BECKHOFF New Automation Technology

Manual | EN

MC6015-0030-1217

IPC module

2026-02-18 | Version: 1.0.0

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1 Foreword

1.1 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.

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1.2 For your safety

Safety regulations

Read the following explanations for your safety.
Always observe and follow product-specific safety instructions, which you may find at the appropriate places in this document.

Exclusion of liability

All the components are supplied in particular hardware and software configurations which are appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation, and drive technology who are familiar with the applicable national standards.

Signal words

The signal words used in the documentation are classified below. In order to prevent injury and damage to persons and property, read and follow the safety and warning notices.

Personal injury warnings

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

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

⚠ CAUTION
There is a low-risk hazard that could result in medium or minor injury.

Warning of damage to property or environment

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

Information on handling the product

This information includes, for example:
recommendations for action, assistance or further information on the product.

1.3 Intended use

Intended use of an MX-System

Application in machines and systems in industrial environments and exclusively inside buildings.

The electrical wiring must be permanent wiring.

Improper use

Improper use is not permitted and will result in the exclusion of liability on the part of Beckhoff Automation GmbH & Co.

2 Product overview

The MC6015-0030-1217 IPC module serves as the central control unit within the modular MX-System from Beckhoff. It enables the integration of a powerful industrial PC for executing automation and control software directly in the system network. The module is mechanically and electrically designed for mounting in the first slot of any MX-System baseplate.

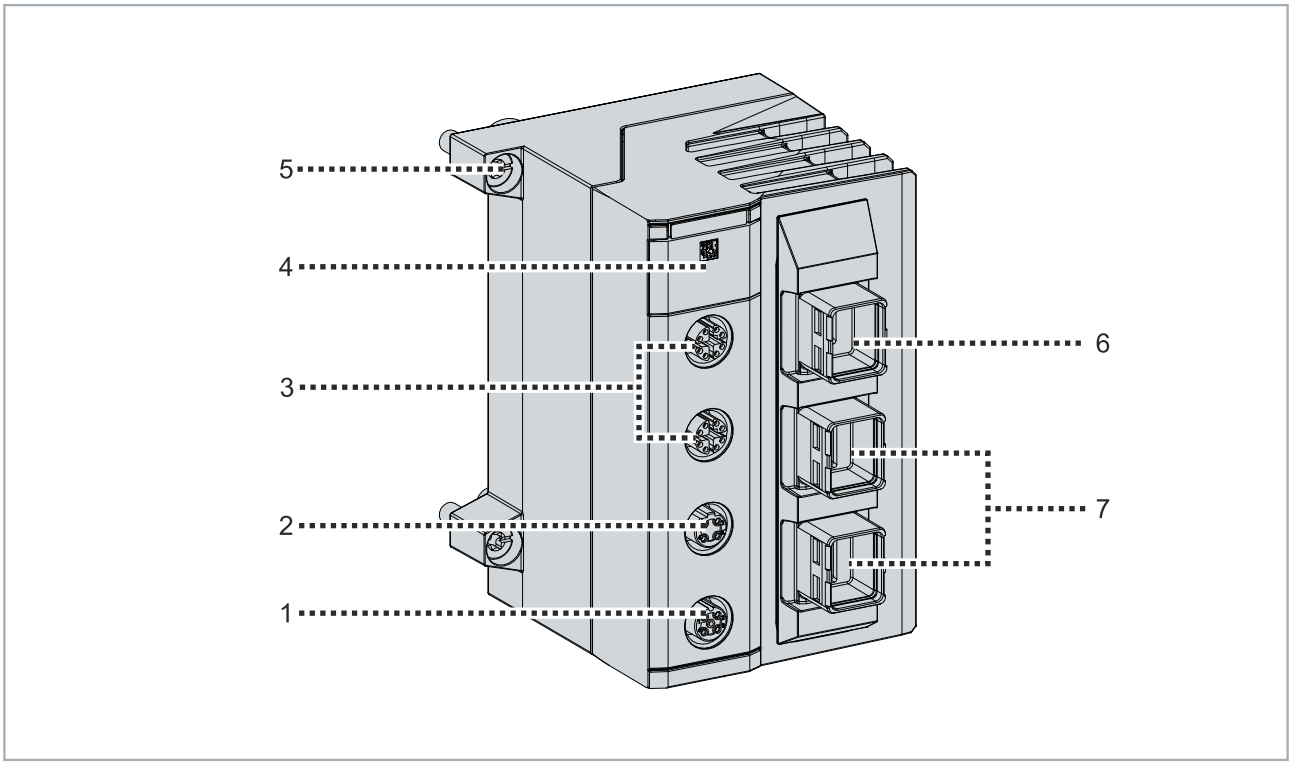


Fig. 1: Example structure of a MC6015-0030-1217 IPC module, front view

Table 1: Legend for the structure.

No.	Component	Description
1	Power I/O interface (M12)	Combination interface that can be used as an input (UPS) or output (power supply panel).
2	EtherCAT extension (M12)	Extension and connection to another EtherCAT segment or to individual EtherCAT devices.
3	2 x Ethernet 10/100/1000/2500 Mbit/s (M12)	Connection of the IPC module to a local network or the Internet.
4	Diagnostic LEDs	Diagnostic LEDs for power supply, TwinCAT and interfaces.
5	Fastening screw	Fastening screw, captive, 4 x
6	Mini DisplayPort (push-pull)	Transmission of the video signal and interface for a monitor or panel.
7	2 x USB 3.1 Gen. 2 (Push-Pull)	Interfaces for peripheral devices such as mouse, keyboard or USB memory.

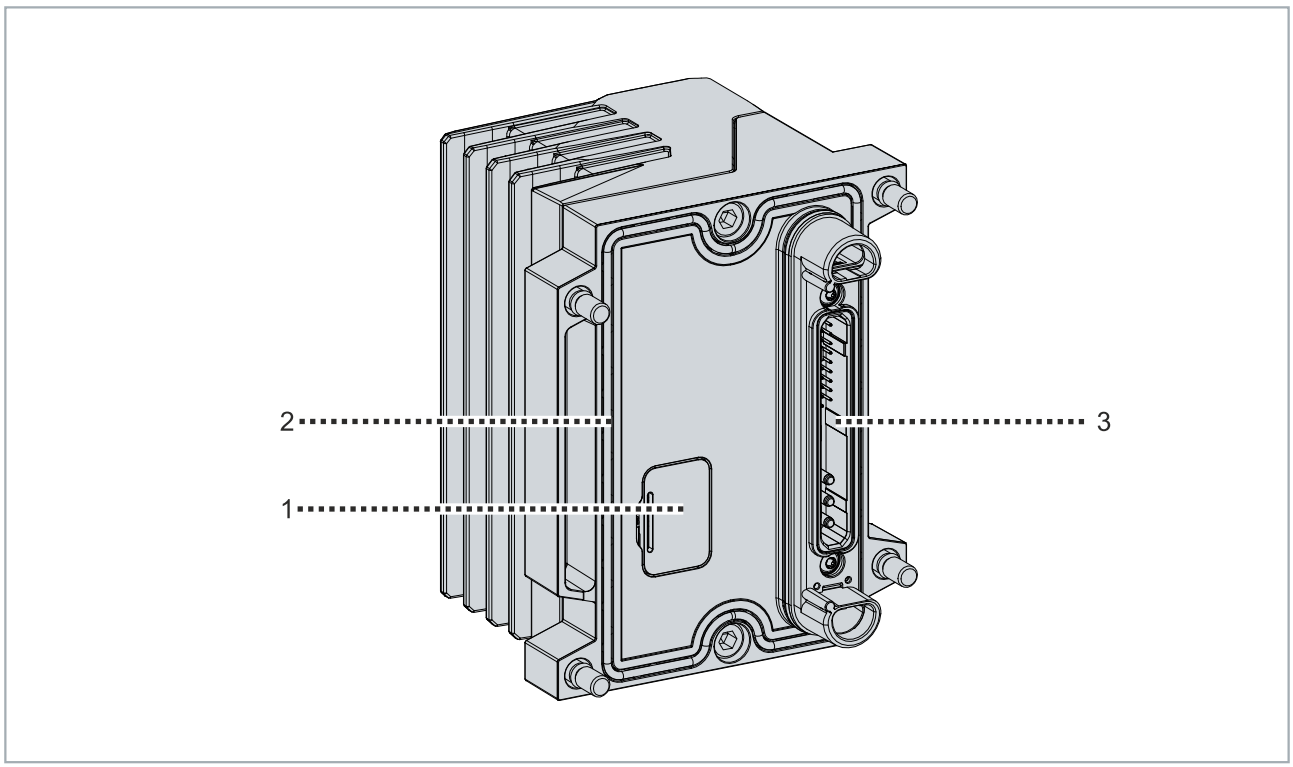


Fig. 2: Example structure of a MC6015-0030-1217 IPC module, rear view

Table 2: Legend for the structure.

No.	Component	Description
1	Service flap	Battery compartment and MicroSD card slot under the service flap
3	Seal	Ensures IP65/67 protection rating when mounted on a baseplate
3	Data connector	Provides power supply and EtherCAT communication via baseplate.

2.1 Name plate

The name plate provides information about the features of the IPC module. The name plate shown here serves only as an example.

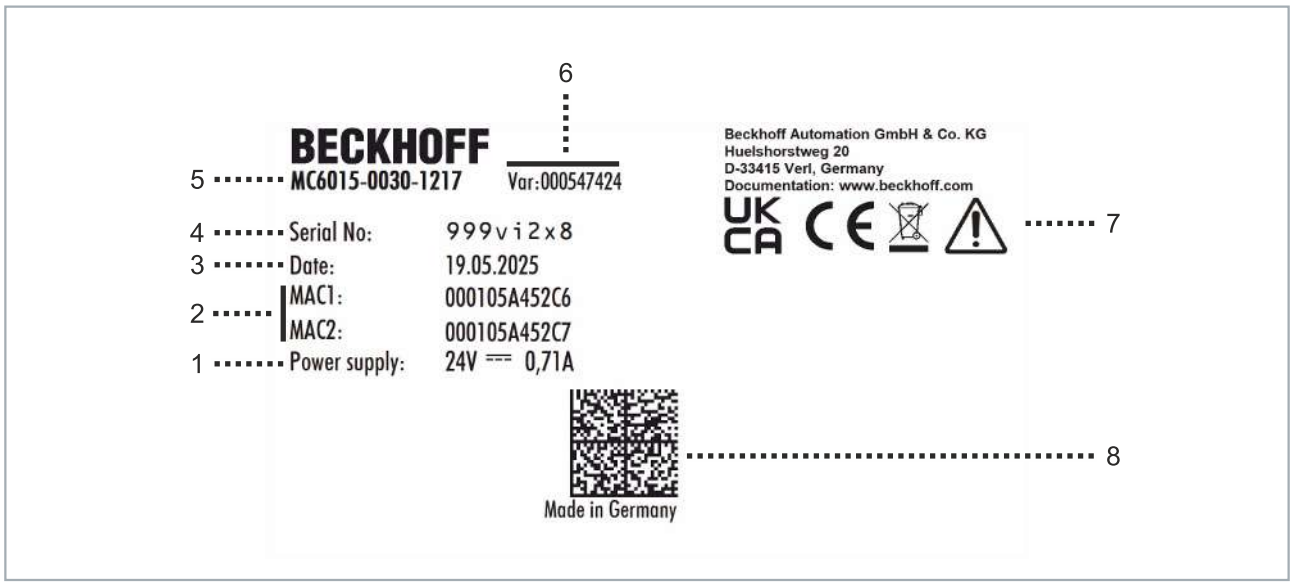
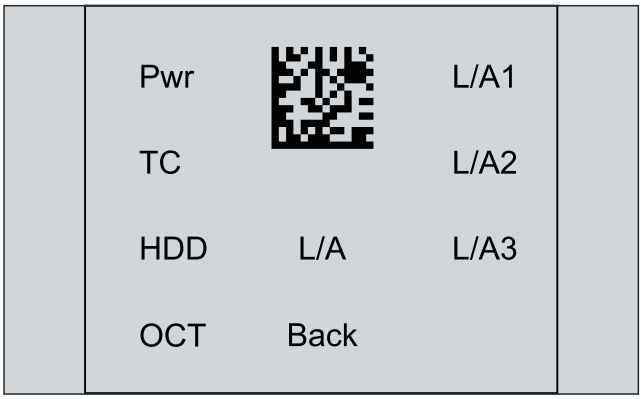


Fig. 3: Name plate example.

Table 3: Legend name plate MC6015-0030-1217

No.	Description
1	Power supply 24 V DC
2	MAC addresses of the built-in Ethernet interfaces. The host name is made up of MC and the last three bytes of the MAC address. Example: the MAC address: 00-01-05-aa-bb-cc results in the host name MC-aabbcc.
3	Date of manufacture.
4	Serial number/Beckhoff Traceability Number (BTN) for the unambiguous identification of the product.
5	Product name to identify the IPC module.
6	The exact configuration consisting of IPC module, operating system, options and TwinCAT can be identified and reordered using the variant number.
7	The symbols for approvals and markings applicable to the device can be found here. The approvals of your device can be found on the name plate.
8	Machine-readable information in the form of a Data Matrix Code (DMC, code scheme ECC200) that you can use for better identification and management.

2.2 Status display



Display	Color	Meaning
Pwr	green	Power supply The power LED lights up when the power supply is switched on (green).
TC	green, red, blue	TwinCAT status LEDs: TwinCAT is in Run Mode (green). TwinCAT is in Stop Mode (red). TwinCAT is in Config Mode (blue)
HDD	TBD	TBD
OCT	green, red	The LED lights up green when the UPS is connected correctly. The LED lights up red (UPS operation) when the input voltage is removed.
Back	green	When plugged in, indicates that the backplane is working properly.
L/A	green	The LED lights up green if EtherCAT communication to the backplane is available.
L/A1	green	Lights up green if interface X1 is connected to a network. Flashes green when data is being transferred.
L/A2	green	Lights up green if interface X2 is connected to a network. Flashes green when data is being transferred.
L/A3	green	The LED lights up green if another EtherCAT segment or EtherCAT devices are connected to interface X3.

2.3 Dimensions

All dimensions in mm

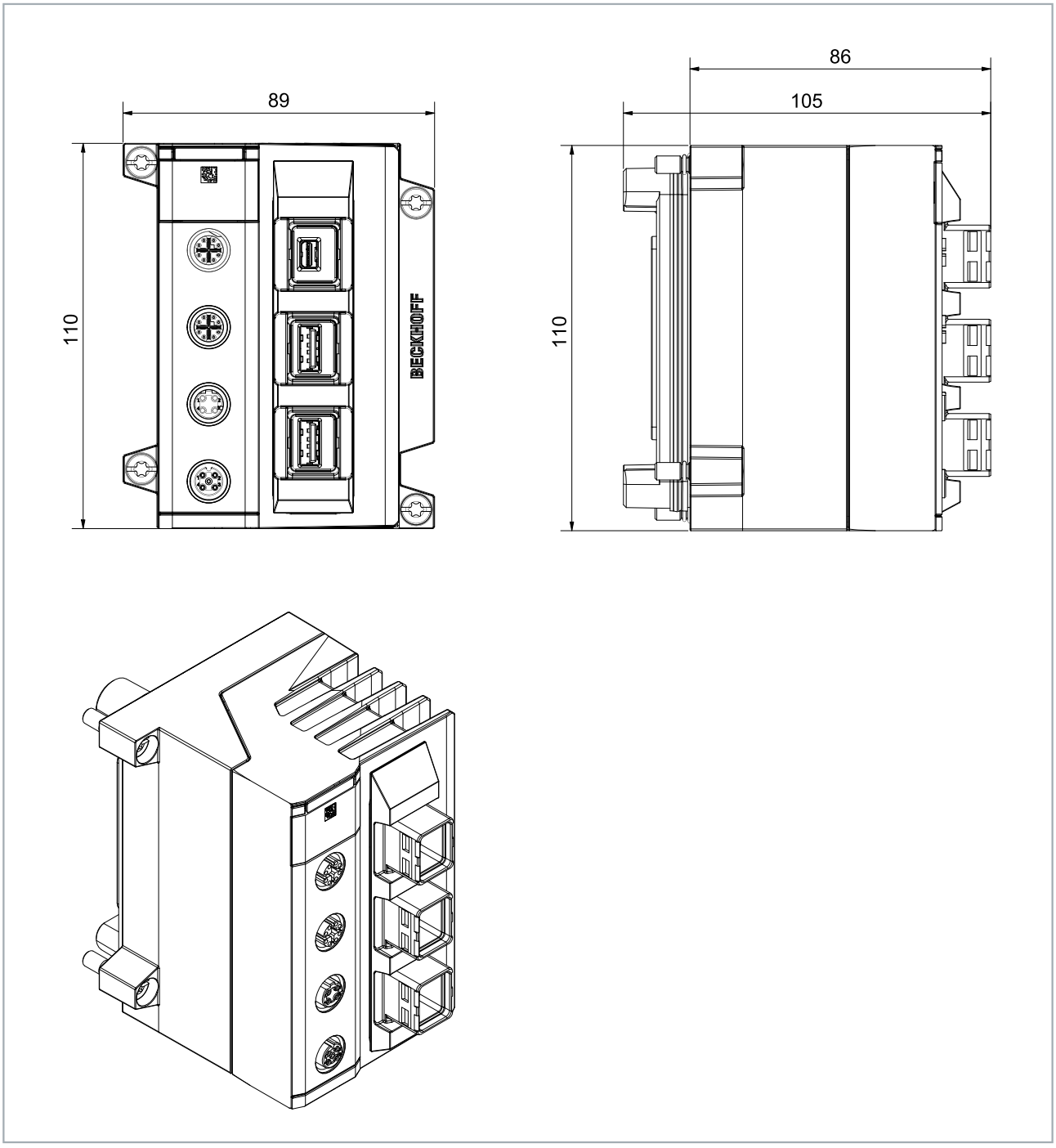


Fig. 4: MC6015-0030-1217 dimensions

3 Technical data

Technical data	MC6015-0030-1217
Product group	IPC modules
Category/Execution	Intel Atom®
Processor	Selection from the processor options list with surcharge
Hard disk/flash recording	1 slot for M.2 SSD
Operating system	Selection from the options list with surcharge
Memory	Selection from the CPU/DRAM options list with surcharge
Hard disks/Flash	Selection from the SSD options list with surcharge
Interfaces	2 x Ethernet 10/100/1000/2500 Mbit/s (M12), 1 x EtherCAT OUT (M12), 1 x Power-I/O (M12), 1 x Mini DisplayPort (push-pull), 2 x USB 3.1 Gen. 2 (Push-Pull)

Housing data	MC6015-0030-1217
Baseplate interface	Data connector
Number of data slots	1
Operating temperature	0…50 °C
Storage temperature	-25…+60 °C
Protection rating	IP65/67
Approvals/markings	CE

4 Mechanical installation

Required tools

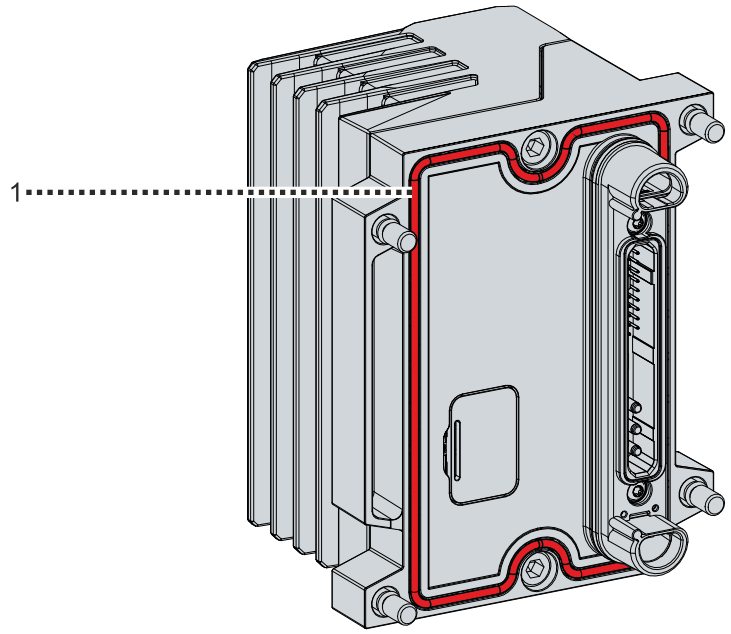
- Torx T25 screwdriver
- Torque wrench 5 Nm

4.1 Preparation

NOTICE

Check the module for damage

If the seal is worn or damaged, liquids and dirt can penetrate and damage the MX-System. The IP67 protection rating is not met if the seals are worn or damaged.

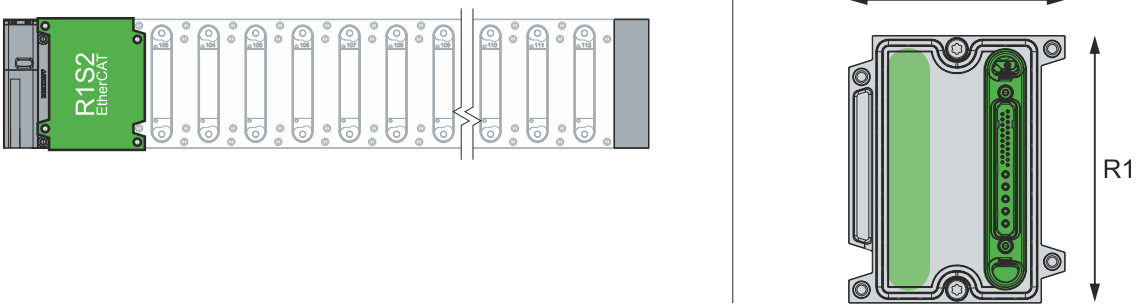


1. Check the seal [1] of the module for wear and damage
2. Replace worn and damaged seals

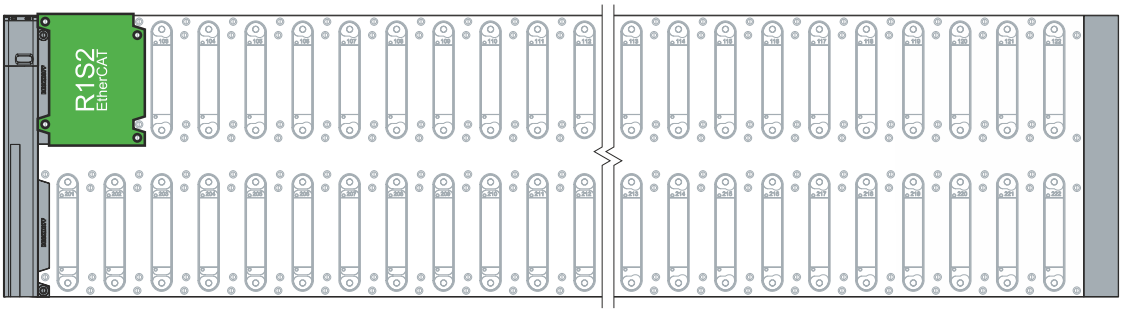
4.2 Placement of the module on the baseplate

The module can be plugged into the following areas marked in green:

MB11xx-0000-0000



MB21xx-0000-0000



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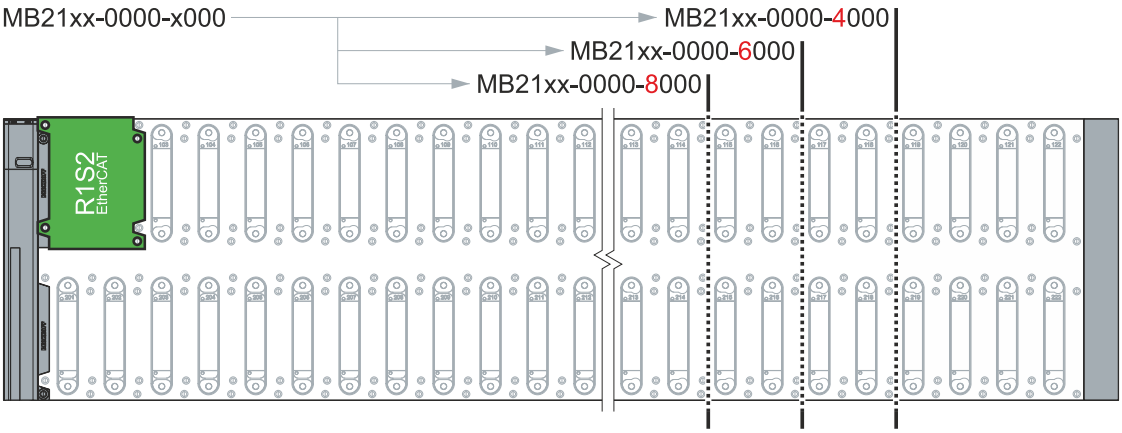

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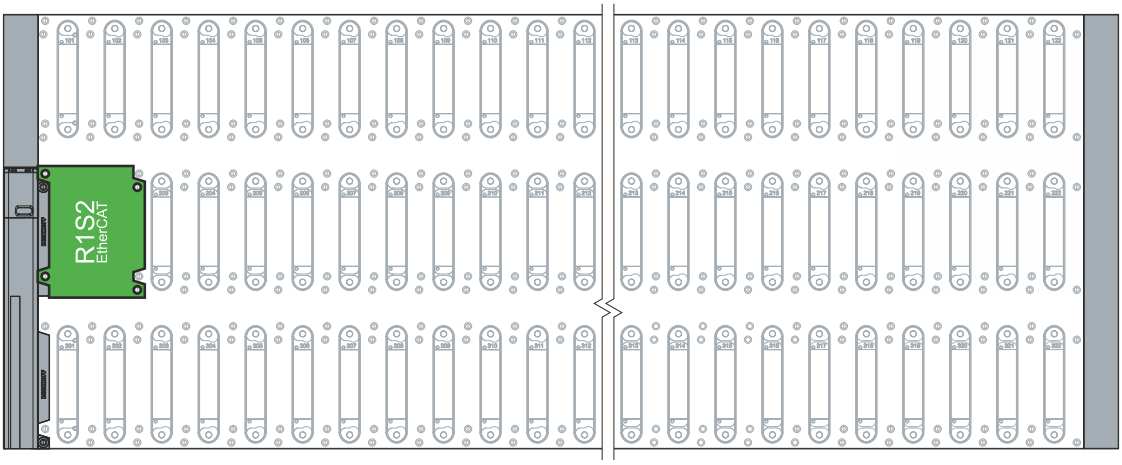


4.3 Mounting the module

⚠ CAUTION

Danger due to the high weight of an equipped baseplate

First mount the baseplate and then the modules to the baseplate. If you mount the modules on the baseplate first, the total weight of the MX-System will increase. Another person is required to transport and assemble an equipped baseplate.

- Wear personal protective equipment.
- The equipped baseplate must be transported and mounted by two people.

NOTICE

Ensure correct installation

If the module is not installed correctly, liquids and dirt may enter and damage the MX-System. The IP67 protection rating is not met if the installation is incorrect.

NOTICE

Limited number of mating cycles

The module may be plugged in a maximum of 25 times to attach it to the baseplate. If the module is plugged into the baseplate more than 25 times, a secure connection between the module and the baseplate cannot be guaranteed.

- Observe the permissible number of mating cycles.
- Replace the module if the number of mating cycles is exceeded.
- Replace the baseplate if the number of mating cycles is exceeded.

The module must be plugged into the data slot *101* of a baseplate.

1. Plug the module on the baseplate
2. Tighten all screws
3. Observe tightening torques:

Components	Tightening torque [Nm]
Screws	5

Further information on installation can be found in the system manual in the "Mounting" chapter.

5 Connection

5.1 M12 interfaces

Tightening torques for connectors

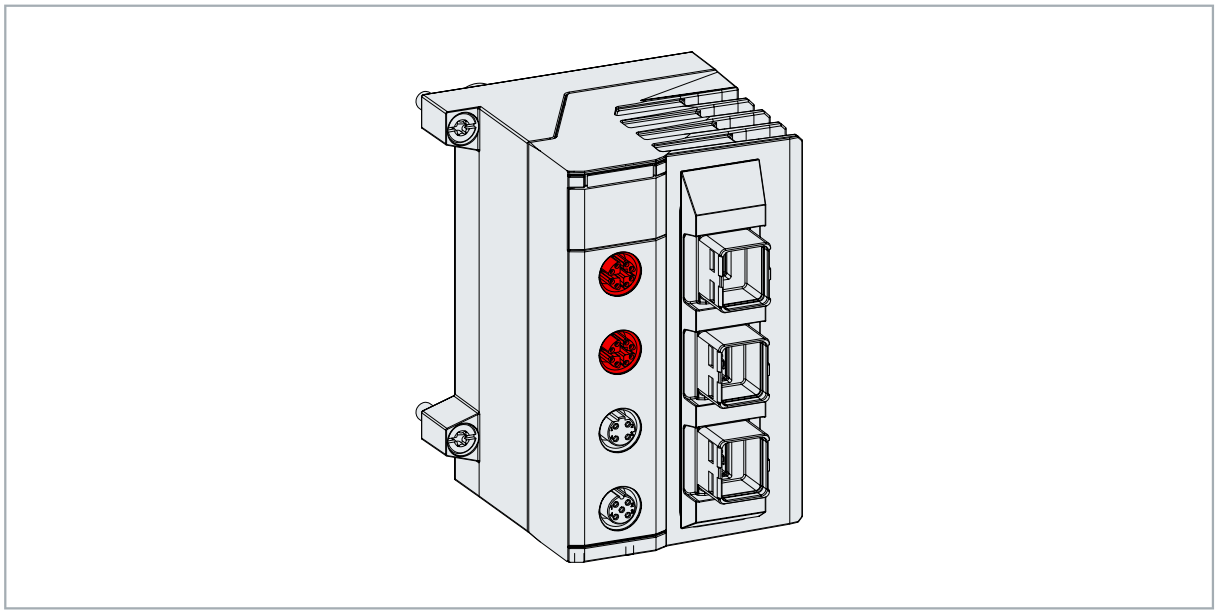
- Use a torque wrench to tighten the M12 connectors, e.g. ZB8801 from Beckhoff.
- Tighten the M12 connectors to 0.6 Nm.

Protective caps

- Cover unused sockets with protective caps.
- The IP65/67 protection rating is only guaranteed if each socket is either connected to a plug or closed with a protective cap.

5.1.1 Ethernet interfaces, M12 (X1, X2)

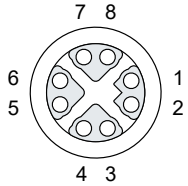
The Ethernet interfaces (X1, X2) are two 8-pin M12 sockets, X-coded. The 10Base-T, 100Base-T, 1000Base-T and 2500Base-T Ethernet standards enable the connection of corresponding network components and data rates of 10/100/1000/2500 Mbit/s. The required speed is selected automatically.



Tightening torque: 0.6 Nm

The maximum length of the cable connection is 100 m.

Pin assignment

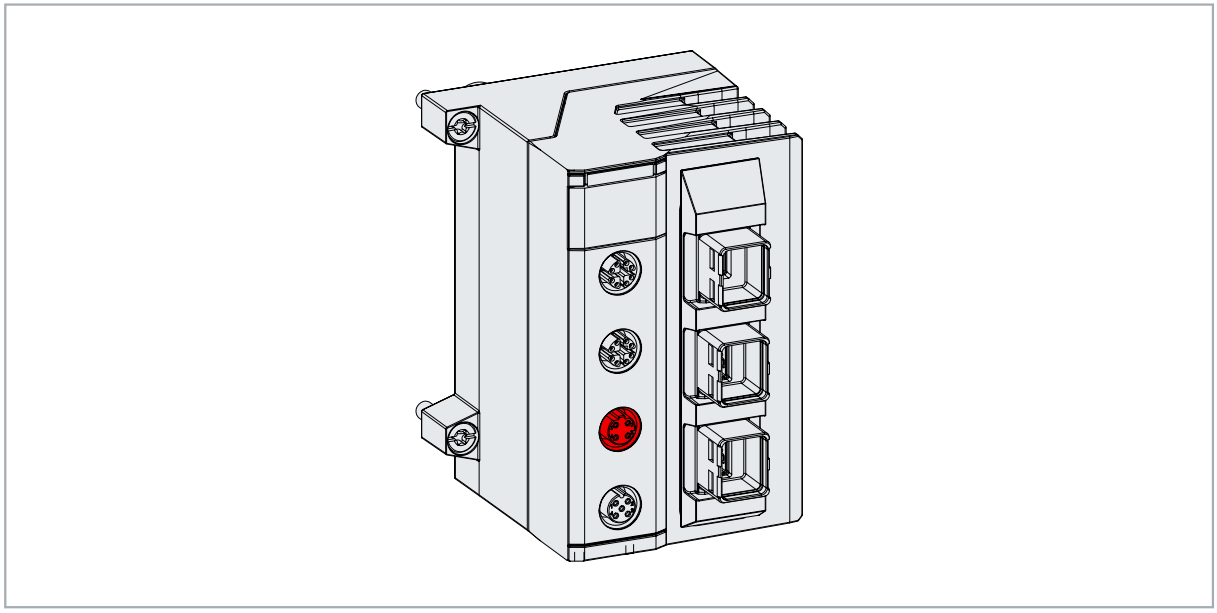
M12 socket, X-coded	Pin	Signal
	1	DA+ / Tx+
	2	DA- / Tx-
	3	DB+ / Rx+
	4	DB- / Rx-
	5	DD+
	6	DD-
	7	DC-
	8	DC+

The cable shield is connected via the thread.

5.1.2 EtherCAT extension, M12 (X3)

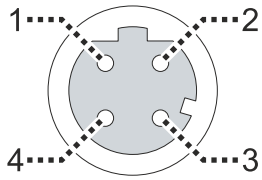
The EtherCAT output (X3) is a 4-pin, D-coded M12 socket and enables the extension of the EtherCAT network in line topology. This interface can be used to establish a connection to another EtherCAT segment or to individual EtherCAT devices.

The interface supports speeds of up to 100 Mbit/s.



Tightening torque: 0.6 Nm

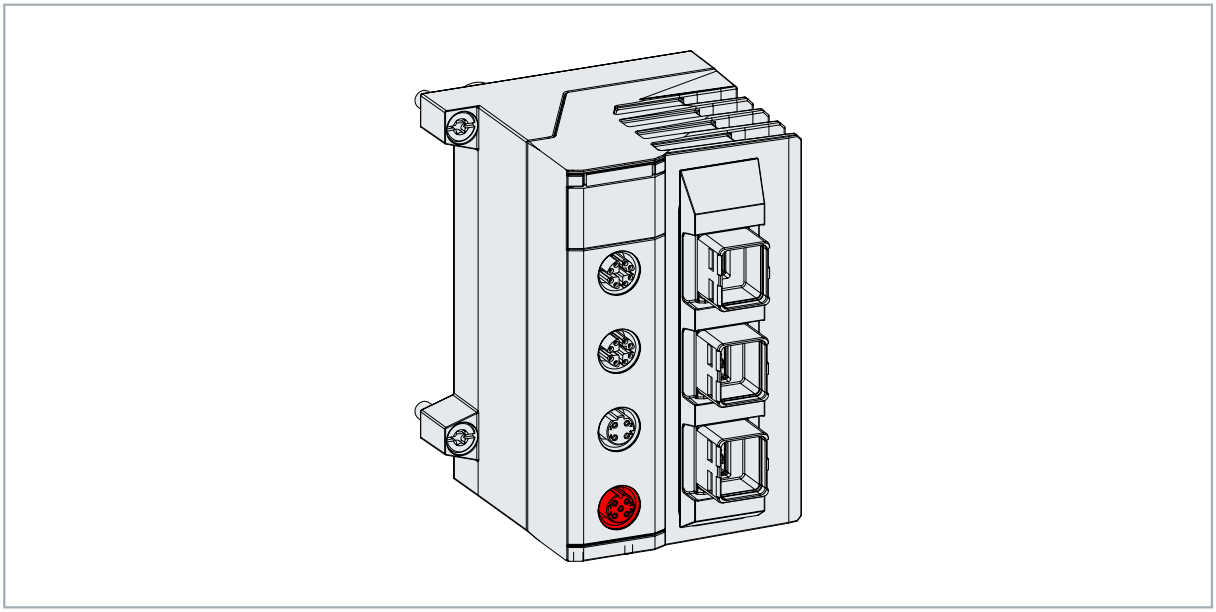
Pin assignment

M12 socket, D-coded	Pin	Signal	Function
	1	Tx+	Tx+
	2	Rx+	Rx+
	3	Tx-	Tx-
	4	Rx-	Rx-

The cable shield is connected via the thread.

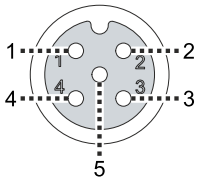
5.1.3 Power I/O interface (X4)

The power I/O interface (X4) is a 5-pin, A-coded M12 socket. It is a combination interface that can be used either as an input or output.



Tightening torque: 0.6 Nm

Pin assignment

M12 socket, A-coded	Pin	Symbol	Function
	1	USV V IN / OCT+	Combined supply and data line: • USV supply voltage input in case of power failure • OCT signal
	2	USV GND IN / OCT-	Combined supply and data line: • GND for pin 1 • OCT signal
	3	GND	GND for pin 4 and pin 5
	4	24 V DC	Supply voltage output 24 V DC for a panel.
	5	PC-ON	Digital input. A rising edge shuts down the PC.

Connection of a UPS (UPS IN input, pin 1 and pin 2)

The interface can be used as an input to connect a UPS module to the IPC module. In the event of a power failure, the UPS automatically takes over the power supply to the IPC module. The interface supports the UPS-OCT communication technology between the UPS and the IPC module. The two connecting lines (+24 V, 0 V) between the IPC module and the UPS are not only used to supply power to the IPC module, but also for bidirectional, modulated data transmission for parameterizing and diagnosing the UPS.

Power supply for testing and configuration purposes (UPS IN input, pin 1 and pin 2)

For test and configuration purposes, the IPC module can be supplied with power via the interface and put into operation - even without being mounted on a baseplate. However, this use is only intended for temporary test scenarios.

Control of system startup (PC-ON input, pin 5 and pin 3)

The PC-ON input is used to control the startup and shutdown process of the operating system. This is an inverted control signal:

- The operating system starts at a signal level of 0 V.
- The operating system is shut down at a signal level of 24 V.

During regular operation, the input must be kept permanently at 0 V to prevent an unintentional shutdown.

A level change to 24 V at the PC-ON input is required to initiate the shutdown in a targeted manner. Once the shutdown process is complete, the PC power supply automatically sets the output from 24 V to 0 V to indicate that the system is switched off.

Power supply of a panel (output 24 V DC, pin 4 and pin 3)

As an output, the interface can be used to supply a panel with 24 V DC and max. 4 A.

5.2 Push-pull interfaces

The push-pull interface is an industrial connector that has been specially developed for use in harsh industrial environments (IP65/IP67). The connector enables simple, tool-free plugging and unplugging: push to engage, pull to release. The colored ring on the connector can be used to lock the connector securely to the housing.

Protective caps

- Cover unused sockets with protective caps. Order identifier: C9900-K935.
- The IP65/IP67 protection rating is only guaranteed if each socket is either connected to a plug or closed with a protective cap.

5.2.1 Mini DisplayPort (X5)

The industrial PC has a Mini DisplayPort (X5) that enables connection of devices with Mini DisplayPort.

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 or DVI signals.

Table 4: Accessories connection cable, ordering information.

Ordering information	Description
C9900-K927...K929	Mini DisplayPort, push-pull V4, plug, straight, male, 20-pin – DVI-D, plug, straight, male, 24 + 1-pin
C9900-K931...K933	Mini DisplayPort, push-pull V4, plug, straight, male, 20-pin – M16, plug, straight, female, 19-pin

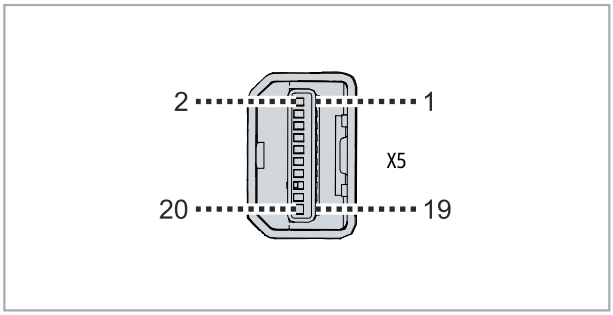


Fig. 5: Mini DisplayPort pin numbering

Table 5: 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

5.2.2 USB interfaces (X6, X7)

The IPC module has two USB interfaces (X6, X7) with IP65/67 protection rating. The connections are type A and comply with the USB 3.1 Gen 2 specification. They support a data transmission rate of up to 10 Gbit/s and are suitable for connecting external hard disks, SSDs, USB sticks or cameras.

Deviating from the specification, the USB interfaces each supply up to 740 mA. A separate power supply is required for devices with higher power requirements. The USB interfaces are electronically protected.

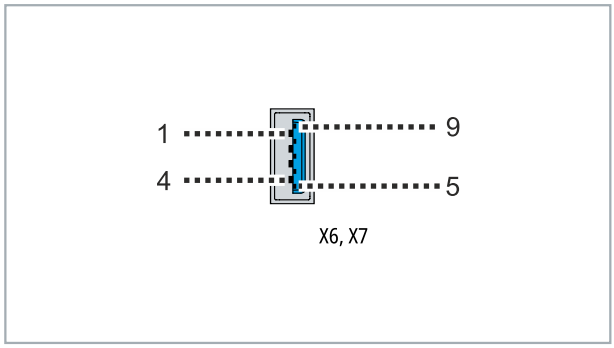


Fig. 6: USB interfaces pin numbering

Table 6: 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
Shell	Shield	Drain Wire

6 Commissioning and operation

NOTICE

Danger if operated in an unsuitable environment

Material damage is possible.

- Before commissioning, ensure that the environmental conditions at the place of commissioning and operation are complied with at all times. See environmental conditions in the chapter Technical data [▶ 14].

6.1 Requirements

- Components show no signs of damage
- Screw connections of the components are correctly tightened
- Wiring and cables are installed correctly

6.2 Commissioning

- Switch on the external supply voltage
- Parameterize the functions of the module if required

6.3 During operation

- Observe information for environment and operation
- Observe maintenance intervals
- Switch off the system if
  - unusual noise occurs
  - smoke develops
  - an atypical temperature development occurs

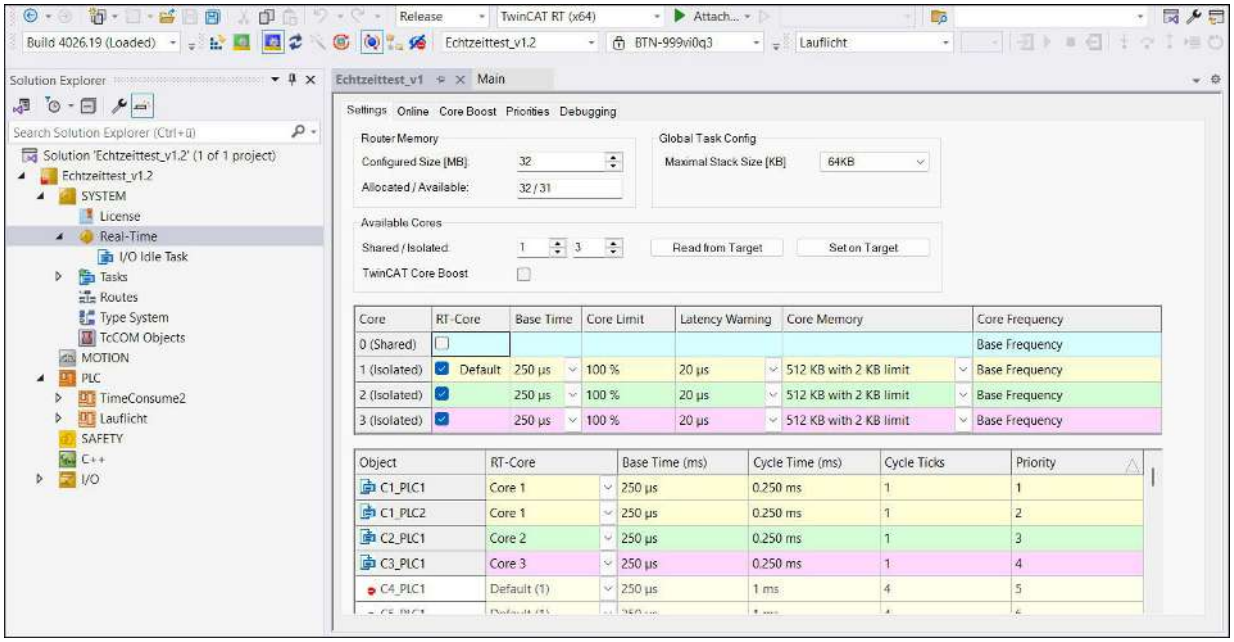
6.4 CPU core isolation for real-time applications

PLC performance and real-time applications depend, to a great extent, on the allocation of the CPU cores in TwinCAT. TwinCAT 3.1 offers the option to isolate CPU cores. These cores are then no longer used by the operating system and are only used to execute real-time tasks.

This separates operating system activities and processes from real-time applications. This ensures that real-time tasks are executed with maximum determinism and minimal latency.

Reserve one or more dedicated isolated cores for real-time applications to achieve maximum performance in the PLC.

1. Configuration is carried out in the **Settings** tab, in the project tree under **SYSTEM > Real-Time**.



2. To display the current configuration of the target system, click **Read from Target**.
3. To change the configuration of the target system, click **Set on Target** and select the desired distribution of the isolated cores.
4. Assign the tasks to the isolated cores, take priorities into account, and set the desired cycle time.

⇨ Restart the system. The target system must be restarted when divided and isolated cores are redefined.

7 Care and maintenance

7.1 Replacing the battery

NOTICE

Fire and explosion hazard

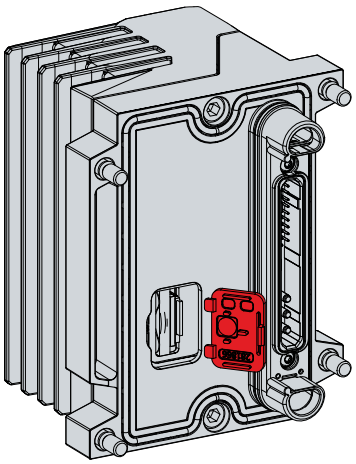
A fire and explosion hazard is present if the battery is short-circuited.

- Use insulated, non-conductive tools and ensure correct polarity when replacing batteries.

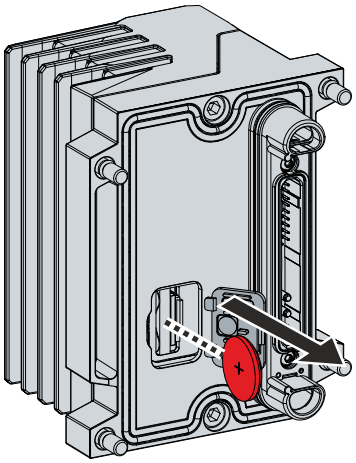
The battery must be replaced every 5 years. Replace the battery with a CR2032 battery (3 V, 225 mAh). The battery compartment is located behind the service flap.

The battery powers the built-in clock and buffers the time and date via it. The time and date are displayed incorrectly if the battery is empty or the battery is removed. Be aware of this behavior for your hardware and software configuration and reset the time and date in the BIOS after a battery change. If the operating system receives the time from an NTP server, the time and date can be set via the operating system.

1. Open the service flap.



2. Use insulated, non-conductive tools and pull the battery out of its holder.



3. Insert the new battery into the battery compartment so that the negative pole is facing right towards the data connector.

⇨ Close the service flap and check the date and time.

7.2 Cleaning

Observe the general conditions of protection rating IP65/67.

Use a vacuum cleaner or a damp, soft cleaning cloth to clean the PC module. Corrosive cleaning agents, solvents and abrasives as well as hard objects are unsuitable and can damage the surface.

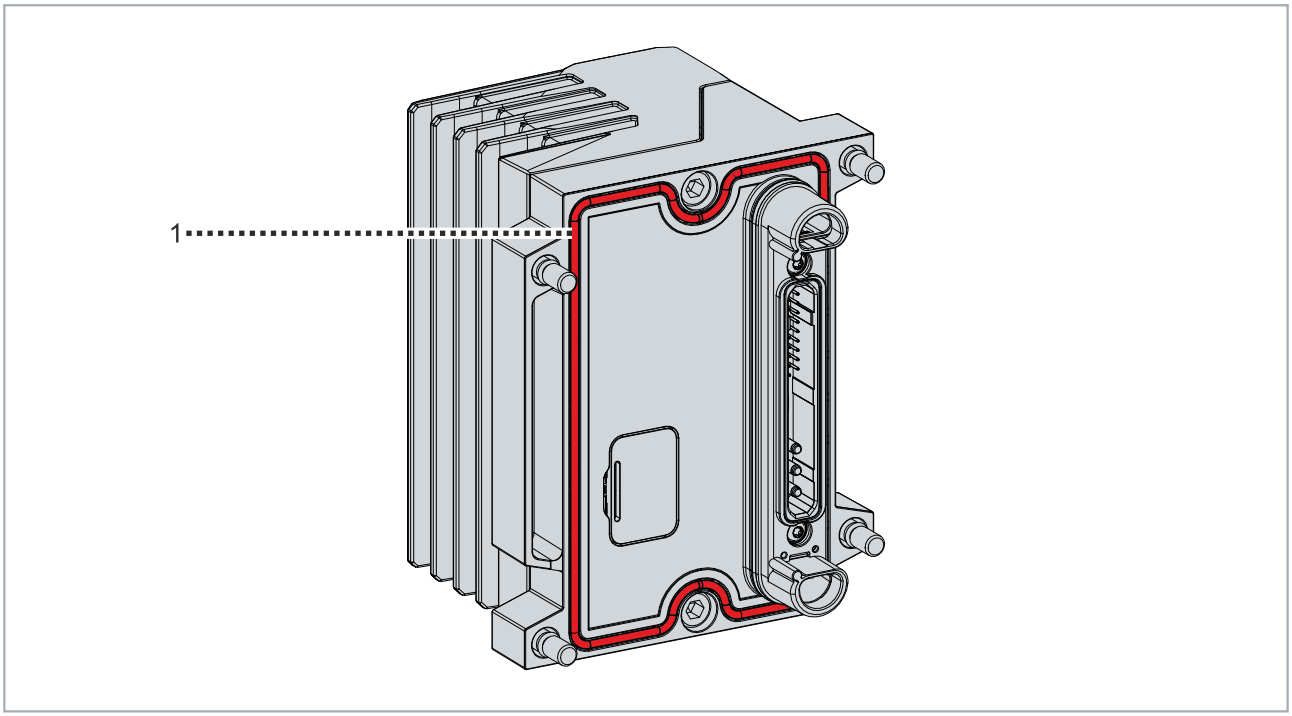
8 Decommissioning

8.1 Disassembly

Disassembly may only be carried out by qualified and trained technical personnel.

1. Remove cables.
2. Loosen all mounting screws of the module.
3. Take the module off the baseplate.
4. Transport the module to the workplace or storage place.

Further information on this can be found in the chapter Technical data [▶ 14] and in the system manual in chapter "Disassembly".



1. Check the seal [1] of the module for wear and damage.
2. Replace worn or damaged seals.

Further information can be found in chapter Accessories [▶ 31].

8.2 Disposal

Products marked with a crossed-out wheeled bin shall not be discarded with the normal waste stream. The device is considered as waste electrical and electronic equipment. The national regulations for the disposal of waste electrical and electronic equipment must be observed.

9 Appendix

9.1 Manual version history

The following table shows the version history of this manual.

Version	Comment
1.0	• First release

9.2 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

Download finder

Our download finder contains all the files that we offer you for downloading. You will find application reports, technical documentation, technical drawings, configuration files and much more.

The downloads are available in various formats.

Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on our internet page: www.beckhoff.com

You will also find further documentation for Beckhoff components there.

Beckhoff Support

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

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

Hotline:	+49 5246 963-157
e-mail:	support@beckhoff.com

Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:

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

Hotline:	+49 5246 963-460
e-mail:	service@beckhoff.com

Beckhoff Headquarters

Beckhoff Automation GmbH & Co. KG

Huelshorstweg 20
33415 Verl
Germany

Phone:	+49 5246 963-0
e-mail:	info@beckhoff.com
web:	www.beckhoff.com

9.3 Accessories

Suitable accessories can be found on the product website:

Table 7: Protective caps.

Order number	Description
ZS5000-0020	Protective cap for M12 socket, plastic, black, IP65/67
C9900-K935	Protective cap, plastic, push-pull V4, black, straight, IP65/67

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