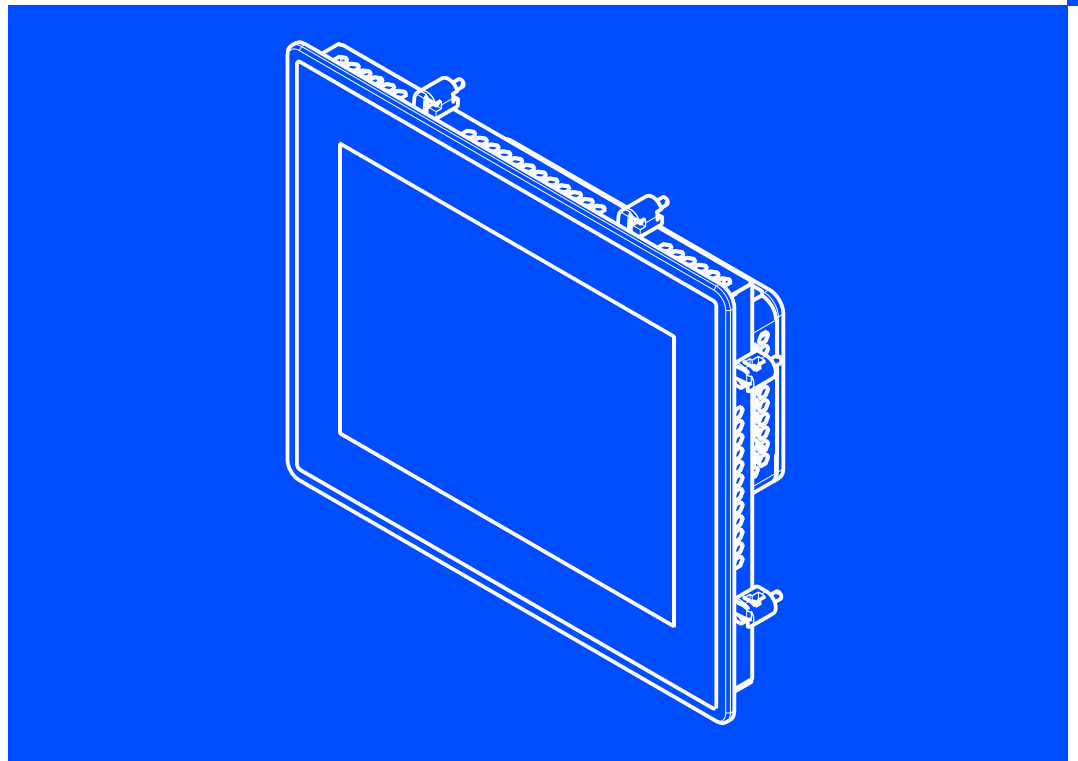BA_p500
13449633

L-force *Controls*

Controller-based Automation

Controller p500

Panel Controller

Lenze

Please read these instructions before you start working!
Follow the enclosed safety instructions.

Contents i

Lenze

i   Contents

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1   About this documentation

Contents

This documentation contains information on the intended use of the Lenze Controller in the context of the "Controller-based Automation" system.

The present manual is part of the "Controller-based automation" manual collection which you can find as a complete version on the DVD of the same name (scope of supply of standard device).

Target group

This documentation is directed at qualified skilled personnel according to IEC 60364.

Qualified skilled personnel are persons who have the required qualifications to carry out all activities involved in installing, mounting, commissioning, and operating the product.

Tip!

Information and auxiliary devices related to the Lenze products can be found in the download area at
http://www.Lenze.com

Validity

These instructions are valid for

► Panel Controller p500

1.1   Document history

Material number	Version			Description
13449633	2.0	10/2013	TD06	General revision and UL approval
13412608	1.0	07/2012	TD29	First edition

1.2 Conventions used

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

Spelling of numbers

Decimal separator	Point	In general, the decimal point is used. For instance: 1234.56

Warnings

UL warnings	Ⓤ	Given in English and French
UR warnings	Ⓡ	

Text

Program name	» «	PC software For example: »Engineer«, »Global Drive Control« (GDC)

Icons

Page reference	📖	Reference to another page with additional information For instance: 📖 16 = see page 16
Documentation reference	Ⓓ	Reference to another documentation with additional information For example: Ⓓ EDKxxx = see documentation EDKxxx

Lenze

1.3   **Notes used**

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

Safety instructions

Structure of safety instructions:

<table>
<tr>
<td>⚠</td>
<td>

Danger!

(characterises the type and severity of danger)

Note

(describes the danger and gives information about how to prevent dangerous situations)
</td>
</tr>
</table>

Pictograph and 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 and signal word	Meaning
🛈 **Note!**	Important note to ensure troublefree operation
💡 **Tip!**	Useful tip for simple handling
📖	Reference to another documentation

Special safety instructions and application notes

Pictograph and signal word	Meaning
ⓤ **Warnings!**	**Safety note or application note for the operation according to UL or CSA requirements.** The measures are required to meet the requirements according to UL or CSA.
ЯU **Warnings!**	

2 Safety instructions

2.1 General safety information

Scope

The following general safety instructions apply to all Lenze drive and automation components.

The product-specific safety and application notes given in this documentation must be observed!

For your own safety

⚠ **Danger!**

Disregarding the following basic safety measures may lead to severe personal injury and damage to material assets!

► Lenze drive and automation components ...

... must only be used for the intended purpose.

... must never be operated if damaged.

... must never be subjected to technical modifications.

... must never be operated unless completely assembled.

... must never be operated without the covers/guards.

... can - depending on their degree of protection - have live, movable or rotating parts during or after operation. Surfaces can be hot.

► For Lenze drive and automation components ...

... only use approved accessories.

... only use original manufacturer spare parts.

► All specifications of the corresponding enclosed documentation must be observed.

This is vital for a safe and trouble-free operation and for achieving the specified product features.

The procedural notes and circuit details provided in this document are proposals which the user must check for suitability for his application. The manufacturer does not accept any liability for the suitability of the specified procedures and circuit proposals.

► Only qualified skilled personnel are permitted to work with or on Lenze drive and automation components.

According to IEC 60364 or CENELEC HD 384, these are persons ...

... who are familiar with the installation, assembly, commissioning and operation of the product,

... possess the appropriate qualifications for their work,

... and are acquainted with and can apply all the accident prevent regulations, directives and laws applicable at the place of use.

Transport, storage

► Transport and storage in a dry, low-vibration environment without aggressive atmosphere; preferably in the packaging provided by the manufacturer.

– Protect against dust and shocks.

– Comply with climatic conditions according to the technical data.

Mechanical installation

► Install the product according to the regulations of the corresponding documentation. In particular observe the section "Operating conditions" in the chapter "Technical data".

► Provide for a careful handling and avoid mechanical overload. During handling neither bend components, nor change the insulation distances.

► The product contains electrostatic sensitive devices which can easily be damaged by short circuit or static discharge (ESD). Thus, electronic components and contacts must not be touched unless ESD measures are taken beforehand.

Electrical installation

► Carry out the electrical installation according to the relevant regulations (e. g. cable cross-sections, fusing, connection to the PE conductor). Additional notes are included in the documentation.

► When working on live products, observe the applicable national regulations for the prevention of accidents (e.g. BGV 3).

► The documentation contains information about EMC-compliant installation (shielding, earthing, arrangement of filters and laying cables). The system or machine manufacturer is responsible for compliance with the limit values required by EMC legislation.

Warning: The controllers are products which can be used in category C2 drive systems as per EN 61800-3. These products may cause radio interference in residential areas. If this happens, the operator may need to take appropriate action.

► For compliance with the limit values for radio interference emission at the site of installation, the components - if specified in the technical data - have to be mounted in housings (e. g. control cabinets). The housings have to enable an EMC-compliant installation. In particular observe that for example control cabinet doors preferably have a circumferential metallic connection to the housing. Reduce openings or cutouts through the housing to a minimum.

► Only plug in or remove pluggable terminals in the deenergised state!

Commissioning

► If required, you have to equip the system with additional monitoring and protective devices in accordance with the respective valid safety regulations (e. g. law on technical equipment, regulations for the prevention of accidents).

Maintenance and servicing

► The components are maintenance-free if the required operating conditions are observed.

► If the cooling air is polluted, the cooling surfaces may be contaminated or the air vents may be blocked. Under these operating conditions, the cooling surfaces and air vents must be cleaned at regular intervals. Never use sharp objects for this purpose!

► After the system has been disconnected from the supply voltage, live components and power connections must not be touched immediately because capacitors may be charged. Please observe the corresponding notes on the device.

Disposal

► Recycle metals and plastic materials. Ensure professional disposal of assembled PCBs.

2.2   **Product-specific safety instructions**

▶ Protect the device against direct solar radiation, since the housing may heat up strongly.

▶ The device is classified as a class A device and can cause radio interference in residential areas. In this case, the operator may have to take special measures. Any costs arising from these measures have to be paid by the operator.

▶ A touchscreen does not comply with the Ergonomics Directive ZH 1/618. This is why it is only designed for short-time inputs and monitoring functions. For longer inputs, connect an external keyboard.

▶ In the event of a fault, unplug the power connector immediately and send back the device to the manufacturer. The address can be found on the self-addressed envelope included in this documentation. Please use the original packaging to return the device!

▶ Printed circuit boards which might be damaged by short circuit or electrostatic discharge (ESD) must be handled appropriately.

▶ The BIOS of the mainboard is configured by the factory. After the BIOS has been updated, malfunctions are possible. Please address to our service.

2.3   **Residual hazards**

> ⚠ **Danger!**
>
> **Hot surface during operation**
>
> The heatsink at the back of the device gets very hot during operation.
>
> **Possible consequences:**
>
> ▶ Burns when touching the heatsink.
>
> ▶ Fire or smouldering fire if flammable material is placed near the heatsink or may get to it.
>
> **Protective measures:**
>
> ▶ Before working on the device, check its heatsink temperature.
>
> ▶ Select the mounting location so that the operating conditions mentioned in the technical data are permanently guaranteed.

2.4   **Safety instructions for the installation according to UL**

Approval

Underwriter Laboratories (UL), UL508 and CSA C22.2 No. 142-M1987, (UL File Number E236341)

Ratings

► Input 24 V DC, max. 1.7 A

► Max. Surrounding temperature:
  – P500 7: 55 °C, in vertical (landscape or portrait) mounting position only at relative humidity of 60%rh with a linear derating to 30°C at 90%rh.
  – P500 10,4: 55°C in vertical (landscape or portrait)mounting position only at a relative humidity of 55%rh with a linear derating to 40°C at 90%rh.
  – P500 15,0: 55°C in vertical (landscape or portrait)mounting position only at a relative humidity of 45%rh with a linear derating to 40°C at 90%rh.

► These devices are intended for mounting in the outer surface of an enclosure, Type 1, 4 and 4X indoor use only.

    ⚠️ **Warnings!**

    Field Wiring Markings

    Wiring Terminal MSTB 2,5/3-STF-5,08:

    ► Use 60° or 60/75° C copper wire only.

    ► AWG 18 ... AWG 12 (0.82 mm^2... 3.3 mm^2)

    ► Torque 5...7 lb-in (0.5 ... 0.6 Nm)

    Device

    ► For use in a pollution degree 2 and controlled environment only.

    ► For use on a Flat Surface of a Type 1, 4 and 4x Indoor Use Only Enclosure

    Optional filed bus module

    ► Use only together with appropriate cable connectors, provided with screws for securement and secure connector to avoid loosening.

Homologation

Underwriter Laboratories (UL), UL508 et CSA C22.2 n° 142-M1987, (n° de dossier UL E236341)

Caractéristiques assignées

▶ Entrée 24 V CC, maximum 1,7 A

▶ Température ambiante maximale :

– P500 7 : 55 °C sur un axe vertical uniquement (montage horizontal ou vertical) pour 60%rh d'humidité relative, réduction linéaire à 30°C à 90%rh d'humidité.

– P500 10,4: 55 °C sur un axe vertical uniquement (montage horizontal ou vertical) pour 55%rh d'humidité relative, réduction linéaire à 40°C à 90%rh d'humidité.

– P500 15,0: 55°C sur un axe vertical uniquement (montage horizontal ou vertical) pour 45%rh d'humidité relative, réduction linéaire à 40°C à 90%rh d'humidité.

▶ Ces équipements sont destinés à être montés sur la surface extérieure d'un coffret de protection de types 1, 4 et 4X (usage intérieur exclusivement).

Warnings!

Marquage du câblage à pied d'oeuvre

Bornier de câblage MSTB 2,5/3-STF-5,08 :

▶ Utiliser exclusivement des conducteurs en cuivre 60 °C ou 60/75 °C.

▶ AWG 18 ... AWG 12 (0.82 mm^2... 3.3 mm^2)

▶ Couple de 5 à 7 lb-in (0,5 ... 0,6 Nm)

Appareil

▶ Destiné uniquement à un environnement contrôlé caractérisé par le degré de pollution 2.

▶ Conçu pour une utilisation sur une surface plane, coffret de type 1, 4 et 4x (usage intérieur uniquement).

Module bus en option

▶ A utiliser exclusivement avec des connecteurs de câble à vis adaptés. Fixer les connecteurs pour éviter toute déconnexion.

3 Product description

3.1 Scope of supply

Quantity	Name
1	Controller
4 8 10	Screw clamp fixings for a screen size of 17.8 cm (7") for a screen size of 26.4 cm (10.4") for a screen size of 38.1 cm (15")
1	Connection plug for voltage supply
1	SD card (inserted)
1	Mounting instructions
1	DVD "Controller-based Automation"

Note!

After receipt of the delivery, check immediately whether the items match the accompanying papers. We do not accept any liability for deficiencies claimed subsequently.

Claim

► visible transport damage immediately to the forwarder

► visible deficiencies/incompleteness immediately to your Lenze representative.

3.2   **Application as directed**

The Controller is used as directed if it is solely used for implementing control and operating concepts or for presenting information in usual industrial and commercial fields. A different use, or one beyond these purposes, is not permissible.

A **use that is not intended** also includes a use harbouring fatal risks or dangers which, without the provision of exceptionally high safety measures, may result in death, injury or damage to material assets.

The Controller in particular must **not** be used ...

▶   in private areas.

▶   in potentially explosive atmospheres.

▶   in areas with harmful gases, oils, acids, radiation, etc.

▶   in applications where vibration and impact loads occur, exceeding the requirements of EN 50178.

▶   for performing safety functions, for instance
   – in air traffic control / in flight-control systems
   – for the monitoring/control of nuclear reactions
   – for the monitoring/control of means of mass transport
   – for the monitoring/control of medical systems
   – for the monitoring/control of weapon systems
   Higher-level safety systems must be used to guarantee the protection of persons and material assets!
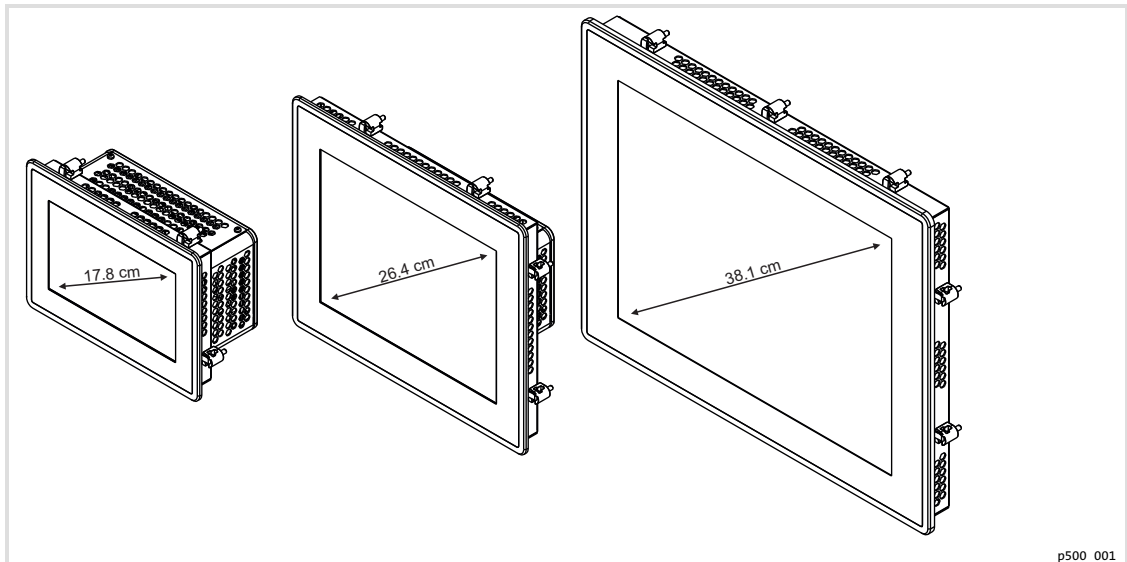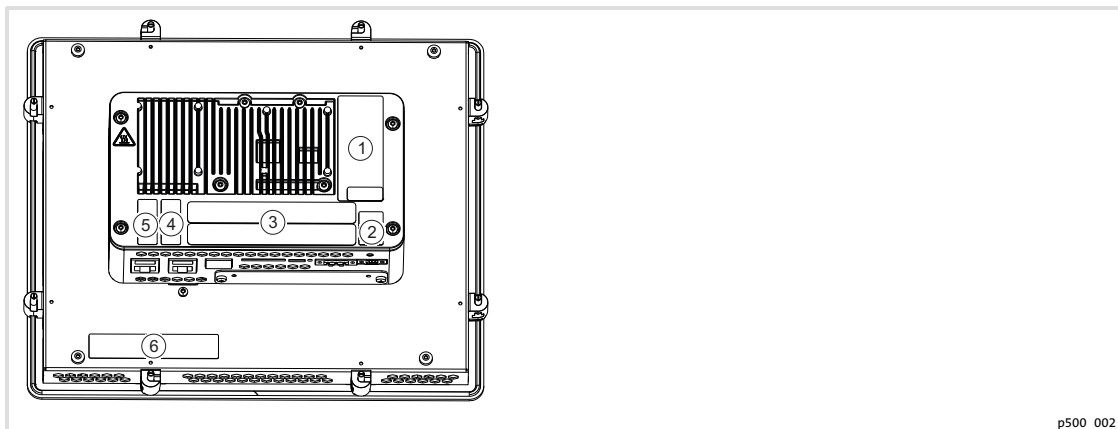
3.3 Device features

Fig. 3-1   Panel Controller p500

	p500		
	17.8 cm (7")	**26.4 cm (10.4")**	**38.1 cm (15")**
Screen resolution	800 x 480 pixels (WVGA)	800 x 600 pixels (SVGA)	1024 x 768 pixels (XGA)
Design	• Housing made of sheet steel • Front frame made of anodised and etched aluminium • Front film made of polyester • Fanless and maintenance-free • Integrated UPS functionality		
Mounting	• For installation in control cabinets, machine enclosures, and control boards		
Touchscreen	• Resistive single touch • Anti-newton ring design • Surface hardness 3H • Transmission degree ~80 %		
Control and display elements	• Reset button • 4 diagnostic LEDs		
Equipment	• Intel® Atom™ Z530 processor, 1.6 GHz, 512 kB L2 cache • 1 GB DDR2 RAM • Intel® chip set US15W • Intel® GMA 500 graphics, direct X 9.0E, open GL 2.0 • AMIBIOS8® (password protection) • ACPI 3.0 compliant power management • Operating system Windows® CE 6.0 on flash memory (2 GB)		
Runtime software	• VisiWinNET compact CE, 1000 power tags • Runtime software control technology: LPC1000 or MPC1200		
Interfaces	• 1 x MC card • 1 x SD/SDHC card • 2 x Ethernet with switch • 1 x EtherCAT • 2 x USB 2.0		
Optional accessories	• MC card		

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3.4 Identification

How to find information

p500_002

① Windows licence number
② CoDeSys licence number
③ Nameplate
④ MAC address LAN2 (EtherCAT)
⑤ MAC address LAN1a/b (Ethernet)
⑥ Terminal assignment

Nameplate

① Manufacturer
② Certification
③ Type designation
④ Technical data
⑤ Serial number as bar code and numerically
⑥ Material number (customer-specific)
⑦ Type code/order number
① Manufacturer
② Certification
③ Type designation
④ Technical data
⑤ Serial number as bar code and numerically
⑥ Material number (customer-specific)
⑦ Type code/order number

Type code

Type code							⑨	
Panel Controller p500	**P50GAP**	**x**	**0300C4G**	**x**	**XXX-02S13**	**x**	**15000**	

Touchscreen
4 = 26.4 cm (10.4")
6 = 38.1 cm (15")
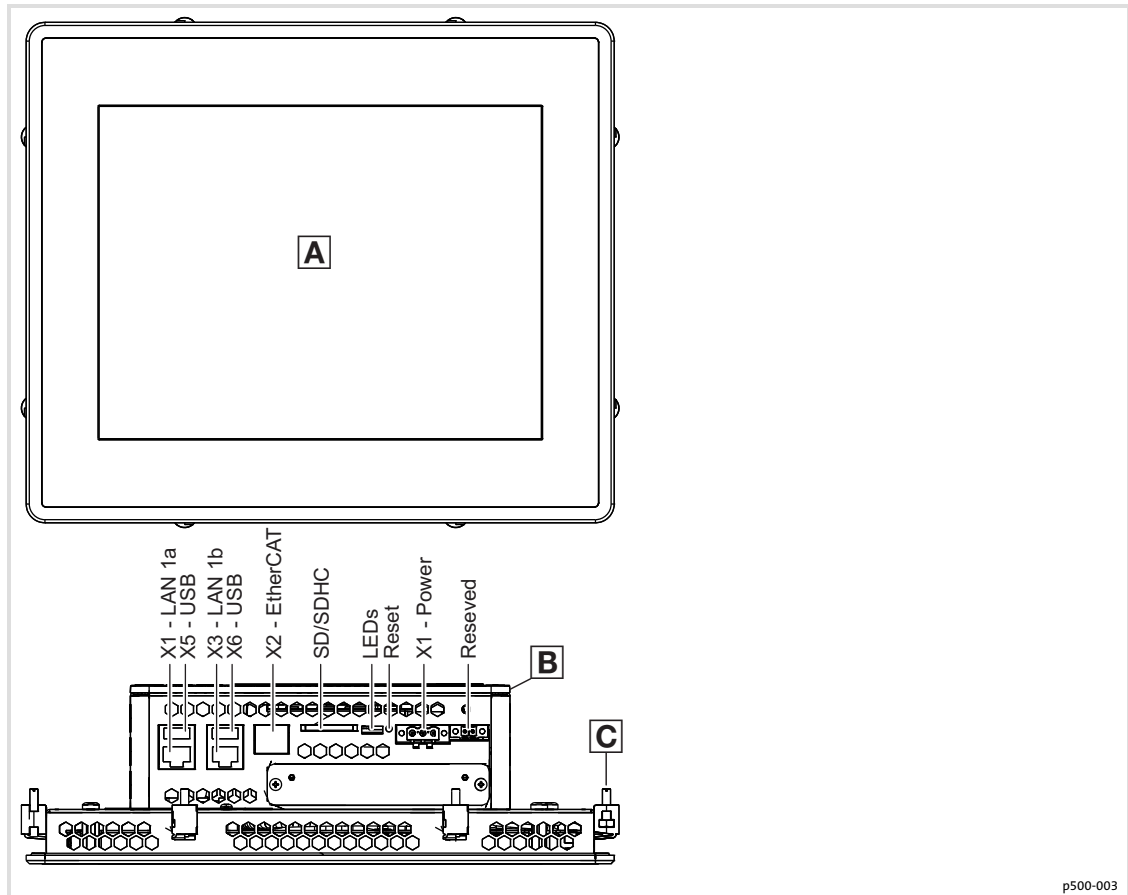9 = 17.8 cm (7")

MC card
0 = without
6 = MC-PBS (PROFIBUS slave)
9 = MC-CAN2 (CANopen)

Control technology runtime software
3 = L-force Logic: LPC1000 (V3.x)
4 = L-force Motion: MPC1200 (V3.x)

3.5   Controls and displays

p500-003

Pos.	Description
A	Touchscreen
B	Controller
C	Screw clamp fixings

LED				Message
Power	Error	Status 1	Status 2	
Is lit blue	-	-	-	Supply voltage is available and system clock is synchronised.
Yellow is continuously ON	-	-	-	Input voltage has fallen below a minimum value (power fail).
Yellow is blinking	-	-	-	After switch-on or after a reset.
Is blinking blue/yellow	-	-	-	System clock is not synchronised.
-	Messages of the optional "backup and restore tool" (see documentation for "backup and restore tool")			

3.6 **UPS functionality**

In case of supply voltage failure, the Controller provides backup functionality for saving the user data (retain variables, logbook data) before the device will be switched off.

	p500
UPS functionality via	internal buffer capacitor
Storage medium for backup data	SD/SDHC card
Buffer time sufficient for	1 MB of retain and logbook data

In order to minimise the power consumption and increase the safety during the buffer times, circuitry parts that are not required can optionally be switched off when the power fail signal occurs (e.g. backlight of the screen).

3.7 **Real-time clock functionality**

The operating system receives the CMOS-RTC time via a maintenance-free clock chip. The clock chip is buffered internally for at least 28 days. Then the clock must be set again. A battery is not required.

3.8 **Reset Device**

To reset the device, press the reset button (📖 19).
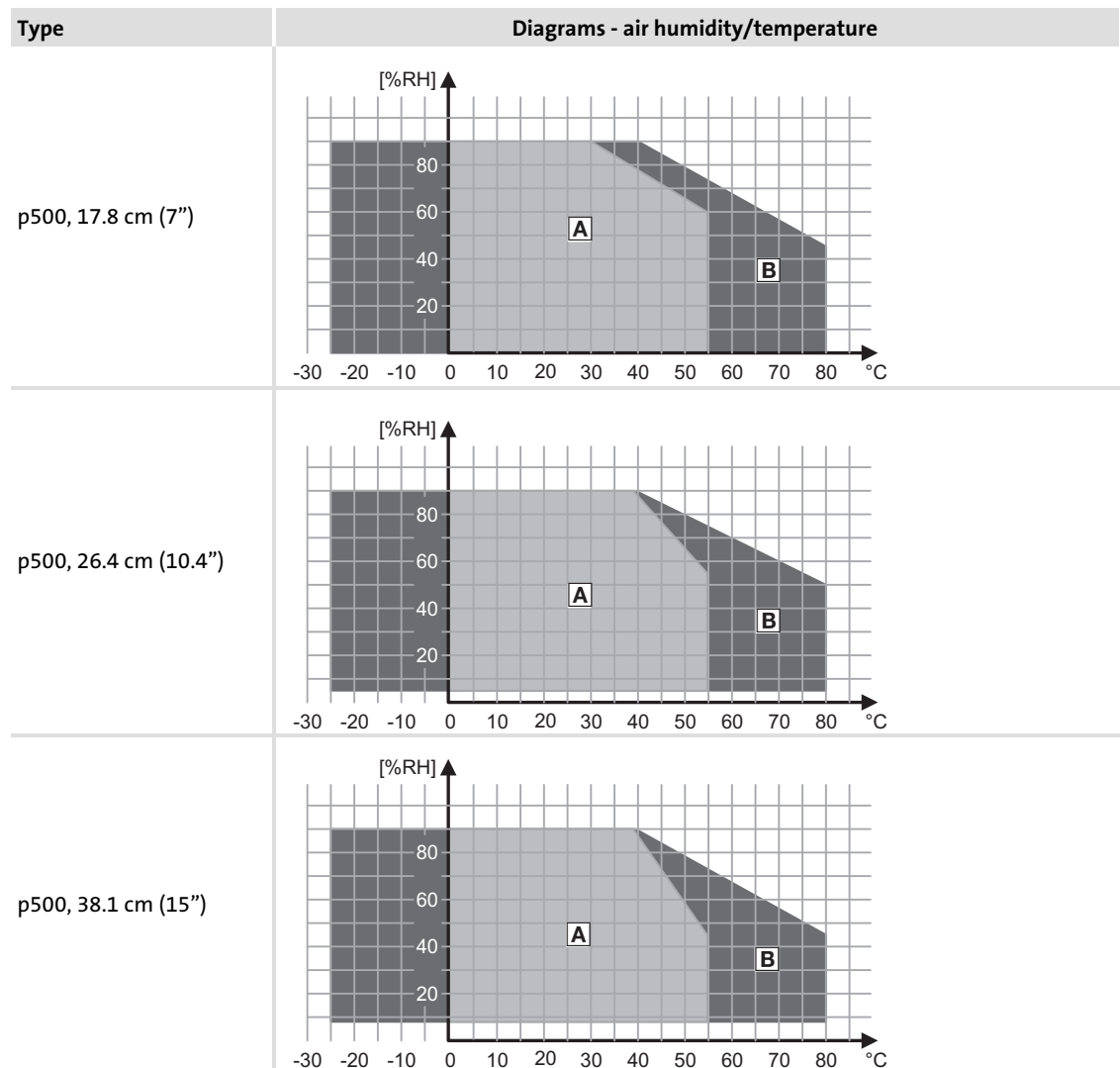
4 Technical data

4.1 General data and operating conditions

General data

Conformity and approval		
Conformity		
CE	EN 61000-6-4 EN 61000-6-2	EMC Directive Class A, industrial premises
Approval		
UL	UL 508 CSA C22.2	Progammable Controllers (File No. E236341)
Other		
RoHS	-	Products lead-free in accordance with CE Directive 2011/65/EU

Protection of persons and device protection		
Safety	VDE0805 (EN60950) VDE0870, UL	
Enclosure		
Front	EN 60529	IP65
	UL 508 CSA 22.2	Type 1, 4 and 4X enclosure indoor use only, pollution degree 2
Rear	EN 60529	IP20
Electrical isolation		
To the fieldbus		Depending on the used MC card
To the process level		None, PE is internally bridged with GND
Insulation resistance	IEC 61131-2	
Protective measures		Against short circuit
Class of protection		3

EMC			
Noise emission	EN 61000-6-4	Class A (industrial premises)	
Noise immunity zone B	EN 61000-6-2	Industrial premises	
		EN 61000-4-2	ESD; severity level 3, i. e. 8 kV for air discharge, 4 kV for contact discharge
		EN 61000-4-3	RF interference (housing) 80 MHz ... 1000 MHz, 10 V/m 80 % AM (1 kHz)
		EN 61000-4-4	Burst, severity level 3
		EN 61000-4-5	Surge, severity level 1 *
		EN 61000-4-6	RF cable-guided 150 kHz ... 80 MHz, 10 V/m 80 % AM (1 kHz)

* Due to the high-energy single current pulses, surges require suitable external wiring with lightning protection elements like for example lightning conductors and overvoltage arresters.

Operating conditions

Ambient conditions		
Climatic		
Storage/transport	IEC/EN 60068-2-14	-25 ... +80 °C depending on the air humidity (see diagrams)
Operation	EN 61131-2	0 ... +55 °C depending on the air humidity (see diagrams)
Air humidity	EN 61131-2	RH1 (without condensation, relative humidity 10 ... 95 %)
Change in temperature	EN 60721-3-2	Class 2K3
Pollution	EN 61800-5-1	Pollution degree 2
Mechanical		
Vibration	EN 60068-2-6	1 g
Shock	EN 60068-2-27	15 g
Site altitude		
Storage/transport		< 12000 m amsl
Operation		< 3000 m amsl

Type	Diagrams - air humidity/temperature
p500, 17.8 cm (7")	
p500, 26.4 cm (10.4")	
p500, 38.1 cm (15")	

Ⓐ During operation
Ⓑ During storage/transport

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Mounting conditions		
Mounting place		In the control cabinet, screen protected against direct solar radiation
Mounting position		Terminals at the sides or bottom

4.2   Electrical data

Type	Supply					
	Voltage range	Rated data [1]			Max. [2]	
		Voltage	Current	Power	Current	Power
	[V DC]	[V DC]	[A]	[W]	[A]	[W]
p500, 17.8 cm (7")	+18 ... +30	24	0.5	12.0	1.2	28.8
p500, 26.4 cm (10.4")			0.6	14.4	1.3	31.2
p500, 38.1 cm (15")			0.7	16.8	1.5	36.0

[1]   at 24 V, without MC card (max. 0.25 A) and USB consumer (max. 2 x 0.5 A)
[2]   at 24 V, full load and during boot/UPS loading phase (max. 30 s)

Type	Screen					
	Format	Resolution	No. of colours	Brightness	Contrast	BLT [3]
		[pixels]		[cd/m²]		[h]
p500, 17.8 cm (7")	15:9	800 x 480 (WVGA)	262144	320	1:400	20000
p500, 26.4 cm (10.4")	4:3	800 x 600 (SVGA)		400	1:700	50000
p500, 38.1 cm (15")		1024 x 768 (XGA)				

[3]   Backlight Life Time

4.3   Mechanical data

Type	Dimensions	Mass [1]
	W x D x H [mm]	[kg]
p500, 17.8 cm (7")	210 x 155 x 86	1.4
p500, 26.4 cm (10.4")	263 x 221 x 86	2.5
p500, 38.1 cm (15")	371 x 291 x 93	4.5

[1]   Without MC card

5   Mechanical installation

5.1   Important notes

► To prevent damage to electronic components, only mount/remove the device with the voltage supply switched off.

► The mounting location always must correspond to the operating conditions specified in the technical data. If required, take additional measures.

► Continuous and adequate air circulation is essential in the installation space so that the device's heat is correctly dissipated. Make sure that the ventilation slots are never covered.

► When choosing the installation location, ensure that the screen is in an ergonomically suitable position and that light is unable to cause irritating reflections on the screen.

► During installation, there is a danger that the controller will fall out of the mounting cutout. You should therefore secure it to prevent this happening until all screw clamps have been fitted.

► During mounting, the gasket of the front frame is exposed and can be damaged.
  – Handle the gasket with care during mounting.
  – Protect the gasket against ultraviolet rays.
  – Check the gasket to make sure it is undamaged before you install the device.

► The device must be securely seated in the mounting cutout and the front panel seal must be correctly fitted. Otherwise, class of protection IP65 will not be achieved on the front side of the device!

► The heat sink on the rear of the L-force controller becomes very hot during operation. There is therefore a risk of burns!
  – Before working on the device, check the temperature of its heat sink.
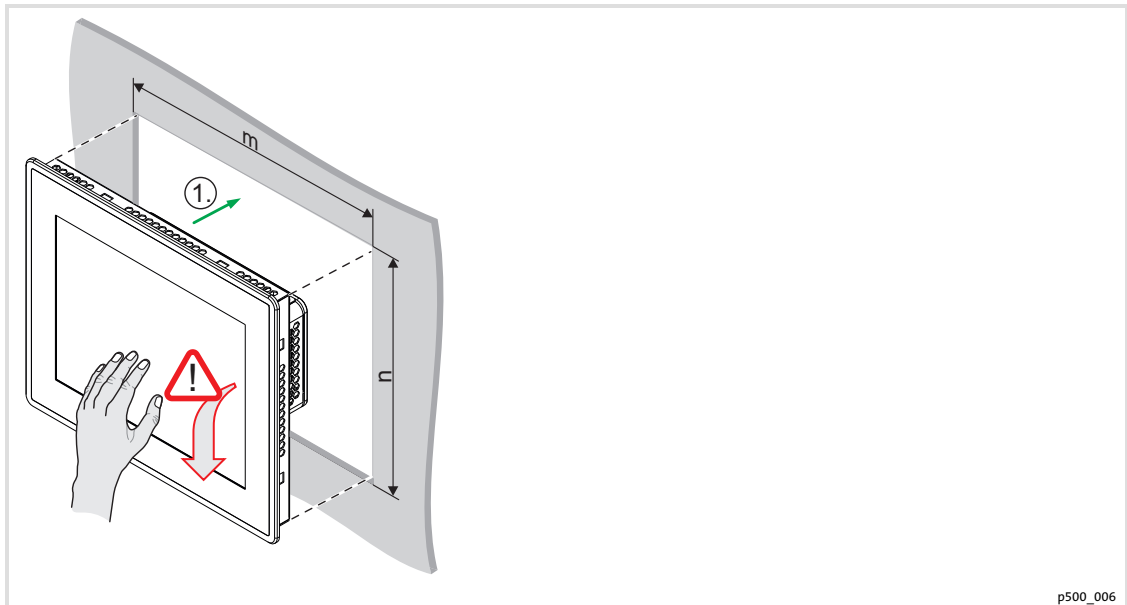
5.2 Dimensions
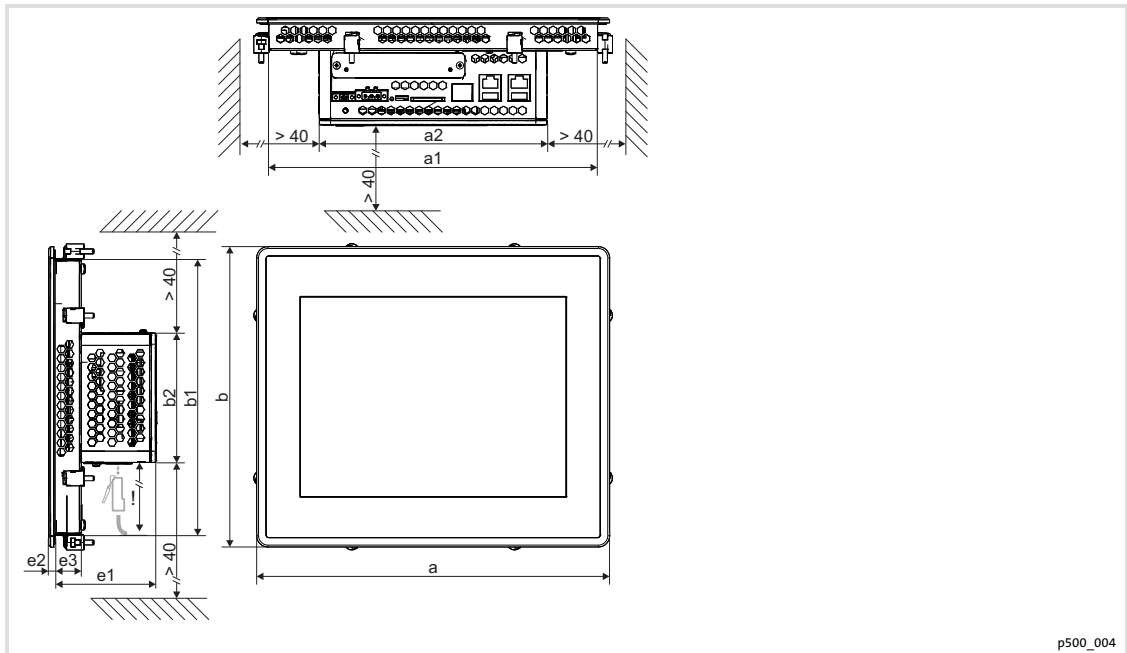
p500_004

	a	a1	a2	b	b1	b2	e1	e2	e3
					[mm]				
p500, 17.8 cm (7")	210.0	190.6		155.0	135.6		82.0	4.0	22.0
p500, 26.4 cm (10.4")	282.0	262.6	182.0	240.0	220.6	104.0	82.0	4.0	22.0
p500, 38.1 cm (15")	390.0	370.8		310.0	290.6		87.0	6.0	27.0

5.3 Mounting steps

p500_006

	m	n
	[mm]	
p500, 17.8 cm (7")	194	139
p500, 26.4 cm (10.4")	266	224
p500, 38.1 cm (15")	374	294

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p500_007
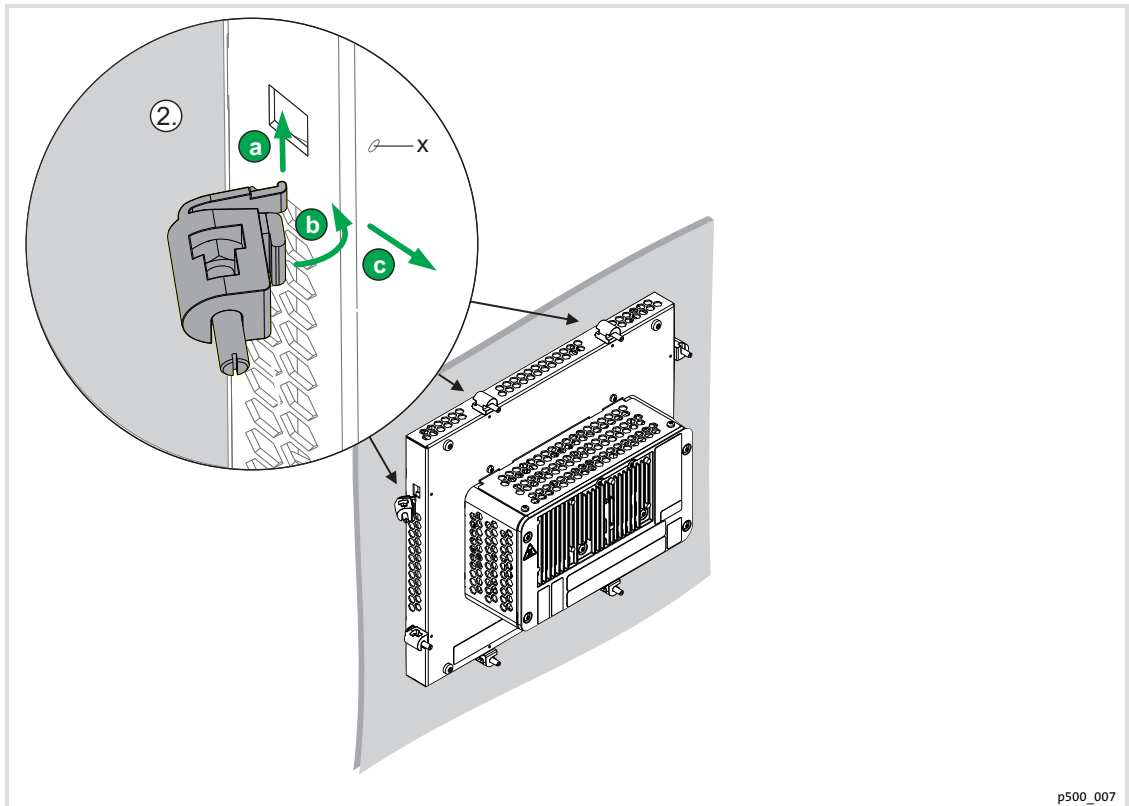
x   Positioning aid for screw clamps

max. 20 Ncm
max. 1.7 lbin

p500_008
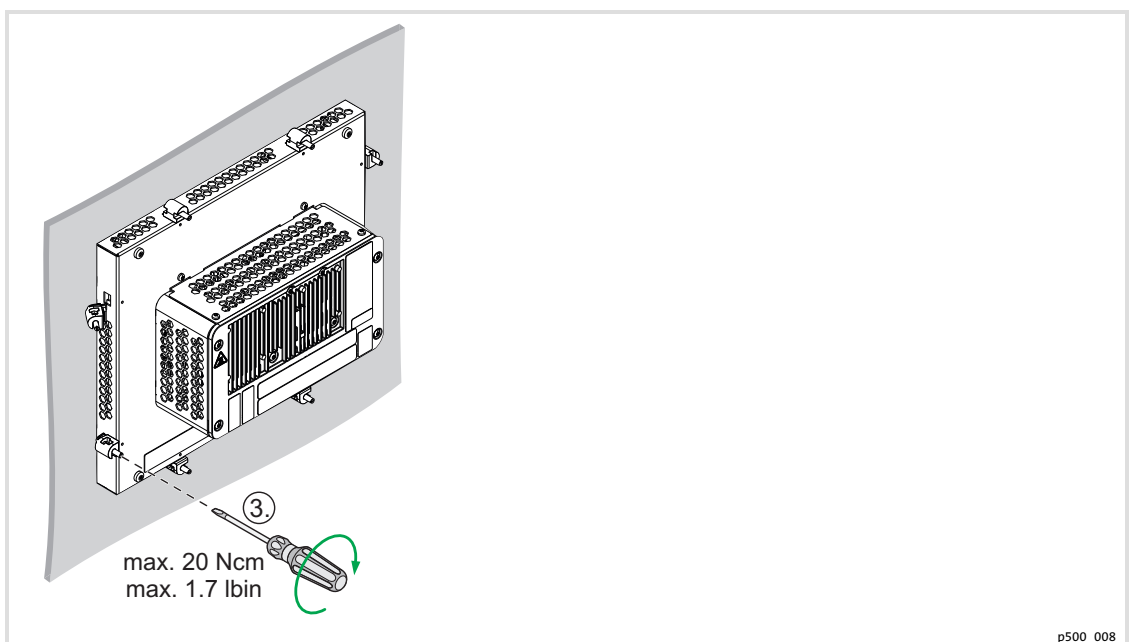
6 Electrical installation

6.1 Important notes

The installation must be carried out by qualified, skilled personnel familiar with the applicable national standards.

> **(STOP)** **Stop!**
>
> **Short circuit and static discharge**
>
> The device contains components which are endangered in the case of short circuit or static discharge.
>
> **Possible consequences:**
>
> ► The device or parts of it will be destroyed.
>
> **Protective measures:**
>
> ► Always switch off the voltage supply when working on the device. This particularly applies:
>   – Before connecting / disconnecting connectors.
>   – Before plugging in / plugging out modules.
>
> ► All persons handling printed circuit boards have to take account of ESD measures.
>
> ► Contacts of plug connectors must not be touched.
>
> ► Printed circuit boards may be touched only at places free from electrical contacts and may be placed only on appropriate materials (e.g. on ESD packaging or conductive foam material).
>
> ► Printed circuit boards may only be transported and stored in ESD packaging.

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6.2 Wiring according to EMC

General notes	● The electromagnetic compatibility of the system depends on the type and accuracy of the installation. Please especially note the following:
	  – Structure
	  – Shielding
	  – Earthing
	● In the case of a differing installation it is required for evaluating the conformity to the EMC Directive to check the system with regard to compliance with the EMC limit values. This for instance applies to:
	  – The use of unshielded cables
	● **The end user is responsible for compliance with the EMC Directive.**
	  – If you observe the following measures, you can be sure that no EMC problems will occur during operation and that the EMC Directive or the EMC law is met.
	  – If devices which do not meet the CE requirement with regard to noise immunity EN 61000-4-2 are actuated near the system, these devices can be affected electromagnetically by the system.

Structure	● Connect device to the earthed mounting plate:
	  – Mounting plates with an electroconductive surface (zinc-coated or stainless steel) allow for continuous contacting.
	  – Coated plates are not suitable for an EMC-compliant installation.
	● If you use several mounting plates:
	  – Connect mounting plates to each other on a large surface and in a conductive manner (e.g. by means of copper strips).
	● When installing the cables, observe a spatial separation of signal and mains cables.
	● Route the cables as near to the reference potential as possible. Freely suspended cables act like aerials.

Shielding	● Preferably only use cables with a braid. ● The coverage of the shield should be more than 80%. ● In the case of data lines for a serial coupling, always use metallic or metallised plugs. Connect the shield of the data line on the connector shell.
Earthing	● Earth all metallically conductive components by the use of corresponding cables from a central earthing point (PE rail). ● Comply with the minimum cross-sections defined in the safety instructions: – With regard to EMC, however, not the cable cross-section, but the surface of the cable and of the extensive contacting is decisive.

6   **Electrical installation**
Connecting the supply and peripheral devices
Terminal diagram supply

6.3   Connecting the supply and peripheral devices

6.3.1   Terminal diagram supply

(STOP) Stop!

No device protection against excessive input voltage

The voltage input is not fused internally.

Possible consequences:

► The device can be destroyed when the input voltage is too high.

Protective measures:

► Observe the max. permissible input voltage.

► Professionally fuse the device on the input side against voltage fluctuations and voltage peaks.

Note!

The Controller boots up as soon as the supply voltage is applied.

After the operating system has been shut down, the Controller switches off automatically. For restarting, the supply voltage has to be disconnected for a short time.
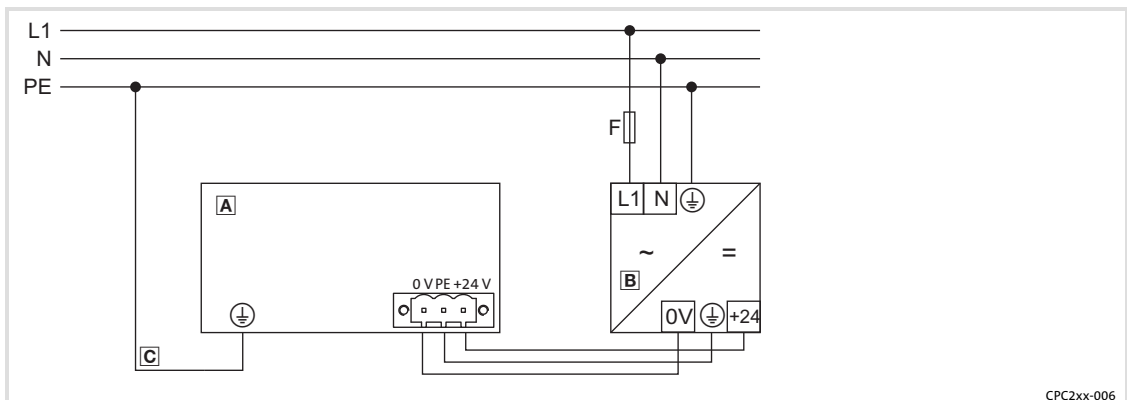
CPC2xx-006

[A] Controller
[B] Power supply unit
[C] Protective earth conductor connection on the supply side (PE, internally bridged with GND)

6.3.2   24 V connection

	Description	Connection type	Cable type
0V ⊕ U IPC001	X1: Connection of 24 V DC power supply	3-pin Combicon socket	Cable (conductor cross-section max. 2.5 mm²) with Combicon connector
⊕ ⊗ IPC001	PE connection	M4 Recessed head screw	Separate earthing conductor (min. 2.5 mm²) with ring cable lug

6.3.3 Ethernet interface
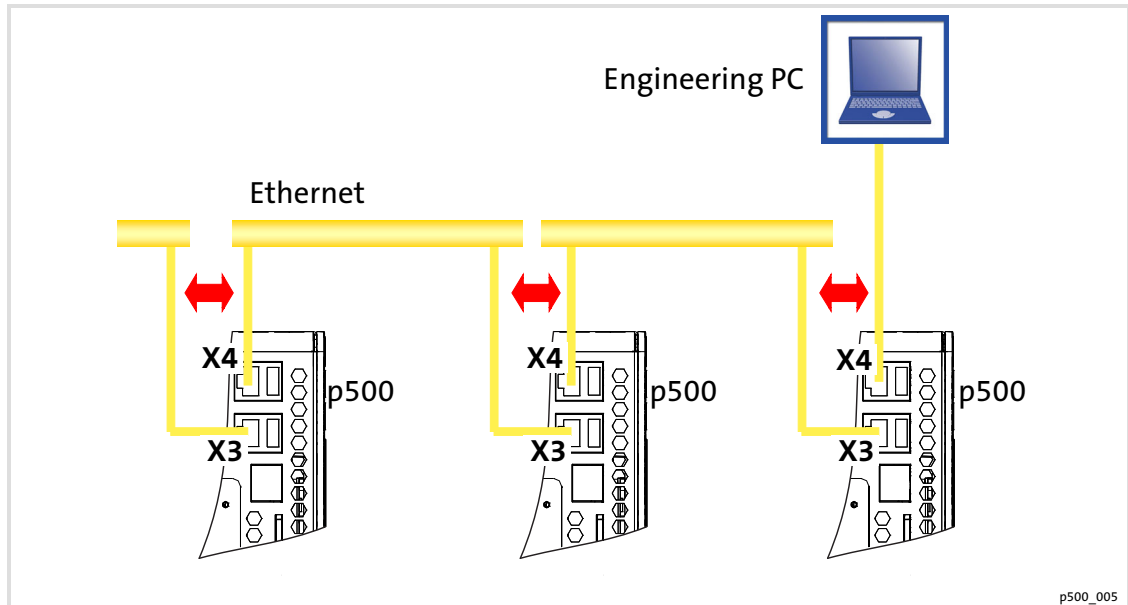
	Description	Connection type	Cable type
IPC001	X3, X4: Ethernet connection X3 LAN1b (internal switch) X4 LAN1a (internal switch)	RJ45 socket	Network cable CAT5e S/FTP (recommended) Max. cable length 100 m

The Controller can be connected to the higher-level network via LAN1b or LAN1a. If the application comprises several Controllers, these can be networked in a line network via the second LAN interface.

> **Note!**
>
> If the RJ45 plug connection is exposed to oscillating or vibrating stress:
> ► Use a strain relief in the immediate vicinity of the RJ45 socket.
> ► Select the contact surface on which the Controller is mounted as fixing point of the strain relief.
> ► Comply with the related minimum bending radius of the cable used.

6.3.4 EtherCAT interface

Ethernet

Engineering PC

EtherCAT

p500_005

	Description	Connection type	Cable type
IPC001	X2 EtherCAT	RJ45 socket	Network cable CAT5e S/FTP (recommended) Max. cable length 100 m

Note!

If the RJ45 plug connection is exposed to oscillating or vibrating stress:

► Use a strain relief in the immediate vicinity of the RJ45 socket.

► Select the contact surface on which the Controller is mounted as fixing point of the strain relief.

► Comply with the related minimum bending radius of the cable used.

6.3.5 USB interface

	Description	Connection type	Cable type
IPC001	X5 ... X6/X7: USB 2.0 host connection Max. load: 5 V/500 mA	USB-A socket	USB cable with USB-A plug

6.3.6 Communication interface (MC card)

	Description	Connection type	Cable type
EL100-013	Interface for MC card	Socket connector	-

6.3.7   SD card interface

	Description	Connection type	Cable type
	SD/SDHC compatible	Slot	-

🛈 **Note!**

The combination of control technology software and application data on the SD card ensures that the data suit the respective application in the present version. This enables an easy transfer of the SD card to another device.

Automatic, possibly unwanted and difficult-to-handle update/downgrade processes can be avoided in this way.

The SD card is used as a flash memory for the following applications:

► PLC boot project

► Visualisation

► Databases of the data manager

► prestart.txt/poststart.txt

► MB of retain and logbook data

► Customer-specific data

The SD card is not bootable and must always be inserted!

7 Maintenance

7.1 Regular checks

The device is free of maintenance. Nevertheless, visual inspections should be carried out at regular intervals which must not be too long, depending on the ambient conditions.

Please check the following:

► Does the environment of the device meet the operating conditions specified in the Technical data?

► Is the heat dissipation of the device not impeded by dust or dirt?

► Are the mechanical and electrical connections o.k.?

7.2 Cleaning

> **STOP**
>
> **Stop!**
>
> **Sensitive surfaces and components**
> The device can be damaged if it is not appropriately cleaned.
>
> **Possible consequences:**
> ► The housing or the screen gets scratched or dull if you use alcoholic, solvent-containing or scouring cleaning agents.
> ► Electrical components can be damaged ...
>   – by a short circuit caused by humidity.
>   – by static discharge.
>
> **Protective measures:**
> ► Observe the following notes.

► Before cleaning, disconnect the device from the power supply as otherwise unintentional commands may be activated via the touchscreen, for example a response of the control.

► Clean the device front (screen and frame) as follows:
  – Use a clean, lint-free and soft cloth.
  – Moisten the cloth with the detergent. Do not spray the detergent directly on the device.
  – Only use water with a fluid addition as detergent or a detergent declared especially for flat screens.

► Clean the rear side of the device with a clean, lint-free and soft cloth. Do not use liquid or foaming detergent since it may enter the housing or terminals.

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