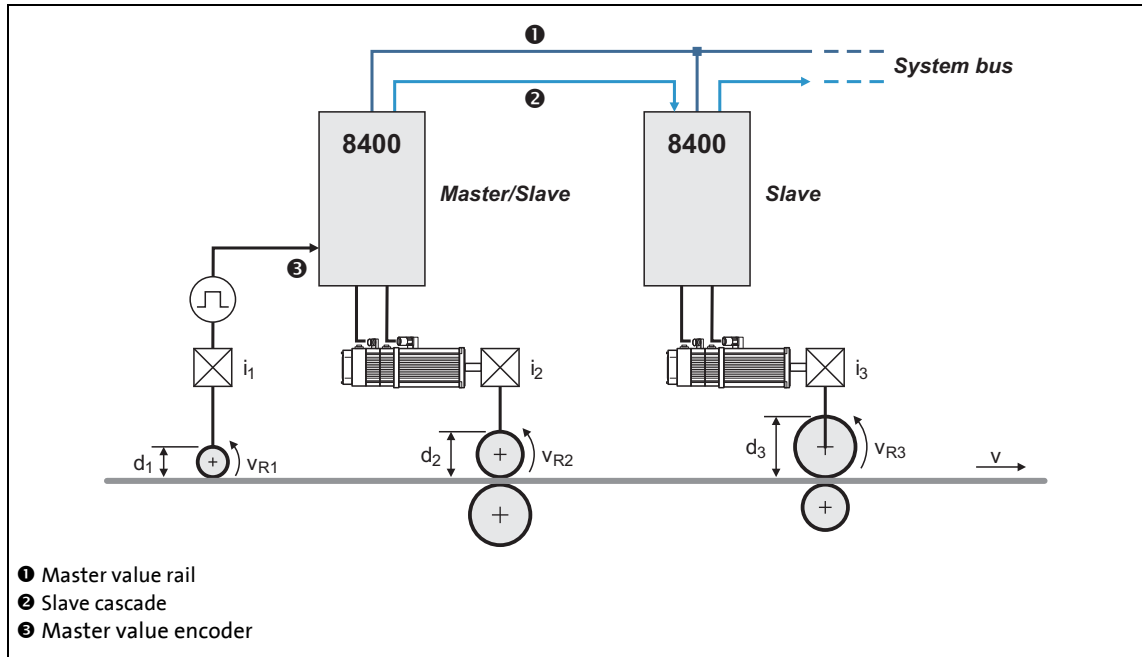
Parameters	Possible settings	Info						
C01067/2	<table border="1"> <tr> <td>0</td> <td>not inverted</td> </tr> <tr> <td>1</td> <td>inverted</td> </tr> <tr> <td>2</td> <td>Automatically from MCK</td> </tr> </table>	0	not inverted	1	inverted	2	Automatically from MCK	Invert. gearbox nSet_v
0	not inverted							
1	inverted							
2	Automatically from MCK							
C01069/1	0 Incr./ms 32767	Ramp SpeedTrim • Lenze setting: 10 incr./ms • From version 12.00.00 onwards, this setting has a resolution increased by the factor 100: A value of 32767 is internally evaluated with 327.67. Hence, the unit is [incr./100 ms].						
C01069/2	0 Incr./ms 32767	Ramp angle compensation • The increments for the angle compensation in case of mark correction are specified in the Lenze setting with downstream 3rd-order polynomial. • Lenze setting: 100 incr./ms						
C01070/1	-134217728 Incr. 134217728	Speed-dependent angle adjustment • Scaling: A revolution is displayed with 65536 increments or steps. • Lenze setting: 0 incr.						
C01071/1	10 Incr. 2147483647	Following error limit • Scaling: A motor revolution is mapped with 65536 increments or steps. • Lenze setting: 32768 incr.						
C01072/1	-20000 20000	Multiplier - angular trimming • Lenze setting: 1						

Parameters	Possible settings	Info	
C01073/1	Setting is bit coded:	setting • Lenze setting: 0x02	
	Bit 0 Setpoint angle without gearbox factor	0 = Evaluation of the setpoint angle with gearbox factor. 1 = Evaluation of the setpoint angle without gearbox factor.	
	Bit 1 Angle correction with polynomial	0 = Angle correction without downstream polynomial. 1 = Angle correction with downstream polynomial.	
	Bit 2 Reserved		
	... Bit 7		
C01074/1	0	16384	Divisor for actual value zero pulse • Number of signals to be received at least until synchronisation gets active. • Initialisation: 0
C01074/2	0	16384	Divisor for setpoint zero pulse • Number of signals to be received at least until synchronisation gets active. • Initialisation: 0
C01075/1			Synchronisation mode - mark correction
	0 Synchronisation inactive		Lenze setting
	1 Permanent synchronisation without enable via the <i>bZeroPulse</i> input • Correction is executed over the shortest possible path.		The synchronisation only takes place after 2 setpoint pulses have been received at the <i>bSetTPReceived</i> input. (required pulse order: set-actual-set)
	2 Permanent synchronisation only with enable via the <i>bZeroPulse</i> input • When <i>bZeroPulse</i> is set to TRUE, a permanent zero pulse/touch probe synchronisation is executed. • Correction is executed over the shortest possible path.		
	10 One-time synchronisation • An angular difference is compensated over the shortest possible path.		
	11 One-time synchronisation • An angle difference is compensated in CW direction.		
	12 One-time synchronisation • An angular difference is compensated in CCW direction.		
	13 One-time synchronisation • An angular difference is compensated over the shortest possible path.		
		Synchronisation takes place after the first setpoint pulse has been received at the <i>bSetTPReceived</i> input and/or actual value pulse at the <i>bActTPReceived</i> input. (Required clock sequence: Set/actual or actual/set)	

18.1.73.1 Master value rail/slave cascade

If there is only one master speed that is transmitted to all slave drives involved, e.g. via system bus (CAN), it is called master value rail.

If a slave drive takes over the master value generation for the following slave, it is called slave cascade.



[18-38] Example: Master value rail/slave cascade

18.1.73.2 Setpoint conditioning with stretch factor and gearbox factor

Stretching factor

The stretch factor is required for the "speed synchronism via master value cascade" mode. It defines the ratio the slave drive is to be running with regard to its master value.

- The stretch factor evaluates the setpoint at the $nSet_v$ input.
- The stretch factor must be selected via the $wGainNum$ and $wGainDenom$ inputs in the form of numerators and denominators.
- The result is provided at the $nSetGain_v$ output.
 - Scaling: $16384 \equiv 15000 \text{ rpm}$

$$nSetGain_v = nSet_v \cdot \frac{wGainNum}{wGainDenom}$$

- If the stretch factor is 1 and the gearbox factors are selected correctly, the circumferential speeds of the rolls for master and slave 1 are identical in the example shown in the illustration [\[18-38\]](#).

Gearbox factor

The gearbox factor defines the gearbox ratio of the drive. Enter the ratio of the drive.

- The gearbox factor evaluates the setpoint at the $nSet_v$ input multiplied by the stretch factor.
- The gearbox factor has to be selected via the inputs $wGearNum$ and $wGearDenom$ in the form of numerators and denominators.
- The bit 0 in [C01073/1](#) serves to simply deactivate the evaluation with the gearbox factor (does not apply to the speed outputs $nSetGain_v$, $nSetGearTrim_v$ and $nSetGearTrim_a$).
- The result is provided at the outputs $nSetGearTrim_v$ and $nSetGearTrim_a$.
 - Scaling $nSetGearTrim_v$: 16384 \equiv 15000 rpm
 - Scaling $nSetGearTrim_a$: 16384 \equiv 100 % reference speed ([C00011](#))

$$nSetGearTrim_v = nSet_v \cdot \text{Stretching factor} \cdot \frac{wGearNum}{wGearDenom}$$

$$nSetGearTrim_v = nSet_v \cdot \frac{wGainNum}{wGainDenom} \cdot \frac{wGearNum}{wGearDenom}$$

$$nSetGearTrim_a = nSet_v \cdot \frac{C00011}{15000} \cdot \frac{wGainNum}{wGainDenom} \cdot \frac{wGearNum}{wGearDenom}$$



Note!

The intermediate results and the result of the evaluation are limited to ± 32767 increments (16 bits).

18.1.73.3 Processing correction values

Speed trimming

Speed trimming enables the connection of correction values, e.g. from a higher-level control loop. This permits an acceleration or deceleration of the drive.

The correction value can either be transmitted as an analog value via the $nSpeedTrim_a$ input or for exact speed trimming as a speed value via the $nSpeedTrim_v$ input.

- Scaling $nSpeedTrim_a$: 16384 \equiv 100 % reference speed ([C00011](#))
- Scaling $nSpeedTrim_v$: 16384 \equiv 15000 rpm

Speed variations of the trimming values are specified via the SpeedTrim ramp ([C01069/1](#)).

Angular trimming

Angular trimming enables the rotor position to be put forward or back with regard to the setpoint (the drive is leading or lagging).

The correction value must have to be defined in [increments] via the *nPositionTrimming* input. It is internally added to the angle setpoint.

- Scaling: A motor revolution is mapped with 65536 increments or steps.
- The maximum angular trimming amounts to $\pm\frac{1}{2}$ motor revolution (± 32767 increments).
- When analog values are selected: 100 % \equiv $\frac{1}{4}$ motor revolution \equiv 16384 increments.
- The setting range can be extended with the multiplier to be set in [C01072/1](#).

Angular offset

The *dnPosOffset_p* input serves to define a permanent angular offset for the setpoint of the drive.

- An adjustment takes place via the following error (*dnDeltaPos_p*) output and via the speed change at the *nSpeedSetOut_v* output.
- Example: A angular offset of 90° is to be set on the load side with a gearbox ratio of 3.8147:

$$\text{dnPosOffset}_p = \frac{90^\circ}{360^\circ} \cdot 65536 \left[\frac{\text{Increments}}{\text{Motor revolution}} \right] \cdot 3.8147 = 62500 \text{ [increments]}$$



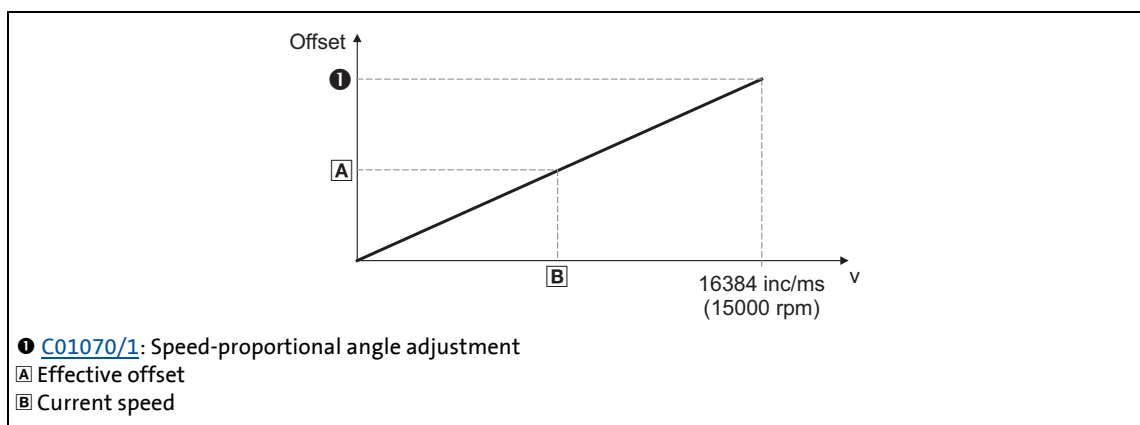
Stop!

Change the angular offset only step by step as the FB does not contain a ram generator for preventing torque impulses.

Speed-proportional angle adjustment

The speed-proportional angle adjustment enables a leading or lagging of the angle with increasing speed and serves to compensate dead times and transmission times.

The correction value selected in [C01070/1](#). in [increments] refers to a speed of 15000 rpm (linear relationship):



[18-39] Connection between offset/speed

18.1.73.4 Synchronising slave drive to master drive

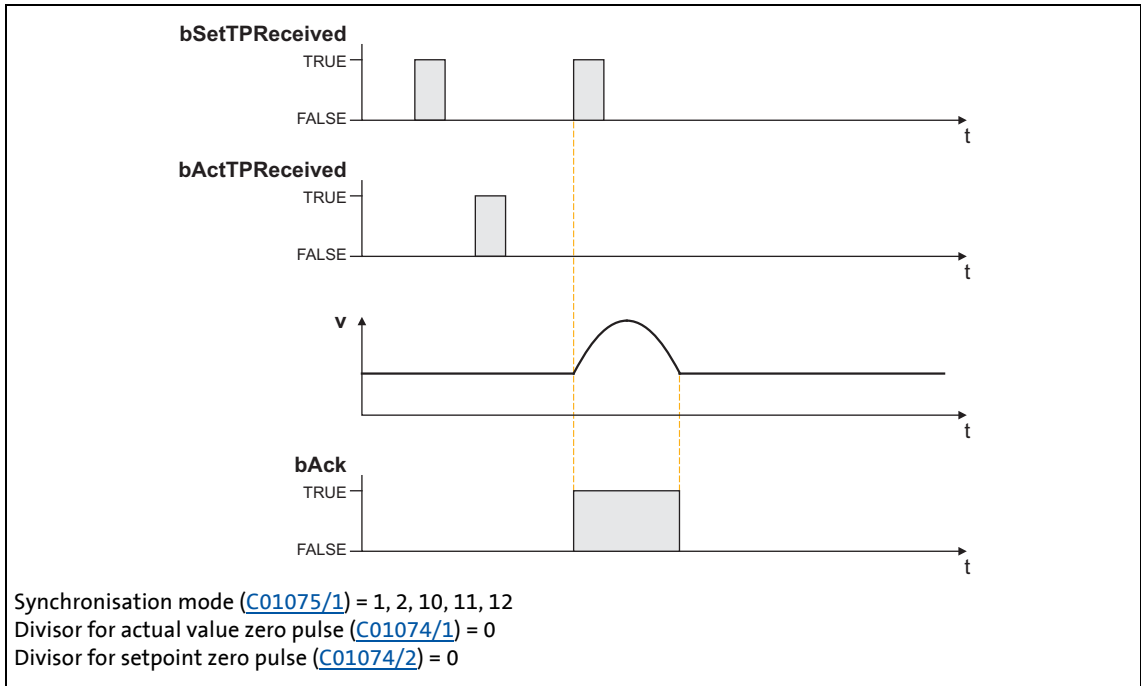
If an angular synchronism of the drives is required (e.g. in printing units), the slave drives must be positioned to the master position since the FB L_DFSET as a master value can only receive and process one relative signal. The FB L_DFSET receives the master value via a real-time capable MotionBus as the system bus (CAN).

For synchronisation purposes, the slave drive is informed cyclically or once about its drive position by a pulse generated by the master drive. This pulse is either the zero pulse of the master feedback or the edge of a touch probe sensor. Moreover, a pulse must be generated by the slave drive. Only if the FB L_DFSET receives both signals, it can execute a synchronisation.

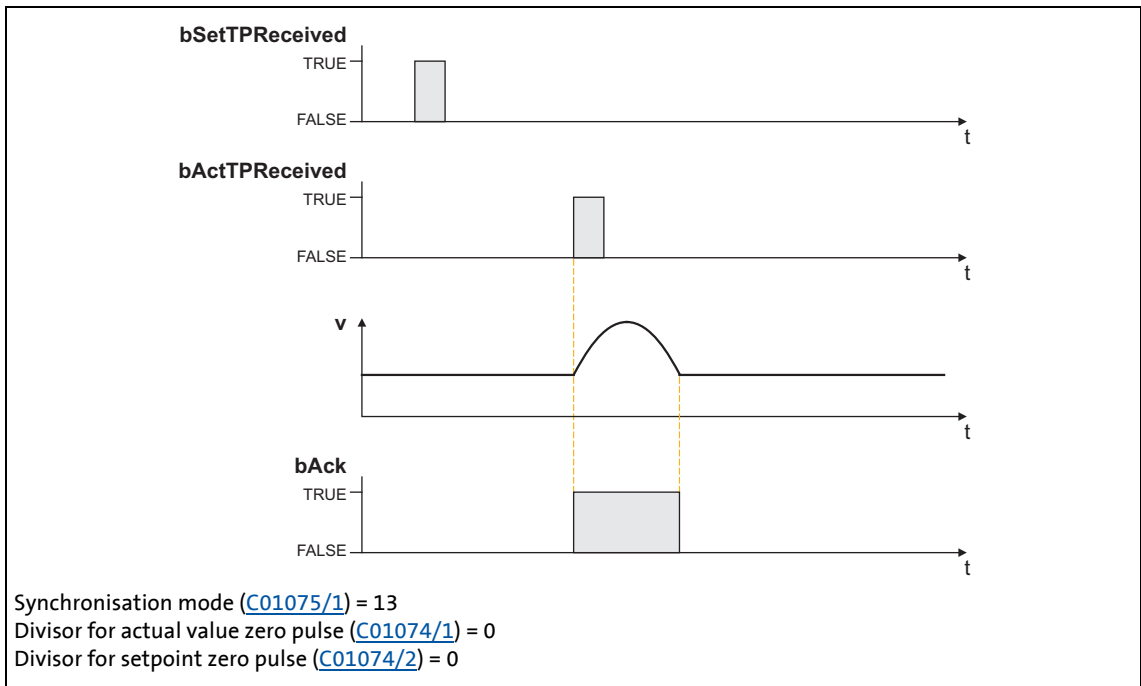
Synchronisation mode - mark correction

For synchronisation, the following modes are available in [C01075/1](#):

Mode	Info
0 Synchronisation inactive	Lenze setting
1 Permanent synchronisation without enable via the <i>bZeroPulse</i> input <ul style="list-style-type: none"> • Correction is executed over the shortest possible path. 	The synchronisation only takes place after 2 setpoint pulses have been received at the <i>bSetTPReceived</i> input. (required pulse order: set-actual-set) • See illustration [18-40] . (1341)
2 Permanent synchronisation only with enable via the <i>bZeroPulse</i> input <ul style="list-style-type: none"> • When <i>bZeroPulse</i> is set to TRUE, a permanent zero pulse/touch probe synchronisation is executed. • Correction is executed over the shortest possible path. 	
10 One-time synchronisation only with enable via the <i>bZeroPulse</i> input <ul style="list-style-type: none"> • An angular difference is compensated over the shortest possible path. 	
11 One-time synchronisation only with enable via the <i>bZeroPulse</i> input <ul style="list-style-type: none"> • An angle difference is compensated in CW direction. 	
12 One-time synchronisation only with enable via the <i>bZeroPulse</i> input <ul style="list-style-type: none"> • An angular difference is compensated in CCW direction. 	
13 One-time synchronisation only with enable via the <i>bZeroPulse</i> input <ul style="list-style-type: none"> • An angular difference is compensated over the shortest possible path. 	



[18-40] Synchronisation process in the modes 1, 2, 10, 11, 12

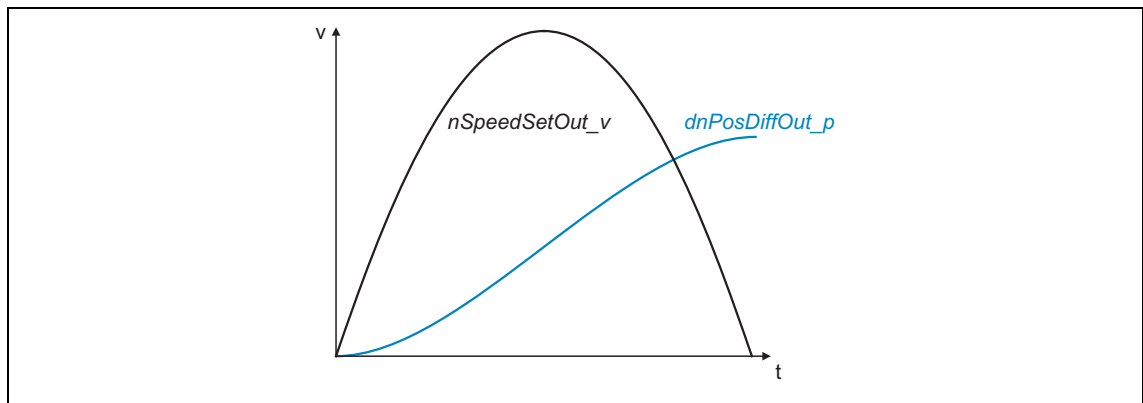


[18-41] Synchronisation process in mode 13

Compensation process

At the input of the second set or actual touch probe pulse, the difference between master and slave position is detected which is then provided via the *nSpeedSetOut_v* speed output and equivalently as position at .

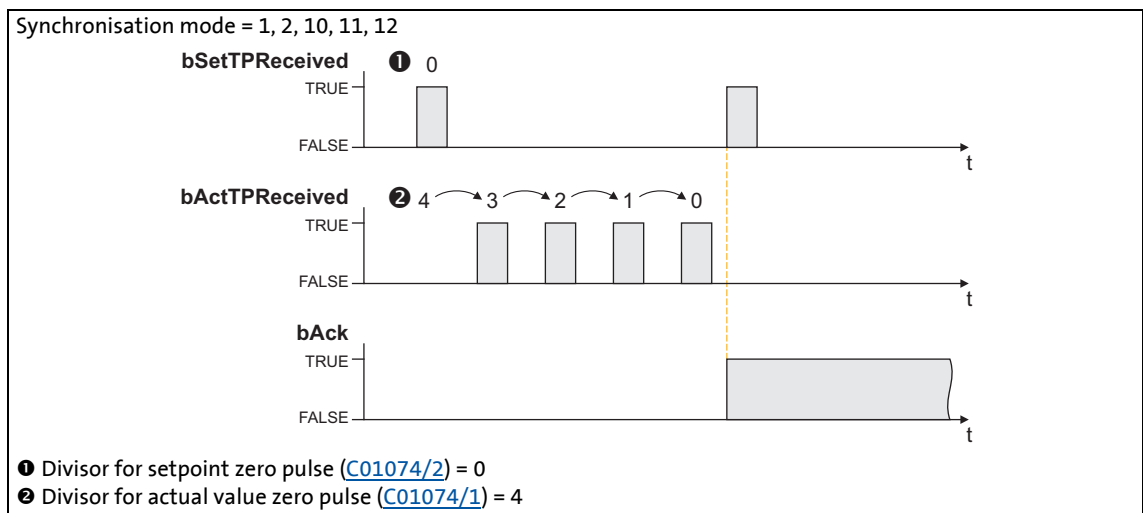
- The compensation process directly takes place by defining the increments/ms set in [C01069/2](#). In order to prevent a jerk in speed, the Lenze setting provides a rounding via polynomial. By resetting bit 1 in [C01073/1](#), this rounding can be deactivated if required.
- The following illustration shows a compensating process after the marks have been detected. The speed is added here as a parabola to the line speed. (The scaling in this diagram does not correspond to reality)



[18-42] Compensating movement

18.1.73.5 Masking out touch probe signals

When passing-through material is used, e.g. printed foil, touch probe initiators may respond several times per cycle. For suppressing such "interference pulses", count values can be selected in [C01074/1](#) and [C01074/2](#) that are decremented when the touch probe pulse has been received. Only when the counter content is "0", the synchronisation will be enabled.



[18-43] Synchronisation process in the modes 1, 2, 10, 11, 12 with a masking out of the touch probe pulses

18.1.73.6 Process monitoring functions

Following error

The *bFollowingErr* status output is set to TRUE if the drive cannot follow its setpoint angle.

- Possible causes:
 - The centrifugal mass is too high for the set acceleration or deceleration time.
 - The torque limit has been reached (load torque > drive torque).
- Remedy: Unload drive or increase torque limit at the servo controller (if the power limits of the inverter have not yet been reached).

The following error is derived from the angular difference of the setpoint angle integrator minus the actual angle integrator. The comparison value (following error limit) can be set in [C01071/1](#).

Angle controller overflow (bPosOverflow = TRUE)

The *bPosOverflow* status output is set to TRUE if the angular difference that can be displayed device-internally has been exceeded. Home positions get lost here.



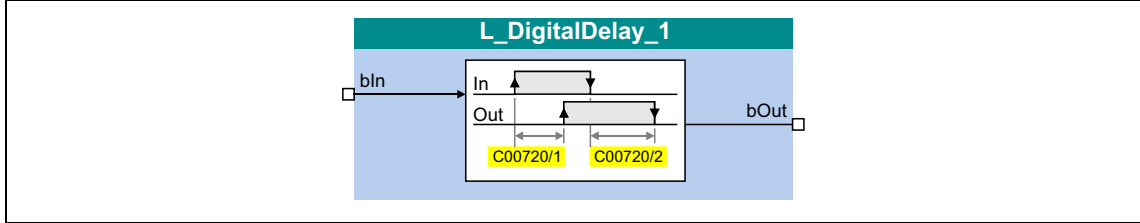
Tip!

If an error response is to be triggered in case of a following error and/or angle controller overflow, connect the corresponding status output with a free *bSetError* input of the SB [LS SetError 2](#) and parameterise the requested error response for this input in [C00581](#).

18.1.74 L_DigitalDelay_1

This FB applies a time delay to binary signals.

- ON and OFF-deceleration can be parameterised separately.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input signal

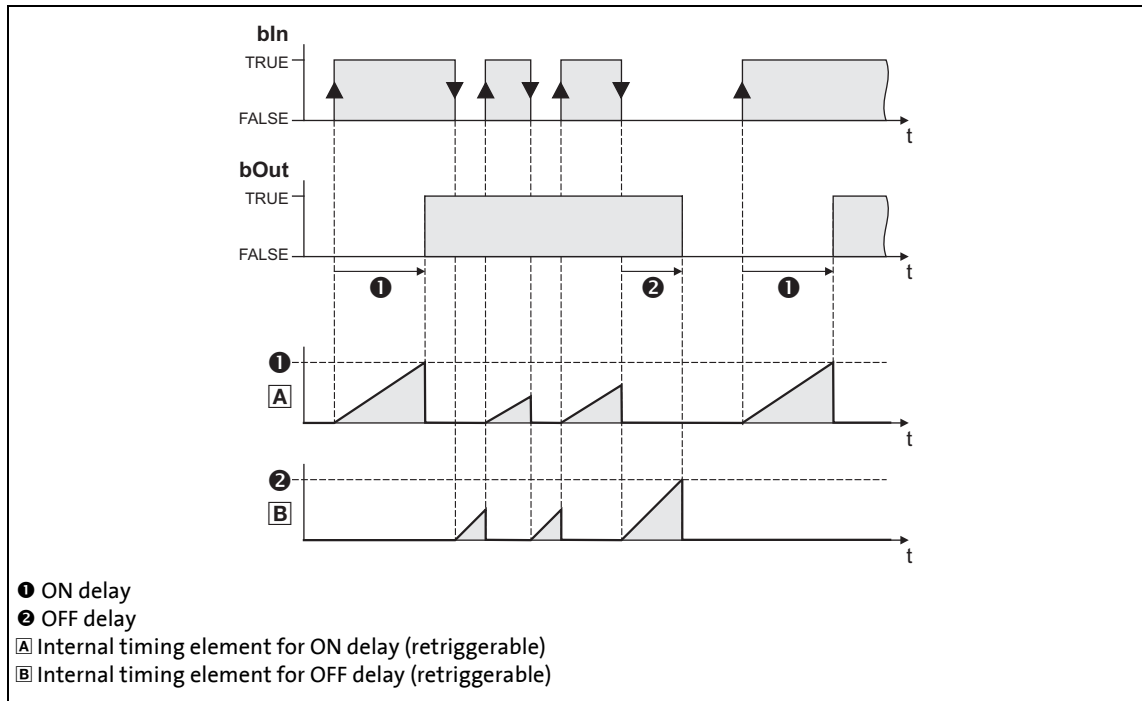
Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal (time-delayed input signal)

Parameters

Parameters	Possible settings			Info
C00720/1	0.000	s	3600.000	ON-deceleration • Lenze setting: 0.000 s
C00720/2	0.000	s	3600.000	OFF-deceleration • Lenze setting: 0.000 s

Function

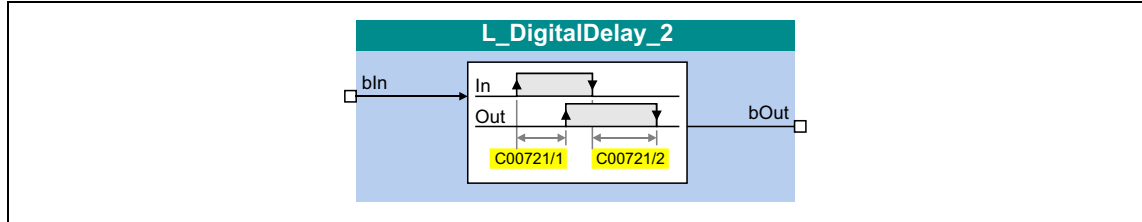


1. A FALSE-TRUE edge at bIn starts the internal timing element for the ON delay.
2. After the defined ON delay, the input signal bIn is output at $bOut$.
3. A TRUE-FALSE edge at bIn starts the internal timing element for the OFF delay.
4. After the defined OFF delay, the input signal bIn is output at $bOut$.

18.1.75 L_DigitalDelay_2

This FB applies a time delay to binary signals.

- ON and OFF-deceleration can be parameterised separately.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal (time-delayed input signal)

Parameters

Parameters	Possible settings			Info
C00721/1	0.000	s	3600.000	ON-deceleration • Lenze setting: 0.000 s
C00721/2	0.000	s	3600.000	OFF-deceleration • Lenze setting: 0.000 s

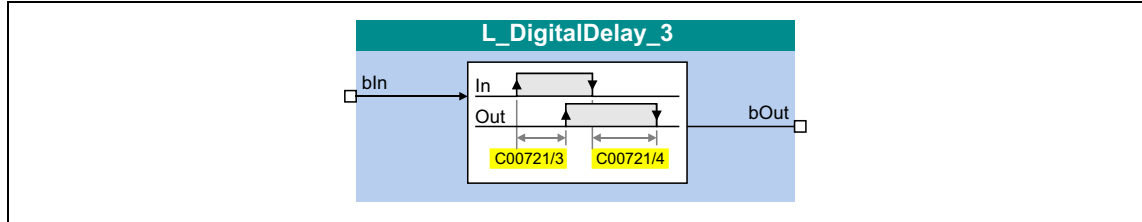


For a detailed description see [L_DigitalDelay_1](#).

18.1.76 L_DigitalDelay_3

This FB applies a time delay to binary signals.

- ON and OFF-deceleration can be parameterised separately.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal (time-delayed input signal)

Parameters

Parameters	Possible settings			Info
C00721/3	0.000	s	3600.000	ON-deceleration • Lenze setting: 0.000 s
C00721/4	0.000	s	3600.000	OFF-deceleration • Lenze setting: 0.000 s

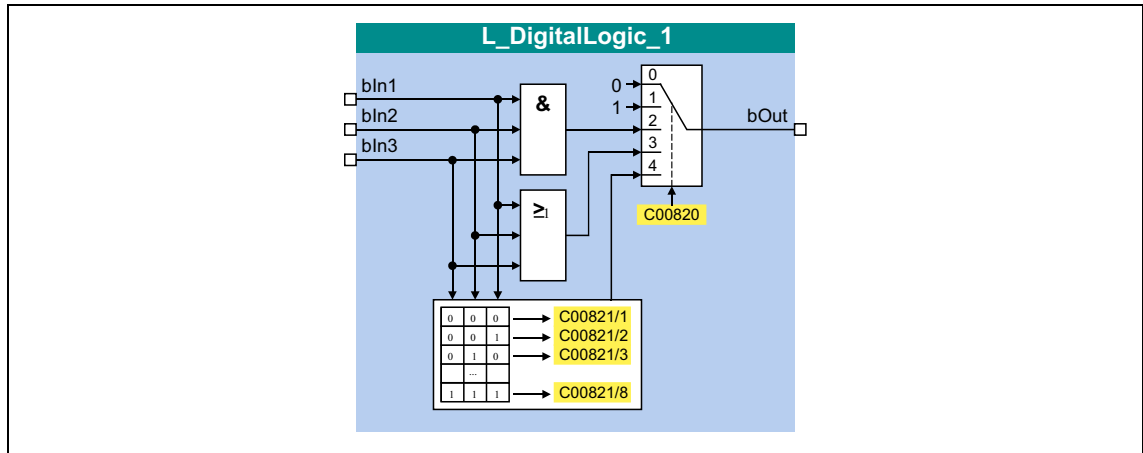


For a detailed description see [L_DigitalDelay_1](#).

18.1.77 L_DigitalLogic_1

This FB provides a binary output signal created by a logic operation of the input signals. Optionally, one of the constant binary values independent from the input signals can be output.

- Output of a constant binary value
- AND operation of the inputs
- OR operation of the inputs
- Output depending on the combination of the input signals



Inputs

Designator	Data type	Information/possible settings
bIn1	BOOL	Input signal 1
bIn2	BOOL	Input signal 2
bIn3	BOOL	Input signal 3

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

Parameters

Parameters	Possible settings	Info
C00820	0 "0"	Function selection Constant value "FALSE"
	1 "1"	Constant value "TRUE"
	2 $bOut = bIn1 \wedge bIn2 \wedge bIn3$	AND operation
	3 $bOut = bIn1 \vee bIn2 \vee bIn3$	OR operation
	4 $bOut = f(\text{truth table})$	The output value depends on the truth table parameterised in C00821/1...8

Parameters	Possible settings	Info				
C00821/1...8	<table border="1"> <tr> <td>0</td> <td>FALSE</td> </tr> <tr> <td>1</td> <td>TRUE</td> </tr> </table>	0	FALSE	1	TRUE	Truth table for function "4: bOut = f (truth table)" <ul style="list-style-type: none"> • Each of the eight possible input combinations can be assigned to the output value FALSE or TRUE. • For an application example see the following section.
0	FALSE					
1	TRUE					

Function "4: bOut = f (Truth table)"

When the function "4: bOut = f (truth table)" is selected in [C00820](#), the output value *bOut* depends on the truth table parameterised in [C00821/1...8](#).

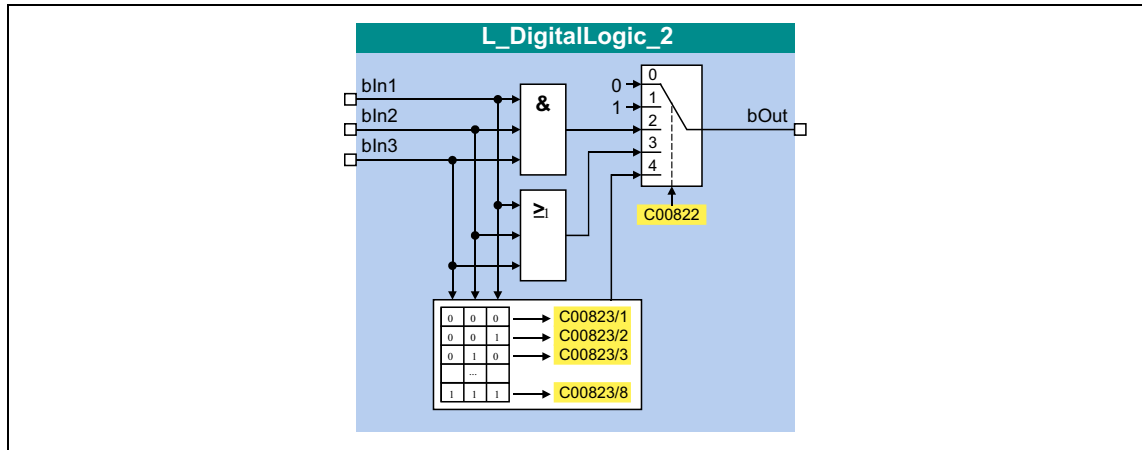
The following table shows which setting may be required in [C00821/1...8](#) to realise the logic operations NAND, NOR, XOR and XNOR:

Input signals			Output <i>bOut</i>	Parameter setting for logic operation:			
<i>bIn3</i>	<i>bIn2</i>	<i>bIn1</i>		NAND	NOR	XOR	XNOR
0	0	0	C00821/1 =	1	1	0	1
0	0	1	C00821/2 =	1	0	1	0
0	1	0	C00821/3 =	1	0	1	0
0	1	1	C00821/4 =	1	0	0	1
1	0	0	C00821/5 =	1	0	1	0
1	0	1	C00821/6 =	1	0	0	1
1	1	0	C00821/7 =	1	0	0	1
1	1	1	C00821/8 =	0	0	0	1

18.1.78 L_DigitalLogic_2

This FB provides a binary output signal created by a logic operation of the input signals. Optionally, one of the constant binary values independent from the input signals can be output.

- Output of a constant binary value
- AND operation of the inputs
- OR operation of the inputs
- Output depending on the combination of the input signals



Inputs

Designator	Data type	Information/possible settings
bIn1	BOOL	Input signal 1
bIn2	BOOL	Input signal 2
bIn3	BOOL	Input signal 3

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

Parameters

Parameters	Possible settings	Info
C00822	0 "0"	Function selection Constant value "FALSE"
	1 "1"	Constant value "TRUE"
	2 $bOut = bIn1 \wedge bIn2 \wedge bIn3$	AND operation
	3 $bOut = bIn1 \vee bIn2 \vee bIn3$	OR operation
	4 $bOut = f$ (truth table)	The output value depends on the truth table parameterised in C00823/1...8

Parameters	Possible settings	Info				
C00823/1...8	<table border="1"> <tr> <td>0</td> <td>FALSE</td> </tr> <tr> <td>1</td> <td>TRUE</td> </tr> </table>	0	FALSE	1	TRUE	Truth table for function "4: bOut = f (truth table)" <ul style="list-style-type: none"> • Each of the eight possible input combinations can be assigned to the output value FALSE or TRUE. • For an application example see the following section.
0	FALSE					
1	TRUE					

Function "4: bOut = f (Truth table)"

When the function "4: bOut = f (truth table)" is selected in [C00822](#), the output value *bOut* depends on the truth table parameterised in [C00823/1...8](#).

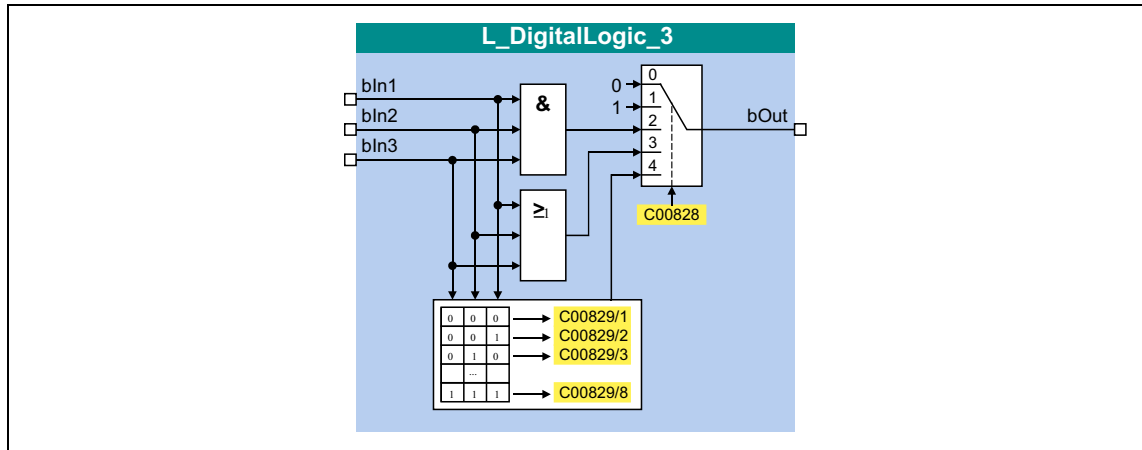
The following table shows which setting may be required in [C00823/1...8](#) to realise the logic operations NAND, NOR, XOR and XNOR:

Input signals			Output <i>bOut</i>	Parameter setting for logic operation:			
<i>bIn3</i>	<i>bIn2</i>	<i>bIn1</i>		NAND	NOR	XOR	XNOR
0	0	0	C00823/1 =	1	1	0	1
0	0	1	C00823/2 =	1	0	1	0
0	1	0	C00823/3 =	1	0	1	0
0	1	1	C00823/4 =	1	0	0	1
1	0	0	C00823/5 =	1	0	1	0
1	0	1	C00823/6 =	1	0	0	1
1	1	0	C00823/7 =	1	0	0	1
1	1	1	C00823/8 =	0	0	0	1

18.1.79 L_DigitalLogic_3

This FB provides a binary output signal created by a logic operation of the input signals. Optionally, one of the constant binary values independent from the input signals can be output.

- Output of a constant binary value
- AND operation of the inputs
- OR operation of the inputs
- Output depending on the combination of the input signals



Inputs

Designator	Data type	Information/possible settings
bIn1	BOOL	Input signal 1
bIn2	BOOL	Input signal 2
bIn3	BOOL	Input signal 3

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

Parameters

Parameters	Possible settings	Info
C00828	0 "0"	Function selection Constant value "FALSE"
	1 "1"	Constant value "TRUE"
	2 $bOut = bIn1 \wedge bIn2 \wedge bIn3$	AND operation
	3 $bOut = bIn1 \vee bIn2 \vee bIn3$	OR operation
	4 $bOut = f(\text{truth table})$	The output value depends on the truth table parameterised in C00829/1...8

Parameters	Possible settings	Info
C00829/1...8		Truth table for function "4: bOut = f (truth table)" <ul style="list-style-type: none"> • Each of the eight possible input combinations can be assigned to the output value FALSE or TRUE. • For an application example see the following section.
	0 FALSE	
	1 TRUE	

Function "4: bOut = f (Truth table)"

When the function "4: bOut = f (truth table)" is selected in [C00828](#), the output value *bOut* depends on the truth table parameterised in [C00829/1...8](#).

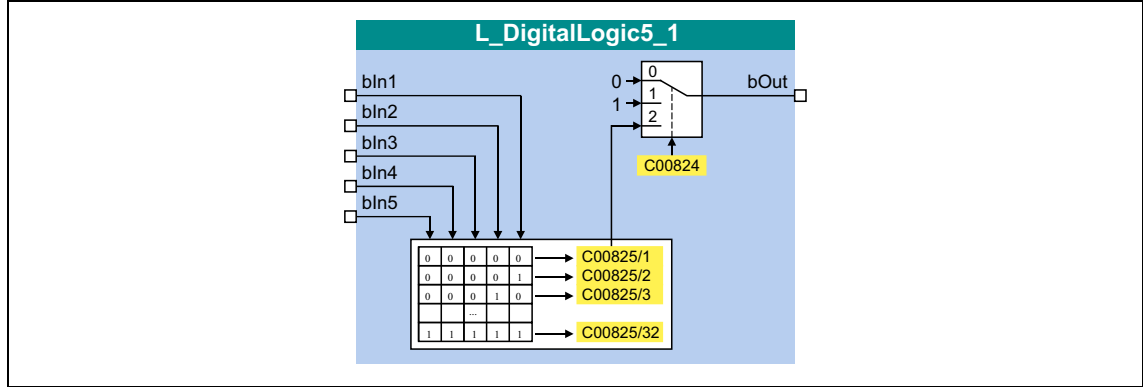
The following table shows which setting may be required in [C00829/1...8](#) to realise the logic operations NAND, NOR, XOR and XNOR:

Input signals			Output <i>bOut</i>	Parameter setting for logic operation:			
<i>bIn3</i>	<i>bIn2</i>	<i>bIn1</i>		NAND	NOR	XOR	XNOR
0	0	0	C00829/1 =	1	1	0	1
0	0	1	C00829/2 =	1	0	1	0
0	1	0	C00829/3 =	1	0	1	0
0	1	1	C00829/4 =	1	0	0	1
1	0	0	C00829/5 =	1	0	1	0
1	0	1	C00829/6 =	1	0	0	1
1	1	0	C00829/7 =	1	0	0	1
1	1	1	C00829/8 =	0	0	0	1

18.1.80 L_DigitalLogic5_1

This FB provides a binary output signal created by a logic operation of the input signals. Optionally, one of the constant binary values independent from the input signals can be output.

- Output of a constant binary value
- Output depending on the combination of the input signals



Inputs

Designator	Data type	Information/possible settings
bln1 ... bln5	BOOL	Input signal 1 ... 5

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

Parameters

Parameters	Possible settings	Info
C00824	0 "0"	Function selection Constant value "FALSE"
	1 "1"	Constant value "TRUE"
	2 bOut = f (truth table)	The output value depends on the parameterised truth table
	see truth table	Truth table Each of the 32 possible input combinations can be assigned to the output value FALSE or TRUE.

Truth table for C00824 = 4

bln5	bln4	bln3	bln2	bln1	Output signal bOut
FALSE	FALSE	FALSE	FALSE	FALSE	C00825/1 (FALSE or TRUE)
FALSE	FALSE	FALSE	FALSE	TRUE	C00825/2 (FALSE or TRUE)

bIn5	bIn4	bIn3	bIn2	bIn1	Output signal bOut
FALSE	FALSE	FALSE	TRUE	FALSE	C00825/3 (FALSE or TRUE)
...					C00825/... (FALSE or TRUE)
TRUE	TRUE	TRUE	FALSE	TRUE	C00825/30 (FALSE or TRUE)
TRUE	TRUE	TRUE	TRUE	FALSE	C00825/31 (FALSE or TRUE)
TRUE	TRUE	TRUE	TRUE	TRUE	C00825/32 (FALSE or TRUE)

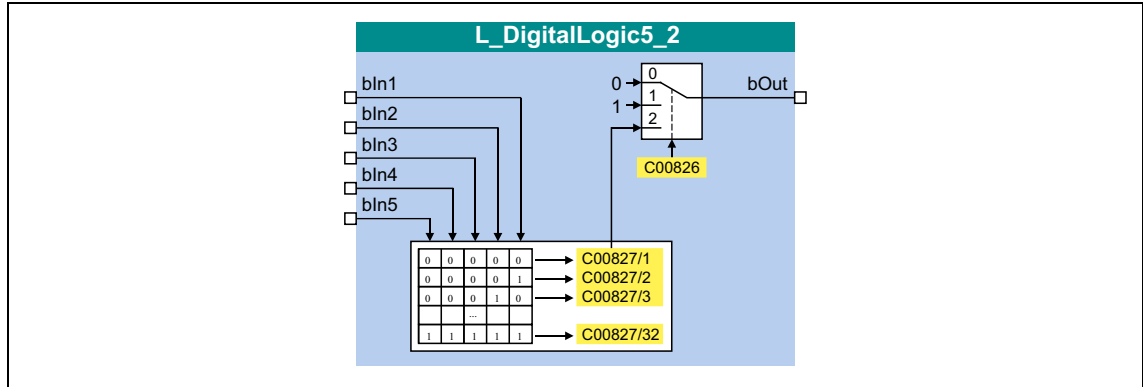
Example: If in case of the signal combination $bIn1 = \text{TRUE}$, $bIn2 = \text{FALSE}$, $bIn3 = \text{TRUE}$, $bIn4 = \text{TRUE}$ and $bIn5 = \text{TRUE}$, the output signal $bOut$ is to be = TRUE, [C00825/30](#) must be set to "TRUE":

bIn5	bIn4	bIn3	bIn2	bIn1	Output signal bOut
TRUE	TRUE	TRUE	FALSE	TRUE	C00825/30 (TRUE)

18.1.81 L_DigitalLogic5_2

This FB provides a binary output signal created by a logic operation of the input signals. Optionally, one of the constant binary values independent from the input signals can be output.

- Output of a constant binary value
- Output depending on the combination of the input signals



Inputs

Designator	Data type	Information/possible settings
bIn1 ... bIn5	BOOL	Input signal 1 ... 5

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

Parameters

Parameters	Possible settings	Info
C00826	0 "0"	Function selection Constant value "FALSE"
	1 "1"	Constant value "TRUE"
	2 bOut = f (truth table)	The output value depends on the parameterised truth table
C00827	see truth table	Truth table Each of the 32 possible input combinations can be assigned to the output value FALSE or TRUE.

Truth table for C00826 = 4

bIn5	bIn4	bIn3	bIn2	bIn1	Output signal bOut
FALSE	FALSE	FALSE	FALSE	FALSE	C00827/1 (FALSE or TRUE)
FALSE	FALSE	FALSE	FALSE	TRUE	C00827/2 (FALSE or TRUE)

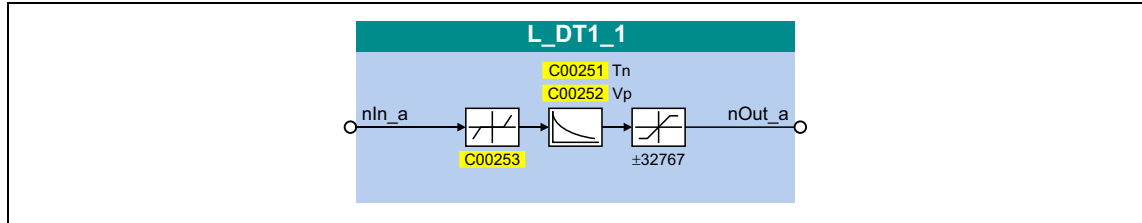
bIn5	bIn4	bIn3	bIn2	bIn1	Output signal bOut
FALSE	FALSE	FALSE	TRUE	FALSE	C00827/3 (FALSE or TRUE)
...					C00827/... (FALSE or TRUE)
TRUE	TRUE	TRUE	FALSE	TRUE	C00827/30 (FALSE or TRUE)
TRUE	TRUE	TRUE	TRUE	FALSE	C00827/31 (FALSE or TRUE)
TRUE	TRUE	TRUE	TRUE	TRUE	C00827/32 (FALSE or TRUE)

Example: If in case of the signal combination $bIn1 = \text{TRUE}$, $bIn2 = \text{FALSE}$, $bIn3 = \text{TRUE}$, $bIn4 = \text{TRUE}$ and $bIn5 = \text{TRUE}$, the output signal $bOut$ is to be = TRUE, [C00827/30](#) must be set to "TRUE":

bIn5	bIn4	bIn3	bIn2	bIn1	Output signal bOut
TRUE	TRUE	TRUE	FALSE	TRUE	C00827/30 (TRUE)

18.1.82 L_DT1_1

This FB differentiates signals. The function block can be used for acceleration feedforward (dv/dt), for example.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

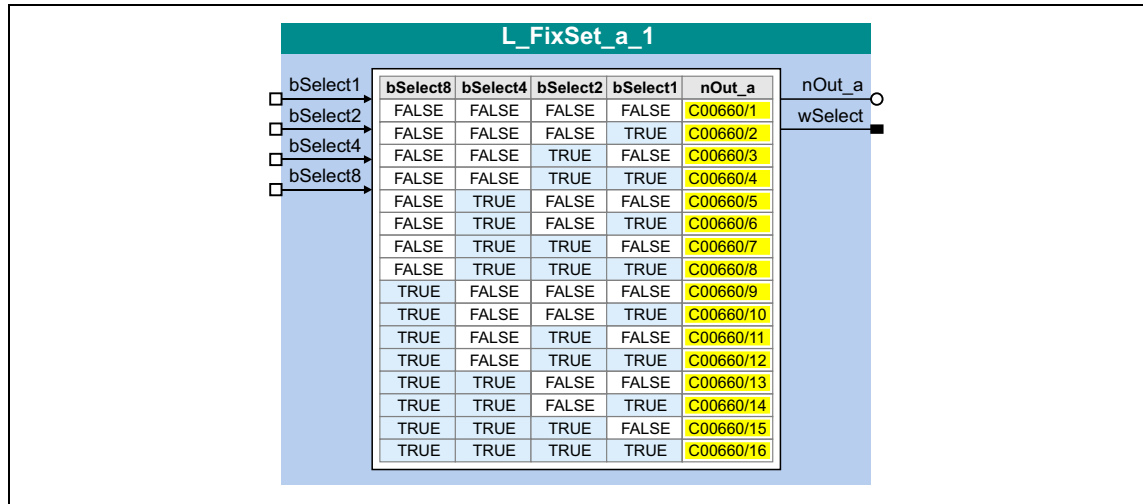
Designator	Data type	Value/meaning
nOut_a	INT	Output signal

Parameters

Parameters	Possible settings			Info
C00251	10	ms	5000	Time constant Tn • Lenze setting: 1000 ms
C00252	-320.00		320.00	Gain factor Vp • Lenze setting: 1.00
C00253	Note: The most significant bit determines the sign of the value, the remaining bits determine the numerical value.			Selection of sensitivity • Depending on the selection, the number of indicated higher-order bits is evaluated. • Lenze setting: 15 bits
	1	15 bits		Bit 0 ... bit 14 are evaluated
	2	14 bits		Bit 0 ... bit 13 are evaluated
	3	13 bits		Bit 0 ... bit 12 are evaluated
	4	12 bits		Bit 0 ... bit 11 are evaluated
	5	11 Bit		Bit 0 ... bit 10 are evaluated
	6	10 Bit		Bit 0 ... bit 9 are evaluated
	7	9 Bit		Bit 0 ... bit 8 are evaluated

18.1.83 L_FixSet_a_1

This FB outputs one of 16 parameterisable analog signals. Binary coded selection of the "fixed value" to be output via the four selection inputs.



Inputs

Designator	Data type	Information/possible settings
bSelect1 ... bSelect8	BOOL	Binary coded selection of the fixed value to be output • See truth table displayed in the FB above.

Outputs

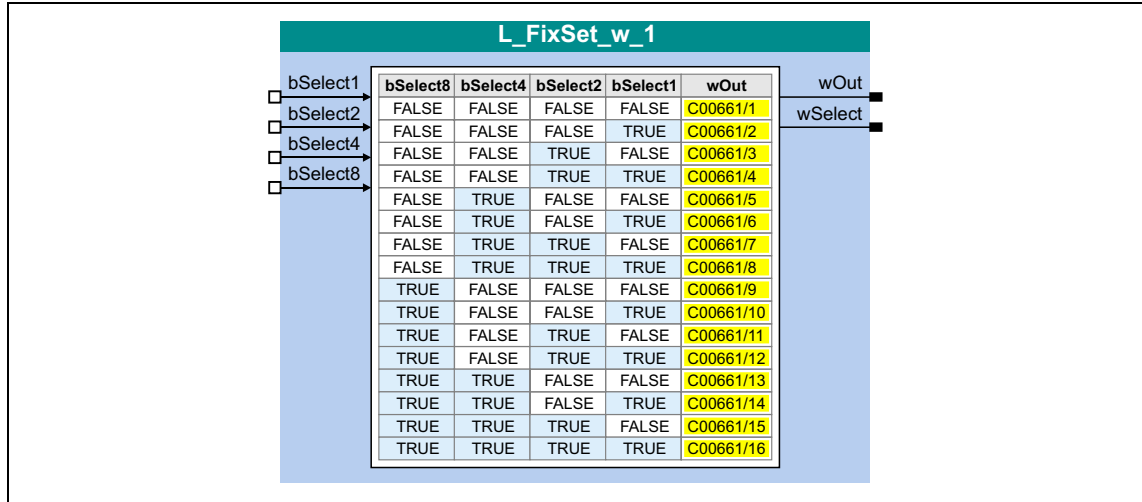
Designator	Data type	Value/meaning
nOut_a	INT	Output of the selected fixed value
wSelect	WORD	Current selection (0 ... 15)

Parameters

Parameters	Possible settings			Info
C00660/1...16	-199.99	%	199.99	Fixed value 0 ... 15 • Lenze setting: 0.00 %

18.1.84 L_FixSet_w_1

This FB outputs one of 16 parameterisable data words. Binary coded selection of the "fixed value" to be output via the four selection inputs.



Inputs

Designator	Data type	Information/possible settings
bSelect1 ... bSelect8	BOOL	Binary coded selection of the fixed value to be output • See truth table displayed in the FB above.

Outputs

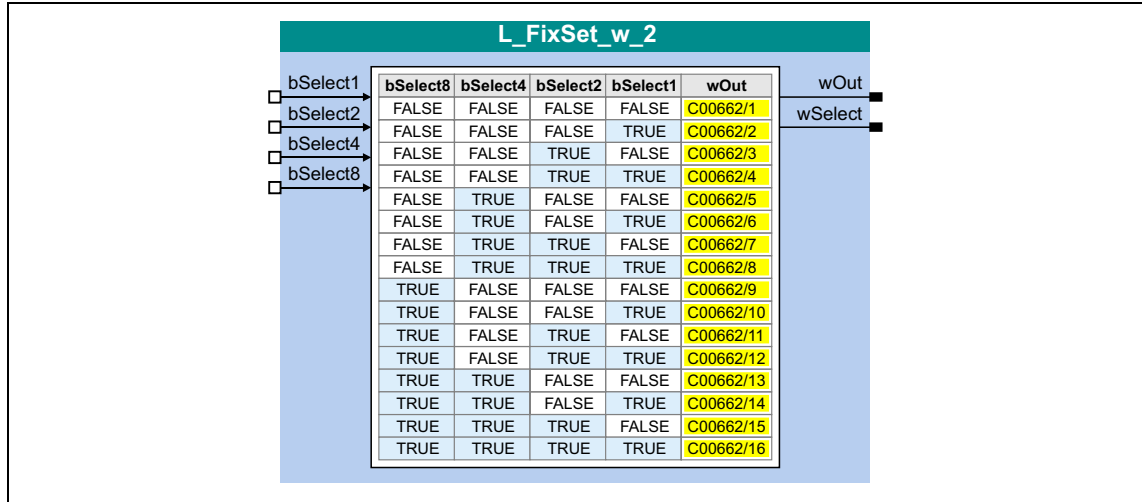
Designator	Data type	Value/meaning
wOut	WORD	Output of the selected fixed value
wSelect	WORD	Current selection (0 ... 15)

Parameters

Parameters	Possible settings	Info
C00661/1...16	0	65535 Fixed values 0 ... 15 • Lenze setting: 0

18.1.85 L_FixSet_w_2

This FB outputs one of 16 parameterisable data words. Binary coded selection of the "fixed value" to be output via the four selection inputs.



Inputs

Designator	Data type	Information/possible settings
bSelect1 ... bSelect8	BOOL	Binary coded selection of the fixed value to be output • See truth table displayed in the FB above.

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output of the selected fixed value
wSelect	WORD	Current selection (0 ... 15)

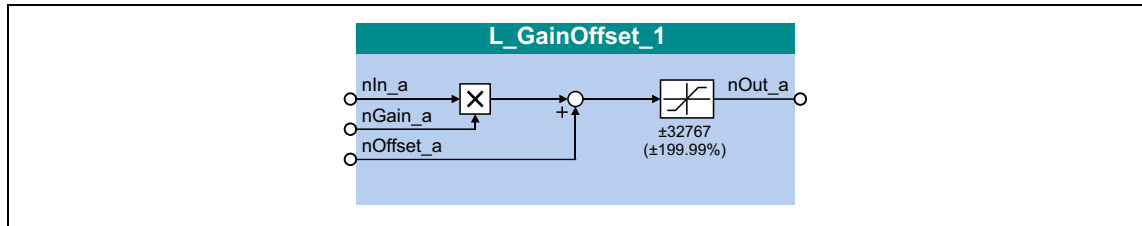
Parameters

Parameters	Possible settings	Info
C00662/1...16	0	65535 Fixed values 0 ... 15 • Lenze setting: 0

18.1.86 L_GainOffset_1

This FB can amplify an analog input signal and add an offset to it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 \equiv 100 %
nGain_a	INT	Gain factor • Scaling: 16384 \equiv 100 % • 199.99 % \approx 2
nOffset_a	INT	Offset • Scaling: 16384 \equiv 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

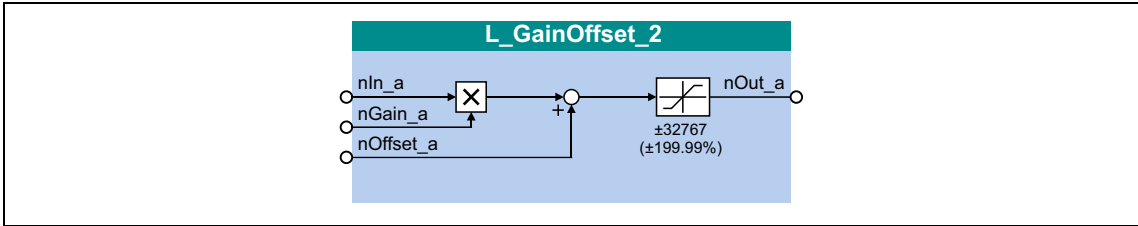
Function

$$nOut_a = (nIn_a \cdot \text{Gain factor}) + \text{Offset}$$

18.1.87 L_GainOffset_2

This FB can amplify an analog input signal and add an offset to it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 \equiv 100 %
nGain_a	INT	Gain factor • Scaling: 16384 \equiv 100 % • 199.99 % \approx 2
nOffset_a	INT	Offset • Scaling: 16384 \equiv 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

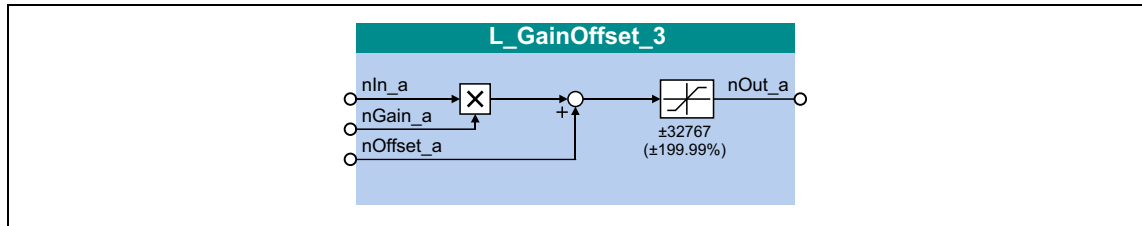
Function

$$nOut_a = (nIn_a \cdot \text{Gain factor}) + \text{Offset}$$

18.1.88 L_GainOffset_3

This FB can amplify an analog input signal and add an offset to it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 \equiv 100 %
nGain_a	INT	Gain factor • Scaling: 16384 \equiv 100 % • 199.99 % \approx 2
nOffset_a	INT	Offset • Scaling: 16384 \equiv 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

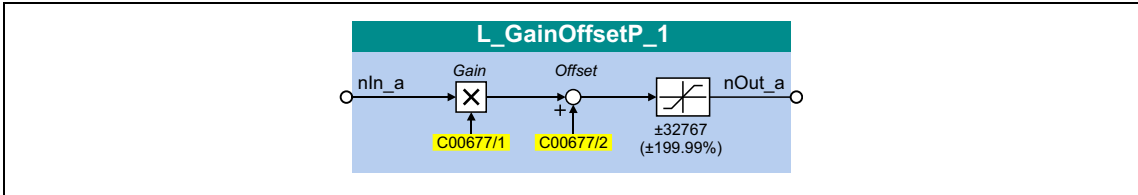
Function

$$nOut_a = (nIn_a \cdot \text{Gain factor}) + \text{Offset}$$

18.1.89 L_GainOffsetP_1

This FB can amplify an analog input signal and add an offset to it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to ±199.99 %.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 ≙ 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199.99 %

Parameters

Parameters	Possible settings			Info
C00677/1	-199.99	%	199.99	Gain factor • Lenze setting: 100.00 % • 199.99 % ≈2
C00677/2	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

Function

$$nOut_a = (nIn_a \cdot \text{Gain factor}) + \text{Offset}$$

18.1.90 L_GainOffsetP_2

This FB can amplify an analog input signal and add an offset to it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.

**Inputs**

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 \equiv 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

Parameters

Parameters	Possible settings			Info
C00677/3	-199.99	%	199.99	Gain factor • Lenze setting: 100.00 % • 199.99 % \approx 2
C00677/4	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

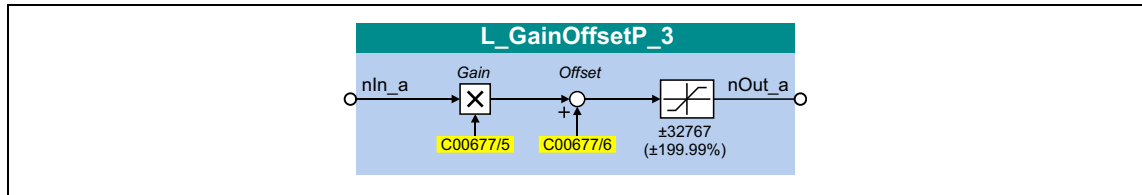
Function

$$nOut_a = (nIn_a \cdot \text{Gain factor}) + \text{Offset}$$

18.1.91 L_GainOffsetP_3

This FB can amplify an analog input signal and add an offset to it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 \equiv 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

Parameters

Parameters	Possible settings			Info
C00677/5	-199.99	%	199.99	Gain factor • Lenze setting: 100.00 % • 199.99 % \approx 2
C00677/6	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

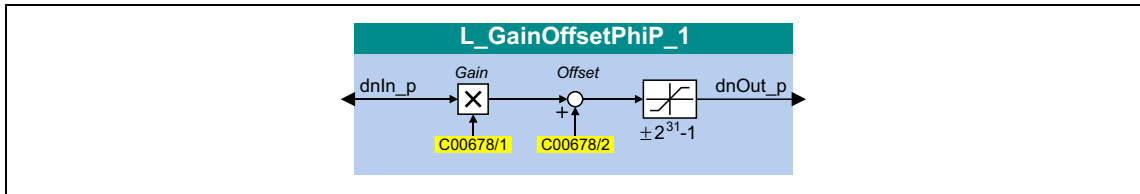
Function

$$nOut_a = (nIn_a \cdot \text{Gain factor}) + \text{Offset}$$

18.1.92 L_GainOffsetPhiP_1

This FB can amplify an angle signal and add an offset to it afterwards.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via parameters.
- The value provided at the *dnOut_p* output is internally limited to $\pm 2^{31}-1$.



Inputs

Designator	Data type	Information/possible settings
dnIn_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

Parameters

Parameters	Possible settings			Info
C00678/1	-2147483647	Incr.	2147483647	Offset • Lenze setting: 0 incr.
C00678/2	-2147483647		2147483647	Gain factor • Lenze setting: 65536

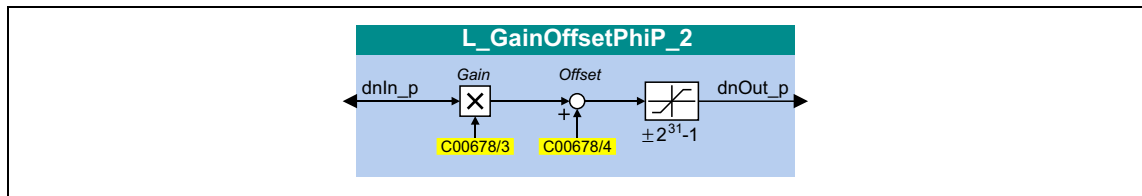
Function

$$dnOut_p = (dnIn_p \cdot \text{Gain factor}) + \text{Offset}$$

18.1.93 L_GainOffsetPhiP_2

This FB can amplify an angle signal and add an offset to it afterwards.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via parameters.
- The value provided at the *dnOut_p* output is internally limited to $\pm 2^{31}-1$.



Inputs

Designator	Data type	Information/possible settings
dnIn_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

Parameters

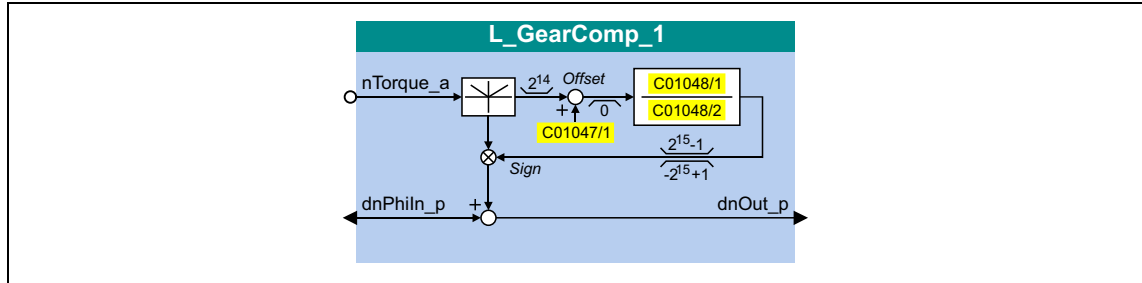
Parameters	Possible settings			Info
C00678/3	-2147483647	Incr.	2147483647	Offset • Lenze setting: 0 incr.
C00678/4	-2147483647		2147483647	Gain factor • Lenze setting: 65536

Function

$$dnOut_p = (dnIn_p \cdot \text{Gain factor}) + \text{Offset}$$

18.1.94 L_GearComp_1

This FB is used for dynamic compensation of elasticities in the drive train that arise, e.g. by elastic coupling of speed reduction gearboxes or long transmission shafts.



Inputs

Designator	Data type	Information/possible settings
nTorque_a	INT	Torque demand • 16384 ≙ 100 %
dnPhiIn_p	DINT	Angle setpoint • 65536 increments ≙ 1 motor revolution

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Corrected angle setpoint • 65536 increments ≙ 1 motor revolution

Parameters

Parameters	Possible settings			Info
C01047/1	-16383		16383	Offset • Static torque offset • Lenze setting: 0
C01048/1	-32767		32767	Counter • Elastic constant • Lenze setting: 1
C01048/2	1		32767	Denominator • Elastic constant • Lenze setting: 1

Function

Elasticity is a measure of how far the load have moved from the ideal setpoint position at motor standstill due to mechanical force effect.

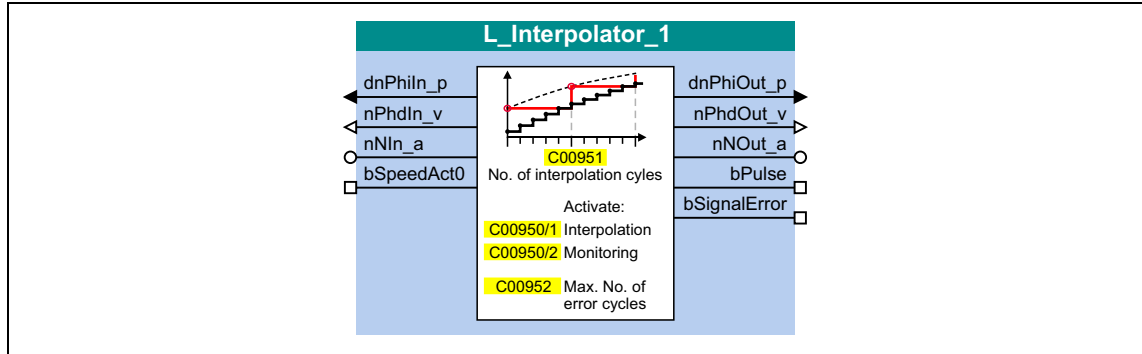
- Example: "Hoist":
Due to elasticity of the mechanical transmission elements, the real position of the "hook" varies in loaded and unloaded status.
- In order to compensate errors caused by elasticity, the actual torque at the *nTorque_a* input is applied. This torque is a measure for the current load.
- The multiplication by an elasticity factor results in an angle compensation value which is added to the setpoint angle correctly signed depending on the direction of the torque. This serves to correct the false position of the load.
- The elasticity factor is selected in the form of numerator and denominator via [C01048/1](#) and [C01048/2](#).
- [C01047/1](#) serves to select a static correction value (offset).

**Note!**

Please note that the compensation may be reversed in case of a signed numerator/denominator selection of the elasticity factor!

18.1.95 L_Interpolator_1

This FB interpolates a position setpoint and/or an analog value e.g. to compensate for larger bus transmission cycles or to continue signal characteristics if data telegrams are missing.



Inputs

Designator	Data type	Information/possible settings
dnPhIn_p	DINT	Position setpoint <ul style="list-style-type: none"> Is interpolated and completed when signal interpolation is activated.
nPhdIn_v	INT	Angular velocity <ul style="list-style-type: none"> Is only passed through to the <i>nPhdOut_v</i> output.
nNIn_a	INT	Analog value <ul style="list-style-type: none"> Is interpolated when signal interpolation is activated.
bSpeedAct0	BOOL	Input for detecting the "Current speed is zero" status <ul style="list-style-type: none"> This status signal needs to be transmitted by the setpoint source to ensure trouble-free operation.
		TRUE Current speed is zero.

Outputs

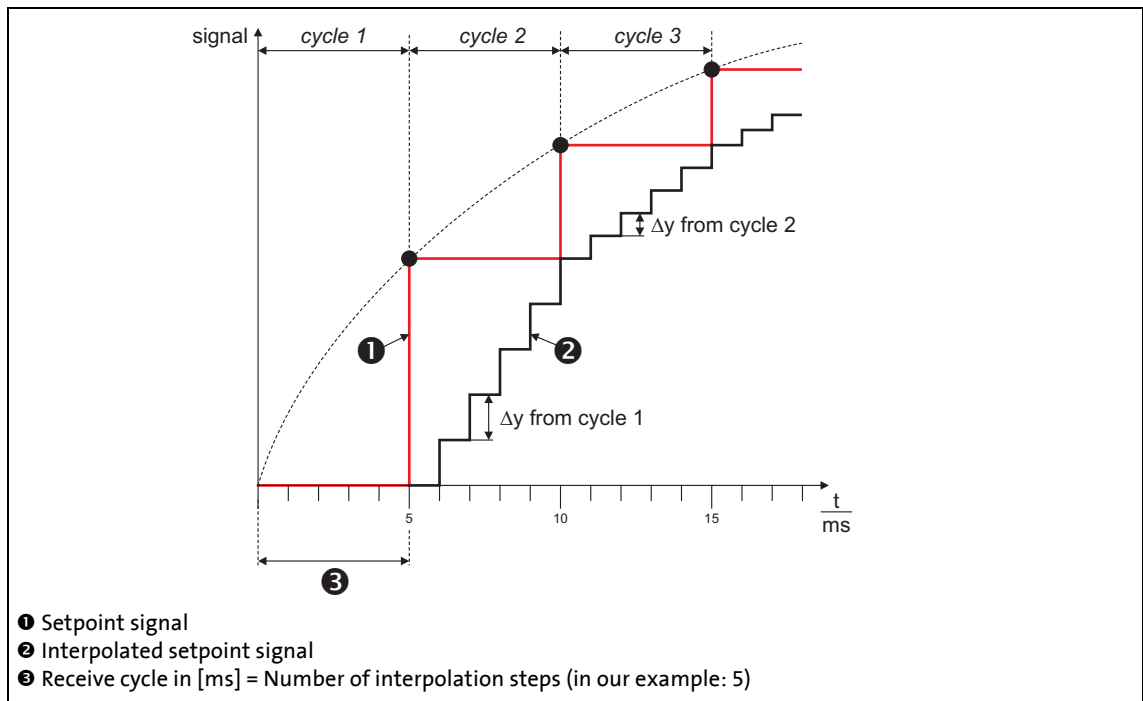
Designator	Data type	Value/meaning
dnPhiOut_p	DINT	Output of the <i>dnPhIn_p</i> position setpoint which, if applicable, has been interpolated and completed
nPhdOut_v	INT	Output of the <i>nPhdIn_v</i> angular velocity
nNOut_a	INT	Output of the <i>nNIn_a</i> analog value which, if applicable, has been interpolated
bPulse	BOOL	"Input values have been accepted" status signal
		TRUE The input values have been accepted during this cycle.
bSignalError	BOOL	"Signal error" status signal <ul style="list-style-type: none"> Only if signal monitoring is active (C00950/2 = "1: On").
		TRUE The number of missing data telegrams has exceeded the limit value parameterised in C00952 .

Parameters

Parameters	Possible settings	Info				
C00950/1	<table border="1"> <tr> <td>0</td> <td>Off</td> </tr> <tr> <td>1</td> <td>On</td> </tr> </table>	0	Off	1	On	Signal interpolation of the <i>dnPhIn_p</i> and <i>nNIn_a</i> input signals • Lenze setting: Off ▶ Signal interpolation (📖 1373)
0	Off					
1	On					
C00950/2	<table border="1"> <tr> <td>0</td> <td>Off</td> </tr> <tr> <td>1</td> <td>On</td> </tr> </table>	0	Off	1	On	Signal monitoring of the <i>dnPhIn_p</i> input signal • Lenze setting: Off ▶ Signal monitoring (📖 1374)
0	Off					
1	On					
C00951	1	65535 Number of interpolation steps • Corresponds to the receive cycle of the data telegrams in [ms]. • Lenze setting: 1				
C00952	0	65535 Limit value for missing data telegrams • Lenze setting: 5 ▶ Signal monitoring (📖 1374)				
C00953	0	100 Speed-up • Limitation of the amount of correction increments per cycle • Scaling: 1 increment/ms \equiv 0.9155 rpm				

18.1.95.1 Signal interpolation

If signal interpolation is active ([C00950/1](#) = 1), the output signal will not reach the level of the corresponding input signal until all interpolation steps parameterised in [C00951](#) have been performed:



[18-44] Signal characteristic

**Note!**

Do not change the number of interpolation steps during operation. Otherwise the interpolation becomes inaccurate.

18.1.95.2 Signal monitoring

If signal monitoring is active ([C00950/2](#) = 1), the signal characteristic of the *dnPhIn_p* input signal is continued even if the data telegram is missing (setpoint selection via CAN).

Monitoring is performed on the basis of the *dnPhIn_p* position setpoint and the *bSpeedAct0* status signal:

- If the *dnPhIn_p* position setpoint remains the same in the next device cycle, it is either because the speed is zero or because no data telegram has been received.
- The evaluation of the *bSpeedAct0* status signal gives information about which reason applies. This status signal needs to be transmitted by the setpoint source to ensure trouble-free operation:
 - *bSpeedAct0* = FALSE means that the speed is not zero, so an error is assumed: The signal characteristic of the *dnPhIn_p* input signal is completed (the current slope is retained).
 - *bSpeedAct0* = TRUE means that the speed is zero, so the unchanged position setpoint is not treated as an error.
- If the number of missing data telegrams exceeds the limit value parameterised in [C00952](#), the *bSignalError* output is set to TRUE.
 - The *bSignalError* output is automatically reset to FALSE if correct signals are detected at *dnPhIn_p* and *bSpeedAct0* again.

**Note!**

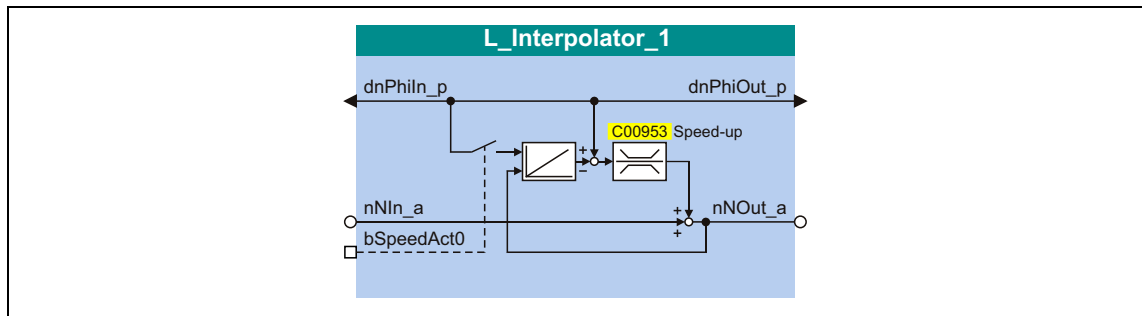
The *nNIn_a* analog value is not monitored!

18.1.95.3 Angle correction in case of transmission errors

If an angular offset between master and slave is caused due to transmission errors (missing data telegrams), it will be corrected by a catch-up function in the FB. For this purpose, the following connections and parameter settings are required for the slave at the FB **L_Interpolator_1**:

1. The master angle of the master is connected to the *dnPhiln_p* input.
2. The speed signal of the master is connected to the *nNIn_a* input.
3. The *nNOut_a* output is connected to the *nSet_v* input of the FB **L_DFSET_1**.

The following illustration shows the principle of the catch-up function in the FB **L_Interpolator_1**:



[18-45] Principle of the catch-up function

The speed signal at *nNIn_a* is provided almost 1:1 at the *nNOut_a* output. In case of a telegram error, a correction value can be added to the signal. This correction value results from the subtraction of the integrated speed signal from the position value applied at *dnPhiln_p*.

If, for example, a data telegram should fail, the input values remain constant for one program cycle. During the next cycle, the correct position and the correct speed are restored.

"Holding" the position at *dnPhiln_p* results in a difference between the position values at *dnPhiln_p* and at the output of the integrator. This difference is added to the *nNOut_a* output signal.

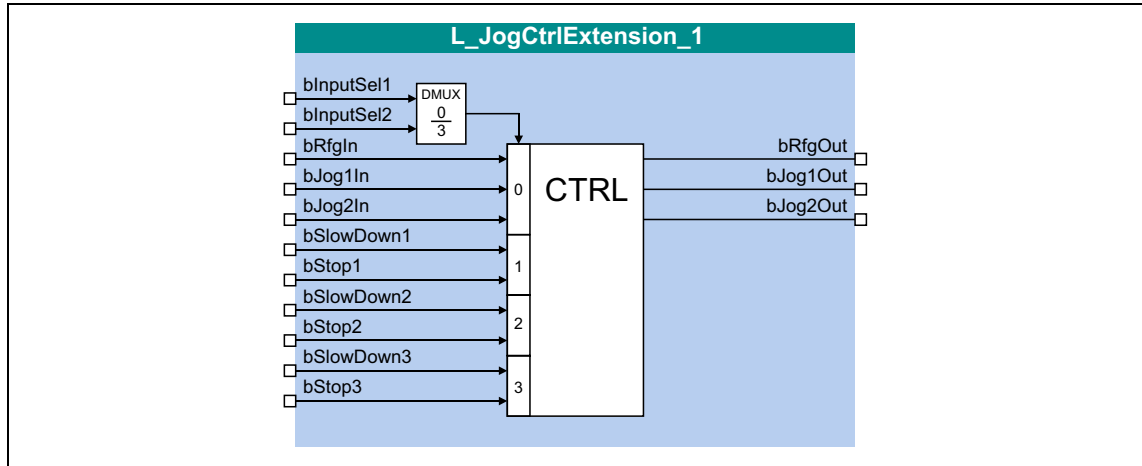
In order that this angle correction does not lead to a strong jerk in the master value, the amount of correction increments is limited per cycle (catch-up cycle) using **C00953**. A typical correction value is for instance 10 increments/ms.

When the controller is inhibited, the integrator is to be loaded with the position value pending at *dnPhiln_p* by setting the *bSpeedAct0* input to TRUE. When the controller is enabled, the *nNOut_a* speed signal is integrated.

18.1.96 L_JogCtrlExtension_1

This FB can be connected upstream to the [L_NSet](#) ramp function generator/setpoint generator to implement a switch-off positioning at limit switch.

- Detailed information on this operating mode can be found in the description
 - ▶ [TA "Switch-off positioning"](#) (☐ 433).



Inputs

Designator	Data type	Information/possible settings
bInputSel1 bInputSel2	BOOL	Activation of the <i>bSlowDown1/bStop1</i> , <i>bSlowDown2/bStop2</i> and <i>bSlowDown3/bStop3</i> signal pairs according to the Truth table
bRfgIn	BOOL	Ramping down of the setpoint generator in the downstream L_NSet FB according to the Truth table
bJog1In bJog2In	BOOL	Selection inputs for setting fixed speeds in the setpoint generator <ul style="list-style-type: none"> • If the pre-switch off is inactive (<i>bInputSel1</i> and <i>bInputSel2</i> are both set to FALSE), the two control signals are output one-to-one at the <i>bJog1Out</i> and <i>bJog2Out</i> outputs. • To achieve the desired behaviour (starting at high speed, pre-switch off at low speed), both inputs must be set to TRUE. • Fixed setpoint 2 must be less than fixed setpoint 3! Otherwise, the drive will start at a low speed and accelerate after the pre-switch off. • If, in addition to the <i>bJog1In</i> and <i>bJog2In</i> inputs, other jog signals are set at the L_NSet FB, new fixed setpoints are reached, and the drive traverses at speeds that differ from the selection via <i>bJog1In</i> and <i>bJog2In</i>.
bSlowDown1 bSlowDown2 bSlowDown3	BOOL	Activation of fixed setpoint 2 in the downstream L_NSet FB <ul style="list-style-type: none"> • These inputs only fulfil a function if they have been activated via <i>bInputSel1</i> and <i>bInputSel2</i> previously (see Truth table).
bStop1 bStop2 bStop3	BOOL	Ramping down of the ramp function generator in the downstream L_NSet FB <ul style="list-style-type: none"> • These inputs only fulfil a function if they have been activated via <i>bInputSel1</i> and <i>bInputSel2</i> previously (see Truth table).

Outputs

Designator	Data type	Value/meaning
bRfgOut	BOOL	Control signal for ramping down the setpoint generator <ul style="list-style-type: none"> Connect this output to the <i>bRfg0</i> input of the L_NSet FB.
bJog1Out	BOOL	Control signal for setting fixed speeds in the setpoint generator <ul style="list-style-type: none"> Connect this output to the <i>bJog1</i> input of the L_NSet FB.
bJog2Out	BOOL	Control signal for setting fixed speeds in the setpoint generator <ul style="list-style-type: none"> Connect this output to the <i>bJog2</i> input of the L_NSet FB.

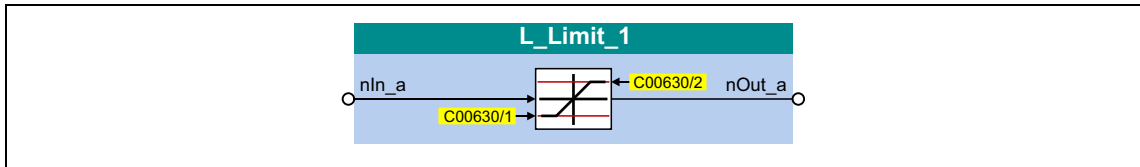
Truth table

Input		Function	Response in the L_NSet FB
bInputSel1	bInputSel2		
FALSE	FALSE	Pre-switch off inactive	No response <ul style="list-style-type: none"> The <i>bRfgIn</i> input signal is directly provided at the <i>bRfgOut</i> output. The <i>bJogIn1</i> and <i>bJogIn2</i> input signals are directly output at the <i>bJog1Out</i> and <i>bJog2Out</i> outputs.
TRUE	FALSE	The <i>bSlowDown1</i> and <i>bStop1</i> inputs are evaluated.	Pre-switch off can be activated <ul style="list-style-type: none"> If the SlowDown function is activated via the selected <i>bSlowDown</i> input, fixed setpoint 2 in the setpoint generator is activated via the <i>bJog1Out</i> and <i>bJog2Out</i> outputs. If the Stop function is activated via the selected <i>bStop</i> input, the <i>bRfgOut</i> output is set to TRUE and hence the setpoint generator is deactivated.
FALSE	TRUE	The <i>bSlowDown2</i> and <i>bStop2</i> inputs are evaluated.	
TRUE	TRUE	The <i>bSlowDown3</i> and <i>bStop3</i> inputs are evaluated.	

[18-1] Truth table for activating the pre-switch off

18.1.97 L_Limit_1

This FB limits an analog input signal to a value range whose upper and lower limit can be set via parameters.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 ≙ 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Scaling: 16384 ≙ 100 %

Parameters

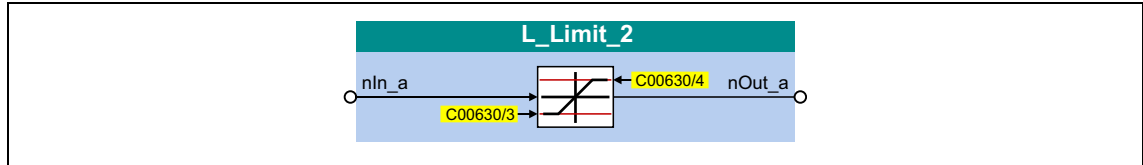
Parameters	Possible settings			Info
C00630/1	-199.99	%	199.99	Lower limit • Lenze setting: -100.00 %
C00630/2	-199.99	%	199.99	Upper limit • Lenze setting: 100.00 %

**Tip!**

Always set the lower limit lower than the upper limit, otherwise value "0" is provided at the *nOut_a* output.

18.1.98 L_Limit_2

This FB limits an analog input signal to a value range whose upper and lower limit can be set via parameters.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 ≙ 100 %

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Scaling: 16384 ≙ 100 %

Parameters

Parameters	Possible settings			Info
C00630/3	-199.99	%	199.99	Lower limit • Lenze setting: -100.00 %
C00630/4	-199.99	%	199.99	Upper limit • Lenze setting: 100.00 %

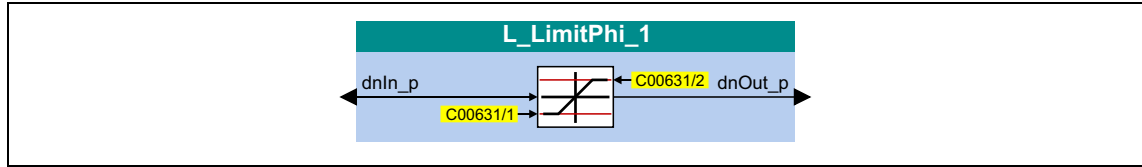


Tip!

Always set the lower limit lower than the upper limit, otherwise value "0" is provided at the nOut_a output.

18.1.99 L_LimitPhi_1

This FB restricts an angle signal to one value range, whose upper and lower limit can be set via parameters.



Inputs

Designator	Data type	Information/possible settings
dnIn_p	INT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	INT	Output signal

Parameters

Parameters	Possible settings			Info
C00631/1	-2147483647	Incr.	2147483647	Lower limit • Lenze setting: -2147483647 incr.
C00631/2	-2147483647	Incr.	2147483647	Upper limit • Lenze setting: 2147483647 incr.

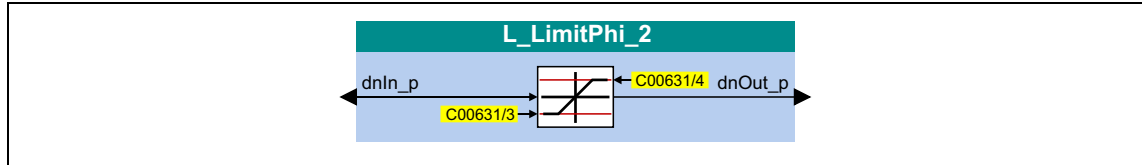


Tip!

Always set the lower limit lower than the upper limit, otherwise value "0" is provided at the *dnOut_p* output.

18.1.100 L_LimitPhi_2

This FB restricts an angle signal to one value range, whose upper and lower limit can be set via parameters.



Inputs

Designator	Data type	Information/possible settings
dnIn_p	INT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	INT	Output signal

Parameters

Parameters	Possible settings			Info
C00631/3	-2147483647	Incr.	2147483647	Lower limit • Lenze setting: -2147483647 incr.
C00631/4	-2147483647	Incr.	2147483647	Upper limit • Lenze setting: 2147483647 incr.

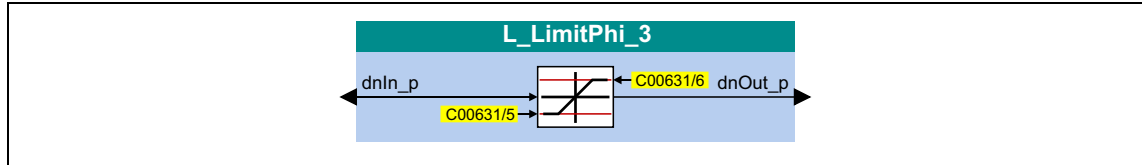


Tip!

Always set the lower limit lower than the upper limit, otherwise value "0" is provided at the *dnOut_p* output.

18.1.101 L_LimitPhi_3

This FB restricts an angle signal to one value range, whose upper and lower limit can be set via parameters.



Inputs

Designator	Data type	Information/possible settings
dnIn_p	INT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	INT	Output signal

Parameters

Parameters	Possible settings			Info
C00631/5	-2147483647	Incr.	2147483647	Lower limit • Lenze setting: -2147483647 incr.
C00631/6	-2147483647	Incr.	2147483647	Upper limit • Lenze setting: 2147483647 incr.



Tip!

Always set the lower limit lower than the upper limit, otherwise value "0" is provided at the *dnOut_p* output.

18.1.102 L_MFail_1

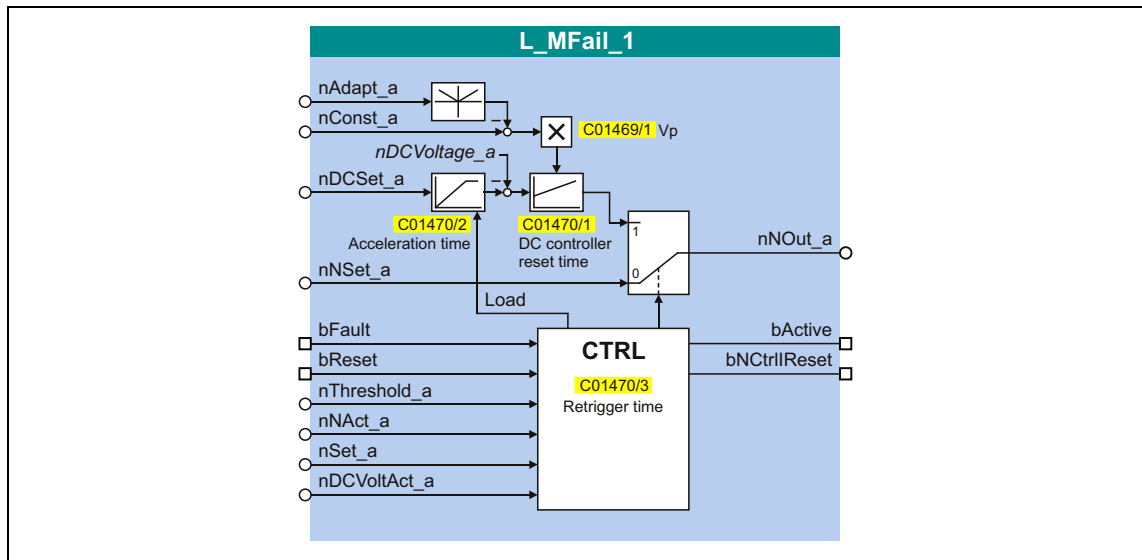
In case the supply voltage fails, this FB serves to stop (brake) the drive or drive system in a controlled way via L1, L2, L3 or +UG, -UG to prevent coasting.



Stop!

For drive systems that are coupled via digital frequency (a master drive and one or several slave drives) the following applies:

- The mains failure detection and control may only be activated for the master drive.
- All inverters must be operated via the terminals +UG, -UG in the DC bus connection.



Inputs

Designator	Data type	Information/possible settings
nAdapt_a	INT	Dynamic adaptation of the proportional gain of the DC-bus voltage controller • The resulting proportional gain results from: $V_p = C01469/1 \cdot \frac{nConst_a [\%] - nAdapt_a [\%] }{100 \%}$ • Scaling: 16384 ≙ 100 %
nConst_a	INT	
nDCSet_a	INT	Voltage setpoint on which the DC-bus voltage is to be kept. • Scaling: 16384 ≙ 1000 V
nNSet_a	INT	Speed setpoint in [%] • Scaling: 16384 ≙ 100 % reference speed (C00011)
bFault	BOOL	Activating the mains failure control TRUE Activate mains failure control.
bReset	BOOL	Reset mains failure control • A reset is always required when the restart protection is active or the restart protection is used and the supply (mains or DC supply) has been switched on. TRUE Reset mains failure control.
nThreshold_a	INT	Restart threshold in [%] • Scaling: 16384 ≙ 100 % reference speed (C00011)

Designator	Data type	Information/possible settings
nNAct_a	INT	Comparison value for the restart threshold in [%] • Scaling: 16384 \equiv 100 % reference speed (C00011)
nSet_a	INT	Speed starting point for the deceleration in [%] • Scaling: 16384 \equiv 100 % reference speed (C00011)
nDCVoltAct_a	INT	Actual DC-bus voltage • Scaling: 16384 \equiv 1000 V

Outputs

Designator	Data type	Value/meaning
nNOut_a	INT	Speed setpoint in [%] • Scaling: 16384 \equiv 100 % reference speed (C00011)
bActive	BOOL	Status signal "Mains failure control active" TRUE The mains failure control is active.
bNCtrlIReset	BOOL	Control signal for resetting the I component of the speed controller in the motor control • Connect this output with the <i>bSpeedCtrlIOn</i> input of the SB LS_MotionControlKernel (if this is connected upstream to the motor control). TRUE Reset I component of the speed controller of the motor control.

Parameters

Parameters	Possible settings			Info
C01469/1	0.001		31.000	Vp • Lenze setting: 1.000
C01470/1	1	ms	60000	Vdc-bus controller reset time • Lenze setting: 20 ms Note: The set value is internally limited to 20 ... 2000 ms! If the setting is outside the limits, the limited value is written back to the code.
C01470/2	1	ms	60000	Acceleration time • Lenze setting: 20 ms Note: The set value is internally set to 1 ... 16000 ms! If the setting is outside the limits, the limited value is written back to the code.
C01470/3	1	ms	60000	Retrigger time • Lenze setting: 20 ms

18.1.102.1 Procedure of the mains failure control

A failure of the voltage supply of the power section can be detected by

- an evaluation of the DC-bus voltage and/or
- an external monitoring system (e.g. voltage measuring relay).

The type of mains failure control to be used depends on the used drive system.



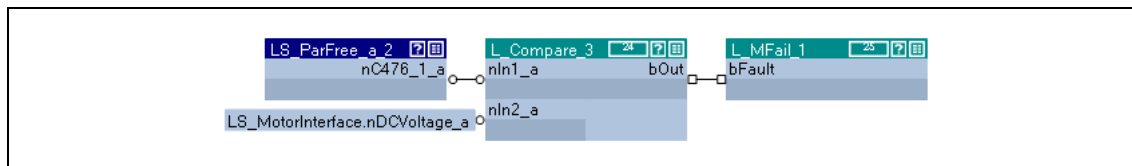
Note!

The following interconnection examples are not functional yet. For an error-free function, connect the FB L_MFail_1 with further signals!

Evaluation of the DC-bus voltage

This proceeding is used for single drives or multi-axis drives which do not use an external monitoring system.

- For evaluating the DC-bus voltage, you can use a comparator (e.g. FB [L_Compare_3](#)) as shown in the following interconnection example 1.
 - In order that the mains failure control will be activated if the DC-bus voltage falls below a certain operating threshold, set the comparison function "2: In1 > In2" has to be set for the FB [L_Compare_3](#) in [C00690](#).
 - For specifying the operating threshold, the SB [LS_ParFree_a_2](#) is used. This system block can output 16 parameterisable analog signals. In the shown example, the operating threshold has to be set in the "free parameter" [C00476/1](#).

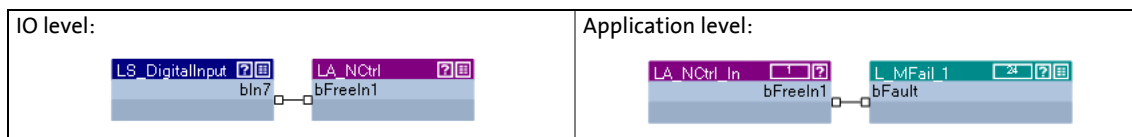


[18-46] Interconnection example 1: Evaluation of the DC-bus voltage with a comparator (cutout)

Use of an external monitoring system

In this proceeding, the digital status signal of an external monitoring system is connected to the FB L_MFail_1 via a digital input of the inverter.

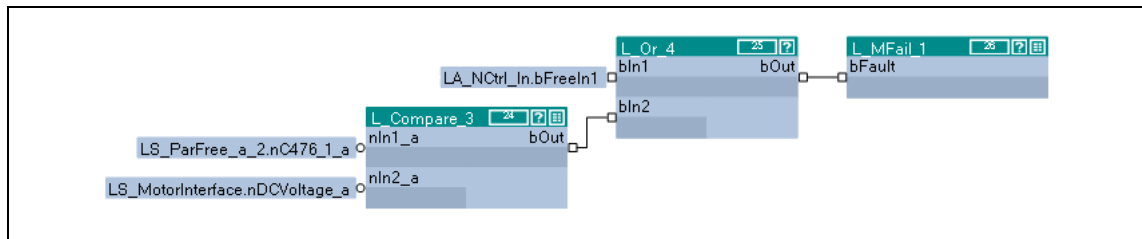
- In the following example, the digital input DI7 is used.
 - The active level (HIGH or LOW active) for DI7 has to be parameterised in [C00114](#) in such a way that *bFault* becomes TRUE when the monitoring system is tripped.
 - A free input of the application block can be used to transfer the digital input signal from I/O level to application level.



[18-47] Interconnection example 2: Use of the digital status signal of an external monitoring system

Combination of the above shown proceedings

The combination of the proceedings can be simply realised via an OR operation:

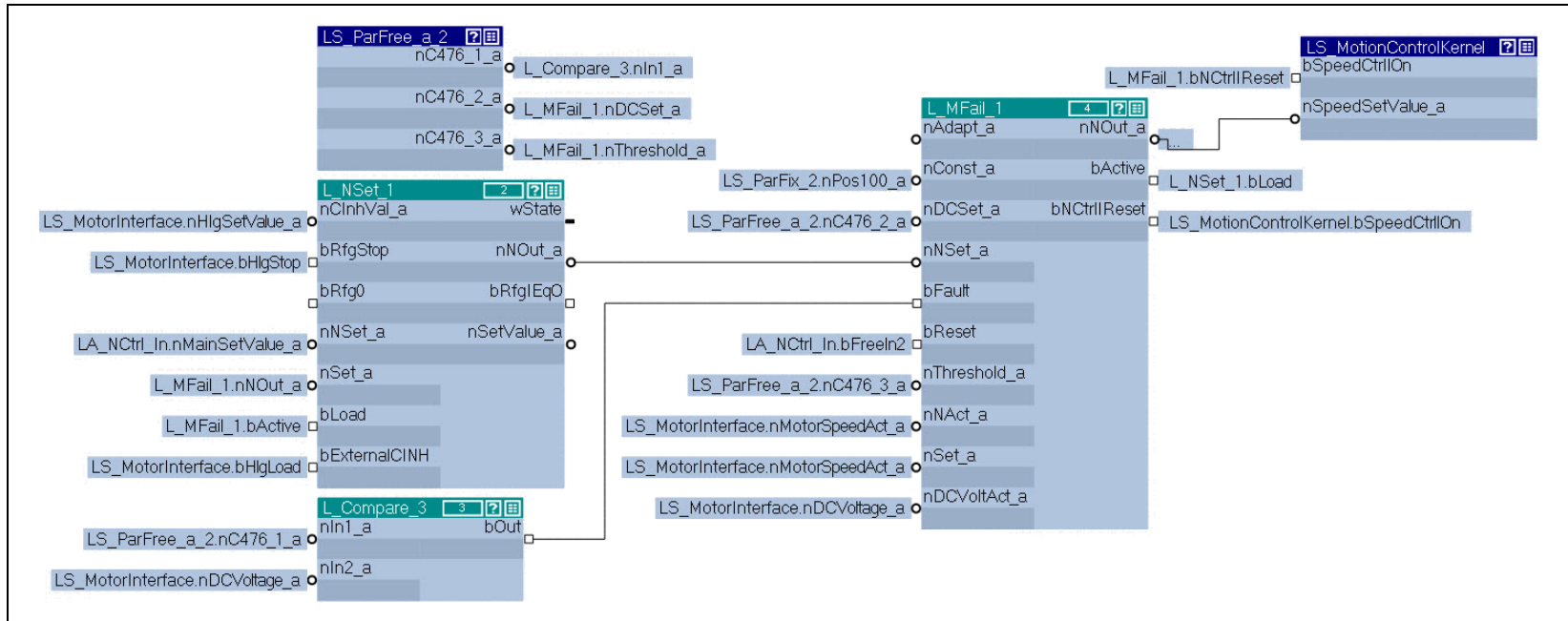


[18-48] Interconnection example 3: Mains failure control of different sources

18.1.102.2 Signal flow for mains failure control

The following illustration shows the basic signal flow (cutout) for a mains failure control.

Note!
The following interconnection example is not functional yet. For an error-free function, connect e.g. the FB [L_NSet_1](#) with further signals!



[18-49] Signal flow (detail)

L_MFail inputs	Function
nAdapt_a	Dynamic adaptation of the proportional gain of the DC-bus voltage controller. • Input not interconnected → Adaptation = 0 %.
nConst_a	Proportional gain of the DC-bus voltage controller • Input with <i>nPos100_a</i> constant interconnected → proportional gain = 100 %.
nDCSet_a	Voltage setpoint on which the DC-bus voltage is to be kept. • The voltage setpoint has to be set in the "free parameter" C00476/2 .
nNset_a	Speed setpoint path (output: nNOut_a)
bFault	Activating the mains failure control ▶ Procedure of the mains failure control (☰ 1385)
bReset	Reset mains failure control • The free <i>bFreeIn2</i> input of the application block used in the example can be e.g. connected to a digital input on I/O level.
nThreshold_a	Restart threshold • The restart threshold (at first approx 2 %) has to be set in the "free parameter" C00476/3 .
nNAct_a	Comparison value for the restart threshold • Comparison value is the actual speed value
nSet_a	Speed starting point for the deceleration • Speed starting point is the actual speed value
nDCVoltAct_a	Actual DC-bus voltage

18.1.102.3 Activating the mains failure control

The mains failure control is activated by setting *bFault* to TRUE. The inverter now generates the required operational energy from the rotational energy of the drive. The drive is braked via the power loss of the inverter and the motor. Thus, the speed deceleration ramp is shorter than for an uncontrolled system (coasting drive).

After activating the mains failure control:

1. The acceleration time set in [C01470/2](#) is used to control the DC-bus voltage to the value at *nDCSet_a*.
2. At *nNOut_a*, an internally generated speed setpoint is output which serves to brake the drive to a speed close to "0" (via the speed setpoint).
 - Starting value for the controlled deceleration is the value at *nSet_a*. This input is appropriately connected to the actual speed value *nMotorSpeedAct_a* of the SB [LS_MotorInterface](#).
 - The speed deceleration ramp (and hence the braking torque) results from the moment of inertia of the load machine(s), the power loss of the drive (system) and the set parameter setting.



Stop!

If a connected braking unit responds, the drive is braked with a max. possible torque (I_{max}). In this case, adapt the parameter setting if required (see the following chapter).

If the power section is not supplied, the drive cannot create a standstill torque (important for active loads as e.g. hoists).

Stopping/cancelling the mains failure control

When *bFault* is reset to FALSE, an internal timing element is triggered. After the time set in [C01470/3](#) has elapsed, the mains failure control is stopped/cancelled.

- When the restart protection is active, the drive is continued to be braked to standstill. ▶ [Restart protection](#) ([□ 1393](#))
 - When the restart protection is active, the drive can only be reset by setting the *bReset* input to TRUE.
- When the restart protection not active, the drive is accelerated to the speed setpoint. ▶ [Quick mains recovery \(KU\)](#) ([□ 1393](#))

18.1.102.4 Parameterising the mains failure control

The parameters to be set before initial commissioning strongly depend on the used motor, the moment of inertia of the drive and the drive configuration (single drive, drive system, master/slave operation etc.) and must hence be adapted to the corresponding application case.



Note!

The following data refers to the chapter "[Procedure of the mains failure control!](#)" ([1385](#))

- Measure the DC-bus voltage with an oscilloscope (channel 1).
 - Signal for the message: *nDCVoltage_a* of the SB [LS_MotorInterface](#).
- Measure the speed with an oscilloscope (channel 2).
 - Signal for the message: *nMotorSpeedAct_a* of the SB [LS_MotorInterface](#).
- Set the operating threshold for the mains failure control in [C00476/1](#).
 - Scaling: 100 % \equiv 1000 V
 - Recommended setting: approx. 50 V above the reset threshold for undervoltage in the DC bus (LU_{off}).
 - From version V17.00.00 onwards:** For a mains voltage of 500 V, you can raise the operating threshold OU_{on} and the reset threshold OU_{off} in [C02864/1:Bit_1](#) by 10 V.
 - The operating thresholds for undervoltage (LU) and overvoltage (OU) depend on the setting in [C00173](#):

Mains voltage		Undervoltage (LU)		Overvoltage (OU)	
1-phase	C00173	Operating threshold LU_{on}	Reset threshold LU_{off}	Operating threshold OU_{on}	Reset threshold OU_{off}
230V _{AC}	0, 1, 2, 3	180 V _{DC}	240 V _{DC}	400 V _{DC}	390 V _{DC}

Mains voltage		Undervoltage (LU)		Overvoltage (OU)	
3-phase	C00173	Operating threshold LU_{on}	Reset threshold LU_{off}	Operating threshold OU_{on}	Reset threshold OU_{off}
400V _{AC}	0	285 V _{DC}	430 V _{DC}	800 V _{DC}	790 V _{DC}
440V _{AC}	1	400 V _{DC}	430 V _{DC}		
480V _{AC}	2	490 V _{DC}	535 V _{DC}		
500V _{AC}	3	540 V _{DC}	585 V _{DC}		

- Set the voltage setpoint in [C00476/2](#) the DC-bus voltage is to be controlled to.
 - Scaling: 100 % \equiv 1000 V
 - Recommended setting: approx. 700 V \rightarrow [C00476/2](#) = 70 %



Stop!

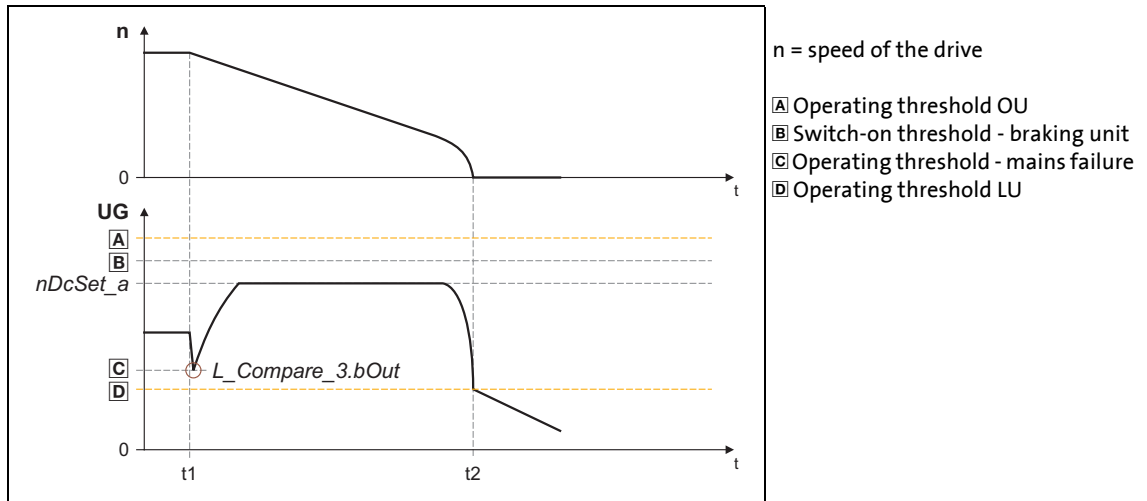
The voltage setpoint must be below the operating threshold of a braking unit if connected. If a connected braking unit responds, the drive with max. possible torque (I_{max}) will be braked. The desired operational performance gets lost.

18.1.102.5 Commissioning the mains failure control

Commissioning should be executed with motors without load.

1. Start the drive.
2. Set the acceleration time:
 - Set the speed setpoint to 100 %, operate the inverter with max. speed.
 - Set controller inhibit and measure deceleration time up to standstill.
 - Set approx. 1/10 of the measured deceleration time in [C01470/2](#).
3. Set retrigger time:
 - In case of mains failure control via detection of the DC-bus voltage level: Set the deceleration time measured under point 2 in [C01470/3](#).
 - In case of mains failure control via an external system: Set the time in which the drive is to be continued to be brought to a standstill under control at short-term mains recovery in [C01470/3](#).
4. Switch off the supply voltage (mains or DC bus).

The following profile is to be shown on the oscilloscope:



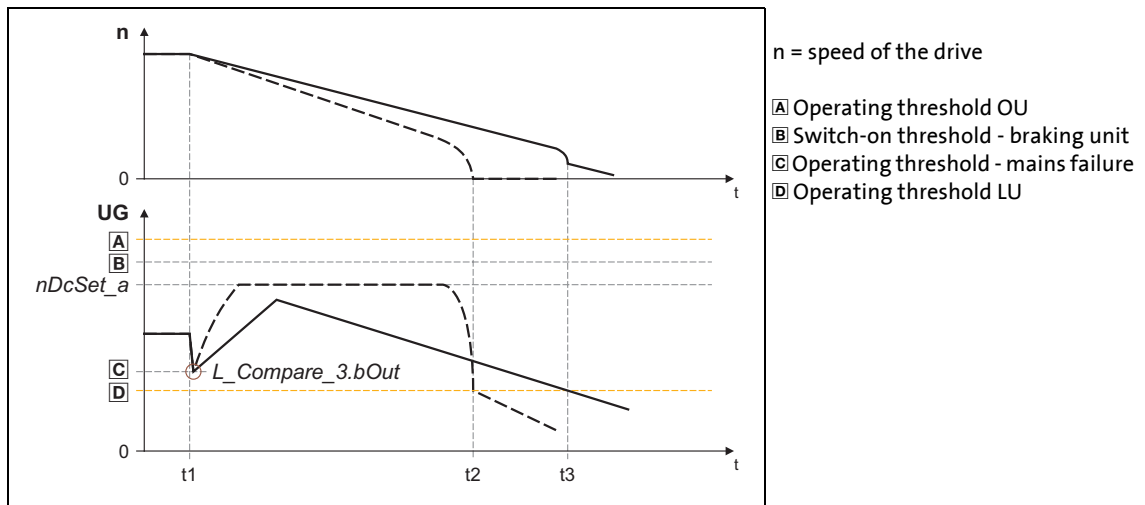
[18-50] Schematic diagram with activated mains failure control (ideal profile)

Point in time	Info
t = t1	Mains failure
t = t2	Speed "0" reached.

18.1.102.6 Fine adjustment of the mains failure control

For the fine adjustment, repeat the following points several times:

1. A final speed as low as possible has to be reached before the inverter reaches the operating threshold for undervoltage (LU):
 - Increase proportional gain V_p in [C01469/1](#).
 - Reduce Vdc-bus controller reset time in [C01470/1](#).
2. The responding of the braking unit or the reaching of the operating threshold for overvoltage (OU) has to be prevented:
 - Increase Vdc controller reset time in [C01470/1](#) until the ideal profile shown in [\[18-50\]](#) will be almost reached.
 - If required, reduce the $nDcSet_a$ voltage setpoint to which the DC-bus voltage is to be controlled (in the interconnection example via the free parameter [C00476/2](#)).
3. Increasing the deceleration time or reducing the braking torque is only possible to a limited extent:
 - Increasing the acceleration time in [C01470/2](#) reduces the initial braking torque and simultaneously increases the deceleration time.
 - Increasing the Vdc controller reset time in [C01470/1](#) reduces the braking torque and simultaneously increases the deceleration time. If the reset times are too high, the inverter reaches the operating threshold for undervoltage (LU) before standstill is reached. Hence, the drive is not controlled anymore.



[18-51] Schematic diagram with different braking torques

Point in time	Info
t = t1	Mains failure
t = t2	Speed "0" with higher braking torque reached (short reset time).
t = t3	With a lower braking torque (higher reset time), the drive reaches the operating threshold for undervoltage (LU) without reaching speed "0".
t > t3	Drive is not controlled anymore (is braked by friction).

18.1.102.7 Reset mains failure control

The mains failure control is reset by setting *bReset* to TRUE.

- A reset via *bReset* is always required when the restart protection is active or the restart protection is used and the supply (mains or DC supply) has been switched on.
- The *bReset* input can, for instance, be connected to a digital input.

18.1.102.8 Restart protection

The integrated restart protection is to prevent a restart in the lower speed range when the supply voltage was only interrupted briefly (mains recovery before drive stands still).

- The *nThreshold_a* input serves to specify the restart threshold in [%] with regard to the reference speed ([C00011](#)) below which no start has to take place after mains recovery.
 - If in case of mains recovery the speed is below the restart threshold, the drive is continued to be braked in a controlled way. This function is only stopped by setting *bReset* to TRUE.
 - If the speed is above the restart threshold after mains recovery, the drive changes to its setpoint *nNSet_a*.
 - The function is switched inactive when *nThreshold_a* = 0 %.
- A reset takes place by setting *bReset* to TRUE and is required after every mains switching.
 - In this case, the *bActive* output is set to TRUE when the *bFault* input is set to FALSE.

18.1.102.9 Quick mains recovery (KU)

The quick mains recovery causes a restart of the inverter if the restart protection is not active anymore.

- In case, the drive reaches its setpoint.
- If this behaviour is not desired, you can delay the restart by setting a retrigger time in [C01470/3](#) or prevent it by using the restart protection.
- Dependent on the system, the mains recovery is reported through the mains failure control via the level of the DC-bus voltage. ▶ [Procedure of the mains failure control](#) (□ 1385)

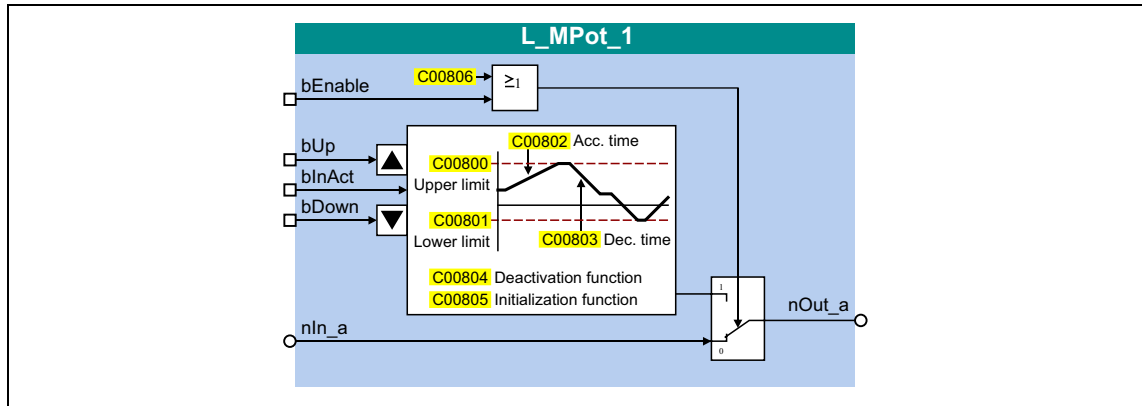
A quick mains recovery is caused by a "quick interruption" of the energy supply company (e.g. thunderstorm) and by faulty components in the supply cables (e.g. collector rings).

- Then, set the retrigger time in [C01470/3](#) higher than the measured deceleration time reached in braking operation.

18.1.103 L_MPot_1

This FB replaces a hardware motor potentiometer and can be used as an alternative setpoint source controlled via two inputs.

- The signal is output via a ramp function generator with linear ramps.
- The acceleration and deceleration times are set via parameters.
- Constant ramping even with speed limit values changed online.
- The motor potentiometer function can be switched on/off online.



Inputs

Designator	Data type	Information/possible settings
bEnable	BOOL	Switch over motor potentiometer function <i>bEnable</i> input and C00806 code are ORed.
		TRUE Motor potentiometer function is active, setpoint can be changed via <i>bUp</i> and <i>bDown</i> . • With switching to TRUE, the value applied to <i>nIn_a</i> is automatically transferred to the motor potentiometer.
		FALSE The value applied to <i>nIn_a</i> is output at <i>nOut_a</i> .
nIn_a	INT	When bEnable = FALSE, the analog nIn_ is input signal switched to the nOut_a output.
bUp	BOOL	Approaching of the upper speed limit value set in C00800 .
		TRUE The <i>nOut_a</i> output signal runs to its upper limit value (<i>nHighLimit</i>). • If the <i>bDown</i> input is simultaneously set to TRUE, the <i>nOut_a</i> output signal is not changed.
bDown	BOOL	Approaching of the lower speed limit value set in C00801 .
		TRUE The <i>nOut_a</i> output signal runs to its lower limit value (<i>nLowLimit</i>). • If the <i>bUp</i> input is simultaneously set to TRUE, the <i>nOut_a</i> output signal is not changed.
bInAct	BOOL	Deactivate motor potentiometer function • This input has the highest priority. • When the motor potentiometer is deactivated, the <i>nOut_a</i> output signal follows the function set with code C00804 .
		TRUE Motor potentiometer function is deactivated.

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

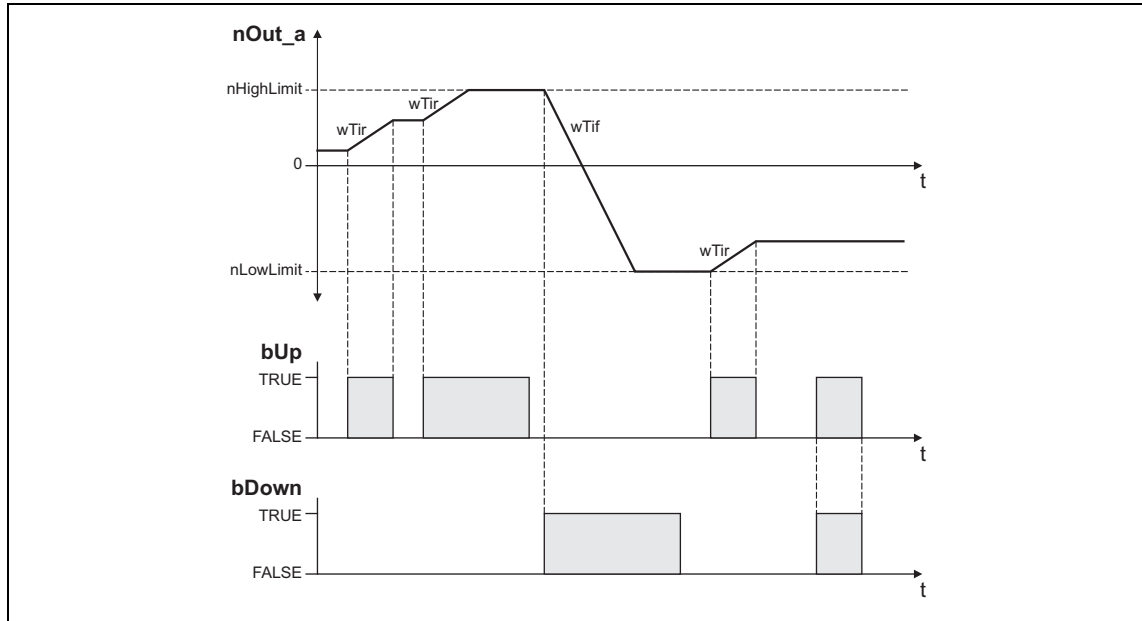
Parameters

Parameters	Possible settings			Info
C00800	-199.99	%	199.99	Upper limit • Lenze setting: 100.00 %
C00801	-199.99	%	199.99	Lower limit • Lenze setting: -100.00 %
C00802	0.1	s	6000.0	Acceleration time • Lenze setting: 10.0 s
C00803	0.1	s	6000.0	Deceleration time • Lenze setting: 10.0 s
C00804				Inactive function • Selection of response when deactivating the motor potentiometer via the input <i>blnAct</i> . • Lenze setting: 0
	0	No further action; <i>nOut_a</i> retains its value.		
	1	The motor potentiometer returns to 0 % within the deceleration time T_{if}		
	2	The motor potentiometer runs to the lower limit value (C00801) within the deceleration time T_{if}		
	3	The motor potentiometer output immediately changes to 0 %		Important for the emergency stop function
	4	The motor potentiometer output immediately changes to the lower limit value (C00801)		
	5	The motor potentiometer runs to the upper limit value (C00800) within the acceleration time T_{ir}		
C00805				Init function • Selection of response when switching on the device. • Lenze setting: 0
	0	The output value being output during mains power-off is saved non-volatilely in the internal memory of the inverter. It will be reloaded during mains power-on.		
	1	The lower limit value (C00801) is loaded during mains power-on.		
	2	An output value = 0 % is loaded during mains power-on.		
C00806				Use of the motor potentiometer • When switching to 1: YES, the value applied to <i>nIn_a</i> is automatically transferred to the motor potentiometer. • Lenze setting: 0
	0	No		
	1	Yes		

18.1.103.1 Activate & control motor potentiometer

When *blnAct* is set to FALSE, the motor potentiometer is activated.

- The currently active function depends on the current output signal *nOut_a*, the limit values set and the control signals at *bUp* and *bDown*.
- When the *nOut_a* output signal is outside the limits set, the output signal runs to the next limit with the *Ti* times set. This process is independent of the control signals at *bUp* and *bDown*.
- When the *nOut_a* output signal is inside the limits set, the output signal changes according to the control signals at *bUp* and *bDown*.

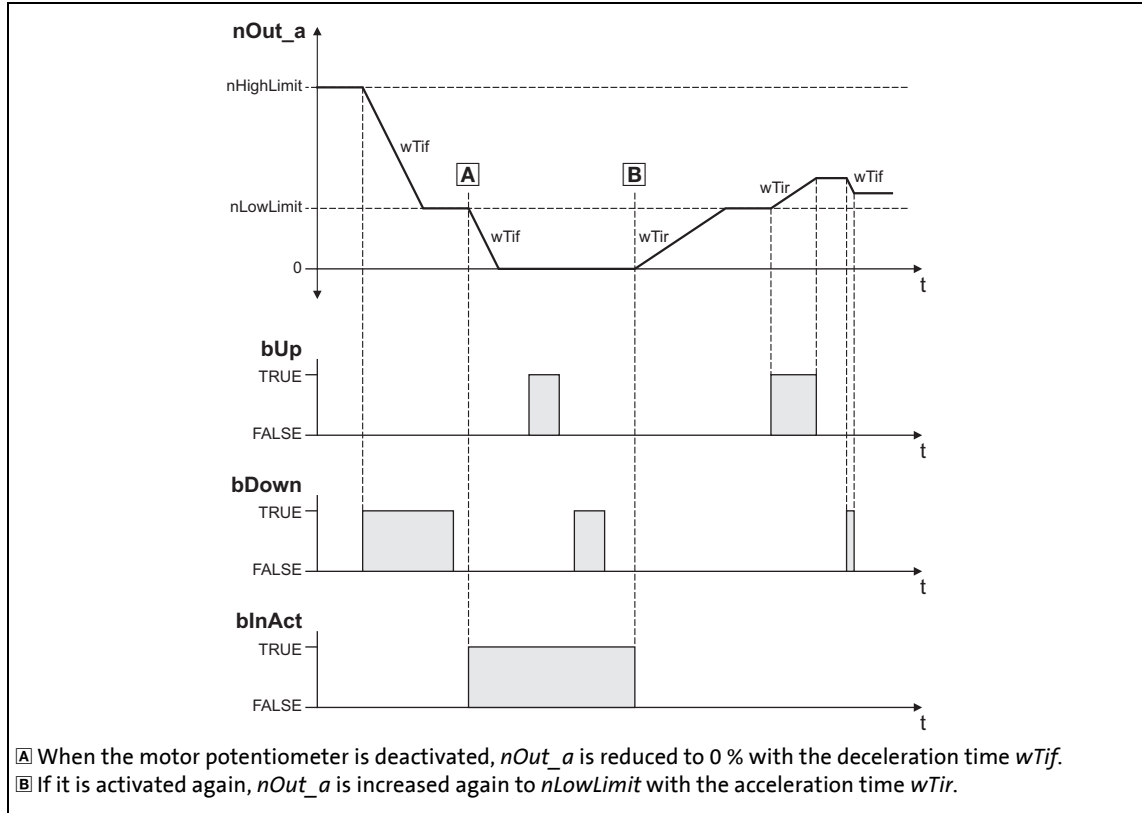


[18-52] Example: Control of the motor potentiometer

bUp	bDown	blnact	Function
FALSE	FALSE	FALSE	The <i>nOut_a</i> output signal remains unchanged.
TRUE	FALSE		The <i>nOut_a</i> output signal runs to its upper limit value (<i>nHighLimit</i>).
FALSE	TRUE		The <i>nOut_a</i> output signal runs to its lower limit value (<i>nLowLimit</i>).
TRUE	TRUE		The <i>nOut_a</i> output signal remains unchanged.
-	-	TRUE	The motor potentiometer function is deactivated. The <i>nOut_a</i> output signal responds according to the function selected via <i>Function</i> .

18.1.103.2 Deactivate motor potentiometer

When the motor potentiometer is deactivated by setting *blnAct* to TRUE, the *nOut_a* output signal responds according to the function selected via *Function*.

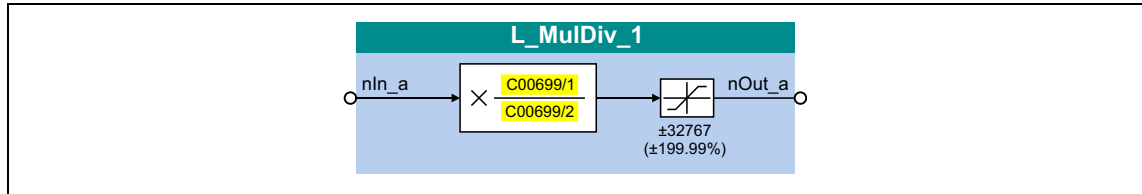


[18-53] Example: Deactivation of the motor potentiometer when the *Function* = 1 has been selected

18.1.104 L_MulDiv_1

This FB multiplies the analog input signal with a parameterisable factor.

- The value of the factor is determined by a quotient consisting of numerator and denominator .
- The value output at *nOut_a* is limited to ±199.99 %.
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
nIn1	INT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Product value (result of the multiplication) • Internal limitation to ± 32767

Parameters

Parameters	Possible settings	Info
C00699/1	-32767	32767 Counter
C00699/2	-32767	32767 Denominator

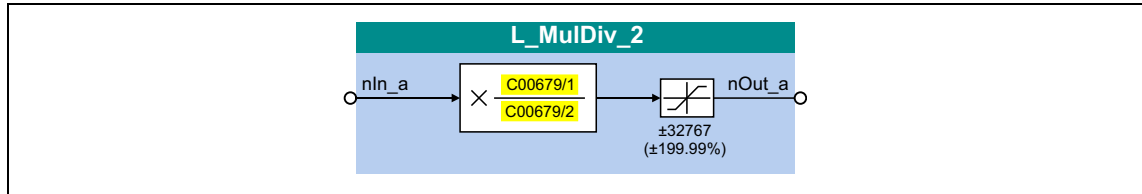
Function

$$nOut_a = nIn_a \times \frac{C00699/1}{C00699/2}$$

18.1.105 L_MulDiv_2

This FB multiplies the analog input signal with a parameterisable factor.

- The value of the factor is determined by a quotient consisting of numerator and denominator .
- The value output at *nOut_a* is limited to ±199.99 %.
- Division is not remainder considered.



Inputs

Designator	Data type	Information/possible settings
nIn1	INT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Product value (result of the multiplication) • Internal limitation to ± 32767

Parameters

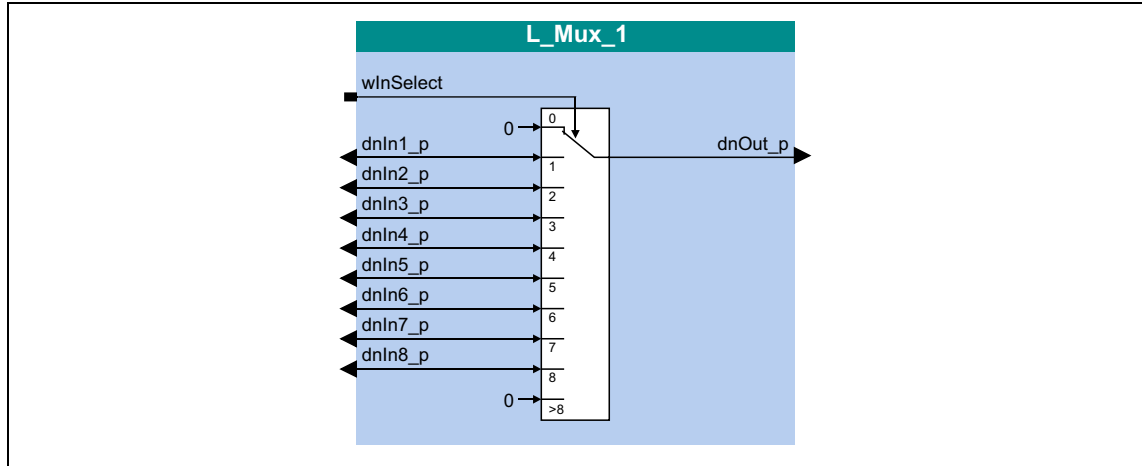
Parameters	Possible settings	Info
C00679/1	-32767	32767 Counter
C00679/2	-32767	32767 Denominator

Function

$$nOut_a = nIn_a \times \frac{C00679/1}{C00679/2}$$

18.1.106 L_Mux_1

This FB provides one of the eight input signals *dnIn1_p* ... *dnIn8_p* at the output *dnOut_p*. The selection is made by means of the signal at the input *wInSelect*.



Inputs

Designator	Data type	Information/possible settings
wInSelect	WORD	Input signal 1 ... 8 <ul style="list-style-type: none"> The values "1" ... "8" select the input signal to be applied to the output. Values from "1" ... "8" set the <i>dnOut_p</i> output to "0".
dnIn1_p	DINT	Input signal
... dnIn8_p	DINT	

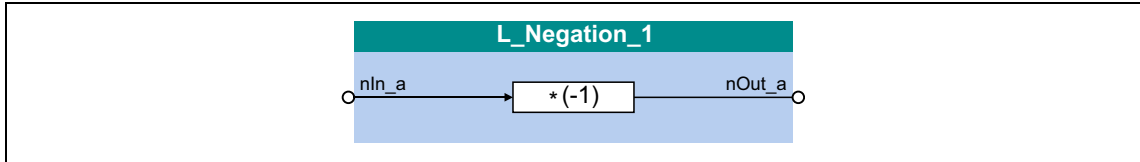
Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal

18.1.107 L_Negation_1

This FB converts the sign of the input signal, i.e. the input signal is multiplied by the value -1 and is then output.

- With the value - 32768 at the *nIn_a* input, the value + 32767 is provided at the *nOut_a* output.

**Inputs**

Designator	Data type	Value/meaning
nIn_a	INT	Input signal

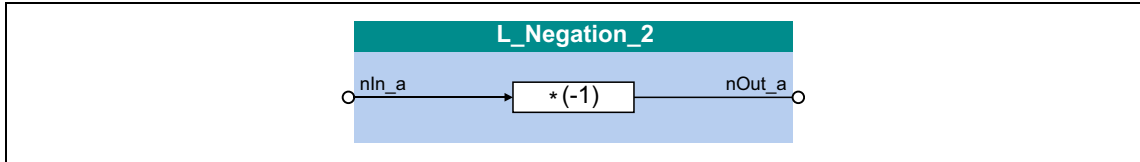
Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.108 L_Negation_2

This FB converts the sign of the input signal, i.e. the input signal is multiplied by the value -1 and is then output.

- With the value - 32768 at the *nIn_a* input, the value + 32767 is provided at the *nOut_a* output.

**Inputs**

Designator	Data type	Value/meaning
nIn_a	INT	Input signal

Outputs

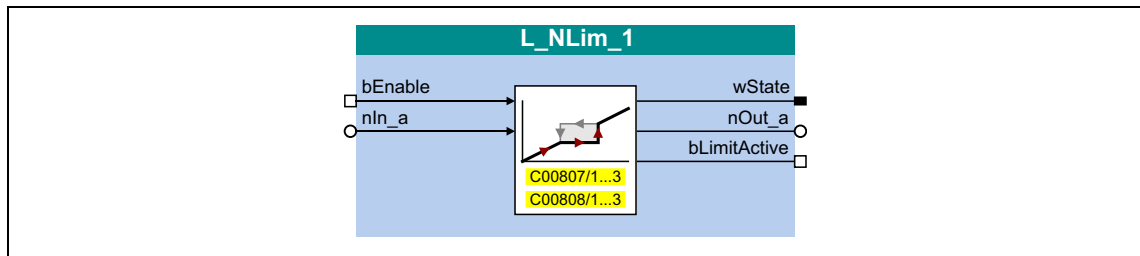
Designator	Data type	Value/meaning
nOut_a	INT	Output signal

18.1.109 L_NLim_1

This FB can hide up to three parameterisable blocking zones within one continuous signal characteristic.

**Note!**

A value of "0" cannot be masked out if the *nIn_a* input signal changes signs.

**Inputs**

Designator	Data type	Information/possible settings	
bEnable	BOOL	Activate zone masking	
		FALSE	The FB has been deactivated. <ul style="list-style-type: none"> The input signal is output one-to-one at the <i>nOut_a</i> output.
		TRUE	The FB has been activated. <ul style="list-style-type: none"> Zone masking of the input signal is carried out according to the parameterised blocking zones.
nIn_a	INT	Input signal	

Outputs

Identifier/data type	Value/meaning	
wState	WORD	Bit-coded status word <ul style="list-style-type: none"> Bits that are not listed are reserved for future extensions.
	Bit 0	No blocking zone active
	Bit 1	Blocking zone 1 active
	Bit 2	Blocking zone 2 active
	Bit 3	Blocking zone 3 active
nOut_a	INT	Output signal <ul style="list-style-type: none"> If the FB has been activated, the output signal is outside the blocking zones.
bLimitActive	BOOL	"Limitation active" status signal
		TRUE

Parameters

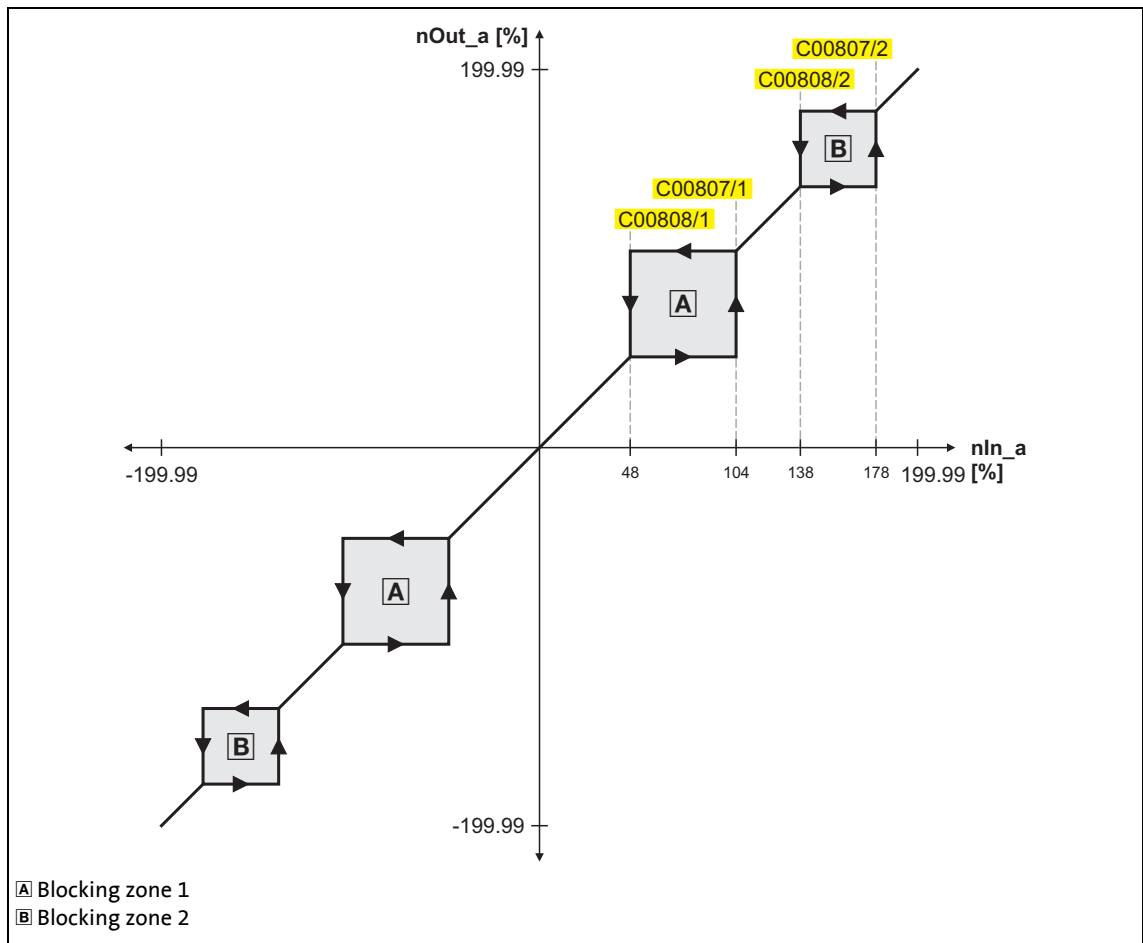
Parameters	Possible settings			Info
C00807/1...3	0.00	%	199.99	Max. skip frequency 1 ... 3 • Lenze setting: 0.00 %
C00808/1...3	0.00	%	199.99	Min. skip frequency 1 ... 3 • Lenze setting: 0.00 %

Definition of the blocking zones

Up to three zones can be parameterised which are to be skipped by the *nOut_a* output signal.

The example below shows the parameter setting of two blocking zones for the L_NLim_1 FB:

Parameters	Blocking zone 1		Blocking zone 2		Blocking zone 3	
Minimum limit value	C00808/1:	48 %	C00808/2:	138 %	C00808/3:	0 %
Maximum limit value	C00807/1:	104 %	C00807/2:	178 %	C00807/3:	0 %



[18-54] Zone masking by means of parameterisable blocking zones (in our example: L_NLim_1)

- The parameterised blocking zones have the same effect on negative input signals.
- A blocking zone is deactivated by entering identical limit values (in our example: blocking zone 3).

Overlapping of blocking zones

If blocking zones overlap, the lowest and highest value of the overlapping zones form a new zone. In this case, the status display (*wState* output) will also just display one zone (the lower one of the two original zones).

Abutting blocking zones

If two blocking zones abut (e.g. 20 ... 30 % and 30 ... 40 %), the limit value between the two zones (in this example 30 %) is also passed through.

The same applies to a limit range of 0 ... xx %. At the zero crossing of the *nIn_a* input signal, a value of "0" is also output at the *nOut_a* output. Value "0" cannot be excluded. If the *nIn_a* input signal drops back to "0", the *nOut_a* output will retain the upper limit value.

18.1.110 L_NLim_2

This FB can hide up to three parameterisable blocking zones within one continuous signal characteristic.

**Note!**

A value of "0" cannot be masked out if the *nIn_a* input signal changes signs.

**Inputs**

Designator	Data type	Information/possible settings		
bEnable	BOOL	Activate zone masking		
		<table border="1"> <tr> <td>FALSE</td> <td>The FB has been deactivated. • The input signal is output one-to-one at the <i>nOut_a</i> output.</td> </tr> <tr> <td>TRUE</td> <td>The FB has been activated. • Zone masking of the input signal is carried out according to the parameterised blocking zones.</td> </tr> </table>	FALSE	The FB has been deactivated. • The input signal is output one-to-one at the <i>nOut_a</i> output.
FALSE	The FB has been deactivated. • The input signal is output one-to-one at the <i>nOut_a</i> output.			
TRUE	The FB has been activated. • Zone masking of the input signal is carried out according to the parameterised blocking zones.			
nIn_a	INT	Input signal		

Outputs

Identifier/data type	Value/meaning	
wState	WORD	Bit-coded status word • Bits that are not listed are reserved for future extensions.
	Bit 0	No blocking zone active
	Bit 1	Blocking zone 1 active
	Bit 2	Blocking zone 2 active
nOut_a	INT	Output signal • If the FB has been activated, the output signal is outside the blocking zones.
	BOOL	"Limitation active" status signal
bLimitActive	BOOL	TRUE The input signal is inside a blocking zones and is limited to the respective boundary value of the blocking zone.

Parameters

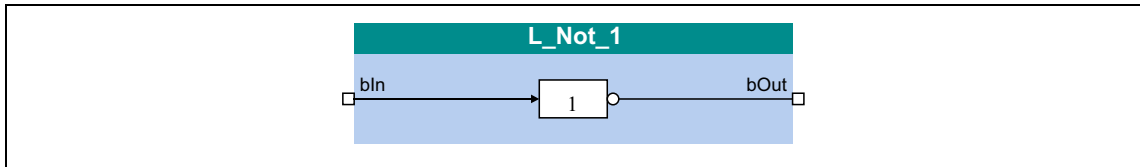
Parameters	Possible settings			Info
C00809/1...3	0.00	%	199.99	Max. skip frequency 1 ... 3 • Lenze setting: 0.00 %
C00810/1...3	0.00	%	199.99	Min. skip frequency 1 ... 3 • Lenze setting: 0.00 %



For a detailed functional description see [L_NLim 1](#).

18.1.111 L_Not_1

This FB negates a BOOL data type signal.

**Inputs**

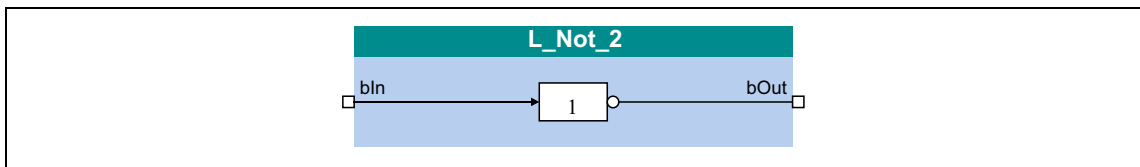
Designator	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

18.1.112 L_Not_2

This FB negates a BOOL data type signal.

**Inputs**

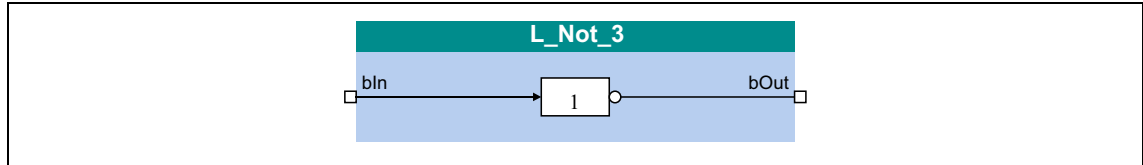
Designator	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

18.1.113 L_Not_3

This FB negates a BOOL data type signal.



Inputs

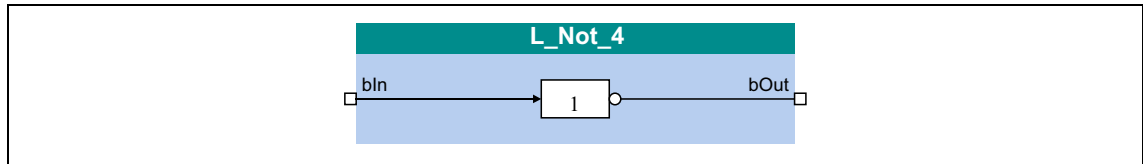
Designator	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

18.1.114 L_Not_4

This FB negates a BOOL data type signal.



Inputs

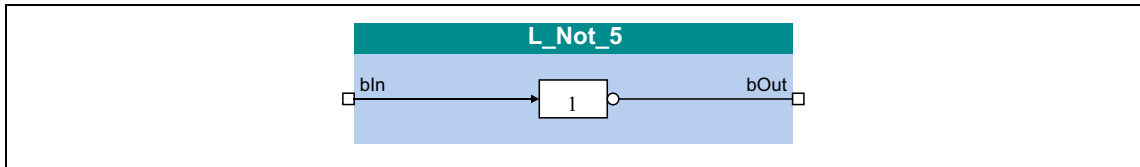
Designator	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

18.1.115 L_Not_5

This FB negates a BOOL data type signal.

**Inputs**

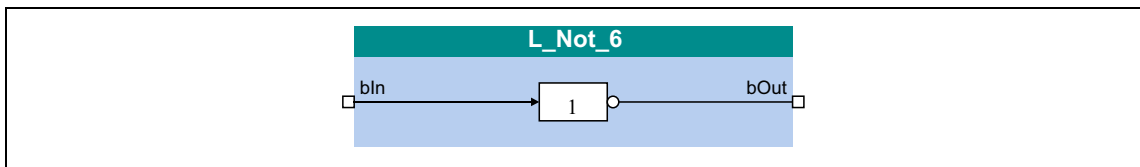
Designator	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

18.1.116 L_Not_6

This FB negates a BOOL data type signal.

**Inputs**

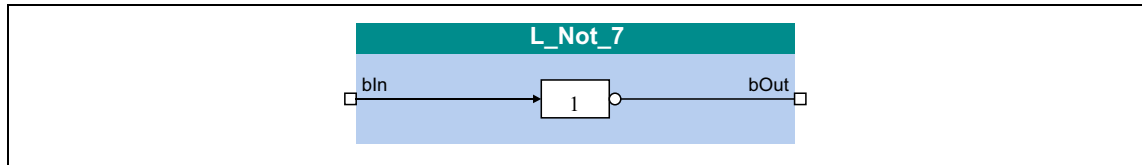
Designator	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

18.1.117 L_Not_7

This FB negates a BOOL data type signal.

**Inputs**

Designator	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

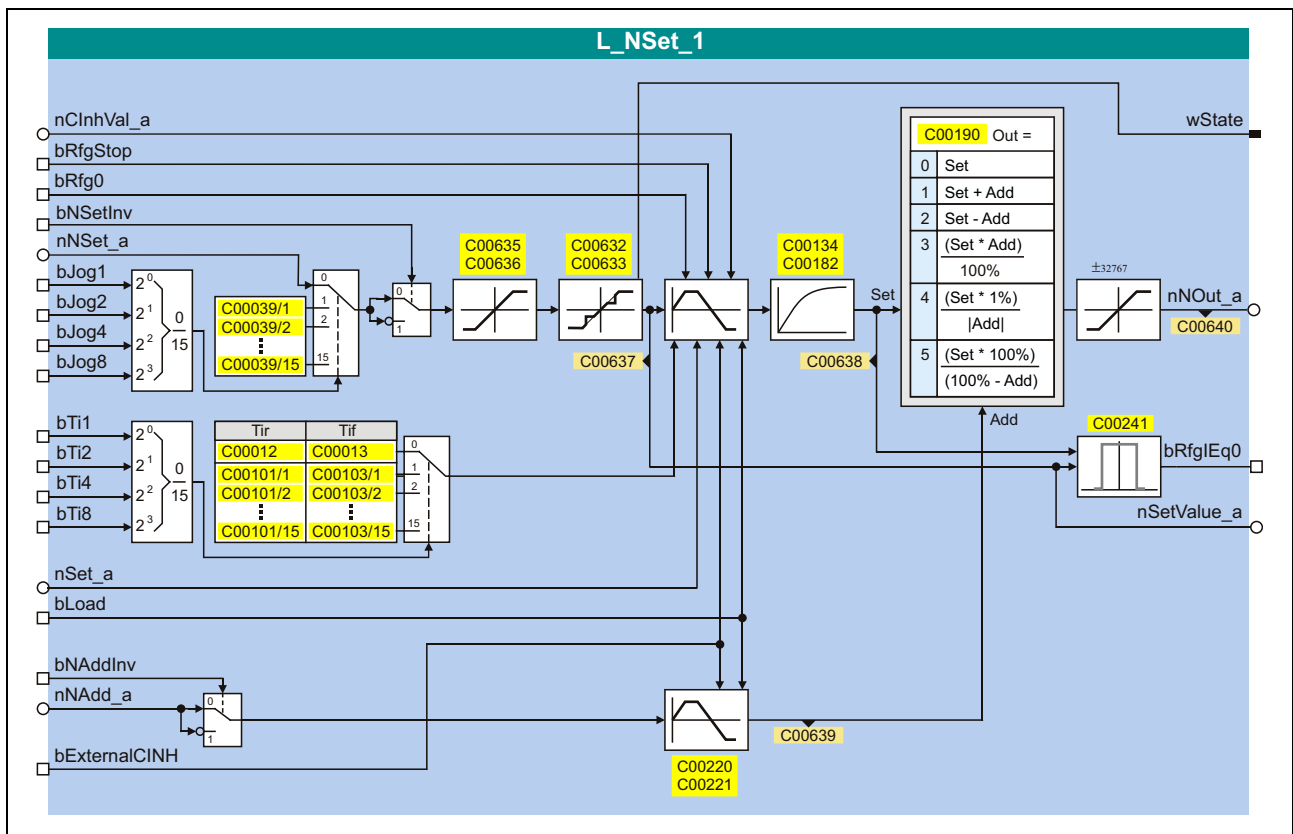
18 Function library

18.1 Function blocks | L_NSet_1

18.1.118 L_NSet_1

This FB is used for general signal processing of process values and is provided with the following functions:

- Ramp function generator
 - With linear ramps for main and additional setpoint path
 - With S-shaped ramp (PT1 rounding)
 - Setting and holding
- Internal limitation of the input signal
- 3 adjustable blocking zones
- Arithmetic function
- 15 fixed setpoints (JOG setpoints)
- 15 acceleration and deceleration times



Inputs

Designator	Data type	Information/possible settings
nClnhVal_a	INT	Main setpoint signal which is to be accepted by the main setpoint integrator when the controller is inhibited.
bRfgStop	BOOL	Holding (freezing) of the current value of the main setpoint integrator TRUE The current value of the main setpoint integrator is held.
bRfg0	BOOL	Leading the main setpoint integrator to 0 within the current Ti times TRUE The current value of the main setpoint integrator is led to "0" within the Ti time set.
bNSetInv	BOOL	Signal inversion for the main setpoint TRUE Main setpoint signal is inverted.
nNset_a	INT	Main setpoint signal • Other signals are also permitted
bJog1 ... bJog8	BOOL	Inputs for overriding fixed setpoints (JOG setpoints) for the main setpoint • Selection inputs are binary coded.
bTI1 ... bTI8	BOOL	Selection inputs for alternative acceleration/deceleration times for the main setpoint • Selection inputs are binary coded.
nSet_a	INT	Starting value which is loaded into the main setpoint integrator by setting <i>bLoad</i> to TRUE.
bLoad	BOOL	Control of both ramp function generators in special situations, e.g. QSP TRUE The <i>nSet_a</i> input signal is loaded into the main setpoint integrator and the additional setpoint integrator is set to "0".
bAddInv	BOOL	Signal inversion for the additional setpoint TRUE Additional setpoint signal is inverted.
nNAdd_a	INT	Additional setpoint signal • Other signals are also permitted
bExternalCINH	BOOL	Additional load input for the main setpoint integrator and the additional setpoint integrator TRUE The main setpoint integrator is set to the value applied at <i>nClnhVal_a</i> . The additional setpoint integrator is set to "0". ▶ Application example for the additional load function (1422)

Outputs

Designator	Data type	Value/meaning
nNOut_a	INT	Speed setpoint output signal • Scaling: 16384 ≙ 100 %
bRfgIEqO	BOOL	Status signal "setpoint = 0"

Designator	Data type	Value/meaning
wState	WORD	Bit-coded status word • Bits that are not listed are reserved for future extensions.
		Bit 0 No blocking zone active
		Bit 1 Blocking zone 1 active
		Bit 2 Blocking zone 2 active
		Bit 3 Blocking zone 3 active
		Bit 4 Jog in blocking zone
		Bit 5 MaxLimit active
		Bit 6 MinLimit active
nSetValue_a	INT	Speed-setpoint input signal of the ramp function generator • Scaling: 16384 \equiv 100 %

Parameters

Parameters	Possible settings			Info												
C00012	0.000	s	999.900	Acceleration time T_{ir} for the main setpoint • Lenze setting: 0.000 s												
C00013	0.000	s	999.900	Deceleration time T_{if} for the main setpoint • Lenze setting: 0.000 s												
C00039/1..15	-199.99	%	199.99	Fixed setpoints (JOG setpoints) • Lenze setting: 0.00 %												
C00101/1..15	0.000	s	999.900	Alternative acceleration times (T_{ir}) for the main setpoint • Lenze setting: 0.000 s												
C00103/1..15	0.000	s	999.900	Alternative deceleration times (T_{if}) for the main setpoint • Lenze setting: 0.000 s												
C00134	<table border="1"> <tr> <td>0</td> <td>Off</td> </tr> <tr> <td>1</td> <td>PT1 behaviour</td> </tr> </table>			0	Off	1	PT1 behaviour	Activates ramp rounding with PT1 behaviour for the main setpoint • The corresponding S-ramp time must be set in C00182 . • Lenze setting: 0 (deactivated)								
0	Off															
1	PT1 behaviour															
C00182	0.01	s	50.00	S-ramp time PT1 • Lenze setting: 20.00 s												
C00190	<table border="1"> <tr> <td>0</td> <td>NOut = NSet</td> </tr> <tr> <td>1</td> <td>NOut = NSet + NAdd</td> </tr> <tr> <td>2</td> <td>NOut = NSet - NAdd</td> </tr> <tr> <td>3</td> <td>NOut = (NSet * NAdd) / 100%</td> </tr> <tr> <td>4</td> <td>NOut = (NSet * 1%) / NAdd </td> </tr> <tr> <td>5</td> <td>NOut = (NSet * 100%) / (100% - NAdd)</td> </tr> </table>			0	NOut = NSet	1	NOut = NSet + NAdd	2	NOut = NSet - NAdd	3	NOut = (NSet * NAdd) / 100%	4	NOut = (NSet * 1%) / NAdd	5	NOut = (NSet * 100%) / (100% - NAdd)	Selection of the arithmetic function for combining main and additional setpoint Lenze setting • The additional setpoint is not processed.
0	NOut = NSet															
1	NOut = NSet + NAdd															
2	NOut = NSet - NAdd															
3	NOut = (NSet * NAdd) / 100%															
4	NOut = (NSet * 1%) / NAdd															
5	NOut = (NSet * 100%) / (100% - NAdd)															
C00220	0.000	s	999.900	Acceleration time T_{ir} for the additional setpoint • Lenze setting: 0.000 s												

Parameters	Possible settings			Info
C00221	0.000	s	999.900	Deceleration time T_{if} for the additional setpoint • Lenze setting: 0.000 s
C00241	0.00	%	100.00	Hysteresis window for zero detection of speed output setpoint (output <i>bRfgIEqO</i>) • Lenze setting: 0.50 %
C00632/1...3	0.00	%	199.99	Maximum limit values for the speed blocking zones • Selection of the maximum limit values for the blocking zones in which the speed must not be constant. • Lenze setting: 0.00 %
C00633/1...3	0.00	%	199.99	Minimum limit values for the speed blocking zones • Selection of the minimum limit values for the blocking zones in which the speed must not be constant. • Lenze setting: 0.00 %
C00634				Status (bit-coded) • Bits that are not listed are reserved for future extensions.
	Bit 0	No blocking zone active		
	Bit 1	Blocking zone 1 active		
	Bit 2	Blocking zone 2 active		
	Bit 3	Blocking zone 3 active		
	Bit 4	Jog in blocking zone		
	Bit 5	MaxLimit active		
	Bit 6	MinLimit active		
C00635	-199.99	%	199.99	nMaxLimit • Maximum speed setpoint for speed setpoint limitation • Lenze setting: 199.99 %
C00636	-199.99	%	199.99	nMinLimit • Minimum speed setpoint for speed setpoint limitation • Lenze setting: -199.99 %
C00637	-199.99	%	199.99	Blocking zone output • Display of the speed setpoint after being processed by blocking zone function.
C00638	-199.99	%	199.99	Ramp smoothing output • Display of the speed setpoint after being processed by PT1 filter function.
C00639	-199.99	%	199.99	Additional value output • Display of the additional speed setpoint after being processed by ramp generator.
C00640	-199.99	%	199.99	Output nNOut_a • Display of the generated main speed setpoint at the <i>nNOut_a</i> output.

18.1.118.1 Main setpoint path

- The signals in the main setpoint path are limited to a value range of ± 32767 .
- The signal at $nNSet_a$ is first led via the JOG selection function.
- A selected JOG value switches the $nNSet_a$ input inactive. Then, the subsequent signal conditioning operates with the JOG value.

18.1.118.2 JOG setpoints

In addition to the direct main setpoint selection via the $nNSet_a$ input, so-called JOG setpoints can be preset in [C00039/1...15](#).

- The JOG setpoints are binary-coded and can be called using the $bJog1 \dots bJog8$ selection inputs so that 15 options are available:

Selection inputs				Main setpoint Main setpoint
$bJog8$	$bJog4$	$bJog2$	$bJog1$	
FALSE	FALSE	FALSE	FALSE	$nNset_a$
FALSE	FALSE	FALSE	TRUE	C00039/1
FALSE	FALSE	TRUE	FALSE	C00039/2
FALSE	FALSE	TRUE	TRUE	C00039/3
FALSE	TRUE	FALSE	FALSE	C00039/4
FALSE	TRUE	FALSE	TRUE	C00039/5
FALSE	TRUE	TRUE	FALSE	C00039/6
FALSE	TRUE	TRUE	TRUE	C00039/7
TRUE	FALSE	FALSE	FALSE	C00039/8
TRUE	FALSE	FALSE	TRUE	C00039/9
TRUE	FALSE	TRUE	FALSE	C00039/10
TRUE	FALSE	TRUE	TRUE	C00039/11
TRUE	TRUE	FALSE	FALSE	C00039/12
TRUE	TRUE	FALSE	TRUE	C00039/13
TRUE	TRUE	TRUE	FALSE	C00039/14
TRUE	TRUE	TRUE	TRUE	C00039/15

- The number of selection inputs to be assigned depends on the number of JOG setpoints required:

Number of JOG setpoints required	Number of selection inputs to be assigned ($bJog1 \dots bJog8$)
1	At least 1
2 ... 3	at least 2
4 ... 7	at least 3
8 ... 15	4

18.1.118.3 Setpoint inversion

The output signal of the JOG function is led via an inverter.

The sign of the setpoint changes if *bNSetInv* is set to TRUE.

18.1.118.4 Value range of the input signal

The value range of the input signal can be limited by using the following parameters:

- [C00635](#): MaxLimit (default setting: +199.99 %)
- [C00636](#): MinLimit (default setting: -199.99 %)

18.1.118.5 Skip frequency function

If the speed setpoints in speed-variable drives are linearly increasing, for instance, the frequency/speed range is divided into a number of equal time segments. Therefore, there may be speeds during acceleration time which must be bridged very fast (e.g. natural resonant frequencies).

The skip frequency function offers the opportunity to select a range in which the initial speed is maintained. If the speed setpoint leaves that range, the drive will be accelerated to reach the desired speed.



Note!

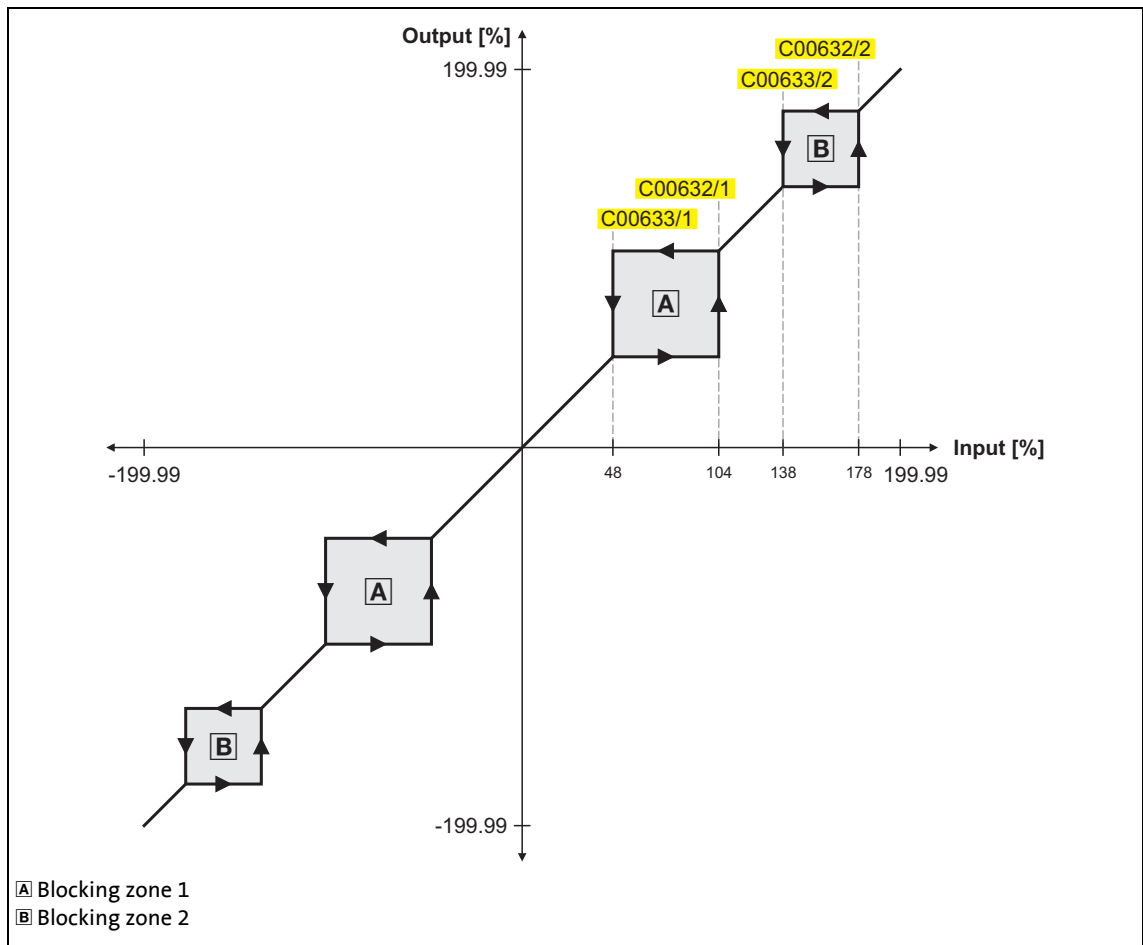
- Skip frequencies only affect main setpoints.
- It is not possible to exclude "0" speed if there is a sign reversal of the speed setpoint.

Definition of the blocking zones

The subcodes of codes [C00632](#) and [C00633](#) can be used to define three zones which are to be skipped by the output setpoint and which are to be passed as fast as possible by the ramp function generator.

The example below shows the parameter setting of two blocking zones:

Parameters	Blocking zone 1	Blocking zone 2	Blocking zone 3
Minimum limit value	C00633/1: 48 %	C00633/2: 138 %	C00633/3: 0 %
Maximum limit value	C00632/1: 104 %	C00632/2: 178 %	C00632/3: 0 %



[18-55] Zone masking by means of parameterisable blocking zones

- The parameterised blocking zones have the same effect on negative input signals.
- A blocking zone is deactivated by entering identical limit values (in our example: blocking zone 3).

Overlapping of blocking zones

If blocking zones overlap, the lowest and highest value of the overlapping zones form a new zone.

In this case, the status display (output *wState* or display parameter [C00634](#)) only indicates one zone (the lower of the two original zones).

Abutting blocking zones

If two blocking zones abut (e.g. 20 ... 30 % and 30 ... 40 %), the limit value between the two zones (in this example 30 %) is also passed through.

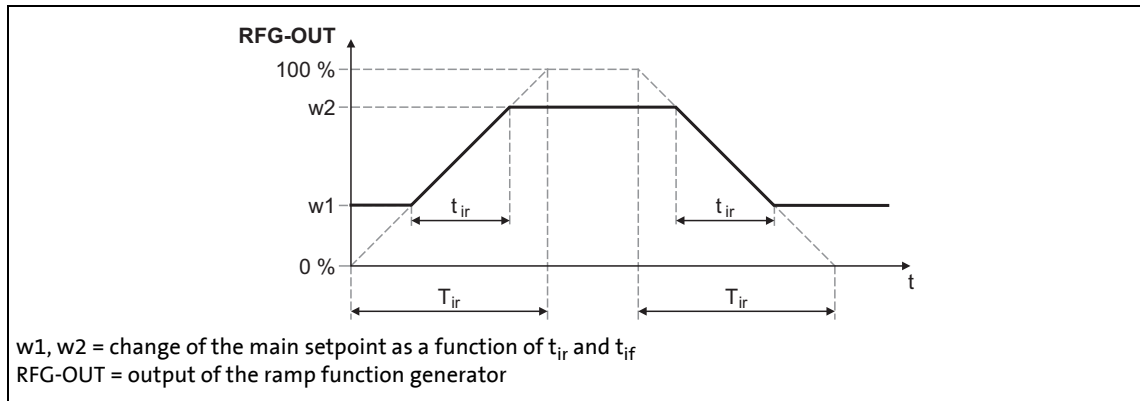
The same applies to a limit range of 0 ... xx %. During zero crossing of the speed setpoint, "0" speed is output as setpoint. It is possible to exclude "0" speed. However, in this case, the output speed will remain on the upper limit value when the input setpoint becomes "0".

**Tip!**

As described above, the acceleration phase starts after the blocking zones have been passed through. The ramp function generator integrated in the **L_Nset** function block limits the progression of the speed. For this reason, the time values set for the integrated ramp function generator should be as low as possible whereas the setpoint for the **L_Nset** function block should be generated by a ramp function generator with higher time values (e.g. [L_MPot](#) function block).

18.1.118.6 Ramp function generator for the main setpoint

The setpoint is now led via a ramp function generator with linear characteristic. The ramp function generator converts setpoint step-changes at the input into a ramp.



[18-56] Acceleration and deceleration times

- t_{ir} and t_{if} are the desired times for changing between $w1$ and $w2$.
- S-ramps are possible by selecting S-ramp times.
- The t_{ir}/t_{if} values are converted into the required Ti times according to the following formula:

$$T_{ir} = t_{ir} \cdot \frac{100\%}{w2 - w1}$$

$$T_{if} = t_{if} \cdot \frac{100\%}{w2 - w1}$$

Setting and selection of Ti times

Via parameters, you can select 16 different Tir and Tif times each for the ramp function generator.

- The selection is made via the binary coded selection inputs $bTI1 \dots bTI8$:

Selection inputs				Used Acceleration time	Used Deceleration time
bTI8	bTI4	bTI2	bTI1		
FALSE	FALSE	FALSE	FALSE	C00012	C00013
FALSE	FALSE	FALSE	TRUE	C00101/1	C00103/1
FALSE	FALSE	TRUE	FALSE	C00101/2	C00103/2
FALSE	FALSE	TRUE	TRUE	C00101/3	C00103/3
FALSE	TRUE	FALSE	FALSE	C00101/4	C00103/4
FALSE	TRUE	FALSE	TRUE	C00101/5	C00103/5
FALSE	TRUE	TRUE	FALSE	C00101/6	C00103/6
FALSE	TRUE	TRUE	TRUE	C00101/7	C00103/7
TRUE	FALSE	FALSE	FALSE	C00101/8	C00103/8
TRUE	FALSE	FALSE	TRUE	C00101/9	C00103/9
TRUE	FALSE	TRUE	FALSE	C00101/10	C00103/10
TRUE	FALSE	TRUE	TRUE	C00101/11	C00103/11
TRUE	TRUE	FALSE	FALSE	C00101/12	C00103/12
TRUE	TRUE	FALSE	TRUE	C00101/13	C00103/13
TRUE	TRUE	TRUE	FALSE	C00101/14	C00103/14
TRUE	TRUE	TRUE	TRUE	C00101/15	C00103/15

Function

- When the controller is inhibited (CINH), the ramp function generator accepts the value applied at *nClnhVal_a* and transfers it to the downstream function. This function has priority over all other functions.
- *bRfgStop* = TRUE
 - The ramp function generator is stopped. Changes at the input of the ramp function generator have no effect on the output signal.
- *bRfg0* = TRUE
 - The ramp function generator runs to 0 along its deceleration ramp.
- Furthermore it is possible to load the ramp function generator online with a defined value. For this purpose, *bLoad* must be set to TRUE. As long as this input is set, the value at *nSet_a* is transferred to the ramp function generator and provided at the output.

Priorities:

CINH	bLoad	bRfg0	bRfgStop	Function
FALSE	FALSE	FALSE	FALSE	The ramp function generator follows the input value via the set ramps.
FALSE	FALSE	FALSE	TRUE	Stop the ramp function generator: The value at the output of the ramp function generator is held.
FALSE	FALSE	TRUE	FALSE	Ramp down the ramp function generator: The ramp function generator runs to 0 within the set deceleration time.
FALSE	FALSE	TRUE	TRUE	
FALSE	TRUE	FALSE	FALSE	Load ramp function generator online: The ramp function generator accepts the value at <i>nSet_a</i> and provides it at its output.
FALSE	TRUE	FALSE	TRUE	
FALSE	TRUE	TRUE	FALSE	
FALSE	TRUE	TRUE	TRUE	
TRUE	FALSE	FALSE	FALSE	Controller inhibit: The ramp function generator accepts the value at <i>nClnhVal_a</i> and provides it at its output.
TRUE	FALSE	FALSE	TRUE	
TRUE	FALSE	TRUE	FALSE	
TRUE	FALSE	TRUE	TRUE	
TRUE	TRUE	FALSE	FALSE	
TRUE	TRUE	FALSE	TRUE	
TRUE	TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE	

18.1.118.7 S-shaped ramp

A PT1 element is connected downstream of the linear ramp function generator. This arrangement implements an S-shaped ramp for a nearly jerk-free acceleration and deceleration.

- The PT1 element can be switched on/off via the *bSShapeActive* input.
- The corresponding S-ramp time can be set under [C00182](#).

18.1.118.8 Additional setpoint

Use the *nNAdd_a* input to define an additional value (e.g. a correcting signal) and combine it arithmetically with the main setpoint *nNSet_a*.

- First, the additional setpoint is led via a ramp function generator with linear characteristic. Its Ti times can be set in [C00220](#) (acceleration time) and [C00221](#) (deceleration time).
- When the input *bNAddInv* is set to TRUE, the additional setpoint can be inverted before having an effect on the ramp function generator.
- When the input *bLoad* is set to TRUE, the ramp function generator is set to zero for the additional setpoint and held there without considering the Ti times. The same applies when the controller is inhibited.
- The following arithmetic combination of main setpoint and additional setpoint can be selected in [C00190](#):

Value in C00190	Function	Info
0	$nNOut_a = nNSet_a$	The additional setpoint <i>nNAdd_a</i> is not processed.
1	$nNOut_a = nNSet_a + nNAdd_a$	
2	$nNOut_a = nNSet_a - nNAdd_a$	
3	$nNOut_a = (nNSet_a * nNAdd_a) / 100 \%$	Internal scaling: • 100 % \equiv 16384 • 1 % \equiv 164
4	$nNOut_a = (nNSet_a * 1 \%) / nNAdd_a $	
5	$nNOut_a = (nNSet_a * 100 \%) / (100 \% - nNAdd_a)$	

18.1.118.9 Application example for the additional load function

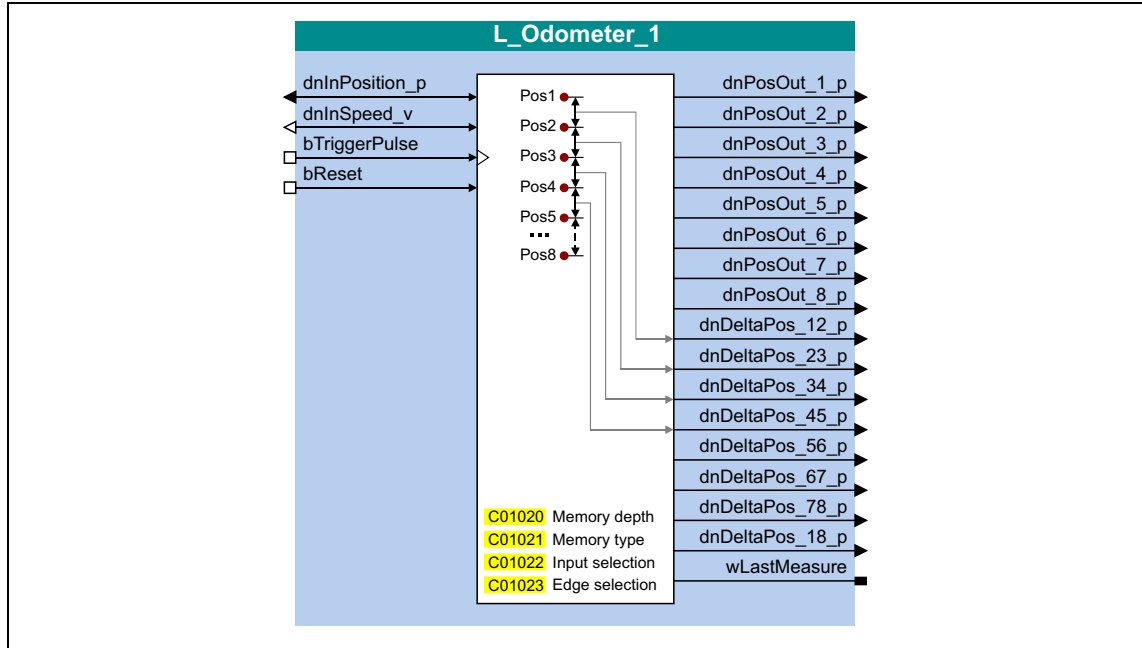
The motor control of the drive is provided with a function for automatically carrying along ramp function generators for "jerk-free" setpoint connection. For speed-controlled drive tasks, the [LS_MotorInterface](#) SB outputs the current actual speed value via the *nHlgSetValue_a* output (e.g. in case of a pulse inhibit, flying restart, controller inhibit).

- In case of a pulse inhibit, the main setpoint generator must be carried along with the current actual speed value to ensure jerk-free setpoint transfer.
- The actual speed value is carried along automatically if the following wiring is provided:
 - [LS_MotorInterface.nHlgSetValue_a](#) \rightarrow [L_NSet_1.nCInhValue_a](#)
 - [LS_MotorInterface.bHlgLoad](#) \rightarrow [L_NSet_1.bExternalCINH](#)

18.1.119 L_Odometer_1

This FB can be used to record positions and calculate distances.

- Depending on the input selection set in [C01022](#), a position signal can be detected at the *dnInPosition_p* input or a speed can be detected at the *nInSpeed_v* input.
- The position is detected/accepted via the edge selected in [C01023](#) at the *bTriggerPulse* input.
- If "Ring buffer" is selected in [C01021](#), the measurement will start all over again after the number of measurements selected in [C01020](#) has been performed and the old values will be overwritten. Otherwise, the measurement will stop.



Inputs

Designator	Data type	Information/possible settings
<i>dnInPosition_p</i>	DINT	Position measurement input <ul style="list-style-type: none"> • Input is only evaluated if C01022 = "0: Pos input" has been set.
<i>nInSpeed_v</i>	INT	Speed measurement input <ul style="list-style-type: none"> • The speed is internally integrated into a position. • Input is only evaluated if C01022 = "1: V input" has been set.
<i>bTriggerPulse</i>	BOOL	Detect position/speed <ul style="list-style-type: none"> • The tripping edge can be parameterised in C01023.
<i>bReset</i>	BOOL	Reset measurement results and internal integrator
		TRUE Reset measurement results and internal integrator.

Outputs

Designator Data type	Value/meaning
dnPosOut_1_p ... dnPosOut_8_p DINT	Detected positions
dnDeltaPos_12_p dnDeltaPos_23_p dnDeltaPos_34_p ... dnDeltaPos_18_p DINT	Calculated distances between the detected positions <ul style="list-style-type: none"> • <i>dnDeltaPos_12_p</i> = Distance between <i>dnPosOut_1_p</i> and <i>dnPosOut_1_p</i> • <i>dnDeltaPos_23_p</i> = Distance between <i>dnPosOut_2_p</i> and <i>dnPosOut_3_p</i> • <i>dnDeltaPos_34_p</i> = Distance between <i>dnPosOut_3_p</i> and <i>dnPosOut_4_p</i> ... • <i>dnDeltaPos_18_p</i> = Distance between <i>dnPosOut_1_p</i> and <i>dnPosOut_8_p</i>
wLastMeasure WORD	Memory location number (1 ... 8) of the last measurement

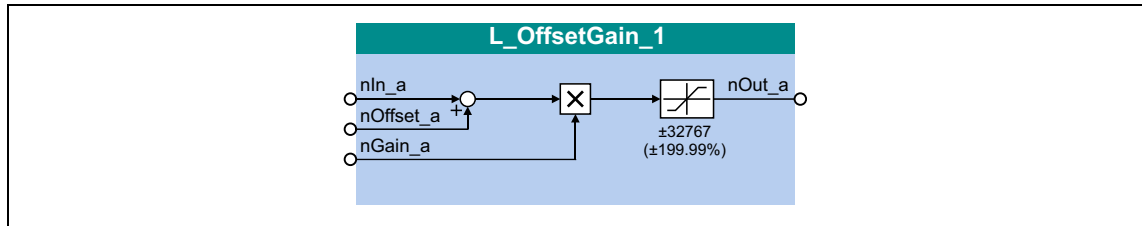
Parameters

Parameters	Possible settings	Info								
C01020	<table border="1"> <tr><td>1</td><td>1 measurement</td></tr> <tr><td>2</td><td>2 measurements</td></tr> <tr><td>...</td><td>...</td></tr> <tr><td>7</td><td>7 measurements</td></tr> </table>	1	1 measurement	2	2 measurements	7	7 measurements	Memory length <ul style="list-style-type: none"> • Lenze setting: 7 measurements
1	1 measurement									
2	2 measurements									
...	...									
7	7 measurements									
C01021	<table border="1"> <tr><td>0</td><td>No ring buffer</td></tr> <tr><td>1</td><td>Ring buffer</td></tr> </table>	0	No ring buffer	1	Ring buffer	Memory type <ul style="list-style-type: none"> • Lenze setting: No ring buffer 				
0	No ring buffer									
1	Ring buffer									
C01022	<table border="1"> <tr><td>0</td><td>Pos input</td></tr> <tr><td>1</td><td>V input</td></tr> </table>	0	Pos input	1	V input	Input selection <ul style="list-style-type: none"> • Lenze setting: Pos input 				
0	Pos input									
1	V input									
C01023	<table border="1"> <tr><td>0</td><td>High edge</td></tr> <tr><td>1</td><td>Low edge</td></tr> <tr><td>2</td><td>High and low edge</td></tr> </table>	0	High edge	1	Low edge	2	High and low edge	Edge selection <ul style="list-style-type: none"> • Lenze setting: HIGH edge 		
0	High edge									
1	Low edge									
2	High and low edge									

18.1.120 L_OffsetGain_1

This FB can add an offset to an analog input signal and then amplify it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 \equiv 100 %
nOffset_a	INT	Offset • Scaling: 16384 \equiv 100 %
nGain_a	INT	Gain factor • Scaling: 16384 \equiv 100 % • 199.99 % \approx 2

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

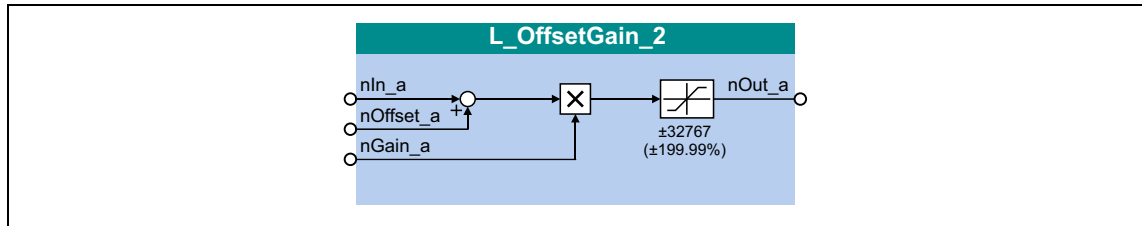
Function

$$nOut_a = (nIn_a + Offset) \cdot Gain\ factor$$

18.1.121 L_OffsetGain_2

This FB can add an offset to an analog input signal and then amplify it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 \equiv 100 %
nOffset_a	INT	Offset • Scaling: 16384 \equiv 100 %
nGain_a	INT	Gain factor • Scaling: 16384 \equiv 100 % • 199.99 % \approx 2

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

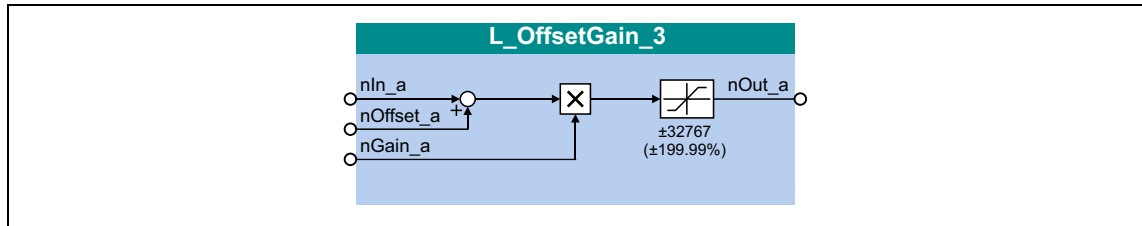
Function

$$nOut_a = (nIn_a + Offset) \cdot Gain\ factor$$

18.1.122 L_OffsetGain_3

This FB can add an offset to an analog input signal and then amplify it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via FB inputs.
- The value provided at the nOut_a output is internally limited to ±199.99 %.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 ≙ 100 %
nOffset_a	INT	Offset • Scaling: 16384 ≙ 100 %
nGain_a	INT	Gain factor • Scaling: 16384 ≙ 100 % • 199.99 % ≈ 2

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199.99 %

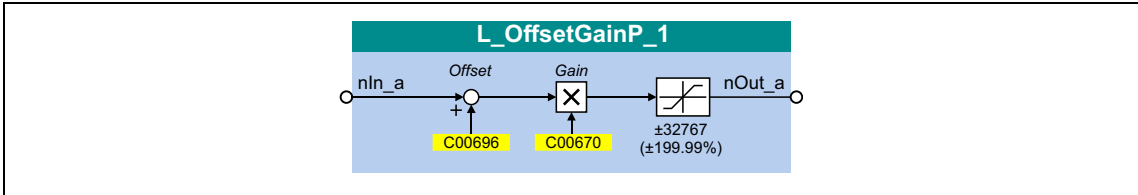
Function

$$nOut_a = (nIn_a + Offset) \cdot Gain\ factor$$

18.1.123 L_OffsetGainP_1

This FB can add an offset to an analog input signal and amplify it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to ±199.99 %.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199.99 %

Parameters

Parameters	Possible settings			Info
C00670	-100.0000		100.0000	Gain factor • High gain factor for further processing of smallest input signals. • Please observe the difference with regard to the gain factors of other blocks in percent (±199.99 % ≈ 2). • Lenze setting: 1.0000
C00696	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

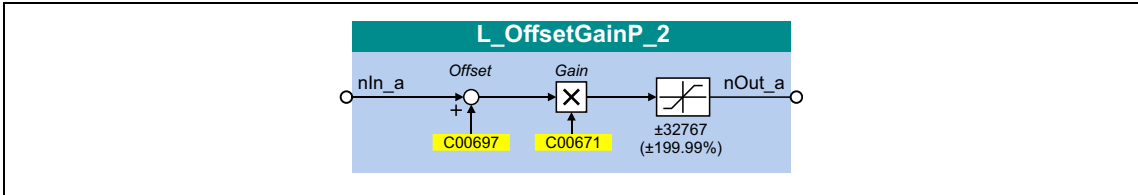
Function

$$nOut_a = (nIn_a + Offset) \cdot Gain\ factor$$

18.1.124 L_OffsetGainP_2

This FB can add an offset to an analog input signal and amplify it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

Parameters

Parameters	Possible settings			Info
C00671	-100.0000		100.0000	Gain factor • High gain factor for further processing of smallest input signals. • Please observe the difference with regard to the gain factors of other blocks in percent ($\pm 199.99\% \approx 2$). • Lenze setting: 1.0000
C00697	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

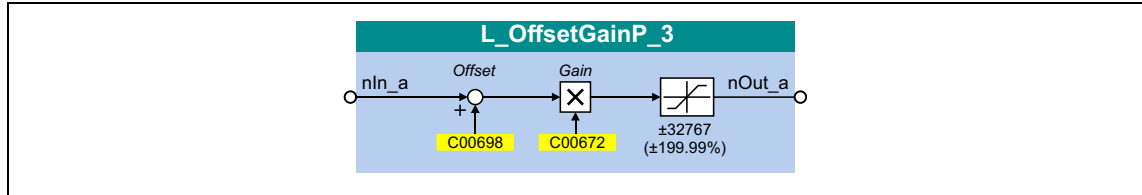
Function

$$nOut_a = (nIn_a + Offset) \cdot Gain\ factor$$

18.1.125 L_OffsetGainP_3

This FB can add an offset to an analog input signal and amplify it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

Parameters

Parameters	Possible settings			Info
C00672	-100.0000		100.0000	Gain factor • High gain factor for further processing of smallest input signals. • Please observe the difference with regard to the gain factors of other blocks in percent ($\pm 199.99\% \approx 2$). • Lenze setting: 1.0000
C00698	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

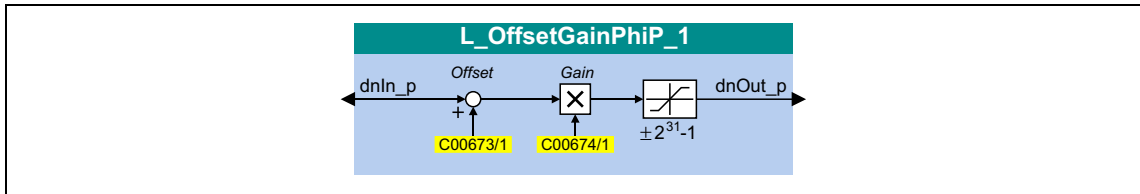
Function

$$nOut_a = (nIn_a + Offset) \cdot Gain\ factor$$

18.1.126 L_OffsetGainPhiP_1

This FB can add an offset to an angle signal and amplify it afterwards.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *dnOut_p* output is internally limited to $\pm 2^{31}-1$.



Inputs

Designator	Data type	Information/possible settings
dnIn_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

Parameters

Parameters	Possible settings			Info
C00673/1	-2147483647	Incr.	2147483647	Offset • Lenze setting: 0 incr.
C00674/1	-2147483647		2147483647	Gain factor • Scaling: 65535 \equiv gain factor 1 • Lenze setting: 65536

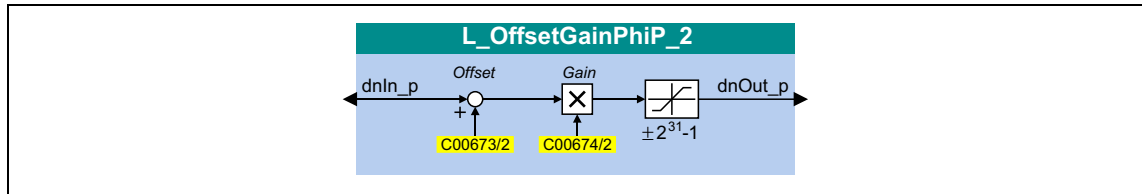
Function

$$dnOut_p = (dnIn_p + Offset) \cdot Gain\ factor$$

18.1.127 L_OffsetGainPhiP_2

This FB can add an offset to an angle signal and amplify it afterwards.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *dnOut_p* output is internally limited to $\pm 2^{31}-1$.



Inputs

Designator	Data type	Information/possible settings
dnIn_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal • Internal limitation to $\pm 2^{31}-1$ (± 2147483647)

Parameters

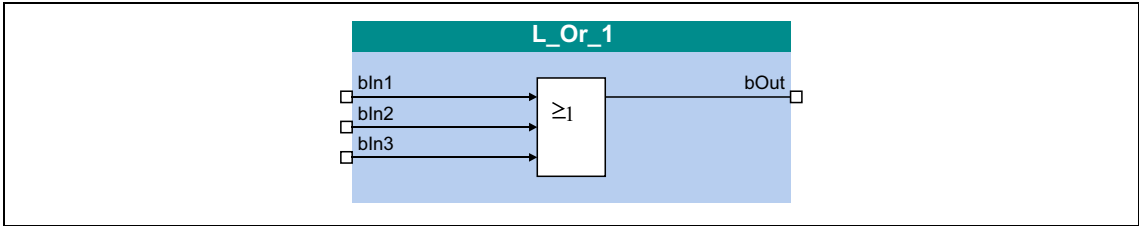
Parameters	Possible settings	Info
C00673/2	-2147483647 Incr. 2147483647	Offset • Lenze setting: 0 incr.
C00674/2	-2147483647 2147483647	Gain factor • Scaling: 65535 \equiv gain factor 1 • Lenze setting: 65536

Function

$$dnOut_p = (dnIn_p + Offset) \cdot Gain\ factor$$

18.1.128 L_Or_1

This FB implements the OR operation of input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

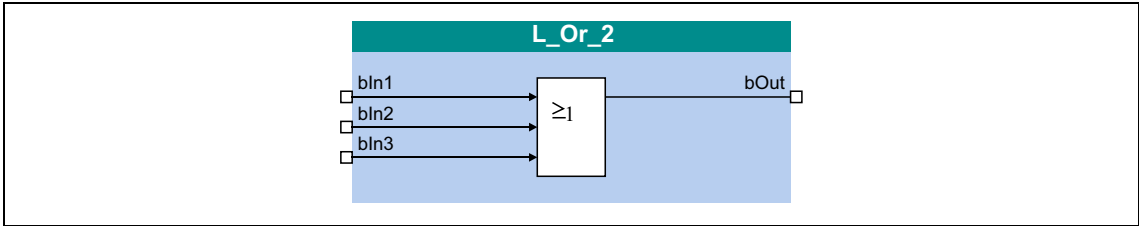
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	TRUE
FALSE	TRUE	TRUE	TRUE
TRUE	FALSE	FALSE	TRUE
TRUE	FALSE	TRUE	TRUE
TRUE	TRUE	FALSE	TRUE
TRUE	TRUE	TRUE	TRUE

[18-57] Truth table of the FB L_Or_1

18.1.129 L_Or_2

This FB implements the OR operation of input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

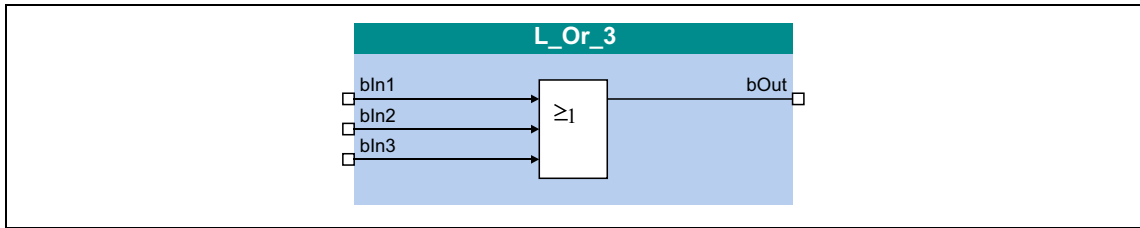
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	TRUE
FALSE	TRUE	TRUE	TRUE
TRUE	FALSE	FALSE	TRUE
TRUE	FALSE	TRUE	TRUE
TRUE	TRUE	FALSE	TRUE
TRUE	TRUE	TRUE	TRUE

[18-58] Truth table of the FB L_Or_2

18.1.130 L_Or_3

This FB implements the OR operation of input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

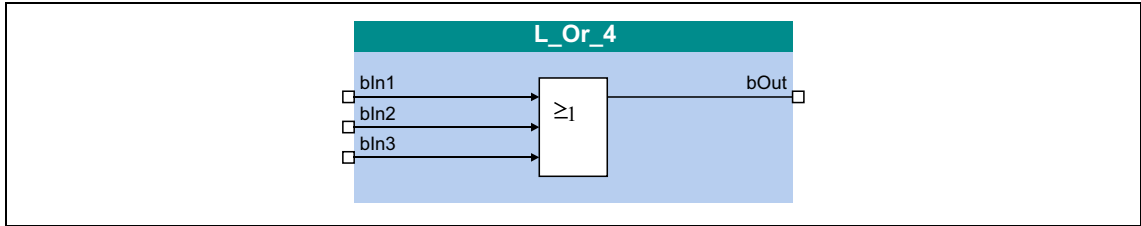
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	

[18-59] Truth table of the L_Or_3 FB

18.1.131 L_Or_4

This FB implements the OR operation of input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

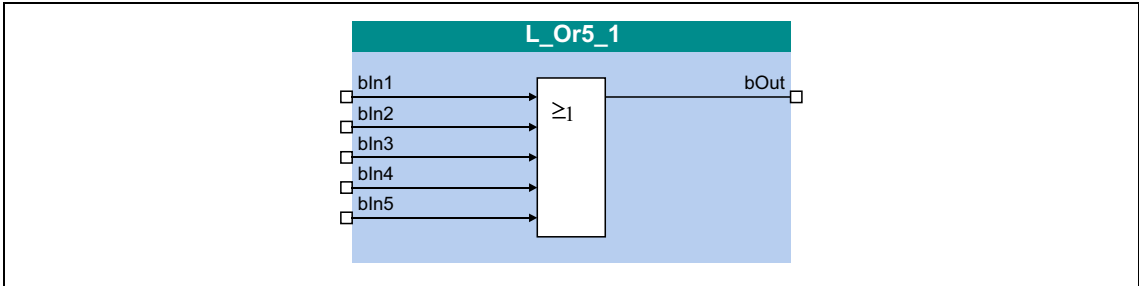
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	TRUE
FALSE	TRUE	TRUE	TRUE
TRUE	FALSE	FALSE	TRUE
TRUE	FALSE	TRUE	TRUE
TRUE	TRUE	FALSE	TRUE
TRUE	TRUE	TRUE	TRUE

[18-60] Truth table of the L_Or_4 FB

18.1.132 L_Or5_1

This FB implements the OR operation of input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 ... bIn5	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

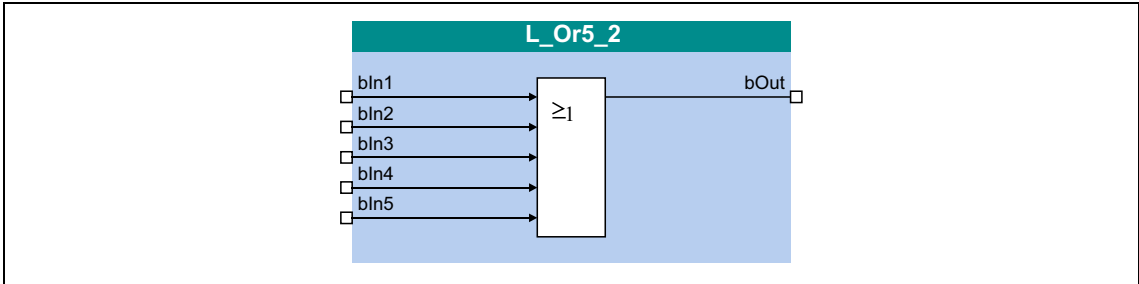
Function

Inputs					Output
bIn5	bIn4	bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	FALSE	FALSE	TRUE	TRUE
FALSE	FALSE	FALSE	TRUE	FALSE	
FALSE	FALSE	FALSE	TRUE	TRUE	
FALSE	FALSE	TRUE	FALSE	FALSE	
...					
TRUE	TRUE	TRUE	FALSE	TRUE	
TRUE	TRUE	TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE	TRUE	

[18-61] Truth table of the FB L_Or5_1

18.1.133 L_Or5_2

This FB implements the OR operation of input signals.



Inputs

Designator	Data type	Information/possible settings
bIn1 ... bIn5	BOOL	Input signal

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal

Function

Inputs					Output
bIn5	bIn4	bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	FALSE	FALSE	TRUE	TRUE
FALSE	FALSE	FALSE	TRUE	FALSE	
FALSE	FALSE	FALSE	TRUE	TRUE	
FALSE	FALSE	TRUE	FALSE	FALSE	
...					
TRUE	TRUE	TRUE	FALSE	TRUE	
TRUE	TRUE	TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE	TRUE	

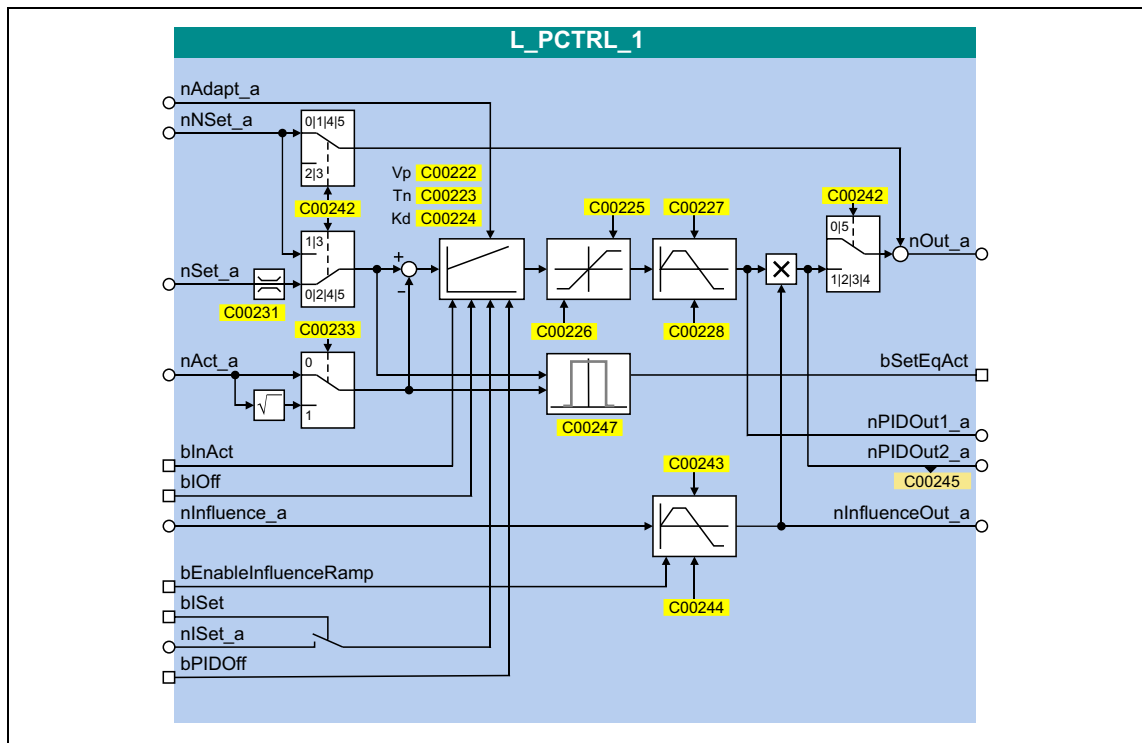
[18-62] Truth table of the FB L_Or5_2

18.1.134 L_PCTRL_1

This FB is a PID controller and can be used for various control tasks (e.g. as dancer position controller, tension controller, or pressure controller).

The FB is provided with the following functions:

- Adjustable control algorithm (P, PI, PID)
- Ramp function generator for preventing setpoint step-changes at the input
- Limitation of the controller output
- Factorisation of the output signal
- Vp adaptation
- Integral action component can be switched off
- Comparison function "Actual value = setpoint"



Inputs

Designator	Data type	Information/possible settings
nAdapt_a	INT	Adaptation of gain Vp set in C00222 in percent <ul style="list-style-type: none"> • Internal limitation to ± 199.99 % • Changes can be done online. • Display parameter: C00830/62
nNSet_a	INT	Speed setpoint <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % • Internal limitation to ± 199.99 % • Display parameter: C00830/89
nSet_a	INT	Sensor and process setpoint for operating modes 2, 4 and 5 <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % • Internal limitation to ± 199.99 % • Display parameter: C00830/63

Designator	Data type	Information/possible settings
nAct_a	INT	Speed or actual sensor value (actual process value) <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 % • Internal limitation to \pm 199.99 % • Display parameter: C00830/61
bInAct	BOOL	Deactivate process controller temporarily (stop) <ul style="list-style-type: none"> • Changes can be done online. • Display parameter: C00833/76 Note: This input is not interconnected in the LA_NCtrl application block.
		TRUE <ul style="list-style-type: none"> • The current output value is frozen. • The internal control algorithm is stopped. • However, a setpoint selected via input <i>nNSet_a</i> is still provided in operating modes 0/1/4/5.
bIOff	BOOL	Switch off the I-component of the process controller <ul style="list-style-type: none"> • Changes can be done online. • Display parameter: C00833/77
		TRUE The I component of the process controller is set to zero.
nInfluence_a	INT	Limitation of the influencing factor in percent <ul style="list-style-type: none"> • <i>nInfluence_a</i> serves to limit the influencing factor of the PID controller contained in the FB to a required value (- 199.99 % ... + 199.99 %). • Scaling: 16384 \equiv 100 % • Internal limitation to \pm 199.99 % • Display parameter: C00830/64
bEnableInfluenceRamp	BOOL	Activate ramp for influencing factor <ul style="list-style-type: none"> • Display parameter: C00833/106
		TRUE Influencing factor of the PID controller is ramped up to the <i>nInfluence_a</i> value.
		FALSE Influencing factor of the PID controller is ramped down to "0".
bISet	BOOL	Accept I component <i>nISet_a</i> in PID controller
		TRUE The value at the input <i>nISet_a</i> is accepted in the PID controller.
nISet_a	INT	Selection of I component of PID controller <ul style="list-style-type: none"> • With a TRUE signal at <i>bISet</i>, the assigned value is accepted in the PID controller. • Scaling: 16384 \equiv 100 % • Internal limitation to \pm 199.99 %
bPIDOff <small>(from version 06.00.00)</small>	BOOL	Reset the entire PID controller
		TRUE <ul style="list-style-type: none"> • The I component of the controller is set to zero. • The controller output is set to zero. • The internal control algorithm is stopped.

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Output signal <ul style="list-style-type: none"> • Internal limitation to \pm32767 (\pm199.99 %) • Scaling: 16384 \equiv 100 %
bSetEqAct	INT	Status output "Setpoint and actual value are identical"
		TRUE Setpoint and actual value are identical, i.e. no system deviation available.
nPIDOut1_a	INT	PID controller output <u>without</u> influencing factor <i>nInfluence_a</i> <ul style="list-style-type: none"> • Inputs <i>bEnableInfluenceRamp</i> and <i>nInfluence_a</i> do not have any effect here, the limited PID output value influenced by the internal ramp times is output. • There is no connection with the additive input <i>nNSet_a</i>. • Scaling: 16384 \equiv 100 %

Designator	Data type	Value/meaning
nPIDOut2_a	INT	PID controller output <u>with</u> influencing factor <i>nInfluence_a</i> . <ul style="list-style-type: none"> • There is no connection with the additive input <i>nSet_a</i>. • Scaling: 16384 \equiv 100 % • Display parameter: C00245
nInfluenceOut_a	INT	Current influencing factor ("ramp status") on the PID output value <ul style="list-style-type: none"> • Scaling: 16384 \equiv 100 %

Parameters

Parameters	Possible settings			Info
C00222	0.1	0.1	500.0	Gain Vp <ul style="list-style-type: none"> • Lenze setting: 1.0
C00223	20	ms	6000	Reset time Tn <ul style="list-style-type: none"> • Lenze setting: 400 ms
C00224	0.0	0.1	5.0	Differential component Kd <ul style="list-style-type: none"> • Lenze setting: 0.0
C00225	-199.99	%	+199.99	MaxLimit <ul style="list-style-type: none"> • Maximum value of the PID operating range • Lenze setting: 199.99 %
C00226	-199.99	%	+199.99	MinLimit <ul style="list-style-type: none"> • Minimum value of the PID operating range • Lenze setting: -199.99 %
C00227	0.000	s	999.999	Acceleration time for the ramp at the PID output (should be set as steep as possible) <ul style="list-style-type: none"> • Lenze setting: 0.010 s
C00228	0.000	s	999.999	Deceleration time for the ramp at the PID output <ul style="list-style-type: none"> • Lenze setting: 0.010 s
C00231/1 (Pos. Maximum) C00231/2 (Pos. Minimum) C00231/3 (Neg. Minimum) C00231/4 (Neg. Maximum)	0.00	%	199.99	Operating range <ul style="list-style-type: none"> • Determination of the operating range for the PID process controller by limiting the input signal <i>nSet_a</i>. • Lenze setting: No limitation (-199.99 % ... +199.99 %)
C00233				Root function <ul style="list-style-type: none"> • Lenze setting: "0: Off"
	0	Off		The actual value at <i>nAct_a</i> is not changed for further processing.
	1	On		The square root of the actual value at <i>nAct_a</i> is taken for further processing.

Parameters	Possible settings			Info
C00242				Operating mode • Lenze setting: "0: Off"
	0	Off		The input setpoint $nNSet_a$ is output without any changes at the output $nOut_a$.
	1	$nNSet + nNSet_PID$		$nNSet_a$ and $nAct_a$ are used as PID input values. The arriving $nNSet_a$ is additively linked to the value output by the PID element.
	2	$nSet_PID$		$nSet_a$ and $nAct_a$ are used as PID input values. The input $nNSet_a$ is not considered.
	3	$nNSet_PID$		$nNSet_a$ and $nAct_a$ are used as PID input values. The input $nSet_a$ is not considered.
	4	$nNSet + nSet_PID$		$nSet_a$ and $nAct_a$ are used as PID input values. The arriving $nNSet_a$ setpoint is additively linked to the value output by the PID element.
	5	$nNSet nSet_PID$		$nSet_a$ and $nAct_a$ are used as PID input values. The setpoint $nNSet_a$ is output at the output $nOut_a$. The PID output value is output at the output $nPIDOut_a$.
C00243	0.000	s	999.999	Influence acceleration time • Acceleration time T_{ir} for the influencing factor. • Lenze setting: 5.000 s
C00244	0.000	s	999.999	Influence deceleration time • Deceleration time T_{if} for the influencing factor. • Lenze setting: 5.000 s
C00245	-199.99	%	+199.99	Display of PID output value $nPIDOut_a$
C00247 (from version 06.00.00)	0	%	100	Window for comparison function "Actual value = setpoint" • Lenze setting: 2 % • Hysteresis: 1 % (fixed)

18.1.134.1 Control characteristic

The PI algorithm is active in the Lenze setting.

Gain (P component)

The input value is controlled by a linear characteristic. The slope of the characteristic is determined by the controller gain V_p .

The controller gain V_p is set under [C00222](#).

- The controller gain can be adapted via the input $nAdapt_a$ (also possible in online mode).
- The input value $nAdapt_a$ has a direct effect on the controller gain:

$$P = nAdapt_a \cdot C00222$$

Example: With the parameterised controller gain $V_p = 2.0$ and $nAdapt_a = 75\%$, the resulting gain factor is as follows:

$$P = \frac{75 [\%]}{100 [\%]} \cdot 2.0 = 1.5$$

Integral action component (I component)

The I component can be selected via the input $nISet_a$. With a TRUE signal at $bISet$, the assigned value is accepted in the PID controller.

- Setting the adjustment time T_n to the maximum value of "6000 ms" deactivates the I component.
- The I component of the controller can also be deactivated by setting the input $bIOff$ to TRUE.
- The I component can be switched on and off online.

Reset time

The adjustment time T_n is set under [C00223](#).

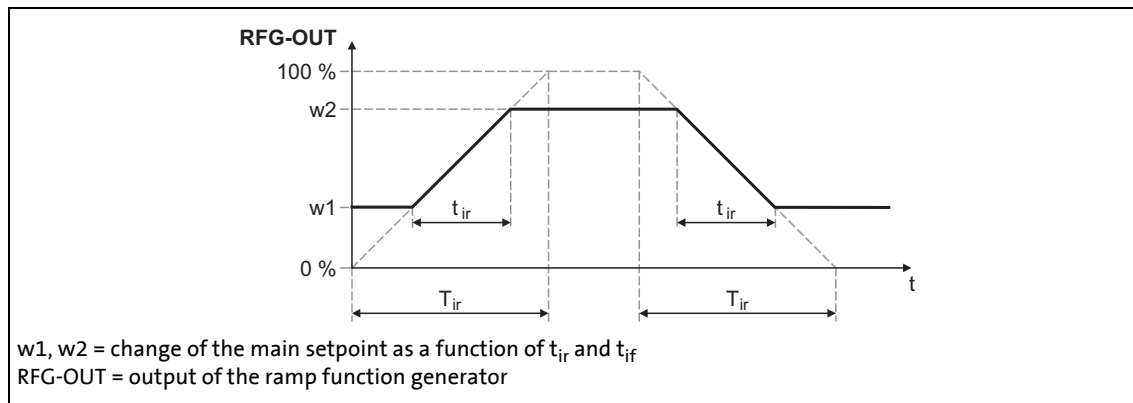
Differential component K_d (D component)

The differential component K_d is set under [C00224](#).

- The setting "0.0 s" deactivates the D component (Lenze setting). In this way, the PID controller becomes a PI controller or P controller, if the I component has been deactivated as well.

18.1.134.2 Ramp function generator

The PID output is led via a ramp function generator with linear characteristic. This serves to transfer setpoint step-changes at the PID output into a ramp which should be as steep as possible.



[18-63] Acceleration and deceleration times

- t_{ir} and t_{if} are the desired times for changing between $w1$ and $w2$.
- The ramps for acceleration and deceleration can be set individually.
 - [C00227](#): Acceleration time t_{ir}
 - [C00228](#): Deceleration time t_{if}
- The t_{ir}/t_{if} values are converted into the required T_i times according to the following formula:

$T_{ir} = t_{ir} \cdot \frac{100\%}{w2 - w1}$	$T_{if} = t_{if} \cdot \frac{100\%}{w2 - w1}$
---	---

- The ramp function generator is immediately set to "0" by setting *blnAct* to TRUE.

18.1.134.3 Operating range of the PID process controller

The value range of the input signal *nSet_a* and thus the operating range of the PID process controller can be limited with the following parameters:

- [C00231/1](#): Pos. maximum (default setting: 199.99 %)
- [C00231/2](#): Pos. minimum (default setting: 0.00 %)
- [C00231/3](#): Neg. minimum (default setting: 0.00 %)
- [C00231/4](#): Neg. maximum (default setting: 199.99 %)

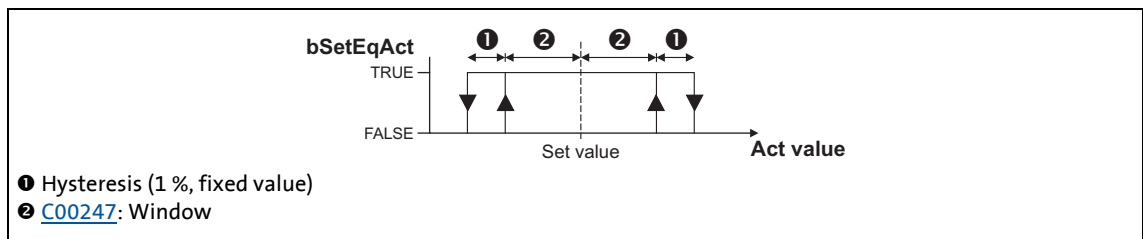
18.1.134.4 Evaluation of the output signal

After the limitation, the output signal is evaluated with the influencing factor *nInfluence_a*. The evaluation is activated/suppressed along a ramp when the *bEnableInfluenceRamp* input is set to TRUE. The ramp times are set with the parameters "Influence acceleration time" (C00243) and "Influence deceleration time" (C00244).

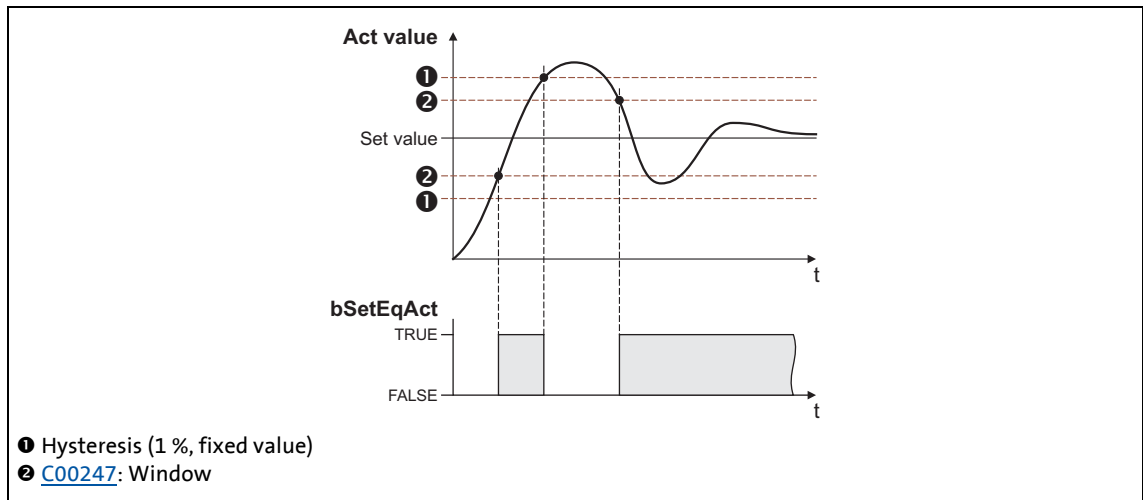
18.1.134.5 Comparison function "Actual value = setpoint"

If setpoint and actual value are identical and there is no system deviation, the *bSetEqAct* status output is set to TRUE.

- The hysteresis of the comparison function has a fixed value of 1 %.
- From version 06.00.00 onwards, the symmetrical window around the setpoint for the comparison function can be set in C00247 (Lenze setting: 2 %).



[18-64] Comparison function: Switching performance



[18-65] Comparison function: Example

18.1.134.6 Control functions

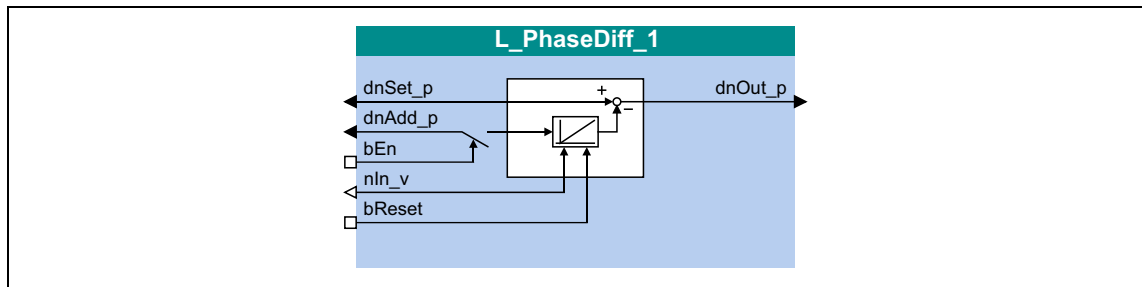
The process controller has various digital inputs for controlling the FB:

Designator	Data type	Information/possible settings
bInAct	BOOL	Deactivate process controller temporarily (stop) <ul style="list-style-type: none"> Changes can be done online. Display parameter: C00833/76 Note: This input is not interconnected in the LA_NCtrl application block.
		TRUE <ul style="list-style-type: none"> The current output value is frozen. The internal control algorithm is stopped. However, a setpoint selected via input <i>nNSet_a</i> is still provided in operating modes 0/1/4/5.
bIOff	BOOL	Switch off the I-component of the process controller <ul style="list-style-type: none"> Changes can be done online. Display parameter: C00833/77
		TRUE The I component of the process controller is set to zero.
bPIDOff <small>(from version 06.00.00)</small>	BOOL	Reset the entire PID controller
		TRUE <ul style="list-style-type: none"> The I component of the controller is set to zero. The controller output is set to zero. The internal control algorithm is stopped.

18.1.135 L_PhaseDiff_1

This FB generates a position difference for the specified position setpoint from a position value and a speed signal.

- In an integrator, the *nIn_v* speed signal is integrated into a position value and subtracted from the *dnSet_p* position setpoint.
- In addition, the adaptive *dnAdd_p* position value can be added to the integrator content by setting *bEn* to TRUE.



Inputs

Designator	Data type	Information/possible settings	
dnSet_p	DINT	Selection of a position setpoint	
dnAdd_p	DINT	Adaptive position value for the actual position	
bEn	BOOL	FALSE	1. The speed signal at <i>nIn_v</i> is integrated by the angle integrator. 2. The result of the angle integrator is subtracted from the angle signal at <i>dnSet_p</i> and output at <i>dnOut_p</i> afterwards.
		TRUE	The adaptive position value selected via <i>dnAdd_p</i> is added: 1. The speed signal at <i>nIn_v</i> is integrated by the angle integrator. 2. The angle signal at <i>dnAdd_p</i> is added to the integrated speed signal in every task cycle. 3. The result of the angle integrator is subtracted from the angle signal at <i>dnSet_p</i> and output at <i>dnOut_p</i> afterwards.
nIn_v	INT	Selection of the actual speed to be converted into the position value	
bReset	BOOL	Reset actual angle integrator	
		TRUE	Actual angle integrator is set to "0".

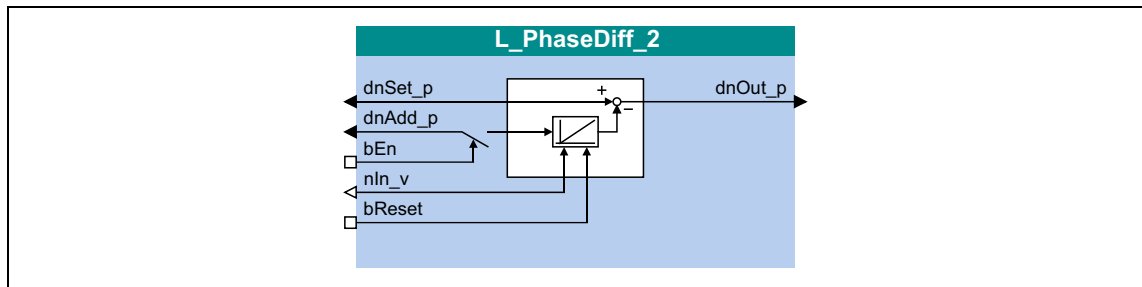
Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output angle signal (position difference) • Without limitation

18.1.136 L_PhaseDiff_2

This FB generates a position difference for the specified position setpoint from a position value and a speed signal.

- In an integrator, the *nIn_v* speed signal is integrated into a position value and subtracted from the *dnSet_p* position setpoint.
- In addition, the adaptive *dnAdd_p* position value can be added to the integrator content by setting *bEn* to TRUE.



Inputs

Designator	Data type	Information/possible settings	
dnSet_p	DINT	Selection of a position setpoint	
dnAdd_p	DINT	Adaptive position value for the actual position	
bEn	BOOL	FALSE	1. The speed signal at <i>nIn_v</i> is integrated by the angle integrator. 2. The result of the angle integrator is subtracted from the angle signal at <i>dnSet_p</i> and output at <i>dnOut_p</i> afterwards.
		TRUE	The adaptive position value selected via <i>dnAdd_p</i> is added: 1. The speed signal at <i>nIn_v</i> is integrated by the angle integrator. 2. The angle signal at <i>dnAdd_p</i> is added to the integrated speed signal in every task cycle. 3. The result of the angle integrator is subtracted from the angle signal at <i>dnSet_p</i> and output at <i>dnOut_p</i> afterwards.
nIn_v	INT	Selection of the actual speed to be converted into the position value	
bReset	BOOL	Reset actual angle integrator	
		TRUE	Actual angle integrator is set to "0".

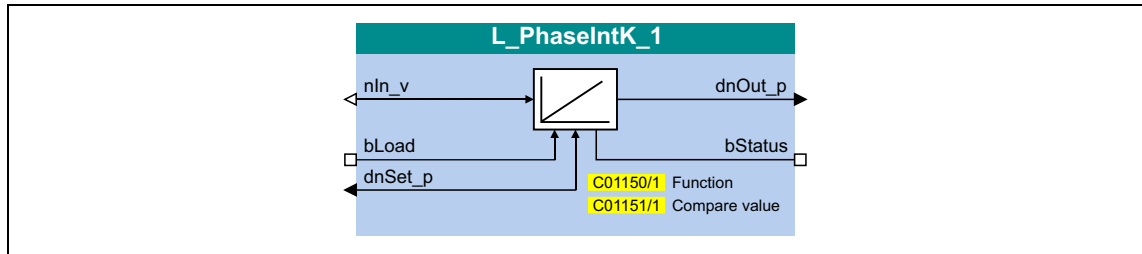
Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output angle signal (position difference) • Without limitation

18.1.137 L_PhaseIntK_1

This FB can integrate a speed or a velocity to an angle (path). The FB can also detect a relatively completed distance.

- The integrator can take max. ± 32000 encoder revolutions.



Inputs

Designator	Data type	Information/possible settings
nIn_v	INT	Selection of the actual speed • 16384 \equiv 15000 rpm
bLoad	BOOL	Load angle integrator with starting value and reset status signal TRUE Angle integrator is loaded with the value at <i>dnSet_p</i> and <i>bStatus</i> is reset to FALSE.
dnSet_p	DINT	Starting value for angle integrator

Outputs

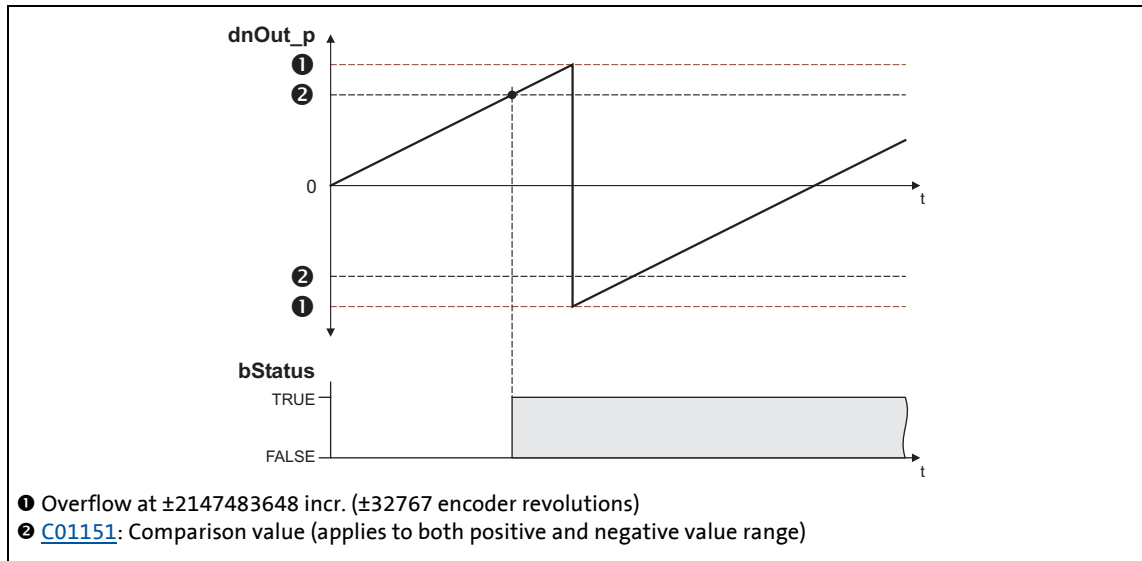
Designator	Data type	Value/meaning
dnOut_p	DINT	Angle output signal • 65536 [incr.] \equiv 1 encoder revolution • Overflow is possible (display via <i>bStatus</i>)
bStatus	BOOL	Status signal "Overflow occurred/distance processed" • Status signal can be reset via <i>bLoad</i> . TRUE Overflow has occurred or distance is processed.

Parameters

Parameters	Possible settings	Info
C01150/1		Function
	0 Loading with level	Load integrator with TRUE level at the input <i>bLoad</i> (Lenze setting)
	1 Loading with edge	Load integrator with FALSE/TRUE edge at the input <i>bLoad</i> .
	2 Loading with level + reset	Load integrator when reaching the comparison value or with TRUE level at the input <i>bLoad</i> .
C01151/1	0	200000000 Comparison value • Is valid for both the positive and the negative value range. • Lenze setting: 0

18.1.137.1 Function at constant input value

Selection: [C01150](#) = "0: Loading with level" or "1: Loading with edge"

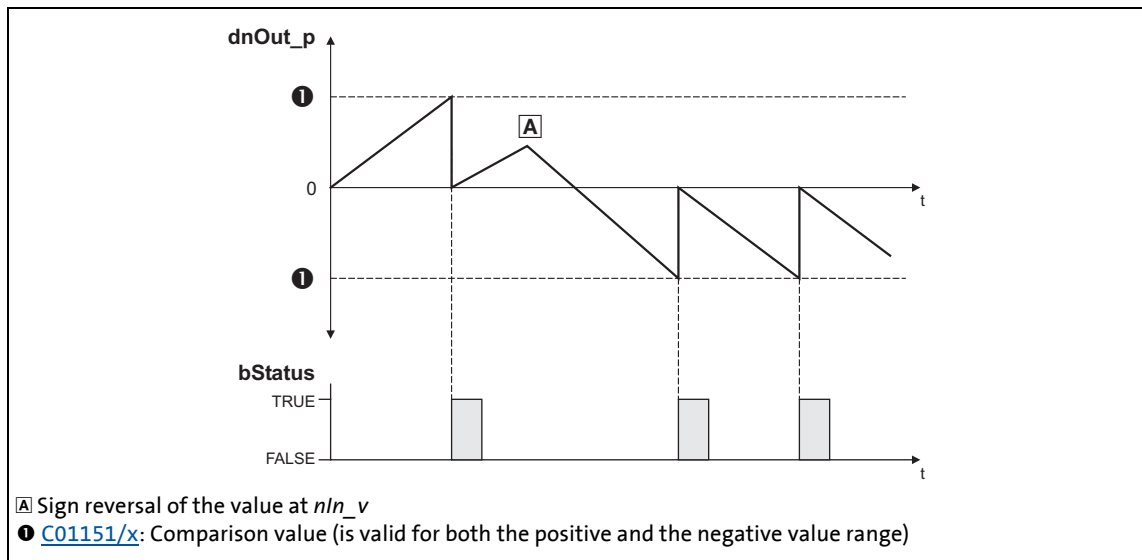


[18-66] Switching performance if the overflow is in the positive direction

- If "0: Loading with level" is selected in [C01150](#), the *bLoad* input is status-controlled: In case of a TRUE signal, the integrator is loaded with the value at *dnSet_p* and the *bStatus* output is set to FALSE.
- If "1: Loading with edge" is selected in [C01150](#), the *bLoad* input is edge-controlled: In case of a FALSE/TRUE edge, the integrator is loaded with the value at *dnSet_p* and then immediately continues to integrate, the *bStatus* output is set to FALSE.
- A positive signal at *nIn_v* is incremented (the counter content is increased with every function call).
- A negative signal at *nIn_v* is decremented (the counter content is reduced with every function call).
- *dnOut_p* outputs the counter content of the bipolar integrator.
 - If the counter content exceeds a value of $+32767$ encoder revolutions (corresponds to $+2147483647$ incr.), an overflow occurs and the counting process continues at a value of -32768 encoder revolutions.
 - If the counter content falls below a value of -32768 encoder revolutions (corresponds to -2147483648 incr.), an overflow occurs and the counting process starts at a value of $+32767$ encoder revolutions.
- *bStatus* will be set to TRUE if the comparison value set in [C01151/x](#) is reached.

18.1.137.2 Function at input value with sign reversal

Selection: [C01150](#) = "2: Loading with level + reset"



[18-67] Switching performance if the input signal changes signs

- If "2: Loading with level + reset" is selected in [C01150](#), the $bLoad$ input is status-controlled: In case of a TRUE signal, the integrator is loaded with the value at $dnSet_p$ and the $bStatus$ output is set to FALSE.
- A positive signal at nl_n_v is incremented (the counter content is increased with every function call).
- A negative signal at nl_n_v is decremented (the counter content is reduced with every function call).
- $dnOut_p$ outputs the counter content of the bipolar integrator.
 - If the positive counter content is higher than the comparison value set in [C01151/x](#), the comparison value will be subtracted from the counter content, and $bStatus$ will be set to TRUE for one task cycle.
 - If the negative counter content is lower than the comparison value set in [C01151/x](#), the comparison value will be added to the counter content, and $bStatus$ will be set to TRUE for one task cycle.

18.1.137.3 Calculation of the output signal

The output value at $dnOut_p$ can be detected according to the following formula:

$$dnOut_p [\text{incr.}] = nIn_v [\text{rpm}] \cdot t [\text{s}] \cdot 65535 [\text{incr./rev.}]$$

t = integration time
 16384 \approx 15000 rpm
 1 \equiv 1 incr.

Example

You want to determine the counter content of the integrator at a certain speed at the input and a certain integration time t.

Given values:

- $nIn_v = 1000 \text{ rpm} \approx \text{integer value } 1092$
- Integration time $t = 10 \text{ s}$
- Starting value of the integrator = 0

Solution:

- Conversion of the input signal at nIn_v :

$$1000 \text{ rpm} = \frac{1000 \text{ rev.}}{60 \text{ s}}$$

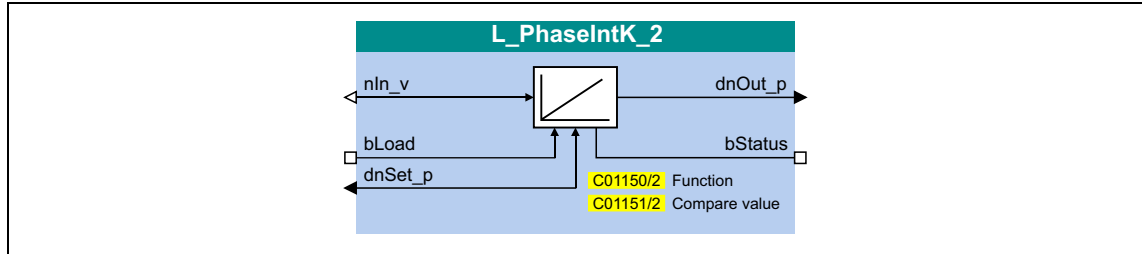
- Calculation of the output value:

$$dnOut_p = \frac{1000 \text{ rev.}}{60 \text{ s}} \cdot 10 \text{ s} \cdot \frac{65535 \text{ incr.}}{\text{Rev.}} = 10922666 \text{ incr.}$$

18.1.138 L_PhaseIntK_2

This FB can integrate a speed or a velocity to an angle (path). The FB can also detect a relatively completed distance.

- The integrator can take max. ±32000 encoder revolutions.



Inputs

Designator	Data type	Information/possible settings
nIn_v	INT	Selection of the actual speed • 16384 ≙ 15000 rpm
bLoad	BOOL	Load angle integrator with starting value and reset status signal
		TRUE Angle integrator is loaded with the value at <i>dnSet_p</i> and <i>bStatus</i> is reset to FALSE.
dnSet_p	DINT	Starting value for angle integrator

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Angle output signal • 65536 [incr.] ≙ 1 encoder revolution • Overflow is possible (display via <i>bStatus</i>)
bStatus	BOOL	Status signal "Overflow occurred/distance processed" • Status signal can be reset via <i>bLoad</i> .
		TRUE Overflow has occurred or distance is processed.

Parameters

Parameters	Possible settings			Info
C01150/2				Function
	0	Loading with level		Load integrator with TRUE level at the input <i>bLoad</i> (Lenze setting)
	1	Loading with edge		Load integrator with FALSE/TRUE edge at the input <i>bLoad</i> .
	2	Loading with level + reset		Load integrator when reaching the comparison value or with TRUE level at the input <i>bLoad</i> .
C01151/2	0		2000000000	Comparison value <ul style="list-style-type: none"> • Is valid for both the positive and the negative value range. • Lenze setting: 0

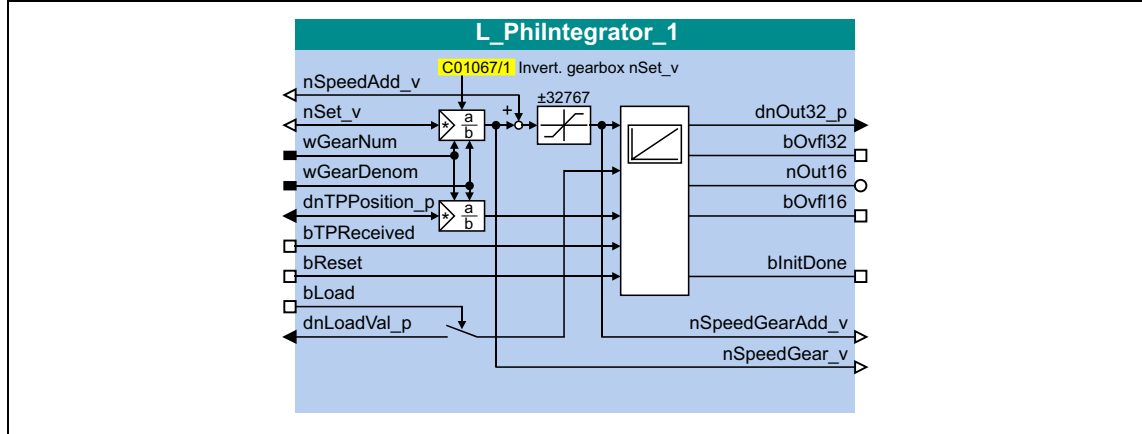


For a detailed functional description see [L_PhaseIntK_1](#).

18.1.139 L_PhilIntegrator_1

This FB evaluates a speed with a gearbox factor and adds them in an integrator.

- The integrator value is output as 16-bit value and 32-bit value.
- An overflow of the prevailing output is signalled.
- The integrator can be loaded and initialised (e.g. with a touch probe signal).



Inputs

Designator	Data type	Information/possible settings
nSpeedAdd_v	INT	Additive speed
nSet_v	INT	Speed input (angular difference)
wGearNum	WORD	Gearbox factor (numerator)
wGearDenom	WORD	Gearbox factor (denominator) • When <i>wGearDenom</i> = 0, it is internally calculated with 1.
dnTPPosition_p	DINT	Initialisation value
bTPReceived	BOOL	Initialise integrator FALSE → TRUE
bReset	BOOL	Reset integrator TRUE
bLoad	BOOL	Load integrator TRUE
dnLoadVal_p	DINT	Value the integrator is to be loaded with.

Outputs

Designator	Data type	Value/meaning
dnOut32_p	DINT	Integrator value (32 bits)
bOvfl32	BOOL	Status signal "overflow (32 bits)"
		TRUE Overflow
nOut16	INT	Integrator value (16 bits)
bOvfl16	BOOL	Status signal "overflow (16 bits)"
		TRUE Overflow
bInitDone	BOOL	Status signal "Initialisation completed"
		TRUE Integrator is initialised
nSpeedGearAdd_v	INT	Resulting speed with additive speed ($nSet_v * \text{gearbox factor} + nSpeedAdd_v$)
nSpeedGear_v	INT	Resulting speed without additive speed ($nSet_v * \text{gearbox factor}$)

Parameters

Parameters	Possible settings	Info
C01067/1		Invert. gearbox nSet_v
	0 not inverted	
	1 inverted	
	2 Automatically from MCK	

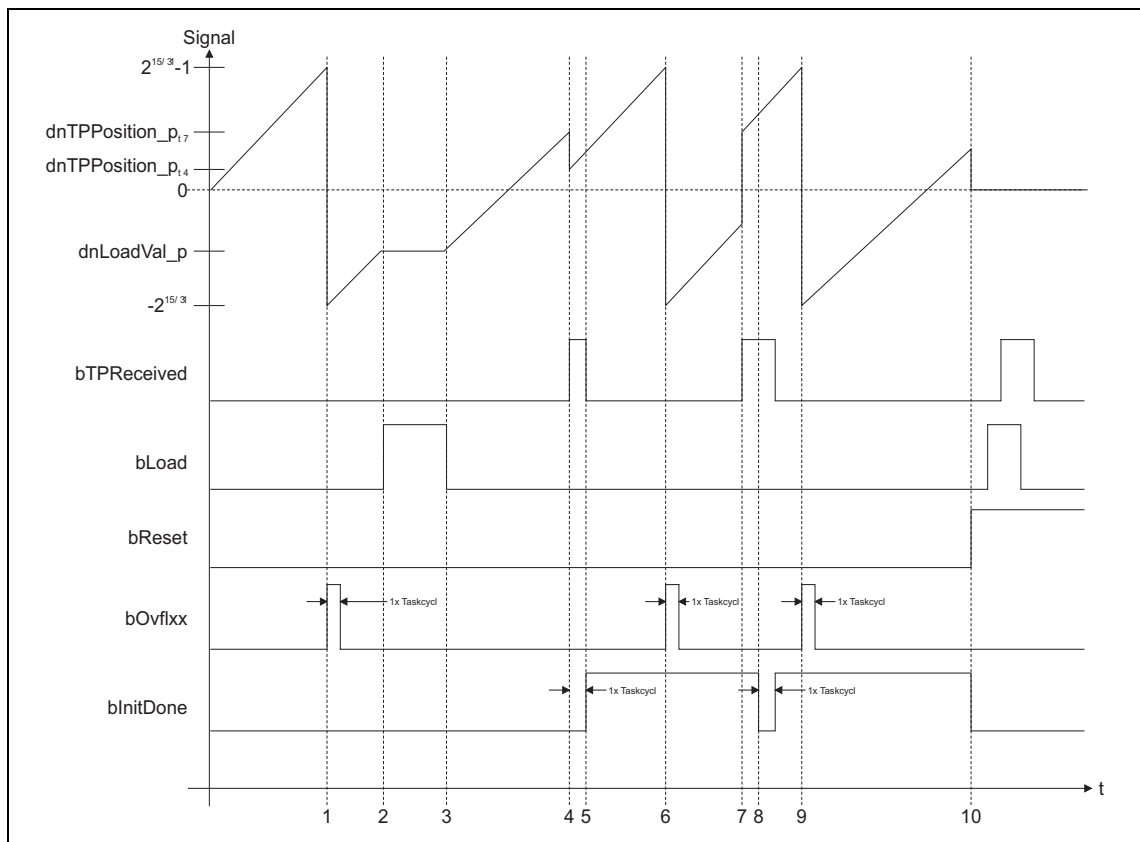
18.1.139.1 Function

The $nSet_v$ input value is evaluated, integrated and output as 16-bit value ($nOut16$) and 32-bit value ($dnOut32_p$) with the gearbox factors $wGearNum$ and $wGearDenom$.

$$nOut16 = nOut16 + nSet_v \cdot \frac{wGearNum}{wGearDenom}$$

$$dnOut32_p = dnOut32_p + nSet_v \cdot \frac{wGearNum}{wGearDenom}$$

- Evaluation of the gearbox factor is remainder considered.
- A positive or negative overflow of the integrator is signalled by a TRUE signal (for a task cycle) at the $bOvfl16$ output for the $nOut16$ output or at the $bOvfl32$ output for the $dnOut32_p$ output.



[18-68] Signal characteristic

18.1.139.2 Example

The current speed at *nSet_v* and the gearbox factors serve to create a specific machine measuring system from the motor measuring system.

- 216 increments in the motor measuring system are to correspond to 1 motor revolution.
- 216 increments in the machine measuring system (*nOut16*) are to correspond to 1 machine shaft revolution.

Initialise integrator

A FALSE/TRUE edge at *bTPReceived* initialises the integrator, i.e. a calculation with *dnTPPosition_p* and *dnLoadVal_p* is made:

$$\begin{aligned} nOut16 &= (\text{INT})(dnLoadVal_p + dnTPPosition_p \cdot \text{Gearbox factor}) \\ dnOut32_p &= dnLoadVal_p + dnTPPosition_p \cdot \text{Gearbox factor} \end{aligned}$$

- After initialisation is completed, the *blnitDone* output is set to TRUE in the next call cycle.
- In case of a renewed initialisation without a previous reset (*bReset* = TRUE), the *blnitDone* output is set to FALSE for a task cycle.

Reset integrator

When *bReset* is set to TRUE, the integrator is set to 0. No calculations are made.

- The Boolean outputs are set to FALSE.
- The *bReset* input has the highest priority.

Load integrator

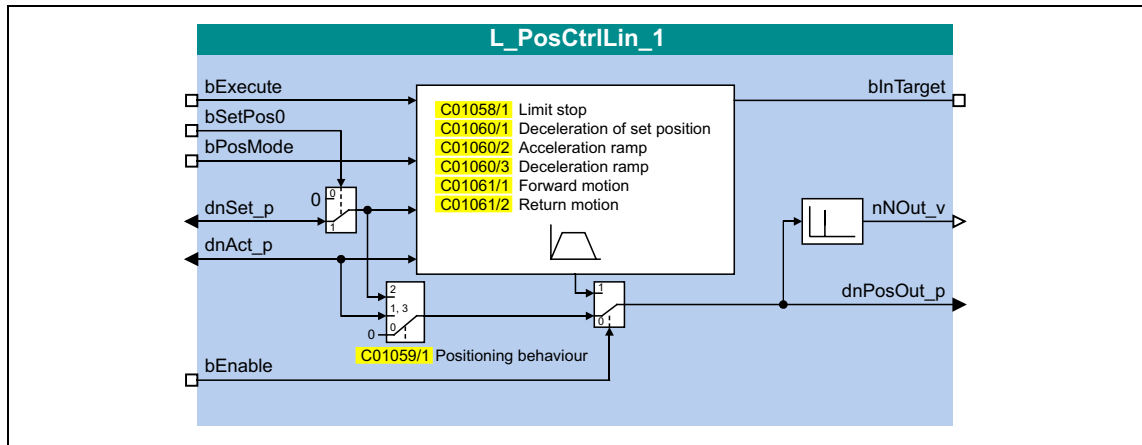
When *bLoad* is set to TRUE, the integrator is loaded with the value at *dnLoadVal_p* and the outputs are set.

- When *bLoad* is set to TRUE, the input is not integrated and no check for overflow is executed.
- When *bLoad* is reset to FALSE, the integrator continues from the loaded value. The *blnitDone* output is reset to FALSE after a FALSE/TRUE edge at *bTPReceived* with a delay of one call cycle.

18.1.140 L_PosCtrlLin_1

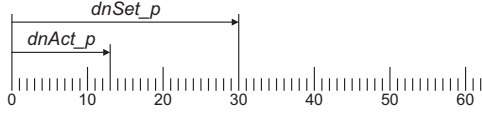
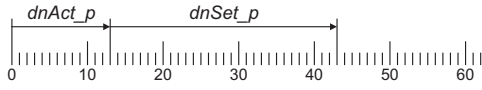
This FB serves to implement the following positioning functions:

- Bring drive to curve position (e.g. after mains connection, manual jog, homing)
- Release drive from curve and bring it to safe position (position override function)
- Positioning the X axis via X offset (higher-level positioning)
- Positioning the Y axis via Y offset (higher-level positioning)



Inputs

Designator	Data type	Information/possible settings	
bExecute	BOOL	Execute positioning profile <ul style="list-style-type: none"> • Only possible if the <i>bEnable</i> input is set to TRUE. 	
		FALSE	No positioning/positioning is aborted. <ul style="list-style-type: none"> • The speed at the <i>nNOOut_v</i> output is braked to standstill via the deceleration ramp set in C01060/1 (<i>nNOOut_v</i> = 0). • At the same time, the <i>dnPosOut_p</i> output is stopped.
		FALSE → TRUE	Positioning is executed/continued. <ul style="list-style-type: none"> • In case of an activated limit stop (C01058/1 = TRUE), a renewed positive edge for a following positioning procedure is required.
bSetPos0	BOOL	Travel to zero position <ul style="list-style-type: none"> • Only possible if the <i>bEnable</i> input is set to TRUE. 	
		FALSE	The value at the <i>dnSet_p</i> input is used as setpoint position.
		TRUE	The value at the <i>dnSet_p</i> input is ignored. The setpoint position is internally set to "0" and the <i>dnPosOut_p</i> output can be travelled to zero position.

Designator	Data type	Information/possible settings
bPosMode	BOOL	Positioning mode FALSE Absolute positioning • The setpoint at <i>dnSet_p</i> is the absolute setpoint position (with regard to zero position): 
		TRUE Relative positioning • With a FALSE/TRUE edge at the <i>bExecute</i> input, the outputs of the current position (<i>dnAct_p</i>) are traversed by the <i>dnSet_p</i> value:  Note: Only to be used with activated limit stop (C01058/1 = TRUE)!
dnSet_p	DINT	Setpoint for positioning in [increments] • Scaling: A revolution is displayed with 65536 increments or steps.
dnAct_p	DINT	Actual position in [increments] • Connect this input with e.g. <i>dnPosOut_p</i> of this FB or with another FB which outputs the actual position of the drive.
bEnable	BOOL	Activate/deactivate positioning function • This input has the highest priority.
		FALSE Positioning function deactivated. • For behaviour see C01059/1 .
		TRUE Positioning function activated.

Outputs

Designator	Data type	Value/meaning
blnTarget	BOOL	Status signal "Target position reached"
		TRUE Target position reached.
nNOut_v	INT	Speed output of the profile generator • Scaling: 16384 \equiv 15000 rpm
dnPosOut_p	DINT	Output position of the profile generator in [increments] • Scaling: A revolution is displayed with 65536 increments or steps.

Parameters

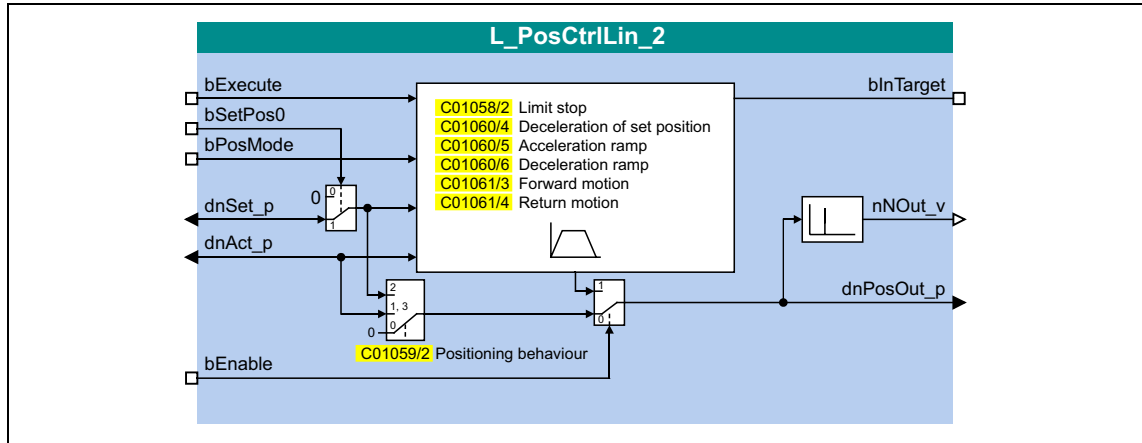
Parameters	Possible settings	Info
C01058/1		Limit stop
	0 deactivated (Lenze setting)	The outputs continuously follow the setpoint at <i>dnSet_p</i> .
	1 activated	The outputs follow the setpoint at <i>dnSet_p</i> once. • If the setpoint position changes, a new FALSE/TRUE edge is required at the <i>bExecute</i> input for another positioning process.

Parameters	Possible settings			Info
C01059/1				Positioning behaviour <ul style="list-style-type: none"> Behaviour with deactivated positioning function (<i>bEnable</i> = FALSE).
	0	<i>dnOut_p</i> = 0 (Lenze setting)		The <i>dnPosOut_p</i> output jumps to "0". <ul style="list-style-type: none"> The speed signal at the <i>nNOut_v</i> output maps this position step change as angle signal. Note: If the <i>nNOut_v</i> output has an impact on the setpoint generation for the drive, undefined motions (shocks, following errors) may occur.
	1	<i>dnOut_p/nNOut_v</i> follow <i>dnAct_p</i>		The outputs <i>dnPosOut_p</i> and <i>nNOut_v</i> follow the value at the <i>dnAct_p</i> input (actual position).
	2	<i>dnOut_p/nNOut_v</i> follow <i>dnSet_p</i>		The outputs <i>dnPosOut_p</i> and <i>nNOut_v</i> follow the value at the <i>dnSet_p</i> input (setpoint).
	3	<i>dnOut_p/nNOut_v</i> follow <i>dnAct_p</i> (without limitation)		The outputs <i>dnPosOut_p</i> and <i>nNOut_v</i> follow the value at the <i>dnAct_p</i> input (actual position), but without limitation.
C01060/1	0.010	s	130.000	Deceleration of set position <ul style="list-style-type: none"> Deceleration ramp for stop before reaching the setpoint position (<i>bExecute</i> = FALSE). Lenze setting: 1.000 s
C01060/2	0.010	s	130.000	Acceleration ramp <ul style="list-style-type: none"> Lenze setting: 1.000 s
C01060/3	0.010	s	130.000	Deceleration ramp <ul style="list-style-type: none"> Lenze setting: 1.000 s
C01061/1	-15000	rpm	15000	Forward motion <ul style="list-style-type: none"> Positive speed Lenze setting: 200 rpm
C01061/2	-15000	rpm	15000	Return motion <ul style="list-style-type: none"> Negative speed Lenze setting: 200 rpm

18.1.141 L_PosCtrlLin_2

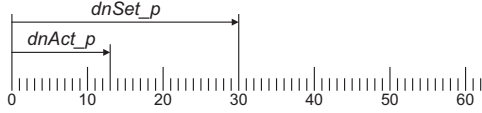
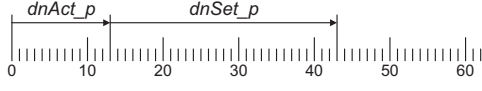
This FB serves to implement the following positioning functions:

- Bring drive to curve position (e.g. after mains connection, manual jog, homing)
- Release drive from curve and bring it to safe position (position override function)
- Positioning the X axis via X offset (higher-level positioning)
- Positioning the Y axis via Y offset (higher-level positioning)



Inputs

Designator	Data type	Information/possible settings	
bExecute	BOOL	Execute positioning profile <ul style="list-style-type: none"> • Only possible if the <i>bEnable</i> input is set to TRUE. 	
		FALSE	No positioning/positioning is aborted. <ul style="list-style-type: none"> • The speed at the <i>nNOut_v</i> output is braked to standstill via the deceleration ramp set in C01060/4 (<i>nNOut_v</i> = 0). • At the same time, the <i>dnPosOut_p</i> output is stopped.
		FALSE → TRUE	Positioning is executed/continued. <ul style="list-style-type: none"> • In case of an activated limit stop (C01058/2 = TRUE), a renewed positive edge for a following positioning procedure is required.
bSetPos0	BOOL	Travel to zero position <ul style="list-style-type: none"> • Only possible if the <i>bEnable</i> input is set to TRUE. 	
		FALSE	The value at the <i>dnSet_p</i> input is used as setpoint position.
		TRUE	The value at the <i>dnSet_p</i> input is ignored. The setpoint position is internally set to "0" and the <i>dnPosOut_p</i> output can be travelled to zero position.

Designator	Data type	Information/possible settings	
bPosMode	BOOL	FALSE Absolute positioning <ul style="list-style-type: none"> The setpoint at <i>dnSet_p</i> is the absolute setpoint position (with regard to zero position): 	
		TRUE Relative positioning <ul style="list-style-type: none"> With a FALSE/TRUE edge at the <i>bExecute</i> input, the outputs of the current position (<i>dnAct_p</i>) are traversed by the <i>dnSet_p</i> value:  <p>Note: Only to be used with activated limit stop (C01058/2 = TRUE)!</p>	
dnSet_p	DINT	Setpoint for positioning in [increments] <ul style="list-style-type: none"> Scaling: A revolution is displayed with 65536 increments or steps. 	
dnAct_p	DINT	Actual position in [increments] <ul style="list-style-type: none"> Connect this input with e.g. <i>dnPosOut_p</i> of this FB or with another FB which outputs the actual position of the drive. 	
bEnable	BOOL	Activate/deactivate positioning function <ul style="list-style-type: none"> This input has the highest priority. 	
		FALSE	Positioning function deactivated. <ul style="list-style-type: none"> For behaviour see C01059/2.
		TRUE	Positioning function activated.

Outputs

Designator	Data type	Value/meaning
blnTarget	BOOL	Status signal "Target position reached"
		TRUE Target position reached.
nNOut_v	INT	Speed output of the profile generator <ul style="list-style-type: none"> Scaling: 16384 \equiv 15000 rpm
dnPosOut_p	DINT	Output position of the profile generator in [increments] <ul style="list-style-type: none"> Scaling: A revolution is displayed with 65536 increments or steps.

Parameters

Parameters	Possible settings	Info
C01058/2		Limit stop
	0 deactivated (Lenze setting)	The outputs continuously follow the setpoint at <i>dnSet_p</i> .
	1 activated	The outputs follow the setpoint at <i>dnSet_p</i> once. <ul style="list-style-type: none"> If the setpoint position changes, a new FALSE/TRUE edge is required at the <i>bExecute</i> input for another positioning process.

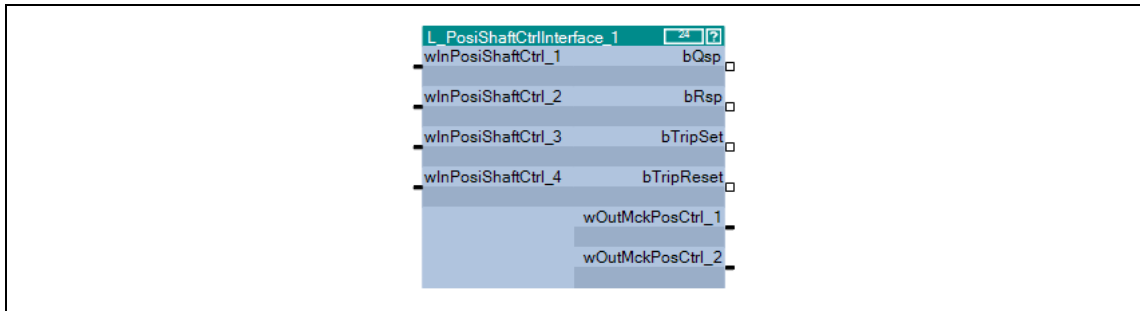
Parameters	Possible settings			Info
C01059/2				Positioning behaviour <ul style="list-style-type: none"> Behaviour with deactivated positioning function (<i>bEnable</i> = FALSE).
	0	<i>dnOut_p</i> = 0 (Lenze setting)		The <i>dnPosOut_p</i> output jumps to "0". <ul style="list-style-type: none"> The speed signal at the <i>nNOut_v</i> output maps this position step change as angle signal. Note: If the <i>nNOut_v</i> output has an impact on the setpoint generation for the drive, undefined motions (shocks, following errors) may occur.
	1	<i>dnOut_p/nNOut_v</i> follow <i>dnAct_p</i>		The outputs <i>dnPosOut_p</i> and <i>nNOut_v</i> follow the value at the <i>dnAct_p</i> input (actual position).
	2	<i>dnOut_p/nNOut_v</i> follow <i>dnSet_p</i>		The outputs <i>dnPosOut_p</i> and <i>nNOut_v</i> follow the value at the <i>dnSet_p</i> input (setpoint).
	3	<i>dnOut_p/nNOut_v</i> follow <i>dnAct_p</i> (without limitation)		The outputs <i>dnPosOut_p</i> and <i>nNOut_v</i> follow the value at the <i>dnAct_p</i> input (actual position), but without limitation.
C01060/4	0.010	s	130.000	Deceleration of set position <ul style="list-style-type: none"> Deceleration ramp for stop before reaching the setpoint position (<i>bExecute</i> = FALSE). Lenze setting: 1.000 s
C01060/5	0.010	s	130.000	Acceleration ramp <ul style="list-style-type: none"> Lenze setting: 1.000 s
C01060/6	0.010	s	130.000	Deceleration ramp <ul style="list-style-type: none"> Lenze setting: 1.000 s
C01061/3	-15000	rpm	15000	Forward motion <ul style="list-style-type: none"> Positive speed Lenze setting: 200 rpm
C01061/4	-15000	rpm	15000	Return motion <ul style="list-style-type: none"> Negative speed Lenze setting: 200 rpm

18 Function library

18.1 Function blocks | L_PosShaftCtrlInterface_1

18.1.142 L_PosShaftCtrlInterface_1

FB in preparation!

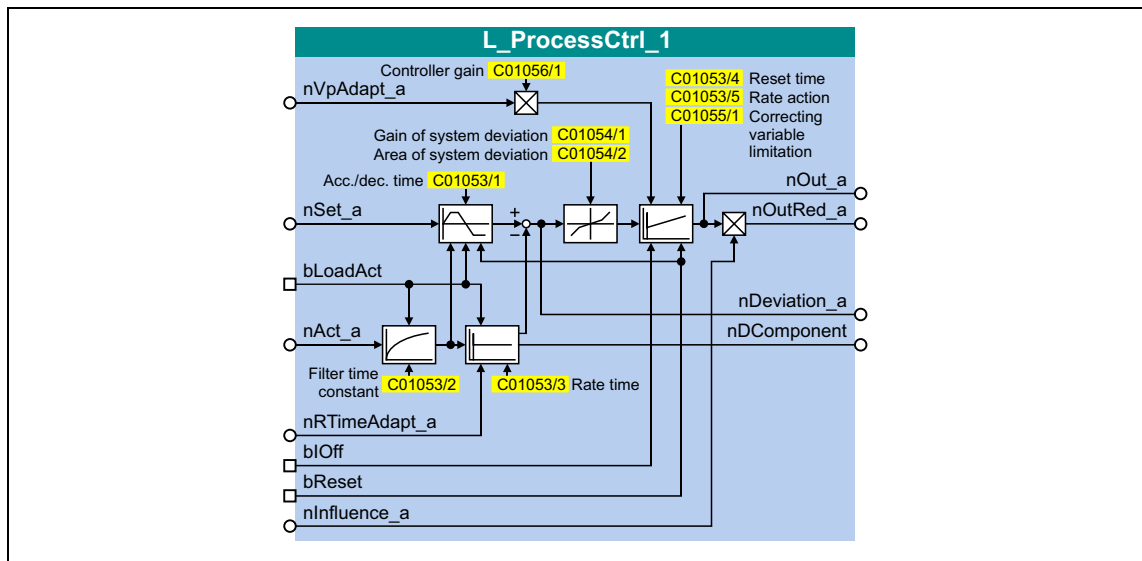


18.1.143 L_ProcessCtrl_1

This FB serves to implement a dancer position or tension control.

The FB is provided with the following functions:

- Adjustable control algorithm (P, PI, PID) with adaptable gain
- Reduced controller dynamics at low system deviation
- Setpoint ramp generator for preventing setpoint step-changes at the input
- Setpoint ramp generator can be loaded with actual value
- Low-pass filter and rate action in the actual value feedback
- Integral action component can be switched off
- Interruptible control



Inputs

Designator	Data type	Information/possible settings		
nVpAdapt_a	INT	Proportional evaluation of the controller gain (Vp) <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % • Internal limitation to 0 ... 16384 (0 ... 100 %) 		
nSet_a	INT	Controller setpoint		
bLoadAct	BOOL	Accept actual controller value <table border="1" style="margin-left: 20px;"> <tr> <td>TRUE</td> <td>The actual controller value <i>nAct_a</i> is taken over into the ramp generator, the low pass and the rate action.</td> </tr> </table>	TRUE	The actual controller value <i>nAct_a</i> is taken over into the ramp generator, the low pass and the rate action.
TRUE	The actual controller value <i>nAct_a</i> is taken over into the ramp generator, the low pass and the rate action.			
nAct_a	INT	Actual controller value		
nRTimeAdapt_a	INT	Proportional evaluation of the rate time in the actual value path <ul style="list-style-type: none"> • Scaling: 16384 ≙ 100 % rate time (C01053) • Internal limitation to 0 ... 16384 (0 ... 100 %) 		
bIOff	BOOL	Reset controller I component <table border="1" style="margin-left: 20px;"> <tr> <td>TRUE</td> <td>The controller I component is reset.</td> </tr> </table>	TRUE	The controller I component is reset.
TRUE	The controller I component is reset.			

Designator	Data type	Information/possible settings
bReset	BOOL	Reset entire control
		TRUE All outputs are reset to 0.
nInfluence_a	INT	Proportional evaluation of the controller correcting variable <i>nOutRed_a</i> • Scaling: 16384 \equiv 100 % controller correcting variable (<i>nOut_a</i>)

Outputs

Designator	Data type	Value/meaning
nOut_a	INT	Controller correcting variable • Internal limitation to ± 16384 (± 100 %)
nOutRed_a	INT	Controller correcting variable (evaluated by <i>nInfluence_a</i>)
nDeviation_a	INT	System deviation • Internal limitation to ± 32767 (± 199.99 %)
nDComponent	INT	D component of the rate action • Internal limitation to ± 16384 (± 100 %)

Parameters

Parameters	Possible settings			Info
C01053/1	0.000	s	30.000	Acceleration/deceleration time of the setpoint ramp generator • Lenze setting: 0.000 s
C01053/2	0.000	s	30.000	Filter time constant for actual controller value • Lenze setting: 0.000 s
C01053/3	0.000	s	30.000	Rate time for actual controller value • Lenze setting: 0.000 s
C01053/4	0.000	s	30.000	Controller reset time • Lenze setting: 1.000 s
C01053/5	0.000	s	30.000	Controller rate action • Lenze setting: 0.000 s
C01054/1	0.00	%	199.99	Gain of the system deviation in the range of reduced sensitivity • Lenze setting: 100.00 %
C01054/2	0.00	%	199.99	Range of system deviation with reduced gain/sensitivity • Lenze setting: 0.00 %
C01055/1	False	Limitation not active. (Lenze setting)		Limitation of the controller correcting variable to the positive area
	True	Limitation active.		
C01056/1	0.00		100.00	Controller gain • Lenze setting: 0.10

18.1.143.1 Control characteristic

The dancer position or tension controller can be optionally operated as P, PI or PID controller. In the Lenze setting, the PI algorithm is active.

Gain (P component)

The input value is controlled by a linear characteristic. The slope of the characteristic is determined by the controller gain V_p .

The controller gain V_p is set in [C01056/1](#).

- The controller gain can be adapted via the $nVpAdapt_a$ input (also possible in online mode).
- The $nVpAdapt_a$ input value has a direct effect on the controller gain:

$$P = nVpAdapt_a \cdot C01056/1$$

Example: With the parameterised controller gain $V_p = 2.0$ and $nVpAdapt_a = 75\%$, the resulting gain factor is as follows:

$$P = \frac{75 [\%]}{100 [\%]} \cdot 2.0 = 1.5$$

Reset time T_n (I component)

The adjustment time T_n is set under [C01053/4](#).

- The I component of the controller can be deactivated by setting the input $bIOff$ to TRUE.
- The I component can be switched on and off online.

Differential component K_d (D component)

The differential component K_d is set under [C01053/5](#).

- The setting "0.0 s" deactivates the D component (Lenze setting). In this way, the PID controller becomes a PI controller or P controller, if the I component has been deactivated as well.

Evaluation of the output signal (controller influence)

If the motor speed or motor torque is precontrolled, a low influence is sufficient for the controller to comply with the setpoint.

Use the $nInfluence_a$ input to select the influencing factor the controller correcting variable ($nOut_a$) is to be evaluated with. The evaluated controller correcting variable is output at $nOutRed_a$.



Note!

The controller influence evaluates the output signal multiplicatively. A change of the $nInfluence_a$ influencing factor also changes the dynamics of the controller!

Switching on/off the controller

By setting the $bReset$ input to TRUE, the process controller can be switched off.

Loading the setpoint ramp generator with the actual value

If the actual value is loaded into the setpoint ramp generator in switched-off state, it has the advantage that in the moment of the renewed controller enable, the system deviation is zero first. Thus, compensation processes can be mostly prevented.

When the *bLoadAct* input is set to TRUE, the setpoint ramp generator can be loaded with the actual value. This keeps the system deviation equal to zero and I component of the controller.

Low pass and rate action in the actual value path

In order to filter signal interferences more effectively, you can activate a low pass in the actual value path.

- The filter time constant for the low pass is set in [C01053/2](#).
- The rate time constant in the feedback path can be set in [C01053/3](#). This serves to compensate interfering decelerations.

Reduced controller dynamics at low system deviation

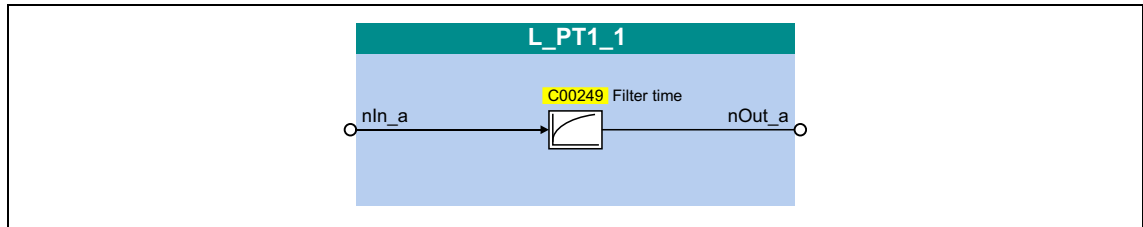
A reduced controller dynamics at low system deviations serves to have a positive effect on the damping behaviour of the control loop.

- [C01054/2](#) serves to determine the tolerance zone in which the system deviation is transmitted to the controller with a slight gain.
- [C01054/1](#) serves to determine the amount of percent the gain in the defined tolerance zone is to be reduced to.

18.1.144 L_PT1_1

This FB filters and delays analog signals.

- The filter time constant T can be set under [C00249](#).
- The gain is defined with $V_p = 1$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

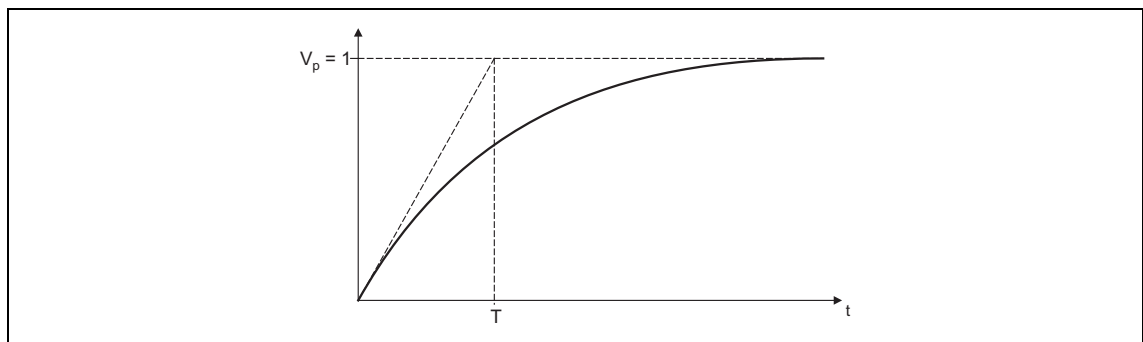
Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal

Parameters

Parameters	Possible settings			Info
C00249	0	ms	5000	Filter time constant • The filter is not active with a setting of "0 ms". The input signal is passed through one-to-one to the output. • Lenze setting: 2000 ms

Function

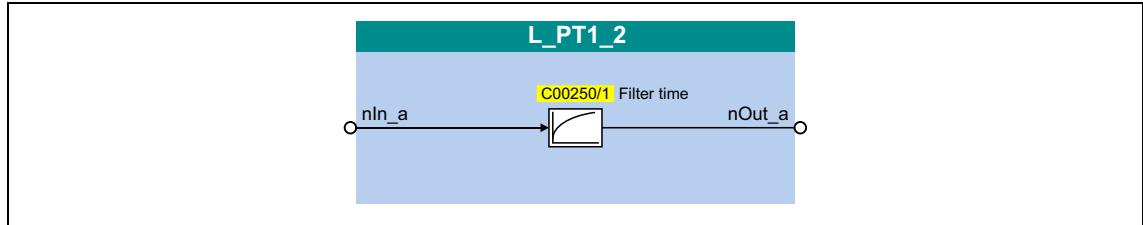


[18-69] Filter time constant T of the first-order delay element

18.1.145 L_PT1_2

This FB filters and delays analog signals.

- Filter time constant T can be set in [C00250/1](#).
- The gain is defined with $V_p = 1$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

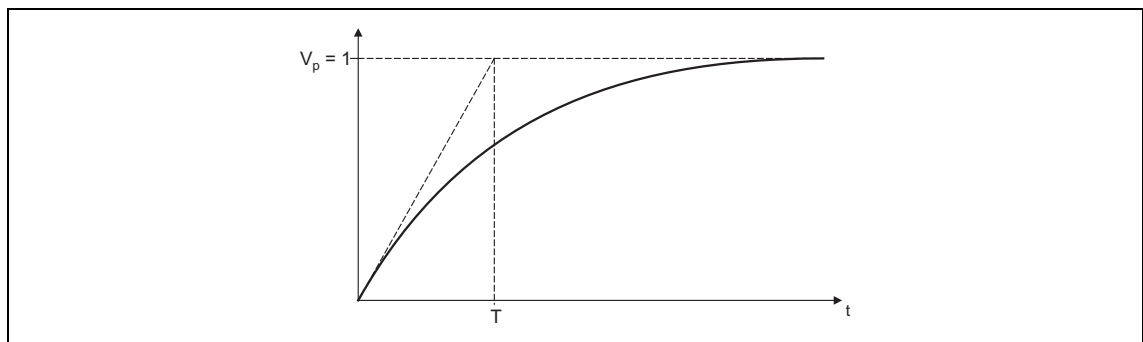
Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal

Parameters

Parameters	Possible settings			Info
C00250/1	0	ms	5000	Filter time constant • The filter is not active with a setting of "0 ms". The input signal is passed through one-to-one to the output. • Lenze setting: 2000 ms

Function

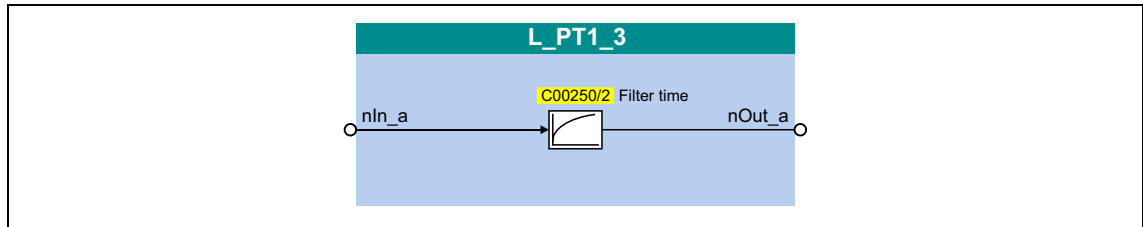


[18-70] Filter time constant T of the first-order delay element

18.1.146 L_PT1_3

This FB filters and delays analog signals.

- Filter time constant T can be set in [C00250/2](#).
- The gain is defined with $V_p = 1$.



Inputs

Designator	Data type	Information/possible settings
nIn_a	INT	Input signal

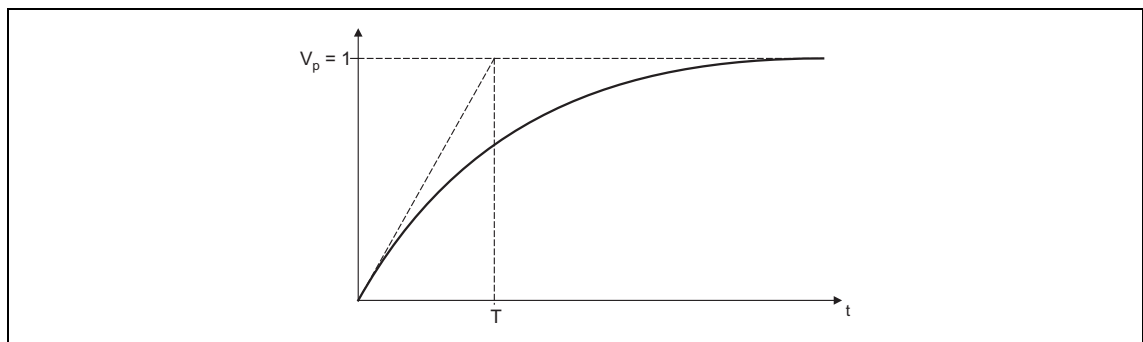
Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal

Parameters

Parameters	Possible settings			Info
C00250/2	0	ms	5000	Filter time constant • The filter is not active with a setting of "0 ms". The input signal is passed through one-to-one to the output. • Lenze setting: 2000 ms

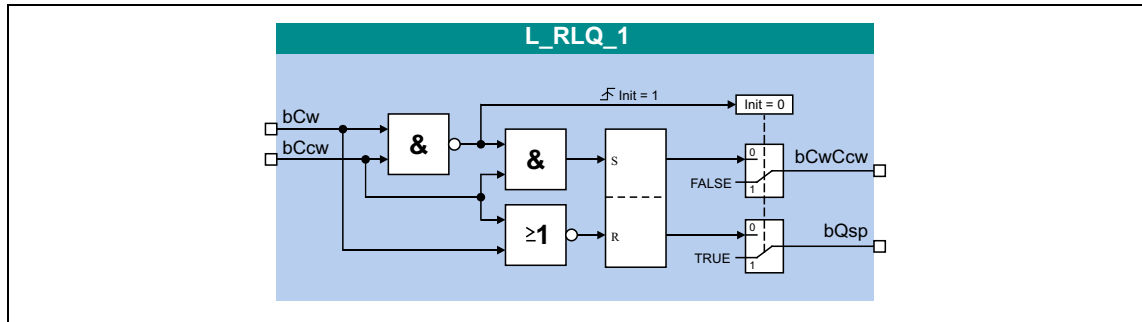
Function



[18-71] Filter time constant T of the first-order delay element

18.1.147 L_RLQ_1

This FB links a selected direction of rotation to the quick stop function with wire-break protection.



Inputs

Designator	Data type	Information/possible settings
bCw	BOOL	Input • TRUE = CW rotation
bCCw	BOOL	Input • TRUE = CCW rotation

Outputs

Designator	Data type	Value/meaning
bQSP	BOOL	Output signal for quick stop (QSP)
bCwCcW	BOOL	Output signal for CW/CCW rotation • TRUE = CCW rotation

Function

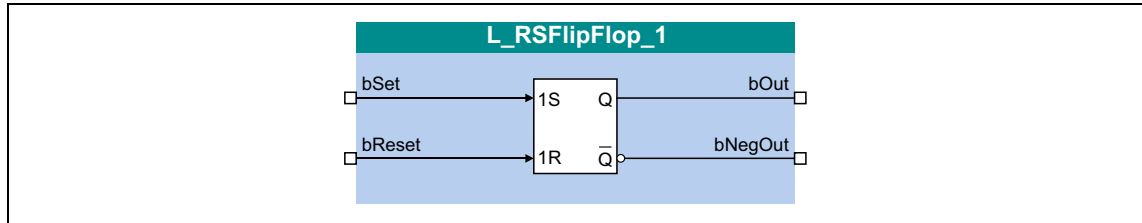
Inputs		Outputs		Notes
bCw	bCCw	bCwCcW	bQSP	
TRUE	TRUE	FALSE	TRUE	The inputs have this status only if a TRUE signal is being applied to <u>both</u> inputs at the moment of switch-on! See also FB illustration above, "Init" = 1.
If <i>one</i> of the inputs has the TRUE status, the following truth table applies:				
FALSE	FALSE	FALSE	TRUE	See also FB illustration above, "Init" = 0.
TRUE	FALSE	FALSE	FALSE	
FALSE	TRUE	TRUE	FALSE	
TRUE	TRUE	X (save)		

[18-72] Truth table of the FB L_RLQ, 0 = FALSE, 1 = TRUE

18.1.148 L_RSFlipFlop_1

The functionality of this FB corresponds to that of an RS flipflop:

- An input signal at *bSet* serves to set the *bOut* output permanently.
- An input signal at *bReset* serves to reset the output.
- Additional, inverted output *bNegOut*



Inputs

Designator	Data type	Information/possible settings
bSet	BOOL	Setting input
		TRUE
bReset	BOOL	Reset input
		TRUE

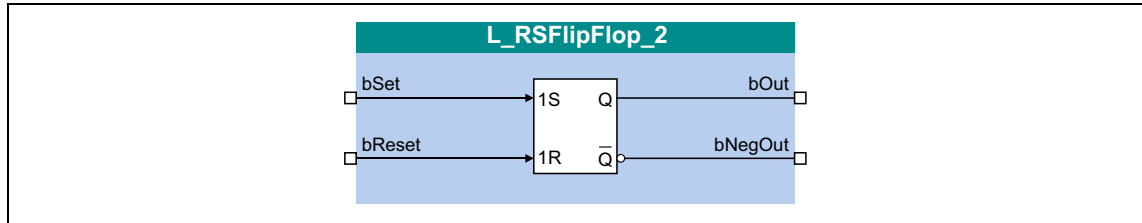
Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal
bNegOut	BOOL	Output signal, inverted

18.1.149 L_RSFlipFlop_2

The functionality of this FB corresponds to that of an RS flipflop:

- An input signal at *bSet* serves to set the *bOut* output permanently.
- An input signal at *bReset* serves to reset the output.
- Additional, inverted output *bNegOut*



Inputs

Designator	Data type	Information/possible settings
bSet	BOOL	Setting input
		TRUE
bReset	BOOL	Reset input
		TRUE

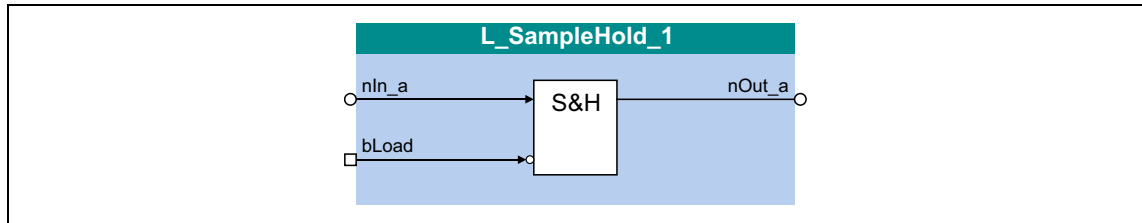
Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output signal
bNegOut	BOOL	Output signal, inverted

18.1.150 L_SampleHold_1

This FB can save a signal.

- The saved value is also available after mains switching.



Inputs

Designator	Data type	Information/possible settings	
nIn_a	INT	Input signal	
bLoad	BOOL	Save input signal	
		FALSE	The last-valid value at <i>nIn</i> is saved and output to <i>nOut</i> . A signal change at <i>nIn</i> does not cause a change at <i>nOut</i> .
		TRUE	The <i>nOut</i> output provides <i>dnIn</i> .

Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal

Function

- When *bLoad* = TRUE, the *nIn_a* signal is switched to *nOut_a*.
- When *bLoad* = FALSE, the last-valid value is saved and output at *nOut_a*. A signal change at *nIn_a* does not cause a change at *nOut_a*.

Behaviour after mains switching

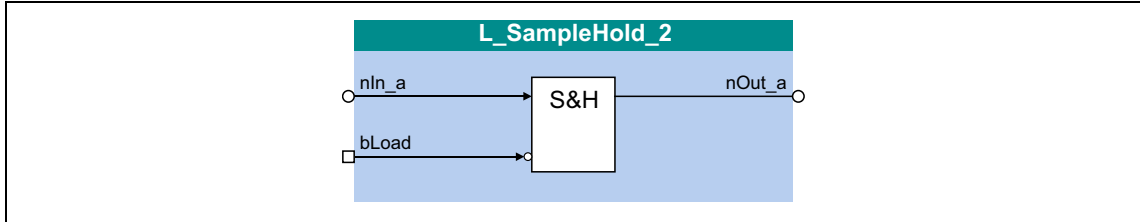
The last-loaded value is permanently stored after switching of the supply voltage and reloaded after restart.

- In order that the saved value is not immediately overwritten with the current input signal at *nIn* after restart, *bLoad* must be set to FALSE at restart.

18.1.151 L_SampleHold_2

This FB can save a signal.

- The saved value is also available after mains switching.



Inputs

Designator	Data type	Information/possible settings	
nIn_a	INT	Input signal	
bLoad	BOOL	Save input signal	
		FALSE	The last-valid value at <i>nIn</i> is saved and output to <i>nOut</i> . A signal change at <i>nIn</i> does not cause a change at <i>nOut</i> .
		TRUE	The <i>nOut</i> output provides <i>dnIn</i> .

Outputs

Designator	Data type	Value/meaning
nOut	INT	Output signal

Function

- When *bLoad* = TRUE, the *nIn_a* signal is switched to *nOut_a*.
- When *bLoad* = FALSE, the last-valid value is saved and output at *nOut_a*. A signal change at *nIn_a* does not cause a change at *nOut_a*.

Behaviour after mains switching

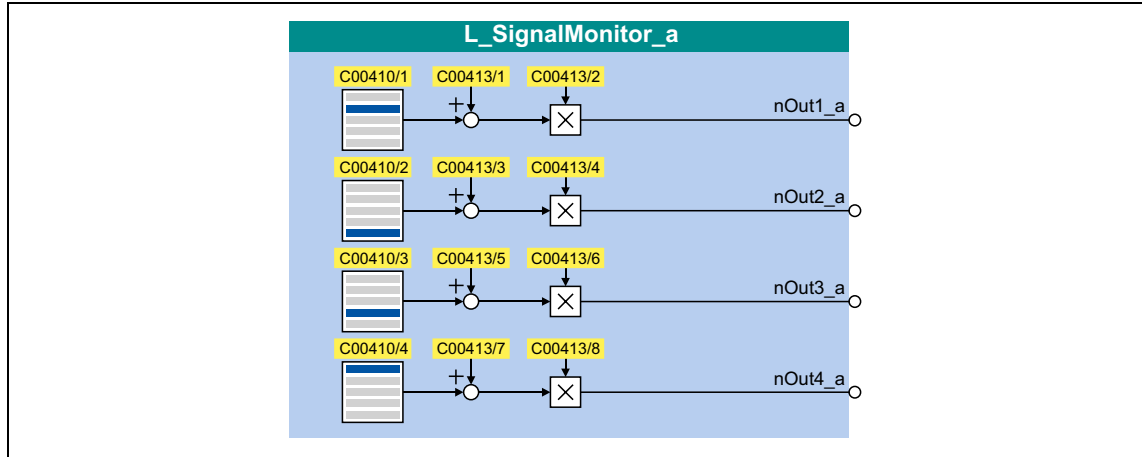
The last-loaded value is permanently stored after switching of the supply voltage and reloaded after restart.

- In order that the saved value is not immediately overwritten with the current input signal at *nIn* after restart, *bLoad* must be set to FALSE at restart.

18.1.152 L_SignalMonitor_a

This FB outputs four analog signals which can be selected from a list of analog output signals of all function blocks provided in the device.

- Offset and gain of the source signals are adjustable.



Outputs

Designator	Data type	Value/meaning
nOut1_a	INT	Output signal • Internal limitation to ±32767
nOut2_a	INT	Output signal • Internal limitation to ±32767
nOut3_a	INT	Output signal • Internal limitation to ±32767
nOut4_a	INT	Output signal • Internal limitation to ±32767

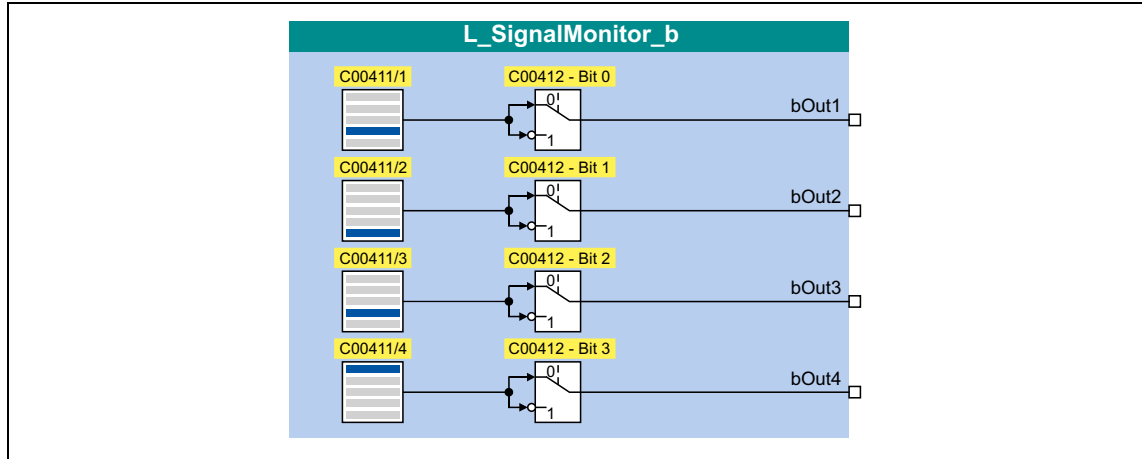
Parameters

Parameters	Possible settings	Info
C00410/1 ... C00410/4	See selection list - analog signals	Selection of the signal sources for <i>nOut1_a ... nOut4_a</i>
C00413/1 C00413/3 C00413/5 C00413/7	-199.99 % +199.99	Offset
C00413/2 C00413/4 C00413/6 C00413/8	-199.99 % +199.99	Gain

18.1.153 L_SignalMonitor_b

This FB outputs four binary signals which can be selected from a list of binary output signals of all function blocks provided in the device.

- Inversion of the output signals can be set.



Outputs

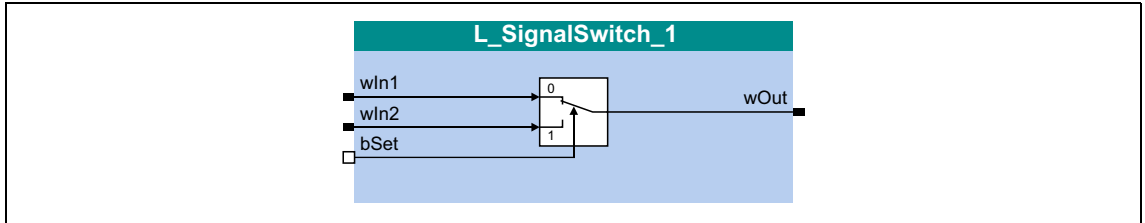
Designator	Data type	Value/meaning
bOut1 ... bOut4	BOOL	Output signal FALSE / TRUE

Parameters

Parameters	Possible settings	Info																
C00411/1 ... C00411/4	See selection list - digital signals	Selection of the signal sources for <i>bOut1 ... bOut4</i>																
C00412	Value is bit-coded: <table border="1"> <tr><td>Bit 0</td><td>bOut1 inverted</td></tr> <tr><td>Bit 1</td><td>bOut2 inverted</td></tr> <tr><td>Bit 2</td><td>bOut3 inverted</td></tr> <tr><td>Bit 3</td><td>bOut4 inverted</td></tr> <tr><td>Bit 4</td><td>Reserved</td></tr> <tr><td>Bit 5</td><td>Reserved</td></tr> <tr><td>Bit 6</td><td>Reserved</td></tr> <tr><td>Bit 7</td><td>Reserved</td></tr> </table>	Bit 0	bOut1 inverted	Bit 1	bOut2 inverted	Bit 2	bOut3 inverted	Bit 3	bOut4 inverted	Bit 4	Reserved	Bit 5	Reserved	Bit 6	Reserved	Bit 7	Reserved	Inversion • Bit set = inversion active
Bit 0	bOut1 inverted																	
Bit 1	bOut2 inverted																	
Bit 2	bOut3 inverted																	
Bit 3	bOut4 inverted																	
Bit 4	Reserved																	
Bit 5	Reserved																	
Bit 6	Reserved																	
Bit 7	Reserved																	

18.1.154 L_SignalSwitch_1

This FB switches between two input signals of the "WORD" data type. The switch-over is controlled by means of a boolean input signal.



Inputs

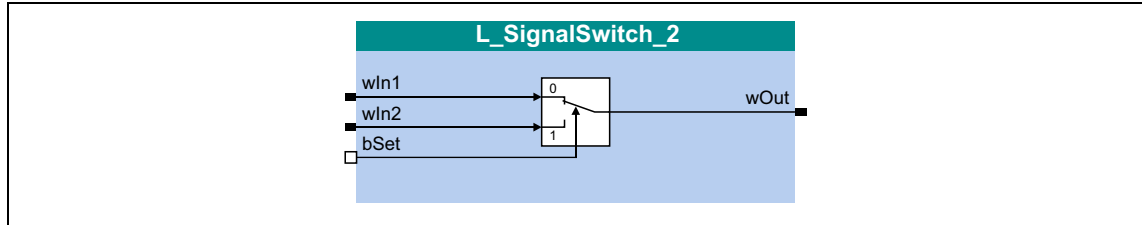
Designator	Data type	Information/possible settings	
wIn1	WORD	Input signal 1	
wIn2	WORD	Input signal 2	
bSet	BOOL	Selection of the input signal for the output at <i>wOut</i>	
		FALSE	<i>wIn1</i>
		TRUE	<i>wIn2</i>

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

18.1.155 L_SignalSwitch_2

This FB switches between two input signals of the "WORD" data type. The switch-over is controlled by means of a boolean input signal.



Inputs

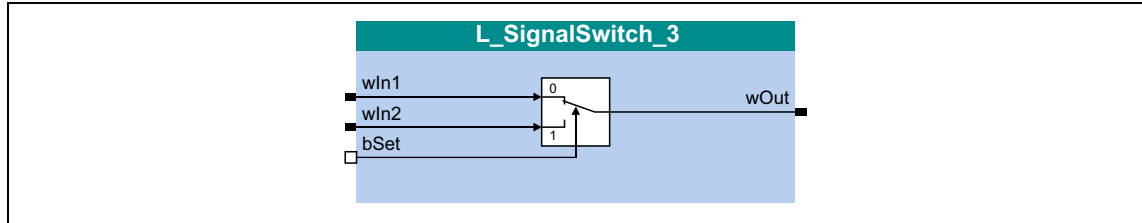
Designator	Data type	Information/possible settings
wIn1	WORD	Input signal 1
wIn2	WORD	Input signal 2
bSet	BOOL	Selection of the input signal for the output at <i>wOut</i>
		FALSE <i>wIn1</i>
		TRUE <i>wIn2</i>

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

18.1.156 L_SignalSwitch_3

This FB switches between two input signals of the "WORD" data type. The switch-over is controlled by means of a boolean input signal.



Inputs

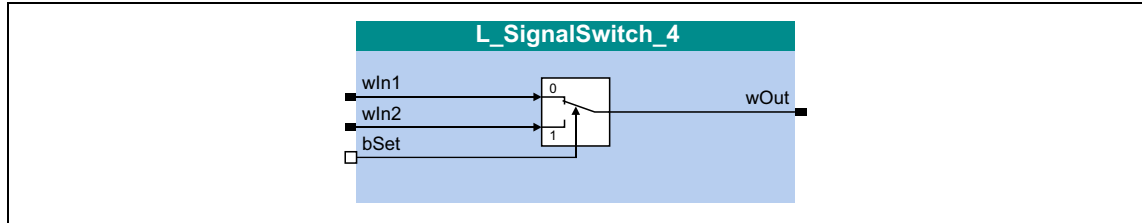
Designator	Data type	Information/possible settings
wIn1	WORD	Input signal 1
wIn2	WORD	Input signal 2
bSet	BOOL	Selection of the input signal for the output at <i>wOut</i>
		FALSE <i>wIn1</i>
		TRUE <i>wIn2</i>

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

18.1.157 L_SignalSwitch_4

This FB switches between two input signals of the "WORD" data type. The switch-over is controlled by means of a boolean input signal.



Inputs

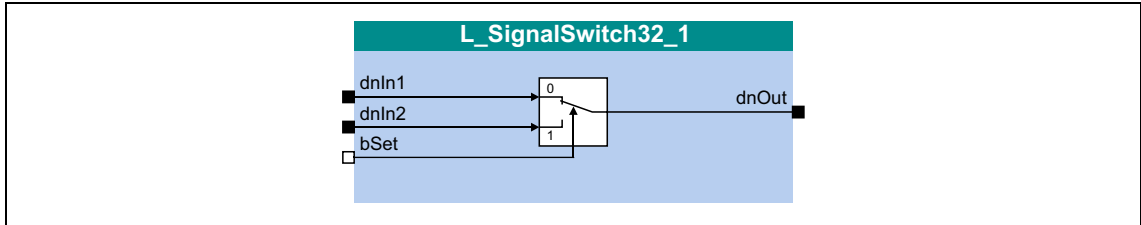
Designator	Data type	Information/possible settings
wIn1	WORD	Input signal 1
wIn2	WORD	Input signal 2
bSet	BOOL	Selection of the input signal for the output at <i>wOut</i>
		FALSE <i>wIn1</i>
		TRUE <i>wIn2</i>

Outputs

Designator	Data type	Value/meaning
wOut	WORD	Output signal

18.1.158 L_SignalSwitch32_1

This FB switches between two input signals of the "DINT" data type. The switch-over is controlled by means of a boolean input signal.



Inputs

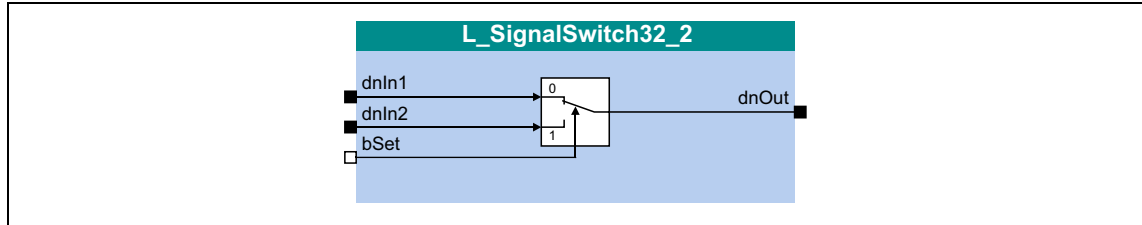
Designator	Data type	Information/possible settings
dnIn1	DINT	Input signal 1
dnIn2	DINT	Input signal 2
bSet	BOOL	Selection of the input signal for the output at <i>dnOut</i>
		FALSE <i>dnIn1</i>
		TRUE <i>dnIn2</i>

Outputs

Designator	Data type	Value/meaning
dnOut	DINT	Output signal

18.1.159 L_SignalSwitch32_2

This FB switches between two input signals of the "DINT" data type. The switch-over is controlled by means of a boolean input signal.



Inputs

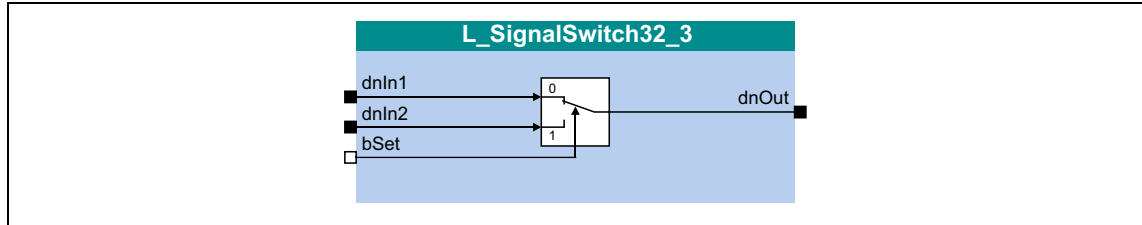
Designator	Data type	Information/possible settings
dnIn1	DINT	Input signal 1
dnIn2	DINT	Input signal 2
bSet	BOOL	Selection of the input signal for the output at <i>dnOut</i>
		FALSE <i>dnIn1</i>
		TRUE <i>dnIn2</i>

Outputs

Designator	Data type	Value/meaning
dnOut	DINT	Output signal

18.1.160 L_SignalSwitch32_3

This FB switches between two input signals of the "DINT" data type. The switch-over is controlled by means of a boolean input signal.



Inputs

Designator	Data type	Information/possible settings
dnIn1	DINT	Input signal 1
dnIn2	DINT	Input signal 2
bSet	BOOL	Selection of the input signal for the output at <i>dnOut</i>
		FALSE <i>dnIn1</i>
		TRUE <i>dnIn2</i>

Outputs

Designator	Data type	Value/meaning
dnOut	DINT	Output signal

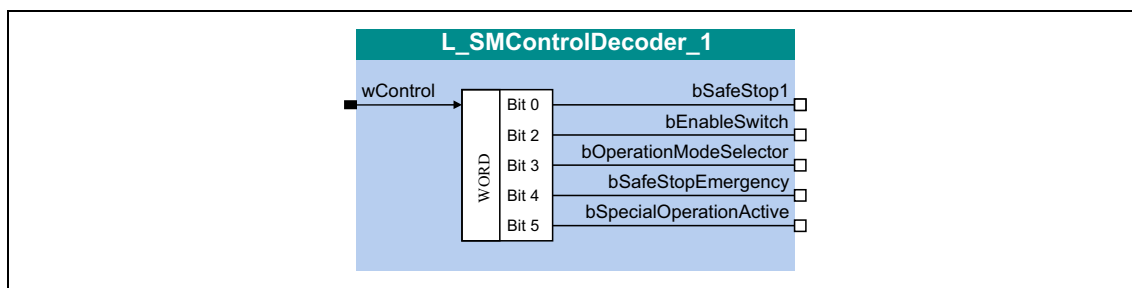
18.1.161 L_SMControlDecoder_1

The integrated safety system transmits information on requested or active safety functions via the bit-coded *wControl* control signal of the SB [LS_SMIInterface](#). This FB decodes the control signal into individual boolean control signals for further use in the function block interconnection.

**Note!**

The application in the inverter has to evaluate the *wControl* control signal and execute the corresponding action. This action (e.g. braking to a standstill) has to be implemented by a corresponding application interconnection, which has to be carried out by an application engineer!

- Several safety functions can be requested/active at the same time.
- Which safety functions are supported depends on the safety module used or the available safety option.
- The functionality of this FB corresponds to a converter "WORD→BOOL", but the outputs of this FB are named according to their meaning.

**Inputs**

Designator	Data type	Information/possible settings
wControl	WORD	Input for the bit-coded control signal of the integrated safety system <ul style="list-style-type: none"> • The control signal of the integrated safety system is provided at the <i>wControl</i> output of the LS_SMIInterface system block.

Outputs

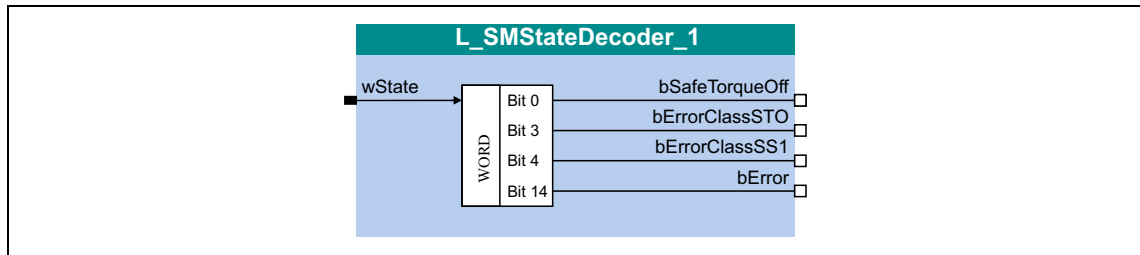
Bit*	Designator	Requested/active safety function in case of TRUE
0	bSafeStop1	Safe stop 1 (SS1)
2	bEnableSwitch	Safe enable switch (ES)
3	bOperationModeSelector	Safe operation mode selector (OMS)
4	bSafeStopEmergency	Emergency stop (SSE)
5	bSpecialOperationActive	Special operation is active.

* with regard to the *wControl* input signal.

18.1.162 L_SMStateDecoder_1

The integrated safety system transmits the status of safety functions to the application via the bit coded *wState* status signal of the SB [LS_SMInterface](#). This FB decodes the status signal into individual boolean status signals for further use in the function block interconnection.

- The functionality of this FB corresponds to a converter "WORD→BOOL", but the outputs of this FB are named according to their meaning.



Inputs

Designator	Data type	Information/possible settings
wState	WORD	Input for the bit-coded status signal of the integrated safety system <ul style="list-style-type: none"> • The status signal of the integrated safety system is provided at the <i>wState</i> output of the LS_SMInterface system block.

Outputs

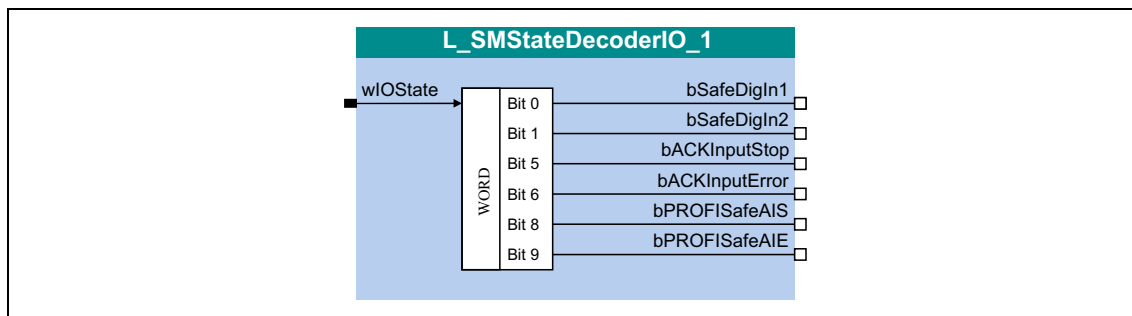
Bit*	Designator	Meaning in case of TRUE
0	bSafeTorqueOff	"Safe torque off (STO)" function is active. <ul style="list-style-type: none"> • The drive is safely switched to torqueless operation.
3	bErrorClassSTO	Error stop category 0: "Safe torque off (STO)" function is active.
4	bErrorClassSS1	Error stop category 1: "Safe stop 1 (SS1)" function is active.
14	bError	Integrated safety system in error status (trouble or warning).

* with regard to the *wState* input signal.

18.1.163 L_SMStateDecoderIO_1

The integrated safety system transmits the status of safety functions to the application via the bit coded *wIOState* status signal of the SB [LS_SMInterface](#). This FB decodes the status signal into individual boolean status signals for further use in the function block interconnection.

- The functionality of this FB corresponds to a converter "WORD→BOOL", but the outputs of this FB are named according to their meaning.



Inputs

Designator	Data type	Information/possible settings
wIOState	WORD	Input for the bit coded I/O status signal of the integrated safety system <ul style="list-style-type: none"> • The I/O status signal of the integrated safety system is provided at the <i>wIOState</i> output of the LS_SMInterface system block.

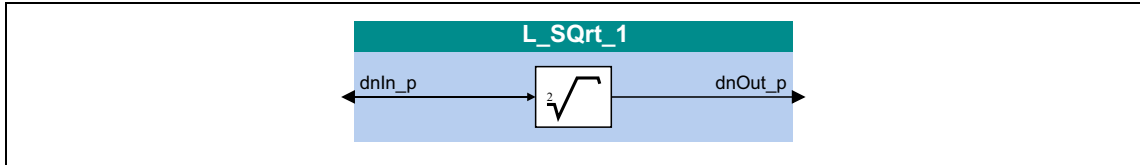
Outputs

Bit*	Designator	Meaning in case of TRUE
0	bSafeDigIn1	Sensor input 1 in ON state.
1	bSafeDigIn2	Sensor input 2 in ON state.
5	bACKInputStop	Restart acknowledgement via terminal is done (if TRUE⇒FALSE).
6	bACKInputError	Error acknowledgement via terminal is done (if TRUE⇒FALSE).
8	bPROFISafeAIS	Restart acknowledgement via safety bus is done (if FALSE⇌TRUE).
9	bPROFISafeAIE	Error acknowledgement via safety bus is done (if FALSE⇌TRUE).

* With regard to the *wIOState* input signal.

18.1.164 L_SQrt_1

This FB outputs the square root of the DINT input value.

**Inputs**

Designator	Data type	Information/possible settings
dnIn_p	DINT	Input signal

Outputs

Designator	Data type	Value/meaning
dnOut_p	DINT	Output signal

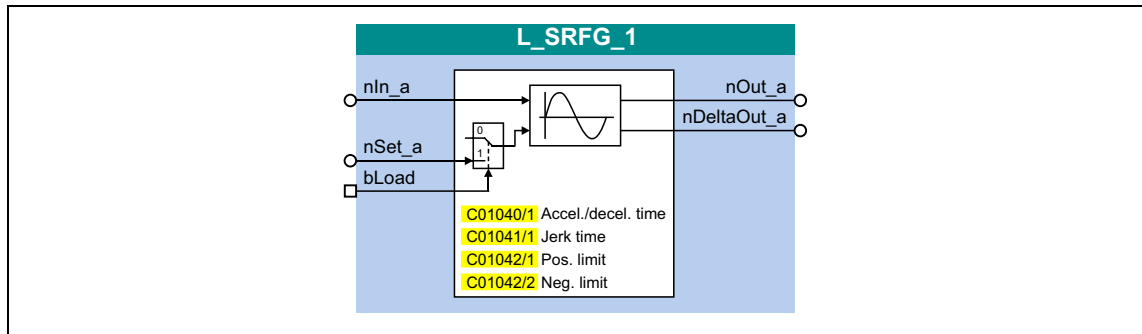
Function

$$\text{dnOut_p} = \sqrt{\text{dnIn_p}}$$

18.1.165 L_SRFG_1

This FB is a ramp function generator with S-shaped ramps for limiting the increase over time of analog signals. The S-shape of the ramps is a result of trapezoidal acceleration.

- The ramp function generator is provided with a setting function so that a value can directly be loaded into the internal ramp generator.
- The balanced acceleration/deceleration time is set in [C01040](#).
- An S-ramp time can be set in [C01041](#) for jerk-free acceleration until maximum acceleration is reached.
- At the *nDeltaOut_a* output, the dy/dt slope of the *nOut_a* output signal is output.



Inputs

Designator	Data type	Information/possible settings
<i>nIn_a</i>	INT	Input signal
<i>nSet_a</i>	INT	Starting value for the ramp function generator • Will be accepted if <i>bLoad</i> = TRUE
<i>bLoad</i>	BOOL	Initialise ramp function generator
		<p>FALSE</p> <p>With the set acceleration/deceleration time, the ramp function generator switches over from the value loaded via <i>nSet_a</i> to the value at <i>nIn_a</i>.</p> <p>TRUE</p> <p>At the <i>nOut_a</i> output, <i>nSet_a</i> is output. • <i>nDeltaOut_a</i> remains at 0 %.</p>

Outputs

Designator	Data type	Value/meaning
<i>nOut_a</i>	INT	Output signal • Internal limitation to ±199 % (100 % ≡ 16384)
<i>nDeltaOut_a</i>	INT	Acceleration of the ramp function generator • Internal limitation to ±100 % (100 % ≡ 16384)

Parameters

Parameters	Possible settings			Info
C01040/1	0.001	s	999.999	Acceleration/Deceleration time • Initialisation: 100.000 s
C01041/1	0.001	s	50.000	S-ramp time • Initialisation: 0.200 s

Parameters	Possible settings			Info
C01042/1	-199.99	s	199.99	Pos. limit • Initialisation: 100.00 %
C01042/2	-199.99	s	199.99	Neg. limit • Initialisation: -100.00 %

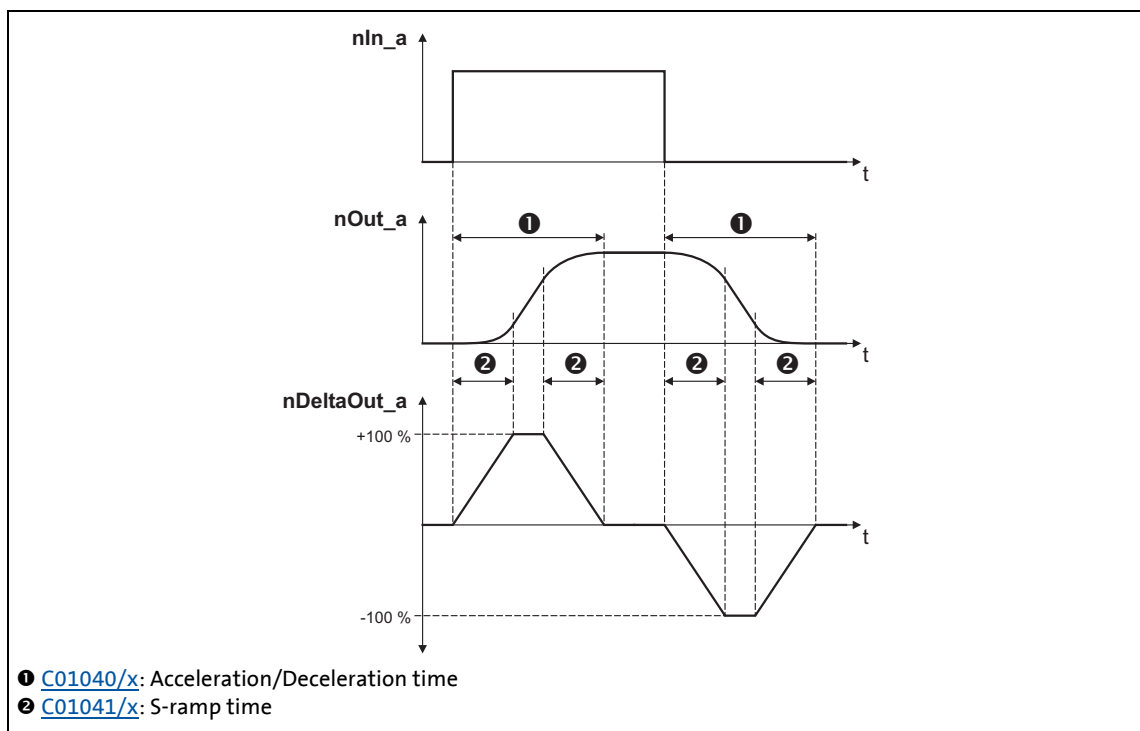
Loading the ramp function generator

When *bLoad* is set to TRUE, the ramp function generator is loaded with the signal at *nSet_a*. This value is accepted immediately and output at *nOut_a*. There is no acceleration or deceleration via an S shape. As long as *bLoad* = TRUE, the ramp function generator remains inhibited.

Acceleration/Deceleration time and S-ramp time

The acceleration/deceleration time and the S-ramp time for jerk-free acceleration can be set separately.

- Acceleration/Deceleration time = Time until the *nOut_a* output value has reached the *nIn_a* input value.
- S-ramp time = Time until the ramp function generator operates at maximum acceleration.

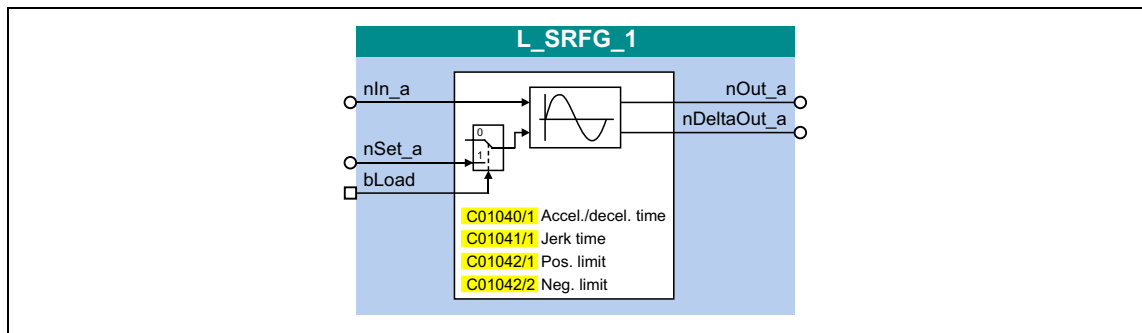


[18-73] Signal flow

18.1.166 L_SRFG_2

This FB is a ramp function generator with S-shaped ramps for limiting the increase over time of analog signals. The S-shape of the ramps is a result of trapezoidal acceleration.

- The ramp function generator is provided with a setting function so that a value can directly be loaded into the internal ramp generator.
- The balanced acceleration/deceleration time is set in [C01040](#).
- An S-ramp time can be set in [C01041](#) for jerk-free acceleration until maximum acceleration is reached.
- At the *nDeltaOut_a* output, the dy/dt slope of the *nOut_a* output signal is output.



Inputs

Designator	Data type	Information/possible settings		
<i>nIn_a</i>	INT	Input signal		
<i>nSet_a</i>	INT	Starting value for the ramp function generator • Will be accepted if <i>bLoad</i> = TRUE		
<i>bLoad</i>	BOOL	Initialise ramp function generator		
		<table border="0"> <tr> <td>FALSE</td> <td>With the set acceleration/deceleration time, the ramp function generator switches over from the value loaded via <i>nSet_a</i> to the value at <i>nIn_a</i>.</td> </tr> <tr> <td>TRUE</td> <td>At the <i>nOut_a</i> output, <i>nSet_a</i> is output. • <i>nDeltaOut_a</i> remains at 0 %.</td> </tr> </table>	FALSE	With the set acceleration/deceleration time, the ramp function generator switches over from the value loaded via <i>nSet_a</i> to the value at <i>nIn_a</i> .
FALSE	With the set acceleration/deceleration time, the ramp function generator switches over from the value loaded via <i>nSet_a</i> to the value at <i>nIn_a</i> .			
TRUE	At the <i>nOut_a</i> output, <i>nSet_a</i> is output. • <i>nDeltaOut_a</i> remains at 0 %.			

Outputs

Designator	Data type	Value/meaning
<i>nOut_a</i>	INT	Output signal • Internal limitation to ±199 % (100 % ≡ 16384)
<i>nDeltaOut_a</i>	INT	Acceleration of the ramp function generator • Internal limitation to ±100 % (100 % ≡ 16384)

Parameters

Parameters	Possible settings			Info
C01040/2	0.001	s	999.999	Acceleration/Deceleration time • Initialisation: 100.000 s
C01041/2	0.001	s	50.000	S-ramp time • Initialisation: 0.200 s

Parameters	Possible settings			Info
C01042/3	-199.99	s	199.99	Pos. limit • Initialisation: 100.00 %
C01042/4	-199.99	s	199.99	Neg. limit • Initialisation: -100.00 %

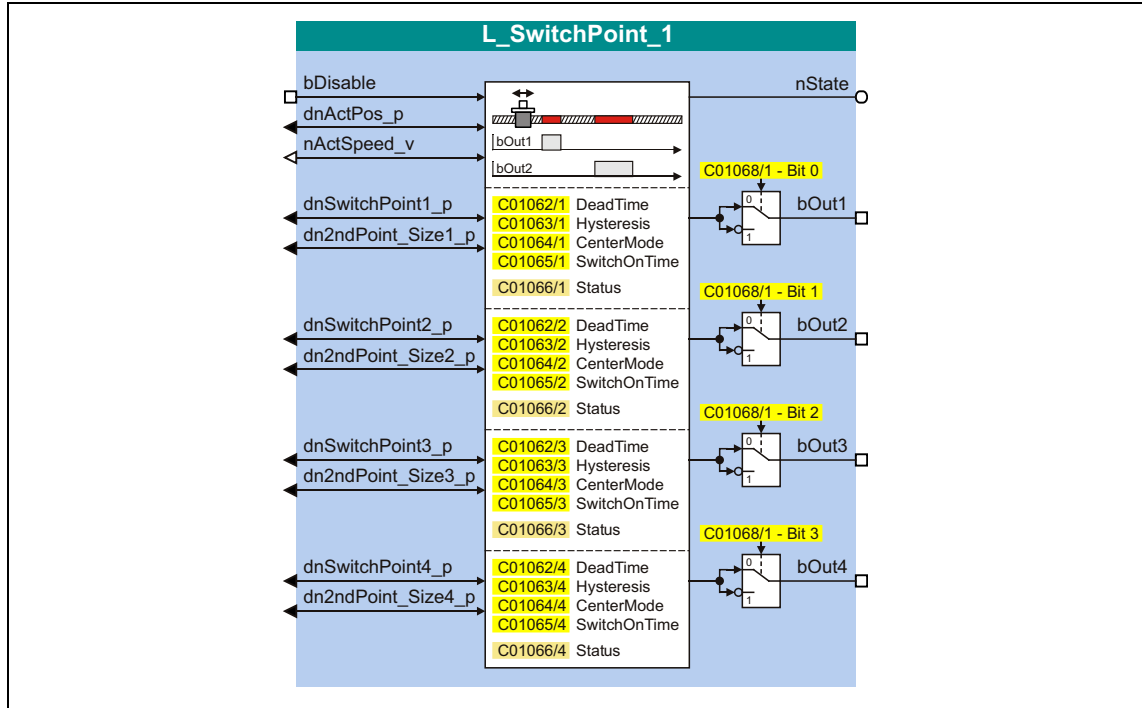


For a detailed functional description see [L_SRFG_1](#).

18.1.167 L_SwitchPoint_1

This FB provides four position switch points, i.e. digital switches the binary statuses (FALSE/TRUE) of which depend on the actual position.

- A position switch point serves to start peripherals as paint nozzles or knives depending on the tool position.
- Moreover the FB supports the compensation of delay times of external switching elements (dead time compensation).
- By setting a running time, position/time-based cams can be realised as well.



Inputs

Designator	Data type	Information/possible settings
bDisable	BOOL	Deactivate position switch points
		<ul style="list-style-type: none"> • This input has the highest priority.
	TRUE	Position switch points are deactivated. • Outputs <i>bOut1</i> ... <i>bOut4</i> = FALSE
dnActPos_p	DINT	Actual position in [increments]
nActSpeed_v	INT	Actual speed in [increments/ms] • Scaling: 16384 ≙ 15000 rpm
dnSwitchPointx_p	DINT	Position switch point x: Position of the first switching point in [increments]

Designator	Data type	Information/possible settings
dn2ndPoint_Size_p	DINT	Position switch point x: Position of the second switching point or size of the switching window depending on the CenterMode set in C01064/x : When CenterMode = FALSE: Position of the second switching point in [increments] • dn2ndPoint_Size_p must be higher than dnSwitchPoint_p. When CenterMode = TRUE: Size of the switching window in [increments] • Due to the symmetrical arrangement of the window around the first switching point, uneven values are rounded to even values. • Only positive values are permissible.

Outputs

Designator	Data type	Value/meaning
bOut1 ... bOut4	BOOL	Switching output 1 ... 4 TRUE The actual position is inside the defined switching window.
nState	INT	Status 1 FB is not active 2 OK 3 The data form resulting from the switching points are not plausible (dnSwitchPoint_p, dn2ndPoint_Size_p, parameterised hysteresis).

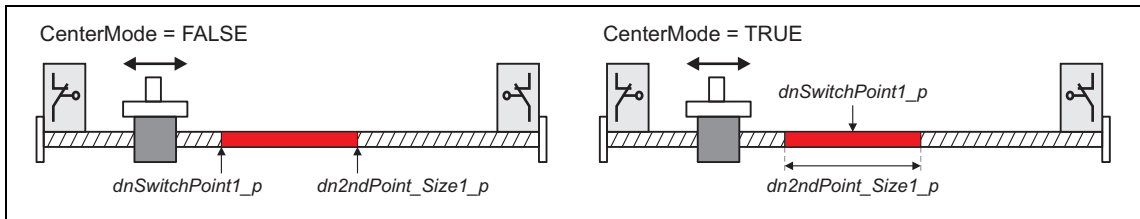
Parameters

Parameters	Possible settings	Info
C01062/1...4	0 μs	65535 Dead time for dead time compensation • The resulting switching position is not subject to a plausibility check. • Lenze setting: 0 μs
C01063/1...4	0 Incr.	65535 Switching hysteresis • Lenze setting: 0 incr.
C01064/1...4	False dn2ndPoint_Size_p defines the second switching point. (Lenze setting) True dn2ndPoint_Size_p defines the size of the switching window.	CenterMode • Definition how the dn2ndPoint_Size_p selection is interpreted.
C01065/1...4	0 ms 0 ms = position-based cam	60000 Running time for position/time-based cams • Lenze setting: 0 ms

Parameters	Possible settings	Info	
C01068/1 From version 12.00.00	Setting is bit coded:	Inversion of outputs • Lenze setting: 0x0000	
	Bit 0		Inversion of output 1
	Bit 1		Inversion of output 2
	Bit 2		Inversion of output 3
	Bit 3		Inversion of output 4
	Bit 4		Reserved
	...		
Bit 15			
C01108/1...4 (from version 15.00.00)		Dead time • Lenze setting: "2: 10 μs"	
	1		1 μs
	2		10 μs
	3		100 μs
	4		1000 μs

18.1.167.1 Definition of the switching range

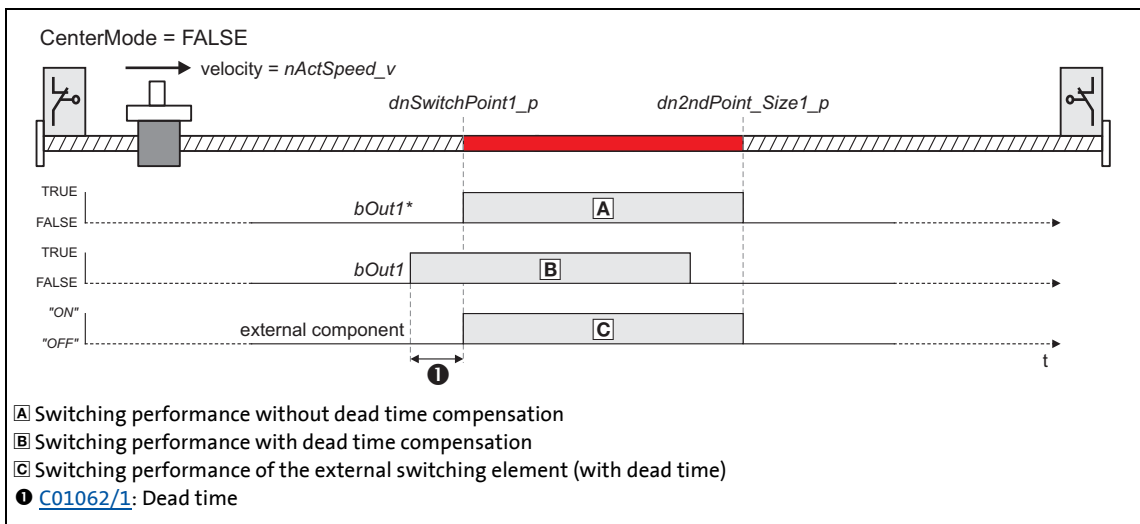
Depending on the setting of the CenterMode ([C01064/x](#)), the switching range can be defined via a start and end position or via the data of the center point/size of switching range:



[18-74] Definition of the switching range

18.1.167.2 Dead time compensation

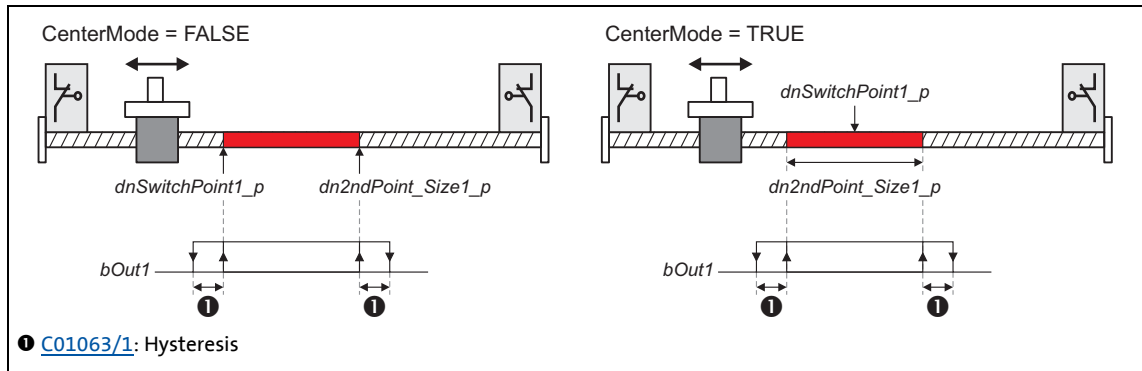
The delay time of external switching elements can be compensated by setting the corresponding delay time in [C01062/x](#). From this input and the current speed, the FB calculates a preliminary stop, i.e. the *bOut* switching output is set correspondingly earlier.



[18-75] Dead time compensation

18.1.167.3 Switching hysteresis

Setting a hysteresis in [C01063/x](#) serves to prevent a permanent state change of the *bOut* switching output that may be caused by actual position value changes due to a mechanical irregularity at the axis.



[18-76] Switching hysteresis

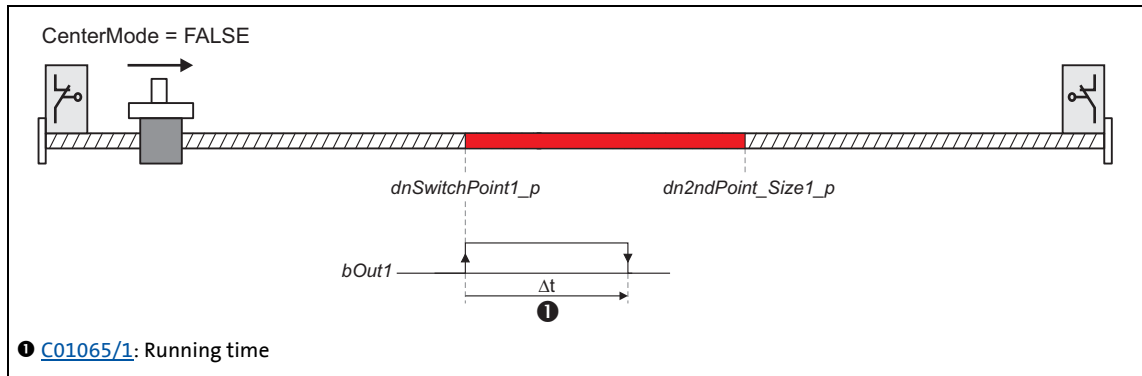


Tip!

Please note that a delay time set in [C01062/x](#) shifts the switching points including the hysteresis.

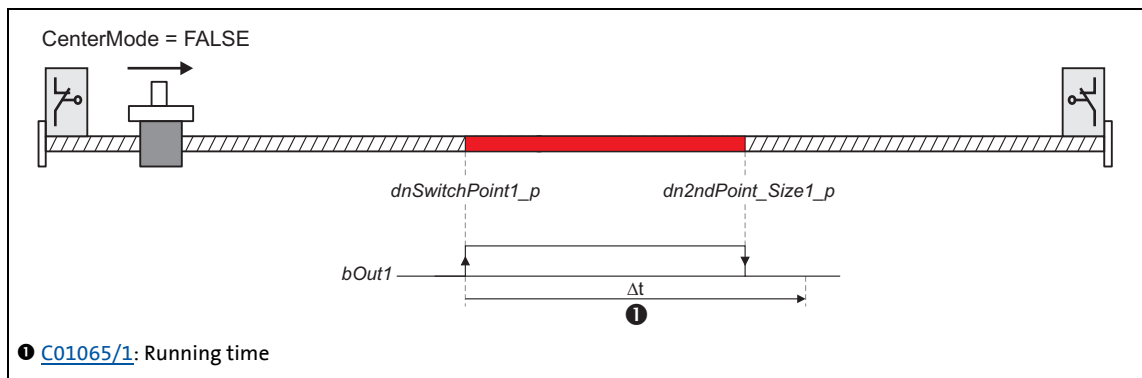
18.1.167.4 Position/time-based cams

The setting of a running time in [C01065/x](#) higher 0 ms serves to realise "position/time-based cams": If the drive reaches the switching range, the *bOut* switching output is set to TRUE and reset to FALSE after the set switching time has elapsed.



[18-77] Position/time-based cams (here without switching hysteresis and dead time compensation)

If the switching range is left before the running time has expired, the *bOut* switching output is reset to FALSE.



[18-78] Position/time-based cams: Behaviour when the switching range is left before the running time has expired

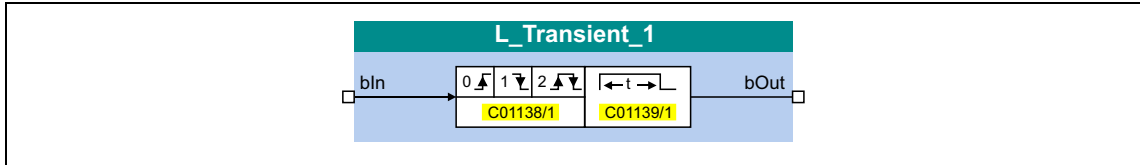


Tip!

Please note that for a resetting of the switching output the switching range must be left first.

18.1.168 L_Transient_1

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/1 .

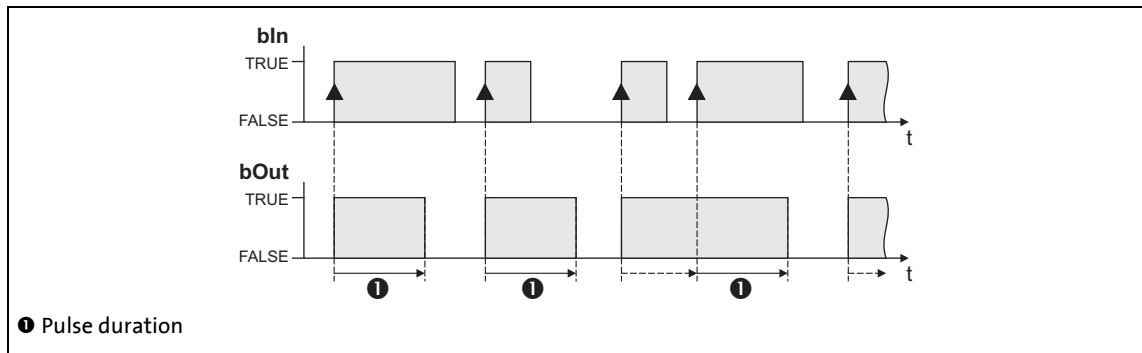
Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

Parameters	Possible settings			Info
C01138/1	0	High edge		Function • Selection of edge evaluation
	1	Low edge		Lenze setting
	2	High and low edge		
C01139/1	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s

18.1.168.1 Function 0: Evaluate rising signal edges

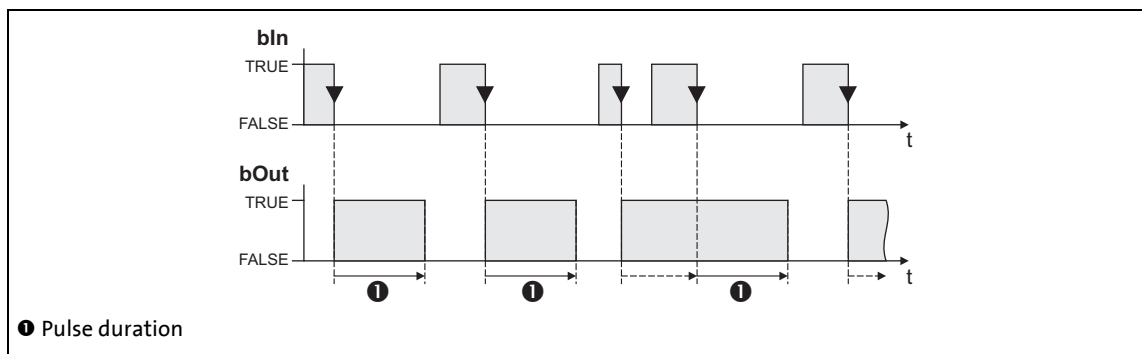


[18-79] Switching performance for function selection "0: High edge"

Functional sequence

1. A FALSE-TRUE edge at the *bIn* input sets the *bOut* output to TRUE.
2. After the parameterised pulse duration has elapsed, the *bOut* output is reset to FALSE unless another FALSE/TRUE edge has been set at the *bIn* input.
 - If an additional FALSE-TRUE edge occurs at the *bIn* input, the pulse duration starts again from the beginning, i.e. the *bOut* output can be retriggered.

18.1.168.2 Function 1: Evaluate falling signal edges

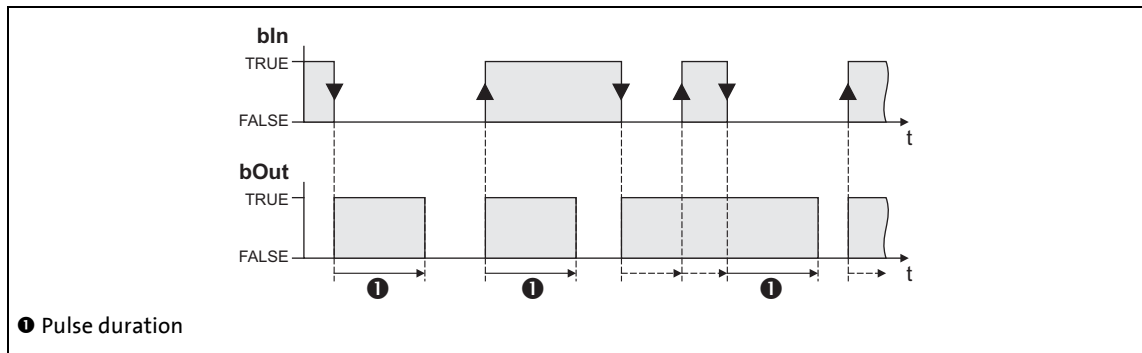


[18-80] Switching performance for function selection "1: Low edge"

Functional sequence

1. A TRUE-FALSE edge at the *bIn* inputs sets the *bOut* output to TRUE.
2. After the parameterised pulse duration has elapsed, the *bOut* output is reset to FALSE unless another TRUE/FALSE edge has been set at the *bIn* input.
 - If an additional TRUE-FALSE edge occurs at the *bIn* input, the pulse duration starts again from the beginning, i.e. the *bOut* output can be retriggered.

18.1.168.3 Function 2: Evaluate rising and falling signal edges



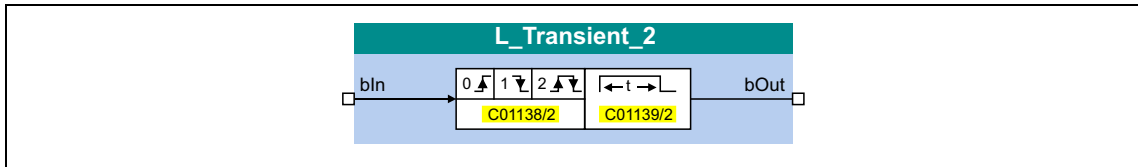
[18-81] Switching performance for function selection "2: High and low edge"

Functional sequence

1. A signal change (FALSE/TRUE edge or TRUE/FALSE edge) at the *bIn* input sets the *bOut* output to TRUE.
2. After the parameterised pulse duration has elapsed, the *bOut* output is reset to FALSE unless another signal change has taken place at the *bIn* input.
 - In case of another signal change at the input *bIn*, the pulse time restarts to elapse, i.e. the output *bOut* can be retriggered.

18.1.169 L_Transient_2

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/2 .

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

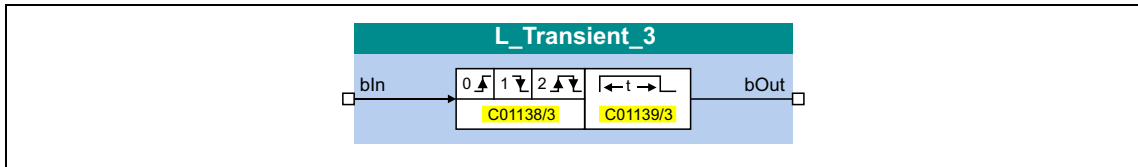
Parameters	Possible settings	Info		
C01138/2	0	High edge	Function • Selection of edge evaluation	
	1	Low edge	Lenze setting	
	2	High and low edge		
C01139/2	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

18.1.170 L_Transient_3

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/3 .

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

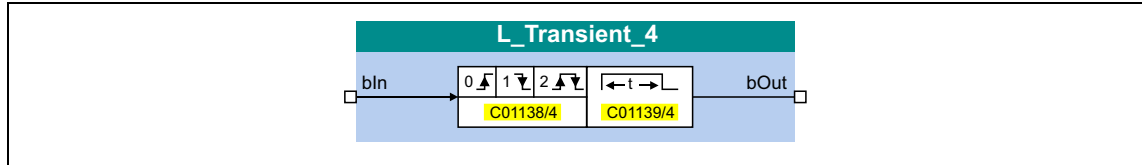
Parameters	Possible settings	Info		
C01138/3	0	High edge		
	1	Low edge		
	2	High and low edge		
C01139/3	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

18.1.171 L_Transient_4

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/4 .

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

Parameters	Possible settings	Info
C01138/4	0	High edge
	1	Low edge
	2	High and low edge
C01139/4	0.001	s
		60.000

Function
 • Selection of edge evaluation
 Lenze setting

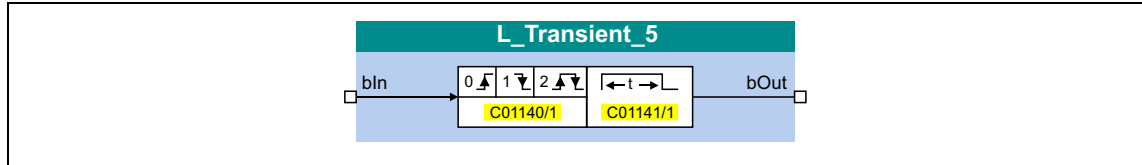
Pulse duration
 • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

18.1.172 L_Transient_5

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01140/1 .

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

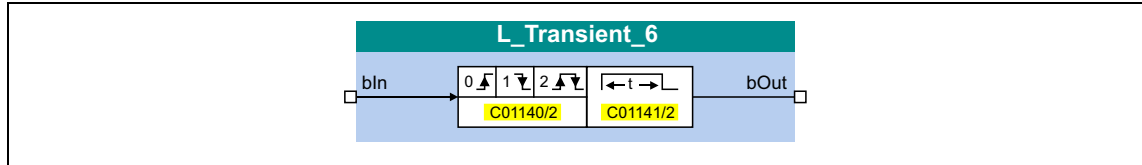
Parameters	Possible settings			Info
C01140/1	0	High edge		Function • Selection of edge evaluation
	1	Low edge		Lenze setting
	2	High and low edge		
C01141/1	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

18.1.173 L_Transient_6

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01140/2 .

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

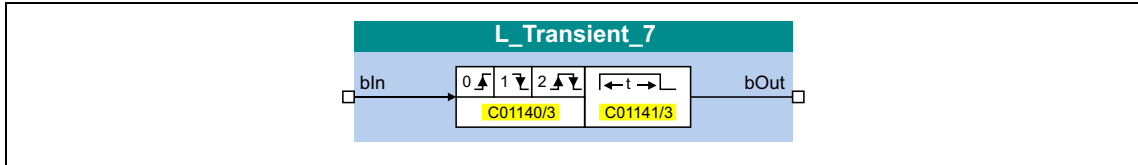
Parameters	Possible settings	Info
C01140/2	0	High edge
	1	Low edge
	2	High and low edge
C01141/2	0.001	s
		60.000
		Pulse duration • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

18.1.174 L_Transient_7

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01140/3 .

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

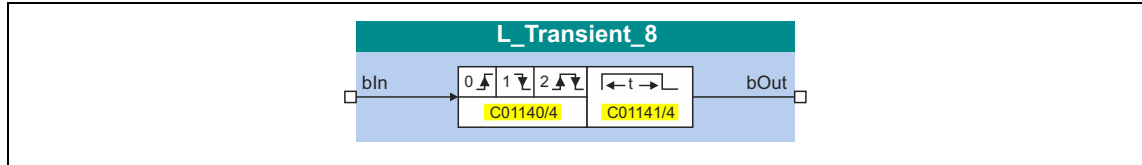
Parameters	Possible settings			Info
C01140/3	0	High edge		Function • Selection of edge evaluation
	1	Low edge		Lenze setting
	2	High and low edge		
C01141/3	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

18.1.175 L_Transient_8

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Designator	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01140/4 .

Outputs

Designator	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameters

Parameters	Possible settings	Info
C01140/4	0	High edge
	1	Low edge
	2	High and low edge
C01141/4	0.001	s
		60.000
	Pulse duration • Lenze setting: 0.001 s	



For a detailed functional description see [L_Transient_1](#).

18.2 System blocks

This chapter describes the system blocks which are available for the inverter in the FB Editor.



The function blocks are described in the chapter "[Function blocks](#)". (☐ 1222)

Overview of system blocks available

System block	Function	can be inserted into level:	
		I/O	Appl.
LS_AnalogInput	Interface to the analog input terminals ▶ Analog terminals (☐ 355)	●	
LS_CANManagement	Control of internal functions of the CAN driver and display of the "Operational" status as well as the node address ▶ CANopen option (☐ 668)	●	
LS_DataAccess	<i>Lenze internal only</i>		●
LS_DeviceMonitor	Motor control status signals ▶ Motor control (MCTRL) (☐ 132)		●
LS_DigitalInput	Interface to the digital input terminals ▶ Digital terminals (☐ 332)	●	
LS_DigitalOutput	Interface to the digital output terminals ▶ Digital terminals (☐ 332)	●	
LS_DisFree	Display of 8 arbitrary 16-bit signals of the application on display codes	●	●
LS_DisFree_a	Display of 8 arbitrary analog signals of the application on display codes	●	●
LS_DisFree_b	Display of 16 arbitrary digital signals of the application on a bit coded display code	●	●
LS_DisFree_p	Display of 8 arbitrary position signals of the application on display codes	●	●
LS_DriveInterface	Interface to drive control (DCTRL) ▶ Device control (DCTRL) (☐ 97)		●
LS_IRInterface	Interface to the optional infrared remote control	●	
LS_Keypad	Control via keypad	●	
LS_MotionControlKernel	Interface to the basic drive function implemented in the Motion Control Kernel (MCK) ▶ Basic drive functions (MCK) (☐ 466)		●
LS_MotorInterface	Interface to motor control (MCTRL) ▶ Motor control (MCTRL) (☐ 132)		●
LS_MultiEncoder	Interface to the SSI encoder evaluation	●	●
LS_ParFix LS_ParFix_2	Output of frequently used constants (TRUE, FALSE, 100 %, etc.) to be used in the interconnection • LS_ParFix_2 is available from version 12.00.00.	●	●
LS_ParFree LS_ParFree_2	Output of 32 parameterisable 16-bit signals • LS_ParFree_2 is available from version 12.00.00.	●	●
LS_ParFree_a LS_ParFree_a_2	Output of 16 parameterisable analog signals • LS_ParFree_a_2 is available from version 12.00.00.	●	●
LS_ParFree_b	Output of 32 parameterisable digital signals	●	●
LS_ParFree_p	Output of 8 parameterisable position signals	●	●
LS_ParFree_v LS_ParFree_v_2	Output of 8 parameterisable speed signals • LS_ParFree_v_2 is available from version 12.00.00.	●	●

System block	Function	can be inserted into level:	
		I/O	Appl.
LS_ParFree32	Output of 8 parameterisable 32-bit signals • This SB is available from version 12.00.00.	●	●
LS_ParFreeUnit LS_ParFreeUnit_2	Output of 16 parameterisable position signals with internal conversion of [unit] in [increments] • These SBs are available from version 12.00.00.	●	●
LS_ParReadWrite_1 ... LS_ParReadWrite_6	Reading/Writing of local parameters	●	
LS_PulseGenerator	Output of 9 fixed frequencies and 1 parameterisable frequency	●	
LS_RetainData	Selection and saving of retain data • This SB is available from version 12.00.00.	●	●
LS_ServiceSwitch	Output of the switching status of the optional service switch	●	
LS_SetError_1	Parameterisable responses to user-defined events are tripped ▶ Diagnostics & error management (📖 589)	●	
LS_SetError_2			●
LS_SMIInterface	Interface to the integrated safety system	●	
LS_SyncManagement	Output of status information for synchronising the internal time base ▶ Synchronisation of the internal time base (📖 755)	●	●
LS_TouchProbe	Interface for touch probe detection ▶ Touch probe detection (📖 360) • This SB will only be available from version 06.00.00.	●	
LS_WriteParamList	Interface to the basic "Parameter change-over" function ▶ Parameter change-over (📖 766)	●	

Related topics:

- ▶ [Overview of function blocks available](#) (📖 1222)
- ▶ [Working with the FB Editor](#) (📖 1170)

18.2.1 LS_AnalogInput

Interface to the analog input terminals.



For a detailed description see the main chapter "I/O terminals":

▶ [Internal interfaces | System block "LS_AnalogInput"](#) (📖 359)

18.2.2 LS_CANManagement

Control of internal functions of the CAN driver and display of the "Operational" status as well as the node address.



For a detailed description see the main chapter "System bus CAN on board":

▶ [Internal interfaces | System block "LS_CANManagement"](#) (📖 747)

18.2.3 LS_DataAccess

Only for Lenze-internal use.

18.2.4 LS_DeviceMonitor

Motor control status signals.



For a detailed description see the main chapter "Motor control (MCTRL)":

▶ [Internal status signals | System block "LS_DeviceMonitor"](#) (📖 329)

18.2.5 LS_DigitalInput

Interface to the digital input terminals.



For a detailed description see the main chapter "I/O terminals":

▶ [Internal interfaces | System block "LS_DigitalInput"](#) (📖 347)

18.2.6 LS_DigitalOutput

Interface to the digital output terminals.

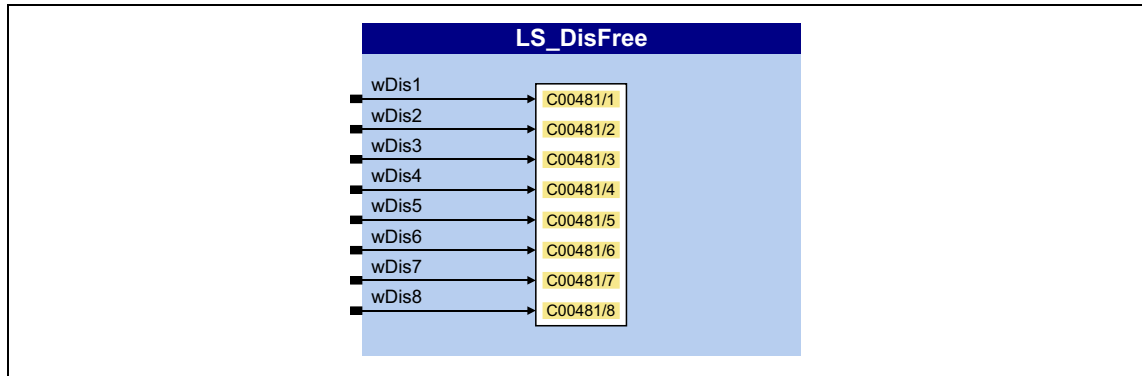


For a detailed description see the main chapter "I/O terminals":

▶ [Internal interfaces | System block "LS_DigitalOutput"](#) (📖 354)

18.2.7 LS_DisFree

This system block displays 8 arbitrary 16-bit signals of the application on display codes.



Inputs

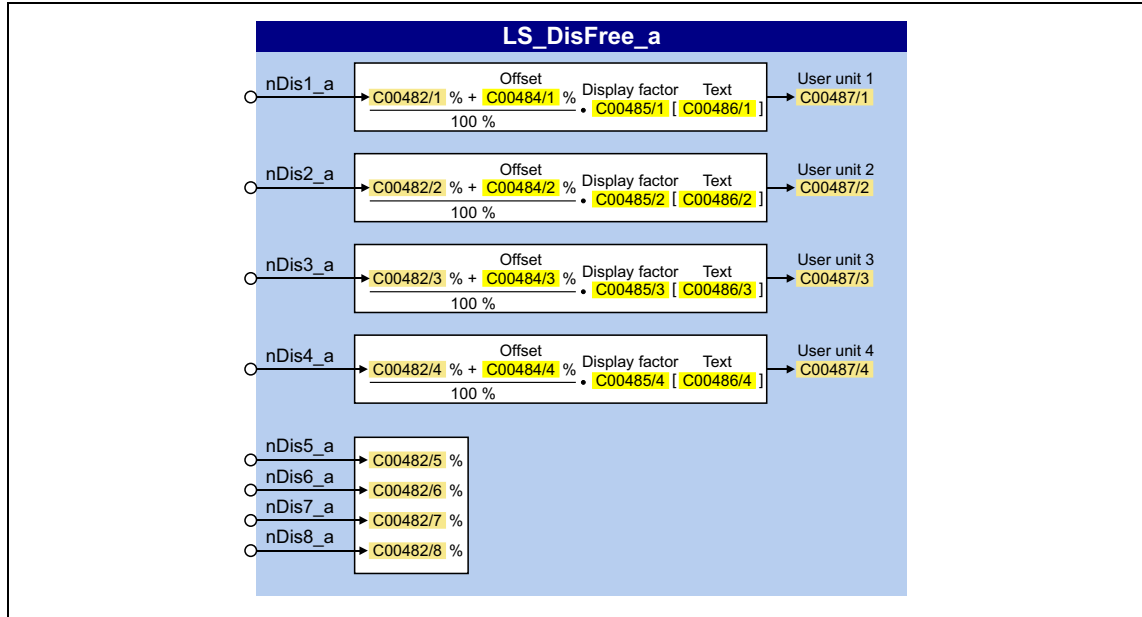
Designator	Data type	Information/possible settings
wDis1 ... wDis8	WORD	Inputs for any 16-bit signals of the application
From version 12.00.00: wC481_1 ... wC481_8_a		Note: From version 12.00.00 the inputs are named according to the display parameter for an easier allocation.

Parameters

Parameters	Possible settings	Info
C00481/1...8	0x0000	0xFFFF
		Display of the 16-bit signals which are applied at the wDis1 ... wDis8 inputs

18.2.8 LS_DisFree_a

This system block displays 8 arbitrary analog signals of the application on display codes.



Inputs

Designator	Information/possible settings
nDis1_a ... nDis8_a <small>Data type</small> INT	Inputs for arbitrary analog signals of the application
<small>From version 12.00.00:</small> nC482_1_a ... nC482_8_a	Note: From version 12.00.00 the inputs are named according to the display parameter for an easier allocation.

Parameters

Parameters	Possible settings	Info
C00482/1...8	-199.99 %	199.99 % Display of the analog signals which are applied at the nDis1_a ... nDis8_a inputs
C00484/1...4 ... C00487/1...4	From version 06.00.00 onwards: ▶ Display of internal process factors in application units	

18.2.8.1 Display of internal process factors in application units

This function extension is available from version 06.00.00!

In addition to the display in percent in [C00482/1...8](#), for the first four analog signals $nDis1_a \dots nDis4_a$ the configurable display parameters [C00487/1...4](#) are provided. Via these display parameters, internal process variables can be displayed, e.g. on the keypad, with an individual scaling and an individual unit.

Configuration of the display parameters ([C00487/1...4](#)):

Parameters	Possible settings			Info
C00484/1...4	-199.99	%	199.99	Offset 1 ... 4 <ul style="list-style-type: none"> See formula [18-82]. Lenze setting: 0.00 %
C00485/1...4	-65536.0000		65536.0000	Display factor 1 ... 4 <ul style="list-style-type: none"> Scaling of the input variable for the display. See formula [18-82]. Lenze setting: 1.0000
C00486/1...4	String (max. 7 digits)			Text 1 ... 4 <ul style="list-style-type: none"> For each display value, an individual unit (e.g. "parts") can be set.

$$\text{User unit 1} = \frac{nDis1_a [\%] + \text{Offset 1} [\%]}{100 [\%]} \cdot \text{Display factor 1} [\text{text 1}]$$

[18-82] Formula for scaling the display

Example 1:

- Input variable $nDis1_a = 100 \%$
- Offset 1 ([C00484/1](#)) = 0 %
- Display factor 1 ([C00485/1](#)) = 123.45
- Text 1 ([C00486/1](#)) = "parts"

$$\text{User unit 1} = \frac{100 [\%] + 0 [\%]}{100 [\%]} \cdot 123.45 [\text{parts}] = 123.45 \text{ parts}$$

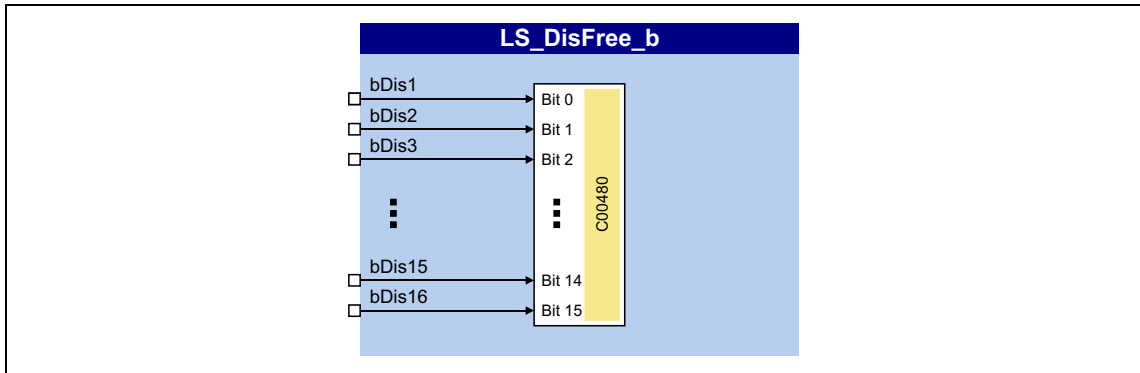
Example 2:

- Input variable $nDis2_a = 40 \%$
- Offset 2 ([C00484/2](#)) = 35 %
- Display factor 2 ([C00485/2](#)) = 20
- Text 2 ([C00486/2](#)) = "kg"

$$\text{User unit 2} = \frac{40 [\%] + 35 [\%]}{100 [\%]} \cdot 20 [\text{kg}] = 15.00 \text{ kg}$$

18.2.9 LS_DisFree_b

This system block displays 16 arbitrary digital signals of the application on a bit coded display code.



Inputs

Designator	Data type	Information/possible settings
bDis1 ... bDis16	BOOL	Inputs for arbitrary digital signals of the application
From version 12.00.00: bC480_B0 ... bC480_B16		Note: From version 12.00.00 the inputs are named according to the display parameter for an easier allocation.

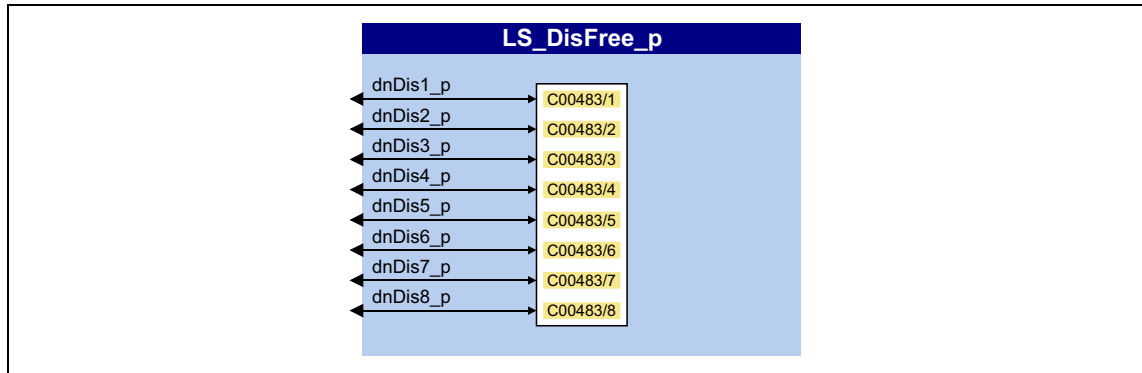
Parameters

Parameters	Possible settings	Info	
C00480	0x0000	Display of the digital signals as hexadecimal values which are applied at the <i>bDis1</i> ... <i>bDis16</i> inputs	
	Bit 0		Signal level at the <i>bDis1</i> input
	Bit 1		Signal level at the <i>bDis2</i> input
	Bit 2		Signal level at the <i>bDis3</i> input

	Bit 15		Signal level at the <i>bDis16</i> input

18.2.10 LS_DisFree_p

This system block displays 8 arbitrary position signals of the application on display codes.



Inputs

Designator	Data type	Information/possible settings
dnDis1_p ... dnDis8_p	DINT	Inputs for arbitrary position signals of the application
From version 12.00.00: dnC483_1_p ... dnC483_8_p		Note: From version 12.00.00 the inputs are named according to the display parameter for an easier allocation.

Parameters

Parameters	Possible settings	Info
C00483/1...8	-2147483647 Incr. 2147483647	Display of the position signals which are applied at the <i>dnDis1_p ... dnDis8_p</i> inputs

18.2.11 LS_DriveInterface

Interface to internal device control.



For a detailed description see main chapter "Device control (DCTRL)":

► [Internal interfaces | "LS_DriveInterface" system block](#) (125)

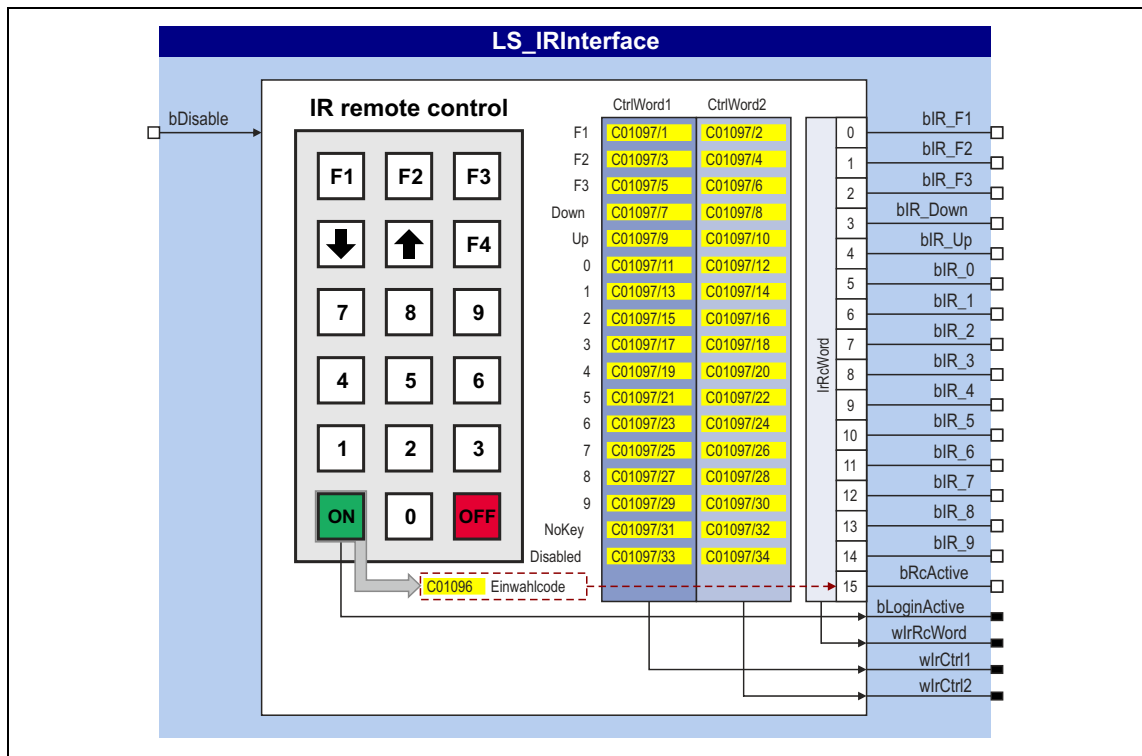
18.2.12 LS_IRInterface

The decentralised 8400 protec inverters are provided with an infrared receiver (IRRC) below the integrated 7-segment display which, in interaction with the optional infrared remote control, provides for a (local) control of the inverter if installed in an inaccessible location, for example.

Examples:

- Traversing a slide in manual operation when installing the system.
- Retracting a limit switch in the event of an error.

The LS_IRInterface system block serves to link the different keys of the remote control in the FB Editor with any control function of the application.



Inputs

Designator	Data type	Information/possible settings
bDisable	BOOL	TRUE Remote control deactivated

Outputs

Designator	Data type	Meaning
bIR_F1 ... bIR_F3	BOOL	TRUE Key F1 ... F3 pressed
bIR_Down / bIR_Up	BOOL	TRUE Key ▼/▲ pressed
bIR_0 ... bIR_9	BOOL	TRUE Key 0 ... 9 pressed

Designator	Data type	Meaning		
bRcActive	BOOL	"Remote control active" status signal		
		<table border="1"> <tr> <td>FALSE</td> <td>No remote control active.</td> </tr> <tr> <td>TRUE</td> <td>The in-dialing number set in C01096 has been entered via the remote control, the remote control is active. ▶ Activate/exit remote control</td> </tr> </table>	FALSE	No remote control active.
FALSE	No remote control active.			
TRUE	The in-dialing number set in C01096 has been entered via the remote control, the remote control is active. ▶ Activate/exit remote control			
bLoginActive	BOOL	"Dial-in mode active" status signal		
		<table border="1"> <tr> <td>FALSE</td> <td>Dial-in mode is not active.</td> </tr> <tr> <td>TRUE</td> <td>Dial-in mode is active. The dial-in number set in C01096 can be entered via the remote control to activate the remote control function.</td> </tr> </table>	FALSE	Dial-in mode is not active.
FALSE	Dial-in mode is not active.			
TRUE	Dial-in mode is active. The dial-in number set in C01096 can be entered via the remote control to activate the remote control function.			
wlRcWord	WORD	Bit coded key status as collective information (Bit 0 ≡ <i>bIR_F1</i> , bit 1 ≡ <i>bIR_F2</i> , ... , bit 15 ≡ <i>bRcActive</i>)		
wlRctrl1 / wlRctrl2	WORD	Output of the individual key codes <ul style="list-style-type: none"> • For each key, two individual values can be set in C01097/x, which, when the key being pressed, are output to <i>wlRctrl1</i> and <i>wlRctrl2</i>. • If no key is pressed, the value set in C01097/31 is output to <i>wlRctrl1</i> and the value set in C01097/32 is output to <i>wlRctrl2</i>. • If the function is deactivated by the <i>bDisable</i> input, the value set in C01097/33 is output to <i>wlRctrl1</i> and the value set in C01097/34 is output to <i>wlRctrl2</i>. 		

Parameters

Parameters	Possible settings	Info
C01096 (In version 8.00.00 and from version 12.00.00 onwards)	0	9999 In-dialing number
C01097/1...34 (In version 8.00.00 and from version 12.00.00 onwards)	0x0000	0xFFFF Individual key codes <ul style="list-style-type: none"> • For the output to <i>wlRctrl1</i> and <i>wlRctrl2</i>.



Note!

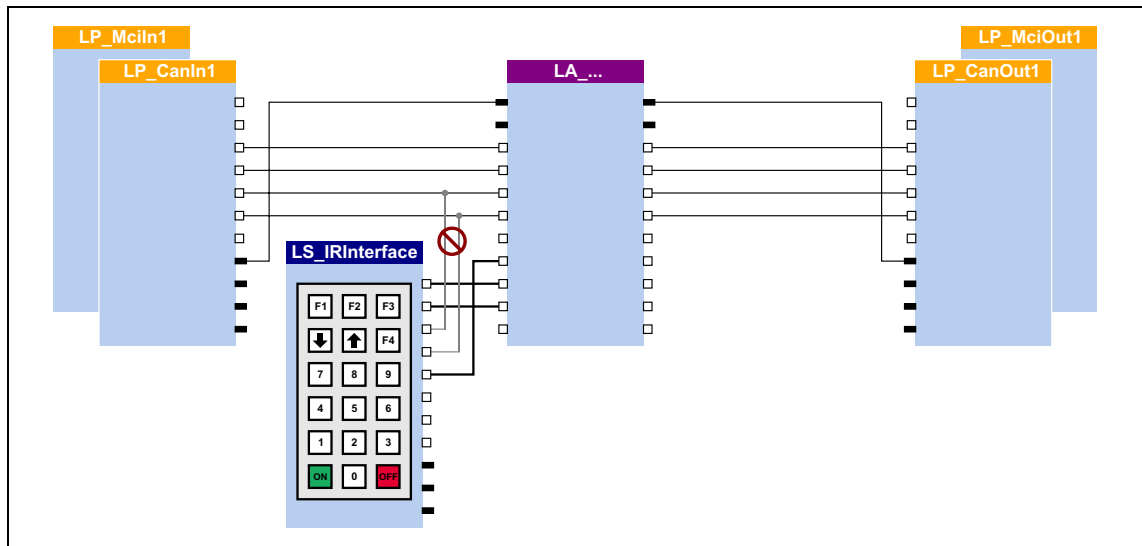
- Only one key at a time can be pressed.
- The respective output is set to TRUE as long as the related key is pressed.
- During the dial-up process, the *bLoginActive* output is active (TRUE). This serves to stop the drive via an individual interconnection so that the operator does not need to follow the drive in case of an on-board inverter.
- If sight between the remote control and the device is lost, the output is reset to FALSE.
- The key F4 of the remote control is permanently assigned to the function of the pushbutton T1 at the device: Browsing the status values S1 ... S5 on the integrated 7-segment display.

18.2.12.1 Assign control functions to the remote control

The control functions are assigned to the keys of the remote control via interconnection in the FB Editor. The following example shows two principal options.

Option 1: Assignment of function/key in the inverter

For this purpose, the SB LS_IRInterface is directly connected to the control inputs of the application block:

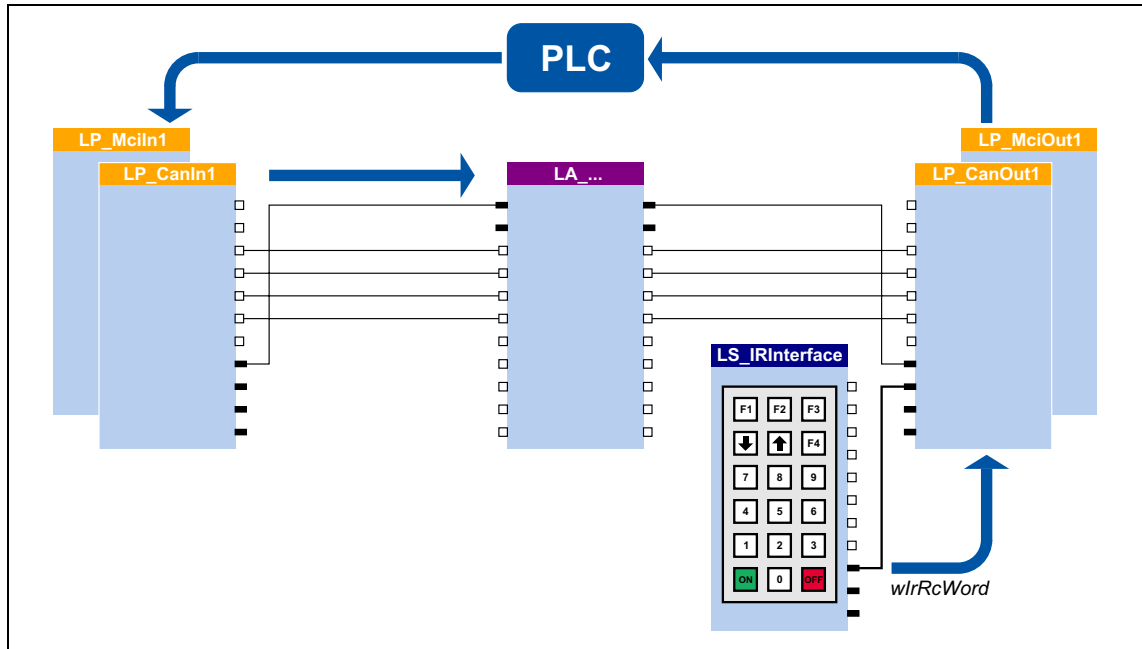


[18-83] Principle: Direct assignment of keys to control inputs of the application

- **Advantage:** Independent of the higher-level control, some functions can be exclusively executed via remote control (e.g. emergency operation in case the higher-level control fails).
- **Disadvantage:** It is not possible to influence the control signals of the higher-level control by means of the remote control.

Option 2: Assignment of function/key in higher-level control

For this purpose, all information of the remote control is transmitted to the higher-level control via the output port block. Via the input port block, the application finally receives the relevant control information from the higher-level control:



[18-84] Principle: Transfer of the key assignment to the higher-level control

- **Advantage:** The higher-level control can accept or deny certain control functions of the remote control individually (process-dependent).
- **Disadvantage:** If the higher-level control fails or the PLC program is stopped, no remote control is possible.

18.2.12.2 Activate/exit remote control



Note!

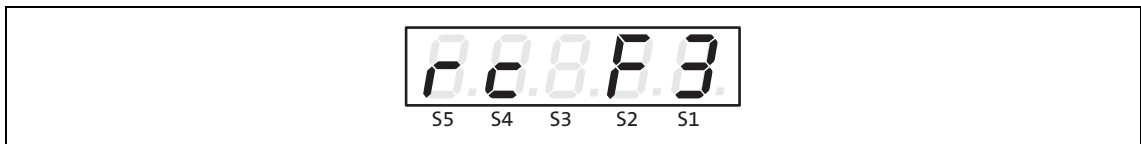
A trouble-free operation of the optical interface requires:

- unhindered line of sight of transmitter and receiver
 - maximum distance ~ 5 m and angle of incidence ~ 30 °
 - Avoid direct solar radiation
 - Environment without interfering transmitter (e.g. from adjacent station)
- clean and scratch-free service hatch

For operating the inverter using the remote control, observe the following steps for dial-up access:

1. Press the "ON" key on the remote control.
2. Enter the dial-in number shown on the 7-segment display with the keys of the remote control (time between pressing two keys < 3 s).

After dialing-in successfully, the 7-segment display indicates "rc" ("remote control") and the respective key pressed in each case:



- If an error exists when remote control is activated, the display changes between "rc [key]" and the error code every 500 ms. If several errors exist, the active status determining error is displayed and all further errors will only be entered into the logbook.



Tip!

- When the remote control is activated, the F4 key of the remote control serves to browse the status values S1 ... S5 in ascending order. After the status value S5, it starts anew with the "rc [key]" display.
- In the Lenze setting, the four-digit in-dialing number is a number derived from the device serial number. If several devices are installed close to each other, this ensures an operation of only one device. The preset in-dialing number can be changed in [C01096](#) and then saved in the memory module.

Exit remote control of the inverter

When pressing the "OFF" key on the remote control, you exit the control via remote control.

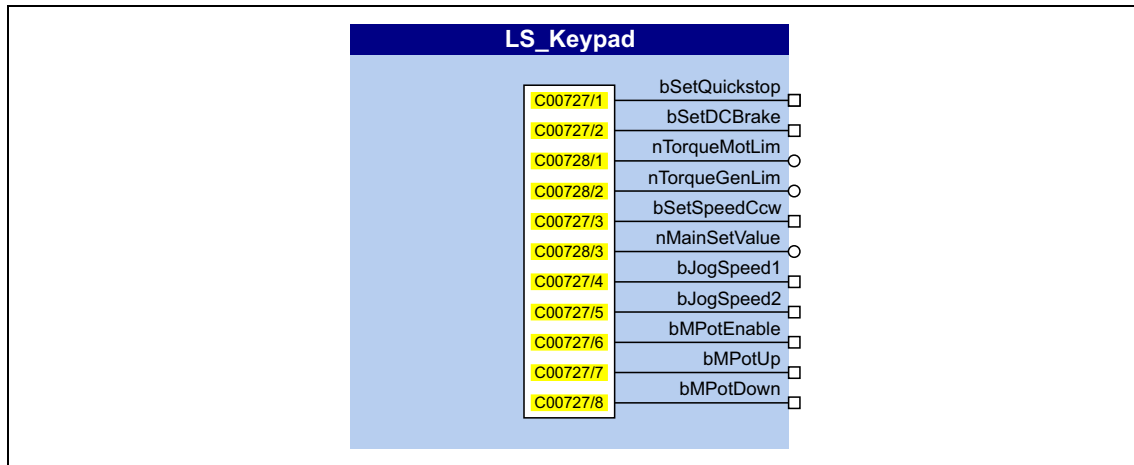
Related topics:

- ▶ [Drive diagnostics via the integrated 7-segment display \(593\)](#)

18.2.13 LS_Keypad

This system block is used on I/O interconnection level if the "Keypad" control mode has been selected in [C00007](#).

In the "Keypad" control mode, the **LS_Keypad** system block passes on various setpoints and control commands to the technology application which can be selected/activated via codes using the keypad.



Outputs

Designator	Data type	Value/meaning
bSetQuickstop	BOOL	C00727/1 = "1" ≡ Request quick stop
bSetDCBrake	BOOL	C00727/2 = "1" ≡ Request DC-injection braking
nTorqueMotLim	INT	Torque limit in motor mode set in C00728/1 • Lenze setting: 100.00 %
nTorqueGenLim	INT	Torque limit in generator mode set in C00728/2 • Lenze setting: 100.00 %
bSetSpeedCcw	BOOL	C00727/3 = "1" ≡ Request reversal
nMainSetValue	INT	Setpoint speed set in C00728/3 • Lenze setting: 0.00 %
bJogSpeed1	BOOL	C00727/4 = "1" ≡ Request fixed speed setpoint 1
bJogSpeed2	BOOL	C00727/5 = "1" ≡ Request fixed speed setpoint 2
bMPotEnable	BOOL	C00727/6 = "1" ≡ Motor potentiometer: Request activation
bMPotUp	BOOL	C00727/7 = "1" ≡ Motor potentiometer: Request positive acceleration
bMPotDown	BOOL	C00727/8 = "1" ≡ Motor potentiometer: Request negative acceleration

Parameters

Parameters	Possible settings			Info
C00727/1...8	0		1	Keypad digital values <ul style="list-style-type: none"> • Execution of control commands for keypad operation • See the "Outputs" table for the meaning of the individual subcodes
C00728/1...3	-199.99	%	199.99	Analog values - keypad <ul style="list-style-type: none"> • Selection of various setpoints for operation via keypad • See the "Outputs" table for the meaning of the individual subcodes

18.2.14 LS_MotionControlKernel

Interface to the basic drive functions implemented in **Motion Control Kernel (MCK)**.



For a detailed description see the main chapter "Basic drive functions":

▶ [Internal interfaces | System block "LS_MotionControlKernel"](#) (📖 468)

18.2.15 LS_MotorInterface

Interface to internal motor control.

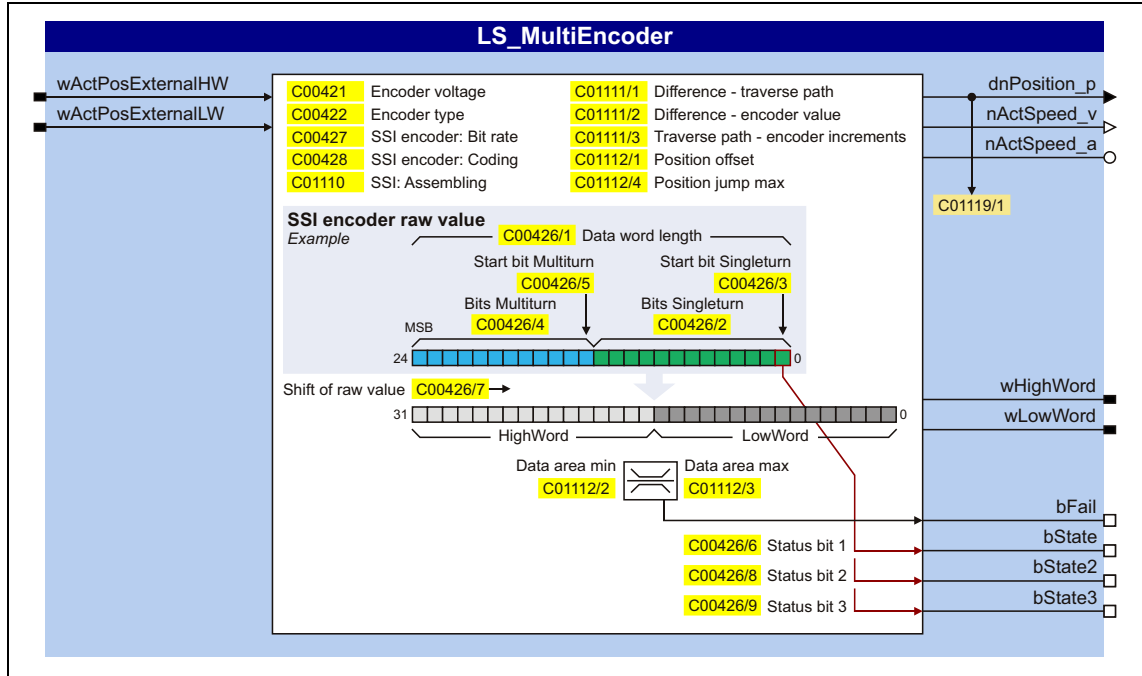


For a detailed description see the main chapter "Motor control (MCTRL)":

▶ [Internal interfaces | System block "LS_MotorInterface"](#) (📖 323)

18.2.16 LS_MultiEncoder

The LS_MultiEncoder system block provides the speed, position and error information of an SSI encoder connected to the synchronous-serial interface (SSI) as process signals to the application.



Inputs

Designator	Data type	Information/possible settings
wActPosExternalHW wActPosExternalLW	WORD	These inputs serve to feed in the position signal of an encoder (e.g. via CAN or another available fieldbus) and use it as position signal. ▶ Evaluation of external absolute value encoders (295) Scaling: LW = 1 revolution, HW = number of revolutions Thus, an encoder revolution is displayed with 65536 increments.

Outputs

Designator	Data type	Value/meaning
dnPosition_p	DINT	Actual position value from the encoder in [increments]
nActSpeed_v	INT	Actual speed from the encoder in [increments/ms] The nActSpeed_v output signal is accurate to increments.
nActSpeed_a	INT	Actual speed from the encoder in [%] • 100 % ≙ reference speed (C00011) The nActSpeed_a output signal is not accurate as to increments and is therefore <u>not</u> suitable for being able to generate a position or path from it!
wHighWord wLowWord	WORD	32-bit data telegram from the encoder (raw data) ▶ SSI encoder evaluation (287) The output is always made in binary format, i.e. in case of Graycode encoders after the received data is decoded. The MSB of the data is at bit 16 of the wHighWord output. In order to obtain a standard data format (LSB at the lowest position), an offset can be set in C00426/7. ▶ Left shift of raw value (290)

Designator	Data type	Value/meaning
bFail	BOOL	TRUE Group error: There is an error (e.g. encoder wire breakage) according to the <i>bFail</i> configuration in C00431/1 . In version 8.00.00 and from version 15.00.00 onwards, the error type is displayed bit-coded in C00451/1 . ▶ Monitoring
bState <small>(from version 02.00.00)</small>	BOOL	Status bit 1 of the encoder <ul style="list-style-type: none"> The bit position of the status bit within the 32-bit data telegram can be set in C00426/6. If C00426/6 = "32", the evaluation of the status bit 1 is deactivated and FALSE is always output at <i>bState</i>.
bState2 <small>(In version 8.00.00 and from version 16.00.00)</small>	BOOL	Status bit 2 of the encoder <ul style="list-style-type: none"> The bit position of the status bit within the 32-bit data telegram can be set in C00426/8. If C00426/8 = "32", the evaluation of the status bit 2 is deactivated and FALSE is always output at <i>bState2</i>.
bState3 <small>(In version 8.00.00 and from version 16.00.00)</small>	BOOL	Status bit 3 of the encoder <ul style="list-style-type: none"> The bit position of the status bit within the 32-bit data telegram can be set in C00426/9. If C00426/9 = "32", the evaluation of the status bit 3 is deactivated and FALSE is always output at <i>bState3</i>.



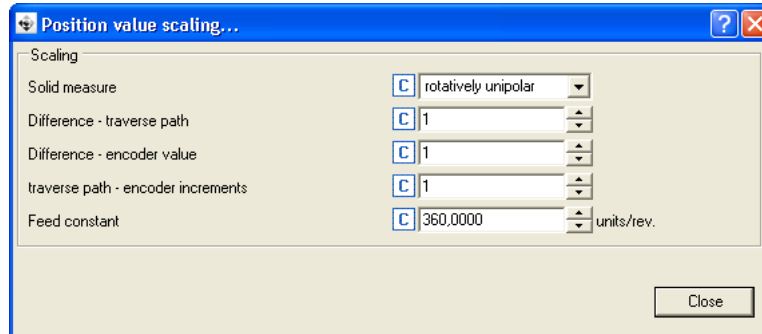
Detailed information on how to parameterise and configure the SSI encoder evaluation can be found in the main chapter "Motor control (MCTRL)" in the subchapter "[SSI encoder evaluation](#)". (📖 287)

Display parameter

Parameters	Info	Lenze setting	
		Value	Unit
C01119/1	LS_MultiEncoder: Current position	-	units
C01119/2	LS_MultiEncoder: Maximum travel distance	-	units
Greyed out = display parameter			

18.2.16.1 Scaling of position value

If you click the **Scaling of position value...** button in the parameterisation dialog for the encoder/feedback system in the category "Multi-Encoder (X8), you get to the respective parameterisation dialog:



Short overview of the relevant parameters:

Parameters	Info	Lenze setting	
		Value	Unit
C01110	LS_MultiEncoder: Solid measure • Setting of rotative or linear encoders.	0:	rotatively unipolar
Settings for linear SinCos absolute value encoder with HIPERFACE® protocol			
C01111/1	LS_MultiEncoder: Difference - traverse path • Specification of the traverse path while passing through the step number of the Hiperface track given in C01111/2 . • Setting is relevant for parameter channel.	1	units
C01111/2	LS_MultiEncoder: Difference - encoder path • Step number of the Hiperface track. • Setting is relevant for parameter channel.	1	Steps
Further settings			
C01204	MCK: Feed constant	360.0000	units/rev.

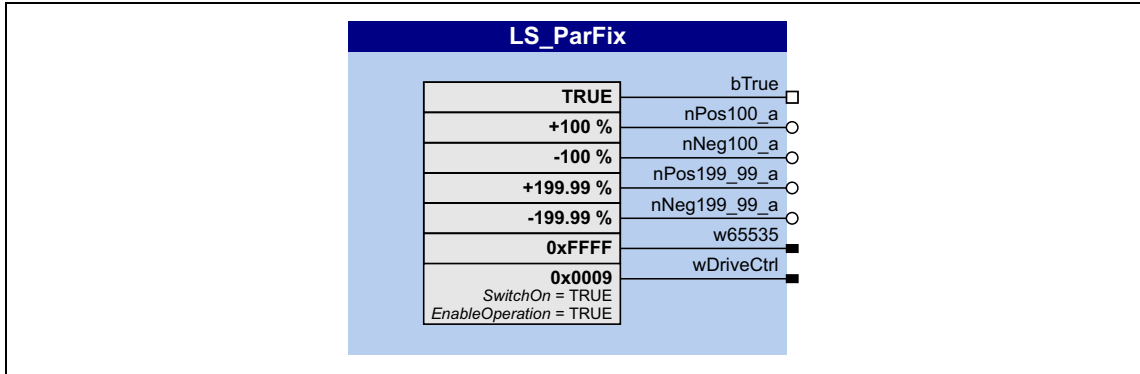
18.2.16.2 Setting of a static position offset

If, for example, the encoder cannot be mounted mechanically in order that the supplied position matches the mechanics or if for other reasons, a static position offset is required, this value can be set in [C01112/1](#).

18.2.17 LS_ParFix

This system block outputs various fixed values (constants) to be used in the interconnection.

- From version 12.00.00, another LS_ParFix_2 system block is available which can be used e.g. in the application level.

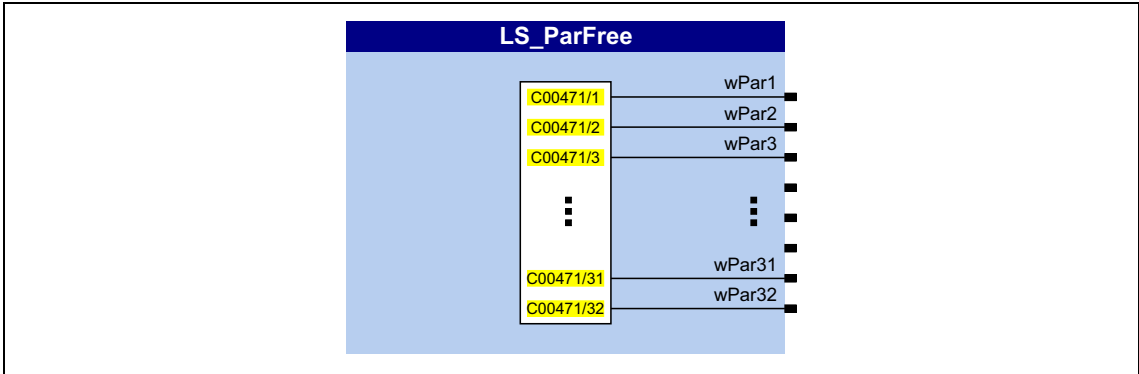


Outputs

Designator	Data type	Value/meaning
bTrue	BOOL	1 ≙ TRUE
nPos100_a	INT	16384 ≙ + 100 %
nNeg100_a	INT	-16384 ≙ - 100 %
nPos199_99_a	INT	32767 ≙ + 199.99 %
nNeg199_99_a	INT	-32767 ≙ - 199.99 %
w65535	WORD	65535 ≙ 0xFFFF
wDriveCtrl	WORD	9 ≙ 0x0009 <ul style="list-style-type: none"> • Bit 0, SwitchOn = TRUE • Bit 3, EnableOperation = TRUE • All others: FALSE See also: ▶ wCANControl/wMCIControl control words (128)

18.2.18 LS_ParFree

This system block outputs 32 parameterisable 16-bit signals.



Outputs

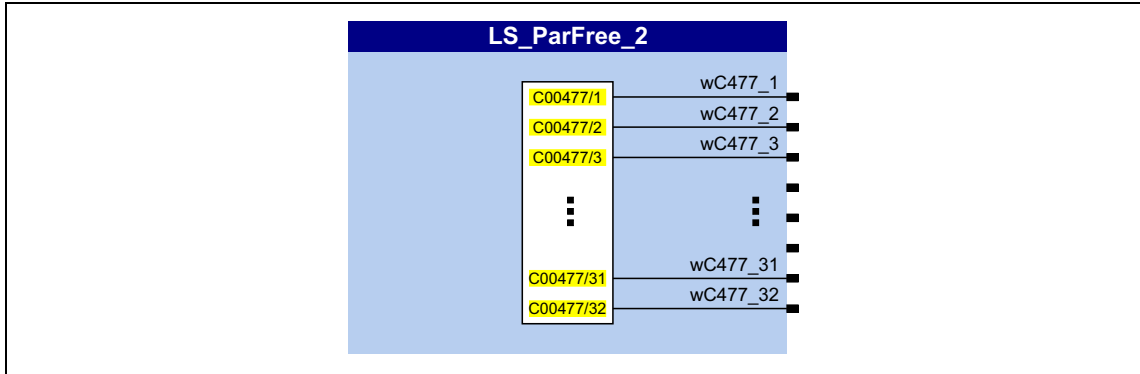
Designator	Data type	Value/meaning
wPar1 ... wPar32 <small>From version 12.00.00: wC471_1 ... wC471_32</small>	WORD	Output of the 16-bit signals parameterised in C00471/1...32 Note: From version 12.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

Parameters

Parameters	Possible settings			Info
C00471/1...32	0x0000		0xFFFF	Setting of the 16-bit signals to be output

18.2.19 LS_ParFree_2

This system block outputs 32 parameterisable 16-bit signals.



Outputs

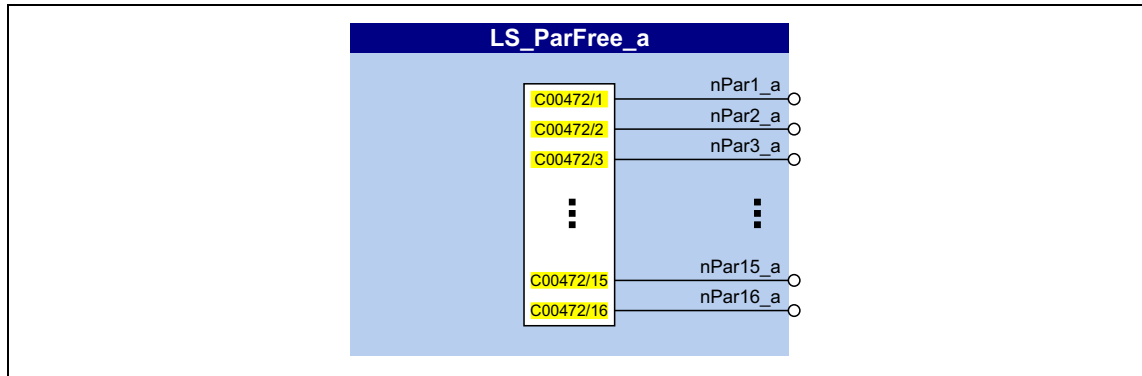
Designator	Data type	Value/meaning
wC477_1 ... wC477_32	WORD	Output of the 16-bit signals parameterised in C00477/1...32

Parameters

Parameters	Possible settings			Info
C00477/1...32	0x0000		0xFFFF	Setting of the 16-bit signals to be output

18.2.20 LS_ParFree_a

This system block outputs 16 parameterisable analog signals.



Outputs

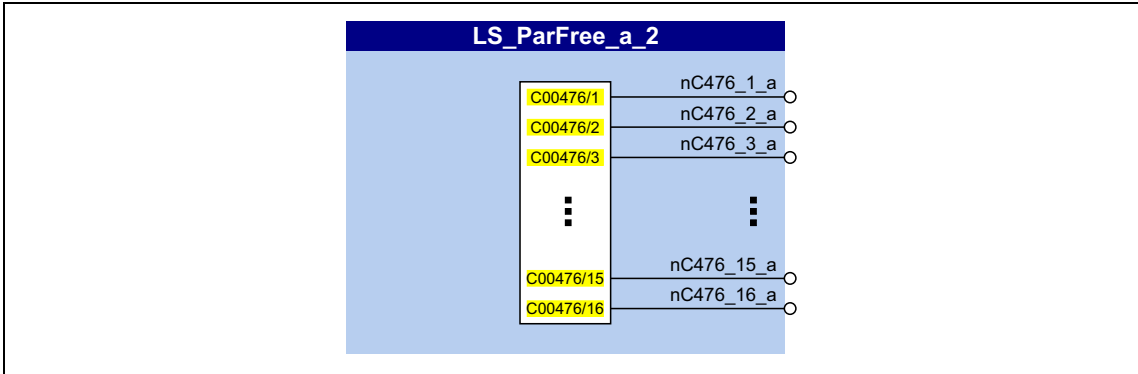
Designator	Data type	Value/meaning
nPar1_a ... nPar16_a	INT	Output of the analog signals parameterised in C00472/1...16
From version 12.00.00: nC472_1_a ... nC472_16_a		Note: From version 12.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

Parameters

Parameters	Possible settings			Info
C00472/1...16	-199.99	%	+199.99	Selection of analog signals to be output

18.2.21 LS_ParFree_a_2

This system block outputs 16 parameterisable analog signals.



Outputs

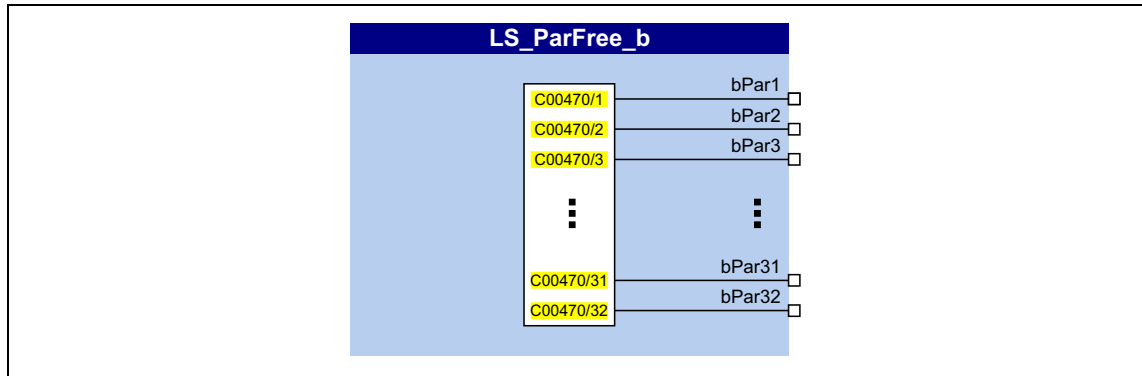
Designator	Data type	Value/meaning
nC476_1_a ... nC476_16_a	INT	Output of the analog signals parameterised in C00476/1...16

Parameters

Parameters	Possible settings			Info
C00476/1...16	-199.99	%	+199.99	Selection of analog signals to be output

18.2.22 LS_ParFree_b

This system block outputs 32 parameterisable digital signals.



Outputs

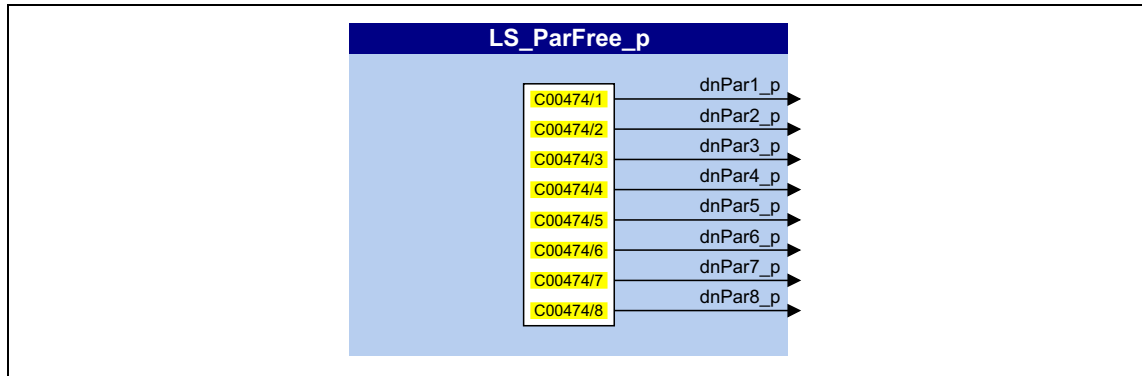
Designator	Data type	Value/meaning
bPar1 ... bPar32 From version 12.00.00: bC470_1 ... bC470_32	BOOL	Output of the signal levels (FALSE/TRUE) parameterised in C00470/1...32 Note: From version 12.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

Parameters

Parameters	Possible settings	Info
C00470/1...32		Selection of signal levels to be output • Bit 0 ... 31 = <i>bPar1</i> ... <i>bPar32</i>
	0 "FALSE" signal is output	
	1 "TRUE" signal is output	

18.2.23 LS_ParFree_p

This system block outputs 8 parameterisable position signals.



Outputs

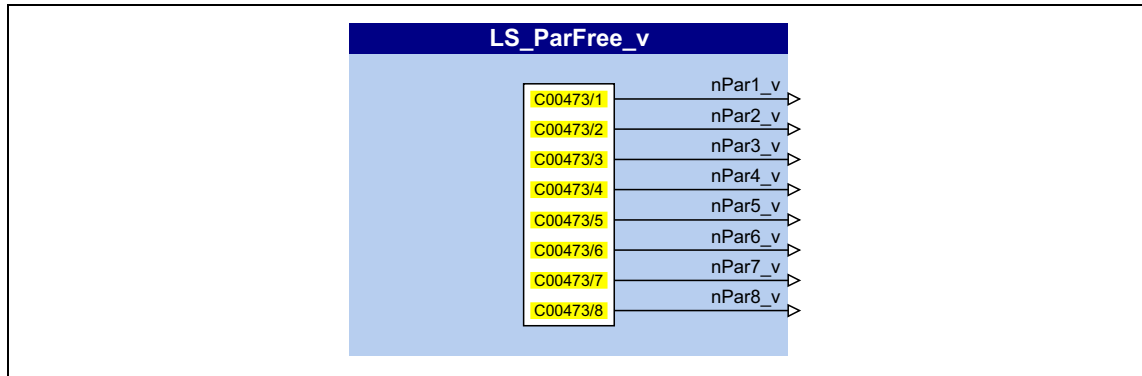
Designator	Data type	Value/meaning
dnPar1_p ... dnPar8_p	DINT	Output of the position signals parameterised in C00474/1...8
From version 12.00.00: dnC474_1_p ... dnC474_8_p		Note: From version 12.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

Parameters

Parameters	Possible settings			Info
C00474/1...8	-2147483647	Incr.	2147483647	Setting of the position signals to be output

18.2.24 LS_ParFree_v

This system block outputs 8 parameterisable speed signals.



Outputs

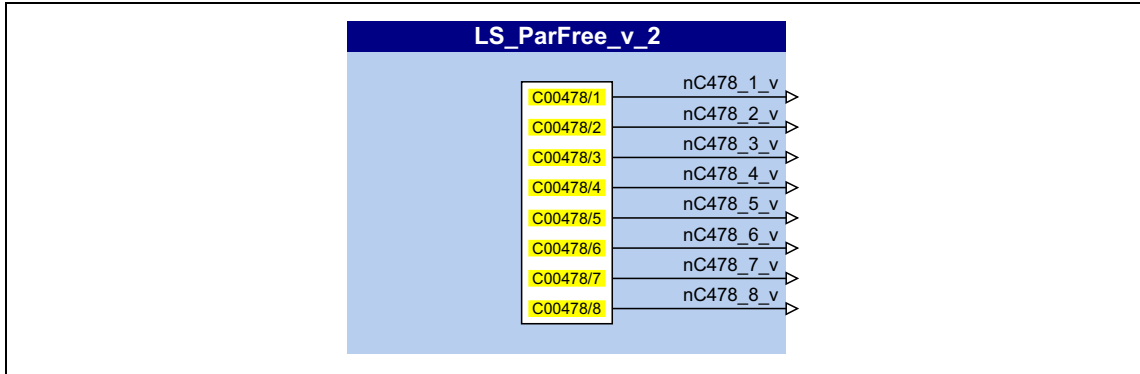
Designator	Data type	Information/possible settings
nPar1_v ... nPar8_v	INT	Output of the speed signals parameterised in C00473/1...8
From version 12.00.00: nC473_1_v ... nC473_8_v		Note: From version 12.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

Parameters

Parameters	Possible settings			Info
C00473/1...8	-32767	Incr/ms	+32767	Selection of speed signals to be output

18.2.25 LS_ParFree_v_2

This system block outputs 8 parameterisable speed signals.



Outputs

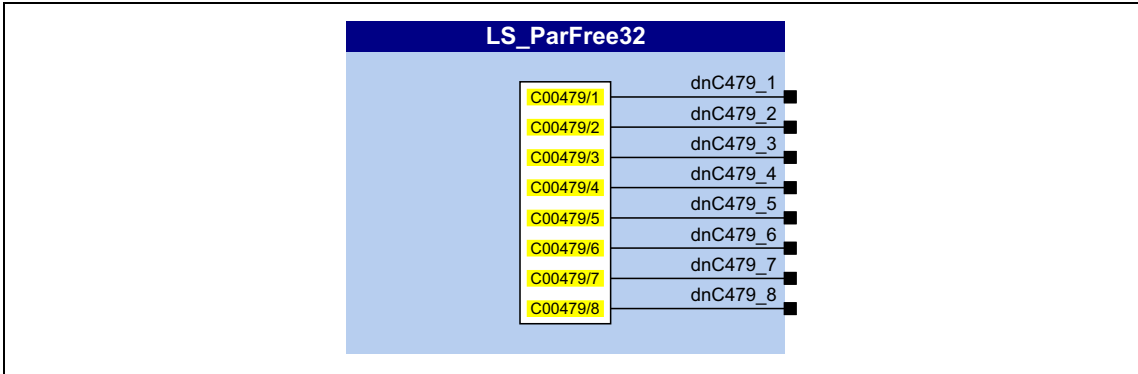
Designator	Data type	Information/possible settings
nC478_1_v ... nC478_8_v	INT	Output of the speed signals parameterised in C00478/1...8

Parameters

Parameters	Possible settings			Info
C00478/1...8	-32767	Incr/ms	+32767	Selection of speed signals to be output

18.2.26 LS_ParFree32

This system block outputs 8 parameterisable 32-bit signals.



Outputs

Designator	Data type	Value/meaning
dnC479_1 ... dnC479_8	DINT	Output of the 32-bit signals parameterised in C00479/1...8

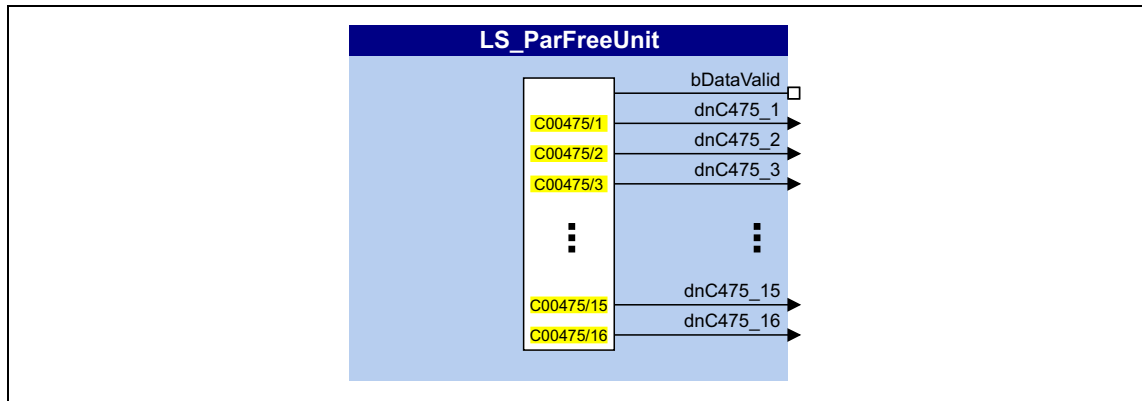
Parameters

Parameters	Possible settings			Info
C00479/1...8	-2147483647		2147483647	Setting of the 32-bit signals to be output

18.2.27 LS_ParFreeUnit

This system block outputs 16 parameterisable position signals.

- In contrast to the SB [LS_ParFree_p](#), the positions are set in the application unit [unit] instead of in [increments].
- The *bDataValid* status signal indicates that the internal position conversion is completed and the output data are consistent.



Outputs

Designator	Data type	Value/meaning
bDataValid	BOOL	Status signal "Position conversion completed, data consistent"
		TRUE The conversion of the positions from [unit] to [increments] is completed.
dnC475_1 ... dnC475_16	DINT	Output of the position signals parameterised in C00475/1...16 in [increments] • Observe <i>bDataValid</i> status signal!

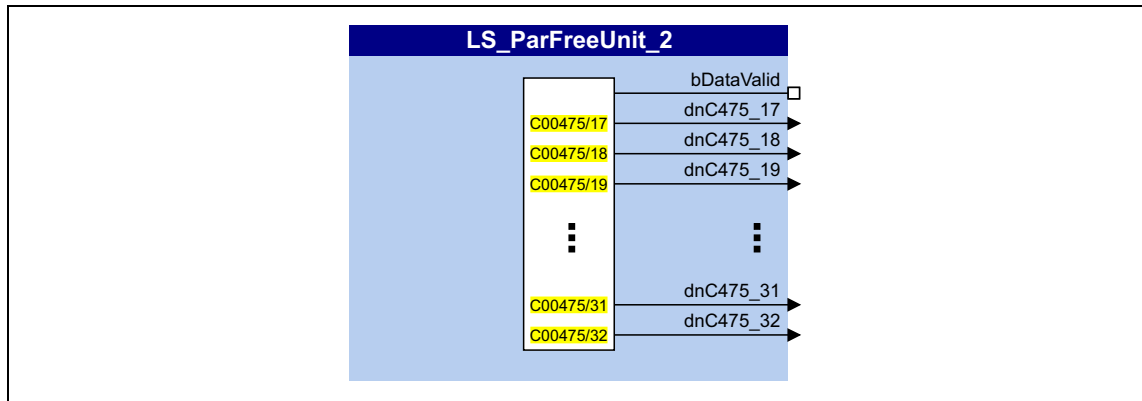
Parameters

Parameters	Possible settings			Info
C00475/1...16	-214748.3647	Unit	214748.3647	Setting of the position signals to be output

18.2.28 LS_ParFreeUnit_2

This system block outputs 16 parameterisable position signals.

- In contrast to the SB [LS_ParFree_p](#), the positions are set in the application unit [unit] instead of in [increments].
- The *bDataValid* status signal indicates that the internal position conversion is completed and the output data are consistent.



Outputs

Designator	Data type	Value/meaning
bDataValid	BOOL	Status signal "Position conversion completed, data consistent"
		TRUE The conversion of the positions from [unit] to [increments] is completed.
dnC475_17 ... dnC475_32	DINT	Output of the position signals parameterised in C00475/17...32 in [increments] • Observe <i>bDataValid</i> status signal!

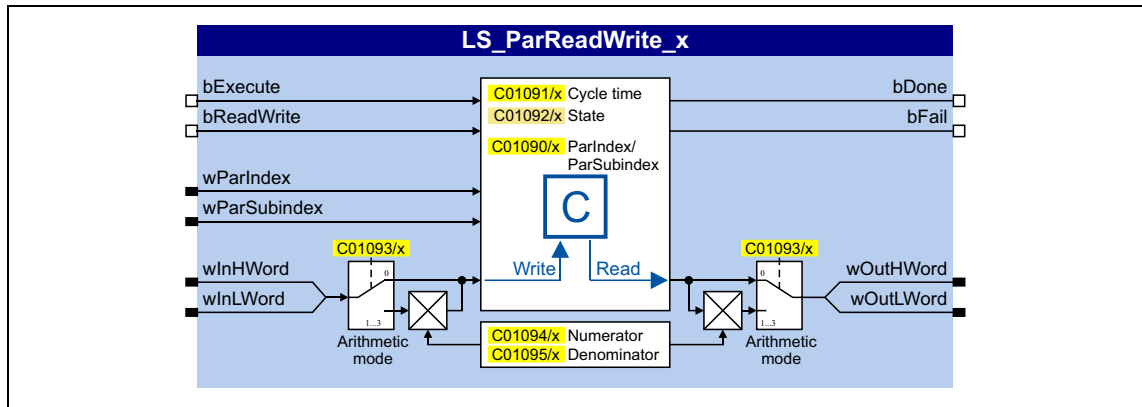
Parameters

Parameters	Possible settings			Info
C00475/17...32	-214748.3647	Unit	214748.3647	Setting of the position signals to be output

18.2.29 LS_ParReadWrite_1-6

The LS_ParReadWrite_1 ... LS_ParReadWrite_6 system blocks are used for reading and writing local parameters.

- If several system blocks are activated at the same time, the blocks will be processed one at a time every time the main program is executed.
- The SB supports one-time and cyclic reading/writing in an adjustable time interval.



Inputs

Designator	Data type	Information/possible settings	
bExecute	BOOL	FALSE → TRUE	If cycle time (C01091) = "0 ms": One-time reading/writing of the parameter value which has been addressed via the wParIndex and wParSubindex inputs.
			If cycle time (C01091) > "0 ms": Cyclic reading/writing of the parameter value which has been addressed via the wParIndex and wParSubindex inputs.
		TRUE → FALSE	Deactivate cyclic reading/writing again.
bReadWrite	BOOL	FALSE	Read request
		TRUE	Write request
wParIndex	WORD	Code to be read or written. • From version 06.00.00 onwards, this selection can be optionally carried out via C01090.	
wParSubindex	WORD	Subcode to be read or written. • From version 06.00.00 onwards, this selection can be optionally carried out via C01090.	
wInHWord wInLWord	WORD	Value to be written (DataHigh/DataLow portion)	

Outputs

Designator	Data type	Value/meaning	
bDone	BOOL	"Read/Write request successfully completed" status signal <ul style="list-style-type: none"> The output is automatically reset to FALSE if a new request is activated via <i>bExecute</i> or the cycle time (C01091) expires. 	
		TRUE	Read/Write request successfully completed.
		FALSE	The FALSE status can have the following meanings: <ol style="list-style-type: none"> There is no active read/write request. The read/write request has not been completed yet. An error has occurred (if <i>bFail</i> = TRUE).
bFail	BOOL	"Error" status	
		TRUE	An error has occurred (group signal). <ul style="list-style-type: none"> See display parameter (C01092) for details.
wOutHWord wOutLWord	WORD	Value which was read (DataHigh/DataLow portion) after read request	

Parameters

Parameters	Possible settings	Info
C01090/1...6 (from version 06.00.00)	0,000 16000,000 Format: <Code number>,<subcode number>	Parameter to be read or written. <ul style="list-style-type: none"> For a setting of "0,000", inputs <i>wParIndex</i> and <i>wParSubindex</i> are effective for addressing purposes instead. Lenze setting: 0.000
C01091/1...6	0 One-time reading/writing at <i>bExecute</i> in case of a FALSE/TRUE edge Cyclic reading/writing: 20 20 ms 50 50 ms 100 100 ms 200 200 ms 500 500 ms 1000 1 s 2000 2 s 5000 5 s 10000 10 s	Cycle time <ul style="list-style-type: none"> Subcode 1 = LS_ParReadWrite_1 Subcode 2 = LS_ParReadWrite_2 ... Subcode 6 = LS_ParReadWrite_6 Lenze setting: 0

Parameters	Possible settings	Info		
C01092/1...6	0	No error	Error status • If <i>bFail</i> = TRUE: Error status is displayed. • Subcode 1 = LS_ParReadWrite_1 Subcode 2 = LS_ParReadWrite_2 ... Subcode 6 = LS_ParReadWrite_6	
	33803	Invalid data type (e.g. STRING)		
	33804	Limit violation		
	33806	Invalid code		
	33813	No element of the selection list		
	33815	Writing of the parameter not permitted		
	33816	Writing of the parameter only permitted if controller is inhibited		
	33829	Invalid subcode		
	33865	No parameter with subcodes		
C01093/1...6 (from version 06.00.00)	0	No arithmetic	Arithmetic mode • Lenze setting: "0: No arithmetic" ▶ Arithmetic function	
	1	In16Bit: LW=+/-32767		
	2	In16Bit: HW=+/-; LW=0..65535		
	3	In32Bit: HW_LW=+/-2147483647		
C01094/1...6 (from version 06.00.00)	-32767		32767	Counter • For internal conversion in arithmetic modes 1 ... 3. • Lenze setting: 1
C01095/1...6 (from version 06.00.00)	1		32767	Denominator • For internal conversion in arithmetic modes 1 ... 3. • Lenze setting: 1

18.2.29.1 Arithmetic function

This function extension is available from version 06.00.00!

The implemented arithmetic function enables easy arithmetic conversion of the process values to be written or read via parameterisable factors into the format of the target parameter without the need of an additional arithmetic function block.

- In [C01093](#), the interpretation of the *wInHWord* and *wInLWord* inputs can be set to be able to write to parameters:

Arithmetic mode	wInHWord	wInLWord	Internal conversion
0 No arithmetic (Lenze setting)	INTEGER_32 (4 bytes with sign)		No (same behaviour as before)
	DataHigh portion	DataLow portion	
1 In16Bit: LW=+/-32767	-	INTEGER_16 (2 bytes with sign)	Yes (see the following section)
2 In16Bit: HW=+/-; LW=0..65535	Sign (0 ≡ positive value)	UNSIGNED_16 (2 bytes without sign)	
3 In32Bit: HW_LW= +/-2147483647	INTEGER_32 (4 bytes with sign)		
	DataHigh portion	DataLow portion	

Internal conversion

If arithmetic modes 1 ... 3 are selected in [C01093](#), the input value / read parameter value is internally converted via parameterisable factors.

- Division is not remainder considered.

$$\text{parameter value to be written} = \text{Input value}_{[32]} \cdot \frac{\text{Counter}_{[16]}}{\text{Denominator}_{[16]}}$$

[C01094](#): Numerator

[C01095](#): Denominator

[18-85] Internal conversion with write access

$$\text{Output value}_{[32]} = \text{Read parameter value} \cdot \frac{\text{Counter}_{[16]}}{\text{Denominator}_{[16]}}$$

[C01094](#): Numerator

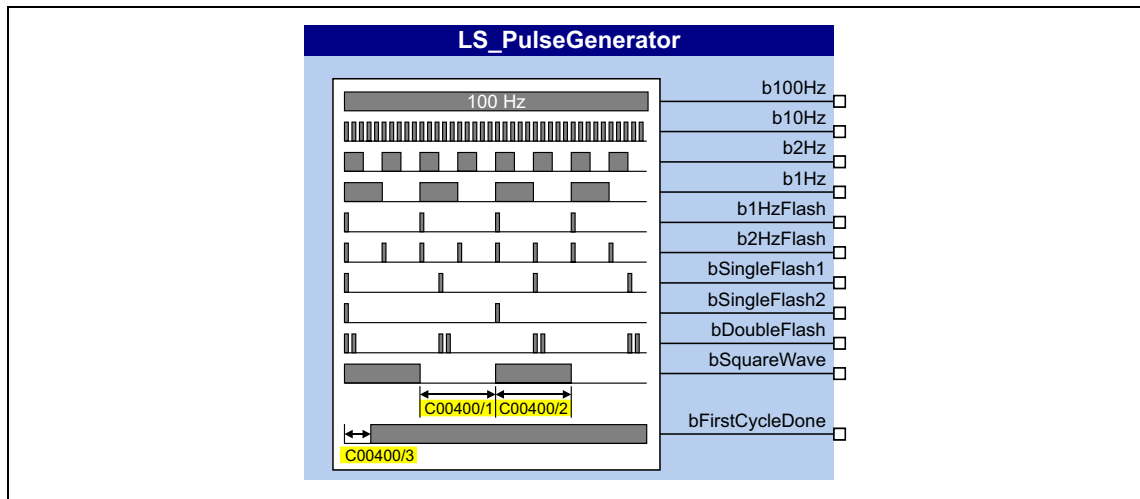
[C01095](#): Denominator

[18-86] Internal conversion with read access

18.2.30 LS_PulseGenerator

This system block outputs 9 different fixed frequencies and 1 frequency with parameterisable pulse/dead time.

From version 06.00.00 onwards, the SB provides a TRUE signal at the *bFirstCycleDone* output when the first 1-ms processing cycle is completed and the time set in [C00400/3](#) has expired. This status signal can e.g. be used for the delayed enable of peripheral devices or motor control setpoints so that all required initial values are calculated first after the inverter switch-on.



Outputs

Designator	Data type	Value/meaning		
b100Hz	BOOL	Rectangular signal 100 Hz		
b10Hz	BOOL	Rectangular signal 10 Hz		
b2Hz	BOOL	Rectangular signal 2 Hz		
b1Hz	BOOL	Rectangular signal 1 Hz		
b1HzFlash	BOOL	80 ms-pulse, repetition rate every second		
b2HzFlash	BOOL	80 ms-pulse, repetition rate every 0.5 seconds		
bSingleFlash1	BOOL	80 ms pulse, repetition rate every 1.25 seconds		
bSingleFlash2	BOOL	80 ms pulse, repetition rate every 3 seconds		
bDoubleFlash	BOOL	80 ms-double pulse, repetition rate every 1.25 seconds		
bSquareWave	BOOL	Output frequency with pulse/dead time set in C00400/1...2		
bFirstCycleDone	BOOL	Status signal "First processing cycle completed"		
(from version 06.00.00)		<table border="1"> <tr> <td>TRUE</td> <td>The first 1-ms processing cycle has been completed and the time set in C00400/3 has expired (i.e. all FBs have been called at least once).</td> </tr> </table>	TRUE	The first 1-ms processing cycle has been completed and the time set in C00400/3 has expired (i.e. all FBs have been called at least once).
TRUE	The first 1-ms processing cycle has been completed and the time set in C00400/3 has expired (i.e. all FBs have been called at least once).			

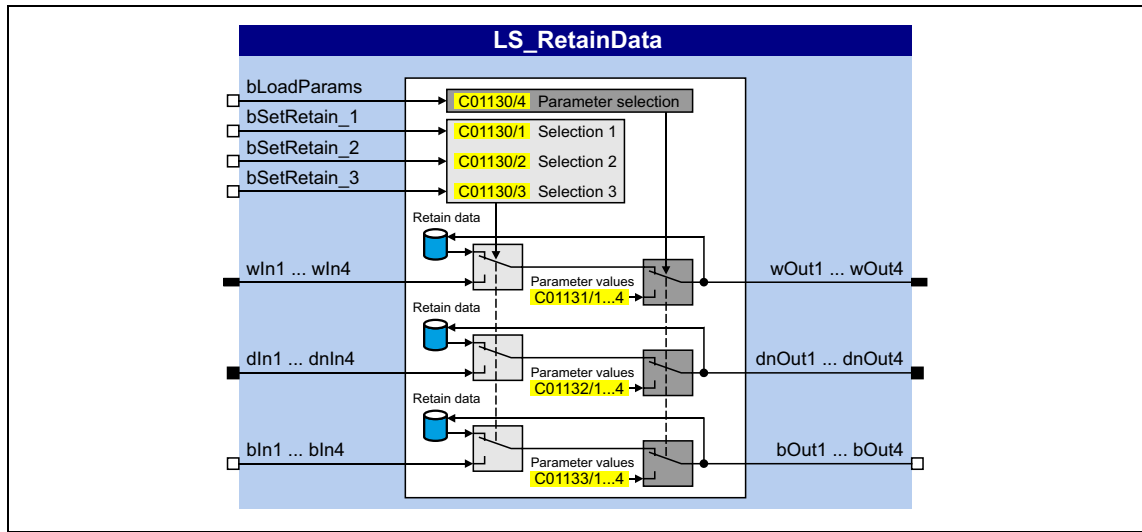
Parameters

Parameters	Possible settings			Info
C00400/1	0	ms	60000	Length of LOW level (break) <ul style="list-style-type: none"> • For output <i>bSquareWave</i> • Lenze setting: 1000 ms
C00400/2	0	ms	60000	Length of HIGH level <ul style="list-style-type: none"> • For output <i>bSquareWave</i> • Lenze setting: 1000 ms
C00400/3 (from version 06.00.00)	0	ms	60000	Delay of the status <i>bFirstCycleDone</i> <ul style="list-style-type: none"> • Lenze setting: 100 ms

18.2.31 LS_RetainData

This system block serves to select and save retain data similar to the FBs [L_SampleHold_1](#) and [L_SampleHold_2](#).

- Retain data are values that are saved automatically at mains disconnection or disconnection of the 24-V supply in the inverter and are restored when the 24-V supply is switched on again.
- A total of 12 retain data can be stored in the retain memory:
 - 4 WORD signals (16 bits, 0 ... 65535)
 - 4 DINT signals (32 bits, -2147483647 ... 2147483647)
 - 4 BOOL signals (FALSE or TRUE)



Inputs

Designator	Data type	Information/possible settings	
bLoadParams	BOOL	Set selected outputs & retain values to parameter values. <ul style="list-style-type: none"> • This input has priority over the <i>bSetRetain</i> inputs. • Typical application: Initialisation of the outputs & retain values. 	
		FALSE	The input or retain values are output, depending on the <i>bSetRetain</i> input.
		TRUE	The outputs selected in C01130/4 and the respective retain values are set to the parameter values and held as long as <i>bLoadParams</i> is TRUE. If the parameter values change during this time, the respective outputs and retain values change as well.
bSetRetain_1...3	BOOL	Transfer selected input values to the retain memory ("latch")	
		FALSE	No transfer. Retain values or parameter values (when <i>bLoadParams</i> = TRUE) are provided at the outputs.
		TRUE	The input values selected in C01130/1...3 are stored in the retain memory and provided at the outputs.
wIn1 ... wIn4	WORD	Input values	
dnIn1 ... dnIn4	DINT		
bln1 ... bln4	BOOL		

Outputs

Designator	Data type	Value/meaning
wOut1 ... wOut4	WORD	Output of the input or retain values, depending on the <i>bSetRetain</i> input
dnOut1 ... dnOut4	DINT	
bOut1 ... bOut4	BOOL	

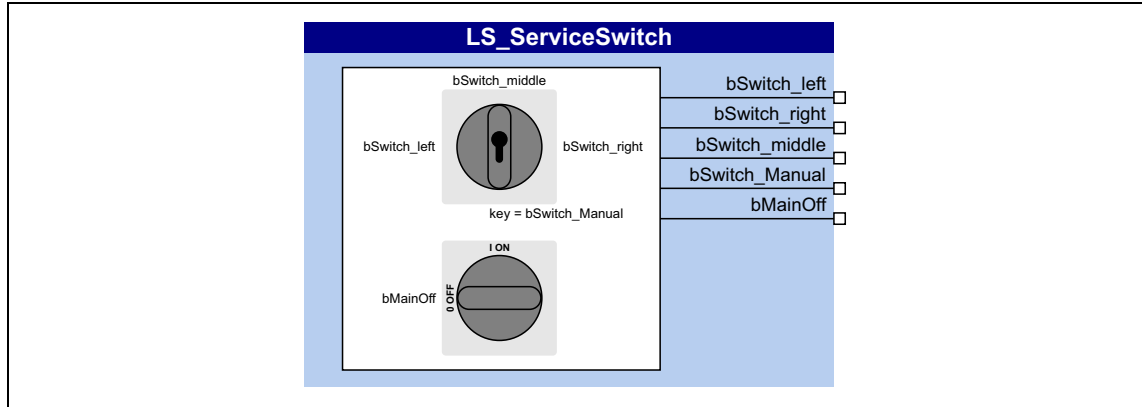
Parameters

Parameters	Possible settings	Info																																																			
C01130/1...4	Setting is bit coded: <table border="1"> <thead> <tr> <th></th> <th>Subcodes 1 ... 3:</th> <th>Subcode 4:</th> </tr> </thead> <tbody> <tr><td>Bit 0</td><td>wIn1</td><td>C01131/1</td></tr> <tr><td>Bit 1</td><td>wIn2</td><td>C01131/2</td></tr> <tr><td>Bit 2</td><td>wIn3</td><td>C01131/3</td></tr> <tr><td>Bit 3</td><td>wIn4</td><td>C01131/4</td></tr> <tr><td>Bit 4</td><td>dnIn1</td><td>C01132/1</td></tr> <tr><td>Bit 5</td><td>dnIn2</td><td>C01132/2</td></tr> <tr><td>Bit 6</td><td>dnIn3</td><td>C01132/3</td></tr> <tr><td>Bit 7</td><td>dnIn4</td><td>C01132/4</td></tr> <tr><td>Bit 8</td><td>bln1</td><td>C01133/1</td></tr> <tr><td>Bit 9</td><td>bln2</td><td>C01133/2</td></tr> <tr><td>Bit 10</td><td>bln3</td><td>C01133/3</td></tr> <tr><td>Bit 11</td><td>bln4</td><td>C01133/4</td></tr> <tr><td>Bit 12</td><td colspan="2">Reserved</td></tr> <tr><td>Bit 13</td><td colspan="2"></td></tr> <tr><td>Bit 14</td><td colspan="2"></td></tr> <tr><td>Bit 15</td><td colspan="2"></td></tr> </tbody> </table>		Subcodes 1 ... 3:	Subcode 4:	Bit 0	wIn1	C01131/1	Bit 1	wIn2	C01131/2	Bit 2	wIn3	C01131/3	Bit 3	wIn4	C01131/4	Bit 4	dnIn1	C01132/1	Bit 5	dnIn2	C01132/2	Bit 6	dnIn3	C01132/3	Bit 7	dnIn4	C01132/4	Bit 8	bln1	C01133/1	Bit 9	bln2	C01133/2	Bit 10	bln3	C01133/3	Bit 11	bln4	C01133/4	Bit 12	Reserved		Bit 13			Bit 14			Bit 15			Subcodes 1 ... 3: Selection 1 ... 3 <ul style="list-style-type: none"> Select which input values are to be stored in the retain memory when setting the respective <i>bSetRetain</i>-input to TRUE. Lenze setting: 0x0000 Subcode 4: Parameter selection <ul style="list-style-type: none"> Select which parameter values are to be stored in the retain memory when setting <i>bLoadParams</i> to TRUE. Lenze setting: 0x0000
	Subcodes 1 ... 3:	Subcode 4:																																																			
Bit 0	wIn1	C01131/1																																																			
Bit 1	wIn2	C01131/2																																																			
Bit 2	wIn3	C01131/3																																																			
Bit 3	wIn4	C01131/4																																																			
Bit 4	dnIn1	C01132/1																																																			
Bit 5	dnIn2	C01132/2																																																			
Bit 6	dnIn3	C01132/3																																																			
Bit 7	dnIn4	C01132/4																																																			
Bit 8	bln1	C01133/1																																																			
Bit 9	bln2	C01133/2																																																			
Bit 10	bln3	C01133/3																																																			
Bit 11	bln4	C01133/4																																																			
Bit 12	Reserved																																																				
Bit 13																																																					
Bit 14																																																					
Bit 15																																																					
C01131/1...4	0	65536	Parameter value for retain memory (outputs <i>wOut1</i> ... <i>wOut4</i>) <ul style="list-style-type: none"> Lenze setting: 0 																																																		
C01132/1...4	-2147483647	2147483647	Parameter values for retain memory (outputs <i>dnOut1</i> ... <i>dnOut4</i>) <ul style="list-style-type: none"> Lenze setting: 0 																																																		
C01133/1...4	<table border="1"> <tbody> <tr><td>0</td><td>FALSE</td></tr> <tr><td>1</td><td>TRUE</td></tr> </tbody> </table>	0	FALSE	1	TRUE		Parameter values for retain memory (outputs <i>bOut1</i> ... <i>bOut4</i>) <ul style="list-style-type: none"> Lenze setting: 0: FALSE 																																														
0	FALSE																																																				
1	TRUE																																																				

18.2.32 LS_ServiceSwitch

This system block provides the switching states of the optional service switch in the FB Editor.

- Which outputs are effective depends on the service switch type available (service switch without/with protective function, service switch with operating unit)
- If no service switch is available, all outputs have to be permanently set to FALSE.



Outputs

Designator	Data type	Meaning in case of TRUE
bSwitch_left	BOOL	Operating unit: Left switch position
bSwitch_right	BOOL	Operating unit: Right switch position
bSwitch_middle	BOOL	Operating unit: Central switch position
bSwitch_Manual	BOOL	Operating unit: Key-operated switch in "manual" position
bMainOff	BOOL	Service switch: "Off" switch position or overcurrent protective function has been triggered



Note!

For flexible customer solutions, the user has to configure the system block for the desired functionality correctly.

18.2.33 LS_SetError_1

Parameterisable responses to user-defined events are tripped.



For a detailed description see the main chapter "Diagnostics & error management":

▶ ["LS_SetError_1" system block](#) (📖 650)

18.2.34 LS_SetError_2

Parameterisable responses to user-defined events are tripped.



For a detailed description see the main chapter "Diagnostics & error management":

▶ ["LS_SetError_2" system block](#) (📖 651)

18.2.35 LS_SyncManagement

Output of status information for synchronising the internal time base.



For a detailed description see main chapter "Synchronisation of the internal time base of the inverter":

▶ [Internal interfaces | System block "LS_SyncManagement"](#) (📖 756)

18.2.36 LS_TouchProbe

Interface for touch probe detection.



For a detailed description see the main chapter "I/O terminals":

▶ [Touch probe detection](#) (📖 360)

18.2.37 LS_WriteParamList

Writing to a configurable list which contains up to 32 local parameters.



For a detailed description see the main chapter! ["Parameter change-over"](#). (📖 766)

18.3 Application blocks

18.3.1 Technology application "Actuating drive speed"

This technology application serves to solve speed-controlled drive tasks, e.g. conveyor drives (interconnected), extruders, test benches, vibrators, travelling drives, presses, machining systems, metering units.



For a detailed description see [TA "Actuating drive speed"](#). (📖 377)

18.3.2 Technology application "Table positioning"

This technology application serves to solve position-controlled drive tasks which are normally controlled by a higher-level control via a fieldbus, e.g. transport facilities, rotary tables, storage and retrieval units, feed drives, metering units, hoists.



For a detailed description see [TA "Table positioning"](#). (📖 404)

18.3.3 "Switch-off positioning" technology application

This technology application is used to solve speed-controlled drive tasks which require a pre-switch off or stopping at certain positions, e.g. roller conveyors and conveying belts. The pre-switch off is implemented by connecting switch-off sensors.



For a detailed description see [TA "Switch-off positioning"](#). (📖 433)

18.4 Port blocks

18.4.1 Port block "LP_CanIn1"

The LP_CanIn1 port block maps process data object RPDO1 in the FB Editor.



For a detailed description see [RPDO1 | "LP_CanIn1" port block](#). (📖 685)

18.4.2 Port block "LP_CanIn2"

The LP_CanIn2 port block maps process data object RPDO2 in the FB Editor.



For a detailed description see [RPDO2 | "LP_CanIn2" port block](#). (📖 687)

18.4.3 Port block "LP_CanIn3"

The LP_CanIn3 port block maps process data object RPDO3 in the FB Editor.



For a detailed description see [RPDO3 | "LP_CanIn3" port block](#). (📖 689)

18.4.4 Port block "LP_CanIn4"

The LP_CanIn4 port block maps process data object RPDO4 in the FB Editor.



For a detailed description see [RPDO4 | "LP_CanIn4" port block](#). (📖 691)

18.4.5 Port block "LP_CanOut1"

The LP_CanOut1 port block maps process data object TPDO1 in the FB Editor.



For a detailed description see [TPDO1 | "LP_CanOut1" port block](#). (📖 693)

18.4.6 Port block "LP_CanOut2"

The LP_CanOut2 port block maps process data object TPDO2 in the FB Editor.



For a detailed description see [TPDO2 | "LP_CanOut2" port block](#). (📖 694)

18.4.7 Port block "LP_CanOut3"

The LP_CanOut3 port block maps process data object TPDO3 in the FB Editor.



For a detailed description see [TPDO3 | "LP_CanOut3" port block](#). (695)

18.4.8 Port block "LP_CanOut4"

The LP_CanOut4 port block maps process data object TPDO4 in the FB Editor.



For a detailed description see [TPDO4 | "LP_CanOut4" port block](#). (696)

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Your opinion is important to us

These instructions were created to the best of our knowledge and belief to give you the best possible support for handling our product.

If you have suggestions for improvement, please e-mail us to:

feedback-docu@Lenze.de

Thank you for your support.

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E84DxxxxxxxG

EtherNet/IP™

Inverter Drives 8400 protec_____

Communication Manual

EN



13465817

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1 About this documentation

1 About this documentation

Contents

This documentation exclusively contains descriptions of the EtherNet/IP™ bus system for Inverter Drives 8400 protec.



Note!

This documentation supplements the **mounting instructions** provided with the inverter and the **hardware manual for Inverter Drives 8400 protec**.

The mounting instructions contain safety instructions which must be observed!

The features and functions of EtherNet/IP for Inverter Drives 8400 protec are described in detail.

Examples illustrate typical applications.

The theoretical concepts are only explained to the level of detail required to understand the function of EtherNet/IP communication with Inverter Drives 8400 protec.

This documentation does not describe the software of another manufacturer. No guarantee can be given for corresponding information in this documentation. Information on the use of the software can be found in the documents for the control system (PLC, scanner).

All brand names mentioned in this documentation are trademarks of their corresponding owners.



Tip!

Detailed information on EtherNet/IP can be found on the website of the user organisation ODVA (Open DeviceNet Vendor Association):

www.odva.org

1 About this documentation

Target group

This documentation addresses to persons who configure, install, commission, and maintain the networking and remote maintenance of a machine.



Tip!

Current documentation and software updates with regard to Lenze products can be found in the download area at:

www.Lenze.com

Information regarding the validity

The information given in this documentation is valid for the following devices:

Product series	Type designation	From hardware version	From software version
Inverter Drives 8400 protec (EtherNet/IP option)	E84DxxxxxxxxG	VB	01.00

Screenshots/application examples

All screenshots in this documentation are application examples. Depending on the firmware version of the inverter and software version of the installed engineering tools (»Engineer«, »RSLogix 5000«), the screenshots in this documentation may differ from the screen representation.

1 About this documentation

1.1 Document history



1.1 Document history

Version			Description
1.0	08/2012	TD17	First edition
2.0	02/2013	TD17	<ul style="list-style-type: none">• "CAN Emergency Error Codes" have been added in chapter Mapping of Lenze device errors to DRIVECOM errors (□ 84).• New layout
3.0	06/2014	TD17	Revised chapters: <ul style="list-style-type: none">▶ I/O data transfer (implicit messages) (□ 42)▶ Parameter data transfer (explicit messages) (□ 69)▶ LED status displays (□ 74)▶ Implemented CIP™ objects (□ 106)

1 About this documentation

1.2 Conventions used


This documentation uses the following conventions to distinguish between different types of information:

Type of information	Writing	Examples/notes
Spelling of numbers		
Decimal separator	Point	The decimal point is always used. For example: 1234.56
Hexadecimal	0x[0 ... 9, A ... F]	Example: 0x60F4
Binary • Nibble	In inverted commas Point	Example: '100' Example: '0110.0100'
Text		
Version information	Blue text colour	All information that applies to from a certain software version of the inverter onwards are marked accordingly in this documentation. Example: This function extension is available from software version V3.0 onwards!
Program name	» «	The Lenze PC software »Engineer«...
Window	<i>italics</i>	The <i>Message window...</i> / The dialog box <i>Options...</i>
Variable name		By setting <i>bEnable</i> to TRUE...
Control element	bold	The OK button... / the Copy command... / the Characteristics tab... / the Name input field...
Sequence of menu commands		If several commands are required to execute one function, the single commands are separated by an arrow: Select the File → Open command to...
Hyperlink	<u>Underlined</u>	Optically highlighted reference to another topic. In this online documentation activated via mouse-click.
Icons		
Page reference	 8	Optically highlighted reference to another page. In this online documentation activated via mouse-click.
Step-by-step instructions		Step-by-step instructions are indicated by a pictograph.

1 About this documentation

1.3 Terminology used

1.3 Terminology used

Term	Meaning
ACD	Address Conflict Detection
Adapter	EtherNet/IP slave
Inverter	Lenze frequency inverters of the "Inverter Drives 8400 protec" product range
Standard device	
ARP	Address Resolution Protocol
Use BOOTP	Bootstrap Protocol
	EtherNet/IP™ (EtherNet Industrial Protocol) is a fieldbus system based on Ethernet which uses the Common Industrial Protocol™ (CIP™) for data exchange. EtherNet/IP™ and Common Industrial Protocol™ (CIP™) are trademarks and patented technologies, licensed by the user organisation ODVA (Open DeviceNet Vendor Association), USA.
Use DHCP	Dynamic Host Configuration Protocol
DSCP	Differentiated Services Codepoints
EDS	Electronic Data Sheet
Explicit messages	Explicit Messages are used to transfer parameter data.
HW	Hardware
IGMP	Internet Group Management Protocol
Implicit messages	Implicit Messages are used to transfer I/O data.
"Class 1" connection	I/O connection
"Class 3" connection	Explicit connection
Level 2	EtherNet/IP performance level 2: I/O Message Server including Explicit Message Server
Lenze setting	Default settings of the device, preconfigured ex works.
Basic setting	
PLC	Programmable Logic Controller
QoS	Quality of Service
RPI	Requested Package Interval: Interval requested between 2 telegrams for cyclic data transmission
»RSLogix 5000«	Programming and development software from Rockwell for control systems (scanner) in EtherNet/IP networks (e.g. Allen-Bradley Logix controllers).
Scanner	EtherNet/IP master or client
Control system	
Host	
SW	Software
TTL	Time To Live: Validity time of data packets in the EtherNet/IP network
UCMM	Unconnected Message Manager

1 About this documentation

1.4 Definition of the notes used

1.4 Definition of the notes used

The following signal words and symbols are used in this documentation to indicate dangers and important information:

Safety instructions

Layout of the safety instructions:



Danger!

(characterises the type and severity of danger)

Note

(describes the danger and gives information about how to prevent dangerous situations)

Pictograph	Signal word	Meaning
	Danger!	Danger of personal injury through dangerous electrical voltage Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Danger!	Danger of personal injury through a general source of danger Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Stop!	Danger of property damage Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph	Signal word	Meaning
	Note!	Important note to ensure trouble-free operation
	Tip!	Useful tip for easy handling
		Reference to another document

2 Safety instructions



Note!

It is absolutely vital that the stated safety measures are implemented in order to prevent serious injury to persons and damage to material assets.

Always keep this documentation to hand in the vicinity of the product during operation.

2.1 General safety and application notes



Danger!

If the following basic safety measures are disregarded, severe injuries to persons and damage to material assets may result.

Lenze drive and automation components ...

- must only be used as directed.
- must never be commissioned if they display signs of damage.
- must never be technically modified.
- must never be commissioned if they are not fully mounted.
- must never be operated without required covers.
- during and after operation can have live, moving and rotating parts, depending on their degree of protection. Surfaces can be hot.

The following applies to Lenze drive components ...

- only use the accessories approved.
- Only use original manufacturer spare parts.

Observe all specifications contained in the enclosed documentation and related documentation.

- This is the precondition for safe and trouble-free operation and for obtaining the product features specified.
 - ▶ [Properties of the EtherNet/IP with Inverter Drives 8400 protec](#) (□ 12)
- The specifications, processes, and circuitry described in this document are for guidance only and must be adapted to your own specific application. Lenze does not take responsibility for the suitability of the process and circuit proposals.

All works on and with Lenze drive and automation components must only be carried out by qualified personnel. In accordance with IEC 60364 and CENELEC HD 384 these are persons who ...

- are familiar with installing, mounting, commissioning, and operating the product.
- who have the corresponding qualifications for their work.
- who know and can apply all regulations for the prevention of accidents, directives, and laws applicable at the place of use.

2 Safety instructions

2.2 Device and application-specific safety instructions

2.2 Device and application-specific safety instructions

Only use cables that meet the listed specifications.

▶ [Ethernet cable specification](#) (book 20)



Documentation for Inverter Drives 8400 protec, control system, plant/machine

All the other measures prescribed in this documentation must also be implemented. Observe the safety instructions and application notes contained in this manual.

3 General information

EtherNet/IP uses CIP (Common Industrial Protocol) for the data exchange between devices via an Ethernet network – just like the closely related bus systems DeviceNet and ControlNet™.

Lenze implements the CIP following the ODVA standard (Open DeviceNet Vendor Association, www.odva.org) and supports the two main types of EtherNet/IP communication:

- Explicit messaging (for parameter data)
- Implicit I/O messaging (for process data)



Tip!

Detailed information on EtherNet/IP can be found on the website of the EtherNet/IP user organisation ODVA (Open DeviceNet Vendor Association):

www.odva.org

Properties of the EtherNet/IP with Inverter Drives 8400 protec

- The Inverter Drive 8400 protec is always an adapter device: EtherNet/IP adapter with "Level 2" functionality
- The integrated safety system can be used for the protection of persons on machines. EtherNet/IP only provides safety option 10 (safe torque off, STO).
- 2-port interface with integrated switch functionality
- Access to all Lenze parameters (configurable via TCP/IP using the Lenze »Engineer«)
- Up to 3 TCP/IP socket connections for communication with the Lenze »Engineer«
- Support of "IP Config Pending" (activation of changed IP configuration by "power off/on" or "type 0 reset")
- Support of the redundancy protocol DLR (Device Level Ring) as "beacon-based ring node"
- Up to 16 I/O data words (32 bytes) are possible.
- Further CIP features:
 - Max. 8 CIP connections
 - 1 "exclusive owner" connection
 - I/O connection type: cyclic
 - Minimum I/O cycle time: 4 ms
 - Support of multicast messages, UCMM, ACD, BOOTP/DHCP, VLAN tagging/DSCP



Hardware manual for Inverter Drives 8400 protec

Here you will find detailed information on the integrated safety system (safety option).

Reference manual / »Engineer« online help for Inverter Drives 8400 protec

Here you will find detailed information on how to configure the safety system (safety option).

4 Technical data

4.1 General data and operating conditions of the EtherNet/IP

4 Technical data



Mounting instructions/hardware manual for Inverter Drives 8400 protec

Here you can find information on general technical data, operating conditions, and rated data of the device.

4.1 General data and operating conditions of the EtherNet/IP

Range	Values
Communication profile	EtherNet/IP
Communication medium	S/FTP (Screened Foiled Twisted Pair, ISO/IEC 11801 or EN 50173), CAT 5e
Interface for communication	RJ45 Standard Ethernet (in accordance with IEEE 802.3), 100Base-TX (Fast Ethernet) or M124-socket (4-pole, D-coded)
Network topology	Tree, star, and line
Type of node	Adapter (slave)
Number of nodes	Max. 254 in the subnetwork
Max. cable length	100 m
Vendor ID	587 (0x24B), Lenze ('Lenze AC Tech' in older Rockwell data)
Device type	2 (0x02), AC Drive
Product code	8410 (0x20DA)
Baud rate	<ul style="list-style-type: none">• 10 Mbps• 100 Mbps
Transmission mode	Half duplex / full duplex
Switching method	Store-and-forward / cut-through
Switch latency	Approx. 125 µs at max. telegram length

4 Technical data

4.2 Protocol data

4.2 Protocol data

Range	Values
I/O data words	1 ... 16 words (max. 32 bytes, 16 bits/word)
Supported CIP services	<ul style="list-style-type: none">• Get_Attributes_All• Get_Attribute_Single• Set_Attribute_Single• Reset (types '0' and '1' only)• Forward_Open• Forward_Close• Get_Member

4.3 Communication time

The communication time is the time between the start of a request and the arrival of the corresponding response.

The communication times in an EtherNet/IP network depend on the ...

- processing time in the inverter;
- telegram runtime (baud rate / telegram length);
- nesting depth of the network.

processing time within the inverter

Data	Processing time						
Process data (I/O data)	<table><tr><td>10 ms</td><td>Lenze standard update cycle (can be changed in the Rockwell engineering tool)</td></tr><tr><td>+ 0 ... 1 ms</td><td>Processing time in the module</td></tr><tr><td>+ 1 ... x ms</td><td>Runtime of the application task of the technology application used (tolerance)</td></tr></table>	10 ms	Lenze standard update cycle (can be changed in the Rockwell engineering tool)	+ 0 ... 1 ms	Processing time in the module	+ 1 ... x ms	Runtime of the application task of the technology application used (tolerance)
10 ms	Lenze standard update cycle (can be changed in the Rockwell engineering tool)						
+ 0 ... 1 ms	Processing time in the module						
+ 1 ... x ms	Runtime of the application task of the technology application used (tolerance)						
Parameter data	Approx. 30 ms + a tolerance of 20 ms (typically) For some codes, the processing time may be longer (see reference manual/ »Engineer« online help for the Inverter Drive 8400 protec).						

There are no interdependencies between parameter data and I/O data.

4.4 Internal switch latency

The integrated 2-port switch causes runtime delays. For "store-and-forward" and 100 Mbps, these runtime delays can be calculated as follows.

Runtime delay for an output data packet of the scanners incl. 32-bit "run/idle header" with 16-bit sequence counter:

$$\text{Runtime delay} = ((66 \text{ permanent bytes} + \text{I/O data in bytes}) \times 8 \times 10 \text{ nsec}) + 4 \mu\text{sec}$$

Runtime delay for an output data packet of an adapter without 32-bit "run/idle header":

$$\text{Runtime delay} = ((62 \text{ permanent bytes} + \text{I/O data in bytes}) \times 8 \times 10 \text{ nsec}) + 4 \mu\text{sec}$$

Example

Delay of an output data packet of the scanners with 8 output data words (16 bytes):

- $((66 \text{ permanent bytes} + 16 \text{ bytes}) \times 8 \times 10 \text{ nsec}) + 4 \mu\text{sec}$
- $(82 \text{ bytes} \times 8 \times 10 \text{ nsec}) + 4 \mu\text{sec}$
- $6.56 \mu\text{sec} + 4 \mu\text{sec} = \mathbf{10.56 \mu\text{sec}}$



Note!

The use of external switches can also lead to runtime delays. Depending on the system constellation, it may be useful to create a star topology or a line/mix topology.

▶ [Network topology](#) (16)

5 Installation



Mounting instructions for the Inverter Drive 8400 protec

Here you will find detailed information on the mechanical and electrical installation of the device.

Hardware manual for Inverter Drives 8400 protec

Here you can find detailed information on ...

- the digital and analog inputs/outputs;
- the relay output;
- the integrated safety system (safety option);
- the wiring of the terminals.

Observe the notes and wiring instructions contained in this documentation!

5.1 Network topology

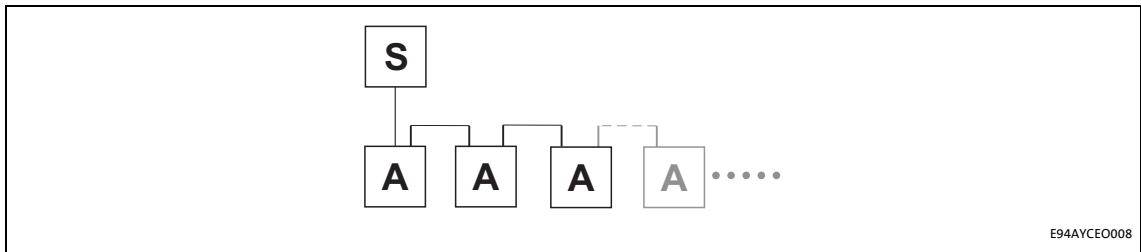
It is typical of EtherNet/IP to have a rather free topology the limiting factor of which is large message latencies due to e.g. switches connected in series.

▶ [Internal switch latency](#) (15)

The combination of a line and a stub is useful for system wiring.

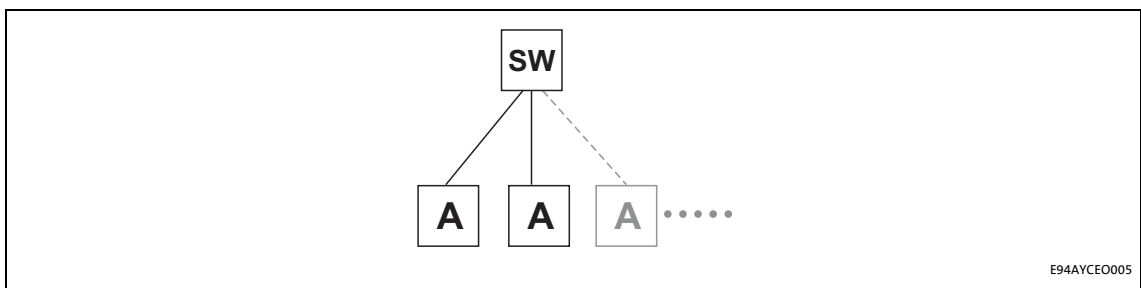
EtherNet/IP supports the following topologies:

- Line



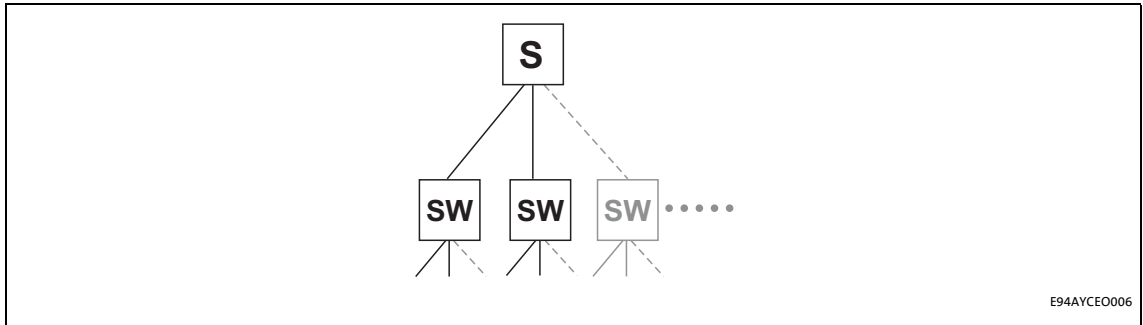
[5-1] Line topology (S = scanner, A = adapter)

- Switch / star



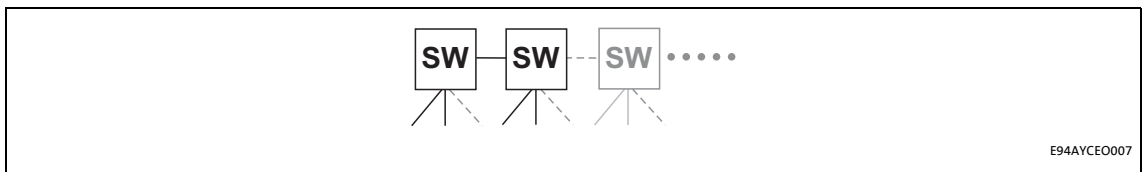
[5-2] Switch / star topology (SW = switch, A = adapter)

- Tree via switches



[5-3] Tree topology (S = scanner, SW = switch)

- Switch / switch

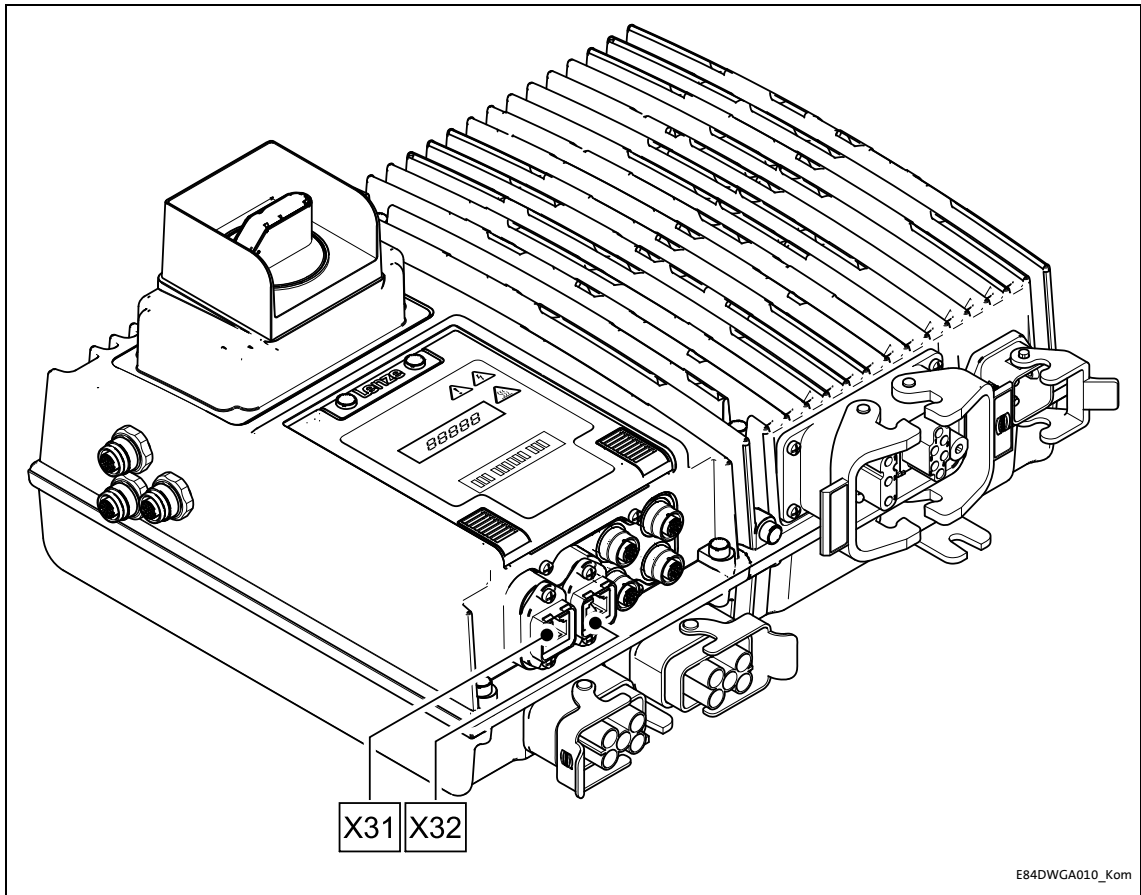


[5-4] Switch / switch topology (SW = switch)

5.2

EtherNet/IP connection

The connection to the EtherNet/IP network is made via the terminals **X31** and **X32** – depending on the version via an RJ45 socket or M12 socket (4-pole, D-coded).



[5-5] EtherNet/IP terminals

- ▶ [EtherNet/IP connection via the RJ45 socket \(19\)](#)
- ▶ [EtherNet/IP connection via the M12 socket \(22\)](#)

5.2.1 EtherNet/IP connection via the RJ45 socket

A standard Ethernet patch cable is suitable for connecting the Inverter Drive 8400 protec to the EtherNet/IP fieldbus.

▶ [Ethernet cable specification](#) (📖 20)

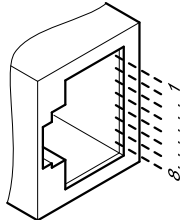
The installation and removal of the Ethernet cables is optimised for the use of connectors in accordance with the "Automation Initiative of German Domestic Automobile Manufacturers" (AIDA).



Note!

To prevent the RJ45 socket from being damaged, insert or remove the Ethernet cable connector straight (at a right angle) into or from the socket.

5.2.1.1 Pin assignment

RJ45 socket	Pin	Signal
 E94AYCXX004C	1	Tx +
	2	Tx -
	3	Rx +
	4	-
	5	-
	6	Rx -
	7	-
	8	-



Note!

Dependent on the configuration of the Ethernet port of the device to be connected, we recommend the use of a cross-over cable.



Tip!

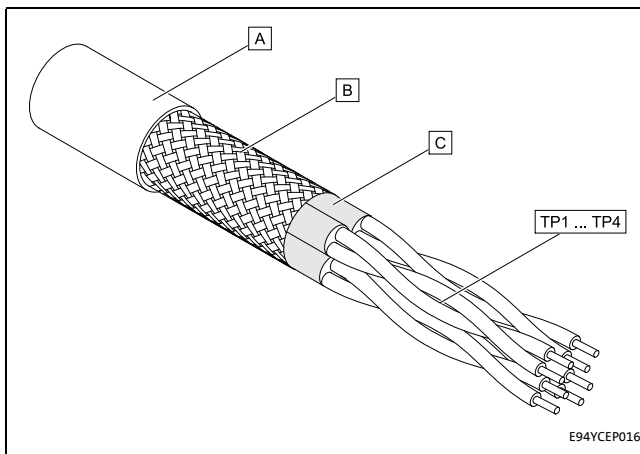
The EtherNet/IP interfaces feature an auto MDIX function. This function adjusts the polarity of the RJ45 interfaces so that a connection is established irrespective of the polarity of the opposite EtherNet/IP interface, and irrespective of the cable type used (standard patch cable or crossover cable).

5.2.1.2 Ethernet cable specification

**Note!**

Only use cables that meet the listed specifications.

Ethernet cable specification	
Ethernet standard	Standard Ethernet (in accordance with IEEE 802.3), 100Base-TX (Fast Ethernet)
Cable type	S/FTP (Screened Foiled Twisted Pair, ISO/IEC 11801 or EN 50173), CAT 5e
Damping	23.2 dB (at 100 MHz and per 100 m)
Crosstalk damping	24 dB (at 100 MHz and per 100 m)
Return loss	10 dB (per 100 m)
Surge impedance	100 Ω

Structure of the Ethernet cable

A Cable insulation

B Braid

C Foil shield

TP1 Twisted core pairs 1 ... 4

... [▶ Colour code of the Ethernet cable](#)

TP4 [\(21\)](#)

[5-6] Structure of the Ethernet cable (S/FTP, CAT 5e)

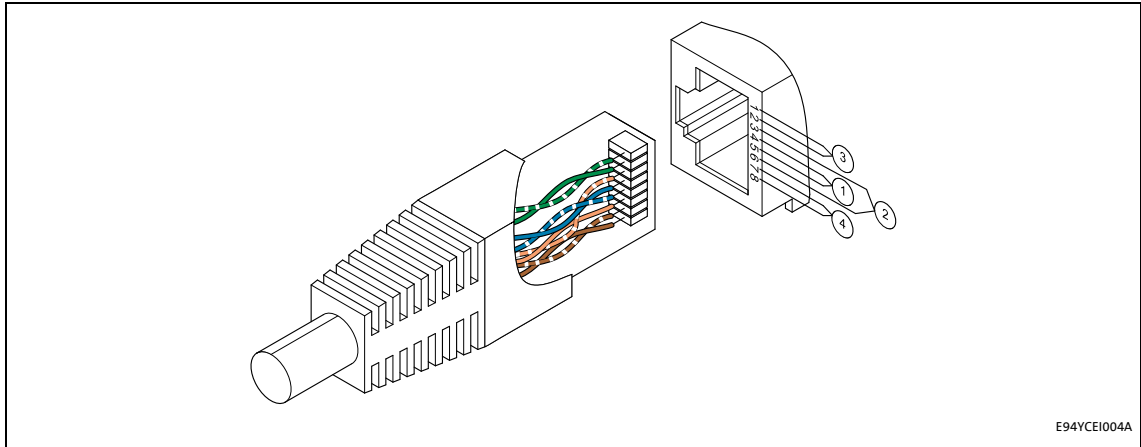
Colour code of the Ethernet cable



Note!

The wiring and colour code are standardised in EIA/TIA 568A/568B.

In accordance with the industrial standard, the use of 4-pin Ethernet cables is permissible. The cable type only connects the assigned pins 1, 2, 3 and 6 to one another.




E94YCEI004A

[5-7] Ethernet connector in accordance with EIA/TIA 568A/568B

Pair	Pin	Signal	EIA/TIA 568A	EIA/TIA 568B
3	1	Tx +	White / Green	White / Orange
	2	Tx -	Green	Orange
2	3	Rx +	White / Orange	White / Green
1	4		Blue	Blue
	5		White / Blue	Blue / White
2	6	Rx -	Orange	Green
4	7		White / Brown	White / Brown
	8		Brown	Brown

5.2.2 EtherNet/IP connection via the M12 socket

Pin assignment

X31 / X32 (M12 socket, 4-pin, D-coded)	Pin	Signal
	1	Tx +
	2	Rx +
	3	Tx -
	4	Rx -

6 Commissioning

6.1 Before initial switch-on

6 Commissioning

During commissioning, plant-specific data such as motor parameters, operating parameters, responses, and parameters for fieldbus communication are defined for the inverter. Lenze devices use codes for this purpose.

The codes of the inverter and for communication are saved to the memory module in a non-volatile data set.

In addition, there are codes for diagnosing and monitoring the stations.

▶ [Parameter reference](#) (□ 88)

6.1 Before initial switch-on



Stop!

Before you switch on the Inverter Drive 8400 protec for the first time, check the entire wiring for completeness, short circuit, and earth fault.

6.2 Configuring the host system (scanner)

First you have to configure the host (scanner) for communication with the Inverter Drive 8400 protec.

The configuration of EtherNet/IP networks always requires an EtherNet/IP configuration software (e.g. »RSLogix 5000« from Rockwell) for the host system (scanner).

The configuration software is necessary for the programming of controller programs, EtherNet/IP configuration, real-time execution and diagnostics.

The basic parameters of the communication module are stored in the internal configuration memory and can be used by the scanner when the nodes are being detected.

For node detection (fieldbus scan), the corresponding device descriptions of the Lenze device family are used.



Tip!

Here you will find information on configuring with the »RSLogix 5000« programming software from Rockwell:

- ▶ [I/O configuration with »RSLogix 5000« version 19 or lower](#) (📖 53)
- ▶ [I/O configuration with »RSLogix 5000« version 20 or higher](#) (📖 58)

6.2.1 EDS files

Depending on the EtherNet/IP scanner configuration software, the EDS files (Electronic Data Sheet) may be used for the configuration of the network profile, the communication with the participating devices and the automatic generation of tags. For this purpose, the EDS files must be imported into the controller project of the scanner configuration software.

The EDS file required for the configuration can be found in the download area at:

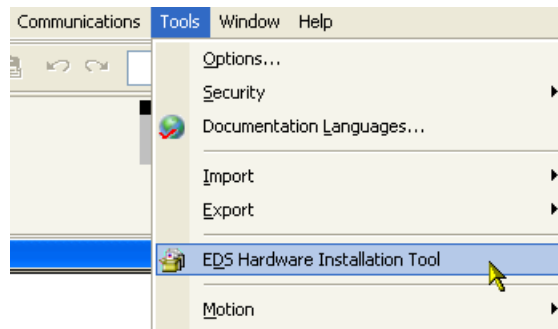
www.Lenze.com



Tip!

From version 20 onwards, Rockwell's »RSLogix 5000« programming software features an "EDS Hardware Installation Tool" that can be used to ...

- install/import EDS files;
- create EDS files;
- carry out EDS uploads;
- delete EDS files from your controller project.



In »RSLogix 5000«, the dialog for the "EDS Hardware Installation Tool" is self-explanatory and not described further in this documentation.

6.2.2 Example: IP configuration of the Allen-Bradley 1769-L32E CompactLogix controller

In this example, the Allen-Bradley CompactLogix control unit 1769-L32E with integrated EtherNet/IP interface is used for communication with the Inverter Drives 8400 protec.

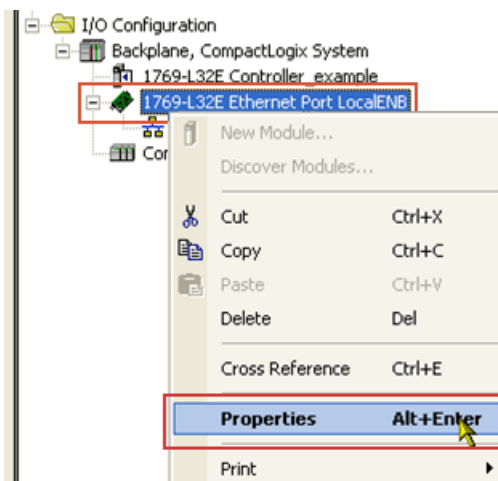
The »RSLogix 5000« programming software from Rockwell is used for the configuration.

To establish communication via an EtherNet/IP network, add the controller and its scanner to the I/O configuration.

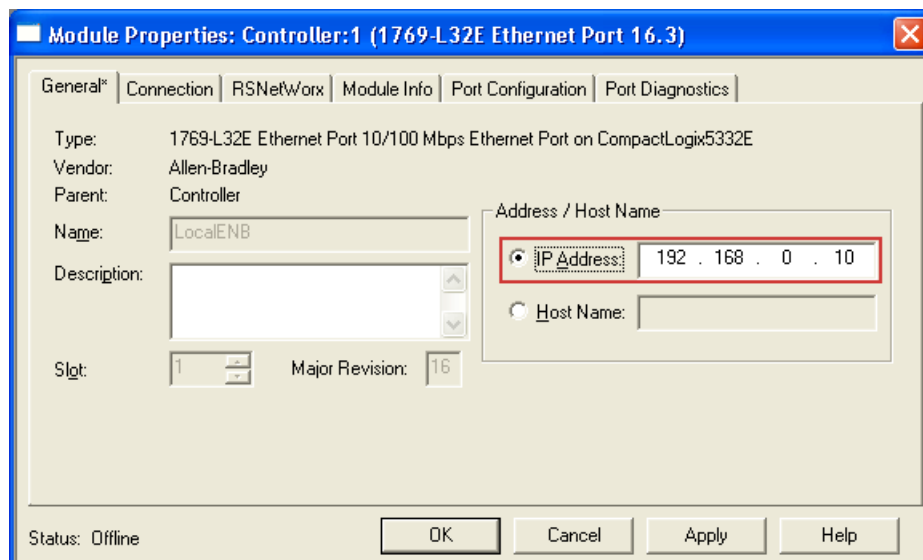


How to set the IP configuration of the 1769-L32E CompactLogix controller using the »RSLogix 5000« programming software:

1. Click on the **I/O Configuration** folder in the configuration tree.
2. Right click on "1769-L32E Ethernet Port LocalENB" and select "Properties" from the context menu.



3. Go to the **General** tab of the "Module Properties: ..." dialog window and enter the IP address of the scanner.



4. Then click **OK**.

5. Go to the **Port Configuration** tab and enter the IP configuration, BOOTP setting, Ethernet baud rate and duplex mode.

Module Properties Report: Controller:1 (1769-L32E Ethernet Port 20.11)

General | Connection | RSNetWorx | Module Info | **Port Configuration** | Port Diagnostics

IP Address: 192 . 168 . 0 . 2
(Must Match IP Address on General Tab)

Subnet Mask: 255 . 255 . 255 . 0

Gateway Address: 0 . 0 . 0 . 0

Primary DNS Server Address: 0 . 0 . 0 . 0

Secondary DNS Server Address: 0 . 0 . 0 . 0

Enable BOOTP

Enable DHCP (DHCP must be configured to return a fixed address.)

Enable DNS

Auto-Negotiate Port Speed and Duplex

Domain Name:

Host Name:

Select Port Speed:

Current Port Speed: 100 Mbps

Select Duplex:

Current Duplex: Half Duplex
(Changes to Port Speed and Duplex require module reset.)

Refresh Set

Status: Running

OK Cancel Apply Help

6. Then click **OK**.
- Now, the scanner is configured for the EtherNet/IP network.
 - Here you will find information on project planning with the »RSLogix 5000« programming software from Rockwell:
 - ▶ [I/O configuration with »RSLogix 5000« version 19 or lower](#) (📖 53)
 - ▶ [I/O configuration with »RSLogix 5000« version 20 or higher](#) (📖 58)

6.3 Setting the IP configuration of the Inverter Drive 8400 protec

IP configuration is necessary in order to assign an address to the Inverter Drive 8400 protec so that communication between the PC/»Engineer« or the scanner and the inverter is possible via EtherNet/IP. For this purpose, an IP address, subnet mask and gateway address have to be assigned. You can assign these IP parameters for the Inverter Drive 8400 protec in the following ways:

- [Setting via the EtherNet/IP configurator of the »Engineer«](#) (📖 29)
- [Setting via codes in the »Engineer«](#) (📖 31)
- [Setting via a BOOTP/DHCP server](#) (📖 33)
- [Setting via the TCP/IP Interface Object \(0xF5\)](#) (📖 33)



Note!

- The assignment of invalid combinations of IP address, subnet mask, and gateway address can have the consequence that no connection to the EtherNet/IP network can be established.
- Codes [C13010](#) (IP address), [C13011](#) (subnet mask), [C13012](#) (gateway address), and [C13016](#) (multicast IP address) show the IP parameters currently used.
- In the case of impermissible settings, the error message [EtherNet/IP: Invalid IP Parameter \[0x01bc6533\]](#) (📖 80) is output.

6.3.1 Setting via the EtherNet/IP configurator of the »Engineer«



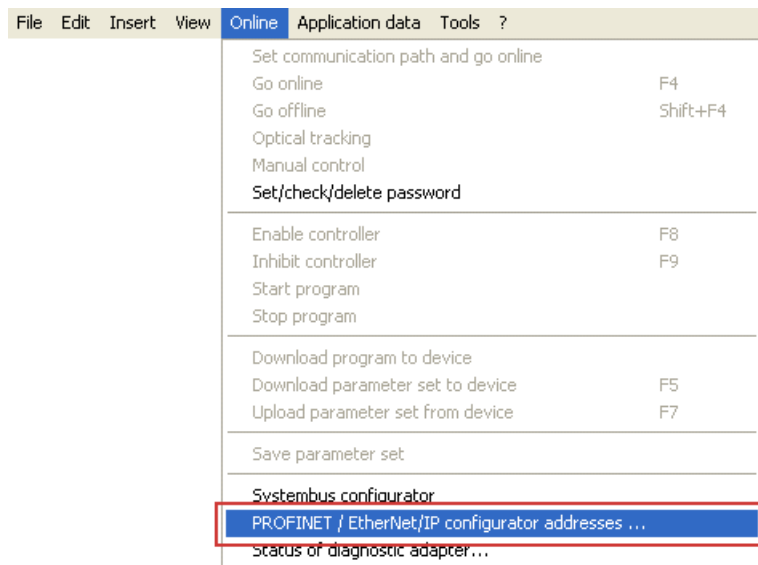
Note!

- Changes in the IP parameters will become effective immediately.
- An already existing IP connection to the Inverter Drive 8400 protec is interrupted.

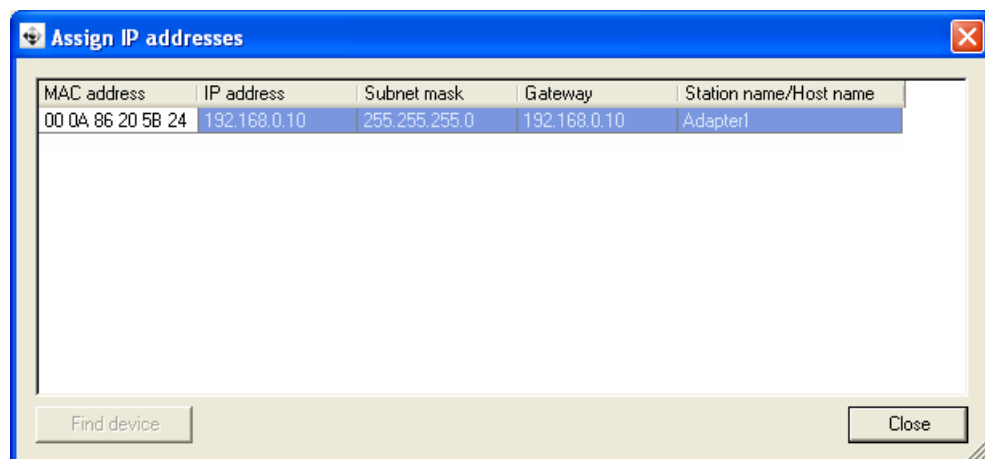


How to set the IP parameters via the EtherNet/IP configurator:

1. Execute the menu command **Online → PROFINET /EtherNet/IP configurator addresses**



The "Assign IP addresses" dialog window is opened and all Lenze EtherNet/IP nodes connected are listed.



2. A double-click on a EtherNet/IP node opens the "Configure nodes" dialog window. Here you can set the IP parameters.

3. Click on **Transferred**.
 - The IP configuration is transferred to the corresponding EtherNet/IP node.
 - The Inverter Drive 8400 protec carries out a stack reset.
 - The IP parameters are written to codes [C13000](#) (IP address), [C13001](#) (subnet mask), and [C13002](#) (gateway address).
 - Code [C13005](#) (IP configuration reference) is set to '0: Saved address' to ensure that the transferred address can be used.



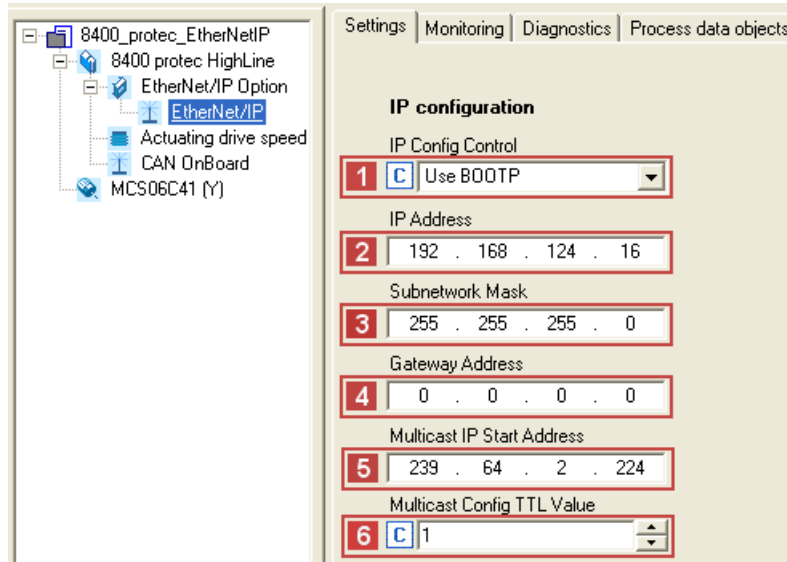
Tip!

Check whether the configuration has been transferred successfully.

For this purpose, open the **Assign IP addresses** dialog window (see step 1) and click on the **Find device** button.

6.3.2 Setting via codes in the »Engineer«

You can also set the IP parameters manually in the »Engineer« under the **Settings** tab. The values will be transferred to the corresponding codes.



Settings	Description
1 IP Config Control	Selection (C13005) of how the IP configuration is to be made: <ul style="list-style-type: none"> • 0: The IP configuration currently stored in the Inverter Drive 8400 protec is used. • 1: The IP configuration is assigned by a BOOTP server using the BOOTP. • 2: The IP configuration is assigned by a DHCP server using the DHCP.
2 IP Address	Setting of the IP address (C13000)
3 Subnet Mask	Setting of the subnet mask (C13001)
4 Gateway Address	Setting of the gateway address (C13002)
5 Multicast IP Start Address	Setting of the Multicast IP start address (C13006) ▶ Setting the multicast configuration (□ 34)
6 Multicast Config TTL Value	Setting of the multicast TTL value (C13019)



How to activate changed settings in the »Engineer«:

1. Execute device command **C00002 = "11: Save all parameter sets"**.
The current IP configuration is stored in the memory module of the inverter.
2. Carry out a "type 0 reset" to the [Identity Object \(1 / 0x01\)](#) ([□ 108](#)) of the bus node or 8400 switch the voltage supply of the Inverter Drive 8400 protec off and then on again.

IP address

The IP address is set/changed in [C13000](#).

The IP address currently used is displayed in [C13010/1...4](#).

Example: Display of the IP address 192.168.124.16				
Code	C13010/1	C13010/2	C13010/3	C13010/4
Value	192	168	124	16

Subnet mask

The subnet mask indicates which part of the IP address is evaluated as net ID or host ID.

Valid subnet masks are defined in accordance with RFC 1878

The subnet mask is set/changed in [C13001](#).

The subnet mask currently used is displayed in [C13011/1...4](#).

Example: Display of the subnet mask 255.255.255.0				
Code	C13011/1	C13011/2	C13011/3	C13011/4
Value	255	255	255	0

Gateway address

The gateway address is valid if the network address of the IP address and the gateway address are identical.

If the gateway address and the IP address are identical or if the address is '0.0.0.0', gateway functionality is not used.

The gateway address is set/changed in [C13002](#).

The gateway address currently used is displayed in [C13012/1...4](#).

Example: Display of the gateway address 192.168.124.16				
Code	C13012/1	C13012/2	C13012/3	C13012/4
Value	192	168	124	16

6.3.3 Setting via a BOOTP/DHCP server

DHCP is the acronym for "Dynamic Host Configuration Protocol". This protocol is defined in RFC 2131 and is a compatible advancement of the "Bootstrap Protocol" (BOOTP) according to RFC 951.

Both protocols enable network nodes to query information about the network configuration (e.g. the IP address) from a server via a TCP/IP network. The BOOTP/DHCP server assigns the IP address to the client dynamically from a defined address range. This means that the client receives an unambiguous IP address.

Code [C13005](#) is used to select how the IP configuration is to be made:

- Value '0': The IP configuration currently stored in the Inverter Drive 8400 protec is used.
- Value '1': BOOTP is used. (Lenze standard setting)
- Value '2': DHCP is used.

The setting can also be selected by write access to attribute 3 (configuration control) of instance 1 of the [TCP/IP Interface Object \(245 / 0xF5\)](#)[TCP/IP Interface Object \(245 / 0xF5\)](#).

6.3.4 Setting via the TCP/IP Interface Object (0xF5)

With a scanner, the IP configuration can be set via attribute 5 (interface configuration) of instance 1 of the [TCP/IP Interface Object \(245 / 0xF5\)](#)[TCP/IP Interface Object \(245 / 0xF5\)](#).

After the IP configuration, carry out a node reset ("power off/on" or "Type 0 reset" for the [Identity Object \(1 / 0x01\)](#) (108)).

In the »Engineer«, codes [C13010](#) (IP address), [C13011](#) (subnet mask), [C13012](#) (gateway address), and [C13016](#) (multicast IP address) show the IP parameters currently used.

6.3.5 Setting the multicast configuration

Several scanners ("Listen only" or "Input only" connections) can access multicast telegrams which are sent by the inverter. Settings for multicast configuration have to be carried out as well in the EtherNet/IP configuration software (e.g. »RSLogix 5000« from Rockwell).

By default, the Inverter Drive 8400 protec automatically generates the Multicast IP start address for I/O data transfer. The standard TTL value for Multicast transfer is '1'; the Multicast I/O data packages are therefore distributed solely via the local network.



Note!

You can also explicitly set the multicast IP start address and the multicast TTL value. We recommend, however, not to change the default settings in order to ensure a secure multicast transmission.

The following multicast codes are configurable:

Code	Description
C13018	Selection for multicast IP addressing via instance attribute 9 (Mcast Config) in the TCP/IP Interface Object (245 / 0xF5) (📖 124) <ul style="list-style-type: none"> • Value '0': The default algorithm is used. • Value '1': The address from code C13006 is used as multicast IP start address.
C13019	Setting of the multicast TTL value for the validity time of data packets in the EtherNet/IP network (Instance attribute 8 (TTL Value) in the TCP/IP Interface Object (245 / 0xF5) (📖 124))
C13020	Used to set how many multicast IP addresses will be assigned. (Instance attribute 9 (Num Mcast) in the TCP/IP Interface Object (245 / 0xF5) (📖 124))

Multicast IP Start Address

Multicast IP start addresses serve to send a message to the members of a certain group (i.e. possibly to several nodes).

The multicast IP start address is set/changed in [C13006](#).

The currently used multicast IP address of the inverter is displayed in [C13016/1...4](#).

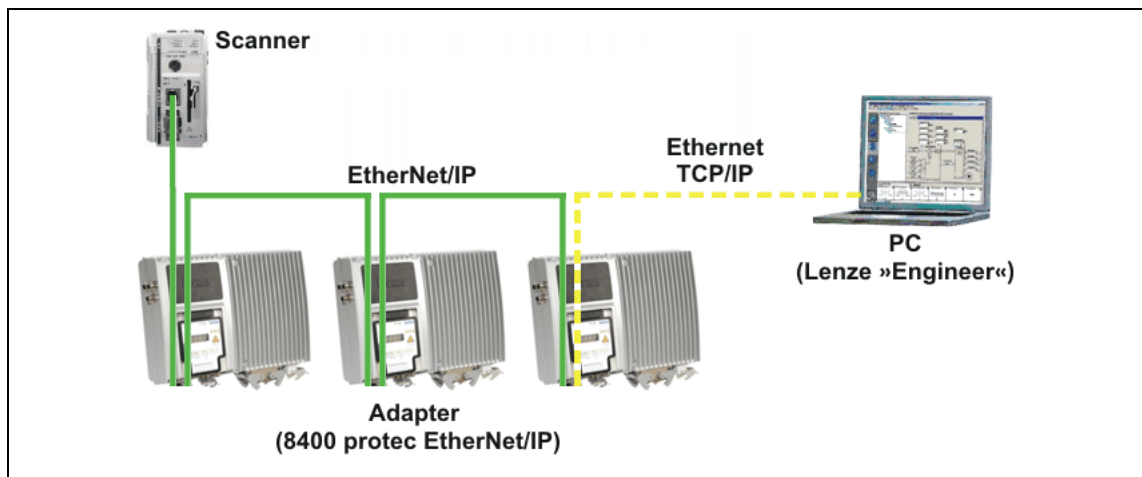
Example: Display of the multicast IP address 239.64.2.224				
Code	C13016/1	C13016/2	C13016/3	C13016/4
Value	239	64	2	224

6.4

Establishing an online connection via EtherNet/IP with the Lenze »Engineer«

**Note!**

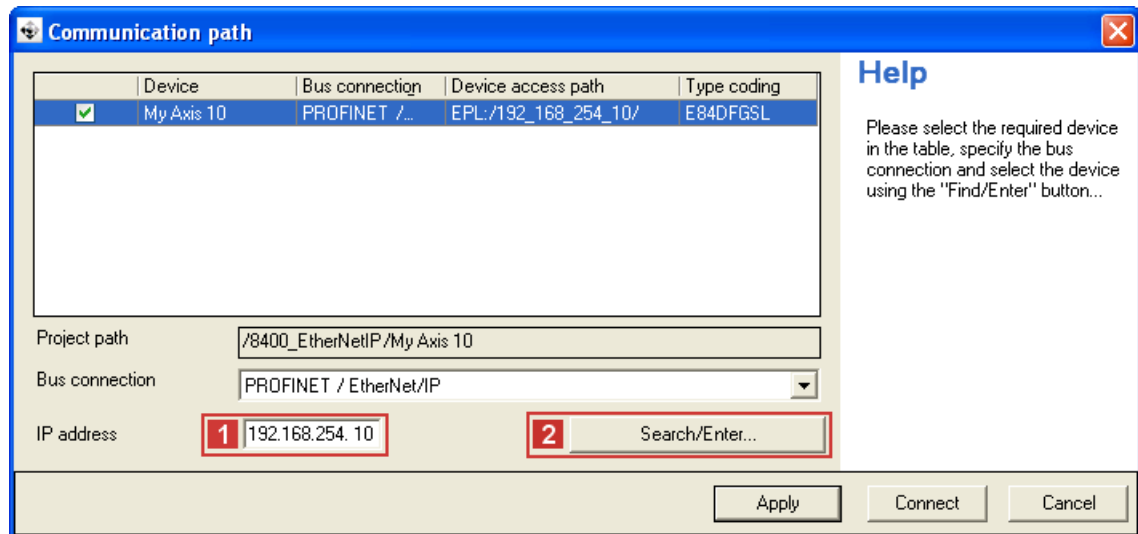
- In order to ensure perfect operation of cyclic EtherNet/IP communication, online access with the »Engineer« should be executed via an IEEE 802.1Q-capable switch.
- The IEEE 802.1Q-capable switch integrated in the Inverter Drive 8400 protec can manage cyclical EtherNet/IP-communication primarily for normal TCP/IP communication. In the case of EtherNet/IP, this is done by means of the VLAN identification in the Ethernet frame (can be set in [C13021](#)).
- If the redundancy protocol DLR (Device Level Ring) is used, the switch also must be DLR-compliant.



[6-1] Example set-up with an Allen Bradley CompactLogix Controller 1769-L32E (scanner)

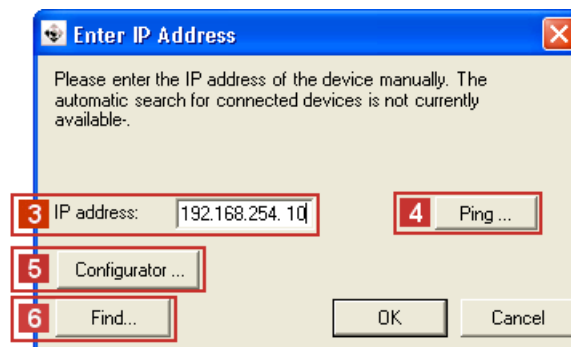
For an online connection between the »Engineer« and the inverter, the inverter must have an IP address (see [Setting the IP configuration of the Inverter Drive 8400 protec](#) (□ 28)).

In the »Engineer«, you can use the **Online → Set communication path and go online** menu command to select the EtherNet/IP communication path. The previously configured EtherNet/IP nodes are shown in the "Communication path" dialog window:



If the device access path is not configured correctly, here the **1** IP address of the inverter selected in the display field can be entered manually.

Via the **2** **Search/Enter** button, you can establish a connection to devices which have not appeared in the display field. Corresponding settings for this can be made in the "Enter IP Address" dialog window that will appear:



Here you can enter an **3** **IP address** manually or execute the following actions using the buttons:

- Execute the console command **4** **Ping**.
- Assign the IP address via the **5** **Configurator**.
 - ▶ [Setting via the EtherNet/IP configurator of the »Engineer«](#) (📖 29)
- Select the device access path to the desired inverter by clicking **6** **Find**.

After having established the online connection, you can continue work with the »Engineer« as usual.

6.5

Initial switch-on

**Mounting instructions for the Inverter Drive 8400 protec**

Observe the safety instructions and residual hazards stated.

**Note!****Activating changed settings**

To activate changed settings ...

- execute device command "11: Save all parameter sets" via inverter code **C00002** and ...
- carry out a "type 0 reset" to the [Identity Object \(1 / 0x01\)](#) (ID 108) of the bus node or switch the voltage supply of the communication module off and then on again.

Protection against uncontrolled restart

After a fault (e.g. short-time mains failure), the restart of a drive is not always wanted and - in some cases - even not allowed.

In the Lenze setting of the Inverter Drives 8400 protec, the restart protection is activated.

The restart behaviour of the inverter can be set via **C00142** ("Autostart Option"):

C00142 = 9 (Lenze setting)

- The inverter remains inhibited (even if the fault is no longer active).
- Bit 0 (inhibit at "power-on") and bit 3 (inhibit in the case of undervoltage) are set.
- The drive starts in a controlled mode by an explicit controller enable: LOW-HIGH edge on a digital input configured correspondingly (terminals X41, X42, X43).

C00142 = 8 (enabled)

- In order to enable the device directly when switching it on, set bit 0 to zero.
- An uncontrolled restart of the drive is possible.

7 Data transfer

EtherNet/IP uses CIP™ (Common Industrial Protocol) for the data exchange between devices via an Ethernet network – just like the closely related bus systems DeviceNet and ControlNet.

Lenze implements the CIP following the ODVA standard (Open DeviceNet Vendor Association, www.odva.org) and supports the two main types of EtherNet/IP communication:

- Explicit messaging (for parameter data)
- Implicit messaging (for I/O data)

7.1 Communication channels



Note!

The terms "input" and "output" refer to the point of view of the scanner:

- Input data is produced by the adapter and consumed by the scanner.
- Output data is produced by the scanner and consumed by the adapter.

EtherNet/IP transmits parameter data and I/O data between the host system (scanner) and the inverters (adapters) connected to the fieldbus. The data are transmitted via corresponding communication channels depending on their time-critical behaviour.

The I/O data channel transmits I/O data by means of "implicit messages".

- The inverter is controlled by means of the I/O data.
- The transmission of I/O data is time-critical.
- I/O data are transmitted cyclically between the host system (scanner) and the inverters (adapters) (permanent exchange of current input and output data).
- The host system (scanner) has direct access to the I/O data (the data are, for example, stored directly in the I/O area).
- In the case of Inverter Drives 8400 protec, maximally 16 data words (max. 32 bytes) can be exchanged for each direction.
- I/O data are not stored in the inverter.
- I/O data are e.g. setpoints, actual values, control and status words

The parameter data channel transmits parameter data by means of "explicit messages".

- The transmission of parameter data is usually not time-critical.
- Examples of parameter data are operating parameters, motor data, and diagnostic information.
- The parameter data channel provides access to all Lenze codes.
- Parameter changes must be saved by means of code **C00002** of the Inverter Drive 8400 protec.

7 Data transfer

7.2 Telegram types

7.2 Telegram types

The "implicit message" and "explicit message" telegram types are transmitted between the host system (scanner) and the inverter (adapter).

Implicit messages (I/O data transfer)

"Implicit messages" are transmitted or received according to the producer/consumer principle. There is one transmitter and no receiver or an optional number of receivers.

The "cyclic I/O data" transmission mode is supported. The scanner and the adapter use "cyclic I/O data" to generate their data independently of each other, which are then transmitted depending on a timer. The user must set the value of the timer in the scanner.

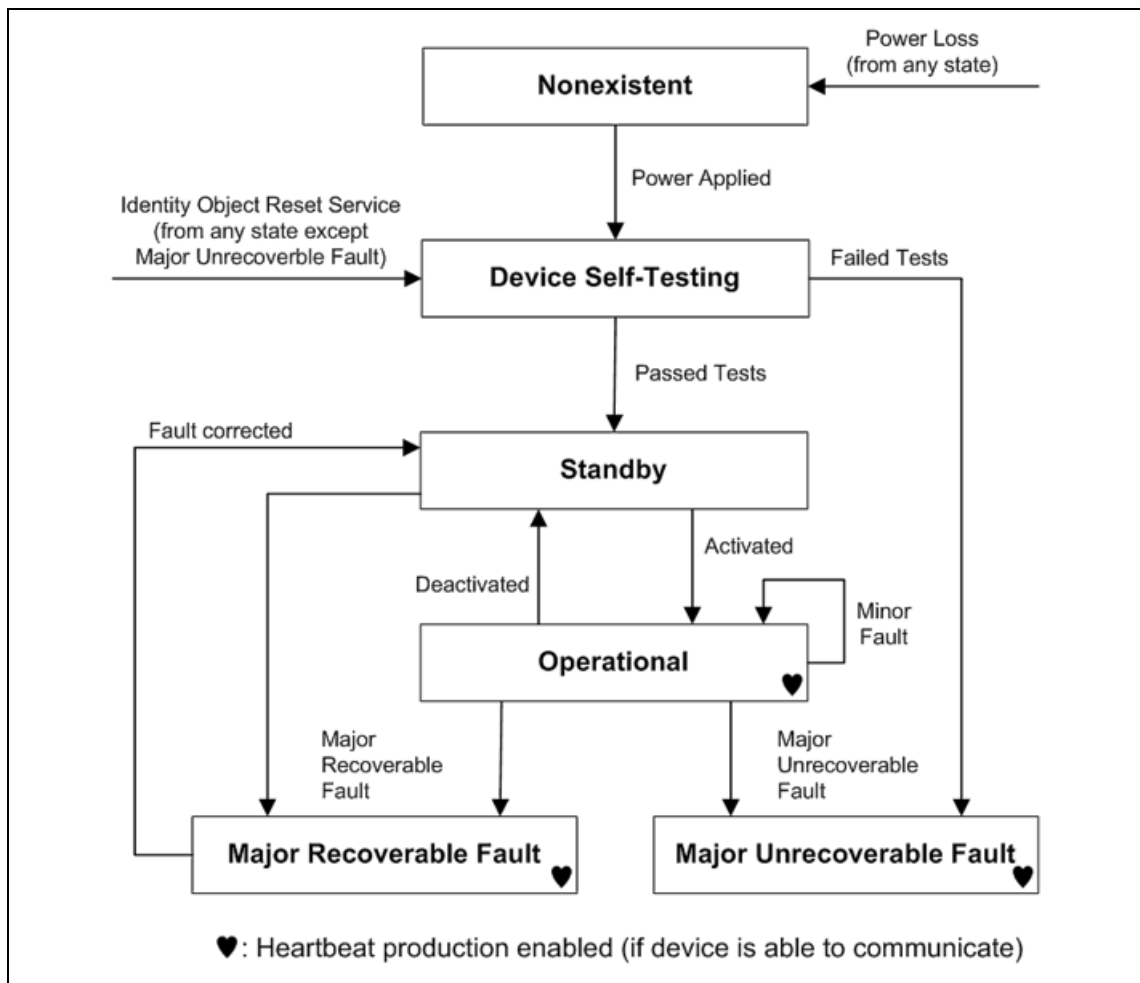
Explicit messages (parameter data transfer)

"Explicit messages" serve to configure and parameterise the individual EtherNet/IP nodes.

Two nodes have a client/server relationship:

The client transmits a job (request). The server receives this job and tries to accomplish it. The server then transmits the requested data (positive response) or an error message (negative response).

7.3 EtherNet/IP state diagram



[7-1] EtherNet/IP state diagram

The current EtherNet/IP device state is ...

- output via code [C13861](#);
- output in the [Identity Object \(1 / 0x01\)](#) ([📖 108](#)) via instance attributes 5 and 8;
- displayed via the LEDs **BUS-RDY** and **BUS-ERR** (see [LED status displays](#) ([📖 74](#))).

8 I/O data transfer (implicit messages)

8 I/O data transfer (implicit messages)

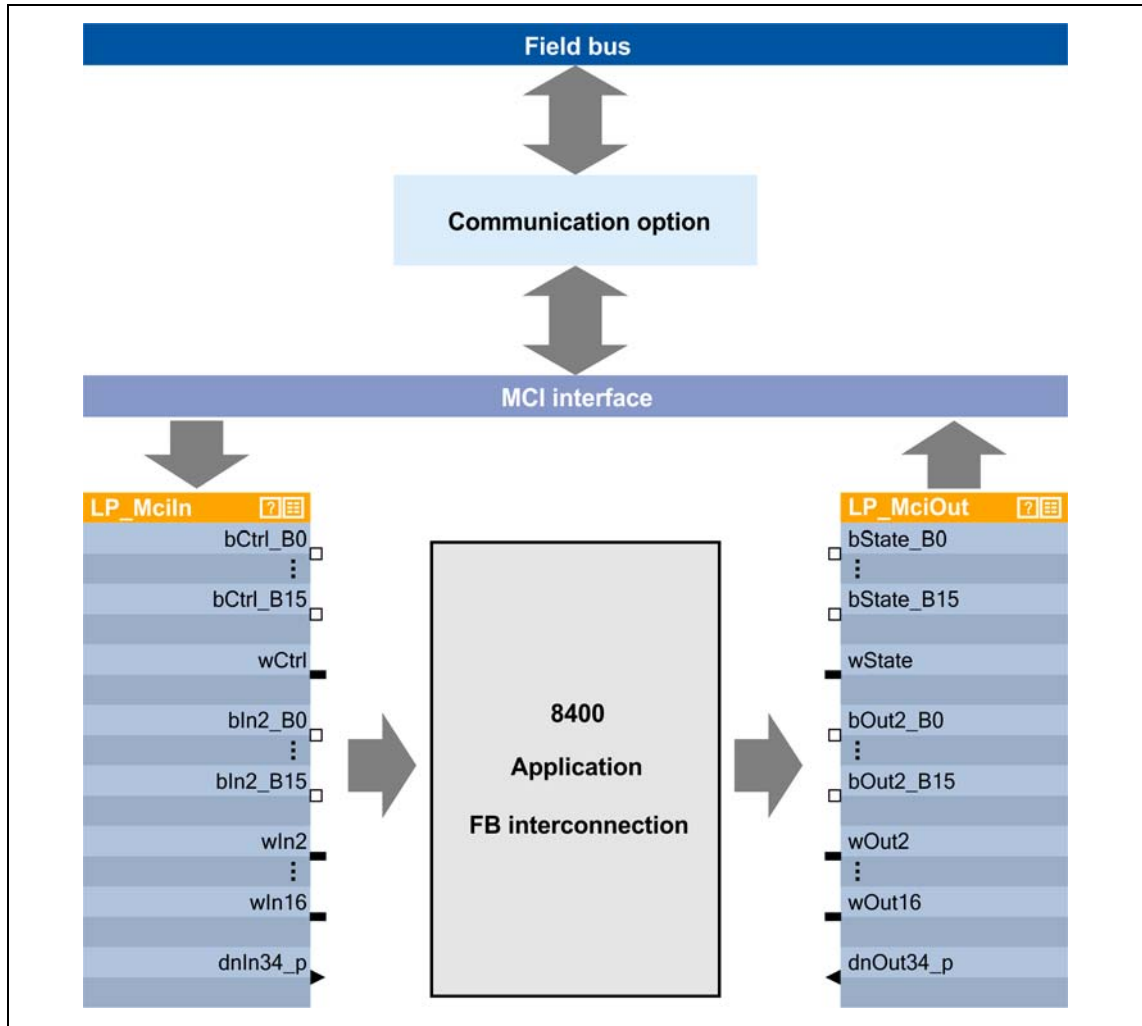
To exchange I/O data (implicit messages) between the host system (scanner) and the inverter (adapter), you have to ...

- Assign the I/O data to the internal ports (MCI) in the inverter (adapter):
 - ▶ [I/O configuration in the »Engineer«](#) (📖 48)
 - ▶ [I/O data mapping](#) (📖 43)
- Configure the I/O data transfer in the host (scanner):
 - ▶ [I/O configuration with »RSLogix 5000« version 19 or lower](#) (📖 53)
 - ▶ [I/O configuration with »RSLogix 5000« version 20 or higher](#) (📖 58)

8.1 I/O data mapping

I/O data transfer takes place via the MCI interface.

- Access to the I/O data takes place via port blocks **LP_MciIn** and **LP_MciOut**.
- The **LP_MciIn** port block maps the received data objects.
- The **LP_MciOut** port block maps the data objects to be sent.
- Up to 16 data words (32 bytes) per direction can be exchanged.
- The ports/function blocks of the I/O data objects are interconnected with the Lenze »Engineer«.



[8-1] Outer and inner data transfer between bus system, inverter, and application



Reference manual / online help for Inverter Drives 8400 protec

Here you will find detailed information on the port/function block interconnection in the »Engineer« and on the port blocks.

8.2 Technology applications (TA) / drive profiles

The Inverter Drives 8400 protec is provided with various drive profiles. They define a standardised or individual control and status word assignment and the standardisation of setpoints and actual value scalings.

The following drive profiles are supported by the inverter:

- Lenze technology applications / user-definable parameter sets
- "AC Drive Profile" application

8.2.1 Lenze technology applications / user-definable parameter sets

The technology applications integrated in the inverter provide the main signal flow for realising a general or specific drive solution.

For using the Lenze technology application selection in the »Engineer« via standard device code **C00005**, the following assembly object instances have to be used in the host (scanner):

Instance ID		Assembly object instance
[dec]	[hex]	
110	0x6E	Custom Output (from the adapter to the scanner)
111	0x6F	Custom Input (from the adapter to the scanner)

See also [Assembly Object \(4 / 0x04\)](#) (📖 111).

The custom assemblies also allow for a user-definable parameter setting, depending on the application. Hence, 16 data words (32 bytes) can be freely assigned with variables of the MCI port blocks in the »Engineer«.

The user-definable parameter setting can be used in addition to the previously set technology application.

▶ [Lenze technology application / configuring user-definable parameter sets](#) (📖 48)



Tip!

Here you will find information on configuring with the »RSLogix 5000« programming software from Rockwell:

- ▶ [I/O configuration with »RSLogix 5000« version 19 or lower](#) (📖 53)
- ▶ [I/O configuration with »RSLogix 5000« version 20 or higher](#) (📖 58)

8.2.2 "AC Drive Profile" application

The "AC Drive Profile" contains ...

- the data basis for motor parameters,
- management functions of the motor control devices,
- Device-specific functions of the inverter, e.g. speed ramps, torque control etc.

For using the "AC Drive Profile", the following assembly object instances in the host (scanner) have to be used:

Instance ID		Assembly object instance	
[dec]	[hex]		
20	0x14	Basic Speed Control Output	Outputs: From the scanner to the adapter
21	0x15	Extended Speed Control Output	
22	0x16	Speed and Torque Control Output	
23	0x17	Extended Speed and Torque Control Output	
70	0x46	Basic Speed Control Input	Inputs: From the adapter to the scanner
71	0x47	Extended Speed Control Input	
72	0x48	Speed and Torque Control Input	
73	0x49	Extended Speed and Torque Control Input	

See also:

- [Assembly Object \(4 / 0x04\)](#) (📖 111)
- ["AC Drive Profile" objects](#) (📖 131)



Reference manual / »Engineer« online help for Inverter Drives 8400 protec

Here you can find detailed information on how to use the "AC Drive Profile".



Tip!

Here you will find information on configuring with the »RSLogix 5000« programming software from Rockwell:

- ▶ [I/O configuration with »RSLogix 5000« version 19 or lower](#) (📖 53)
- ▶ [I/O configuration with »RSLogix 5000« version 20 or higher](#) (📖 58)

8.3

I/O assemblies

**Note!**

The terms "input" and "output" refer to the point of view of the scanner:

- Assembly input objects (input) are sent from the adapter to the scanner.
- Assembly output objects (output) are sent from the scanner to the adapter.

The length of the I/O data must correspond with the respective resulting length of the mapped ports ([I/O data mapping](#) (43)).

The communication module supports the [Assembly Object \(4 / 0x04\)](#) (111) and the ["AC Drive Profile" objects](#) (131).

For data exchange, the inverter supports the following assembly object instances:

Application	Instance ID		Assembly object instance
	[dec]	[hex]	
Lenze technology applications / User-definable parameter sets	110	0x6E	Custom Output
	111	0x6F	Custom Input
"AC Drive Profile" application	20	0x14	Basic Speed Control Output
	21	0x15	Extended Speed Control Output
	22	0x16	Speed and Torque Control Output
	23	0x17	Extended Speed and Torque Control Output
	70	0x46	Basic Speed Control Input
	71	0x47	Extended Speed Control Input
	72	0x48	Speed and Torque Control Input
	73	0x49	Extended Speed and Torque Control Input

Assembly output objects (outputs) are usually used for controlling the enable/disable state of the inverter and for supplying the speed or torque references.

Assembly input objects (inputs) are usually used to monitor the drive status and the runtime values such as actual speed, current, actual position and position error.

Depending on the data length defined by the scanner, the memory map of the I/O data can have different sizes.

Assembly output objects (scanner → adapter)

Assembly output objects are assumed to have a 4-byte header (32-bit "run/idle header"). When mapping the assemblies, this header will automatically be added to the data stream by most Allen-Bradley PLC/SLC equipment.

If your PLC does not support this header (like the Rockwell PLCs do), add a preceding 32-bit header to the output image.

You can then define the **bit 0** of this header in the process image of your PLC:

- 0: Idle mode
- 1: Run mode

For the operation with Rockwell PLCs, adaptations are not required.

Assembly input objects (adapter → scanner)

The assembly input objects are mapped in the adapter memory starting with byte 0.

The input objects are transmitted in a "modeless" manner, i.e. a 4-byte header (32-bit "Run/Idle header") is not included in the transfer.

So the start address in the assembly memory map is the actual start of the first assembly data element.

Please observe the actual assembly lengths when mapping the input objects to the controller memory.

The contents of the input data depends on the I/O data arrangement in the inverter ([I/O data mapping](#) (□ 43)).

8.4 I/O configuration in the »Engineer«

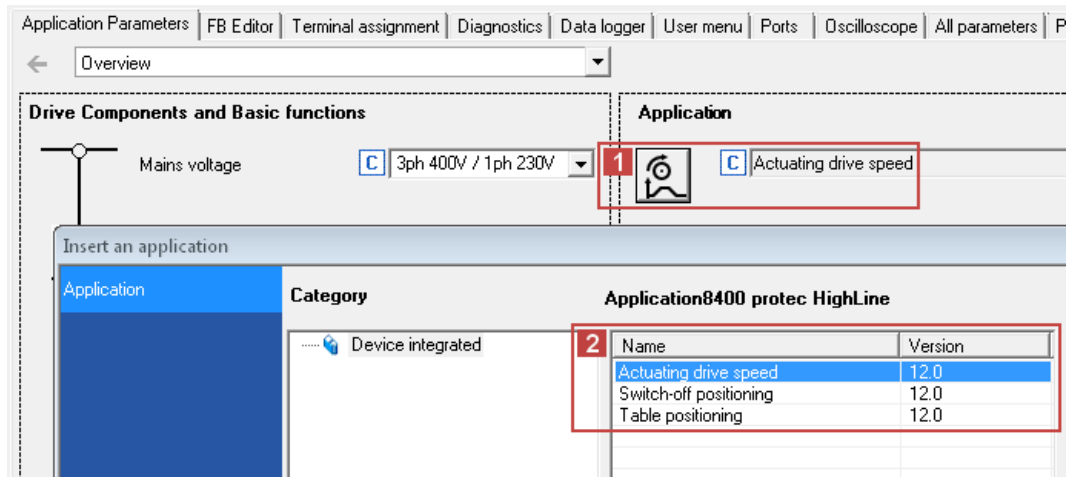
Lenze technology application / configuring user-definable parameter sets



How to configure the Lenze technology applications / user-definable parameter sets in the »Engineer«:

1. Select or change the application (C00005) in the **Application** parameter tab.

In the example, the "speed actuating drive" application (C00005 = 1000) is configured.



- **1** Click the application button:



switch-off positioning



speed actuating drive

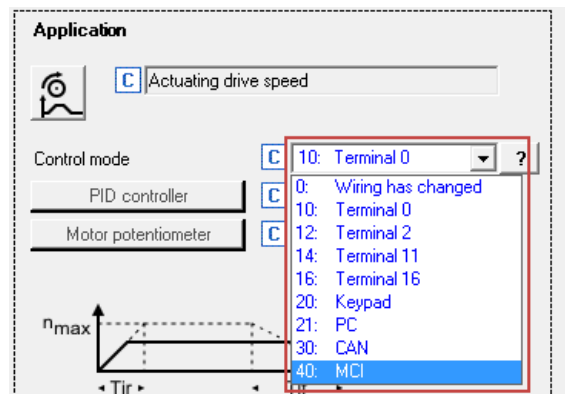


table positioning

- **2** Select the application in the "Insert application" dialog box.

2. Make the default setting of the I/O configuration.

Select "**MCI**" control mode (C00007 = 40).




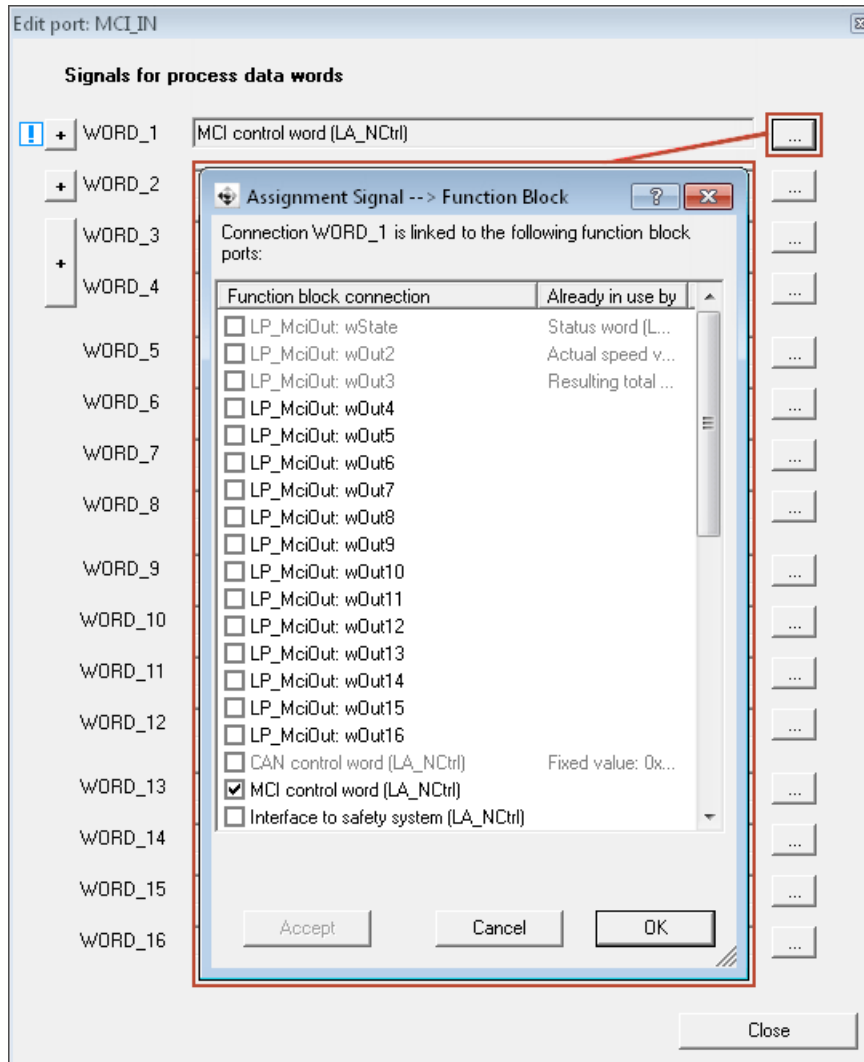
3. On the **Ports** tab, the port blocks **1** **MCI_IN** and **MCI_OUT** for the I/O data objects are shown.

The screenshot displays the 'Ports' configuration interface. At the top, there are tabs for 'Application Parameters', 'FB Editor', 'Terminal assignment', 'Diagnostics', 'Data logger', 'User menu', 'Ports', 'Oscilloscope', 'All parameters', and 'Properties'. Below the tabs, there are buttons for 'Rename' and 'Activate'. The main area is divided into three columns: 'Input ports', 'Actuating drive speed', and 'Output ports'. The 'Input ports' column contains 'CAN1_IN', 'CAN2_IN', 'CAN3_IN', and 'MCI_IN' (highlighted with a red box and labeled '1'). The 'Actuating drive speed' column contains '(Application)'. The 'Output ports' column contains 'CAN1_OUT', 'CAN2_OUT', 'CAN3_OUT', and 'MCI_OUT' (highlighted with a red box). Below this, the 'Mapping' section shows 'EtherNet/IP/MCI_IN_ETHERNETIP : 0' and '<not defined>'. The 'Application variables' section is a table with columns: Name, Signal, Type, Length, Index, and Online. A red box labeled '2' highlights the table, and a red box labeled '3' highlights the 'Change Variable...' button.

Name	Signal	Type	Length	Index	Online
WORD_1	[not connected]	WORD	16	C876/1	offline
WORD_2	[not connected]	WORD	16	C876/2	offline
WORD_3	[not connected]	WORD	16	C876/3	offline
WORD_4	[not connected]	WORD	16	C876/4	offline
WORD_5	[not connected]	WORD	16	C876/5	offline
WORD_6	[not connected]	WORD	16	C876/6	offline
WORD_7	[not connected]	WORD	16	C876/7	offline
WORD_8	[not connected]	WORD	16	C876/8	offline
WORD_9	[not connected]	WORD	16	C876/9	offline

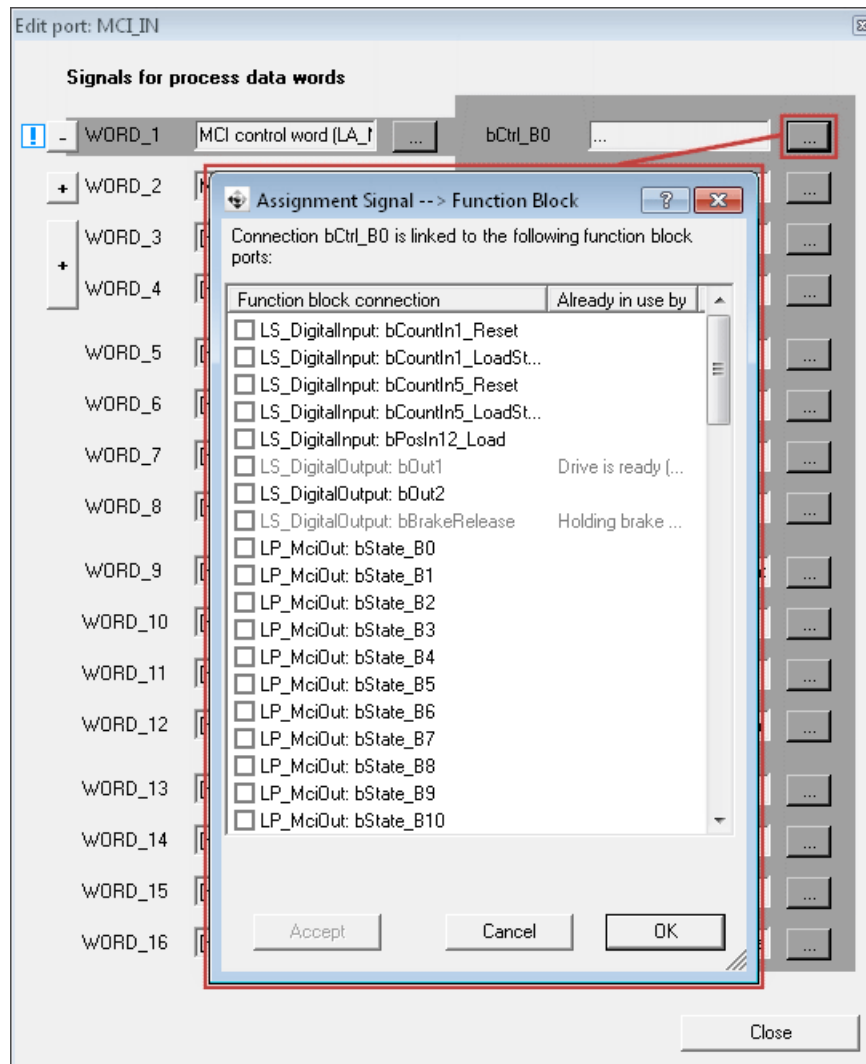
- By clicking the required port, the preconfigured signal combination can be obtained from the **2** **Application variables**.
- If you want to complement or change the signal combination, click the **3** **Change Variable ...** button.

4. In the "Edit port" dialog window, you can assign signals to the I/O data words via the  button.
Select the signals and confirm the selection with **OK**.



For some data words, you can also assign signals to the individual bits via the **+** and **...** buttons.

W Select the signals and then confirm the selection with **OK**.



5. Use the standard device code **C00002** to execute the command **"11: Save all parameter sets"**.

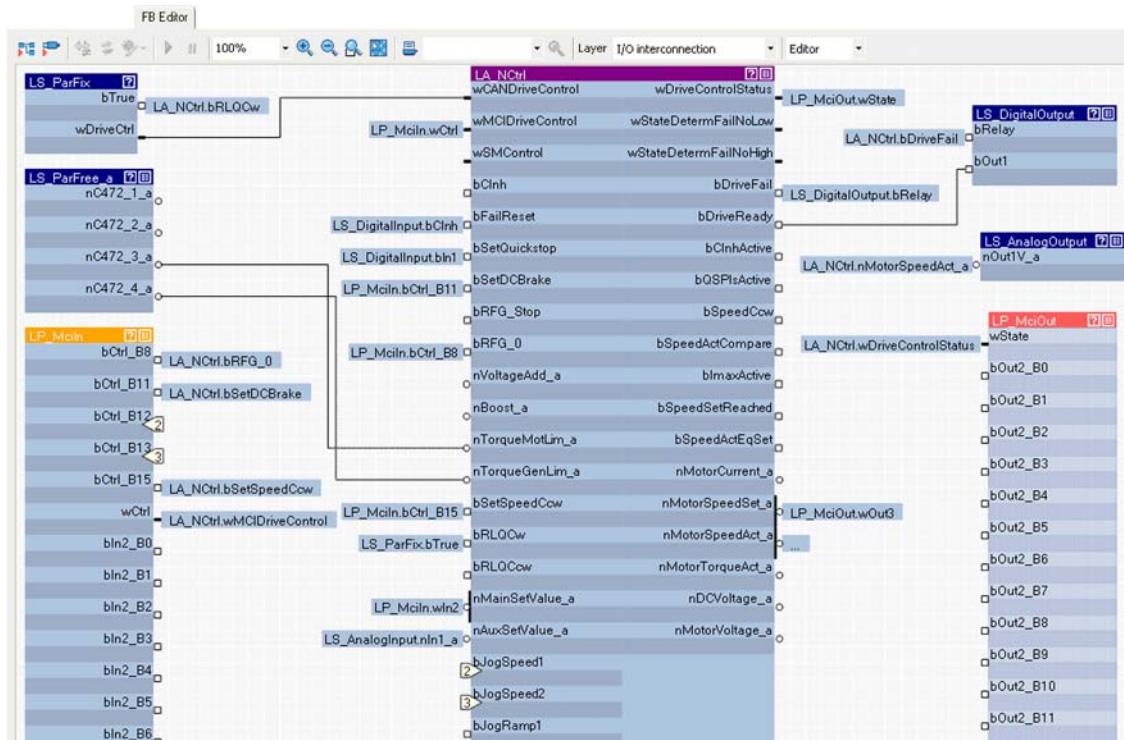
The changed settings are activated and saved with mains failure protection.

Preconfigured signal combination in the "FB Editor"

The preconfigured signal combination is activated by setting code **C00007 = "40: MCI"** in the standard device.

The function block editor (FB Editor) can be used to display the port blocks **LP_MciIn** and **LP_MciOut** with the preconfigured signal combinations:

Here, signal combinations can be added or changed.



Reference manual / online help for Inverter Drives 8400 protec

Here you will find detailed information on the port/function block interconnection in the »Engineer« and on the port blocks.

8 I/O data transfer (implicit messages)

8.5 I/O configuration with »RSLogix 5000« version 19 or lower

8.5 I/O configuration with »RSLogix 5000« version 19 or lower

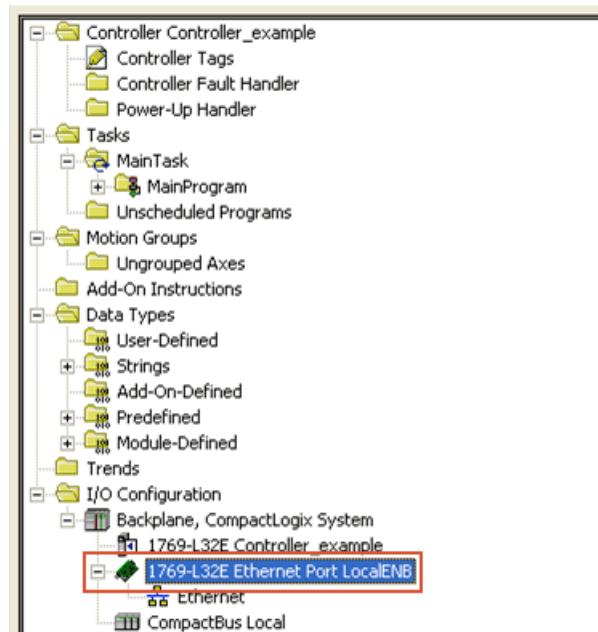
The following example describes the I/O configuration of the Allen-Bradley 1769-L32E CompactLogix controller using the Rockwell »RSLogix 5000« programming software up to version 19.

Up to and including software version 19 the I/O configuration is carried out without EDS files (25).



How to carry out the I/O configuration, taking the CompactLogix controller 1769-L32E with »RSLogix 5000« as an example:

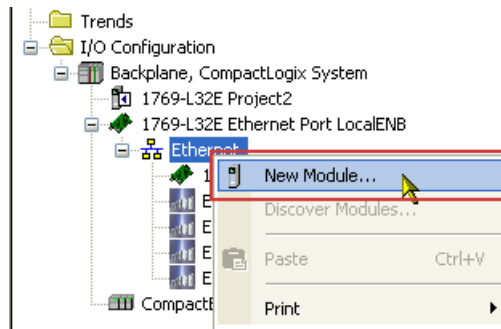
1. Click the **I/O Configuration** folder in the configuration tree.



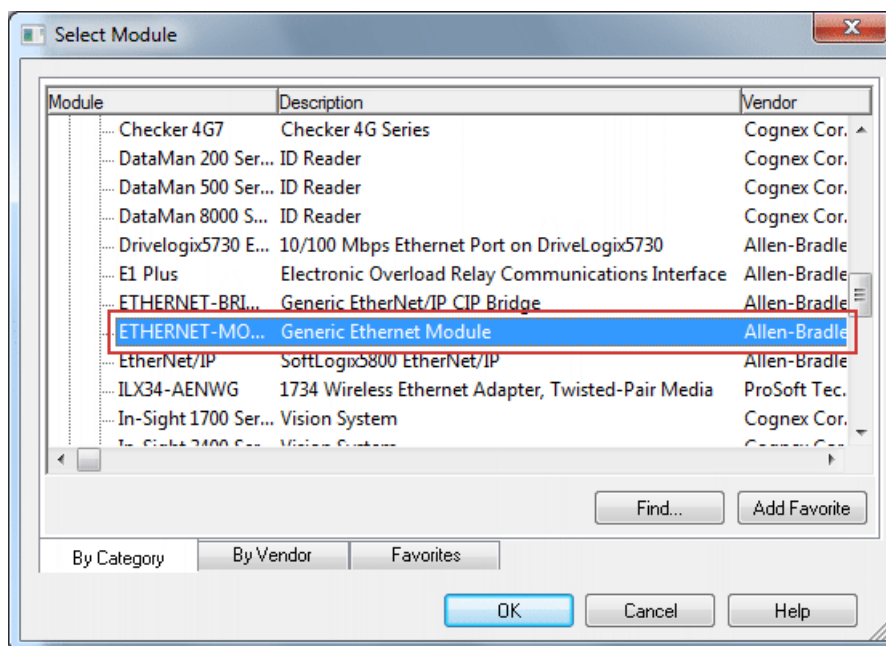
For the 1769-L32E CompactLogix controller, the I/O configuration already includes a local Ethernet port.

If a SoftLogic or ControlLogix controller is used, an Ethernet port scanner needs to be added to the configuration.

- Right click on "Ethernet" and execute the "**New Module ...**" command from the context menu.



- Open "Communications" and select "ETHERNET-MODULE | Generic Ethernet Module".



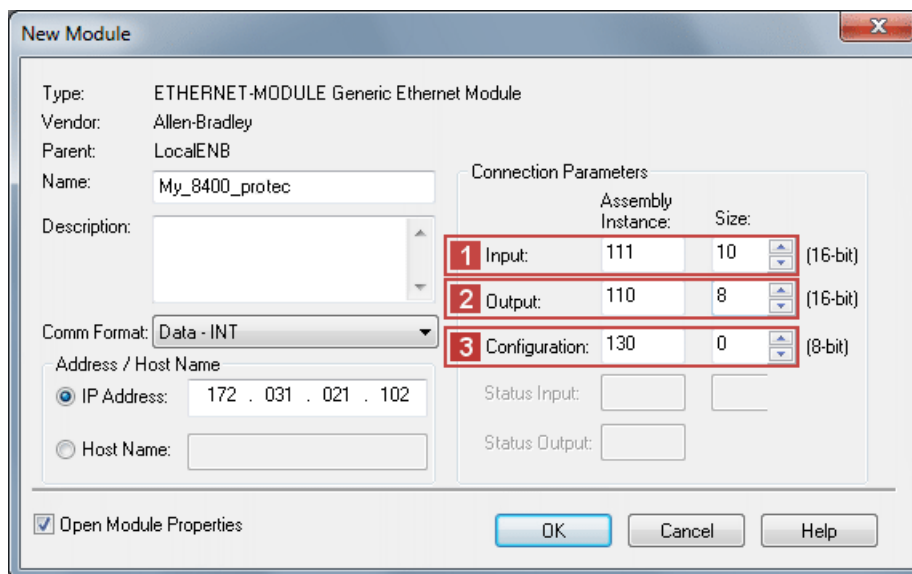
- Confirm the selection with **OK**.

5. Go to the "New Module" dialog window and define the properties of the newly added device .

The terms "input" and "output" refer to the point of view of the scanner:

- Assembly input objects (input) are sent from the adapter to the scanner.
- Assembly output objects (output) are sent from the scanner to the adapter.

Settings for Lenze technology applications or user-definable parameter sets:



If a Lenze technology application or an individual parameter set is used in the inverter, the assembly object instances **1** "Input = 111" and **2** "Output = 110" can be used to exchange up to 16 user-definable words (INT) via ports MCI_IN and MCI_OUT.

Go to **3** "Configuration" and enter the **Assembly instance "130"** and the **Size "0"**.

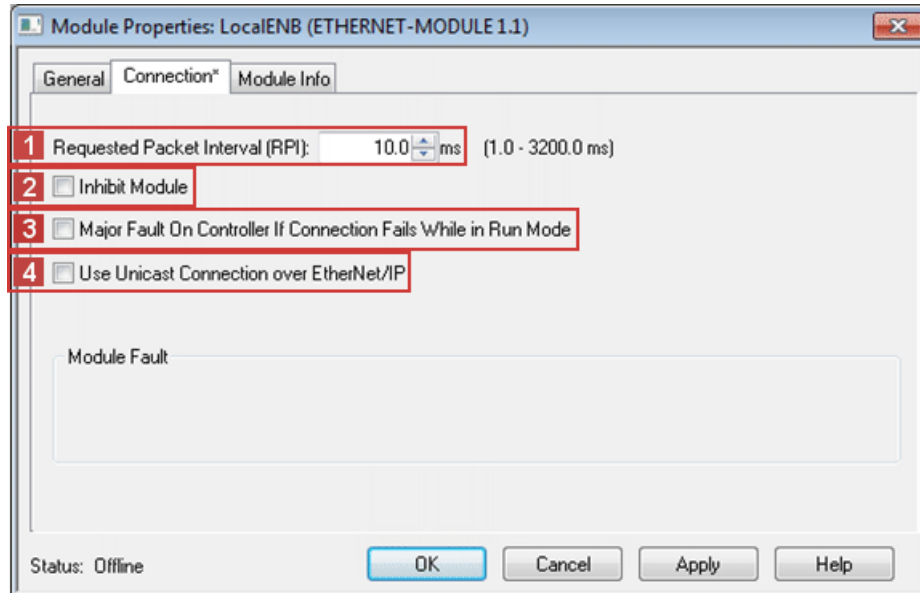
Settings for an "AC Drive Profile" application:

The assembly object instances **4** "Input = 73" and **5** "Output = 23" shown here exemplify the use of the AC Drive Profile "Extended Speed and Torque".

Settings	Description
1 Name	Device name or type of inverter, usually with reference to the process (in the example "My_E84AYCEO")
2 Comm Format	Data format for the assembly object instances ("connection parameters" area)
3 IP Address	IP address of the inverter <ul style="list-style-type: none"> The IP address must be in the same subnetwork like the controller. (Depending on the subnet mask; in general, the first 3 octets of the IP address must be identical.) DNS is not supported; the host name merely describes the device.
4 Input	Assembly object instance for input objects <ul style="list-style-type: none"> Max. 16 input data words (32 bytes, 16 bits/word) The number of input data must correspond to the length of the mapped ports in the transmit PDO (PDO_TX0), otherwise the adapter will reject the connection with the error message "Invalid Target to Originator Size" (0x0128). ▶ I/O data mapping (43)
5 Output	Assembly object instance for output objects <ul style="list-style-type: none"> Max. 16 output data words (32 bytes, 16 bits/word) The number of output data must correspond to the length of the mapped ports in the receive PDO (PDO_RX0), otherwise the adapter will reject the connection with the error message "Invalid Originator to Target Size" (0x0127). ▶ I/O data mapping (43)
6 Configuration	Select the Assembly instance "130" and the Size "0" for the configuration. These values are required!

6. Complete the settings with **OK**.

7. Under **I/O Configuration** in the configuration tree, right click "1769-L32E Ethernet Port LocalENB" and select "Properties".
8. Go to the **Connection** tab and set further properties.



Required setting

Setting	Description
1 Requested Packet Interval (RPI)	Set RPI \geq 4.0 ms. (Standard setting: 10 ms) The RPI [ms] specifies the intervals for the I/O data exchange between the inverter (adapter) and the controller (scanner).

Optional settings

Settings	Description
2 Inhibit module	This option serves to interrupt or inhibit the communication to the adapter.
3 Major Fault On Controller If Connection Fails While In Run Mode	This option serves to put the drive into the error status if the EtherNet/IP connection to the inverter fails while the controller is running.
4 Use Unicast Connection over EtherNet/IP	<p>Option deactivated (standard setting):</p> <ul style="list-style-type: none"> The input data is sent from the adapter to the scanner by means of multicast telegrams. Other scanners can access this data in addition to the currently configured scanner ("Listen only" or "Input only" connections). <p>Option activated: The input data is sent from the adapter to the scanner by means of unicast telegrams.</p>

9. Complete the settings with **OK**.
 - The I/O configuration is now complete.
 - The corresponding tags will then be created in the "Controller Tags" of the controller project.
10. The last step is [Saving the I/O configuration in »RSLogix 5000«](#) (□ 68).

8.6 I/O configuration with »RSLogix 5000« version 20 or higher

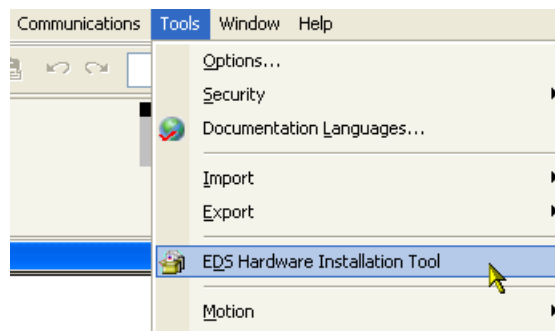
The following example describes the I/O configuration of the Allen-Bradley 1769-L32E CompactLogix controller using the Rockwell »RSLogix 5000« programming software from version 20.

From software version 20 onwards, [EDS files](#) (📄 25) are used for the I/O configuration.



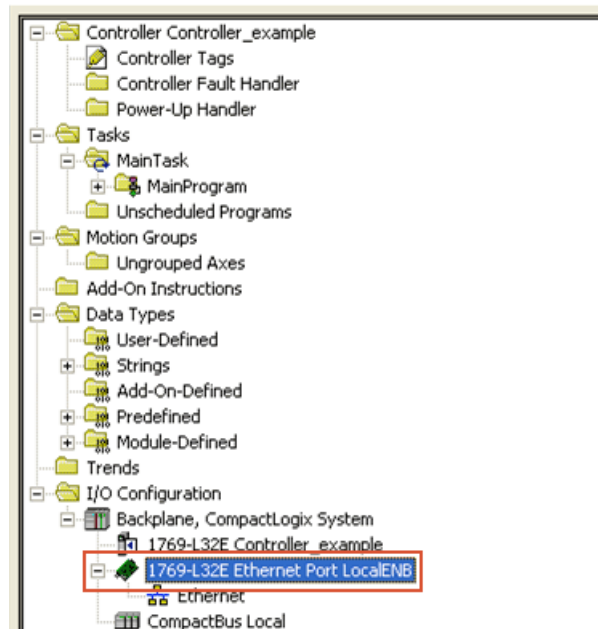
How to carry out the I/O configuration, taking the CompactLogix controller 1769-L32E with »RSLogix 5000« as an example:

1. Use the "EDS Hardware Installation Tool" item to import the [EDS files](#) (📄 25) of the EtherNet/IP nodes.



In »RSLogix 5000«, the dialog for the "EDS Hardware Installation Tool" is self-explanatory and not described further in this documentation.

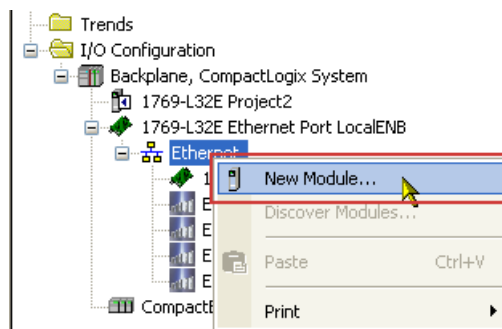
2. Click the **I/O Configuration** folder in the configuration tree.



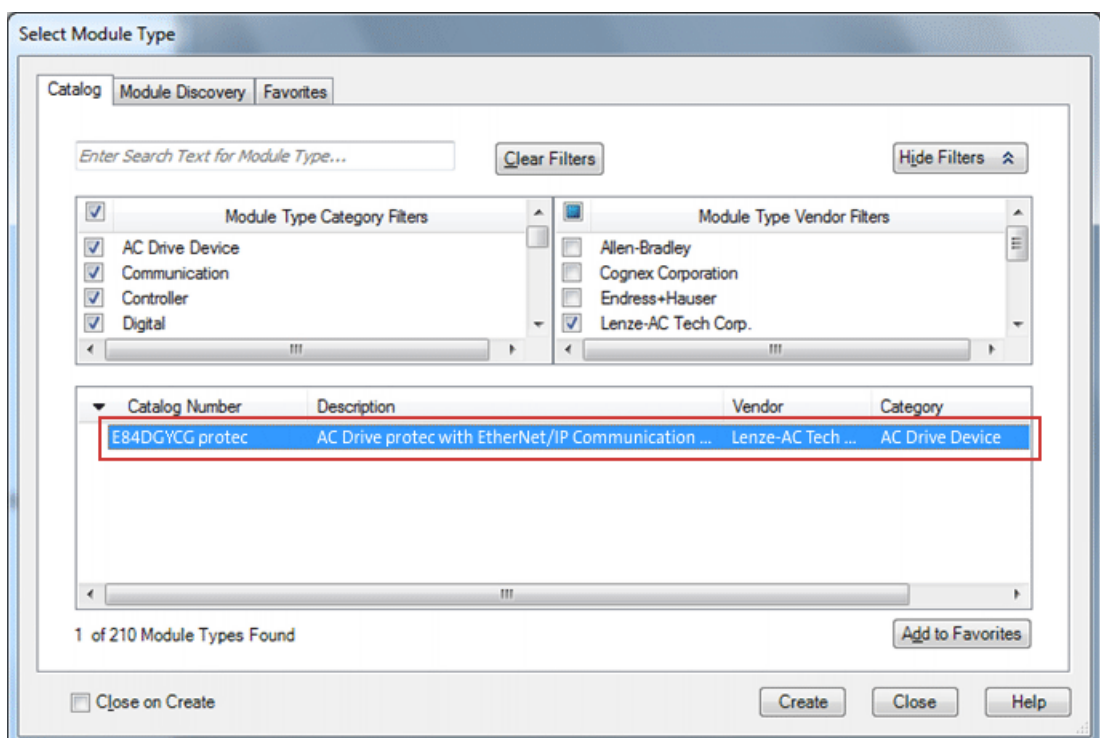
For the 1769-L32E CompactLogix controller, the I/O configuration already includes a local Ethernet port.

If a SoftLogic or ControlLogix controller is used, an Ethernet port scanner needs to be added to the configuration.

- Right click on "Ethernet" and execute the "**New Module ...**" command from the context menu.



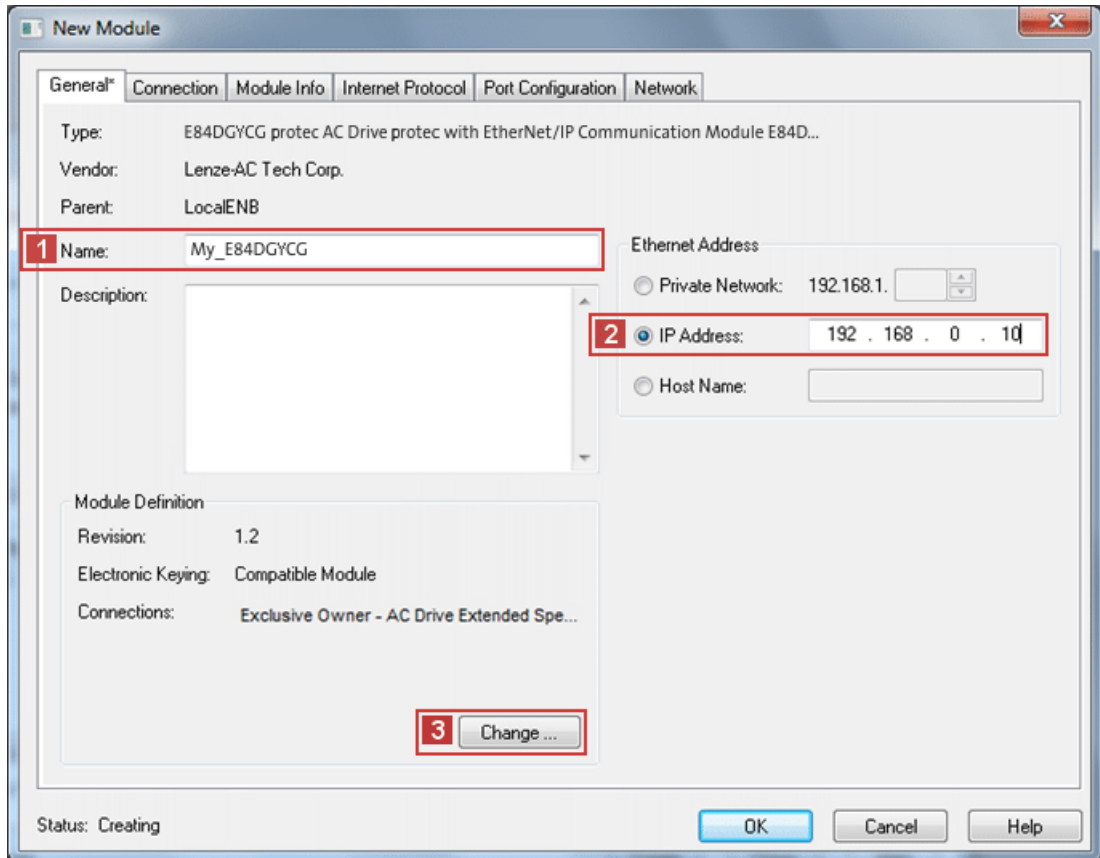
- In the "Select Module Type" dialog box, open the **Catalog** tab and select "E84DGYCG protec".



- Confirm the selection with **Create**.

6. In the "New Module" dialog window, select the **General** tab and allocate a **1** name and an unique **2** IP address.

Example settings:



DNS is not supported; the host name merely describes the device.

7. Click the **3** **Change ...** button.

8. Go to the "Module Definition" dialog window and make the connection settings.

The terms "input" and "output" refer to the point of view of the scanner:

- Assembly input objects (input) are sent from the adapter to the scanner.
- Assembly output objects (output) are sent from the scanner to the adapter.

Settings for Lenze technology applications or user-definable parameter sets:

- **1** Select "Exclusive Owner - Custom" connection.

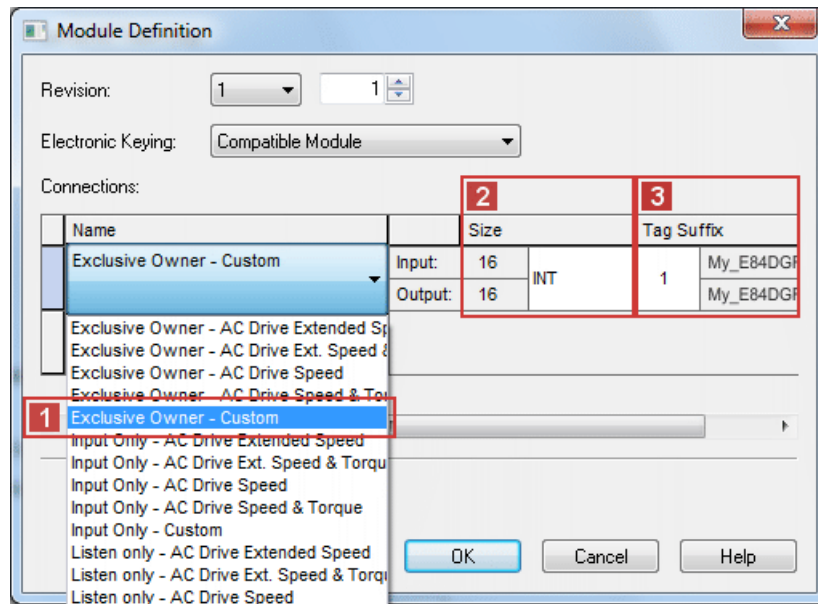
If you use the Lenze technology applications or user-definable parameter sets in the inverter, the "Exclusive Owner - Custom" assembly object instance always has to be selected.

- **2** Set Data type = INT.

The INT data type is exchanged via the ports MCI_IN and MCI_OUT of the Inverter Drives 8400 protec. In case of the SINT data type, an additional PLC logic is required for conversion.

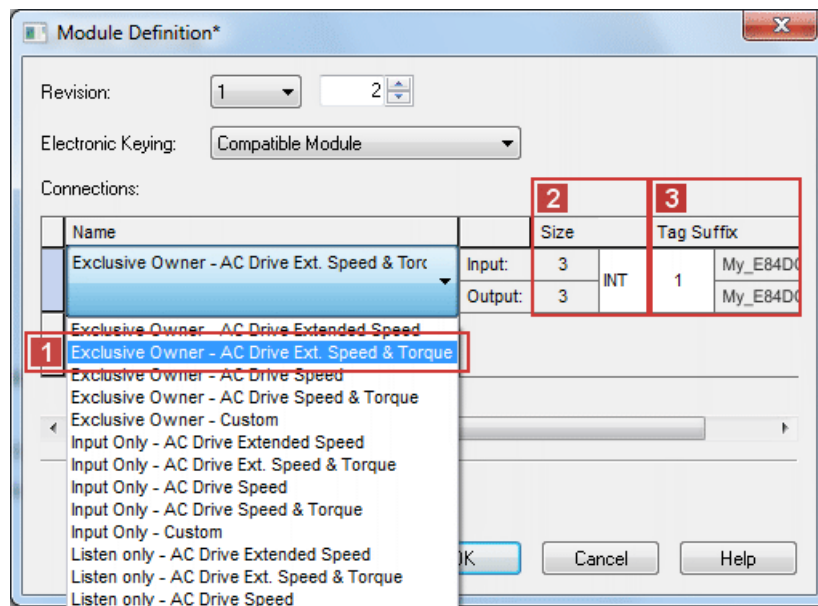
- **3** Set Tag Suffix = 1.

A tag suffix formulates a module-describing tag name.



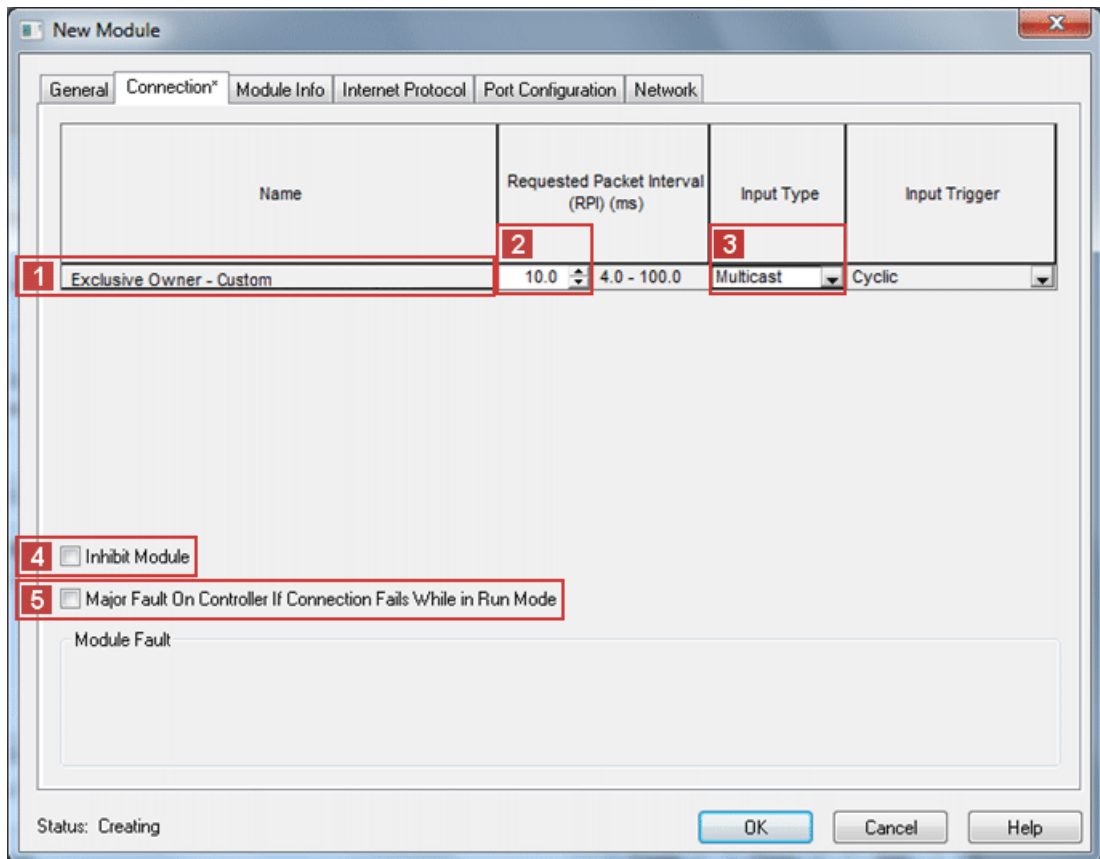
Settings for an "AC Drive Profile" application:

- **1** Select "AC Drive" connection.
In the example, the AC Drive Profile "Exclusive Owner - AC Drive Ext. Speed & Torque" is used.
- **2** Set **Data type = INT**.
The INT data type is exchanged via the ports MCI_IN and MCI_OUT of the Inverter Drives 8400 protec. In case of the SINT data type, an additional PLC logic is required for conversion.
- **3** Set **Tag Suffix = 1**.
A tag suffix formulates a module-describing tag name.



9. Complete the settings with **OK**.

10. Open the "New Module" dialog window, select the **Connection** tab and set further properties.



- 1** "Name" displays the name of the connection set under 8..

The example shows an "Exclusive Owner - Custom" connection. According to this, the name of an "AC Drive Profile" connection may be displayed here too.

Required settings

Settings	Description
2 Requested Packet Interval (RPI)	Set RPI \geq 4.0 ms. (Standard: 10 ms) The RPI [ms] specifies the intervals for the I/O data exchange between the inverter (adapter) and the controller (scanner).
3 Input type	Select the "Multicast" input type. <ul style="list-style-type: none"> The input data is sent from the adapter to the scanner by means of multicast telegrams. Other scanners can access this data in addition to the currently configured scanner ("Listen only" or "Input only" connections).

Optional settings

Settings	Description
4 Inhibit module	This option serves to interrupt or inhibit the communication to the adapter.
5 Major Fault On Controller If Connection Fails While In Run Mode	This option serves to put the drive into the error status if the EtherNet/IP connection to the inverter fails while the controller is running.

11. Complete the settings with OK.

- The inverter is inserted in the configuration tree under the **2** "I/O Configuration".
- The corresponding tags are created in the **1** "Controller Tags".
- The example **3** shows the ...
input assembly tags as "MY_EIP8400_FROM_EDS:I1";
output assembly tags as "MY_EIP8400_FROM_EDS:O1";

The screenshot shows the 'Controller Organizer' window for a project named 'LACT_TEST_UP'. The left pane shows a tree view with 'Controller Tags' (1) expanded. Under 'I/O Configuration' (2), the 'E84DGYCG MY_EIP8400_FROM_EDS' folder is expanded. The right pane shows a table of tags with the following data:

Name	Value	Force Mask	Style	Data Type
+ Drive_Mode_Select	0		Decimal	DINT
+ MY_EIP8400_FROM_EDS:I1	{...}	{...}		_024B:E84AYCE...
+ MY_EIP8400_FROM_EDS:O1	{...}	{...}		_024B:E84AYCE...
+ Read_INT	0		Decimal	DINT
Read_Target	0.0		Float	REAL
+ SET_Attribute_1	{...}	{...}		MESSAGE
+ TEST2	0		Decimal	INT
Trigger1	0		Decimal	BOOL

If you click the "+" in front of the assembly tag name, all data contained in the assembly tags are shown below it. You can create "alias tags" to reference to single bits of the assembly tag.

12. Create an "alias tag".

Example with the assembly object instance 23 (0x17):

For a forward motion of a conveyor, bit '0' (Run Fwd) is to be referenced by byte '0'.

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
23 (0x17)	0		Net Ref	NetCtrl			Fault Reset	Run Rev	Run Fwd	
	1									
	2	Speed Reference (Low Byte)								
	3	Speed Reference (High Byte)								
	4	Torque Reference (Low Byte)								
	5	Torque Reference (High Byte)								

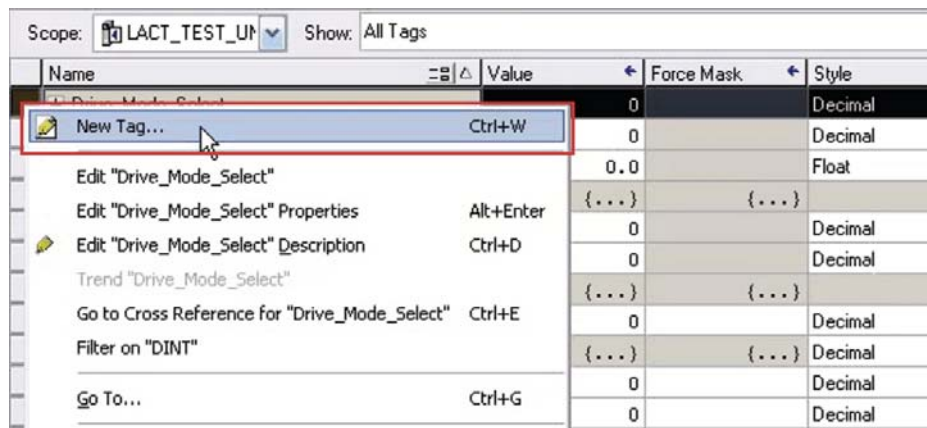


Note!

- **NetCtrl (Bit 5)** and **NetRef (Bit 6)** have to be set in order that the inverter can receive start/stop commands and speed/torque command via the network.
- In order to be able to use the torque control of the **assembly object distance 23 (0x17)**, the "DriveMode" attribute has to be written by means of explicit message transmission.

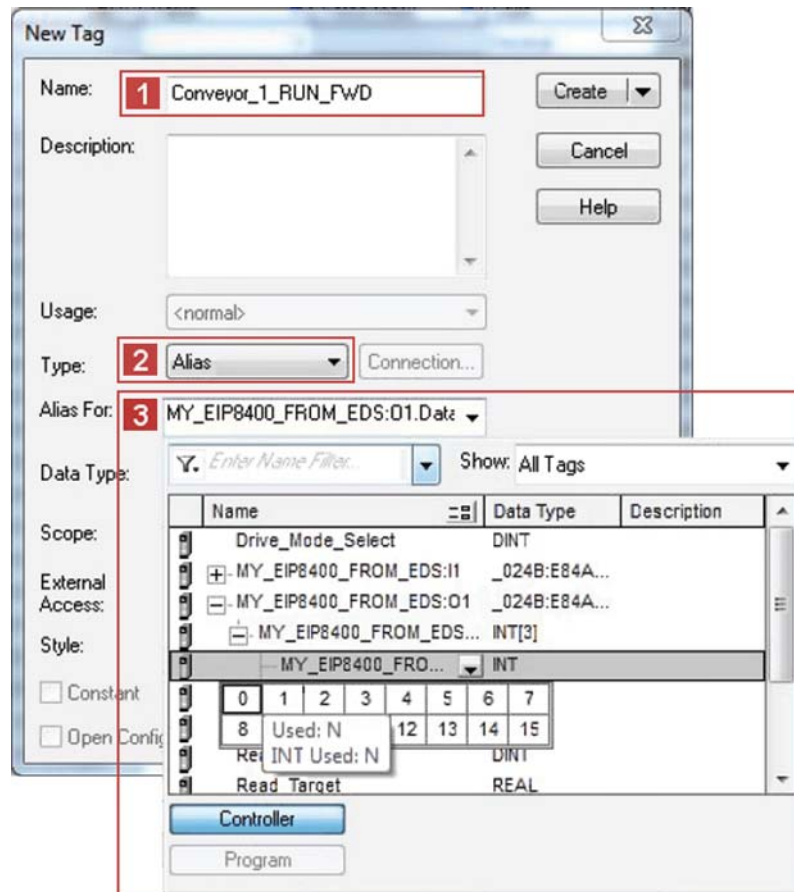
▶ [Write "DriveMode" attribute](#) (□ 137)

Right-click an assembly tag and select the command "New Tag..." in the context menu.



13. Go to the "New Tag" dialog window and ...

- assign a **1** Name for the tag (in the example: "Conveyor_1_RUN_FWD");
- **2** set Type = "Alias";
- select the **3** Alias address which is to be referenced for the alias tag.
(in the example: "MY_EIP8400_FROM_EDS:01.Data(0).0" (bit '0' of byte '0'))



14. Confirm the settings with the **Create** button.

The screenshot shows the 'New Tag' dialog box with the following settings:

- Name: Conveyor_1_RUN_FWD
- Description: (empty)
- Usage: <normal>
- Type: Alias
- Alias For: IP8400_FROM_EDS:01.Data[0].0
- Data Type: BOOL
- Scope: LACT_TEST_UNIT
- External Access: (empty)
- Style: Decimal
- Constant:
- Open Configuration:

The alias tag "Conveyor_1_RUN_FWD" is created below the "Controller Tags":

Name	Value	Force Mask	Style	Data Type
...
[−] MY_EIP8400_FROM_EDS:01	{..}	{..}		_024B:E84AYCE...
[+] MY_EIP8400_FROM_EDS:01.Data[1]	0		Decimal	SINT
[+] MY_EIP8400_FROM_EDS:01.Data[2]	0		Decimal	SINT
[+] MY_EIP8400_FROM_EDS:01.Data[3]	0		Decimal	SINT
[+] MY_EIP8400_FROM_EDS:01.Data[4]	0		Decimal	SINT
[+] MY_EIP8400_FROM_EDS:01.Data[5]	0		Decimal	SINT
Conveyor_1_RUN_FWD	0		Decimal	BOOL

15. The last step is [Saving the I/O configuration in »RSLogix 5000«](#) (□ 68).

8.7 Saving the I/O configuration in »RSLogix 5000«

After adding the scanner and the adapter to the I/O configuration, the configuration must be downloaded to the controller. The configuration file should also be saved on your computer.



How to save the I/O configuration:

1. Select the menu command **Communications → Download**.
 - The "Download" dialog box will open.
 - If a message box reports that »RSLogix 5000« is unable to go online, select the menu command **Communications → Communications Who Active** and try to find your controller in the "Who Active" dialog box. If the controller is not shown there, the EtherNet/IP driver needs to be added to »RSLinx« or configured in »RSLinx«. For more information, please refer to the »RSLinx« online help.
2. Click the **Download** button.
 - The I/O configuration is downloaded to the controller.
 - When the download has been successfully completed, »RSLogix 5000« changes to online mode and the I/O OK box in the upper left of the screen is green.
3. Select the menu command **File → Save**.
 - If this is the first time the I/O configuration is saved, the "Save As" dialog box will open.
 - Select a folder and enter a file name to save the configuration to a file on your computer.
 - Finally, click the **Save** button.

9 Parameter data transfer (explicit messages)

9 Parameter data transfer (explicit messages)

An "explicit message" is a logical instruction in the PLC program used for messaging. It can be used to read or write to either a parameter setting or the data of an assembly.

For all Allen-Bradley devices of the CompactLogix, ControlLogix and SoftLogix series, the MSG instruction provides the application possibilities described in this chapter. For other PLC types, please consult the programming documentation for the corresponding PLC.



Note!

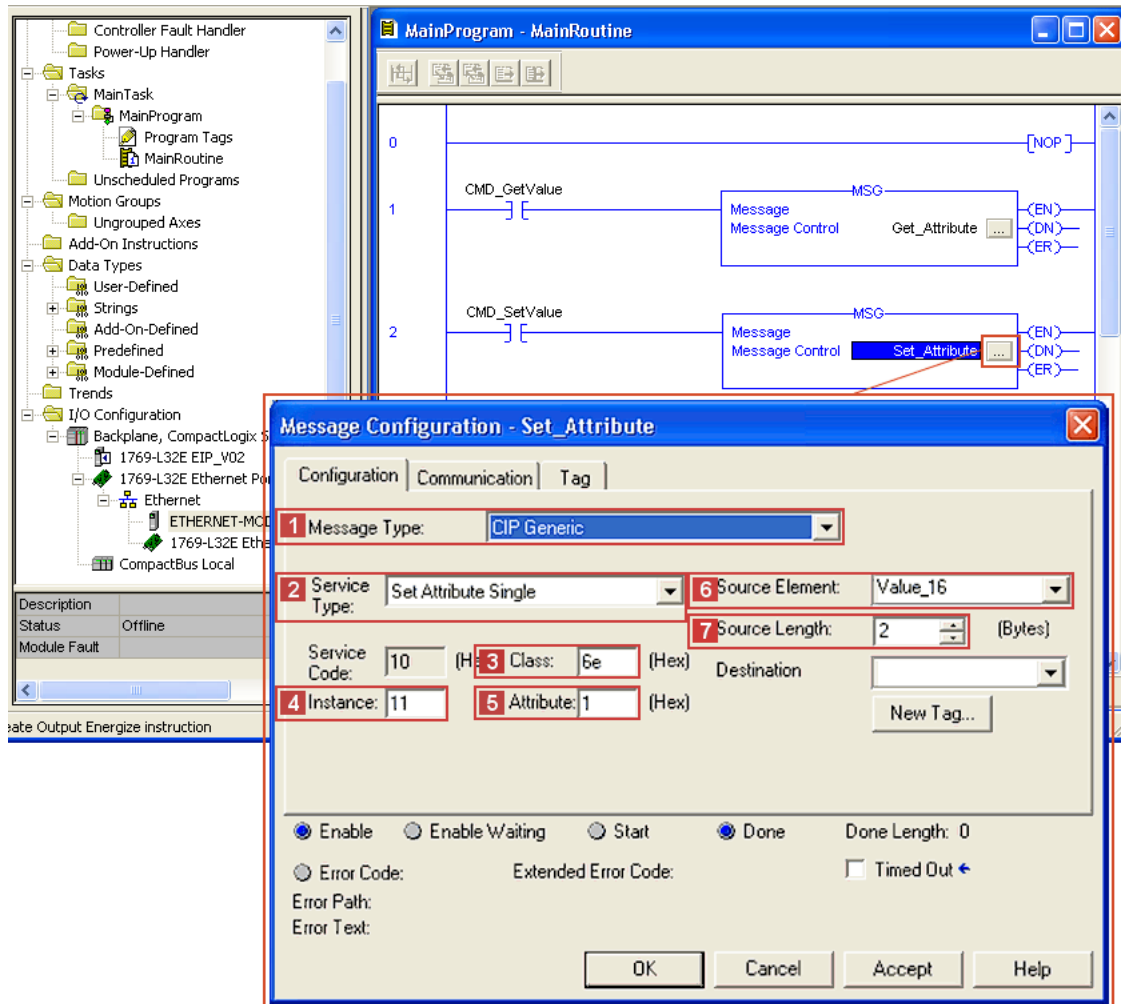
When you use several MSG BLOCKs per adapter, you can work resource-friendly by sequential triggering and hold available enough communication reserves in the EtherNet/IP module for further possible clients.

9 Parameter data transfer (explicit messages)

9.1 Write parameters

9.1 Write parameters

In order to write data into code **C00011** of the Inverter Drive 8400 protec by means of explicit message transfer, for example, the following settings are necessary:



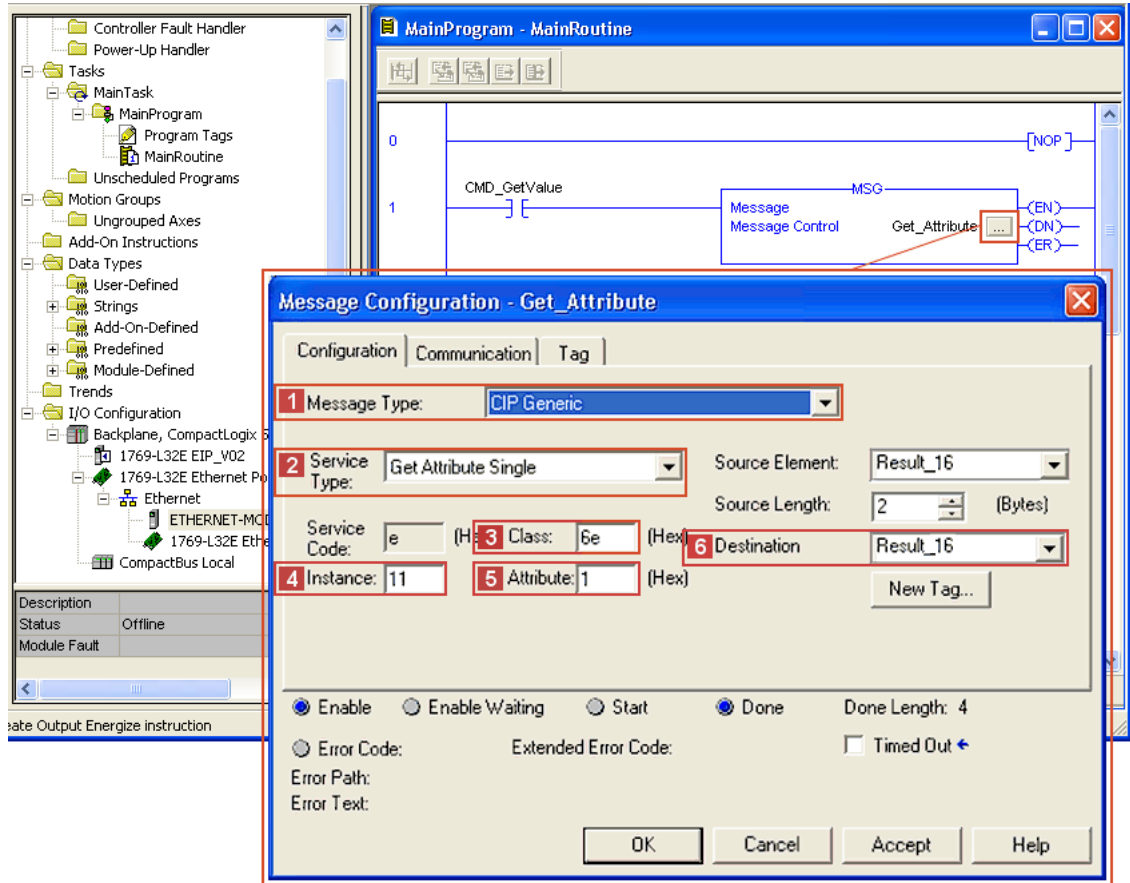
Settings	Value / description
1 Message Type	"CIP Generic"
2 Service Type	"Set Attribute Single" (service code "0x10")
3 Class	"0x6E" (access to Lenze code)
4 Instance	"11" = Lenze code C00011 of Inverter Drive 8400 protec
5 Attribute	"1" = Subcode of the Lenze code • If the corresponding Lenze code does not have a subcode, the value '1' must be entered here. • A display code cannot be configured by the "SET" service.
6 Source Element	Variable in the PLC program used as data source for writing.
7 Source Length	For writing to code C00011, set the source length to "2 bytes".

9 Parameter data transfer (explicit messages)

9.2 Read parameters

9.2 Read parameters

In order to read out Lenze code **C00011** of the Inverter Drive 8400 protec by means of explicit message transfer, for example, the following settings are necessary:



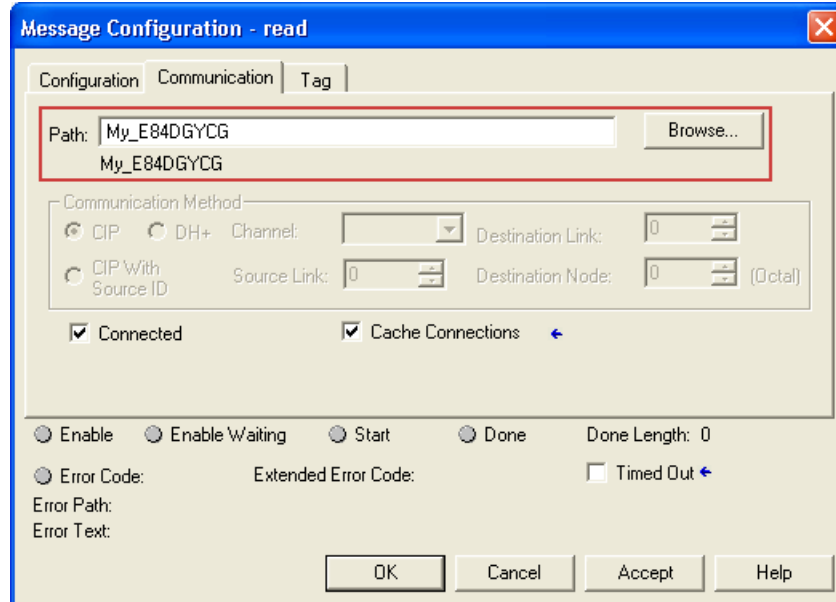
Settings	Value / description
1 Message Type	"CIP Generic"
2 Service Type	"Get Attribute Single" (service code "0x0E")
3 Class	"0x6E" (access to Lenze code)
4 Instance	"11" = Lenze code C00011 of Inverter Drive 8400 protec
5 Attribute	"1" = Subcode of the Lenze code If the corresponding Lenze code does not have a subcode, the value '1' must be entered here.
6 Destination	Variable in the PLC program the drive data will be copied to. When reading code C00011, make sure that the tag used as destination is a single word in UINT16 format.

9 Parameter data transfer (explicit messages)

9.2 Read parameters

For every "explicit message", the path for sending the message via the Ethernet port of the drive to the IP address of the inverter needs to be set under the **Communication** tab.

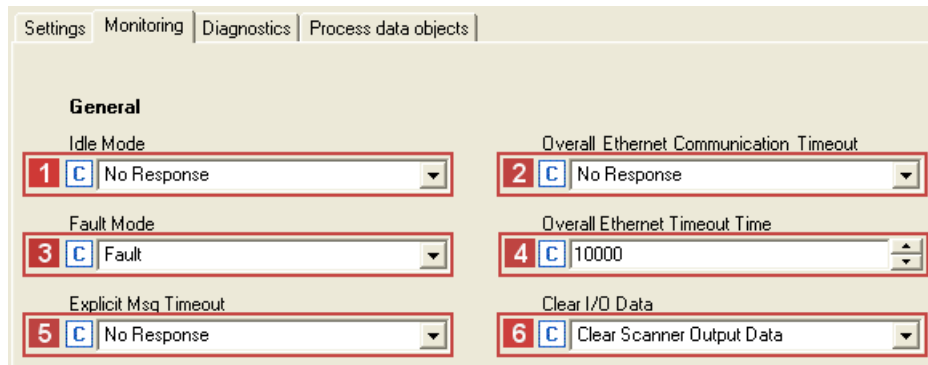
If you need assistance with the setting of this path, please consult the PLC manufacturer.



10 Monitoring

Fault with regard to EtherNet/IP communication

You can set the reactions of the Inverter Drive 8400 protec to a fault in EtherNet/IP communication in »Engineer« by opening the **Monitoring** tab and making the appropriate settings.



Settings	Description
1 Idle Mode	The 32-bit real time header sent by the scanner is evaluated. Run/idle flag (bit 0) = 1: <ul style="list-style-type: none"> The scanner indicates the validity of the I/O data. Run/idle flag (bit 0) = 0: <ul style="list-style-type: none"> The I/O data are invalid and the response parameterised here (C13880/1) is executed on the inverter. The I/O data are processed as set in 6 (C13885).
2 Overall Ethernet Communication Timeout	If there is no reception of explicit or implicit messages after expiry of the time set in 4 (C13881) or if access via »Engineer« no longer takes place after this time, the reaction parameterised here takes place in the inverter (C13880/4). Access to the web server is not monitored.
3 Fault Mode	The adapter (Inverter Drive 8400 protec) monitors the I/O connection to the scanner. If no "implicit message" has been received within the timeout time for implicit messages parameterised by the scanner, the response parameterised here (C13880/2) is executed on the inverter.
4 Overall Ethernet Timeout Time	Here, the overall message timeout time (C13881) is set. If no message has been received within this time, the response parameterised in 2 (C13880/4) is executed. The following messages are monitored: <ul style="list-style-type: none"> Implicit messages Explicit messages »Engineer« access via EtherNet/IP
5 Explicit Msg Timeout	If no "explicit message" has been received within the timeout time for explicit messages parameterised by the scanner, the response parameterised here (C13880/3) is executed on the inverter.
6 Clear I/O Data	(C13885), serves to set the I/O data to be processed by the adapter to maintain internal communication if ... <ul style="list-style-type: none"> the CIP network status (C13862) of the controlling I/O connection is not "Connected" or an idle event has occurred.

11 Diagnostics

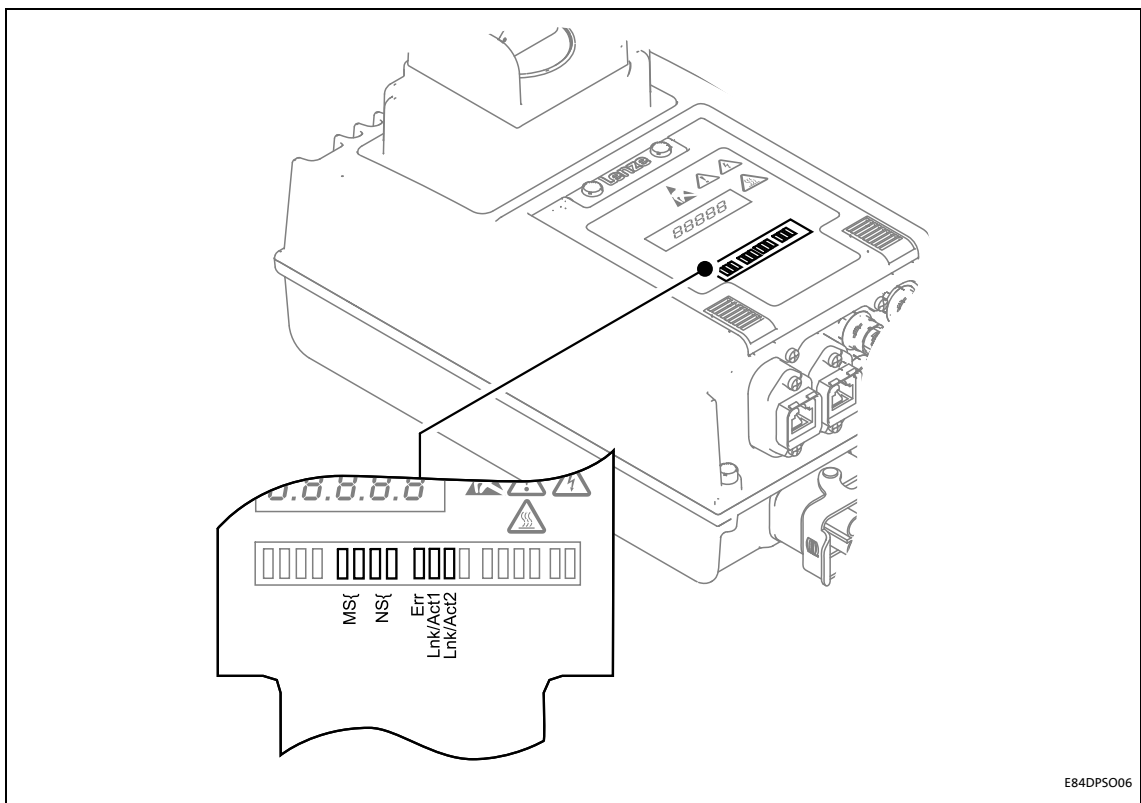
The LEDs on the front of the inverter are provided for the purpose of fault diagnostics. In addition, »Engineer« enables comprehensive diagnosis of the entire EtherNet/IP network.








Safety engineering manual for Inverter Drives 8400 protec








Here you can find detailed information on the LED status displays for devices with an integrated safety system.

11.1 LED status displays



[11-1] LED display on the front of the Inverter Drive 8400 protec

LED	Colour / Status		Description
MS	Green	Red	
	Off	Off	CIP module status: "Nonexistent" The communication module is not supplied with voltage.
	Off	On	 CIP module status: "Major Unrecoverable Fault" The device displays an unrecoverable fault. The status is set if the pending status-determining device error has the reaction 'system fault'.
	Off	Blinking	 CIP module status: "Major Recoverable Fault" The device displays a recoverable fault. The status is set if the pending status-determining device error has the reaction 'error', 'fault', 'quick stop by trouble', 'warning locked' or 'warning'..
	On	Off	 CIP module status: "Operational" The device is working correctly.
	Blinking	Off	 CIP module status: "Standby" The device has not been completely configured yet or the configuration is incorrect (e.g. invalid IP address).
	Blinking	Blinking	 CIP module status: "Device Self Testing" The device is in the state of self testing.

LED	Colour / Status		Description
NS	Green	Red	
	Off	Off	CIP network status: "No IP Address" The device is not supplied with voltage or does not yet have an IP address.
	Off	On	 CIP network status: "Duplicate IP" The device has no access to the fieldbus (IP address conflict).
	Off	Blinking	 CIP network status: "Connection Timeout" A time-out is executed.
	On	Off	 CIP network status: "Connected" The device is working correctly and has established a connection to the scanner.
	Blinking	Off	 CIP network status: "No Connections" The device ... • is working correctly; • has been assigned an IP address; • has not been integrated into the network by the scanner yet.
	Blinking	Blinking	 CIP network status: "Self-Test" The device is in the state of self testing.
Err	Red		
	On		 A communication error has occurred.
Lnk/Act1 Lnk/Act2	Yellow		
	On or flickers		 Data are exchanged via Ethernet.

11.2 Diagnosing with the »Engineer«

In the »Engineer« under the **Diagnostics** tab, you will find EtherNet/IP diagnostics information.

The screenshot shows the 'EtherNet/IP diagnostics' section of the software interface. It is divided into three main columns: 'Address', 'Status', and 'Ethernet port status'. Each column contains several diagnostic fields, each with a red box containing a number and a blue box containing a letter 'C'. The fields are: 1. MAC ID (C13003), 2. Active IP Address (C13010), 3. Active Subnetwork Mask (C13011), 4. Active Gateway Address (C13012), 5. Active Multicast IP Start Address (C13016), 6. Process data... (C13850, C13851, C13852, C13853), 7. CIP Module Status (C13861), 8. CIP Network Status (C13862), 9. Ethernet Port X1.31 P1 Link State (C13863/1), 10. Ethernet Port X1.32 P2 Link State (C13863/2).

Display	Code
1 MAC-ID	C13003
2 Active IP Address	C13010
3 Active Subnetwork Mask	C13011
4 Active Gateway Address	C13012
5 Active Multicast IP Start Address	C13016
6 Process data	C13850 , C13851 , C13852 , C13853
7 CIP Module Status	C13861
8 CIP Network Status	C13862
9 Ethernet Port X31 Link State	C13863/1
10 Ethernet Port X32 Link State	C13863/2

12 Error messages

This chapter supplements the error list in the reference manual and the »Engineer« online help for the Inverter Drive 8400 protec by the EtherNet/IP error messages.



Reference manual / »Engineer« online help for Inverter Drives 8400 protec

Here you will find general information on diagnostics & fault analysis and on error messages.

12.1 Short overview of the EtherNet/IP error messages

The following table lists all EtherNet/IP error messages in the numerical order of the error numbers. Furthermore, the preset error response and - if available - the parameter for setting the error response are specified.



Tip!

If you click on the cross-reference in the first column, you will get a detailed description (causes and remedies) of the corresponding error message.

Error no. [hex]	Subject area no. [dec]	Error no. [dec]	Error text	Error type (Error response)	Adjustable in
0x01bc3100	444	12544	EtherNet/IP: Exist. connect. to 8400 lost	0: No Response	-
0x01bc5531	444	21809	EtherNet/IP: Memory: No Access	1: No Response	-
0x01bc5532	444	21810	EtherNet/IP: Memory: Read Error	1: No Response	-
0x01bc5533	444	21811	EtherNet/IP: Memory: Write Error	1: No Response	-
0x01bc6010	444	24592	EtherNet/IP: Restart by Watchdogreset	1: No Response	-
0x01bc6011	444	24593	EtherNet/IP: Internal Error	1: No Response	-
0x01bc6100	444	24832	EtherNet/IP: Internal Error	1: No Response	-
0x01bc6101	444	24833	EtherNet/IP: Internal Error	1: No Response	-
0x01bc641f	444	25631	EtherNet/IP: Invalid Parameter Set	1: No Response	-
0x01bc6420	444	25632	EtherNet/IP: Error: Lenze Setting Loaded	1: No Response	-
0x01bc6430	444	25648	EtherNet/IP: Invalid Configuration	1: No Response	-
0x01bc6533	444	25907	EtherNet/IP: Invalid IP Parameter	1: No Response	-
0x01bc8111	444	33041	EtherNet/IP: Fault Mode	1: No Response	C13880/2
0x01bc8112	444	33042	EtherNet/IP: Explicit Message Timeout	0: No Response	C13880/3
0x01bc8114	444	33044	EtherNet/IP: Overall Ethernet Timeout	0: No Response	C13880/4
0x01bc8121	444	33057	EtherNet/IP: Ethernet cable pulled out	1: No Response	-
0x01bc8132	444	33074	EtherNet/IP: Idle Mode	0: No Response	C13880/1
0x01bc8273	444	33395	EtherNet/IP: Duplicate IP Address	1: No Response	-

12.2 Possible causes and remedies

This chapter lists all EtherNet/IP error messages in the numerical order of the error numbers. Possible causes and remedies as well as responses to the error messages are described in detail.

EtherNet/IP: Exist. connect. to 8400 lost [0x01bc3100]

Response (Lenze setting printed in bold)	Setting: not possible
<input checked="" type="checkbox"/> None <input type="checkbox"/> System fault <input type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
<ul style="list-style-type: none"> • Network cable (plug) is defective. • Network cable at EtherNet/IP terminal X31 or X32 is disconnected. • Voltage supply is interrupted. 	<ul style="list-style-type: none"> • Check cables and terminals. • Plug in network cable at EtherNet/IP terminal X31 or X32.

EtherNet/IP: Memory: No Access [0x01bc5531]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Access to memory was not possible.	Send the device and a description of the fault to Lenze.

EtherNet/IP: Memory: Read Error [0x01bc5532]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Parameter could not be read.	Send the device and a description of the fault to Lenze.

EtherNet/IP: Memory: Write Error [0x01bc5533]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Parameter could not be written.	Send the device and a description of the fault to Lenze.

EtherNet/IP: Restart by Watchdogreset [0x01bc6010]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Device is defective.	Send the device and a description of the fault to Lenze.

EtherNet/IP: Internal Error [0x01bc6011]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Device is defective.	Send the device and a description of the fault to Lenze.

EtherNet/IP: Internal Error [0x01bc6100]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Device is defective.	Send the device and a description of the fault to Lenze.

EtherNet/IP: Internal Error [0x01bc6101]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Device is defective.	Send the device and a description of the fault to Lenze.

EtherNet/IP: Invalid Parameter Set [0x01bc641f]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
No active parameter set could be loaded.	Download application again (including module).

EtherNet/IP: Error: Lenze Setting Loaded [0x01bc6420]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Access to parameter set in memory module via inverter was not successful.	Download application again (including module).

EtherNet/IP: Invalid Configuration [0x01bc6430]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
Module configuration is faulty.	Check and correct module configuration.

EtherNet/IP: Invalid IP Parameter [0x01bc6533]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
One or more IP parameters are faulty.	Check and correct IP configuration. ▶ Setting the IP configuration of the Inverter Drive 8400 protec (📖 28)

EtherNet/IP: Fault Mode [0x01bc8111]

Response (Lenze setting printed in bold)	Setting: C13880/2
<input checked="" type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
<ul style="list-style-type: none"> • Connection to scanner has been interrupted. • Controlling I/O connection failed by timeout. • Within the timeout time for implicit messages parameterised by the scanner, no "implicit messages" have been received. 	<ul style="list-style-type: none"> • Check cables and terminals. • Plug in the network cable into the Ethernet port. • Check Requested Package Interval (RPI) of I/O connection. • Increase timeout time for implicit messages.

EtherNet/IP: Explicit Message Timeout [0x01bc8112]

Response (Lenze setting printed in bold)	Setting: C13880/3
<input checked="" type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
<ul style="list-style-type: none"> • Connection to scanner has been interrupted. • Failure of an explicit connection • Within the timeout time for explicit messages parameterised by the scanner, no "explicit messages" have been received. 	<ul style="list-style-type: none"> • Check cables and terminals. • Plug in the network cable into the Ethernet port. • Check Requested Package Interval (RPI) of the explicit connection. • Increase timeout time for explicit messages.

EtherNet/IP: Overall Ethernet Timeout [0x01bc8114]

Response (Lenze setting printed in bold)	Setting: C13880/4
<input checked="" type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
<ul style="list-style-type: none"> • Failure of »Engineer« communication via Ethernet • When the time set in C13881 has expired, there is no access via the »Engineer«. 	<ul style="list-style-type: none"> • Check cables and terminals. • Plug in the network cable into the Ethernet port. • Increase the overall Ethernet timeout time in C13881. <p>▶ Fault with regard to EtherNet/IP communication (73)</p>

EtherNet/IP: Ethernet cable pulled out [0x01bc8121]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> system fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
<ul style="list-style-type: none"> • Network cable has been detached from the Ethernet terminal. • Network cable (plug) is defective. 	<ul style="list-style-type: none"> • Plug the network cable into the Ethernet terminal. • Check the network cable (plug) and replace it if necessary.

EtherNet/IP: Idle Mode [0x01bc8132]

Response (Lenze setting printed in bold)	Setting: C13880/1
<input checked="" type="checkbox"/> None <input type="checkbox"/> system fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
<ul style="list-style-type: none"> • Scanner has received an idle event. • The scanner is in the "PROG" mode. • In the "Scanner Command Register", the run/idle flag (bit 0) is 0. 	<p>Set the scanner to the run mode. Run/idle flag (bit 0) = 1</p>

EtherNet/IP: Duplicate IP Address [0x01bc8273]

Response (Lenze setting printed in bold)	Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> system fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information	
Cause	Remedy
An IP address has been allocated twice within the network. The addresses of the network nodes must differ from each other.	Correct the IP address (C13000). ▶ Setting the IP configuration of the Inverter Drive 8400 protec (📖 28)

12.3 CIP™ error messages

Error code [hex]	Error designation	Description
0x000	SUCCESS	No error
0x001	...	Instance error messages (□ 119) of the Connection Manager Object (6 / 0x06) (□ 118)
0x002	RESOURCE_UNAVAILABLE	Resource required to perform the service not available.
0x003	INVALID_PARAM_VALUE	Invalid parameter value
0x008	SERVICE_NOT_SUPP	Service is not supported.
0x009	INVALID_ATTRIB_VALUE	Invalid attribute.
0x00B	ALREADY_IN_STATE	The object is already in the required state.
0x00C	OBJ_STATE_CONFLICT	The object cannot perform the service.
0x00E	ATTR_NOT_SETTABLE	The attribute is write-protected.
0x00F	PRIVILEGE_VIOLATION	Access denied.
0x010	DEVICE_STATE_CONFLICT	The current state of the device prohibits performing the requested service.
0x011	REPLY_DATA_TOO_LARGE	The response data are longer than the response buffer
0x013	NOT_ENOUGH_DATA	The data length is too short.
0x014	ATTRIBUTE_NOT_SUPP	The attribute is not supported.
0x015	TOO_MUCH_DATA	The data length is too long.
0x016	OBJECT_DOES_NOT_EXIST	The object is not supported by the adapter.
0x017	FRAGMENTATION	The fragmentation for the requested service is currently not activated.
0x020	INVALID_PARAMETER	Invalid parameter

12.4 Mapping of Lenze device errors to DRIVECOM errors

Via the instance attribute "FaultCode" of the [Control Supervisor Object \(41 / 0x29\)](#) (□ 133) Lenze device errors are output with the DRIVECOM error numbers.

The following tables show the assignment of the Lenze device errors to the "CAN Emergency Error Codes" and DRIVECOM errors.



Reference manual / »Engineer« online help for Inverter Drives 8400 protec

Here you will find detailed information about the Lenze error messages listed in the following table.

Lenze error		CAN	DRIVECOM error	
Error number [32 bits]	Error message	Emergency Error Code	Error number [hex]	Error message
xx.0111.00002	Su02: One mains phase is missing	0x3000	0x3000	Voltage
xx.0111.00003	Su03: Too frequent mains switching	0x3000	0x3000	Voltage
xx.0111.00004	Su04: CU insufficiently supplied	0x3000	0x3000	Voltage
xx.0111.00005	Su05: IO Supply overload	0x3000	0x3000	Voltage
xx.0119.00000	OH4: Heat sink temp. > Switch-off temp. -5°C	0x4000	0x4000	Temperature
xx.0119.00001	OH1: Heatsink overtemperature	0x4000	0x4000	Temperature
xx.0119.00015	OH3: Motor temperature (X21) triggered	0x4000	0x4000	Temperature
xx.0119.00016	OH5: Brake res. temperature (X20) triggered	0x4000	0x4000	Temperature
xx.0119.00050	OC5: Ixt overload	0x2000	0x2000	Current
xx.0119.00052	OC9: Ixt overload - shutdown limit	0x2000	0x2000	Current
xx.0123.00001	OT1: Maximal torque reached	0x8300	0x8302	Torque limiting
xx.0123.00007	OC7: Motor overcurrent	0x2000	0x2000	Current
xx.0123.00014	OU: DC bus overvoltage	0x3100	0x3110	Mains overvoltage
xx.0123.00015	LU: DC bus undervoltage	0x3100	0x3120	Mains undervoltage
xx.0123.00016	OC1: Power section - short circuit	0x2000	0x2130	Short Circuit
xx.0123.00017	OC2: Power section - earth fault	0x2000	0x2120	Short to Earth
xx.0123.00030	OC10: Maximum current reached	0x2000	0x2000	Current
xx.0123.00031	OC17: Clamp sets pulse inhibit	0xF000	0xF000	Additional functions
xx.0123.00032	OS1: Maximum speed limit reached	0x8400	0x8402	Velocity Limiting
xx.0123.00033	OS2: Max. motor speed	0x8400	0x8400	Speed Controller
xx.0123.00057	ID1: Motor data identification error	0xF000	0xF000	Additional functions
xx.0123.00058	ID3: CINH motor data identification	0xF000	0xF000	Additional functions
xx.0123.00059	ID4: Error resistor identification	0xF000	0xF000	Additional functions
xx.0123.00060	ID7: Motor control does not match motor data	0xF000	0xF000	Additional functions
xx.0123.00065	OC12: I2xt overload - brake resistor	0xF000	0x7110	Brake Chopper
xx.0123.00071	OC11: Current clamp for too long (>1 sec)	0xF000	0xF000	Additional functions
xx.0123.00090	OC13: Maximum current for Fch exceeded	0xF000	0x2000	Current
xx.0123.00093	OT2: Speed controller output is limited	0xF000	0x7310	Speed
xx.0123.00094	FCH1: Switching frequency reduction	0x2000	0xF000	Additional functions
xx.0123.00095	FCH2: Maximum speed for Fchop	0xF000	0xF000	Additional functions
xx.0123.00096	OC14: Limitation direct-axis current controller	0xF000	0xF000	Additional functions
xx.0123.00097	OC15: Limitation cross current controller	0xF000	0xF000	Additional functions
xx.0123.00098	OC16: Limitation torque controller	0xF000	0xF000	Additional functions
xx.0123.00099	FC1: Limitation field controller	0xF000	0xF000	Additional functions
xx.0123.00105	OC6: I2xt overload - motor	0x2000	0x7120	Motor
xx.0123.00145	LP1: Motor phase failure	0x3000	0x3130	Phase Failure
xx.0123.00200	SD10: Speed limit - feedback system 12	0x7300	0x7300	Sensor

Lenze error		CAN	DRIVECOM error	
Error number [32 bits]	Error message	Emergency Error Code	Error number [hex]	Error message
xx.0123.00201	SD11: Speed limit - feedback system 67	0x7300	0x7300	Sensor
xx.0123.00205	SD3: Open circuit - feedback system	0x7300	0x7301	Tacho defective
xx.0125.00001	An01: AIN1_I < 4 mA	0xF000	0xF000	Additional functions
xx.0125.00002	An02: AIN2_I < 4 mA	0xF000	0xF000	Additional functions
xx.0125.00011	Io11: DigOut level	0xF000	0xF000	Additional functions
xx.0127.00002	CE04: MCI communication error	0x7000	0x7500	Communication
xx.0127.00003	Smr1: Module internal watchdog or trap	0x6100	0x6010	Software reset (watchdog)
xx.0127.00004	Smr2: Module Offline - no status or PDOs	0x7000	0x7500	Communication
xx.0127.00005	Smr3: Module timeout - one or more of PDOs timeout	0x7000	0x7500	Communication
xx.0127.00006	Smr4: SDO access failure	0x6100	0x6100	Internal software
xx.0127.00015	CE0F: MCI control word	0xF000	0xF000	Additional functions
xx.0131.00000	CE4: CAN Bus Off	0x8000	0x8000	Monitoring
xx.0131.00006	CA06: CAN CRC error	0x8000	0x8000	Monitoring
xx.0131.00007	CA07: CAN Bus Warn	0x8000	0x8000	Monitoring
xx.0131.00008	CA08: CAN Bus Stopped	0x8000	0x8000	Monitoring
xx.0131.00011	CA0b: CAN Bus Live Time	0x8130	0x8000	Monitoring
xx.0131.00015	CA0F: CAN control word	0xF000	0x8000	Monitoring
xx.0135.00001	CE1: CAN RPDO1	0x8100	0x8100	Communication
xx.0135.00002	CE2: CAN RPDO2	0x8100	0x8100	Communication
xx.0135.00003	CE3: CAN RPDO3	0x8100	0x8100	Communication
xx.0135.00004	CP04: CAN RPDO4	0x8100	0x8100	Communication
xx.0140.00013	MC11: Module missing/incompatible	0x7000	0x7000	Additional Modules
xx.0144.00001	PS01: No memory module	0x6300	0x6300	Date Set
xx.0144.00002	PS02: Par. set invalid	0x6300	0x6300	Date Set
xx.0144.00003	PS03: Par. set device invalid	0x6300	0x6300	Date Set
xx.0144.00004	PS04: Par. set device incompatible	0x6300	0x6300	Date Set
xx.0144.00007	PS07: Par. mem. module invalid	0x6300	0x6300	Date Set
xx.0144.00008	PS08: Par. device invalid	0x6300	0x6300	Date Set
xx.0144.00009	PS09: Par. format invalid	0x6300	0x6300	Date Set
xx.0144.00010	PS10: Memory module link invalid	0x5000	0x5000	Device Hardware
xx.0144.00031	PS31: Ident. error	0x6300	0x6300	Date Set
xx.0145.00001	dF01: Internal error 01	0x6100	0x6100	Internal software
xx.0145.00002	dF02: Internal error 02	0x6100	0x6100	Internal software
xx.0145.00003	dF03: Internal error 03	0x6100	0x6100	Internal software
xx.0145.00004	dF04: Internal error 04	0x6100	0x6100	Internal software
xx.0145.00005	dF05: Internal error 05	0x6100	0x6100	Internal software
xx.0145.00006	dF06: Internal error 06	0x6100	0x6100	Internal software
xx.0145.00007	dF07: Internal error 07	0x6100	0x6100	Internal software
xx.0145.00008	dF08: Internal error 08	0x6100	0x6100	Internal software
xx.0145.00009	dF09: Internal error 09	0x6100	0x6100	Internal software
xx.0145.00010	dF10: Internal error 10	0x6100	0x6100	Internal software
xx.0145.00014	dF14: SW-HW invalid	0x5530	0x6000	Device software
xx.0145.00024	dF18: BU RCOM error	0x6100	0x6100	Internal software
xx.0145.00025	dF25: CU RCOM error	0x6100	0x6100	Internal software
xx.0145.00033	dF21: BU watchdog	0x6100	0x6010	Software reset (watchdog)
xx.0145.00034	dF22: CU Watchdog	0x6100	0x6010	Software reset (watchdog)
xx.0145.00035	dF10: AutoTrip reset	0xF000	0xF000	Additional functions
xx.0145.00050	dF50: Retain error	0x6100	0x6100	Internal software
xx.0145.00051	dF51: CuCcr error	0x6100	0x6100	Internal software

Lenze error		CAN	DRIVECOM error	
Error number [32 bits]	Error message	Emergency Error Code	Error number [hex]	Error message
xx.0145.00052	dF52: BuCcr error	0x6100	0x6100	Internal software
xx.0145.00198	loC: Comm module changed	0x5000	0x5000	Device Hardware
xx.0184.00001	Ck01: Pos. HW limit switch	0x8600	0x8600	Positioning controller
xx.0184.00002	Ck02: Neg. HW limit switch	0x8600	0x8600	Positioning controller
xx.0184.00005	Ck15: Error message sig. brake	0x8600	0x8600	Positioning controller
xx.0184.00007	Ck03: Pos. SW limit position	0x8600	0x8600	Positioning controller
xx.0184.00008	Ck04: Neg. SW limit position	0x8600	0x8600	Positioning controller
xx.0184.00015	Ck14: Target position outside SW limit position	0x8600	0x8600	Positioning controller
xx.0184.00064	Ck16: Time overrun manual operation	0x8600	0x8600	Positioning controller
xx.0184.00153	Ck05: Error following error 1	0x8611	0x8611	Following error
xx.0184.00154	Ck06: Error following error 2	0x8611	0x8611	Following error
xx.0184.00155	Ck07: Traversing range limit exceeded	0x8612	0x8612	Reference limit
xx.0184.00156	Ck08: Reference position unknown	0x8612	0x8612	Reference limit
xx.0184.08005	Ck09: Positioning mode invalid	0x8600	0x8600	Positioning controller
xx.0184.08007	Ck10: Profile data implausible	0x8600	0x8600	Positioning controller
xx.0184.08009	Ck11: Operating mode invalid	0x8600	0x8600	Positioning controller
xx.0184.08014	Ck12: Profile number invalid	0x8600	0x8600	Positioning controller
xx.0184.08015	Ck13: Error FB MCKCtrlInterface	0x8600	0x8600	Positioning controller
xx.0400.00009	dH09: EEPROM power unit	0x5530	0x7600	Data memory
xx.0400.00016	dH10: Fan failure	0x5000	0x5000	Device Hardware
xx.0400.00104	dH68: Adjustment data error CU	0x5530	0x6000	Device software
xx.0400.00105	dH69: Adjustment data error BU	0x5530	0x6000	Device software
xx.0980.00001	US01: User error 1	0x6200	0x6200	User software
xx.0981.00002	US02: User error 2	0x6200	0x6200	User software
xx.0982.00003	US03: User error 3	0x6200	0x6200	User software
xx.0983.00004	US04: User error 4	0x6200	0x6200	User software
xx.0984.00001	US05: User error 5	0x6200	0x6200	User software
xx.0985.00002	US06: User error 6	0x6200	0x6200	User software
xx.0986.00003	US07: User error 7	0x6200	0x6200	User software
xx.0987.00004	US08: User error 8	0x6200	0x6200	User software

EtherNet/IP error messages

Lenze error		DRIVECOM error	
Error number [32 bits]	Error message	Error number [hex]	Error message
xx.0444.12544	EtherNet/IP: Exist. connect. to 8400 lost	0x7510	Serial Interface No 1
xx.0444.21809	EtherNet/IP: Memory: No Access	0x7600	Data memory
xx.0444.21810	EtherNet/IP: Memory: Read Error	0x7600	Data memory
xx.0444.21811	EtherNet/IP: Memory: Write Error	0x7600	Data memory
xx.0444.24592	EtherNet/IP: Restart by Watchdogreset	0x6010	Software reset (watchdog)
xx.0444.24593	EtherNet/IP: Internal Error	0x6100	Internal software
xx.0444.24832	EtherNet/IP: Internal Error	0x6100	Internal software
xx.0444.24833	EtherNet/IP: Internal Error	0x6100	Internal software
xx.0444.25631	EtherNet/IP: Invalid Parameter Set	0x7421	Invalid Parameters
xx.0444.25632	EtherNet/IP: Error: Lenze Setting Loaded	0x7421	Invalid Parameters
xx.0444.25648	EtherNet/IP: Invalid Configuration	0x7421	Invalid Parameters
xx.0444.25907	EtherNet/IP: Invalid IP Parameter	0x7421	Invalid Parameters
xx.0444.33041	EtherNet/IP: Fault Mode	0x7000	Additional Modules
xx.0444.33042	EtherNet/IP: Explicit Message Timeout	0x7500	Communication
xx.0444.33044	EtherNet/IP: Overall Ethernet Timeout	0x7500	Communication
xx.0444.33057	EtherNet/IP: Ethernet cable pulled out	0x9000	External malfunction
xx.0444.33074	EtherNet/IP: Idle Mode	0x7000	Additional Modules
xx.0444.33395	EtherNet/IP: Duplicate IP Address	0x7421	Invalid Parameters

13 Parameter reference

13.1 Parameters relevant for communication

13 Parameter reference

This chapter supplements the parameter list and the table of attributes in the reference manual and the »Engineer« online help for the Inverter Drives 8400 protec by the EtherNet/IP parameters.



Reference manual / »Engineer« online help for Inverter Drives 8400 protec
Here you will find general information on parameters.

13.1 Parameters relevant for communication

This chapter lists the EtherNet/IP parameters in numerically ascending order.

C13000

Parameter Name: C13000 IP Address		Data type: UNSIGNED 8 Index: 11575 _d = 2D37 _h
Setting of the IP address ▶ Setting the IP configuration of the Inverter Drive 8400 protec (□ 28)		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C13000/1	192	IP address (most significant byte)
C13000/2	168	IP address
C13000/3	124	IP address
C13000/4	16	IP address (least significant byte)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13001

Parameter Name: C13001 Subnetwork Mask		Data type: UNSIGNED 8 Index: 11574 _d = 2D36 _h
Setting of the subnet mask ▶ Setting the IP configuration of the Inverter Drive 8400 protec (□ 28)		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C13001/1	255	Subnet mask (most significant byte)
C13001/2	255	Subnet mask
C13001/3	255	Subnet mask
C13001/4	0	Subnet mask (least significant byte)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameters relevant for communication

C13002

Parameter Name: C13002 Gateway Address		Data type: UNSIGNED_8 Index: 11573 _d = 2D35 _h
Setting of the gateway address ▶ Setting the IP configuration of the Inverter Drive 8400 protec (□ 28)		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C13002/1	0	Gateway address (most significant byte)
C13002/2	0	Gateway address
C13002/3	0	Gateway address
C13002/4	0	Gateway address (least significant byte)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13003

Parameter Name: C13003 MAC ID		Data type: OCTET_STRING Index: 11572 _d = 2D34 _h
Display of the MAC-ID		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13005

Parameter Name: C13005 IP Config Control		Data type: UNSIGNED_8 Index: 11570 _d = 2D32 _h
Selection how the IP configuration is to be effected. (Instance attribute 3 (Configuration Control) in the TCP/IP Interface Object (245 / 0xF5) (□ 124)) ▶ Setting the IP configuration of the Inverter Drive 8400 protec (□ 28)		
Selection list (Lenze setting printed in bold)		Info
0	Use stored IP	The IP configuration currently stored in the Inverter Drive 8400 protec is used.
1	Use BOOTP	The IP configuration is assigned by the scanner using BOOTP.
2	Use DHCP	The IP configuration is assigned by the scanner using DHCP. The assignment of a gateway address which is not in the same subnetwork than the IP address, is rejected.
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13006

Parameter Name: C13006 Multicast IP Start Address		Data type: UNSIGNED_8 Index: 11569 _d = 2D31 _h
Setting of the multicast IP address ▶ Setting the IP configuration of the Inverter Drive 8400 protec (📖 28)		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C13006/1	239	Multicast IP start address (most significant byte)
C13006/2	64	Multicast IP start address
C13006/3	2	Multicast IP start address
C13006/4	224	Multicast start address (least significant byte)
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13010

Parameter Name: C13010 Active IP Address		Data type: UNSIGNED_8 Index: 11565 _d = 2D2D _h
Display of the active IP address (Instance attribute 5 (IP Address) in the TCP/IP Interface Object (245 / 0xF5) (📖 124))		
Display range (min. value unit max. value)		
0		255
Subcodes		Info
C13010/1		Active IP address (most significant byte)
C13010/2		Active IP Address
C13010/3		Active IP Address
C13010/4		Active IP address (least significant byte)
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13011

Parameter Name: C13011 Active Subnetwork Mask		Data type: UNSIGNED_8 Index: 11564 _d = 2D2C _h
Display of the active subnetwork mask (Instance attribute 5 (IP Network Mask) in the TCP/IP Interface Object (245 / 0xF5) (📖 124))		
Display range (min. value unit max. value)		
0		255
Subcodes		Info
C13011/1		Active subnet mask (most significant byte)
C13011/2		Active Subnetwork Mask
C13011/3		Active Subnetwork Mask
C13011/4		Active subnet mask (least significant byte)
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameters relevant for communication

C13012

Parameter Name: C13012 Active Gateway Address		Data type: UNSIGNED_8 Index: 11563 _d = 2D2B _h
Display of the active gateway address (Instance attribute 5 (Gateway Address) in the TCP/IP Interface Object (245 / 0xF5) (□ 124))		
Display range (min. value unit max. value)		
0		255
Subcodes	Info	
C13012/1	Active gateway address (most significant byte)	
C13012/2	Active gateway address	
C13012/3	Active gateway address	
C13012/4	Active gateway address (least significant byte)	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13016

Parameter Name: C13016 Active Multicast IP Address		Data type: UNSIGNED_8 Index: 11559 _d = 2D27 _h
Display of the active multicast IP address		
Display range (min. value unit max. value)		
0		255
Subcodes	Info	
C13016/1	Multicast IP address (most significant byte)	
C13016/2	Multicast IP address	
C13016/3	Multicast IP address	
C13016/4	Multicast IP address (least significant byte)	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13017

Parameter Name: C13017 Ethernet Config Control		Data type: UNSIGNED_16 Index: 11558 _d = 2D26 _h
Setting of the baud rate for the Ethernet connections Connection via RJ45 socket: Dependent on the configuration of the Ethernet port of the device to be connected, we recommend to use a cross-over cable. ▶ EtherNet/IP connection via the RJ45 socket (□ 19)		
Selection list		
0	Auto-Negotiation	
1	10 Mbps	
2	100 Mbps	
3	Reserved	
4	Reserved	
5	10 Mbps/Half Duplex	
6	10 Mbps/Full Duplex	
7	100 Mbps/Half Duplex	
8	100 Mbps/Full Duplex	
9	Reserved	
10	Reserved	
11	Reserved	
12	Reserved	
Subcodes	Lenze setting	Info
C13017/1	0: Auto-Negotiation	Ethernet setting port X31
C13017/2	0: Auto-Negotiation	Ethernet setting port X32
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13018

Parameter Name: C13018 Multicast Config Alloc Control		Data type: UNSIGNED_8 Index: 11557 _d = 2D25 _h
Selection for multicast IP addressing via instance attribute 9 (Mcast Config) in the TCP/IP Interface Object (245 / 0xF5) (□ 124)		
Selection list (Lenze setting printed in bold)		
0	Default Allocation Algorithm	
1	Multicast IP Start Address	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13019

Parameter Name: C13019 Multicast Config TTL Value		Data type: UNSIGNED_8 Index: 11556 _d = 2D24 _h
Setting of the multicast TTL value for the validity time of data packets in the EtherNet/IP network (Instance attribute 8 (TTL Value) in the TCP/IP Interface Object (245 / 0xF5) (□ 124))		
Setting range (min. value unit max. value)	Lenze setting	
1	255	1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameters relevant for communication

C13020

Parameter Name: C13020 Multicast Config Num Mcast		Data type: UNSIGNED_8 Index: 11555 _d = 2D23 _h
Used to set how many multicast IP addresses will be assigned. (Instance attribute 9 (Num Mcast) in the TCP/IP Interface Object (245 / 0xF5) (124))		
Setting range (min. value unit max. value)		Lenze setting
1		8 1
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13021

Parameter Name: C13021 Quality of Service (VLAN-Tagging)		Data type: UNSIGNED_8 Index: 11554 _d = 2D22 _h
Used to set whether QoS tags will be used for the prioritisation of the data packets to be transferred. (Instance attribute 1 (802.1Q Tag Enable) in the TCP/IP Interface Object (245 / 0xF5) (124))		
Selection list (Lenze setting printed in bold)		
0	802.1Q Tag Disable	
1	802.1Q Tag Enable	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13022

Parameter Name: C13022 Quality of Service (DSCP)		Data type: UNSIGNED_8 Index: 11553 _d = 2D21 _h
Setting for the prioritisation of the data packets to be transferred using Differentiated Services Codepoints (DSCP)		
Setting range (min. value unit max. value)		
0		63
Subcodes	Lenze setting	Info
C13022/1	59	Reserved
C13022/2	47	Reserved
C13022/3	55	Reserved
C13022/4	47	QoS DSCP Scheduled (Instance attribute 5 (DSCP Scheduled) in the Quality of Service (QoS) Object (72 / 0x48) (122))
C13022/5	43	QoS DSCP High Prio (Instance attribute 6 (DSCP High Prio) in the Quality of Service (QoS) Object (72 / 0x48) (122))
C13022/6	31	Reserved
C13022/7	27	QoS DSCP Explicit Msg (Instance attribute 8 (DSCP Explicit Msg.) in the Quality of Service (QoS) Object (72 / 0x48) (122))
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameters relevant for communication

C13840

Parameter Name: C13840 DLR Network Topology		Data type: UNSIGNED_8 Index: 10735 _d = 29EF _h
Display of the used DLR network topology (Device Level Ring) (Instance attribute 1 (Network Topology) in the Device Level Ring (DLR) Object (71 / 0x47) (120))		
Selection list (read only)		
0	Linear	
1	Ring	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13841

Parameter Name: C13841 DLR Network Status		Data type: UNSIGNED_8 Index: 10734 _d = 29EE _h
Display of the DLR network status (Device Level Ring) (Instance attribute 2 (Network Status) in the Device Level Ring (DLR) Object (71 / 0x47) (120))		
Selection list (read only)		
0	Normal	
1	Ring Fault	
2	Unexpected Loop detected	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13842

Parameter Name: C13842 Supervisor IP Address		Data type: UNSIGNED_8 Index: 10733 _d = 29ED _h
Display of the supervisor IP address (Instance attribute 10 (Supervisor IP Address) in the Device Level Ring (DLR) Object (71 / 0x47) (120))		
Display range (min. value unit max. value)		
0		255
Subcodes		Info
C13842/1		Supervisor IP address (most significant byte)
C13842/2		Supervisor IP Address
C13842/3		Supervisor IP Address
C13842/4		Supervisor IP address (least significant byte)
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13843

Parameter Name: C13843 Supervisor MAC ID		Data type: OCTET_STRING Index: 10732 _d = 29EC _h
Display of the supervisor MAC ID (Instance attribute 10 (Supervisor MAC Address) in the Device Level Ring (DLR) Object (71 / 0x47) (120))		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameter reference

13.1

Parameters relevant for communication

C13844

Parameter Name: C13844 Beacon Times		Data type: UNSIGNED_32 Index: 10731 _d = 29EB _h
Display of the beacon times (µs)		
Subcodes	Info	
C13844/1	Beacon interval	
C13844/2	Beacon timeout	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13845

Parameter Name: C13845 Beacon Frames		Data type: UNSIGNED_32 Index: 10730 _d = 29EA _h
Display of beacon frame information		
Subcodes	Info	
C13845/1	Beacon frames - port X31	
C13845/2	Beacon frame error - port X31	
C13845/3	Beacon frames - port X32	
C13845/4	Beacon frame error - port X32	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13846

Parameter Name: C13846 Address Conflict Detection		Data type: UNSIGNED_8 Index: 10729 _d = 29E9 _h
Activation of the address conflict detection (ACD) (Instance attribute 10 (SelectAcD) in the TCP/IP Interface Object (245 / 0xF5) (□ 124)) Changing this value requires a reset of the device ("power off/on" or "type 0 reset").		
Selection list (Lenze setting printed in bold)		
0	Deactivated	
1	Enable	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13847

Parameter Name: C13847 Active Conflict Detection State		Data type: UNSIGNED_8 Index: 10728 _d = 29E8 _h
Display of the status of address conflict detection (ACD)		
Selection list (read only)		
0	Not conflicted	
1	Conflicted	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameters relevant for communication

C13848

Parameter Name: C13848 Last Conflicted MAC ID	Data type: OCTET_STRING Index: 10727 _d = 29E7 _h
<p>Display of the MAC address of the EtherNet/IP node with the last address conflict (ACD). The data of the last conflict will only be saved in this code if ACD is active at the moment when the conflict occurs (C13846 = 1). (Instance attribute 11 (RemoteMAC) in the TCP/IP Interface Object (245 / 0xF5) (□ 124))</p>	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13849

Parameter Name: C13849 Last Conflicted IP Address	Data type: UNSIGNED_8 Index: 10726 _d = 29E6 _h
<p>Display of the MAC address of the EtherNet/IP node with the last address conflict (ACD). The data of the last conflict will only be saved in this code if ACD is active at the moment when the conflict occurs (C13846 = 1).</p>	
Display range (min. value unit max. value)	
0	255
Subcodes	Info
C13849/1	Last conflicted IP address (most significant byte)
C13849/2	Last conflicted IP address
C13849/3	Last conflicted IP address
C13849/4	Last conflicted IP address (least significant byte)
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13850

Parameter Name: C13850 All words to scanner	Data type: INTEGER_16 Index: 10725 _d = 29E5 _h
<p>Indication of the I/O data words that are transferred from the Inverter Drive 8400 protec (adapter) to the scanner. In the subcodes, all I/O data words transferred to the scanner are displayed. However, only the configured I/O data words are valid.</p>	
Display range (min. value unit max. value)	
-32768	32767
Subcodes	Info
C13850/1	
...	
C13850/16	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

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Parameters relevant for communication

C13851

Parameter Name: C13851 All words from scanner		Data type: INTEGER_16 Index: 10724 _d = 29E4 _h
Indication of the I/O data words that are transferred from the scanner to the Inverter Drive 8400 protec (adapter). In the subcodes, all I/O data words transferred from the scanner are displayed. However, only the configured I/O data words are valid.		
Display range (min. value unit max. value)		
-32768		32767
Subcodes		Info
C13851/1		
...		
C13851/16		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13852

Parameter Name: C13852 All words to the basic device		Data type: INTEGER_16 Index: 10723 _d = 29E3 _h
Indication of the I/O data words that are transferred from the scanner to the Inverter Drive 8400 protec (adapter). In the subcodes, all I/O data words transferred from the scanner are displayed. However, only the configured I/O data words are valid.		
Display range (min. value unit max. value)		
-32768		32767
Subcodes		Info
C13852/1		
...		
C13852/16		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13853

Parameter Name: C13853 All words to the basic device		Data type: INTEGER_16 Index: 10722 _d = 29E2 _h
Indication of the I/O data words that are transferred from the Inverter Drive 8400 protec (adapter) to the scanner. In the subcodes, all I/O data words transferred to the scanner are displayed. However, only the configured I/O data words are valid.		
Display range (min. value unit max. value)		
-32768		32767
Subcodes		Info
C13853/1		
...		
C13853/16		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13858

Parameter Name: C13858 Ethernet Port Statistics		Data type: UNSIGNED_32 Index: 10717 _d = 29DD _h
Display of statistical values for the data transfer via the Ethernet connections		
Subcodes	Info	
C13858/1	Ethernet port X31: RX	
C13858/2	Ethernet port X31: RX CRC error	
C13858/3	Ethernet port X31: RX discarded	
C13858/4	Ethernet port X31: TX	
C13858/5	Ethernet port X31: TX discarded	
C13858/6	Ethernet port X32: RX	
C13858/7	Ethernet port X32: RX CRC error	
C13858/8	Ethernet port X32: RX discarded	
C13858/9	Ethernet port X32: TX	
C13858/10	Ethernet port X32: TX discarded	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13861

Parameter Name: C13861 CIP Module Status		Data type: UNSIGNED_16 Index: 10714 _d = 29DA _h
Display of the current CIP module status (Instance attribute 8 (State) in the Identity Object (1 / 0x01) (108))		
<ul style="list-style-type: none"> The status is also signalled by means of the NS LED. 		
LED status displays (74)		
Selection list (read only)		
0	Nonexistent	
1	Device Self Testing	
2	Standby	
3	Operational	
4	Major Recoverable Fault	
5	Major Unrecoverable Fault	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13862

Parameter Name: C13862 CIP Network Status		Data type: UNSIGNED_16 Index: 10713 _d = 29D9 _h
Display of the current CIP network status		
<ul style="list-style-type: none"> The status is also signalled by means of the NS LED. 		
LED status displays (74)		
Selection list (read only)		
0	No IP Address	
1	Nonexistent	
2	Established	
3	Timed Out	
4	Duplicate IP	
5	Self-Test	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameters relevant for communication

C13863

Parameter Name: C13863 Ethernet Port		Data type: UNSIGNED_16 Index: 10712 _d = 29D8 _h
Display of the baud rate currently used on the Ethernet connections		
Selection list (read only)		
0	Nonexistent	
1	10 Mbps/Half Duplex	
2	10 Mbps/Full Duplex	
3	100 Mbps/Half Duplex	
4	100 Mbps/Full Duplex	
5	Reserved	
6	Reserved	
Subcodes		Info
C13863/1		Ethernet port X31 link state
C13863/2		Ethernet port X32 link state
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13870

Parameter Name: C13870 CIP Connections State		Data type: UNSIGNED_16 Index: 10705 _d = 29D1 _h
Display of the current CIP connection status		
Selection list (read only)		
0	Nonexistent	
3	Established	
4	Timed Out	
Subcodes		Info
C13870/1		Status of CIP connection 1
...		...
C13870/8		Status of CIP connection 8
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13871

Parameter Name: C13871 CIP Connections Type		Data type: UNSIGNED_16 Index: 10704 _d = 29D0 _h
Display of the current CIP connection types • "Listen Only" connections are not displayed.		
Selection list (read only)		
0	Nonexistent	
1	Exclusive Owner	
2	Input Only	
3	Listen Only	
4	Explicit Connection	
Subcodes		Info
C13871/1		Type of CIP connection 1
...		...
C13871/8		Type of CIP connection 8
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13872

Parameter Name: C13872 CIP Connection Triggers		Data type: UNSIGNED_16 Index: 10703 _d = 29CF _h
Display of the current CIP connection class		
Selection list (read only)		
0	Nonexistent	
1	Class 1, Cyclic, Client	
163	Class 3, App. Obj., Server	
Subcodes		Info
C13872/1		Trigger of CIP connection 1
...		...
C13872/8		Trigger of CIP connection 8
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13873

Parameter Name: C13873 CIP Connections RPI		Data type: UNSIGNED_32 Index: 10702 _d = 29CE _h
Indication of the current RPI times (Requested Package Interval) of the CIP connections		
Display range (min. value unit max. value)		
0	ms	4294967295
Subcodes		Info
C13873/1		RPI of CIP connection 1
...		...
C13873/8		RPI of CIP connection 8
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameters relevant for communication

C13874

Parameter Name: C13874 CIP Connections Timeout Time		Data type: UNSIGNED_32 Index: 10701 _d = 29CD _h
Display of the timeouts (ms) of the CIP connections		
Display range (min. value unit max. value)		
0	ms	4294967295
Subcodes		Info
C13874/1		Timeout time of CIP connection 1
...		...
C13874/8		Timeout time of CIP connection 8
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13875

Parameter Name: C13875 CIP Connections RUN/IDLE Flag		Data type: UNSIGNED_16 Index: 10700 _d = 29CC _h
Display of the run and idle flags of the CIP connections		
Selection list (read only)		
0	Nonexistent	
1	IDLE	
2	RUN	
Subcodes		Info
C13875/1		RUN/IDLE flag - CIP connection 1
...		...
C13875/8		RUN/IDLE flag - CIP connection 8
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13880

Parameter Name: C13880 Monitoring Reaction		Data type: UNSIGNED_8 Index: 10695 _d = 29C7 _h
Setting of the monitoring response in the event of a Fault with regard to EtherNet/IP communication (📖 73) (Mapping of the Lenze object Lenze Class (101 / 0x65) (📖 138)) A change in the monitoring response becomes immediately effective.		
Selection list		
0	No response	
1	Fault	
3	Quick stop by trouble	
4	Warning Locked	
6	Information	
Subcodes	Lenze setting	Info
C13880/1	0: No Response	Idle Mode
C13880/2	3: Quick stop by trouble	Fault Mode (only for "exclusive owner" connections)
C13880/3	0: No Response	Expl. message timeout
C13880/4	0: No Response	Overall Ethernet communication timeout
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13881

Parameter Name: C13881 Overall Ethernet Timeout Time		Data type: UNSIGNED_16 Index: 10694 _d = 29C6 _h
Setting of the overall monitoring time (see Fault with regard to EtherNet/IP communication (□ 73)) A change in the monitoring response becomes immediately effective.		
Setting range (min. value unit max. value)		Lenze setting
500	ms	65535 10000 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13885

Parameter Name: C13885 Clear I/O Data		Data type: UNSIGNED_8 Index: 10690 _d = 29C2 _h
Setting which I/O data are to be processed by the adapter to maintain internal communication if ... <ul style="list-style-type: none"> the network status of the controlling I/O connection is "Not connected" (see C13862) or an idle event has occurred. Changes in the setting becomes effective immediately. (See Fault with regard to EtherNet/IP communication (□ 73) .)		
Selection list (Lenze setting printed in bold)		
0	Use of last Scanner Output Data	
1	Clear Scanner Output Data	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13899

Parameter Name: C13899 Hostname		Data type: VISIBLE_STRING Index: 10676 _d = 29B4 _h
Each subcode contains a string with a length of 32 bytes indicating the designation of the EtherNet/IP node. (Instance attribute 6 (Host Name) in the TCP/IP Interface Object (245 / 0xF5) (□ 124))		
Subcodes	Lenze setting	Info
C13899/1		Host name
C13899/2		Host name
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13900

Parameter Name: C13900 Firmware Product Type		Data type: VISIBLE_STRING Index: 10675 _d = 29B3 _h
The code contains a string with a length of 8 bytes. The identification code "E84DG YCG" is output.		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13901

Parameter Name: C13901 Firmware Compilation Date		Data type: VISIBLE_STRING Index: 10674 _d = 29B2 _h
The code contains a string with a length of 20 bytes. The software creation date ("MMM DD YYYY") and time ("hh:mm:ss") are displayed (e.g. "Mar 21 2005 12:31:21").		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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C13902

Parameter Name: C13902 Firmware Version	Data type: VISIBLE_STRING Index: 1067 _d = 29B1 _h
The code contains a string with a length of 11 bytes. The firmware version is displayed (e.g. "01.00.01.00").	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

13 Parameter reference

13.2 Table of attributes

13.2 Table of attributes

The table of attributes contains information required for communication with the inverter via parameters.

How to read the table of attributes:

Column		Meaning	Entry	
Code		Parameter name	Cxxxxx	
Name		Parameter short text (display text)	Text	
Index	dec	Index under which the parameter is addressed. The subindex for array variables corresponds to the Lenze subcode number.	24575 - Lenze code number	Is only required for access via a bus system.
	hex		5FFF _h - Lenze code number	
Data	DS	Data structure	E	Single variable (only one parameter element)
			A	Array variable (several parameter elements)
	DA	Number of array elements (subcodes)	Number	
	DT	Data type	BITFIELD_8	1 byte, bit-coded
			BITFIELD_16	2 bytes, bit-coded
			BITFIELD_32	4 bytes, bit-coded
			INTEGER_8	1 byte, with sign
			INTEGER_16	2 bytes with sign
			INTEGER_32	4 bytes, with sign
			UNSIGNED_8	1 byte without sign
			UNSIGNED_16	2 bytes without sign
			VISIBLE_STRING	ASCII string
			OCTET_STRING	
Factor	Factor for data transmission via a bus system, depending on the number of decimal positions	Factor	1 = No decimal positions 10 = 1 decimal position 100 = 2 decimal positions 1000 = 3 decimal positions	
Access	R	Read access	<input checked="" type="checkbox"/> Reading permitted	
	W	Write access	<input checked="" type="checkbox"/> Writing permitted	
	CINH	Controller inhibit (CINH) required	<input checked="" type="checkbox"/> Writing is only possible when the controller is inhibited	

Table of attributes

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C13000	IP address	11575	2D37	A	4	UNSIGNED_8		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13001	Subnet mask	11574	2D36	A	4	UNSIGNED_8		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13002	Gateway address	11573	2D35	A	4	UNSIGNED_8		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13003	MAC-ID	11572	2D34	E	1	OCTET_STRING		<input checked="" type="checkbox"/>		
C13005	IP Config Control	11570	2D32	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13006	Multicast IP Start Address	11569	2D31	A	4	UNSIGNED_8		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13010	Active IP Address	11565	2D2D	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13011	Active Subnetwork Mask	11564	2D2C	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13012	Active gateway address	11563	2D2B	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13016	Active Multicast IP Address	11559	2D27	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13017	Ethernet Config Control	11558	2D26	A	2	UNSIGNED_16	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13018	Multicast Config Alloc Control	11557	2D25	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13019	Multicast Config TTL Value	11556	2D24	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13020	Multicast Config Num Mcast	11555	2D23	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13021	Quality of Service (VLAN-Tagging)	11554	2D22	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13022	Quality of Service (DSCP)	11553	2D21	A	7	UNSIGNED_8		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13840	DLR Network Topology	10735	29EF	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13841	DLR Network Status	10734	29EE	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13842	Supervisor IP Address	10733	29ED	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13843	Supervisor MAC ID	10732	29EC	E	1	OCTET_STRING		<input checked="" type="checkbox"/>		
C13844	Beacon Times	10731	29EB	A	2	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C13845	Beacon Frames	10730	29EA	A	4	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C13846	Address Conflict Detection	10729	29E9	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13847	Active Conflict Detection State	10728	29E8	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13848	Last Conflicted MAC ID	10727	29E7	E	1	OCTET_STRING		<input checked="" type="checkbox"/>		
C13849	Last Conflicted IP Address	10726	29E6	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13850	All words to scanner	10725	29E5	A	16	INTEGER_16	1	<input checked="" type="checkbox"/>		
C13851	All words from scanner	10724	29E4	A	16	INTEGER_16	1	<input checked="" type="checkbox"/>		
C13852	All words to the basic device	10723	29E3	A	16	INTEGER_16	1	<input checked="" type="checkbox"/>		
C13853	All words to the basic device	10722	29E2	A	16	INTEGER_16	1	<input checked="" type="checkbox"/>		
C13858	Ethernet Port Statistics	10717	29DD	A	10	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C13861	CIP Module Status	10714	29DA	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13862	CIP Network Status	10713	29D9	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13863	Ethernet Port	10712	29D8	A	2	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13870	CIP Connections State	10705	29D1	A	8	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13871	CIP Connections Type	10704	29D0	A	8	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13872	CIP Connection Triggers	10703	29CF	A	8	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13873	CIP Connections RPI	10702	29CE	A	8	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C13874	CIP Connections Timeout Time	10701	29CD	A	8	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C13875	CIP Connections RUN/IDLE Flag	10700	29CC	A	8	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13880	Monitoring Reaction	10695	29C7	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13881	Overall Ethernet Timeout Time	10694	29C6	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13885	Clear I/O Data	10690	29C2	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13899	Hostname	10676	29B4	A	2	VISIBLE_STRING		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13900	Firmware Product Type	10675	29B3	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C13901	Firmware Compilation Date	10674	29B2	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C13902	Firmware Version	10673	29B1	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		

14 Implemented CIP™ objects

An EtherNet/IP node can be seen as an accumulation of objects. An individual object is characterised by its class, its instances and attributes. Several services such as read and write services can be applied to these objects.



Note!

This chapter only describes the CIP objects implemented by Lenze and the properties supported by them (attributes, service codes etc.).

Not all object properties described in the "Common Industrial Protocol Specification" of the ODVA are supported.



"Common Industrial Protocol Specification" of the ODVA

Here you will find detailed information about the CIP objects.

Overview of the implemented CIP objects

CIP objects	Description
General objects	
Identity Object (1 / 0x01) (📖 108)	Identification and general information about the device
Message Router Object (2 / 0x02) (📖 110)	Addressing of a service for the transfer of data to any object class or instance
Assembly Object (4 / 0x04) (📖 111)	Input/output data of the scanner
Connection Manager Object (6 / 0x06) (📖 118)	Management of the internal resources for the transfer of data (implicit/explicit messaging)
EtherNet/IP objects	
Device Level Ring (DLR) Object (71 / 0x47) (📖 120)	Status information for the DLR protocol
Quality of Service (QoS) Object (72 / 0x48) (📖 122)	Classification and prioritisation of the data packets for EtherNet/IP communication
TCP/IP Interface Object (245 / 0xF5) (📖 124)	Configuration of the TCP/IP network interface of the device
Ethernet Link Object (246 / 0xF6) (📖 128)	General information and status information about the Ethernet interfaces of the device
AC drive profile objects	
Motor Data Object (40 / 0x28) (📖 132)	Data basis for motor parameters
Control Supervisor Object (41 / 0x29) (📖 133)	Management functions of the motor control devices.
AC Drive Object (42 / 0x2A) (📖 135)	Device-specific functions of the inverter, e.g. speed ramps, torque control etc.
Lenze objects	
Lenze Class (101 / 0x65) (📖 138)	Lenze error responses to EtherNet/IP errors
Lenze Class (103 / 0x67) (📖 140)	Image of the scanner input data
Lenze Class (104 / 0x68) (📖 141)	Image of the scanner output data
Lenze Class (110 / 0x6E) (📖 142)	Access to Lenze codes

General class attributes

Attribute ID	Service	Name	Data type	Description
1	Get	Revision	UINT	Revision no. of the object
2	Get	Max. Instance	UINT	Max. number of instances of the object
3	Get	Number of Instances	UINT	Number of instances of the object
4	Get	Optional Attribute List:	STRUCT of:	List of the optional instance attributes:
		Number Attributes	UINT	Number of optional attributes
		Optional Attributes	ARRAY of UINT	Listing of the optional attributes
5	Get	Optional Service List:	STRUCT of:	List of the optional services:
		Number Services	UINT	Number of optional services
		Optional Services	ARRAY of UINT	Listing of the optional services
6	Get	Max. ID Number Class Attributes	UINT	The attribute ID of the last class attribute of the class description implemented in the device
7	Get	Max. ID Number Instance Attributes	UINT	The attribute ID of the last instance attribute of the class description implemented in the device

14 Implemented CIP™ objects

14.1 General CIP objects

14.1 General CIP objects

14.1.1 Identity Object (1 / 0x01)

The "Identity Object" provides the identification and general information about the device.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	1 (0x0001)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)
6	Get	Max. ID Number Class Attributes	UINT	7 (0x0007)
7	Get	Max. ID Number Instance Attributes	UINT	8 (0x0008)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Vendor ID	UINT	587 (0x024B)
2	Get	Device Type	UINT	2 (0x0002): AC Drive
3	Get	Product Code	UINT	8410 (0x20DA)
4	Get	Revision:	STRUCT of:	Firmware revision of the device
		Major Revision	USINT	
		Minor Revision	USINT	
5	Get	Status	WORD	Current device status (status bits) <ul style="list-style-type: none">• Instance attribute "Status" (attribute 5) (📖 109)• EtherNet/IP state diagram (📖 41)
6	Get	Serial Number	UDINT	Serial number of the device
7	Get	Product Name	SHORT_STRING	E84DGYCG
8	Get	State	USINT	Current device state: <ul style="list-style-type: none">• 0: Nonexistent• 1: Device self-testing• 2: Standby• 3: Operational• 4: Major recoverable fault• 5: Major unrecoverable fault• 6 ... 254: Reserved• 255: Standard for "Get_Attributes_All" service (See also C13861 , LED status displays (📖 74))

Instance attribute "Status" (attribute 5)

Bits	Name	Description
0	Owned	The state '1' indicates that the device (or an object within the device) has an owner. Within a master/slave model, the state '1' indicates that the "predefined master/slave connection set" is assigned to a master. Outside the master/slave model, it means "TBD".
1	-	Reserved (0)
2	Configured	The state '1' indicates that the activities the device application carries out differ from the "out of box" standard configuration. This should not comprise the configuration of communication.
3	-	Reserved (0)
4 ... 7	Extended Device Status	<ul style="list-style-type: none"> • 0000: Status is "self-testing" or unknown • 0001: Firmware update is being carried out • 0010: At least one faulty I/O connection • 0011: No I/O connections available • 0100: Non-volatile configuration is faulty • 0101: "Major fault" (bit 10 or 11 is '1') • 0110: At least one I/O connection is in the "run mode" • 0111: At least one I/O connection is available, all are in the "idle mode" • 1000: Reserved • 1001: Reserved • 1010 ... 1111: Reserved / manufacturer-specific
8	Minor Recoverable Fault	The state '1' indicates that a "Minor Recoverable Fault" has occurred.
9	Minor Unrecoverable Fault	The state '1' indicates that a "Minor Unrecoverable Fault" has occurred.
10	Major Recoverable Fault	The state '1' indicates that a "Major Recoverable Fault" has occurred.
11	Major Unrecoverable Fault	The state '1' indicates that a "Major Unrecoverable Fault" has occurred.
12 ... 15	Extended Device Status 2	Reserved (0) / manufacturer-specific

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x05	Reset	These reset service types are supported: <ul style="list-style-type: none"> • 0: Mains switching (power off/on) is simulated. • 1: The parameters of the device are reset to the Lenze setting and mains switching (power off/on) is simulated.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.

14.1.2 Message Router Object (2 / 0x02)

With the "Message Router Object", a client can address a service for the transfer of data to any object class or instance.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	1 (0x0001)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)
4	Get	Optional Attribute List:	STRUCT of:	
		Number Attributes	UINT	2 (0x0002)
		Optional Attributes	ARRAY of UINT	1, 2 (0x0001.0002)
5	Get	Optional Service List:	STRUCT of:	
		Number Services	UINT	1 (0x0001)
		Optional Services	ARRAY of UINT	10 (0x000A)
6	Get	Max. ID Number Class Attributes	UINT	7 (0x0007)
7	Get	Max. ID Number Instance Attributes	UINT	6 (0x0006)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Object list:	STRUCT of:	Object list:
		Number	UINT	Number of supported object class codes
		Classes	ARRAY of UINT	Listing of the supported object class codes
2	Get	Number Available	UINT	Max. number of supported connections

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.

14.1.3 Assembly Object (4 / 0x04)

For data exchange, the communication module supports the following assembly object instances:

Application	Instance ID		Assembly object instance
	[dec]	[hex]	
Lenze technology applications / User-definable parameter sets	110	0x6E	Custom Output
	111	0x6F	Custom Input
"AC Drive Profile" application	20	0x14	Basic Speed Control Output
	21	0x15	Extended Speed Control Output
	22	0x16	Speed and Torque Control Output
	23	0x17	Extended Speed and Torque Control Output
	70	0x46	Basic Speed Control Input
	71	0x47	Extended Speed Control Input
	72	0x48	Speed and Torque Control Input
	73	0x49	Extended Speed and Torque Control Input

The contents of the input and output data depends on the I/O data arrangement in the inverter ([I/O data mapping](#) (43)).

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	2 (0x0002)
2	Get	Max. Instance	UINT	130 (0x0082)
3	Get	Number of Instances	UINT	11 (0x000B)
4	Get	Optional Attribute List:	STRUCT of:	
		Number Attributes	UINT	1 (0x0001)
		Optional Attributes	ARRAY of UINT	4 (0x0004)
6	Get	Max. ID Number Class Attributes	UINT	7 (0x0007)
7	Get	Max. ID Number Instance Attributes	UINT	4 (0x0004)

Instance attributes for output data of the scanner

Attribute ID	Service	Name	Data type	Value
3	Get / Set	Data	ARRAY of SINT / INT / DINT	16 bytes to the scanner: <ul style="list-style-type: none"> • 20 (0x14): Basic Speed Control Output • 21 (0x15): Extended Speed Control Output • 22 (0x16): Speed and Torque Control Output • 23 (0x17): Extended Speed and Torque Control Output • 110 (0x6E): Custom Output ▶ Instance attribute "Data" (attribute 3) (114)
4	Get	Size	UINT	Number of bytes in attribute 3 (Data)

Assembly output objects (scanner to adapter) are assumed to have a 4-byte header (32-bit "run/idle header"). When mapping the assemblies, this header will automatically be added to the data stream by most Allen-Bradley PLC/SLC equipment.

If your PLC does not support this header (like the Rockwell PLCs do), add a preceding 32-bit header to the output image.

You can then define the **bit 0** of this header in the process image of your PLC:

- State '0': idle mode
- State '1': run mode

For the operation with Rockwell PLCs, adaptations are not required.

The [Lenze Class \(104 / 0x68\)](#) (141) provides the image of the output data of the scanner.

Instance attributes for input data of the scanner

Attribute ID	Service	Name	Data type	Value
3	Get / Set	Data	ARRAY of SINT / INT / DINT	16 bytes to the scanner: <ul style="list-style-type: none"> • 70 (0x46): Basic Speed Control Input • 71 (0x47): Extended Speed Control Input • 72 (0x48): Speed and Torque Control Input • 73 (0x49): Extended Speed and Torque Control Input • 111 (0x6F): Custom Input ▶ Instance attribute "Data" (attribute 3) (📄 114)
4	Get	Size	UINT	Number of bytes in attribute 3 (Data)

The assembly input objects (adapter to scanner) are mapped in the adapter memory starting with byte 0.

The input objects are transmitted in a "modeless" manner, i.e. a 4-byte header is not included in the transfer.

So the start address in the assembly memory map is the actual start of the first assembly data element.

Please observe the actual assembly lengths when mapping the input objects to the controller memory.

The [Lenze Class \(103 / 0x67\)](#) [\(📄 140\)](#) provides the image of the input data of the scanner.

Instance attribute "Data" (attribute 3)

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
20 (0x14)	0						Fault Reset		Run Fwd
	1								
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
21 (0x15)	0		Net Ref	NetCtrl			Fault Reset	Run Rev	Run Fwd
	1								
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
22 (0x16)	0						Fault Reset		Run Fwd
	1								
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference (Low Byte)							
	5	Torque Reference (High Byte)							
23 (0x17)	0		Net Ref	NetCtrl			Fault Reset	Run Rev	Run Fwd
	1								
	2	Speed Reference (Low Byte)							
	3	Speed Reference (High Byte)							
	4	Torque Reference (Low Byte)							
	5	Torque Reference (High Byte)							
110 (0x6E)	0	Custom Output							
							
	31	Custom Output							
70 (0x46)	0						Running1 (Fwd)		Faulted
	1								
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							
71 (0x47)	0	At Referenc e	RefFrom Net	CtrlFrom Net	Ready	Running2 (Rev)	Running1 (Fwd)	Warning	Faulted
	1	Drive State							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							
72 (0x48)	0						Running1 (Fwd)		Faulted
	1								
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							
	4	Torque Actual (Low Byte)							
	5	Torque Actual (High Byte)							
73 (0x49)	0	At Referenc e	RefFrom Net	CtrlFrom Net	Ready	Running2 (Rev)	Running1 (Fwd)	Warning	Faulted
	1	Drive State							
	2	Speed Actual (Low Byte)							
	3	Speed Actual (High Byte)							
	4	Torque Actual (Low Byte)							
	5	Torque Actual (High Byte)							
111 (0x6F)	0	Custom Input							
							
	31	Custom Input							

**Note!**

In order to be able to use the torque control for the **assembly object instances 22 (0x16), 23 (0x17), 72 (0x48), 73 (0x49)**, the "DriveMode" attribute has to be written by means of explicit message transfer.

▶ [Write "DriveMode" attribute](#) (□ 137)

Data mapping of the output assemblies

Data component [Bits 0 ... 7]	Class		Instance Number	Attribute	
	Name	Number		Name	Number
RunFwd [Bit 0]	Control Supervisor	0x29	1	Run1	3
RunRev [Bit 1]	Control Supervisor	0x29	1	Run2	4
FaultReset [Bit 2]	Control Supervisor	0x29	1	FaultRst	12
NetCtrl [Bit 5]	Control Supervisor	0x29	1	NetCtrl	5
NetRef [Bit 6]	AC Drive	0x2A	1	NetRef	4
Drive Mode [Bits 0 ... 7]	AC Drive	0x2A	1	DriveMode	6
Speed Reference [Bits 0 ... 7]	AC Drive	0x2A	1	SpeedRef	8
Torque Reference [Bits 0 ... 7]	AC Drive	0x2A	1	TorqueRef	12
Custom Output [Bits 0 ... 7]					

**Note!**

In case of the **assembly object instances 21 (0x15) und 23 (0x17)**, **NetCtrl (Bit 5)** and **NetRef (Bit 6)** must be set in order that the inverter can receive start/stop commands and speed/torque commands via the network.

Data mapping of the input assemblies

Data component [Bits 0 ... 7]	Class		Instance Number	Attribute	
	Name	Number		Name	Number
Faulted [Bit 0]	Control Supervisor	0x29	1	Faulted	10
Warning [Bit 1]	Control Supervisor	0x29	1	Warning	11
Running1 (Fwd) [Bit 2]	Control Supervisor	0x29	1	Running1	7
Running2 (Rev) [Bit 3]	Control Supervisor	0x29	1	Running2	8
Ready [Bit 4]	Control Supervisor	0x29	1	Ready	9
CtrlFromNet [Bit 5]	Control Supervisor	0x29	1	CtrlFromNet	15
RefFromNet [Bit 6]	AC Drive	0x2A	1	RefFromNet	29

Data component [Bits 0 ... 7]	Class		Instance Number	Attribute	
	Name	Number		Name	Number
At Reference [Bit 7]	AC Drive	0x2A	1	AtReference	3
Drive State [Bits 0 ... 7]	Control Supervisor	0x29	1	State	6
Speed Actual [Bits 0 ... 7]	AC Drive	0x2A	1	SpeedActual	7
Torque Actual [Bits 0 ... 7]	AC Drive	0x2A	1	TorqueActual	11
Custom Input [Bits 0 ... 7]					

Supported service codes

Service code [hex]	Name	Description
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.1.4 Connection Manager Object (6 / 0x06)

The "Connection Manager Object" manages the internal resources for the I/O data transfer (implicit messaging) and the parameter data transfer (explicit messaging). The instance specified by the "connection manager" class refers to a "connection instance" or a "connection object".

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	1 (0x0001)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)
4	Get	Optional Attribute List:	STRUCT of:	
		Number Attributes	UINT	8 (0x0008)
		Optional Attributes	ARRAY of UINT	1 ... 8 0x0001.0002.0003.0004.0005.0006.0007. 0008
6	Get	Max. ID Number Class Attributes	UINT	7 (0x0007)
7	Get	Max. ID Number Instance Attributes	UINT	8 (0x0008)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Set ¹⁾	Open Requests	UINT	Number of "Forward Open Service Requests" received
2	Set ¹⁾	Open Format Rejects	UINT	Number of "Forward Open Service Requests" rejected due to faulty format.
3	Set ¹⁾	Open Resource Rejects	UINT	Number of "Forward Open Service Requests" rejected due to a lack of resources.
4	Set ¹⁾	Open Other Rejects	UINT	Number of "Forward Open Service Requests" rejected due to other reasons than faulty format or lack of resources.
5	Set ¹⁾	Close Requests	UINT	Number of "Forward Close Service Requests" received
6	Set ¹⁾	Close Format Requests	UINT	Number of "Forward Close Service Requests" rejected due to faulty format.
7	Set ¹⁾	Close Other Requests	UINT	Number of "Forward Close Service Requests" rejected due to other reasons than faulty format.
8	Set ¹⁾	Connection Timeouts	UINT	Total number of "Connection Timeouts" that have occurred within the connections monitored by this object.

- 1) A device can reject a "Request" of the attribute with the general status code "0x09" (invalid attribute value) if the attribute value sent is unequal to zero.

Instance error messages

Error code [hex]	Extended code [hex]	Error designation	Description
0x000	-	SUCCESS	No error
0x001	0x106	OWNERSHIP_CONFLICT	The connection could not be established because another connection has already occupied the required resources. It is only possible to establish an "exclusive owner" connection to the adapter.
0x001	0x119	NON-LISTEN ONLY CONNECTION NOT OPENED	The connection could not be established because there is no "non-listen only" connection (input only, exclusive owner). The "non-listen only" connection must be of the "multicast" connection type.
0x001	0x127	INVALID_ORIGINATOR_TO_TARGET_SIZE	The resulting length of the ports mapped in the receive object PDO_RX0 does not correspond to the number of data bytes of the assembly object instance 110 (0x6E, Custom Output) defined in the scanner.
0x001	0x128	INVALID_TARGET_TO_ORIGINATOR_SIZE	The resulting length of the ports mapped in the transmit object PDO_TX0 does not correspond to the number of data bytes of the assembly object instance 111 (0x6F, Custom Input) defined in the scanner.
0x001	0x204	UNCONNECTED_REQUEST_TIMED_OUT	The adapter does not respond to the establishment of the connection. <ul style="list-style-type: none"> • There might be no physical connection. • The adapter is switched off. • The adapter has an invalid IP configuration.
0x001	0x320	ACCESS_CONTENTION	Manufacturer-specific error: <ul style="list-style-type: none"> • The configurations of the assembly input and output objects are mixed up. • The connection could not be established because another connection has already occupied the required resources. It is only possible to establish an "exclusive owner" connection to the adapter.
0x001	0x111	ROUTER_EXT_ERR_RPI_NOT_SUPPORTED	The RPI set for a connection is not supported. <ul style="list-style-type: none"> • Min. class 1 RPI = 4 ms • Min. class-3-RPI = 10 ms
0x001	0x112	RROUTER_EXT_ERR_RPI_VALUE_NOT_ACCEPTABLE	The RPI set for a connection is not supported. <ul style="list-style-type: none"> • Min. class 1 RPI = 4 ms • Min. class-3-RPI = 10 ms
0x001	0x123	ROUTER_EXT_ERR_INVALID_TO_CONNECTION_TYPE	The output image connection type is invalid or not supported.
0x001	0x124	ROUTER_EXT_ERR_INVALID_TO_CONNECTION_TYPE	The input image connection type is invalid or not supported.
0x001	0x12A	ROUTER_EXT_ERR_INVALID_CONSUMING_PATH	The path specification for the output data from the scanner is invalid.
0x001	0x12B	ROUTER_EXT_ERR_INVALID_PRODUCING_PATH	The path specification for the input data to the scanner is invalid.

Supported service codes

Service code [hex]	Name	Description
0x54	Forward_Open	Opens a CIP connection from the PLC to the target drive.
0x4E	Forward_Close	Closes a CIP connection from the PLC to the target drive.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.

14.2 EtherNet/IP objects

14.2.1 Device Level Ring (DLR) Object (71 / 0x47)

The "Device Level Ring (DLR) Object" provides status information for the DLR protocol. The DLR protocol is a "layer 2" protocol enabling the use of an Ethernet ring topology.



Note!

Only the "beacon-based ring node" mode is supported.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	2 (0x0002)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)
6	Get	Max. ID Number Class Attributes	UINT	7 (0x0007)
7	Get	Max. ID Number Instance Attributes	UINT	2 (0x0002)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Network Topology	USINT	Current network topology <ul style="list-style-type: none"> • 0: Line topology • 1: Ring topology (Display via C13840)
2	Get	Network Status	USINT	Current network status <ul style="list-style-type: none"> • 0: Normal • 1: Ring Fault (only for ring topology) • 2: Unexpected Loop Detected (only for line topology) (Display via C13841)
10	Get	Active Supervisor Address	STRUCT of:	IP and MAC address of the active ring supervisor
		Supervisor IP Address	UDINT	Ethernet MAC address The value '0' indicates that no IP address has been configured for the device. (Display via C13842)
		Supervisor MAC Address	ARRAY of USINT[6]	Ethernet MAC address (Display via C13843)
12	Get	Capability Flags	DWORD	Telegram processing method for the ring node implementation <ul style="list-style-type: none"> • 2: Beacon-based ring node ▶ Instance attribute "Capability Flags" (attribute 12) (□ 121)

Instance attribute "Capability Flags" (attribute 12)

Bits	Name	Description
0	Announce-based Ring Node	Is not supported (state '0').
1	Beacon-based Ring Node	The state '1' is set if the ring node implementation is based on the processing of "beacon frames". See also: <ul style="list-style-type: none"> • C13844 (Beacon Times) • C13845 (Beacon Frames)
2 ... 31	-	Reserved (0)

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.
0x18	Get_Member	Outputs the members of a certain attribute.

14.2.2 Quality of Service (QoS) Object (72 / 0x48)

The "Quality of Service (QoS) Object" enables different classifications and prioritisations of the data packets for EtherNet/IP communication. For this purpose, the EtherNet/IP messages are marked with "802.1Q tags" and "Differentiated Services Codepoints" (DSCP).

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	1 (0x0001)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)
6	Get	Max. ID Number Class Attributes	UINT	7 (0x0007)
7	Get	Max. ID Number Instance Attributes	UINT	8 (0x0008)

Instance attributes

The instance attributes act independently of each other.

The DSCP values are used for the IP headers.

Irrespective of this, VLAN tagging can be activated in addition ([C13021](#) = 1).

The VLAN ID of Lenze devices is '0'.

The VLAN priority results from the DSCP values configured.

Changes in the attribute values will only take effect after a reset of the device ("power off/on" or "type 0 reset").



Note!

Before activating VLAN tagging, please ensure that all involved components support VLAN tagging. It may occur that the devices not supporting VLAN tagging cannot be accessed anymore.

Attribute ID	Service	Name	Data type	Value
1	Set	802.1Q Tag Enable	USINT	Enables the sending of data packets with 802.1Q tags (C13021) <ul style="list-style-type: none"> • 0: No use of 802.1Q tags (Lenze setting) • 1: Use of 802.1Q tags
4	Set	DSCP Urgent	USINT	55: Urgent/imperative messages Is not supported at the moment.
5	Set	DSCP Scheduled	USINT	47: Scheduled messages (Can only be used for "exclusive owner" connections.) (C13022/4)
6	Set	DSCP High	USINT	43: Messages with high priority (Can only be used for "input only" and "listen only" connections.) (C13022/5)

Attribute ID	Service	Name	Data type	Value
7	Set	DSCP Low	USINT	31: Messages with low priority Is not supported at the moment.
8	Set	DSCP Explicit	USINT	27: "Explicit messages" (parameter data) (C13022/7)

Supported service codes

Service code [hex]	Name	Description
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.2.3 TCP/IP Interface Object (245 / 0xF5)

The "TCP/IP Interface Object" serves to configure the TCP/IP network interface of the device.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	2 (0x0002)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)
4	Get	Optional Attribute List:	STRUCT of:	
		Number Attributes	UINT	4 (0x0004)
		Optional Attributes	ARRAY of UINT	8 ... 11 (0x0008.0009.000A.000B)
6	Get	Max. ID Number Class Attributes	UINT	0x0007
7	Get	Max. ID Number Instance Attributes	UINT	0x000B

Instance attributes



Note!

Write access to attribute 3 (Configuration Control) permanently saves the TCP/IP configuration defined in attribute 5.

If the TCP/IP configuration defined in attribute 5 is to be used as a "static IP" during the start-up, "0 = use static TCP/IP configuration" must be set in attribute 3.

Attribute ID	Service	Name	Data type	Value
1	Get	Status	DWORD	Current status of the TCP/IP network interface ▶ Instance attribute "Status" (attribute 1) (📖 126)
2	Get	Configuration Capability	DWORD	Possible options for TCP/IP configuration ▶ Instance attribute "Configuration Capability" (attribute 2) (📖 126)
3	Get / Set	Configuration Control	DWORD	Selection of how the TCP/IP configuration is to be made (C13005): Possible values for bits 0 ... 3: <ul style="list-style-type: none"> • 0000: Use static TCP/IP config. • 0001: TCP/IP config. via BOOTP • 0010: TCP/IP config. via DHCP Bits 4 ... 31 are reserved (0).
4	Get	Physical Link Object:	STRUCT of:	Path to "Physical Link Object"
		Path Size	UINT	2 (0x0002)
		Path	padded EPATH	<ul style="list-style-type: none"> • 32 (0x0020) • 246 (0x00F6) • 36 (0x0024) • 1 (0x0001)

Attribute ID	Service	Name	Data type	Value
5	Get	Interface Configuration:	STRUCT of:	Current TCP/IP configuration
		IP Address	UDINT	C13010 (active IP address)
		Network Mask	UDINT	C13011 (active subnet mask)
		Gateway Address	UDINT	C13012 (active gateway address)
		Name Server	UDINT	
		Name Server 2	UDINT	
		Domain Name 1	STRING	
6	Get / Set	Host Name	STRING	Host name of the device (C13899 , max. 64 ASCII characters)
8	Get / Set	TTL Value	USINT	TTL value (C13019) for EtherNet/IP multicast data packets (value range: 1 ... 255)
9	Get / Set	Mcast Config:	STRUCT of:	Configuration of the multicast IP addressing
		Alloc Control	USINT	Control word (C13018) for addressing: <ul style="list-style-type: none"> • 0: The multicast IP addresses are generated with the standard assignment algorithm. • 1: The multicast IP addresses are assigned via the values in "Num Mcast" and "Mcast Start Addr" (C13006) • 2: Reserved
		Reserved	USINT	0 (0x0000)
		Num Mcast	UINT	Total number of multicast IP addresses assigned (C13020)
		Mcast Start Addr	UDINT	Active multicast IP start address (C13016)
10	Set	SelectAcd	BOOL	Activation of address conflict detection (ACD, C13846) <ul style="list-style-type: none"> • 0: Disable ACD • 1: Enable ACD Changing this value requires a reset of the device ("power off/on" or "type 0 reset").
11	Get / Set	LastConflictDetected:	STRUCT of:	ACD diagnostics information about the last occurred address conflict
		AcdActivity	USINT	Status of the ACD algorithm when the last address conflict occurred: <ul style="list-style-type: none"> • 0: NoConflictDetected (default) • 1: Probelpv4Address • 2: OngoingDetection • 3: SemiActiveProbe
		RemoteMAC	ARRAY of USINT[6]	MAC address of the device with the last address conflict
		ArpPdu	ARRAY of USINT[28]	Reproduction of the ARP message with information about the address conflict <ul style="list-style-type: none"> ▶ Structure of the ARP message (attribute 11, "ArpPdu") (📄 127)

Instance attribute "Status" (attribute 1)

Bits	Name	Description
0 ... 3	Interface Configuration Status	<ul style="list-style-type: none"> • 0000: No TCP/IP configuration available (attribute 5) • 0001: Valid TCP/IP configuration (attribute 5) via BOOTP, DHCP or static/permanent storage • 0010 ... 1111: Reserved
4	Mcast Pending	This bit indicates a pending change of the multicast configuration in attribute 9 (Mcast Config) and/or the TTL value (C13019). It is set to '1' if either a multicast attribute or the TTL value is set. The pending change will only take effect after a reset of the device ("power off/on" or "type 0 reset"). This bit is then reset to '0'.
5	Interface Configuration Pending	This bit indicates a pending change of the TCP/IP configuration in attribute 5 (Interface Configuration). It is set to '1' if an attribute is set. The pending change will only take effect after a reset of the device ("power off/on" or "type 0 reset").
6	AcdStatus	Display of the status of address conflict detection (ACD, C13847): <ul style="list-style-type: none"> • 0: No address conflict detected • 1: Address conflict detected
7 ... 31	-	Reserved (0)

Instance attribute "Configuration Capability" (attribute 2)

Bits	Name	Description
0	BOOTP Client	The state '1' indicates that BOOTP is used for the TCP/IP configuration of the device.
1	DNS Client	Is not supported (state '0').
2	DHCP Client	The state '1' indicates that DHCP is used for the TCP/IP configuration of the device.
3	DHCP-DNS Update	Is not supported (state '0').
4	Configuration Settable	The state '1' indicates that the TCP/IP configuration can be set in attribute 5 (Interface Configuration).
5	Hardware Configurable	Is not supported (state '0').
6	Interface Configuration Change Requires Reset	The state '1' indicates that changes of the TCP/IP configuration in attribute 5 (Interface Configuration) will only take effect after a reset of the device ("power off/on" or "type 0 reset"). The state '0' is not supported (changes becoming effective immediately).
7	AcdCapable	The state '1' indicates that the device is provided with address conflict detection (ACD).
8 ... 31	-	Reserved (0)

Structure of the ARP message (attribute 11, "ArpPdu")

Field size [Bytes]	Field name	Value
2	Hardware Address Type	1: Ethernet H/W
2	Protocol Address Type	0x0800: IP
1	HADDR LEN	6: Ethernet H/W
1	PADDR LEN	4: IP
2	OPERATION	1: Request 2: Response
6	SENDER HADDR	H/W address of the sender
4	SENDER PADDR	Protocol address of the sender
6	TARGET HADDR	H/W address of the target
4	TARGET PADDR	Protocol address of the target

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.2.4 Ethernet Link Object (246 / 0xF6)

The "Ethernet Link Object" provides general information and status information about the Ethernet interfaces (IEEE 802.3).



Note!

Write accesses to writable attributes become effective immediately.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	3 (0x0003)
2	Get	Max. Instance	UINT	2 (0x0002)
3	Get	Number of Instances	UINT	2 (0x0002)
4	Get	Optional Attribute List:	STRUCT of:	
		Number Attributes	UINT	4 (0x0004)
		Optional Attributes	ARRAY of UINT	7 ... 10 (0x0007.0008.0009.000A)
6	Get	Max. ID Number Class Attributes	UINT	0x0007
7	Get	Max. ID Number Instance Attributes	UINT	0x000A

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Interface Speed	UDINT	Current baud rate <ul style="list-style-type: none"> • 10 Mbps • 100 Mbps
2	Get	Interface Flags	DWORD	Status bits of the Ethernet interface ▶ Instance attribute "Interface Flags" (attribute 2) (129)
3	Get	Physical Address	ARRAY of USINT[6]	MAC address of the Ethernet interface
6	Set	Interface Control	STRUCT of:	
		Control Bits	WORD	Control bits for the Ethernet interface ▶ Instance attribute "Control Bits" (attribute 6, Interface Control) (130)
		Forced Interface Speed	UINT	Baud rate [in Mbps] at which the Ethernet interface is to be operated (C13017). Example values: <ul style="list-style-type: none"> • 10 = 10 Mbps • 100 = 100 Mbps
7	Get	Interface Type	USINT	Interface type (transmission medium) <ul style="list-style-type: none"> • 0: Unknown interface type • 1: Device-internal interface (e.g. embedded switch) • 2: Twisted pair (e.g. 100Base-TX), Lenze setting • 3: Optical fibre (e.g. 100Base-FX) • 4 ... 255: Reserved

Attribute ID	Service	Name	Data type	Value
8	Get	Interface State	USINT	Current operating status of the Ethernet interface <ul style="list-style-type: none"> • 0: Unknown status • 1: Enable (The interface can send and receive data.) • 2: Disable • 3: Testing • 4 ... 255: Reserved
9	Set	Admin State	USINT	Administrative status <ul style="list-style-type: none"> • 0: Reserved • 1: Enable • 2: Disable • 3 ... 255: Reserved
10	Get	Interface Label	SHORT_STRING	Text for the identification/designation of the Ethernet interface

Instance attribute "Interface Flags" (attribute 2)

Bits	Name	Description
0	Link Status	This bit indicates whether the Ethernet interface is connected to an active network. <ul style="list-style-type: none"> • 0: No Ethernet connection available • 1: Ethernet connection available
1	Half/Full Duplex	This bit indicates the current transmission mode of the Ethernet interface. <ul style="list-style-type: none"> • 0: Half duplex • 1: Full duplex Note: If "Link Status" bit = 0, it is not possible to determine the value of the "Half/Full Duplex" bit.
2 ... 4	Negotiation Status	This bit indicates the status of "Link Auto-Negotiation". <ul style="list-style-type: none"> • 000: "Link Auto-Negotiation" is being processed. • 001: "Link Auto-Negotiation" and speed detection have failed. <ul style="list-style-type: none"> • Use the standard baud rate and transmission mode values. • The standard values depend on the product; recommended values are '10 Mbps' and 'Half Duplex'. • 010: "Link Auto-Negotiation" has failed, but a baud rate has been detected. <ul style="list-style-type: none"> • Use the recommended value ('Half Duplex') for the transmission mode . • 011: "Link Auto-Negotiation" and speed detection have been successful. • 100: No "Link Auto-Negotiation" active.
5	Manual Setting Requires Reset	Reset after changes in the link parameters <ul style="list-style-type: none"> • 0: The Ethernet interface can activate changes in the link parameters (auto-negotiation, transmission mode, baud rate) automatically. • 1: If the link parameters (auto-negotiation, transmission mode, baud rate) are changed, the device must be reset ("power off/on" or "type 0 reset").
6	Local Hardware Fault	Hardware fault detection <ul style="list-style-type: none"> • 0: No hardware fault has been detected on the Ethernet interface. • 1: A hardware fault has been detected on the Ethernet interface.
7 ... 31	-	Reserved (0)

Instance attribute "Control Bits" (attribute 6, Interface Control)

Bits	Name	Description
0	Auto-negotiate	Activation of "Link Auto-Negotiation" <ul style="list-style-type: none"> • 0: "Link Auto-Negotiation" is inactive. • The device uses the settings of the bits "Forced Duplex Mode" (bit 1) and "Forced Interface Speed" (see attribute 6, Interface Control). • 1: "Link Auto-Negotiation" is active.
1	Forced Duplex Mode	If "Auto-negotiate" bit = 0, this bit indicates the transmission mode to be used. <ul style="list-style-type: none"> • 0: Half duplex • 1: Full duplex
2 ... 15	-	Reserved (0)

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.3 "AC Drive Profile" objects

The Inverter Drive 8400 protec supports the "AC Drive Profile".

The "AC Drive Profile" contains ...

- the data basis for motor parameters,
- management functions of the motor control devices,
- Device-specific functions of the inverter, e.g. speed ramps, torque control etc.

For using the "AC Drive Profile", the following assembly object instances in the host (scanner) have to be used:

Instance ID		Assembly object instance	
[dec]	[hex]		
20	0x14	Basic Speed Control Output	Outputs: From the scanner to the adapter
21	0x15	Extended Speed Control Output	
22	0x16	Speed and Torque Control Output	
23	0x17	Extended Speed and Torque Control Output	
70	0x46	Basic Speed Control Input	Inputs: From the adapter to the scanner
71	0x47	Extended Speed Control Input	
72	0x48	Speed and Torque Control Input	
73	0x49	Extended Speed and Torque Control Input	

See also [Assembly Object \(4 / 0x04\)](#) (📖 111)



Reference manual / »Engineer« online help for Inverter Drives 8400 protec

Here you can find detailed information on how to use the "AC Drive Profile".

14.3.1 Motor Data Object (40 / 0x28)

The "Motor Data Object" provides a data basis for motor parameters.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	1 (0x0001)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	NumAttr	USINT	Number of supported attributes
2	Get	Attributes	ARRAY of USINT	Listing of the supported attributes
3	Get / Set	MotorType	USINT	AC motor type <ul style="list-style-type: none"> • 6: Wound-rotor induction motor • 7: Squirrel-cage induction motor

Instance attributes for AC motor types

Attribute ID	Service	Name	Data type	Value
6	Get / Set	RatedCurrent	UINT	Rated stator current [100mA]
7	Get / Set	RatedVoltage	UINT	Rated base voltage [V]

For a write access to the attributes "RatedCurrent" and "RatedVoltage", the controller enable (RFR = 0) must be deactivated.

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.3.2 Control Supervisor Object (41 / 0x29)

The "Control Supervisor Object" describes all management functions of the devices used to control the motor.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	1 (0x0001)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	NumAttr	USINT	Number of supported attributes
2	Get	Attributes	ARRAY of USINT	Listing of the supported attributes
3	Set	Run1	BOOL	Run/stop can be controlled via a local setting on the device or terminal, or via the network (see attribute "NetCtrl"). The relationship between Run1, Run2 and the trigger events is described in the Run/stop event (134) section.
4	Set	Run2	BOOL	
5	Set	NetCtrl	BOOL	Run/Stop control <ul style="list-style-type: none"> • 0: Run/stop control via local setting on the device or terminal • 1: Run/stop control via network (e.g. from the scanner)
6	Get	State	USINT	<ul style="list-style-type: none"> • 0: Manufacturer-specific • 1: Startup • 2: Not_Ready • 3: Ready • 4: Enabled • 5: Stopping • 6: Fault_Stop • 7: Faulted
7	Get	Running1	BOOL	<ul style="list-style-type: none"> • 0: Other status than listed under '1' • 1: [Enabled and Run1] or [Stopping and Running1] or [Fault_Stop and Running1]
8	Get	Running2	BOOL	<ul style="list-style-type: none"> • 0: Other status than listed under '1' • 1: [Enabled and Run2] or [Stopping and Running2] or [Fault_Stop and Running2]
9	Get	Ready	BOOL	<ul style="list-style-type: none"> • 0: Other status than listed under '1' • 1: Ready or Enabled or Stopping
10	Get	Faulted	BOOL	<ul style="list-style-type: none"> • 0: No errors • 1: Errors have occurred
11	Get	Warning	BOOL	<ul style="list-style-type: none"> • 0: No warnings • 1: Warnings have occurred
12	Set	FaultRst	BOOL	<ul style="list-style-type: none"> • 0 → 1: Reset error • 0: No Response

Attribute ID	Service	Name	Data type	Value
13	Get	FaultCode	UINT	DRIVECOM error code of the error causing the Faulted status. ▶ Mapping of Lenze device errors to DRIVECOM errors (84)
15	Get	CtrlFromNet	BOOL	Status of run/stop control <ul style="list-style-type: none"> • 0: Run/stop control via local setting on the device or terminal • 1: Run/stop control via network (e.g. from the scanner)

Run/stop event

Relationships between Run1 and Run2:

	Starter					Drive
	Contactora	Starter	Reverser	Speed	Soft start	
Run1	Close	Run	RunFwd	RunLow	RunRamp1	RunFwd
Run2	No Action	No Action	RunRev	RunHigh	RunRamp2	RunRev

Run1 and Run2 trigger:

Run1	Run2	Trigger event	Run type
0	0	Stop	No Action
0 → 1	0	Run	Run1
0	0 → 1	Run	Run2
0 → 1	0 → 1	No Action	No Action
1	1	No Action	No Action
1 → 0	1	Run	Run2
1	1 → 0	Run	Run1

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.3.3 AC Drive Object (42 / 0x2A)

The "AC Drive Object" describes the device-specific functions of the inverter, e.g. speed ramps, torque control etc.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	1 (0x0001)
2	Get	Max. Instance	UINT	1 (0x0001)
3	Get	Number of Instances	UINT	1 (0x0001)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	NumAttr	USINT	Number of supported attributes
2	Get	Attributes	ARRAY of USINT	Listing of the supported attributes
3	Get	AtReference	BOOL	1: The inverter currently runs at reference speed or reference torque (depending on attribute 6, DriveMode).
4	Get / Set	NetRef	BOOL	<ul style="list-style-type: none"> • 0: Reference via local setting on the device or terminal • 1: Reference via network (e.g. from the scanner)
6	Get / Set	DriveMode	USINT	Drive mode: <ul style="list-style-type: none"> • 1: Idle speed (frequency) • 3: Torque control In order to be able to use the torque control for the assembly object instances 22 (0x16) , 23 (0x17) , 72 (0x48) , 73 (0x49) , this attribute has to be written. ▶ Write "DriveMode" attribute (137)
7	Get	SpeedActual	INT	Current speed [rpm/2 ^{SpeedScale}]
8	Get / Set	SpeedRef	INT	Reference speed [rpm/2 ^{SpeedScale}]
11	Get	TorqueActual	INT	Current torque [Nm/2 ^{TorqueScale}]
12	Get / Set	TorqueRef	INT	Reference torque [Nm/2 ^{TorqueScale}]
22	Get / Set	SpeedScale	SINT	Speed scaling factor [Nm/2 ^{SpeedScale}] Value range: -128 ... 127
24	Get / Set	TorqueScale	SINT	Torque scaling factor [Nm/2 ^{TorqueScale}] Value range: -128 ... 127
29	Get / Set	RefFromNet	BOOL	Status of reference speed / reference torque <ul style="list-style-type: none"> • 0: Reference via local setting on the device or terminal • 1: Reference via network (e.g. from the scanner)

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.3.4 Write "DriveMode" attribute

In order to be able to use the torque control for the **assembly object instances 22 (0x16), 23 (0x17), 72 (0x48), 73 (0x49)**, the "DriveMode" attribute has to be written by means of explicit message transfer.

In order to write the "DriveMode" attribute by means of explicit message transmission, the following settings are required:

Settings	Value / description
1 Message Type	"CIP Generic"
2 Service Type	"Set Attribute Single" (service code "0x10")
3 Class	"2A" (AC Drive Object)
4 Instance	"1"
5 Attribute	"6" ("DriveMode" attribute)
6 Source Element	"Drive_Mode" (variable in the PLC program used as data source for writing.)
7 Source Length	"1 byte" (The variable data type is SINT.)

14 Implemented CIP™ objects

14.4 Lenze objects

14.4 Lenze objects

14.4.1 Lenze Class (101 / 0x65)

The "Lenze Class (101 / 0x65)" enables the access to the adjustable error responses to EtherNet/IP errors which can be set in code [C13880](#).



Note

The attributes of this class are described in the EDS file. Using the »RSNetWorx« Rockwell software, the attributes can thus be directly set under "Parameters" in the properties dialog of the EtherNet/IP node.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	2 (0x0002)
2	Get	Max. Instance	UINT	1 (0x0001)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	No. of supported Attributes	USINT	6 (0x0006)
2	Get	Attribute List	USINT	1 (0x0001) ... 6 (0x0006)
3	Get / Set	Reaction on Idle Mode	USINT	Corresponds to the value in C13880/1 : <ul style="list-style-type: none">• 0 = no response• 1 = error• 4 = warning locked
4	Get / Set	Reaction on Fault Mode	USINT	Corresponds to the value in C13880/2 : <ul style="list-style-type: none">• 0 = no response• 1 = error• 4 = warning locked
5	Get / Set	Reaction on Expl. Msg. TO	USINT	Corresponds to the value in C13880/3 : <ul style="list-style-type: none">• 0 = no response• 1 = error• 4 = warning locked
6	Get / Set	Reaction on I/O Timeout	USINT	Corresponds to the value in C13880/4 : <ul style="list-style-type: none">• 0 = no response• 1 = error• 4 = warning locked

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

14.4.2 Lenze Class (103 / 0x67)

The "Lenze Class (103 / 0x67)" provides the image of the scanner input data.

The input data for the scanner are provided at the **MCI_OUT** interface of the communication module and are sent to the scanner by means of the assembly object instance **111 (0xE6)**.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	2 (0x0002)
2	Get	Max. Instance	UINT	1 (0x0001)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	No. of supported Attributes	USINT	3 (0x0003)
2	Get	Attribute List	USINT	1 (0x0001) ... 3 (0x0003)
3	Get	I/O image of produced data	USINT	Image of the scanner input data

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.

14.4.3 Lenze Class (104 / 0x68)

The "Lenze Class (104 / 0x68)" provides the image of the scanner output data.

The output data of the scanner are sent by means of the assembly object instance **110 (0xE5, Custom Output)** and are provided at the **MCI_IN** interface of the communication module.

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	2 (0x0002)
2	Get	Max. Instance	UINT	1 (0x0001)

Instance attributes

Attribute ID	Service	Name	Data type	Value
1	Get	No. of supported Attributes	USINT	3 (0x0003)
2	Get	Attribute List	USINT	1 (0x0001) ... 3 (0x0003)
3	Get	I/O image of consumed data	USINT	Image of the scanner output data

Supported service codes

Service code [hex]	Name	Description
0x01	Get_Attributes_All	Outputs a list of the attributes and the attribute's values for a certain object.
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.

14.4.4 Lenze Class (110 / 0x6E)

The "Lenze Class (110 / 0x6E)" enables read or write access to Lenze codes.

The Lenze code must be specified as an "instance" (corresponding code no. 1 ... 65535) and its subcodes must be specified as "attributes".

**Note!**

- If the corresponding Lenze code does not have a subcode, the value '0' must be entered in the attribute. If '0' is not supported as attribute value by the engineering tool used, the value '1' must be entered.
- A display code cannot be configured using "Set_Attribute_Single".

Class attributes

Attribute ID	Service	Name	Data type	Value
1	Get	Revision	UINT	2 (0x0002)
2	Get	Max. Instance	UINT	1 (0x0001)

Instance attributes

Attribute ID	Service	Name	Data type	Value
0 ... 255	Get / Set	Lenze Subcode number	Data type of the subcode	Value of the subcode

Supported service codes

Service code	Name	Description
0x0E	Get_Attribute_Single	Outputs the value of a certain attribute.
0x10	Set_Attribute_Single	Changes the value of a certain attribute.

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FEEDBACK



Your opinion is important to us

These instructions were created to the best of our knowledge and belief to give you the best possible support for handling our product.

Perhaps we have not succeeded in achieving this objective in every respect. If you have suggestions for improvement, please e-mail us to:

feedback-docu@lenze.com

Thank you very much for your support.

Your Lenze documentation team

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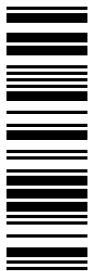
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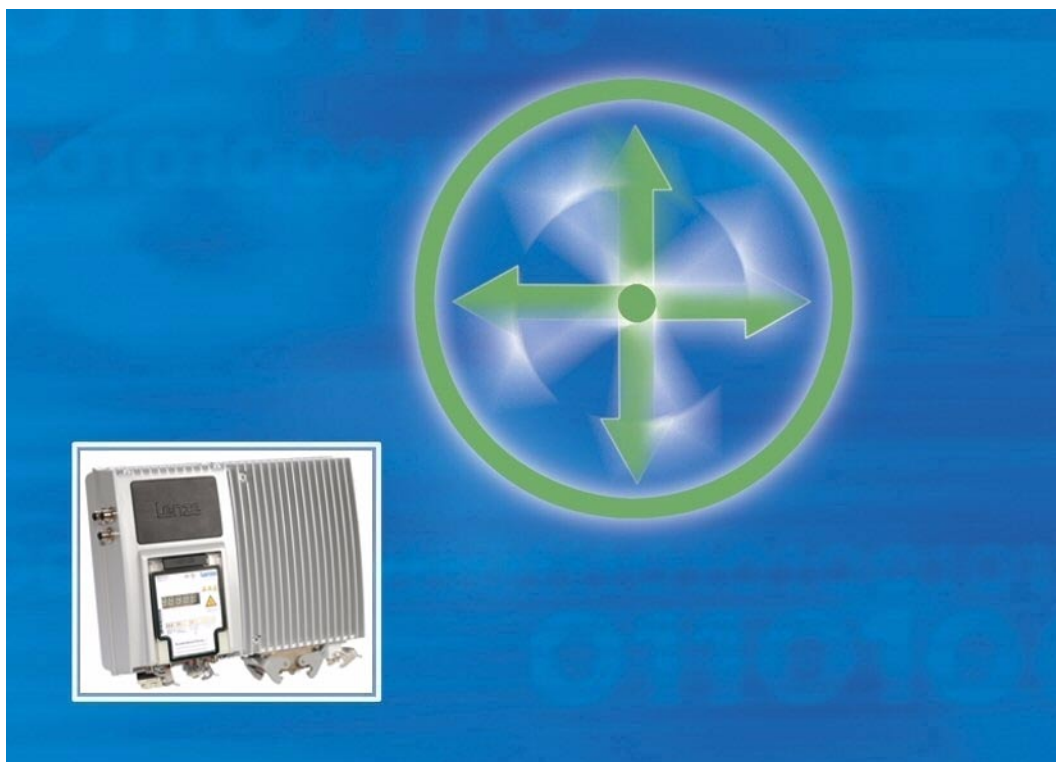
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📠 +49 5154 82-1112
✉ service@lenze.com

L-force *Communication*



Communication manual

8400 protec



E84DxxxxxxxxxP

PROFIBUS

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1 About this documentation

Contents

This documentation exclusively contains descriptions of the PROFIBUS fieldbus system for Inverter Drives 8400 protec.



Note!

This documentation supplements the **mounting instructions** and the **hardware manual "Inverter Drives 8400 protec"** supplied with the controller.

The Mounting Instructions contain safety instructions which must be observed!

The properties and functions of the PROFIBUS for Inverter Drives 8400 protec are described in detail.

Typical applications are explained with the help of examples.

This documentation also contains ...

- ▶ the most important technical data for PROFIBUS communication;
- ▶ Information on the installation and commissioning of the PROFIBUS network;
- ▶ Information on the PROFIBUS data transfer;
- ▶ Notes on troubleshooting and fault elimination.

The theoretical concepts are only explained to the level of detail required to understand the function of the PROFIBUS communication with Inverter Drives 8400 protec.

Depending on the software version of the controller and of the installed »Engineer« software, the screenshots in this documentation may vary from the »Engineer« depiction.

This documentation does not describe the software of other manufacturers. No responsibility is taken for corresponding information given in this documentation. Information on how to use the software can be obtained from the documents of the host system (master).

All brand names used in this documentation are trademarks of their respective owners.



Tip!

Detailed information about the PROFIBUS can be found on the website of the PROFIBUS user organisation:

www.profibus.com

Target group

This documentation is intended for all persons who plan, install, commission and maintain the networking and remote servicing of a machine.



Tip!

Documentation and software updates for Lenze products can be found on the Internet in the "Services & Downloads" area under:

www.Lenze.com

Information on validity

The information given in this documentation is valid for the following devices:

Product series	Type designation	From hardware version	From software version
8400 protec (PROFIBUS Option)	E84DxxxxxxxxxP	VA	01.01

1.1 Document history

Material no.	Version			Description
13335789	1.0	04/2010	TD17	First edition
13348674	2.0	09/2010	TD17	General revision

Your opinion is important to us!

These instructions were created to the best of our knowledge and belief to give you the best possible support for handling our product.

If you have suggestions for improvement, please e-mail us to:



feedback-docu@Lenze.de

Thank you for your support.

Your Lenze documentation team

1.2 Conventions used

This manual uses the following conventions to distinguish between different types of information:

Type of information	Writing	Examples/notes
Numbers		
Decimal	Standard notation	Example: 1234
Hexadecimal	0x[0 ... 9, A ... F]	Example: 0x60F4
Binary • Nibble	In inverted commas Point	Example: '100' Example: '0110.0100'
Decimal separator	Point	The decimal point is always used. Example: 1234.56
Text		
Program name	» «	PC software Example: Lenze »Engineer«
Control element	Bold	The OK button ... / The Copy command ... / The Properties tab ... / The Name input field ...
Hyperlink	<u>Underlined</u>	Optically highlighted reference to another topic. Can be activated with a mouse-click in this documentation.
Symbols		
Page reference	 9	Optically highlighted reference to another page. Can be activated with a mouse-click in this documentation.
Step-by-step instructions		Step-by-step instructions are indicated by a pictograph.

1.3 Terminology used

Term	Meaning
Controller	Lenze frequency inverters of the "Inverter Drives 8400 protec" product range
Standard device	
»Engineer«	Lenze software which supports you throughout the whole machine life cycle - from planning to maintenance.
Code	"Container" for one or more parameters, which can be used to parameterise or monitor the device.
Subcode	If a code contains more than one parameter, these parameters are stored in "subcodes". In this documentation a slash "/" is used as a separator between code and subcode (e.g. "C00118/3").
HW	Hardware
SW	Software

1.4 Notes used

The following signal words and symbols are used in this documentation to indicate dangers and important information:

Safety instructions

Layout of the safety instructions:



Pictograph and signal word!

(characterise the type and severity of danger)

Note

(describes the danger and informs how to prevent dangerous situations)

Pictograph	Signal word	Meaning
	Danger!	Danger of personal injury through dangerous electrical voltage Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Danger!	Danger of personal injury through a general source of danger Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Stop!	Danger of property damage Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph	Signal word	Meaning
	Note!	Important note to ensure trouble-free operation
	Tip!	Useful tip for easy handling
		Reference to other documents

2 General information

Machines which use bus lengths of more than 100 meters are often equipped with INTERBUS or PROFIBUS-DP (PROFIBUS Decentralised Deripherals). The PROFIBUS-DP is always used together with a master control (PLC).

Here, a PROFIBUS master transfers, for instance, the setpoints to the single PROFIBUS nodes (e.g. Lenze controllers).

The process data is transferred to the sensors and actuators at the baud rate typical for the PROFIBUS-DP of 1.5 Mbit/s. Because of the data transfer method and a telegram overhead, the bus cycle time at 1.5 Mbit/s is high enough to control, for instance, conveyors.

If the process data must reach sensors and actuators more quickly, the PROFIBUS can also be operated at a baud rate of max. 12 Mbit/s.

PROFIBUS is defined by the PROFIBUS user organisation.



Tip!

Detailed information on the PROFIBUS can be found on the website of the PROFIBUS user organisation that also develops the PROFIBUS communication technology:

www.profibus.com

Features of the PROFIBUS with Inverter Drives 8400 protec

- ▶ Support of parameter data channels DRIVECOM (DP-V0) and PROFIDrive (DP-V1)
- ▶ Transmission of safe information via the PROFIsafe protocol when using a version with an integrated safety system
- ▶ A maximum of 16 process data words per direction can be exchanged.
- ▶ Bus coupling via remote bus according to the RS485 standard
- ▶ Automatic detection of the baud rate (9.6 kbps to 12 Mbps)
- ▶ Setting of the station address is possible via DIP switch or code.
- ▶ Access to all Lenze parameters



Manual for safety engineering of "Inverter Drives 8400 protec"

Here you will find detailed information on devices with an integrated safety system.

3 Technical data



Mounting instructions "Inverter Drives 8400 protec"

Here you will find information on general technical data, operating conditions and rated data of the device.

3.1 General data and operating conditions of the PROFIBUS

Area	Values
Communication profile	<ul style="list-style-type: none">• PROFIBUS DP-V0 (DRIVECOM)• PROFIBUS DP-V1 (PROFIdrive)
Communication medium	RS485
Interface	9-pole Sub-D socket or M12 socket
Network topology	<ul style="list-style-type: none">• Line (without repeater)• Tree/line (with repeater)
Node	PROFIBUS slave
Number of slaves	<ul style="list-style-type: none">• max. 31 (without repeater)• max. 125 (with repeater)
Max. cable length	1200 m (depending on the selected baud rate and the cable type used)
PNO identification number	0xE84D
Baud rate for cable type A (EN 50170)	9.6 kbps ... 12 Mbps (automatic detection)

3.2 Protocol data

Area	Values
Process data words (PCD)	1 ... 16 words (32 bytes)
PROFIsafe messages	4 words (8 bytes)
Cyclic parameter data channel (DP-V0)	4 words (8 bytes)
Acyclic parameter data channel (DP-V1)	Max. 240 bytes
PROFIBUS user data length	1 ... 16 words process data channel + 4 words parameter data channel (10 ... 40 bytes)

3.3 Communication time

The communication time is the time between the start of a request and the arrival of the corresponding response.

The communication times in a PROFIBUS network depend on ...

- ▶ the processing time in the controller;
- ▶ the transmission delay time (baud rate / telegram length);
- ▶ the nesting depth of the network.

Processing time in the controller

Data	Processing time
Process data	Approx. 2 update cycle ms processing time in the module + 0 ... 1 ms application task runtime of the technology application used + 1 ... x ms (tolerance)
Parameter data	Approx. 30 ms + 20 ms tolerance (typical) <ul style="list-style-type: none"> • Some codes may require a longer processing time (see software manual/ »Engineer« online help for Inverter Drives 8400).

There are no interdependencies between parameter data and process data.

4 Installation



Mounting instructions "Inverter Drives 8400 protec"

Here you will find detailed information on the mechanical and electrical installation of the device.

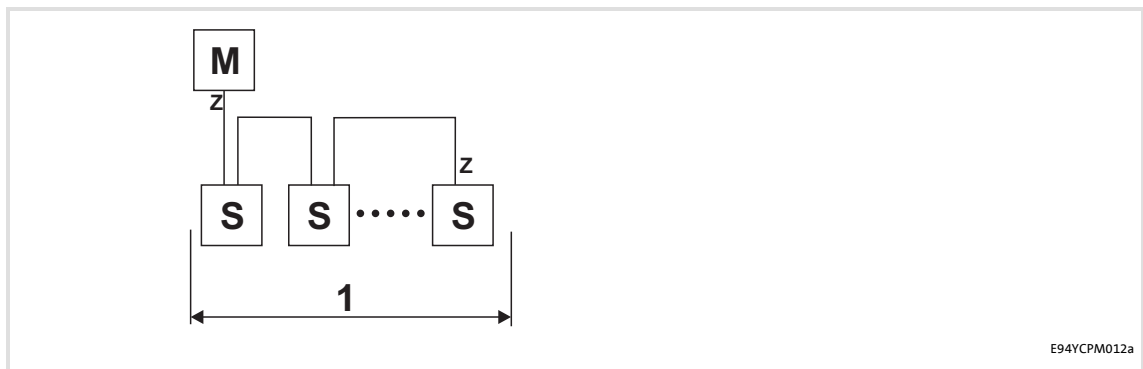
Observe the included safety instructions!

4.1 Network topology

The following examples show two simple RS485 networks.

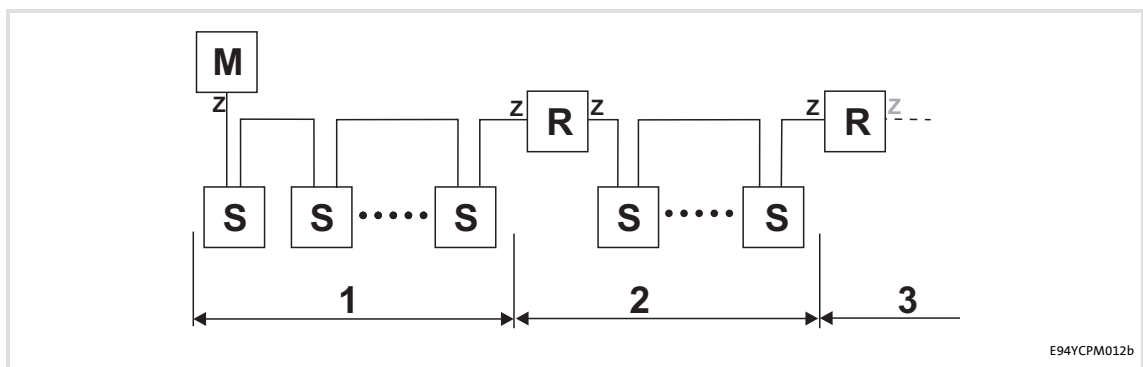
Each segment of the network must be terminated at both ends. The bus terminators of the PROFIBUS are marked with a "Z" in the examples.

With an RS485 network of only one segment, the PROFIBUS master (M) with the integrated bus terminating resistor starts the segment and the bus of the last PROFIBUS node (S) must be terminated with a bus terminating resistor.



[4-1] RS485 network with one segment

An RS485 network consisting of several segments contains repeaters (R) for coupling the segments. The repeaters are provided with integrated bus terminating resistors.

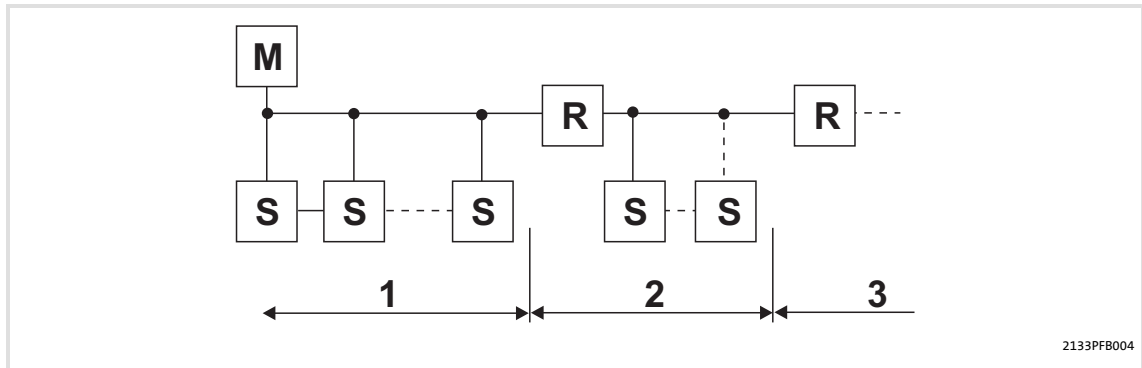


[4-2] RS485 network with repeater

If no repeater is to be used at the end of the segment, the bus must be terminated with a bus terminating resistor. The bus termination is supplied by the node itself.

▶ [Connecting the bus terminating resistor](#) (📖 20)

Number of nodes



[4-3] Number of nodes

Segment	Master (M)	Slave (S)	Repeater (R)
1	1	31	-
	2	30	-
2	-	30	1
3	-	30	1

Tip!

Repeaters do not have a station address. When calculating the maximum number of stations, they reduce the number of stations by 1 on each side of the segment.

Repeaters can be used to build up line and tree topologies. The maximum total bus system expansion depends on ...

- the baud rate used;
- the number of repeaters used.

4.2 Specification of the bus cable

Please follow the specifications of the PROFIBUS user organisation (PNO) for bus cables:

Area	Values
Cable resistance	135 ... 165 Ω /km, (f = 3 ... 20 MHz)
Capacitance per unit length	\leq 30 nF/km
Loop resistance	$<$ 110 Ω /km
Core diameter	$>$ 0.64 mm
Core cross-section	$>$ 0.34 mm ²
Cores	Double twisted, insulated and shielded

Bus cable length

The bus cable length depends on the baud rate used:

Baud rate	Length
9.6 ... 93.75 kbps	1200 m
187.5 kbps	1000 m
500 kbps	400 m
1500 kbps	200 m
3000 ... 12000 kBit/s	100 m



Note!

The baud rate depending of the data volume, cycle time and number of stations should only be selected as high as required for the application.



Tip!

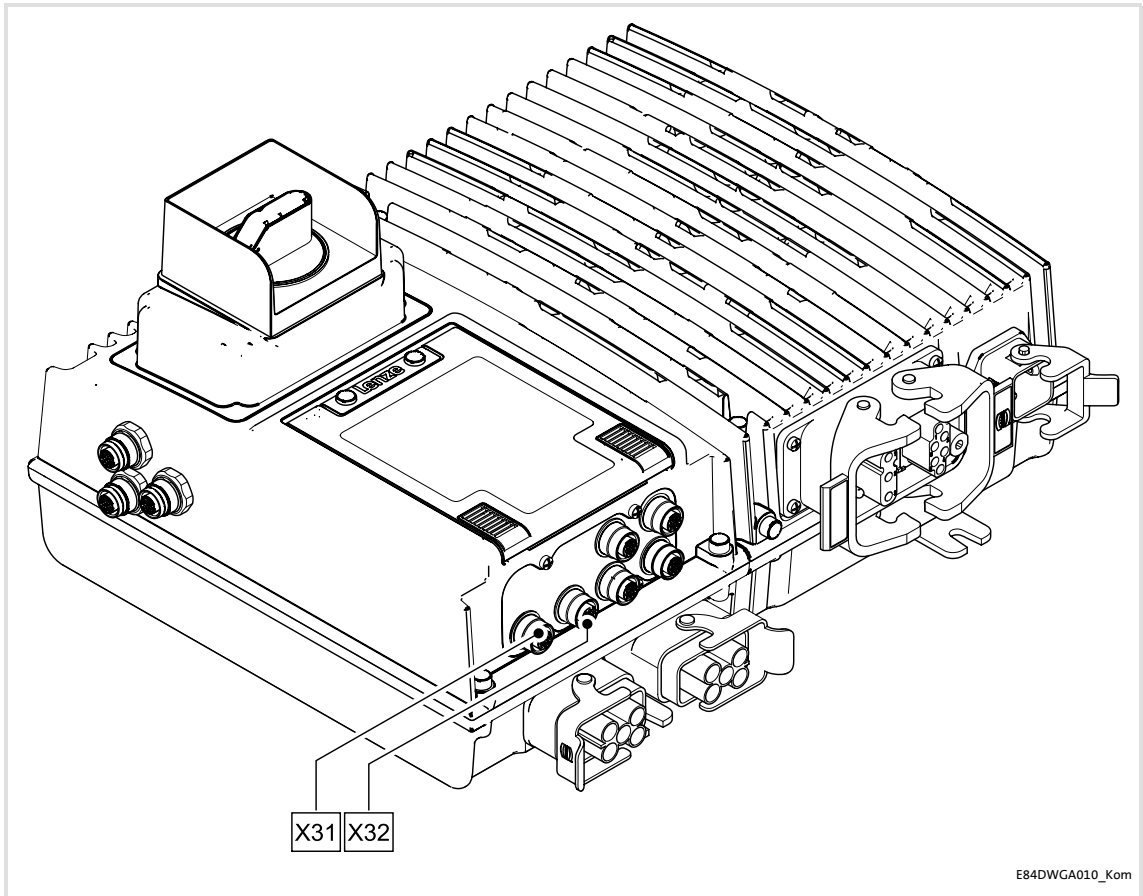
For high baud rates we recommend to consider the application of optical fibres.

Advantages of optical fibres:

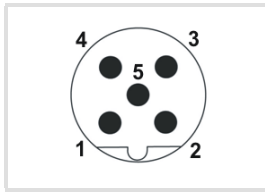
- External electromagnetic interferences on the transmission path remain ineffective.
- Bus lengths of several kilometres are also possible with higher baud rates. The bus length is ...
 - independent of the baud rate;
 - dependent on the optical fibre used.

4.3 PROFIBUS connection

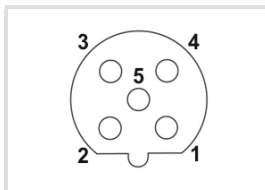
The connection to the PROFIBUS network is made via the terminals **X31** and **X32**.



Pin assignment



PROFIBUS input **X31**: M12 pins, 5-pole, B-coded



PROFIBUS output **X32**: M12 socket, 5-pole, B-coded

PROFIBUS connection

Pin	Signal	Description
1	P5V2	5 V DC / 30 mA (bus termination) • Only assigned at the output.
2	RxD/TxD-N	Data line-A (received/transmitted data, minus)
3	M5V2	Data ground (ground to 5 V)
4	RxD/TxD-P	Data line B (received/transmitted data, plus)
5	-	Not assigned (shield connection via housing)

4.4 Connecting the bus terminating resistor

The PROFIBUS must be terminated through a bus terminating resistor at the first and last physical bus station.

Use a terminating resistor plug at PROFIBUS output **X32** (M12 pins, 4-pole, B-coded).

Terminating resistor plugs can be purchased at various cable manufacturers (e.g. Lapp or Turck).



Note!

- If you want to disconnect individual bus stations, ensure that the bus terminators at the cable ends remain active. Otherwise, the bus may become unstable.
- Please observe that the bus termination is not active any longer if ...
 - the terminating resistor plug was removed;
 - the supply of the Inverter Drives 8400 protec has been switched off.

5 Commissioning

During commissioning, plant-specific data such as motor parameters, operating parameters, responses, and parameters for fieldbus communication are defined for the controller. Lenze devices use codes for this purpose.

The codes of the controller and for communication are saved to the memory module in a non-volatile data set.

In addition, other codes are also available for diagnosing and monitoring the nodes.

▶ [Parameter reference](#) (□ 79)

5.1 Before initial switch-on



Stop!

Before switching on the device for the first time, please check ...

- the entire wiring for completeness, short circuit and earth fault.
- whether the bus system is terminated through a bus terminating resistor at the first and last physical bus station.

▶ [Connecting the bus terminating resistor](#) (□ 20)

5.2 Configuration of the host

First the host system (master) must be configured to enable communication with the controller.

Configuration for host system (master) and DP-V0 parameter data channel

To configure the PROFIBUS, the PROFIBUS device description file of the Inverter Drives 8400 protec must be read into the master.

The device description file is provided on the Lenze Internet pages in the "Services & Downloads" area at:

www.Lenze.com

The following language variants of the device description file can be used:

- ▶ LENZE84D.GSD (source file, English)
- ▶ LENZE84D.GSG (German)
- ▶ LENZE84D.GSE (English)

Defining the user data length

The user data length is defined during the initialisation phase of the master.

The Inverter Drives 8400 protec support the configuration of max. 16 process data words (max. 32 bytes). By optionally activating the cycle parameter data channel, 4 process data words (8 bytes) are additionally assigned. An additional 4 process data words are also assigned if PROFISafe messages are transmitted.

The user data lengths for process input data and process output data are the same.

Description of the device data base file

Selection text	Parameter data (with consistency)	Process data words (with consistency)	Assigned IO memory
Drivecom-PAR (Kons) + PZD (nW Kons)	Yes	n words	4 + n words
PCD (nW cons)	-	n words	n words
Safety (4 W)	-	4 words	4 words

n = 1 ... 16 process data words

Example for selecting the device data base file

DRIVECOM-PAR (cons) + PCD (8W cons)

- ▶ "Drivecom-PAR (Kons)" = parameter data channel (4 words)
- ▶ "PCD (8W cons)" = process data words (8 words)



Tip!

A detailed description of consistency is given in the chapter "[Consistent parameter data](#)" (62).

5.3 Setting the station address

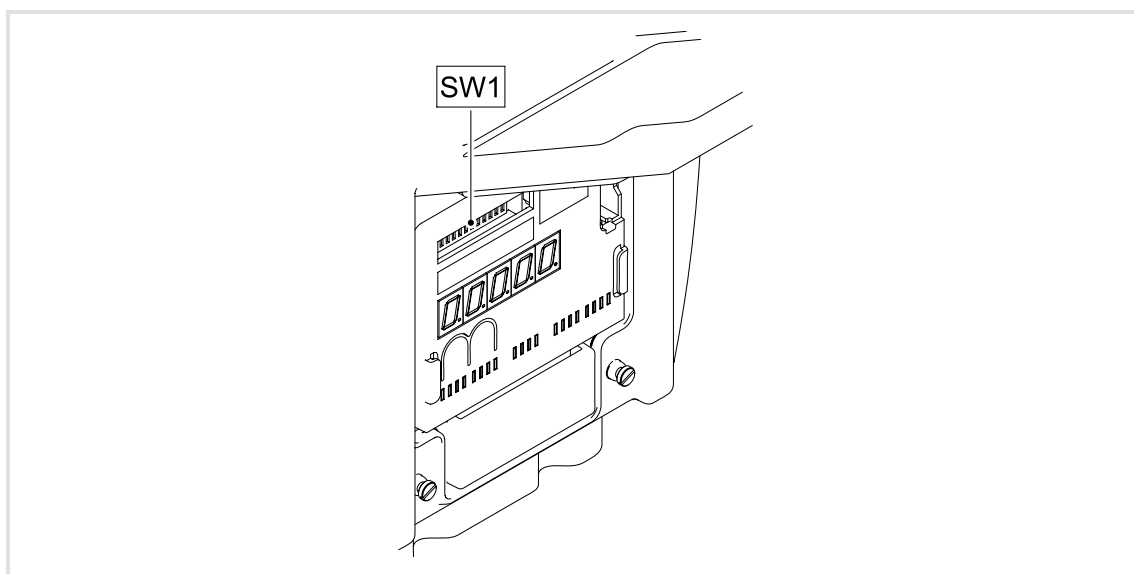
The station addresses must differ from each other in case of several networked PROFIBUS nodes.

The station address can be set via DIP switch **SW1** or via the »Engineer« (code [C13899](#)).

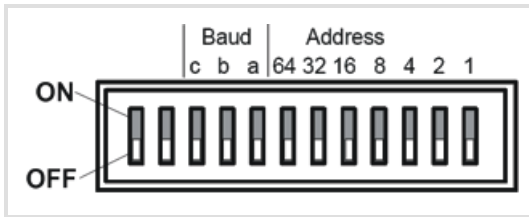
	Defining the station address by ...	
	DIP switch	C13899
Condition	at least one switch 1 ... 64 = ON	Switches 1 ... 64 = OFF (Lenze setting)

5.3.1 Setting the station address via DIP switches

The DIP switch **SW1** for setting the station address is under the service cover.



[5-1] Position of the DIP switch



[5-2] DIP switch

- ▶ The switches "1" ... "64" serve to set the station address.
- ▶ The switches "a" ... "c" and the non-labelled switches have no function.



Note!

The DIP switch settings are only read in when the device is switched on.

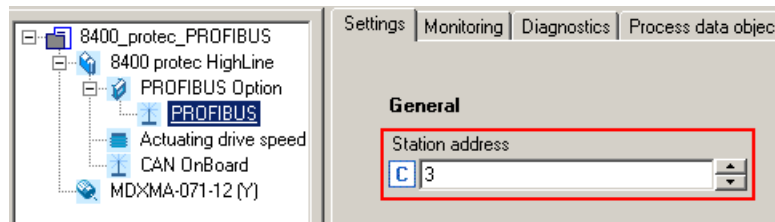
The package labelling indicates the valencies of the individual DIP switches for setting the station address.

DIP switch	64	32	16	8	4	2	1
Switch position	OFF	OFF	ON	OFF	ON	ON	ON
Value	0	0	16	0	4	2	1
Station address	= Sum of the values = 16 + 4 + 2 + 1 = 23						
	▶ DIP switch positions for setting the station address (p. 90)						

- ▶ Valid address range: 1 ... 126 (max. 125 slave nodes)
- ▶ The current address setting of the switches is displayed in [C13920](#).
- ▶ The station address currently active on PROFIBUS is displayed in [C13864](#).

5.3.2 Setting the station address via the »Engineer«

In the »Engineer«, the station address is set under the **Settings** tab.



- ▶ Valid address range: 1 ... 126 (max. 125 slave nodes)
Impermissible addresses are indicated in red in the **Station address** input field.
- ▶ Save the changed settings with the device command **C00002 = 11** (save all parameter sets).

5.4 Initial switch-on



Mounting instructions "Inverter Drives 8400 protec"

Observe the safety instructions and residual hazards stated.



Note!

Protection against uncontrolled restart

After a fault (e.g. short-term mains failure), it is sometimes undesirable or even impermissible for the drive to restart.

In the Lenze setting of the Inverter Drives 8400 protec, the restart protection is activated.

The restart behaviour of the controller can be set via C00142 ("Autostart Option").

- C00142 = 9 (Lenze setting)
 - The controller remains inhibited (even if the fault is not active anymore).
 - Bit 0 (inhibit if device is ON) and bit 3 (inhibit in case of undervoltage) are set.
 - The drive starts in a controlled way thanks to explicit controller enable: LOW-HIGH edge at a correspondingly configured digital input (connections X41, X42, X43).
- C00142 = 8 (enabled)
 - In order to enable the device directly when switching it on, set bit 0 to zero.
 - An uncontrolled restart of the drive is possible.

6 Data transfer

PROFIBUS master and controller communicate through the exchange of data telegrams via PROFIBUS. The user data area of the data telegram contains parameter data or process data. In the controller, different communication channels are assigned to the parameter data and process data.

Communication channels

- ▶ The process data channel serves to transfer process data.
 - The process data serve to control the controller.
 - The host can directly access the process data. In the PLC, for instance, the data are directly saved to the I/O area.
 - Process data are not saved in the controller.
 - Process data are transferred cyclically between the host system and the controllers (permanent exchange of current input / output data).
 - Process data are, for instance, setpoints, actual values, control words and status words.
 - The Inverter Drives 8400 can exchange a maximum of 16 process data word (16 bits/word) per direction.



Note!

Observe the direction of the information flow!

- Process input data (Rx data):
 - Process data from the controller (slave) to the master
- Process output data (Tx data):
 - Process data from the master to the controller (slave)

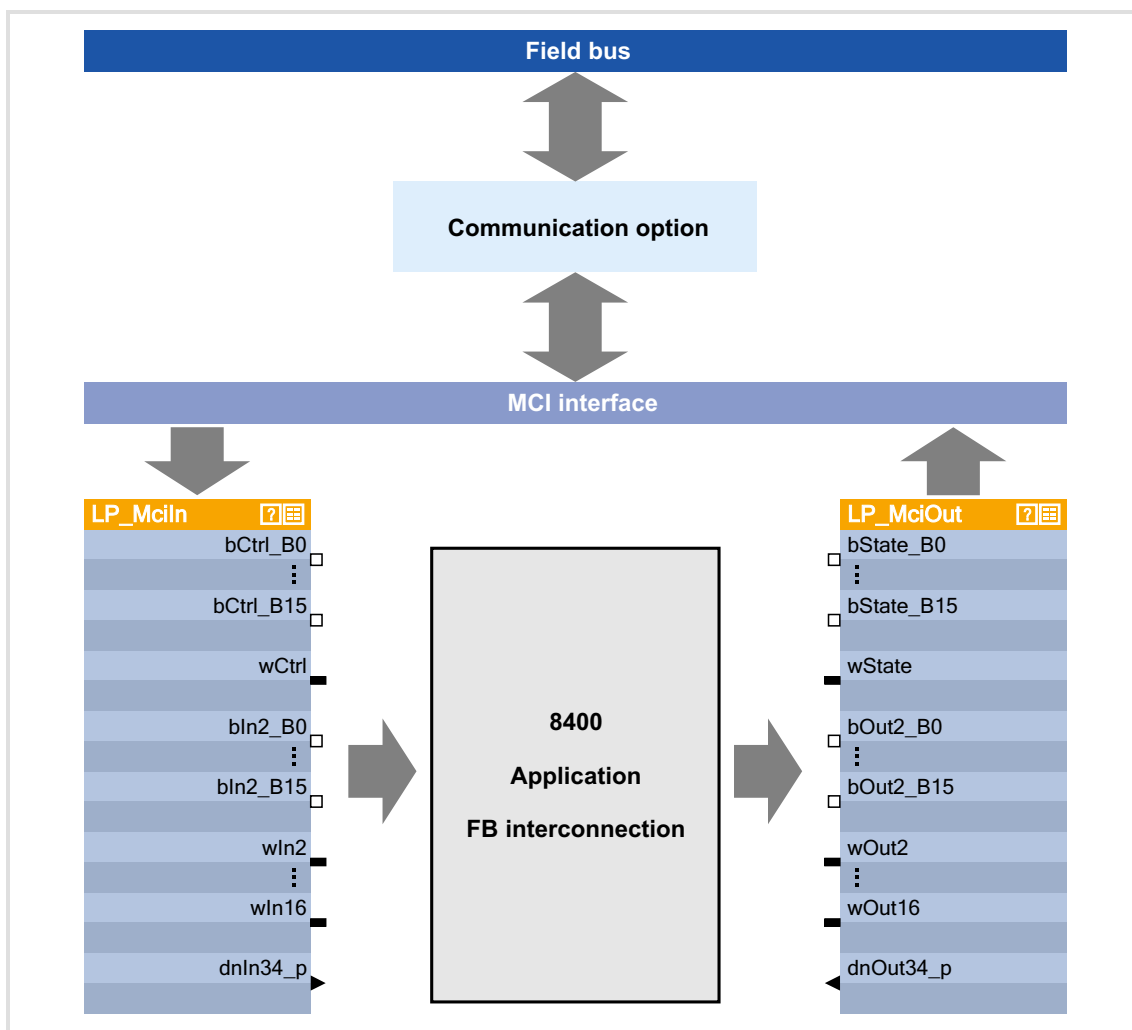
- ▶ The parameter data channel serves to transfer parameter data.
 - The parameter data channel provides access to all Lenze codes.
 - In general, the parameter data transfer is not time-critical.
 - Parameter data are, for instance, operating parameters, diagnostic information, and motor data.
 - Changes to parameters must be saved via code **C00002** of the Inverter Drives 8400 protec.

7 Process data transfer

7.1 Access to process data / PDO mapping

The process data (MCI-PDOs) are transferred via the MCI interface.

- ▶ Max. 16 words per direction are exchanged.
- ▶ The process data are accessed via the port blocks **LP_MciIn** and **LP_MciOut**. These port blocks are also called process data channels.
- ▶ The port/function block interconnection of the process data objects (PDO) takes place via the Lenze »Engineer«.



[7-1] External and internal data transfer between bus system, controller, and function block interconnection



Software manual / »Engineer« online help Inverter Drive 8400 protec

Here you will find detailed information on port/function block interconnection in the »Engineer« and on port blocks.



Note!

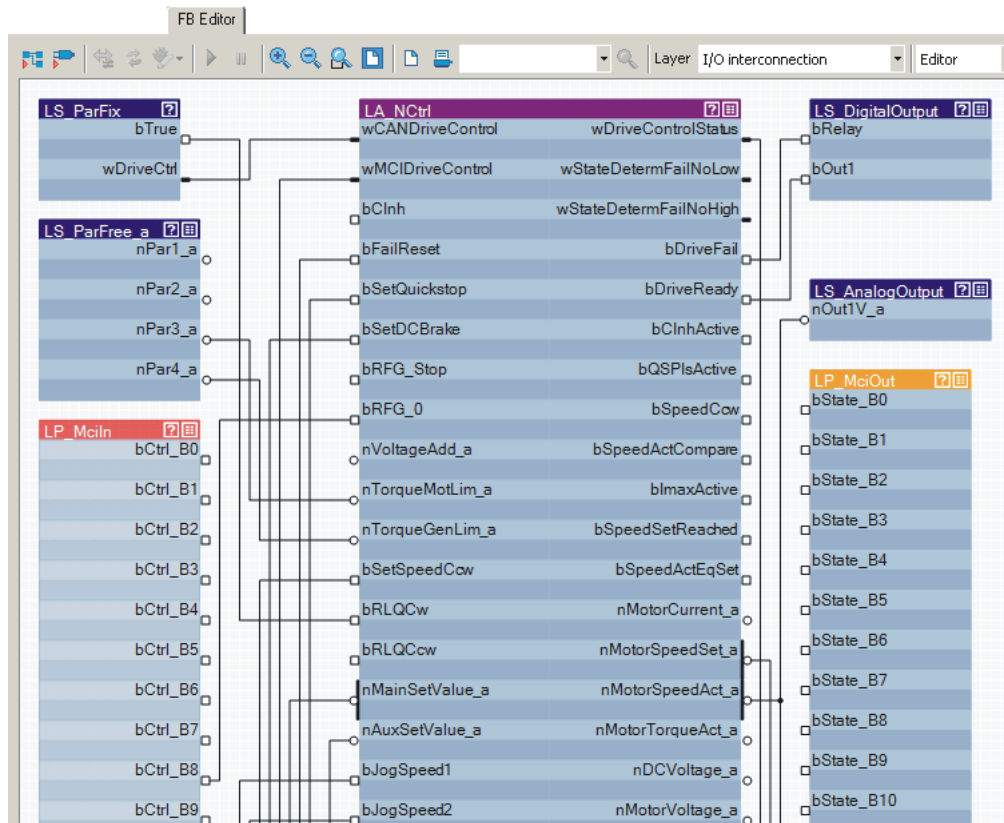
The »Engineer« screenshots shown on the following pages are only examples for the setting sequence and the resulting screens.

Depending on the software version of the controller and of the installed »Engineer« software, the screenshots may vary from your »Engineer« representation.

7.2 Preconfigured port interconnection of the process data objects (PDO)

The preconfigured port interconnection of the process data objects is activated by setting the standard device code C00007 = "40: MCI".

It is possible to display the port blocks "LP_MciIn" and "LP_MciOut" as well as the preconfigured interconnections in the function block editor (FB Editor):

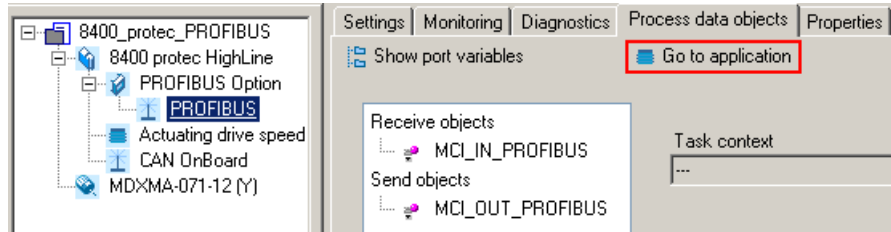


7.3 Free configuration of the port interconnection of process data objects (PDO)

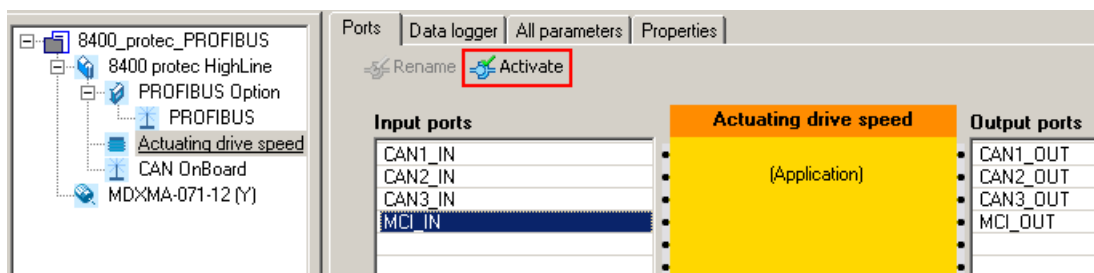


How to configure the port interconnection in the »Engineer«:

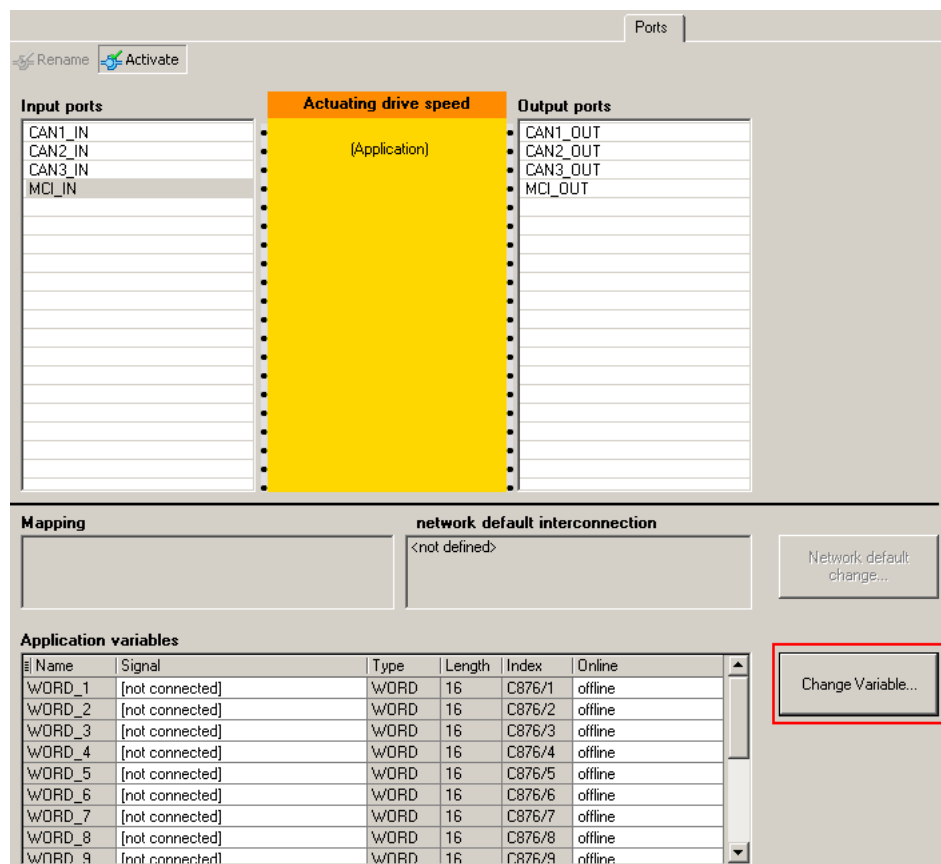
1. Go to the **Process data objects** tab, click the **Go to application** button.




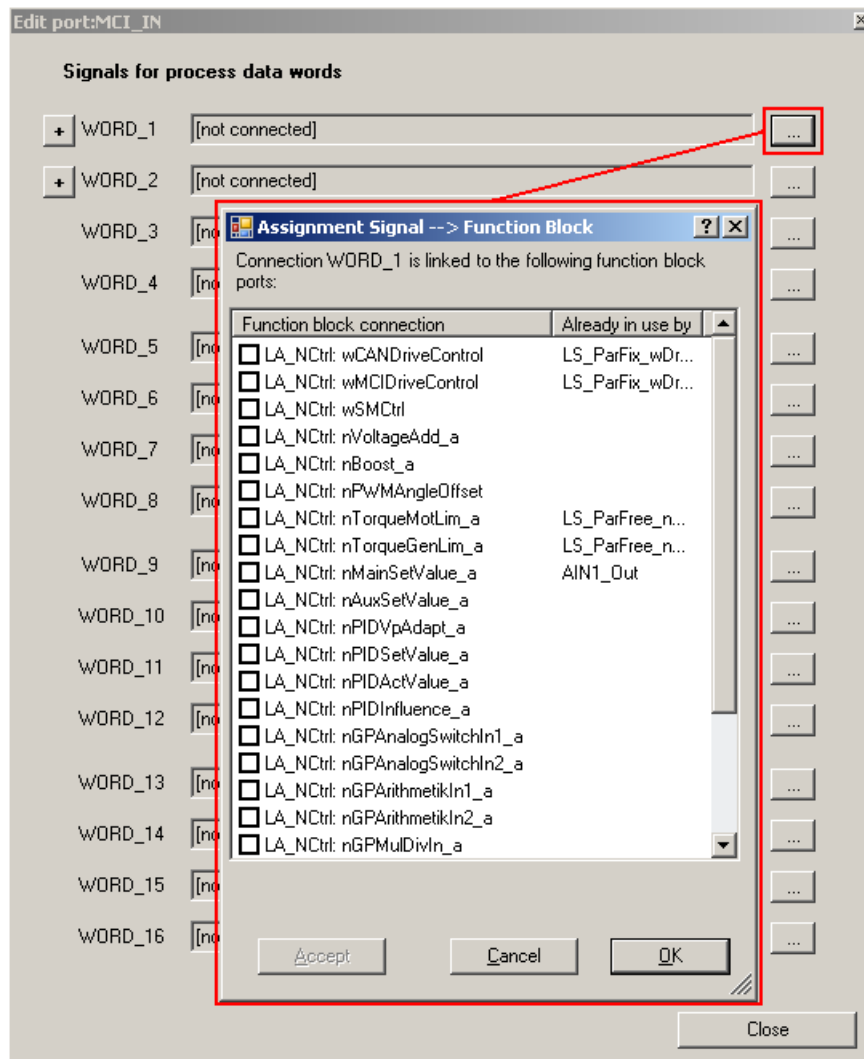
2. Go to the **Ports** tab and select the port blocks "MCI_IN" or "MCI_OUT" with a mouse-click. Activate them with the **Activate** button.



3. Click the **Change Variable ...** button.



4. Via the  button, you can assign signals to the process data words in the *Assignment Signal --> Function Block* dialog box.
 → Select the signals and then confirm the selection with the **OK** button.

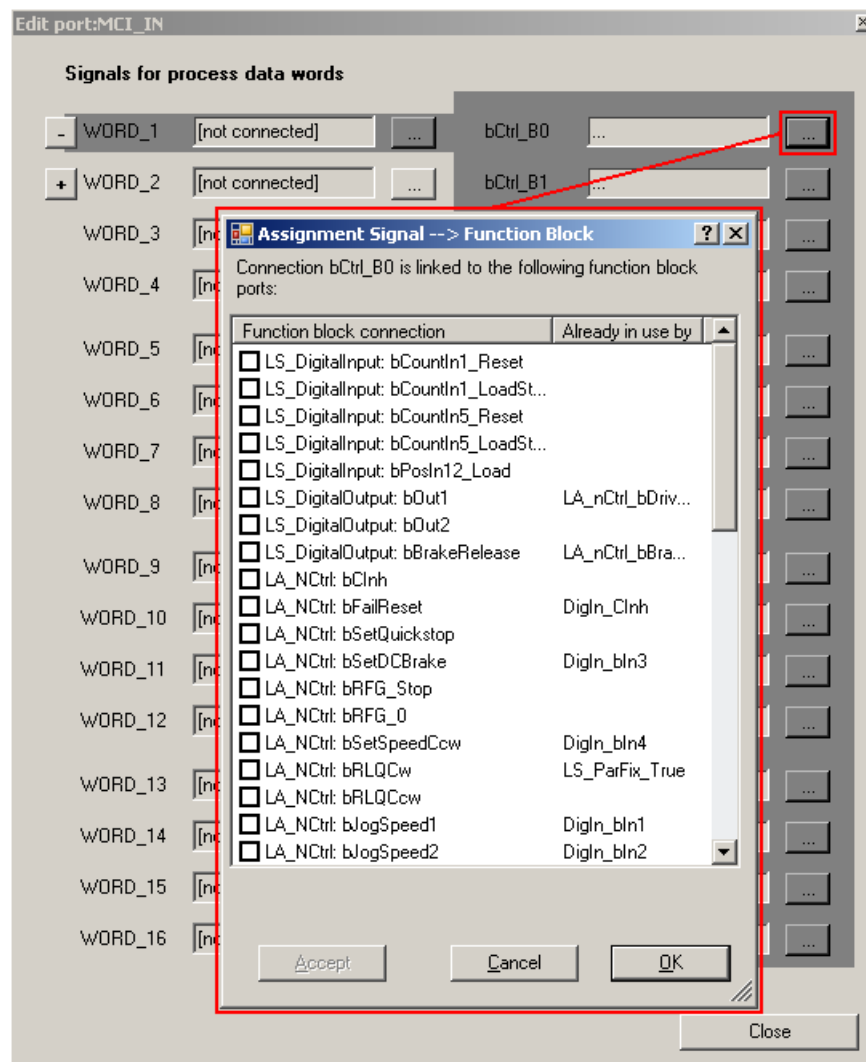


Communication manual 8400 protec PROFIBUS

Process data transfer

Free configuration of the port interconnection of process data objects (PDO)

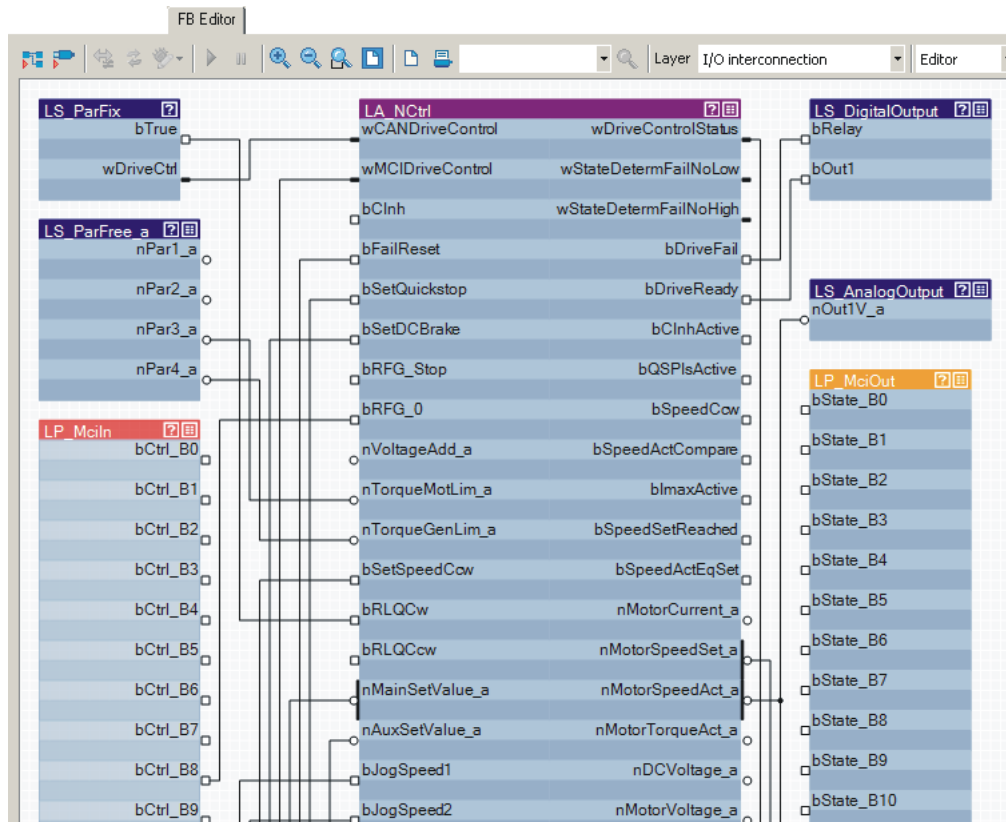
For the process data words WORD_1 and WORD_2, you can also assign signals to the individual control bits and status bits via the **+** and **...** buttons.
→ Select the signals and then confirm the selection with the **OK** button.





Tip!

If the port blocks "LP_MciIn" and "LP_MciOut" are activated (see step 1), they are displayed in the »FB Editor«. Here you can also assign signals to the process data words.



8 Parameter data transfer

The Inverter Drive 8400 protec (PROFIBUS) supports cyclic and acyclic transmission of parameter data:

- ▶ Cyclic DP-V0 parameter data is based on the DRIVECOM profile.
If the parameter data channel is active according to DP-V0, it is assigned an additional 4 words of input / output data.
- ▶ Acyclic DP-V1 parameter data is based on the PROFIdrive profile.

8.1 Addressing of the parameter data

The parameter data are addressed via codes which are listed in a code table in this documentation and in the corresponding documentation of your controller.

▶ [Parameter reference](#) (□ 79)

Addressing of the parameters for DP-V0 parameter data channel

In the case of the DP-V0 parameter data channel, the parameters of a device are not addressed directly via Lenze code numbers, but via indexes (bytes 3 + 4) and subindexes (byte 2).

- ▶ The conversion is made via an offset (24575 / 0x5FFF):
 - PROFIBUS-Index_{dec} = 24575 - Lenze code numbers
 - PROFIBUS-DP index_{hex} = 0x5FFF - Lenze code number_{hex}
- ▶ Example for C00105 (quick stop deceleration time):
 - PROFIBUS-Index_{dec} = 24575 - 105 = 24470
 - PROFIBUS-DP index_{hex} = 0x5FFF - 0x69 = 0x5F96
- ▶ The parameter values are entered into the user data (bytes 5 to 8) of the telegram.

8.2 DP-V0 parameter data channel (DRIVECOM profile)

The DP-V0 parameter data channel

- ▶ enables parameter setting and diagnostics of the controller.
- ▶ permits the access to all Lenze parameters (codes).
- ▶ additionally occupies 4 words (16 bits/word) of the input and output data words in the master.
- ▶ is identical for both transmission directions.

8.2.1 Telegram structure (overview)

The telegram of the DP-V0 parameter data channel consists of a total of 8 bytes:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

The individual bytes are described in detail in the following subchapters.

Communication manual 8400 protec PROFIBUS

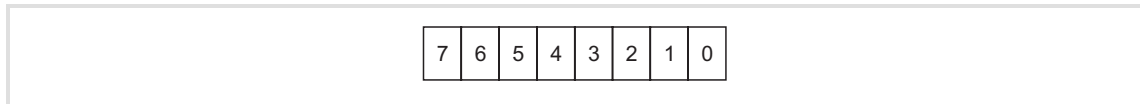
Parameter data transfer

DP-V0 parameter data channel (DRIVECOM profile)

8.2.2 Byte 1: Service

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

Request and response control for the parameter data channel



[8-1] Method of counting for bit 0 ... 7

Bit 0 ... 2: Request	
Read/write request from the master to the controller	
000	No request
001	Read request ▶ Reading parameter data from the controller (📖 38)
010	Write request (write data to the controller) ▶ Writing parameter data to the controller (📖 38)
100	Data transfer abort by the master ▶ Data transfer abort by the master (📖 39)
Bit 3	
Reserved	
Bit 4/5: Data length	
Data length ≤ 4 bytes in the telegram bytes 5 ... 8 (data 1 ... 4 / error 1 ... 4)	
00	1 byte
01	2 bytes
10	3 bytes
11	4 bytes
Bit 6: Handshake	
Indicates a new request.	
<ul style="list-style-type: none">• The status of this (toggle) bit is changed by the master for every new request.• The controller copies the bit into its response telegram.	
Bit 7: Status	
Status information from the controller to the master when sending the request confirmation.	
<ul style="list-style-type: none">• This bit informs the master whether the request has been carried out without errors.	
0	Request completed without errors.
1	Request not completed because of an error. <ul style="list-style-type: none">• The set status bit indicates that the telegram is an "error telegram". The data of bytes 5 ... 8 (data/error) has to be interpreted as an error message. ▶ Error codes (📖 42)

8.2.2.1 Reading parameter data from the controller

How to proceed:

1. Define the user data range of the controller, i.e. define the location of the DP user data in the host (observe manufacturer-specific information).
2. Enter the address of the desired parameter in the fields "Index" and "Subindex" (DP output data).
3. Request in the service byte = Read request.
 - The handshake bit in the service byte must be changed (DP output data).
4. Check whether the handshake bit in the service byte is the same for the DP input data and the DP output data.
 - If the handshake bit is the same, the response has been received.
 - It is useful to implement a time monitoring tool.
5. Check whether the status bit in the service byte is set:
 - Status bit is not set: The "Data/Error" field contains the required [Parameter value \(data\)](#) (☞ 41).
 - Status bit is set: The read request has not been executed correctly. The "Data/Error" field contains the [Error codes](#) (☞ 42).

8.2.2.2 Writing parameter data to the controller

How to proceed:

1. Define the user data range of the controller, i.e. define the location of the DP user data in the host (observe manufacturer-specific information).
2. Enter the address of the desired parameter in the fields "Index" and "Subindex" (DP output data).
3. Enter the parameter value in the "Data/error" field.
4. Request in the service byte = Write request.
 - The handshake bit in the service byte must be changed (DP output data).
5. Check whether the handshake bit in the service byte is the same for the DP input data and the DP output data.
 - If the handshake bit is the same, the response has been received.
 - It is useful to implement a time monitoring tool.
6. Check whether the status bit in the service byte is set:
 - Status bit is not set: The write request has been executed correctly.
 - Status bit is set: The write request has not been executed correctly. The "Data/Error" field contains the [Error codes](#) (☞ 42).

8.2.2.3 Data transfer abort by the controller

The error telegram is used to abort the transfer.

- ▶ The error telegram is marked by a set status bit in the service byte.
- ▶ The telegram can either be effected as a response to an "Initiate Read/Write Service or to a Read/Write Segment Service".

Controller response in case of an error:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1
1t110000	SIDX	IDXH	IDXL	Error Class	Error code	Additional Code High	Additional Code Low

8.2.2.4 Data transfer abort by the master

With this telegram, the master is able to abort a running segment transmission.

- ▶ The error telegram is marked by a set status bit in the service byte.
- ▶ The service byte also contains the request code "4" (100_{bin}).
- ▶ Bit 4 and bit 5 in the service byte (data length) are without meaning.
- ▶ Additional information (subindex, index, error information) is not transmitted.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
1txx0100	0	0	0	0	0	0	0

Controller response in case of faultless execution:

The controller confirms the error telegram of the master by also sending an error telegram.

- ▶ The error telegram is marked by a set status bit in the service byte.
- ▶ In case of faultless execution, the telegram contains the error information "0x00000000" in bytes 5 ... 8.
- ▶ Additional information (subindex, index) is not transmitted.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	SIDX	IDXH	IDXL	Error Class	Error code	Additional Code High	Additional Code Low
1t110000	0	0	0	0	0	0	0

8.2.3 Byte 2: Subindex

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

The Inverter Drives 8400 protec require an additional addressing via the subindex for those codes which have a subcode (see code table).

8.2.4 Bytes 3 + 4: Index

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

The parameter (Lenze code) is selected via these two bytes according to the formula:

- ▶ **Index = 24575 - Lenze code number**

(See also "[Addressing of the parameter data](#)" (□ 35).)

Example:

The parameter C00105 (quick stop (QSP) deceleration time) is to be addressed:

- ▶ $\text{Index} = 24575 - 105 = 24470 = 0x5F96$
- ▶ The entries in bytes 3 + 4 for this example would be:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	0x5F	0x96	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

8.2.5 Bytes 5 ... 8: Parameter value / error information

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index High byte	Index Low byte	Data 4 / Error 4	Data 3 / Error 3	Data 2 / Error 2	Data 1 / Error 1

The status bit 7 in the service byte determines the meaning of this data field:

Status bit	Meaning of bytes 5 ... 8
0	Bytes 5 ... 8 contain the parameter value (data 1 ... 4). ▶ Parameter value (data) (41)
1	Bytes 5 ... 8 contain an error message (error 1 ... 4) due to an invalid access. ▶ Error codes (42)

8.2.5.1 Parameter value (data)



Note!

Strings or data blocks cannot be transmitted.

Depending on the data format, the length of the parameter value is between 1 and 4 bytes.

- ▶ Data is saved in the Motorola format, i.e. first the high byte (high word), then the low byte (low word):

Byte 5	Byte 6	Byte 7	Byte 8
High byte	Low byte	High byte	Low byte
High word		Low word	
Double word			

- ▶ Principle for the assignment of bytes 5 ... 8 with parameter values of different lengths:

Byte 5	Byte 6	Byte 7	Byte 8
Parameter value (length 1)	00	00	00
Parameter value (length 2)		00	00
Parameter value (length 4)			

8.2.6 Error codes

The following error messages can occur:

Byte 8	Byte 7	Byte 6	Byte 5	Meaning
Error 1	Error 2	Error 3	Error 4	
0x06	0x03	0x00	0x00	No right to access
0x06	0x05		0x11	Invalid subindex
0x06	0x05		0x12	Data length too big
0x06	0x05		0x13	Data length too small
0x06	0x07		0x00	Object does not exist
0x06	0x08		0x00	Data types do not comply with each other
0x08	0x00		0x00	Job cannot be executed
0x08	0x00		0x20	Job cannot be executed at the moment
0x08	0x00		0x22	Request cannot be executed because of device status / parameter can only be changed with inhibited controller
0x08	0x00		0x30	Out of value range
0x08	0x00		0x31	Value of the parameter is too high
0x08	0x00		0x32	Value of the parameter is too low
0x08	0x00		0x80	Hardware error

8.2.7 Telegram examples

8.2.7.1 Read request: Querying the heatsink temperature

The heatsink temperature of the controller is to be read.

- ▶ Code to be read: C00061
- ▶ Heatsink temperature: 43 °C

Byte 1: Service (request)

- ▶ Request = $0t110001_{bin}$
 - Bit 0 ... 2 = 001_{bin} for read request
 - Bit 3 = 0 (reserved)
 - Bit 4/5 = 01_{bin} for 2-byte data length (only relevant for the response message)
 - Bit 6 = handshake bit (t = status is changed in the response message)
 - Bit 7 = status bit (only relevant for the response message)

Byte 2: Subindex

- ▶ Subindex = 0 because code C00061 contains no subindexes.

Bytes 3 + 4: Index

- ▶ Index = 24575 - code number = 24575 - 61 = 24514 = $0x5FC2$
 - Byte 3 (high byte) = $0x5F$
 - Byte 4 (low byte) = $0xC2$

Bytes 5 ... 8: Data

- ▶ The response message contains the value of code C00061:
 - Data 3 + 4 = $43 [^{\circ}C] \times 1$ (internal factor) = 43 = $0x002B$

Result:

- ▶ Request message from master to drive:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index high byte	Index low byte	Data 4	Data 3	Data 2	Data 1
0x01	0x00	0x5F	0xC2	0x00	0x00	0x00	0x00
$0t000001_{bin}$	00000000_{bin}	01011111_{bin}	11000010_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}	00000000_{bin}

Waiting for change of handshake bit 6 in service byte 1 of the response.

- ▶ Response message from drive to master (for faultless execution):

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index high byte	Index low byte	Data 4	Data 3	Data 2	Data 1
0x11	0x00	0x5F	0xC2	0x00	0x2B	0x00	0x00
$0t010001_{bin}$	00000000_{bin}	01011111_{bin}	11000010_{bin}	00000000_{bin}	00101011_{bin}	00000000_{bin}	00000000_{bin}

8.2.7.2 Write request: Setting the deceleration time for quick stop (QSP)

In the controller, the deceleration time for quick stop (QSP) is to be set to 50 ms.

- ▶ Code to be written: C00105

Byte 1: Service (request)

- ▶ Request = 0t110010_{bin}
 - Bit 0 ... 2 = 010_{bin} for write request
 - Bit 3 = 0 (reserved)
 - Bit 4/5 = 11_{bin} for 4-byte data length
 - Bit 6 = handshake bit (t ≡ status is changed in the response message)
 - Bit 7 = status bit (only relevant for the response message)

Byte 2: Subindex

- ▶ Subindex = 0, as there is no subindex under code C00105.

Bytes 3 + 4: Index

- ▶ Index = 24575 - code number = 24575 - 105 = 24470 = 0x5F96
 - Byte 3 (high byte) = 0x5F
 - Byte 4 (low byte) = 0x96

Bytes 5 ... 8: Data

- ▶ The parameter value of 0.05 s to be set is multiplied by the code-specific factor of "1000" and entered in the user data:
 - Data 1 ... 4 = 0.05 [s] x 1000 (internal factor) = 50 = 0x00000032

Result:

- ▶ Request message from master to drive:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index high byte	Index low byte	Data 4	Data 3	Data 2	Data 1
0x72	0x00	0x5F	0x96	0x00	0x00	0x00	0x32
0t110010 _{bin}	00000000 _{bin}	01011111 _{bin}	10010110 _{bin}	00000000 _{bin}	00000000 _{bin}	00000000 _{bin}	00110010 _{bin}

Waiting for change of handshake bit 6 in service byte 1 of the response

- ▶ Response message from drive to master (for faultless execution):

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Service	Subindex	Index high byte	Index low byte	Data 4	Data 3	Data 2	Data 1
0x40	0x00	0x5F	0x96	0x00	0x00	0x00	0x32
0t000000 _{bin}	00000000 _{bin}	01011111 _{bin}	10010110 _{bin}	00000000 _{bin}	00000000 _{bin}	00000000 _{bin}	00110010 _{bin}

8.3 DP-V1 parameter data channel (PROFIdrive profile)

Data communication with the PROFIBUS DP-V0 is characterised by cyclic diagnostics and cyclic process data and parameter data transfer.

An optional service extension is the acyclic parameter data transfer of the PROFIBUS DP-V1. All standard services under PROFIBUS DP-V0 still maintain their unrestricted validity.

PROFIBUS DP-V0 and PROFIBUS DP-V1 can be operated simultaneously in the same network. This enables the step-by-step extension or retrofitting of a system.

The services of PROFIBUS DP-V1 can be used by the class 1 master (PLC) and class 2 master (diagnostics master etc.).

The integration of the acyclic service into the fixed bus cycle depends on the corresponding configuration of the class 1 master:

- ▶ With configuration, a time slot is reserved.
- ▶ Without configuration the acyclic service is *appended* when a class 2 master acyclically accesses a DP-V1 slave.

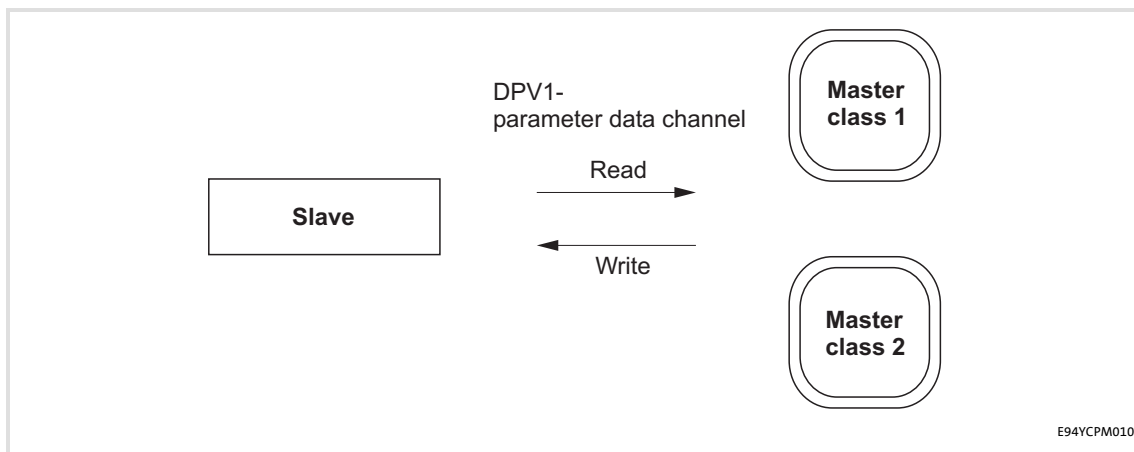
Features

- ▶ Address for parameter number and subindex with a width of 16 bits each.
- ▶ Several parameter requests can be united to one request (multi-parameter request).
- ▶ There is always only one parameter request in process (no pipelining).
- ▶ A parameter request/response must fit into a data block (max. 240 bytes). Requests/responses cannot be split into several data blocks.
- ▶ No spontaneous messages are transferred.
- ▶ Only acyclic parameter requests exist.
- ▶ Profile-specific parameters can be read independently of the slave status.

8.3.1 Connection establishment between master and slave

A class 1 master can always be used to request parameters from a slave if the slave is in the "DATA_EXCHANGE" status.

In addition to the class 1 master, a class 2 master can establish a communication connection to the slave:



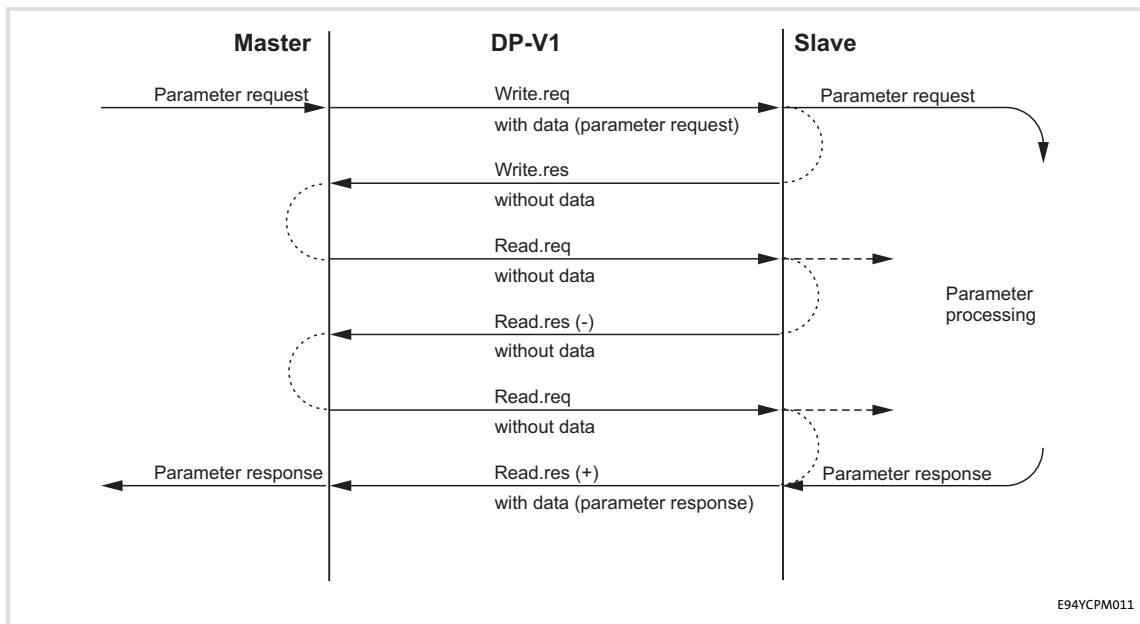
[8-2] Data communication via the DP-V1 parameter data channel

8.3.2 Acyclic data transfer



Note!

A parameter request refers to one or several parameter(s) (multi-parameter request).



[8-3] Transmission directions

Explanation

- ▶ A "Write.req" is used to pass the data set (DB47) to the slave in the form of a parameter request.
- ▶ With "Write.res" the master receives the confirmation for the receipt of the message.
- ▶ The master requests the response of the slave with "Read.req".
- ▶ The slave responds with "Read.res (-)" if it has not yet completed the processing.
- ▶ When the parameter processing is completed, the parameter request is completed by transmitting the parameter response to the master with "Read.res (+)".

8.3.3 Telegram structure



[8-4] PROFIBUS data telegram

The data unit (DU) contains the DP-V1 header and the parameter request or the parameter response.

The following subchapters describe the parameter request and the parameter response in detail.



Note!

The DP-V1 header consists of:

- function identifier
- slot number
- data set
- length of the user data

Please refer to the corresponding PROFIBUS specification for further information on the DP-V1 header.

Assignment of the user data depending on the data type

Depending on the data type, the user data are assigned as follows:

Data type	Length	User data assignment				
		Byte 1	Byte 2	Byte 3	Byte 4	Byte ...
String	x bytes					
U8	1 byte		00			
U16	2 bytes	High byte	Low byte			
U32	4 bytes	High word		Low word		
		High byte	Low byte	High byte	Low byte	

8.3.3.1 Reading parameter data from the controller



Note!

- When a read request is processed, no parameter value is written to the slave.
- In case of a read request of multi parameters, parameter attribute, index, and subindex are repeated with the number "n" of the requested parameters.
- A read request must not exceed the maximum data length of 240 bytes.

Request head

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Request identification	Axis	Number of indices

Field	Data type	Values
Request reference	U8	This value is specified by the master
Request identification	U8	0x01: Request parameters for reading
Axis	U8	0x00 or 0x01
Number of indices	U8	0x"n" (n = number of parameters requested)

Parameter attribute

Byte 5	Byte 6
Attribute	Number of subindices

Field	Data type	Values
Attribute	U8	0x10: Value
Number of subindices	U8	0x00 (For array elements: Enter the number of array elements required.)

Index and subindex

Byte 7	Byte 8	Byte 9	Byte 10
Index		Subindex	
High byte	Low byte	High byte	Low byte

Field	Data type	Values
Index	U16	0x0001 ... 0xFFFF (1 ... 65535)
Subindex	U16	0x0001 ... 0xFFFF (1 ... 65535)

8.3.3.2 Response after a faultless read request



Note!

Responses to a read request do not contain parameter attributes, indexes and subindexes.

Response head

Byte 1	Byte 2	Byte 3	Byte 4
Request reference (mirrored)	Response identification	Axis (mirrored)	Number of indices

Field	Data type	Values
Request reference	U8	Mirrored value of the parameter request
Response identification	U8	0x01: Parameter read
Axis	U8	0x00 or 0x01
Number of indices	U8	0x"n" (n = number of parameters requested)

Parameter format

Byte 5	Byte 6
Format	Number of values

Field	Data type	Values
Format	U8	0x02: Integer8 0x03: Integer16 0x04: Integer32 0x05: Unsigned8 0x06: Unsigned16 0x07: Unsigned32 0x09: Visible string 0x0A: Octet string 0x40: Zero 0x41: Byte 0x42: Word 0x43: Double word
Number of values	U8	0x01 or number of requested subindexes/parameters (with several subindexes/parameters only the parameter value is repeated). For string codes, the number of characters is entered here.

Parameter value

Byte 7	Byte 8	Byte 9	Byte 10
Value			

Field	Data type	Values
Value	String	any (length > 4 bytes possible)
	U8	0x00 0xFF
	U16	0x0000 0xFFFF
	U32	0x0000 0000 0xFFFF FFFF

8.3.3.3 Response after a read error

Response head

Byte 1	Byte 2	Byte 3	Byte 4
Request reference (mirrored)	Response identification	Axis (mirrored)	Number of indices

Field	Data type	Values
Request reference	U8	Mirrored value of the parameter request
Response identification	U8	0x81: Parameters not read • The data in the bytes 7 + 8 must be interpreted as error code.
Axis	U8	0x00 or 0x01
Number of indices	U8	0x"n" (n = number of parameters requested)

Parameter format

Byte 5	Byte 6
Format	Number of values

Field	Data type	Values
Format	U8	0x44: Error
Number of values	U8	0x01: Error code without additional information 0x02: Error code with additional information

Error code

Byte 7	Byte 8	Byte 9	Byte 10
Error code		Additional information (if available)	
High byte	Low byte	High byte	Low byte

Field	Data type	Values
Error code	U16	0x0000 0xFFFF
Additional information (if available)	U16	▶ Error codes (□ 56)

8.3.3.4 Writing parameter data to the controller



Note!

In case of a write request transfer of multi-parameters ...

- Parameter attribute
- Index and subindex

and then ...

- Parameter format
- Parameter value

... are repeated with the number "n" of the parameters addressed.

A write request must not exceed the maximum data length of 240 bytes.

Request head

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Request identification	Axis	Number of indices

Field	Data type	Values
Request reference	U8	This value is defined by the master.
Request identification	U8	0x02: Write parameters
Axis	U8	0x00 or 0x01
Number of indices	U8	0x"n" (n = number of parameters addressed)

Communication manual 8400 protec PROFIBUS

Parameter data transfer

DP-V1 parameter data channel (PROFIdrive profile)

Parameter attribute

Byte 5	Byte 6
Attribute	Number of subindices

Field	Data type	Values
Attribute	U8	0x10: Value
Number of subindices	U8	0x00 (For array elements: Enter the number of array elements required.)

Index and subindex

Byte 7	Byte 8	Byte 9	Byte 10
Index		Subindex	
High byte	Low byte	High byte	Low byte

Field	Data type	Values
Index	U16	0x0001 ... 0xFFFF (1 ... 65535)
Subindex	U16	0x0001 ... 0xFFFF (1 ... 65535)

Parameter format

Byte 11	Byte 12
Format	Number of values

Field	Data type	Values
Format	U8	0x02: Integer8 0x03: Integer16 0x04: Integer32 0x05: Unsigned8 0x06: Unsigned16 0x07: Unsigned32 0x09: Visible string 0x0A: Octet string 0x40: Zero 0x41: Byte 0x42: Word 0x43: Double word
Number of values	U8	0x01 or number of written subindexes/parameters (with several subindexes/parameters only the parameter value is repeated). For string codes, the number of characters is entered here.

Parameter value

Byte 13	Byte 14	Byte 15	Byte 16
Value			

Field	Data type	Values
Value	String	any (length > 4 bytes possible)
	U8	0x00 0xFF
	U16	0x0000 0xFFFF
	U32	0x0000 0000 0xFFFF FFFF

8.3.3.5 Response after a faultless write request



Note!

Faultless and, if existing, faulty messages are summarised in one telegram in case of a multi parameter request. They have the following data contents:

- Faultless message
 - Format: 0x40
 - Number of values: 0x00
- Faulty message
 - Format: 0x44
 - Number of values: 0x01 or 0x02
 - Error code only (with number of values = 0x01) *or*
 - error code with additional information (with number of values = 0x02)

A faulty access to a parameter "n" is reported in the response message of a multi parameter request at the n-th position.

Response head

Byte 1	Byte 2	Byte 3	Byte 4
Request reference (mirrored)	Response identification	Axis (mirrored)	Number of indices

Field	Data type	Values
Request reference	U8	Mirrored value of the parameter request
Response identification	U8	0x02: Written parameter
Axis	U8	0x00 or 0x01
Number of indices	U8	0xn (n = number of parameter addressed)

8.3.3.6 Response after a write error

Response head

Byte 1	Byte 2	Byte 3	Byte 4
Request reference (mirrored)	Response identification	Axis (mirrored)	Number of indices

Field	Data type	Values
Request reference	U8	Mirrored value of the parameter request
Response identification	U8	0x82: Parameter not written • The data in the bytes 7 + 8 must be interpreted as error code.
Axis	U8	0x00 or 0x01
Number of indices	U8	0x"n" (n = number of parameters addressed)

Parameter format

Byte 5	Byte 6
Format	Number of values

Field	Data type	Values
Format	U8	0x44: Error
Number of values	U8	0x01: Error code without additional information 0x02: Error code with additional information

Error code

Byte 7	Byte 8	Byte 9	Byte 10
Error code		Additional information (if available)	
High byte	Low byte	High byte	Low byte

Field	Data type	Values
Error code	U16	0x0000 0xFFFF
Additional information (if available)	U16	▶ Error codes (□ 56)

8.3.4 Error codes

Error code	Description	Explanation	Additional info
0x0000	Impermissible parameter number	Access to non-available parameter	-
0x0001	Parameter value cannot be changed	Change access to a parameter value that cannot be changed	Subindex
0x0002	Lower or upper value limit exceeded	Change access with value beyond the value limits	Subindex
0x0003	Faulty subindex	Access to non-available subindex	Subindex
0x0004	No array	Access with subindex to non-indicated parameter	-
0x0005	Wrong data type	Change access with value that does not go with the data type of the parameter	-
0x0006	No setting permitted (only resettable)	Change access with non-zero value where this is not permitted	Subindex
0x0007	Description element cannot be changed	Change access to a description element that cannot be changed	Subindex
0x0008	Reserved	(PROFIdrive profile V2: PPO-Write requested in the IR is not available)	-
0x0009	Description data is not available	Access to non-available description (parameter value is available)	-
0x000A	Reserved	(PROFIdrive profile V2: Access group is wrong)	-
0x000B	No parameter change rights	Change access if the parameter change rights are missing	-
0x000C	Reserved	(PROFIdrive profile V2: Password is wrong)	-
0x000D	Reserved	(PROFIdrive profile V2: Text in the cyclic traffic cannot be read)	-
0x000E	Reserved	(PROFIdrive profile V2: Name in the cyclic traffic cannot be read)	-
0x000F	No text array available	Access to non-available text array (parameter value is available)	-
0x0010	Reserved	(PROFIdrive profile V2: PPO-Write is missing)	-
0x0011	Job cannot be executed due to operating status	Access is not possible due to temporary reasons not specified here	-
0x0012	Reserved	(PROFIdrive-Profil V2: Other error)	-
0x0013	Reserved	(PROFIdrive profile V2: Date in the cyclic traffic cannot be read)	-
0x0014	Value is impermissible	Change access with the value that is inside the value limits but not permissible for other permanent reasons (parameters with defined individual values)	Subindex
0x0015	Response is too long	The length of the current response exceeds the maximally transferrable length	-
0x0016	Parameter address is impermissible	Impermissible or non-supported value for attribute, number of subindices, parameter number, or subindex, or a combination	-
0x0017	Format is impermissible	Write request: Impermissible or non-supported format of parameter data	-
0x0018	Number of values are not consistent	Write request: Number of values of the parameter data do not match the number of subindices in the parameter address	-

Communication manual 8400 protec PROFIBUS

Parameter data transfer

DP-V1 parameter data channel (PROFIdrive profile)

Error code	Description	Explanation	Additional info
0x0019	Reserved	-	-
...			
0x0064			
0x0065	manufacturer-specific	-	-
...			
0x00FF			

8.3.5 Telegram examples

8.3.5.1 Read request: Querying the heatsink temperature

The heatsink temperature of the controller is to be read.

- ▶ Code to be read: C00061
- ▶ Heatsink temperature: 43 °C

Parameter request

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Request identification	Axis	Number of indices
0xXX	0x01	0x00	0x01
	Request parameters for reading		

Byte 5	Byte 6
Attribute	Number of subindices
0x10	0x00
Value	No subindex

Byte 7	Byte 8	Byte 9	Byte 10
Index		Subindex	
High byte	Low byte	High byte	Low byte
0x5F	0xC2	0x00	0x00
Index = 24575 - code no. = 24575 - 61 = 24514 = 0x5F C2		No subindex	

Parameter response after faultless read request

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Response identification	Axis	Number of indices
0xXX	0x01	0x00	0x01
(mirrored)	Parameter read	(mirrored)	

Byte 5	Byte 6
Format	Number of values
0x03	0x01
Integer16	1 value

Byte 7	Byte 8
Value	
High byte	Low byte
0x00	0x2B
Value read = 0x 00 2B = 43 x 1 (internal factor) = 43 [°C]	

Parameter response after read error

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Response identification	Axis	Number of indices
0xXX	0x81	0x00	0x01
(mirrored)	Parameter not read	(mirrored)	

Byte 5	Byte 6
Format	Number of values
0x44	0x01
Fault	Error code without additional information

Byte 7	Byte 8
Error code	
High byte	Low byte
For meaning see chapter " Error codes " (□ 56)	

8.3.5.2 Write request: Setting the deceleration time for quick stop (QSP)

In the controller, the deceleration time for quick stop (QSP) is to be set to 50 ms.

► Code to be written: C00105

Parameter request

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Request identification	Axis	Number of indices
0xXX	0x02	0x00	0x01
	Write parameters	Axis 0	1 index

Byte 5	Byte 6
Attribute	Number of subindices
0x10	0x00
Value	No subindex

Byte 7	Byte 8	Byte 9	Byte 10
Index		Subindex	
High byte	Low byte	High byte	Low byte
0x5F	0x96	0x00	0x00
Index = 24575 - code no. = 24575 - 105 = 24470 = 0x5F 96		No subindex	

Byte 11	Byte 12
Format	Number of values
0x43	0x01
Double word	1 value

Byte 13	Byte 14	Byte 15	Byte 16
Value			
High word: High byte	Low word: High byte	Low word: High byte	Low word: Low byte
0x00	0x00	0x00	0x32
Value to be written = 0.05 [s] x 1000 (internal factor) = 50 = 0x00 00 00 32			

Parameter response after faultless write request

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Response identification	Axis	Number of indices
0xXX	0x02	0x00	0x01
(mirrored)	Parameter written	(mirrored)	1 index

Parameter response after read error

Byte 1	Byte 2	Byte 3	Byte 4
Request reference	Response identification	Axis	Number of indices
0xXX	0x82	0x00	0x01
(mirrored)	Parameter not written	(mirrored)	1 index

Byte 5	Byte 6
Format	Number of values
0x44	0x01
Fault	Error code without additional information

Byte 7	Byte 8
Error code	
High byte	Low byte
For meaning see chapter " Error codes " (56)	

8.4 Consistent parameter data

In the PROFIBUS communication system, data are permanently exchanged between the host (CPU + PROFIBUS master) and the standard device via the plugged-on slave interface module. Both the PROFIBUS master and the CPU (central processing unit) of the host access a joint memory: the dual port memory (DPM).

- ▶ The DPM permits a data exchange in both directions (write/read):



It could happen that a slower PROFIBUS master writing would be overtaken by a faster CPU reading within a cycle time without any further data organisation.

To avoid such an impermissible status, the parameter data to be transmitted must be marked as "consistent".

Data communication with existing consistency

With consistency, either "reading" or "writing" is possible when the master and the CPU simultaneously access the memory:

- ▶ The PROFIBUS master transfers data only as a complete data set.
- ▶ The CPU can only access completely updated data sets.
- ▶ The PROFIBUS master cannot read or write data as long as the CPU accesses consistent data.

The result becomes clear from the example below:



1. As the master can only write if the CPU does not read, the master waits until the data are read completely by the CPU.
2. The master only writes a complete data set into DPM.

Configuring consistent data



Note!

Consistency is achieved by an appropriate PROFIBUS master configuration.

Please refer to the corresponding documentation for your configuring software for this purpose.

9 PROFIsafe

PROFIBUS provides the transfer of safe information via the PROFIsafe protocol according to the "PROFIsafe - Profile for Safety Technology" specification, Version 2.0.



Note!

Transmission of safe information via the PROFIsafe protocol is only possible when a version with an integrated safety system is used.

- ▶ The PROFIsafe messages are sent in the first slot of a PROFIBUS telegram.
- ▶ In the PROFIsafe messages, one bit each is used for the control of a certain safety function.
- ▶ The structure of the PROFIsafe messages is described in the PROFIsafe profile.
- ▶ The length of the PROFIsafe message is 8 bytes.



Software manual / »Engineer« online help "Inverter Drives 8400 protec – drive-based safety"

Here, detailed information on the configuration of drive-based safety is provided.

Starting PROFIBUS/PROFIsafe in the Inverter Drive 8400 protec

Inverter Drives 8400 protec PROFIBUS are available in two designs – with or without safety option SO20/SO30.

Sequence: If safety option SO20/SO30 PROFIsafe is activated, the use of the safety option is supported by the master.

- ▶ The PRM and CFG data are sent by a PROFIBUS master to establish data exchange. The data may contain safety data and general PROFIBUS data.
- ▶ Exclusive exchange of PROFIBUS data (parameter and process data) is always possible.
- ▶ If PRM data and PROFIsafe messages are sent by the master, safety option SO20/SO30 must be active.
- ▶ The PRM data are checked by the safety option.
- ▶ In the master, safety data must always be assigned to the first slot (slot 0).

10 Monitorings

10.1 Permanent interruption of PROFIBUS communication

If the PROFIBUS communication is interrupted permanently, e.g. by cable breakage or failure of the PROFIBUS master, no process data is transmitted to the slave being in the "DATA_EXCHANGE" status.

After the watchdog monitoring time determined by the PROFIBUS master has expired, the response parameterised in [C13880](#) is executed in the controller.

The process data are treated according to the setting in [C13885](#). (The data last sent by the master may be used or set to zero.)

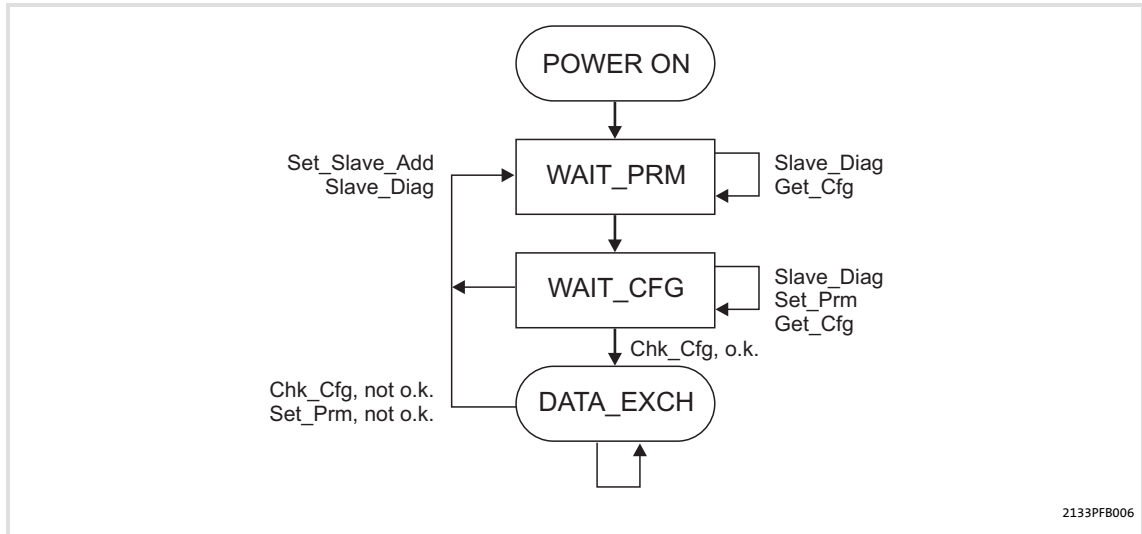
Preconditions for a controller (slave) response

- ▶ A monitoring time of 1 ... 65534 ms for the "Data_Exchange" status ([C13881](#)) is set.
A value of "65535 ms" (Lenze setting) deactivates the monitoring.
- ▶ For the slave, a response is set in [C13880](#) (Lenze setting: "No response").
- ▶ The slave is in the "Data_Exchange" status.
- ▶ In the master, the watchdog monitoring time must be configured correctly.

If one of these preconditions is not met, the response to the absence of cyclic process data telegrams from the master is not executed.

▶ [Settings and displays in the »Engineer«](#) (📖 66)

10.2 Short interruption of PROFIBUS communication



[10-1] Sequence for short-time interruption of communication

The master detects the communication fault and only after a few microseconds it transfers the slave to the "WAIT_PRM" status of the DP state machine (see illustration [\[10-1\]](#)).

Only after the state chain of the DP state machine ending in the "DATA_EXCHANGE" status (DATA_EXCH) has been passed through, the watchdog monitoring time calculated for the slave (in milliseconds) continues to run.



Note!

The watchdog monitoring time does not continue to run when the slave does not reach the "DATA_EXCHANGE" status due to repeated communication faults (e.g. caused by loose contact).

Additional monitoring for the data exchange

For this reason an additional monitoring function for data exchange is available with [C13881](#) which is activated when "Data_Exchange" is exited and the parameterised time (0 ... 65535 ms) has expired. The active monitoring triggers the response parameterised in [C13880](#).

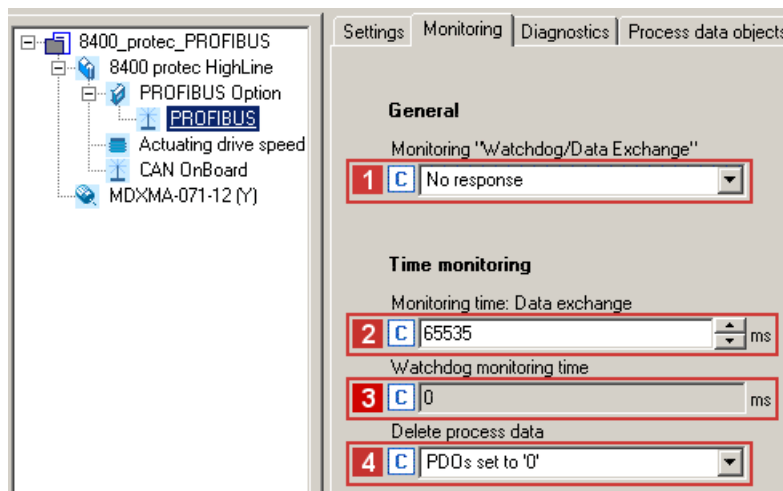


Note!

Meet the following condition for the time setting:

Monitoring time for the data exchange ([C13881](#)) \leq Watchdog monitoring time of the PROFIBUS ([C13882](#)).

10.3 Settings and displays in the »Engineer«



In the »Engineer« under the **Monitoring** tab you can ...

- ▶ set a response **1** ([C13880](#)) to an interruption in communication.
- ▶ set a monitoring time **2** ([C13881](#)) for the "Data_Exchange" status.
- ▶ display the watchdog monitoring time **3** ([C13882](#)) defined in the master.

If the Inverter Drive 8400 protec does not receive any valid process data when being in the DATA_EXCHANGE state, the process data are handled according to the setting in **4** [C13885](#). (Thus, the data sent last by the master can be used or set to zero.)

11 Diagnostics

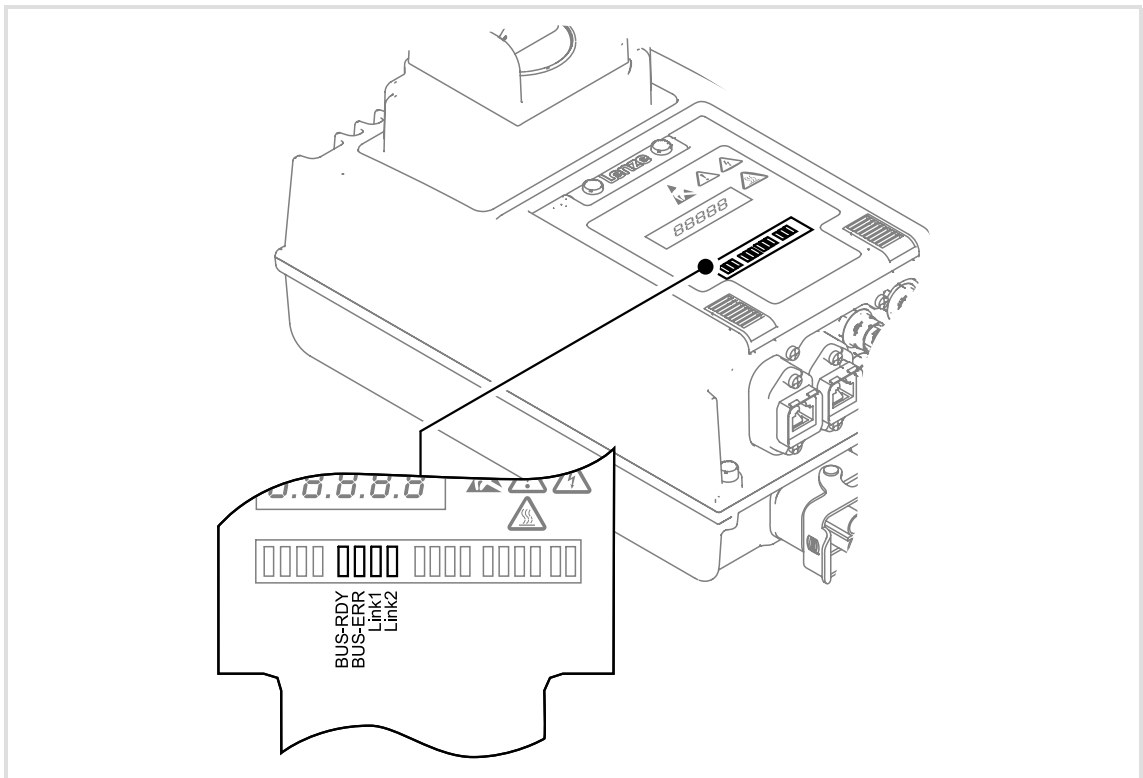
The Inverter Drives 8400 protec provides LEDs on the front side for the failure diagnosis of the PROFIBUS. Besides, you can query the current bus state in the »Engineer« via code [C13861](#).





Manual for safety engineering of "Inverter Drives 8400 protec"

Here you will find detailed information on the LED status displays for devices with an integrated safety system.

11.1 LED status displays

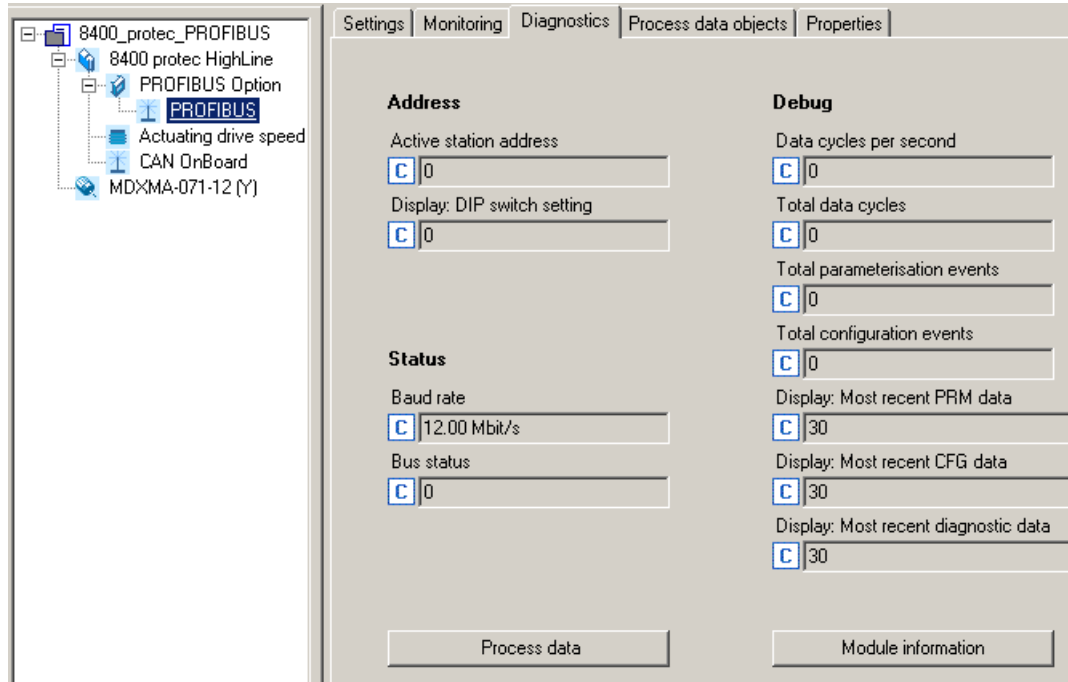


[11-1] LED display on the front of the Inverter Drive 8400 protec

Pos.	Colour	Status	Description
BUS-RDY	Green	Off	No communication
		Blinking	 <p>200 ms</p> <p>200 ms</p> <p>Communication is active</p>
BUS-ERR	Red	On	 <p>Communication error (e.g. PROFIBUS cable removed)</p>
Link1 Link2	Yellow	Off	These LEDs are not used.

11.2 Diagnostics with the »Engineer«

In the »Engineer« under the **Diagnostics** tab, various PROFIBUS diagnostics information is displayed.



11.3 Querying the current bus status

Code [C13861](#) displays the current PROFIBUS status in a bit-coded form:

Bit assignment				Description
Bit 3	Bit 2	Bit 1	Bit 0	Reserved
<hr/>				
	Bit 5	Bit 4	Status of the DP state machine (DP-STATE)	
	0	0	WAIT_PRM	The slave waits for a parameter data telegram after acceleration. Other types of telegrams will not be processed. Data exchange is not yet possible.
	0	1	WAIT_CFG	The slave waits for the configuration telegram that specifies the number of input and output bytes. The master informs the slave about the number of I/O bytes that will be transferred.
	1	0	DATA_EX	If the parameter settings and the configuration have been accepted by the firmware and by the application, the slave state changes to DATA_EXCHANGE (exchange of user data with the master).
	1	1	Not possible	
<hr/>				
	Bit 7	Bit 6	Status of watchdog state machine (WD-STATE)	
	0	0	BAUD_SEARCH	The PROFIBUS slave is able to recognise the baud rate automatically.
	0	1	BAUD_CONTROL	After recognising the correct baud rate, the slave status changes to BAUD_CONTROL and the baud rate is monitored.
	1	0	DP_CONTROL	The DP_CONTROL status serves for response monitoring of the master.
	1	1	Not possible	
<hr/>				
Bit 11	Bit 10	Bit 9	Bit 8	Detected PROFIBUS baud rate
0	0	0	0	12 Mbps
0	0	0	1	6 Mbps
0	0	1	0	3 Mbps
0	0	1	1	1.5 Mbps
0	1	0	0	500 kbps
0	1	0	1	187.5 kbps
0	1	1	0	93.75 kbps
0	1	1	1	45.45 kbps
1	0	0	0	19.2 kbps
1	0	0	1	9.6 kbps
<hr/>				
Bit 15	Bit 14	Bit 13	Bit 12	Reserved

11.4 Advanced diagnostic message

Errors in the standard device and its plugged-in modules are transmitted to the PROFIBUS master in the form of advanced diagnostic messages.

Structure of the advanced diagnostic message

Byte	Description
1	Bit 0: Station does not exist (set by the master). Bit 1: Slave is not ready for data exchange. Bit 2: Configuration data are not consistent. Bit 3: Slave has extended diagnostic data. Bit 4: Requested service is not supported by the slave. Bit 5: Slave response is invalid (set by the master) Bit 6: Incorrect parameter setting Bit 7: Slave is parameterised by another master (set by the master).
2	Bit 0: Slave must be parameterised again. Bit 1: Static diagnostics Bit 2: Fixedly set to "1". Bit 3: Watchdog active Bit 4: Freeze command received. Bit 5: Sync command received. Bit 6: Reserved Bit 7: Slave is deactivated (set by the master).
3	Bit 7: Diagnostics overflow - amount of diagnostics data present in the slave is too large to fit into one telegram.
4	Bits 0 ... 7: Master address after parameter setting ("0xFF" without parameterisation)
5	Bits 0 ... 7: ID number (high byte)
6	Bits 0 ... 7: ID number (low byte)
7	Header <ul style="list-style-type: none"> In the header, the block length of the extended diagnostics including the header byte is specified. In this case, the value of the entry is "0x0A" (bytes 7 ... 16 = 10 bytes).
8	Status_Type <ul style="list-style-type: none"> The value of this entry is fixed. For the following bit assignment it is "0x81": <ul style="list-style-type: none"> –Bit 7 = 1: "status" –Bit 0 = 1: "status message" –Value of all other bits = 0
9	Slot_Number <ul style="list-style-type: none"> The value of the slot number is "0x00".
10	Specifier <ul style="list-style-type: none"> An indicated error is entered in the specifier with the identification "0x1" (status coming). An eliminated error is entered in the specifier with the identification "0x02" (status going). If no errors are indicated, the entry in the specifier has the value "0x00" (no further differentiation).

Byte	Description
11	PROFIsafe: Error number of safety option SO20/SO30
12	<ul style="list-style-type: none"> If an error occurs in the safety option, byte 11 (LOW byte) and byte 12 (HIGH byte) contain the respective error number. Please also refer to the documentation of the safety option.
13 ... 16	<p>Error code of the Inverter Drive 8400 protec</p> <p>For the sake of legibility, the error number is displayed in the Logbook and in device code C00165 as follows: [error type].[error subject number].[error ID]</p> <p>Structure:</p> <p>A reserved B error type C error subject D error ID</p>

11.4.1 Example 1: Error in parameter data "Incorrect PROFIsafe target address"

This error was caused while the communication of the PROFIBUS master was established because the projected PROFIsafe target address in the PROFIBUS master does not correspond to the set address anymore.

Byte	Value (hex)	Meaning
1	x	Standard data (PRM_Fault)
...		
6		
7	0A	Block length of the extended diagnostics = 10 bytes
8	81	Status message
9	00	Slot 0
10	01	Status coming
11	40	PROFIsafe error "0x0040" (64)
12	00	• GSG: "F address differ to F_Dest_Add"
13	00	No other error message
...	...	
16	00	

11.4.2 Example: Error in standard device "Short circuit (OC1)"

Byte	Value [hex]	Description
1	x	Standard data (PRM_Fault)
...		
6		
7	0A	Block length of the extended diagnostics = 10 bytes
8	81	Status message
9	00	Slot 0
10	01	Status coming
11	00	
12	00	
13	0B	Error message 0x11C4000B ("Short circuit (OC1)")
14	00	• Error type: "Warning locked"
15	C4	• Subject area: 0x11C4 (current)
16	11	• Error ID: 0x000B
		Thus, the error number "0x11C4000B" means: An overcurrent has been detected in the "current" subject area causing a "Warning locked" error response which must be unlocked after the error has been removed.

12 Error messages

This chapter complements the error list in the software manual and the »Engineer« online help for the Inverter Drive 8400 protec by PROFIBUS error messages.



Software manual/»Engineer« online help for the Inverter Drive 8400 protec

Here you will find general information on diagnostics & fault analysis and error messages.

12.1 Short overview (A-Z) of the PROFIBUS-error messages

The following table contains all PROFIBUS error messages in alphabetical order with the preset error response as well as – if applicable – the parameter for setting the error response.



Tip!

When you click the cross-reference in the last column, you will see a detailed description (causes and remedies) of this error message.

Error text	Error type	Subject area no.	Error no.	Adjustable in	Detailed information
Connection to 8400 standard device lost	1: Error	444	12544	-	0x01bc3100
Error: Lenze settings loaded	1: Error	444	25632	-	0x01bc6420
Internal error	1: Error	444	24832	-	0x01bc6100
Internal error	1: Error	444	24833	-	0x01bc6101
Internal error	1: Error	444	24848	-	0x01bc6110
Internal error	1: Error	444	24593	-	0x01bc6011
Invalid parameter set	1: Error	444	25631	-	0x01bc641f
Memory: Read error	1: Error	444	21810	-	0x01bc5532
Memory: Write error	1: Error	444	21811	-	0x01bc5533
Memory: No access	1: Error	444	21809	-	0x01bc5531
Profibus: "Data_Exchange" status exited	0: No response	444	33073	C13880/1	0x01bc8131
Profibus watchdog: DP-V1 MSC2 monitoring time exceeded	0: No response	444	33074	C13880/2	0x01bc8132
Profibus watchdog: Monitoring time expired	0: No response	444	33072	C13880/1	0x01bc8130
Restart after watchdog reset	1: Error	444	24592	-	0x01bc6010
Safety communication timeout	4: Warning locked	444	26128	-	0x01bc6610
Safety Init error	4: Warning locked	444	26130	-	0x01bc6612
Safety parameter timeout	4: Warning locked	444	26129	-	0x01bc6611

12.2 Possible causes and remedies

This chapter contains all PROFIBUS error messages in numerical order of the error number. Possible causes and remedies as well as responses to the error messages are described in detail.



Tip!

An alphabetical listing of all PROFIBUS-error messages can be found in the previous chapter "[Short overview \(A-Z\) of the PROFIBUS-error messages](#)" (□ 74).

Connection to 8400 standard device lost [0x01bc3100]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
<ul style="list-style-type: none">• Network cable (plug) is defective.• Network cable is not connected to PROFIBUS connection X31/X32.• Voltage supply is interrupted.	Check cables and terminals. Connect network cable to PROFIBUS connection X31/X32.	

Memory: No access [0x01bc5531]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Access to memory was not possible.	Send the device and a description of the fault to Lenze.	

Memory: Read error [0x01bc5532]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Parameter could not be read.	Send the device and a description of the fault to Lenze.	

Memory: Write error [0x01bc5533]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Parameter could not be written.	Send the device and a description of the fault to Lenze.	

Restart after watchdog reset [0x01bc6010]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Device is defective.	Send the device and a description of the fault to Lenze.	

Internal error [0x01bc6011]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Device is defective.	Send the device and a description of the fault to Lenze.	

Internal error [0x01bc6100]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Internal error	Send the device and a description of the fault to Lenze.	

Internal error [0x01bc6101]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Internal error	Send the device and a description of the fault to Lenze.	

Internal error [0x01bc6110]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Internal error	Send the device and a description of the fault to Lenze.	

Invalid parameter set [0x01bc641f]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
No active parameter set could be loaded.	Repeat download of the application (including module).	

Error: Lenze settings loaded [0x01bc6420]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Access to the parameter set in the memory module via standard device failed.	Repeat download of the application (including module).	

Communication manual 8400 protec PROFIBUS

Error messages

Possible causes and remedies

Safety communication timeout [0x01bc6610]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input checked="" type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
This is an error message which occurs during each safe parameter download.	Acknowledge error.	

Safety parameter timeout [0x01bc6611]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input checked="" type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
Safety option SO20/SO30 does not respond to a PROFISafe parameterisation telegram (PRM data) within a set time interval (200 ms).	Activate safety option SO20/SO30.	

Safety Init error [0x01bc6612]

Response (Lenze setting printed in bold)		Setting: not possible
<input type="checkbox"/> None <input type="checkbox"/> System fault <input type="checkbox"/> Fault <input type="checkbox"/> Trouble <input type="checkbox"/> Quick stop by trouble <input checked="" type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input type="checkbox"/> Information		
Cause	Remedy	
<ul style="list-style-type: none">Communication with safety option SO20/SO30 could not initialised properly.The master did define a safety application but a connection to the safety option has not been detected internally.	Activate safety option SO20/SO30.	

Profibus watchdog: Monitoring time expired [0x01bc8130]

Response (Lenze setting printed in bold)		Setting: C13880/1 (<input checked="" type="checkbox"/> adjustable response)
<input checked="" type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input checked="" type="checkbox"/> Quick stop by trouble <input checked="" type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input checked="" type="checkbox"/> Information		
Cause	Remedy	
Permanent interruption of communication to the PROFIBUS master. <ul style="list-style-type: none">See also chapter "Permanent interruption of PROFIBUS communication" (□ 64).	Check cables and terminals.	

Profibus: "Data_Exchange" status exited [0x01bc8131]

Response (Lenze setting printed in bold)		Setting: C13880/1 (<input checked="" type="checkbox"/> adjustable response)
<input checked="" type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input checked="" type="checkbox"/> Quick stop by trouble <input checked="" type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input checked="" type="checkbox"/> Information		
Cause	Remedy	
Data exchange via PROFIBUS has been stopped. <ul style="list-style-type: none">See also chapter "Permanent interruption of PROFIBUS communication" (□ 64).	Check cables and terminals. The slave must receive new parameterisation and configuration files from the master for again being able to exchange data.	

Profibus watchdog: DP-V1 MSC2 monitoring time exceeded [0x01bc8132]

Response (Lenze setting printed in bold)		Setting: C13880/2 (<input checked="" type="checkbox"/> adjustable response)
<input checked="" type="checkbox"/> None <input type="checkbox"/> System fault <input checked="" type="checkbox"/> Fault <input type="checkbox"/> Trouble <input checked="" type="checkbox"/> Quick stop by trouble <input checked="" type="checkbox"/> Warning locked <input type="checkbox"/> Warning <input checked="" type="checkbox"/> Information		
Cause	Remedy	
Permanent interruption of communication to the C2 PROFIBUS master. <ul style="list-style-type: none"> • See also chapter "Permanent interruption of PROFIBUS communication" (□ 64). 	Check cables and terminals.	

13 Parameter reference

This chapter complements the parameter list and table of attributes in the software manual and the »Engineer« online help for the Inverter Drive 8400 protec by the PROFIBUS parameters relevant for the communication.



Software manual/»Engineer« online help for the Inverter Drive 8400 protec

Here you can find general information on parameters.

13.1 Parameters relevant for the communication

This chapter lists the PROFIBUS parameters in numerically ascending order.

C13850

Parameter Name:		Data type: UNSIGNED_16
C13850 All words to master		Index: 10725 _d = 29E5 _h
Display of the process data words which are transmitted from the controller to the master.		
<ul style="list-style-type: none"> In the subcodes 1 to 16, all process data words to the master are displayed. However, only the configured process data words are valid. 		
Display area (min. value unit max. value)		
0		65535
Subcodes		Info
C13850/1		
...		
C13850/16		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13851

Parameter Name:		Data type: UNSIGNED_16
C13851 All words from master		Index: 10724 _d = 29E4 _h
Display of the process data words which are transmitted from the master to the controller.		
<ul style="list-style-type: none"> In the subcodes 1 to 16, all process data words from the master are displayed. However, only the configured process data words are valid. 		
Display area (min. value unit max. value)		
0		65535
Subcodes		Info
C13851/1		
...		
C13851/16		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13852

Parameter Name: C13852 All words to standard device		Data type: UNSIGNED_16 Index: 10723 _d = 29E3 _h
Display of the process data words 1 ... 16 which are transmitted from the master to the controller.		
• Subcodes 1 ... 16 displays all process data words to the standard device.		
Display area (min. value unit max. value)		
0		65535
Subcodes		Info
C13852/1		
...		
C13852/16		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13853

Parameter Name: C13853 All words from standard device		Data type: UNSIGNED_16 Index: 10722 _d = 29E2 _h
Display of the process data words 1 ... 16 which are transmitted from the controller to the master.		
• Subcodes 1 ... 16 displays all process data words from the standard device.		
Display area (min. value unit max. value)		
0		65535
Subcodes		Info
C13853/1		
...		
C13853/16		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13860

Parameter Name: C13860 Settings		Data type: UNSIGNED_8 Index: 10715 _d = 29DB _h
Display of current configuration data.		
Display area (min. value unit max. value)		
0		255
Subcodes		Info
C13860/1		PROFIsafe • 0: Not active • 1: Active
C13860/2		Number of process data words • 1 ... 16 words
C13860/3		DRIVECOM parameter data channel • 0: Not active • 1: Active
C13860/4		Number of PROFIsafe words • 0 or 4 words
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameter reference

Parameters relevant for the communication

C13861

Parameter Name: C13861 Bus status	Data type: UNSIGNED_16 Index: 10714 _d = 29DA _h
Bit coded display of the current bus status. ▶ Querying the current bus status (□ 70)	
Display area (min. value unit max. value)	
0 65535	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13862

Parameter Name: C13862 Bus counter	Data type: UNSIGNED_16 Index: 10713 _d = 29D9 _h
When the maximum count value of 65535 is reached, the counter starts again with 0.	
Display area (min. value unit max. value)	
0 65535	
Subcodes	Info
C13862/1	Data cycles per second
C13862/2	Total data cycles
C13862/3	Total parameterisation events
C13862/4	Total configuration events
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13863

Parameter Name: C13863 Baud rate	Data type: UNSIGNED_8 Index: 10712 _d = 29D8 _h
Display of baud rate	
Selection list (read only)	Info
0 12.00 Mbps	
1 6.00 Mbps	
2 3.00 Mbps	
3 1.50 Mbps	
4 500.00 kbps	
5 187.50 kbps	
6 93.75 kbps	
7 45.45 kbps	
8 19.20 kbps	
9 9.60 kbps	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13864

Parameter Name:	Data type: UNSIGNED_8 Index: 10711 _d = 29D7 _h
C13864 Active station address	
Display of active station address	
<ul style="list-style-type: none"> If the front panel DIP switches 1 to 64 are all in the "OFF" position (Lenze setting), the station address parameterised under C13899 becomes active and is displayed here after switching on. 	
▶ Setting the station address (□ 24)	
Display area (min. value unit max. value)	
0	255
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13865

Parameter Name:	Data type: OCTET_STRING Index: 10710 _d = 29D6 _h
C13865 Display: Last PRM data	
Display of the most recently sent parameter data from the PROFIBUS master with the "Set-Prm" telegram (ASCII string with 24 digits)	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13866

Parameter Name:	Data type: OCTET_STRING Index: 10709 _d = 29D5 _h
C13866 Display: Last CFG data	
Display of the most recently sent configuration data from the PROFIBUS master with the "Chk-Cfg" telegram (ASCII string with 22 digits)	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

C13867

Parameter Name:	Data type: OCTET_STRING Index: 10708 _d = 29D4 _h
C13867 Display: Last diagnostic data	
Display of the most recently sent diagnostic data to the PROFIBUS master (ASCII string with 16 digits)	
▶ Advanced diagnostic message (□ 71)	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

Communication manual 8400 protec PROFIBUS

Parameter reference

Parameters relevant for the communication

C13880

Parameter Name: C13880 Reaction on communication failure		Data type: UNSIGNED_8 Index: 10695 _d = 29C7 _h
Monitoring response in case of a communication fault on the PROFIBUS		
<ul style="list-style-type: none"> A change of the monitoring response is effective immediately. 		
<ul style="list-style-type: none"> ▶ Permanent interruption of PROFIBUS communication (□ 64) 		
Selection list		
	0	No response
	1	Fault
	3	Quick stop by trouble
	4	Warning locked
	6	Information
Subcodes	Lenze setting	Info
C13880/1	0: No response	The response set here for the "watchdog/data exchange" monitoring is executed if the bus station ... <ul style="list-style-type: none"> does not receive a message from the master within the watchdog monitoring time (during an active connection displayed under C13882/1). detects that it is no longer in the "DATA_EXCHANGE" status. Please see also the notes given under C13881.
C13880/2	0: No response	The response set here for "DPV1 MSC2" monitoring is activated if, during the monitoring time (during an active connection displayed in C13882/2), the node does not receive a "DPV1 MSAC2" message from the master and the MSAC2 connection is stopped from the slave. <p>Note:We recommend to set "Information" for the response in order that no drive-relevant response takes place.</p>
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13881

Parameter Name: C13881 Monit. time: Data exchange		Data type: UNSIGNED_16 Index: 10694 _d = 29C6 _h
If the DATA_EXCHANGE state has been exited, the response parameterised with C13880/1 is carried out when the time set here for the data exchange has expired.		
<ul style="list-style-type: none"> The value "65535" in this code deactivates monitoring. A change in monitoring is effective immediately. The value set here for the monitoring time must be smaller than the watchdog monitoring time (displayed under C13882/1). 		
<ul style="list-style-type: none"> ▶ Permanent interruption of PROFIBUS communication (□ 64) 		
Setting range (min. value unit max. value)		Lenze setting
0	ms	65535
		65535 ms
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13882

Parameter Name: C13882 Monitoring time: Watchdog		Data type: UNSIGNED_32 Index: 10693 _d = 29C5 _h
<p>Display of the watchdog monitoring time determined by the PROFIBUS master</p> <ul style="list-style-type: none"> • A change in the watchdog monitoring time is immediately effective. • Monitoring starts with the receipt of the first telegram. • When the value "0" is displayed, monitoring is deactivated. <p>▶ Permanent interruption of PROFIBUS communication (64)</p>		
Display area (min. value unit max. value)		
0	ms	4294967295
Subcodes		Info
C13882/1		Monitoring time watchdog
C13882/2		DP-V1 MSC2
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13885

Parameter Name: C13885 Delete process data		Data type: UNSIGNED_8 Index: 10690 _d = 29C2 _h
<p>Selection of the process data which the controller is to continue to process in order to maintain the internal communication in the event of a PROFIBUS failure.</p>		
Selection list (Lenze setting printed in bold)		
0	Use of the last master PDOs	
1	PDOs are set to the value'0'	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

C13886

Parameter Name: C13886 Set ext. diagnostic bit by		Data type: BITFIELD_8 Index: 10689 _d = 29C1 _h
<p>Bit-coded selection of the error responses in the standard device causing the external diagnostic bit ("diag bit") to be set (see PROFIBUS specification; bit 3 of byte 1 of the DP diagnostic messages).</p> <ul style="list-style-type: none"> • The diagnostic bit is sent from the controller to the host system where it is evaluated separately. • The diagnostic bit is always set when a system error occurs. • The Lenze setting "0" means that the diagnostic bit is not set for the following error responses. • An extended diagnostic message is generally sent. 		
Value is bit-coded:		Info
Bit 0	Fault	
Bit 1	Trouble	
Bit 2	Quick stop by trouble	
Bit 3	Warning locked	
Bit 4	Warning	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT		

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Parameter reference

Parameters relevant for the communication

C13899

Parameter | Name: **C13899 | Station address** Data type: UNSIGNED_8
Index: 10676_d = 29B4_h

Optional setting of the station address (instead of setting via DIP switches 1 ... 64)

- The station address set here only becomes effective if the DIP switches 1 ... 64 have been set to OFF prior to mains switching.
- The active station address is displayed under [C13864](#).

Note!

A change in the station address will not be effective until the "Save parameter set" command was executed and another mains switching for the module / drive was performed.

▶ [Setting the station address](#) (□ 24)

Setting range (min. value unit max. value)	Lenze setting
3	126 3
<input checked="" type="checkbox"/> Read access <input checked="" type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input checked="" type="checkbox"/> COM <input type="checkbox"/> MOT	

C13900

Parameter | Name: **C13900 | Firmware product type** Data type: VISIBLE_STRING
Index: 10675_d = 29B3_h

Display of the product type (string with a length of 8 bytes)

- The following identification code is displayed: "E84DFYPM".

Read access Write access CINH PLC-STOP No transfer PDO_MAP_RX PDO_MAP_TX COM MOT

C13901

Parameter | Name: **C13901 | Firmware compilation date** Data type: VISIBLE_STRING
Index: 10674_d = 29B2_h

Display of the compilation date of the firmware (string with a length of 20 bytes)

- The date ("MMM DD YYYY") and time ("hh:mm:ss") are displayed, e.g. "Mar 21 2005 12:31:21".

Read access Write access CINH PLC-STOP No transfer PDO_MAP_RX PDO_MAP_TX COM MOT

C13902

Parameter | Name: **C13902 | Firmware version** Data type: VISIBLE_STRING
Index: 10673_d = 29B1_h

Display of the firmware version (string with a length of 5 bytes)

- An identification code is displayed, e.g. "01.00.00.00".

Read access Write access CINH PLC-STOP No transfer PDO_MAP_RX PDO_MAP_TX COM MOT

C13920

Parameter | Name: **C13920 | Display: DIP switch setting** Data type: UNSIGNED_8
Index: 10655_d = 299F_h

Display of the current DIP switch setting

- The displayed value corresponds to the sum of the individual DIP switch values 1 ... 64.
- The active station address is displayed under [C13864](#).

▶ [Setting the station address](#) (□ 24)

Display area (min. value unit max. value)	
0	255
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer <input type="checkbox"/> PDO_MAP_RX <input type="checkbox"/> PDO_MAP_TX <input type="checkbox"/> COM <input type="checkbox"/> MOT	

13.2 Table of attributes

The table of attributes contains information required for a communication with the controller via parameters.

How to read the table of attributes:

Column	Meaning		Entry	
Code	Parameter name		Cxxxxx	
Name	Parameter short text (display text)		Text	
Index	dec	Index under which the parameter is addressed. The subindex for array variables corresponds to the Lenze subcode number.	24575 - Lenze code number	Is only required for access via a bus system.
	hex		5FFF _h - Lenze code number	
Data	DS	Data structure	E	Single variable (only one parameter element)
			A	Array variable (Several parameter elements)
	DA	Number of array elements (subcodes)	Number	
	DT	Data type	BITFIELD_8	1 byte, bit-coded
			BITFIELD_16	2 bytes, bit-coded
			BITFIELD_32	4 bytes, bit-coded
			INTEGER_8	1 byte with sign
			INTEGER_16	2 bytes with sign
			INTEGER_32	4 bytes with sign
			UNSIGNED_8	1 byte without sign
			UNSIGNED_16	2 bytes without sign
			UNSIGNED_32	4 bytes, without sign
			VISIBLE_STRING	ASCII string
OCTET_STRING				
Factor	Factor for data transmission via a bus system, depending on the number of decimal positions	Factor	1 = no decimal positions 10 = 1 decimal position 100 = 2 decimal positions 1000 = 3 decimal positions	
Access	R	Read access	<input checked="" type="checkbox"/> Reading permitted	
	W	Write access	<input checked="" type="checkbox"/> Writing permitted	
	CINH	Controller inhibit required	<input checked="" type="checkbox"/> Writing is only possible if controller inhibit is set	

Table of attributes

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C13850	All words to master	10725	29E5	A	16	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13851	All words from master	10724	29E4	A	16	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13852	All words to standard device	10723	29E3	A	16	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13853	All words from standard device	10722	29E2	A	16	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13860	Settings	10715	29DB	A	4	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13861	Bus status	10714	29DA	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13862	Bus counter	10713	29D9	A	4	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C13863	Baud rate	10712	29D8	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13864	Active station address	10711	29D7	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C13865	Display: Last PRM data	10710	29D6	E	1	OCTET_STRING		<input checked="" type="checkbox"/>		
C13866	Display: Last CFG data	10709	29D5	E	1	OCTET_STRING		<input checked="" type="checkbox"/>		
C13867	Display: Last diagnostic data	10708	29D4	E	1	OCTET_STRING		<input checked="" type="checkbox"/>		
C13880	Reaction on communication failure	10695	29C7	A	2	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13881	Monit. time: Data exchange	10694	29C6	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13882	Monitoring time: Watchdog	10693	29C5	A	2	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C13885	Delete process data	10690	29C2	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13886	Set ext. diagnostic bit by	10689	29C1	E	1	BITFIELD_8		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13899	Station address	10676	29B4	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
C13900	Firmware product type	10675	29B3	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C13901	Firmware compile date	10674	29B2	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C13902	Firmware version	10673	29B1	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C13920	Display: DIP switch setting	10655	299F	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		

13.3 Implemented PROFIdrive objects (DP-V1)

I-918

Index Name:		Data type: U16
0x918 Display of station address		
Display of the station address set		
Display area (min. value unit max. value)		
1		126
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access		

I-963

Index Name:		Data type: U16
0x963 Baud rate		
Display of the PROFIBUS baud rate		
Selection list (read only)		
0	9.6 kbps	
1	19.2 kbps	
2	93.75 kbps	
3	187.5 kbps	
4	500 kbps	
6	1.5 Mbps	
7	3 Mbps	
8	6 Mbps	
9	12 Mbps	
10	31.25 kbps	
11	45.45 kbps	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access		

I-964

Index Name:		Data type: U16
0x964 Device identification		
Display of identification data		
Subindex	Display	Info
0x964/0	262	Manufacturer: Lenze
0x964/1	8400	Device type
0x964/2	xxyy	Software version, e.g. 0100 (V 01.00)
0x964/3	yyyy	Firmware date (year), e.g. 2007
0x964/4	ddmm	Firmware date (day/month), e.g. 0506 (5th June)
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access		

I-974

Index Name:		Data type: U16
0x974 Maximum time per DPV1 parameter access		
Display of access statistics		
Subindex	Display	Info
0x974/0	240 bytes	Maximum block length
0x974/1	40	Maximum number of parameter accesses
0x974/2	0	Maximum time per access
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access		

14 DIP switch positions for setting the station address

The station address results from the sum of the binary valencies of the switches 1 ... 64.

The following table shows the switch positions for the valid address range 0 ... 126.

▶ [Setting the station address](#) (□ 24)

Station address (MAC ID)	DIP switch						
	64	32	16	8	4	2	1
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	OFF	ON	ON
4	OFF	OFF	OFF	OFF	ON	OFF	OFF
5	OFF	OFF	OFF	OFF	ON	OFF	ON
6	OFF	OFF	OFF	OFF	ON	ON	OFF
7	OFF	OFF	OFF	OFF	ON	ON	ON
8	OFF	OFF	OFF	ON	OFF	OFF	OFF
9	OFF	OFF	OFF	ON	OFF	OFF	ON
10	OFF	OFF	OFF	ON	OFF	ON	OFF
11	OFF	OFF	OFF	ON	OFF	ON	ON
12	OFF	OFF	OFF	ON	ON	OFF	OFF
13	OFF	OFF	OFF	ON	ON	OFF	ON
14	OFF	OFF	OFF	ON	ON	ON	OFF
15	OFF	OFF	OFF	ON	ON	ON	ON
16	OFF	OFF	ON	OFF	OFF	OFF	OFF
17	OFF	OFF	ON	OFF	OFF	OFF	ON
18	OFF	OFF	ON	OFF	OFF	ON	OFF
19	OFF	OFF	ON	OFF	OFF	ON	ON
20	OFF	OFF	ON	OFF	ON	OFF	OFF
21	OFF	OFF	ON	OFF	ON	OFF	ON
22	OFF	OFF	ON	OFF	ON	ON	OFF
23	OFF	OFF	ON	OFF	ON	ON	ON
24	OFF	OFF	ON	ON	OFF	OFF	OFF
25	OFF	OFF	ON	ON	OFF	OFF	ON
26	OFF	OFF	ON	ON	OFF	ON	OFF
27	OFF	OFF	ON	ON	OFF	ON	ON
28	OFF	OFF	ON	ON	ON	OFF	OFF
29	OFF	OFF	ON	ON	ON	OFF	ON
30	OFF	OFF	ON	ON	ON	ON	OFF
31	OFF	OFF	ON	ON	ON	ON	ON
32	OFF	ON	OFF	OFF	OFF	OFF	OFF
33	OFF	ON	OFF	OFF	OFF	OFF	ON
34	OFF	ON	OFF	OFF	OFF	ON	OFF
35	OFF	ON	OFF	OFF	OFF	ON	ON
36	OFF	ON	OFF	OFF	ON	OFF	OFF
37	OFF	ON	OFF	OFF	ON	OFF	ON

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DIP switch positions for setting the station address

Station address (MAC ID)	DIP switch						
	64	32	16	8	4	2	1
38	OFF	ON	OFF	OFF	ON	ON	OFF
39	OFF	ON	OFF	OFF	ON	ON	ON
40	OFF	ON	OFF	ON	OFF	OFF	OFF
41	OFF	ON	OFF	ON	OFF	OFF	ON
42	OFF	ON	OFF	ON	OFF	ON	OFF
43	OFF	ON	OFF	ON	OFF	ON	ON
44	OFF	ON	OFF	ON	ON	OFF	OFF
45	OFF	ON	OFF	ON	ON	OFF	ON
46	OFF	ON	OFF	ON	ON	ON	OFF
47	OFF	ON	OFF	ON	ON	ON	ON
48	OFF	ON	ON	OFF	OFF	OFF	OFF
49	OFF	ON	ON	OFF	OFF	OFF	ON
50	OFF	ON	ON	OFF	OFF	ON	OFF
51	OFF	ON	ON	OFF	OFF	ON	ON
52	OFF	ON	ON	OFF	ON	OFF	OFF
53	OFF	ON	ON	OFF	ON	OFF	ON
54	OFF	ON	ON	OFF	ON	ON	OFF
55	OFF	ON	ON	OFF	ON	ON	ON
56	OFF	ON	ON	ON	OFF	OFF	OFF
57	OFF	ON	ON	ON	OFF	OFF	ON
58	OFF	ON	ON	ON	OFF	ON	OFF
59	OFF	ON	ON	ON	OFF	ON	ON
60	OFF	ON	ON	ON	ON	OFF	OFF
61	OFF	ON	ON	ON	ON	OFF	ON
62	OFF	ON	ON	ON	ON	ON	OFF
63	OFF	ON	ON	ON	ON	ON	ON
64	ON	OFF	OFF	OFF	OFF	OFF	OFF
65	ON	OFF	OFF	OFF	OFF	OFF	ON
66	ON	OFF	OFF	OFF	OFF	ON	OFF
67	ON	OFF	OFF	OFF	OFF	ON	ON
68	ON	OFF	OFF	OFF	ON	OFF	OFF
69	ON	OFF	OFF	OFF	ON	OFF	ON
70	ON	OFF	OFF	OFF	ON	ON	OFF
71	ON	OFF	OFF	OFF	ON	ON	ON
72	ON	OFF	OFF	ON	OFF	OFF	OFF
73	ON	OFF	OFF	ON	OFF	OFF	ON
74	ON	OFF	OFF	ON	OFF	ON	OFF
75	ON	OFF	OFF	ON	OFF	ON	ON
76	ON	OFF	OFF	ON	ON	OFF	OFF
77	ON	OFF	OFF	ON	ON	OFF	ON
78	ON	OFF	OFF	ON	ON	ON	OFF
79	ON	OFF	OFF	ON	ON	ON	ON
80	ON	OFF	ON	OFF	OFF	OFF	OFF

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DIP switch positions for setting the station address

Station address (MAC ID)	DIP switch						
	64	32	16	8	4	2	1
81	ON	OFF	ON	OFF	OFF	OFF	ON
82	ON	OFF	ON	OFF	OFF	ON	OFF
83	ON	OFF	ON	OFF	OFF	ON	ON
84	ON	OFF	ON	OFF	ON	OFF	OFF
85	ON	OFF	ON	OFF	ON	OFF	ON
86	ON	OFF	ON	OFF	ON	ON	OFF
87	ON	OFF	ON	OFF	ON	ON	ON
88	ON	OFF	ON	ON	OFF	OFF	OFF
89	ON	OFF	ON	ON	OFF	OFF	ON
90	ON	OFF	ON	ON	OFF	ON	OFF
91	ON	OFF	ON	ON	OFF	ON	ON
92	ON	OFF	ON	ON	ON	OFF	OFF
93	ON	OFF	ON	ON	ON	OFF	ON
94	ON	OFF	ON	ON	ON	ON	OFF
95	ON	OFF	ON	ON	ON	ON	ON
96	ON	ON	OFF	OFF	OFF	OFF	OFF
97	ON	ON	OFF	OFF	OFF	OFF	ON
98	ON	ON	OFF	OFF	OFF	ON	OFF
99	ON	ON	OFF	OFF	OFF	ON	ON
100	ON	ON	OFF	OFF	ON	OFF	OFF
101	ON	ON	OFF	OFF	ON	OFF	ON
102	ON	ON	OFF	OFF	ON	ON	OFF
103	ON	ON	OFF	OFF	ON	ON	ON
104	ON	ON	OFF	ON	OFF	OFF	OFF
105	ON	ON	OFF	ON	OFF	OFF	ON
106	ON	ON	OFF	ON	OFF	ON	OFF
107	ON	ON	OFF	ON	OFF	ON	ON
108	ON	ON	OFF	ON	ON	OFF	OFF
109	ON	ON	OFF	ON	ON	OFF	ON
110	ON	ON	OFF	ON	ON	ON	OFF
111	ON	ON	OFF	ON	ON	ON	ON
112	ON	ON	ON	OFF	OFF	OFF	OFF
113	ON	ON	ON	OFF	OFF	OFF	ON
114	ON	ON	ON	OFF	OFF	ON	OFF
115	ON	ON	ON	OFF	OFF	ON	ON
116	ON	ON	ON	OFF	ON	OFF	OFF
117	ON	ON	ON	OFF	ON	OFF	ON
118	ON	ON	ON	OFF	ON	ON	OFF
119	ON	ON	ON	OFF	ON	ON	ON
120	ON	ON	ON	ON	OFF	OFF	OFF
121	ON	ON	ON	ON	OFF	OFF	ON
122	ON	ON	ON	ON	OFF	ON	OFF
123	ON	ON	ON	ON	OFF	ON	ON

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DIP switch positions for setting the station address

Station address (MAC ID)	DIP switch						
	64	32	16	8	4	2	1
124	ON	ON	ON	ON	ON	OFF	OFF
125	ON	ON	ON	ON	ON	OFF	ON

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