BECKHOFF New Automation Technology

Manual | EN

CP79xx-14xx

Control Panel

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Version: 1.2

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).

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Please check whether you are using the current and valid version of this document. The current version is always available for download from the Beckhoff website. In case of doubt, contact Technical Support.

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

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 -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 -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 DVI/USB extension technology integrated in the CP3921-150x-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 CP3921-150x-0010 Control Panel enables the panel to be located up to 100 m away from the PC via a CP-Link 4 cable. The 24 V power supply must be provided by a separate cable.

The device has been developed for an IP20 working environment. This involves finger protection and protection against solid foreign objects up to 12.5 mm. There is no protection against water. Operation of the devices in wet and dusty environments is not permitted.

The front of the device is designed for an IP50 working environment. There is complete protection against contact and dust in harmful quantities. It is not protected against water.

The rear of the device 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 front of the panel PC is designed for an IP54 working environment. There is complete protection against contact and against dust in harmful quantities, as well as protection against splash water on all sides.

The rear side is designed for a working environment that meets the IP20 protection rating. This involves finger protection and protection against solid foreign objects up to 12.5 mm. There is no protection 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 front of the panel PC 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 a working environment that meets the IP20 protection rating. 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 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.

Potentially hazardous area

For the operation of the industrial PC in hazardous area Zone 2, the device adaptation by the is required.

The industrial PC is only suitable for the following hazardous areas:

- For Zone 2 where gas is present as a combustible material. Zone 2 means that the environment is usually either not explosive or only for a short period of time.

The industrial PC must be installed in a housing with an IP54 protection rating for gas according to EN 60079-7 or IEC 60079-7.

Improper use

Do not use the device outside the documented operating conditions.

The industrial PC is not suitable for use in the following environments:

- The industrial PC may only be used in Zone 2 and only with a suitable housing.
- The industrial PC is not suitable for use in aggressive environments, for example with aggressive gases or chemicals.
- The industrial PC is not suitable for residential areas. Relevant standards regarding interference emissions must be observed. The device must be installed in a housing or a control cabinet with suitable shielding.

2.3 Fundamental safety instructions

The following safety instructions must be observed when handling the the Control Panel.

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.

- 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.

- Observe hot surfaces when using the device. There is a risk of burns.

Damage to property, loss of data and impairment of functions

- If you change the hardware and software configurations, you must keep within the specified limits of power consumption and power loss (please refer to the respective data sheet).

- Ensure that only trained specialists with a control and automation engineering background, operate the device. Use by unauthorized persons can lead to damage to property and loss of data.

- In the case of a 24 V DC power supply unit, fuse the power supply line according to its cross-section to protect the supply line in the event of a short circuit.

- In case of fire, extinguish the device with powder or nitrogen.

2.4 Operator's obligation to exercise diligence

The operator must ensure that

- the products are used only for their intended purpose (see Chapter 2.2 Intended use [▶ 6]).

- the products are only operated in sound condition and in working order.

- the products are operated only by suitably qualified and authorized personnel.

- the personnel is instructed regularly about relevant occupational safety and environmental protection aspects, and is familiar with the operating instructions and in particular the safety instructions contained herein.

- the operating instructions are in good condition and complete, and always available for reference at the location where the products are used.

2.5   Notes on information security

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

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

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

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

3   Product overview

The stainless steel control panel is designed for installation on the mounting arm. It offers suitable solutions for a variety of applications. The model variety ranges from different display sizes to custom models.

The control panel has the following features:

- Three display sizes and resolutions:
    - 12-inch, 800 x 600
    - 15-inch, 1024 x 768
    - 19-inch, 1280 x 1024
- Single-touch
- Stainless steel housing, IP65 all around
- 24 V DC power supply unit

Each of the three display sizes is available without or with push button extension:

- CP7901-1400-0010 (12-inch, without push button extension)
- CP7901-1401-0010 (12-inch, with push button extension)
- CP7902-1400-0010 (15-inch, without push button extension)
- CP7902-1401-0010 (15-inch, with push button extension)
- CP7903-1400-0010 (19-inch, without push button extension)
- CP7903-1401-0010 (19-inch, with push button extension)

Figure 1 shows an example of a control panel without (1) and with (2) push button extension for all display sizes.
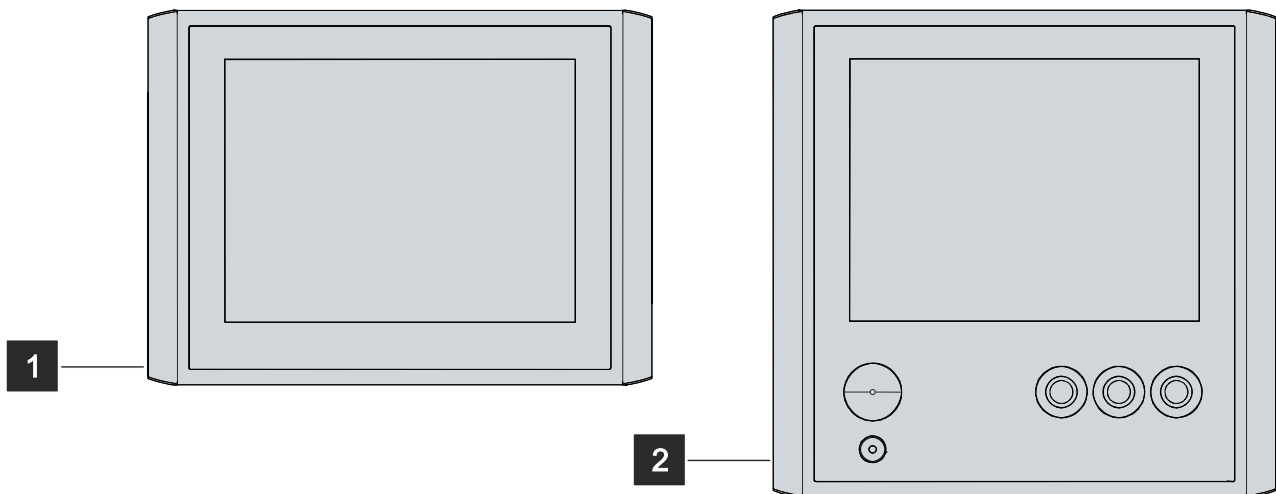
Fig. 1: CP79xx-14xx_without and with push button extension

3.1 Structure

Fig. 2: CP79xx-14xx_structure

Table 1: Legend CP79xx-14xx structure

No.	Component	Description
1	Display and touch screen glass	Operating the control panel
2	Stainless steel front	Use in environments with higher hygiene requirements
3	Threaded bolts	Bolts for installation on the mounting arm system
4	Connection compartment	Access to the interfaces

3.2 Interface description

The number of interfaces of the control panel varies depending on whether the device is equipped with a push button extension. The following table provides information about the interfaces of the device without and with push button extension.

Table 2: Interface assignment CP79xx-14xx

Control Panel	Interfaces
CP79xx-1400	DVI Extended input (X101)
	Power supply (X102)
	USB Extended 2.0 input (X103)
CP79xx-1401	DVI Extended input (X101)
	Power supply (X102)
	USB Extended 2.0 input (X103)
	Emergency stop and push button connection (XS01)

The interfaces are located at the rear of the control panel (see fig. 3, section A).

The control panels with push button extension also have a USB interface in the front. It is located behind a screw cap (see Fig. 3, section B). The screw cap is attached to a wire so that it remains with the device even after unscrewing.
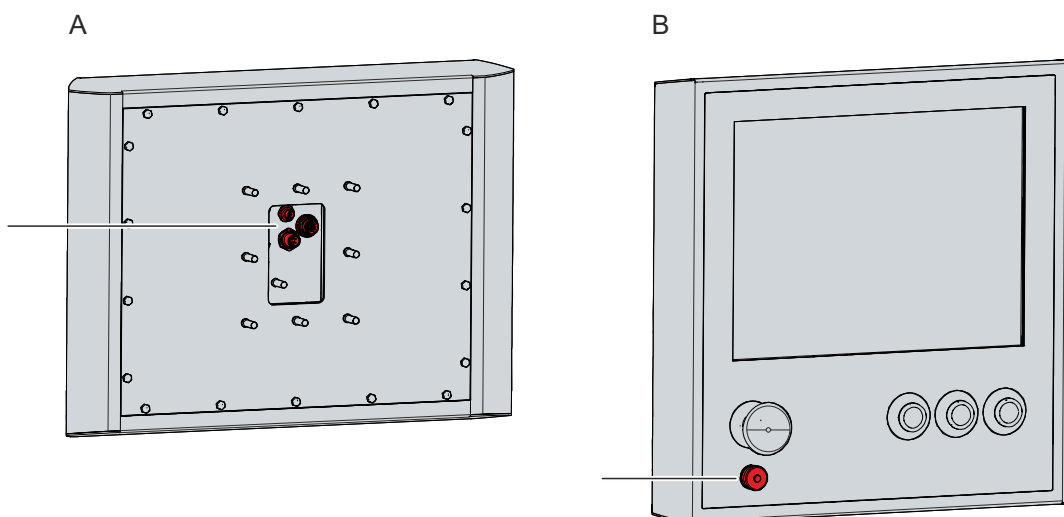
A   B

Fig. 3: CP79xx-14xx_connection section

If you have ordered your device with a mounting arm adapter option (see chapter 4.2 Mounting [▶ 21]), you must first gain access to the connection compartment of the device. The procedure is the same, regardless of whether you have ordered the mounting arm adapter with upwards or downwards orientation.

Follow the steps below to disassemble the cover, as shown in figure 4:

1. Loosen and remove the fastening screw with an Allen key (section A).
2. Pull the cover from the unit in the opposite direction to the mounting arm tube (section B).
   ⇨ You now have access to the interfaces.
3. Slide the cover back onto the unit in the direction of the mounting arm adapter.
4. Tighten the fastening screw again with an Allen key.
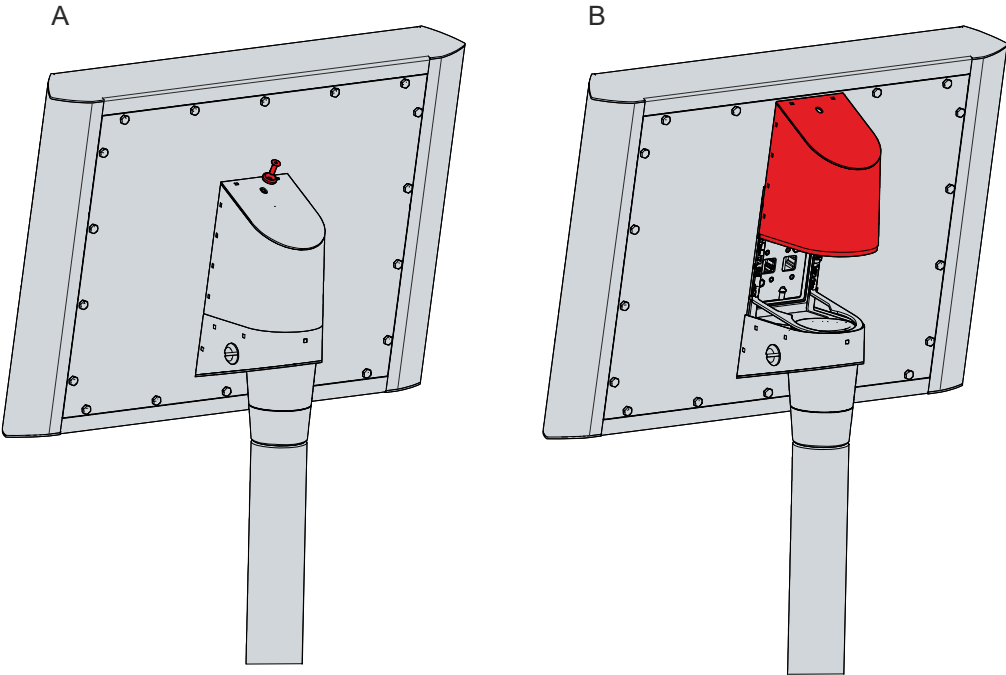⇨ You have mounted the cover again.

A   B

Fig. 4: CP79xx-14xx_Disassembly cover

3.2.1 DVI Extended input

The control panel has a DVI Extended input (X101) according to IP65. 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.
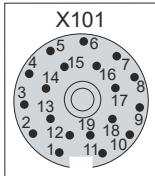
Fig. 5: CP79xx-14xx_DVI Extended input pin numbering

Table 3: DVI extended interface pin assignment

Pin	Assignment	Pin	Assignment
1	Shield	11	IN_TMDS_C+
2	IN_TMDS_2+	12	GND
3	GND	13	IN_TMDS_2+
4	IN_TMDS_1-	14	IN_TMDS_1+
5	GND	15	GND
6	IN_TMDS_0-	16	IN_TMDS_0+
7	GND	17	HPD_DVI
8	+ 5 V_DVI	18	GND
9	I2C_Data	19	IN_TMDS_C-
10	I2C_CLK		

Setting the data transfer rate

If the distance between the PC and the control panel is large, the transfer rate for the DDC file must be limited. The DDC file is transferred from the control panel to the PC to tell the PC the properties of the display such as timing and resolution.

The VideoBIOS in the graphics card, or in case of on-board graphics the VideoBIOS in the motherboard, contains the definition of the transfer rate for the DDC file. This value must be 50 kHz or less. If this value is too high, the image is either not displayed or only displayed after Windows starts.

Windows graphic drivers also contain a value for the transfer rate of the DDC file. If no image is displayed under Windows, a graphic driver must be used that contains a value of 50 kHz or less for the DDC file transfer.

3.2.2 Power supply

The control panel is supplied with a nominal input voltage of 24 V_{DC}. The connection to the power supply as well as the external wiring of the device is made via the 4-pin M12 socket (X102).
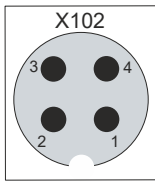

Fig. 6: CP79xx-14xx_voltage socket pin numbering

Table 4: Voltage socket pin assignment

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

The plug for the power supply is specified for 16 A and can accommodate wire cross-sections of up to 0.75 mm^2. For long supply lines, use 0.75 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-P916: power supply connector for CP79xx, round connector IP65 with strain relief for the external supply cable

3.2.3 USB Extended 2.0 input

The control panel has a USB Extended 2.0 input (X103). The control panel is connected to the CU8801 USB-to-USB Extended converter box via the interface. The interface transmits USB 2.0 with 480 Mbit/s.

To realize a distance of 50 m without hubs, USB Extended 2.0 (USB-E 2.0) 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. This is not an Ethernet connection. No Ethernet switch or hub can be integrated in the USB Extended 2.0 cable.
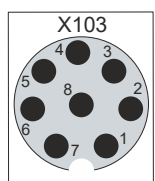

Fig. 7: CP79xx-14xx_USB-E 2.0 input pin numbering

Table 5: USB E input pin assignment

Pin	Signal	Pin	Signal
1	+ 5 V USB	5	BR RCV IN DP
2	RB TRN IN DP	6	BR RCV IN DM
3	RB TRN IN DM	7	+ 15 V USB E
4	GND USB	8	GND USB

3.2.4 Emergency stop and push button connection

The CP79xx-1401 Control Panels with integrated push button extension have an additional connection (XS01) at the rear side in the connection section. The 19-pin M23 connector can be used to connect the emergency stop button and the three electromechanical push buttons S2-S4 of the push button extension.

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The maximum current carrying capacity of the contacts for the wiring of the emergency stop and push buttons is 100 mA at 35 V AC/DC max.
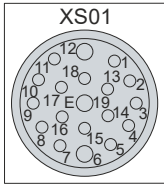

Fig. 8: CP79xx-14xx_XS01 pin assignment

Table 6: XS01 pin assignment

Pin	Assignment	Pin	Assignment
1	S1.12	11	LED red K1
2	S1.11	12	PE
3	S1.22	13	S4.14
4	S1.21	14	S4.22
5	S2.14	15	LED white K1
6	GND	16	NC
7	S2.22	17	NC
8	LED green K1	18	NC
9	S3.14	19	+24 V
10	S3.22		

3.3   Name plate

The name plate provides information about the control panel equipment. The name plate shown here serves only as an example.
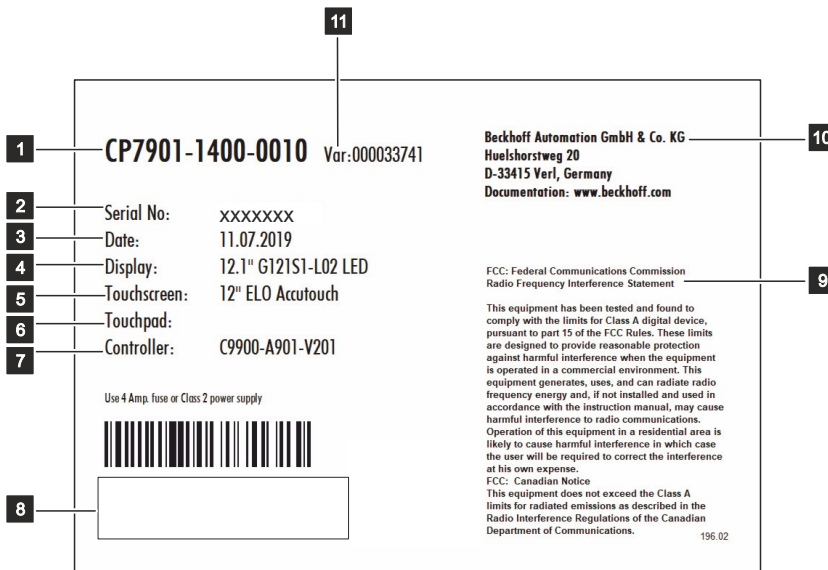
Fig. 9: CP79xx-14xx_name plate

Table 7: Legend for CP79xx-14xx name plate

No.	Description
1	Model
2	Serial number (BTN)
3	Date of manufacture
4	Display
5	Touch screen
6	Touch pad
7	Controller
8	Symbols Note: here are the symbols applicable to the device such as CE, EAC, UKCA, . The approvals of your device can be found on the name plate and in chapter 9.2 Approvals.
9	FCC approval
10	Address of the vendor
11	Variant number: commercial number of the order code including ordering options

3.4   Connection cables/connection kits

Ready-made connection cables for connecting emergency stop and push buttons (XS01) as well as connection kits for the DVI-E/USB-E 2.0 connection are available.

Table 8: Connection cable XS01

Connection cable	Description
C9900-K604	Signal and power supply cable for CP770x-1401 and CP790x-1401, length 10 m, 18 x 0.75 mm^2, pre-assembled, M23 socket IP65, screwable, 19-pin, second end open
C9900-K593	Signal and power supply cable for CP770x-1401 and CP790x-1401, length 20 m, 18 x 0.75 mm^2, pre-assembled, M23 socket IP65, screwable, 19-pin, second end open
C9900-K558	Signal and power supply cable for CP770x-1401 and CP790x-1401, length 30 m, 18 x 0.75 mm^2, pre-assembled, M23 socket IP65, screwable, 19-pin, second end open

Table 9: CP79xx-14xx connection kits

Connection kits	Description
C9900-K630	3 m connection kit for CP79xx-xxxx-0010, consisting of: 3 m DVI cable, 3 m Cat.5 cable for USB-E 2.0, CU8801 USB-to-USB-E 2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E 2.0 converter to the PC
C9900-K631	5 m connection kit for CP79xx-xxxx-0010, consisting of: 5 m DVI cable, 5 m Cat.5 cable for USB-E 2.0, CU8801 USB-to-USB-E 2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E 2.0 converter to the PC
C9900-K632	10 m connection kit for CP79xx-xxxx-0010, consisting of: 10 m DVI cable, 10 m Cat.5 cable for USB-E 2.0, CU8801 USB-to-USB-E 2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E 2.0 converter to the PC
C9900-K649	15 m connection kit for CP79xx-xxxx-0010, consisting of: 15 m DVI cable, 15 m Cat.6a cable for USB-E-2.0, CU8801 USB-to-USB-E-2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E-2.0 converter to the PC
C9900-K633	20 m connection kit for CP79xx-xxxx-0010, consisting of: 20 m DVI cable, 20 m Cat.5 cable for USB-E 2.0, CU8801 USB-to-USB-E 2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E 2.0 converter to the PC
C9900-K634	30 m connection kit for CP79xx-xxxx-0010, consisting of: 30 m DVI cable, 30 m Cat.5 cable for USB-E 2.0, CU8801 USB-to-USB-E 2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E 2.0 converter to the PC
C9900-K635	40 m connection kit for CP79xx-xxxx-0010, consisting of: 40 m DVI cable, 40 m Cat.5 cable for USB-E 2.0, CU8801 USB-to-USB-E 2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E 2.0 converter to the PC
C9900-K636	50 m connection kit for CP79xx-xxxx-0010, consisting of: 50 m DVI cable, 50 m Cat.5 cable for USB-E 2.0, CU8801 USB-to-USB-E 2.0 converter for DIN rail mounting next to the PC and 1 m USB cable for connecting the USB-to-USB-E 2.0 converter to the PC

4 Commissioning

To use the control panel, you must first put it into operation. The first step is to transport the device to is operating location and unpack it. This is followed by mounting the device on the mounting arm, connecting the cables and power supply, and finally switching on the control panel. Since the control panel does not have its own power switch, switching the power supply on and off also switches the control panel on and off.

Operating the control panel

The control panel is operated via the touch screen.

NOTICE
Damage to the touch screen
Operating the touch screen with unsuitable objects may damage the touch screen.
• Only operate the touch screen with your bare finger or with your finger using a suitable glove.
• 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.

   ⇨ You have mounted the protective film.

If you want to remove the protective film again, you must proceed with caution so as not to damage the touch foil, which is located between the glass pane of the control panel and the applied protective film.

To remove the protective film, proceed as follows:

1. Carefully loosen one corner of the protective film.
2. Carefully pull the protective film off the control panel at the loosened corner at as flat an angle as possible.

   ⇨ You have removed the protective film.

4.1 Transport and unpacking

The specified storage conditions must be adhered to (see chapter 8 Technical data [▶ 30]).

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 control panel, 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).

4.2   Mounting

The control panel is designed for installation on a mounting arm system. There are eight M6 x 20 threaded bolts on the back of the unit for mounting. The dimensions of the device can be found on the Beckhoff website: https://www.beckhoff.com/de-de/support/downloadfinder/technische-zeichnungen/. All dimensions are in mm.

Alternatively, you can mount the control panel on a mounting arm tube using a mounting arm adapter. Two adapter options from Beckhoff are available for this purpose, which are mounted ex factory:

Table 10: Mounting arm adapter ordering options

Ordering option	Description
C9900-M177	Rotatable mounting arm adapter on Control Panel CP790x-140x or Panel PC CP770x-140x instead of 8 threaded bolts M6 x 20 mm. Stainless steel 1.4301, brushed. Mounting arm installation from below.
C9900-M178	Rotatable mounting arm adapter on Control Panel CP790x-140x or Panel PC CP770x-140x instead of 8 threaded bolts M6 x 20 mm. Stainless steel 1.4301, brushed. Mounting arm installation from above.

Figure 10 shows the two available rotatable mounting arm adapters. Ordering option 1 is oriented for mounting from below. Ordering option 2 is oriented for mounting from above.
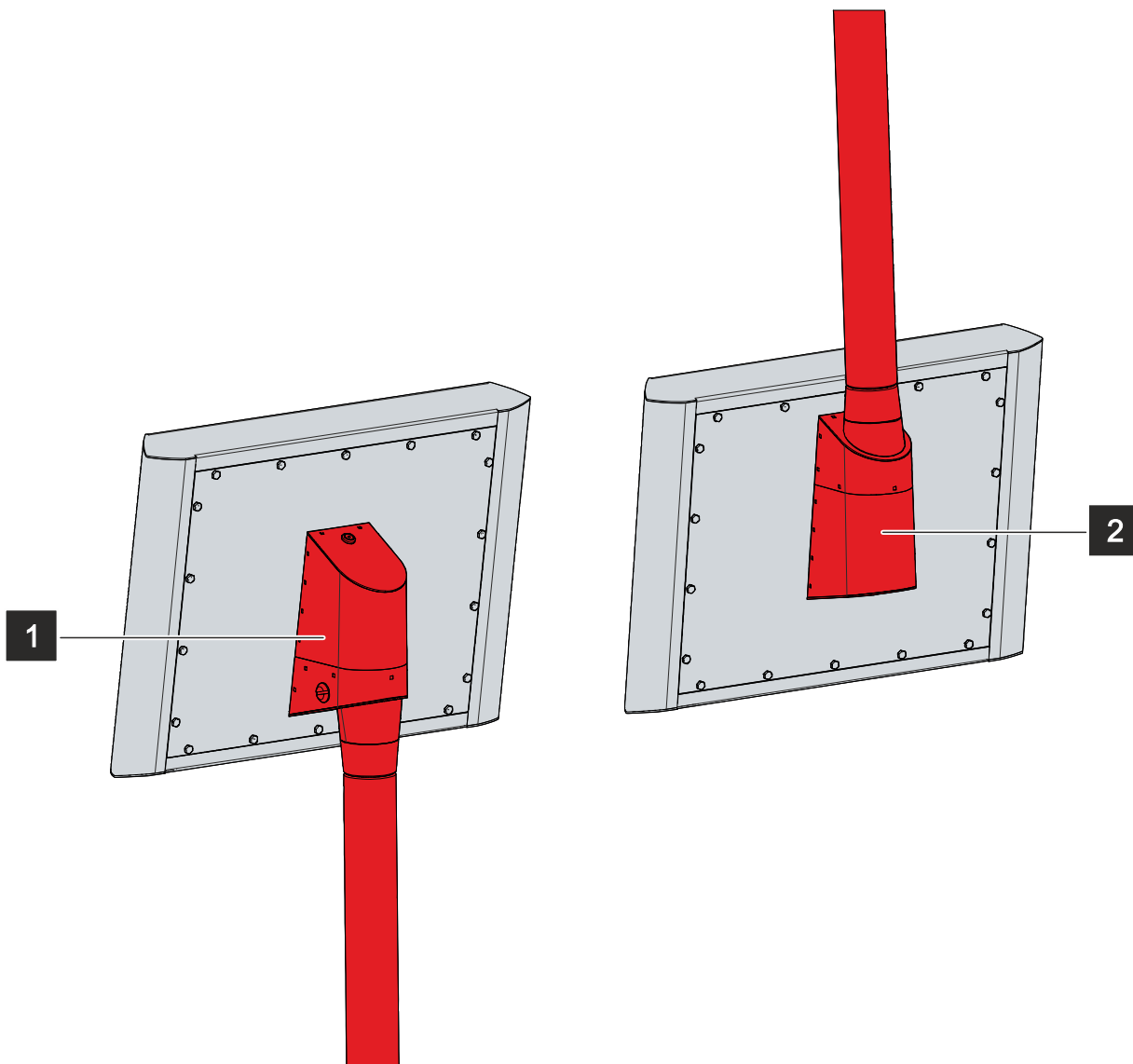
Fig. 10: CP79xx-14xx_mounting arm adapter

Mounting arm tube installation

The scope of delivery of the mounting arm adapters includes a connection piece and O-rings. This connection piece allows you to install a mounting arm tube on the mounting arm adapter. You must weld the connection piece (1) to the mounting arm tube (2).
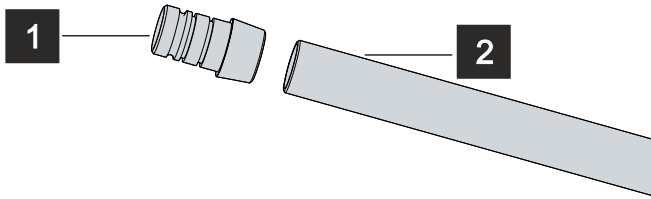

Fig. 11: CP79xx-14xx_installation mounting arm tube

Alternatively, you can order a ready-configured mounting arm tube with already welded connection piece from Beckhoff:

- C9900-M167: Adapter with welded tube (length: 1.50 m, diameter: 48 mm) for mounting arm adapter C9900-M177 or C9900-M178 on CP790x-140x Control Panel. Stainless steel 1.4301, brushed

Mounting arm installation

After you have welded the connection piece and the mounting arm tube together, you can mount the finished mounting arm on the mounting arm adapter. To do this, follow the steps below as shown in Figure 12:

1. Apply the supplied PTFE paste thinly to the O-rings and to the grooves for the rings on the connection piece using a brush or spatula.
2. Put the O-rings onto the connection piece (section A).
3. Unscrew the fixing screw of the mounting arm adapter completely (section B).
4. Push the connection piece into the mounting arm adapter as far as it will go (section C). Be careful not to damage the O-rings.
5. Screw the fixing screw back into the mounting arm adapter (section D).
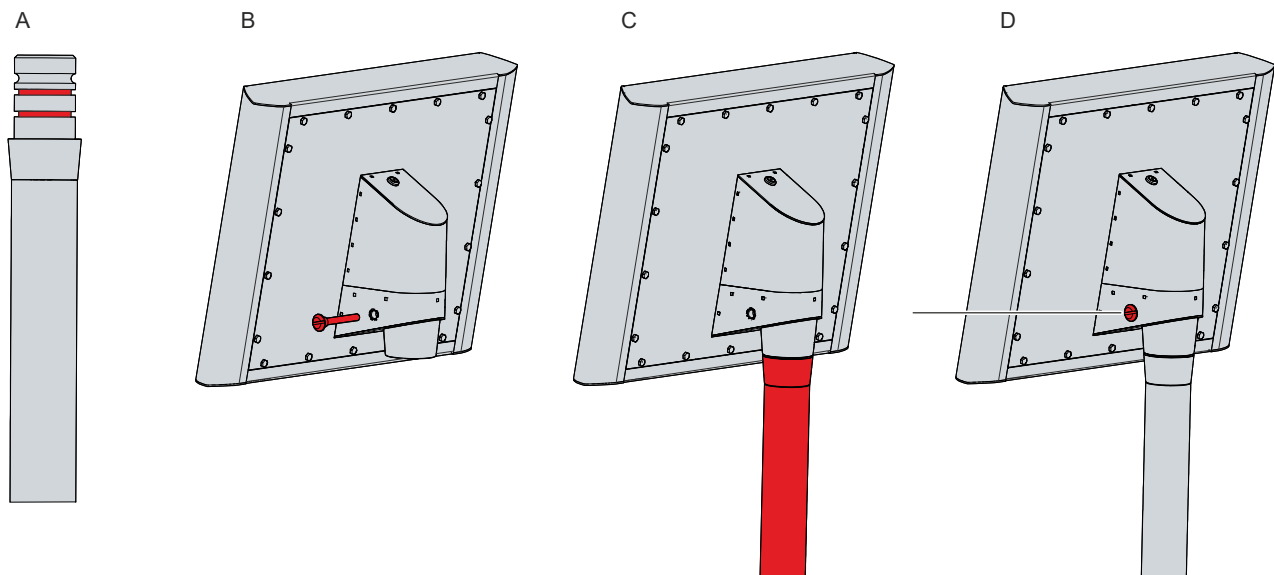⇨ You have installed the mounting arm on the mounting arm adapter.

Fig. 12: CP79xx-14xx_installation mounting arm

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 prepare the control panel 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 providing 24 V DC (-15 %/+20 %) from an isolated source is required for the power supply. This source must be protected by a UL 248 rated fuse with a maximum rating of 4 A.

Connect the control panel in the control cabinet according to standard EN 60204-1:2006 Protective Extra Low Voltage (PELV):

• 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 control panel with their own power supply must have the same potential for the PE "0 V" conductors as the control panel (no potential difference).

4.3.1   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.

On the rear side of the control panel there is the protective conductor connection PE in the connection section, which ensures both the protective earthing of the panel and the functional earthing. 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.

If you have equipped your device with a Beckhoff mounting arm adapter, you will find the information for accessing the connections in Chapter 3.2 <u>Interface description [▶ 12]</u>.

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.

By connecting the protective earth conductor (PE), you establish a low-resistance protective earth of the control panel and thus avoid dangerous touch voltages.

EMC

NOTICE
Hardware damage due to electromagnetic interference Using the control panel without functional earth can lead to hardware damage due to electromagnetic interference. • Only use the device with functional earth.

BECKHOFF

Electromagnetic compatibility (EMC) of the control panel 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.

The control panel must comply with certain protection requirements. The control panel 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. The functional earth is also established via the connection of the PE protective conductor.

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 all 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 in the connection section of the device. If you have equipped your device with a Beckhoff mounting arm adapter, you will find the information for accessing the connections in Chapter 3.2 Interface description [▶ 12].

Connecting cables

Make sure that you first ground the panel (see Chapter 4.3.1 Grounding the control panel [▶ 23]) and then plug in all data transmission cables.

When connecting the control panel to an industrial PC with UPS output, Beckhoff recommends using this for the connection so that the display is also active in UPS mode. Only one control panel may be connected to the UPS output on the PC.

Connect power cable

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 power supply plug of the control panel, so that the panel remains switched on during voltage fluctuations.

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

1. Plug the voltage connector into the voltage socket on the panel.
2. Connect the panel to your external 24 V power supply.
3. Switch on the 24 V power supply.

5   Decommissioning

NOTICE
Hardware damage due to power supply
A connected power supply can cause damage to the control panel during disassembly.
• Disconnect the power supply from the device before starting to disassemble it.

When taking the control panel out of operation, you must first disconnect the power supply and cables. You can then dismantle the device.

If you do not want to continue using the control panel, Chapter 5.2 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
Disconnecting the control panel during a thunderstorm can lead to electric shock.
• Never disconnect the cables of the control panel during a thunderstorm.

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

1. Shut down the control panel.
2. Disconnect the control panel from the 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 transfer cables from the control panel.
6. Finally, disconnect the ground connection.
⇨ You have disconnected the power supply and the cables.

5.2 Disassembly and disposal

Before you can remove the control panel from the mounting arm, you must first disconnect the power supply and the cables (see chapter 5.1 Disconnecting the power supply and cables [▶ 25]).

NOTICE
Damage to property due to falling down
If the control panel hangs from the ceiling and you start disassembly from the mounting arm without securing it, the control panel will fall down.
• Be sure to secure the control panel against falling down before you start disassembling it from the mounting arm.

To remove the control panel from the mounting arm, follow the steps shown in Fig. 13:

1. Unscrew the fixing screw of the mounting arm adapter completely (section A).
2. Pull the mounting arm out of the mounting arm adapter (section B).
3. Screw the fixing screw back into the mounting arm adapter (section C).
⇨ You have disassembled the mounting arm from the mounting arm adapter.
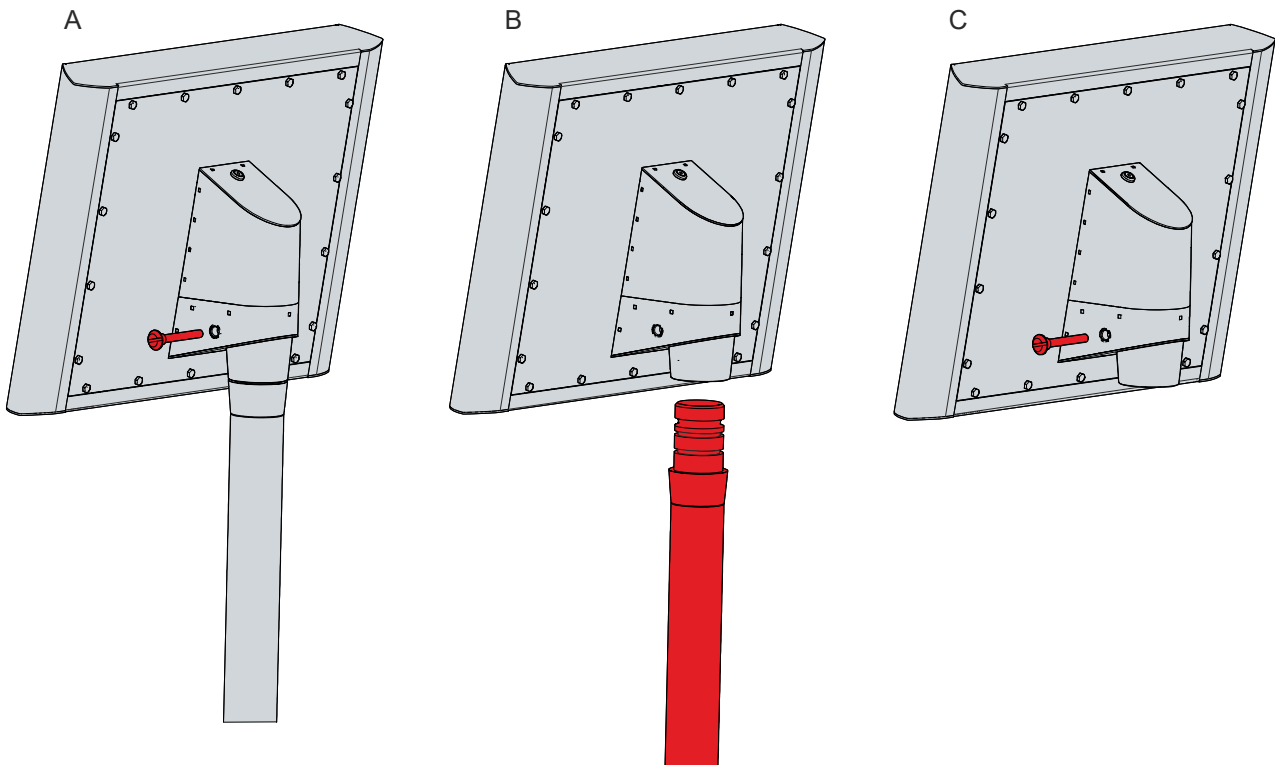
Fig. 13: CP79xx-14xx_disassembly mounting arm

6   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.
• The control panel should only be cleaned as specified.

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

- Ensure that no dust enters the panel via the rear.
- Never use compressed air to clean the panel.
- Maintain an ambient temperature range of 0 °C to 55 °C.

Cleaning agents

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

- benzine
- spirit
- glass cleaner

Avoid the following cleaning agents:

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

Cleaning the front screen

You can clean the front screen of the control panel 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 Control Tool.

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

1. Click the Beckhoff Control Tool to start it.
   ⇨ When the tool is started, a small sun symbol appears in the taskbar.
2. Right-click the sun symbol. Touch the sun when operating via the touch screen.
3. Select the "Cleaning Mode" (see Fig. 14).
⇨ "Cleaning Mode" is activated. You can now clean the front panel.

BECKHOFF
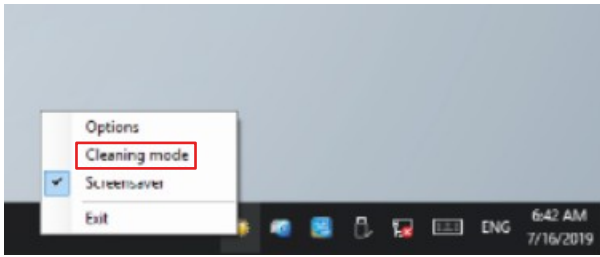
Fig. 14: CP69xx_Select Cleaning Mode

You can set the duration for which the panel 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 period (see fig. 15).
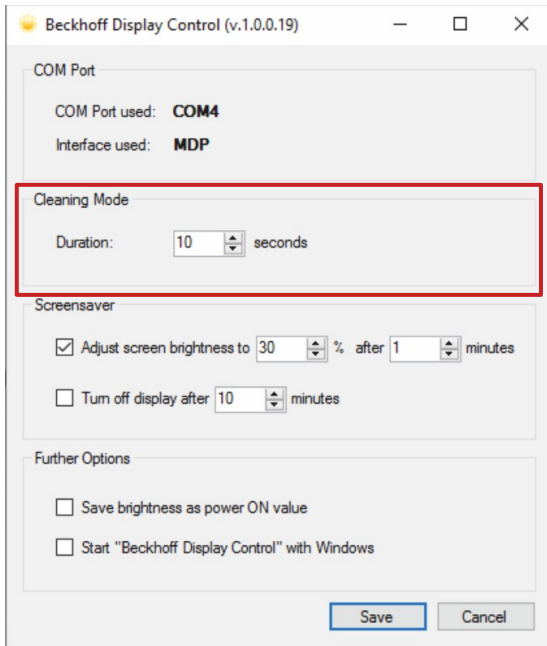

Fig. 15: CP69xx_Options

Repair

Only the vendor may repair the device. If a repair should be necessary, contact Beckhoff Service (see Chapter 9.1 <u>Service and Support [▶ 31]</u>).

7   Troubleshooting

Table 11: Troubleshooting

Fault	Cause	Measures
No control panel function	Lack of power supply to the control panel Cable not connected	Check the power supply cable 1. Correctly connect the cable 2. Call Beckhoff Service
USB error during access with TwinCAT via USB	Cycle time in TwinCAT set to 10 ms (standard)	Increase the cycle time to between 50 ms and 80 ms
No picture/backlight	Problem with the cable connections	Check the cable connection

Beckhoff recommends using Beckhoff connection cables and connection kits.

8   Technical data

Table 12: Technical data

Product designation	CP79xx-14xx		
Weights without / with mounting arm adapter	CP7901-1400: 5.3 kg / 7.2 kg CP7901-1401: 7.0 kg / 8.9 kg CP7902-1400: 7.2 kg / 9.1 kg CP7902-1401: 8.9 kg / 10.8 kg CP7903-1400: 10.6 kg / 12.5 kg CP7903-1401: 12.3 kg / 14.2 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/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 ... +55 °C Transport / storage: -25 °C ... +65 °C		
Permissible relative air humidity	Maximum 95%, no condensation		
Transport and storage	The same values for air humidity and shock resistance 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 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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33415 Verl
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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

More Information:
www.beckhoff.com/de-de/produkte/ipc/control-panels/cp39xx-cp79xx-edelstahl-control-panels