rexroth
A Bosch Company

Operating Instructions
(Translation of the original)

ctrlX CORE^{plus} X5 and X7

Controls

R911419122, Edition 03

Disclaimer

The data specified above only serve to describe the product. As our products are constantly being further developed, no statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

Table of contents

1 About this documentation

1.1 Revision history

Edition	Release date	Note
Edition 01	2022-12	First edition
Edition 02	2024-03	X5 supplemented
Edition 03	2024-07	Editorial changes, reference to document on the ctrlX CORE status LED inserted

1.2 Overview on target groups and product phases

In the following illustration, the framed activities, product phases and target groups refer to the present documentation.

Example: In the product phase “Mounting (assembly/installation)”, the target group “Mechanic/electrician” can execute the activity “install” using this documentation.

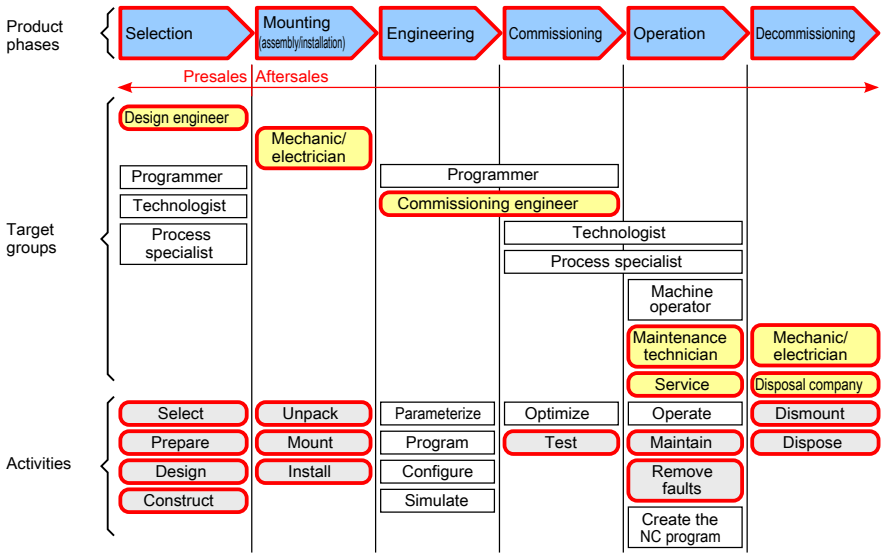

Fig. 1: Assigning the present documentation to the target groups, product phases and activities of the target group

This document instructs the technical staff of the machine manufacturer on how to safely perform the mechanical and electrical installation and on how to commission the device.

Required qualification: Individual who is able to assess the tasks assigned and to identify possible safety risks owing to qualification in the subject, knowledge and experience. The individual should also be familiar with the standards and regulations.

1.3 Scope

This operating instructions is valid for all variants of the control with a type code starting with:

COREX-M X7 or COREX-M X5

The type code specifications are located on the type plate of the device. Also refer to ➦ Chapter 2.1 “Product identification” on page 9.

1.4 Related documents

Table 1: Related documentation

Title	Part number and document type
Security Manual	➦ R911342562
Electric Drives and Controls	Project Planning Manual
Rexroth IndraControl VAU 01.1 UPS with Communication Interface	➦ R911336867 Operating Instructions

1.5 Customer feedback

Customer requests, comments or suggestions for improvement are of great importance. Please email your feedback on the documentations to ➦ Feedback.Documentation@boschrexroth.de. Directly insert comments into the electronic PDF document and send the PDF file to Bosch Rexroth.

2 Product identification and scope of delivery

2.1 Product identification

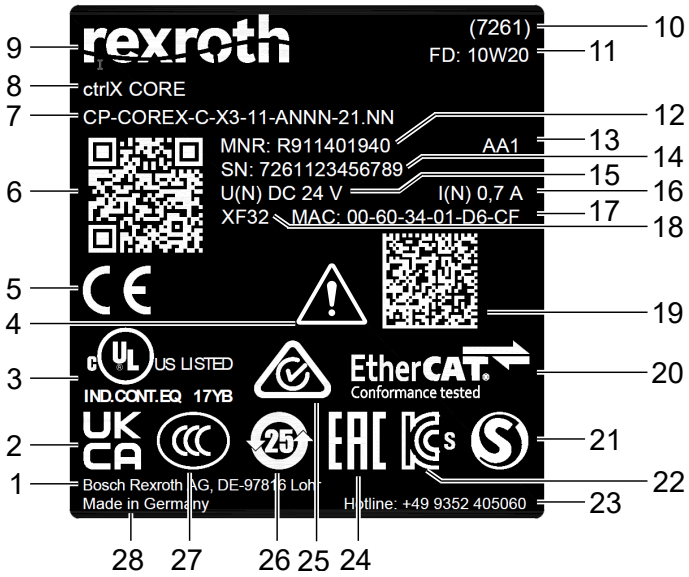

Fig. 2: Type plate (example)

1 Company address
2 UKCA marking
3 Underwriters Laboratories Inc. mark
4 Symbol for reference to the operating instructions
5 CE conformity mark
6 QR or data matrix code, Rexroth, 2D code
7 Type code
8 Product
9 Trademark
10 Plant number
11 Manufacturing date
12 Part number
13 State of revision
14 Serial number
15 Rated voltage
16 Rated current
17 MAC address (Ethernet ID)
18 Free text on the MAC address
19 MAC code (2D code), data matrix
20 EtherCAT
21 S-mark logo
22 KCs mark
23 Service hotline number
24 EAC conformity mark
25 Regulatory Compliance Mark (RCM)
26 China-RoHs 2 label
27 CCC marking
28 Name of origin

2.2 Scope of delivery

- ctrlX CORE control
- 24 V power connector, 4-pin (ctrlX CORE X7plus)
- Endcover

3 Using safety instructions

3.1 Structure of the safety instructions

The safety instructions are structured as follows:

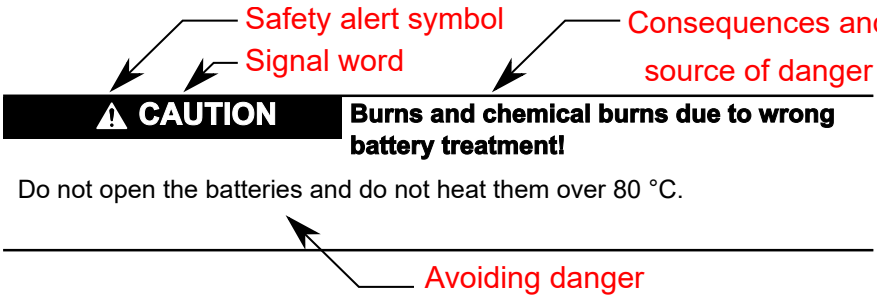

Fig. 3: Structure of the safety instructions

3.2 Explaining signal words and the safety alert symbol

The safety instructions in this documentation contain specific signal words (danger, warning, caution, notice) and, if necessary, a safety alert symbol (according to ANSI Z535.6).

The signal word draws attention to the safety instruction and indicates the risk potential.

The signal graphics (warning triangle with exclamation mark), added in front of the signal words Danger, Warning and Caution refer to hazards to inidividuals.

⚠ DANGER	In case of non-compliance with this safety instruction, death or serious injury **will** occur.
⚠ WARNING	In case of non-compliance with this safety instruction, death or serious injury **can** occur.
⚠ CAUTION	In case of non-compliance with this safety instruction, minor or moderate injury can occur.
NOTICE	In case of non-compliance with this safety instruction, material damage can occur.

3.3 Symbols used

This is a tip.

3.4 Explaining the signal alert symbol on the device

If this symbol is on your device, you have to observe the documentation on the device. The respective documentation informs on the type of hazard as well as the steps required to avoid this hazard.

4 Intended use

4.1 General information on the intended use

NOTICE

Risk of damaging the device if not expressly stated accessories, mounting parts and other components, cables, lines, software and firmware are used.

The ctrlX CORE control may only be used with the accessories and mounting parts listed in this documentation. Components that are not expressly mentioned must neither be attached nor connected. The same applies to cables and lines.

Only to be operated with the component configurations and combinations expressly defined and with the software and firmware specified in the corresponding functional description.

Typical areas of application of the control:

- Handling and assembly systems
- Packaging and food processing machines
- Printing and paper converting machines
- Machine tools
- Wood working machines
- General mechanical engineering
- Building automation

⚠ WARNING

Danger due to unintended use

The protection specified by Bosch Rexroth cannot be ensured if not used as intended.

- Use the product exclusively as intended by Bosch Rexroth.
- Operate this device only under the mounting and installation conditions, in the position and under the ambient conditions (temperature, degree of protection, humidity, EMC etc.) specified in this documentation.

5 Spare parts, accessories and wear parts

5.1 Power connector, 24 V

Ordering code	Part number	Description
XACC-1-CSPWRM	R911416670	24 V power connector

5.2 SD card

Ordering code	Part number	Description
XACC-0-SD016GB	R911404022	Micro SD card, 16 GB

5.3 RJ45 cable

Ordering code	Part number	Description
RKB0020	R911340676	Bus cable

5.4 End clamp

Ordering code	Part number	Description
SUP-M01-ENDHALTER	R911170685	2 pieces of snap-on end brackets for 35 mm NS 35/7.5 support rail; width: 9.5 mm

5.5 Fan unit

Ordering code	Part number	Description
XACC-1-FAN	R911423619	Fan unit

5.6 End cover

Ordering code	Part number	Description
XACC-2-ENDCOVR	R911412178	End cover

5.7 License dongle

The license dongle allows to easily transmit licenses between ctrlX controls. The license dongle is a micro SD card with a serial number. The user can assign licenses to the dongle instead of to the ctrlX controls.

Ordering code	Part number	Description
XACC-1-SD*000L	R911416693	License dongle

5.8 Wear parts

5.8.1 Read-only memory

The internal physical read-only memory of the control has a limited number of write cycles. Retrieve the current status of the read-only memories via the ctrlX CORE web interface: *"ctrlX CORE side navigation → Settings → Information → tab "Resources" → Sensors"*.

Notes on sensor values:

- "0 - 10% of life time used" means that up to 10 % of the maximum write cycles can be used.
- Create a backup if the value exceeds 80%.
- Replace the hardware if the value exceeds 80%.
- Use an external memory to prolong the service life of the read-only memory.
- The frequency of the refresh cycle depends on the service life of the memory. If a refresh cycle is not possible anymore, data can be lost.

5.8.2 Fan

The maximum service life of the fan unit is 50,000 hours. The fan unit then needs to be replaced. For the ordering data, refer to ➦ Chapter 5.5 "Fan unit" on page 12.

6 Ambient conditions

6.1 Ambient conditions of the ctrlX CORE

Ambient temperature during operation	Up to 2,000 m: -25 °C to +55 °C X5: 50 °C to 55 °C with fan 2,000 m to 3,000 m: -25 °C to +50 °C 3,000 m to 4,000 m: -25 °C to +45 °C 4,000 m to 5,000 m: -25 °C to +40 °C
Ambient temperature during storage and transport	-40 °C to +70 °C
Operating altitude according to DIN 60204	Up to 5,000 m above sea level
Permitted air humidity according to EN 61131-2	5 % to 85 %
Degree of protection acc. to EN 60529	IP 20 (not evaluated by UL)
Protection class acc. to EN 61010-2-201	III
Overvoltage category acc. to IEC 60664-1	2
Contamination level acc. to EN 61010-1	2, no condensation allowed
Mechanical tests	
Vibration resistance acc. to DIN EN 60068-2-6①	Oscillations, sinusoidal in all three axes 5 Hz - 8.4 Hz with 3.5 mm amplitude 8.4 Hz -150 Hz with 1 g peak acceleration
Shock test acc. to DIN EN 60068-2-27	Shock stress: Shock resistance in all three axes, 11 ms semi-sinusoidal 15 g

Broadband noise acc. to DIN EN 60068-2-64	20-500 Hz with 1.22 g RMS (Root-Mean-Square), 30 min in all three axes
Electrostatic discharge	
ESD resistance acc. to DIN EN 61131-2	Criterion B
• Test voltage	8 kV for air discharge 4 kV for contact discharge

① To avoid vibration, secure the cables at a short distance (< 20 cm).

NOTICE

Defective device due to contaminated air!

- The ambient air must not contain acids, alkaline solutions, corrosive agents, salts, metal vapors and other electrically conductive contaminants in high concentrations.
- The devices to be installed into the housings and installation compartments must at least comply with the degree of protection IP 54 according to DIN EN 60529.
- The device shall be provided in a suitable fire enclosure in the end-use application.

NOTICE

Defective device due to gases jeopardizing functions

Due to the risk of corrosion, avoid sulphureous gases (e.g. sulphur dioxide (SO_2) and hydrogen sulphide (H_2S)). The device is not resistant against these gases.

NOTICE

Failure of the product due to overheating

To avoid overheating and to ensure a smooth operation of the product, sufficient air has to circulate according to the minimum distances specified, see Fig. 9.

This is a product that corresponds to the limit values of the emitted interference of class A (industrial environments). This is a product that does not correspond to the limit values of the emitted interference of class B (residential area and small enterprises.

When using the product in residential areas or small enterprises, the operator has to take actions to prevent radio interferences (also refer to DIN EN 55022).

7 Technical data

7.1 General technical data

	COREX-M-X7	COREX-M-X5
Processor	11th Generation Intel® Core™/I7 Quad Core Processor i7-1185GRE	INTEL ATOM X 6425RE Quad Core
RAM	16 gigabytes of DRAM	8 gigabyte DRAM
Internal physical read-only memory	32 gigabyte, see also ➦ Chapter 5.8 “Wear parts” on page 13	16 gigabyte, see also ➦ Chapter 5.8 “Wear parts” on page 13

	COREX-M-X7	COREX-M-X5
Internal non-volatile random-access memory (NVRAM)	2 megabyte	2 megabyte
Extensions	• Extension option 1: Multi-Ethernet M/S 4 × RJ45 COM.20 (weight: 106 g) or SSD memory 80 gigabyte (weight: 80 g) • Extension option 2: Multi-Ethernet M/S 4 × RJ45 COM.20 (weight: 106 g) • Extension option 3: Multi-Ethernet M/S 4 × RJ45 COM.20 (weight: 106 g) or SSD memory 80 gigabyte (weight: 80 g)	
Communication interfaces	RJ-45 • 5 × Ethernet connection (10 Mbit, 100 Mbit, 1 Gbit)	RJ-45 • 5 × Ethernet connection (10 Mbit, 100 Mbit, 1 Gbit)
Display port	• 1 × display port	• 1 × display port
USB	3 × USB host, TYPE C (USB3.1), maximum cable length of 3 m	3 × USB host, TYPE C (USB3.1), maximum cable length of 3 m
Pushbutton	–	–
SD card	Slot for SD card	Slot for SD card
Battery	CR1025	CR1025
Weight without extensions	1200 g	1200 g
Dimensions	Refer to ➥ Chapter 10.1 “Housing dimensions” on page 25	

7.2 Voltage supply and current consumption

Nominal voltage at U_L and U_P	DC 24 V SELV/PELV
Maximum permitted voltage range of the supply voltage U_L and U_P	DC 19.2 V to DC 30 V
Current consumption of the control from U_L at a nominal voltage of 24 V	Without I/O modules at UL = 24 V: • COREplus X7: 2 A • COREplus X7 with 80 GB SSD memory: 2.1 A • COREplus X7 with COM.20: 2.2 A • COREplus X7 with 3 ×COM.20: 2.6 A • COREplus X5: 1.3 A • COREplus X5 with 80 GB SSD memory: 1.4 A • COREplus X5 with COM.20: 1.5 A • COREplus X5 with 3 ×COM.20: 1.9 A With I/O modules at $_{UL}$ = 24 V plus up to 3 A

Power consumption of the control from U_L at a nominal voltage of 24 V	Without I/O modules at UL = 24 V: • COREplus X7: 48 W • COREplus X7 with 80 GB SSD memory: 50.4 W • COREplus X7 with COM.20: 52.8 W • COREplus X7 with 3 ×COM.20: 62.4 W • COREplus X5: 31.2 W • COREplus X5 with 80 GB SSD memory: 33.6 W • COREplus X5 with COM.20: 36.0 W • COREplus X5 with 3 ×COM.20: 45.6 W With I/O modules at U_L = 24 V plus up to 72 W
Current consumption U_P	Typ. 5 mA (without I/O modules), 8 A max., at U_P = 24 V
Power consumption from U_P	Typ. 0.12 W (without I/O modules), 192 W max., at U_P = 24 V
Reverse voltage protection of the supply voltage U_L and U_P	Present
Fuse protection U_L	Internal with a protective fuse of 10 A
Fuse protection U_P	No internal fuse protection. The operator has to provide protection against overload by an external fuse. An overcurrent protective device with a maximum rating of 10 A must be fitted when the device is installed, e.g: • Main switch acc. to UL489* (B-, C-, D-, K- or Z-characteristic) • Class CC or Class J fuse acc. to UL248* The overcurrent protective devices marked with "*" should be used in installations conforming to UL standards.
Overvoltage protection U_L and U_P	Present, fuses can trigger in case of overvoltage.
Transient protection U_L and U_P	Present, suppressor diodes Pulse load up to 1,500 W
Voltage dips at current supply interfaces	PS1 < 1 ms, evaluation criterion A
Electrical isolation 24 V supply (U_L/U_L GND) to the functional earth 24 V supply (U_P/U_P GND) to the functional earth	DC 707 V (not evaluated by UL)
24 V supply voltage (U_L/U_L GND and U_P/U_P GND) to XF10, XF11, XF12, XF50 and XF52	DC 1200 V (not evaluated by UL)
U_L/U_L GND to U_P/U_P GND	DC 1200 V (not evaluated by UL)

NOTICE

Electronic damage due to polarity reversal or due to a nominal current that is too low

The power supply unit has to be able to deliver the quadruple nominal current of the internal and external fuses to ensure that the fuse reliably triggers in case of error.

8 Standards

8.1 General notes on the standards

The products have been developed according to the German editions of the standards published at the time of product engineering.

For the applied standards, refer to the chapters "Technical data" and "Ambient conditions."

8.2 EU declaration of conformity

CE

Excerpt:

The undersigned, representing the manufacturer, hereby declares that the product is in conformity with the provisions of the following EU Directive(s) (including all applicable amendments) and that the standards and technical specifications stated in the EU Declaration of Conformity have been applied:

- ROHS DIRECTIVE 2011/65/EU
- EMC DIRECTIVE 2014/30/EU

Loss of EU conformity due to modifications at the device

EU marking applies only to the device upon delivery. After modifying the device, verify the EU conformity.

For the EU declaration of conformity, go to the Bosch Rexroth media directory: ➦ www.boschrexroth.com/MediaDirectory, search term ➦ "DCTC-30455-001".

8.3 UL/CSA-certified

c UL us LISTED

The devices "ctrlX CORE" are certified according to:

- **UL 61010-2-201** (Industrial Control Equipment) and
- **CSA22.2 No. 61010-2-201** (CSA)

However, there can be combinations or extension stages with a limited or missing certification. Thus, verify the registration according to the UL marking on the device.

Loss of UL/CSA conformity due to modifications at the device.

UL and CSA marking applies only to the device upon delivery. After modifying the device, verify the UL and the CSA conformity.

To guarantee a UL/CSA-compliant operation, the following conditions have to be met:

– Use only insulated copper wires suitable for at least 75 °C

8.4 UK declaration of conformity

The products comply with the UK directive acc. to S.I. 2016/1091 (electromagnetic compatibility).

For the UK declaration of conformity, go to the Bosch Rexroth media directory: ➦ www.boschrexroth.com/mediadirectory, search term: ➦ "DCTC-30455-031".

9 Interfaces

9.1 Interface description

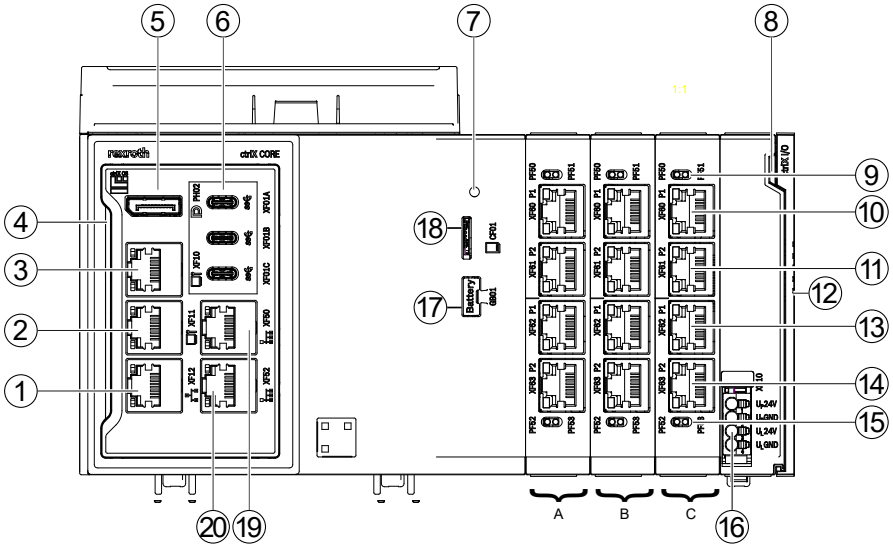

Fig. 4: Interfaces

A Extension option 1 (optional)
B Extension option 2 (optional)
C Extension option 3 (optional)

No.	Name	Connection type	Connector type (Integrated)	Mating connector and cable (From outside)
①	XF12	Ethernet	RJ45 socket	RJ45 plug
②	XF11	10/100/1000 MBit	8-pin	(twisted pair, 8-wire)
③	XF10	HMI and engineering port		
④	–	ctrlX CORE status LED	–	–
⑤	PH02	Displayport	Displayport socket	Displayport plug
⑥	XF01A XF01B XF01C	USB host, USB 3.1	USB socket, type C	USB plug, type C

No.	Name	Connection type	Connector type (Integrated)	Mating connector and cable (From outside)
⑦	–	Pushbutton	–	–
⑧	–	Device status LED	–	–
⑨	PF50	Status display PF50	–	–
	PF51	Status display PF51		
⑩	XF60	Multi-Ethernet 10/100 MBit field bus master, field bus slave (configurable)	RJ45 socket 8-pin	RJ45 socket (twisted in pairs, 8-wire)
⑪	XF61	Multi-Ethernet 10/100 MBit field bus master, field bus slave (configurable)	RJ45 socket 8-pin	RJ45 socket (twisted pair, 8-wire)
⑫	–	End cover	–	–
⑬	XF62	Multi-Ethernet 10/100 MBit field bus master, slave (configurable)	RJ45 socket 8-pin	RJ45 socket (twisted pair, 8-wire)
⑭	XF63	Multi-Ethernet 10/100 MBit field bus master, field bus slave (configurable)	RJ45 socket 8-pin	RJ45 socket (twisted pair, 8-wire)
⑮	PF52	Status display PF52	–	–
	PF53	Status display PF53		
⑯	XD10	24 V power connected, U_L, U_P, with status display	4-pin	4-pin
⑰	–	Battery case	–	–
⑱	–	SD card holder	–	–
⑲	XF50	Ethernet	RJ45 socket	RJ45 plug
⑳	XF52	10/100/1000 MBit	8-pin	(twisted pair, 8-wire)

NOTICE

Damage of the device by plug mounting under voltage!

- Before mounting or dismounting components, disconnect the control - including its components - from voltage.
- Connect the voltage only after the control and its components have been set up.

9.2 USB interface

There is a USB interface (XF01) (type C, USB 2.0) on the front side of the control. The USB interface can be used to connect USB storage media (only FAT16 and FAT32), scanners and similar USB devices.

The USB interface provides a voltage supply with DC 5 V and 0.5 A for external devices. The USB interface is switched off up to the next voltage cycle if the current is exceeded.

The maximum cable length allowed is 3 m.

NOTICE

Device damage due to external supply via the USB interface

The supply voltage (GND (U_L)) at the 24 V power connector XD10 has to be always connected.

9.3 RJ45 interface

XF10	HMI and engineering port
XF50	Ethernet (configurable)
XF52	Ethernet (configurable)
XF11	HMI and engineering port
XF12	HMI and engineering port
XF60	Ethernet 10/100 MBit Ethernet (configurable)
XF61	Ethernet 10/100 MBit Ethernet (configurable)
XF62	Ethernet 10/100 MBit Ethernet (configurable)
XF63	Ethernet 10/100 MBit Ethernet (configurable)

9.4 Display port interface

A display port interface with the following specifications is located on the front side of the control:

- Standard DP++
- Maximum resolution 4096 × 2304, 60 Hz
- Automatic display detection (AUX channel)
- Compatible via adapter with DVI and HDMI
- The display port interface provides a voltage supply with DC 5 V and 0.5 A for external devices

The maximum cable length allowed is 3 m.

NOTICE

Device damage due to external supply via the display port interface

The supply voltage (GND (U_L)) at the 24 V power connector XD10 has to be always connected.

9.5 SD card

There is a slot (CF01) for the micro SD card on the front of the control. The SD card host controller supports the version 2.0 (standard SDHC). That means the maximum supported capacity of an SD card is 32 GB.

Use only SD cards available as accessories, see ➦ Chapter 5.2 “SD card” on page 12. These SD cards are formatted and tested for the control.

A correct functioning of other SD cards cannot be ensured.

9.6 Battery

A battery with battery holder (GB01) is included and working in the device upon delivery. Battery designation: Lithium battery 3.0 V CR1025 (30 mAH).

The battery is used to buffer the real-time clock if the control is disconnected from voltage. A circuit monitors the battery state.

For notes on changing the battery, see ➦ Chapter 14.3 “Battery change ” on page 46.

A discharged battery causes an incorrect system time.

9.7 Local bus interface Ethercat of ctrlX COREPLUS

The local bus connected to the ctrlX COREPLUS at the right is a 100 MBit/s LVDS Ethercat bus. The ctrlX COREPLUS can be extended with up to 20 ctrlX I/O modules. The number of connectable modules depends on the total current consumption of the ctrlX I/O modules. The ctrlX COREPLUS can provide up to 3 A for the current supply of the modules. The ctrlX COREPLUS supplies the connected I/O modules with the logic voltage U_L and the periphery voltage U_P. The voltages and currents fed in are measured internally and applied to the process data. For U_L, only the current consumption of the infeed terminal and the I/O modules. For the integration into the parent system, the respective ESI files are available. For the ESI files, go to ➥ http://www.boschrexroth.com/electrics.

9.7.1 Signal processing

Synchronizing the application

The application is synchronized in the "SM synchronous" mode.

9.7.2 Object directory

CoE standard objects

The object directory of the module contains objects that can be triggered via SDO services. These are defined in the ETG standards:

Index (hex)	Name
1000	Device type
1001	Error register
1008	Device name
1009	Hardware version
100A	Software version
1018	Identify
10F1	Error settings
10F3	Diagnosis history
10F8	Timestamp object
1Ann	PDO mapping TxPDO
1C00	Sync manager type
1C12	Sync manager 2 assignment
1C13	Sync manager 3 assignment
1C33	SM input parameter
F000	Modular device profile
F100	Device state

Module-specific CoE objects

Objects with a module-specific design are described in the following table.

Index (hex)	Object name	Data type	Error, warning	Diagnostic number (hex)	Unit
6000	**U_P Supply periphery**				
6000:01	U_P Voltage	Uint16	–	–	mV
6000:02	U_P Current	Uint16	–	–	mA
6010	**U_P Supply logic**				
6010:01	U_L Voltage	Uint16	–	–	mV
6010:02	U_L Current	Uint16	–	–	mA
6020	**State**				
6020:01	U_P Undervoltage	Bit	W	3420	–
6020:02	U_P Overvoltage	Bit	W	3410	–
6020:03	U_P Overcurrent	Bit	E	2316	–
6020:04	U_L Undervoltage	Bit	W	3421	–
6020:05	U_L Overvoltage	Bit	W	3411	–
6020:06	U_L Overcurrent	Bit	E	2315	–
8000	**System info**				
8000:01	Temperature	Int16	W	4210 4220	0.1 °C
8000:02	Power logic used	Uint16	–	–	mW
8000:03	Power logic available	Uint16	–	–	mW
A000:0	Material number	String(20)	–	–	–
A010:0	Full serial number	String(20)	–	–	–

9.7.3 Process data

The ctrlX COREPLUS infeed is provided with input data that is inserted into the cyclic process image. This data length is 5 words in total.

The process data words from 0 to 3 contain the voltage and current values of U_P and U_L as well as their bits for the supply voltage diagnostics. This information can also be retrieved via acyclic services using CoE. They are shown there as the indices 6000(hex), 6010(hex) and 6020(hex).

Word 1	UINT16	U_P Voltage
Word 2	UINT16	U_P Current
Word 3	UINT16	U_L Voltage
Word 4	UINT16	U_L Current
Word 5		State
Byte 1		
	Bit 0	U_P Undervoltage
	Bit 1	U_P Overvoltage
	Bit 2	U_P Overcurrent
	Bit 3	U_L Undervoltage
	Bit 4	U_L Overvoltage
	Bit 5	U_L Overcurrent
	Bit 6	Periphery voltage OK
	Bit 7	Error

9.7.4 Diagnostic strategy

Mechanisms

Different mechanisms are used for the diagnostics.

Mechanism	Diagnostics
EtherCAT state machine	EtherCAT system diagnostics
EtherCAT hardware watchdog	
Diagnostic objects in the CoE object directory	Extended diagnostics, e.g. peripheral errors
10F1(hex)	Error settings
Diagnosis history object	20 diagnostic messages can be stored
	Diagnosis history
10F3(hex)	

Diagnosis history

The object 10F3(hex) is implemented as ring memory into the "Overwrite mode". The latest 20 diagnostic messages are stored. Older messages are deleted.

The following table shows the structure of the Diagnosis History object.

Index (hex)	Subindex	Object name	Data type	Rights	Meaning
10F3		Diagnosis history			Diagnostic statistics
	01	Maximum messages	UINT8	R	Maximum number of messages
	02	Newest message	UINT8	R	Latest message
	03	Newest acknowledged message	UINT8	R/W	Latest confirmed message. Writing "0" deletes the messages in the ring memory.
	04	New messages available	Boolean	R	New message available
	05	Flags	UINT16	R/W	Setting of the object response. Refer to ETG.1020
	06 - 26	Diagnosis message	String	R	Diagnostic message according to ETG.1020

10 Mounting, dismounting and electric installation

10.1 Housing dimensions

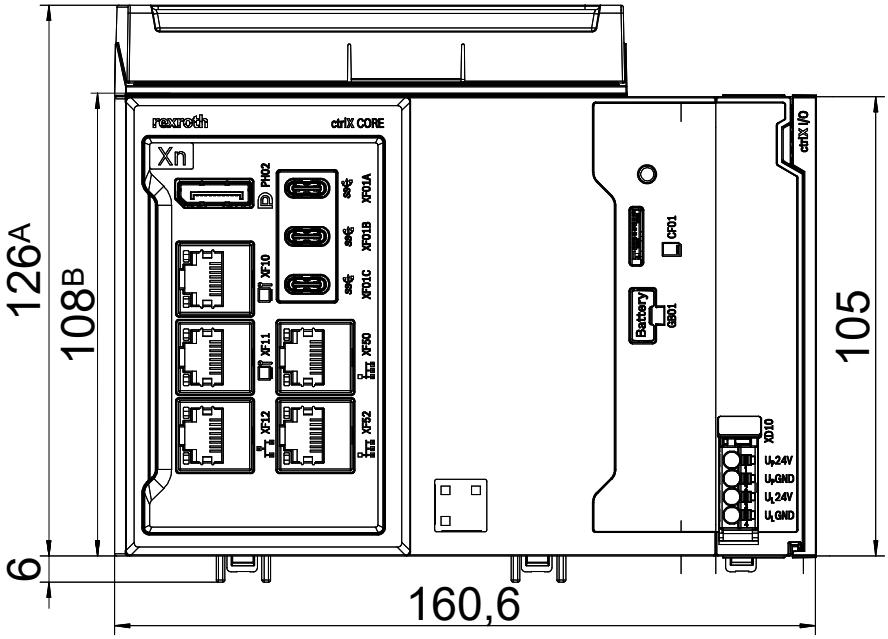

Fig. 5: Front view
A X7 and X5 with optional fan
B X5

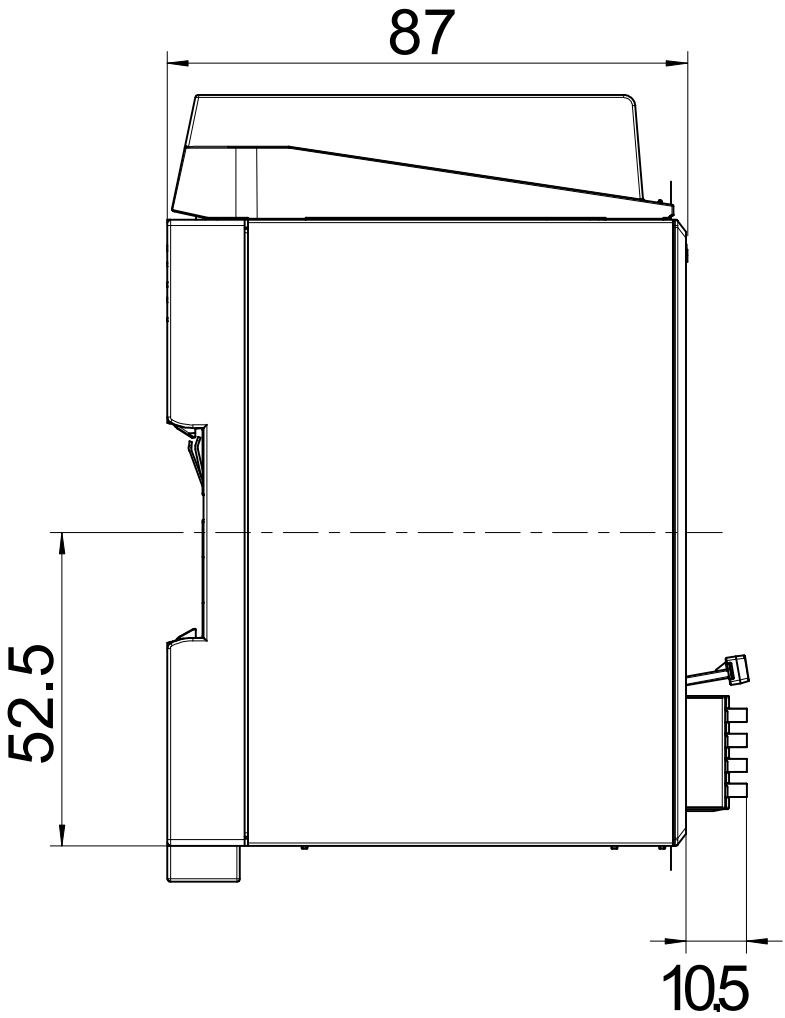

Fig. 6: Side view

10.2 Installation notes

NOTICE	**Destruction of the device due to electrostatic discharge**
	The device contains components that can be damaged or destroyed by electrostatic discharge. Comply with the required safety measures against electrostatic discharge (ESD) acc. to EN 61340-5-1 when operating the control.

- Mounting location

  The control has the degree of protection IP 20 and is thus intended for use in a closed control cabinet or control box (terminal box) of the degree of protection IP 54 (acc. to DIN EN 60529) or higher. The control cabinet has to be provided with sufficient stability and rigidity and has to comply with the requirement to impede fire spreading (acc. to UL 61010-1, 61010-2-201).
- Support rail

  Mount the control on an electrically conductive 35 mm standard support rail. Its connection to the functional earth is sufficient. Only use a support rail with an design height of 7.5 mm (corresponds to TH 35-7.5 acc. to EN 60715).

  The fastening distance of the support rails may not exceed 200 mm. This distance is required to ensure stability while mounting and dismounting the control.

Fig. 7: Support rail fastening (in mm)

- Mounting position

  To ensure air cooling in the device by convection, mount the control only vertically on a horizontal support rail as shown in the following figure.

  In the shown mounting position, the natural convection supports the forced cooling air flow. Heat pockets can thus not be caused in the device.

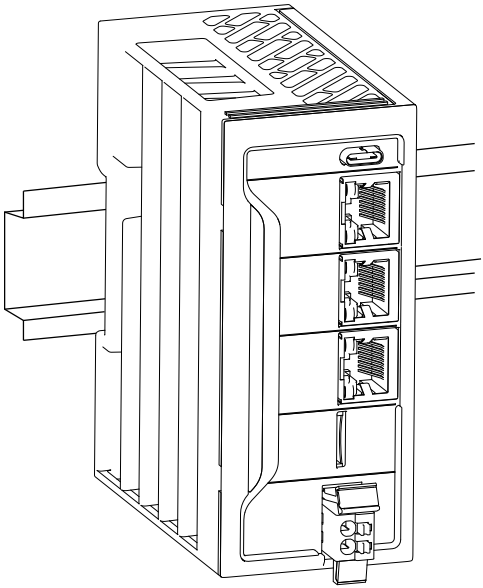

Fig. 8: Permitted mounting position for all ctrlX CORE controls

- End clamps
  Fasten end clamps of the type SUP-M01-ENDHALTER on both sides of the control.
  End clamps ensure a correct fastening of the control connected to them on the support rail and they are used as lateral end elements.
  Always fasten one end clamp of the station before mounting the control. This ensures the following:
  – It impedes the shifting of the control.
  – The installation place for the end clamps is secured.
- Do not route cables parallel to motor cables or other strong interference sources to avoid the coupling of interferences.
- Observe the bending radii of the cables when routing.
- The cabling of the Ethernet wires may not be outside the building.
- Use strain reliefs for all cables and place them the closest possible to the connection of the control.
- Install the control only horizontally on a support rail attached to a wall.
- Keep the maximum possible distance from interference sources.
- Provide the following minimum distances for sufficient cooling:
  In case of a several line design, the supply air has to be measured under each line and its limit value may not be exceeded. For information on ambient temperatures, refer to ➥ Chapter 6.1 “Ambient conditions of the ctrlX CORE” on page 13.

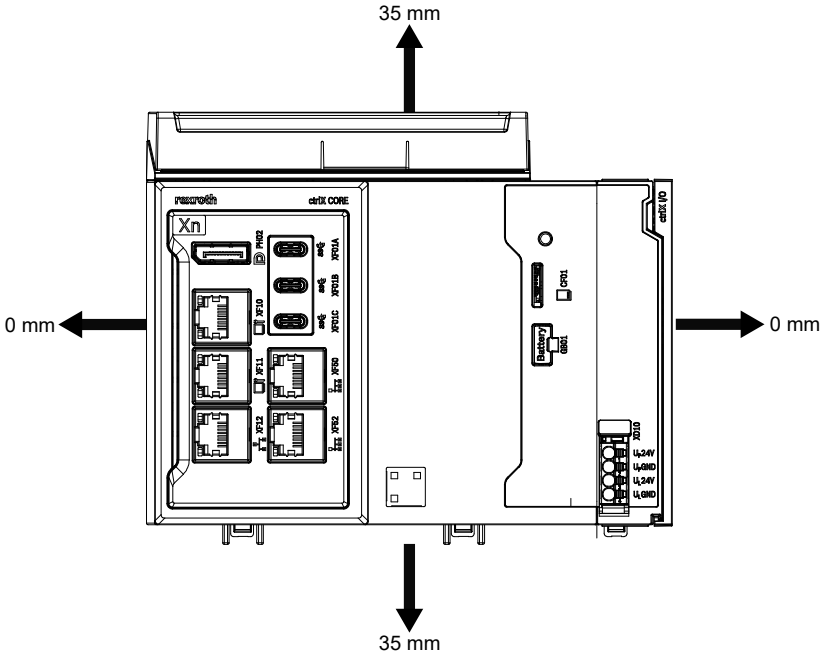

Fig. 9: Minimum distances for the circulation of ambient air

- Additionally, provide sufficient distance for mounting, dismounting, plugs and cables.

10.3 Mounting the control

NOTICE	**Damage of the device by plug mounting under voltage!** – Before mounting or dismounting components, disconnect the control - including its components - from voltage. – Connect the voltage only after the control and its components have been set up.
NOTICE	**Possible damage to property due to unintended mounting of the support rail** – Fasten the support rail adequately. – Connect the support rail to a functional earth. – Mount the IPC or the control on the support rail, as the support rail is also used for heat dissipation and grounding. – Install the IPC or the control in a control cabinet or an appropriate housing.
NOTICE	**Control not fixed due to clamped support arm mounting!** Before mounting, ensure that the support arm mounting of the control is not in open position. If required, release the clamping of the open position using the locking lever, see Fig. 10.

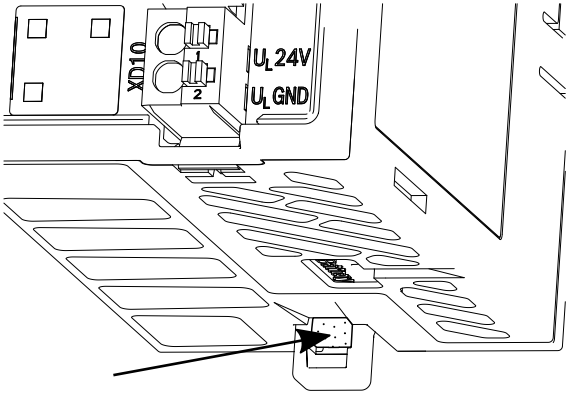

Fig. 10: Locking lever to release the clamping of the open position

Mounting steps

1. Mount the control
2. Connect ctrlX I/O modules in series (optional)
3. Fasten endcover
4. Fasten end clamp

The control has up to 50 mounting cycles.

10.3.1 Mounting the ctrlX I/O module

NOTICE	Damage of the device by plug mounting under voltage! Disconnect the module and all connected module components from voltage before mounting or dismounting.

NOTICE	Damage of the device by short circuit of patch connectors There is an endcover on the right upon delivery of the bus coupler. Remove this endcover to connect the modules at the bus coupler in series. Position the endcover on the last module of the station to protect it against short circuit and contamination.

NOTICE	Possible damage to property due to unintended mounting of the support rail – Connect the support rail to a functional earth. – Mount the module on a support rail. – Install the module in a control cabinet or in an appropriate housing.

NOTICE	Module is not fixed correctly due to open support arm mounting! Before mounting, ensure that the support arm mounting of the control is not clamped in open position. If required, release the clamping using the locking lever as shown in the following figure.

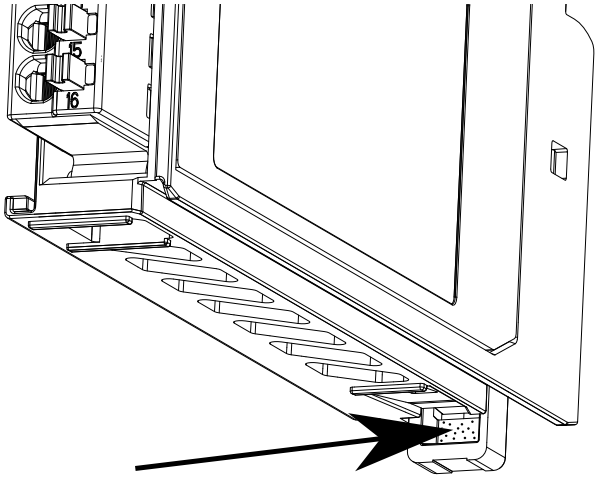

Fig. 11: Locking lever to release the clamping of the open position.

Each module has to be snapped separately.

10.3.2 Mounting the fan

1. Remove the housing cover on the X5 before installing the fan.
2. Engaging hook at the rear side of the fan ②.
3. Hinge down the fan until the locking hook ① is engaged at the front of the control.

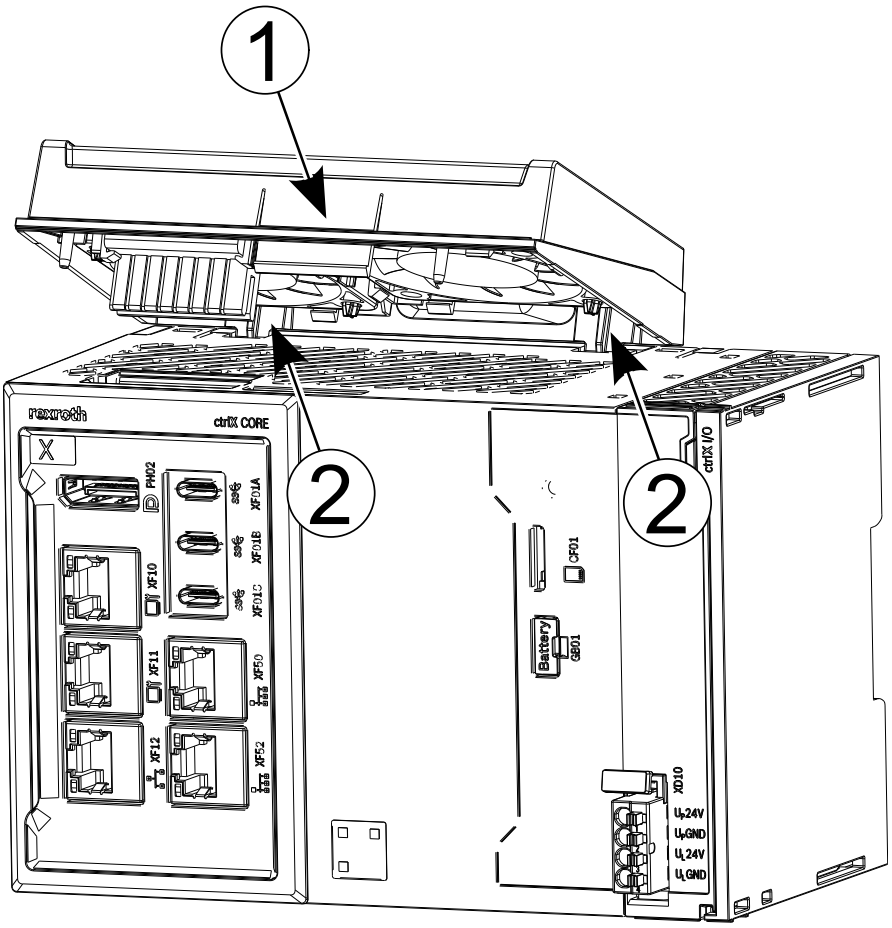

Fig. 12: Fan mounting

10.4 Dismounting the control

For dismounting, use a common tool such as a slotted screwdriver with a 2.5 mm blade.

10.4.1 Dismounting steps

NOTICE	**Destruction of components and devices due to mounting and dismounting under voltage!**
	– Before mounting or dismounting, disconnect the IPC or the control - including its components - from voltage. – Connect the voltage only after the IPC or the control and its components have been set up.

For a secure decommissioning with regard to IT security, refer to ➦ Chapter 11.3.1 “Notes on safe decommissioning” on page 40.

Removing the control from the top-hat rail

1. Remove the left or the right end clamp.
2. Remove the first ctrlX IO terminal from the ctrlX COREPLUS if required.
3. Use a suitable tool (e.g. slotted screwdriver) and put it into the lower disengaging mechanism (base latch) of the control and disengage the control (see (A) in the following figure). The base latch is locked in the open position.
4. Remove the control vertically to the support rail [see (B) in the following figure].

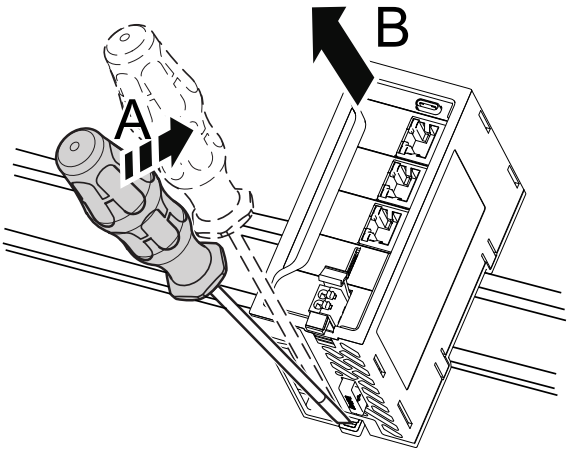

Fig. 13: Removing the control from the support rail

Before mounting the control on the support rail again, release the clamping of the open position again. Press the locking lever, see Locking lever to release the clamping of the open position.

10.4.2 Dismounting the fan

1. Release the locking hook of the fan at the front, see ① in Fig. 12.
2. Hinge up the fan and disengage from device.

10.5 Electric installation

10.5.1 External power supply unit

⚠ WARNING	Danger of lethal injury due to hazardous electric voltage
	– Connect power supply units generating protective extra-low voltage (24 V) only to supply voltages designed for these power supply units. Note the overvoltage categories (refer to the documentation of the power supply unit). – Do not apply the supply voltage to the protective extra-low voltage.

All components of the control have to be supplied from SELV/PELV 24 V voltage supplies.

The power supply units used have to be able to deliver the quadruple nominal current of the internal and external fuses to ensure that the fuse reliably triggers in case of an error.

All lines of the 24 V voltage supply have to be routed separately from lines carrying higher voltages.

All peripheral devices, such as digital sensors or actuators connected to the interfaces of the control, also have to comply with the criteria of safety-separated SELV/PELV circuits.

The 24 V voltage supply can be grounded. For more detailed information, refer to the documentation of the power supply unit.

Use only power supply units that can bridge a half-wave failure (10 ms) at the maximum load connected.

10.5.2 Power connector XD10

The control is supplied via the XD10 power connector.

Use only copper wires to connect the connection terminals.

Only the power connector is permitted to connect the 24 V supply voltage for the control (see ➥ Chapter 5.1 “Power connector, 24 V” on page 12).

The power connector has a maximum number of 50 mating cycles. The mating cycles of the cables in the XD10 power connectors are limited to 50.

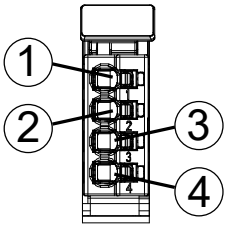

Fig. 14: Power connector XD10

Table 2: Pin assignment of the power connector XD10

Plug contact	Signal	Function	Color
1	24 V	DC +24 V supply voltage (U_P)	Red
2	0 V	GND (U_P) (supply voltage grounding)	Blue
3	24 V	DC +24 V supply voltage (U_L)	Red
4	0 V	GND (U_L) (supply voltage grounding)	Blue

Notes on the electrical connection

- To avoid EMC interferences due to loop formation, 24 V voltage potential and ground (GND) have to be connected in star shape from the 24 V power supply unit to the connections for logic voltage (U_L) and peripheral voltage (U_P).
- Use only insulated copper wires suitable for at least 60 °C.

Tools

- Use the "Phoenix Crimpfox 6" crimping plier to crimp wire end ferrules. The ordering number is: "1212034 Crimpfox 6" at Phoenix Contact.
- Use a slotted screwdriver with a 2.5 mm blade.

Permitted lines

- Rigid lines
  Stripping length: 8.5 mm ±.5 mm, burr-free
- Flexible line without wire end ferrule
  Stripping length: The length of the stripped and 360° twisted braids has to be 8.5 mm ±0.5 mm
- Flexible line with wire end ferrule
- Use a cable cross-section corresponding to the current (minimum 0.2 mm^2, maximum 1.5 mm^2) to avoid an excessive increase in temperature. A cable cross-section of 1.5 mm^2 is specified for the power supply (U_P) of 8 A. The minimum cable cross-section for the power supply (U_L) is 0.75 mm^2.
- The insulation of the cables used has to correspond to the rated voltage.

Wire end ferrules

- Wire end ferrules with and without insulating collar are permitted with a contact length of 8 mm according to DIN 46228.
- Maximum dimensions of the crimped wire end ferrule:
  Height 1.45 mm
  Width 2.34 mm
- Twin wire end ferrules are not permitted.

Orientation of the wire end ferrules

- The orientation of the wire end ferrule in the clamping point has to be vertical.

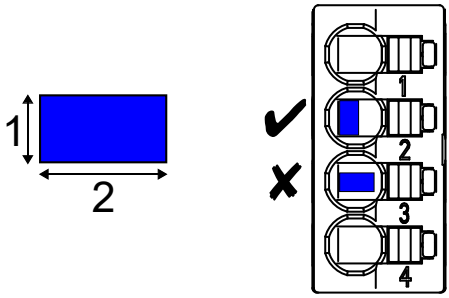

Fig. 15: Orientation of the wire end ferrules in the clamping point
1 Height of the crimped wire end ferrule
2 Width of the crimped wire end ferrule

Installing lines

- Press the pusher with a suitable slotted screwdriver.
- Insert the line into the clamping point as far as possible.
- Release the pusher.

Uninstalling lines

- Press the pusher with a suitable slotted screwdriver.
- Remove line.
- Release the pusher.

Mounting notes for UL certification

Permitted lines

- Use flexible lines with wire end ferrules for UL devices.
- The following wire end ferrules are permitted:
  - Wire end ferrules with insulating collar as per the table:

Cable cross-section in AWG	Cable cross-section mm²	Ordering numbers of the wire end ferrules (Weidmüller company)
24 AWG	0.2 mm²	9025760000, 500 pieces
22 AWG	0.35 mm²	9025770000, 500 pieces
20 AWG	0.5 mm²	0690700000, 500 pieces 1476230000, 100 pieces
18 AWG	0.75 mm²	0462900000, 500 pieces 1476240000, 100 pieces

-	1 mm^2	0463000000, 500 pieces
		1476250000, 100 pieces
16 AWG	1.5 mm^2	0463100000, 500 pieces
		1476270000, 100 pieces

Orientation of wire end ferrules

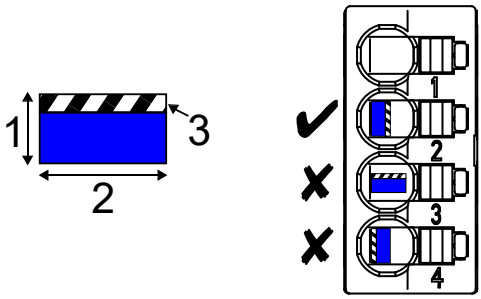

Fig. 16: Orientation of the wire end ferrules in the clamping point

1 Height of the crimped wire end ferrule
2 Width of the crimped wire end ferrule
3 Crimped side of the wire end ferrule

Positioning peripheral plug

1. Position the peripheral plug on the peripheral plug holder, see ①.
2. The peripheral plug engages at the locking lever, see ②

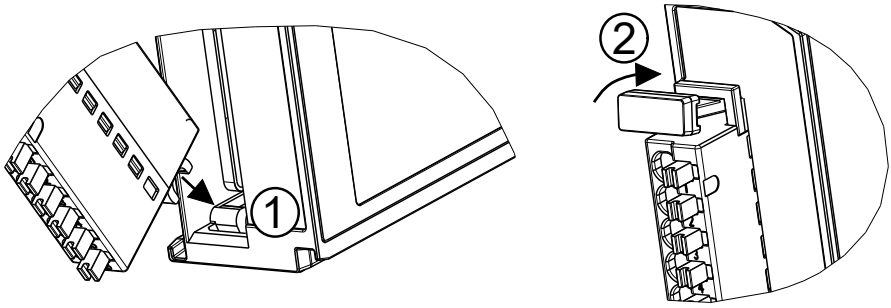

Fig. 17: Positioning peripheral plug

Removing peripheral plug

1. Press the locking lever of the peripheral plug, see ①.

2. Remove the peripheral plug, see ②.

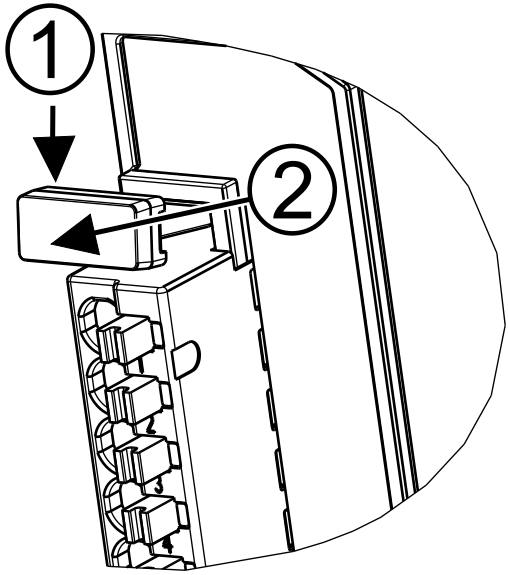

Fig. 18: Removing peripheral plug

10.5.3 24 V voltage supply

For the voltage supply, use a power supply unit as described in the following chapter: ➦ Chapter 10.5.1 “External power supply unit ” on page 33.

The GND (U_L, U_P) is not grounded to the device!

Setup without electrical isolation

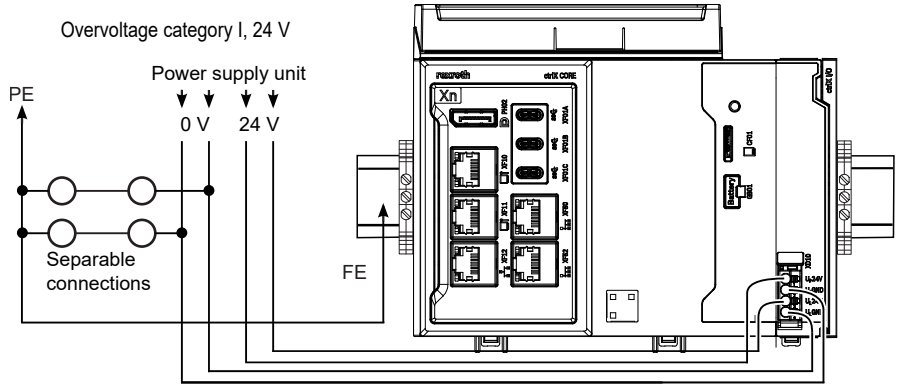

Fig. 19: Setup of the voltage supply

Control does not start in case of reverse input voltage.

The 24 V feeding U_L and U_P at the XD10 connector is protected against polarity reversal. A polarity reversal of U_L and GND U_L feeding as well as U_P and GND U_P feeding does not damage the device. However, the control does not start and the status displays are not on.

Setup with electrical isolation

Provide electrical isolation between the logic supply U_L and the periphery supply U_P of the I/O terminals acc. to DIN EN 60204-1. Accordingly, the voltage U_L (24 V logic voltage) at the control is electrically isolated from the peripheral voltages U_P (24 V segment voltage).

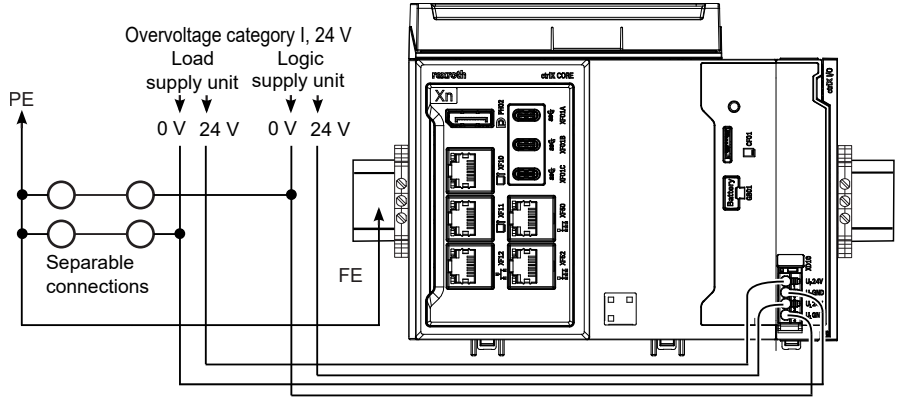

Fig. 20: Setup of the voltage supply

Dimensioning the voltage infeed

Observe the maximum currents when dimensioning the voltage supply. The operating voltage allowed has to be applied directly to the device.

The voltage must also not be exceeded if:

- there are variations in mains voltage, e.g. caused by different loads of the mains
- there are varying load states, such as short-circuit, normal load, lamp load or no load

Connecting the reference conductor to the protective conductor

If the reference conductor 0 V (U_L, U_P) is connected to the protective conductor system, this connection has to be arranged at a central place (e.g. at the load power supply unit). Hence, the supply current circuit is a PELV circuit.

10.5.4 Grounding

NOTICE	**Failure due to insufficient grounding** An optimum grounding is required to impede possible interferences from the control and to discharge them to the ground.

Functional earth

Only the functional earth (FE) is used for the device. The functional earth is only used to discharge disturbances. For individuals, the functional earth is not intended as protection against electric shock.

The control is grounded via the support rail. The support rail, on which the control is mounted, has to be mounted to a grounded metal carrier, e. g. the rear panel of the control cabinet.

The control is provided with FE springs (metal clips) at its bottom side creating an electric connection to the support rail while mounting.

If necessary, provide the support rail with a separate ground connection.

Potential equalization

Potential equalization acc. to DIN VDE 0100 part 540 has to be provided between the system parts and the voltage supply.

10.5.5 Shielding

NOTICE	**Failure due to insufficient shielding** Provide sufficient shielding.

The shielding reduces any effects of interferences on the system.

Observe the following when shielding:

- Fasten the shielding as extensively as possible
- Ensure proper contact between connector and terminal
- Avoid damaging or squeezing conductors

- Note the wire specifications when connecting the shielding
- Shield the closest possible to the signal terminal points

Route all power cables and data cables in separate cable channels.

11 Commissioning

11.1 IT security

Operating systems and machines requires the implementation of a comprehensive concept for state-of-the-art IT security. Bosch Rexroth products are part of this comprehensive concept. The properties of the Bosch Rexroth products have to be considered for a comprehensive IT Security concept. For the required properties, refer to the IT Security Guideline (➦ R911342562).

11.2 Commissioning steps

11.2.1 General information

To commission the device, proceed as follows:

1. Mount the control.
   For details, refer to ➦ Chapter 10.2 “Installation notes” on page 26.
2. Connect the voltage supply to the XD10 connection of the control.
   Refer to ➦ Chapter 10.5.2 “Power connector XD10 ” on page 33.

11.3 Safe decommissioning

11.3.1 Notes on safe decommissioning

To securely decommission the ctrlX CORE control with regard to IT security, delete all user data on the control. There are two options to delete user data:

1. Deleting configurations and apps
   First, delete all configurations created on the control and then all installed apps. All user data belonging to the apps is also deleted.
2. Loading a new image to the control using an SD card
   An SD card can be used to load an image to the control. All existing data is deleted when loading a new image. Please contact the Bosch Rexroth Service.

Please back up the user data before you delete it if you want to restore it on another control.

12 Device description

12.1 ctrlX CORE control

The ctrlX CORE is a high performance compact control in embedded format suitable for the support rail mounting and for its use in a control cabinet.

With Quad Core Intel® Core™/I7-CPU of the 11th generation for the X7 or with the INTEL ATOM X 6425RE Quad Core CPU for the X5, the ctrlX CORE has sufficient computing performance for complex control tasks. The Linux-based operating system is open for the integration of all ctrlX CORE Runtime and ctrlX CORE engineering apps from the ctrlX WORKS function module kit and other further customized apps. A central ctrlX Data Layer is used to exchange the communication between the apps in realtime and non-realtime.

The onboard EtherCAT master is used to connect and control the drives, I/O modules and other devices from the open EtherCAT ecosystem.

12.2 Status displays

There are following status displays on the ctrlX COREPLUS: The ctrlX CORE status LED, PF30-NET-ST-LED, PF50 to PF53 and device status LED.

12.2.1 ctrlX CORE status LED

The ctrlX CORE status LED is a device diagnostics LED. The exact description can be found in the following documentation:

- ctrlX OS Runtime, Application Manual ➦ R911421590
- ➦ https://docs.automation.boschrexroth.com/cdphelp?tkeyword=ctrlX_CORE_MANUAL_diagnostics_LED_state

A new status is only displayed after the previous flashing cycle has elapsed. A change in status can thus be delayed up to two seconds.

12.2.2 Status display at the power connector XD10 ctrlX COREplus

The voltages U_L and U_P applied at the connection points are signaled via an own green LED next to the respective red pusher.

Off = Voltage not present

On = Voltage present

12.2.3 Status displays PF50 to PF53 LED

The status displays PF50 to PF53 are field bus slave LEDs. For a detailed description, refer to the documentation. See ➦ R911386579.

12.2.4 Status display of device status LED

For the status displays of the device status LED of the infeed terminal, refer to the bus coupler documentation, see ➦ R911416731.

12.3 Initial firmware

Upon delivery, the ctrlX CORE is provided with the operating system (Linux) including all system-relevant apps and optionally selected apps. The operating system provides commissioning and maintenance functions.

12.4 Booting

The ctrlX CORE control starts booting after switching on the 24 V voltage supply. Booting can be monitored and checked using the status display.

The status display is red briefly after switching on the 24 V voltage supply. In the initialization phase, the operating system (Linux) is started, the respective hardware drivers are loaded and the ctrlX CORE application is then started. The status display of the control is flashing blue during that time. If the initialization phase is completed, the control is in "Run" mode and the status display is permanently green.

12.4.1 Secure Boot

Booting is secured by "Secure Boot". Thus, it can only be loaded by a runtime system released by Bosch Rexroth. For the kernel development, this mechanism can be unlocked using an app and the respective license.

If the system is unlocked, the status display of the control flashes yellow during each booting. The warning "080E0305 Bootloader enabled!“ is entered into the logbook.

To purchase the app and the license for unlocking purposes, please contact the Bosch Rexroth Service.

NOTICE	**Limitation of the security functions and the loss of the device warranty by unlocking the "Secure Boot" mechanism** Unlocking the "Secure Boot mechanism" is at own risk. The productive device use is not supported anymore. The certification according to IEC 62443 is lost.

12.5 Backing up remanent data

At runtime, remanent data is saved to an internal remanent NVRAM. It is immediately available after booting.

12.6 Real-time clock

The real-time clock of the control is buffered in the switched-off state using the inserted battery. If no voltage is applied, the battery buffers the real-time clock for at least 3 years. For notes on changing the battery, see ➥ Chapter 14.3 “Battery change ” on page 46.

It is recommended to set the time via SNTP.

12.7 Fan

The fan unit, with the two axial fans suitable for industrial use, ensures an optimum cooling of the ctrlX COREPLUS. The fan unit is essential to operate the X7 and the X5 above 50 °C. A missing fan unit or a defective fan can cause overheating and thus the safe shutdown of the ctrlX COREPLUS. The fans are speed-controlled; depending on the CPU temperature. The fans are monitored and a failure is reported to the user. The fan unit can be changed without tools, see ➥ Chapter 10.3.2 “Mounting the fan” on page 31.

NOTICE	Material damage due to fan replacement during operation Only change the fans when the power is switched off

The fan unit can be ordered as spare part, see ➥ Chapter 5.5 “Fan unit” on page 12.

12.8 Pushbuttons

For the pushbutton function, go to the system documentation.

12.9 SSD

The SSD (solid state disk) is an optical memory extension.

12.10 License information

12.10.1 General information

This product contains software components licensed by the right holders as Free Software respectively Open Source Software under one or more of the licenses mentioned below and thus require their source code to be made available. The source code of these software components is not being delivered altogether with the product. Instead, for the licenses listed below, Bosch Rexroth offers to provide the source code on request. Please send your query to obtain the source code via email to ➥ open.source@boschrexroth.de or via mail to the following address:

Bosch Rexroth AG

Open Source Office

Zum Eisengießer 1

97816 Lohr am Main

Germany

- a. For those software components that are licensed under the GNU General Public License version 2 and/or 3, respectively the GNU Library General Public License version 2, and/or GNU Lesser General Public License version 2.1 and/or 3.0, Affero General Public License version 1,2 and/or 3, the 7-Zip License or eCos License 2.0 the following applies:
  - Everyone has the right to receive the corresponding source code of these software components from us.
  - This offer is valid for a time period of up to three years after the last assignment of the object code by Bosch Rexroth; notwithstanding the foregoing, in case of a licensing under the GNU General Public License version 3, the Affero General Public License version 3 or the GNU Lesser General Public License version 3.0 the offer remains valid as long as Bosch Rexroth offers spare parts or support for the product.
  - The corresponding source code will include, to the extent required by the applicable license, all the source code needed to generate, install and (if it is an executable work) run the object code and to modify the work.
  - Bosch Rexroth reserves the right to charge for performing the distribution of the corresponding source code the incidental costs of creating the data carrier (CD-ROM, DVD or USB memory stick) plus postage.
  - Please state where the corresponding source code shall be sent to. Additional information to the product (e.g. product identification, serial number) would help us to identify the corresponding source code.
- For those software components or corresponding source code that are either licensed under Mozilla Public License (MPL) version 1.0, 1.1 or 2.0, the Common Development and Distribution License (CDDL) version 1.0, Nokia Open Source License (Nokia or NOKOS) Version 1.0a, Common Public Attribution License v.1.0 or fall under the exception of the Modified GPLv2 FreeRTOS License (Exception), the following applies:
  - If you have received such software components from Bosch Rexroth, Bosch Rexroth will provide to you upon request the corresponding source code of the software component licensed under the terms of the applicable above-mentioned license either, depending on the volume, via email or file hosting service.
  - If Bosch Rexroth has modified preexisting source code, the corresponding source code of this modification will be provided (licensed under the terms of the applicable above-mentioned license) for at least 12 months after the first time it was made available to a third party, however at least 6 months after a subsequent version of the modification has been made available to a third party.
  - Please provide information to the product with which you have received the software components (e.g. product identification, serial number) in order to help us to identify the corresponding source code.

13 Error causes and troubleshooting

13.1 General information

Table 3: Error causes and troubleshooting XF 10

Error	Troubleshooting actions
The engineering PC cannot reach the control via the Ethernet interface “XF10”	• Check whether the device driver was correctly installed in the “Device manager” of the system control. • Check whether the operating system assigned a valid IP address and a subnet mask to the network adapter (e.g. via the command "ipconfig"). If this is not the case, configure the IP address and the subnet mask manually.

The customer may not repair the device. Exceptions are maintenance works listed in the chapter “Maintenance”.

For further information in the event of repair, please contact the Bosch Rexroth Service.

14 Maintenance

14.1 General maintenance information

NOTICE

Maintenance work in the device is only permitted by trained staff!

If hardware or software components have to be exchanged, please contact the Bosch Rexroth Service or ensure that only skilled staff changes the respective components.

NOTICE

Loss of IP degree of protection due to incorrect maintenance.

Ensure that the IP degree of protection remains unchanged during maintenance!

Only the maintenance works at the device listed in this chapter are permitted.

For further information in the event of repair, please contact the Bosch Rexroth Service.

14.2 Scheduled maintenance tasks

Include the following tasks into the maintenance schedule:

- Check all plug and terminal connections of the components for proper tightness and possible damage at least annually.
- Ensure that cables are not broken or crushed.
- Replace damaged parts immediately.
- The device may not be opened.

14.3 Battery change

⚠ WARNING

Risk of injury due to fire or explosions caused by batteries. Risk of chemical burns due to battery contact.

- Ensure that the batteries and accumulators are not short-circuited.
- Do not charge batteries and accumulators externally. Do not dismantle, destroy or burn them or do not heat them above 80 °C.
- Recycle old batteries and accumulators immediately and as intended.
- Use only the battery specified in this documentation.

It is recommended to change the battery of the control ctrlX CORE every three years.

The battery holder GB01 is located on the bottom side of the control (on the front side of the ctrlX CORE X7). Insert a common CR1025 lithium battery into a drawer of this battery holder. The design of the battery drawer ensures that inserting the battery is reverse polarity-protected. In order not to loose the time when changing the battery, a capacitor buffers the time for approximately 60 minutes.

Battery designation: Lithium battery 3.0 V CR1025 (30 mAH), manufacturer: Renata, part number: CR1025.IB.

15 Ordering information

15.1 General information on ordering

Function packages are also provided with the ctrlX CORE controls. The function packages are implemented into the control according to the system functions required in the application. Thus, variants with individual ordering information result from the required functional scope. Please contact the corresponding marketing organization and ask for the ordering information of the control variant optimized for your application.

15.2 Type code

No.	1	.	2	.	3	.	4	5	6	7	8	.	9	10	.	11	.	12	13	.	14	15	.	16
Example	COREX	–	M	–	X7	–	31	B	7	7	7	–	2	1	–	01	–	02	RS	–	N	N	–	L1

No.	Characteristic name	Characteristic value	Text
1	Product	COREX	ctrlX CORE
2	Design	C	Compact
		M	Modular
3	Performance class	X2	CPU version X2
		X3	CPU version X3
		X5	CPU version X5
		X7	CPU version X7
4	Device configuration	11	Device configuration 11, CPU basic device (2 GB RAM, 4 GB hard drive, 1 MBit retentive memory)
		21	Device configuration 21, CPU basic device (8 GB RAM, 16 GB hard drive, 2 MBit retentive memory)
		31	Device configuration 31, CPU basic device (16 GB RAM, 32 GB hard drive, 2 MB retentive memory)

No.	Characteristic name	Characteristic value	Text
5	Basic interfaces	A	Configuration A, 1 × HMI/Engineering, 1 × Fieldbus master, 1 × configurable
		B	Configuration B, 1 × HMI/Engineering, 1 × Fieldbus master, 1 × configurable, 1 × IO connection
6	Onboard extensions 1	N	None
		1	MultiEthernet
		2	MultiEthernet M/S 4 × RJ45
		4	AI module
		7	Memory 80 GB
7	Onboard extensions 2	N	None
		2	MultiEthernet M/S 4 × RJ45
		4	AI module
		7	Memory 80 GB
8	Onboard extensions 3	N	None
		2	MultiEthernet M/S 4 × RJ45
		4	AI module
		7	Memory 80 GB
9	Protection class	2	IP20
10	Reserve	1	Reserve
11	Device version	01	Without
12	Runtime version	01	Version 01
		02	Version 02
13	Runtime release	RS	Current release
14	Extended certification	N	None
15	Subject to export control (EU)	N	No export license required
16	Special variant	NN	None
		B1	Robert Bosch 1
		W1	Customer specific 1
		L1	Customer specific 2

15.3 Accessories and spare parts

For ordering information on accessories and spare parts, refer to the chapter “Spare parts, accessories and wear parts”.

16 Disposal

16.1 General information

Dispose the products according to the respective valid national standards.

16.2 Return

For disposal, our products can be returned free of charge. However, the products must be free from remains such as oil, grease or other impurities.

Furthermore, the products returned for disposal must not contain any undue foreign substances or external components.

Send the products free of charge to the following address:

Bosch Rexroth AG
Bürgermeister-Dr.-Nebel-Straße 2
97816 Lohr a.Main
Germany

16.3 Packaging

The packaging material consists of cardboard, plastics, wood or styrofoam. Packaging material can be recycled anywhere. For ecological reasons, please do not return empty packages.

17 Service and support

Our worldwide service network provides an optimized and efficient support. Our experts provide you with advice and assistance. You can contact us **24/7**.

Service Germany

Our technology-oriented Competence Center in Lohr, Germany, is responsible for all your service-related queries for electric drive and controls.

Contact the **Service Hotline** and **Service Helpdesk** under:

Phone:	**+49 9352 40 5060**
Fax:	**+49 9352 18 4941**
Email:	➦ service.svc@boschrexroth.de
Internet:	➦ http://www.boschrexroth.com

Additional information on service, repair (e.g. delivery addresses) and training can be found on our internet sites.

Service worldwide

Outside Germany, please contact your local service office first. For hotline numbers, refer to the sales office addresses on the internet.

Preparing information

To be able to help you more quickly and efficiently, please have the following information ready:

- Detailed description of malfunction and circumstances
- Type plate specifications of the affected products, in particular type codes and serial numbers
- Your contact data (phone and fax number as well as your e-mail address)

Index

U

V

W

X

rexroth
A Bosch Company

Bosch Rexroth AG
Bgm.-Dr.-Nebel-Str. 2
97816 Lohr a.Main
Germany
Tel. +49 9352 18 0
Fax +49 9352 18 8400
www.boschrexroth.com/electrics

R911419122