BECKHOFF New Automation Technology

Manual | EN

CP29xx

Control Panel



2026-06-03 | Version: 4.5

Table of contents

1 Notes on the documentation 5

2 For your safety 6

2.1 Signal words 6
2.2 Intended use 6
2.3 Fundamental safety instructions 7
2.4 Operator's obligation to exercise diligence 7
2.5 Notes on information security 8

3 Product overview 9

3.1 Structure 11
3.2 CP29xx-0000 interface description 13
3.2.1 Power supply 14
3.2.2 USB output 15
3.2.3 USB input 16
3.2.4 USB Extended input 17
3.2.5 DVI Extended input 18
3.3 CP29xx-0010 interface description 19
3.3.1 Power supply 19
3.3.2 USB output 20
3.3.3 CP-Link 4 21
3.4 Optional USB interface 24
3.5 Name plate 25

4 Commissioning 26

4.1 Transport and unpacking 27
4.2 Installation in the control cabinet 28
4.2.1 Installation in the control cabinet 29
4.3 Connecting the control panel 31
4.3.1 Installing power supply cable 32
4.3.2 Grounding the control panel 34
4.3.3 Connecting cables and power supply 35

5 Shutting down 36

5.1 Disconnecting the power supply and cables 36
5.2 Disassembly and disposal 37

6 Servicing and maintenance 38

6.1 Cleaning the front screen 39
6.2 Exchange seal 40

7 Troubleshooting 42

8 Technical Data 43

9 Appendix 44

9.1 Service and support 44
9.2 Approvals 45

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.
We reserve the right to revise and change the documentation at any time and without notice.
Claims to modify products that have already been supplied may not be made on the basis of the data, diagrams, and descriptions in this documentation.

Trademarks

Beckhoff®, ATRO®, EtherCAT®, EtherCAT G®, EtherCAT G10®, EtherCAT P®, MX-System®, Safety over EtherCAT®, TC/BSD®, TwinCAT®, TwinCAT/BSD®, TwinSAFE®, XFC®, XPlanar®, and XTS® are registered and licensed trademarks of Beckhoff Automation GmbH.
If third parties make use of the designations or trademarks contained in this publication for their own purposes, this could infringe upon the rights of the owners of the said designations.



EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Copyright

© Beckhoff Automation GmbH & Co. KG, Germany.
The distribution and reproduction of this document, as well as the use and communication of its contents without express authorization, are prohibited.
Offenders will be held liable for the payment of damages. All rights reserved in the event that a patent, utility model, or design are registered.

Third-party trademarks

Trademarks of third parties may be used in this documentation. You can find the trademark notices here: https://www.beckhoff.com/trademarks.

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 control panel is designed for industrial application in machine and system engineering. It serves as the operating unit of the machine or plant.

The DVI/USB extension technology integrated in the CP29xx-0000 Control Panel enables the panel to be located up to 50 m away from the PC.

The CP-Link 4 technology integrated in the CP29xx-0010 Control Panel enables the panel to be located up to 100 m away from the PC via a CP-Link 4 cable with optionally integrated or separate 24 V power supply, depending on the transmitter module.

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.
- Do not use the device in hazardous areas.
- 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.
- 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

- 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.
- Fuse the power supply line to protect the supply line in the event of a short circuit according to its cross-section.
- 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 Beckhoff Panel generation with industrially-compatible multi-touch display is designed for control cabinet installation. The devices offer suitable solutions for a variety of applications. The model variety ranges from different display sizes and formats to custom models. This Panel generation is also suited for single-touch applications.

The control panel has the following features:

- Different display sizes and resolutions, landscape and portrait mode:
  - 7-inch, 800 x 480 (5:3)
  - 12-inch, 800 x 600 (4:3)
  - 12.1-inch, 1280 x 800 (16:10)
  - 15-inch, 1024 x 768 (4:3)
  - 15.6-inch, 1366 x 768 (16:9)
  - 18.5-inch, 1366 x 768 (16:9)
  - 19-inch, 1280 x 1024 (5:4)
  - 21.5-inch, 1920 x 1080 (16:9)
  - 24-inch, 1920 x 1080 (16:9)
- Multi-finger touch screen (PCT): e.g. for 10-finger touch
- Aluminum housing with glass front, front IP65, rear IP20, the housing surface is electrically insulating
- Control cabinet installation via pull-out clamping levers for fast installation without loose parts

Push-button extension

The following control panels are optionally available in landscape mode ex factory with a corresponding, C9900-G0xx push-button extension:

- CP2912 (C9900-G002)
- CP2913 (C9900-G009)
- CP2915 (C9900-G003)
- CP2916 (C9900-G004)
- CP2918 (C9900-G005)
- CP2919 (C9900-G006)
- CP2921 (C9900-G008)
- CP2924 (C9900-G007)

Explanations of the push-button extension and the functions can be found in the installation and operating instructions for the C9900-G00x-G02x. The figure shows an example of a control panel without (1) and with (2) push-button extension.

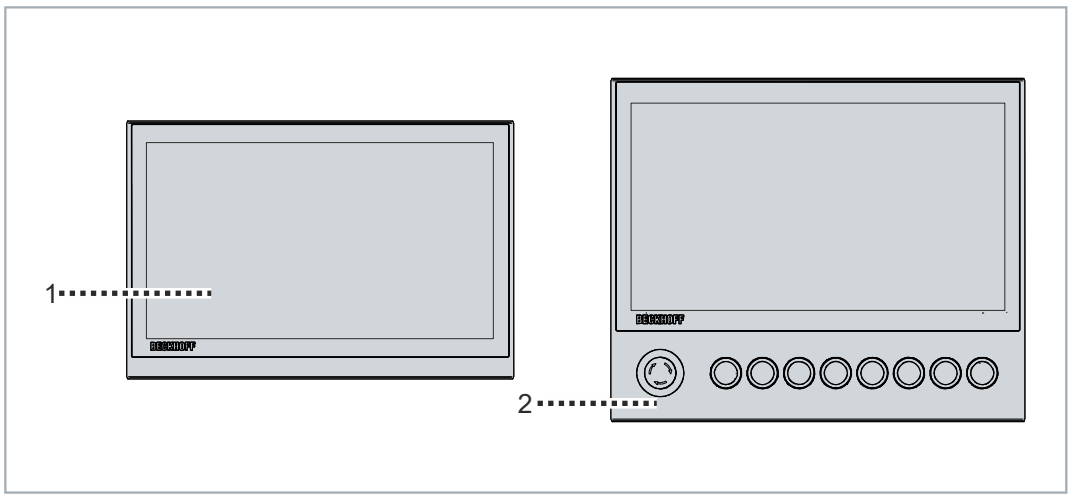


Fig. 1: Device without and with push-button extension

3.1 Structure

The figure shows the device set-up as an example of all versions.

The interfaces of the device on the connection block vary depending on the product variant. Otherwise, there are no differences in the external set-up of the device.

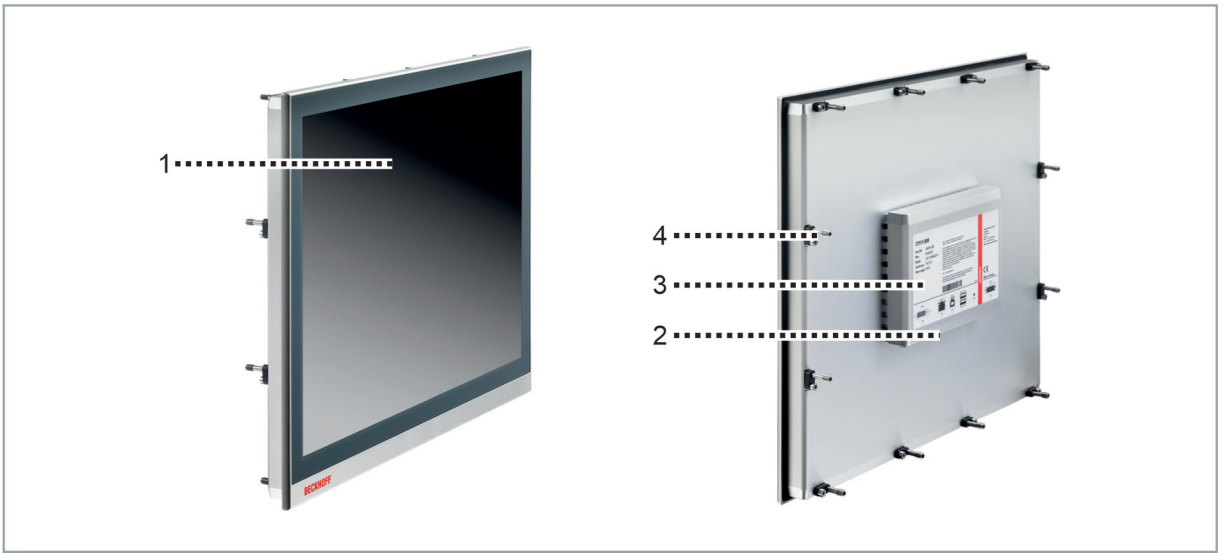


Fig. 2: Set-up

Table 1: Legend set-up

No.	Component	Description
1	Display and touch screen glass	Operating the device
2	Clamping lever	Mounting the device in the control cabinet
3	Connection block	Access to the interfaces
4	Name plate	Information on the equipment of the device
5	Power supply (X101)	Connection of the power supply and protective earth of the device
6	Grounding bolt	Functional earth of the device
7	USB output (X102, X103)	Connection of peripheral devices
8	USB input (X104)	Connection of control panel and industrial PC up to a maximum of 5 m
9	RJ45 for USB Extended (X105)	Connection of control panel and CU8801 USB-to-USB extended converter box over up to 50 m
10	DVI input (X106)	Transmission of DVI from industrial PC to control panel over up to 50 m

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:

- CP2907 (ordering option stainless steel front: C9900-F941)
- CP2913 (stainless steel front ordering option: C9900-F942)
- CP2916 (stainless steel front ordering option: C9900-F945)
- CP2918 (stainless steel front ordering option: C9900-F946)
- CP2921 (stainless steel front ordering option: C9900-F948)

The following figure shows the set-up of a stainless steel device:

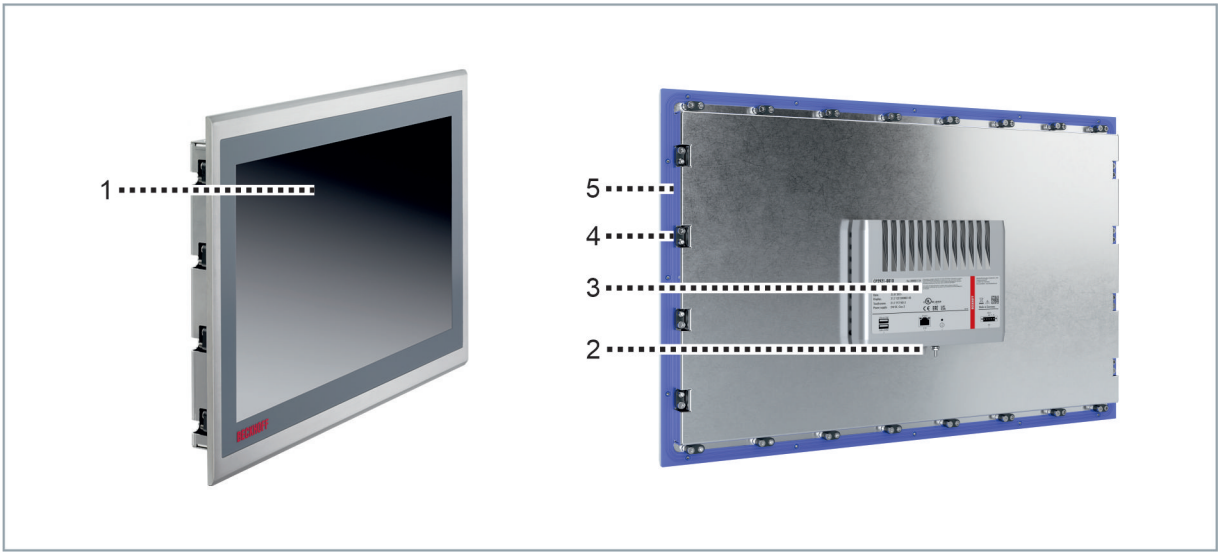


Fig. 3: Set-up stainless steel device

Table 2: Legend Set-up CP29xx stainless steel device

No.	Component	Description
1	Clamping lever	Mounting the device in the control cabinet wall
2	Silicone seal	Protection of the connection section from moisture
3	Name plate	Information on the equipment of the device
4	Access to interfaces	Interfaces on the underside
5	Display and touch screen glass	Operating the device
6	Stainless steel front	Use in environments with higher hygiene requirements

3.2 CP29xx-0000 interface description

The CP29xx-0000 features the following interfaces, which are located at the back of the housing:

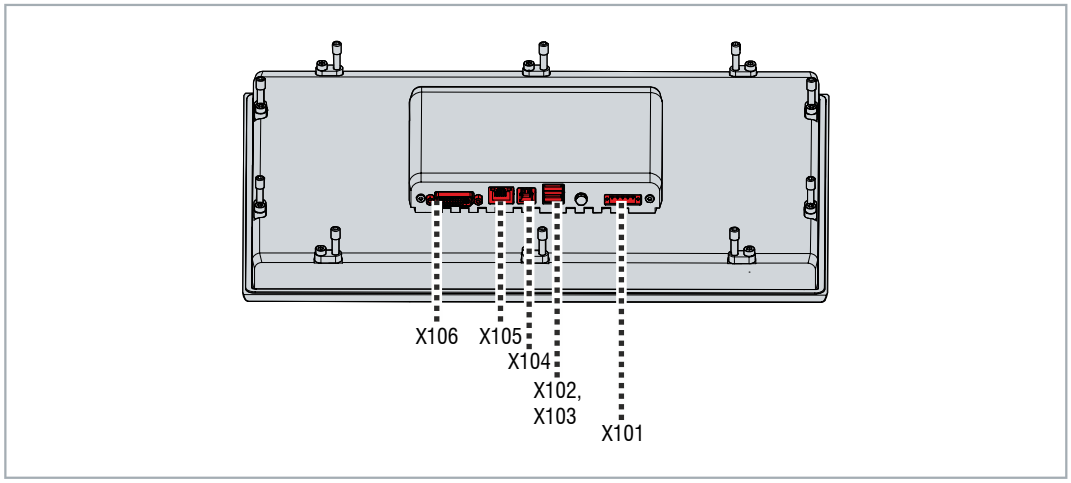


Fig. 4: Connection section -0000

Table 3: Legend Connection section -0000

Name	Interface
X101	Power supply [▶ 14]
X102, X103	USB output [▶ 15]
X104	USB input [▶ 16]
X105	USB Extended input [▶ 17]
X106	DVI Extended input [▶ 18]

3.2.1 Power supply

The control panel is supplied with a nominal input voltage of 24 V. The five-pin voltage socket (X101) is used for connection to the power supply and the protective earth of the control panel.

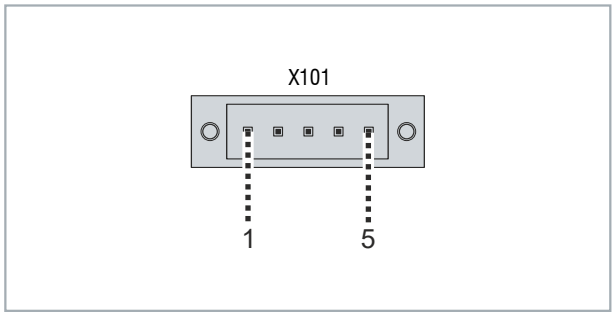


Fig. 5: Voltage socket pin numbering

Table 4: Voltage socket pin assignment

Pin	Signal	Description
1	NC	not used
2	NC	not used
3	⏚	Protective earth
4	-	Negative pole power supply 24 V
5	+ 24 V	24 V power supply, positive pole

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. There should be at least 22 V at the power supply plug of the control panel, so that the control panel remains switched on during 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-P927: power supply connector for CP29xx, 5-pin connector with strain relief for the external supply cable

3.2.2 USB output

The CP29xx-0000 Control Panel has two USB outputs (X102, X103) with socket type A. The interfaces are used to connect peripheral devices with USB connection. USB specification 3.0 is supported for connection distances up to 3 m. USB specification 2.0 is supported for connection distances of more than 3 m or when USB-E is used.

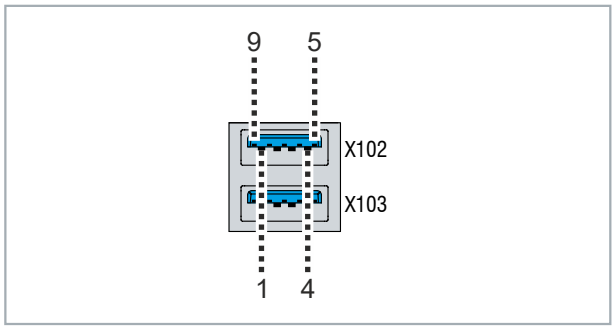


Fig. 6: USB interface pin numbering

Table 5: 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 +

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

3.2.3 USB input

The CP29xx-0000 Control Panel has a USB input (X104) with socket type B. The USB input is used to connect the control panel to the industrial PC. USB specification 3.0 is supported for connection distances up to 3 m. USB specification 2.0 is supported for connection distances up to 5 m.

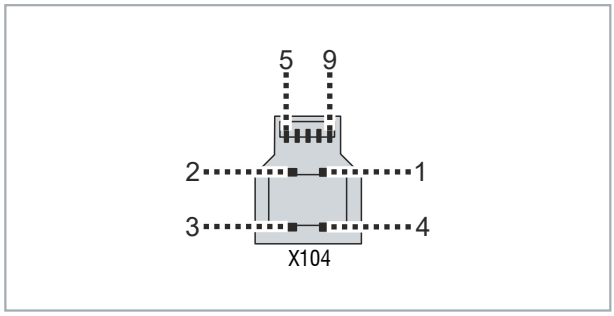


Fig. 7: USB input pin numbering

Table 6: 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 +

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

3.2.4 USB Extended input

The CP29xx-0000 Control Panel has a USB Extended input (X105) in the form of an RJ45 socket. The interface is used to connect the control panel to the CU8801 USB-to-USB extended transmitter box. The connection is made via a standard RJ45 cable, not crossed. The interface transmits USB 2.0 at 480 Mbit/s. The socket does not represent an Ethernet port.

To realize a distance of 50 m without hubs, USB Extended converts the USB signal so that it can be transmitted via a 50 m CAT-5 cable. In the control panel the signal is converted back to USB.

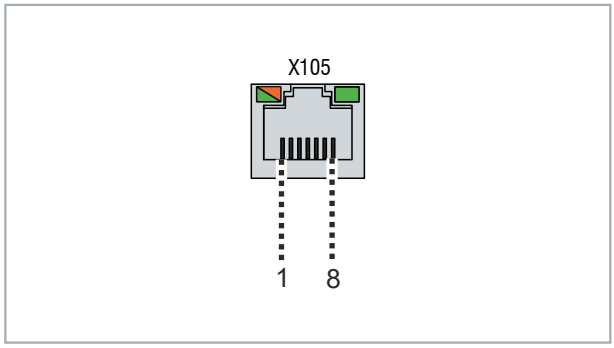


Fig. 8: USB-E input pin numbering

Table 7: USB-E input 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 -	

3.2.5 DVI Extended input

The CP29xx-0000 Control Panel has a DVI Extended input (X106). It is used to transmit the graphics signal from the industrial PC to the control panel.

The graphics signal is transferred directly via a DVI cable over a distance of 50 m max. Such a cable length leads to strong distortion of the graphics signal on arrival at the control panel. A signal processor is used in the control panel to fully restore the DVI signal. The industrial PC requires a conventional DVI output.

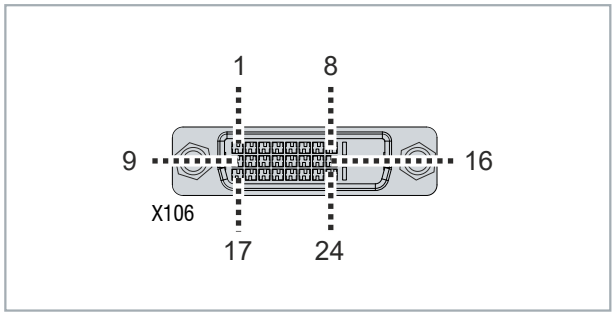


Fig. 9: DVI Extended input pin numbering

Table 8: DVI Extended 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	TMDS Data 4 -	12	TMDS Data 3 -	20	TMDS Data 5 -
5	TMDS Data 4 +	13	TMDS Data 3 +	21	TMDS Data 5 +
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 -

3.3 CP29xx-0010 interface description

The CP29xx-0010 features the following interfaces, which are located at the back of the housing:

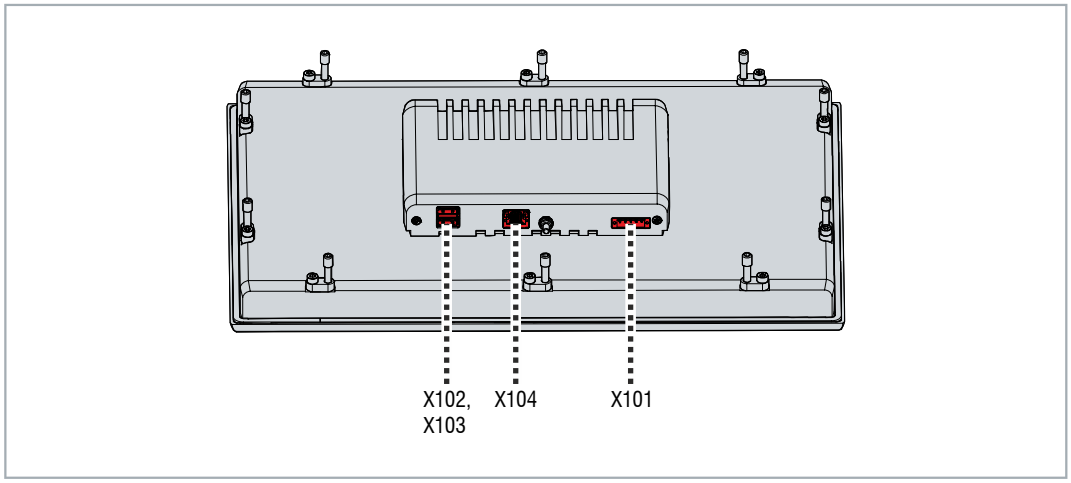


Fig. 10: Connection section -0010

Table 9: Legend Connection section -0010

Name	Interface
X101	Power supply [▶ 19]
X102, X103	USB output [▶ 20]
X104	CP-Link 4 [▶ 21]

3.3.1 Power supply

The control panel is supplied with a nominal input voltage of 24 V. The electrically isolated five-pin voltage socket (X101) is used for connection to the power supply and the protective earth of the control panel.

If the control panel is connected to an industrial PC via the CU8803 transmitter box, no additional power supply to the control panel is required via the voltage socket.

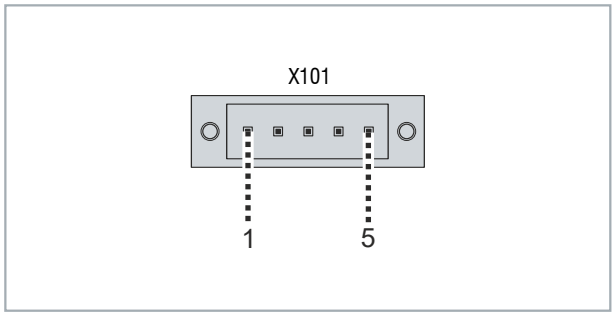


Fig. 11: Voltage socket pin numbering

Table 10: Voltage socket pin assignment

Pin	Signal	Description
1	NC	not used
2	NC	not used
3	⏚	Protective earth
4	-	24 V supply voltage, negative pole
5	+ 24 V	24 V supply voltage, positive pole

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. There should be at least 22 V at the power supply plug of the control panel, so that the control panel remains switched on during 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-P927: power supply connector for CP29xx, 5-pin connector with strain relief for the external supply cable

3.3.2 USB output

The CP29xx-0010 Control Panel has two USB outputs (X102, X103) with socket type A. The interfaces are used to connect peripheral devices with USB connection. USB specification 2.0 is supported.

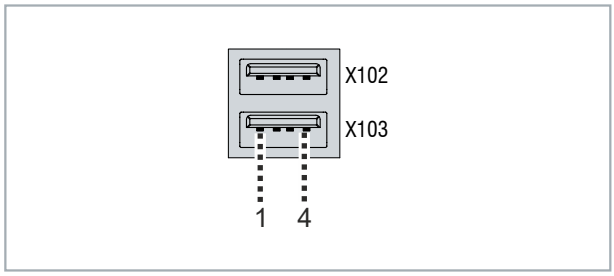


Fig. 12: USB interface pin numbering

Table 11: USB interface pin assignment

Pin	Connection
1	Vbus
2	D -
3	D +
4	GND

3.3.3 CP-Link 4

The CP29xx-0010 Control Panel has a CP-Link 4 input (X104) in the form of an RJ45 socket. This is not an Ethernet port. Via the interface, the control panel can be connected to an industrial PC located at a distance of up to 100 m. The connection can be made either directly to an industrial PC with an appropriate PCIe® module or indirectly via an intermediate transmitter box.

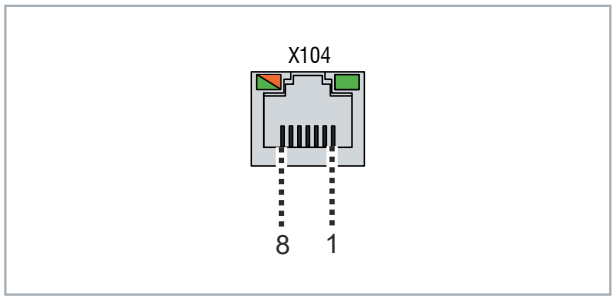


Fig. 13: CP-Link 4 interface pin numbering

Table 12: CP-Link 4 pin assignment

Pin	Signal	Description
1	0 +	Pair 0
2	0 -	
3	1 +	Pair 1
4	2 +	Pair 2
5	2 -	
6	1 -	Pair 1
7	3 +	Pair 3
8	3 -	

CP-Link 4 is available as a Two Cable Display Link on an industrial PC with PCIe® module. The devices shown below are examples of all CP-Link 4-capable industrial PCs and control panels.

The control panel can be connected directly to the industrial PC via the module. USB 2.0 (100 Mbit/s) and DVI are transmitted together via a CP-Link 4 cable. An additional power supply is required for the control panel.

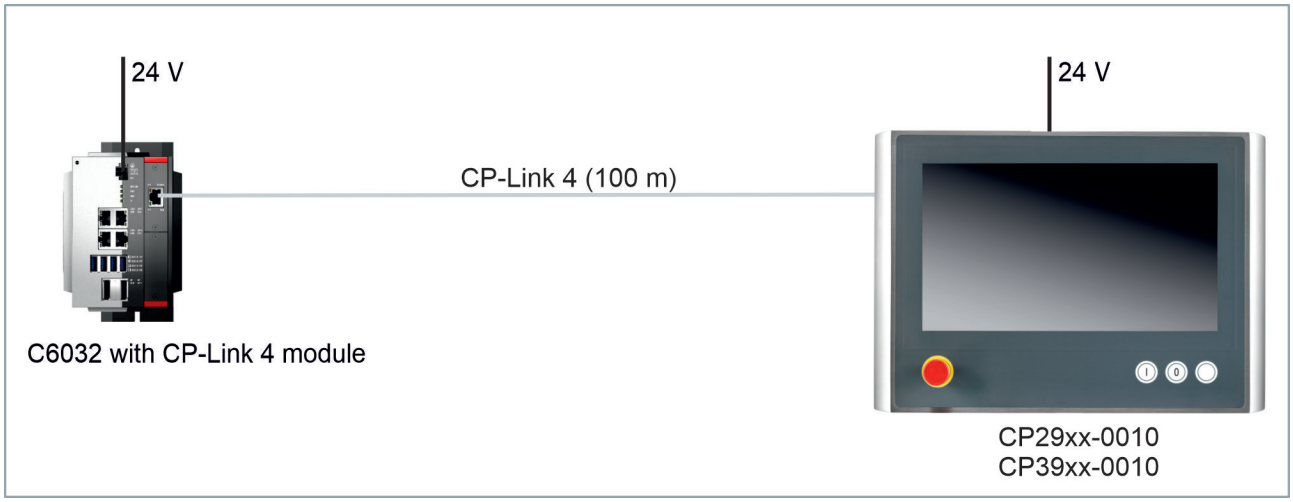


Fig. 14: CP-Link 4

CP-Link 4 with CU8802 transmitter box

If the industrial PC is not equipped with a PCIe® module, a transmitter box is required for connecting the control panel.

When installing the control panel with the CU8802 transmitter box, the industrial PC is connected to the transmitter box via USB and DP/DVI. The transmitter box is then connected to the control panel via the CP-Link 4 connection of the transmitter box using a CP-Link 4 cable. USB and DVI are transmitted together via this cable. An additional power supply is required for the control panel (Two Cable Display Link). The following figure shows the wire connection to the CU8802-000x.

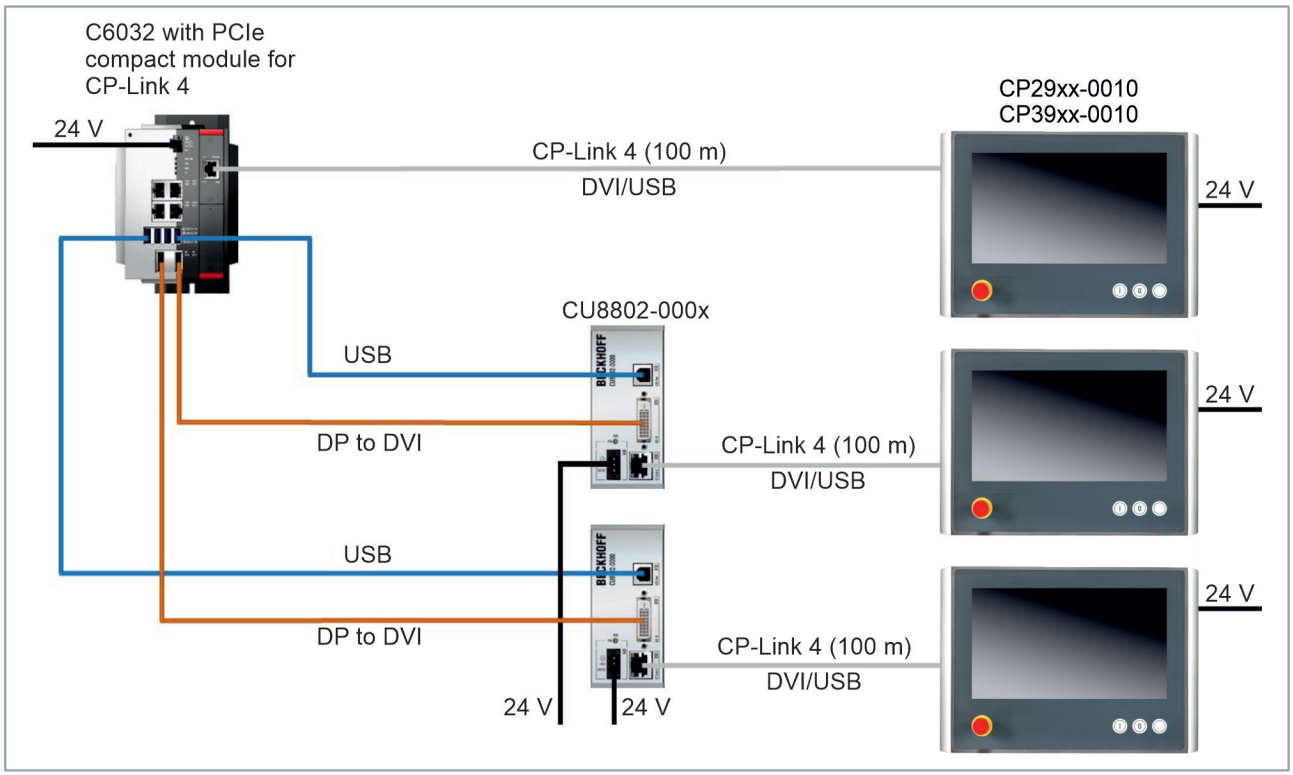


Fig. 15: CP-Link 4, CU8802-000x

The following ordering options are available for the transmitter boxes:

- CU8802-0000: DVI-to-DVI cable included in the box
- CU8802-0010: DisplayPort to DVI cable included with box

CP-Link 4 with CU8803 transmitter box

NOTICE

Material damage due to double voltage connection with CU8803

Connecting an additional power supply to the voltage socket of the control panel can cause damage to the panel.

- Power the control panel exclusively via One Cable Display Link through the CU8803 transmitter box.
- When using the CU8803 transmitter box, never connect an additional power supply to the voltage socket of the control panel.
- Only connect an additional power supply to the voltage socket of the control panel when using the CU8802 transmitter box.

When installing the control panel with the CU8803 transmitter box, the industrial PC is also connected to the transmitter box via USB and DP/DVI. The transmitter box is then connected to the control panel via the CP-Link 4 connection of the transmitter box using a CP-Link 4 cable. With this box, USB, DP/DVI and power supply can be transmitted together via the cable (One Cable Display Link). Do not connect an additional power supply to the CP39xx-0010 as this could cause damage. The following figure shows the wire connection to the CU8803.

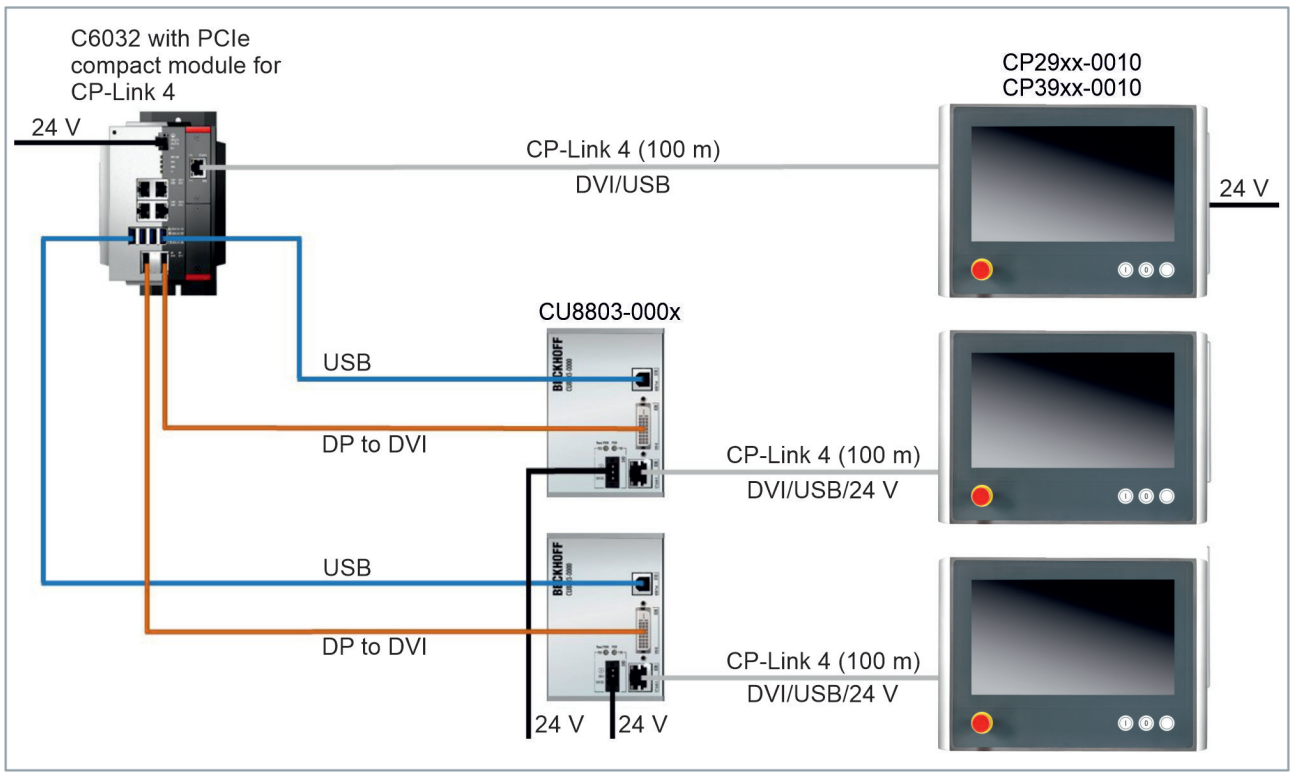


Fig. 16: CP-Link 4, CU8803-000x

The following ordering options are available for the transmitter boxes:

- CU8803-0000: DVI-to-DVI cable included in the box
- CU8803-0001: DisplayPort to DVI cable included with box

3.4 Optional USB interface

You can expand the device beyond the basic configuration with an additional USB interface. The following ordering options are available:

- USB (order identifier: C9900-E268)

The ordering option is not available for the device in combination with a push-button extension or a stainless steel front.

The interface is mounted ex factory. It is located at the bottom right in the front of the device behind a cover. To make the interface accessible, follow the steps below:

1. Press against the bulge on the right side of the cover (section A).
   ⇨ The cover protrudes slightly from the left side of the device.
2. Turn the cover down (section B).

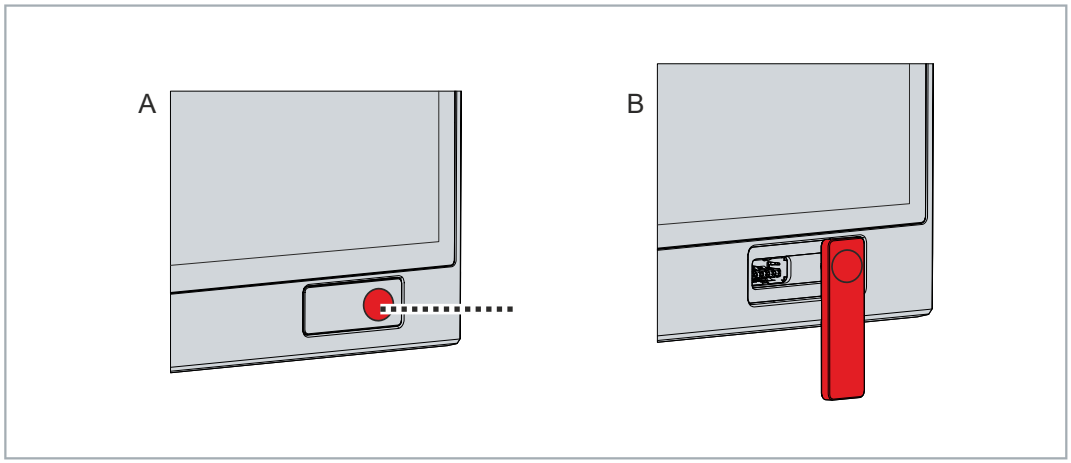


Fig. 17: Access optional interface

   ⇨ The USB interface is now accessible.
3. Turn the cover back again.
4. Press the bulge again.

⇨ The cover is locked again.

The interface is used to connect peripheral devices with USB connection. This is a USB-A socket with IP65 protection. The USB specification 2.0 is supported.

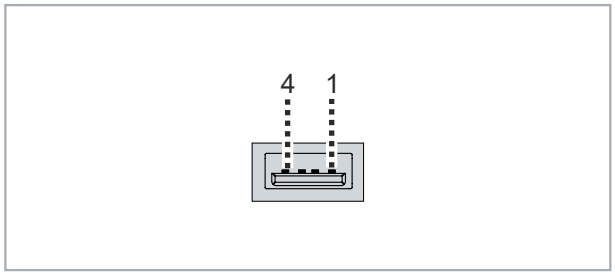


Fig. 18: CP29xx_optional USB interface

Table 13: Optional USB interface pin assignment

Pin	Assignment
1	Vbus
2	D -
3	D +
4	GND

3.5 Name plate

The name plate provides you with information on the equipment of the control panel. The name plate shown here is only an example.

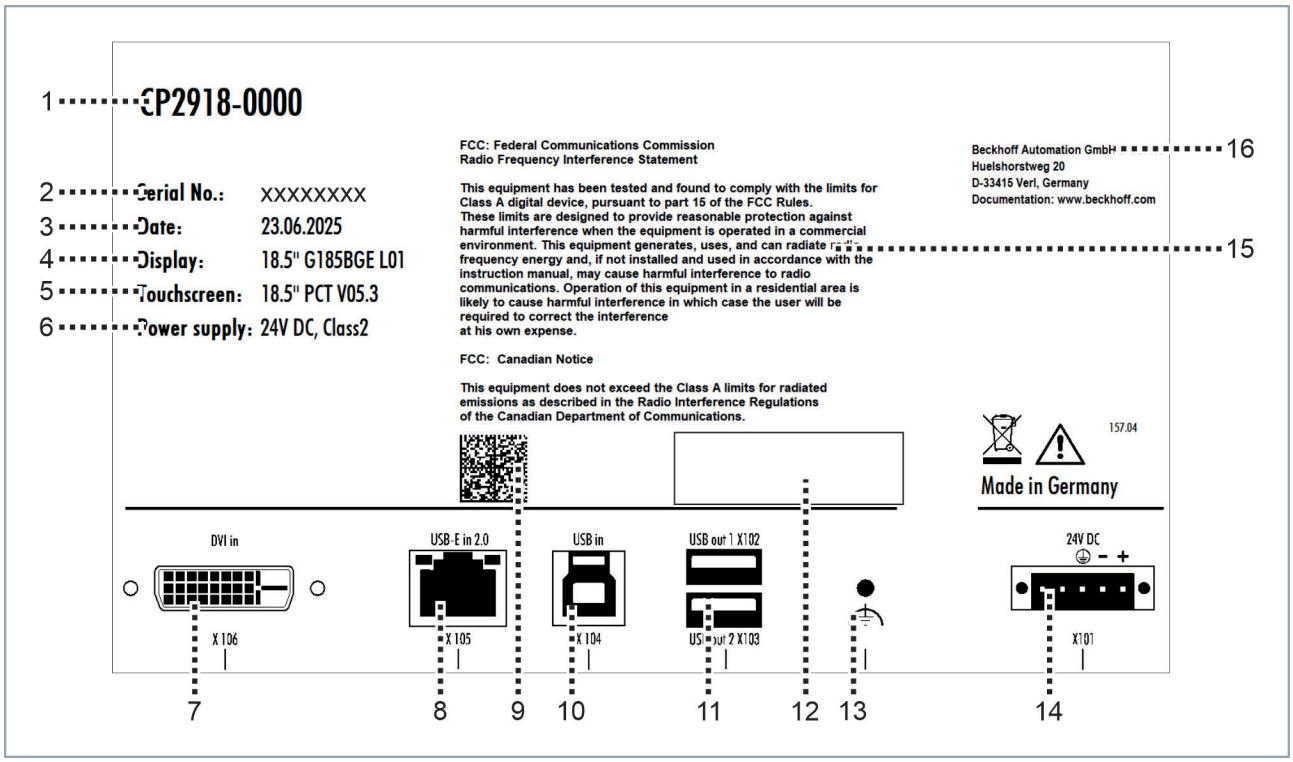


Fig. 19: Name plate example

Table 14: Name plate legend

No.	Description
1	Model: the last four digits indicate the product variant.
2	Serial number = Beckhoff Traceability Number (BTN)
3	Date of manufacture
4	Display
5	Touch screen
6	Power supply: 24 V_{DC}, NEC class 2
7	DVI Extended interface (X106)
8	USB Extended Interface (X105)
9	BIC
10	USB input (X104)
11	USB output (X102, X103)
12	Symbols Note: The symbols applicable to the device such as CE, EAC, UKCA,  are located here. The approvals of your device can be found on the name plate and in chapter 9.2 Approvals.
13	Ground connection for functional earthing of the control panel
14	Connection of the power supply and protective earth of the control panel (X101)
15	FCC approval
16	Manufacturer’s address

4 Commissioning

In order to use the device, you must first commission it. The first step is to transport the device to is operating location and unpack it. The device is then installed in the control cabinet, the cables and power supply are connected, and finally the device is switched on.

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 observed (see chapter 8 Technical Data [▶ 43]).

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.

Proceed as follows to unpack the unit:

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. Inform the Beckhoff Service Dept. in case of discrepancies between the packaging content and the order or in the event of transport damage.

⇨ You have unpacked the device.

4.2 Installation in the control cabinet

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.

The dimensions of the control panel can be found in the download finder on the Beckhoff website under Technical drawings: https://www.beckhoff.com/downloadfinder.

4.2.1 Installation in the control cabinet

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. 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.

Once you have made the required cutout in the control cabinet, you can install the device in the control cabinet. Clamping levers are provided at the rear side of the housing for mounting of the device. When delivered, the clamping levers are folded down onto the device.

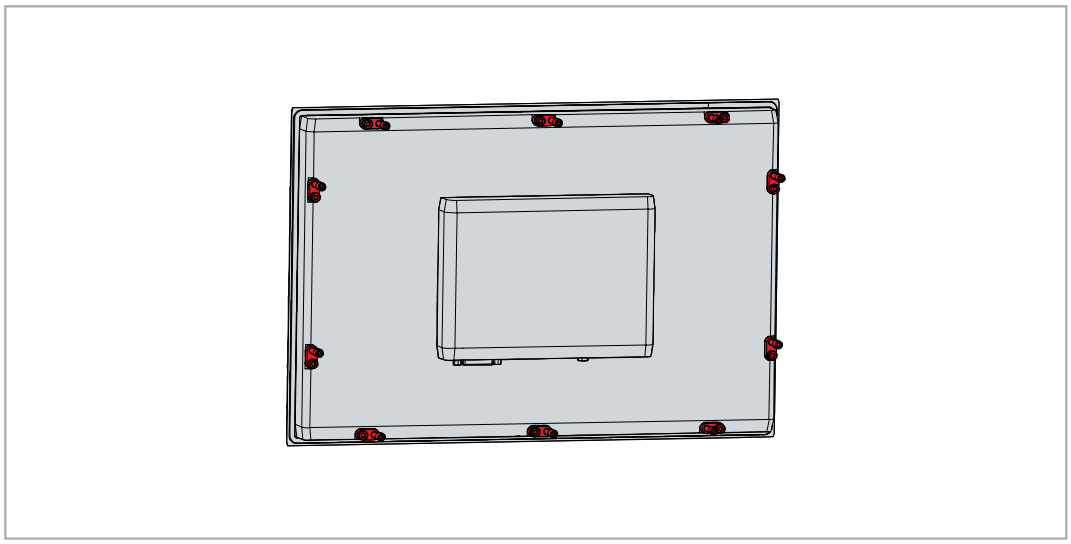


Fig. 20: Delivery state clamping lever

To mount the device in the control cabinet, follow the steps below:

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

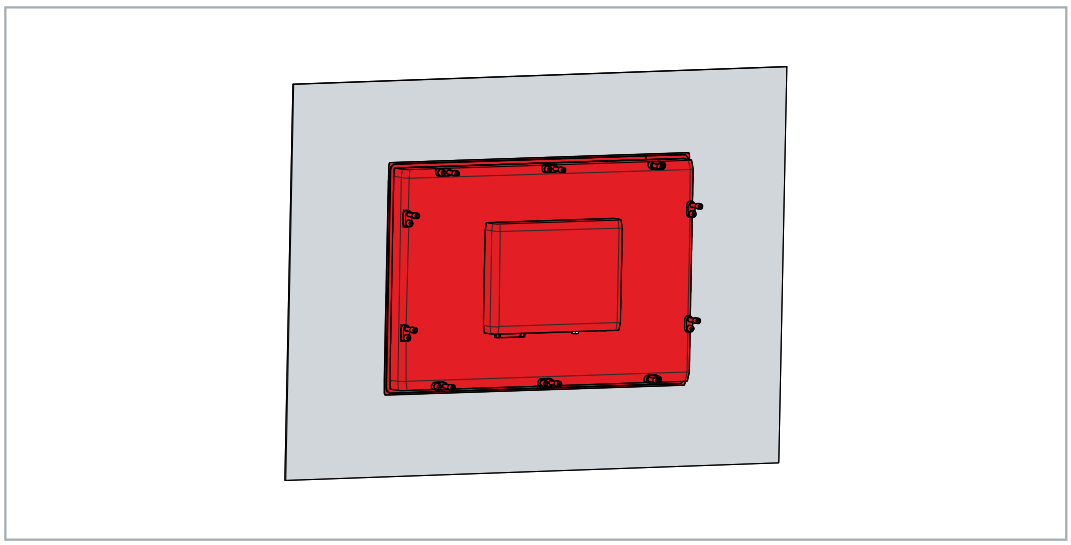


Fig. 21: Wall positioning

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

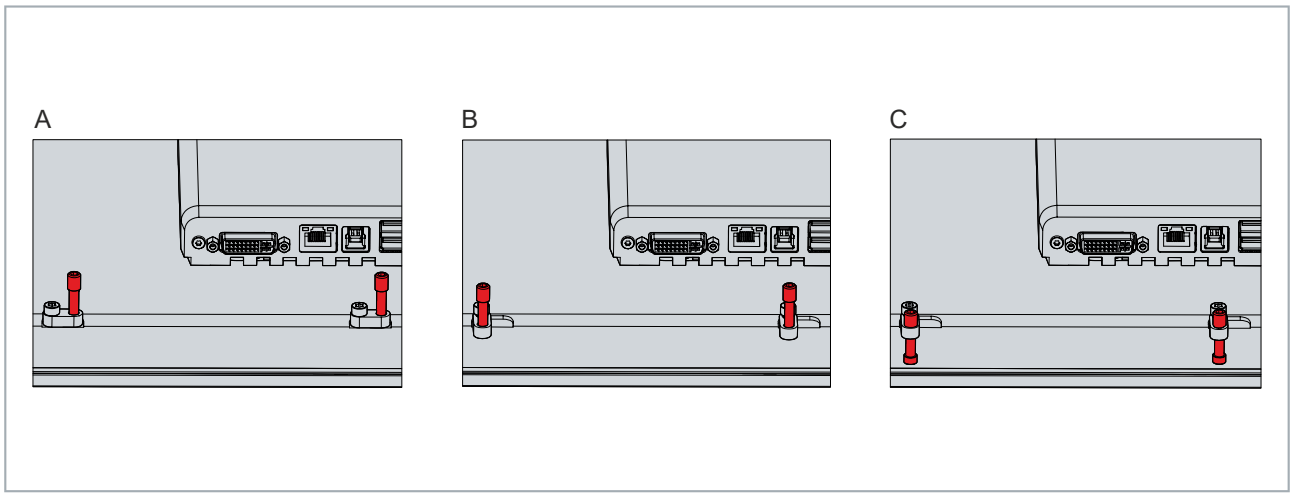


Fig. 22: Control cabinet installation

⇨ You have installed the device in the control cabinet.

4.3 Connecting the control panel

⚠ 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 power supply providing 24 V DC from an isolated source is required. This must be protected by a fuse in accordance with UL 248 with a maximum nominal value of 4 A. 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 (no potential difference).

4.3.1 Installing power supply cable

Before you can connect the power supply, you must install the power supply line yourself. For this purpose, use the supplied material for connector assembly. This consists of the 5-pin connector and the strain relief housing with cable tie.

Mounting the supply line

First mount the plug on the cable as follows:

1. Remove the insulation from the cable ends (8-9 mm).
2. Screw the cable ends into the connection strip. For the pin assignment of the connector, see Chapter Power supply.

⇨ You have fitted the supply line to the plug.

Assembly of strain relief housing

Now fit the strain relief housing to the already connected plug and supply line:

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).

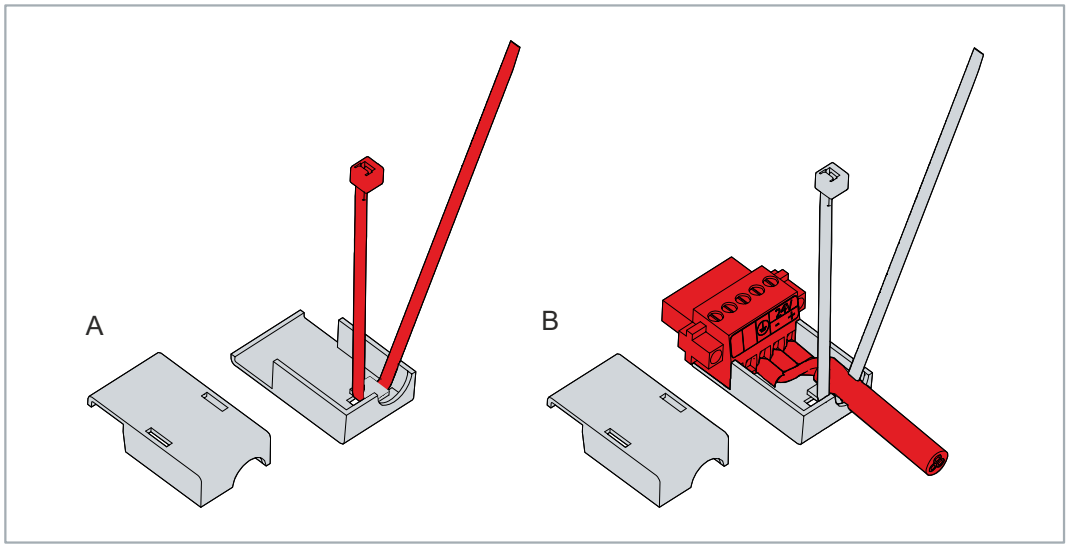


Fig. 23: Mounting lower part of strain relief housing

3. Tighten the cable tie and cut off the plastic tab (section C).
4. Attach the upper part of the strain relief housing by snapping it onto the lower part (section D).

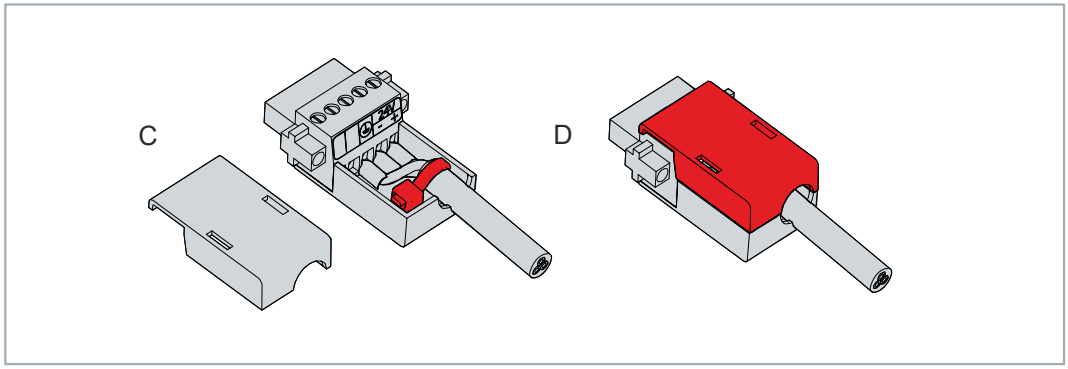


Fig. 24: Mounting upper part of strain relief housing

⇨ You have mounted the strain relief housing.

To dismantle the strain relief housing, proceed as follows:

1. Use your fingers to bend the latching lugs on the lower part slightly outwards.

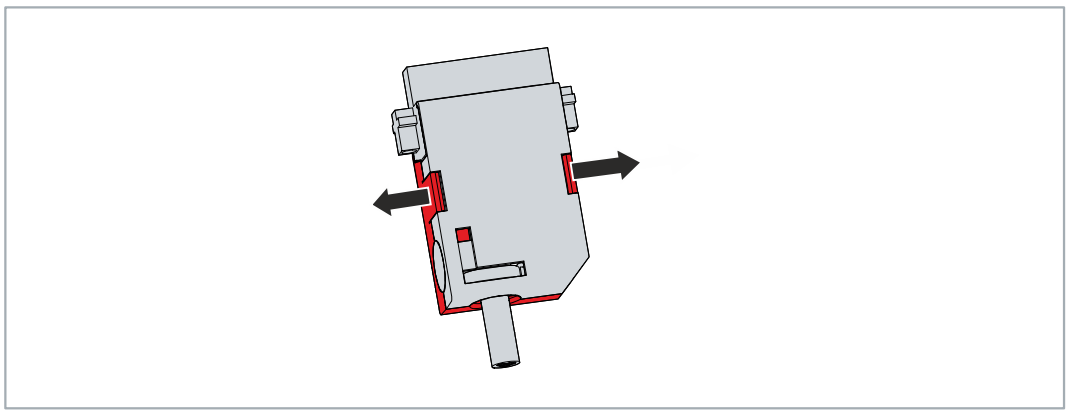


Fig. 25: Disassembly of the strain relief housing

2. Lever the upper part off the lower part.
3. Cut the cable tie.

⇨ You have dismantled the strain relief housing.

4.3.2 Grounding the control panel

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 device 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 block on the rear side of the device and the central grounding point of the control cabinet in which the device 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.

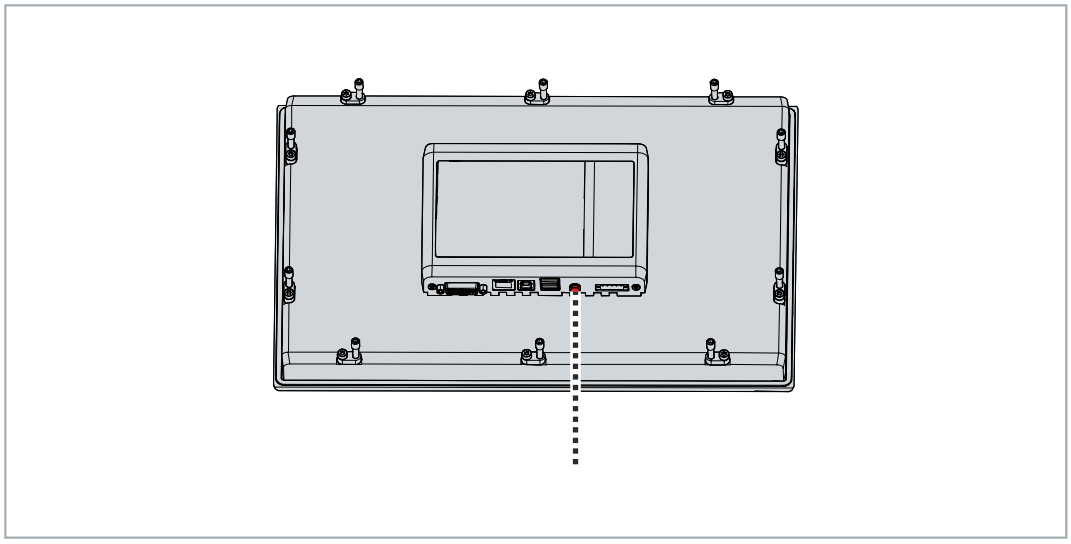


Fig. 26: Grounding bolt for functional earthing

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.

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

Connecting cables

Make sure that you first ground the panel (see chapter 4.3.2 Grounding the control panel [▶ 34]) and then plug in all data transmission cables.

When connecting the control panel to an industrial PC with UPS output, we recommend using this for the connection. In the case of CP-Link 4, we recommend connecting the CU880x transmitter boxes to the UPS output of the PC.

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 device, so that the device remains switched on during voltage fluctuations.

Proceed as follows to connect the 24 V DC power supply:

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

⇨ You have connected the power supply.

5 Shutting down

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 device, 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 device any further, chapter Disassembly and disposal provides information on the correct disposal of the device.

5.1 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.

NOTICE

Hardware damage due to power supply

Disconnecting the CP-Link 4 connection while the transmitter box power supply is switched on may cause damage to the transmitter box.

- Switch off the power supply to the CU8803 transmitter box before disconnecting the CP-Link 4 connection.

Proceed as follows to disconnect the power supply and lines:

1. Shut down the device.
2. Disconnect the device from your external 24 V power supply.
3. Remove the voltage connector from the voltage 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 device.
6. Finally, disconnect the ground connection.

⇨ You have disconnected the power supply and the cables.

Also see about this

Installing power supply cable [▶ 32]

5.2 Disassembly and disposal

Before you can remove the device from the control cabinet, you must first disconnect the power supply and the cables (see Chapter Disconnecting the power supply and cables).

To remove the device from the control cabinet, follow the steps below:

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 by 90° onto the device (section C).

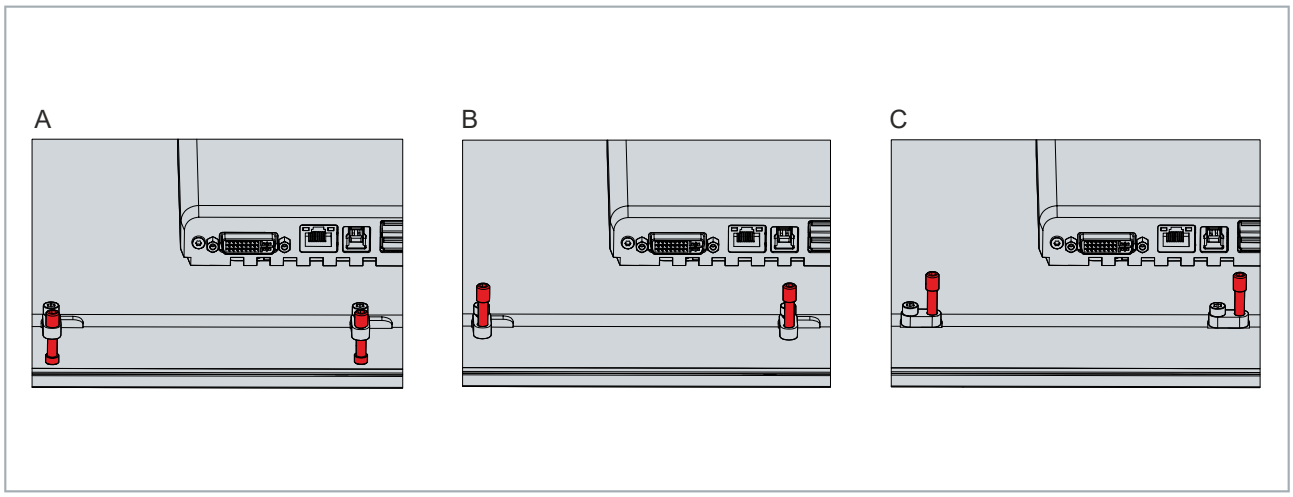


Fig. 27: Dismantling the control cabinet

3. Remove the device from the corresponding cutout in the control cabinet wall.

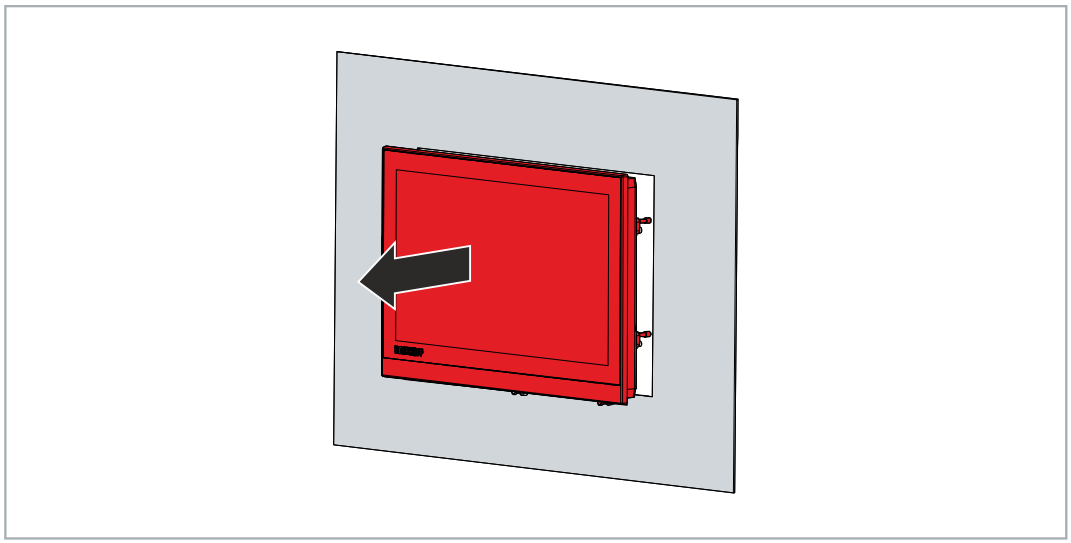


Fig. 28: Wall removal

⇨ You have successfully removed the device from the control cabinet.

When disposing of the device follow the national electronic scrap regulations. In order to dispose of the device, it must be removed and fully dismantled. Dispose of the components in the following way:

- Send plastic parts (polycarbonate, polyamide (PA6.6)) for plastics recycling.
- Take metal parts to the metal recycling collection point.
- Electronic parts such as fans and circuit boards must be disposed of in accordance with national electronic scrap regulations.
- Stick insulating tape over the poles of the CR2032 battery on the motherboard and dispose of the battery via the local battery recycling.

6 Servicing and maintenance

Maintenance measures increase the efficiency of the device by ensuring long-term functionality. Cleaning the device contributes to this.

Defective pixels in the TFT display are production-related and are not grounds for complaint.

Cleaning

NOTICE

Unsuitable cleaning agents

The use of unsuitable cleaning agents can damage the device.

- Clean the device only as specified.

It is essential to observe the following aspects when cleaning the control panel:

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

Cleaning agents

You must use suitable cleaning agents to avoid damaging the front of the device during cleaning. 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

Repair

Only the vendor may repair the device. If a repair should be necessary, contact Beckhoff Service (see Chapter 9.1 Service and Support).

Also see about this

Service and support [▶ 44]

6.1 Cleaning the front screen

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.).

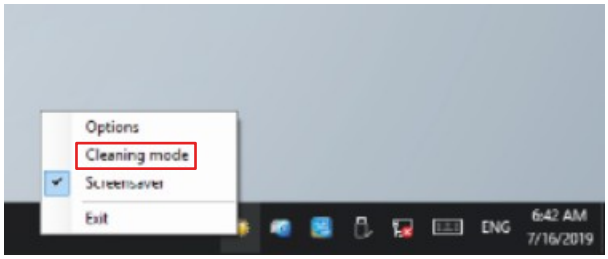


Fig. 29: Select "Cleaning Mode"

⇨ "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 figure.).

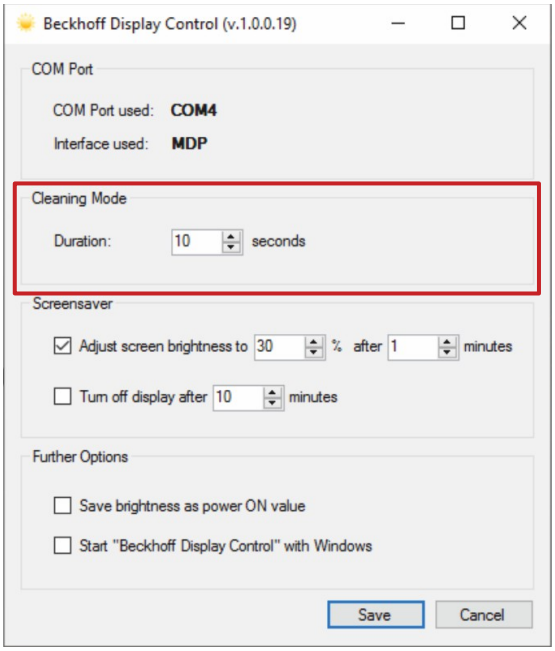


Fig. 30: Configuration "Cleaning Mode"

6.2 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 seal on the rear of the unit to protect the connection section from moisture.

The silicone seal may become porous after a long operating time. 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 15: 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 seal, follow the steps below:

1. Loosen and remove the M2.5x4 screws.
2. Remove the seal.

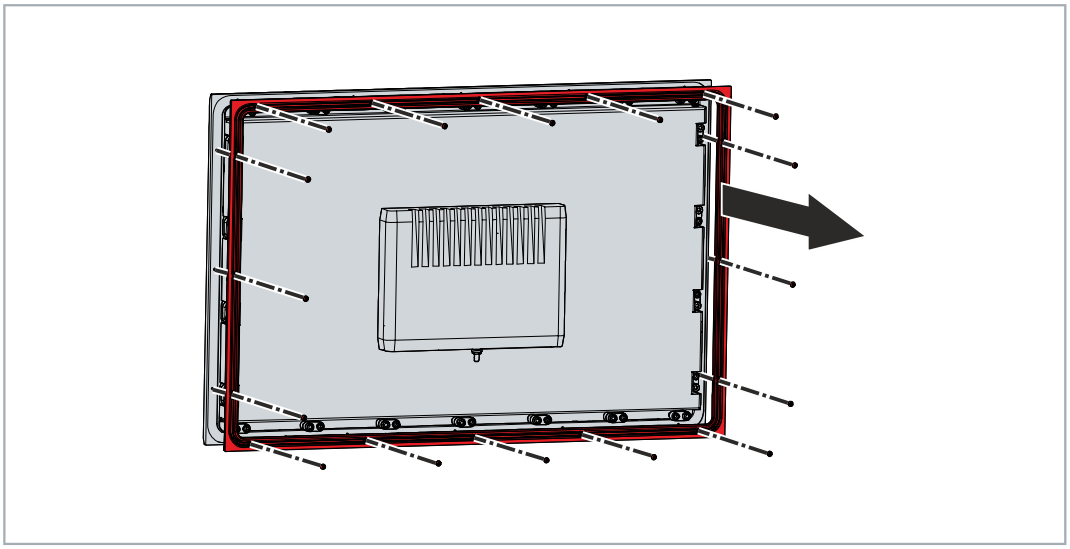


Fig. 31: Removing the seal

3. Place the new seal in the circumferential sealing groove on the rear of the device.
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.

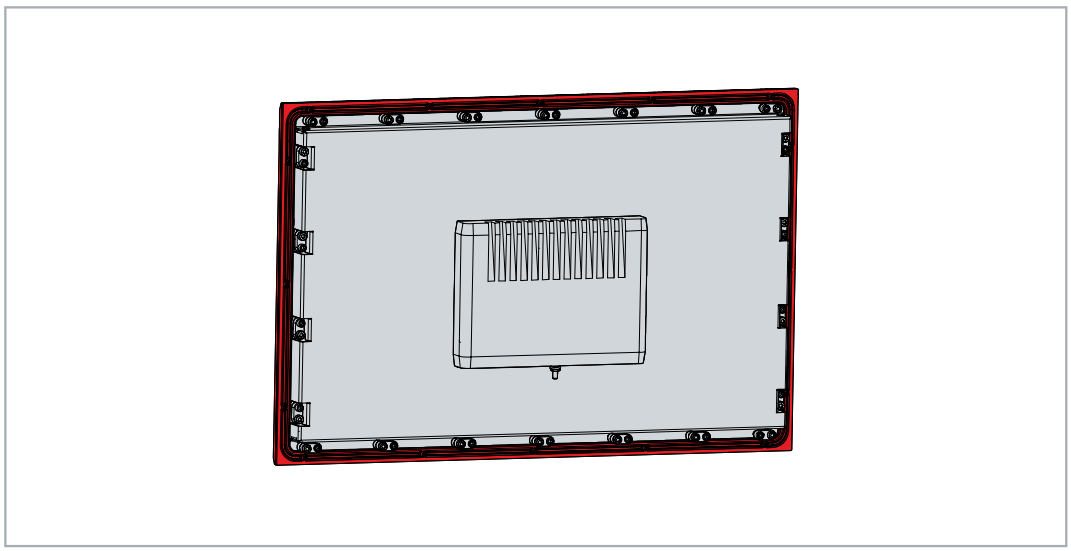


Fig. 32: Inserting the new seal

⇨ You have replaced the seal.

7 Troubleshooting

Table 16: Troubleshooting

Fault	Cause	Measures
No control panel function	Lack of power supply to the control panel Other cause	Check the power supply cable Call Beckhoff Service
The control panel only works partially or only temporarily (e.g. dark screen image or none at all)	Defective backlight in the display Components in the control panel defective	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

8 Technical Data

Table 17: Technical data

Product designation	CP29xx		
Weights aluminum front/stainless steel front	CP2907: 1.5 kg / 1.8 kg CP2912: 3.0 kg CP2913: 2.8 kg / 3.1 kg CP2915: 3.7 kg CP2916: 4.2 kg / 4.5 kg CP2918: 5.1 kg / 5.4 kg CP2919: 5.4 kg CP2921: 5.9 kg / 6.2 kg CP2924: 7.2 kg		
Supply voltage	22-30 V_{DC} (24 V_{DC} power supply unit, NEC class 2)		
Power consumption	Data sheet for calculating power consumption and power loss in the download finder: https://www.beckhoff.com/en-en/support/download-finder/search-result/?download_group=691754572		
Protection rating	Front IP65, rear IP20		
Vibration resistance (sinusoidal vibration)	EN 60068-2-6:	10 ... 58 Hz:	0.035 mm
		58 ... 500 Hz:	0.5 G (~ 5 m/s²)
Shock resistance (shock)	EN 60068-2-27:	5 G (~ 50 m/s²), 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 CP29xx-0000: 0 °C ... +55 °C Operation CP29xx-0010: 0 °C ... +50 °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. Suitable packaging of the control panel can improve the resistance to impact during transport.		

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 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

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
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.

9.2 Approvals

Your device has at least the following approvals:

- CE
- 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

Fig. 1 Device without and with push-button extension 10
Fig. 2 Set-up 11
Fig. 3 Set-up stainless steel device 12
Fig. 4 Connection section -0000 13
Fig. 5 Voltage socket pin numbering 14
Fig. 6 USB interface pin numbering 15
Fig. 7 USB input pin numbering 16
Fig. 8 USB-E input pin numbering 17
Fig. 9 DVI Extended input pin numbering 18
Fig. 10 Connection section -0010 19
Fig. 11 Voltage socket pin numbering 19
Fig. 12 USB interface pin numbering 20
Fig. 13 CP-Link 4 interface pin numbering 21
Fig. 14 CP-Link 4 21
Fig. 15 CP-Link 4, CU8802-000x 22
Fig. 16 CP-Link 4, CU8803-000x 23
Fig. 17 Access optional interface 24
Fig. 18 CP29xx_optional USB interface 24
Fig. 19 Name plate example 25
Fig. 20 Delivery state clamping lever 29
Fig. 21 Wall positioning 30
Fig. 22 Control cabinet installation 30
Fig. 23 Mounting lower part of strain relief housing 32
Fig. 24 Mounting upper part of strain relief housing 32
Fig. 25 Disassembly of the strain relief housing 33
Fig. 26 Grounding bolt for functional earthing 34
Fig. 27 Dismantling the control cabinet 37
Fig. 28 Wall removal 37
Fig. 29 Select "Cleaning Mode" 39
Fig. 30 Configuration "Cleaning Mode" 39
Fig. 31 Removing the seal 40
Fig. 32 Inserting the new seal 41

List of tables

Table 1 Legend set-up 11
Table 2 Legend Set-up CP29xx stainless steel device 12
Table 3 Legend Connection section -0000 13
Table 4 Voltage socket pin assignment 14
Table 5 USB interface pin assignment 15
Table 6 USB interface pin assignment 16
Table 7 USB-E input pin assignment 17
Table 8 DVI Extended interface pin assignment 18
Table 9 Legend Connection section -0010 19
Table 10 Voltage socket pin assignment 19
Table 11 USB interface pin assignment 20
Table 12 CP-Link 4 pin assignment 21
Table 13 Optional USB interface pin assignment 24
Table 14 Name plate legend 25
Table 15 Ordering options seal 40
Table 16 Troubleshooting 42
Table 17 Technical data 43

Trademark statements

Beckhoff®, ATRO®, EtherCAT®, EtherCAT G®, EtherCAT G10®, EtherCAT P®, MX-System®, Safety over EtherCAT®, TC/BSD®, TwinCAT®, TwinCAT/BSD®, TwinSAFE®, XFC®, XPlanar® and XTS® are registered and licensed trademarks of Beckhoff Automation GmbH.

Third-party trademark statements

PCI Express®, PCIe®, PCI™ and PCI HOT PLUG™ are trademarks or registered trademarks and/or service marks of PCI-SIG.

More Information:
www.beckhoff.com/cp29xx

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany
Phone: +49 5246 9630
info@beckhoff.com
www.beckhoff.com