

Manual | EN

MS4208-2003-1112

2-channel EtherCAT power output, EtherCAT, 24 V DC/2 x 4 A, switchable, M12

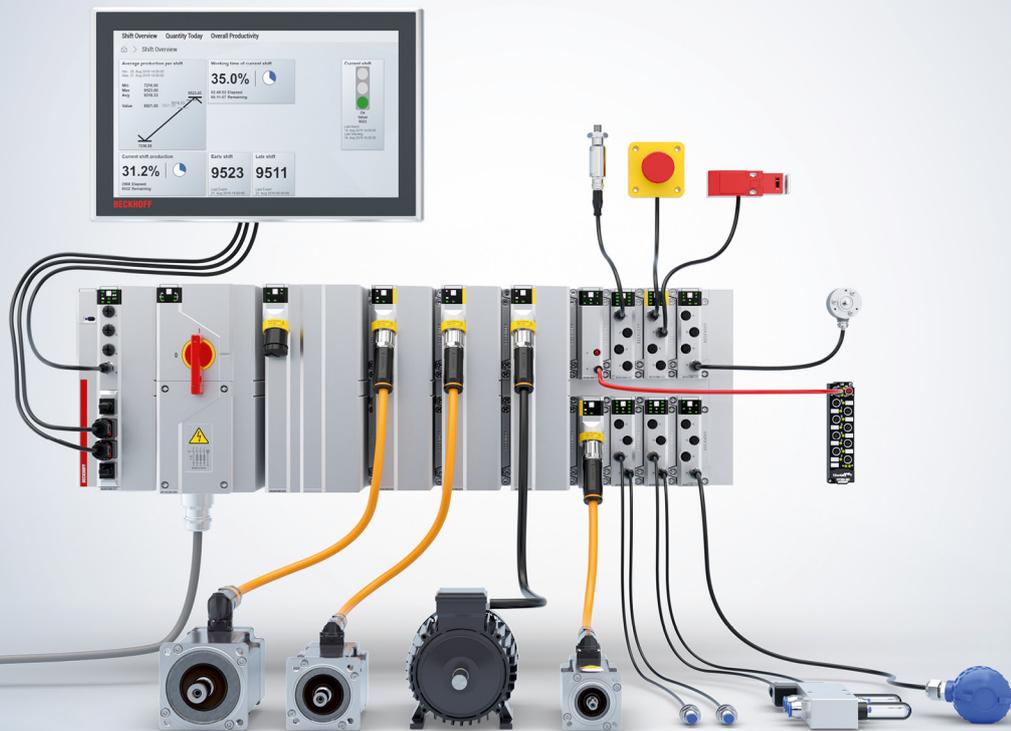


Table of contents

1 Foreword	5
1.1 Notes on the documentation	5
1.2 For your safety	6
1.3 Intended use	7
2 Product overview	8
2.1 Product functions	10
2.1.1 EtherCAT connections	10
2.1.2 Supply voltage outputs.....	10
2.2 Delivery state	11
2.3 Block diagram	12
2.4 Type key.....	13
2.5 Status display	14
2.6 Dimensions	16
3 Technical data	17
4 Software functions	19
4.1 Electronic fuse.....	19
5 Mechanical installation	20
5.1 Preparation.....	20
5.2 Placement of the module on the baseplate	21
5.3 Mounting the module.....	22
6 Connection	23
7 Commissioning and operation	25
7.1 Requirements	25
7.2 Commissioning.....	25
7.3 During operation.....	25
8 Decommissioning	27
8.1 Disassembly	27
8.2 Disposal	27
9 Appendix	28
9.1 Manual version history	28
9.2 Support and Service.....	29
9.3 Accessories	30

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

The MS4208-2003-1112 may only be operated if it is mounted on a baseplate in accordance with the installation instructions in this manual. It is designed for the following purposes:

- Communication with other EtherCAT devices.
- Use of the supply voltage U_B to supply these EtherCAT devices, other baseplates or other external devices.

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.

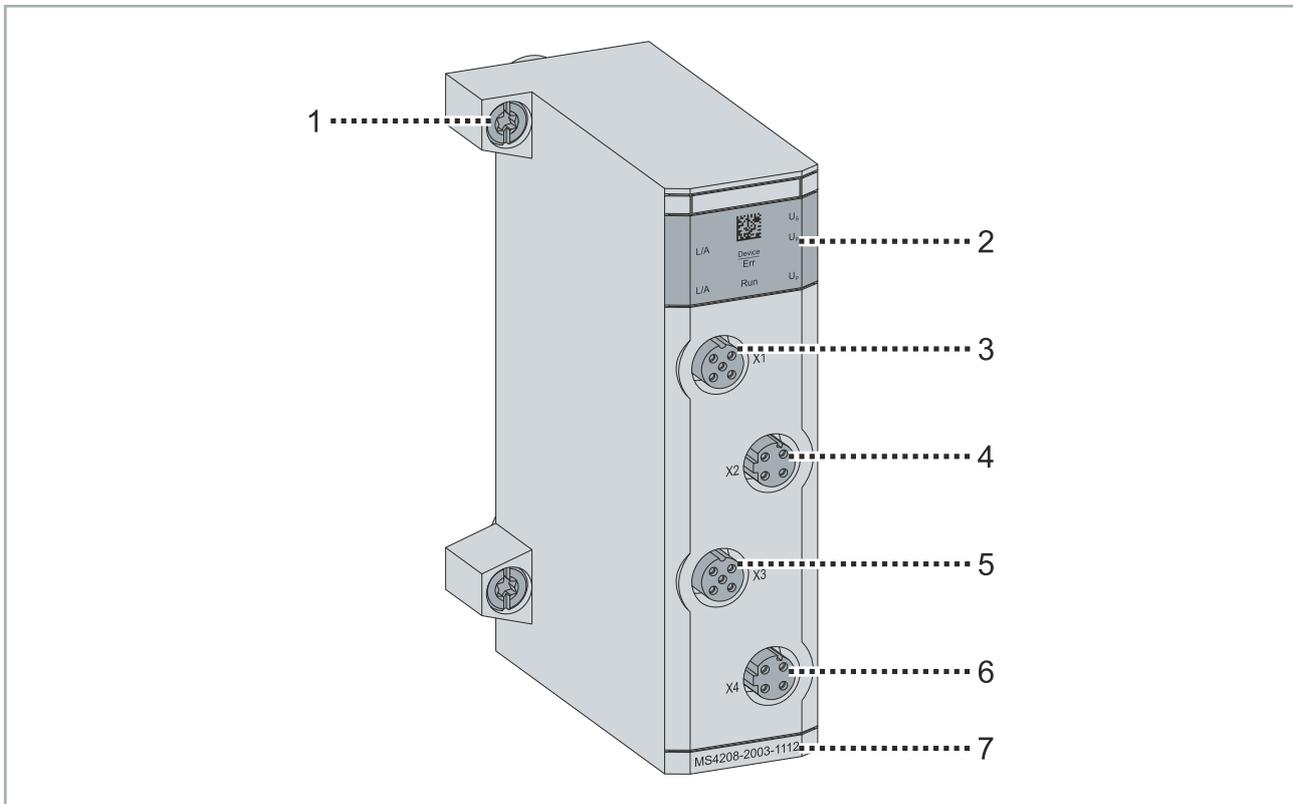
Improper use

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

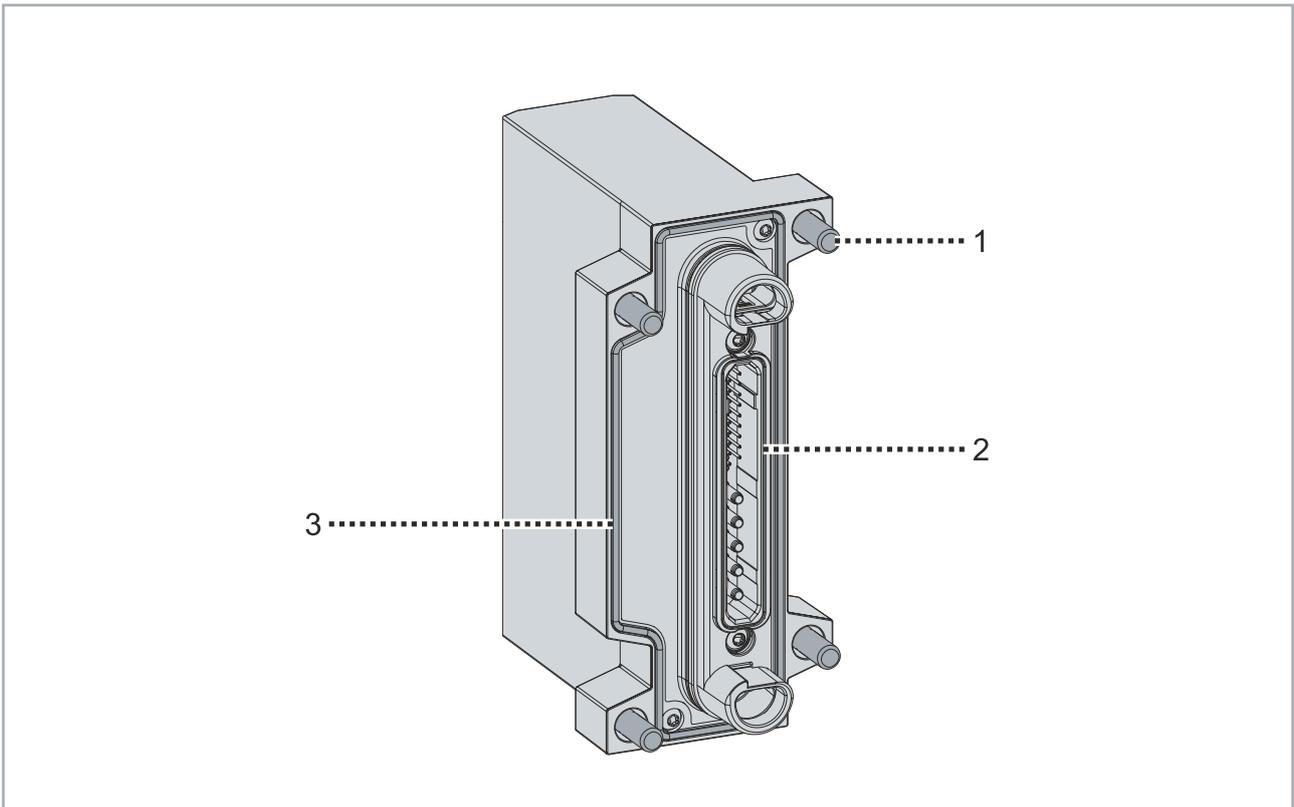
2 Product overview

The MS4208-2003-1112 EtherCAT power output module provides 24 V DC for the control voltage U_S or the load voltage U_P as well as EtherCAT for additional consumers. Both voltages are protected by integrated electronic fuses; the load voltage U_P can also be switched. Two channels are supplied via separate connectors.

The integration of an EtherCAT power output module allows MX-System stations to be expanded to include EtherCAT Box modules as well as any other EtherCAT devices, such as EtherCAT valve terminals.



Position	Name
1	Fastening screw, captive, 8 x
2	Status display
3	Supply voltage output X1
4	EtherCAT connection X2
5	Supply voltage output X3
6	EtherCAT connection X4
7	Module name



Position	Name
1	Fastening screw, captive, 4 x
2	Data connector
3	Seal

2.1 Product functions

2.1.1 EtherCAT connections

You can connect one or more EtherCAT SubDevices to each EtherCAT connection.

2.1.2 Supply voltage outputs

The supply voltage outputs each output two voltages: U_S and U_P . The voltages are protected by electronic fuses as follows:

- A common electronic fuse for U_S of both outputs.
- One electronic fuse per output for U_P .

All output voltages are branched off from the baseplate voltage U_B .

A graphical representation of the current circuits can be found in the chapter [Block diagram \[► 12\]](#).

You can access the software functions of the electronic fuses via Electronic fuse.

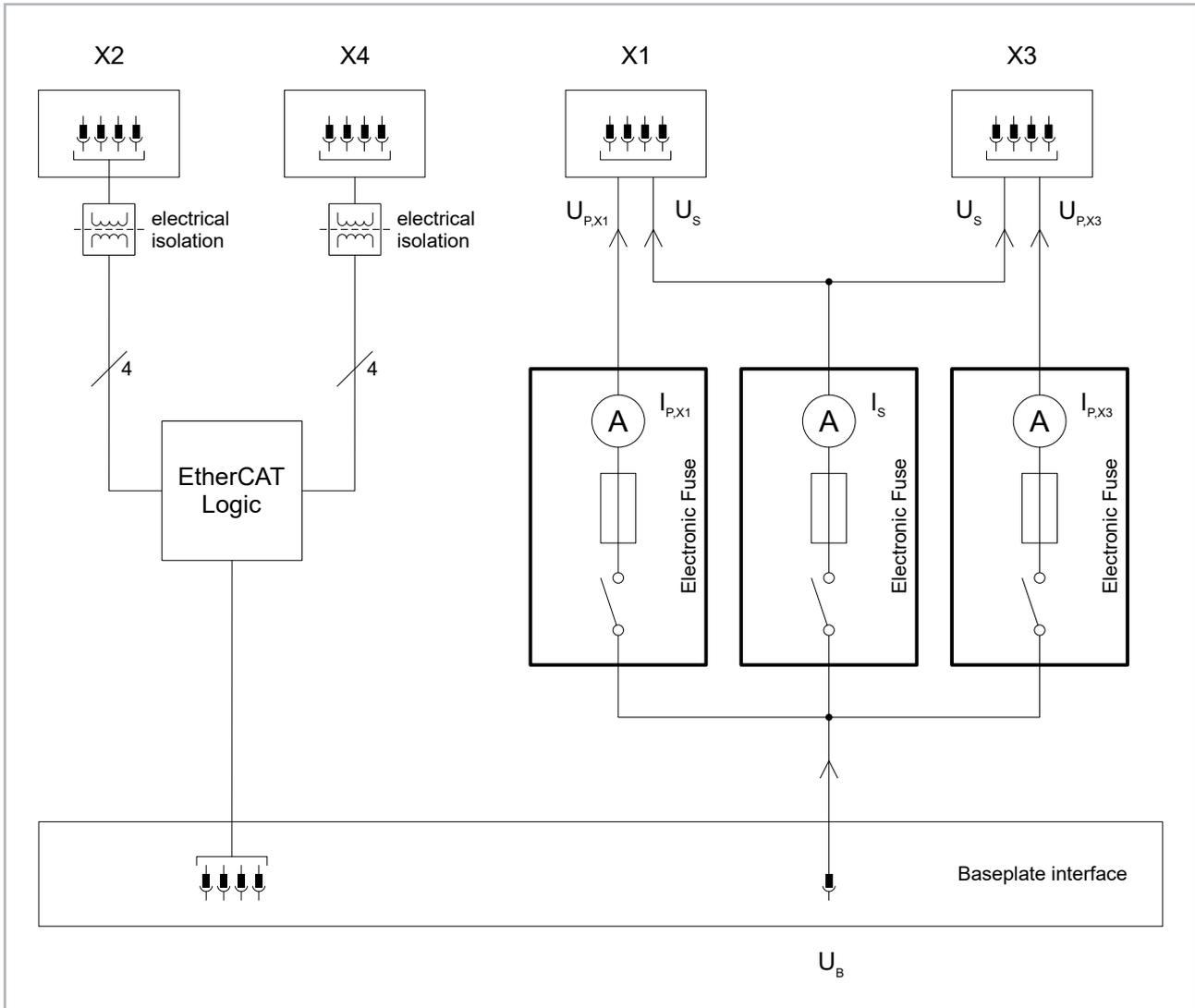
2.2 Delivery state

This chapter describes the default settings for basic product functions on delivery.

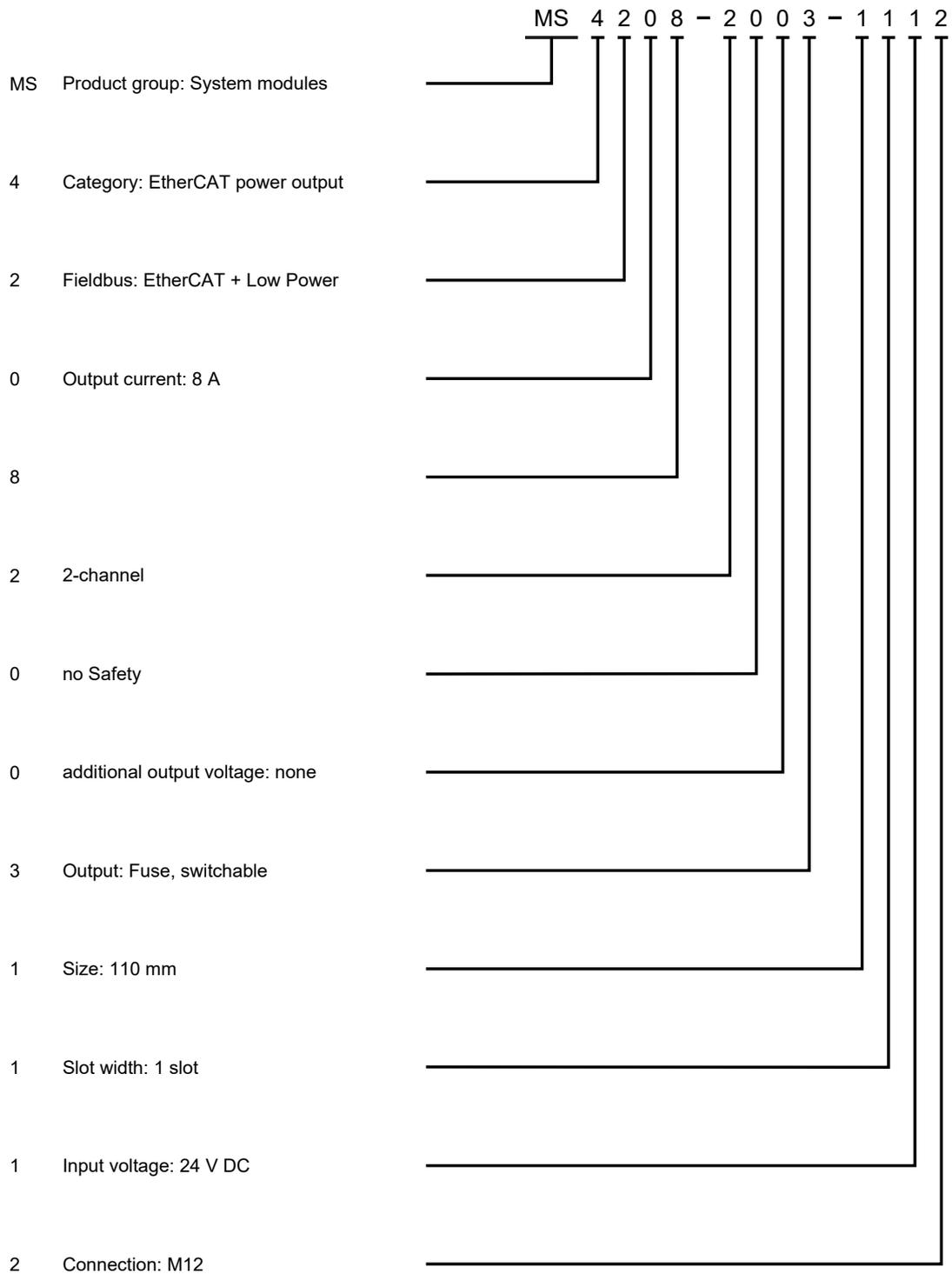
2.2.1 Switching state of the supply voltage outputs

On delivery, all output voltages are switched on.

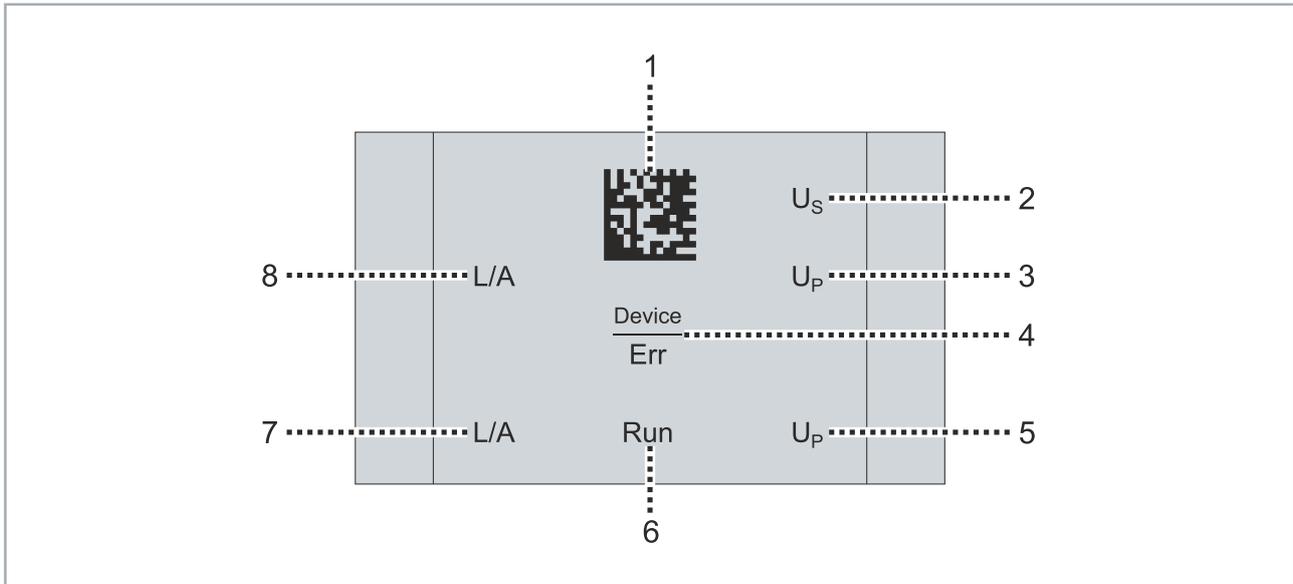
2.3 Block diagram



2.4 Type key



2.5 Status display

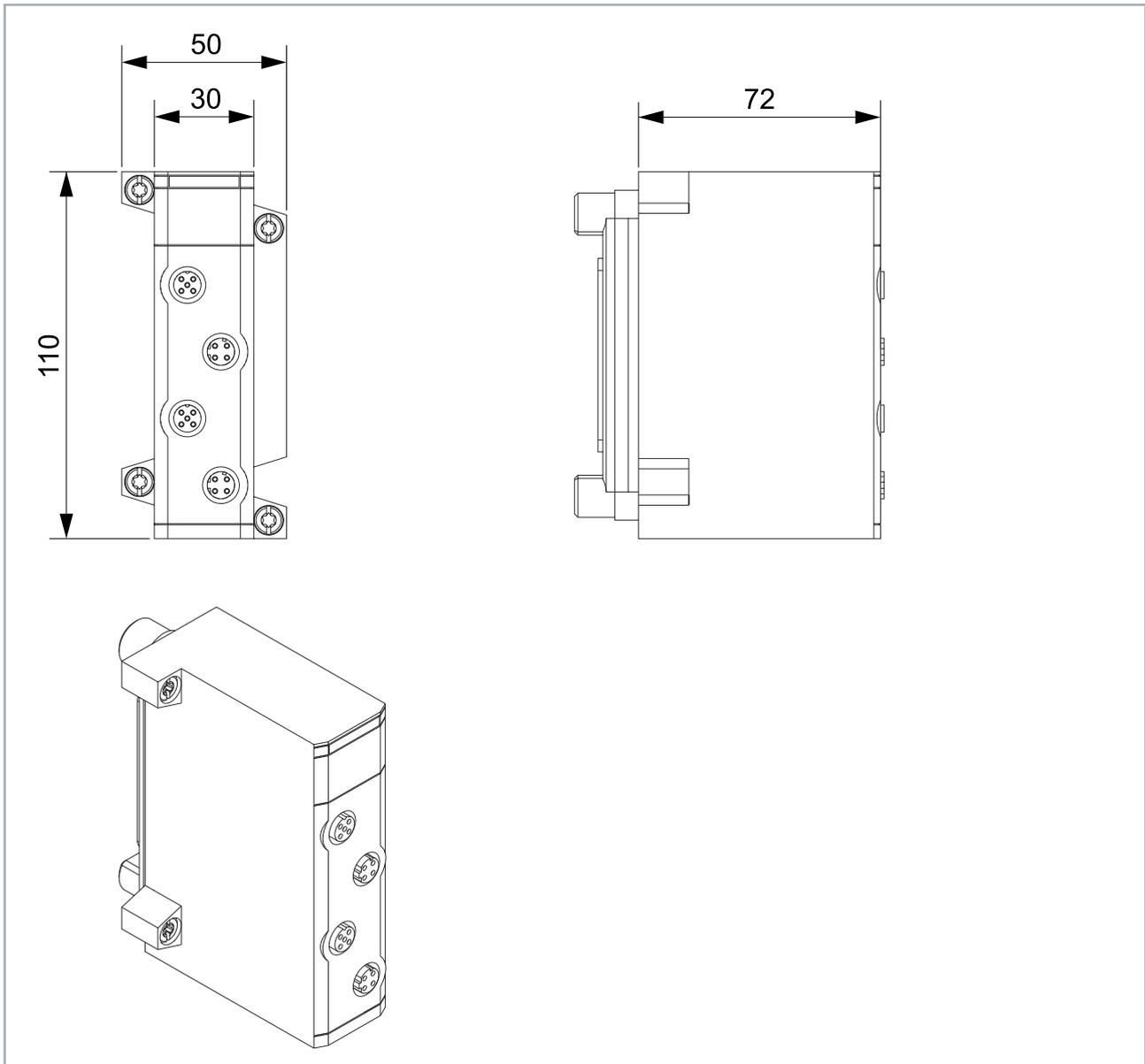


Position	Status display	Status	Explanation
1	-	-	Beckhoff Identification Code as DataMatrix code
2	U_S	off	No supply voltage present
		green illuminated	Supply voltage switched on
3	$U_P (X1)$	off	No supply voltage present
		green illuminated	Supply voltage switched on
4	Device Err	off	No error exists
		red illuminated	Error collection LED
5	UP (X3)	off	No supply voltage present
		green illuminated	Supply voltage switched on
6	Run	off	The EtherCAT State Machine of the module is in the initialization state
		flashing green	The EtherCAT State Machine of the module is in the <i>Pre-Operational</i> state
		single flash green	The EtherCAT State Machine of the module is in the <i>Safe-Operational</i> state
		green illuminated	The EtherCAT State Machine of the module is in the <i>Operational</i> state
		flickers green	Firmware is being loaded
7	L/A (X4)	off	No connection on the incoming EtherCAT segment
		green illuminated	Preceding EtherCAT device connected
		flashing green	Communication with preceding EtherCAT device

Position	Status display	Status	Explanation
8	L/A (X2)	off	No connection on the incoming EtherCAT segment
		green illuminated	Preceding EtherCAT device connected
		flashing green	Communication with preceding EtherCAT device

2.6 Dimensions

All dimensions in mm



3 Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

Baseplate interface	
Connector	1 data connector
Hot Swap	No

EtherCAT	
Distributed Clocks	No
Current consumption via E-bus	330 mA

EtherCAT ports	
Connection	2 x M12 socket, D-coded
Cable length	max. 100 m per port

Supply voltage outputs	
Connection	2 x M12 socket, A-coded
Output voltages per connection	<ul style="list-style-type: none"> • 24 V DC U_S • 24 V DC U_P
Rated output currents	<ul style="list-style-type: none"> • U_S: max. 4 A • U_P: max. 4 A per connection • Sum current of all output currents: 10 A
Output current limitation	<ul style="list-style-type: none"> • U_S: 4.4 A • U_P: 4.4 A per connection
Output power limitation	<ul style="list-style-type: none"> • U_S: 100 W • U_P: 100 W per connection
Output current measuring range	<ul style="list-style-type: none"> • U_S: 0...6 A • U_P: 0...6 A per connection

Environmental conditions	
Operating temperature	0 ... 50 °C
Storage temperature	-25 ... +60 °C
Air humidity	95%, no condensation
Protection rating	IP20 as a separate module IP65 / IP67 as part of a fully and correctly assembled MX-System
Pollution degree	2
Overvoltage category	III 300 V
Maximum installation altitude	2000 m

Standards, approvals	
Device safety	conforms to EN 61010-2-201
EMC immunity/emission	conforms to EN IEC 61000-6-2 / EN IEC 61000-6-4
Vibration/shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
Approvals	CE, UL in preparation

Housing data	
Width (slots)	1
Height (rows)	1
Dimensions W × H × D	50 mm × 110 mm × 73 mm 50 mm × 110 mm × 72 mm (housing only)
Material	Zinc die-cast and aluminum die-cast
Cooling	Convection
Weight	540 g
Installation position	Vertical. See system manual, chapter "Installation conditions".

4 Software functions

Software functions are the functions of a module's firmware that a controller can access via EtherCAT.

Functionality

The following descriptions document the full range of software functions at the time of publication of this manual. The range of functions that can actually be used depends on the firmware version of a module.

4.1 Electronic fuse

This software function enables configuration, control and diagnosis of the electronic fuse(s) integrated in the module.

It is implemented by the EtherCAT profile 5001.00925 "Electronic Fuse", or "EFU" for short.

Full description of this software function in the Beckhoff Information System: [Link](#)

4.1.1 Process Data Objects (PDO)

EFU Inputs Ch.n

Variable	Data type	Description
Warning	BOOL	(no description available in the sti)
Error	BOOL	(no description available in the sti)
Tripped	BOOL	(no description available in the sti)
Enabled	BOOL	(no description available in the sti)
Input cycle counter	BIT2	(no description available in the sti)
Current	REAL32	Measured output current.

EFU Outputs Ch.n

Variable	Data type	Description
Enable	BOOL	Enable/disable output driver
Control Via Process Data	BOOL	Enable/disable output driver
Reset	BOOL	Reset fuse state in error state

5 Mechanical installation



Required tools

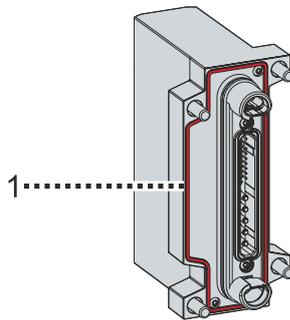
- Torx T25 screwdriver
- Torque wrench 5 Nm

5.1 Preparation

NOTICE

Check the module for damage

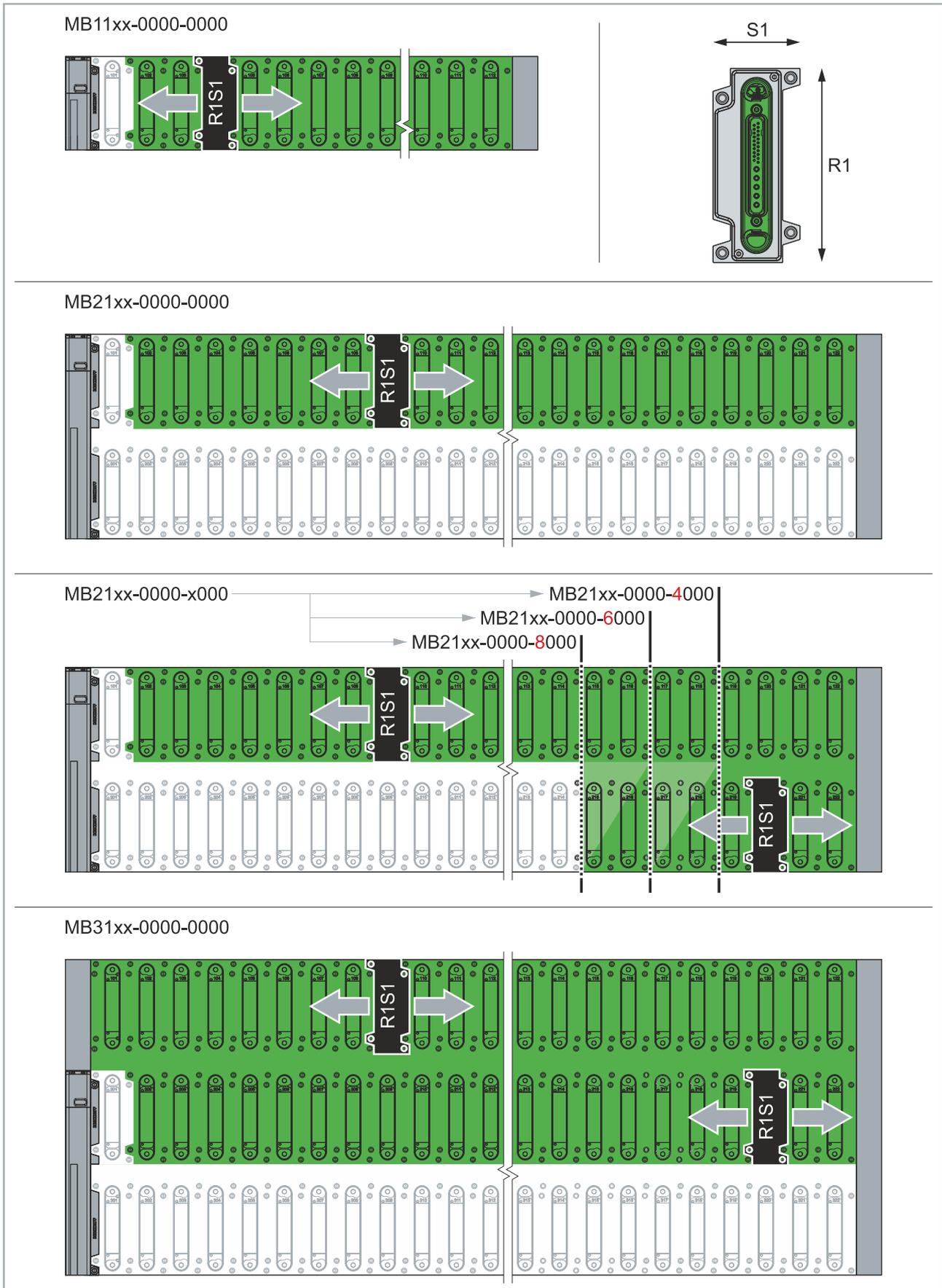
If the seal is worn or damaged, liquids and dirt can penetrate and damage the MX-System. The IP67 protection rating is not met if the seals are worn or damaged.



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

5.2 Placement of the module on the baseplate

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



5.3 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.

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.

6 Connection

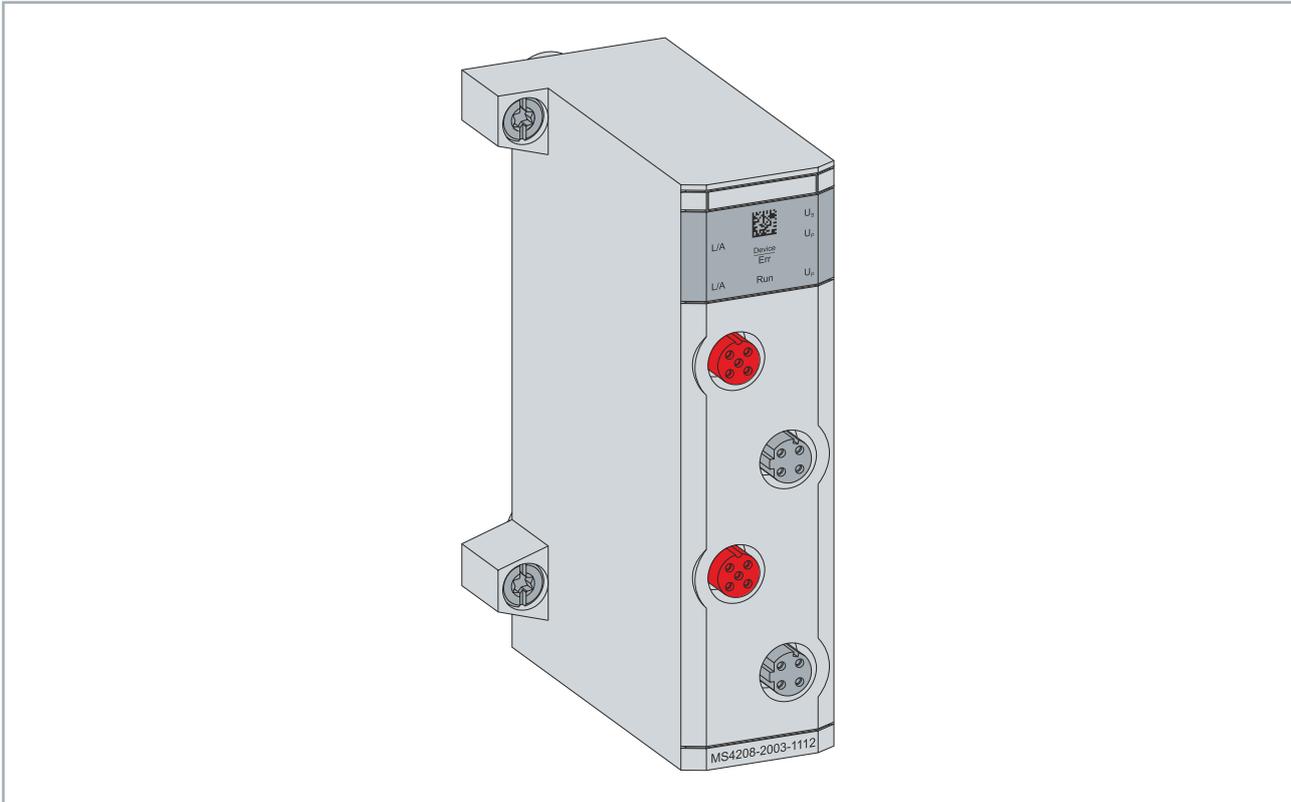
NOTICE

Defect caused by hot plug

If cables are connected or disconnected during operation, damage to property is possible.

- Only connect or disconnect cables when all supply voltages have been shutdown.

Supply voltage outputs: X1, X3



Required tools

- Torque wrench for connectors



Required accessories [+]

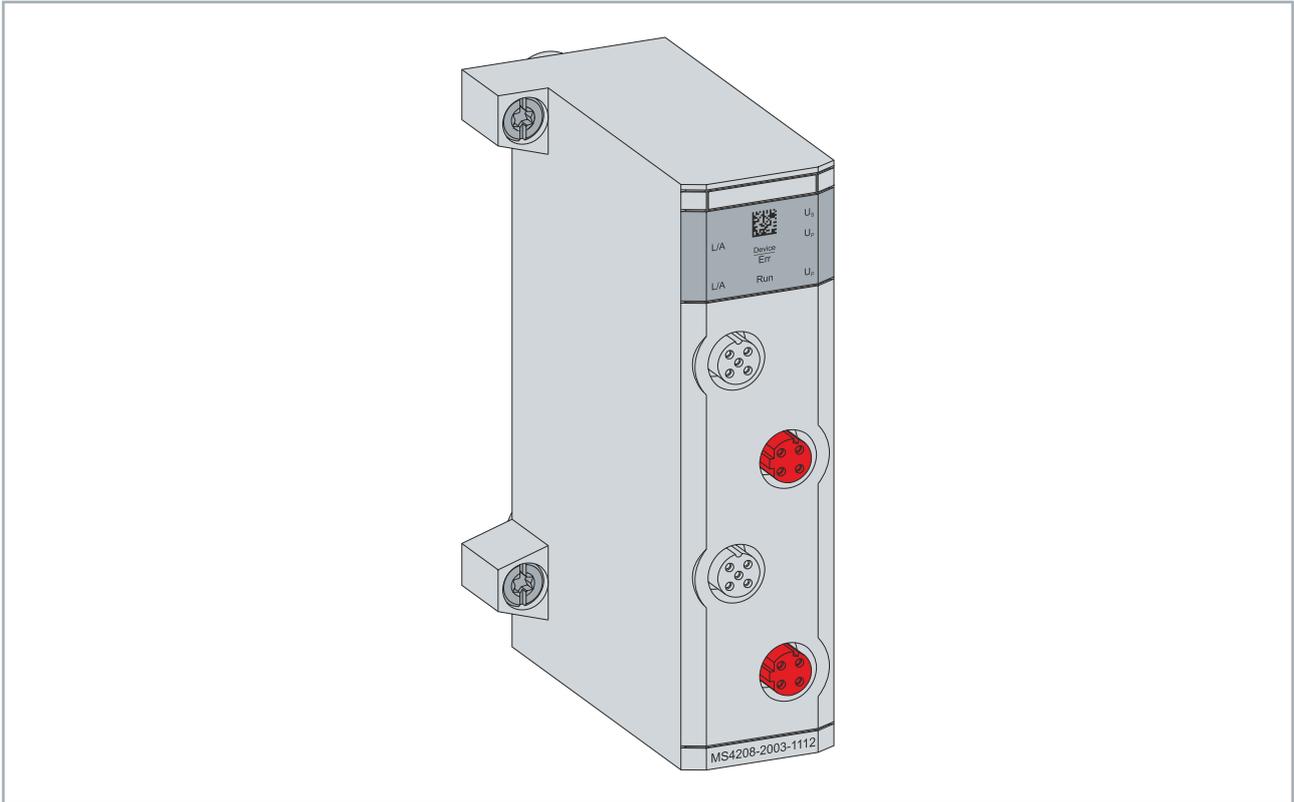
- Cable with M12 connector, 4-pin

Components	Tightening torque [Nm]
Connector	0.6

Pin assignment

M12 connector	Pin	Signal	Function
	1	+24 V U _s	Supply voltage output
	2	+24 V U _p	Supply voltage output
	3	GND _s	GND to pin 1
	4	GND _p	GND to pin 2
	5	--	--

EtherCAT: X2, X4



Required tools

- Torque wrench for connectors



Required accessories [+]

- Cable with M12 connector, 4-pin

Components	Tightening torque [Nm]
Connector	0.6

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.

7 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](#) [▶ 17].

7.1 Requirements

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

7.2 Commissioning

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

7.3 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

8 Decommissioning

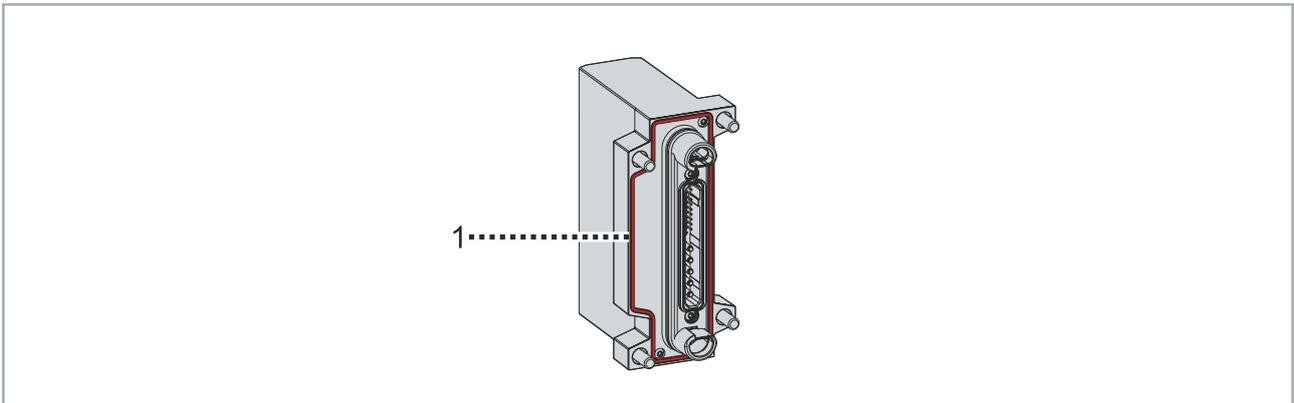
8.1 Disassembly

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

Further information can be found in chapter [Notes on the documentation](#) [► 5].

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 can be found in the chapter [Technical data](#) [► 17] and in the system manual in the 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](#) [► 30].

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
1.0.0	• 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.

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You will also find further documentation for Beckhoff components there.

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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

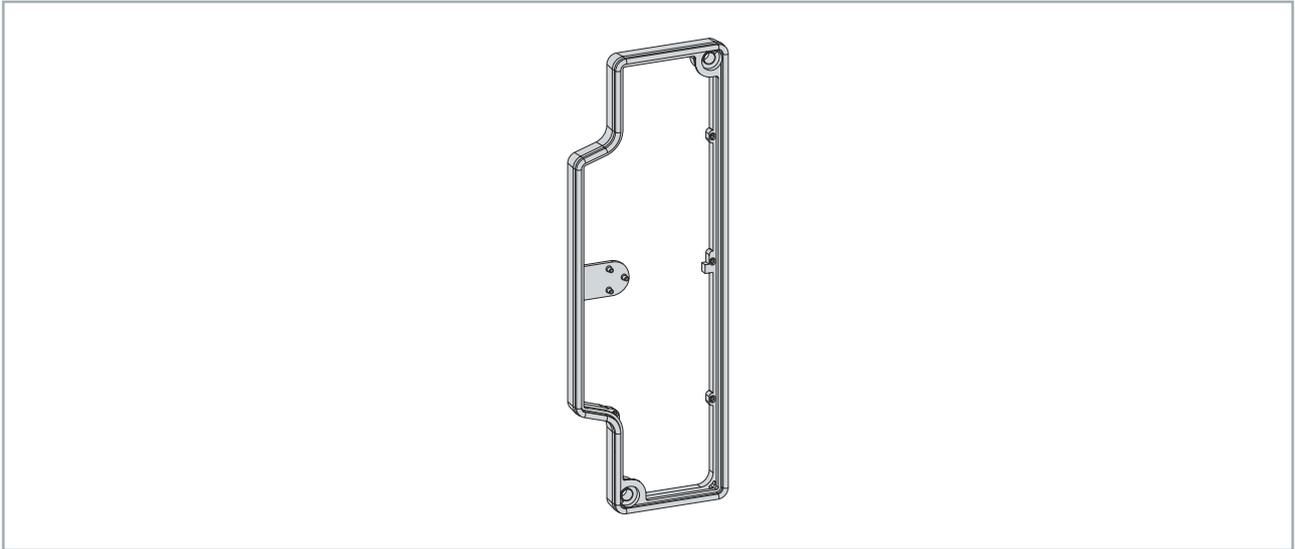
9.3 Accessories

Suitable accessories can be found on the product website:

<https://www.beckhoff.com/ms4208-2003-1112>

The following items are also available for replacing worn parts:

MX module base S1R1 with seal



The module base S1R1 with seal is available for replacing worn and damaged seals on a 1-row MX module with one slot.

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More Information:

www.beckhoff.com/ms4208-2003-1112

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

