

3200 C

Controller 3221 C / 3231 C / 3241 C



E32GAC...

Operating Instructions

EN



13466740

Lenze



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



Tip!

Information and tools concerning the Lenze products can be found in the download area under www.lenze.com

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Contents

This documentation provides information on the application as directed of the **Controllers 3221 C / 3231 C / 3241 C** in the Lenze "Controller-based Automation" control system.



Reference manual "Controller"

Here you can find detailed information on the **parameter setting and programming** of the Lenze Controllers.

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.

1.1 Document history

Version			Description
5.0	07/2014	TD17	<ul style="list-style-type: none">• Amended by EAC conformity• General updates• New layout
4.0	12/2013	TD29	New designation and general revision
3.0	02/2012	TD29	Amended by description of Controller 3241 C
2.0	11/2011	TD29	General revision and UL approval
1.0	09/2010	TD29	First edition

1 About this documentation

Conventions used

1.2 Conventions used

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

Type of information	Writing	Example/notes
Spelling of numbers		
Decimal	Normal spelling	Example: 1234
Decimal separator	Point	The decimal point is always used. For example: 1234.56
Warnings		
UL warnings	Ⓢ	Given in English and French
UR warnings	Ⓡ	
Text		
Program name	» «	PC software For example: Lenze »Engineer«
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 Example: 📄 EDKxxx = see documentation EDKxxx

1.3 Notes used

The following pictographs and signal words 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 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 trouble-free operation
 Tip!	Useful tip for easy handling
	Reference to another document

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.
 Warnings!	The measures are required to meet the requirements according to UL or CSA.

2 Safety instructions

General safety information

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 impacts.
 - Observe 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 Instructions contain notes concerning wiring according to EMC regulations (shielding, earthing, filters and cable routing). The compliance with limit values required by the EMC legislation is the responsibility of the manufacturer of the machine or system.

Warning: The inverters are automation components which can be used in industrial environment according to EN 61000-6-4. 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).

2 Safety instructions

General safety information

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 or dispose of the product according to the applicable regulations.

2.2 Product-specific safety instructions

- 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.
- In case of error the device has to be switched to a deenergised state immediately. For this, disconnect the supply connector and a possibly available UPS pack. Afterwards the device is to be sent to the manufacturer. The address can be found on the back of this documentation. For return, please use the original packaging!
- Printed circuit boards which might be damaged by short circuit or electrostatic discharge (ESD) must be handled appropriately.
- If an optional **battery pack** (ACCU-PACK) is used:
 - Connect the battery pack before switching on the standard device.
 - The standard device is only deenergised if the supply cable **and** the battery pack connecting cable have been disconnected.
 - If the standard device is disconnected from the mains for a longer time, the supply cable of the battery pack must be disconnected, so that the rechargeable batteries are not damaged by a possible exhaustive discharge.
 - When being stored, the batteries are losing energy over time. Hence, the batteries must be fully charged by means of the standard device after a storage period of six months at the latest.
 - The batteries of the battery pack must not be charged by means of external battery chargers. Use the ACU-UPS power supply unit of the standard device for this purpose.
- If an optional **capacitor pack** (CAPS-PACK) is used:
 - Connect the capacitor pack before switching on the standard device.
 - The standard device is only deenergised if the supply cable **and** the capacitor pack connecting cable have been disconnected.
 - The capacitor pack is only deenergised if its capacitors are discharged.
 - The capacitor pack must not be charged by means of external battery chargers.

2 Safety instructions

Safety instructions for the installation according to UL/CSA

2.3 Safety instructions for the installation according to UL/CSA



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:
 - 3221C: 55 °C, vertical or horizontal mounting
 - 3231 C / 3241 C:
 - 45 °C, vertical (upright) mounting
 - 50 °C, horizontal mounting



Warnings!

Field Wiring Markings

Wiring Terminal MSTB 2.5/3-STF-5.08:

- Use Copper Wire only.
- AWG 18 ... 12 (0.82 ... 3.3 mm²)
- Torque 5 ... 7 lb-in (0.5 ... 0.6 Nm)

Device

- These devices are open type programmable controllers, provided with housing for use in pollution degree 2 and controlled environment only.
- For use in max. surrounding temperature:
 - 3221 C: 55 °C, vertical or horizontal mounting
 - 3231 C / 3241 C:
 - 45 °C, vertical (upright) mounting
 - 50 °C, horizontal mounting

Optional filed bus module

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

F**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 :
 - 3221 C : 55 °C, montage vertical ou horizontal
 - 3231 C / 3241 C :
 - 45 °C, montage vertical
 - 50 °C, montage horizontal

**Warnings!****Marquage du câblage à pied d'oeuvre**

Bornier de câblage MSTB 2.5/3-STF-5.08 :

- Utiliser exclusivement des conducteurs en cuivre.
- AWG 18 ... 12 (0.82 ... 3.3 mm²)
- Couple de 5 ... 7 lb-in (0.5 ... 0.6 Nm)

Appareil

- Ces appareils sont des contrôleurs programmables à circuit ouvert avec un coffret de protection destinés uniquement à un environnement contrôlé caractérisé par le degré de pollution 2.
- Températures ambiantes maximales admissibles :
 - 3221 C : 55 °C, montage vertical ou horizontal
 - 3231 C / 3241 C :
 - 45 °C, montage vertical
 - 50 °C, montage horizontal

Module bus en option

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

2 Safety instructions

Residual hazards

2.4 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.

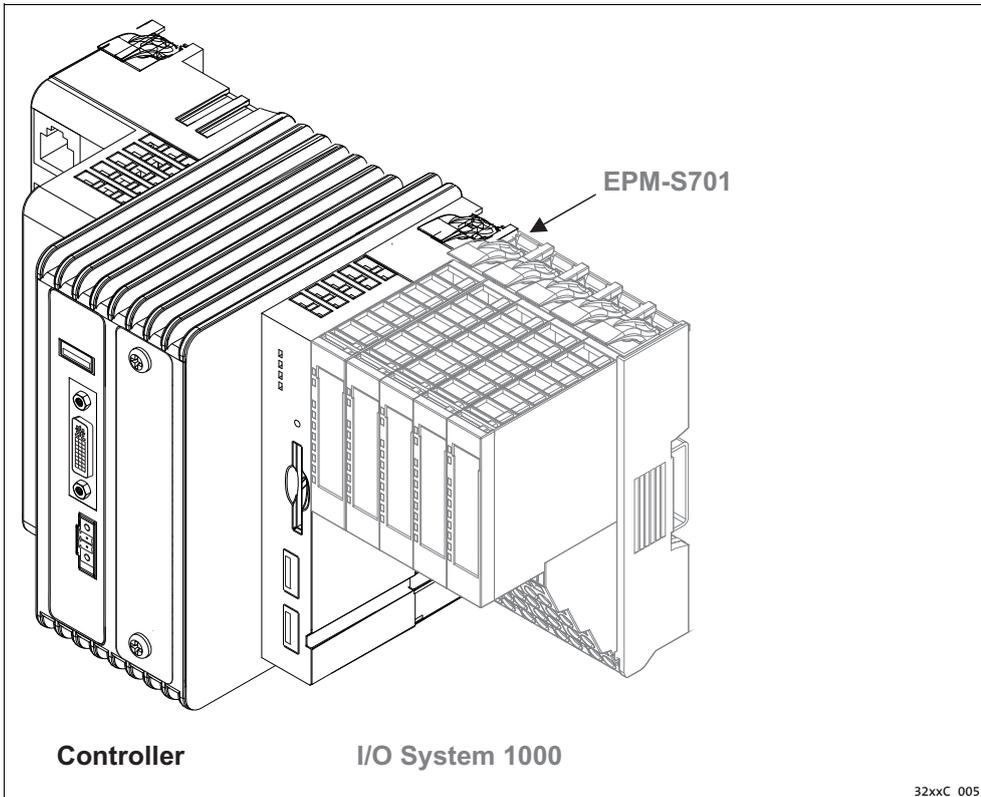


Fig. 3-1 Controller 3200 C with coupled I/O system 1000 (EPM-S701)

 **System manual "I/O system 1000"**
Here you can find detailed information on the I/O system 1000.

3.1 Scope of supply

Number	Name
1	Controller
1	Connection plug for voltage supply
1	SD card (inserted)
1	Contact cover
1	Mounting instructions

 **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 Product description

Application as directed

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 which exceed the requirements of EN 61131-2.
- to execute safety functions, as for example
 - in the air-traffic control / in flight control systems
 - for monitoring/controlling nuclear reactions
 - for monitoring/controlling mass transportation
 - for monitoring/controlling medical systems
 - for monitoring/controlling weapons systems

In order to ensure the protection of persons and material assets, higher-level safety systems must be used!

3.3 Device features

Range	Controller		
	3221 C	3231 C	3241 C
Design	<ul style="list-style-type: none"> Mounting on standard DIN rail (35 mm) I/O system 1000 can be connected via internal backplane bus 		
Equipment	<ul style="list-style-type: none"> 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 		
Processor type			
Fanless	Atom™ 1.1 GHz 512 kB L2 cache	Atom™ 1.6 GHz 512 kB L2 cache	
Memory			
RAM	1 GB DDR2-RAM		
ROM (Flash)	1 GB	2 GB	4 GB
SD/SDHC card	≥ 128 MB		
Retain memory	60 kB		1024 kB
Interfaces			
SD/SDHC card	1		
Ethernet	2		
EtherCAT	1		
USB 2.0	2	3	
DVI-D	-	1	
ACU (UPS function)	- (internal capacitor)		1 1)
Option (MC card)	CANopen PROFIBUS master/slave PROFINET device		
Control/display elements			
Reset button	✓		
Diagnostic LEDs	4		
Operating system			
	Windows [®] CE 6.0		Windows [®] Embedded Standard 2009
Runtime software			
Logic	✓		
Motion	✓		
Visu 2)	-	VisiWinNET [®] Compact CE, 500 Power Tags	

- 1) For external battery pack (ACCU-PACK) or capacitor pack (CAPS-PACK)
- 2) Visualisation for using an external Monitor Panel with DVI/USB Extender (accessories)

3 Product description

Identification

3.4 Identification

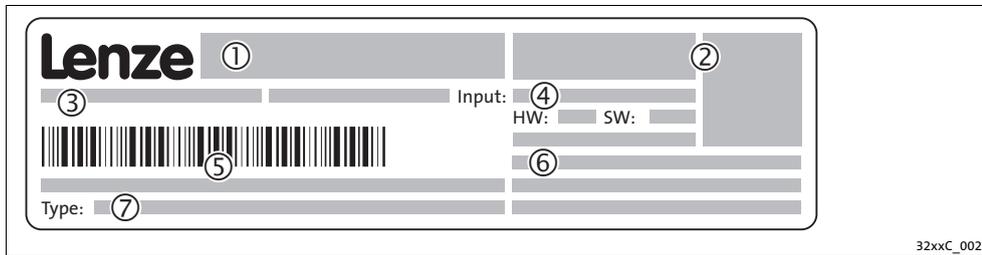


Fig. 3-2 Typenschild

Pos.	Description
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	E32GAC0000B4F	x	XXX-02S13	x	00000
Controller 3221 C					
MC card 0 = without 5 = MC-PBM 6 = MC-PBS 7 = MC-PNC 8 = MC-PND 9 = MC-CAN2 D = MC-ISI					
Control technology runtime software 0 = without 3 = LPC1000 (V3.x) 4 = MPC1200 (V3.x)					

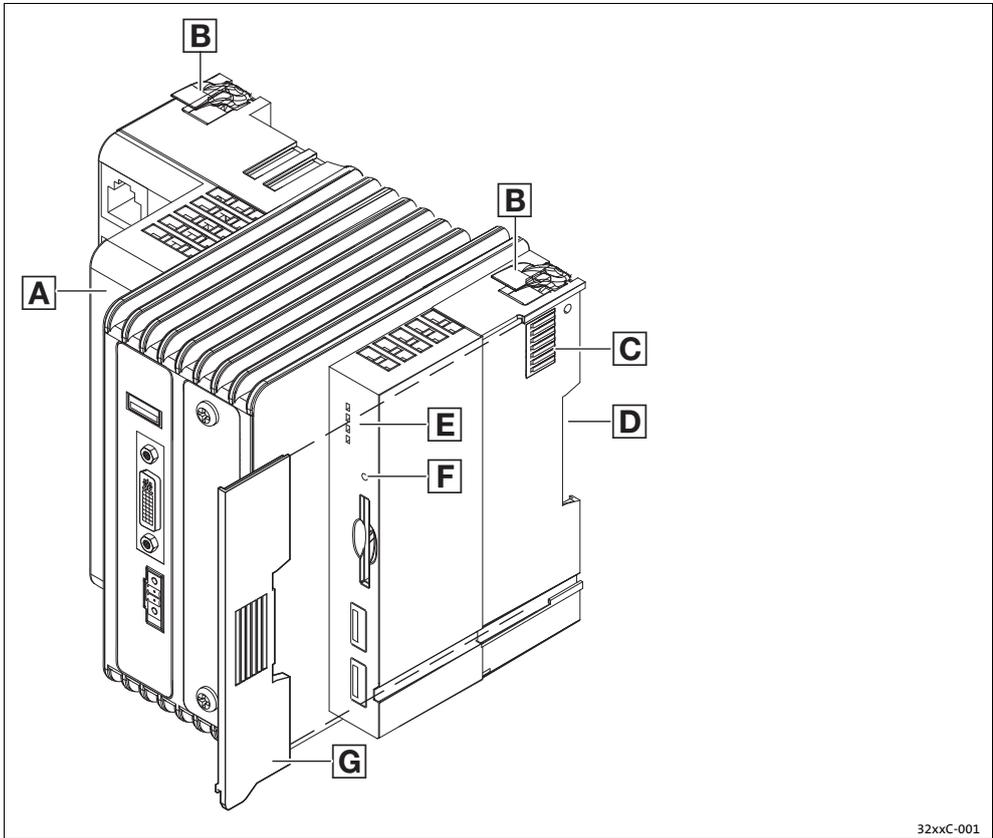
Type code	E32GAC10000C4G	x	XXX-02S13	x	xx	000
Controller 3231 C						
MC card 0 = without 5 = MC-PBM 6 = MC-PBS 7 = MC-PNC 8 = MC-PND 9 = MC-CAN2 D = MC-ISI						
Control technology runtime software 0 = without 3 = LPC1000 (V3.x) 4 = MPC1200 (V3.x)						
Runtime software visualisation (Visu) 00 = without 14 = VisiWinNET [®] Compact CE, 500 Power Tags						

Type code Controller 3241 C	E32GAC1000C4H	x	XXX-01S13	x	xx	000
<p>MC card 0 = without 5 = MC-PBM 6 = MC-PBS 7 = MC-PNC 8 = MC-PND 9 = MC-CAN2 D = MC-ISI</p> <p>Control technology runtime software 0 = without 3 = LPC1000 (V3.x) 4 = MPC1200 (V3.x)</p> <p>Visualisation runtime software 00 = without 14 = VisiWinNET[®] Compact CE, 500 Power Tags</p>						

3 Product description

Controls and displays

3.5 Controls and displays



32xxC-001

Fig. 3-3 Control and display elements

Pos.	Description
A	Controller
B	Locking lever (DIN rail)
C	Backplane bus contacts
D	Guide for DIN rail with thermal connection via GapPad strips
E	Status LEDs (21)
F	Reset button
G	Contact cover

LED status displays

LED		Interval	Meaning
Color 1 / Color 2			
Power			
Green		Is ON constantly	Starting sequence properly completed. <ul style="list-style-type: none"> No pending error Controller is switched on Supply voltage OK
Yellow		Is ON constantly	The supply voltage has fallen below the minimum value.
		Blinking (2.0 Hz)	Status after switch-on/restart
Green	Yellow	Blinking (0.5 Hz)	System clock is not synchronised (missing time information). <p>Note: If the Controller is switched off for longer than two weeks, the set time information is lost.</p> <ul style="list-style-type: none"> The next starting sequence generates a logbook entry (power LED is blinking green). Set the current time manually via the »WebConfig« (parameter 91).
Only for Controller 3241 C			Battery pack (ACCU-PACK) or capacitor pack (CAPS-PACK) is not fully charged.
Green		Blinking (5.0 Hz)	The length of the dark bar shows the state of charge: <ul style="list-style-type: none"> ACCU/CAPS-PACK almost dead: long dark bar ACCU/CAPS-PACK almost fully charged: short dark bar
Only for Controller 3241 C			Error status of the battery pack (ACCU-PACK) or capacitor pack (CAPS-PACK)
Green	Yellow	Blinking (5.0 Hz)	UPS function not available, possible cause: <ul style="list-style-type: none"> Connection to ACCU/CAPS-PACK interrupted ACCU/CAPS-PACK not connected, cable break/short circuit
Error			
Red		Blinking (5.0 Hz)	Error: <ul style="list-style-type: none"> Fatal error (abort) SD card not available/not inserted correctly No operating system licence available
Green	Red	Blinking (5.0 Hz)	Mains switching required
Status 1 ("busy")			
Green		Is ON constantly	Operating status: <ul style="list-style-type: none"> Controller running PLC project running
		Blinking (0.5 Hz)	Starting sequence of the Controller is active
Green	Yellow	Blinking (0.5 Hz)	User action required: <ul style="list-style-type: none"> Load PLC project (PLC was started, project is not running) Remove USB stick
Status 2			
-		-	No response

3 Product description

UPS functionality

3.6 UPS functionality

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

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 during a supply voltage failure (e.g. supply of the backplane bus, supply of the devices connected to the USB ports).

	Controller	
	3221 C / 3231 C	3241 C
UPS functionality via ...	Internal buffer capacitor	<ul style="list-style-type: none">External battery pack (ACCU-PACK)External capacitor pack (CAPS-PACK)
Storage medium for backup data	MRAM	SD/SDHC card
Buffer time sufficient for ...	60 kB of retain and logbook data	1 MB of retain and logbook data



Documentation for "ACCU-PACK"/"CAPS-PACK"

Here you can find detailed information on ...

- Battery pack (ACCU PACK);
- Capacitor pack (CAPS-PACK).

3.7 "Real Time Clock" functionality

The operating system contains the CMOS-RTC time via a maintenance-free chip.

The CMOS-RTC time is internally saved for a minimum period of 14 days. Then the time must be set again manually via the »WebConfig« (parameter 91). A battery is not required.

3.8 Resetting the device (Reset)

To reset the device, press the reset button ( 20).

4.1 General data and operating conditions

General data

Conformity and approval			
Conformity			
CE	2004/108/EC	EMC Directive	
EAC	TP TC 020/2011 (TR CU 020/2011)	Electromagnetic compatibility of technical means	Eurasian Conformity TR CU: Technical Regulation of Customs Union
Approval			
UL	UL 508 CSA C22.2	Process Control Equipment (File-No. E236341)	
Other			
RoHS	2011/65/EU	Products are lead-free acc. to directive.	

Protection of persons and device protection		
Enclosure		IP20
Electrical isolation		
To the fieldbus		Depending on the used MC card
To the process level		None
Insulation resistance	IEC 61131-2	
Protective measures		Against short circuit

EMC			
Interference emission	EN 61000-6-4	Class A (industrial premises)	
Noise immunity	EN 61000-6-2	Industrial premises	
		EN 61000-4-2	ESD; severity 3, i.e. Air discharge: 8 kV, 4 kV with 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 1
		EN 61000-4-6	RF cable-guided 150 kHz ... 80 MHz, 10 V/m 80 % AM (1 kHz)

4 Technical data

Mechanical data

Operating conditions

Ambient conditions		
Climatic		
Storage/transport	EN 60721-3-2	2K3: -25 ... +70 °C
Operation	EN 60721-3-2	3K3: Horizontal mounting: 0 ... +50 °C (3221 C: 0 ... +55 °C) Vertical mounting: 0 ... +45 °C (3221 C: 0 ... +55 °C)
Air humidity	EN 60721-3-3	3K3 (without condensation, relative humidity 10 ... 95 %)
Pollution	EN 61131-2	Pollution degree 2
Mechanical		
Vibration	EN 61131-2	1 g
Shock	EN 61131-2	15 g
Site altitude		
Storage/transport		< 12000 m amsl
Operation		< 3000 m amsl

Mounting conditions		
Mounting place		In the control cabinet
Mounting position		<ul style="list-style-type: none"> • Horizontal • Vertical <ul style="list-style-type: none"> – LAN connections point downwards (▣ 27) – With reduced ambient temperature range
Mounting type		Clip mounting on DIN rail according to DIN EN 60715 (TH 35 x 7.5 or TH 35 x 15); maximum of 20 plug cycles, then GapPad strips must be exchanged (▣ 37)

4.2 Mechanical data

Type	Dimensions B x H x T [mm]	Mass [kg]
3221 C	136 x 105 x 112	0.6
3231 C		
3241 C		

Dimensions without MC-Card

4.3 Electrical data

Type	Supply					
	Voltage [V DC]	Stand-alone		With maximum configuration of I/O system 1000 (5 V/1.7 A)		ACCU-PACK CAPS-PACK
		Current [A]	Power ¹⁾ [W]	Current [A]	Power [W]	Charging current [A]
3221 C	24	0.6	14.4	1.0	24.0	-
3231 C	(+18 ... +30, +/-0 %) ²⁾	0.8	19.2	1.2	28.8	-
3241 C		1.3	31.2	1.8	41.0	Max. 0.6

1) Power without MC card and without USB consumer

2) With battery pack (ACCU-PACK) / capacitor pack (CAPS-PACK): +20 ... +30 V DC

5.1 Important notes



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.



Note!

On the rear of the device, there are two GapPad strips. These strips serve to thermally connect the device to the DIN rail. If the strips are defective, they must be replaced (☞ 37).

Mounting of the device on the DIN rail is limited to 20 plug cycles. Then the GapPad strips must be exchanged.

New GapPad strips are available from Lenze (order number EPCZMEG).

- The mounting site must always comply with the operating conditions stated in the technical data. Take additional measures if necessary.
- The mechanical connections must always be ensured.
- The mounting rail and the mounting plate in the control cabinet must be electrically conductive and free of lacquer.
- Attach and detach Controllers and modules of the I/O system 1000 only when the supply voltage is switched off. Otherwise, they could be damaged by short circuits.
- Always arrange the modules from left to right starting with the Controller directly followed by a power supply module EMP-S701 on the right side.
- The module must always be installed directly next to each other. Free slots between the modules are not permissible because otherwise the backplane bus would be interrupted.
- The side contacts of the last module always must be covered with the supplied contact cover. Otherwise, the modules may be damaged by short circuit or static discharge.

5 Mechanical installation

Dimensions

5.2 Dimensions

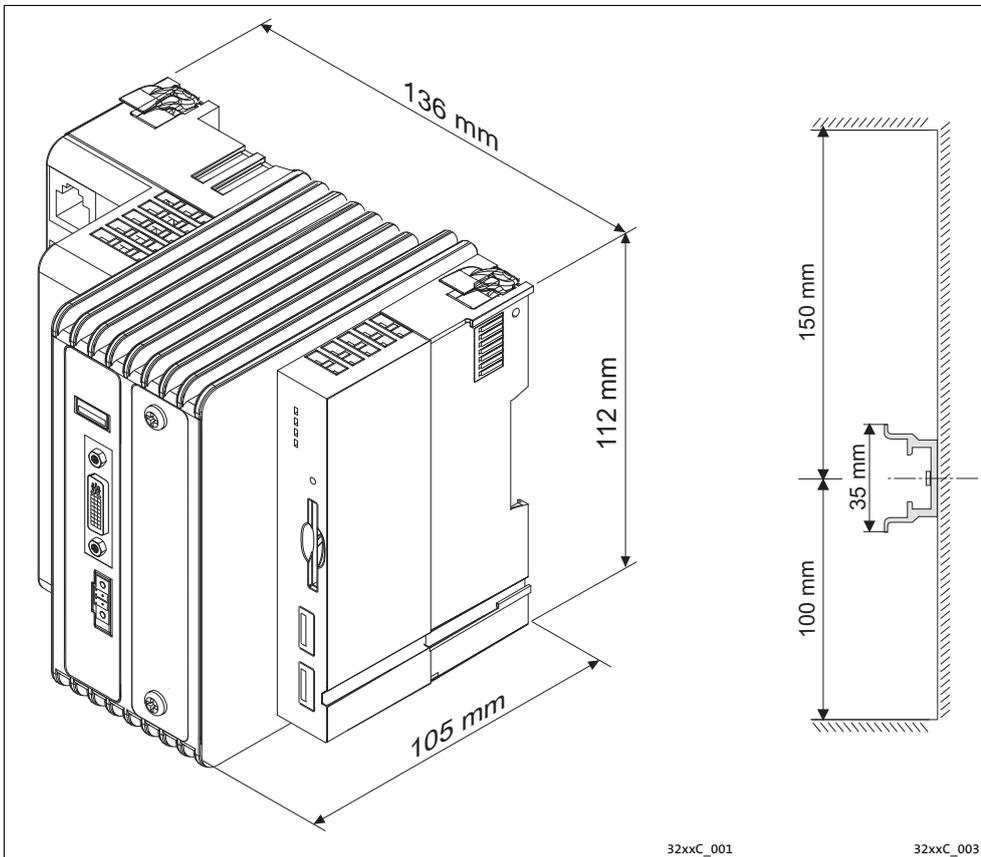


Fig. 5-1 Dimensions and mounting clearances

5.3 Mounting

**Stop!****Short circuit on the backplane bus contact**

The backplane bus signals are forwarded to the adjacent module of the I/O system 1000 via a contact strip. If electrically conductive material contacts this contact strip, a short circuit can be caused. Moreover, touching the contact strip can cause a static discharge.

Possible consequences:

- Destruction of the device and/or the modules.

Protective measures:

Plug on the contact cover provided in the scope of supply, ...

- on to the side contacts of the last I/O module or
- if no module of the I/O system 1000 is added.

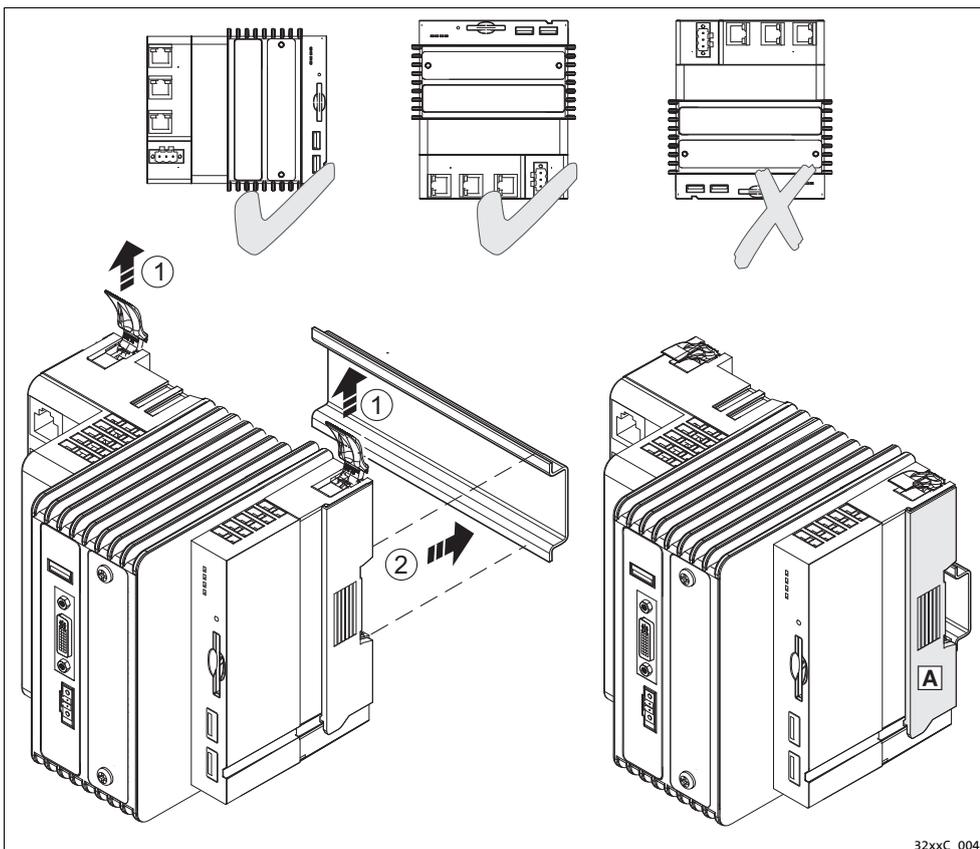


Fig. 5-2 Mounting

Pos.	Description
A	Contact cover

How to mount the Controller:

1. Loosen the locking lever for the DIN rail.
2. Put the Controller on the DIN rail.
3. Shut the locking lever.

5 Mechanical installation

Dismounting

5.4 Dismounting



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.

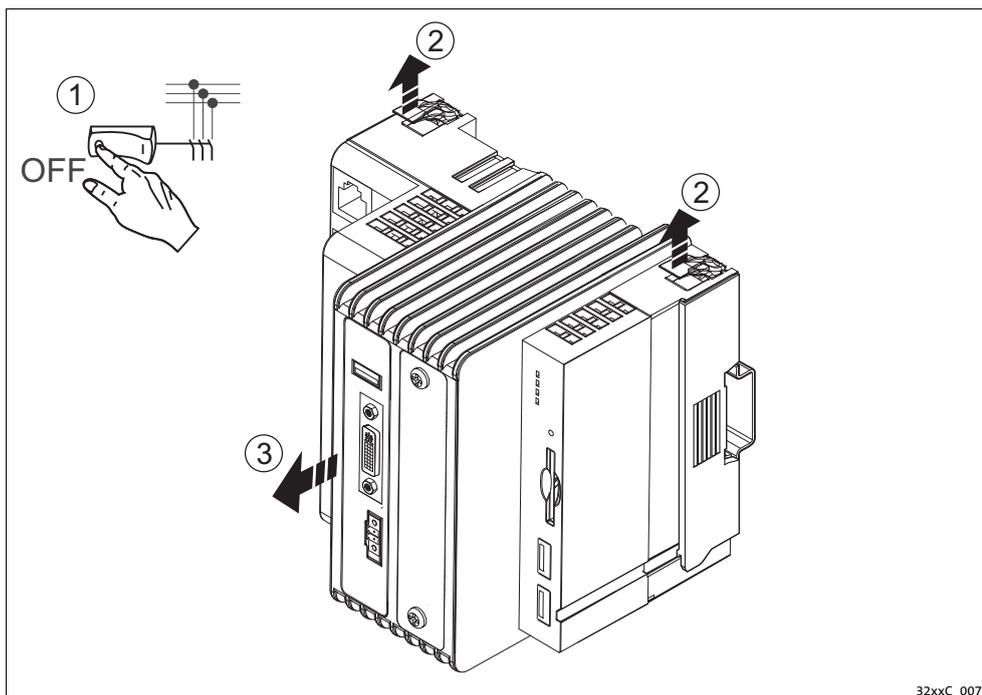


Fig. 5-3 Disassembly

How to remove the Controller:

1. Switch off the supply voltage.
2. Loosen the locking lever for the DIN rail.
3. Remove the Controller from the DIN rail.

6.1 Important notes

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



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.

6 Electrical installation

EMC-compliant wiring

6.2 EMC-compliant wiring

Notes on EMC-compliant wiring	
General notes	<ul style="list-style-type: none">• The electromagnetic compatibility of the system depends on the type of installation and care taken. Especially consider the following:<ul style="list-style-type: none">– Structure– Shielding– Earthing• For installations differing from the one described, the evaluation of the conformity with the EMC Directive requires a check of the system regarding the EMC limit values. This for instance applies to:<ul style="list-style-type: none">– Use of unshielded cables• The compliance with the EMC Directive is in the responsibility of the user.<ul style="list-style-type: none">– If you observe the following measures, you can assume that no EMC problems will occur during operation and that compliance with the EMC Directive and the EMC law is achieved.– If devices which do not comply with the CE requirement concerning noise immunity (EN 6100042) are operated close to the system, these devices may be electromagnetically affected by the system.
Structure	<ul style="list-style-type: none">• Provide electrical contact between the DIN rail and the earthed mounting plate:<ul style="list-style-type: none">– Mounting plates with electrically conductive surfaces (zinc-coated or stainless steel) allow permanent contact.– Painted plates are not suitable for an EMC-compliant installation.• If you use several mounting plates:<ul style="list-style-type: none">– Connect as much surface of the mounting plates as possible (e.g. with copper strips).• When laying the cables, pay attention to the separation of signal cables and mains cables.• Lay the cables as close as possible to the reference potential. Freely suspended cables act like aerials.
Shielding	<ul style="list-style-type: none">• Only use cables with braided shield if possible.• The overlap rate of the shield should be higher than 80%.• For data cables for serial connection, always use metal or metallised connectors. Connect the shield of the data cable to the connector shell.
Earthing	<ul style="list-style-type: none">• Earth all metallically conductive components using suitable cables connected to a central earthing point (PE bar).• Keep to the minimum cross-sections defined in the safety instructions:<ul style="list-style-type: none">– For EMC not the cable cross-section is important, but the surface of the cable and the contact with a cross-section as large as possible, i.e. large surface.

6.3 Connecting voltage supply (24 V)



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 starts 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.

6.3.1 Connection plan

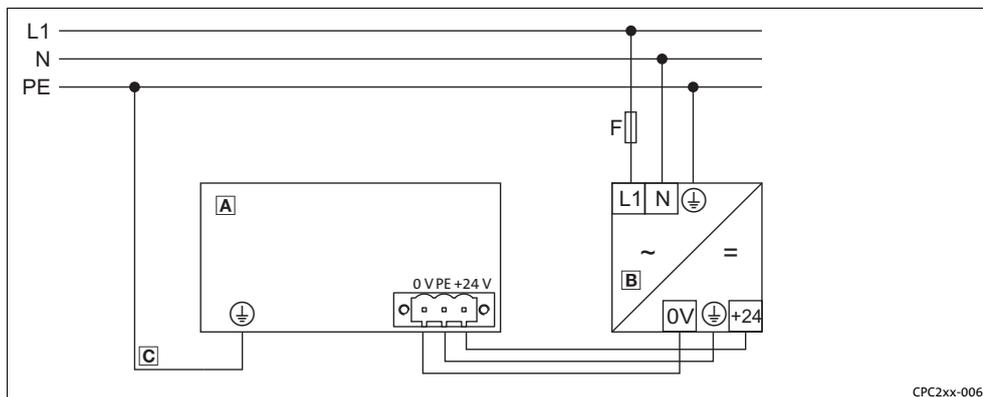


Fig. 6-1 Connection plan for voltage supply (24 V)

Pos.	Description
A	Controller
B	Power supply unit
C	PE conductor connection on the supply side via DIN rail

6.3.2 Mains connection (24 V)

Figure	Connection	Connection type	Cable type
 IPC001	X1: DC voltage supply (24 V)	3-pin Combicon socket	Cable with Combicon plug (conductor cross-section max. 2.5 mm ²)

6 Electrical installation

Interfaces for peripheral devices
UPS connection

6.4 Interfaces for peripheral devices

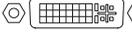
6.4.1 UPS connection

For Controller 3241 C only.

Figure	Connection	Connection type	Cable type
 IPC001	X9: <ul style="list-style-type: none">• Capacitor pack (CAPS-PACK)• Battery pack (ACCU-PACK)  Mounting instructions	2-pin socket	Cable included in the scope of supply, length: 2.5 m (extension cable separately available)

6.4.2 DVI interface

For Controllers 3231 C and 3241 C only.

Figure	Connection	Connection type	Cable type
 IPC001	X8: Monitor with DVI-D interface (no VGA)	DVI socket	DVI-I single link (18+5) DVI-I double link (24+5) DVI-D single link (18+1) DVI-D double link (24+1)

6.4.3 Ethernet interface

Figure	Connection	Connection type	Cable type
 IPC001	X3 / X4: Ethernet X3 LAN1b (internal switch) X4 LAN1a (internal switch)	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 device is mounted as fixing point of the strain relief.
- Comply with the related minimum bending radius of the cable used.

The Controller can be connected to the higher-level network via X3 (LAN1b) or X4 (LAN1a). If the application comprises several Controllers, these can be networked in a line network via the second LAN interface.

Baud rates: 10 or 100 Mbps

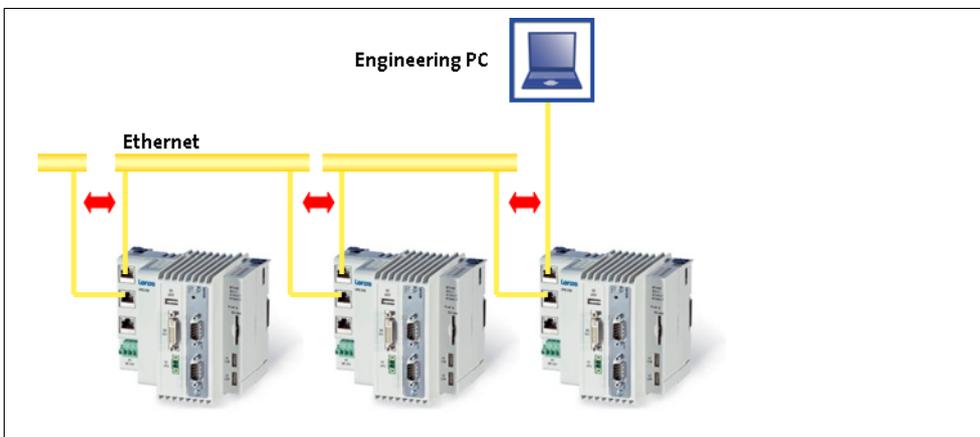


Fig. 6-2 Beispiel: 3241 C am Ethernet-Netzwerk

6 Electrical installation

Interfaces for peripheral devices
EtherCAT interface

6.4.4 EtherCAT interface

Figure	Connection	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 device is mounted as fixing point of the strain relief.
- Comply with the related minimum bending radius of the cable used.

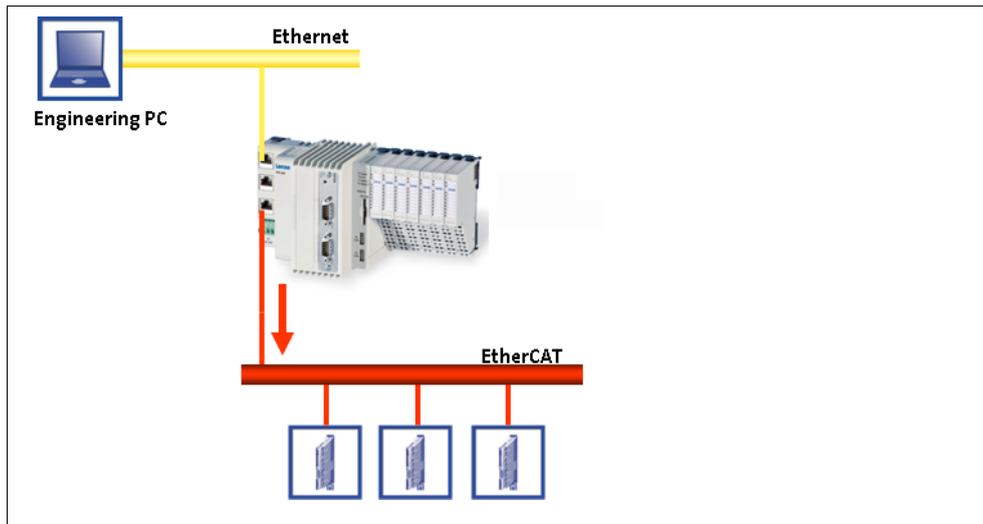
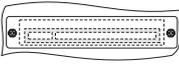


Fig. 6-3 Controller am EtherCAT-Netzwerk

6.4.5 USB interface

Figure	Connection	Connection type	Cable type
 IPC001	X5 / X6 / X7: USB 2.0 connection (max. load: 5 V/500 mA)	USB-A socket	USB cable with USB-A plug

6.4.6 Communication interface (MC card)

Figure	Connection	Connection type	Cable type
 EL100-013	Interface for optional communication card (MC card)	Socket connector	-

6.4.7 SD card interface

Figure	Connection	Connection type	Cable type
	SD/SDHC card	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
- Retain and logbook data (Controller 3241 C only)
- Customer-specific data

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

How to exchange the SC card:

1. To unlock the SD card, press it carefully into the slot and release it.
2. Remove the SD card carefully.
3. Gently press the new SD card into the slot until it clicks into place.

7 Maintenance

Regular checks

7.1 Regular checks

The system is maintenance-free. Nevertheless, visual inspections must 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 system still meet the operating conditions specified in the Technical data?
- Is the heat dissipation impeded by dust or dirt?
- Are the mechanical and electrical connections still okay?

7.2 Cleaning



Stop!

Sensitive surfaces and components

The system can be damaged if it is not appropriately cleaned.

Possible consequences:

- Housings will get scratched or dull if cleaning agents containing alcohol, solvents or abrasives are used.
- Electrical components will be damaged if humidity enters in the housing.

Protective measures:

- Deenergise the complete system before cleaning.
- Wipe the housing using a clean, lint-free, soft cloth. For stubborn dirt, dampen the cloth with water and an ordinary household cleaning agent.

7.3 Exchanging GapPad strips



Note!

On the rear of the device, there are two GapPad strips. These strips serve to thermally connect the device to the DIN rail. If the strips are defective, they must be replaced (📖 37).

Mounting of the device on the DIN rail is limited to 20 plug cycles. Then the GapPad strips must be exchanged.

New GapPad strips are available from Lenze (order number EPCZMEG).

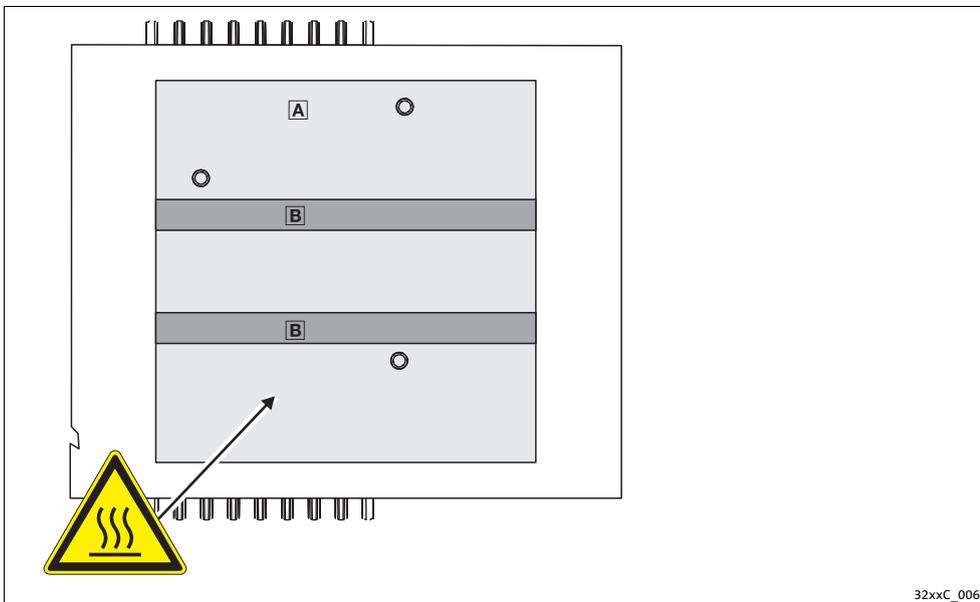


Fig. 7-1 Rear side

Pos.	Description
A	Heatsink
B	GapPad strip

How to exchange the GapPad strips:

4. Check the temperature of the heatsink because it may become very hot during operation and contact may cause burns.
5. Pull off the old GapPad strip from the groove in the heatsink.
6. Remove the blue film from the self-adhesive side of the new GapPad strip and stick the GapPad strip into the groove.
7. Repeat these steps for the second GapPad strip.

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