BECKHOFF New Automation Technology

Manual | EN

CP22xx

Panel PC

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1 Notes on the documentation

This description is intended exclusively for trained specialists in control and automation technology who are familiar with the applicable national standards.
The documentation and the following notes and explanations must be complied with when installing and commissioning the components.
The trained specialists must always use the current valid documentation.

The trained specialists must ensure that the application and use of the products described is in line with all safety requirements, including all relevant laws, regulations, guidelines, and standards.

Disclaimer

The documentation has been compiled with care. The products described are, however, constantly under development.
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2 For your safety

The signal words and their meanings are explained in the chapter on safety. They contain fundamental safety instructions that are essential for preventing personal injuries and damage to property.

Exclusion of liability

Beckhoff shall not be held liable in the event that this documentation is not complied with and the devices are therefore not used in line with the documented operating conditions.

2.1 Signal words

The signal words used in the documentation are classified below.

Warning on personal injuries

⚠ DANGER
High-risk hazard that will result in death or serious injury.

⚠ WARNING
Medium-risk hazard that may result in death or serious injury.

⚠ CAUTION
Low-risk hazard that may result in minor injury.

Warning on property and environmental damage

NOTICE
The environment, equipment, or data may be damaged.

2.2 Intended use

The device is intended for use as a control system for automation, visualization and communication in machine and system engineering.

The Front side of the device is designed for an IP65 working environment. It offers full protection against contact and against dust, as well as protection against water jets (nozzle) from any angle.

The Rear side is designed for an IP20 working environment. It is protected against the penetration of fingers and solid foreign bodies of 12.5 mm in diameter or larger in size. It is not protected against water. Operation of the device in wet and dusty environments is not permitted.

The specified limits for technical data must be adhered to.

The device can be used within the documented operating conditions.

Improper use

Do not use the device outside the documented operating conditions.

2.3 Fundamental safety instructions

The following safety instructions must be observed when handling the device.

Application conditions

- Do not use the device under extreme environmental conditions.
- Only use the device in hazardous areas if it is explicitly designed for this purpose.
- Never plug or unplug connectors during thunderstorms. There is a risk of electric shock.
- Ensure that the device has a protective and functional earth connection.

Damage to property, loss of data and impairment of functions

- If you change the hardware and software configurations, you must keep within the specified limits of power consumption and power loss (please refer to the respective data sheet).
- Ensure that only trained specialists with a control and automation engineering background, operate the device. Use by unauthorized persons can lead to damage to property and loss of data.
- In the case of a 24 V DC power supply unit, fuse the power supply line according to its cross-section to protect the supply line in the event of a short circuit.
- In case of fire, extinguish the device with powder or nitrogen.

2.4 Operator's obligation to exercise diligence

The operator must ensure that

- the products are used only for their intended purpose (see Chapter 2.2 Intended use [▶ 6]).
- the products are only operated in sound condition and in working order.
- the products are operated only by suitably qualified and authorized personnel.
- the personnel is instructed regularly about relevant occupational safety and environmental protection aspects, and is familiar with the operating instructions and in particular the safety instructions contained herein.
- the operating instructions are in good condition and complete, and always available for reference at the location where the products are used.

2.5 Notes on information security

The products of Beckhoff Automation GmbH & Co. KG (Beckhoff), insofar as they can be accessed online, are equipped with security functions that support the secure operation of plants, systems, machines and networks. Despite the security functions, the creation, implementation and constant updating of a holistic security concept for the operation are necessary to protect the respective plant, system, machine and networks against cyber threats. The products sold by Beckhoff are only part of the overall security concept. The customer is responsible for preventing unauthorized access by third parties to its equipment, systems, machines and networks. The latter should be connected to the corporate network or the Internet only if appropriate protective measures have been set up.

In addition, the recommendations from Beckhoff regarding appropriate protective measures should be observed. Further information regarding information security and industrial security can be found in our https://www.beckhoff.com/secguide.

Beckhoff products and solutions undergo continuous further development. This also applies to security functions. In light of this continuous further development, Beckhoff expressly recommends that the products are kept up to date at all times and that updates are installed for the products once they have been made available. Using outdated or unsupported product versions can increase the risk of cyber threats.

To stay informed about information security for Beckhoff products, subscribe to the RSS feed at https://www.beckhoff.com/secinfo.

3 Product overview

The CP22xx built-in Panel PC is designed for installation in the front of a control cabinet and represents a powerful platform for use in machine and system engineering.

Thanks to its processors, you can use the panel PC for the following applications, among others:

- diverse automation and visualization tasks
- wide range of IoT tasks with data preprocessing
- HMI applications
- axis control
- short cycle times
- high-volume data handling
- other PC applications

The panel PC is available in the following eight display sizes with corresponding resolutions in landscape or portrait formats:

- 12-inch (800 x 600)
- 12.1-inch (1280 x 800)
- 15-inch (1024 x 768)
- 15.6-inch (1366 x 768)
- 18.5-inch (1366 x 768)
- 19-inch (1280 x 1024)
- 21.5-inch (1920 x 1080)
- 24-inch (1920 x 1080)

The device has a multi-finger touch screen and an aluminum housing with glass front with IP65 on the front side and IP20 on the rear side.

In its basic configuration, the CP22xx includes the following features:

- 3½-inch motherboard
- Intel® processor
- 2½-inch hard disk
- 1 slot for 2½-inch hard disk/SSD, 1 slot for CFast
- 24 V DC power supply unit

Push button extension

The following panel PCs are optionally available ex factory with a corresponding C9900-G0xx push button extension:

- CP2212 (C9900-G002)
- CP2213 (C9900-G009)
- CP2215 (C9900-G003)
- CP2216 (C9900-G004)
- CP2218 (C9900-G005)
- CP2219 (C9900-G006)
- CP2221 (C9900-G008)
- CP2224 (C9900-G007)

You can only order the push button extension with a device in landscape format.

For explanations of the push button extension and the functions, refer to the C9900-G00x-G02x manual. Figure 1 shows an example of a panel PC without (1) and with (2) push button extension.

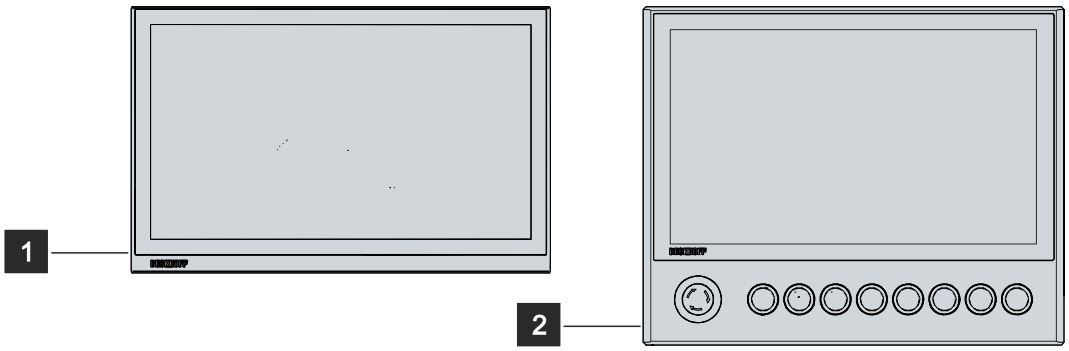


Fig. 1: Without and with push button extension

3.1 Structure

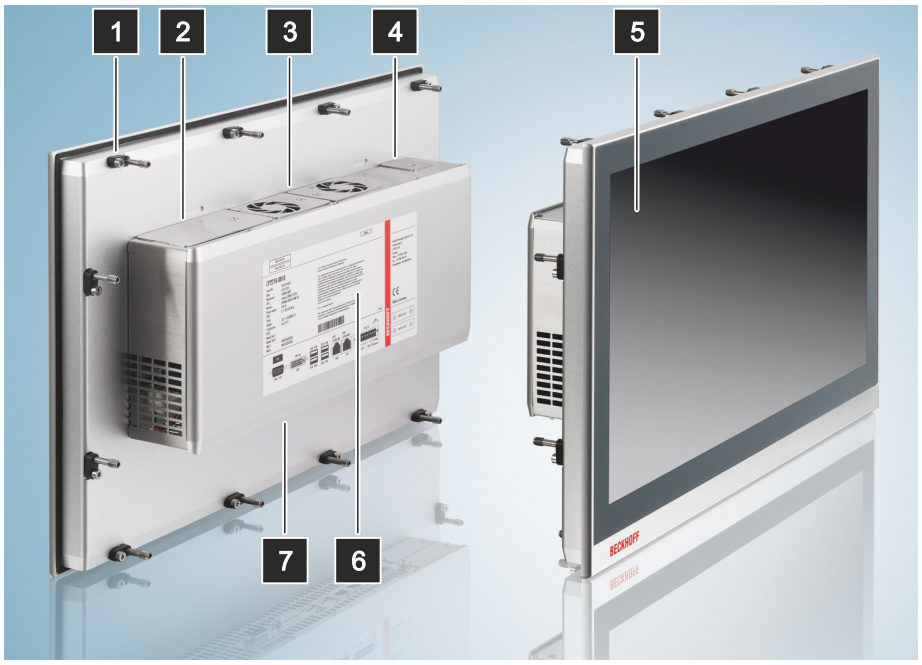


Fig. 2: Structure

Table 1: CP22xx configuration legend

No.	Component	Description
1	Clamping lever	Mounting the panel PC in the panel of the control cabinet
2	Access to storage media	Storage media behind the cover
3	Fan access	Fan cartridges
4	Access battery	Battery behind the cover
5	Display and touch screen glass	Operation of the panel PC
6	Name plate	Information on the equipment of the panel PC
7	Access to interfaces	Interfaces on the underside

Optionally, you can order the following devices with a stainless steel front instead of an aluminum front. For this you need to order the device itself and the ordering option below:

- CP2216 (ordering option stainless steel front: C9900-F945)
- CP2218 (ordering option stainless steel front: C9900-F946)
- CP2221 (ordering option stainless steel front: C9900-F948)

The following figure shows the structure of a stainless steel device:

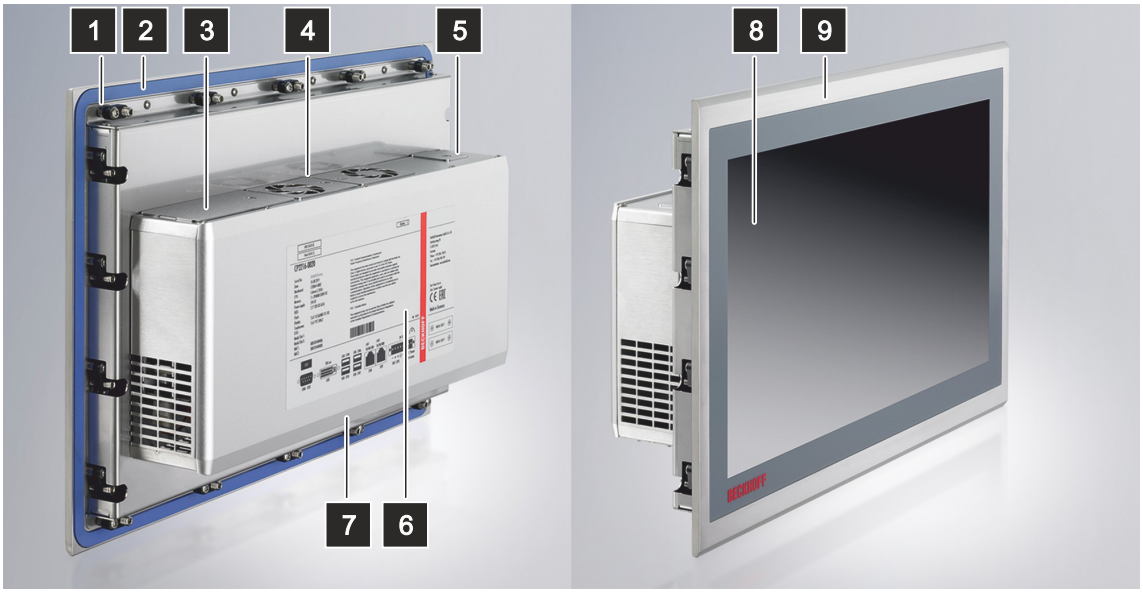


Fig. 3: Structure stainless steel device

Table 2: Legend structure CP22xx stainless steel device

No.	Component	Description
1	Clamping lever	Mounting the panel PC in the panel of the control cabinet
2	Silicone seal	Protection of the connection section from moisture
3	Access to storage media	Storage media behind the cover
4	Fan access	Fan cartridges
5	Access battery	Battery behind the cover
6	Name plate	Information on the equipment of the panel PC
7	Access to interfaces	Interfaces on the underside
8	Display and touch screen glass	Operation of the panel PC
9	Stainless steel front	Use in environments with higher hygiene requirements

3.2 Interface description

In the basic configuration, the panel PC includes the following interfaces:

- Power supply (X110)
- Ethernet RJ45 (X109, X108)
- USB (X104 - X107)
- DVI (X103)
- RS232 (X102)

The interfaces are located on the rear side of the panel PC at the bottom in the connection section. Depending on the selected display size of your device, the connection compartment is set up differently (see Fig. 4).

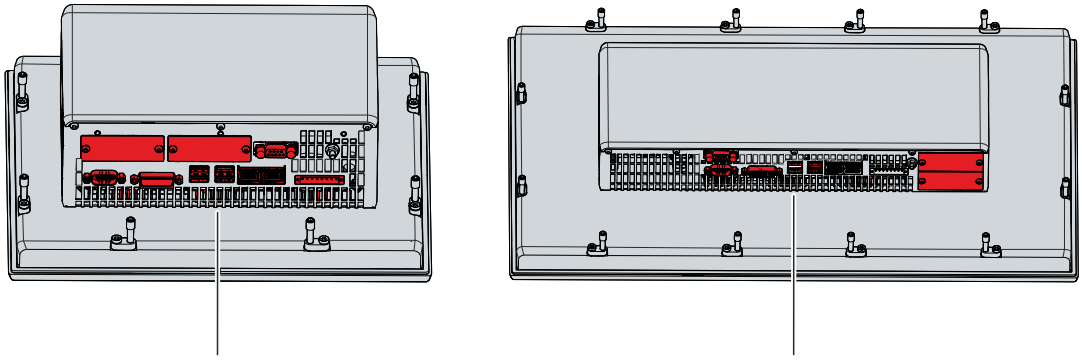


Fig. 4: Connection section

3.2.1 Power supply

The panel PC is supplied with a nominal voltage of 24 V. The power supply and the protective earth of the device are connected via the 8-pin voltage socket (X110). The main supply voltage is applied between PIN 5 (0 V) and PIN 6 (24 V) of the socket. If the panel PC is equipped with an integrated uninterruptible power supply (UPS), an external battery pack can additionally be connected to PIN 1 and PIN 2. Beckhoff offers the C9900-U330 battery pack for this purpose.

Fig. 5: Voltage socket pin numbering

Table 3: Voltage socket pin assignment

Pin	Signal	Description
1	- BAT	Negative pole of the battery pack
2	+ BAT	Positive pole of the battery pack
3	27 V UPS	27 V UPS output 2.5 A, negative is pin 1 "- BAT"
4	⏚	Protective earth
5	-	24 V supply voltage, negative pole
6	+ 24 V	24 V supply voltage, positive pole
7	PC-ON	Input PC-ON
8	P-S	Power Status output, minus is the negative pole of the supply voltage

To operate the buffered 24 V output, you must use PIN 1 (-) and PIN 3 (+).

The plug for the power supply is specified for 16 A and can accommodate wire cross-sections of up to 1.5 mm^2. For long supply lines, use 1.5 mm^2 cables to achieve a low voltage drop on the supply line. At least 22 V should be present at the voltage connector of the panel PC so that the PC remains switched on in the event of voltage fluctuations. The plug is included in the delivery. You can obtain a replacement plug from your Beckhoff Sales using the following ordering option:

- C9900-P926: power supply connector for CP22xx Panel PC

3.2.2 Ethernet RJ45

The panel PC has two Gigabit LAN ports (X108, X109). The 100Base-T, 1000Base-T, and 2500Base-T Ethernet standards enable the connection of corresponding network components and data rates of 100/1000/2500 Mbit/s. The required speed is selected automatically. The following table assigns the data rates and controllers to the device generations:

Table 4: Assignment of data rates and controllers

Device generation	Mbit/s	Controller
CP22xx-0020	100/1000	Intel® i219 for LAN1 and i210 for LAN2
CP22xx-0030	100/1000	Intel® i219 for LAN1 and i210 for LAN2
CP22xx-0040	LAN1 100/1000 LAN2 100/1000/2500	Intel® i219 for LAN1 and i226 for LAN2

The RJ45 connection technology with twisted-pair cables is used. The maximum length of the cable connection is 100 m.

If you use the Ethernet ports with EtherCAT or for Real-Time Ethernet applications, you must observe the following distinction:

The Ethernet port (X109, LAN2) connected with the i210/i226 controller via PCIe is generally suitable for cycle times <= 1 ms and for distributed clock applications with EtherCAT.

The Ethernet port (X108, LAN1) integrated in the chipset with the i219 controller is generally suitable for EtherCAT and Real-Time Ethernet applications with cycle times > 1 ms (without distributed clocks).

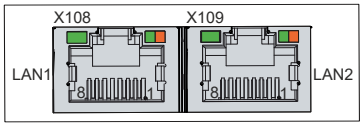


Fig. 6: Ethernet interface pin numbering

Table 5: Ethernet interface pin assignment

Pin	Signal	Description
1	T2 +	Pair 2
2	T2 -	
3	T3 +	Pair 3
4	T1 +	Pair 1
5	T1 -	
6	T3 -	Pair 3
7	T4 +	Pair 4
8	T4 -	

The LEDs of the LAN interfaces indicate the activity and the data transmission rate (Mbit/s). The LED shown completely green in the figure indicates whether the interface is connected to a network. If this is the case, the LED lights up green. The LED flashes when data transmission is in progress on the interface.

The green/orange LED shown in the figure indicates the data transmission rate. The device generations differ in terms of the possible data transmission rate. The following tables show the data transmission rates that the LEDs indicate.

Table 6: LED means speed of 100/1000 Mbit/s

Mbit/s	LED
100	Lights up orange
1000	Lights up green

Table 7: LED means speed of 100/1000/2500 Mbit/s

Mbit/s	LED
100	Off
1000	Lights up orange
2500	Lights up green

3.2.3 USB

The panel PC has four USB interfaces (X104, X107). They are used to connect peripheral devices with USB interfaces.

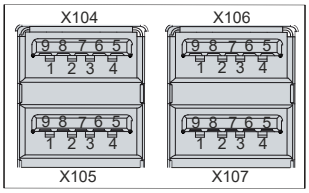


Fig. 7: USB interface pin numbering

Table 8: USB interface pin assignment

Pin	Connection
1	Vbus
2	D -
3	D +
4	GND
5	StdA_SSRX -
6	StdA_SSRX +
7	GND_DRAIN
8	StdA_SSTX -
9	StdA_SSTX +

3.2.4 DVI

The panel PC is equipped with a DVI connector (X103), to which a DVI-capable monitor can be connected. Only digital signals are transmitted.

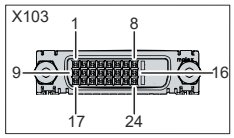


Fig. 8: DVI interface pin numbering

Table 9: DVI interface pin assignment

Pin	Connection	Pin	Connection	Pin	Connection
1	TMDS Data 2 -	9	TMDS Data 1 -	17	TMDS Data 0 -
2	TMDS Data 2 +	10	TMDS Data 1 +	18	TMDS Data 0 +
3	TMDS Data 2/4 Shield	11	TMDS Data 1/3 Shield	19	TMDS Data 0/5 Shield
4	not connected	12	not connected	20	not connected
5	not connected	13	not connected	21	not connected
6	DDC Clock	14	+ 5 V Power	22	TMDS Clock Shield
7	DDC Data	15	Ground (+ 5 V, Analog H/V Sync)	23	TMDS Clock +
8	Analog Vertical Sync	16	Hot Plug Detect	24	TMDA Clock -

3.2.5 RS232

The COM1 serial interface (X102) is fed out via a 9-pin standard D-sub connector. The signals comply with the RS232 standard. The port address and the used interrupt are configured automatically, but can also be set manually with the help of the BIOS setup if required.

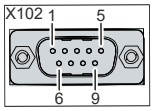


Fig. 9: RS232 interface pin numbering

Table 10: RS232 pin assignment

Pin	Signal	Description
1	DCD	Data Carrier Detect
2	RxD	Receive Data
3	TxD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

3.3 Optional interfaces

Various interface options are available to expand your panel PC with additional interfaces beyond the basic configuration. The following table provides information about the available interfaces depending on the device generation:

Table 11: CP22xx interface options

Ordering option	Description	Device generation
C9900-E268[1)]	1-port USB interface in the front of a CP2xxx without push button extension, USB-A socket IP 65	CP22xx-0020 CP22xx-0030 CP22xx-0040
FC9071-0000	Gigabit-Ethernet PC network card 10/100/1000 Mbit/s, 1-channel, PCIe interface, covers the fieldbus connection section	CP22xx-0020 CP22xx-0030 CP22xx-0040
C9900-E308	Serial interface, RS232, electrical isolation, D-sub, 9-pin, PCIe interface covers the fieldbus connection section	CP22xx-0020
C9900-E233	1 RS232 serial interface led out in the connection section of the CP2xxx	CP22xx-0030 CP22xx-0040
C9900-E240	Serial interface COM2, RS232, electrical isolation, overvoltage protection, D-sub, 9-pin	CP22xx-0030 CP22xx-0040
C9900-E241	Serial interface COM2 RS485, electrical isolation, overvoltage protection, D-sub, 9-pin. Configuration as endpoint without echo: Echo off, Auto send on, Always send off, Auto receive on, Always receive off, Termination on.	CP22xx-0030 CP22xx-0040
C9900-E242	Serial interface COM2 RS485, electrical isolation, overvoltage protection, D-sub, 9-pin. Configuration as full duplex endpoint: Echo on, Auto send off, Always send on, Auto receive off, Always receive on, Termination on	CP22xx-0030 CP22xx-0040

[1)] This option is not available in combination with stainless steel front.

PCIe modules

In addition, you can expand the panel PC with PCIe modules by ordering the device with PCIe module slots:

Table 12: CP22xx PCIe module slots

Ordering option	Description	Device generation
C9900-B517	2 PCIe module slots, integrated in the CP22xx, for inserting Beckhoff PCIe modules, instead of 2 connector brackets for leading out interfaces	CP22xx-0020 CP22xx-0030 CP22xx-0040

The PCIe module is the Beckhoff definition of a small plug-in card format with a PCIe-x1 bus interface. For ordering options, please contact your Beckhoff Sales department. If you have ordered your device without PCIe module slots and subsequently want to install PCIe modules, you must first send your device to Beckhoff Service for the conversion (see chapter 10.1 Service and Support).

Depending on the selected display size of your device, the PCIe module slots are located at different places in the connection section (see Fig. 10).

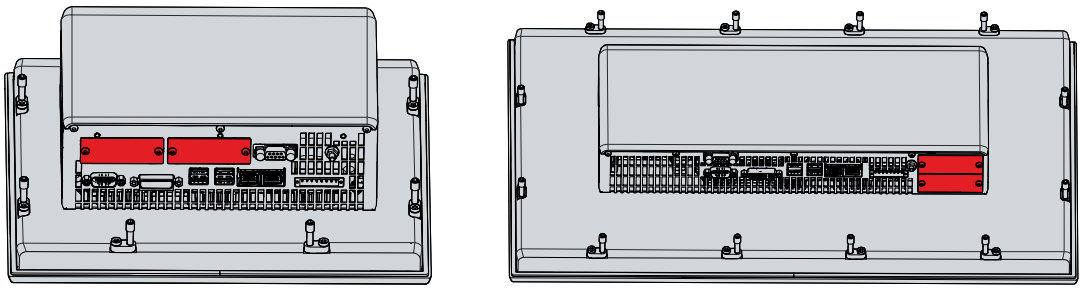


Fig. 10: Position PCIe module slots

If you have ordered the device without already installed modules, you have to replace the blank covers of the module slots with the ordered PCIe modules on your own. Regardless of where the module slots are located, you must proceed in the same way. To do this, loosen the two M3x4 screws of the covers in each case, insert the modules and screw the M3x4 screws back in place.

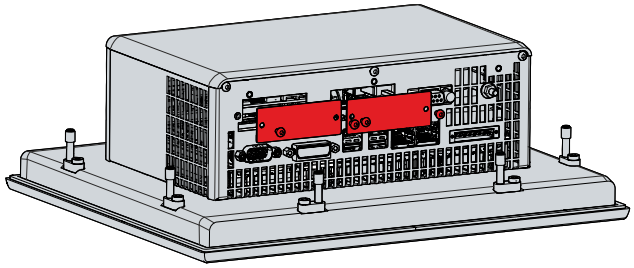


Fig. 11: Installation PCIe modules

Please refer to the current price list for the available PCIe modules.

3.4 Name plate

The name plate provides information about the panel PC equipment. The name plate shown here serves only as an example.

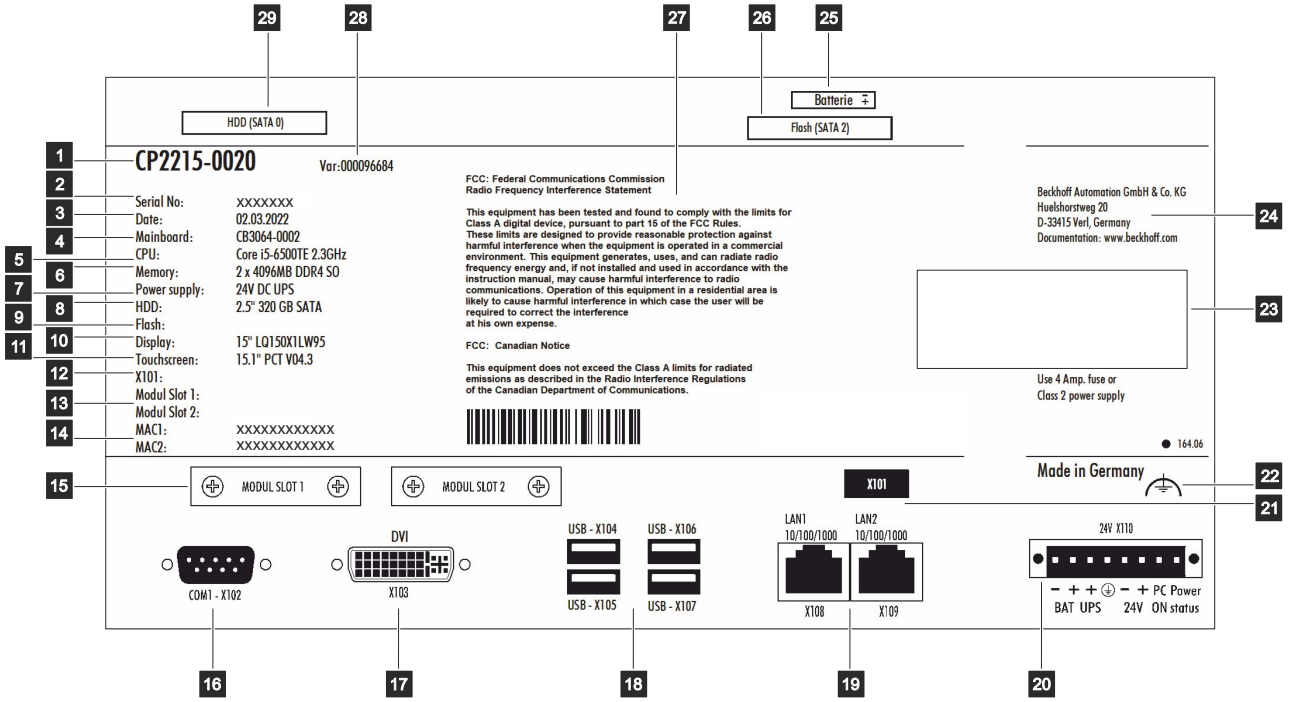


Fig. 12: Name plate

Table 13: Legend CP22xx name plate

No.	Description
1	Model: The last four digits indicate the device generation.
2	Serial number (BTN)
3	Date of manufacture
4	Mainboard
5	CPU
6	Storage media
7	Power supply
8	Main memory
9	Hard disk, SSD or CFast
10	Display
11	Touch screen
12	Optional interface (X101)
13	Optional slots for PCIe compact modules
14	MAC addresses of the Ethernet interfaces (X108, X109)
15	Module slot 1 and module slot 2
16	RS232 interface (X102)
17	DVI interface (X103)
18	USB interfaces (X104 - X107)
19	Ethernet interfaces (X108, X109)
20	Connection of the power supply and protective earth of the panel PC (X110)
21	Optional interface led out into the connection section (X101)

22	Grounding bolt for functional earthing of the panel PC
23	Symbols Note: Here are the symbols applicable to the device such as CE, EAC, UKCA, . The approvals of your device can be found on the name plate and in chapter 10.2 Approvals.
24	Address of the vendor
25	Access to motherboard battery
26	Access to storage medium
27	FCC approval
28	Variant number: commercial number of the order code including ordering options
29	Access to storage medium

3.5 TwinCAT version

To ensure optimal performance and access to all the functions of your device when using the TwinCAT control software, Beckhoff recommends using the latest TwinCAT version. In addition, you should never go below the minimum requirement for the TwinCAT version. This consists of the hardware requirements and the general TwinCAT system requirements. The general TwinCAT system requirements can be found here. The following table shows the minimum TwinCAT version required for the different device generations, depending on the operating system and based on the hardware requirements:

Table 14: CP22xx-0020 Minimum TwinCAT version

Operating system	Minimum TwinCAT version
Windows 7 32-bit	3.1 build 4022.0, 2.11 b2259(x86)
Windows 10 32-bit	3.1 build 4022.0, 2.11 b2259(x86)
Windows 7 64-bit	3.1 build 4022.0
Windows 10 64-bit	3.1 build 4022.0
Windows Server 2016	3.1 build 4022.0

Table 15: CP22xx-0030 Minimum TwinCAT version

Operating system	Minimum TwinCAT version
Windows 10 64-bit	3.1 build 4024.12
Windows Server 2019	3.1 build 4024.12
Windows 11 64-bit	3.1 build 4026.16

Table 16: CP22xx-0040 Minimum TwinCAT version

Operating system	Minimum TwinCAT version
Windows 10 64-bit	3.1 build 4024.50
Windows Server 2022	3.1 build 4026.14
Windows 11 64-bit	3.1 build 4026.16

4 Commissioning

In order to use the panel PC, you must first commission it. The first step is to transport the device to is operating location and unpack it. This is followed by installing the device in the control cabinet front, connecting the cables and the power supply and finally switching on the panel PC.

Operating the device

The device is operated via the touch screen.

NOTICE

Damage to the touch screen

Operating the touch screen with unsuitable objects may damage the touch screen.

- Operate the touch screen only with bare fingers or wearing suitable gloves.
- If you use gloves, make sure that no hard particles such as metal shavings, glass splinters or similar adhere to the glove.

If you, as the user, require additional protection for the touch screen against dirt and scratching, for example due to dirty hands, this can be achieved with a protective film. The film provides short-term protection for a few days.

You can either order a protective film individually and fit it yourself retrospectively, or you can order the film for fitting directly ex factory. The protective films available for the display size of your device can be found on the Beckhoff website.

Proceed as follows to attach the protective film to the touch screen:

1. Ensure that the environment is as dust-free as possible.
2. Thoroughly clean the surface of the device to be fitted with the film and remove all grease residues.
3. Detach the film from the backing at the short edge and place it on the surface.
4. Gradually remove the film from the backing. At the same time, use a doctor blade or other object with a soft rubber or felt edge to apply the film.
5. Brush away air bubbles towards the edge with a doctor blade or other object with a soft rubber or felt edge.

⇨ The film is now fitted.

You can use the Dimming, Screensaver and Cleaning mode functions with the Display Control Tool. The Beckhoff Information System provides more information about the tool: https: https://infosys.beckhoff.com/content/1031/panelconfigurationtools/11725543179.html?id=7993182328699786200.

4.1 Transport and unpacking

The specified storage conditions must be adhered to (see chapter 9 Technical data [▶ 51]).

Despite the robust design of the unit, the components are sensitive to strong vibrations and impacts. During transport the device must therefore be protected from mechanical stress. Appropriate packaging of the device, such as the original packaging, can improve the vibration resistance during transport.

NOTICE

Hardware damage due to condensation

Unfavorable weather conditions during transport can cause damage to the device.

- Protect the device against moisture (condensation) during transport in cold weather or in case of extreme temperature fluctuations.
- Do not put the device into operation until it has slowly adjusted to the room temperature.
- Should condensation occur, wait for about 12 hours before switching the device on.

Unpacking

Proceed as follows to unpack the device:

1. Check the packaging for transport damage.
2. Remove packaging.
3. Keep the packaging for possible future transport.
4. Check your delivery for completeness by comparing it with your order.
5. Check the contents for visible shipping damage.
6. In case of discrepancies between the package contents and the order, or in case of transport damage, please inform Beckhoff Service (see Chapter 10.1 Service and Support).

4.2 Control cabinet installation

NOTICE

Extreme environmental conditions

Extreme environmental conditions can cause damage to the device.

- Avoid extreme environmental conditions.
- Protect the device against dust, moisture and heat.

NOTICE

Lack of air circulation

Incorrect installation of the device prevents air circulation in the device and thus causes overheating and impaired functioning.

- Only install the device in the corresponding wall in the orientation shown.

NOTICE

Incorrect installation

Mounting the device in a way that deviates from the documentation can impair its functionality.

- Mount the device only in the orientations shown in the documents.

The device is designed for installation in a control cabinet for machine and system engineering. The environmental conditions specified for operation must be observed.

Dimensions

The dimensions of the panel PC can be found on the Beckhoff website: https://www.beckhoff.com/de-de/support/downloadfinder/technische-zeichnungen/.

All dimensions are in mm.

Preparation of the control cabinet

The control cabinet must have the required installation cutout according to the device dimensions of the panel PC.

The wall thickness must be between 1 mm and 5 mm for installation. In the case of a device with a stainless steel front, the panel thickness must be between 1 mm and 3 mm. After installation, be sure to check the tightness between the panel PC and the wall.

Please also note the following for installation in a control cabinet:

- Ensure that there is 5 cm of free space above and below the device for air circulation.
- Position the panel PC such that reflections from light sources on the screen are avoided as far as possible.
- For the correct installation height, use the position of the screen for guidance. This should always be optimally visible to the user.
- Do not expose the panel PC to direct sunlight.

Installation in the control cabinet

Once you have made the required cutout in the control cabinet, you can install the panel PC in the control cabinet. Clamping levers are provided at the back of the housing for mounting of the device. In the delivery state, the clamping levers are turned onto the device (see Fig. 13).

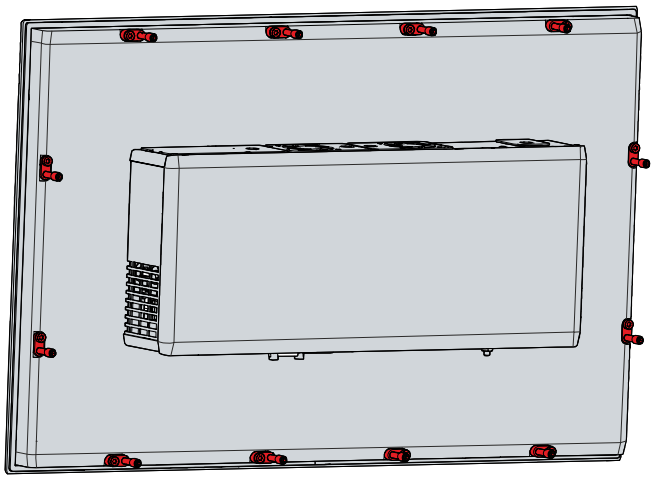


Fig. 13: Delivery state clamping lever

To install and secure the panel PC in the control cabinet, follow the steps shown in Fig. 14 and 15:

1. Insert the panel PC at the intended position in the wall of the control cabinet. Make sure that the device is secured against falling out until it is fastened properly.

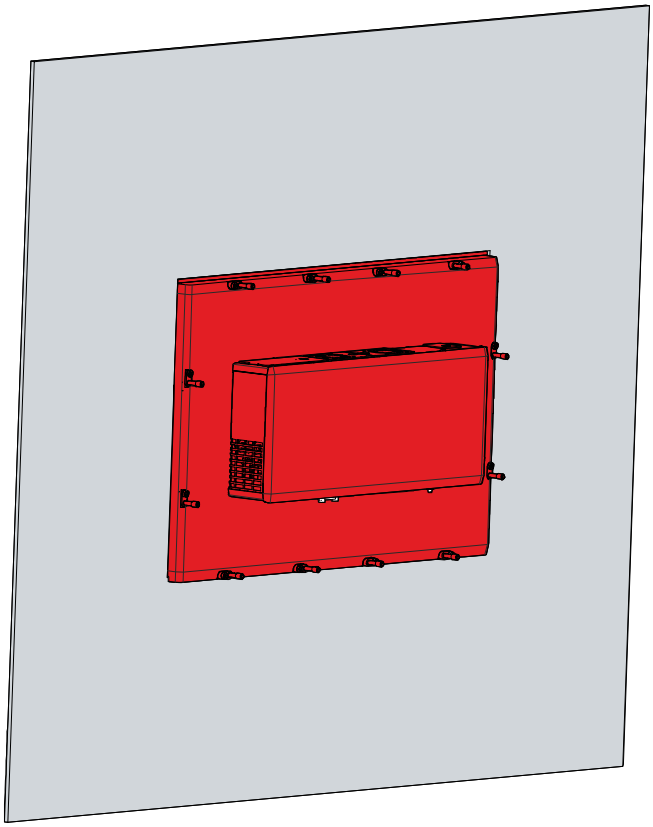


Fig. 14: Wall positioning

2. Turn the clamping levers 90° outwards (sections A and B).
3. Tighten the clamping levers with the Allen key 3.0 mm (section C).

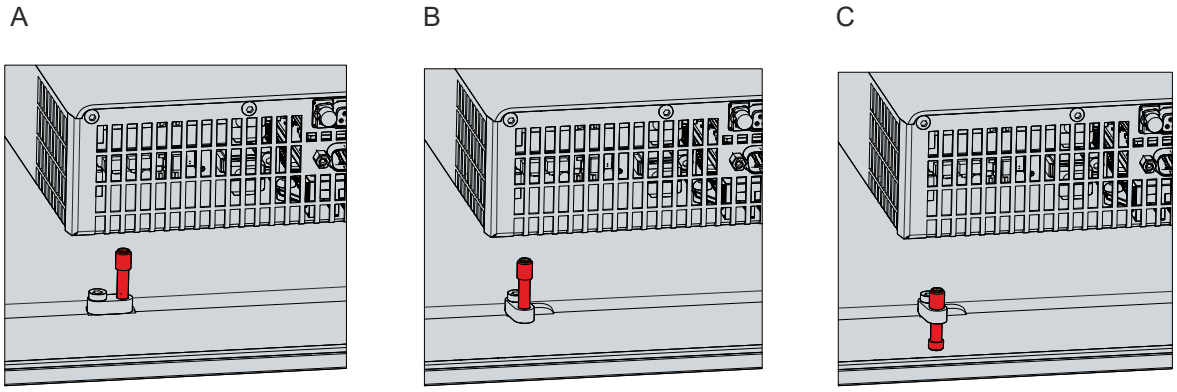


Fig. 15: Control cabinet installation

Also see about this

Technical data [▶ 51]

4.3 Connecting the Panel PC

⚠ CAUTION

Risk of electric shock

Dangerous touch voltages can lead to electric shock. To avoid electric shock, observe the following:

- Never connect or disconnect the device cables during a thunderstorm.
- Provide protective earthing for handling the device.

To make the device ready for operation, you have to connect it. The first step is to ground the device. Then you can connect the cables and the power supply.

An external 24 V DC power supply is required to operate the device. A nominal voltage of at least 22 V must be applied to the power supply plug of the device at all times.

The cabling of the device in the control cabinet must be done in accordance with the standard EN 60204-1:2006 PELV = Protective Extra Low Voltage:

- The PE conductor (protective earth) and the "0 V" conductor of the voltage source must be on the same potential (connected in the control cabinet).
- Standard EN 60204-1:2006, section 6.4.1:b stipulates that one side of the circuit, or a point of the energy source for this circuit must be connected to the protective conductor system.

Peripheral devices connected to the device with their own power supply must have the same potential for the PE and "0 V" conductors as the control panel (no potential difference).

4.3.1 Mounting power supply cable

Install the cable for the power supply of the panel PC using the material supplied for connector assembly. It consists of an 8-pin connection strip and a strain relief housing with cable tie.

If you require a replacement for the voltage connector or the strain relief housing, you can order these from Beckhoff Sales using the following ordering option:

- C9900-P926: power supply plug for Industrial PC C5210, C63xx, C65xx, C69xx, CP22xx, CP27xx, CP62xx, CP63xx or CP67xx, 8-pin connector with strain relief for the external supply cables

Mounting power supply cable

First mount the plug on the cable as follows:

1. Remove a few centimeters of the cable sheath.
2. Remove the insulation from the wire ends (8-9 mm).
3. Crimp the ferrules onto the stripped wire ends.
4. Insert the cable ends with the ferrules into the 8-pin connection strip. For the pin assignment of the connector, see Chapter 3.2.1 Power supply [▶ 14].
5. Screw the cable ends into the 8-pin connection strip.

⇨ You have mounted the plug on the cable.

Assembly of strain relief housing

Now mount the strain relief housing on the previously connected plug and power supply cable as shown in Fig. 16:

1. Thread the cable tie into the lower part of the strain relief housing (section A).
2. Insert the connection strip into the lower part of the strain relief housing (section B).
3. Tighten the cable tie and remove the plastic tab (section C).
4. Attach the upper part of the strain relief housing by snapping it onto the lower part (section D).

⇨ You have mounted the strain relief housing.

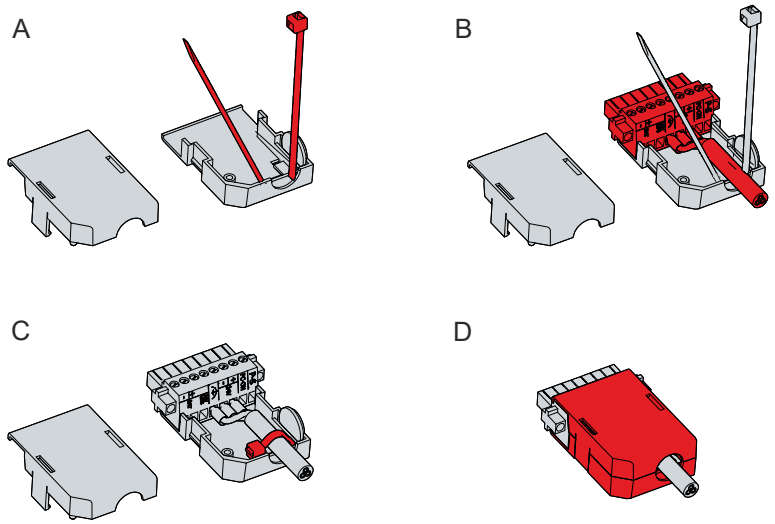


Fig. 16: Assembly of strain relief housing

To remove the strain relief housing, proceed as follows:

1. Use your fingers to bend the latching lugs on the lower part slightly outwards (see Fig. 17).
2. Lever the upper part off the lower part.
3. Cut the cable tie.

⇨ You have removed the strain relief housing.

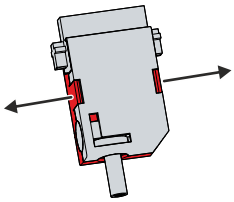


Fig. 17: Disassembly of the strain relief housing

4.3.2 Grounding the Panel PC

Potential differences are minimized and electrical currents are diverted to the ground through grounding or potential equalization of electronic devices. This is to prevent dangerous touch voltages and electromagnetic interference.

Protective earth

The protective grounding of a device serves to avoid dangerous touch voltages. According to the EN 60204-1 standard (Chapter 8 Potential equalization), protective grounding is required if:

- the device exceeds dimensions of 50 mm x 50 mm,
- the device can be touched or encompassed over a large area,
- contact between the device and active parts is possible,
- an insulation fault may occur.

Establish low-resistance protective earthing of the panel PC via the voltage connection to avoid dangerous touch voltages. There is a pin in the voltage socket for the protective earth (PE).

EMC

NOTICE

Hardware damage due to electromagnetic interference

The use of the device without a functional earth can lead to material damage due to electromagnetic interference.

- Only use the device with functional earth.

Electromagnetic compatibility (EMC) of the device includes on the one hand not affecting other devices and equipment by electromagnetic interference and on the other hand not being disturbed by electrical or electromagnetic effects itself.

To do this, the device must comply with certain protection requirements. The device has EMC interference immunity according to EN 61000-6-2. The EMC interference emission of the device meets the requirements of EN 61000-6-4.

The functional earth is necessary for the EMC of the device. You establish functional earthing via the grounding connection between the grounding bolt in the connection section on the rear side of the panel PC (see Fig. 18) and the central grounding point of the control cabinet in which the PC is installed. Use wires with a cross-section of at least 4 mm^2 or a flat conductor for the ground connection, as the circumference of the conductor should be as large as possible.

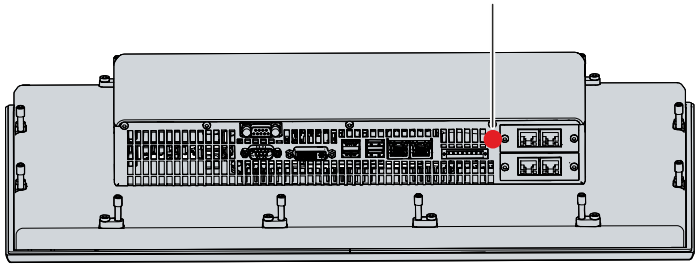


Fig. 18: Grounding bolt for functional earthing

4.3.3 Connecting cables and power supply

NOTICE

Incorrect connection procedure

Incorrect procedure when connecting the cables and the power supply can cause hardware damage.

- Follow the documented procedure for connecting the cables and the power supply.
- Always connect the cables first and only then switch on the power supply.
- Please read the documentation for the external devices prior to connecting them.

NOTICE

Connection of incorrect battery packs

Connecting the wrong battery packs can cause damage to the device and the battery packs.

- Only connect the C9900-U330 Beckhoff battery pack.

The connections are located at the rear of the panel PC.

Connecting cables

Make sure that you first ground the PC (see chapter 4.3.2 Grounding the panel PC [▶ 30]) and then plug in all data transmission cables.

Connecting the power supply

Cables with a maximum cable cross-section of 1.5 mm^2 can be used for connecting the power supply. For long supply lines, use 1.5 mm^2 cables to achieve a low voltage drop on the supply line. There should be at least 22 V at the voltage connector of the panel PC, so that the PC remains switched on during voltage fluctuations.

Proceed as follows to connect the 24 V_{DC} power supply unit:

1. First mount the power supply cable with the 8-pin connection strip without its strain relief housing.
2. Plug the voltage connector into the voltage socket on the panel PC.
3. Screw the voltage connector to the voltage socket.
4. Connect the PC to your external 24 V power supply.
5. Switch on the 24 V power supply.
6. Measure the voltage at the 8-pin connection strip of the PC.
7. Mount the strain relief housing on the 8-pin connection strip.

External battery pack

If you ordered your device with an integrated UPS, then you can connect an external battery pack and install it on a DIN rail near to the PC. Use only Beckhoff battery packs for this:

Table 17: Order identifier battery pack

Order identifier	Version
C9900-U330	Battery pack for PCs with 24 V power supply unit and integrated UPS C9900-P209 or C9900-U209, external for DIN rail mounting, 3.4 Ah, operating temperature 0...50 °C, contains two closed lead-acid batteries VRLA-AGM

You can use the UPS output of the power supply unit and connect a Beckhoff Control Panel as a second display. If the supply voltage fails and the panel PC is only supplied by the battery pack, the control panel remains in operation. Second display operators can use it to read the power failure notification, back up data, and shut down the operating system.

PIN 4 and 5 of the battery pack are available for looping through a 24 V power supply. Accordingly, you can connect a three-core sheathed cable with plus and minus of the supply voltage as well as protective earth to the battery pack and then connect to the PC with a five-core sheathed cable. The method of connecting different components can be taken from the wiring diagram in fig. 19.

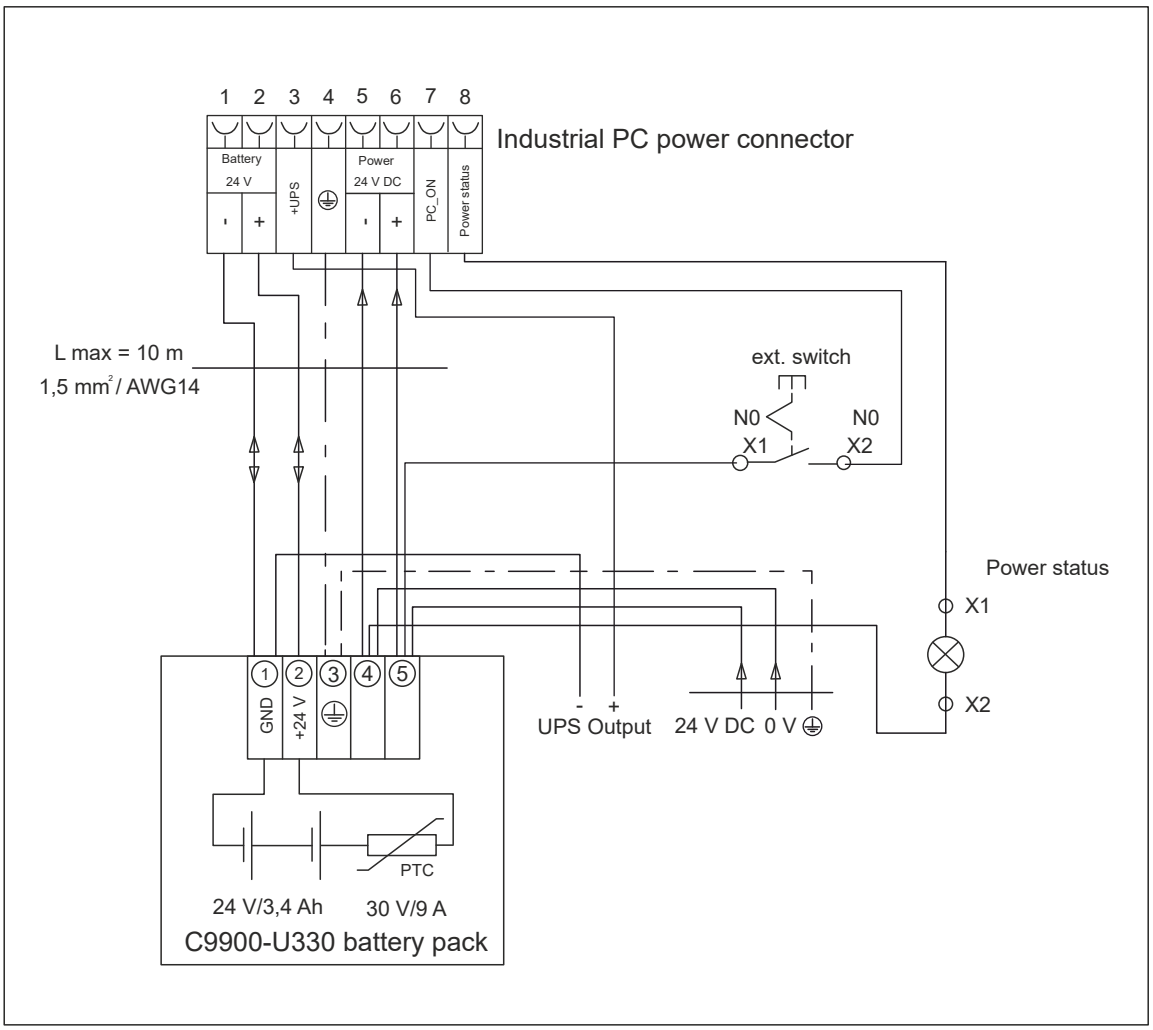


Fig. 19: Wiring diagram with UPS

4.4 Switching the Panel PC on and off

NOTICE

Public networks

Connecting the device to public networks without additional protective measures can compromise the safety of the device.

- Protect the device before connecting it to public networks.

NOTICE

Data loss due to switching off the device while the software is running

Switching off the device before the running software is terminated and the operating system is shut down can lead to data loss.

- Quit the running software and shut down the operating system before switching off the device.

NOTICE

Data loss due to switching off the power supply when the UPS battery is empty

Switching off the power supply when the UPS battery is empty can lead to data loss, as the operating system cannot be shut down properly without battery power.

- Ensure that the UPS battery is charged in the event of a power failure.
- For UPS C9900-P209 and C9900-U209, charge the battery exclusively via the switched-on PC. Never connect a charger.

NOTICE

Shortened battery life due to switching off the power supply

If the power supply is simply switched off, the operating system shuts down via the battery. With daily use, this significantly shortens the life of the battery.

- Avoid switching off the power supply before shutting down the operating system.
- Use the PC-ON input (see the following description) to shut down the operating system in a battery-friendly manner.

The industrial PC is started or switched off when the system is switched on or off or when the power supply to the PC is connected or disconnected.

You can use the PC-ON input of the PC to control the startup and shutdown of the operating system. The PC-ON signal is inverted, which is why the operating system boots up at 0 V at the input and shuts down at 24 V. During operation, 0 V must therefore be permanently applied to the input. If you want to shut down the operating system, you must apply 24 V to the PC-ON input. Once the operating system has shut down, the PC power supply unit sets the Power Status output from 24 V to 0 V. This indicates that the shutdown is complete. You can then switch off the power supply. If you remove the 24 V from the PC-ON input before you have switched off the power supply, the operating system restarts. Therefore, 24 V must be applied to the PC-ON input until you have switched off the power supply.

To shut down the operating system properly, you can install an additional ON/OFF switch next to the machine's main switch to turn the machine on and off. The main switch can thus remain switched on in principle and thus ensures that the PC is still supplied with power during the shutdown of the operating system. Via the Power Status output, you can switch, for example, a contactor that switches off the entire system. The load capacity of the Power Status output is limited to max. 0.5 A. No fuse protection is required.

Driver installation

When you switch on the device for the first time, the optionally pre-installed operating system will be started. For any additional hardware you have connected, you have to install the drivers yourself afterwards. In addition, the Beckhoff Device Manager starts automatically. The Device Manager is a software from Beckhoff that supports you in configuring the device.

If you have ordered the device without an operating system, you must install this and the driver software for the additional hardware you have connected and for the components inside the device. Please follow the instructions in the documentation for the operating system and the additional components.

UPS software components

The UPS software components with the corresponding drivers must be installed on the PC in order to operate the power supply unit as a UPS. The software components and drivers are already installed on delivery of the PC with operating system. If they are not, you have to install the installation package *Beckhoff UPS* yourself.

You can obtain the installation package from Beckhoff Service (service@beckhoff.com). You then use the installation package to install the UPS software components. The UPS software components come with a detailed help function. Call up the help files either directly from the configuration register by clicking the Help button or start the file under *Start > Programs > Beckhoff > UPS software components.*

5 Configuration

The configuration chapter provides an overview of the Beckhoff Device Manager and the Wake on LAN (WOL) function.

The Beckhoff Device Manager is a tool for detailed system diagnostics of hardware and software components. The procedure after the first start and after manually starting Beckhoff Device Manager is explained.

Using the Wake on LAN (WOL) function, you can switch on your device remotely.

5.1 Beckhoff Device Manager

The Beckhoff Device Manager enables detailed system diagnostics with uniform secure access to the existing hardware and software components. System data is recorded, analyzed and evaluated during operation. The data helps to detect deviations at an early stage and prevent device downtimes.

The user interface screenshots shown in this chapter are examples only and do not represent the actual state of your device.

The Beckhoff Device Manager always starts automatically after the device has been booted. In addition, you have the option of manually starting the previously closed Device Manager at any time.

The device is supplied with predetermined access data by default:

- User name: Administrator
- Password: 1

You also have the option of using the Beckhoff Device Manager to remotely configure the device via a web browser. More detailed information is available in the Beckhoff Device Manager manual.

First start of Beckhoff Device Manager

When your device is booted for the first time, the Beckhoff Device Manager also starts automatically for the first time. The Security Wizard opens. It informs you that you should reset the default password set by Beckhoff. Proceed as follows:

1. Click **Next** on the Security Wizard start page.
   ⇨ This will take you to the **Change Passwords** page:

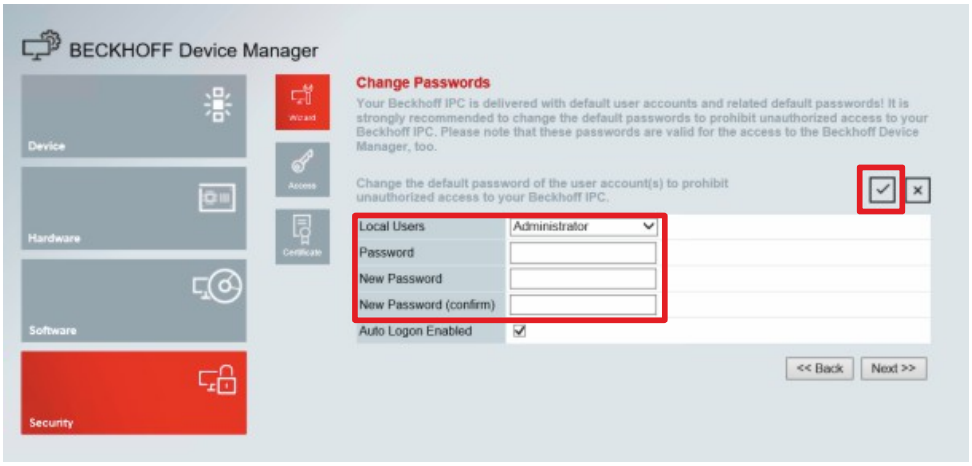


Fig. 20: Beckhoff Device Manager – Change passwords

2. Enter the access data of the Device Manager on delivery.
3. Choose a secure new password. Instructions for choosing a secure password are given below.
4. Confirm the changes by clicking on the tick in the red box on the right.
5. Exit the Security Wizard.

⇨ You have reached the Device Manager start page.

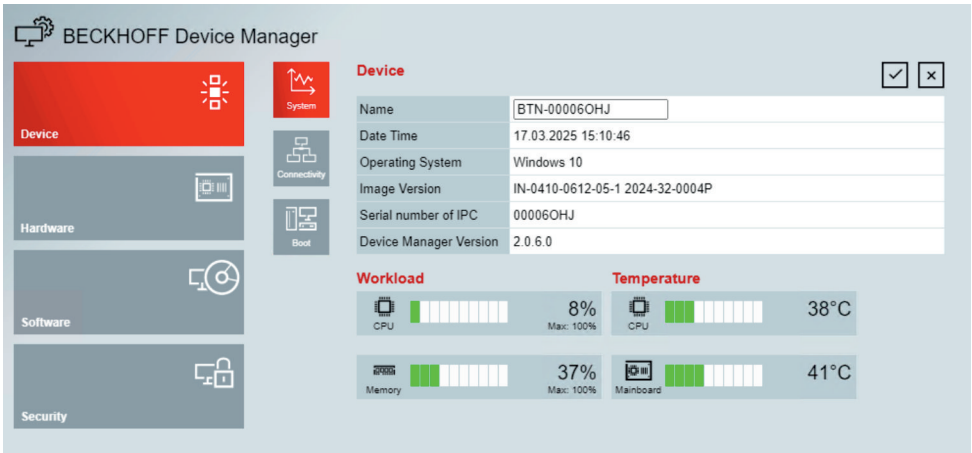


Fig. 21: Beckhoff Device Manager – Start page

Continue to navigate in the menu and to configure the device. Note that modifications only become active once they have been confirmed.

Manual start of Beckhoff Device Manager

To start the Beckhoff Device Manager manually, proceed as follows:

1. Open a web browser locally on the device.
2. Enter *localhost/config* in the web browser to start the Beckhoff Device Manager.

⇨ The Beckhoff Device Manager starts. The Security Wizard appears.

Secure passwords

Strong passwords are an important prerequisite for a secure system.

Beckhoff supplies the device images with standard user names and standard passwords for the operating system. It is imperative that you change these.

Controllers are shipped without a password in the UEFI/BIOS setup. Beckhoff recommends assigning a password here as well.

Please note the following:

- Passwords should be unique for each user and service.
- Only change passwords after an incident in which passwords have become known without authorization.
- Train the device users in the use of passwords.

A secure password has the following characteristics:

- Password complexity: The password should contain capital and lower-case letters, numbers, punctuation marks and special characters.
- Password length: The password should be at least 10 characters long.

5.2 Wake on LAN (WOL)

Wake on LAN (WOL) allows you to turn on your device remotely when it receives a special network signal. WOL is enabled by default in Beckhoff standard images. You can configure this function in the operating system.

Configuration under Windows

To configure the Wake on LAN function, follow these steps:

1. Open the Device Manager.
2. Navigate to the **Network adapters** section.
3. Double-click the appropriate Ethernet controller.
   ⇨ A window containing the Ethernet controller's properties will open.
4. Klick on the **Advanced** tab.
5. Set the **Wake on Magic Packet** and **Wake on Magic Packet from S5** properties to **Enabled**.
6. Confirm with **OK**.

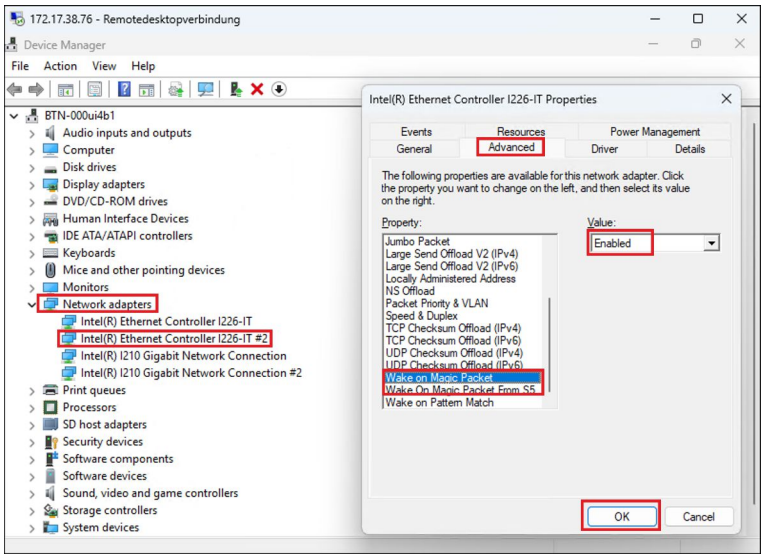


Fig. 22: Activate function

7. Click the **Power Management** tab.
8. Check the box next to **Allow this device to wake the computer**.
9. Confirm with **OK**.

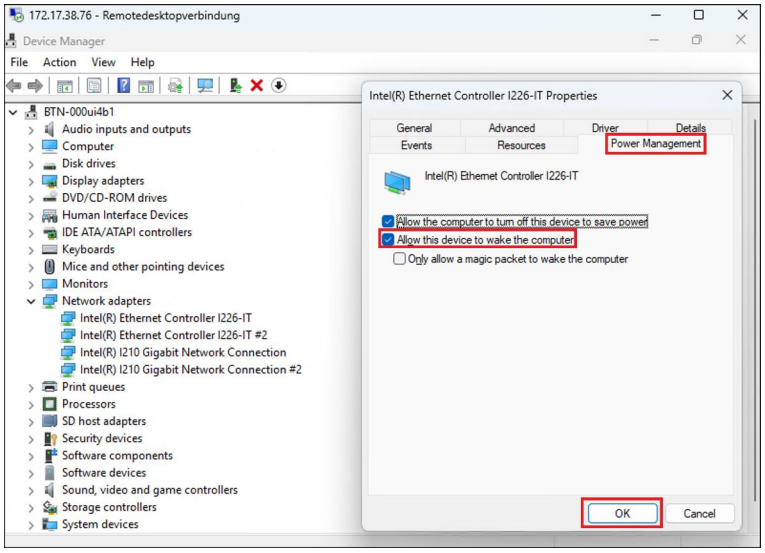


Fig. 23: Enable Function

⇨ You have configured the Wake on LAN function.

6 Decommissioning

NOTICE

Hardware damage due to power supply

A connected power supply can cause damage to the device during disassembly.

- Disconnect the power supply from the device before starting to disassemble it.

As part of the decommissioning of the panel PC, you must first disconnect the power supply and cables. You can then remove the device from the control cabinet.

If you do not wish to use the panel PC any further, chapter 6.2 Disassembly and disposal [▶ 39] provides information on the correct disposal of the device.

6.1 Disconnecting the power supply and cables

⚠ CAUTION

Risk of electric shock

Dangerous touch voltages can lead to electric shock. To avoid electric shock, observe the following:

- Never connect or disconnect the device cables during a thunderstorm.
- Provide protective earthing for handling the device.

Before disassembling the panel PC, you must disconnect the power supply and the cables. Follow the steps below:

1. Shut down the panel PC.
2. Disconnect the PC from your external 24 V power supply.
3. Unscrew the voltage connector and pull it out of the PC.
4. Make a note of the wiring of all data transmission cables if you want to restore the cabling with another device.
5. Disconnect all data transmission cables from the panel PC.
6. Finally, disconnect the ground connection.

⇨ You have disconnected the power supply and the cables.

6.2 Disassembly and disposal

In order to be able to dismount the panel PC from the control cabinet, you must first have disconnected the power supply and the cables (see Chapter 5.1 Disconnecting the power supply and cables [▶ 38]).

To remove the panel PC from the control cabinet, follow the steps shown in Fig. 22 and 23:

1. Loosen the clamping levers with a 3.0 mm Allen key (sections A and B). Make sure that the device is secured against falling out until it is removed from the wall.
2. Turn the clamping levers back by 90° onto the housing (section C).

A B C

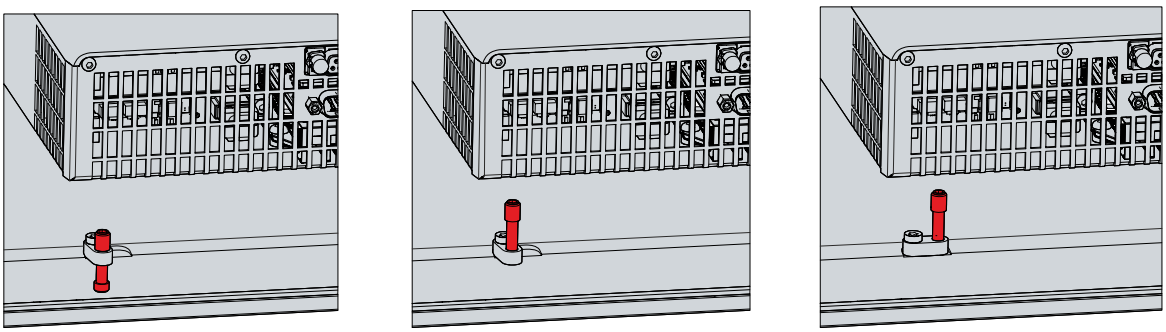


Fig. 24: Removal from the control cabinet

⇨ You can now remove the panel PC from the corresponding cutout in the control cabinet wall.

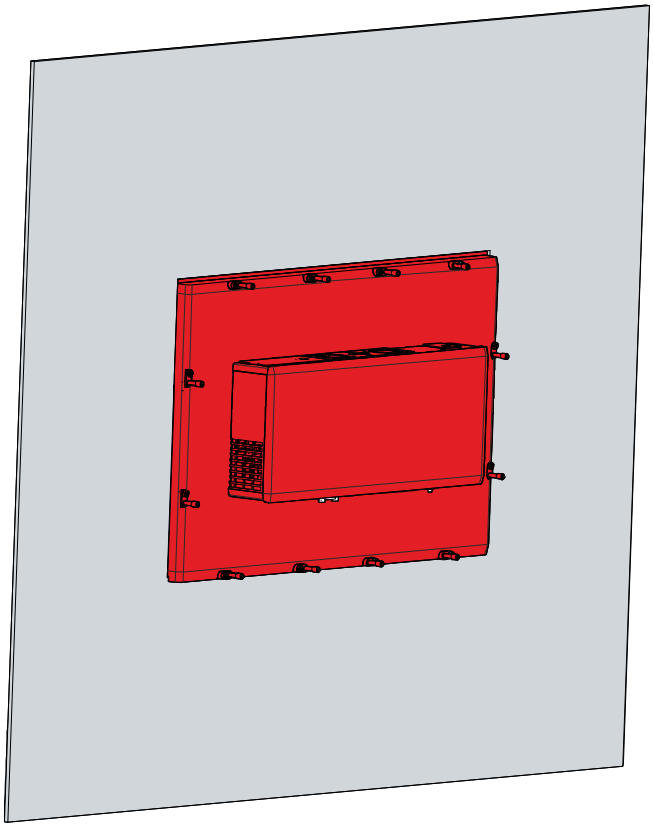


Fig. 25: Removal installation cutout

Disposal of the panel PC

When disposing of the panel PC, be sure to observe the national electronic waste regulations.

For disposal, you must remove the device from the control cabinet.

7 Maintenance

7.1 Cleaning

NOTICE

Unsuitable cleaning agents

The use of unsuitable cleaning agents can damage the device.

- Clean the device only as specified.

NOTICE

Faulty touch screen function

Cleaning the front screen without cleaning the edge of the glass screen can lead to faulty touch screen functions due to liquid residue.

- Always clean the front screen including the edge of the glass pane to avoid liquid residue.

It is essential to observe the following points when cleaning the PC:

- Keep to the boundary conditions of protection rating IP65/IP20.
- Never use compressed air to clean the PC.
- Maintain an ambient temperature range of 0 °C to 55 °C.

Cleaning agents

In order to avoid damage to the front of the panel PC during cleaning, you must use suitable cleaning agents. Examples include:

- benzine
- spirit
- glass cleaner

Avoid the following cleaning agents:

- detergents with scouring or abrasive components
- metal cleaning objects such as razor blades or steel spatulas
- steam jet cleaner or very hot water
- cold water with a heated device
- high water pressure, e.g. high-pressure cleaner

Cleaning the front screen

You can clean the front screen of the device during operation. In order to avoid inadvertent touch entries when doing this, you must first set the device to "Cleaning Mode" with the help of the Beckhoff Display Control Tool. Also make sure that you not only clean the display area, but also the edge of the glass pane. Impurities in the edge area or liquids that do not run down the glass pane as drops but as a long short-circuit bridge create an electrically conductive connection between the touch screen area and the metal housing of the device. This unintentionally triggers a touch event at the edge of the touch screen, which can lead to incorrect operation.

The Beckhoff Display Control Tool does not start automatically when the device starts up. Proceed as follows to activate the "Cleaning Mode" of the tool:

1. Click the Beckhoff Display Control Tool icon to start it.
   ⇨ When the tool is started, a small sun symbol appears in the taskbar.
2. Right-click the sun symbol.
3. Select the "Cleaning Mode" (see Fig.).

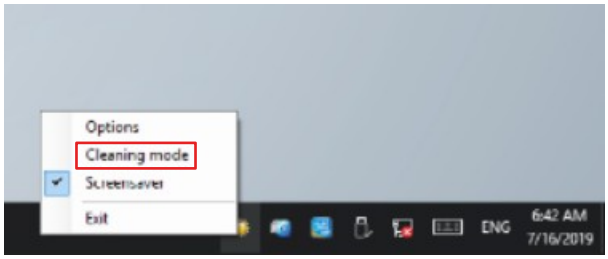


Fig. 26: Select "Cleaning Mode"

⇨ "Cleaning Mode" is activated. You can now clean the front panel.

You can set the duration for which the device should remain in "Cleaning Mode". The period can be set between 5 and 120 seconds. Right-click the sun symbol again and click "Options". Now select the appropriate duration (see Fig.).

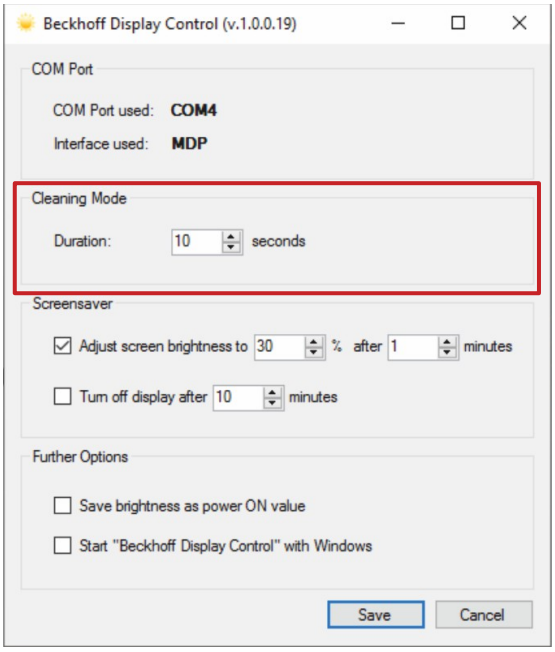


Fig. 27: Configuration "Cleaning Mode"

7.2 Maintenance

NOTICE

Use of incorrect spare parts

The use of spare parts not ordered from Beckhoff Service can lead to unsafe and faulty operation.

- Only use spare parts that you have ordered from Beckhoff Service.

Beckhoff devices are manufactured from components of the highest quality and robustness. They are selected and tested for best interoperability, long-term availability and reliable function under the specified environmental conditions.

Nevertheless, some components of the devices may be subject to a limited service life if they are operated under certain conditions, such as at increased ambient temperatures during operation or during storage or during long periods of storage out of operation.

Beckhoff therefore recommends replacing some of the components of the devices after the time after which predictions of the remaining service life of such components can no longer be reliably calculated.

The following table provides recommendations for the regular, precautionary replacement of the device components:

Table 18: Device component replacement recommendations

Component	Recommendation for replacement intervals (years)
UPS battery pack	5 years
2.5-inch hard disk	5 years or after 20,000 operating hours at more than 40 °C or after 30,000 operating hours at less than 40 °C
3.5-inch hard disk	5 years, irrespective of the operating hours
Fan	7 years
CFast, SSD, MicroSD, Compact Flash	10 years
Motherboard battery	5 years

Beckhoff is excluded from liability in the event of possible damage occurring during maintenance work. In order to avoid damage caused by electrostatic discharge when replacing device components, protective measures are recommended. Below are some suggestions.

ESD protection

NOTICE

Electrostatic discharge

The replacement of device components without ESD protection can lead to functional impairment and destruction of the device.

- If possible, apply ESD protection measures during maintenance work.

When working on electronic devices, there is a risk of damage due to ESD (electrostatic discharge), which can impair the function or destroy the device.

Protect the device and create an ESD-protected environment in which existing electrostatic charges are safely discharged to ground and charging is prevented.

An ESD-protected environment can best be created by setting up ESD protection zones. The following measures serve this purpose:

- ESD-compliant floors with sufficient conductivity to the reference potential PE;
- ESD-compatible work surfaces such as tables and shelves;
- Wrist grounding strap, especially for sedentary activities;
- grounded and electrostatically dissipating equipment and operating materials (e.g. tools) within the ESD protection zone.

If it is not possible to create an ESD protection zone, you can still protect the device against ESD damage. For example, the following measures can be used:

- Use conductive mats connected to the ground potential as underlays.
- Dissipate possible charges from your own body by touching grounded metal (e.g. control cabinet door).
- Wear a wrist grounding strap.
- Only remove new electronic components from the ESD packaging (tinted plastic bag) after putting on the wrist grounding strap.
- Do not walk around with electronic components in your hand if they are not in ESD packaging.

Access to exchangeable device components

You can access the storage media (1), the fan cartridges (2) and the battery (3) via the rear side of the panel PC. The components are located on the top of the connection block under covers (see Fig. 26). Depending on the selected display size of your device, the storage media and battery are either located together under one cover (A) or under separate covers (B). The procedure for replacing the components is the same regardless of the arrangement on the device (see upcoming chapters).

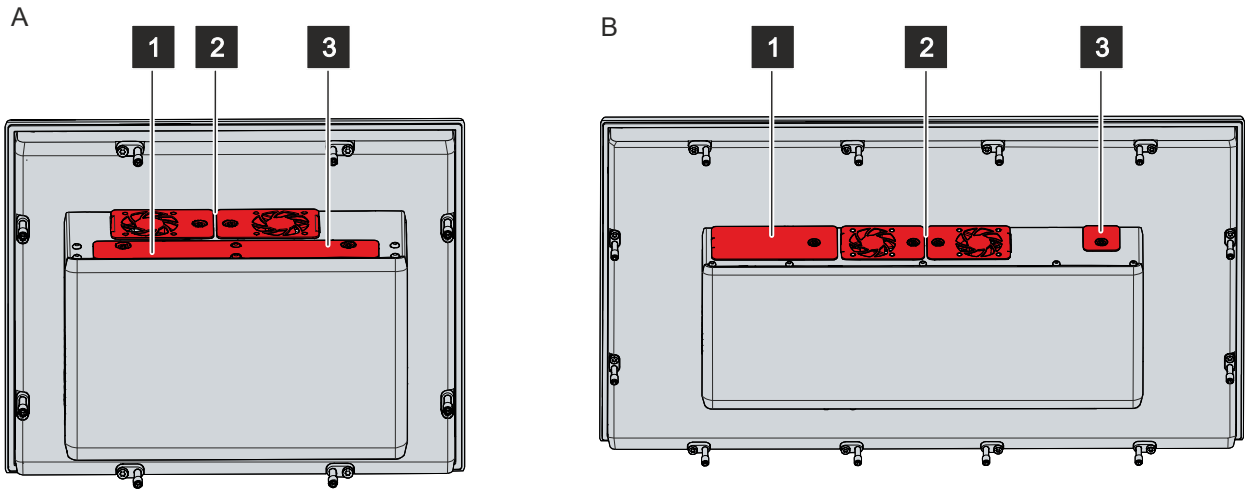


Fig. 28: Access device components

7.2.1 Replacing the battery

⚠ WARNING

Incorrect battery type

Using a different type of battery can lead to a fire or explosion.

- Only replace the battery with a type R/C (BBCV2) battery, article number RC2032, nominal voltage 3 V.
- When replacing the battery, make sure that the polarity is correct.

⚠ WARNING

Incorrect handling of the battery

Handling the motherboard battery incorrectly can cause an explosion.

- Do not recharge the battery.
- Do not disassemble the battery.
- Do not dispose of the battery in fire.
- Do not open the battery.
- Protect the battery against direct sunlight and moisture.

NOTICE

Failure of the electronics due to mechanical damage

Scratches or damaged components on PCBs can cause the electronics to fail.

- Be very careful when replacing the battery and avoid mechanical damage to the electronics.

The device does not contain a lithium-ion battery. The motherboard battery is a CR2032 lithium-metal cell. It is used to supply power to the clock integrated on the motherboard. If the battery is depleted or missing, the date and time are displayed incorrectly.

Table 19: Technical data of the battery

Battery type	Electrical properties (at 20 °C)		Dimensions		
	Nominal voltage	Nominal capacity	Diameter	Height	Weight
CR2032	3.0 V	225 mAh	20.0 mm	3.20 mm	3.1 g

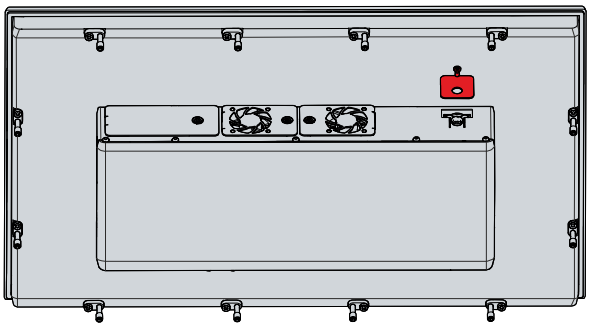
Chapter 7.2 Maintenance [▶ 41] shows where the battery is located.

To replace the battery, follow the steps below as shown in Figure 27:

1. Loosen and remove the M4 screw and the cover (section A).

2. Pull the battery out of the panel PC with needle-nose pliers (section B).
3. Insert the new battery into the PC by hand. Pay attention to the correct polarity. The negative pole of the battery must face the display.

A



B

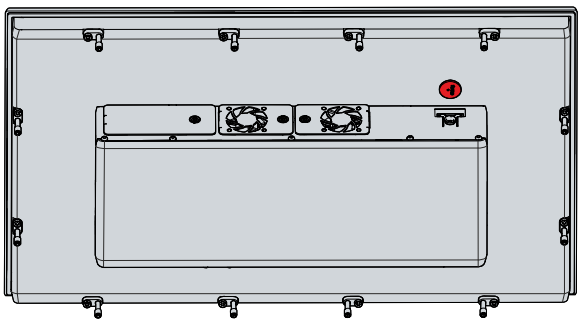


Fig. 29: Battery change

Battery disposal

To dispose of the battery, remove it, tape off the poles and put it in the battery disposal.

7.2.2 Replacing the storage media

Chapter 7.2 Maintenance [▶ 41] shows where the storage media are located.

Data transmission before replacement

If you want to exchange a storage medium according to Beckhoff's recommendation, you must copy the data from the old to the new storage medium. You can use the Beckhoff Service Tool (BST) for this purpose. BST is a graphical backup and restore program for devices with a Windows operating system. You can create an image of your operating system and use it to back up the operating system. Then you can restore the created image to a new data carrier. The BST is available on a bootable BST USB flash drive. This includes Windows and a backup tool. Select the size of the BST USB flash drive according to the size of the backup copy of your operating system. You can then keep the flash drive as a backup copy. For this purpose, the BST USB flash drives are designed for particularly long data preservation by means of special flash. For more information on the function of the BST, please refer to the corresponding manual.

If your storage medium is defective and there is no backup, Beckhoff Service can provide you with a fresh Windows image. For this to be possible, your Beckhoff device must already have been delivered with a valid operating system license. After installing the fresh image, the applications must be reinstalled.

Exchange hard disk/SSD

To replace the hard disk or SSD, follow the steps below as shown in Figure 28:

1. Loosen and remove the M4 screw (section A).
2. Turn the cover to the left side (section B).
3. Remove the hard disk or SSD from the panel PC by pulling on the protruding Beckhoff sticker (section C).

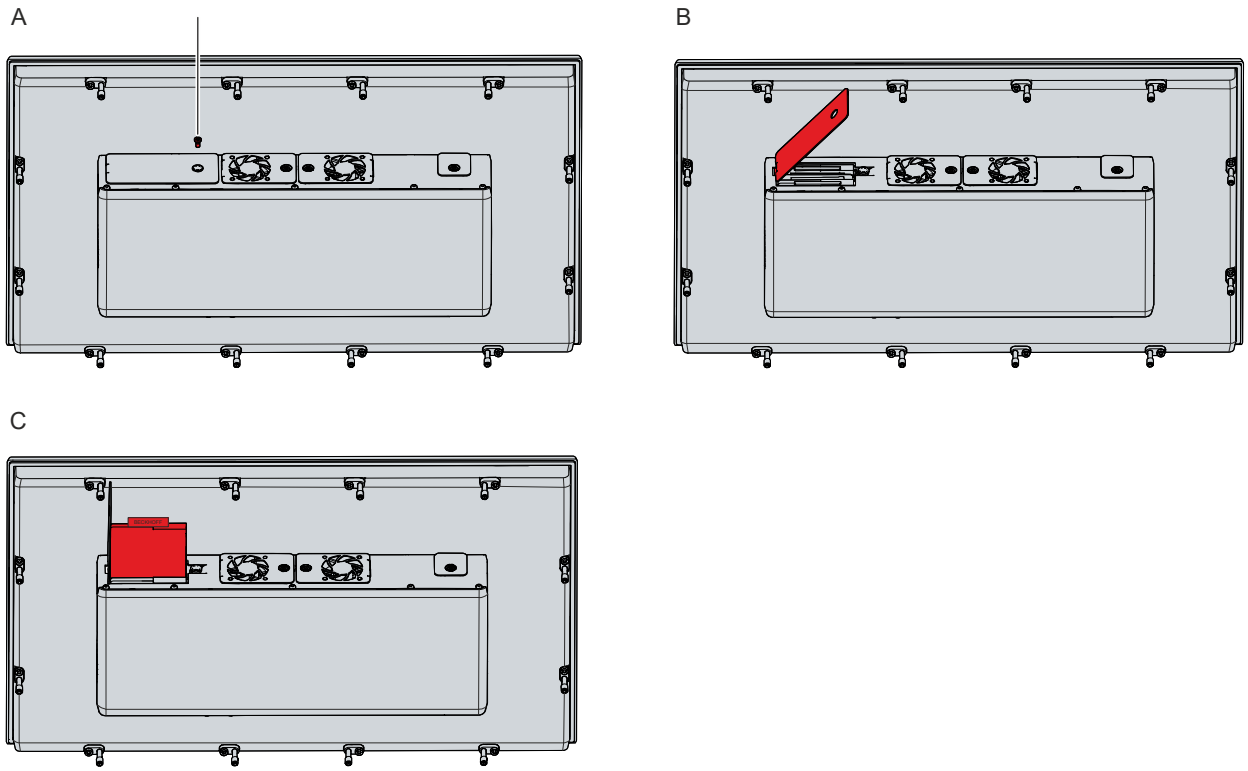


Fig. 30: Exchange hard disk

4. Insert the new hard disk or SSD into the PC in the same orientation up to the stop.

⇨ You have replaced the hard disk or SSD.

Replacing the CFast

To replace the CFast, follow the steps shown below in Fig. 29:

1. Loosen and remove the M4 screw (section A).
2. Turn the cover to the left side (section B).
3. Press lightly on the CFast from above, like on a button (section C).
   ⇨ When you release the CFast, the push-pull mechanism guides the CFast out of the slot far enough for you to grab it.
4. Pull the CFast out of the PC (section D).
5. Insert the new CFast into the PC in the same orientation until it protrudes just a bit from the PC.
6. Press the CFast into the PC.

⇨ You have replaced the CFast.

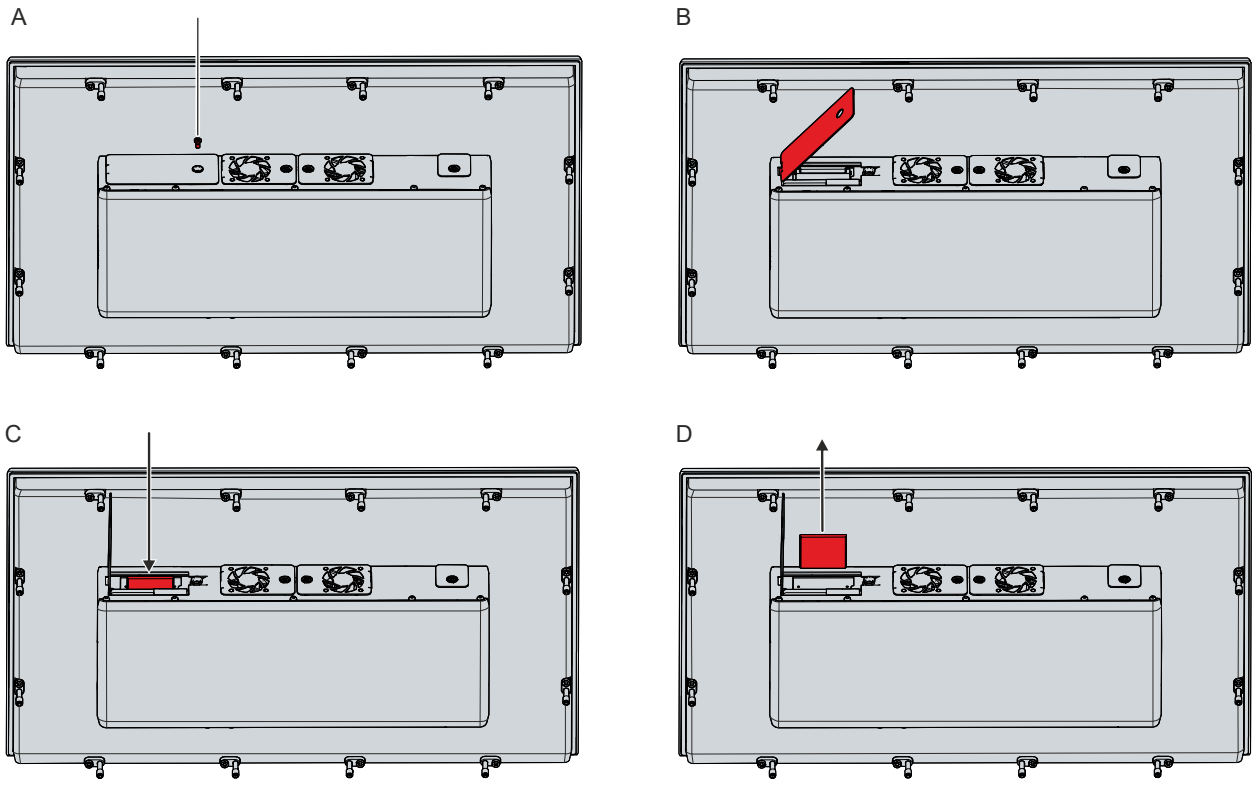


Fig. 31: Replacing the CFast

Disposal of storage media

Delete confidential or technologically important data from the storage media before disposing of it. If a storage medium is defective, you must destroy it mechanically to prevent access to the data.

The old storage media must be disposed of in accordance with the national electronic waste regulations.

7.2.3 Replacing the fan

NOTICE

Incorrect fan type

The device may be damaged if the wrong type of fan is installed.

- Only replace the fans with replacement fans from Beckhoff Service.

The fans ensure optimal cooling of the device. Order replacement fans only from Beckhoff. Please get in touch with your Beckhoff sales contact.

You can replace the fan cartridges while the PC is running. Insert the new cartridge immediately after removing the old one.

To replace the fan cartridges, follow the steps below as shown in Figure 30:

1. Loosen each M4 screw of the fan cartridge (section A).
2. Turn the fan cartridges to the outside (section B).
3. Remove the fan cartridges (section C).

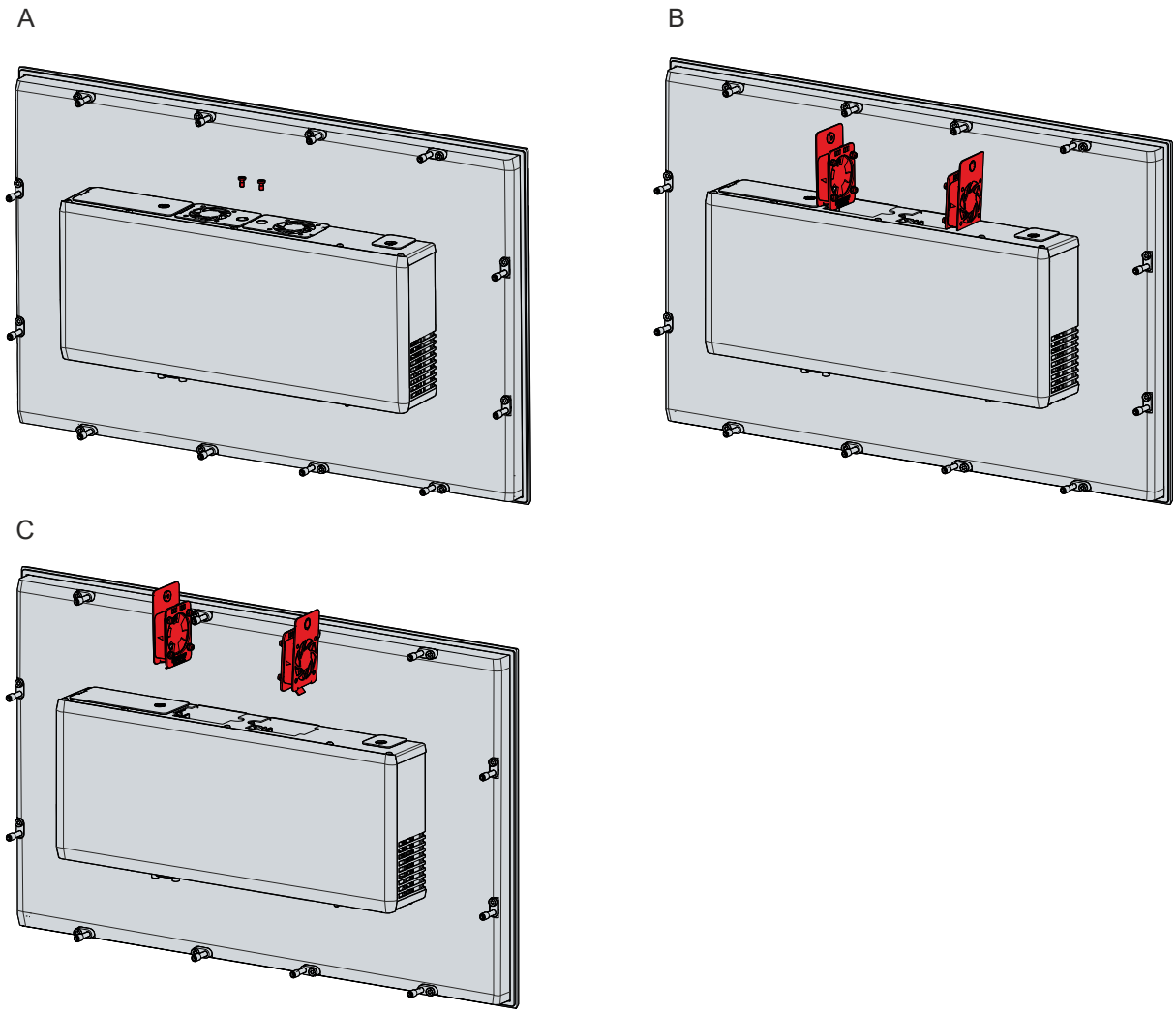


Fig. 32: Replacing the fan

4. Insert the new fan cartridges.
5. Turn the fan cartridges to the inside.
6. Tighten the M4 screws.

⇨ You have now replaced the fan cartridges.

The old fan must be disposed of in accordance with the national electronic waste regulations.

7.2.4 Exchange seal

If you have chosen to order your device with the option of a stainless steel front instead of an aluminum front, there is a silicone seal on the back of the unit to protect the connection section from moisture.

The seal may become porous after a long period of operation. In that case, you should replace the seal to continue protecting the connection section. You can order the following replacement seals from your Beckhoff sales department:

Table 20: Ordering options seal

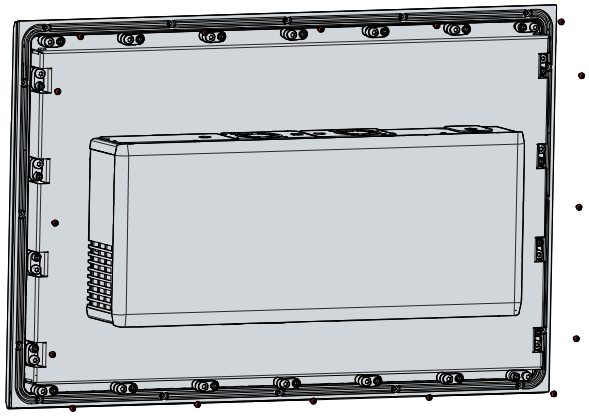
Ordering option	Description
C9900-Z520	Replacement seals for stainless steel built-in Panel CP2x07-00x0 (C9900-F941)
C9900-Z521	Replacement seals for stainless steel built-in Panel CP2x13-00x0 (C9900-F942)
C9900-Z522	Replacement seals for stainless steel built-in Panel CP2x16-00x0 (C9900-F945)
C9900-Z523	Replacement seals for stainless steel built-in Panel CP2x18-00x0 (C9900-F946)
C9900-Z524	Replacement seals for stainless steel built-in Panel CP2x21-00x0 (C9900-F948)

To replace the silicone seal, follow the steps shown below in figure 31:

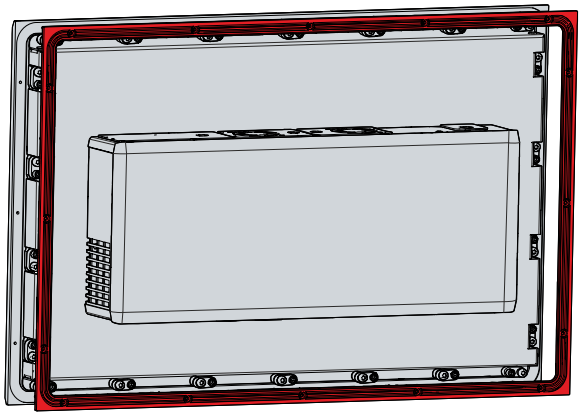
1. Loosen and remove the M2.5x4 screws (section A).
2. Remove the seal (section B).
3. Place the new seal in the circumferential sealing groove on the back of the device (section C).
4. Press along the seal with your fingers until it is neatly in the sealing groove. Make sure that the seal does not make any waves.
5. Screw the seal back in place with the M2.5x4 screws.

⇨ You have replaced the seal.

A



B



C

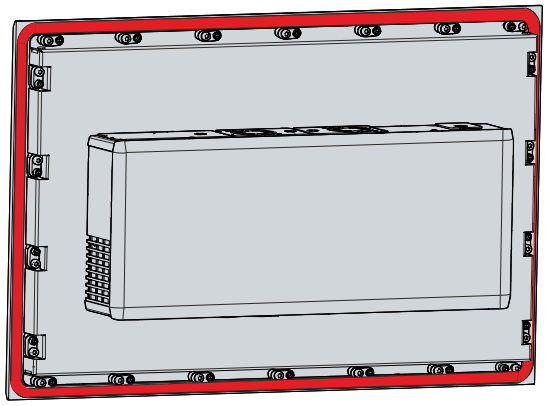


Fig. 33: Replacing silicone seal

8 Troubleshooting

Fault	Cause	Measures
No function of the panel PC	No power supply to the panel PC Other cause	Check the power supply cable Call Beckhoff Service
The Panel PC does not boot completely	BIOS setup settings are incorrect Other causes	Check BIOS setup settings (load defaults) Call Beckhoff Service
Panel PC boots, software starts, but controller does not work properly	The cause of the error is the software or plant parts outside of the panel PC	Call the machine and software manufacturer
The panel PC only works partially or only temporarily (e.g. dark screen image or none at all)	Defective backlight in the display Defective components in the panel PC	Call Beckhoff Service Call Beckhoff Service
Malfunction of the touch screen	Poor or missing functional earth of the device Poor or missing ground connection of the user	Establish functional earth User must stand on the floor with normal shoes
USB error during access with TwinCAT via USB	Cycle times in TwinCAT set to 10 ms (default)	Increase the cycle times to between 50 ms and 80 ms

9 Technical data

Table 21: Technical data

Product designation	CP22xx		
Weights of aluminum front/ stainless steel front	CP2212: 5.2 kg CP2213: 5.2 kg CP2215: 5.9 kg CP2216: 6.7 kg / 7 kg CP2218: 7.5 kg / 7.8 kg CP2219: 7.8 kg CP2221: 8.3 kg / 8.6 kg CP2224: 9.6 kg		
Supply voltage	20.4-30 V_{DC} (24 V_{DC} power supply unit)		
Power consumption	Data sheet for power consumption and power loss in the download finder: https://www.beckhoff.com/en-en/support/download-finder/search-result/?download_group=691754572		
Secure element	fTPM 2.0 enabled (see TPM manual)		
Degree of protection	Front IP65, rear IP20		
Vibration resistance (sinusoidal vibration)	EN 60068-2-6:	10 to 58 Hz:	0.035 mm
		58 to 500 Hz:	0.5 G (~ 5 m/ s^2)
Shock resistance (shock)	EN 60068-2-27:	5 G (~ 50 m/s^2), duration: 30 ms	
EMC interference immunity	conforms to EN 61000-6-2		
EMC interference emission	conforms to EN 61000-6-4		
Permissible ambient temperature	Operation: 0 °C ... +55 °C Transport / storage: -25 °C ... +65 °C		
Permissible relative air humidity	Maximum 95%, no condensation		
Transport and storage	The same values for air humidity and shock resistance for operation are to be observed during transport and storage. Suitable packaging of the panel PC can improve its shock resistance during transportation.		

10 Appendix

In the appendix you will find information for servicing and details of the approvals that your device has.

10.1 Service and support

Beckhoff and its worldwide subsidiaries offer comprehensive service and support, providing fast and competent assistance for all issues relating to Beckhoff products and system solutions.

Beckhoff Service

The Beckhoff Service Center provides support in all forms of after-sales service:

- on-site service
- repair service
- spare parts service
- hotline service

Hotline: + 49 5246/963-460
email: service@beckhoff.com

If your device requires attention, please state its serial number, which you can find on the name plate.

Beckhoff Support

Support offers you comprehensive technical assistance to help you with the application of individual Beckhoff products, and also with other extensive services:

- world-wide support
- design, programming, and commissioning of complex automation systems
- extensive training program for Beckhoff system components

Hotline: + 49 5246/963-157
email: support@beckhoff.com

Headquarters

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Germany

Phone: + 49 5246/963-0
email: info@beckhoff.de

The addresses of the worldwide Beckhoff branches and agencies can be found on our website at http://www.beckhoff.com/.

You can also find further documentation for Beckhoff components there.

10.2 Approvals

Your device has at least the following approvals:

- CE
- EAC
- UKCA
- FCC

You will find all other applicable approvals on the name plate of your device.

FCC approvals for the United States of America

FCC: Federal Communications Commission Radio Frequency Interference Statement

This device was tested and complies with the limits for a digital device of class A, according part 15 of the FCC regulations. These limits are designed to provide adequate protection against adverse interference, if the device is used in a commercial environment. This device generates, uses and may emit radio frequency energy and may cause adverse interference with radio communications, if it is not installed and used in accordance with the operating instructions. If this device is used in a residential area it is likely to cause adverse interference, in which case the user must take appropriate countermeasures in order to eliminate the interference at his own expense.

FCC approvals for Canada

FCC: Canadian Notice

This device does not exceed the class A limits for radiation, as specified by the Radio Interference Regulations of the Canadian Department of Communications.

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