BECKHOFF New Automation Technology

Manual | EN

C7015

Industrial PC



2026-07-10 | Version: 2.4

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 10
3.2 Interface description 11
3.2.1 EtherCAT P 11
3.2.2 Power supply 12
3.2.3 Ethernet RJ45 13
3.2.4 Mini DisplayPort 14
3.2.5 USB 15
3.3 Status LEDs 16
3.3.1 UPS-OCT LED 16
3.3.2 PWR LED 17
3.3.3 HDD LED 17
3.3.4 TC LED 17
3.4 Name plate 18
3.5 TwinCAT version 18

4 Commissioning 20

4.1 Transport and unpacking 20
4.2 Assembly 21
4.2.1 Dimensions 22
4.2.2 Mounting the Industrial PC 23
4.2.3 Mounting EtherCAT P Box module 25
4.3 Connecting the industrial PC 26
4.3.1 Grounding of the industrial PC 27
4.3.2 Connecting cables and power supply 28
4.4 Switching the industrial PC on and off 29

5 Configuration 30

5.1 Beckhoff Device Manager 30
5.2 Wake on LAN (WOL) 32

6 Decommissioning 34

6.1 Disconnecting the power supply and cables 34
6.2 Disassembly and disposal 35

7 Maintenance 37

7.1 Cleaning 37
7.2 Maintenance 38

8 Troubleshooting 40

9 Technical data 41

10 Appendix 42

10.1 Service and support 42

10.2 Approvals 43

1 Notes on the documentation

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

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

Disclaimer

The documentation has been compiled with care. The products described are, however, constantly under development.
We reserve the right to revise and change the documentation at any time and without notice.
Claims to modify products that have already been supplied may not be made on the basis of the data, diagrams, and descriptions in this documentation.

Trademarks

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

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

Copyright

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

Third-party trademarks

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

2 For your safety

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

Exclusion of liability

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

2.1 Signal words

The signal words used in the documentation are classified below.

Warning on personal injuries

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

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

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

Warning on property and environmental damage

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

2.2 Intended use

The 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 IP65 working environment. It offers full protection against contact (dust-tight) and against water jets (nozzle) from any angle.

The specified limits for technical data must be adhered to.

The device can be used within the documented operating conditions.

Improper use

Do not use the device outside the documented operating conditions.

2.3 Fundamental safety instructions

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

Application conditions

- Do not use the device under extreme environmental conditions.
- Do not use the device in hazardous areas.
- Do not carry out any work on the device while it is live. Always switch off the supply voltage for the device before mounting it, replacing device components or rectifying malfunctions.
- Never plug or unplug connectors during thunderstorms. There is a risk of electric shock.
- Ensure that the device has a protective and functional earth connection.

Damage to property, loss of data and impairment of functions

- Ensure that only trained specialists with a control and automation engineering background, operate the device. Use by unauthorized persons can lead to damage to property and loss of data.
- Fuse the power supply line to protect the supply line in the event of a short circuit according to its cross-section.
- In case of fire, extinguish the device with powder or nitrogen.

2.4 Operator's obligation to exercise diligence

The operator must ensure that

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

2.5 Notes on information security

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

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

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

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

3 Product overview

The C7015 Industrial PC is an ultra-compact Industrial PC in IP65 that can be mounted either in the control cabinet to save space or directly on the machine.

Thanks to the existing processors, the industrial PC has sufficient performance reserves for the following applications, among others:

- diverse automation and visualization tasks
- extensive IoT tasks
- HMI applications
- axis control
- short cycle times
- high-volume data handling
- complex diagnostics
- Condition Monitoring tasks
- other PC applications

The basic configuration of the C7015 includes the following aspects:

- compact motherboard
- Intel® processor
- M.2-SSD
- 1 slot for M.2 SSD
- 24 V DC power supply unit

3.1 Structure

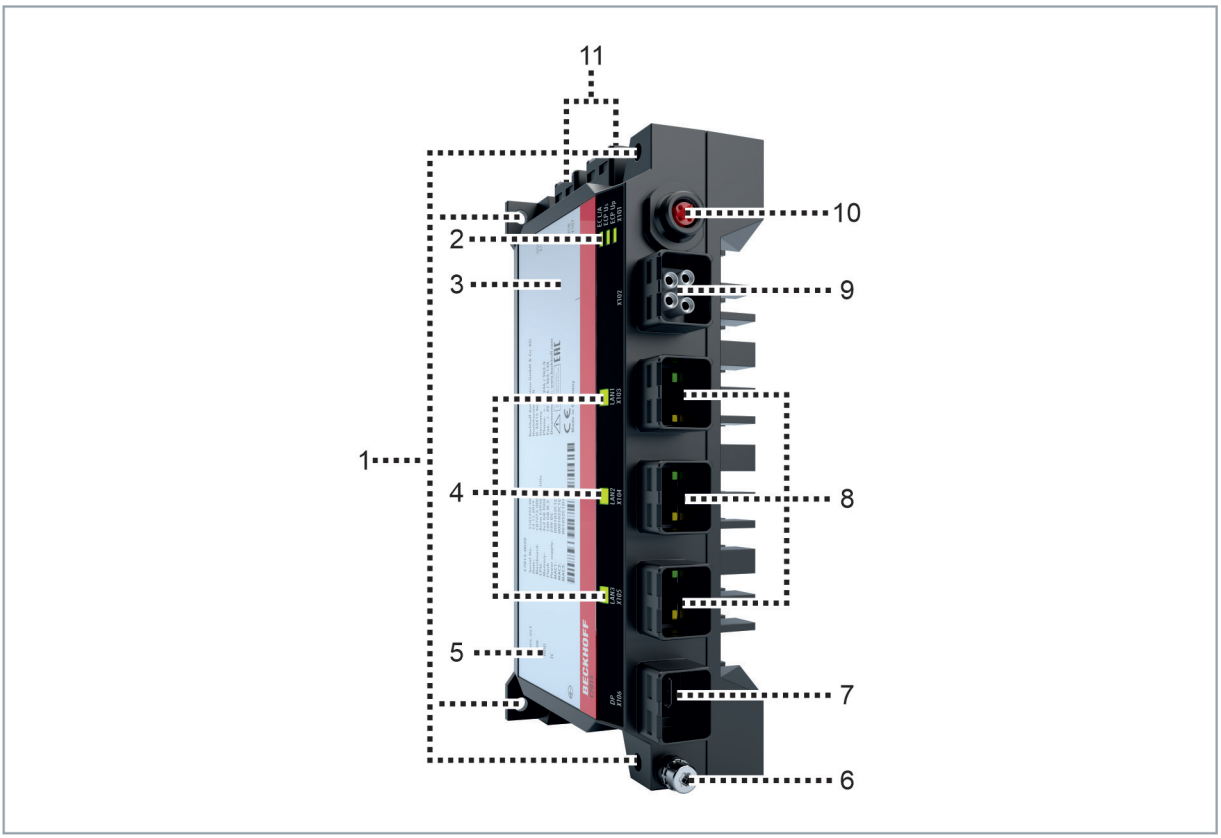


Fig. 1: Structure

Table 1: Legend - C7015 structure

No.	Component	Description
1	Flexible mounting concept	For mounting inside or outside the control cabinet via the rear or side panel
2	EtherCAT P LEDs	Display for Link Activity, system voltage, peripheral voltage
3	Name plate	Information on the equipment of the industrial PC
4	Ethernet LEDs	Display of the activity and speed of the Ethernet interfaces
5	Status LEDs	Status display for UPS-OCT, power, SSD, TwinCAT
6	Grounding bolt for functional earthing	Functional earthing of the industrial PC
7	Mini DisplayPort (X106)	Transmission of the video signal
8	Ethernet interfaces RJ45 (X103-X105)	Connection of the industrial PC to a 100/1000BASE-T network
9	Power supply (X102)	Connection of the power supply and external wiring of the industrial PC
10	EtherCAT P interface (X101)	Power supply and communication to EtherCAT P slaves via a cable
11	USB interfaces (X107, X108)	Connection of peripheral devices

3.2 Interface description

In the basic configuration, the C7015 includes the following interfaces:

- EtherCAT P (X101)
- Power supply (X102)
- Ethernet RJ45 (X103-X105)
- Mini DisplayPort (X106)
- USB (X107, X108)

3.2.1 EtherCAT P

The industrial PC has an EtherCAT P interface (X101). EtherCAT P (EtherCAT + Power) is an extension of the EtherCAT technology in the area of cabling. Via the connector in IP65/67 design, you can use the four-wire Ethernet cable (according to IP65) for data and for two electrically isolated, individually switchable 24 V/ 3 A supplies. This allows you to cascade several EtherCAT devices. For connection and power supply of I/O as well as field devices you only need one cable. Beckhoff recommends the use of the following cable:

- ZK7000-0101-1003

Alternatively, you can use other cables whose length exceeds 20 cm.

A protective cap for the EtherCAT P interface is included in the scope of delivery.

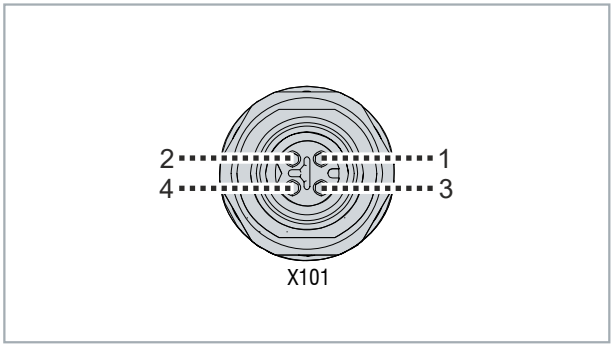


Fig. 2: EtherCAT P interface pin numbering

Table 2: EtherCAT P interface pin assignment

Pin	Signal	Description
1	Tx +	LAN signal + and GND_S
2	Rx +	LAN signal + and GND_P
3	Rx -	LAN signal and peripheral voltage 24 V (U_P)
4	Tx -	LAN signal and control voltage 24 V (U_S)

On the housing of the PC there are the three LEDs of the EtherCAT P interface (see Fig. 3). They provide information about the Link Activity (EC L/A), the system voltage (ECP U_S) and the peripheral voltage (ECP U_P).

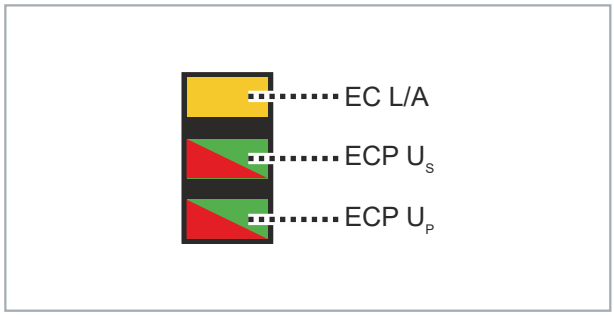


Fig. 3: EtherCAT P LEDs

The following table shows the meaning of the colors and flashing intervals:

Table 3: LEDs EtherCAT P interface

LED	Color/flashing interval	Meaning
EC L/A	yellow on	Connection to network
	yellow flashing	Data transmission in progress
ECP U_S	green on	Voltage in normal range
	red on	Voltage outside the normal range
ECP U_P	green on	Voltage in normal range
	red on	Voltage outside the normal range

You can use the Beckhoff Device Manager to switch the system voltage U_S and the peripheral voltage U_P. For more information, refer to Chapter 5 Beckhoff Device Manager [▶ 30].

3.2.2 Power supply

The industrial PC is supplied with a nominal voltage of 24 V. The 2x2-pin voltage socket according to IP65/67 (X102) is used for connection to the power supply and the external wiring of the industrial PC. The main supply voltage is applied between PIN 1 (0 V) and PIN 2 (24 V) of the socket.

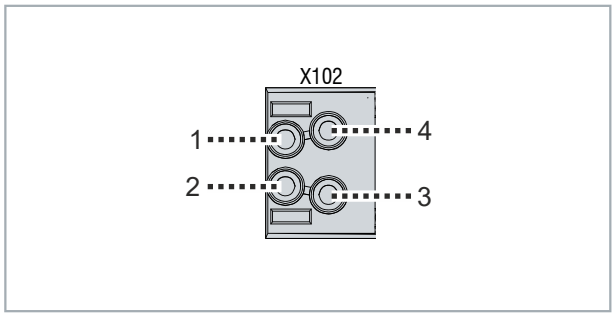


Fig. 4: Voltage socket pin numbering

Table 4: Voltage socket pin assignment

Pin	Signal	Description
1	GND	0 V
2	24 V	Power supply
3	PC-ON	Input PC-ON
4	P-S	Power status output

The connector for the power supply is specified for 8 A and can accommodate either wire cross-sections up to 1.5 mm^2 or up to 2.5 mm^2 according to your selection. Use 1.5 mm^2 or 2.5 mm^2 for long supply lines to achieve a low voltage drop on the supply lines. There should be at least 22 V at the power supply plug of the industrial PC, so that the industrial PC remains switched on during voltage fluctuations.

There is no voltage connector in the scope of delivery of the industrial PC. To connect the PC, Beckhoff recommends ordering one of the following options from your Beckhoff Sales:

- C9900-K936
- C9900-K937

3.2.3 Ethernet RJ45

The industrial PC has three Gigabit LAN ports according to IP65/67 (X103-X105). 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 data rates of the Ethernet interfaces and the use of the controller vary depending on the device generation. The following table shows classification according to the device generation:

Table 5: Classification according to device generation

Device generation	Controller	Mbit/s
C7015-0020	Intel® i210	100/1000
C7015-0030	Intel® i226	100/1000/2500

The Ethernet ports are suitable for cycle times <= 1 ms and for distributed clock applications in EtherCAT.

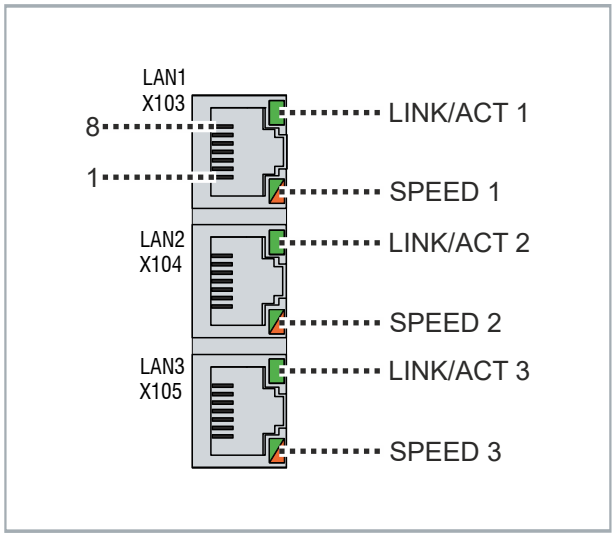


Fig. 5: Ethernet interfaces pin numbering

Table 6: Ethernet interface pin assignment

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

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

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

Table 7: LED meaning: speed 100/1000 Mbit/s

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

Table 8: LED meaning: speed 100/1000/2500 Mbit/s

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

Since the LEDs directly at the interface cannot be seen with an existing wiring, the LEDs on the side panel of the PC (see Fig. 6) show the status of the Ethernet interfaces.

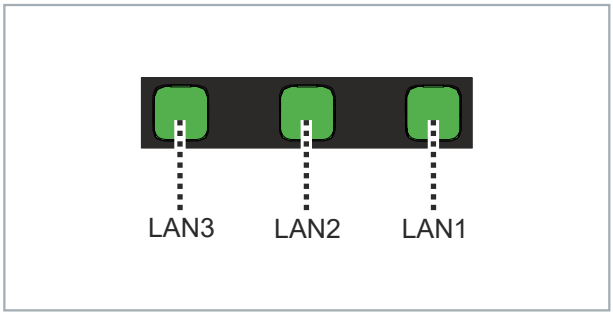


Fig. 6: Ethernet LEDs

3.2.4 Mini DisplayPort

The industrial PC has a Mini DisplayPort according to IP65/67 (X106) that enables connection of devices with Mini DisplayPort. It facilitates transfer of image signals.

In addition, DVI signals can be transferred via an adapter. Please get in touch with your Beckhoff sales contact.

DisplayPort signals are led out via the interface by default. With the use of a level shifter cable the board switches the DisplayPort specification 1.1 automatically to HDMI signals.

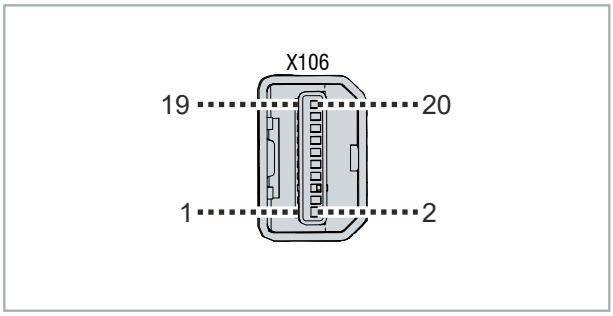


Fig. 7: Mini DisplayPort pin numbering

Table 9: Mini DisplayPort pin assignment

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

3.2.5 USB

The industrial PC has two USB 3.0 interfaces (X107, X108) according to IP65/67. They are used to connect peripheral devices with USB interfaces.

Contrary to the specification, the channels only supply current up to 500 mA. For higher power requirements, devices with their own power supply must be used. The USB interfaces are electronically protected.

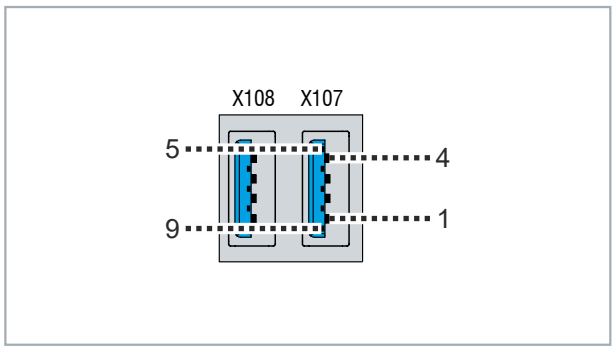


Fig. 8: USB interfaces pin numbering

Table 10: 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 Status LEDs

The industrial PC has four status LEDs: UPS-OCT, PWR, HDD, TC. They provide information on the following aspects:

- the transmission quality of the UPS-OCT signals
- the status of the power controller
- the hard disk activity
- the TwinCAT status

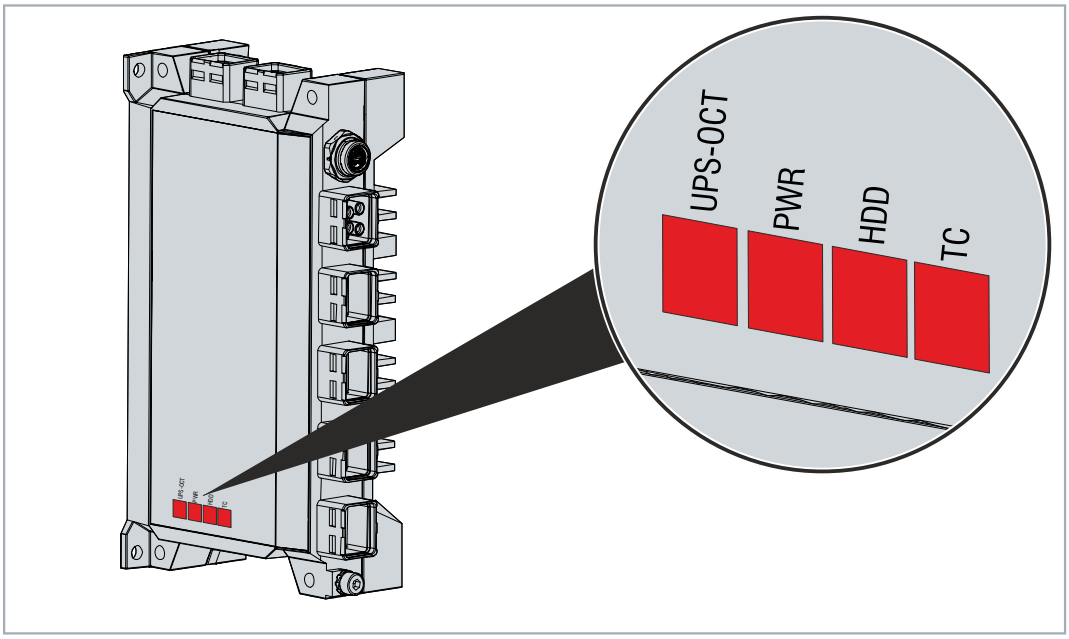


Fig. 9: Status LEDs

3.3.1 UPS-OCT LED

The UPS-OCT LED indicates the transmission quality of the UPS-OCT signals. UPS stands for the uninterruptible power supply. One-cable technology (OCT) enables the communication between PC and UPS to be transmitted together with the power supply, so that only one cable is required.

The colors and flashing intervals have the following meanings:

Table 11: Meaning of the UPS-OCT LED

Color	Flashing interval	Meaning
None	Steadily lit	No UPS-OCT connected
Blue	Flashing	Bootloader active
Yellow	Steadily lit	Moderate signal quality
Green	Steadily lit	Good signal quality
Red	Steadily lit	Poor signal quality

3.3.2 PWR LED

The PWR (power) LED indicates the status of the power controller. The colors and flashing intervals have the following meanings:

Table 12: Meaning of the PWR LED

Color	Flashing interval	Meaning
None	Steadily lit	PC is off
White	Steadily lit	VCC power fail
Magenta	Steadily lit	S UPS active (if existent)
Yellow	Steadily lit	Windows shut down, supply voltage still present
Green	Steadily lit	Normal operation
Red	Steadily lit	Reset/power fail
Green/yellow	Flashing	Bootloader running without error
Red/yellow	Flashing	Bootloader is starting (start sequence is being run through)
Magenta	Flashing (0.5 s)	S UPS capacitance test (if S UPS exists)
Red/magenta	Flashing	Checksum error during the I2C transmission in the bootloader
Cyan	Flashing (2 s)	contact Beckhoff Service

3.3.3 HDD LED

The HDD LED indicates the activity of the storage medium. The colors and flashing intervals have the following meanings:

Table 13: Meaning of the HDD LED

Color	Flashing interval	Meaning
Red	Flashing	Activity (access to storage medium)

3.3.4 TC LED

The TC LED indicates the TwinCAT status. The colors and flashing intervals have the following meanings:

Table 14: Meaning of the TC LED

Color	Flashing interval	Meaning
Green	Steadily lit	TwinCAT Run Mode
Blue	Steadily lit	TwinCAT Config Mode
Red	Steadily lit	TwinCAT Stop
-	-	TwinCAT not started

3.4 Name plate

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

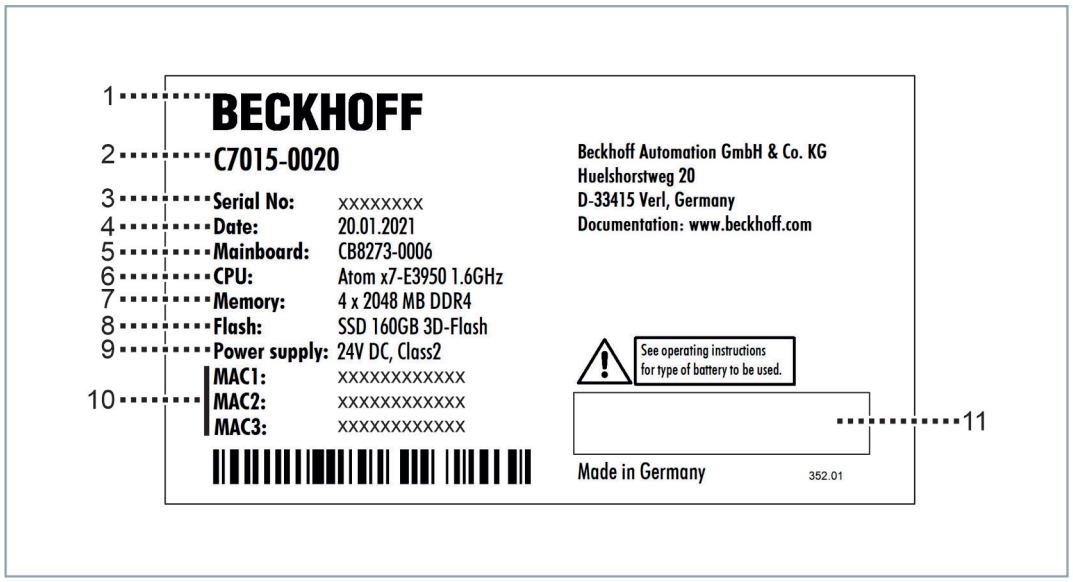


Fig. 10: Name plate

Table 15: Legend C7015 name plate

No.	Description
1	Manufacturer, including address
2	Model: the last four digits indicate the product variant.
3	Serial number (BTN)
4	Date of manufacture
5	Mainboard
6	CPU
7	Main memory
8	Storage media
9	Power supply: 24 V_{DC}, NEC class 2
10	MAC addresses of the Ethernet interfaces (X103-X105)
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.

3.5 TwinCAT version

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

Table 16: C7015-0020 Minimum TwinCAT version

Operating system	Minimum TwinCAT version
Windows 10	3.1 build 4024.7

Table 17: C7015-0030 Minimum TwinCAT version

Operating system	Minimum TwinCAT version
Windows 10	3.1 build 4026.14
Windows 11	3.1 build 4026.16

4 Commissioning

To be able to use the industrial PC, you must first commission it. The first step is to transport the device to is operating location and unpack it. This is followed by installing the device inside or outside a control cabinet, connecting the cables and the power supply, and finally switching on the industrial PC.

4.1 Transport and unpacking

Note the specified transport and storage conditions (see Chapter 9 Technical data [▶ 41]).

Despite the robust design of the unit, the components are sensitive to strong vibrations and impacts. Transporting a control cabinet with a built-in PC can result in excessive impact on the Industrial PC. During transport the device must therefore be protected from excessive mechanical stress. Appropriate packaging of the Industrial PC, in particular the original packaging, can improve the vibration resistance during transport.

NOTICE

Hardware damage due to condensation

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

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

Unpacking

Proceed as follows to unpack the 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. In case of discrepancies between the package contents and the order, or in case of transport damage, please inform Beckhoff Service (see Chapter 10.1 Service and support).

4.2 Assembly

NOTICE

Incorrect installation

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

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

The C7015 Industrial PC is designed for flexible and space-saving installation in machine and plant integration. The environmental conditions specified for operation must be observed (see chapter 9 Technical data [▶ 41]).

With the help of the flexible mounting concept, you can align the cable feed according to the application requirements. The mounting concept allows mounting via the rear panel as well as via the right side panel of the industrial PC. The C7015 can either be mounted inside a control cabinet or integrated outside a control cabinet on the machine or plant.

Figure 11 shows the flexible mounting concept, which is already mounted ex works. You must insert the fastening screws at the marked points.

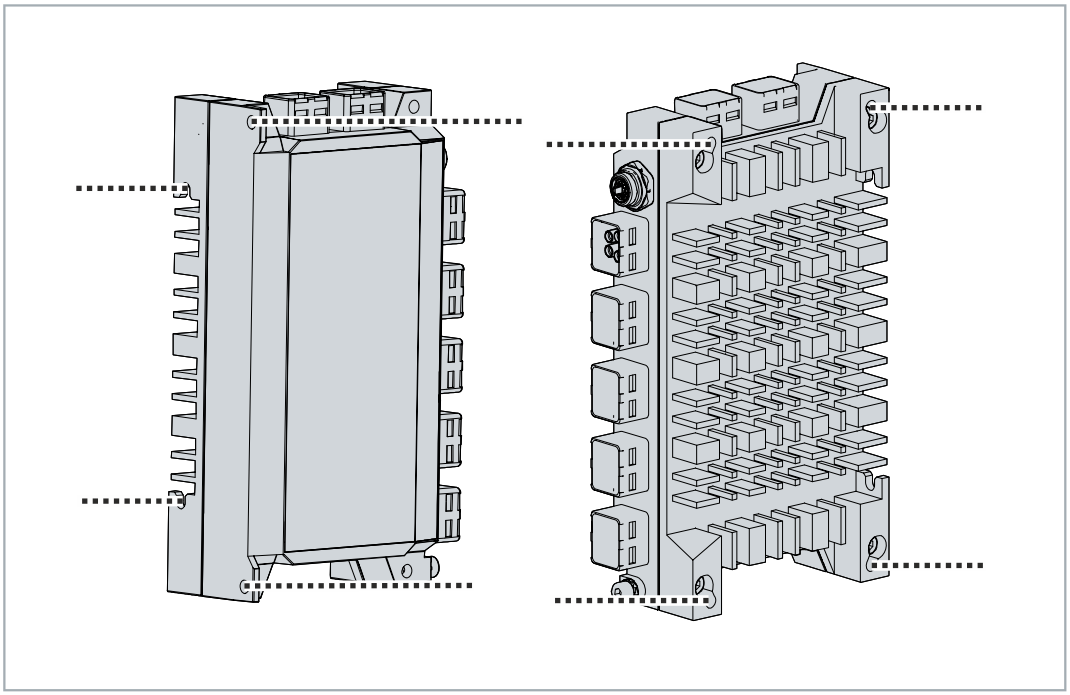


Fig. 11: Flexible mounting concept

4.2.1 Dimensions

The dimensions of the industrial PC and the mounting concept are used to prepare the control cabinet and to mount the device correctly inside and outside the control cabinet. All dimensions are in mm. Figure 12 shows the dimensions of the C7015 with the flexible mounting concept.

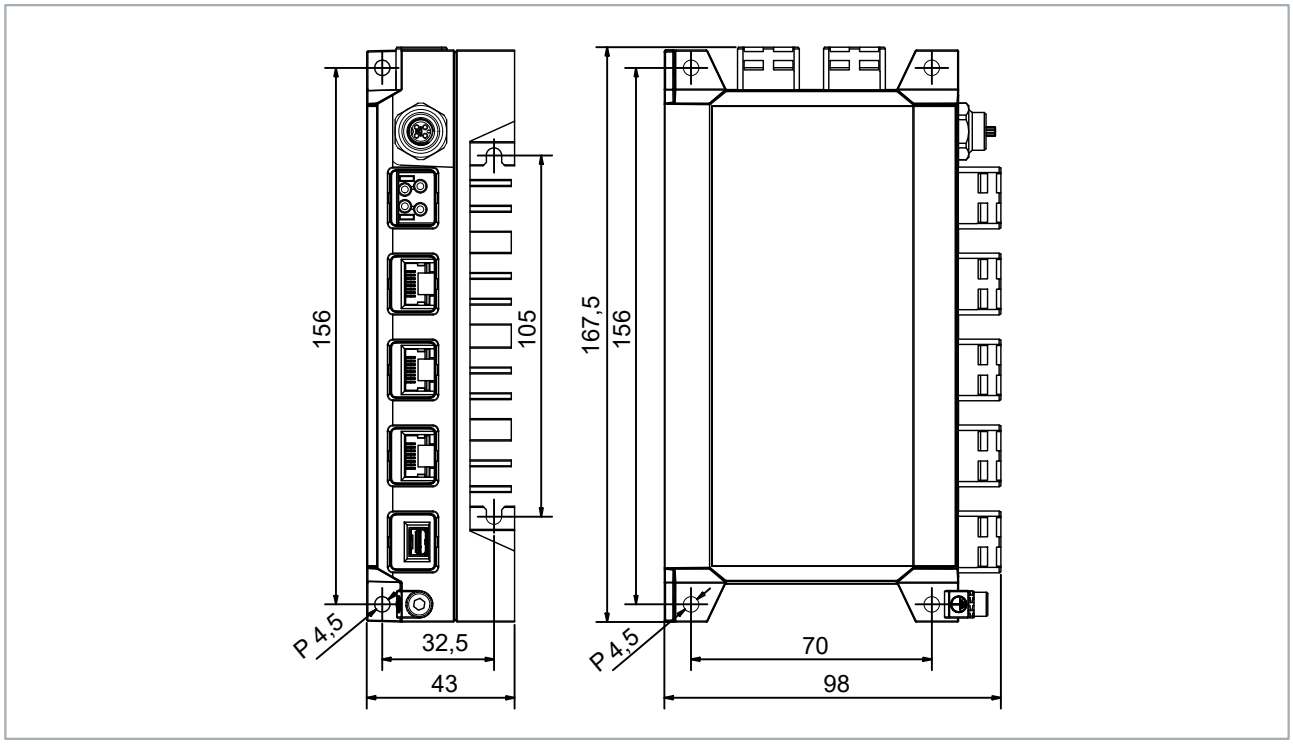


Fig. 12: Dimensions

If you have mounted an EtherCAT P Box module directly on the industrial PC, this changes the dimensions. Figure 13 shows the dimensions of the C7015 with mounted EtherCAT P Box module.

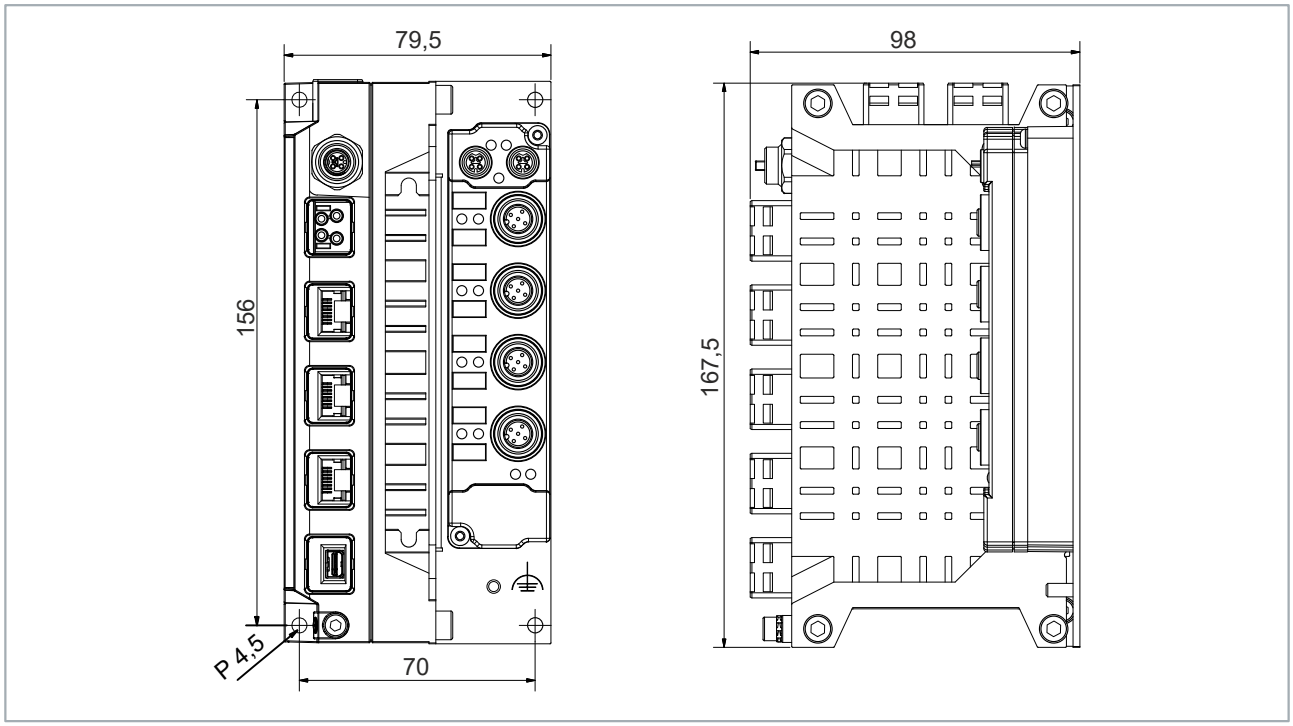


Fig. 13: Dimensions with ECP Box module

4.2.2 Mounting the Industrial PC

NOTICE

Extreme environmental conditions

Extreme environmental conditions can cause damage to the device.

- Avoid extreme environmental conditions.
- Protect the device from moisture and heat.

When installing in the control cabinet, note that there must be 5 cm of free space above and below the device for ventilation of the PC.

Regardless of whether you want to mount the industrial PC inside or outside a control cabinet, this is done using the flexible mounting concept. You must provide the wall intended for mounting with the necessary holes for the fastening screws according to the device dimensions of the PC (see chapter 4.2.1 Dimensions [▶ 22]).

After you have drilled the holes for the fastening screws on the corresponding wall, you can now mount the industrial PC using the mounting concept via the rear panel or the side panel.

M4 screws are required to secure the device via the rear panel (1). When fastening via the right-hand side panel, you can insert the screws from two sides. Insert M4 screws via the left-hand side of the device (2). Insert M5 screws via the right-hand side of the device (3) (see Fig. 14).

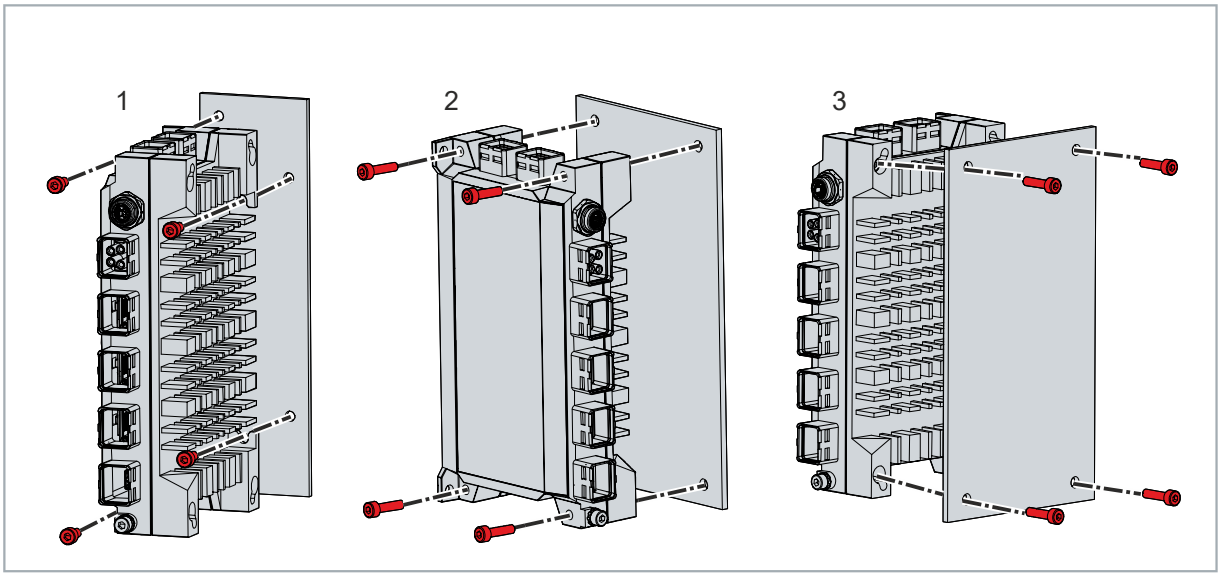


Fig. 14: Mounting with mounting concept

To install the industrial PC, follow the steps below:

1. Place the industrial PC over the drill holes in the desired orientation.
2. Insert the fastening screws one after the other and screw them tight.

⇨ You have successfully installed the industrial PC.

If you have mounted an EtherCAT P Box module directly on the industrial PC (see chapter 4.2.3 Mounting EtherCAT P Box module [▶ 25]), you can mount the industrial PC with the module exclusively via the rear panel using M4 screws (see Fig. 15).

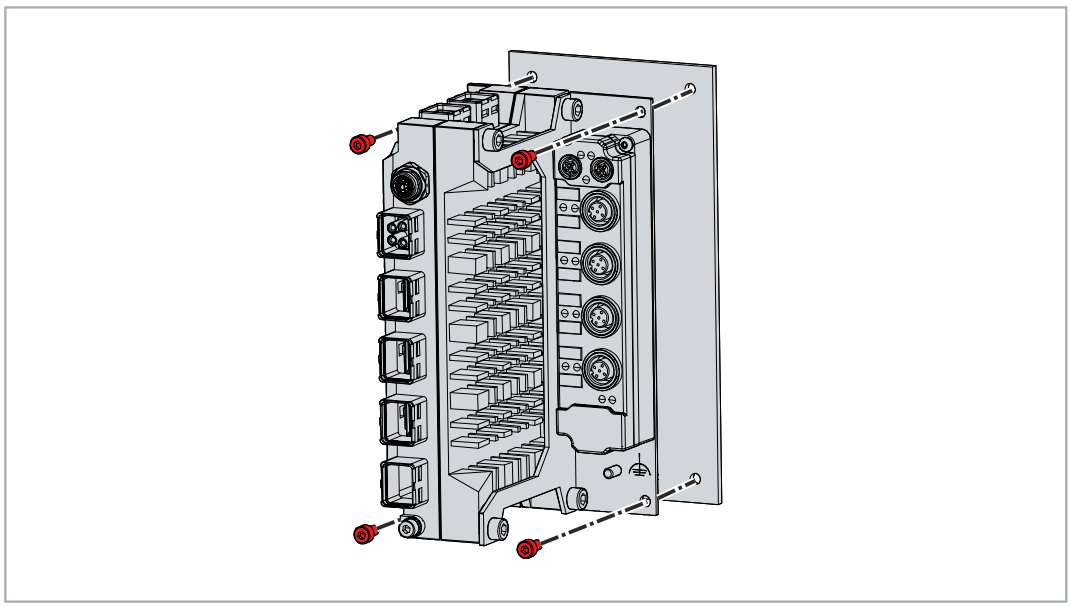


Fig. 15: Mounting with EtherCAT P Box module

4.2.3 Mounting EtherCAT P Box module

The integrated EtherCAT P connection of the industrial PC enables you to connect actuators/sensors directly via IP67-protected EtherCAT P Box modules. These act as EtherCAT P slaves, while the C7015 is used as master. For more information on the Box modules, refer to the EPP1xxx documentation.

You have two options for mounting the modules:

- The separate mounting of the modules in the immediate vicinity of the industrial PC.
- Direct mounting on the industrial PC via a mounting bracket (order designation: C9900-M688).

To mount the module to the PC using the mounting bracket, follow the steps below, shown in Figure 16:

1. Mount the mounting bracket on the right side panel of the industrial PC using the four M5 screws (section A).
2. Mount the module to the mounting bracket using the two M3 screws (section B).

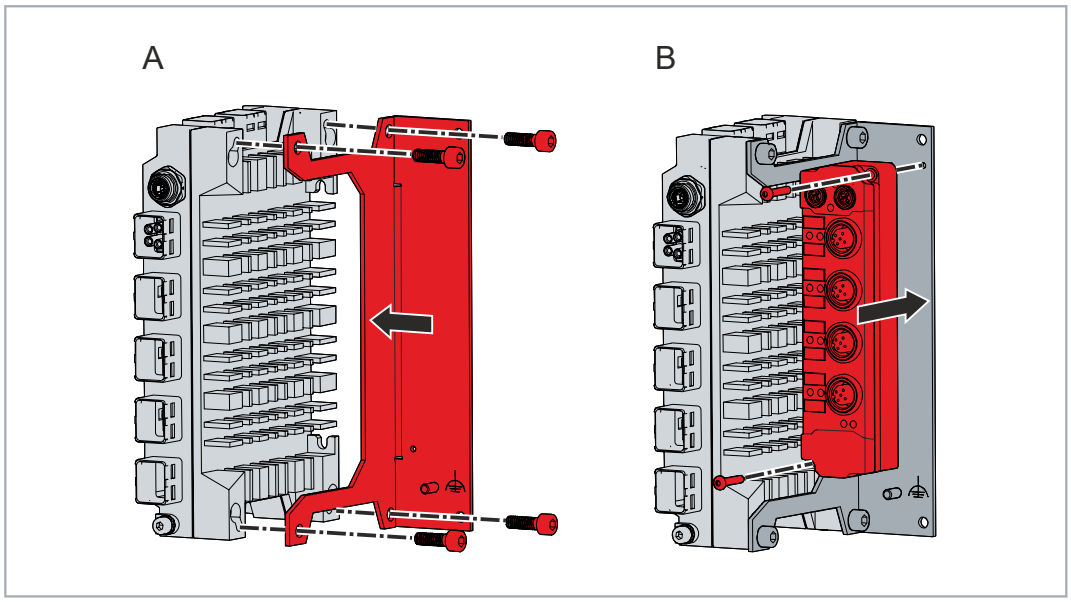


Fig. 16: Mounting EtherCAT P Box module

⇨ You have mounted the EtherCAT P Box module on the industrial PC.

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.

An external power supply unit is required for the power supply, which supplies 24 V DC (-15%/+20%) from an isolated source. This must be protected by a fuse in accordance with UL 248 with a maximum nominal value of 4 A.

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

- 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.

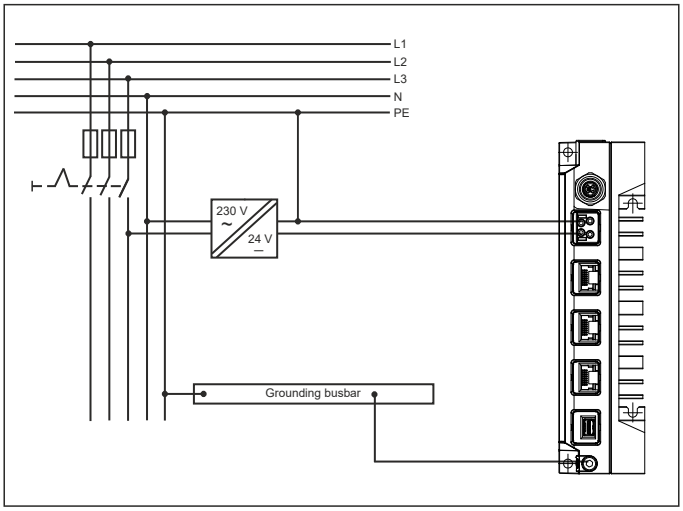


Fig. 17: Wiring example

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 avoid electromagnetic interference.

EMC

NOTICE

Hardware damage due to electromagnetic interference

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

- Only use the device with functional earth.

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

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

The functional earth is necessary for the EMC of the device. You establish functional earthing via the grounding connection between the grounding bolt at the bottom of the device (see Fig. 18) and the central grounding point of the control cabinet in which the PC is installed.

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

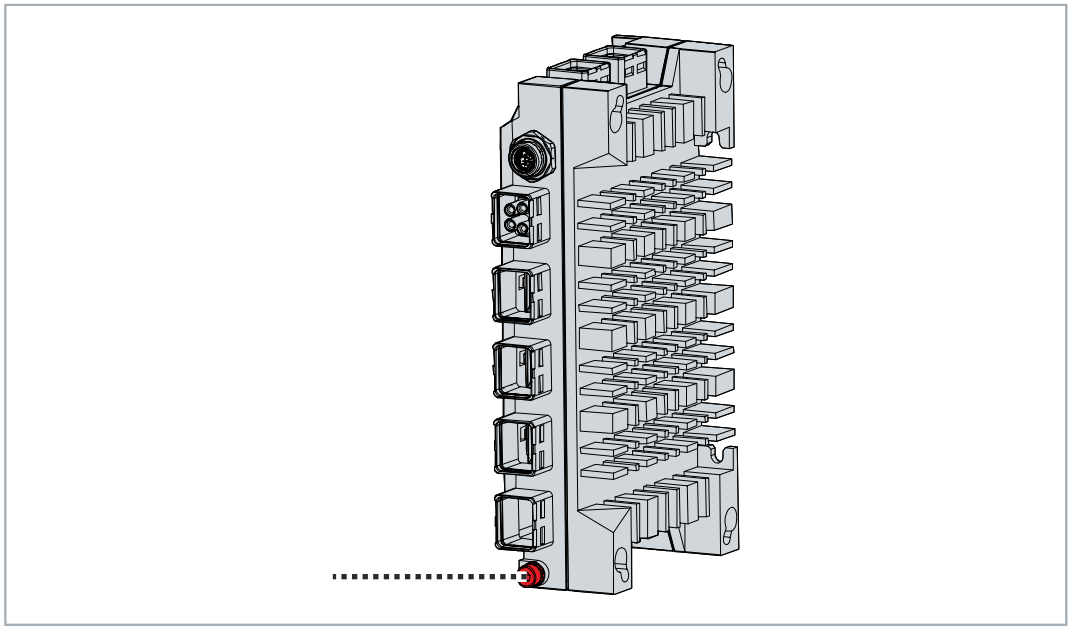


Fig. 18: Grounding bolt for functional earthing

4.3.2 Connecting cables and power supply

NOTICE

Incorrect connection procedure

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

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

Connecting cables

The connections are located both in the front and on the top of the industrial PC. They are documented in chapter 3.1 Structure [▶ 10].

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

Observe the cable recommendation from Beckhoff when connecting the EtherCAT P interface:

- ZK7000-0101-1003

Alternatively, you can use other cables whose length exceeds 20 cm for this interface.

Connecting the power supply

For the connection of the power supply, you can use cables with a maximum cable cross-section of up to 1.5 mm^2 or 2.5 mm^2. Use 1.5 mm^2 or 2.5 mm^2 for long supply lines to achieve a low voltage drop on the supply lines. There should be at least 22 V at the voltage connector of the industrial PC, so that the PC remains switched on during voltage fluctuations.

Make sure that the power supply cables are made of copper. Only use power supply cables with a temperature specification of up to 75 °C.

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

1. Check the correct voltage of your external power supply.
2. Plug the power supply cable into the four-pin push-pull power built-in socket of the industrial PC.
3. Connect the PC to your external 24 V power supply.
4. Switch on the 24 V power supply.
5. Measure the voltage on the power supply plug of the PC.

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.

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

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

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

Driver installation

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

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

5 Configuration

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

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

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

5.1 Beckhoff Device Manager

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

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

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

The device is supplied with predetermined access data by default:

- User name: Administrator
- Password: 1

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

First start of Beckhoff Device Manager

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

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

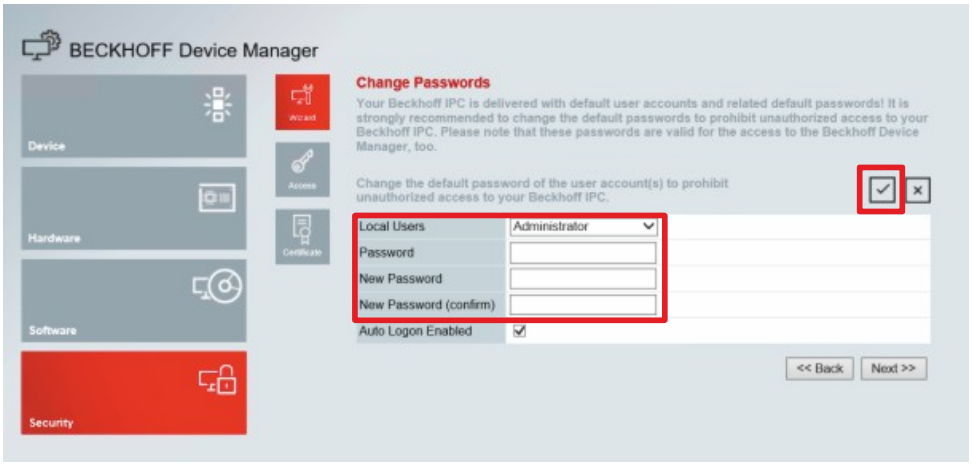


Fig. 19: Beckhoff Device Manager – Change passwords

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.

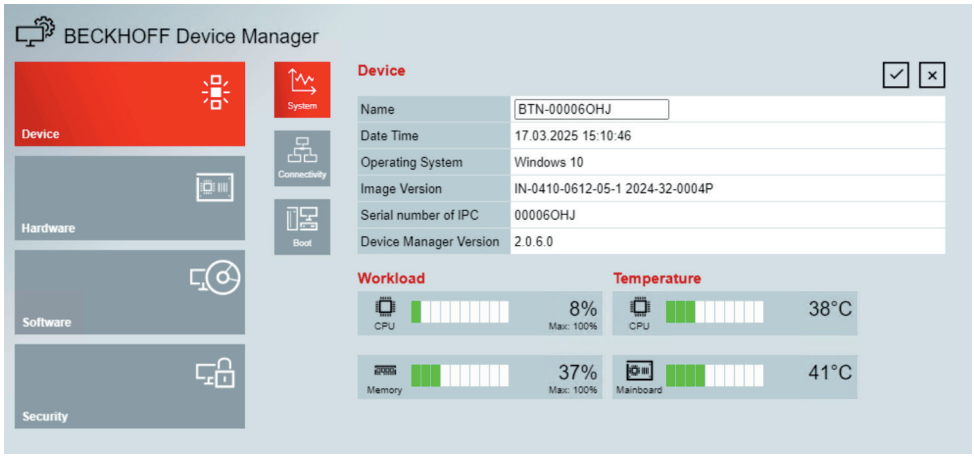


Fig. 20: Beckhoff Device Manager – Start page

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.

Switching capability Onboard EtherCAT P voltages

Using the Beckhoff Device Manager you can enable and disable the system voltage U_S and the peripheral voltage U_P of the onboard EtherCAT P interface. You can set a state value and a default value for both voltages.

You can set the state value of the voltages at runtime. After a cold start a reset takes place, after a warm start **no** reset takes place.

With the default value of the voltages, you set the value that the voltage has after a cold start. To enable a default value, you must perform a power cycle after setting it. For the durability of the memory block, note that it may be read cyclically but not written cyclically.

To switch the voltages, follow the steps shown in the figure below:

1. In the left area of the Device Manager, select the **Hardware** tile (1).
2. In the middle area of the Device Manager, select the **Equipment** tile (2).
3. Select either **Enabled** or **Disabled** for the state and default values of the voltages (3).
4. Confirm your selection by clicking on the checkmark on the right (4).

⇨ You have switched the voltages.

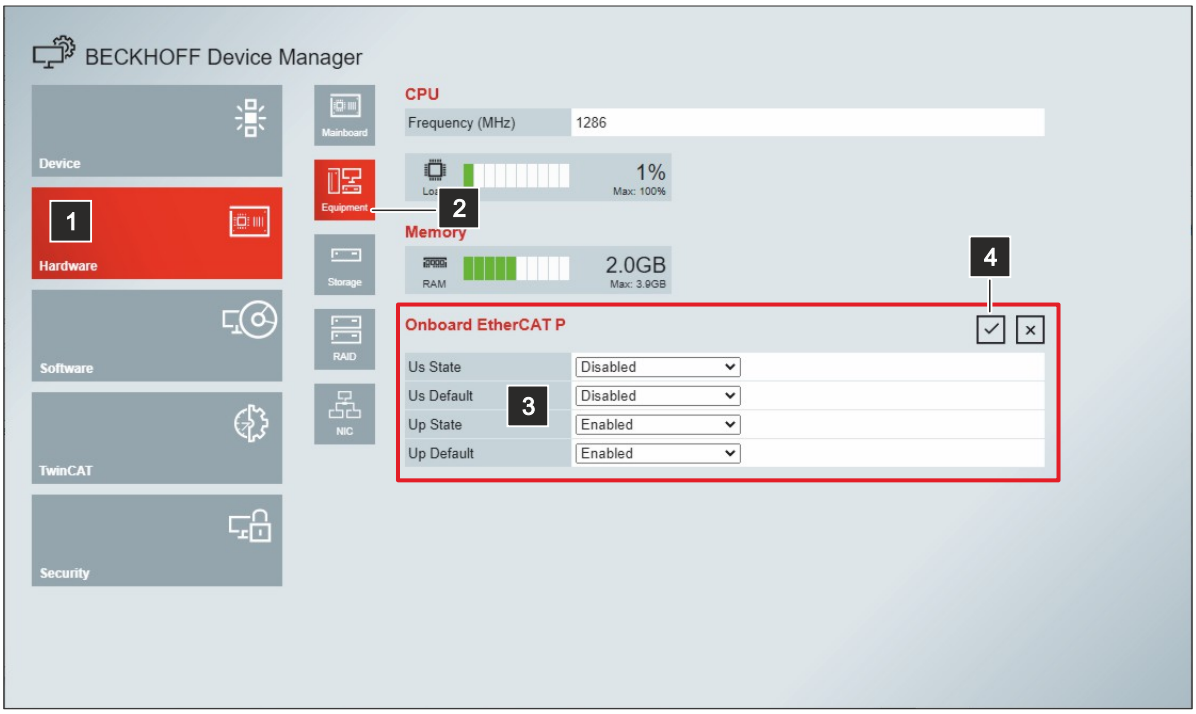


Fig. 21: Beckhoff Device Manager - Onboard EtherCAT P

Further interfaces for switching U_S and U_P, for example directly from the TwinCAT application, can be found in the manual for the Beckhoff Device Manager.

5.2 Wake on LAN (WOL)

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

The following device does not support the WOL function:

- C7015-0020

Configuration under Windows

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

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

6. Confirm with **OK**.

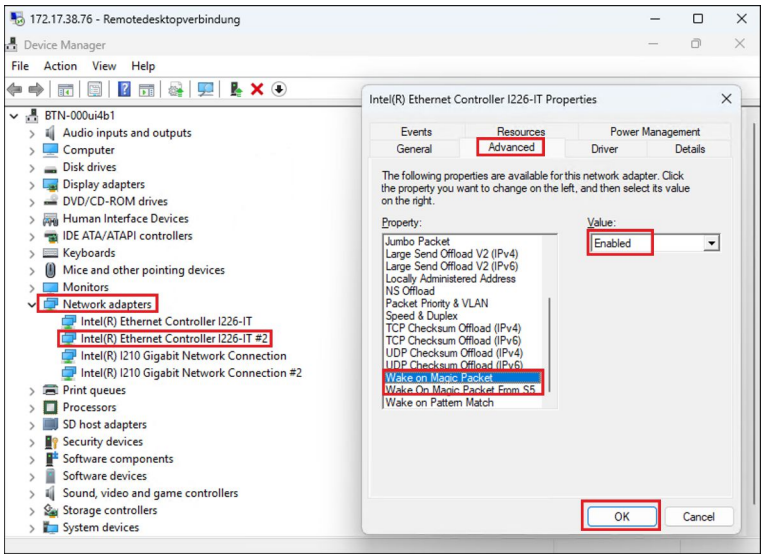


Fig. 22: Activate function

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

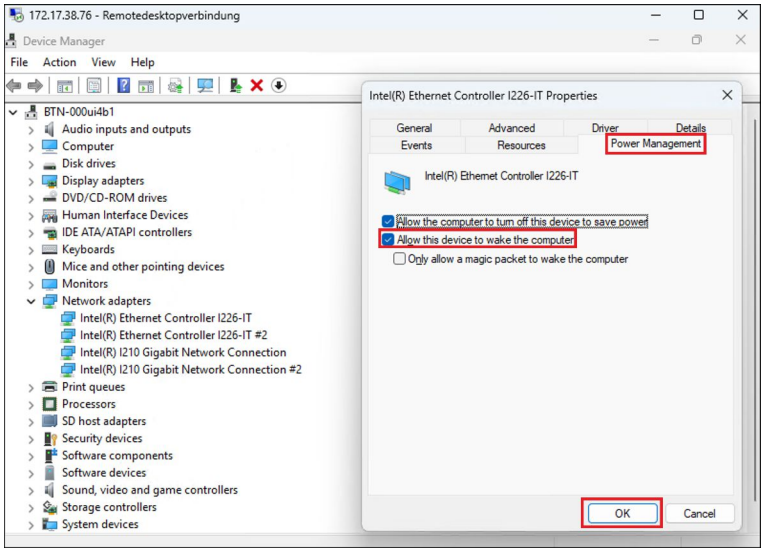


Fig. 23: Enable Function

⇨ You have configured the Wake on LAN function.

6 Decommissioning

NOTICE

Hardware damage due to power supply

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

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

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

If you do not want to continue using the industrial PC, Chapter 6.2 Disassembly and disposal [▶ 35] provides information on the correct disposal of the device.

6.1 Disconnecting the power supply and cables

⚠ CAUTION

Risk of electric shock

Disconnecting the industrial PC during a thunderstorm can lead to electric shock.

- Never disconnect the cables of the industrial PC during a thunderstorm.

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

1. Shut down the operating system.
2. Disconnect the PC from your external 24 V power supply.
3. Pull the power cable out of the 4-pin push-pull built-in power socket of the industrial PC.
4. Make a note of the wiring of all data transmission cables if you want to restore the cabling with another device.
5. Disconnect the data transmission cables from the industrial PC.
6. Finally, disconnect the ground connection.

⇨ You have disconnected the power supply and the cables.

6.2 Disassembly and disposal

Before you can remove the industrial PC, you must first disconnect the power supply and the cables (see chapter 6.1 Disconnecting the power supply and cables [▶ 34]).

Regardless of whether you have mounted the industrial PC inside or outside a control cabinet, you must proceed in the same way for disassembly. To do this, loosen the fastening screws. Be sure to hold the device while loosening and removing the screws.

Figure 22 shows the three possible cases according to the orientation of the industrial PC:

- Disassembly via the rear panel with M4 screws (1)
- Disassembly via the side panel with M4 screws to the left (2)
- Disassembly via the side panel with M5 screws to the right (3)

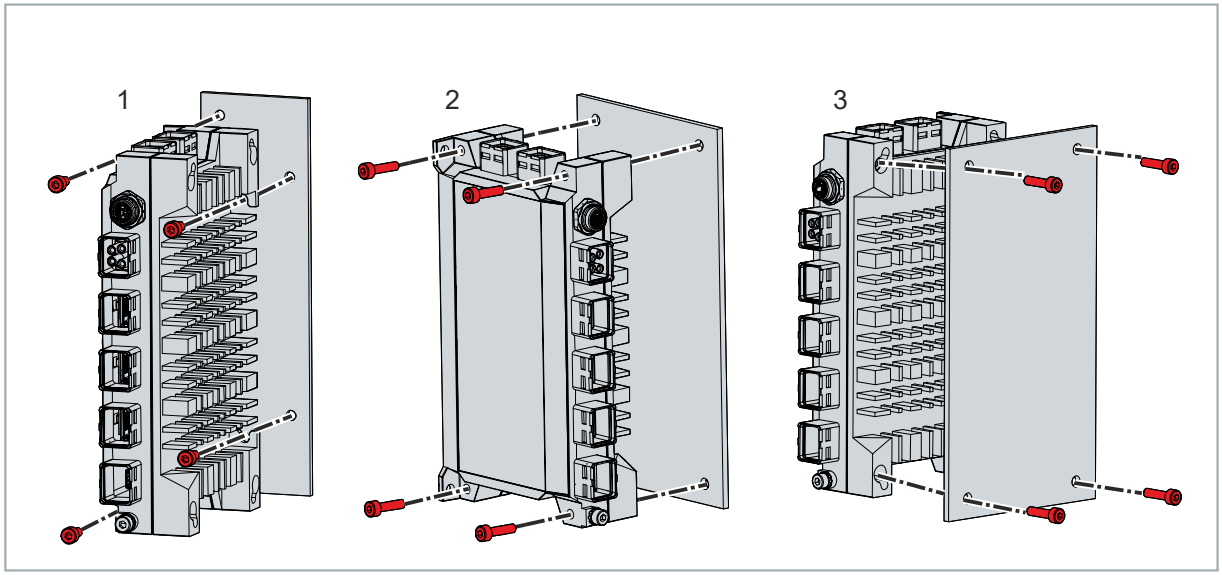


Fig. 24: Disassembly with mounting concept

Disassembly EtherCAT P Box module

If you have mounted an EtherCAT P Box module directly on the PC, you must loosen the four M4 screws on the rear panel of the assembly to remove it from the wall.

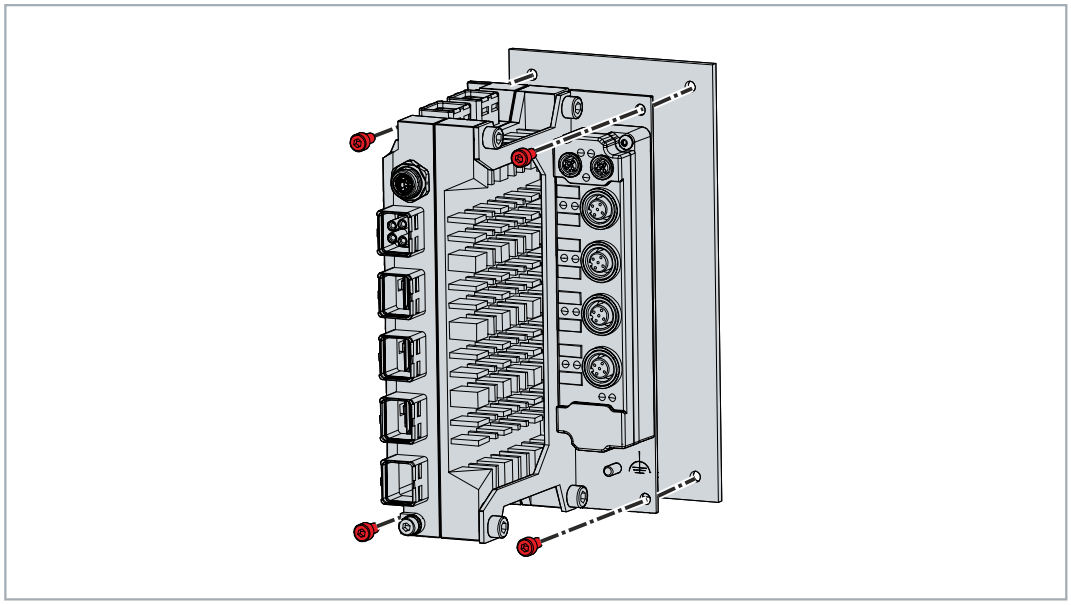


Fig. 25: Disassembly of industrial PC with EtherCAT P Box module

To remove the EtherCAT P Box module from the industrial PC, follow the steps below (see Fig. 24):

1. Loosen the two M3 screws to remove the module from the mounting bracket (section A).
2. Loosen the four M5 screws to remove the mounting bracket from the side panel of the PC (section B).

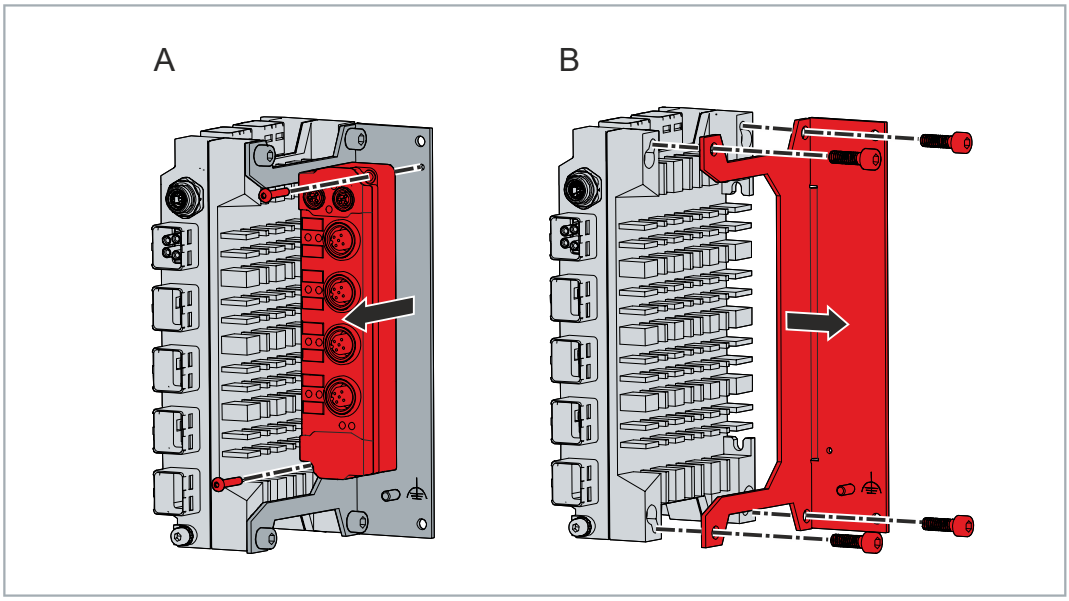


Fig. 26: Disassembly EtherCAT P Box module

⇨ You have disassembled the EtherCAT P Box module.

Disposal of the industrial PC

Be sure to observe the national electronic scrap regulations when disposing of the industrial PC.

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 circuit boards must be disposed of in accordance with national electronics scrap regulations.

7 Maintenance

⚠ CAUTION

Risk of electric shock

Working on the industrial PC while it is live can lead to electric shock.

- Switch off the supply voltage before cleaning the device.

Maintenance measures increase the efficiency of the device by ensuring long-term functionality. Cleaning and maintenance of certain device components and the replacement of other 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 aspects when cleaning the industrial PC:

- Keep to the boundary conditions of protection rating IP65.
- Only use a vacuum cleaner to clean the PC. The industrial PC does not have to be switched off for this.
- Never use compressed air to clean the PC.
- Maintain an ambient temperature range of 0 °C to 50 °C.

7.2 Maintenance

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

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

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

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

Table 18: Device component replacement recommendations

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

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

Device components may only be replaced by Beckhoff. Contact Beckhoff Service (see Chap. 10.1 Service and support) to have device components replaced.

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.

8 Troubleshooting

Table 19: Troubleshooting

Fault	Cause	Measures
No function of the device	No power supply to the device	Check the power supply cable
	Other cause	Call Beckhoff Service
The device does not boot fully	BIOS setup settings are incorrect	Check BIOS setup settings (load defaults)
	Other causes	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 20: Technical data

Product designation	C7015
Dimensions (W x H x D)	85 x 167 x 43 mm, without mounting plate
Weight	approx. 1000 g
Supply voltage	22-30 V_{DC} (24 V_{DC} power supply unit) NEC class 2
Power consumption	Data sheet power consumption and power loss in the download finder: https://www.beckhoff.com/en-en/support/download-finder/search-result/?download_group=691754572
Secure element	fTPM 2.0 enabled (see TPM manual)
Protection rating	IP65 (not evaluated under UL)
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/ s^2)
Shock resistance (shock)	EN 60068-2-27: 5 G (approx. 50 m/s^2), duration: 30 ms
EMC interference immunity	conforms to EN 61000-6-2
EMC interference emission	conforms to EN 61000-6-4
Permissible ambient temperature	0 °C ... +50 °C (operation) -25 °C ... +65 °C (transport / storage)
Permissible air humidity	Maximum 95 %, no condensation
Transport and storage	The same values for air humidity and shock resistance are to be observed during transport and storage as in operation. The shock resistance during transport can be improved by means of suitably packing the 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 10
Fig. 2 EtherCAT P interface pin numbering 11
Fig. 3 EtherCAT P LEDs 12
Fig. 4 Voltage socket pin numbering 12
Fig. 5 Ethernet interfaces pin numbering 13
Fig. 6 Ethernet LEDs 14
Fig. 7 Mini DisplayPort pin numbering 14
Fig. 8 USB interfaces pin numbering 15
Fig. 9 Status LEDs 16
Fig. 10 Name plate 18
Fig. 11 Flexible mounting concept 21
Fig. 12 Dimensions 22
Fig. 13 Dimensions with ECP Box module 22
Fig. 14 Mounting with mounting concept 23
Fig. 15 Mounting with EtherCAT P Box module 24
Fig. 16 Mounting EtherCAT P Box module 25
Fig. 17 Wiring example 26
Fig. 18 Grounding bolt for functional earthing 27
Fig. 19 Beckhoff Device Manager – Change passwords 30
Fig. 20 Beckhoff Device Manager – Start page 31
Fig. 21 Beckhoff Device Manager - Onboard EtherCAT P 32
Fig. 22 Activate function 33
Fig. 23 Enable Function 33
Fig. 24 Disassembly with mounting concept 35
Fig. 25 Disassembly of industrial PC with EtherCAT P Box module 35
Fig. 26 Disassembly EtherCAT P Box module 36

List of tables

Table 1 Legend - C7015 structure 10
Table 2 EtherCAT P interface pin assignment 11
Table 3 LEDs EtherCAT P interface 12
Table 4 Voltage socket pin assignment 12
Table 5 Classification according to device generation 13
Table 6 Ethernet interface pin assignment 13
Table 7 LED meaning: speed 100/1000 Mbit/s 14
Table 8 LED meaning: speed 100/1000/2500 Mbit/s 14
Table 9 Mini DisplayPort pin assignment 15
Table 10 USB interface pin assignment 15
Table 11 Meaning of the UPS-OCT LED 16
Table 12 Meaning of the PWR LED 17
Table 13 Meaning of the HDD LED 17
Table 14 Meaning of the TC LED 17
Table 15 Legend C7015 name plate 18
Table 16 C7015-0020 Minimum TwinCAT version 19
Table 17 C7015-0030 Minimum TwinCAT version 19
Table 18 Device component replacement recommendations 38
Table 19 Troubleshooting 40
Table 20 Technical data 41

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.

More Information:
www.beckhoff.com/C7015

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