BECKHOFF New Automation Technology

Manual | EN

CP32xx-2xxx

Panel PC

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Version: 1.7

1   Notes on the documentation

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.

The following instructions and explanations must be followed during installation and commissioning of the components. The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development. For that reason the documentation is not in every case checked for consistency with performance data, standards or other characteristics. In the event that it contains technical or editorial errors, we retain the right to make alterations at any time and without warning. No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams, and descriptions in this documentation. All illustrations shown are only examples. The configurations depicted may deviate from the standard.

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Delivery state

All the components are supplied in particular hardware and software configurations appropriate for the application. Changes to the hardware or software configuration are permitted, provided they are within the specified limits for power consumption and power loss (please refer to the respective data sheet).

Currentness

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Delivery conditions

In addition, the general delivery conditions of the company Beckhoff Automation GmbH & Co. KG apply.

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 the avoidance of personal injuries and damage to property.

Exclusion of liability

Beckhoff shall not be liable in the event of non-compliance with this documentation and thus the use of the devices outside the documented operating conditions.

2.1　Signal words

The signal words used in the documentation are classified below.

Warning of personal injuries

⚠ **DANGER**
Hazard with high risk of death or serious injury.

⚠ **WARNING**
Hazard with medium risk of death or serious injury.

⚠ **CAUTION**
There is a low-risk hazard that can result in minor injury.

Warning of property and environmental damage

NOTICE
There is a possibility of damage to the environment, equipment or data.

2.2　Intended use

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

The device has been developed for an IP65 working environment. It offers full protection against contact (dust-tight) and against water jets (nozzle) from any angle.

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 the Panel PC.

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.
- Do not carry out any work on the device while it is live. Always switch off the supply voltage for the device before mounting it, replacing device components or rectifying malfunctions. This does not apply to the replacement of hard disks in a RAID configuration.
- 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

With the CP32xx series, you can use multitouch as a high-end Panel PC directly in the field. The devices in the robust aluminum housing are designed for mounting arm installation. The connection cables are routed through the mounting arm.

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

- extensive axis controllers
- complicated HMI applications
- high-volume data handling
- various visualization tasks
- wide range of IoT tasks with data preprocessing

The panel PC is available in two different display sizes (18.5-inch and 24-inch) with a resolution of 1920 x 1080 and in various performance classes. The device has a multi-finger touch screen and an aluminum housing with all-round IP65 protection. There is an adapter on the housing for mounting arm installation on the C9900-M80x.

In its basic configuration, the CP32xx includes the following features:

- 3½-inch motherboard
- Intel® processor
- 2½-inch hard disk
- 2 slots for 2½-inch hard disk/SSD
- 24 V DC power supply unit

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3.1   Structure

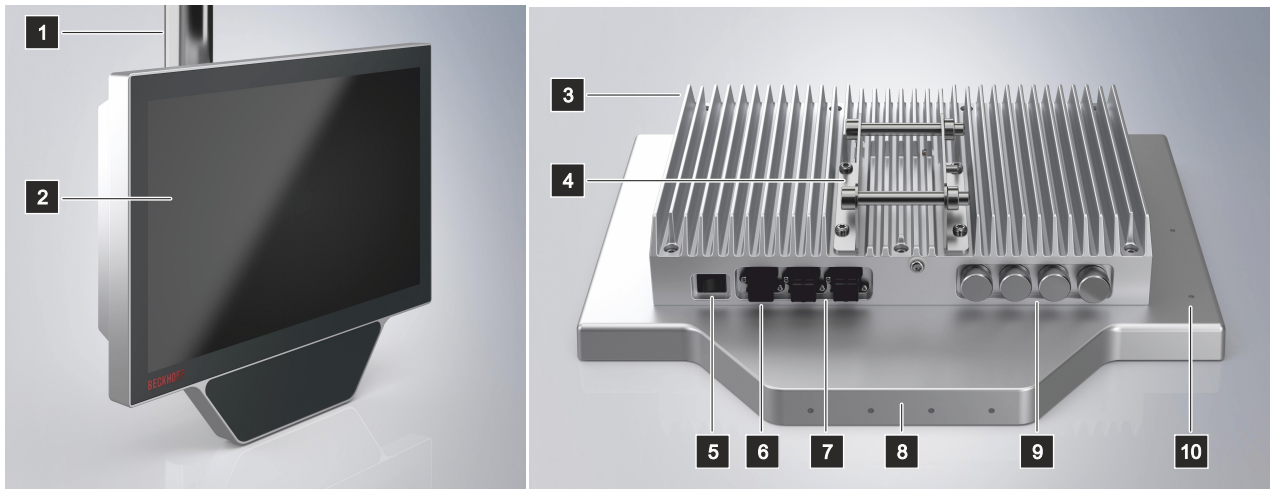Figure 1 shows the structure of the device as an example for all CP32xx variants.

Fig. 1: CP32xx_structure

Table 1: Key: CP32xx structure

No.	Component	Description
1	Example: Mounting arm C9900-M802	Mounting arm for mounting on ceiling
2	Touch Screen	Operation of the Panel PC
3	Heat sink	Access to the motherboard
4	Mounting arm adapter	Adapter for installation on mounting arm
5	Toggle switch	Switching the power supply on and off
6	Power supply (XD01)	Connection of the power supply and external wiring of the Panel PC
7	Ethernet RJ45 interfaces (XF01, XF02)	Connection of the Panel PC to a 100/1000BASE-T network
8	Drill holes	For mounting the keyboard shelf, mounting plate
9	USB interfaces (XG01 or XG02-XG04)	Connection of peripheral devices
10	Drill holes	For mounting optional extensions

3.2   Interface description

The panel PC has the following interfaces:

- Power supply (XD01)
- Ethernet (XF01, XF02)
- USB (XG01-XG04)

The interfaces are located at the bottom of the back of the housing. The push-pull built-in power socket for the power supply as well as one of the two push-pull built-in Ethernet sockets are freely accessible. The second push-pull built-in Ethernet socket is covered by a protective cap. If you also need the second interface, remove its protective cap. The USB interfaces are located under screw caps. To gain access to the USB interfaces, remove the screw caps from the housing (see Fig. 2).
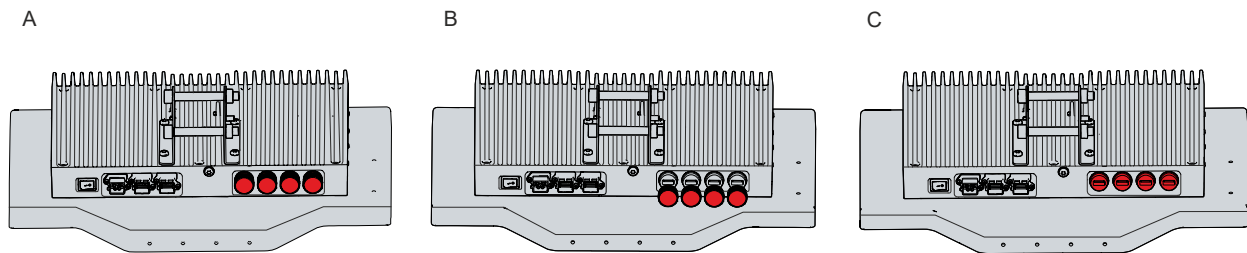

Fig. 2: CP32xx_access to interfaces

3.2.1   Power supply

The panel PC is supplied with a nominal voltage of 24 V. The connection of the power supply as well as the external wiring of the panel PC is carried out via a push-pull built-in power socket (XD01). There is a connection cable inside the column unit of the mounting arm. If the panel PC is used alone, this cable is intended for the power connection of the PC. If the C9900-M800 push button extension is also used in addition to the PC, use the cable for the power connection of the push button extension. For the wiring of CP32xx and C9900-M800, a separate cable is supplied with the push button extension.

Fig. 3: CP32xx_voltage socket pin numbering

Table 2: Voltage socket pin assignment

Pin	Signal	Description
1	+ 24 V	Power supply
2	GND	0 V
3	nc	not connected
4	nc	not connected

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3.2.2   Ethernet RJ45

The CP32xx has two Ethernet RJ45 interfaces (XF01, XF02) in the form of push-pull built-in Ethernet sockets. The 100Base-T and 1000Base-T Ethernet standards enable the connection of corresponding network components and data rates of 100/1000 Mbit/s. The required speed is selected automatically. There is a connection cable inside the column unit of the mounting arm. If the panel PC is used alone, this cable is intended for the Ethernet connection of the PC. If the C900-M800 push button extension is also used in addition to the PC, use the cable for the Ethernet connection of the push button extension. For the wiring of CP32xx and C9900-M800, a separate cable is supplied with the push button extension.
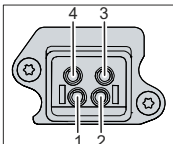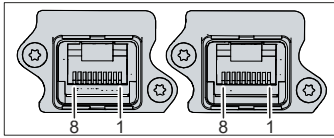

Fig. 4: CP32xx_Ethernet interface pin numbering

Table 3: 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 -	

3.2.3   USB

In the High Performance Class, the CP32xx has two USB 3.0 interfaces and two USB 2.0 interfaces. In the Smart Performance Class, the panel PC has one USB 3.0 interface and two USB 2.0 interfaces. The assignment of the interfaces varies depending on the device generation. The following table provides information about the assignment of the interfaces.

Table 4: Assignment USB interfaces

Device generation	Performance Class	Interfaces
CP32xx-2xxx-0020	High Performance	2 x USB 3.0 (XG01, XG02)
		2 x USB 2.0 (XG03, XG04)
	Smart Performance	1 x USB 3.0 (XG02)
		2 x USB 2.0 (XG03, XG04)
CP32xx-2xxx-0030	High Performance	2 x USB 2.0 (XG01, XG02)
		2 x USB 3.0 (XG03, XG04)
	Smart Performance	2 x USB 2.0 (XG01, XG02)
		1 x USB 3.0 (XG03)

The interfaces are located behind screw caps.

The USB 2.0 interfaces provide up to 500 mA, the USB 3.0 interfaces up to 900 mA. They are electronically fused.
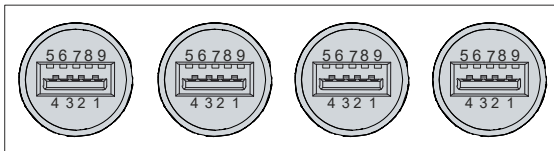
Fig. 5: CP32xx_USB interface pin numbering

Table 5: USB interface pin assignment

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

For USB 2.0, only pins 1 to 4 are relevant.

3.3   Name plate

The name plate provides information on the equipment fitted to the Panel PC. The name plate shown here serves only as an example.
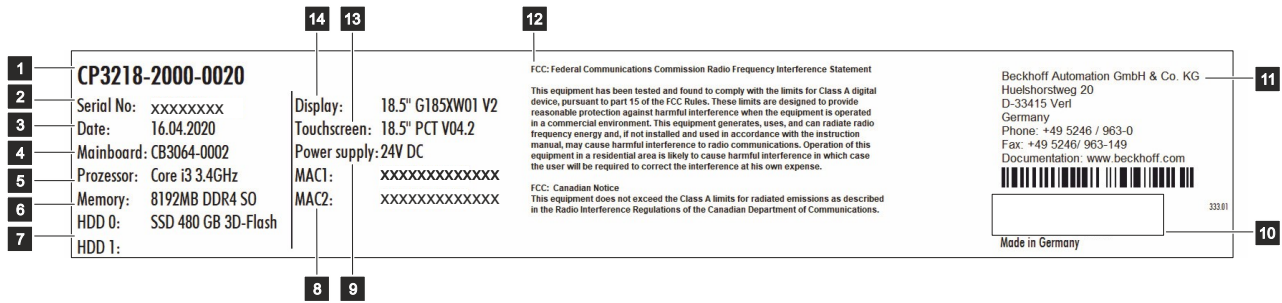

Fig. 6: CP32xx_nameplate

Table 6: Key: nameplate CP32xx

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	Main memory
7	Hard disk
8	MAC addresses of the Ethernet interfaces
9	Power supply unit for power supply: 24 V_{DC}, NEC class 2
10	Symbols Note: Here you will find the symbols applicable to the device such as CE, EAC, UKCA, . The approvals of your device can be found on the nameplate and in chapter 9.2 Approvals.
11	Address of the manufacturer
12	FCC approval
13	Touch screen
14	Display

3.4   Connecting cable

Pre-assembled connection cables for connecting the power supply and pre-assembled Ethernet connection cables are optionally available. You can order them from Beckhoff Customer Service by specifying the following article descriptions (see Chapter 9.1 Service and Support).

Table 7: Power supply connection cable

Connection cable	Power supply cable with IP65 plug
C9900-K785	Power supply cable for CP32xx-2xxx, length 1.85 m, pre-assembled, push-pull power plug IP 65, other end HAN Modular
C9900-K788	Power supply cable for CP32xx-2xxx, length 0.75 m, pre-assembled, push-pull power plug IP 65, other end push-pull power plug IP 65
C9900-K791	Power supply cable for CP32xx-2xxx, length 0.85 m, pre-assembled, push-pull power plug IP 65, other end HAN Modular

Table 8: Ethernet connection cable

Patch cable	Network cable with IP65 plug
C9900-K786	Network cable for CP32xx-2xxx, length 1.85 m, pre-assembled, Harting push-pull Ethernet plug IP 65, other end Harting HAN Modular RJ45 socket
C9900-K313	Network cable for CP32xx-2xxx, length 0.75 m, pre-assembled, push-pull Ethernet plug IP 65, other end push-pull Ethernet plug IP 65
C9900-K792	Network cable for CP32xx-2xxx, length 0.85 m, pre-assembled, push-pull Ethernet plug IP 65, other end HAN Modular

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 the mounting of the device on the mounting arm, the connection of the cables and the power supply and finally the switching on of the panel PC.

Operation of the panel PC

The panel PC is operated via the touch screen.

> **NOTICE**
>
> **Damage to the touch screen**
>
> Operating the touch screen with unsuitable objects may damage it.
> - Operate the touch screen only with your bare fingers, wearing special gloves or with a touch screen pen.
> - 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 Beckhoff protective film. The film provides short-term protection for a few days.

You can either order your device directly with the protective film applied or order a film individually and apply it yourself. Please refer to the price list for the available protective films according to the display size of your device.

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.

4.1   Transport and storage

The specified storage conditions must be adhered to (see chapter 8 Technical data [▶ 44]).

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 panel PC, in particular 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 9.1 Service and Support).

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4.2 Mounting

The CP32xx Panel PC is designed for mounting on the mounting arm. The environmental conditions specified for operation must be observed (see chapter 8 Technical data [▶ 44]).

To align the device according to your requirements, four different mounting arms are available on which you can mount the device. The device is mounted on the mounting arm via a mounting arm adapter.

Figure 7 shows the four available mounting arms for mounting on the ceiling (1), on the control cabinet (2), on the floor (3) and on the wall (4).
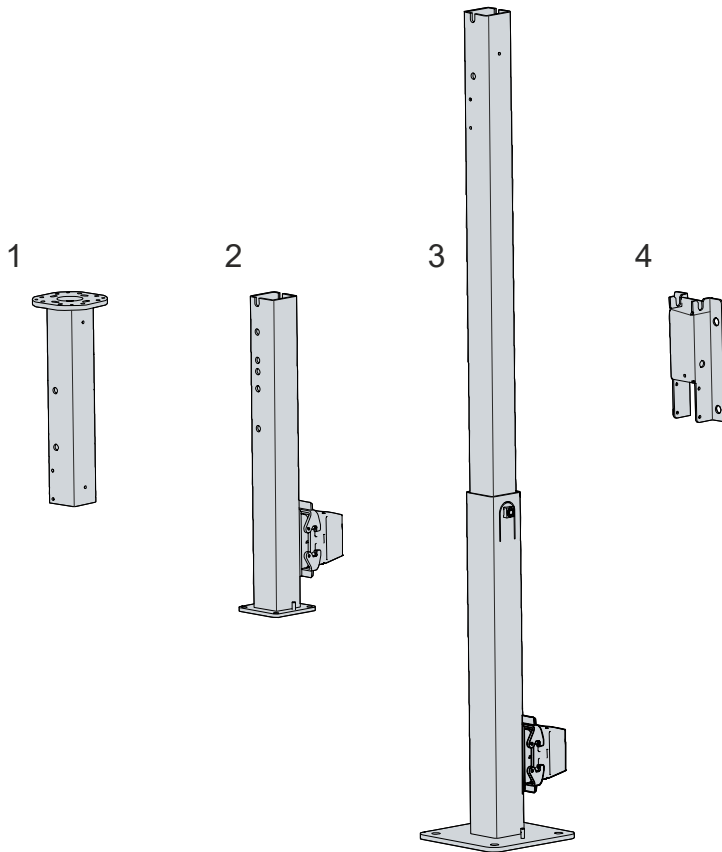

Fig. 7: CP32xx_mounting arms

You can select from the following ordering options:

Table 9: Mounting arm ordering options

Order identifier	Design
C9900-M802	Mounting arm for mounting on ceiling
C9900-M803	Stand for mounting on the control cabinet
C9900-M804	Stand for mounting on hall floors
C9900-M805	Bracket for mounting on the wall

Depending on the chosen mounting arm, the procedure for mounting is different. Chapter 4.2.2 Mounting arm installation [▶ 21] shows the two different procedures.

The C9900-M803 and M804 mounting arms are equipped with a cable set for the CP32xx-2xxx or the C9900-M800 push button extension. These cables are connected to a HAN connection socket in the lower part of the mounting arms. Figure 7 shows the connection sockets on the two mounting arms mentioned (2, 3). Both mounting arms are supplied with a plug to match the connection socket. Further information on the HAN plug can be found in the corresponding plug documentation.

For information on how to establish the functional earth connection between the panel PC and mechanical extensions, refer to chapter 4.3.1 Grounding the panel PC [▶ 27].

Mounting arm adapter

The panel PC is supplied automatically with the standard mounting arm adapter (1) already mounted. In addition, you have the option to order a rotary adapter (2) under the order identifier C9900-M809. Figure 8 shows the two available mounting arm adapters.
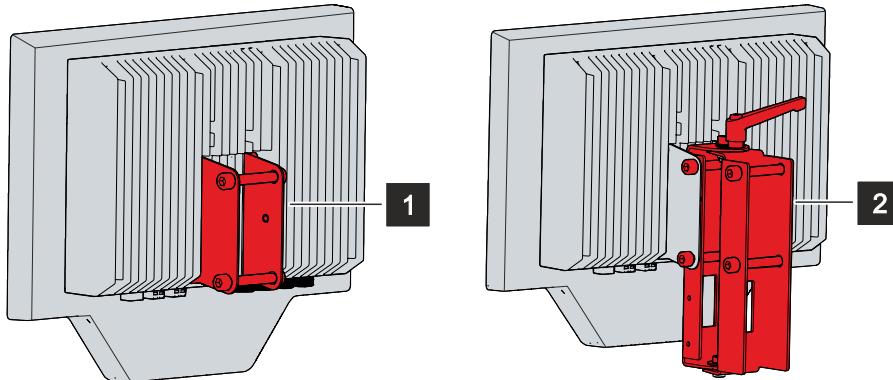

Fig. 8: CP32xx_mounting arm adapters

The rotary adapter is mounted on the standard mounting arm adapter. To do this, follow the steps below as shown in Figure 9:

1. Remove the two screws from the standard mounting arm adapter (Section A).
2. Place the rotary adapter between the holding brackets of the standard adapter (Section B).
3. Insert the two screws of the standard adapter again (section C).
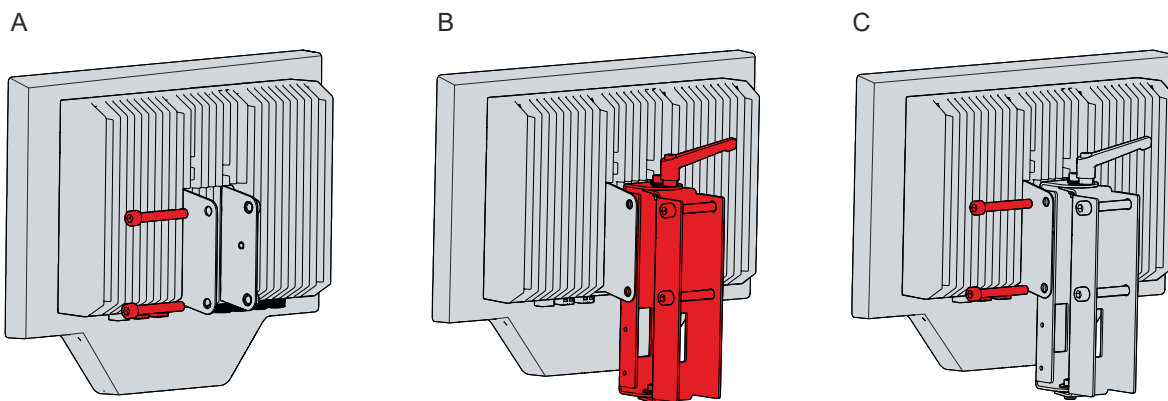⇨ You have now mounted the rotary adapter on the standard adapter.

Fig. 9: CP32xx_mounting the rotary adapter

The PC is mounted rigidly on the mounting arm with the standard mounting arm adapter. With the additional lever, the rotary adapter offers the possibility to rotate the device after mounting on the mounting arm.

Push button extension

You have the option to order the additional C9900-M800 push button extension from your Beckhoff Sales department.

For explanations of the push button extension, functions and mounting, refer to the associated C9900-M800 manual.

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4.2.1   Dimensions

The dimensions of the Panel PC are for aligning the device on the mounting arm.

All dimensions are in mm.

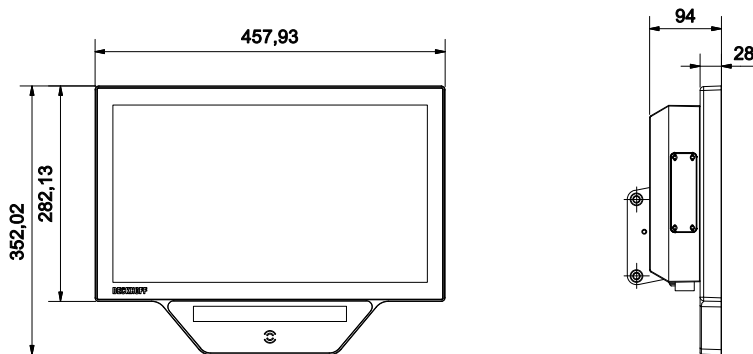Fig. 10 illustrates the dimensions of the 18.5-inch Panel PC.

Fig. 10: CP32xx_dimensions 18.5-inch

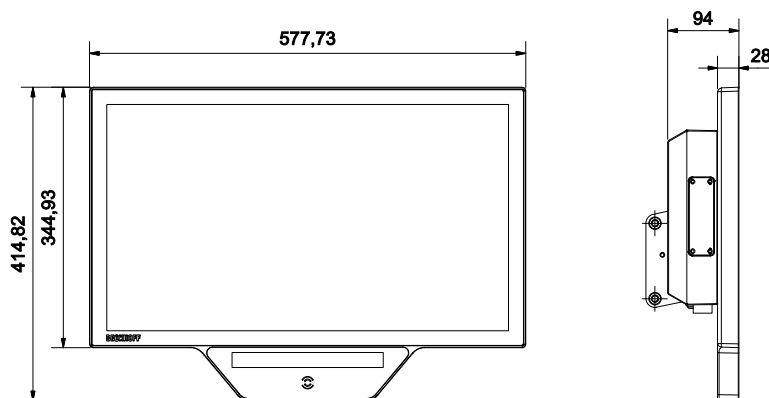Fig. 11 illustrates the dimensions of the 24-inch Panel PC.

Fig. 11: CP32xx_dimensions 24-inch

4.2.2   Mounting arm installation

NOTICE
Extreme environmental conditions
Extreme environmental conditions can cause damage to the device.
• Avoid extreme environmental conditions.
• Protect the device from moisture and heat.

Observe the following points when mounting the panel PC on the mounting arm:

- 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.

Mounting on the mounting arm

Four different mounting arm options are available (see chapter 4.2 Mounting [▶ 18]). Depending on the selected mounting arm, you must proceed differently in order to mount the device on the mounting arm via the mounting arm adapter. Figure 12 shows the procedure as an example for the C9900-M803, C9900-M804 and C9900-M805 mounting arms.

Proceed as follows to mount the panel PC on the mounting arm:

1. Remove the lower screw of the mounting arm adapter (Section A).
2. Hook the device into the mounting arm at an angle with the upper screw (section B).
3. Swivel the device into a straight position so that the mounting arm adapter and mounting arm are directly on top of each other (Section C).
4. Insert the previously removed screw into the mounting arm adapter again so that the adapter is fastened to the mounting arm (section D).
5. Tighten the screw.
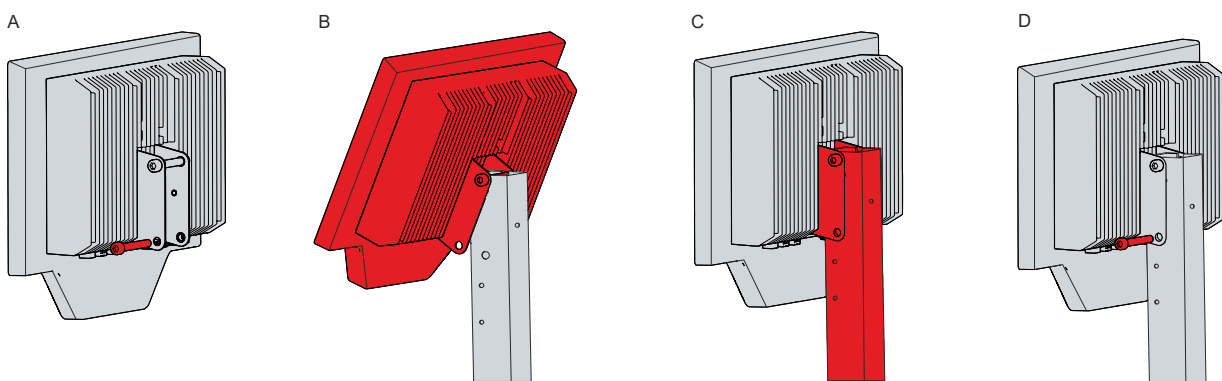⇨ You have now mounted the panel PC on the mounting arm.

Fig. 12: CP32xx_mounting on mounting arm, variant 1

If you have chosen the C9900-M802 mounting arm or if you want to mount the device a little lower on the C9900-M803 mounting arm, you will have to proceed for the mounting as shown in Figure 13:

1. Remove both screws from the mounting arm adapter (Section A).
2. Place the mounting arm adapter over the corresponding holes in the mounting arm (section B).
3. Insert the two screws into the mounting arm adapter again so that the adapter is fastened to the mounting arm (section C).
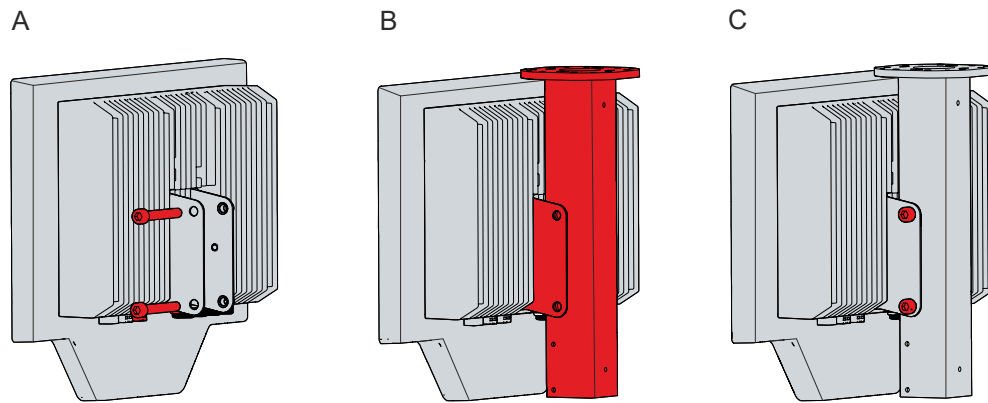
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A   B   C

Fig. 13: CP32xx_mounting on mounting arm, variant 2

If you have chosen the rotary adapter with lever in order to be able to rotate the device on the mounting arm, the installation is done in the same way as with the standard mounting arm adapter.

4.2.3 Mounting the keyboard shelf

You can mount a shelf for the keyboard and mouse below the PC. You can obtain the shelf from your Beckhoff distributor under the order identifier C9900-M801.

You have three options for mounting the shelf (see Figure 14):

- Mounting directly below the PC using the drill holes on the underside of the PC (A)
- Mounting slightly lower beneath the PC using the separate mounting plate C9900-M807 (B)
- Mounting directly below the key extension using the drill holes on the underside of the C9900-M800 (C)
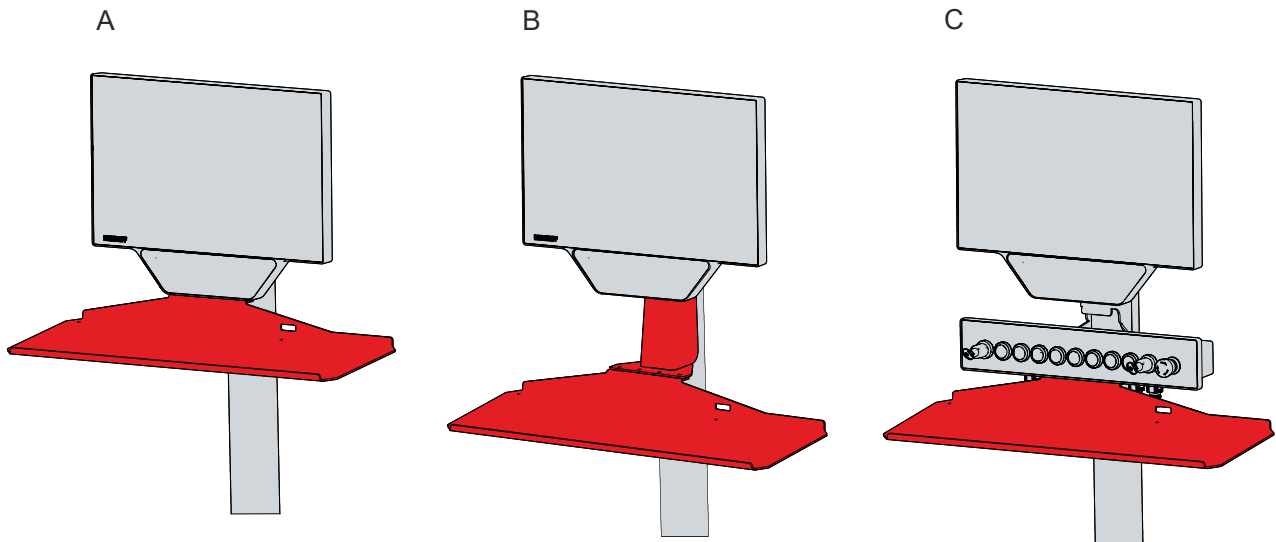
A   B   C

Fig. 14: CP32xx_keyboard shelf mounting options

Mount the keyboard shelf directly below the PC or directly below the key extension using Torx TX25 screws and the existing drill holes.

To mount the keyboard shelf lower using the mounting plate, follow the steps below as shown in Fig. 15:

1. Loosen the TX25 screws from the mounting plate (Section A).
2. Place the mounting plate above the mounting arm (section B).
3. Insert the TX25 screws of the mounting plate again (section C).
4. Mount the keyboard shelf below the mounting plate using the TX25 screws of the sheet (Section D).
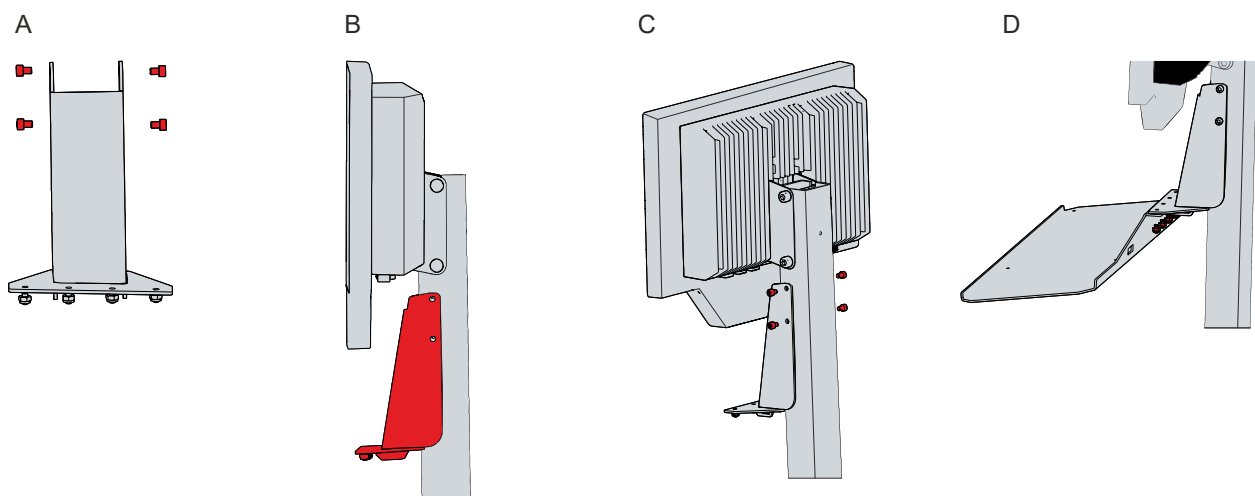
A   B   C   D

Fig. 15: CP32xx_mounting via mounting plate

4.2.4   Mounting the adapter housing

You have the possibility to mount the C9900-M808 adapter housing for a Euchner EKS RFID reader on the Panel PC. The shipment includes only the empty housing, without the Euchner EKS RFID reader.

There are two drill holes on the back of the Panel PC on the right for mounting the adapter housing. The housing is located to the left of the PC after installation. To mount the adapter housing on the Panel PC, follow the steps below as shown in Fig. 16:

1. Place the adapter housing with the holding brackets in front of the drill holes on the back of the Panel PC (section A).
2. Insert the two screws and tighten them (section B).

⇨ You have now mounted the adapter housing on the Panel PC (section C).

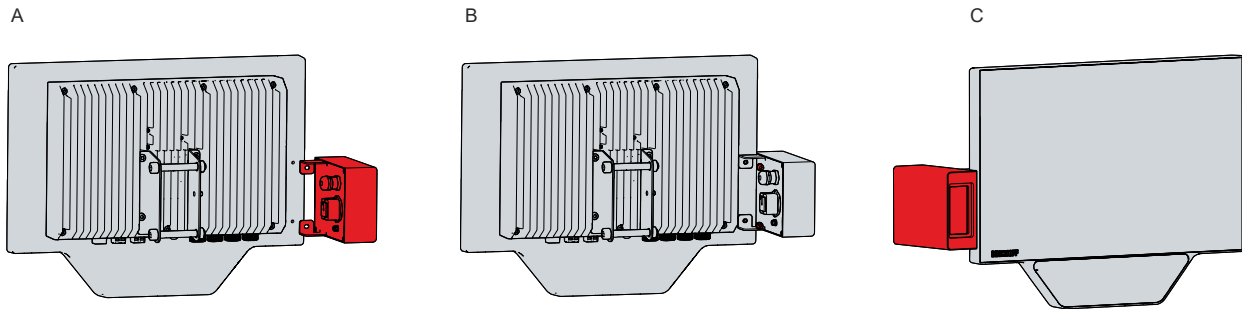A   B   C

Fig. 16: CP32xx_mounting the adapter housing

4.2.5   Mounting of extensions

You have the option to mount additional extensions at the Panel PC. These are the bracket for a signal lamp (C9900-M811) and the holder for an RFID card (C9900-M812).

Signal lamp bracket

You can mount a bracket for a signal lamp (C9900-M811) with an M12 connection socket on devices with mounting arms C9900-M803 and C9900-M804. You must then connect the signal lamp to the M12 connector of the push-button extension.

To mount the bracket to the mounting arm, follow the steps below, shown in Figure 17:

1. Loosen the two screws of the mounting arm adapter by a few turns (section A).
2. Place the bracket with the large keyholes over the loosened screws (section B and C).
3. Slide the bracket down so that the screws slide into the small keyholes in the bracket (section D).
4. Tighten the two screws of the mounting arm adapter again.
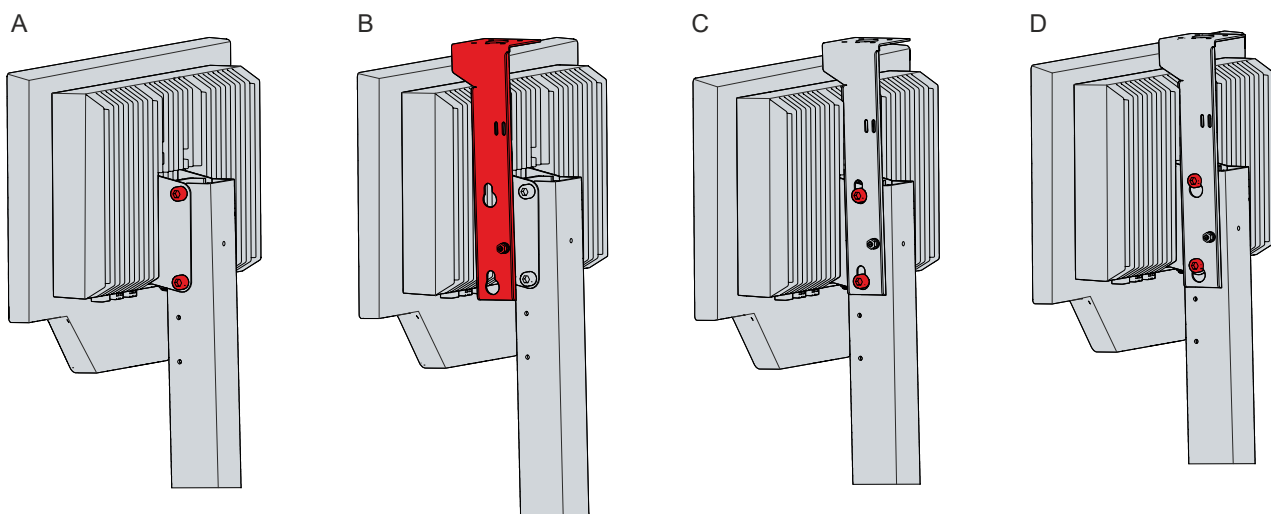 ⇨ You have mounted the bracket.

Fig. 17: CP32xx_mounting the bracket signal lamp

RFID card holder

You can mount a holder for an RFID card (C9900-M812) on the Panel PC. You must mount the holder on the front of the device below the display. Make sure that the lower edge of the holder is flush with the lower edge of the front foil.

To mount the holder, follow the steps below:

1. Remove the protective cover (liner) completely.
2. Completely remove grease, oil and silicone films as well as dirt particles from the adhesive surface of the Panel PC.
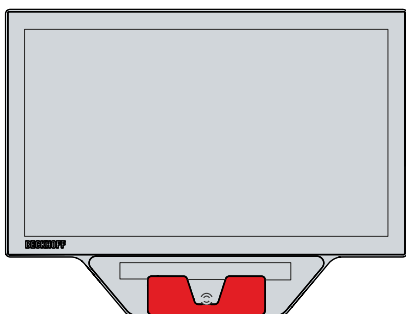3. Position the holder with the lower edge flush with the lower edge of the front foil (see Fig. 18).

Fig. 18: CP32xx_position holder RFID card

BECKHOFF

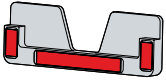4. Press the holder with the adhesive strips (see Fig. 19) onto the front foil.

Fig. 19: CP32xx_adhesive strip RFID card

⇨ You have mounted the bracket.

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 panel PC 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 power supply unit is required to supply 24 V DC (-15 %/+20 %) for operating the device.

The cabling of the panel PC 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.

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

4.3.1   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.

EMC

NOTICE
Hardware damage due to electromagnetic interference The use of the panel PC 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 panel PC 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 panel PC must comply with certain protection requirements. The panel PC 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. Various mechanical supports and extensions in delivery state already includes cables for connecting the functional earth. You establish the functional earthing by first mounting the panel PC on an appropriate mechanical extension and then connecting it via the functional earth cable. Figure 20 shows an example of the panel PC with different mounted extensions and the respective mounted functional earth cables.
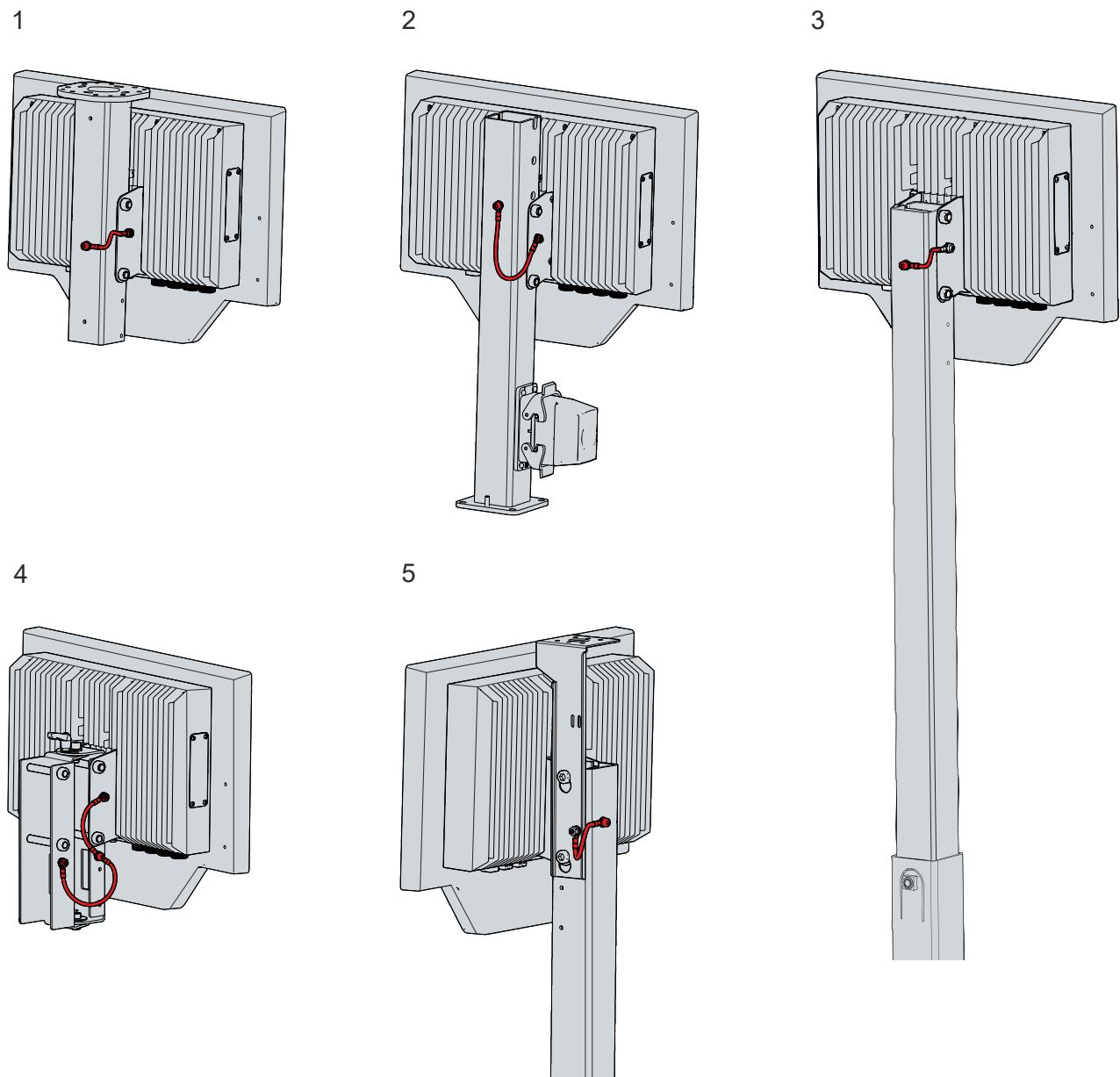
1

2

3

4

5

Fig. 20: CP32xx_Position functional earth cable

The extensions shown are the following:

- 1: Option C9900-M802 mounting arm for mounting on ceiling
- 2: Option C9900-M803 stand for mounting on the control cabinet
- 3: Option C9900-M804 stand for mounting on hall floors
- 4: Option C9900-M809 rotary adapter
- 5: Option C9900-M811 bracket for signal lamp

4.3.2   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.

If you mount the panel PC on the C9900-M803 (2) or C9900-M804 (3) mounting arm, the wiring of the power supply and Ethernet passes through the mounting arms. At the foot of the mounting arms is the HAN connection socket with the HAN plug. From there, the power cables and Ethernet cables are fed through the mounting arms upwards to the opening (see Figure 21). Plug the plugs protruding out of the mounting arm into the PC.
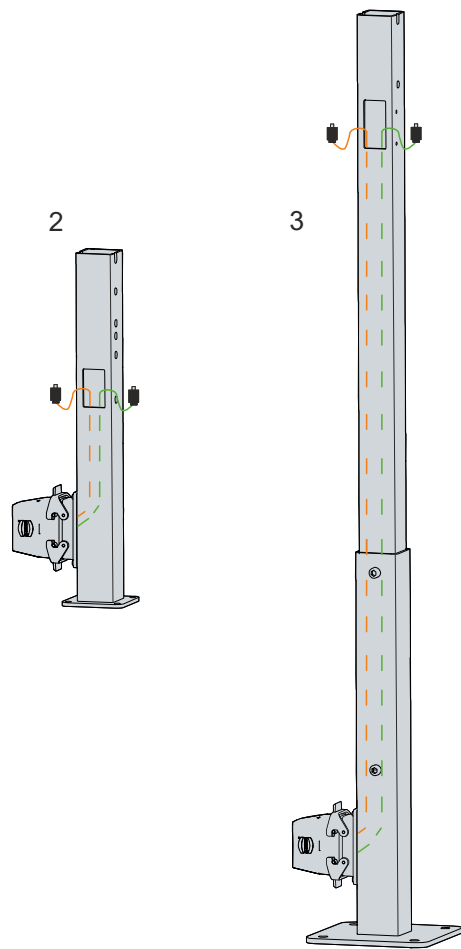

Fig. 21: CP32xx_wiring

If you mount the panel PC on the C9900-M802 (1) or C9900-M805 (3) mounting arm, an adapter cable (15 cm) from push-pull to a HAN adapter piece is available for voltage transmission. You have to lay the Ethernet cables in place yourself. A push-pull plug for the Ethernet cable for field assembly is included in the scope of delivery.

Connecting cables

The connections are located at the bottom of the rear housing and are documented in Chapter 3.1 Structure [▶ 10].

Make sure that you first ground the PC (see chapter 4.3.1 Grounding the Panel PC [▶ 27]) and then plug in all data transmission cables.

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Connecting the power supply

Cables with the following maximum cable cross-sections must be used to connect the power supply:

- 2.5 mm^2 if using the panel PC without a mounting arm
- 2.5 mm^2 if using the panel PC on the C9900-M802 und C900-M805 mounting arms; the plug is provided
- 8 mm^2 if using the panel PC on the C9900-M803 und C9900-M804 mounting arms; the plug is provided

For long supply lines, use the maximum possible cross-section 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. Insert the voltage connector into the push-pull built-in power socket of the panel PC.
2. Connect the PC to your external 24 V power supply.
3. Switch on the 24 V power supply.
4. Measure the voltage on the power supply plug of the PC.

4.4 Switching the Panel PC on and off

First switching on and driver installation

NOTICE
Public networks
Connecting the PC to public networks without additional protective measures can compromise the safety of the device.
• Protect the PC before connecting it to public networks.

The panel PC has a power switch that switches 24 V. This is located on the back of the housing next to the connections. If the power supply is switched on using the toggle switch, the PC starts.

Driver installation

When you switch on the PC 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 PC.

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

Switching off the panel PC

NOTICE
Data loss due to switching off the PC while the software is running
Switching off the PC 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 PC.

If the power supply is switched off by means of the toggle switch, the PC is also switched off.

You can assign different access rights to all users in the operating system and in the application software. Since there is a risk of data loss if the panel PC is switched off incorrectly, assign the rights advisedly.

5   Decommissioning

NOTICE
Hardware damage due to power supply
A connected power supply can cause damage to the Panel PC 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. Afterwards, you can dismount the device from the mounting arm.

If you do not wish to use the Panel PC any further, chapter 5.2 Disassembly and disposal [▶ 33] provides information on the correct disposal of the device.

5.1   Disconnecting the power supply and cables

⚠ CAUTION
Risk of electric shock
Disconnecting the panel PC during a thunderstorm can lead to electric shock.
• Never disconnect the cables of the panel PC during a thunderstorm.

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

1. Shut down the panel PC.
2. Disconnect the PC from your external 24 V power supply.
3. Pull the voltage connector out of the push-pull built-in power socket.
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 cables and the power supply.

5.2 Disassembly and disposal

To be able to dismount the panel PC from the mounting arm, you must first have disconnected the power supply and the cables (see Chapter 5.1 Disconnecting the power supply and cables [▶ 32]).

Dismounting from the mounting arm

Depending on the selected mounting arm on which you mounted the device, the procedure for dismounting is different.

To dismount the panel PC from the C9900-M803, C9900-M804 and C9900-M9805 mounting arms, follow the steps below as shown in Fig. 22:

1. Remove the lower screw of the mounting arm adapter with which it is screwed to the mounting arm (Section A).
2. Swivel the device into an angled position so that the lower part of the mounting arm adapter is released from the mounting arm (section B).
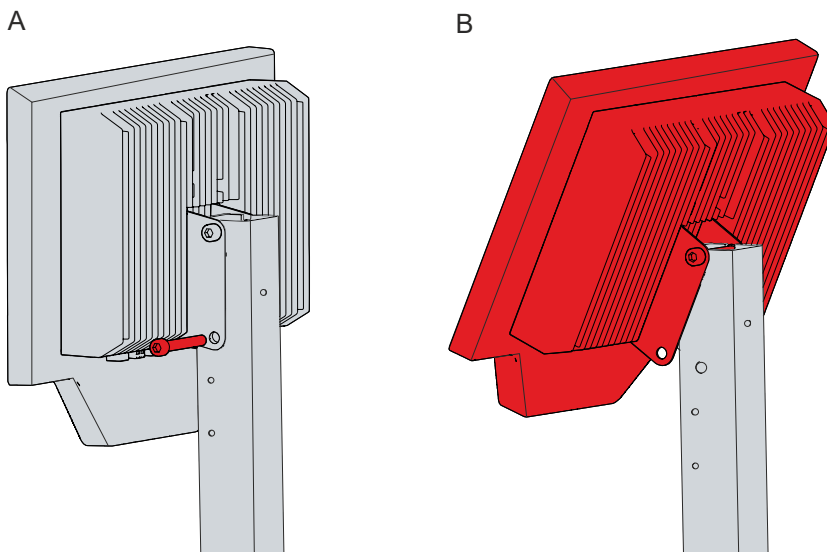
A   B

Fig. 22: CP32xx_dismounting from mounting arm, variant 1

3. Fully unhook the device from the mounting arm.
⇨ You have now dismounted the panel PC from the mounting arm.

If the panel PC is installed on the C9900-M802 mounting arm or lower down on the C9900-M803, follow the steps below for disassembly, as shown in Fig. 23:

1. Remove the two screws with which the mounting arm adapter is fastened to the mounting arm (section A).
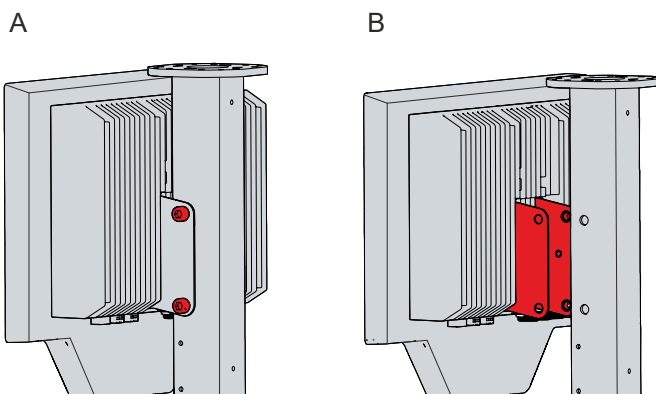2. Pull the panel PC together with the mounting arm adapter off the mounting arm.

A   B

Fig. 23: CP32xx_dismounting from mounting arm, variant 2

Dismounting the keyboard shelf

To dismount the keyboard shelf, depending on the mounting option selected, you must either remove the Torx TX25 screws from the holes on the bottom of the PC or the push button extension, or remove the TX25 screws from the mounting plate.

Dismounting the adapter housing

To dismount the adapter housing, remove the two screws from the holding brackets with which the housing is fastened to the back of the panel PC.

Disposal of the panel PC

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

For disposal, the device must be dismounted and completely dismantled.

6   Maintenance

⚠ **CAUTION**
Risk of electric shock
Working on the panel PC when live can lead to electric shock.
• Switch off the power supply before cleaning the device or replacing device components. Excluded from this is the replacement of hard disks and SSDs in RAID configuration and fan cartridges.

Maintenance measures increase the efficiency of the device by ensuring long-term functionality. Cleaning and maintenance by replacing certain device components contribute to this.

6.1   Cleaning

NOTICE
Unsuitable cleaning agents
The use of unsuitable cleaning agents can damage the device.
• Clean the Panel PC only as specified.

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

- Adhere to the general conditions of the IP65 protection class.
- Never use compressed air to clean the PC.
- Adhere to the ambient temperature range of 0 °C to 55 °C.

Cleaning agents

You must use suitable cleaning agents to avoid damaging the front of the Panel PC during cleaning. Examples include:

- Benzine
- Spirit
- Glass cleaner

On the other hand, you should avoid the following cleaning agents when cleaning:

- Cleaning agents with scouring or abrasive components
- Metal cleaning objects such as razor blades or steel spatulas
- Steam jet or very hot water
- Cold water with a heated unit
- High water pressure, as with a high-pressure cleaner

6.2 Maintenance

NOTICE
Use of incorrect spare parts
The use of spare parts not ordered from Beckhoff Service can result in unsafe and incorrect operation.
• Only use spare parts that you have ordered from Beckhoff Service.

Beckhoff Panel PCs 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 Panel PC may be subject to a limited service life if they are operated under certain conditions, such as more demanding ambient conditions during operation or during storage, or if they are out of service for long periods of storage.

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

These are the following components:

- Storage media
- Battery
- Fan

The following table provides recommendations for regular replacement of PC components:

Table 10: Replacement recommendations for PC components

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
Compact Flash, CFast or SSD	10 years
Motherboard battery	5 years

Beckhoff is excluded from liability in the event of possible damage occurring during maintenance work. Before working on the device, you should have established ESD protection to prevent damage to the device through electrostatic discharge.

ESD protection

NOTICE
Electrostatic discharge
Replacing 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 Panel PC and create an ESD-protected environment in which existing electrostatic charges are safely discharged to ground and charging is prevented.

The best way to create an ESD-protected environment is to set 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. The following measures serve this purpose, for example:

- Use conductive mats connected to the ground potential for temporary storage of components.
- Divert any charges from your own body by touching grounded metal (e.g. control cabinet door).
- Wear a wrist grounding strap.
- Remove new electronic components from the ESD packaging (tinted plastic bag) only while wearing a wrist grounding strap.
- No walking around with electronic components without ESD packaging in your hand.

6.2.1 Access to device components

In order to be able to exchange the storage media, the battery or the fan, you must first gain access to these device components.

Access to storage media

Access is gained to the storage media from the back of the panel PC. The storage media are located behind the lateral cover flap. To access the storage media, follow the steps below as shown in Figure 24:

1. Loosen and remove the four Torx TX10 screws (section A).
2. Remove the cover flap (section B).
⇨ You now have access to the storage media.

A   B
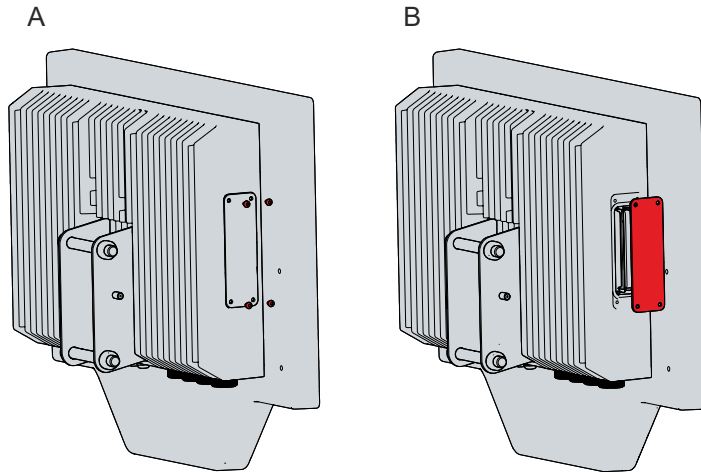
Fig. 24: CP32xx_access to storage media

Access to battery and fan

Access is gained to the battery and fans from the back of the panel PC. To access the components, you must disconnect the heat sink from the display. To do this, follow the steps below as shown in Figure 25:

1. Remove the lower screw of the mounting arm adapter (Section A).
2. Loosen and remove the seven Torx TX25 screws on the back of the device (section B).
3. Disconnect the heat sink from the display (Section C).

A   B   C
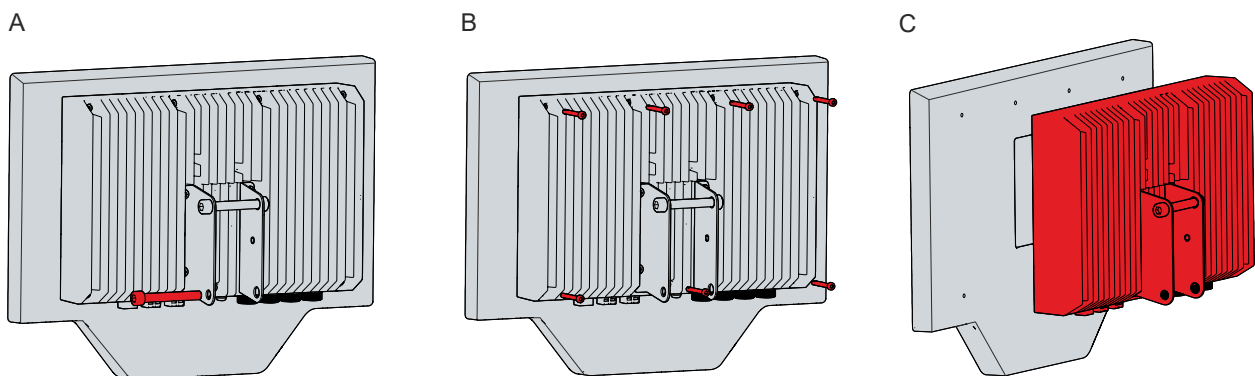
Fig. 25: CP32xx_access to battery and fans

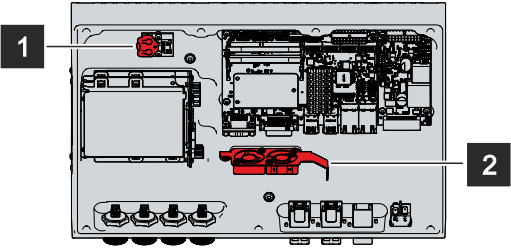⇨ You now have access to the battery (1) and the fans (2) (see Fig. 26).

Fig. 26: CP32xx_battery and fans

6.2.2 Replacing the storage media

New storage media should only be obtained from Beckhoff Service (see Chapter 9.1 Service and Support).

In the High Performance Class, the CP32xx is equipped with the following storage media:

- one SSD, 3D-Flash in TLC configuration, 2.5-inch, 512 GB
- one SSD, 3D-Flash in TLC configuration, 2.5-inch, 1 TB

In the Smart Performance Class, the CP32xx is equipped with the following storage medium:

- one SSD, 3D-Flash in TLC configuration, 2.5-inch, 512 GB

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 PCs 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 software. 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, the Beckhoff PC must already have been shipped with a valid operating system license. After installing the fresh image, the applications must be reinstalled.

Replacing the storage media

Chapter 6.2.1 Access to device components [▶ 38] shows how to access the storage media.

On the storage media there are stickers that protrude beyond the storage media. To replace the storage media, pull them out of the device by the stickers (see Fig. 27). Then plug the new storage media into the device in the same direction.
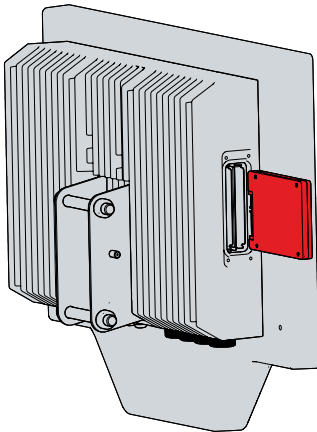

Fig. 27: CP32xx_replacing storage media

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

6.2.3   Replacing the battery

NOTICE
Incorrect battery type
Inserting the wrong type of battery can damage the device.
• Only replace the battery with a replacement battery from Beckhoff Service.
• When replacing the battery, make sure that the polarity is correct.

NOTICE
Battery damage
Incorrect handling of the motherboard battery can damage it.
• Do not recharge the battery.
• Do not throw the battery on the fire.
• Do not open the battery.
• Protect the battery against direct sunlight and moisture.

NOTICE
Motherboard failure
Scratches on the motherboard may cause the motherboard to fail.
• Be very careful when replacing the battery and be sure to avoid scratches on the motherboard.

The panel PC 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 11: 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 6.2.1 Access to device components [▶ 38] shows how to access the battery.

To replace the battery, pull it out of the battery holder (see Fig. 28). Then insert the new battery into the battery holder. Make sure that the polarity is correct as shown in the illustration.
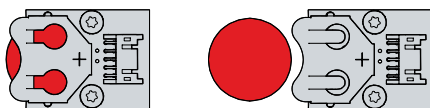

Fig. 28: CP32xx_battery replacement

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

6.2.4   Replacing the fan

NOTICE
Incorrect fan type
The industrial PC may be damaged if the wrong type of fan is installed.
• Only replace the fan with a replacement fan from Beckhoff Service.

The fans ensure optimal cooling of the panel PC. Order replacement fans exclusively from Beckhoff Service (see Chapter 9.1 Service and support).

Before you can replace the fans, you must gain access to them in accordance with the instructions in Chapter 6.2.1 Access to device components [▶ 38].

To replace the fans, follow the steps below as shown in Figure 29:

1. Remove the two Torx TX10 screws from each fan to release the fans from the fan plate (section A).
2. Remove the fans from the fan plate (section B).

A   B
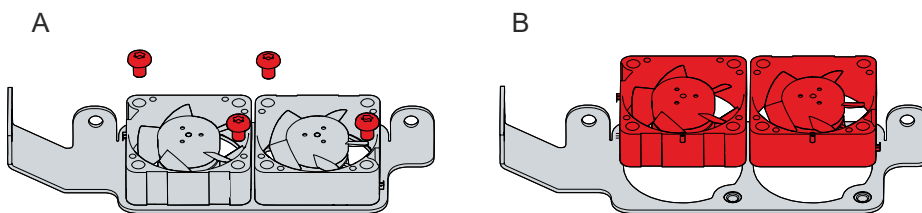
Fig. 29: CP32xx_fan replacement

3. Disconnect the fan supply cables from the motherboard and pull them out of the cable sleeves.
   ⇨ You can now exchange the fans.
4. Pull the supply cables of the new fans through the cable sleeves and plug them into the motherboard.
5. Screw each new fan firmly to the fan plate with the two Torx TX10 screws with a tightening torque of approx. 0.5 Nm.
⇨ You have now replaced the fans.

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

7   Troubleshooting

Table 12: Troubleshooting

Fault	Cause	Measures
No function of the panel PC	No power supply to the panel PC	Check the power supply cable
	Cable not connected	1. Correctly connect the cable 2. 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 or software manufacturer
The panel PC only works partially or only temporarily, e.g. dark image or none at all	Defective backlight in the display	Call Beckhoff Service
	Components defective in the panel PC	Call Beckhoff Service
Malfunction of the touch screen	Poor or missing functional earth of the device	Establish functional earth
	Poor or missing ground connection of the user	User must stand on the floor with normal shoes

8   Technical data

Table 13: Technical data

Product designation	CP32xx-2xxx		
Dimensions (W x H x D)	CP3218: 458 x 352 x 89 mm		
	CP3224: 578 x 415 x 89 mm		
Weight	CP3218: approx. 8.5 kg		
	CP3224: approx. 10 kg		
Supply voltage	22-30 V_{DC} (24 V_{DC} power supply unit)		
Power consumption	Data sheet power consumption and power loss in the download finder:		
	https://www.beckhoff.com/de-de/support/downloadfinder/ suchergebnis/?c-1=40717316		
Protection rating	IP65		
Vibration resistance (sinusoidal vibration)	EN 60068-2-6:	10 ... 58 Hz:	0.035 mm
		58 ... 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 ... +45 °C		
	Transport / storage: -20 °C ... +65 °C		
Permissible relative air humidity	Maximum 95%, no condensation		
Transport and storage	The same values for air humidity and shock resistance are to be observed during transport and storage as in operation. The shock resistance during transport can be improved by means of suitably packing the panel PC.		

9   Appendix

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

9.1   Service and support

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

Beckhoff Service

The Beckhoff Service Center supports you in all matters 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 service, please indicate the serial number, which you can find on the name plate.

Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- World-wide support
- Design, programming and commissioning of sophisticated automation systems
- extensive training program for Beckhoff system components

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

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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 will also find further documentation for Beckhoff components there.

9.2 Approvals

Your device has 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.

List of figures

List of tables