rexroth
A Bosch Company

Operating Instructions
(Translation of the original)

ctrlX IPC PR5x.2

Industrial PC

R911424211 Edition 01

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
01	2024-07	First edition

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.

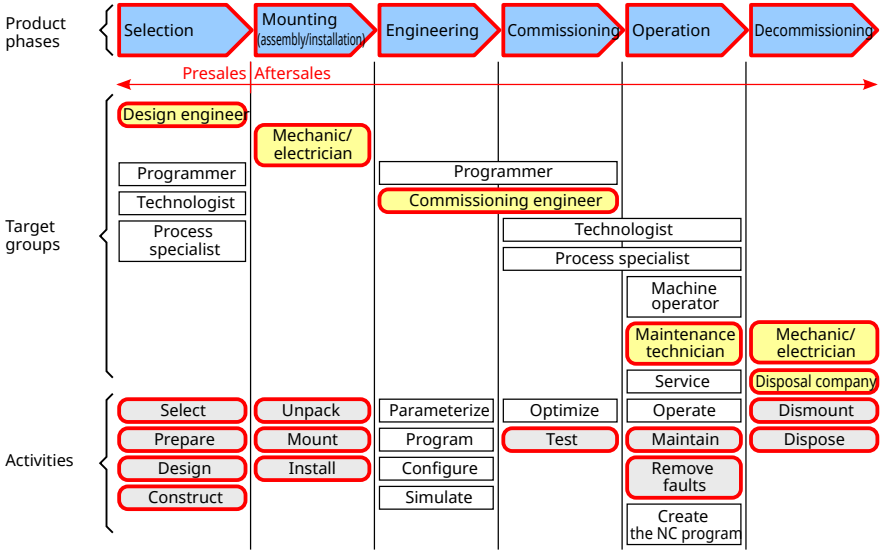

Fig. 1: Assigning the present documentation to the target groups, product phases and activities of the target group

This document instructs the technical staff of the machine manufacturer on how to safely perform the mechanic and electric installation and on how to commission the devices.

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 Purpose

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

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1.4 Scope

This operating instructions applies to all industrial PCs whose type code starts with "PR5x.2". The type code is located on the type plate of the device, also refer to ➦ Chapter 2.1 “Product identification” on page 8.

1.5 Related documents

Title	Part number and document type
Security Manual Electric Drives and Controls	➦ R911342562 Project Planning Manual
IndraControl VAP 01.1 Power Supply Unit	➦ R911339613 Operating Instructions
ctrlX HMI DE0015, DE0021 Multi-Touch Displays	➦ R911405731 Operating Instructions
Rexroth IndraControl PR, VR, DR and DE Devices Software Applications	➦ R911384733 Project Planning Manual

1.6 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

1 Company address
2 Ambient temperature
3 Rated current
4 Rated voltage
5 Serial number
6 Name of origin
7 Product
8 Part number
9 Type code
10 Trademark
11 Manufacturing date
12 Plant number
13 FCC note text EN
14 QR or data matrix code, Rexroth, 2D code
15 WEEE marking
16 Underwriters Laboratories Inc. mark
17 CE conformity mark
18 Warning notice
19 UKCA marking
20 Warning notice

2.2 Scope of delivery

- Industrial PC
- Safety instructions
- Firmware image, USB recovery stick
- Power connector (24 V connection terminal)
- Grounding cable
- Serial connecting cable with DB9 connection

3 Using safety instructions

3.1 Structure of the safety instructions

The safety instructions are structured as follows:

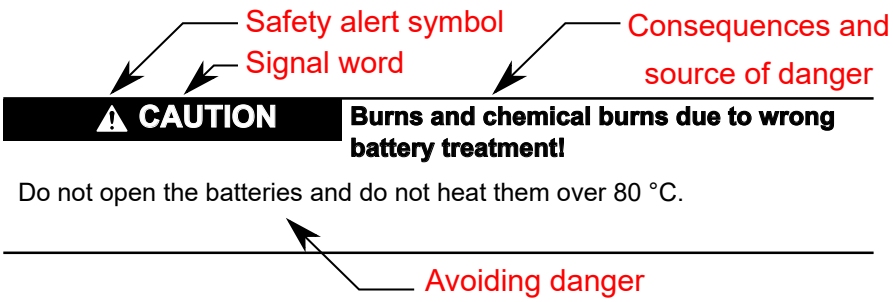


Fig. 3: Structure of the safety instructions

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 Intended use

The industrial PCs by Bosch Rexroth are intended for "HMI" and "Control" applications.

NOTICE	**The device might be destructed if not the expressly stated accessories, mounting parts and other components, cables, lines, software and firmware are used.**
	The industrial PCs may only be used as intended and with the accessories, mounting parts and other components specified 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 industrial PCs:

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

⚠ 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 24 V power connector

Ordering code	Part number	Description
CONNECTION PLUG 24VDC-PR4V2-PR5	R911424539	Power connector

5.2 External 24 V power supply unit

Ordering code	Part number	Description
VAP01.1H-W23-024-010-NN	R911171065	External 24 V power supply unit

5.3 Connecting cables for CDI+ interface

Malfunctions caused by using inappropriate CDI cables.

Use only cables listed in the following overview.

Ordering code	Part number	Description
RKB0008/000,5 (*******-*******-*******)	R911171484	Length: 0.5 m
RKB0008/001,0 (*******-*******-*******)	R911171485	Length: 1 m
RKB0008/002,5 (*******-*******-*******)	R911170151	Length: 2.5 m
RKB0008/005,0 (*******-*******-*******)	R911170152	Length: 5 m
RKB0008/007,5 (*******-*******-*******)	R911172971	Length: 7.5 m
RKB0008/010,0 (*******-*******-*******)	R911170153	Length: 10 m
RKB0008/015,0 (*******-*******-*******)	R911171183	Length: 15 m
RKB0008/020,0 (*******-*******-*******)	R911171184	Length: 20 m
RKB0008/025,0 (*******-*******-*******)	R911170154	Length: 25 m
RKB0008/030,0 (*******-*******-*******)	R911171381	Length: 30 m
RKB0008/035,0 (*******-*******-*******)	R911171369	Length: 35 m
RKB0008/040,0 (*******-*******-*******)	R911171382	Length: 40 m
RKB0008/050,0 (*******-*******-*******)	R911171383	Length: 50 m
RKB0008/055,0 (*******-*******-*******)	R911173779	Length: 55 m
RKB0008/060,0 (*******-*******-*******)	R911173780	Length: 60 m
RKB0008/065,0 (*******-*******-*******)	R911173781	Length: 65 m
RKB0008/070,0 (*******-*******-*******)	R911173782	Length: 70 m

Further cable lengths are available on request.

5.4 USB connecting cables (USB 2.0)

Ordering code	Part number	Description
RKB0019/000,5 (*******-*******-*******)	R911171165	USB connecting cable, length 0.5 m
RKB0019/001,0 (*******-*******-*******)	R911171166	USB connecting cable, length 1 m

Ordering code	Part number	Description
RKB0019/003,0 (*******-*******-*******)	R911171167	USB connecting cable, length 3 m
RKB0019/005,0 (*******-*******-*******)	R911171168	USB connecting cable, length 5 m

5.5 Splitter

Connecting unit to connect two operating displays with the same resolution and the same design with only one industrial PC.

Ordering code	Part number	Description
VAC08.1SSP-HDM-2D2-NNNN	R911175117	Splitter for CDI+ interface

5.6 CMOS battery

Ordering code	Part number	Description
BATTERY BGR SUP-E02-PR4V2/PR5	R911423804	CMOS battery with connecting cable

5.7 Connecting cables of the display port

The listed display port cables are provided with a special shielding. The display port cables meet the following technical specifications:

- Compliant with the display port 1.2
- Resolutions up to 4096 × 2160
- Supports HDCP 1.3 and DPCP

Ordering code	Part number	Description
RKB0063/003,0 (*******-*******-*******)	R911391713	Connecting cable of the display port, length 3 m
RKB0063/005,0 (*******-*******-*******)	R911391714	Connecting cable of the display port, length 5 m

5.8 Wear parts

Wear parts are not subject to any warranty.

5.8.1 CMOS battery

The typical service life of the CMOS battery of type BR2032 is 5 to 7 years.

6 Ambient conditions

6.1 Ambient conditions

Humidity	85% at 40°C (non-condensing)
Ambient temperature during operation	0 to 50 °C
Ambient temperature during storage	-40 to 85°C
Shock protection	EN 60068-2-27
Overvoltage category	2
Contamination level	2, no condensation allowed
Mechanical strength	EN 60068-2-64 Acceleration: 2G

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

Risk to damage the device due to external influences

Keep the device away from oils and emulsions.

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.

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 PC box

	PR5x.2
Housing	Aluminum
Holder	Mounting rail
Mounting orientation	Book mount

Input voltage	DC 24 V
Power consumption	31.82 W typical, 94.7 W maximum
Operating systems	Windows 10 IoT 2021 LTSC
Fan	With fan
BIOS	AMI UEFI 256 Mbit
Watchdog	Programmable watchdog with 255 intervals (1 to 255 seconds)
Security	TPM2.0
Memory	DDR5 16 GB, 32 GB or 64 GB
CPU	Intel® Core™ I7-13800HRE, 45 W, Performance-cores 6, Efficient-cores 8
Graphic card	Intel® Iris® Xe Graphics
Ethernet	LAN A: Intel® i219-LM GbE, IEEE 802.3AZ/802.1AS LAN B: Intel® i226-IT 2.5GbE, IEEE 802.3AZ/802.1AS LAN C: Intel® i226-IT 2.5GbE, IEEE 802.3AZ/802.1AS
TSN	TSN support via LAN IEEE 802.1Qav/802.1Qbv
LED	• 1 × Power • 1 × programmable • 1 × RTC battery
Extensions	• 1 × M.2 B-key 3052 module (PCIe signal) • 1 × M.2 B-key 3042 module (PCIe signal) • 1 × miniPCIe (PCIe/USB2.0 signal) • 1 × Nano SIM card slot for mPCIe • 2 × PCIe x4
Isolated serial interfaces	2 × RS232, RS422 or RS485 (peripheral plug) 50 to 115.2 kbps (insulation protection: DC 2500 V)
LAN	1 × 10/100/1000BASE-T Fast Ethernet (RJ45) 2 × 10/100/1000/2500BASE-T Fast Ethernet (RJ45)
Displays	2 × DP 1.4, to 7680 × 4320 (8K) @ 60 Hz
Power connection	1 × 2-pin peripheral plug
LED	Green: On Orange: Standby
Pushbutton	Power pushbutton and Reset pushbutton
Humidity	95% at 40°C (non-condensing)
Operating temperature	0 to 50 °C
Storage temperature	-40 to 85°C
Shock protection	IEC 60068-2-27
Vibration protection	IEC 60068-2-64 Random vibration: 4G
Battery	BR2032

Weight	2.3 kg, with extension box 3.0 kg
Degree of protection	IP 20

8 Standards

8.1 General notes on the standards

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

8.2 Standards used

For the respective versions of the standards, refer to the declarations of conformity.

EN 55011	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement
EN 55032	Electromagnetic compatibility of multimedia equipment – Emission Requirements
EN IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
EN 55035	Electromagnetic compatibility of multimedia equipment – Immunity requirements
EN IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Noise immunity for industrial environments
EN 61000-4-2	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test
EN IEC 61000-4-3	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test
EN 61000-4-4	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test
EN 61000-4-5	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test
EN 61000-4-6	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8	Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test
IEC 60068-2-64	Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance
IEC 60068-2-6	Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)
IEC 60068-2-27	Environmental testing – Part 2-27: Tests - Test Ea and guidance: Shock

8.3 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

For the EU declaration of conformity, go to the Bosch Rexroth media directory: ➦ www.boschrexroth.com/MediaDirectory, search term ➦ „DCTC-30446-002“.

8.4 UL/CSA-certified

c UL us LISTED

The devices are certified according to:

- UL 61010-1, 3rd edition und UL 61010-2-201, 2nd edition
- CAN/CSA C22.2 No. 61010-1, 3rd edition and CAN/CSA C22.2 no. 61010-2-201:18
  UL file number: E210730

However, there can be combinations or extension stages with a limited or missing certification. Thus, verify the approval 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 60 °C

8.5 UK declaration of conformity

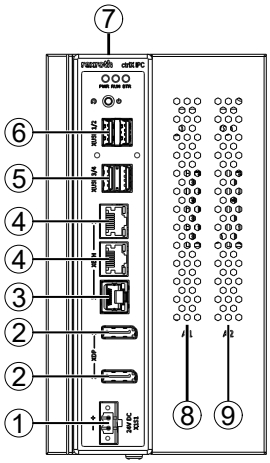
The products comply with the UK statutory instrument acc. to S.I. 2016/1091 (Electromagnetic Compatibility) and the UK RoHS regulation S.I. 2012/3032.

For the UK declaration of conformity, go to the Bosch Rexroth media directory: ➦ www.boschrexroth.com/mediadirectory, search term: ➦ „DCTC-30446-032“.

UK CA

9 Interfaces

9.1 Overview



No.	Name	Connection type	Connector type (Integrated)	Mating connector and cable (From outside)
①	X1S1	PC voltage supply	Male connector strip, 2-pin	Female connector strip, 2-pin
②	XDP1 XDP2	Connections for external monitor	Display port socket, 20-pin	Display port plug, 20-pin
③	XETH3	Ethernet interface 1 GBit	RJ45 socket 8-pin	RJ45 plug (twisted pair, 8-wire)
④	XETH2 XETH1	Ethernet interface 2.5 GBit	RJ45 socket 8-pin	RJ45 plug (twisted pair, 8-wire)
⑤	XUSB4 XUSB3	USB3.2 interface USB3.2 interface	USB socket, 8-pin, type A	USB plug, 8-pin, type A
⑥	XUSB2 XUSB1	USB2.0 interface USB3.2 interface	USB socket, 8-pin, type A	USB plug, 8-pin, type A
⑦	XCOM1 XCOM2	RS232 interface, preset RS485 interface, preset	Socket strip, 10-pin, 2 × 5	Connector strip, 10-pin, 2 × 5 Provided upon delivery
⑧	A1	Slot for extension module CDI+ or PCIe x4	–	–
⑨	A2	Slot for extension module PCIe x4	–	–

NOTICE	**Malfunctions due to insufficient shielding!** Use only shielded cables and metallic or conductive connector/coupling housings with large-area shield support.

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

9.2 Voltage supply X1S1

The DC 24 V voltage supply for the industrial PC is connected via the "X1S1" connection.

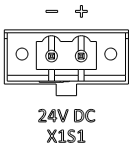


Fig. 4: XD1

Pin	Function
1	+24 V supply voltage
2	0 V supply voltage

Note the following restrictions:

1. Plug the positive and negative wires into the "V+" and "V-" contacts of the peripheral plug.
2. Tighten the screws of the peripheral plug.

Observe the following notes for wiring the device.

- The peripheral plug has to be suitable for 12-24 AWG (12 A).
- Tighten the screws of the peripheral plug with the mounting torque of 7 lb-in.
- Use only copper wires.
- The temperature resistance of the connecting cable should be higher than 95 °C (203 °F).

9.3 USB interfaces XUSB1 to XUSB4

At the devices, four USB interfaces are provided at the connector panel:

- XUSB1/2: USB 3.2, USB 2.0
- XUSB3/4: USB 3.2, USB 3.2

The maximum current carrying capacity per USB socket is 500 mA for the USB2.0 and 900 mA for the USB3.2.

9.4 RSxxx interfaces XCOM1 and XCOM2

Enable serial data transfers via the XCOM1 and XCOM2 interfaces. Both interfaces are provided with sockets with enclosed plugs and support RS232, RS422 and RS485. The transmission method is selected via a hardware switch.

9.5 Ethernet interfaces XETH1, XETH2 and XETH3

The industrial PC can be connected to an Ethernet network via the Ethernet interfaces XETH1, XETH2 and XETH3.

9.6 Optional extension interfaces

9.6.1 CDI+ (A1)

Use the CDI+ interface to connect remote operating displays with a cable length of up to 100 m between the individual devices.

The CDI+ interface is connected to the "A1" interface. If CDI+ is not assigned to the interface A1, a PCIe x4 card can be assigned to the interface A1.

The CDI+ interface can be ordered as device variant. It cannot be installed by the user.

9.6.2 PCIe x4 (A2)

The industrial PC can be extended with a PCIe card via the interfaces A2, see ➥ Chapter 10.5.2 “Installing PCIe card” on page 22.

Another PCIe card can be connected to the interface A1 if the position at the interface is not assigned, for example with a CDI+.

9.6.3 M.2 3042, M.2 3052

The industrial PC can be extended with M.2-3042- or M.2-3052-B-Key modules via the interface "M.2 3042, M.2 3052", see ➥ Chapter 10.5.3 “ Installing M.2-3042 module, M.2-3052 module and mPCIe module” on page 26.

9.6.4 mPCIe

The industrial PC can be extended to mPCIe Full Size modules via the "mPCIe" interfaces, see ➥ Chapter “Installing M.2 3052 module and mPCIe module” on page 27.

10 Mounting, dismounting and electric installation

10.1 General information

NOTICE	**Mechanical damage due to incorrect torque.** Tighten the screws and nuts with the corresponding torque according to the following table.

Thread	Tightening torque
M2.5	0.4 Nm
M3	0.7 Nm
M4	1.4 Nm
M5	2.8 Nm
M6	3.0 Nm

10.2 Dimensions of the industrial PC

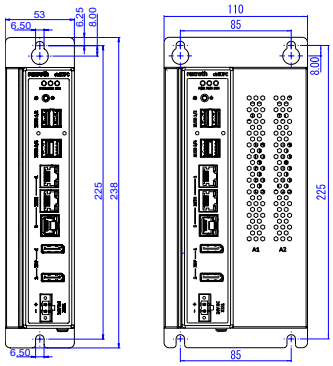


Fig. 5: Front view

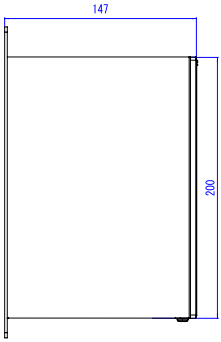


Fig. 6: Side view

10.3 Installation notes

- The LED display on the operator panel must not be covered.
- Wire all cables in loops. Use strain reliefs for all cables.
- Install the industrial PC only vertically, with a max. deviation of ±45°, measured from the vertical.
- Do not lay the CDI cables in parallel to motor cables or to other noise sources, as the CDI connection can be disturbed. Keep the maximum possible distance from interference sources.
- Provide a free space for sufficient cooling and cable routing as given in the following figure:

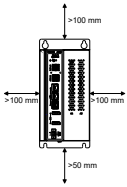


Fig. 7: Ventilation distances

10.4 Mounting

The industrial PC can be mounted in front upright mounting (book mounting) using mounting holes. For the corresponding dimensions, please refer to the following figures: Fig. 5.

Fasten the devices using M6 screws.

10.5 Installing components

10.5.1 CDI+

The CDI+ card is installed in the corresponding device variant upon delivery. Retrofitting is not intended.

10.5.2 Installing PCIe card

The PCIe x4 card can only be installed if there is already an extension box.

The steps 1- 4 are omitted if the industrial PC is not yet installed in the control cabinet.

1. Switch off the supply voltage.
2. If operated with a UPS, wait until the industrial PC switches off automatically.
3. Remove all connectors from the industrial PC.
4. Loosen the fastening screws of the industrial and remove the industrial PC from the mounting panel.

5. Loosen the screw, see the following illustration:

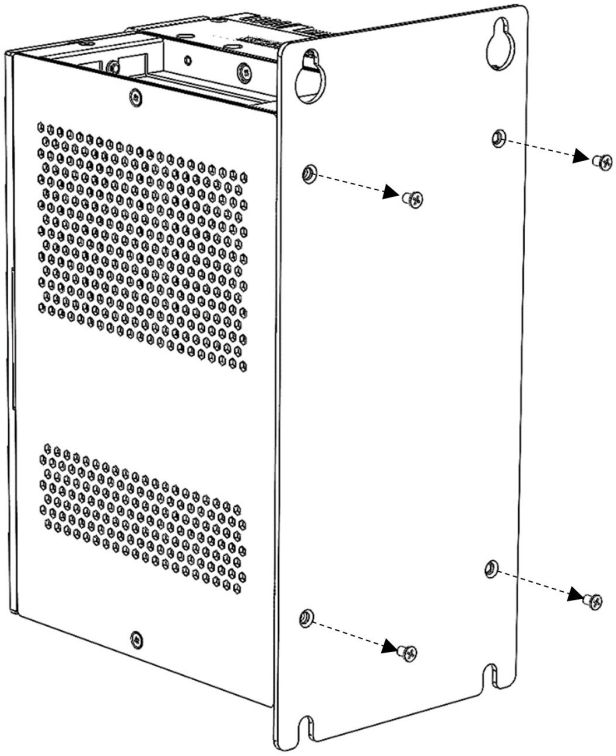


Fig. 8: Removing rear cover

6. Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.

7. Loosen the 4 fastening screws and remove the housing cover on top and on the side.

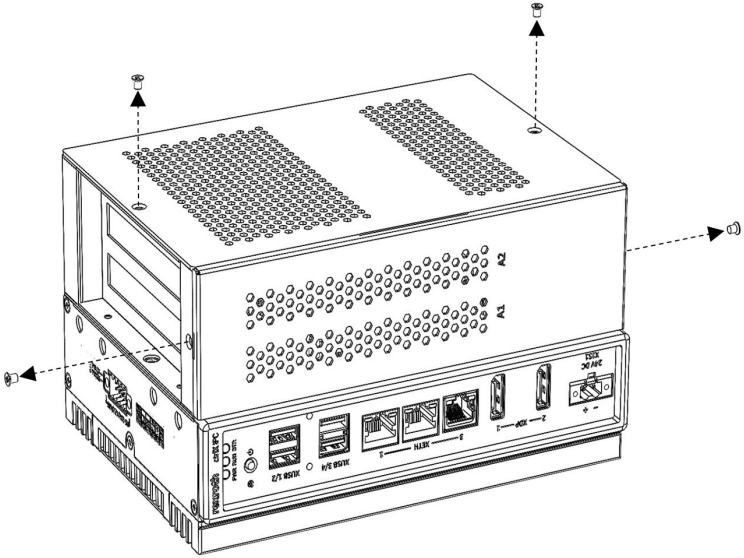


Fig. 9: Removing housing lid

8. Loosen the screw on the cover and remove the cover.

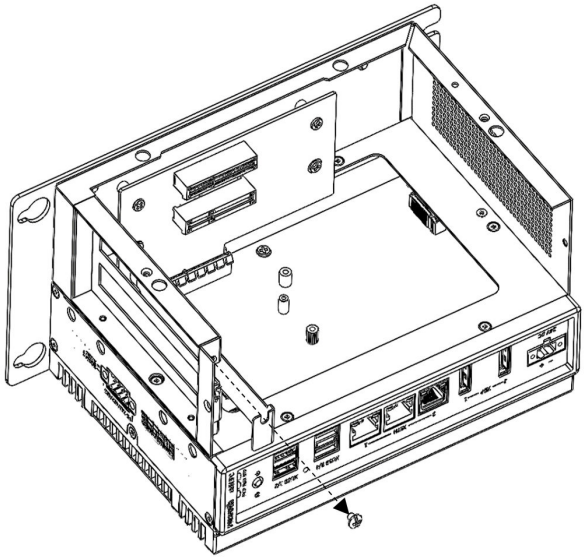


Fig. 10: Removing cover

9. Plug in the PCIe card into the PCIe slot and fix it with the M3 screw.

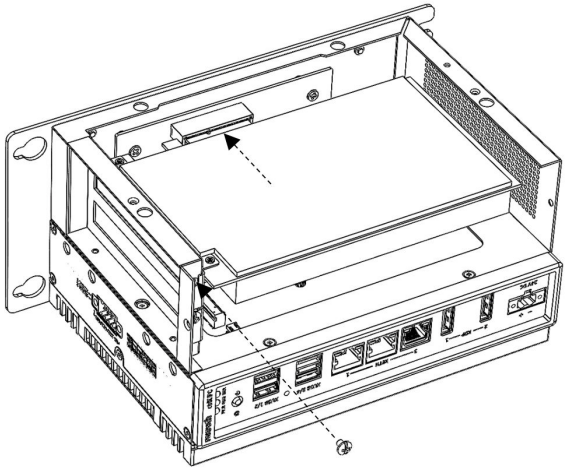


Fig. 11: Inserting PCIe card

10. Attach the housing cover again using the 4 fastening screws.

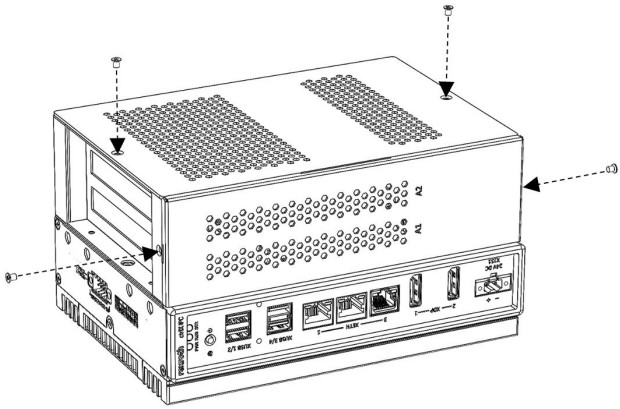


Fig. 12: Fastening the housing lid

10.5.3 Installing M.2-3042 module, M.2-3052 module and mPCIe module

Installing M.2 3042 module

First, perform the steps 1 to 6, refer to ➥ Chapter 10.5.2 “Installing PCIe card” on page 22.

1. Loosen the screw of the M.2 3042 holder, refer to ①.

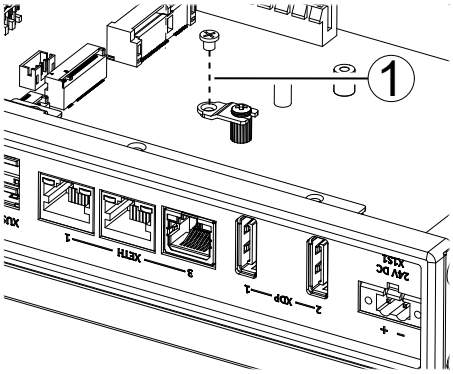


Fig. 13: Position of the screw for the M.2 3042 holder

① Screw for the M.2 3042 holder

2. Insert the M.2 3042 module and fasten the screw of the holder, see ①.

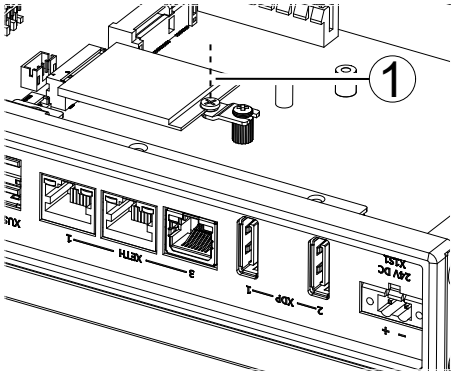


Fig. 14: Fastening M.2 3042 module

3. Attach the housing cover again using the 4 fastening screws.

Installing M.2 3052 module and mPCIe module

First, perform the steps 1 to 6, refer to ➥ Chapter 10.5.2 “Installing PCIe card” on page 22.

1. For the M.2 3052 module, remove the fastening screw of the holder ① or for the mPCIe module, remove the fastening screw ②.

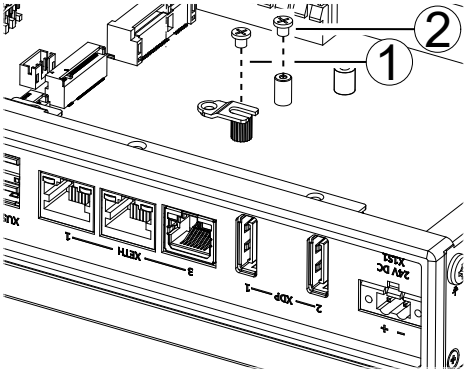


Fig. 15: Position of the fastening screws

① Fastening screw for the M.2 3052 module
② Fastening screw for the mPCIe module

2. Insert the module into the slot provided: The M.2 3052 module into the left slot ① and the mPCIe module into the right slot ②.

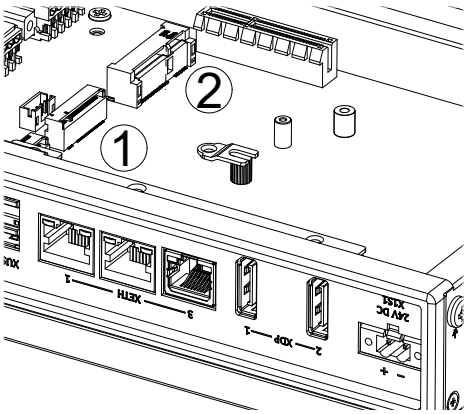


Fig. 16: Slots for modules
① Slot for the M.2 3052 module
② Slot for the mPCIe module

3. Fasten the fastening screw of the M.2 3052 module or the mPCIe module ①

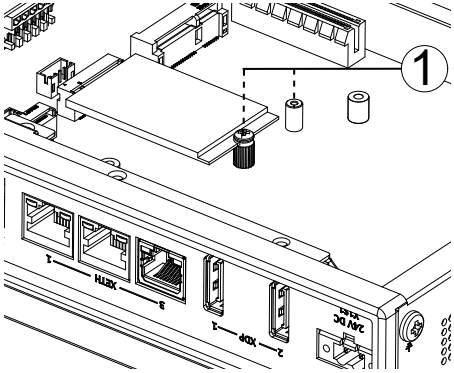


Fig. 17: Fastening M.2 3052 module or mPCIe module

4. Attach the housing cover again using the 4 fastening screws.

10.6 Dismounting

1. Disconnect the industrial PC from voltage.
2. Remove all connected cables.
3. Loosen the screws of the fastening elements.

4. Remove the fastening elements.
5. Press the detents of the installation aid from top. Ensure that the industrial PC is prevented from falling out of the mounting cut-out!
6. Remove the industrial PC from the mounting frame.

10.7 Electric installation

10.7.1 Connecting the industrial PC to the 24 V voltage supply

Connect the “X1S1” interface for the 24 V voltage supply to the industrial power supply unit.

For the voltage supply, use a 24 V industrial power supply unit acc. to DIN EN 60742, classification VDE 551, for example VAP01.1HW23- 024-010-NN with the part number R911171065.

10.7.2 Connecting industrial PC to operating display

Connection diagram:

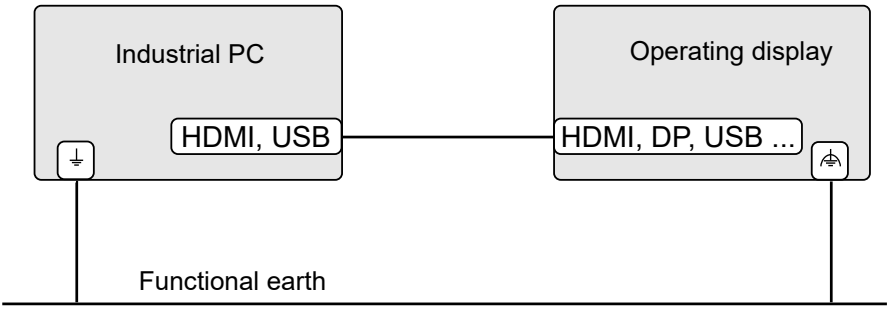


Fig. 18: Wiring the industrial PC to an operating display

1. Connect the functional earth.

2. Connect the display port interface at the industrial PC to the display port interface at the respective operating display using a display port cable.

   Or:

   Connect the XCDI+tx interface at the optional extension module to the XCDi+rx interface at the respective operating display using a CDI+ cable.

NOTICE	**Material damages to electronics due to missing functional earth!**
	Ensure that the functional earth is connected, as otherwise the electronics can be destroyed by a potential difference between the operating display and the industrial PC if the voltage supply is interrupted to only one device and established again. A direct connection of the functional earth between the operating display and the industrial PC is optimal. If the functional earth is connected to a neutral point, the industrial PC has to be connected to this neutral point as well.

When installing CDI cables with a diameter of 7.4 mm, observe the following bending radius:

- Radius (when bended once while routing): 4 x cable diameter
- Minimum bending radius (when moved permanently): 8 x cable diameter
- Optimum bending radius (when moved permanently): 12.5 × cable diameter

Operation breakdown due to mechanical forces on the CDI cables.

Avoid mechanical stress (tensile, compressive, torsional and lateral forces) caused by plugs to the RJ45 socket.

Malfunctions caused by using inappropriate cables.

Use only the CDI+ cables specified in this documentation, see ➦ Chapter 5.3 “Connecting cables for CDI+ interface ” on page 11.

10.7.3 Connecting the industrial PC to multiple operating displays

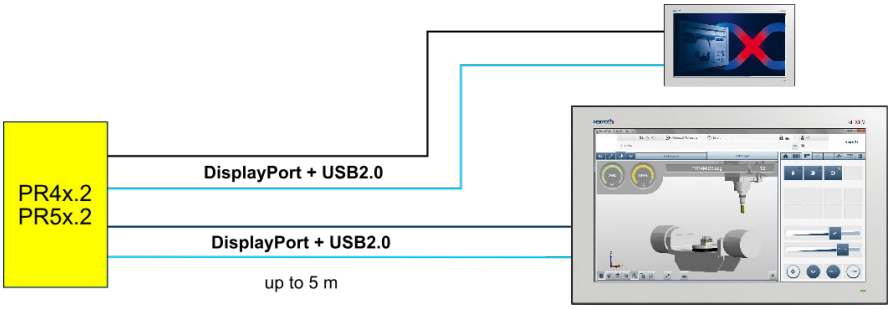
Up to three operating displays ctrlX HMI DE/DR can be connected serially to the ctrlX IPCs PR4 and ctrlX IPCs PR5 devices using the CDI+ interface. The operating displays only operate in "Clone" mode. The advanced mode can only be used if a second or third display is connected to one of the two display ports. The touch function is always active on all operating displays. Entries cannot be blocked at individual operating displays.

Note that devices in the variant "CDI+-rx/tx" are required at the first and second position for operating displays. The variant with "CDI+rx" is sufficient for the last position.

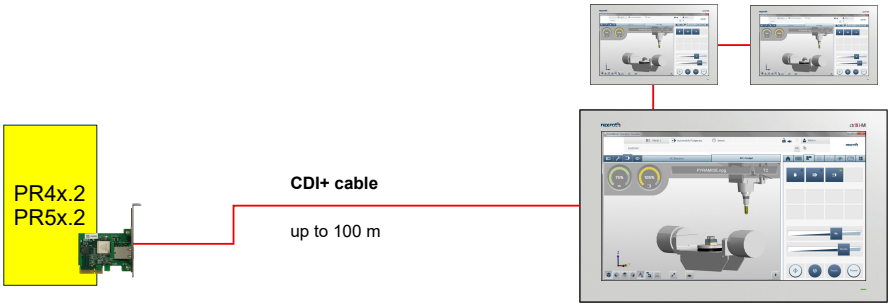
Connection examples

When combining the various interfaces, three displays with different content can be connected to the industrial PC.

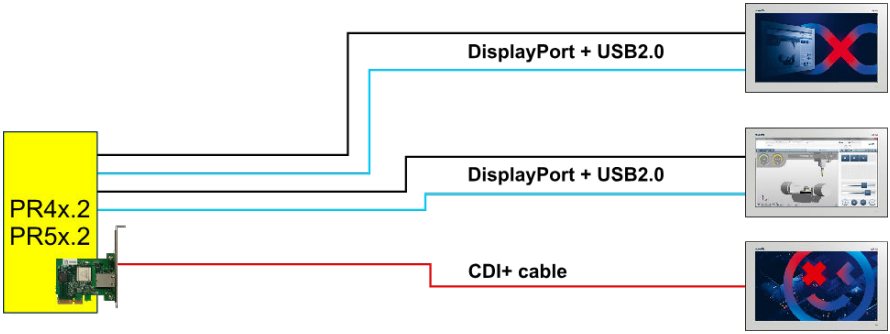
1. Two displays with different content: The two displays are connected directly to the industrial PC via display port and USB. The maximum cable length is 5 m.



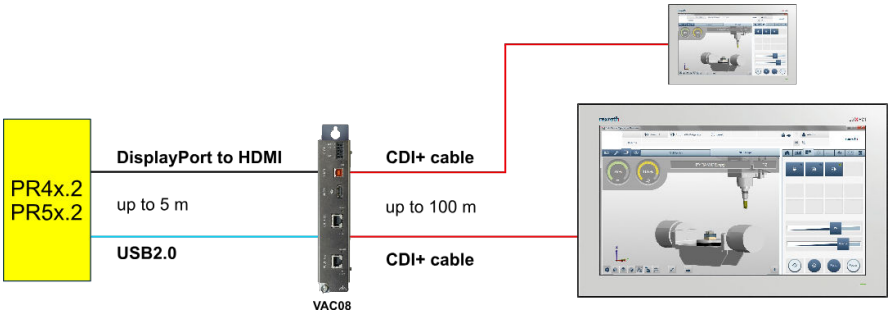
2. Three displays with the same content: One display is connected directly to the industrial PC via CDI+, the other two displays are connected in series to the first display. The maximum cable length between the directly connected display and the industrial PC is 100 m.



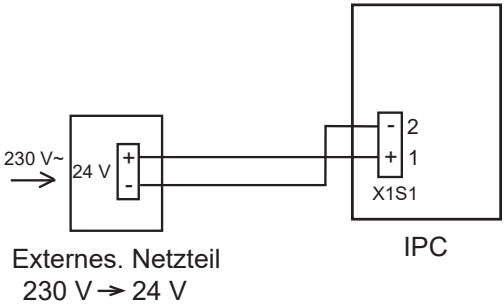
3. Three displays with different content: Two displays are connected directly to the industrial PC via display port and USB and one display is connected directly to the industrial PC via CDI+.



4. Two displays with the same content connected via the CDI+ splitter: The CDI+ splitter is connected via a display-port-to-HDMI cable and USB, maximum cable length is 5 m. The two displays are connected to the CDI+ splitter via CDI+, the maximum cable length is 100 m.



10.7.4 Overall connection diagram – Power supply unit and industrial PC



11 Commissioning

11.1 General information

The device is immediately ready for operation without further configuration.

11.2 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).

11.3 RS232, RS422, RS485

The "RS232", "RS422" and "RS485" interfaces can be configured differently. Therefore, a sliding switch is provided on the circuit board.

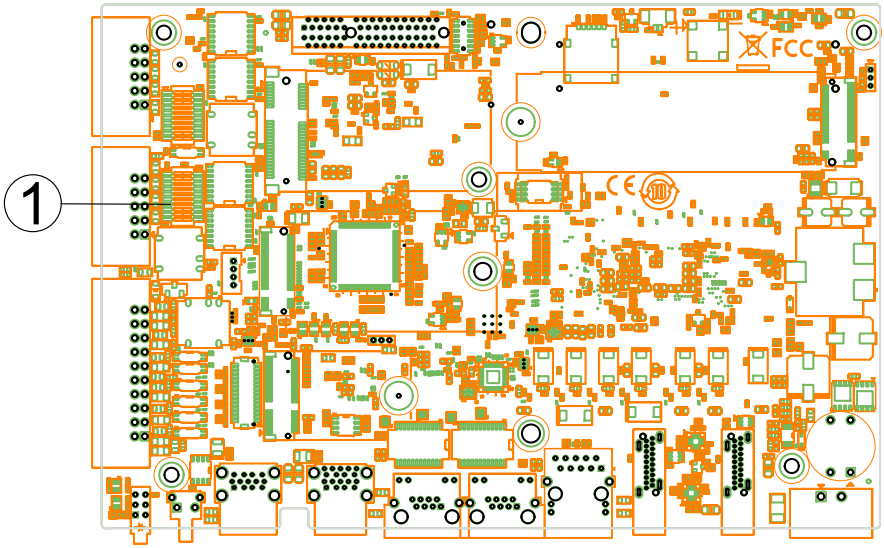


Fig. 19: Sliding switch position

1. Switch off the box PC and disconnect it from the voltage supply.
2. Remove all plugs from the box PC.
3. Open the device, see chapter "PCIe card".
4. Set the switch positions for "COM1" and "COM2", see below.
5. Mount the housing cover again.
6. Configure the connecting cables for the RS interfaces as described on the housing next to the interface.

11.3.1 Sliding switch

COM1 and COM2

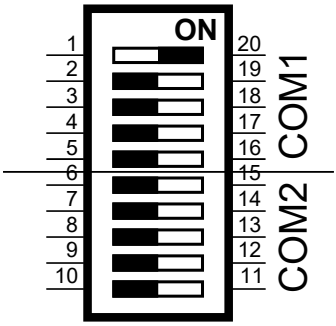


Fig. 20: Assigning the COM1 and COM2 changeover switches

COM1: RSxxx

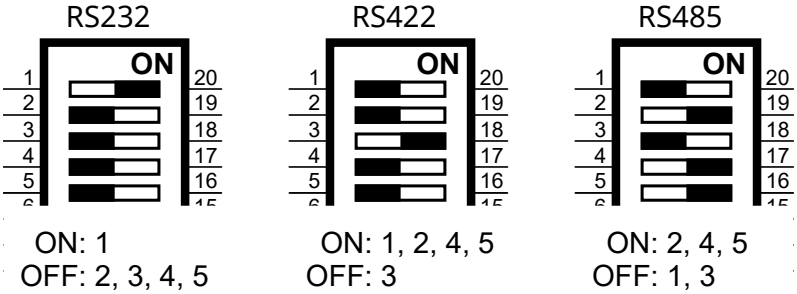


Fig. 21: Position of the changeover switches at COM1 for RS232, RS422 and RS485

COM2: RSxxx

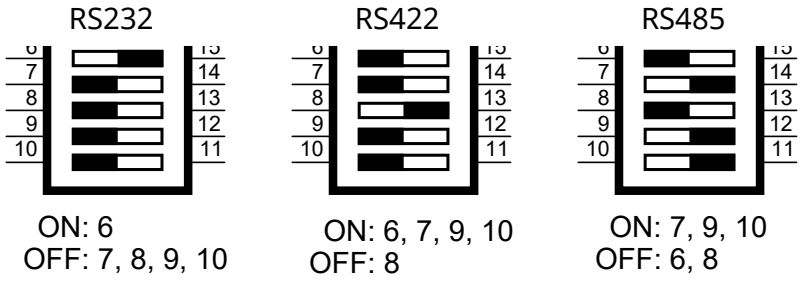


Fig. 22: Position of the changeover switches at COM2 for RS232, RS422 and RS485

State of COM1 and COM2 upon delivery

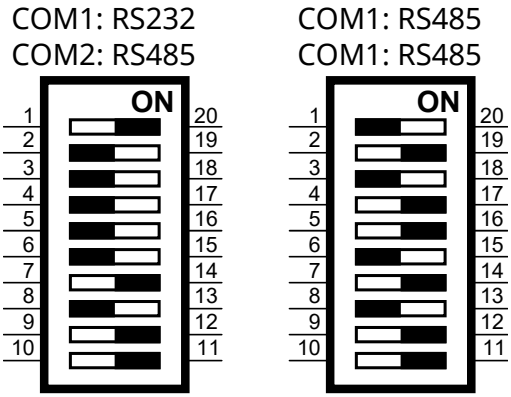


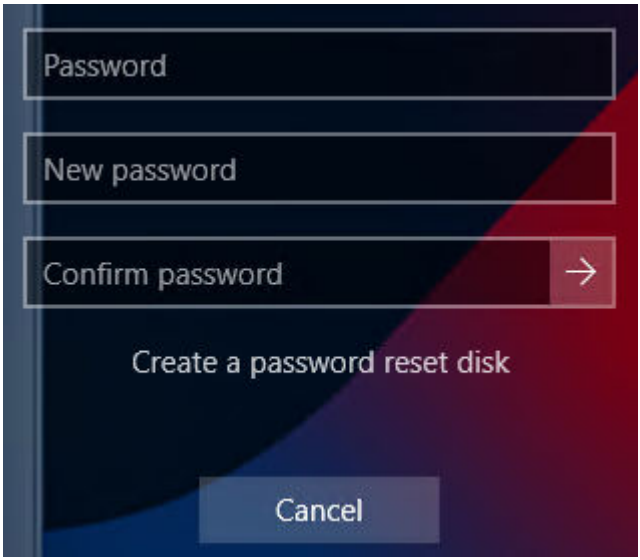
Fig. 23: Changeover switch position of COM1 and COM2 upon delivery

11.4 Commissioning steps

11.4.1 Password assignment during initial commissioning

1. Start the industrial PC.
2. Accept the license agreement.
   ➡ The industrial PC now sets up services and devices and restarts at least once. The voltage supply may not be interrupted!
3. When the industrial PC is ready, the "Sign in" prompt appears on the screen. Select the "Sign in" button.
4. Confirm the prompt to change the password with "OK".

5. In the following window, leave the first field "Password" empty. Enter the new password into the two fields "New password" and "Confirm Password" and confirm your entry by selecting the arrow.



➡ Your entry is confirmed in the following window.

12 Device description

12.1 ctrlX IPC

The ctrlX IPC PR5 is the high-end variant of the box PC portfolio and impresses with its high performance when processing large amount of data. Combined with two PCIe extension slots, the PR5 provides a high degree of flexibility to adapt to any use cases: From brand new applications to the seamless migration of older systems.

With the 13th processor generation from Intel with industrial standard, the PR5 is state of the art. It also scores with scalable RAM and storage options. For example, it enables RAID1 with capacities of up to 1 TB to provide local protection against data loss.

With the optional "CDI+" long-distance interface, displays can be realized up to 100 m away from the Box PC.

12.2 Operating and error display

Symbol, LED	Display	Meaning	Action
Power	LED green	Industrial PC on, normal mode	-

Symbol, LED	Display	Meaning	Action
	LED orange	Industrial PC off and voltage supply present or Standby mode	-
	LED off	Industrial PC off, no voltage supply	Check voltage supply (DC 24 V)

12.3 Reset and power pushbutton

Pushbutton	Action	Effect
Reset pushbutton	Press less than three seconds	Hardware reset
	Press more than three seconds	Windows recovery
Power pushbutton	On, off	-

12.4 License information

12.4.1 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 Error causes and troubleshooting

Error	Correction
No image visible	• Connect the supply voltage and check the XD1 connection
Distorted display due to incorrect display resolution	• Set the correct display resolution in the graphic driver. The standard resolution of the Windows images (also for the recovery sticks) is FullHD (1920 × 1080). Set the correct value once when displays with a smaller resolution are used • Restart industrial PC

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

- Check all plug and terminal connections of the components for proper tightness and possible damage at least annually.
- Check for wire breaks or crimped lines.
- Damaged parts must be replaced immediately.

14.3 USB recovery

For information on restoring the system, refer to the project planning manual "PR-, VR-, DR- and DE-devices, Software Applications", see ➦ R911384733.

14.4 Replacing CMOS battery

Ensure the correct polarity when inserting the new CMOS battery!

First, perform the steps 1 to 6, refer to ➦ Chapter 10.5.2 “Installing PCIe card” on page 22.

1. Loosen the screw, see the following illustration:

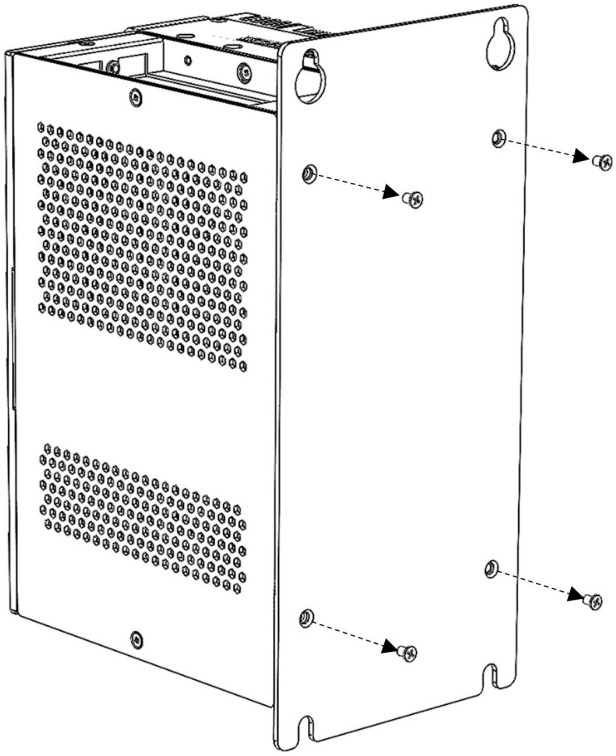


Fig. 24: Removing rear cover

2. Loosen the 4 fastening screws and remove the housing cover on top and on the side.

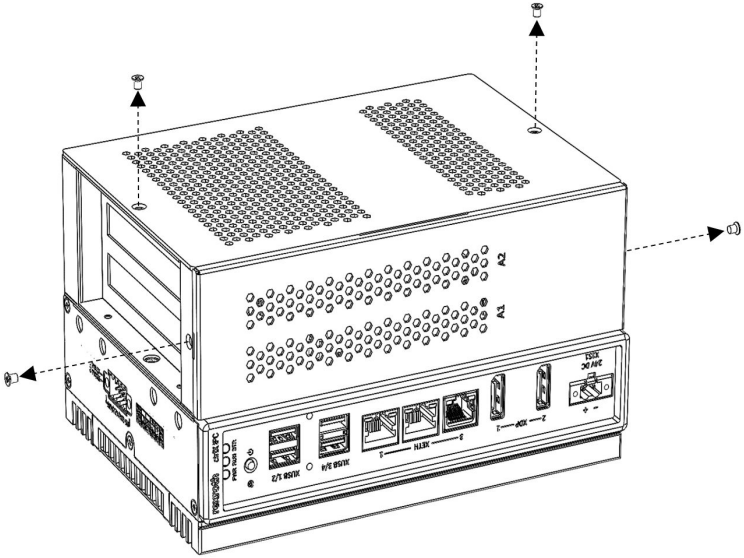


Fig. 25: Removing housing lid

3. Loosen the 6 screws and remove the extension box with the printed circuit board.

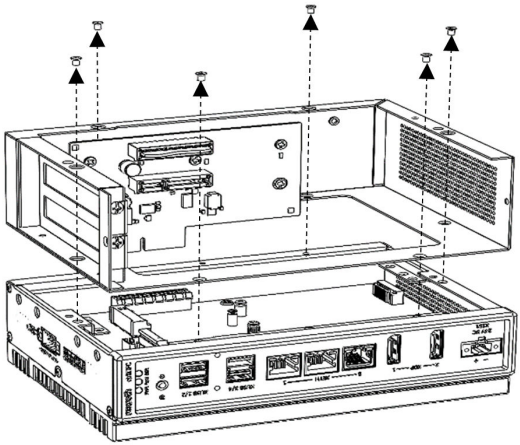


Fig. 26: Removing extension box

4. Unplug the battery and remove the old battery including the black adhesive pad.

5. Connect the plug of the new battery. Note the polarity.

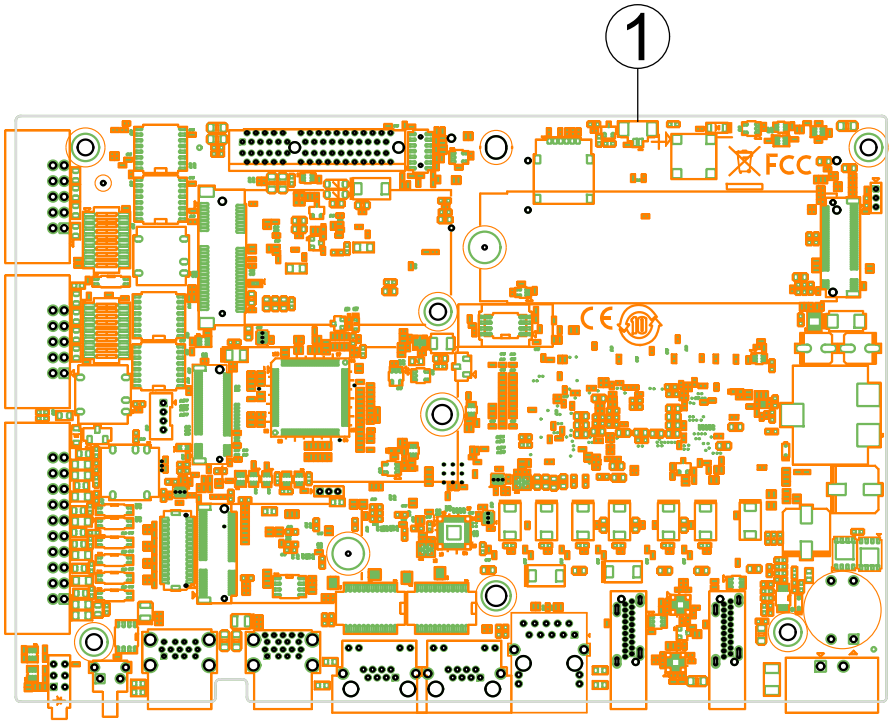


Fig. 27: Position of the battery plug on the circuit board

① Connection for battery

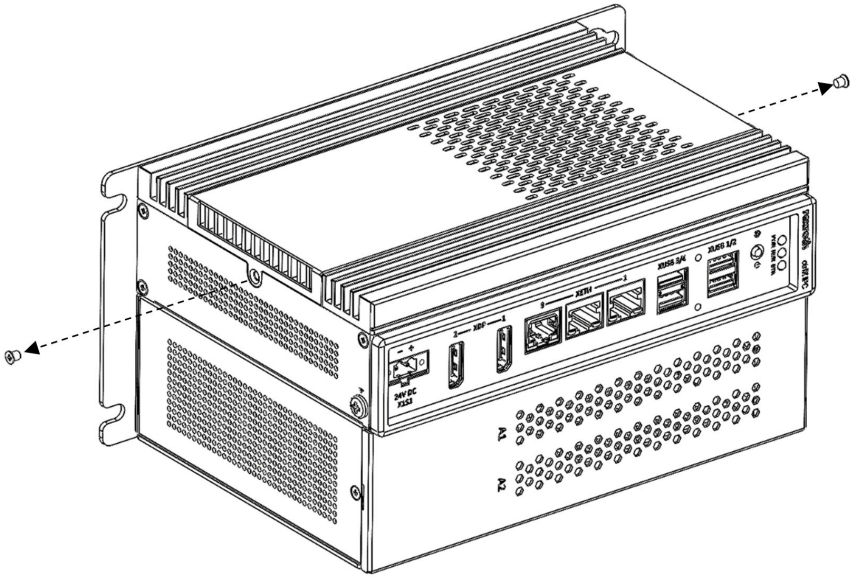
6. Remove the protective film from the adhesive pad on the new battery.
7. Glue the battery in place.
8. Close the device again with the top, side and rear cover and fasten the respective screws.

When changing the battery, both the BIOS setting and the clock setting may be lost!

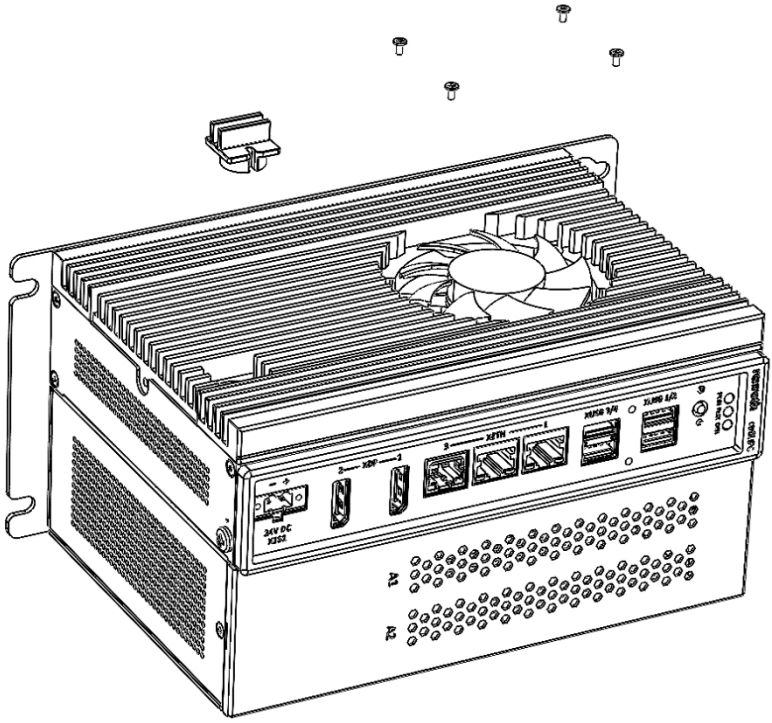
14.5 Replacing fan

First, perform the steps 1 to 6, refer to ➥ Chapter 10.5.2 “Installing PCIe card” on page 22.

1. Remove the two screws from the fan cover and remove the fan cover.



2. Remove the rubber and the 4 screws from the fan.



3. Disconnect the fan plug and remove the fan.
4. Fasten the new fan with the 4 fan screws.
5. Plug the connection of the new fan into the socket for the fan voltage supply.
6. Attach the rubber again and route the fan cable.
7. Fasten the fan cover with two screws.

15 Ordering information

15.1 Type code

No.	1	2	3	4		5		6	7	8		9		10	11	.	12	13	.	14	15	.	16	17	18	.	19
Example	P	R	53	00	.	2	–	1	P	5	–	AA	–	0	0	–	B	NN	–	B	1	–	NN	NN	NN	–	H

No.	Characteristic name	Characteristic value	Text
1	Device type 1	P	Embedded PC/IPC
2	Device type 2	R	Box-, build-in version
3	Performance class	53	Intel Core i7-13800HRE
4	Display size	00	Without display
5	Hardware variant	2	Hardware type no. 2
6	Interfaces	1	2 × standard video DisplayPort
7	Mass storage (Flash, SSD...)	E	512 GB NVMe
		F	1 TB NVMe
		O	2 × 512 GB NVMe (RAID1)
		P	2 × 1 TB NVMe (RAID1)
8	Memory	3	16 GB RAM
		4	32 GB RAM
		5	64 GB RAM
9	Design and display properties	AA	IPC Rexroth design
10	M.2 extension	0	Without
11	mPCIe extension	0	Without
12	Extended hardware properties	A	Base
		B	with extension box, for 2 × PCIe x4 slots
13	PCIe extension	NN	Without
		AN	CDI+, none
14	Operating system	C	Windows 10 IoT Enterprise LTSC 2021 – High End
15	Firmware version-No.	1	Version 1
16-18	Reserved	NN	None
19	Material identification	H	Component

15.2 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)

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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

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