BECKHOFF New Automation Technology

Manual | EN

C5210

Industrial PC



2026-07-09 | Version: 2.3

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 9
3.2 Interface description 10
3.2.1 RS232 11
3.2.2 DVI 12
3.2.3 USB 13
3.2.4 Ethernet RJ45 14
3.2.5 Power supply 15
3.3 Optional interfaces 17
3.3.1 PCIe® module FC9062 with 2 Gigabit Ethernet ports 18
3.3.2 PCIe® module C9900-E301 with 2 serial interfaces RS232 19
3.3.3 PCIe® module C9900-E309 with 2 serial interfaces RS485 20
3.3.4 PCIe® module C9900-E310 with 2 serial interfaces RS422 21
3.3.5 PCIe® module C9900-E277 with 2 USB 3.0 interfaces 22
3.3.6 DisplayPort 23
3.3.7 DVI 24
3.3.8 Serial interface RS232 25
3.3.9 Serial interface RS485 26
3.3.10 Serial interface RS422 27
3.3.11 Ethernet RJ45 28
3.4 Status LEDs 29
3.5 Name plate 30
3.6 TwinCAT version 31

4 Commissioning 32

4.1 Transport and unpacking 32
4.2 Rack installation 32
4.3 Connecting the industrial PC 34
4.3.1 Grounding of the industrial PC 34
4.3.2 Connecting cables and power supply 36
4.3.3 Connecting the 24 V power supply 37
4.4 Switching the industrial PC on and off 41

5 Configuration 43

5.1 Beckhoff Device Manager 43
5.2 UPS configuration 44
5.3 Wake on LAN (WOL) 46

6 Decommissioning 48

6.1 Disconnecting the power supply and cables ... 48
6.2 Disassembly and disposal ... 49

7 Maintenance ... 50
7.1 Cleaning ... 50
7.2 Maintenance ... 50
7.2.1 Replacing the battery ... 51
7.2.2 Replacing the storage media ... 53
7.2.3 Replacing the fan ... 55

8 Troubleshooting ... 57

9 Technical data ... 58

10 Appendix ... 59
10.1 Service and support ... 59
10.2 Approvals ... 60

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.

Trademarks

Beckhoff®, TwinCAT®, TwinCAT/BSD®, TC/BSD®, EtherCAT®, EtherCAT G®, EtherCAT G10®, EtherCAT P®, Safety over EtherCAT®, TwinSAFE®, XFC®, XTS® and XPlanar® are registered and licensed trademarks of Beckhoff Automation GmbH.
Other designations used in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owners.

Patents

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents: EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702 and similar applications and registrations in several other countries.

Copyright

© Beckhoff Automation GmbH & Co. KG. Publication of this document on websites other than ours is prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

Delivery state

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

Currentness

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 preventing personal injuries and damage to property.

Exclusion of liability

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

2.1 Signal words

The signal words used in the documentation are classified below.

Warning on personal injuries

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

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

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

Warning on property and environmental damage

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

2.2 Intended use

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

The 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 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.
- Never plug or unplug connectors during thunderstorms. There is a risk of electric shock.
- Ensure that the device has a protective and functional earth connection.

Damage to property, loss of data and impairment of functions

- If you change the hardware and software configurations, you must keep within the specified limits of power consumption and power loss (please refer to the respective data sheet).
- Ensure that only trained specialists with a control and automation engineering background, operate the device. Use by unauthorized persons can lead to damage to property and loss of data.
- 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 C5210 is a powerful industrial PC for installation in a 19-inch rack. The device is suitable for various applications and requirements.

You can use the industrial PC for the following applications, among others:

- various automation and visualization tasks
- a wide range of IoT tasks with data preprocessing
- complicated HMI applications
- extensive axis controllers
- short cycle times
- high-volume data handling

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

- 3½-inch motherboard
- Intel® processor
- DRAM SODIMM
- 3½-inch hard disk
- 100-240 V AC power supply

3.1 Structure



Fig. 1: Structure

Table 1: Legend structure

No.	Component	Description
1	Removable frame	Access to hard disk/SSD
2	Connection section	Access to interfaces
3	Battery cover	Access battery and optional fieldbus interface
4	PCIe® module slots	Optional interface expansion with PCIe® modules
5	IEC socket	Power supply connection
6	Main switch	Switching the device on/off
7	Name plate	Information on the equipment of the device
8	Front flap	Access USB interfaces, ATX button, reset button, status LEDs
9	Housing cover	Access to replaceable fans

3.2 Interface description

The basic version of the device includes the following interfaces:

- RS232 (X102)
- DVI (X103)
- USB (X104-X107, X112, X113)
- Ethernet RJ45 (X108, X109)
- Power supply (X110)

Most of the interfaces are located on the rear side of the device in the connection section (section A). The two USB interfaces X112 and X113 are located in the front of the device behind the front flap (section B).

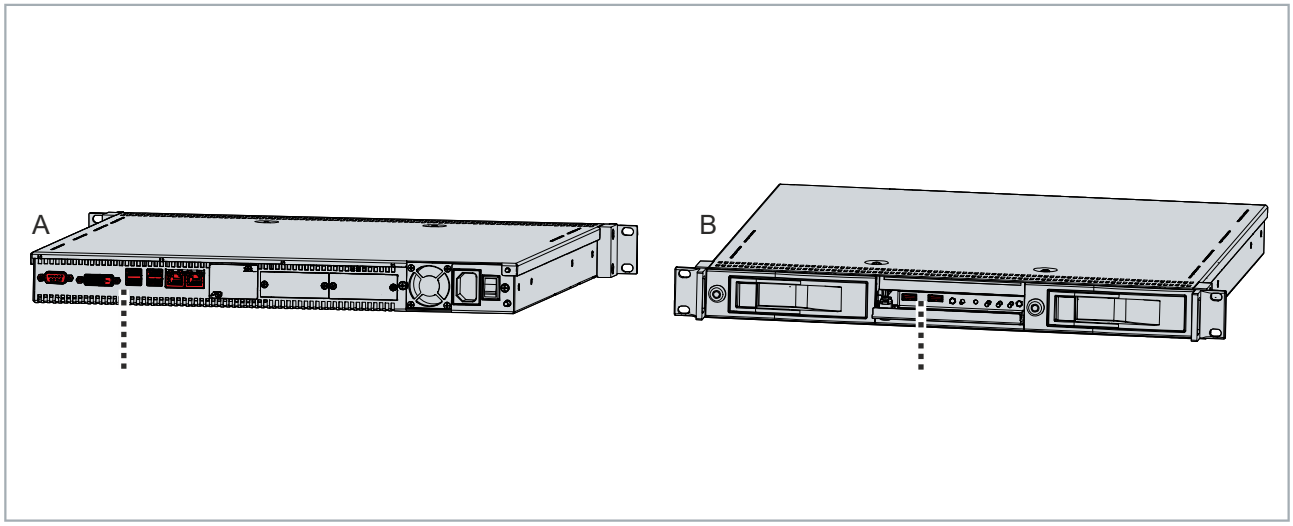


Fig. 2: Position interfaces

To access the USB interfaces in the front, you first have to open the front flap. Your device comes with a red accessory cover that contains keys. To open the front flap, use the pair of keys with the black key cover.

To open the front flap, follow these steps:

1. Unlock the front flap with the corresponding key (section A).
2. Turn the front flap down (section B).

⇨ You now have access to the USB interfaces.

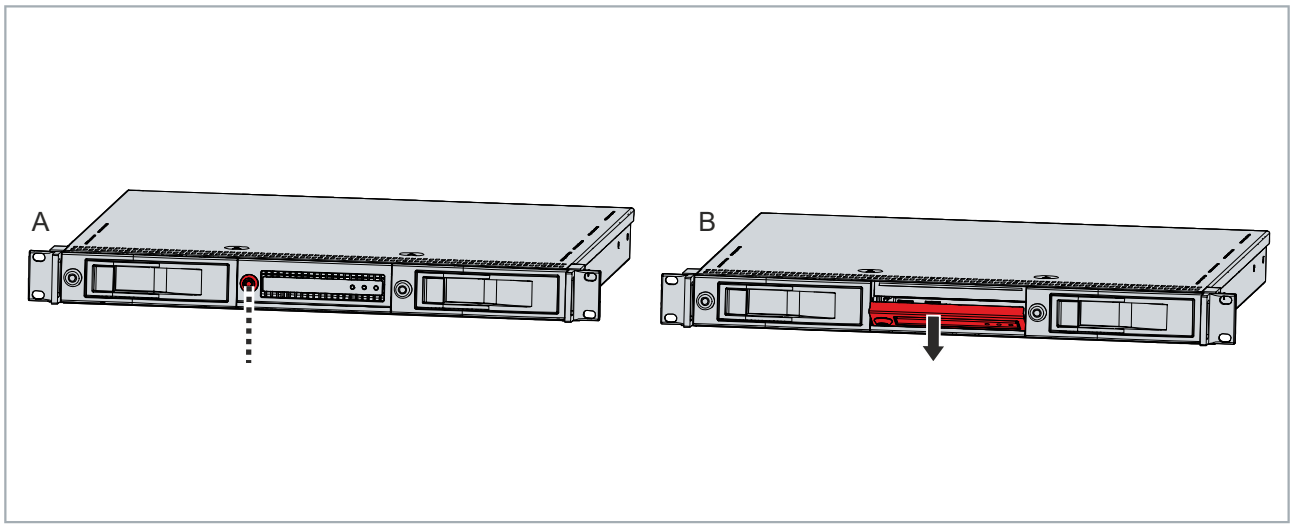


Fig. 3: Opening the front flap

3.2.1 RS232

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

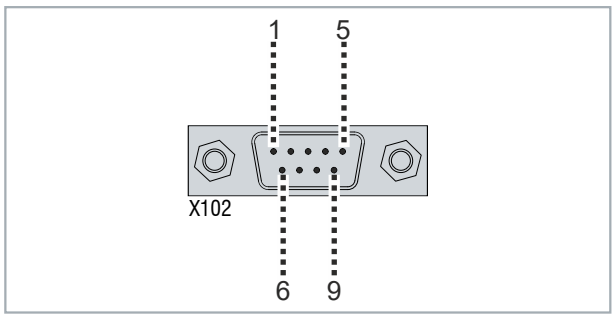


Fig. 4: RS232 interface pin numbering

Table 2: COM1 interface pin numbering

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

3.2.2 DVI

The device has a DVI connection (X103) to which a DVI-capable monitor can be connected. Only digital signals are transmitted.

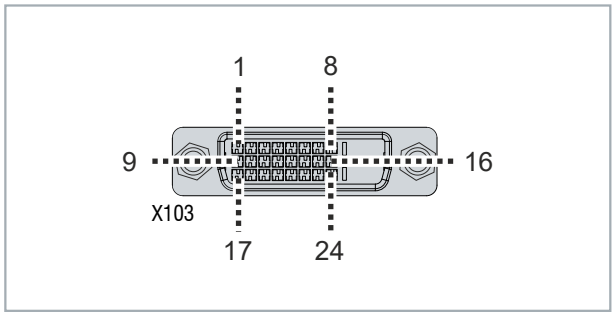


Fig. 5: DVI interface pin numbering

Table 3: DVI interface pin assignment

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

3.2.3 USB

The device has four USB interfaces (X104-X107) on the rear and two USB interfaces (X112, X113) behind the front flap. The two interfaces on the front correspond to USB standard 2.0. The standard of the interfaces on the rear differs according to the device generation (see following table).

Table 4: USB standard device generation

Device generation	USB standard
C5210-0030	4x USB 3.0
C5210-0040	4x USB 3.0
C5210-0050	4x USB 3.2 Gen. 2

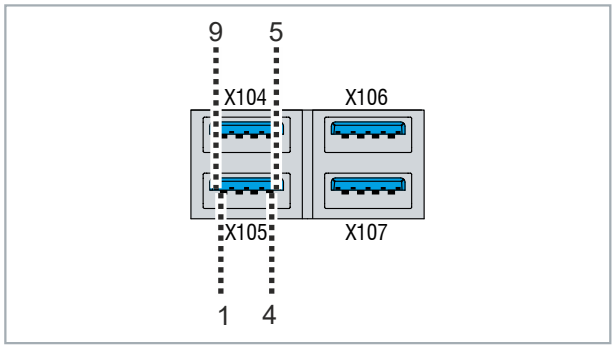


Fig. 6: USB interface pin numbering

Table 5: USB interface pin assignment

Pin	Connection	Typical assignment
1	Vbus	Red
2	D -	White
3	D +	Green
4	GND	Black
5	StdA_SSRX -	Blue
6	StdA_SSRX +	Yellow
7	GND_DRAIN	N/A
8	StdA_SSTX -	Purple
9	StdA_SSTX +	Orange

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

3.2.4 Ethernet RJ45

The industrial PC has two Gigabit LAN ports (X108, X109). The 100BASE-T, 1000BASE-T and 2500BASE-T Ethernet standards enable the connection of corresponding network components and data rates of 100/1000/2500 Mbit/s. The required speed is selected automatically.

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

The controllers are used as follows, based on the device generation:

Table 6: Controller classification based on device generation

Device generation	Controller	Mbit/s
C5210-0030	Intel® i210 for LAN2 and Intel® i219 for LAN1	100/1000
C5210-0040	Intel® i210 for LAN2 and Intel® i219 for LAN1	100/1000
C5210-0050	Intel® i226 for LAN2 and Intel® i219 for LAN1	LAN1 100/1000 LAN2 100/1000/2500

The Ethernet port (X108, LAN2) connected via PCIe® with the i210/i226 controller is suitable for cycle times <= 1 ms and for distributed clock applications with EtherCAT.

The Ethernet port (X109, LAN1) integrated in the chipset with the i219 controller is suitable for real-time Ethernet applications with cycle times > 1 ms (without distributed clocks).

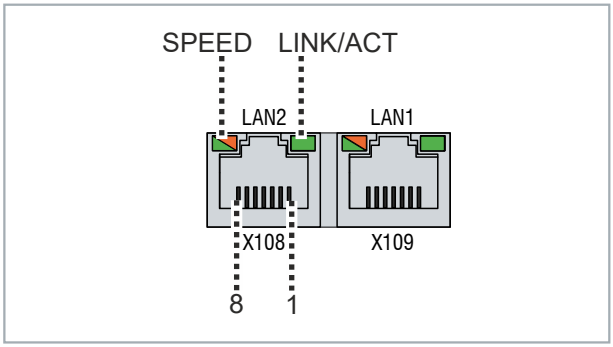


Fig. 7: Ethernet interfaces pin numbering

Table 7: Ethernet interface pin assignment

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

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

The green/orange LED (SPEED) shown in the figure indicates the data transmission rate. The device generations differ in terms of the possible data transmission rate. The following tables show what the LEDs mean with regard to the potential data transmission rate.

Table 8: LED meaning: speed 100/1000 Mbit/s

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

Table 9: LED meaning: speed 100/1000/2500 Mbit/s

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

With the device generation C5210-0050, the two interfaces differ in the possible data transmission rate. The speed for LAN1 is 100/1000 Mbit/s and for LAN2 100/1000/2500 Mbit/s.

3.2.5 Power supply

The device comes with a 100-240 V AC, 50-60 Hz full range power supply as standard.

Table 10: Current carrying capacity power supply

Output voltages power supply	Current load 100-240 V AC power supply max.
+3.3 V	12 A
+5 V	14 A
+12 V	35 A
+5 V stand by	3 A
-12 V	0.3 A
-5 V	0.1 A

The power supply is connected via the IEC socket (X101) on the rear side of the industrial PC. The assignment includes a protective conductor (1), a neutral conductor (2) and an outer conductor (2).

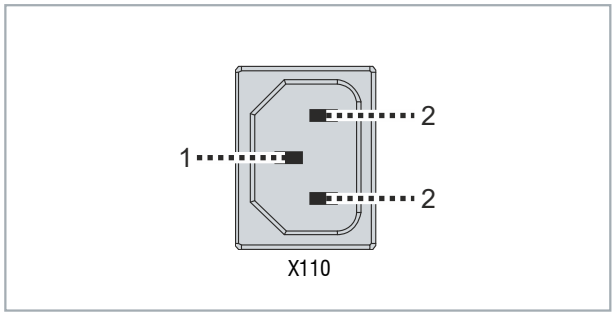


Fig. 8: IEC socket

Optionally, you can order the device with a 24 V DC power supply. In this case, the device is supplied with a nominal voltage of 24 V. The power supply and the external wiring are connected via an 8-pin socket (X110).

The main supply voltage is applied between PIN 5 (0 V) and PIN 6 (24 V) of the power supply socket. If the device is equipped with an integrated uninterruptible power supply (UPS), you can also connect an external battery pack to PIN 1 and 2.

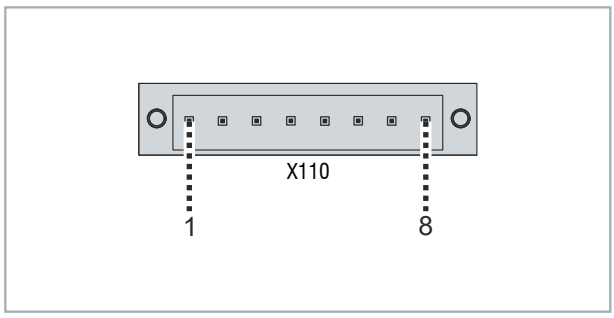


Fig. 9: Power supply socket 24 V

Table 11: Voltage socket pin assignment

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

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

The plug for the power supply is specified for 8 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 lines. At least 22 V should be present at the power supply plug of the device so that the device remains switched on in the event of voltage fluctuations. The plug is included in the scope of delivery. You can obtain a replacement plug from your Beckhoff Sales using the following ordering option: C9900-P926

3.3 Optional interfaces

Interface options are available to extend your device with additional interfaces beyond the basic configuration.

On the one hand, you can use the two PCIe® module slots on the rear of the device. Loosen the two M3 screws and remove the blank covers to insert the PCIe® modules.

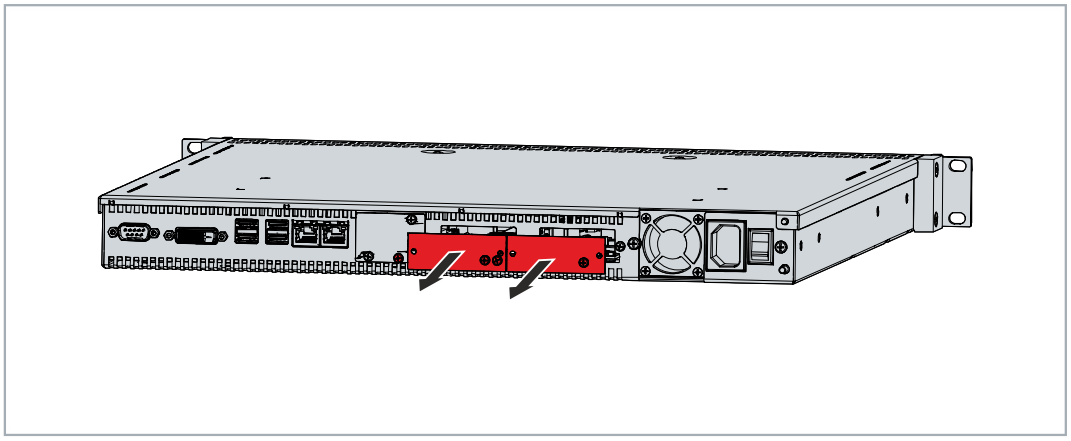


Fig. 10: Access to PCIe® module slots

The following ordering options are available to you:

Table 12: PCIe® modules Ordering options

Ordering option	Description	Link to option
FC9062	Gigabit Ethernet PCIe® module	https://www.beckhoff.com/c5210 Select a product variant and then select the “Options” tab at the bottom of the website.
C9900-E301	RS232 PCIe® module	
C9900-E309	RS485 PCIe® module	
C9900-E310	RS422 PCIe® module	
C9900-E277	USB 3.0 PCIe® module	

On the other hand, you can assign additional interfaces to the fieldbus connection section and route them out in the connection section on the rear of the device. The following ordering options are available:

Table 13: Interface options

Ordering option	Description	Link to option
C9900-E292	DisplayPort	https://www.beckhoff.com/c5210 Select a product variant and then select the “Options” tab at the bottom of the website.
C9900-E294	DisplayPort	
C9900-E237	DVI socket	
C9900-E233	Serial interface RS232	
C9900-E240	Serial interface RS232	
C9900-E241	Serial interface RS485	
C9900-E242	Serial interface RS422	
FC9071-0000	Gigabit Ethernet PC network card	

3.3.1 PCIe® module FC9062 with 2 Gigabit Ethernet ports

The Ethernet standards 100Base-T and 1000Base-T enable the connection of corresponding network components and data rates of 100/1000 MBit/s for the two Ethernet ports of the FC9062 option connected via PCIe. The required speeds are selected automatically.

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

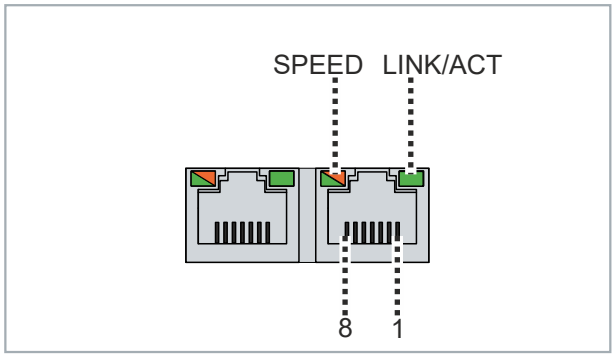


Fig. 11: Ethernet interface pin numbering

Table 14: Ethernet interface pin assignment

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

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

The green/orange LED (SPEED) shown in the figure indicates the data transmission rate. If the speed is 100 Mbit/s the LED is orange, at 1000 Mbit/s it is green.

3.3.2 PCIe® module C9900-E301 with 2 serial interfaces RS232

The RS232 interfaces contain two electrically isolated sockets ix Industrial® type B. Two adapter cables ix Industrial® type B to D-sub, 9-pin are required (order identifier C9900-K920). The adapter cables are 50 cm long. The interface provides an asynchronous, serial communication method defined in the RS232 standard.

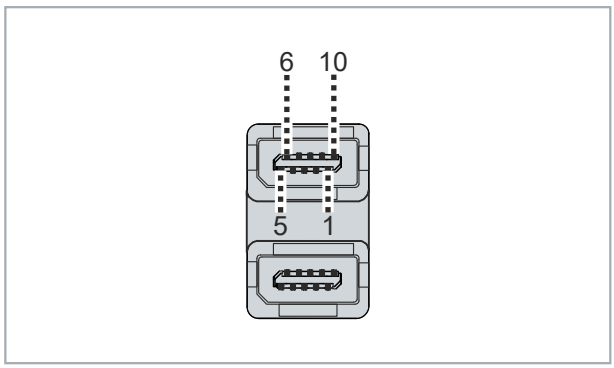


Fig. 12: RS232 interface pin numbering

Table 15: RS232 interface pin numbering

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

3.3.3 PCIe® module C9900-E309 with 2 serial interfaces RS485

The RS485 PCIe module contains two electrically isolated ix Industrial® type B sockets for asynchronous, serial high-speed data transmission. Two ix Industrial® type B to D-sub, 9-pin adapter cables are required (order identifier C9900-K922). The adapter cables are 50 cm long. The signal transfer takes place symmetrically.

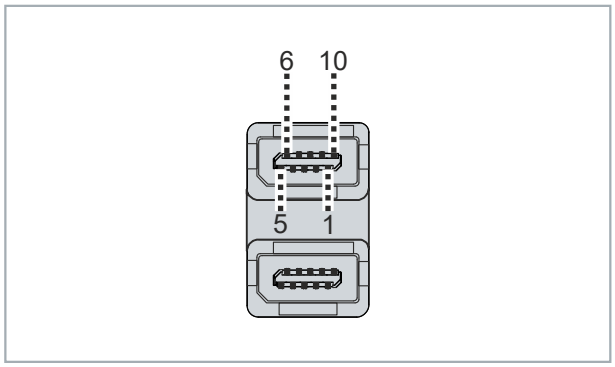


Fig. 13: RS485 interface pin numbering

Table 16: RS485 pin assignment

Pin	Signal	Type	Description
1	N/C	-	Not used
2	TxD +	Data-Out +	Transmit 485
3	RxD +	Data-In +	Receive 485
4	N/C	-	Not used
5	GND	Ground	Ground
6	VCC	VCC	+5 V
7	TxD-	Data-Out -	Transmit 485
8	RxD-	Data-In -	Receive 485
9	N/C	-	Not used
10	N/C	-	Not used

Pins 2 and 3 (data +) and pins 7 and 8 (data -) must be connected.

On delivery the interface is configured as a half-duplex endpoint without echo as standard – see table below:

Table 17: RS485 standard configuration

Function	Status
Echo	off
Auto send	on
Always send	off
Auto receive	on
Always receive	off
Termination	on

3.3.4 PCIe® module C9900-E310 with 2 serial interfaces RS422

The RS422 PCIe module contains two electrically isolated ix Industrial® type B sockets for high-speed serial data transmission. Two ix Industrial® type B to D-sub, 9-pin adapter cables are required (order identifier C9900-K922). The adapter cables are 50 cm long. The signal transfer takes place symmetrically.

The channels are protected by a common overvoltage protection. If an overvoltage occurs at one of the channels, both channels are switched off.

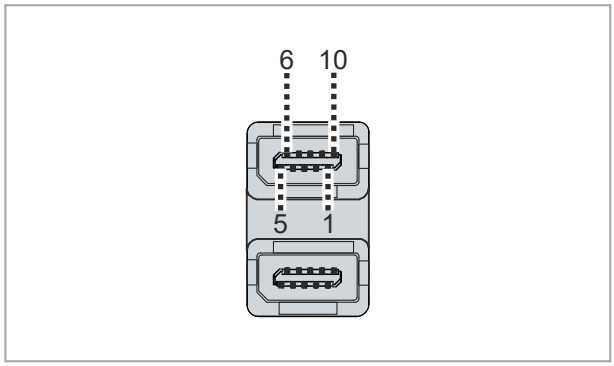


Fig. 14: RS422 interface pin numbering

Table 18: RS422 pin assignment

Pin	Signal	Type	Description
1	N/C	-	Not used
2	TxD +	Data-Out +	Transmit 422
3	RxD +	Data-In +	Receive 422
4	N/C	-	Not used
5	GND	Ground	Ground
6	VCC	VCC	+5 V
7	TxD -	Data-Out -	Transmit 422
8	RxD -	Data-In -	Receive 422
9	N/C	-	Not used
10	N/C	-	Not used

On delivery the interface is configured as a full duplex endpoint as standard:

Table 19: RS422 standard configuration

Function	State
Echo	on
Auto send	off
Always send	on
Auto receive	off
Always receive	on
Termination	on

3.3.5 PCIe® module C9900-E277 with 2 USB 3.0 interfaces

The USB 3.0 PCIe module includes two USB ports with a data transmission rate of up to 5 Gbit/s according to the USB 3.0 specification. Each port provides up to 1 A power supply.

They are used to connect peripheral devices with USB interfaces. Compatibility with all USB standards is assured.

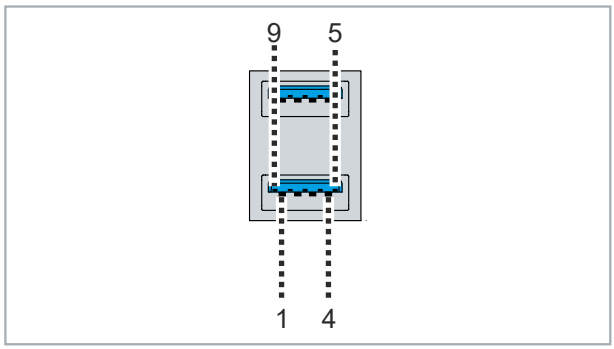


Fig. 15: USB interface pin numbering

Table 20: USB interface pin assignment

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

3.3.6 DisplayPort

The optional interface includes a DisplayPort connector for connecting DisplayPort devices. It facilitates transfer of image signals.

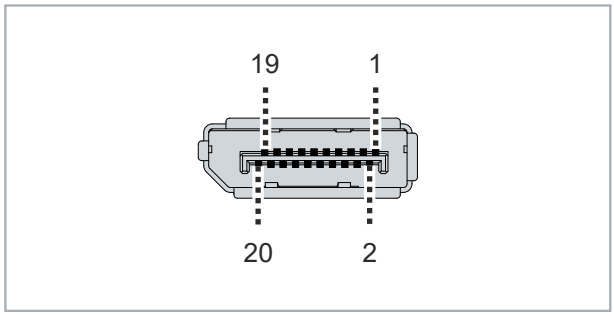


Fig. 16: DisplayPort pin numbering

Table 21: Pin assignment of DisplayPort

Pin	Connection	Pin	Connection
1	LVDS lane 0 +	2	Ground
3	LVDS lane 0 -	4	LVDS lane 1 +
5	Ground	6	LVDS lane 1 -
7	LVDS lane 2 +	8	Ground
9	LVDS lane 2 -	10	LVDS lane 3 +
11	Ground	12	LVDS lane 3 -
13	Config 1	14	Config 2
15	AUX channel +	16	Ground
17	AUX channel -	18	Hot-plug detection
19	Power supply: ground	20	Power supply: 3.3 V / 500 mA

3.3.7 DVI

The optional interface includes a DVI connector. to which a DVI-capable monitor can be connected. Only digital signals are transmitted.

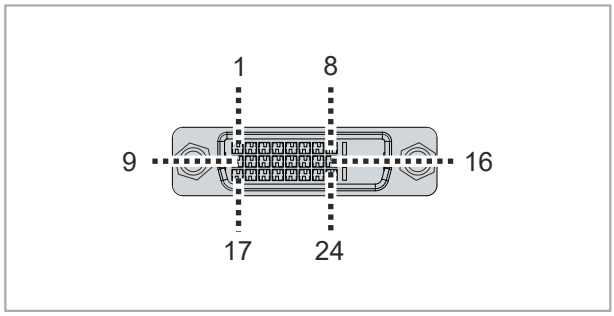


Fig. 17: DVI interface pin numbering

Table 22: DVI interface pin assignment

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

3.3.8 Serial interface RS232

The serial interface contains an electrically isolated socket. It is led out via a 9-pin standard DSUB connector. The interface provides an asynchronous, serial communication method defined in the RS232 standard.

The channel features overvoltage protection.

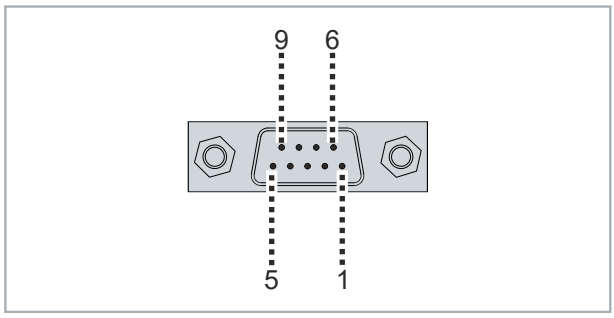


Fig. 18: RS232 interface pin numbering

Table 23: RS232 interface pin numbering

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

3.3.9 Serial interface RS485

The interface contains an electrically isolated socket. It is led out via a 9-pin standard DSUB connector. The interface provides an asynchronous, serial communication method defined in the RS485 standard.

The channel features overvoltage protection.

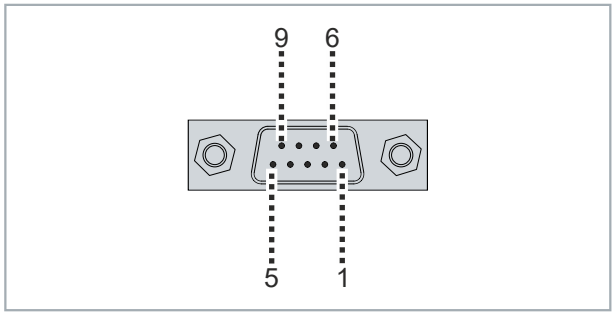


Fig. 19: RS485 interface pin numbering

Table 24: RS485 pin assignment

Pin	Signal	Type	Description
1	N/C	-	Not used
2	TxD +	Data-Out +	Transmit 485
3	RxD +	Data-In +	Receive 485
4	N/C	-	Not used
5	GND	Ground	Ground
6	VCC	VCC	+5 V
7	TxD-	Data-Out -	Transmit 485
8	RxD-	Data-In -	Receive 485
9	N/C	-	Not used
10	N/C	-	Not used

Pins 2 and 3 (data +) and pins 7 and 8 (data -) must be connected.

On delivery the interface is configured as a half-duplex endpoint without echo as standard – see table below:

Table 25: RS485 standard configuration

Function	State
Echo	off
Auto send	on
Always send	off
Auto receive	on
Always receive	off
Termination	on

3.3.10 Serial interface RS422

The interface contains an electrically isolated socket. It is led out via a 9-pin standard DSUB connector. The interface provides an asynchronous, serial communication method defined in the RS422 standard.

The channel features overvoltage protection.

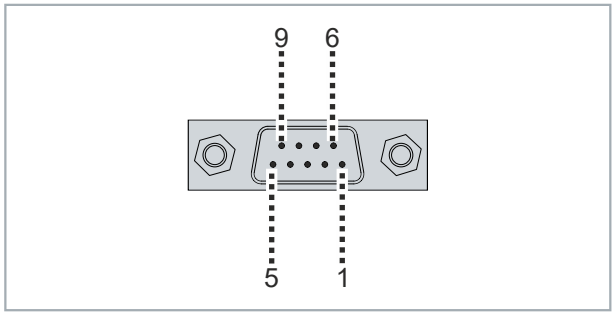


Fig. 20: RS422 interface pin numbering

Table 26: RS422 pin assignment

Pin	Signal	Type	Description
1	N/C	-	Not used
2	TxD +	Data-Out +	Transmit 422
3	RxD +	Data-In +	Receive 422
4	N/C	-	Not used
5	GND	Ground	Ground
6	VCC	VCC	+5 V
7	TxD -	Data-Out -	Transmit 422
8	RxD -	Data-In -	Receive 422
9	N/C	-	Not used
10	N/C	-	Not used

On delivery the interface is configured as a full duplex endpoint as standard:

Table 27: RS422 standard configuration

Function	State
Echo	on
Auto send	off
Always send	on
Auto receive	off
Always receive	on
Termination	on

3.3.11 Ethernet RJ45

The FC9071-0000 Gigabit Ethernet PC network interface card includes an Ethernet interface. The 100Base-T and 1000Base-T Ethernet standards enable the connection of corresponding network components and data rates of 100/1000 Mbit/s. The required speed is selected automatically.

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

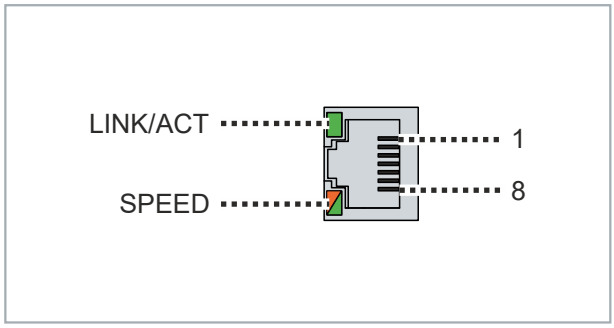


Fig. 21: Ethernet interface pin numbering

Table 28: Ethernet interface pin assignment

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

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

The green/orange LED (SPEED) shown in the figure indicates the data transmission rate. If the speed is 100 Mbit/s the LED is orange, at 1000 Mbit/s it is green.

3.4 Status LEDs

The device has three status LEDs: HDD, FB, PWR. They provide information on the following aspects:

- the hard disk activity
- the fieldbus status
- the status of the power controller

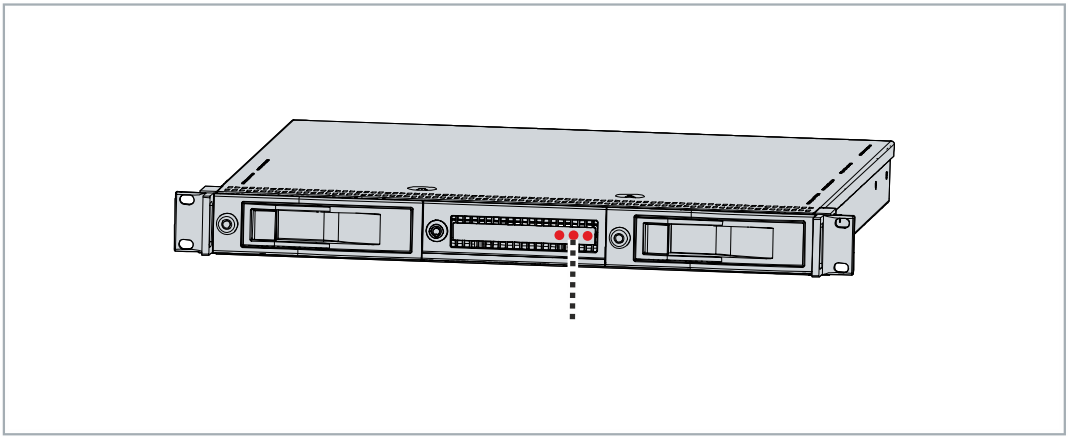


Fig. 22: Status LEDs

Table 29: Meaning of the Status LEDs

LED	Color/flashing interval	Meaning
PWR (Power)	green	Computer on
	off	Computer off
FB (fieldbus)	red	TwinCAT Stop
	blue	TwinCAT Config
	blue/red flashing	TwinCAT Config (fieldbus error)
	green	TwinCAT Run
	green/red flashing	TwinCAT Run (fieldbus error)
HDD (hard disk)	red	Accessing storage media

3.5 Name plate

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

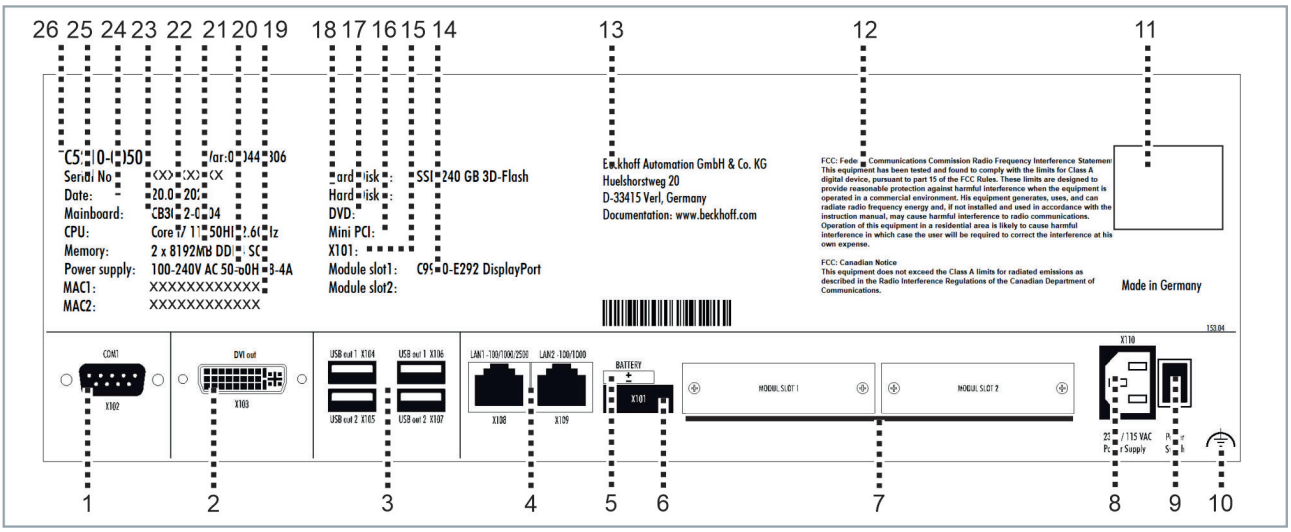


Fig. 23: Name plate

Table 30: Name plate legend

No.	Description
1	RS232 interface (X102)
2	DVI interface (X103)
3	USB interfaces (X104 - X107)
4	Ethernet interfaces (X108, X109)
5	Battery
6	Optional fieldbus interface (X101)
7	PCIe® module slots
8	IEC socket power supply
9	Main switch
10	Functional earth
11	Symbols Note: Here are the symbols applicable to the device such as CE, EAC, UKCA,  . The approvals of your device can be found on the name plate and in chapter 10.2 Approvals.
12	FCC approvals
13	Address of the vendor
14	PCIe® module slots
15	Optional fieldbus interface (X101)
16	Mini PCI™

No.	Description
17	DVD drive
18	Hard disk
19	MAC addresses of the Ethernet interfaces (X108, X109)
20	Power supply
21	Main memory
22	CPU
23	Mainboard
24	Date of manufacture
25	Serial number = Beckhoff Traceability Number (BTN)
26	Model: The last four digits indicate the device generation.

3.6 TwinCAT version

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

Table 31: C5210-0030 Minimum TwinCAT version

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

Table 32: C5210-0040 Minimum TwinCAT version

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

Table 33: C5240-0050 Minimum TwinCAT version

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

4 Commissioning

In order to use the device, you must first commission it. The first step is to transport the device to is operating location and unpack it. This is followed by installing the device in the 19-inch rack, connecting the cables and the power supply and finally switching on the device.

4.1 Transport and unpacking

Note the specified transport and storage conditions (see Chapter 9 Technical data).

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

NOTICE

Hardware damage due to condensation

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

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

Unpacking

Proceed as follows to unpack the 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 Rack installation

NOTICE

Extreme environmental conditions

Extreme environmental conditions can cause damage to the device.

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

NOTICE

Incorrect installation

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

- Only install the device with the connection section facing backwards.

The industrial PC is designed for installation in 19-inch racks in machine and plant engineering. Please observe the environmental conditions prescribed for the operation (see Chapter 9 Technical data).

Dimensions

The dimensions of the industrial PC are used to prepare the rack and to mount the device correctly in the rack.

All dimensions are in mm.

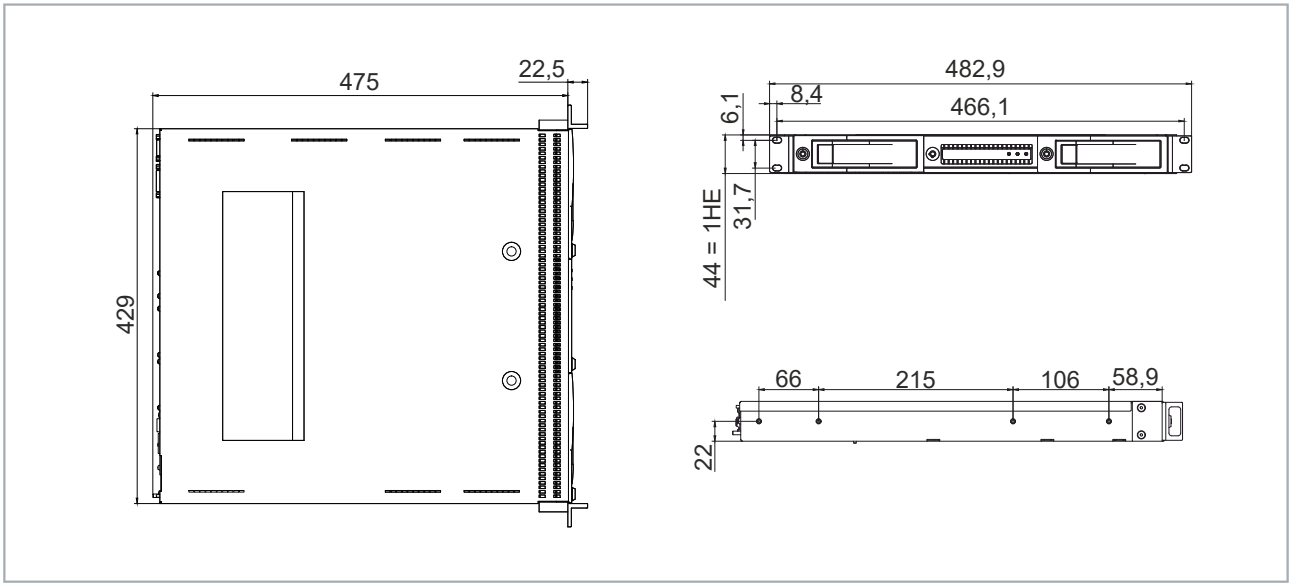


Fig. 24: Device dimensions

Beckhoff provides the following ordering option C9900-M712 with telescopic rails and brackets:

- C9900-M712: telescopic rails for C5210 and C5240, rails including bracket set for 19-inch rack assembly

The telescopic rails and brackets allow you to pull the industrial PC out of the rack. This makes it easier to open or connect the industrial PC, for example.

Instructions for mounting the C9900-M712 ordering option are provided in the following document:

https://www.beckhoff.com/de-de/support/downloadfinder/suchergebnis/?download_group=527329111&download_item=527329150

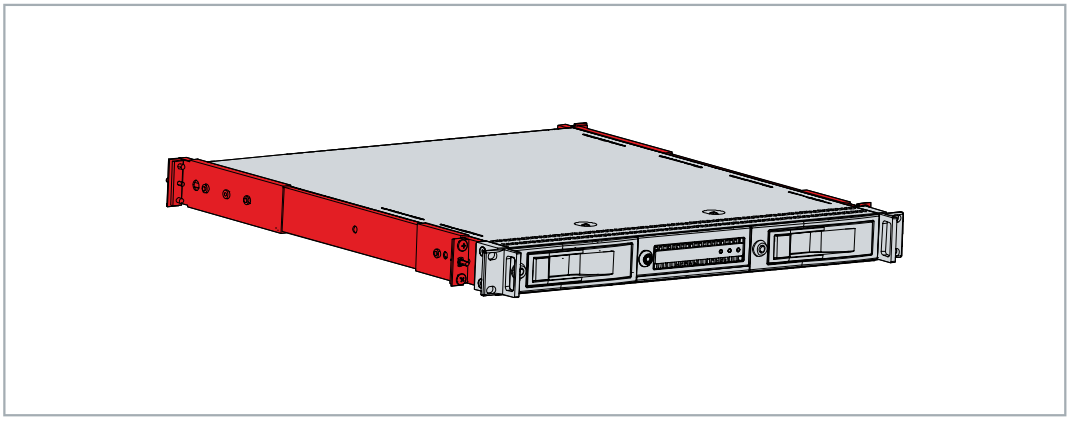


Fig. 25: Telescopic rails mounted

4.3 Connecting the industrial PC

⚠ CAUTION

Risk of electric shock

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

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

To prepare the industrial PC for operation, it must be connected. The first step is to ground the device. Then you can connect the cables and the power supply.

In its basic configuration, the industrial PC is equipped with a 100-240 V AC, 50-60 Hz full range power supply. The following ordering options are available:

- C9900-P208: 24 V DC power supply, instead of 100-240 V AC full range power supply, occupies one serial interface
- C9900-P209: 24 V DC power supply with integrated UPS, instead of 100-240 V AC full range power supply, occupies one serial interface

If you have ordered the PC with one of the ordering options for a 24 V DC power supply, wire the industrial PC in the 19-inch rack in accordance with the EN 60204-1:2006 standard 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 industrial PC with their own power supply must have the same potential for the PE and "0 V" conductors as the industrial PC (no potential difference).

4.3.1 Grounding of the industrial PC

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

The protection provided by the devices may be impaired by non-intended use.

All connected devices must be in SELV (Safety Extra Low Voltage)/PELV (Protective Extra Low Voltage) circuits.

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.

A protective conductor is included in the industrial PC's IEC socket for connecting the power supply. Establish the low-resistance protective earth of the industrial PC via the voltage connection, thus avoiding dangerous touch voltages.

If you have ordered the industrial PC with a 24 V power supply, a pin for protective earthing (PE) of the device is included in the power supply socket. Establish the low-resistance protective earth of the industrial PC via the voltage connection, thus avoiding dangerous touch voltages.

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. The functional earthing is established via the ground connection between the threaded hole above the connection section and the central grounding point of the rack in which the PC is installed.

If you have ordered the industrial PC with a 24 V power supply, you can choose between two grounding points for functional earthing. Use either the threaded hole above the connection section or the grounding bolt in the sheet metal on the power supply. Again, make the ground connection to the central grounding point of the rack.

Use cables with the largest possible cross-section, at least 4 mm^2, or a flat conductor for the ground connection, as the conductor's circumference should be as large as possible.

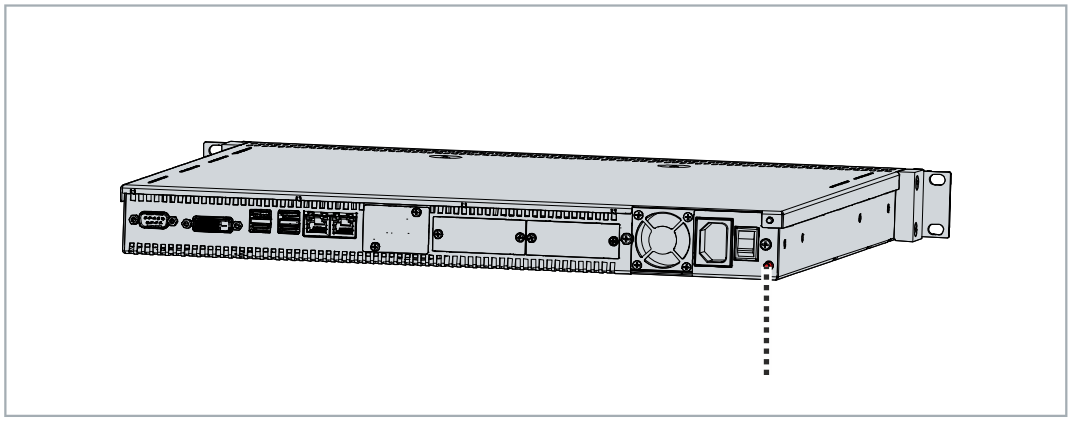


Fig. 26: Grounding bolt for functional earthing

4.3.2 Connecting cables and power supply

NOTICE

Incorrect connection procedure

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

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

Connecting cables

The connections are located on the front and rear side of the industrial PC. They are documented in chapter 3.1 Structure [▶ 9].

Make sure that you first connect the functional earth (see chapter 4.3.1 Grounding of the industrial PC [▶ 34]) and then plug in all data transmission cables.

Connect power supply via 100-240 V AC power supply

For the connection of the power supply, there is an IEC socket in the connection compartment on the rear side of the device. To connect the industrial PC to the power supply, use the supplied IEC power cable with a German Schuko plug at the end.

In the USA and Canada, the connection cable must meet the following specifications depending on the power supply:

- Separable supply cable of a max. length of 4.5 m (14.76 ft.) of type SJT or SVT (min. 125 V, 10 A), plug with ground connection according to NEMA 5-15P/-20P or IEC plug on the device side.
- Separable supply cable of a max. length of 4.5 m (14.76 ft.) of type SJT or SVT (min. 250 V, 10 A), plug with ground connection according to NEMA 6-15P/-20P or IEC plug on the device side.

Proceed as follows to connect the 100-240 V AC power supply:

1. Check that the mains voltage is correct.
2. Plug the corresponding IEC power cable into the IEC socket of the industrial PC.
3. Connect the industrial PC to a Schuko socket.

⇨ You have connected the industrial PC to the power supply.

4.3.3 Connecting the 24 V power supply

NOTICE

Connection of incorrect battery packs

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

- Only connect the C9900-U330 Beckhoff battery pack.

As an alternative to the 100-240 V AC power supply in the basic configuration, you can order the industrial PC with a 24 V DC power supply. The options C9900-P208 without integrated UPS and C9900-P209 with integrated UPS are available.

Connect power supply via 24 V DC 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. Install the power supply cable (see the following section "Mounting the supply line").
2. Plug the power supply cable into the power supply socket on the device.
3. Connect the device to your external 24 V power supply.
4. Switch on the 24 V power supply.

⇨ You have connected the device to the power supply.

If you ordered your device with an integrated UPS, then you can connect an external battery pack and install it on a DIN rail near to the PC. Only use the Beckhoff C9900-U330 battery pack (http://www.beckhoff.com/c9900-u330).

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

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

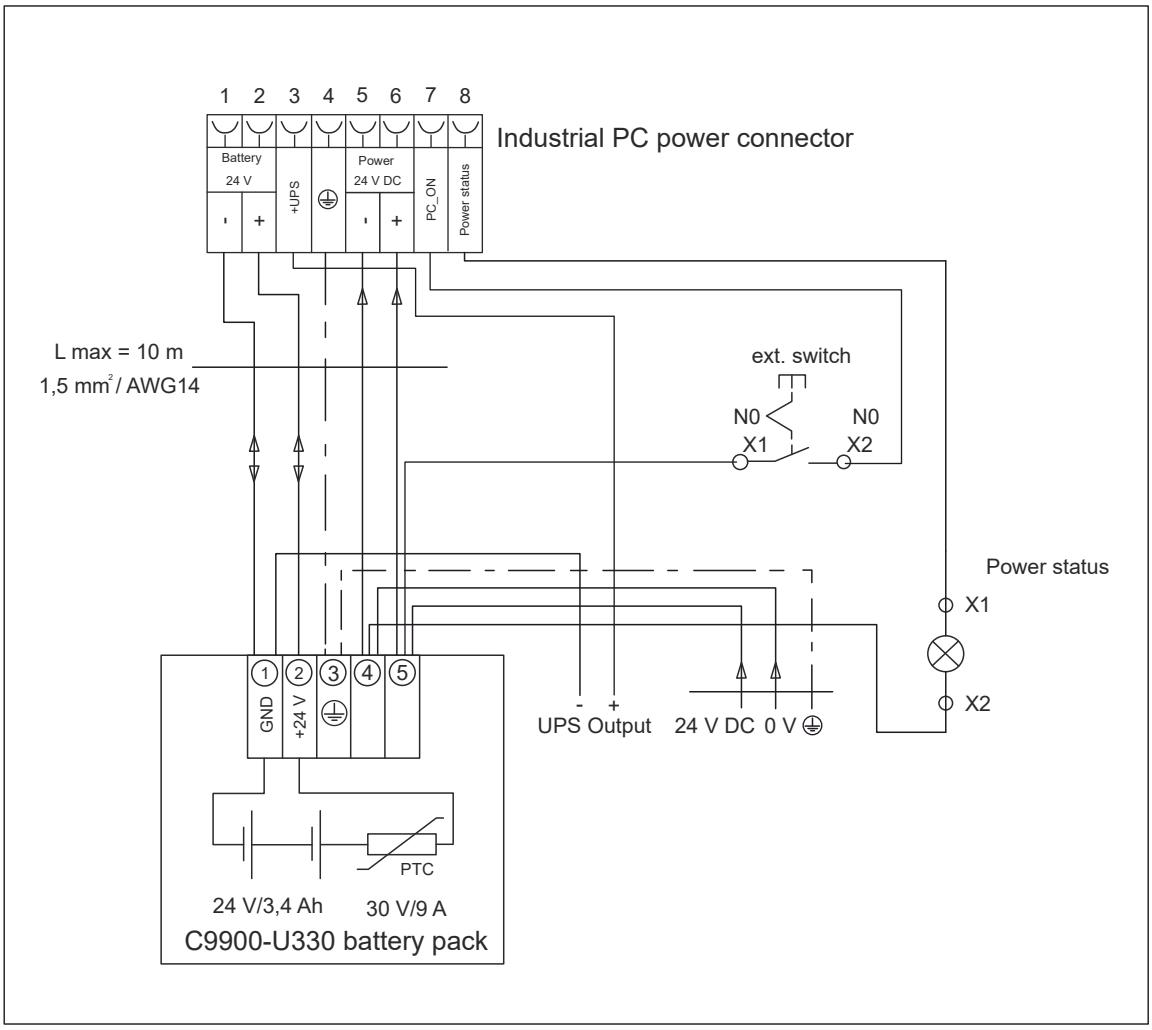


Fig. 27: Wiring diagram C9900-U330

Further information on the battery pack can be found in the corresponding manual in the download finder on the Beckhoff website C9900-U330.

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. It consists of an 8-pin connection strip and a 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.

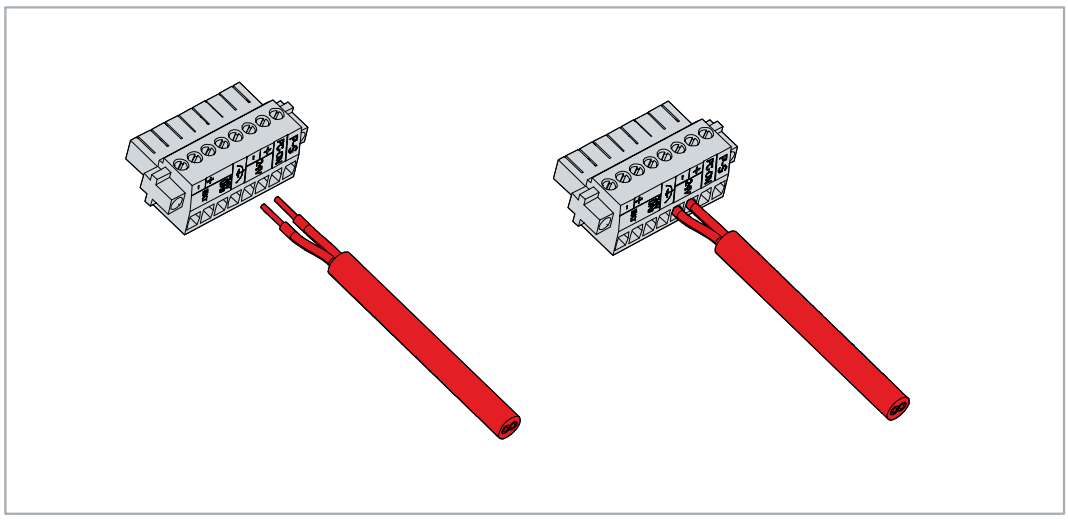


Fig. 28: Mounting the supply line

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).

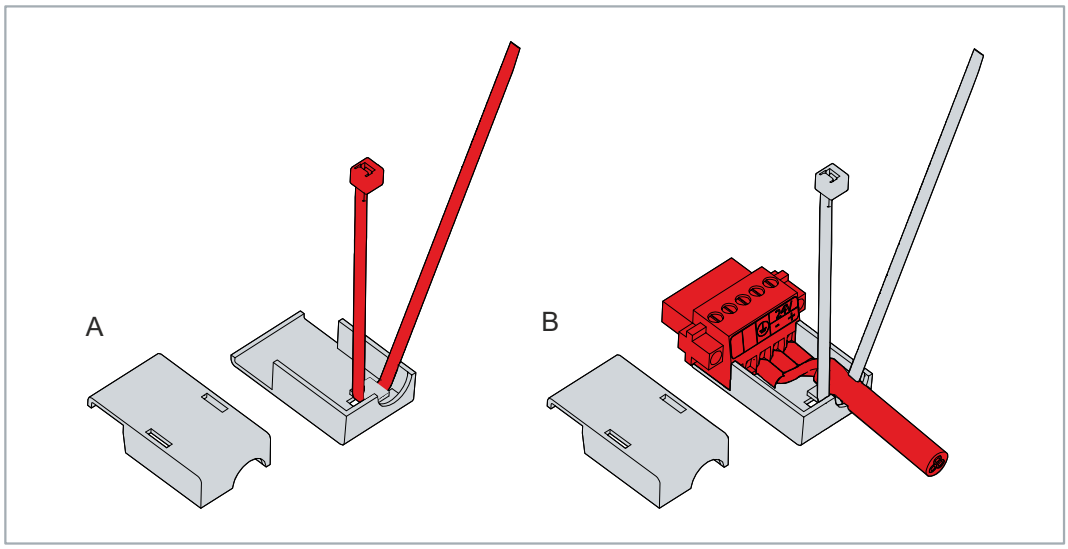


Fig. 29: Mounting lower part of strain relief housing

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).

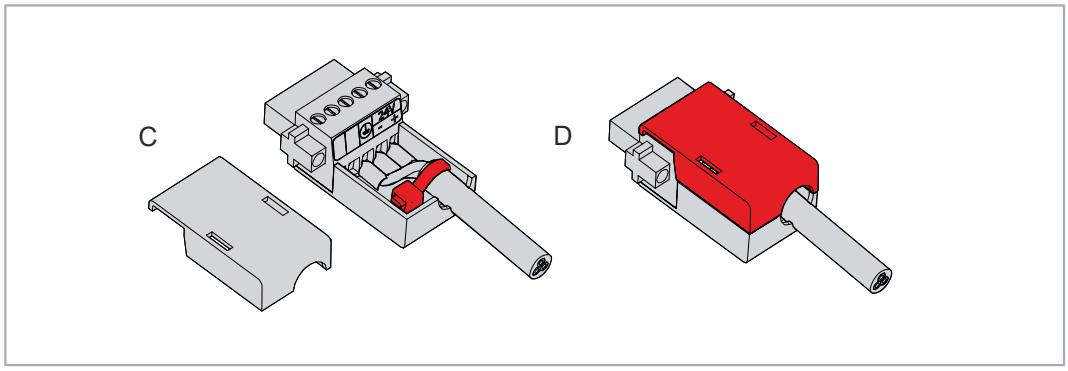


Fig. 30: Mounting upper part of strain relief housing

⇨ 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.

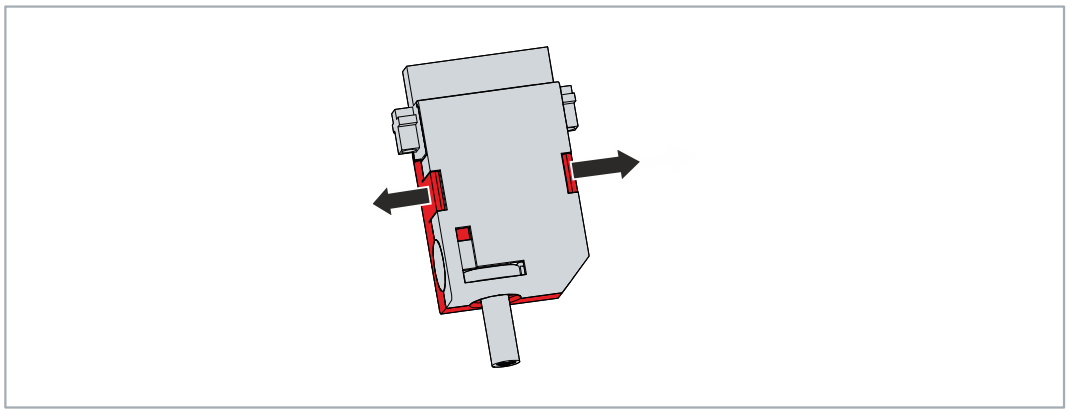


Fig. 31: Disassembly of the strain relief housing

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

⇨ You have dismantled the strain relief housing.

4.4 Switching the industrial PC on and off

NOTICE

Public networks

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

- Protect the device before connecting it to public networks.

NOTICE

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

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

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

NOTICE

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

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

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

NOTICE

Shortened battery life due to switching off the power supply

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

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

Switch on and off with 100-240 V power supply

The industrial PC is started or switched off when the system is switched on or off or when the power supply to the industrial PC is connected or disconnected. Behind the front flap of the industrial PC there is an ATX push button. You can use it to control the startup and shutdown of the operating system. If you press the ATX push button briefly while the Windows operating system is running, the operating system shuts down. You can switch off the supply voltage after shutdown or restart the PC by pressing the ATX push button again.

You can restart the device via the reset button behind the front flap of the industrial PC. Without shutting down the operating system in advance, there is a risk of data loss.

If you have ordered your industrial PC with a 110 V or 230 V UPS, this enables data backup in the event of a sudden switch-off of the device. If the power supply or the system is switched off before you have shut down the operating system properly, the operating system shuts down using the battery. Data can be saved. With frequent use, this shortens the life of the battery.

Switching on and off with 24 V power supply without UPS

If you have ordered your industrial PC with a 24 V power supply without integrated UPS instead of a 100-240 V power supply, the industrial PC has a power supply socket (X101) and a socket for external wiring (X102). The socket for external wiring contains an input PC-ON and an output Power Status.

You can use the PC-ON input to control the startup and shutdown of the operating system as an alternative to the ATX push button. The PC-ON signal is inverted, which is why the operating system boots up at 0 V at the input and shuts down at 24 V. During operation, 0 V must therefore be permanently applied to the input. If you want to shut down the operating system, you must apply 24 V to the PC-ON input. Once the operating

system has shut down, the PC power supply sets the Power Status output from 24 V to 0 V. This indicates that the shutdown is complete. You can then switch off the power supply. If you remove the 24 V from the PC-ON input before you have switched off the power supply, the operating system restarts. Therefore, 24 V must be applied to the input until you have switched off the power supply.

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

Switching on and off with 24 V power supply with UPS

If you have ordered your industrial PC with a 24 V power supply with integrated UPS instead of a 100-240 V power supply, the industrial PC has a power supply socket (X101) and a socket for external wiring (X102). You can connect an external battery pack to the industrial PC via the voltage socket. The socket for external wiring contains an input PC-ON and an output Power Status.

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

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

Driver installation

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

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

UPS software components

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

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

For more detailed information on UPS configuration, refer to chapter 5.2 UPS configuration [▶ 44].

5 Configuration

The configuration chapter gives you an insight into the Beckhoff Device Manager and the UPS configuration as well as the Wake on LAN (WOL) function. The UPS configuration is relevant if you ordered your device with a UPS.

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

In the UPS configuration, assign the appropriate UPS to the device.

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

5.1 Beckhoff Device Manager

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

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

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

The device is supplied with predetermined access data by default:

- User name: Administrator
- Password: 1

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

First start of Beckhoff Device Manager

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

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

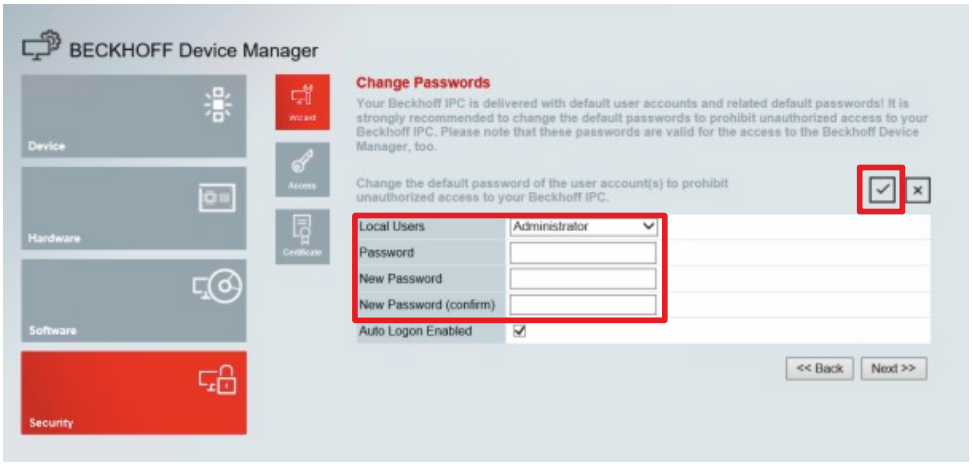


Fig. 32: Beckhoff Device Manager – Change passwords

2. Enter the access data of the Device Manager on delivery.
3. Choose a secure new password. Instructions for choosing a secure password are given below.

4. Confirm the changes by clicking on the tick in the red box on the right.
5. Exit the Security Wizard.

⇨ You have reached the Device Manager start page.

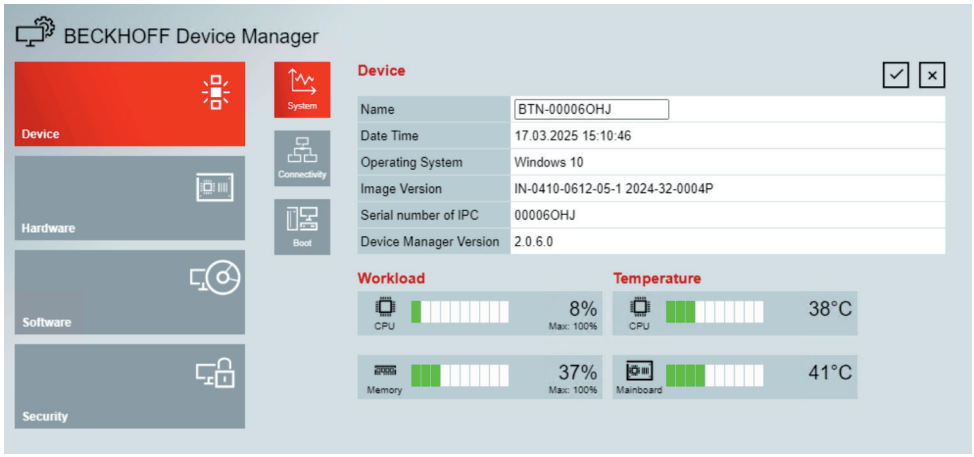


Fig. 33: Beckhoff Device Manager – Start page

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

Manual start of Beckhoff Device Manager

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

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

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

Secure passwords

Strong passwords are an important prerequisite for a secure system.

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

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

Please note the following:

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

A secure password has the following characteristics:

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

5.2 UPS configuration

Once you have installed the installation package with the UPS software components, you can configure the UPS. To start the configuration, go to *Start -> Beckhoff -> UPS Configuration.*

After starting the configuration, follow the steps below:

1. Click *Select*.

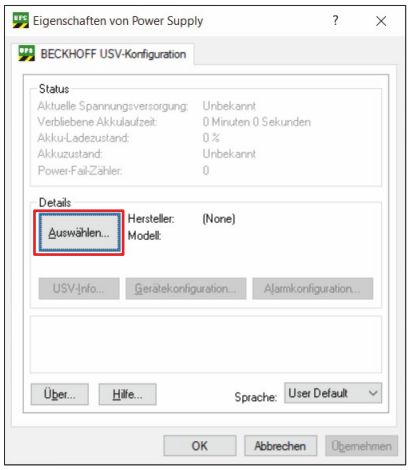


Fig. 34: Select UPS

2. Select the manufacturer *Beckhoff* from the drop-down menu.

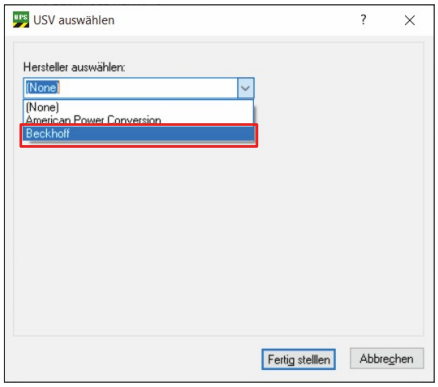


Fig. 35: Select manufacturer

3. Select at Model/Interface *Beckhoff P24Vxxxx*.
4. Select the port *COM4.*
5. Click *Finish.*

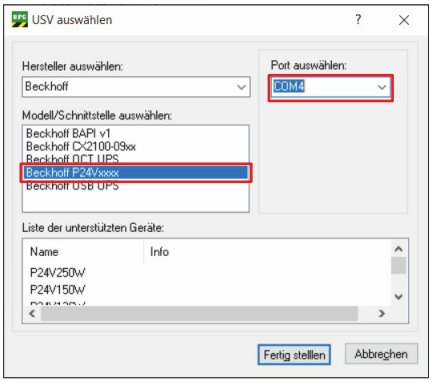


Fig. 36: Select model/interface & port

6. Click *Apply.*

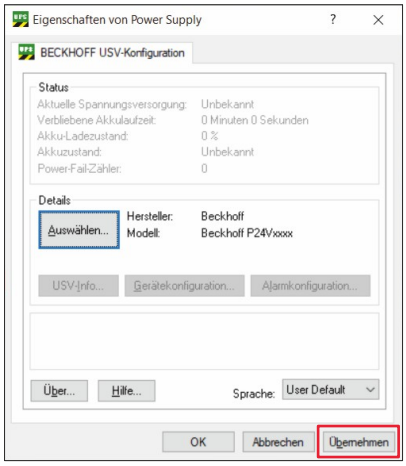


Fig. 37: Apply configuration

⇨ You have configured the UPS. The status of the connected UPS is displayed.

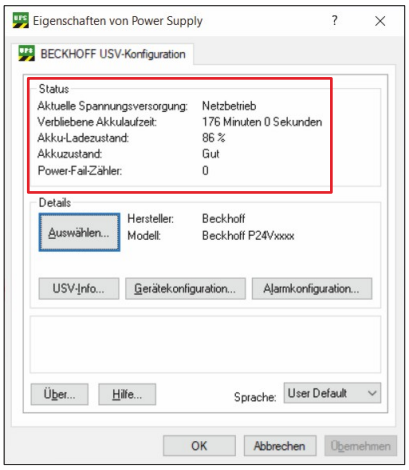


Fig. 38: UPS status

5.3 Wake on LAN (WOL)

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

Configuration under Windows

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

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

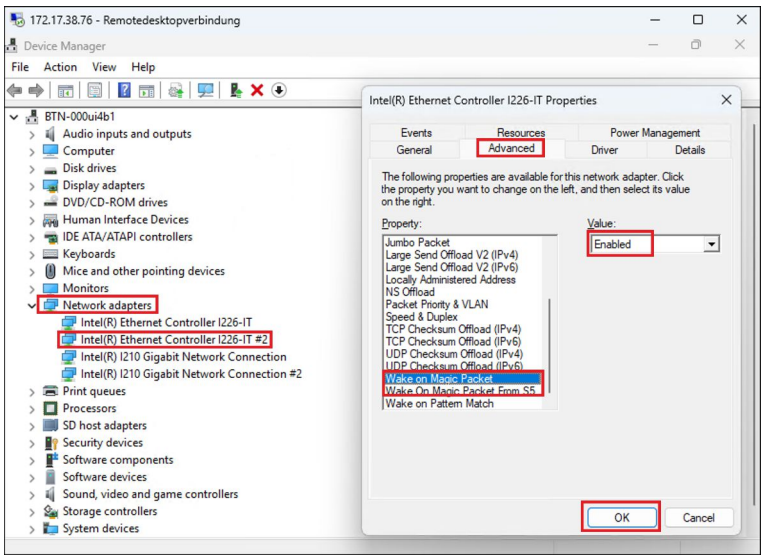


Fig. 39: Activate function

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

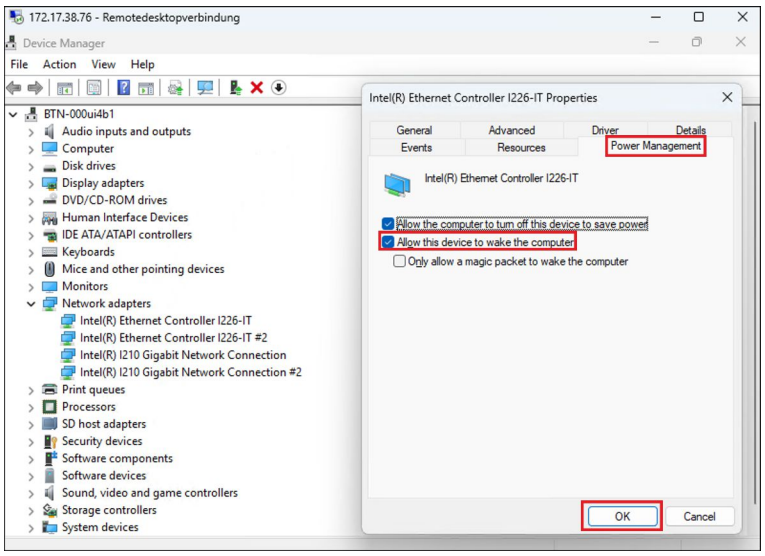


Fig. 40: Enable Function

⇨ You have configured the Wake on LAN function.

6 Decommissioning

NOTICE

Hardware damage due to power supply

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

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

As part of the decommissioning of the device, you must first disconnect the power supply and cables. You can then remove the device from the 19-inch rack.

If you do not wish to use the device any further, chapter 6.2 Disassembly and disposal provides information on the correct disposal of the device.

6.1 Disconnecting the power supply and cables

⚠ CAUTION

Risk of electric shock

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

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

Before you remove the device from the 19-inch rack, you must disconnect the power supply and the cables.

Disconnect the power supply

Proceed as follows to disconnect the 100-240 V AC power supply:

1. Disconnect the device from your power supply.
2. Pull the IEC plug out of the IEC socket of the device.

⇨ You have disconnected the power supply from the device.

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

1. Disconnect the device from your power supply.
2. Press the latches on the voltage connector together and pull it out of the device.
3. Remove the power supply cable if the connector is to remain with the device.

⇨ You have disconnected the power supply from the device.

Disconnecting cables

1. Make a note of the wiring of all data transmission cables if you want to restore the cabling with another device.
2. Disconnect all data transmission cables from the device.
3. Finally, disconnect the ground connection.

⇨ You have disconnected the cables from the device.

6.2 Disassembly and disposal

Before you can remove the device from the 19-inch rack, you must first disconnect the power supply and the cables (see chapter 6.1 Disconnecting the power supply and cables [▶ 48]).

You can pull the device out of the rack using the telescopic rails mounted on the device (https://www.beckhoff.com/de-de/support/downloadfinder/suchergebnis/?download_group=527329111&download_item=527329150).

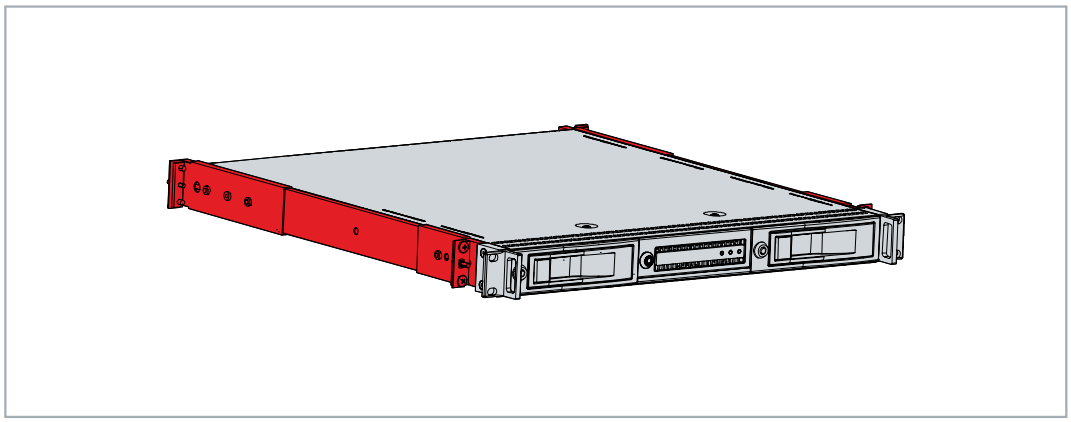


Fig. 41: Disassembly via telescopic rails

Disposal of the device

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.

7 Maintenance

⚠ CAUTION

Risk of electric shock

Working on the device when live can lead to electric shock.

- Switch off the power supply before replacing device components. This does not apply to the replacement of storage media in a RAID configuration.

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

7.1 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 points when cleaning the device:

- Keep to the boundary conditions of protection rating IP20.
- Only use a vacuum cleaner to clean the device. The device does not have to be switched off for this.
- Never use compressed air to clean the device.
- Maintain an ambient temperature range of 0 °C to 55 °C.

7.2 Maintenance

NOTICE

Use of incorrect spare parts

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

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

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

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

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

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

Table 34: Device component replacement recommendations

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

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

ESD protection

NOTICE

Electrostatic discharge

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

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

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

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

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

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

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

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

7.2.1 Replacing the battery

⚠ WARNING

Incorrect battery type

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

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

⚠ WARNING

Incorrect handling of the battery

Handling the motherboard battery incorrectly can cause an explosion.

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

NOTICE

Failure of the electronics due to mechanical damage

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

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

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

Table 35: Technical data of the battery

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

The battery is located in the connection section of the device behind a cover.

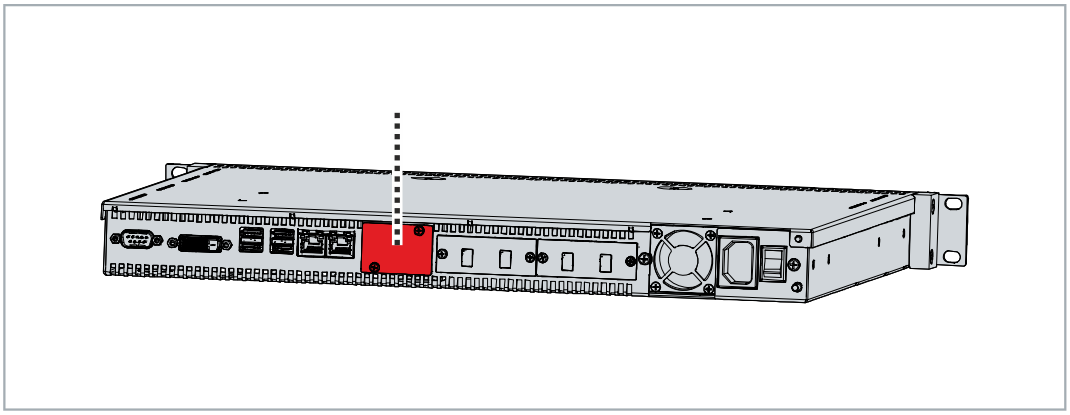


Fig. 42: Battery position

To replace the battery, follow the steps below:

1. Remove both M3 screws from the cover (section A).
2. Remove the cover (section A).
3. Pull the battery out of the device (section B).

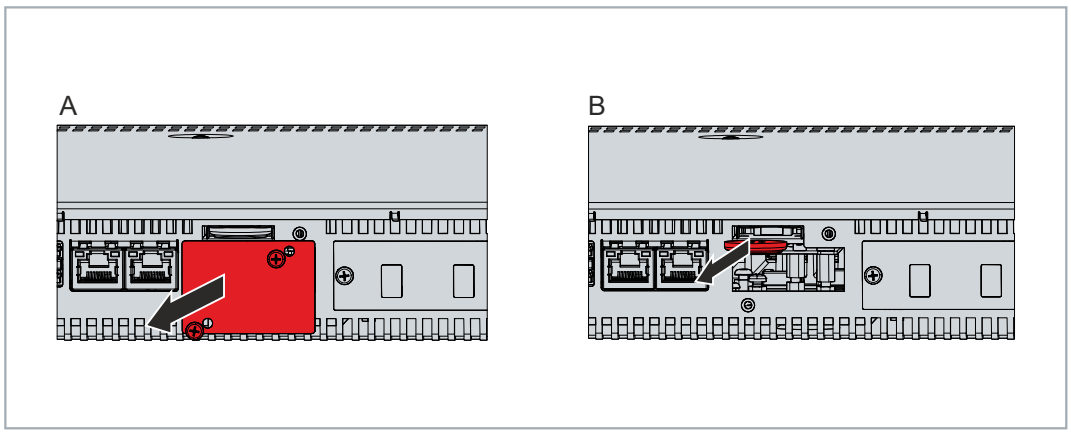


Fig. 43: Replacing the battery

4. Insert the new battery into the device. Make sure that the positive pole is pointing upwards.

⇨ You have successfully replaced the battery.

7.2.2 Replacing the storage media

For new storage media, please contact your Beckhoff Sales only. Hard disks from Beckhoff are optimized for industrial applications. SSDs from Beckhoff have a considerably higher lifetime expectancy than commercially available SSDs.

Data transmission before replacement

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

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

The storage media are located in the front of the device in removable frames.

Hard disk replacement

To replace a hard disk in the removable frame, proceed as follows:

1. Unlock the removable frame with the supplied key (section A).
2. Pull the key of the removable frame to unlock it (section B).

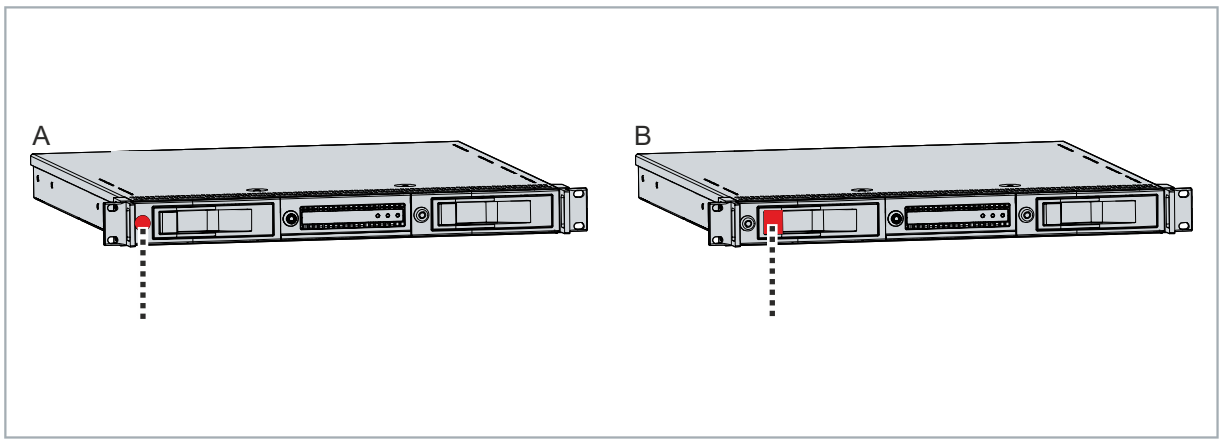


Fig. 44: Open removable frame

3. Open the removable frame (section C).
   ⇨ The hard disk is pushed out of the removable frame.
4. Pull the hard disk out of the removable frame (section D).

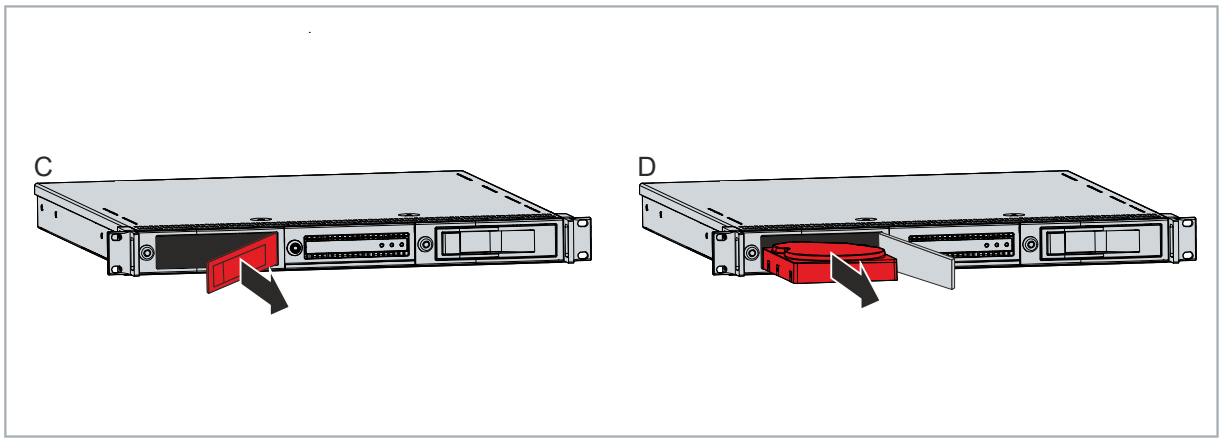


Fig. 45: Hard disk removal

5. Insert the new hard disk into the removable frame with the manufacturer's sticker facing upwards.
6. Close the removable frame again.
7. Lock the removable frame again.

⇨ You have replaced the hard disk.

SSD replacement

If you have ordered your device with an SSD instead of a hard disk, you have to proceed as follows when replacing the SSD:

1. Unlock the removable frame with the corresponding key (section A).
2. Pull the key of the removable frame to unlock it (section B).

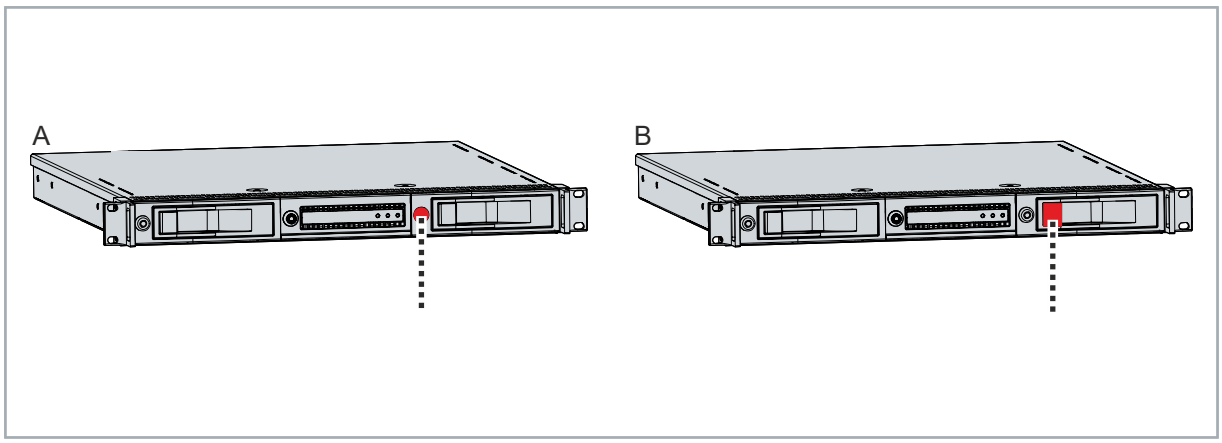


Fig. 46: Open removable frame

3. Open the removable frame (section C).
4. Pull the SSD out of the removable frame by the protruding Beckhoff sticker (section D).

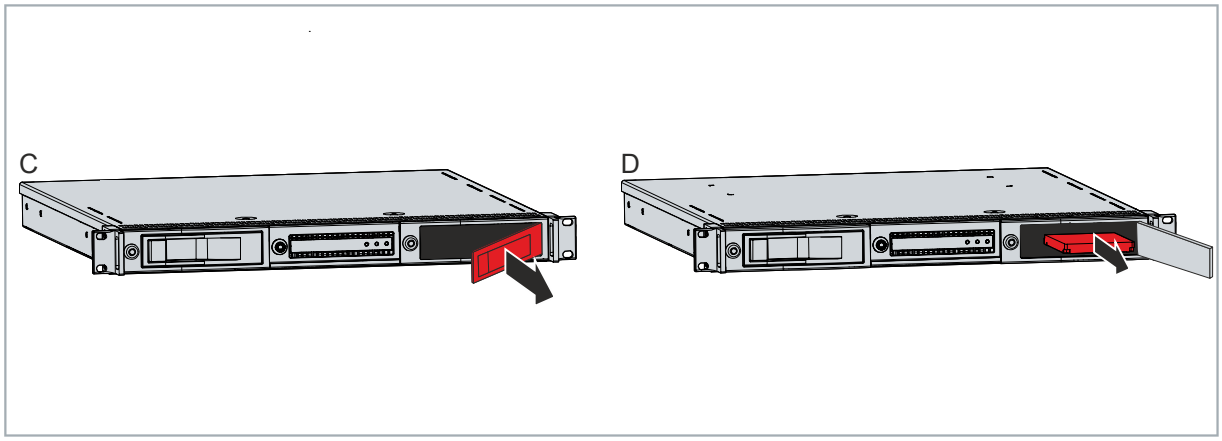


Fig. 47: Removal SSD

5. Reinsert the new SSD in the same orientation.
6. Close the removable frame again.
7. Lock the removable frame again.

⇨ You have replaced the SSD.

Disposal of storage media

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

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

7.2.3 Replacing the fan

NOTICE

Incorrect fan type

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

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

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

You cannot replace power supply fans yourself. In this case, contact your Beckhoff sales department to have the entire power supply replaced.

Before you can replace the device's fans, you must gain access to the inside of the device. Follow the steps below:

1. Loosen and remove the two M4 screws from the housing cover (section A).
2. Push the housing cover 1 cm backwards (section B).
3. Remove the housing cover upwards (section B).

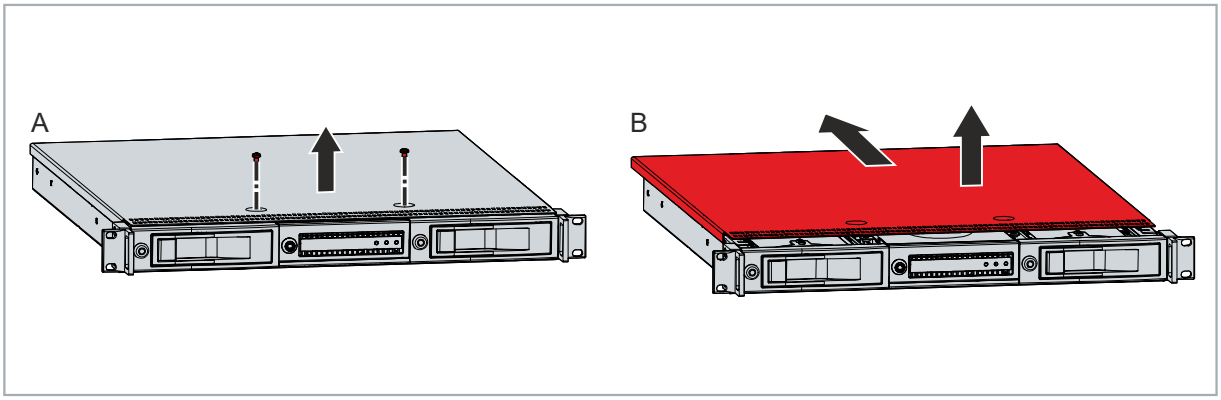


Fig. 48: Open the housing cover

⇨ You now have access to the interior of the device.

Replacing the fan

To replace the fans, follow the steps below:

1. Disconnect the fan supply cables from the motherboard.
2. Press the cable holders slightly upwards and pull the fan supply cables out of the cable holders.
3. Pull the fans up and out of the fan holders.

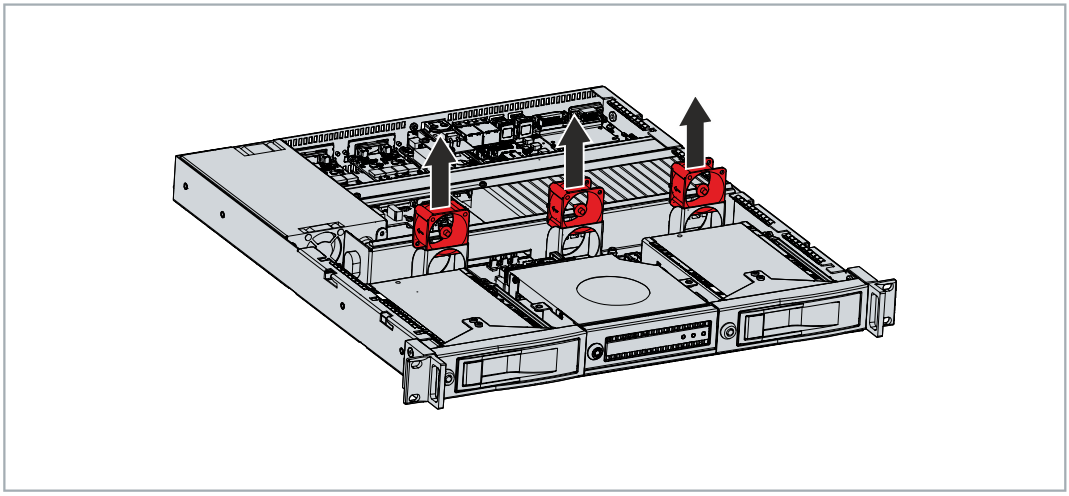


Fig. 49: Fan removal

4. Insert the new fans into the fan holders.
5. Route the fan supply cables through the cable holders.
6. Connect the fan power cables to the motherboard.

⇨ You have now replaced the fans.

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

8 Troubleshooting

Table 36: Troubleshooting

Fault	Cause	Measures
No function of the device	No power supply to the device Other cause	Check the power supply cable Call Beckhoff Service
The device does not boot fully	BIOS setup settings are incorrect Other causes	Check BIOS setup settings (load defaults) Call Beckhoff Service
The device boots, software starts, but control does not operate correctly	The cause of the error is the software or plant parts outside of the device	Call the machine and software manufacturer
USB error during access with TwinCAT via USB	Cycle times in TwinCAT set to 10 ms (default)	Increase the cycle times to between 50 ms and 80 ms

9 Technical data

Table 37: Technical data

Product designation	C5240
Dimensions (W x H x D)	482.7 x 44 x 493.8 mm
Weight of the basic configuration	Approx. 7.5 kg
Supply voltage	100–240 V_{AC}, 50 – 60 Hz 22–30 V_{DC} (24 V_{DC} power supply)
Power consumption	Data sheet for power consumption and power loss in the download finder: https://www.beckhoff.com/en-en/support/download-finder/search-result/?download_group=691754572
Secure element	fTPM 2.0 activated (see TPM documentation)
Protection rating	IP20
Vibration resistance (sinusoidal vibration)	EN 60068-2-6: 10 to 58 Hz: 0.035 mm 58 to 500 Hz: 0.5 G (approx. 5 m/s²) During reading of CD/DVD: EN 60068-2-6: 10 to 58 Hz: 0.019 mm 58 to 500 Hz: 0.25 G (approx. 2.5 m/s²)
Shock resistance (shock)	EN 60068-2-27: 5 G (approx. 50 m/s²), duration: 30 ms During reading of CD/DVD: 5 G (approx. 50 m/s²), duration: 11 ms
EMC interference immunity	conforms to EN 61000-6-2
EMC interference emission	conforms to EN 61000-6-4
Permissible ambient temperature	0 °C...+55 °C (operation) -20 °C ... +65 °C (transport / storage)
Permissible air humidity	Maximum 95 %, no condensation
Transport and storage	The values for air humidity and shock resistance are to be observed during transport and storage and in operation. The shock resistance during transport can be improved by means of suitably packing the industrial PC.

10 Appendix

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

10.1 Service and support

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

Beckhoff Service

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

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

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

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

Beckhoff Support

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

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

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

Headquarters

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.

10.2 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 Structure ... 9
Fig. 2 Position interfaces ... 10
Fig. 3 Opening the front flap ... 10
Fig. 4 RS232 interface pin numbering ... 11
Fig. 5 DVI interface pin numbering ... 12
Fig. 6 USB interface pin numbering ... 13
Fig. 7 Ethernet interfaces pin numbering ... 14
Fig. 8 IEC socket ... 15
Fig. 9 Power supply socket 24 V ... 16
Fig. 10 Access to PCIe® module slots ... 17
Fig. 11 Ethernet interface pin numbering ... 18
Fig. 12 RS232 interface pin numbering ... 19
Fig. 13 RS485 interface pin numbering ... 20
Fig. 14 RS422 interface pin numbering ... 21
Fig. 15 USB interface pin numbering ... 22
Fig. 16 DisplayPort pin numbering ... 23
Fig. 17 DVI interface pin numbering ... 24
Fig. 18 RS232 interface pin numbering ... 25
Fig. 19 RS485 interface pin numbering ... 26
Fig. 20 RS422 interface pin numbering ... 27
Fig. 21 Ethernet interface pin numbering ... 28
Fig. 22 Status LEDs ... 29
Fig. 23 Name plate ... 30
Fig. 24 Device dimensions ... 33
Fig. 25 Telescopic rails mounted ... 33
Fig. 26 Grounding bolt for functional earthing ... 35
Fig. 27 Wiring diagram C9900-U330 ... 38
Fig. 28 Mounting the supply line ... 39
Fig. 29 Mounting lower part of strain relief housing ... 39
Fig. 30 Mounting upper part of strain relief housing ... 39
Fig. 31 Disassembly of the strain relief housing ... 40
Fig. 32 Beckhoff Device Manager – Change passwords ... 43
Fig. 33 Beckhoff Device Manager – Start page ... 44
Fig. 34 Select UPS ... 45
Fig. 35 Select manufacturer ... 45
Fig. 36 Select model/interface & port ... 45
Fig. 37 Apply configuration ... 46
Fig. 38 UPS status ... 46
Fig. 39 Activate function ... 47
Fig. 40 Enable Function ... 47
Fig. 41 Disassembly via telescopic rails ... 49
Fig. 42 Battery position ... 52
Fig. 43 Replacing the battery ... 53
Fig. 44 Open removable frame ... 54

Fig. 45 Hard disk removal 54
Fig. 46 Open removable frame 55
Fig. 47 Removal SSD 55
Fig. 48 Open the housing cover 56
Fig. 49 Fan removal 56

List of tables

Table 1 Legend structure 9
Table 2 COM1 interface pin numbering 11
Table 3 DVI interface pin assignment 12
Table 4 USB standard device generation 13
Table 5 USB interface pin assignment 13
Table 6 Controller classification based on device generation 14
Table 7 Ethernet interface pin assignment 14
Table 8 LED meaning: speed 100/1000 Mbit/s 15
Table 9 LED meaning: speed 100/1000/2500 Mbit/s 15
Table 10 Current carrying capacity power supply 15
Table 11 Voltage socket pin assignment 16
Table 12 PCIe® modules Ordering options 17
Table 13 Interface options 17
Table 14 Ethernet interface pin assignment 18
Table 15 RS232 interface pin numbering 19
Table 16 RS485 pin assignment 20
Table 17 RS485 standard configuration 20
Table 18 RS422 pin assignment 21
Table 19 RS422 standard configuration 21
Table 20 USB interface pin assignment 22
Table 21 Pin assignment of DisplayPort 23
Table 22 DVI interface pin assignment 24
Table 23 RS232 interface pin numbering 25
Table 24 RS485 pin assignment 26
Table 25 RS485 standard configuration 26
Table 26 RS422 pin assignment 27
Table 27 RS422 standard configuration 27
Table 28 Ethernet interface pin assignment 28
Table 29 Meaning of the Status LEDs 29
Table 30 Name plate legend 30
Table 31 C5210-0030 Minimum TwinCAT version 31
Table 32 C5210-0040 Minimum TwinCAT version 31
Table 33 C5240-0050 Minimum TwinCAT version 31
Table 34 Device component replacement recommendations 51
Table 35 Technical data of the battery 52
Table 36 Troubleshooting 57
Table 37 Technical data 58

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

CFast is a registered trademark of CompactFlash Association.

Excel, IntelliSense, Microsoft, Microsoft Azure, Microsoft Edge, PowerShell, Visual Studio, Windows and Xbox are trademarks of the Microsoft group of companies.

MAX®, Stratix®, Cyclone®, Altera®, Agilex™, Arria®, Intel, the Intel logo, Intel Core, Xeon, Intel Atom, Celeron and Pentium are trademarks of Intel Corporation or its subsidiaries.

ix Industrial® is a registered trademark of HARTING Electronics GmbH or Hirose Electric Co., Ltd

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/C5210

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