BECKHOFF New Automation Technology

Manual | EN

MS2204-0002-1112

EtherCAT power infeed + forwarding, EtherCAT, 24 V DC/4 A, M12

2025-12-16 | Version: 1.0

Table of contents

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 MS2204-0002-1112 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:

- Feeding and forwarding the supply voltage U_B.
- Communication with other EtherCAT 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.

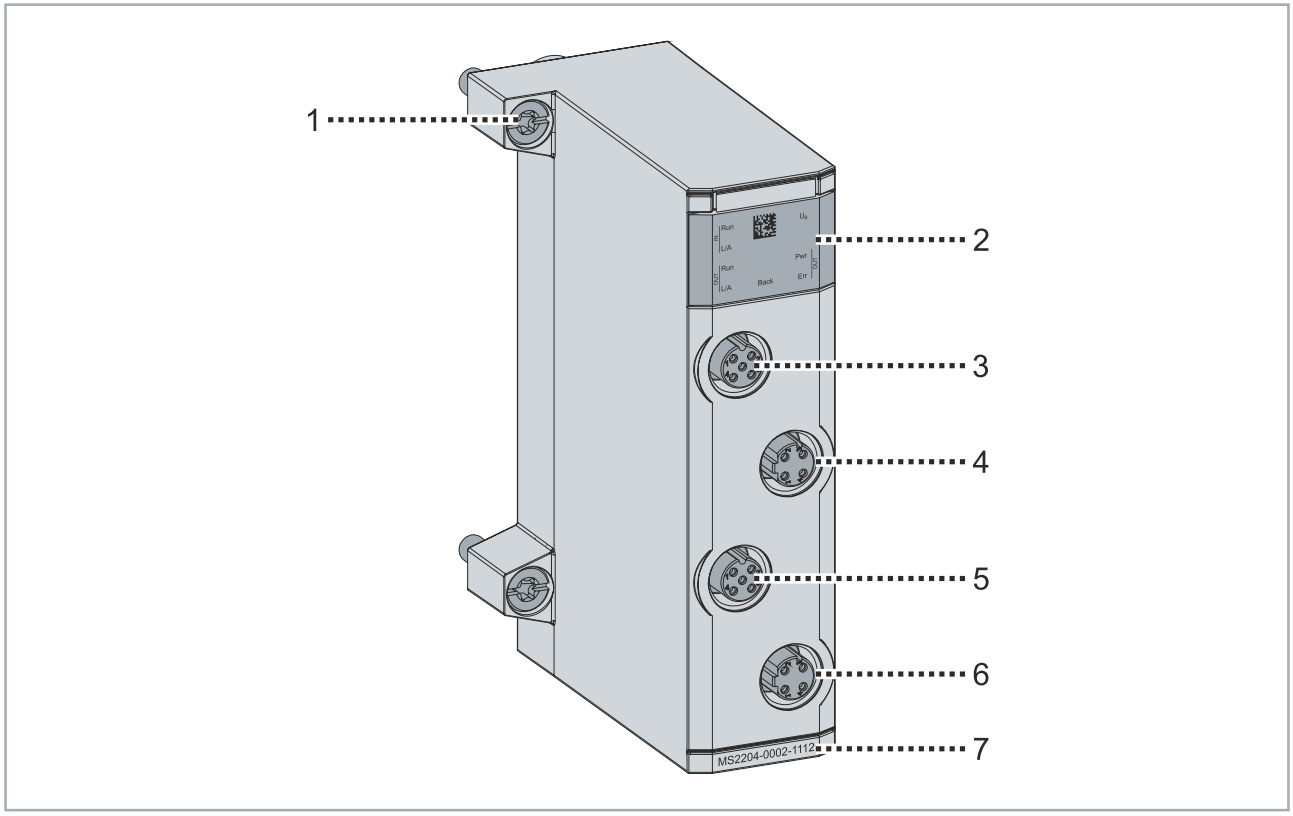
Improper use

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

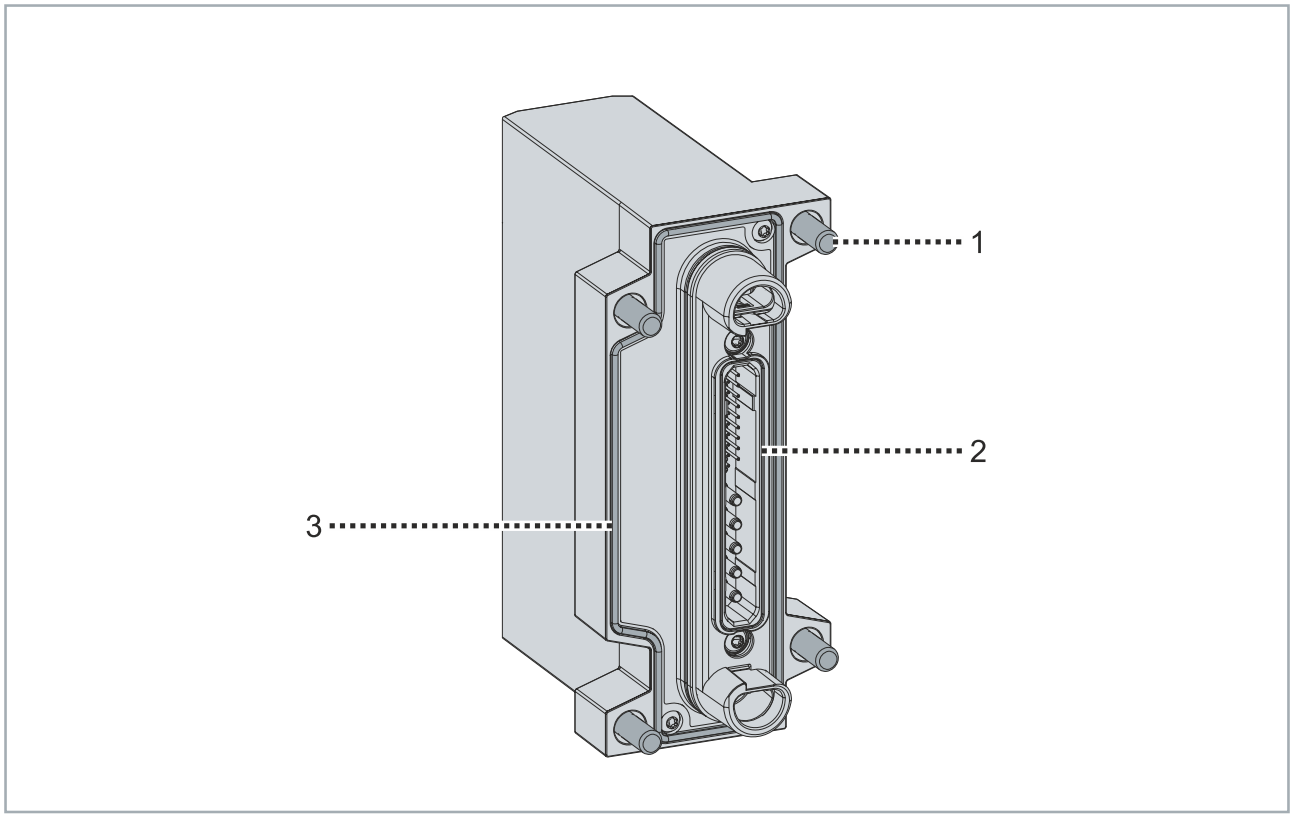
2 Product overview

The MS2204-0002-1112 power infeed module enables integration into an existing EtherCAT topology. A separate connection provides 24 V DC and up to 4 A from an external source for the system.

The MS2204-0002-1112 also has an EtherCAT junction for integrating additional devices or entire EtherCAT segments as well as a fused 24 V DC output of the base voltage U_B, which can be used to supply a control panel, for example.



Position	Name
1	Fastening screw, captive, 4 x
2	Status display
3	Supply voltage input X1
4	EtherCAT input X2
5	Supply voltage output X3
6	EtherCAT output 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 input

Use the EtherCAT input X2 to connect the baseplate to a higher-level EtherCAT network or an EtherCAT MainDevice.

Further information can be found in chapter .

2.1.2 EtherCAT output

Use the EtherCAT output X4 to integrate external EtherCAT devices or additional baseplates via EtherCAT.

Further information can be found in chapter .

2.1.3 Supply voltage input

You can feed the supply voltage U_B to the baseplate via the supply voltage input.

The supply voltage input is protected against polarity reversal.

You can monitor the supply voltage using the software function Supply voltage input [▶ 20].

2.1.4 Supply voltage output

The supply voltage output provides two voltages:

- The supply voltage U_B from the baseplate.
- The infeed voltage applied to the supply voltage input. This can be forwarded from the supply voltage output.

The current circuit of the supply voltage U_B from the baseplate to the voltage output is protected by an electronic fuse. The electronic fuse protects against overload and measures the output current. In the event of overload, the electronic fuse prevents the overload from affecting the MX system. You can also use the electronic fuse as a switch to turn the output voltage on or off.

You can control and monitor the electronic protection using the software function Electronic fuse [▶ 19].

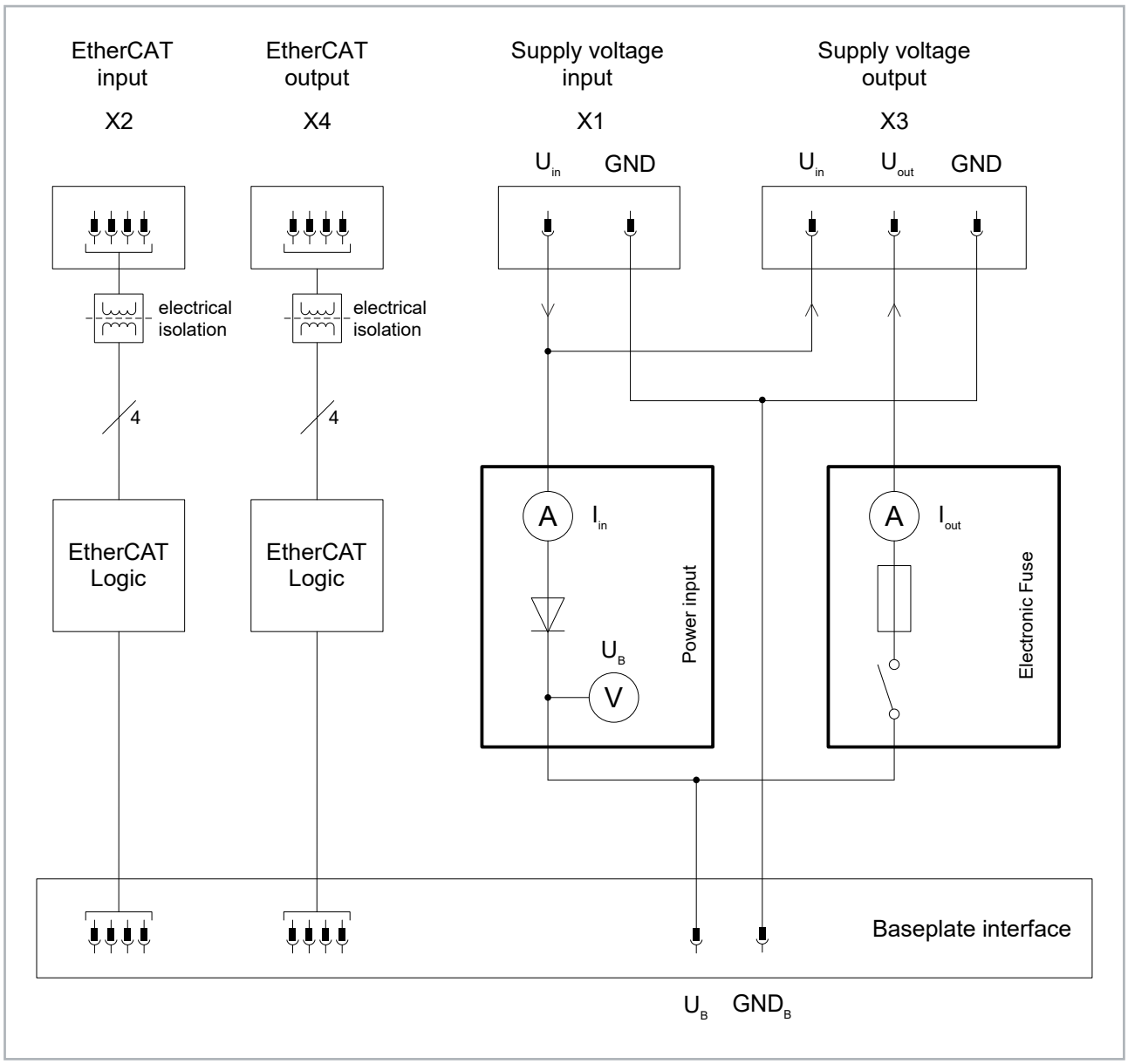
2.2 Delivery state

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

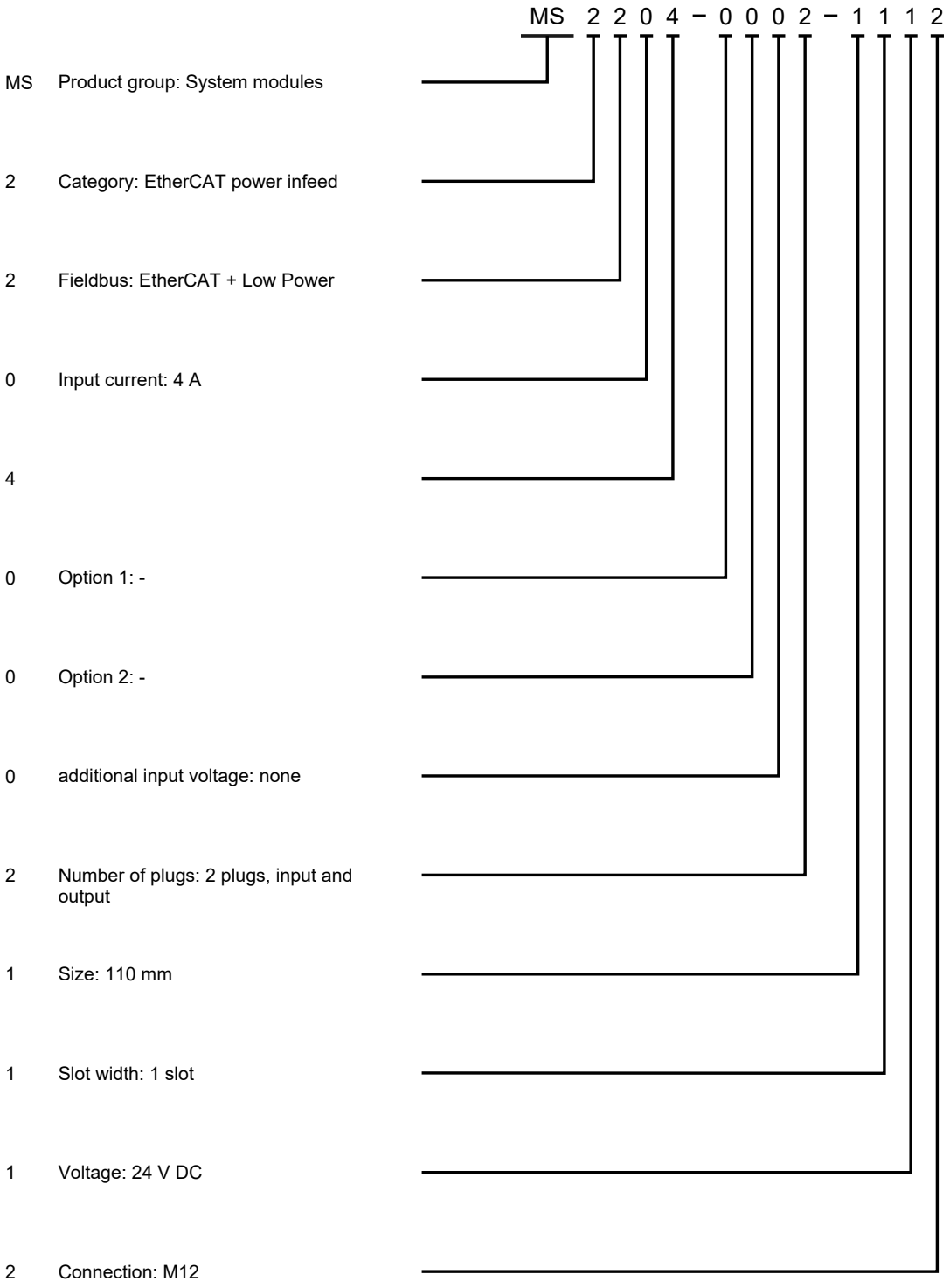
2.2.1 Switching state of the supply voltage output

The switchable output voltage on X3, pin 2 is switched on in the delivery state.

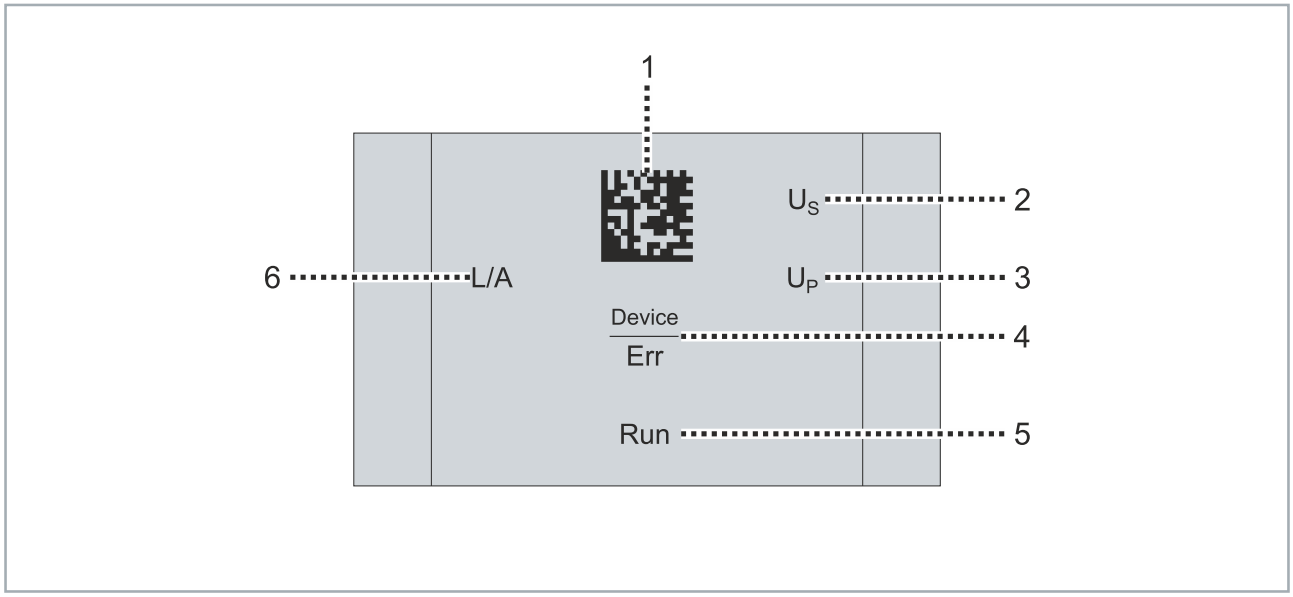
2.3 Block diagram



2.4 Type key


MS 2 2 0 4 – 0 0 0 2 – 1 1 1 2
MS Product group: System modules
2 Category: EtherCAT power infeed
2 Fieldbus: EtherCAT + Low Power
0 Input current: 4 A
4
0 Option 1: -
0 Option 2: -
0 additional input voltage: none
2 Number of plugs: 2 plugs, input and output
1 Size: 110 mm
1 Slot width: 1 slot
1 Voltage: 24 V DC
2 Connection: M12

2.5 Status display



Position	Status display	Status	Explanation
1	-	-	Beckhoff Identification Code as DataMatrix code
2	U_B	off	No supply voltage present
		green illuminated	Supply voltage switched on

OUT – Status display for supply voltage output X3

Position	Status display	Status	Explanation
3	Pwr	off	No supply voltage present
		green illuminated	Supply voltage switched on
4	Err	off	No error exists
		red illuminated	Error collection LED

Position	Status display	Status	Explanation
5	Back	green illuminated	EtherCAT State Machine from the ASIC in the module

OUT - Status display for EtherCAT output X4

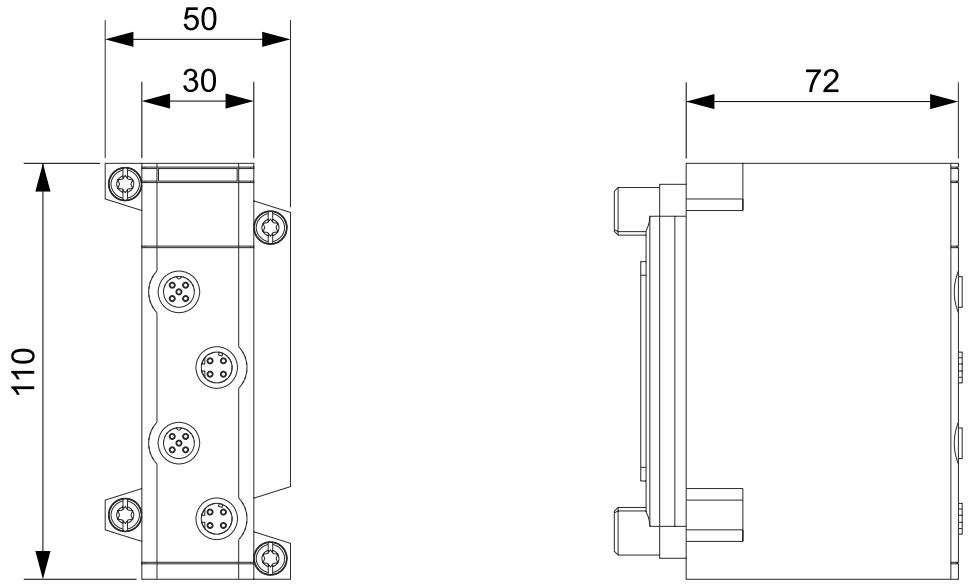
Position	Status display	Status	Explanation
6	L/A	off	No connection on the incoming EtherCAT segment
		green illuminated	Preceding EtherCAT device connected
		flashing green	Communication with preceding EtherCAT device
7	Run	off	The EtherCAT State Machine of the module is in the initialization state
		flashing green	The EtherCAT State Machine of the module is in the *Pre-Operational* state
		single flash green	The EtherCAT State Machine of the module is in the *Safe-Operational* state
		green illuminated	The EtherCAT State Machine of the module is in the *Operational* state
		flickers green	Firmware is being loaded

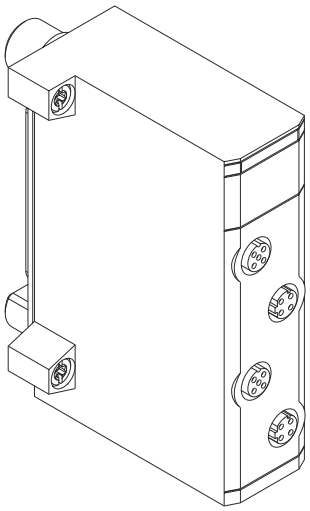
IN - Status display for EtherCAT input X2

Position	Status display	Status	Explanation
8	L/A	off	No connection on the incoming EtherCAT segment
		green illuminated	Preceding EtherCAT device connected
		flashing green	Communication with preceding EtherCAT device
9	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 *Pre-Operational* state
		single flash green	The EtherCAT State Machine of the module is in the *Safe-Operational* state
		green illuminated	The EtherCAT State Machine of the module is in the *Operational* state
		flickers green	Firmware is being loaded

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	200 mA

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

Supply voltage input	
Connection	1 x M12 socket, A-coded
Infeed voltage	24 V DC
Infeed current	max. 4 A
Current consumption from the input	10 mA + load

Supply voltage output and forwarding	
Connection	1 x M12 socket, A-coded
Output voltage	24 V DC from the supply voltage U_B
Output current	max. 4 A
Output current limitation	4.4 A typ.
Output power limitation	100 W typ.
Output current, forwarding	max. 4 A

Current and voltage measurement	
U_B measuring range (theoretical)	0 … 65 V
U_B measurement uncertainty	500 mV
Input current measuring range	-8 … 8 A
Input current measurement uncertainty	80 mA
Output current measuring range	0 … 6 A
Output current measurement uncertainty	80 mA

Housing data	
Width (slots)	1
Height (rows)	1
Dimensions W × H × D	50 mm × 110 mm × 104 mm 50 mm × 110 mm × 72 mm (housing only)
Material	Zinc die-cast and aluminum die-cast
Cooling	Convection
Weight	520 g
Installation position	Vertical. See system manual, chapter "Installation conditions".

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

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

4 Software functions

This chapter contains the descriptions of the software functions of the MS2204-0002-1112.

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

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

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

4.2 Supply voltage input

This software function is implemented by profile 5001.00905 “Power Input”, or PWI for short.

The "Power Input" profile enables monitoring of the input current and input voltage at a supply voltage input.

A complete description of this profile can be found in the software function manual: Link

5 Mechanical installation

Required tools

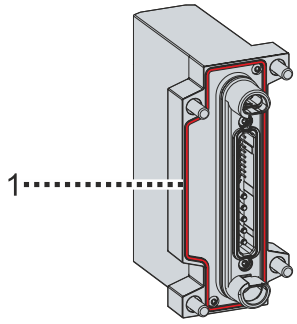
- Torx T25 screwdriver
- Torque wrench 5 Nm

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:

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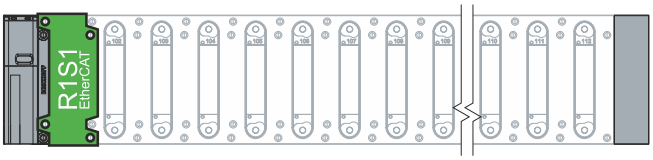

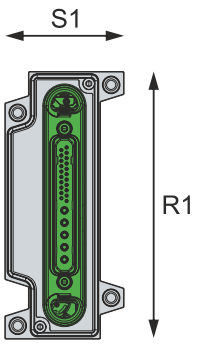

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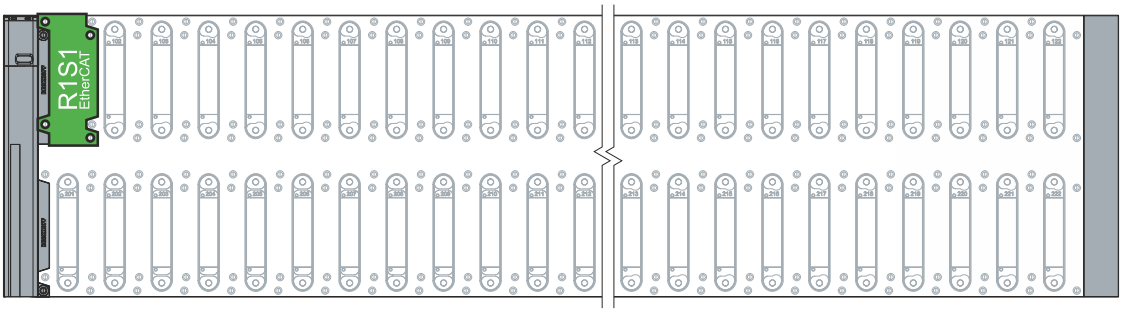

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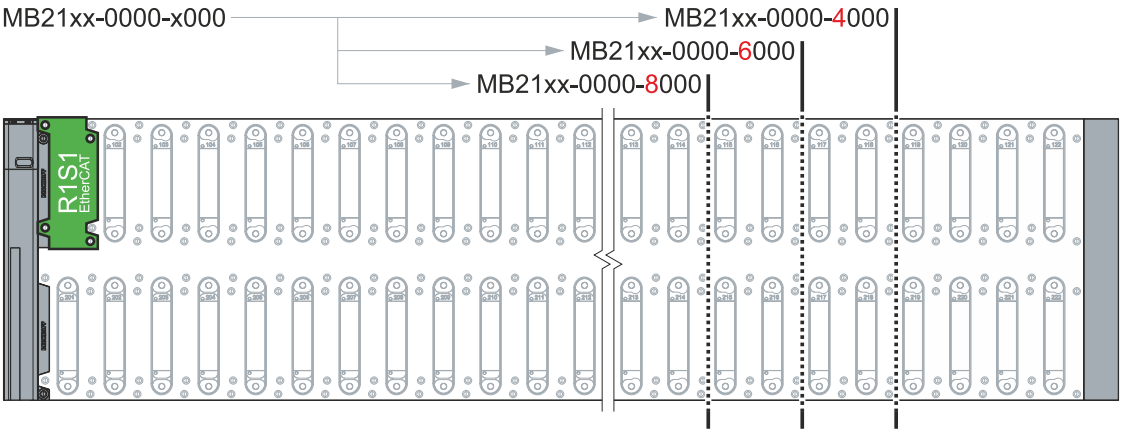

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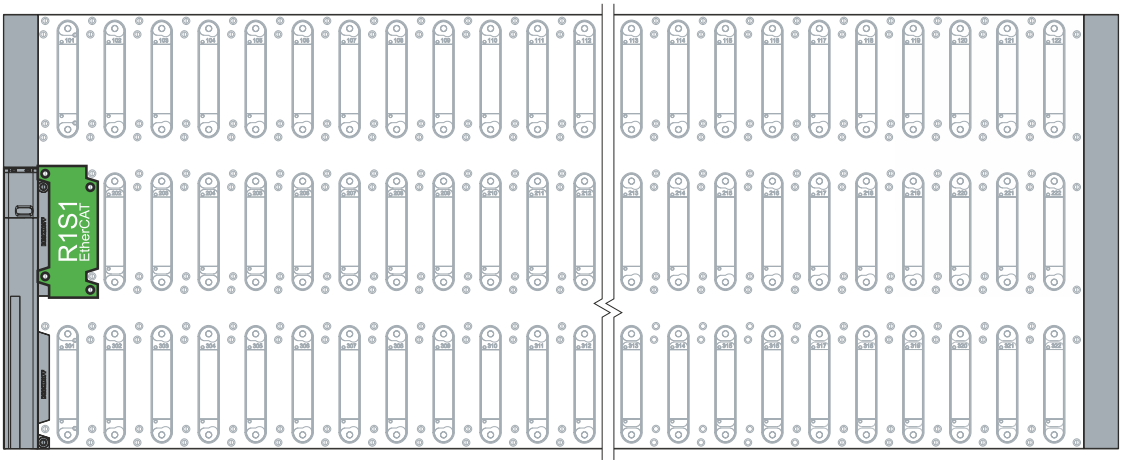


5.3 Mounting the module

⚠ 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.

Required tools

- Torque wrench, e.g. ZB8801 [+] Torque wrench for hexagonal plugs, adjustable 0.4...1.0 Nm

Connector

1. Lock the M12 connector
2. Observe tightening torques:

Components	Tightening torques [Nm]
M8 connector	0.6

Protective caps

NOTICE

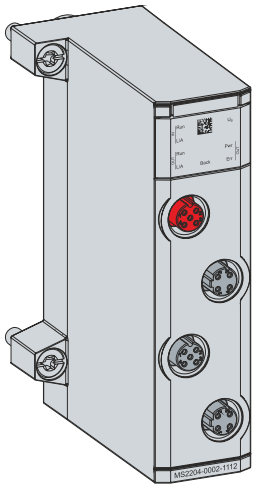
Defect due to unsealed connectors

The IP67 protection rating is only guaranteed if connectors are connected to all M12 connectors and unused M12 connectors are closed with protective caps.

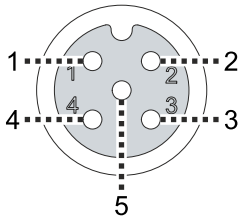
- Cover unused connectors with protective caps.

1. Close unused connectors with a protective cap

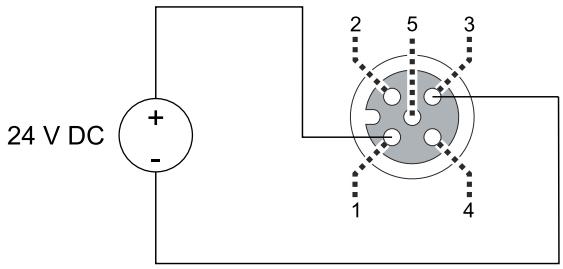
Supply voltage input X1



Pin assignment

M12 socket, A-coded	Pin	Signal	Function
	1	+24 V in	Input for the supply voltage U_B
	2	n.c.	--
	3	GND	Ground
	4	n.c.	--
	5	n.c.	--

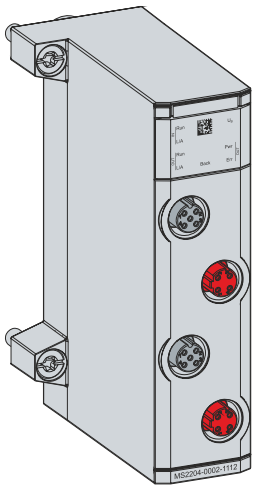
Connection diagram



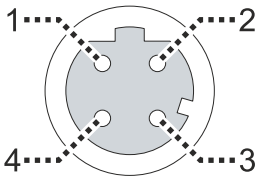
EtherCAT ports X2 and X4

NOTICE

Do not connect to telecommunication networks



Pin assignment

M12 connector, A-coded	Pin	Signal	Function
	1	Tx+	Tx+
	2	Rx+	Rx+
	3	Tx-	Tx-
	4	Rx-	Rx-

The cable shield is connected via the thread.

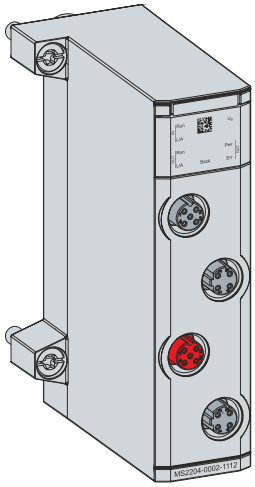
Supply voltage output X3

NOTICE

No overcurrent protection on pin 1

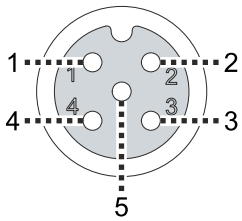
Exceeding the permissible output current can lead to material damage.

- Make sure that no more than 4 A is drawn from the forwarding output at pin 1.



The supply voltage output is a 5-pin A-coded M12 connector.

Pin assignment

M12 connector, A-coded	Pin	Signal	Function
	1	+24 V in	Forwarding the voltage applied to X1
	2	+24 V out	Output of the supply voltage UB
	3	GND	Ground
	4	GND	Ground
	5	n.c.	--

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. Further information can be found in 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

NOTICE

This device is not hot-swappable

Disassembling this device under voltage can lead to material damage.

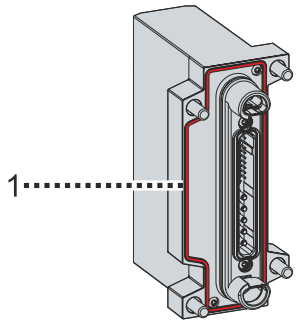
- Switch off the supply voltage before disassembling.

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 [▶ 32].

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
0.1	• First preliminary version

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

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

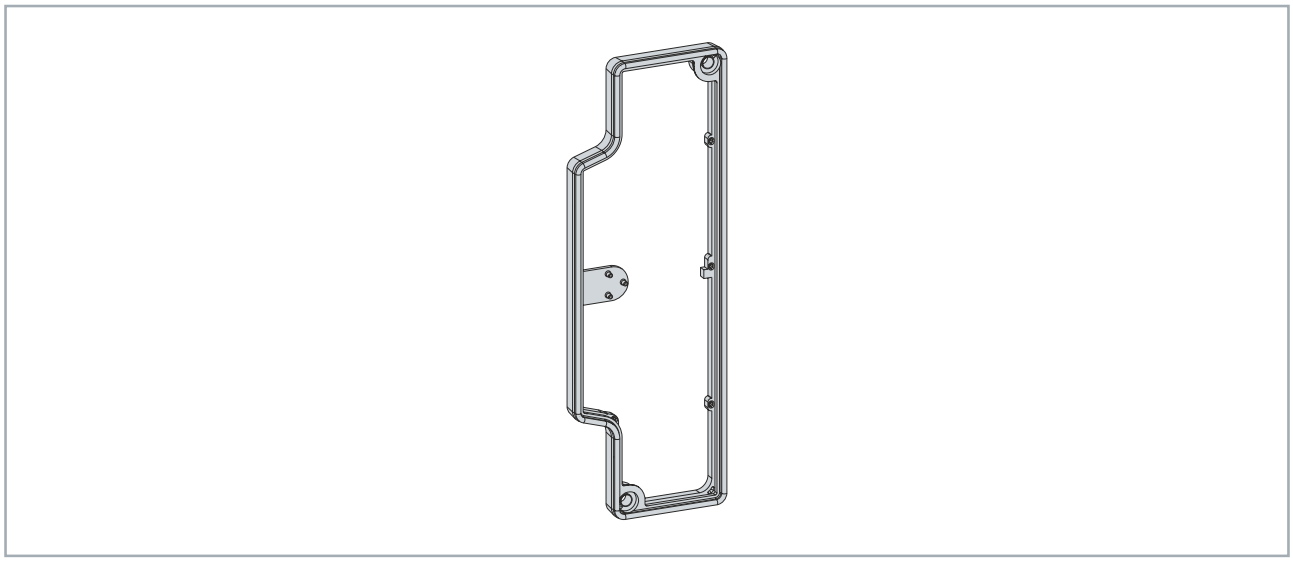
9.3 Accessories

Suitable accessories can be found on the product website:

https://www.beckhoff.com/ms2204-0002-1112

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.

Trademark statements

More Information:
www.beckhoff.com/ms2204-0002-1112

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