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SINAMICS drives

SINAMICS DCM DC Converter

SIMOTION

Guideline

Edition 02/2017

Answers for industry.

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SINAMICS DCM Guideline SIMOTION

Installation Manual

02.2017

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indicates that minor personal injury can result if proper precautions are not taken.

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Table of contents

Introduction 1

1.1 General information

This document is a guideline for the connection of a SINAMICS DCM to a SIMOTION controller.

It describes

- The basic configuration and integration in the HW Config as PN and DP slave
- The connection to a technology object (TO) as
  - Drive axis
  - Position axis
- The integration as DP/PN slave without direct connection to a TO axis.

Detailed information about communication via PROFIBUS and PROFINET including information on setting the system cycle clock and IRT communication, can be found in the SIMOTION Communication Manual, Section 5.

SIMOTION Communication Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476535)

1.2 Requirements

This document assumes that you have basic knowledge in the operation and handling of SIMOTION SCOUT and SIMATIC STEP 7 as well as HW Config.

It is also assumes that you have knowledge in the programming of SIMOTION and SIMATIC STEP 7.

General information on SIMOTION SCOUT can be found in the Configuration Manual

SIMOTION SCOUT Configuration Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476540)

or SIMOTION SCOUT TIA

SIMOTION SCOUT TIA Configuration Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476550)

Configuration of a SINAMICS DCM in the HW Config 2

Requirements:

The basic configuration of the SIMOTION system has been performed:

- Module created
- Bus system created: PROFIBUS or PROFINET defined

Additional information on the connection of a drive to the SIMOTION controller via PROFIBUS and PROFINET can be found in the System Manual.

SIMOTION TO Axis Electric/Hydraulic, External Encoder Function Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476542)

2.1 Inserting the drive in the HW Config by means of PROFINET

1. Open the HW Config.
2. Open or display the hardware catalog.

3. The SINAMICS DCM can be found in the catalog at the "PROFINET IO - Drives - SINAMICS" node.

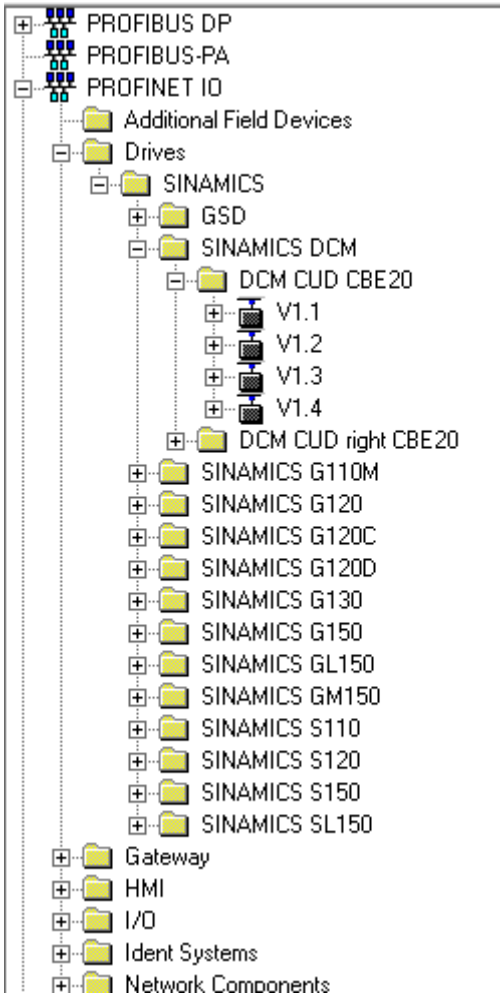

Figure 2-1 SINAMICS DCM in the hardware catalog with PROFINET

4. Select the appropriate device with the correct version (DCM CUD CBE20, DCM CUD right CBE20, correct firmware version) and connect it to the bus system.

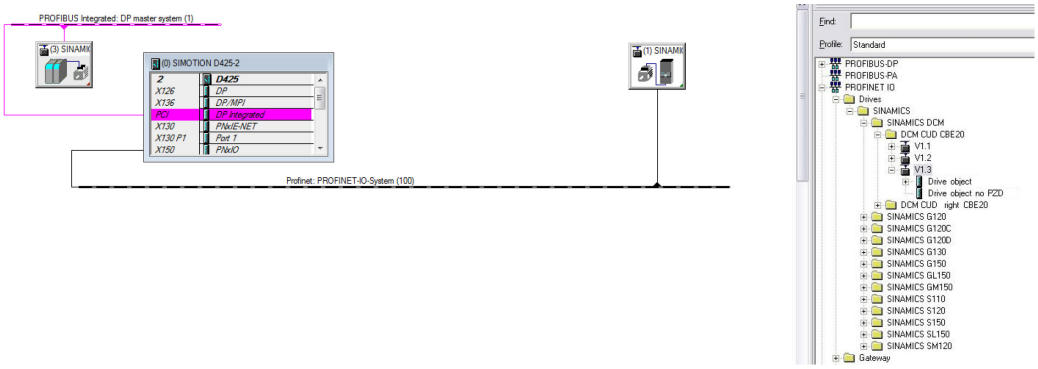

Figure 2-2 Connecting SINAMICS DCM to the bus system

Note

There is no separate catalog entry for firmware version V1.4 SP1. The device with version V1.4 must be used. After entering the IP address, the version V1.4.1 = V1.4 SP1 or V1.4 can be selected in the following dialog box. See step 6 and Fig. 3.1 – 4

5. Definition and setting of the IP address and selection of the subnet:

   The subnet and the IP address of the slave must be set here.

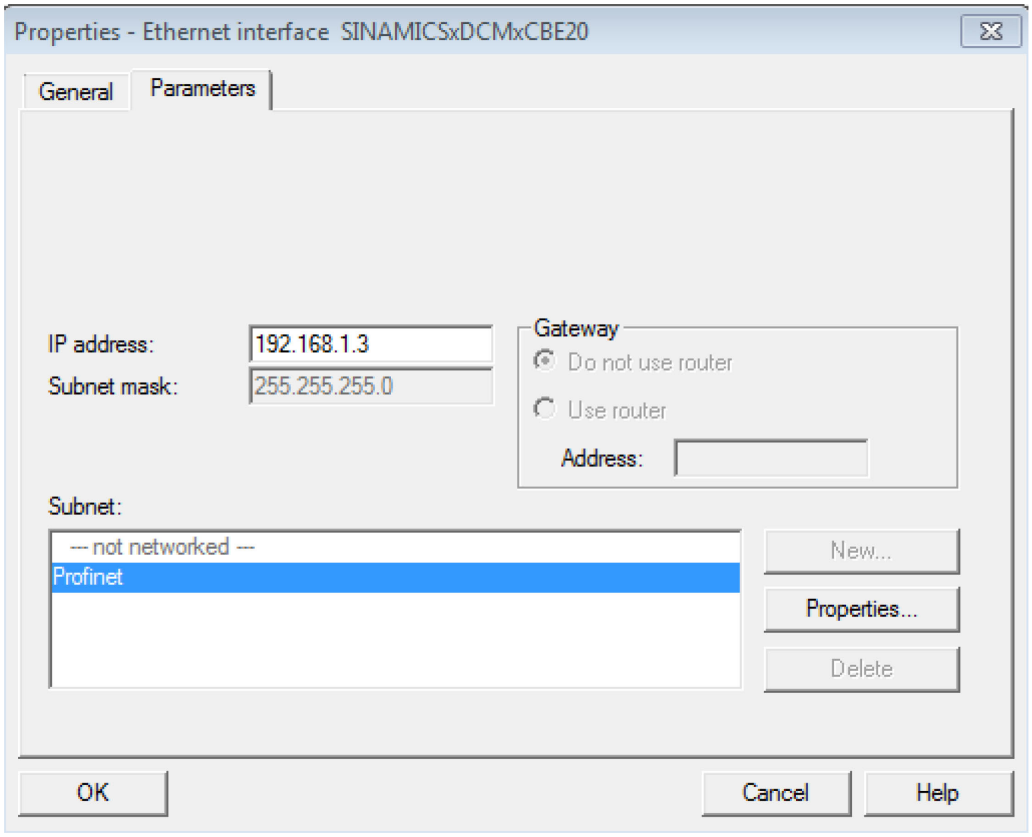

Figure 2-3 Setting the IP address and the subnet for the SINAMICS DCM

6. Selection of the software version V1.4 or V1.4.1:

   The selection is limited, with one exception, to the version selected in step 4. The exception is version 1.4 and version V1.4 SP1. A selection can be made between V1.4 and V1.4.1 = SP1.

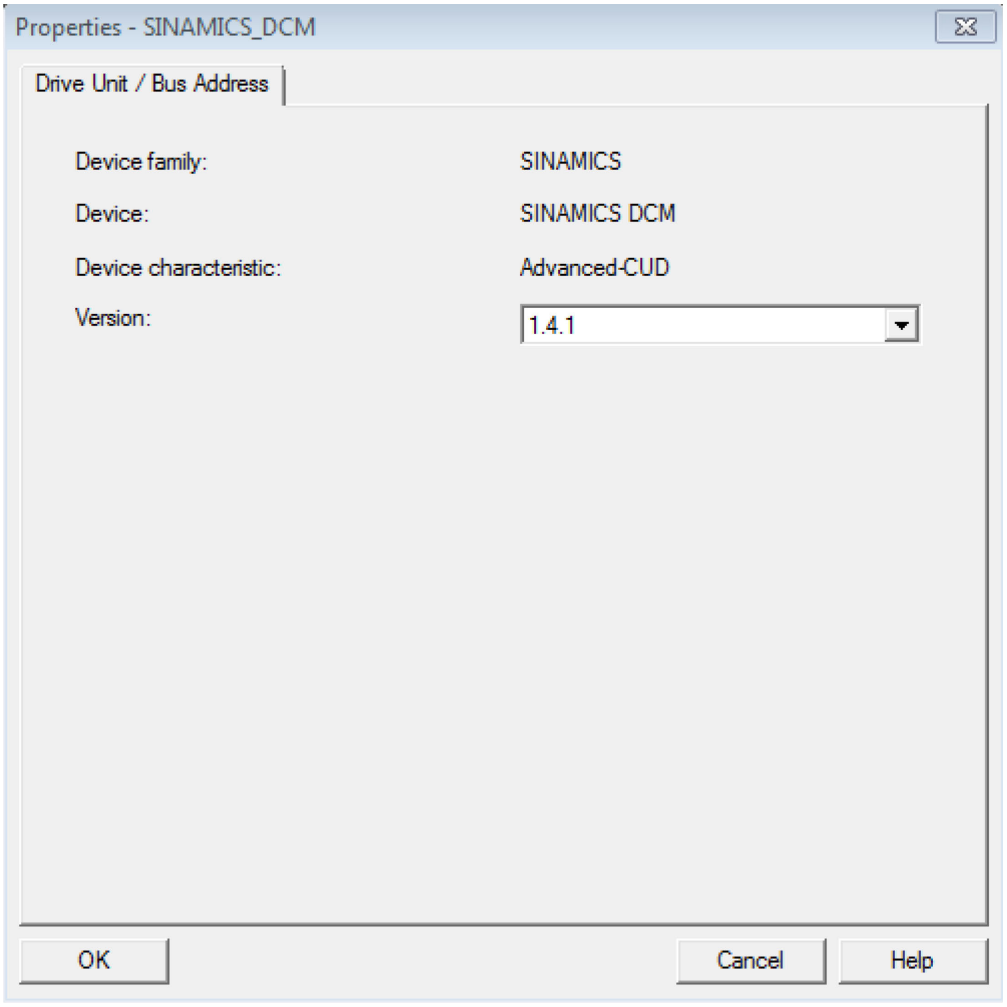

Figure 2-4 Selection of the SINAMICS DCM software version

7. Check or activation of the isochronous operation for the CBE20 and the DCM:

Note

The DCM cannot be operated isochronously. Only the connection to an isochronous system is possible. The control cycle clock of the DCM is not synchronized. The control cycle clock for the DCM is 3.3 ms.

– Integration of the DCM in the PROFINET topology:

The physical bus connection must be defined in the topology setting of the PROFINET system. You must specify which port of the DCM communicates with the partner port of the next device.

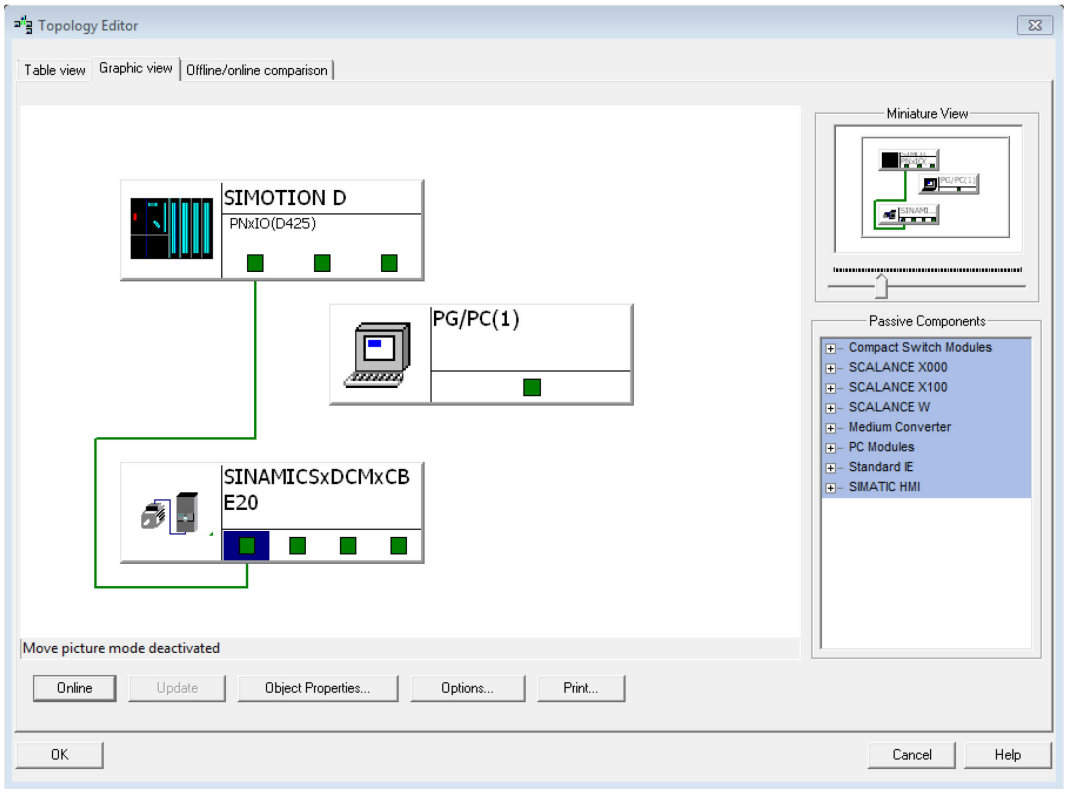

Figure 2-5 Integration of the SINAMICS DCM in the PROFINET topology

When creating the connection, a dialog appears in which you must specify the cable length as well as the medium (copper or fiber optic cable).

– Check/activation of the sync slave mode for the DCM:

This function is set at the "Domain management" menu item. It can be opened via the "Edit - PROFINET IO" menu, or by right-clicking the drive system on the bus or the port of the SIMOTION device.

In this dialog box, the send clock time, as well as the synchronization role (master/slave), the RT class, the IRT option for the master and for the slave, and the nodes can be set.

The DCM with the CBE20 only supports IRT with high performance.

Information on PROFINET and RT/IRT communication can be found in Section 5 of the SIMOTION Communication Manual.

SIMOTION Communication Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476535)

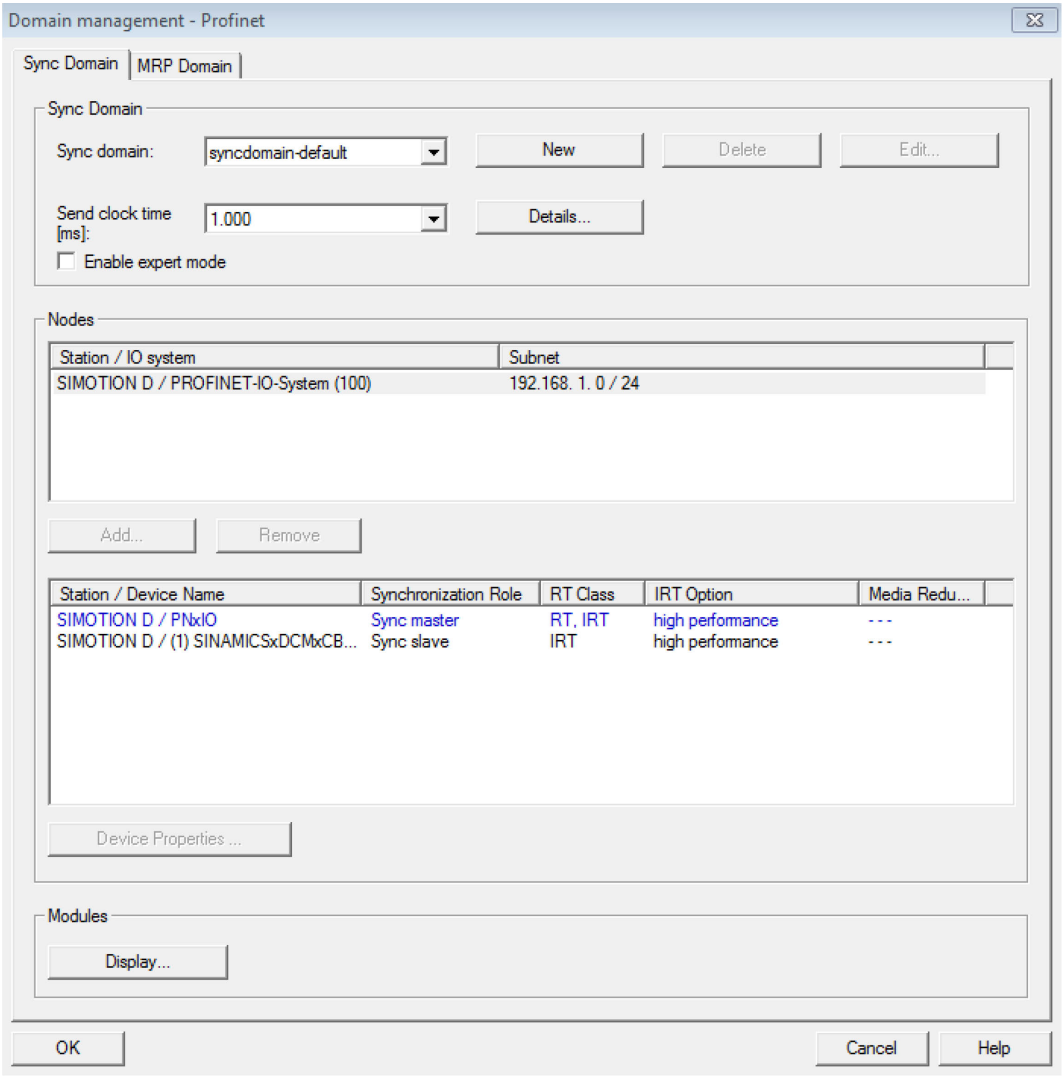

Figure 2-6 Activation of the sync slave mode for the SINAMICS DCM

By selecting a station / device name in the lower selection field, you can define the role of the master and the slave by clicking the "Device Properties" button.

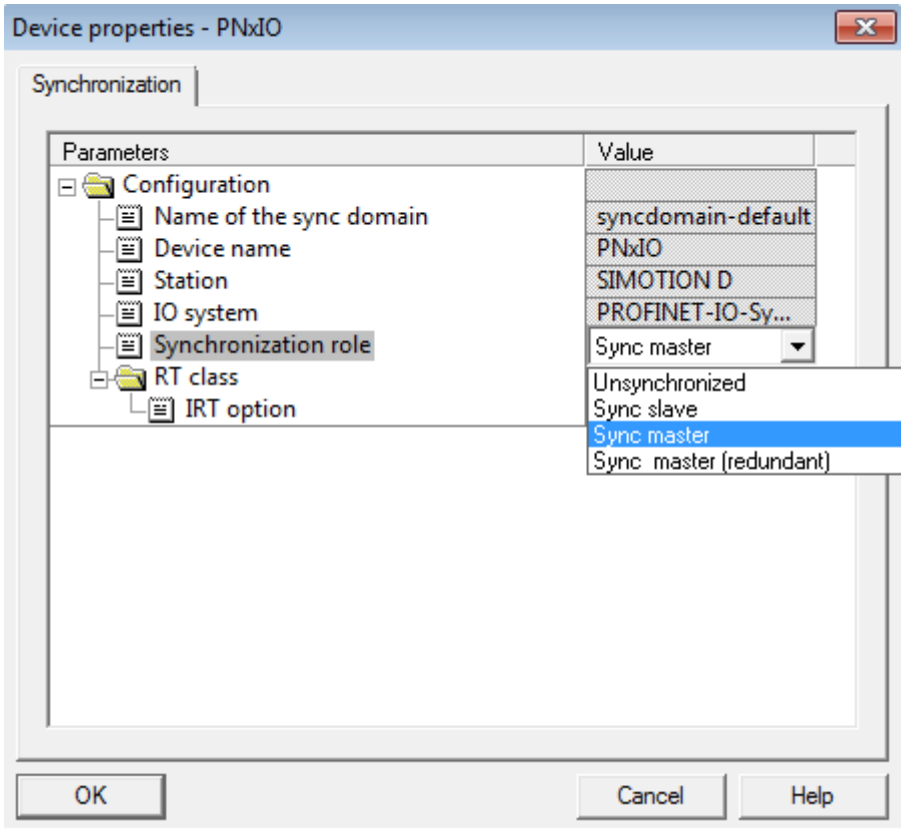

Figure 2-7 Configuration of the sync master synchronization role

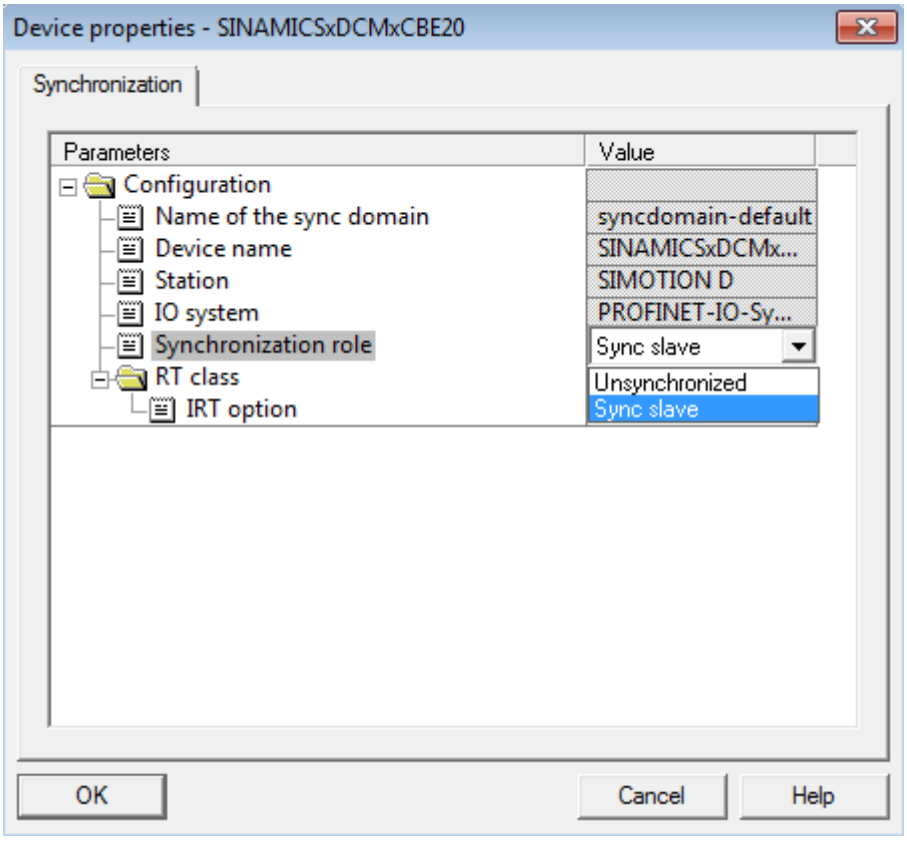

Figure 2-8 Configuration of the sync slave synchronization role

8. Configuration of the DCM: Creating the drive object.

   In order to obtain the correct telegram structure in the drive, it must be configured and created in SIMOTION SCOUT.

   The following standard telegrams are available for the telegram configuration for a direct link to a TO axis.

   – Standard telegram 1..... Drive axis
   – Standard telegram 3..... Positioning axis with one encoder
   – Standard telegram 4..... Positioning axis with two encoders

   The configuration steps of the SINAMICS DCM can be found in the Operating Instructions.

2.2 Integration as PROFIBUS slave

1. Open the HW Config.
2. Open or display the hardware catalog.

3. The SINAMICS DCM can be found in the catalog at the "PROFIBUS DP - SINAMICS" node. The correct entry must be selected according to the HW version and connected to the PROFIBUS.

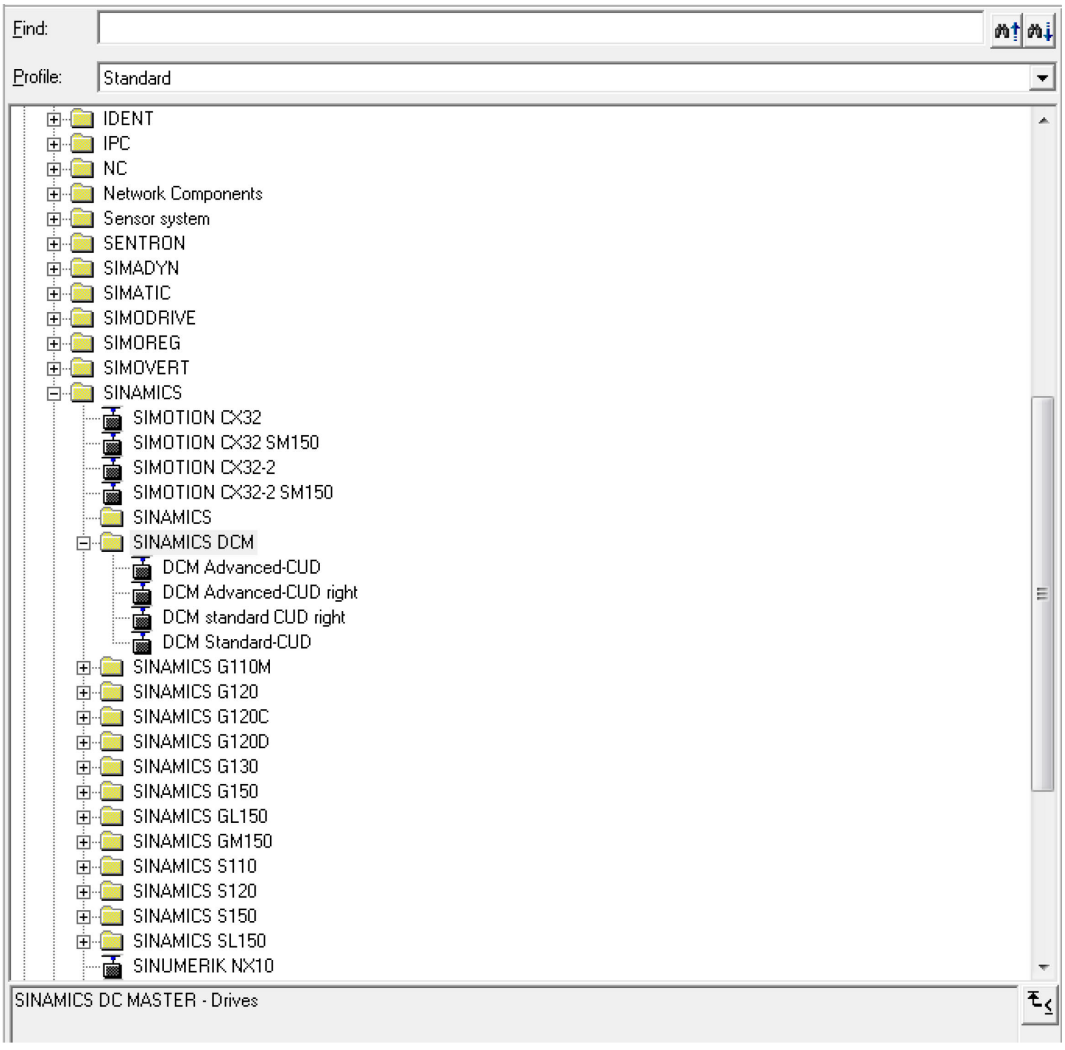

Figure 2-9 SINAMICS DCM in the hardware catalog with PROFIBUS

4. Selection of the bus segment and the slave address.

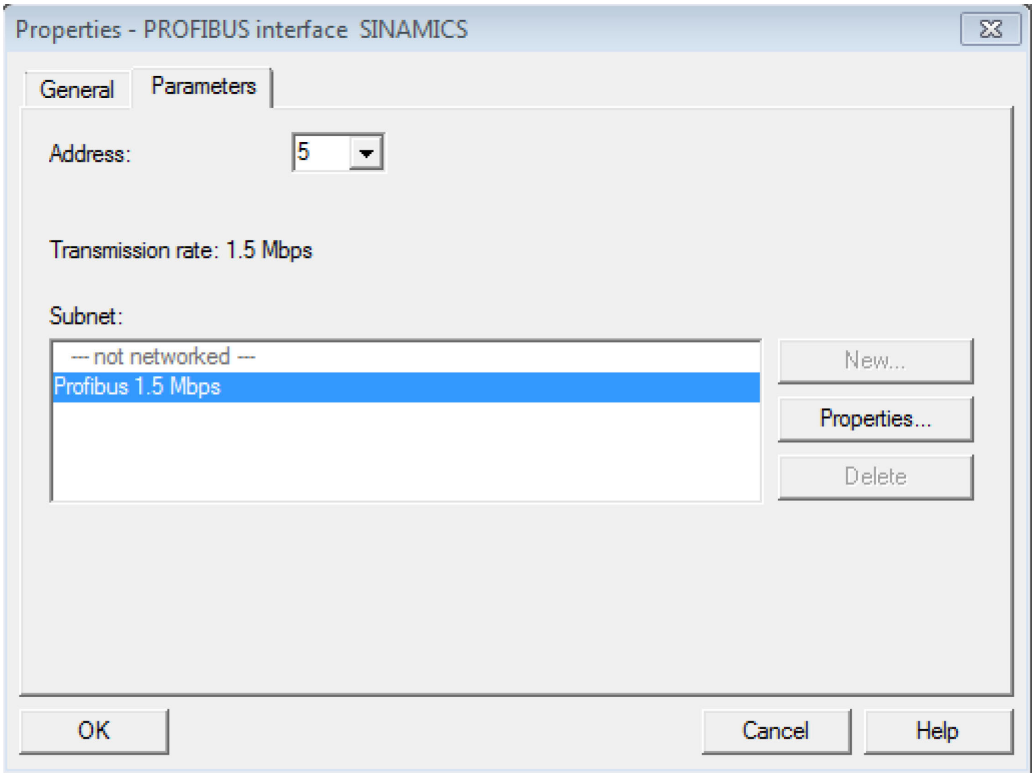

Figure 2-10 Selection of the PROFIBUS address and the bus segment for the SINAMICS DCM

5. Selection of the correct firmware version.

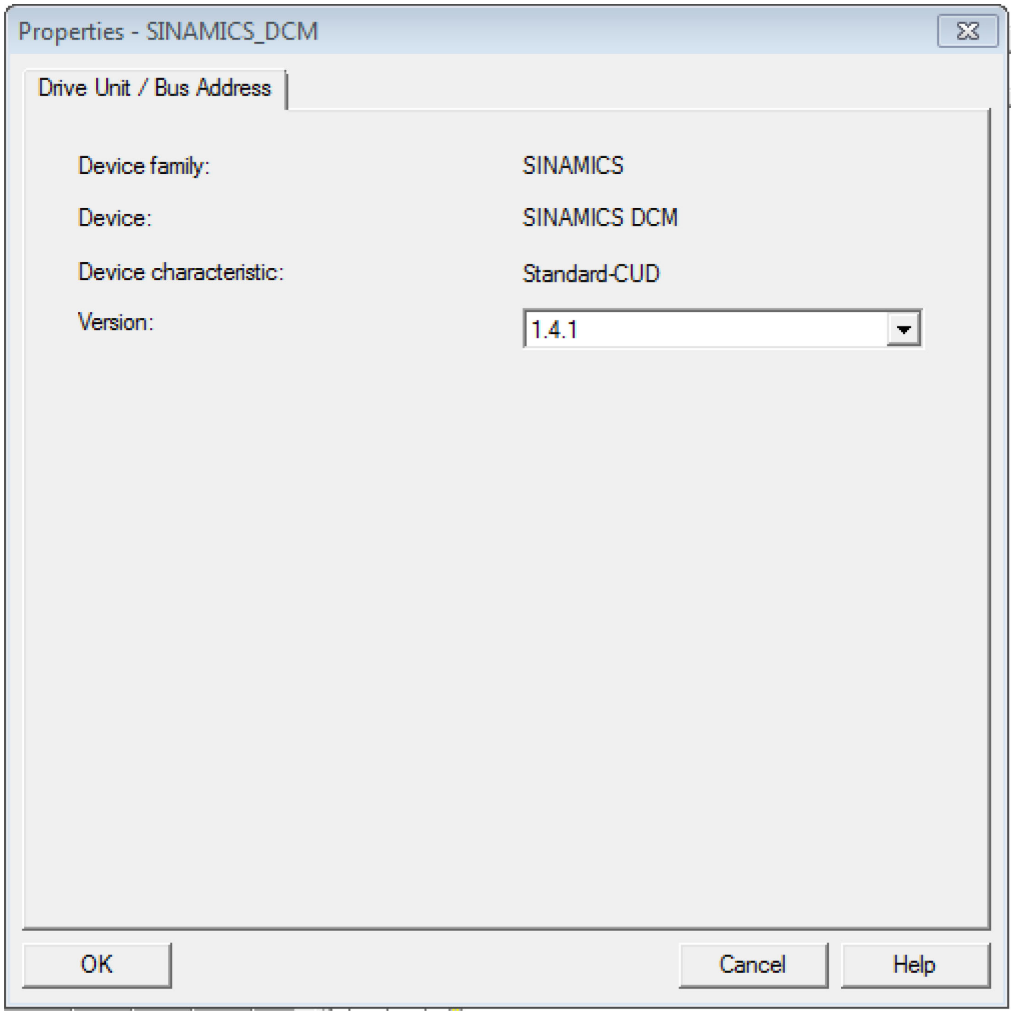

Figure 2-11 Selection of the SINAMICS DCM software version

6. Telegram selection: The telegram selection can also be made later or adjusted during the drive configuration.

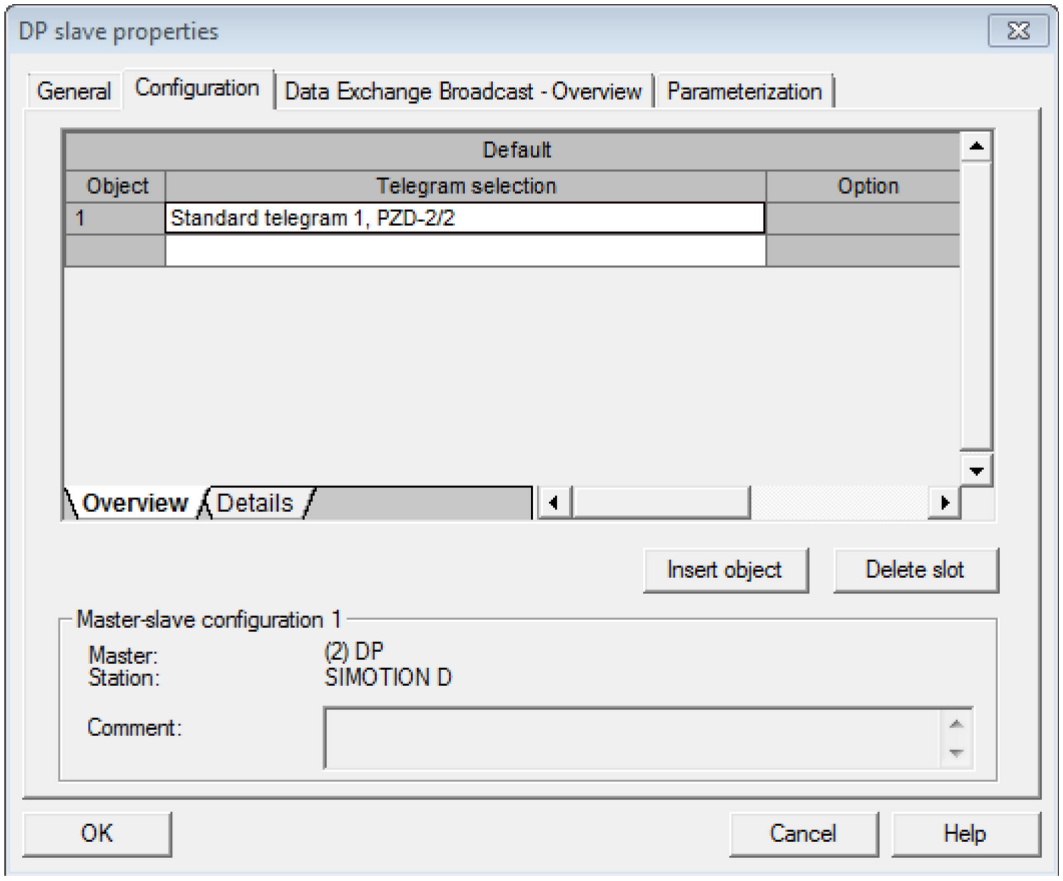

Figure 2-12 PROFIBUS telegram selection for the SINAMICS DCM

Integration of the SINAMICS DCM in the user program

3

3.1 Use of a technology object axis

The following section describes the linking of a SINAMICS DCM to a technology object (TO) axis.

Detailed notes and information on the technology object can be found in the TO Axis Function Manual:

SIMOTION TO Axis Electric/Hydraulic, External Encoder Function Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476542)

General notes on the use of the DCM with a SIMOTION/T-CPU technology object:

The DCM supports two encoder types: Incremental encoders with square-wave track and encoders with SSI interface. The latter can only be used with an SMC30 module and an Advanced CUD.

All other encoder types can only be imported via bus or via the CU320 (integrated) and assigned to the axis via a TO externalEncoder.

Detailed information on the functions and integration can be found in Sections 9 – 11.

Since the SINAMICS DCM does not have any high-speed inputs, data transfer from the drive is not possible for the homing. All measuring inputs and reversing cams must be manually assigned accordingly.

High-speed measuring inputs, for example, can be imported via the digital inputs of the SIMOTION or by means of the TM15, TM17 and a CU320.

1. Creating an axis in SIMOTION:

   In order to be able to use an axis object, it must first be created. To do this, a TO or an axis must be created under "AXES" (Fig. 4.1 – 1). Double-click "Insert axis" to start the wizard to create an axis.

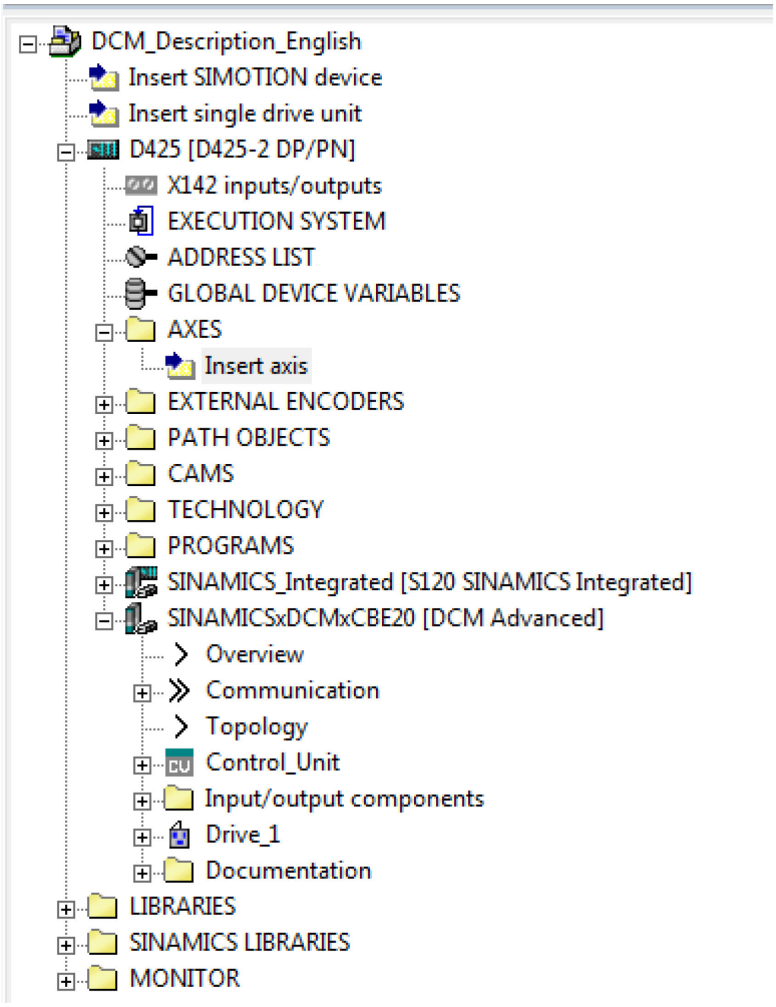

Figure 3-1 Inserting an axis in SIMOTION

2. Specifying the technology

   The function of the axis must be defined:

   – Speed control
   – Positioning
   – Synchronous operation
   – Path interpolation

The technology packages to be selected depend on the application.

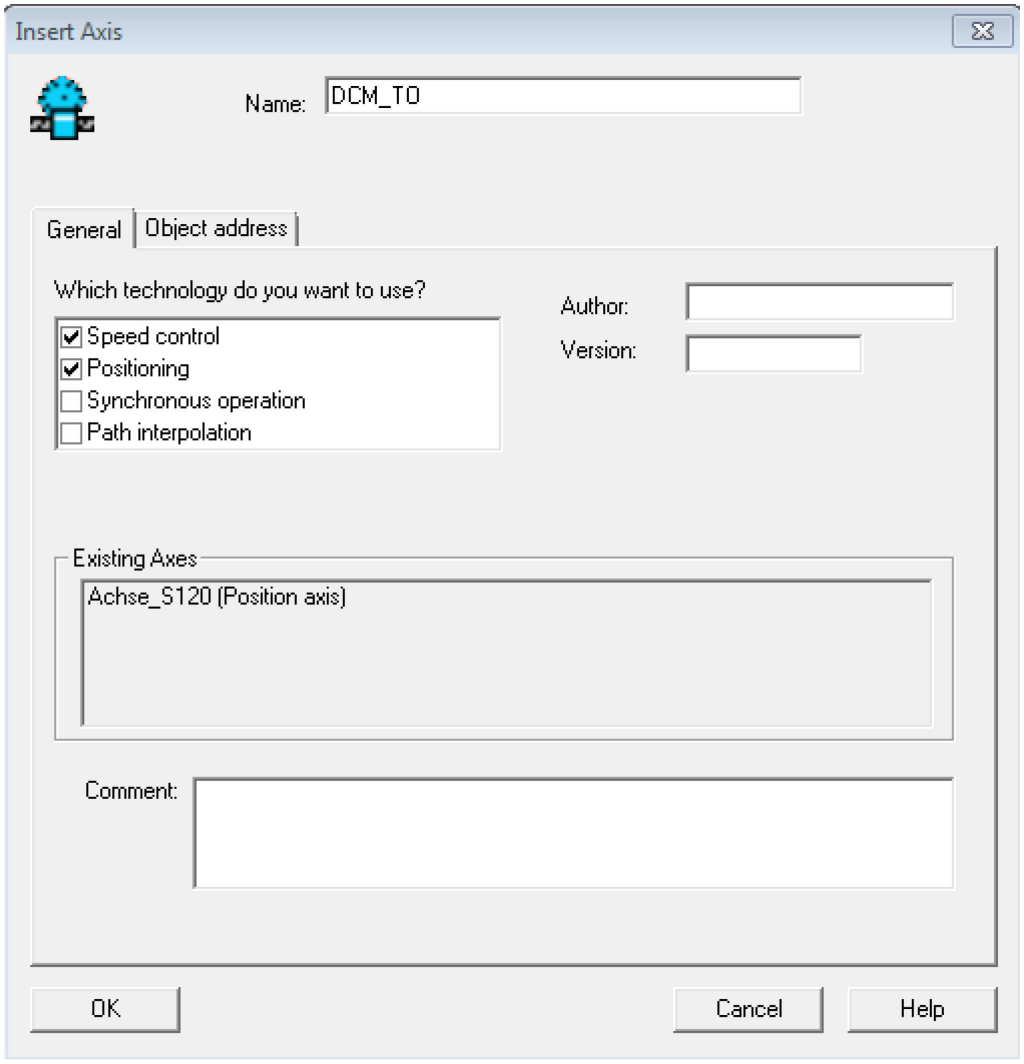

Figure 3-2 Technology selection for the axis

In this example, the axis is used as a normal position axis.

3. Specifying the axis type:

   A linear or a rotary axis must be selected depending on the application. However, for the SINAMICS DCM it must be an electric axis. The units can also be defined by clicking the "Configure units" button.

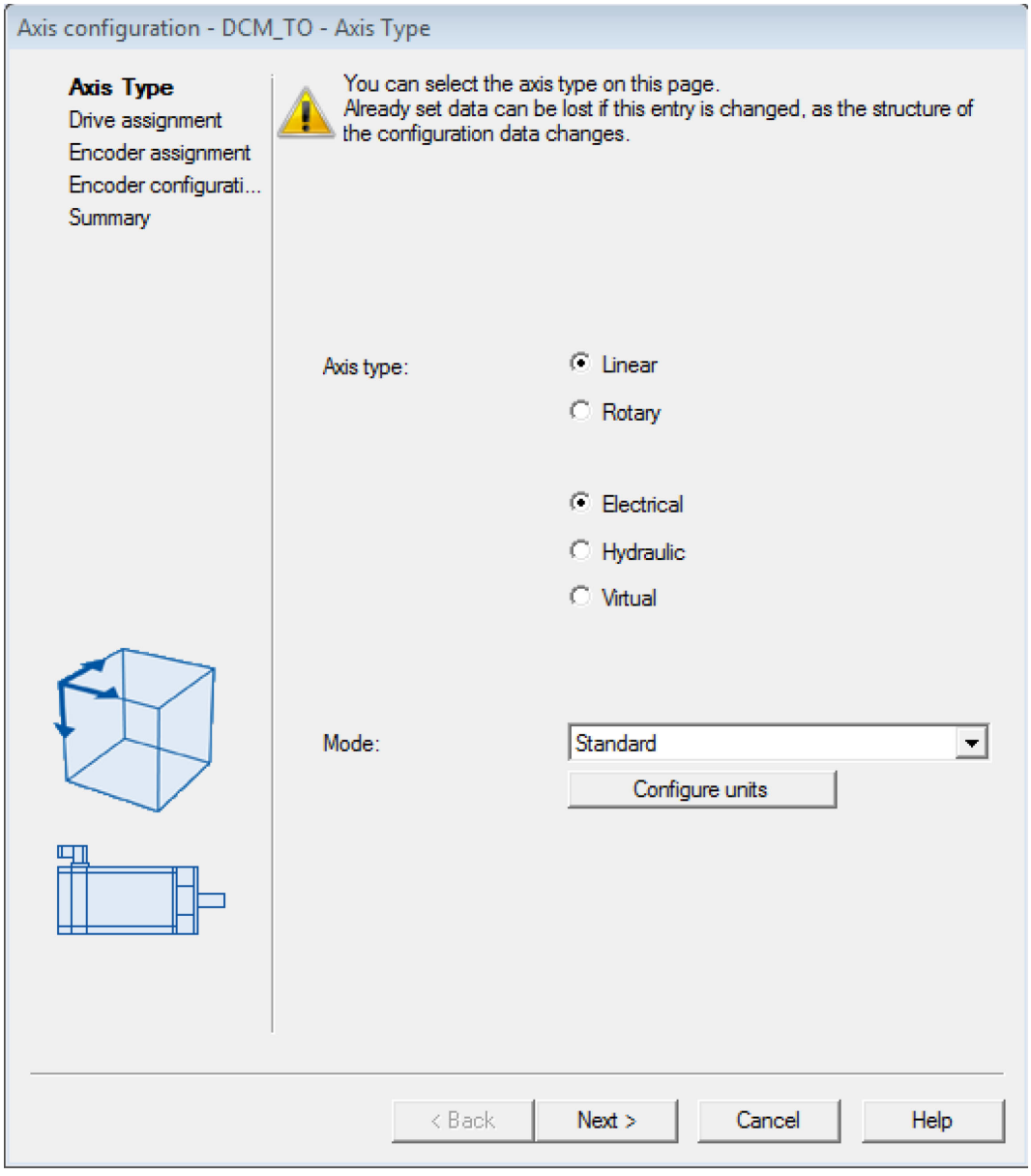

Figure 3-3 Specifying the axis type

4. Assigning the technology object or the technology axis to the real drive:

   After the axis selection, the connection to the drive is made. A list of the available drives is displayed in the top section of the dialog box. The assignment is made by clicking the "Set up addresses" button.

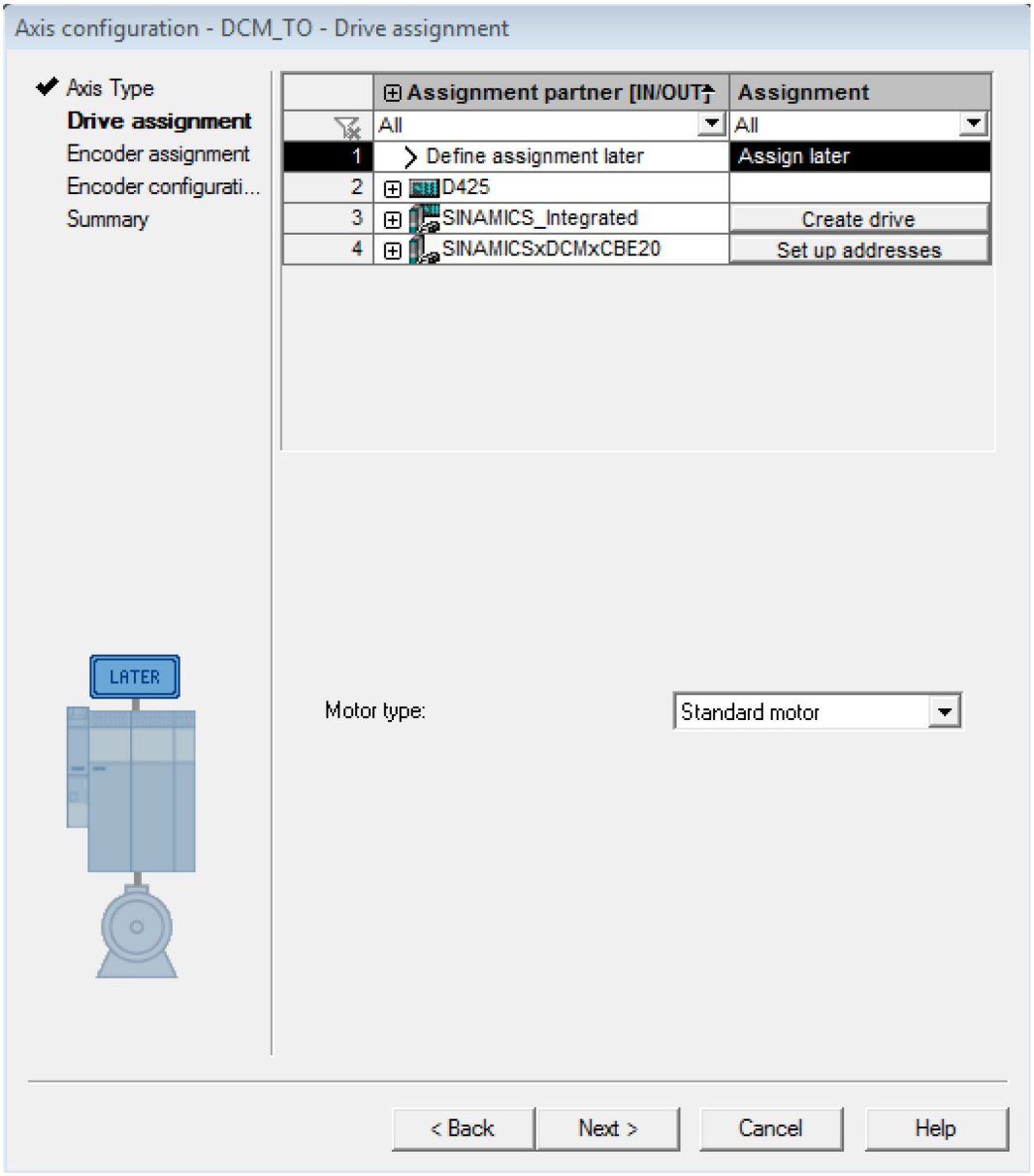

Figure 3-4 Assigning the axis to the drive

The PROFIdrive telegram used and the respective associated input and output address of the SIMOTION module are displayed at Properties. The speed must now be normalized accordingly.

The normalization must be identical in the drive and in the SIMOTION system, otherwise the speed values are different and therefore one of the values will be interpreted incorrectly, because only integer values in percent with 16 or 32 bits are transferred via the bus. The 16-bit setpoint / actual value 16384 corresponds to 100%.

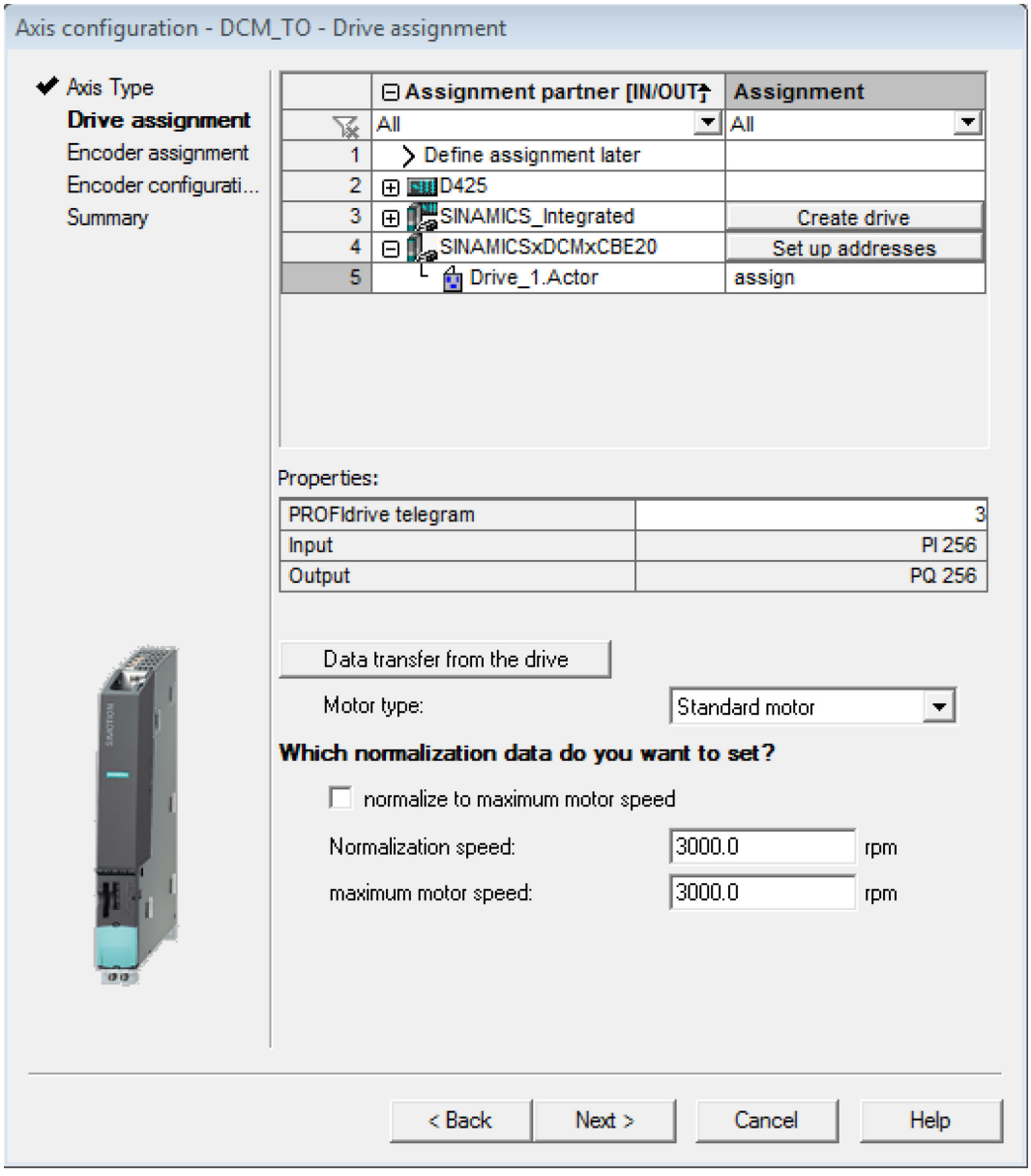

Figure 3-5 Axis configuration: PROFIdrive telegram and normalization

If the data transfer of the speed values from the drive does not function and an error message is issued, enter the values manually.

Figure 3-6 Error message for non-functioning data transfer from the drive

Actual speed value reference values for the SINAMICS DCM:

Actual speed value = incremental encoder (p50083 = 2 or 5)……...100% = p2000

Actual speed value = analog tachometer (p50083 = 1)……100% = p50741

Maximum speed:

The maximum speed is specified as a percentage value for the DCM and only affects the setpoint limitation after the ramp-function generator, and the overspeed message.

5. Assignment of the encoder:

   In the last step, the encoder is assigned and the encoder data set.

Note

When selecting the actual speed value source in the drive, p50083 = 1 (analog tachometer), an assignment can be made to the DCM, but physically there is no actual position value.

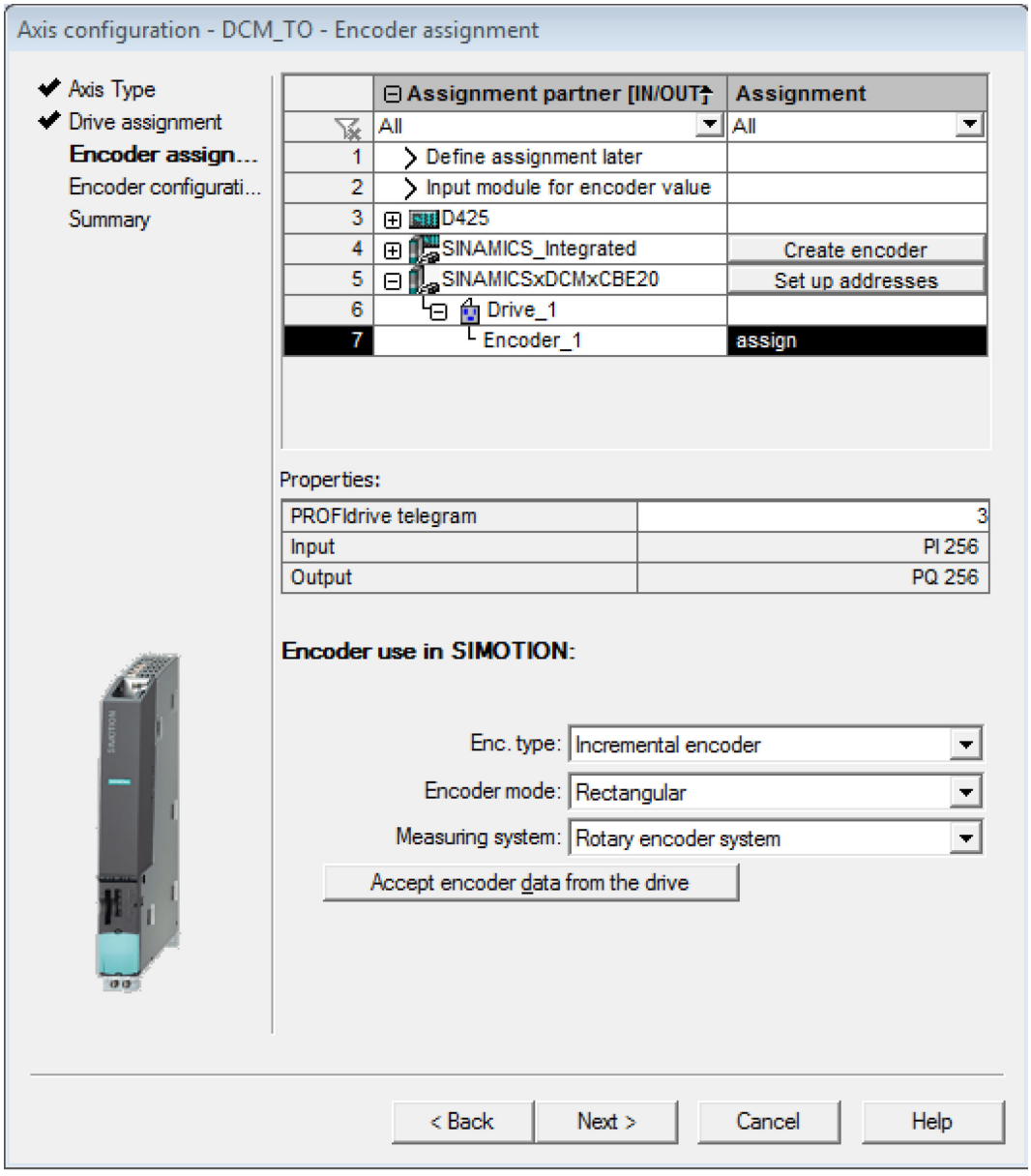

Figure 3-7 Assignment of the encoder

The encoder pulses per revolution must then be specified.

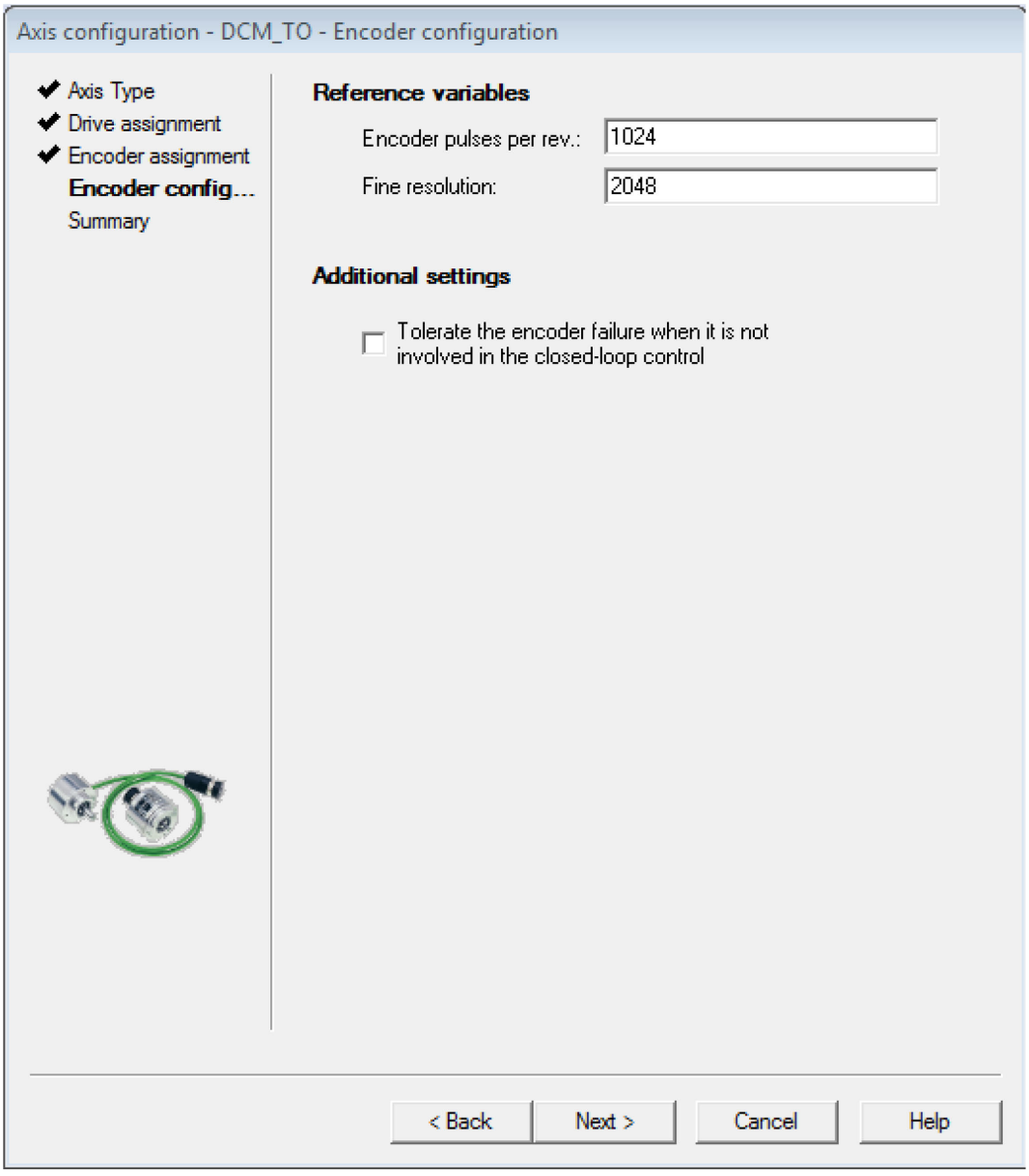

Figure 3-8 Setting the encoder data

Integration as normal DP/PN slave

4

The address list must be selected in SIMOTION SCOUT and a variable declaration performed for the appropriate PZDs of the drive. The data to or from the SINAMICS DCM can now be processed accordingly in the user program via the name of the variable.

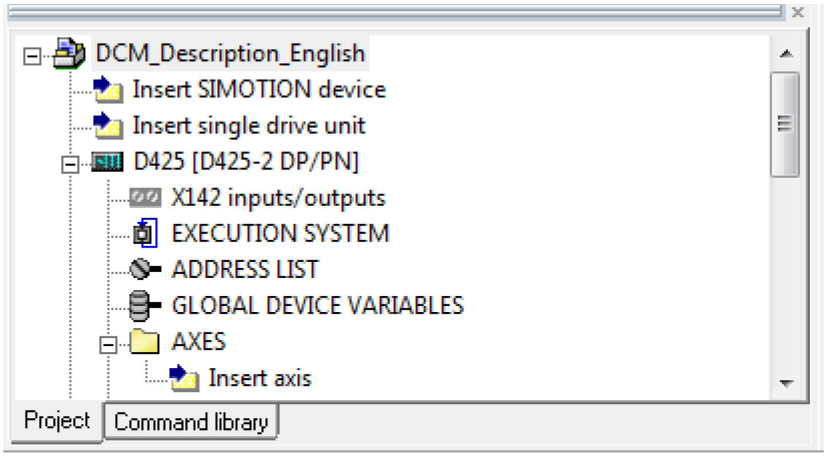

Figure 4-1 Selection of the address list in SIMOTION

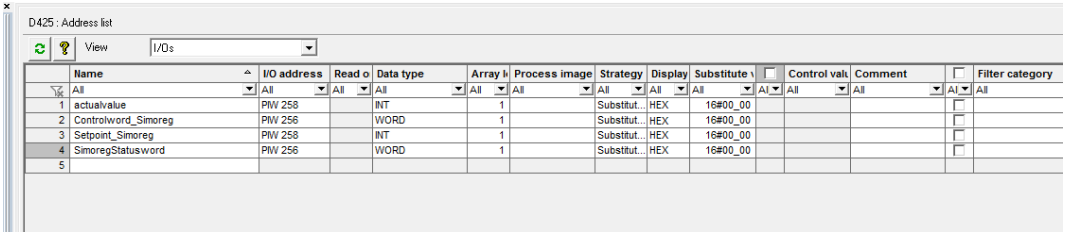

Figure 4-2 Variable declaration for the PZDs of the drive

References:
SIMOTION TO Axis Electric/Hydraulic, External Encoder Function Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476542)

SIMOTION Communication Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476535)

SIMOTION SCOUT Configuration Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476540)

SIMOTION SCOUT TIA Configuration Manual:
(https://support.industry.siemens.com/cs/at/en/view/109476550)

List of abbreviations

A

Abbreviation	Meaning, German	Meaning, English
A		
A...	Warnung	Alarm
AC	Wechselstrom	Alternating Current
ADC	Analog-Digital-Konverter	Analog Digital Converter
AI	Analogeingang	Analog Input
AIM	Active Interface Module	Active Interface Module
ALM	Active Line Module	Active Line Module
AO	Analogausgang	Analog Output
AOP	Advanced Operator Panel	Advanced Operator Panel
APC	Advanced Positioning Control	Advanced Positioning Control
ASC	Ankerkurzschluss	Armature Short Circuit
ASCII	Amerikanische Code-Norm für den Informationsaustausch	American Standard Code for Information Interchange
ASM	Asynchronmotor	Induction motor
B		
BERO	Firmenname für einen Näherungsschalter	Trade name for a type of proximity switch
BI	Binektoreingang	Binector Input
BIA	Berufsgenossenschaftliches Institut für Arbeitssicherheit	German Institute for Occupational Safety
BICO	Binektor-Konnektor-Technologie	Binector Connector Technology
BLM	Basic Line Module	Basic Line Module
BOP	Basic Operator Panel	Basic Operator Panel
C		
C	Kapazität	Capacitance
C...	Safety-Meldung	Safety message
CAN	Steuerbereich-Netzwerk	Control Area Network
CBC	Kommunikationsbaugruppe CAN	Communication Board CAN
CBE20	Kommunikationsbaugruppe Ethernet 20	Communication Board Ethernet 20
CD	Compact Disc	Compact Disc
CDS	Befehlsdatensatz	Command Data Set
CF	CompactFlash	CompactFlash
CI	Konnektoreingang	Connector Input
CNC	Computerunterstützte numerische Steuerung	Computer Numerical Control
CO	Konnektorausgang	Connector Output
CO/BO	Konnektor-/Binektorausgang	Connector Output / Binector Output
COB ID	CAN Object-Identification	CAN Object-Identification
COM	Mittelkontakt eines Wechselkontaktes	Common contact of a changeover relay

Abbreviation	Meaning, German	Meaning, English
CP	Kommunikationsprozessor	Communication Processor
CPU	Zentrale Recheneinheit	Central Processing Unit
CRC	Checksummenprüfung	Cyclic Redundancy Check
CSM	Control Supply Module	Control Supply Module
CU	Steuereinheit	Control Unit
CUD	Steuereinheit Gleichstrom	Control Unit Direct Current
D		
DAC	Digital-Analog-Konverter	Digital Analog Converter
DC	Gleichstrom	Direct Current
DCB	Drive Control Block	Drive Control Block
DCC	Drive Control Chart	Drive Control Chart
DCM	DC Master (Stromrichter)	DC Master (current converter)
DDS	Antriebsdatensatz	Drive Data Set
DI	Digitaleingang	Digital Input
DI/DO	Digitaleingang/-ausgang bidirektional	Bidirectional Digital Input/Output
DMC	DRIVE-CLiQ Module Cabinet (Hub)	DRIVE-CLiQ Module Cabinet (Hub)
DO	Digitalausgang	Digital Output
DO	Antriebsobjekt	Drive Object
DP	Dezentrale Peripherie	Decentralized Peripherals
DPRAM	Speicher mit beidseitigem Zugriff	Dual-Port Random Access Memory
DRAM	Dynamischer Speicher	Dynamic Random Access Memory
DRIVE-CLiQ	Drive Component Link with IQ	Drive Component Link with IQ
DSC	Dynamic Servo Control	Dynamic Servo Control
E		
EDS	Geberdatensatz	Encoder Data Set
ESD	Elektrostatisch gefährdete Baugruppen	Electrostatic Sensitive Devices
ELP	Erdschlussüberwachung	Earth Leakage Protection
EMF	Elektromagnetische Kraft	Electromagnetic Force
EMC	Elektromagnetische Verträglichkeit	Electromagnetic Compatibility
EN	Europäische Norm	European standard
EnDat	Geber-Schnittstelle	Encoder Data Interface
EP	Impulsfreigabe	Enable Pulses
EPOS	Einfachpositionierer	Basic positioner
ES	Engineering System	Engineering System
ECD	Ersatzschaltbild	Equivalent Circuit Diagram
ESR	Erweitertes Stillsetzen und Rückziehen	Extended Stop and Retract
F		
F...	Störung	Fault
FBLOCKS	Freie Funktionsblöcke	Free Blocks
FCC	Function Control Chart	Function Control Chart
FCC	Flussstromregelung	Flux Current Control
F-DI	Fehlersicherer Digitaleingang	Fail-safe Digital Input

Abbreviation	Meaning, German	Meaning, English
F-DO	Fehlersicherer Digitalausgang	Fail-safe Digital Output
FEM	Fremderregter Synchronmotor	Separately excited synchronous motor
FEPROM	Schreib- und Lesespeicher nichtflüchtig	Flash EPROM
FG	Funktionsgenerator	Function Generator
FI	Fehlerstrom-Schutzschalter	Earth Leakage Circuit-Breaker (ELCB)
FP	Funktionsplan	Function diagram
FPGA	Field Programmable Gate Array	Field Programmable Gate Array
FW	Firmware	Firmware
G		
GB	Gigabyte	Gigabyte
GC	Global-Control-Telegramm (Broadcast-Telegramm)	Global Control Telegram (Broadcast Telegram)
GSD	Gerätestammdatei: beschreibt die Merkmale eines PROFIBUS-Slaves	Device master file: describes the features of a PROFIBUS slave
GSV	Gate Supply Voltage	Gate Supply Voltage
GUID	Globally Unique Identifier	Globally Unique Identifier
H		
HF	Hochfrequenz	High Frequency
HFD	Hochfrequenzdrossel	High frequency reactor
RFG	Hochlaufgeber	Ramp-Function Generator
HMI	Mensch-Maschine-Schnittstelle	Human Machine Interface
HTL	Logik mit hoher Störschwelle	High-Threshold Logic
HW	Hardware	Hardware
I		
I/O	Eingang/Ausgang	Input/Output
IASC	Interner Ankerkurzschluss	Internal Armature Short-Circuit
IBN	Inbetriebnahme	Commissioning
ID	Identifizierung	Identifier
IEC	Internationale Norm in der Elektrotechnik	International Electrotechnical Commission
IF	Interface	Interface
IGBT	Bipolartransistor mit isolierter Steuerelektrode	Insulated Gate Bipolar Transistor
IL	Impulslöschung	Pulse suppression
IO	Eingabe Ausgabe	Input Output
IRT	Isochrone Echtzeit	Isochronous Real Time
IVP	Interner Spannungsschutz	Internal Voltage Protection
J		
JOG	Tippen	Jogging
K		
KDV	Kreuzweiser Datenvergleich	Data cross-checking
KIP	Kinetische Pufferung	Kinetic buffering
Kp	Proportionalverstärkung	Proportional gain
KTY	Spezieller Temperatursensor	Special temperature sensor
L		

Abbreviation	Meaning, German	Meaning, English
L	Induktivität	Inductance
LED	Leuchtdiode	Light Emitting Diode
LIN	Linearmotor	Linear motor
LR	Lageregler	Position controller
LSB	Niederstwertiges Bit	Least Significant Bit
LSS	Netzschalter	Line Side Switch
LU	Längeneinheit	Length Unit
LWL	Lichtwellenleiter	Fiber-optic cable
M		
M	Masse	Reference potential, zero potential
MB	Megabyte	Megabyte
MCC	Motion Control Chart	Motion Control Chart
MDS	Motordatensatz	Motor Data Set
MLFB	Maschinenlesbare Fabrikatebezeichnung	Machine-readable product designation
MMC	Multimedia Karte	Multi Media Card
MSB	Höchstwertiges Bit	Most Significant Bit
MSCY_C1	Zyklische Kommunikation zwischen Master (Klasse 1) und Slave	Master Slave Cycle Class 1
MT	Messtaster	Measuring input
N		
N...	Keine Meldung oder Interne Meldung	No Report
NAMUR	Normenarbeitsgemeinschaft für Mess- und Regeltechnik in der chemischen Industrie	Standardization association for instrumentation and control in the chemical industry
NC	Öffner	Normally Closed (contact)
NC	Numerische Steuerung	Numerical Control
NEMA	Normengremium in USA (United States of America)	National Electrical Manufacturers Association
NM	Nullmarke	Zero mark
NO	Schließer	Normally Open (contact)
NSR	Netzstromrichter	Line power converter
O		
OA	Open Architecture	Open Architecture
OEM	Original Equipment Manufacturer	Original Equipment Manufacturer
OLP	Busstecker für Lichtleiter	Optical Link Plug
OMI	Option Module Interface	Option Module Interface
P		
p...	Einstellparameter	Adjustable parameter
PA	Prozess-Automation	Process Automation
PcCtrl	Steuerungshoheit	Master control
PD	PROFIdrive	PROFIdrive
PDS	Leistungsteildatensatz	Power Unit Data Set
PE	Schutzerde	Protective Earth
PELV	Schutzkleinspannung	Protective Extra-Low Voltage

Abbreviation	Meaning, German	Meaning, English
PEM	Permanenterregter Synchronmotor	Permanent-magnet synchronous motor
PG	Programmiergerät	Programming device
PI	Proportional Integral	Proportional Integral
PID	Proportional Integral Differential	Proportional Integral Differential
PLC	Speicherprogrammierbare Steuerung (SPS)	Programmable Logical Controller
PLL	Phase Locked Loop	Phase Locked Loop
PNO	PROFIBUS Nutzerorganisation	PROFIBUS user organization
PPI	Punkt zu Punkt Schnittstelle	Point-to-Point Interface
PRBS	Weißes Rauschen	Pseudo Random Binary Signal
PROFIBUS	Prozess-Feldbus	Process Field Bus
PS	Stromversorgung	Power Supply
PSA	Power Stack Adapter	Power Stack Adapter
PTC	Positiver Temperaturkoeffizient	Positive Temperature Coefficient
PTP	Punkt zu Punkt	Point-To-Point
PWM	Pulsweitenmodulation	Pulse Width Modulation
PZD	PROFIBUS Prozessdaten	PROFIBUS process data
R		
r...	Beobachtungsparameter (nur lesbar)	Display parameter (read only)
RAM	Speicher zum Lesen und Schreiben	Random Access Memory
RJ45	Norm. Beschreibt eine 8-polige Steckverbindung mit Twisted-Pair Ethernet.	Standard. Describes an 8-pole plug connector with twisted pair Ethernet.
RO	Nur lesbar	Read Only
RPDO	Receive Process Data Object	Receive Process Data Object
RS232	Serielle Schnittstelle	Serial interface
RS485	Norm. Beschreibt die Physik einer digitalen seriellen Schnittstelle.	Standard. Describes the physical characteristics of a digital serial interface.
RT	Echtzeit	Real Time
S		
SBC	Sichere Bremsenansteuerung	Safe Brake Control
SBH	Sicherer Betriebshalt	Safe Operating Stop
SBR	Sichere Beschleunigungsüberwachung	Safe Acceleration Monitor
SCA	Sichere Nocke	Safe Cam
SE	Sicherer Software-Endschalter	Safe software limit switch
SG	Sicher reduzierte Geschwindigkeit	Safely reduced speed
SGA	Sicherheitsgerichteter Ausgang	Safety-related output
SGE	Sicherheitsgerichteter Eingang	Safety-related input
SH	Sicherer Halt	Safety standstill
SI	Safety Integrated	Safety Integrated
SIL	Sicherheitsintegritätsgrad	Safety Integrity Level
SLM	Smart Line Module	Smart Line Module
SLP	Sicher begrenzte Position	Safely-Limited Position
SLS	Sicher begrenzte Geschwindigkeit	Safely-Limited Speed

Abbreviation	Meaning, German	Meaning, English
SLVC	Geberlose Vektorregelung	Sensorless Vector Control
SM	Sensor Module	Sensor Module
SMC	Sensor Module Cabinet	Sensor Module Cabinet
SME	Sensor Module External	Sensor Module External
SN	Sicherer Software-Nocken	Safe software cam
SOS	Sicherer Betriebshalt	Safe Operating Stop
SP	Service Pack	Service Pack
SPC	Sollwertkanal	Setpoint Channel
SPS	Speicherprogrammierbare Steuerung	Programmable Logic Controller (PLC)
SS1	Sicherer Stop 1	Safe Stop 1
SS2	Sicherer Stop 2	Safe Stop 2
SSI	Synchron Serielle Schnittstelle	Synchronous Serial Interface
SSM	Sichere Rückmeldung der Geschwindigkeitsüberwachung (n < nx)	Safe Speed Monitor
SSR	Sichere Bremsrampe	Safe Stop Ramp
STO	Sicher abgeschaltetes Moment	Safe Torque Off
STW	PROFIBUS Steuerwort	PROFIBUS control word
T		
TB	Terminal Board	Terminal Board
TIA	Totally Integrated Automation	Totally Integrated Automation
TM	Terminal Module	Terminal Module
Tn	Nachstellzeit	Integral time
TO	Technologieobjekt	Technology Object
TPDO	Transmit Process Data Object	Transmit Process Data Object
TT	Drehstromversorgungsnetz geerdet	Grounded three-phase supply network
TTL	Transistor-Transistor-Logik	Transistor-Transistor Logic
Tv	Vorhaltezeit	Derivative-action time
U		
UL	Underwriters Laboratories Inc.	Underwriters Laboratories Inc.
UPS	Unterbrechungsfreie Stromversorgung	Uninterruptible Power Supply
V		
VC	Vektorregelung	Vector Control
Vdc	Zwischenkreisspannung	DC-link voltage
VdcN	Teilzwischenkreisspannung negativ	Partial DC-link voltage negative
VdcP	Teilzwischenkreisspannung positiv	Partial DC-link voltage positive
VDE	Verband Deutscher Elektrotechniker	Association of German Electrical Engineers
VDI	Verein Deutscher Ingenieure	Association of German Engineers
Vpp	Volt Spitze zu Spitze	Volt peak to peak
VSM	Voltage Sensing Module	Voltage Sensing Module
W		
AR	Wiedereinschaltautomatik	Automatic Restart
WZM	Werkzeugmaschine	Machine tool

Abbreviation	Meaning, German	Meaning, English
X		
XML	Erweiterbare Auszeichnungssprache (Standardsprache für Web-Publishing und Dokumentenmanagement)	Extensible Markup Language
Z		
ZK	Zwischenkreis	DC link
ZSW	PROFIBUS Zustandswort	PROFIBUS status word

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