BECKHOFF New Automation Technology

Manual | EN

MS6020-1100-2240

Power supply, 24 V DC/20 A, 400/480 V AC

2025-11-11 | 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 module described in this documentation is designed to generate the supply voltage U_B = 24 V DC from the MX-System's internal three-phase AC voltage. It may only be operated if it is mounted on a baseplate in accordance with the installation instructions in this manual.

The housing must not be opened by the user. There are no user-serviceable parts inside the housing. The housing screws on the bottom of the module may only be loosened by Beckhoff Service.

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.

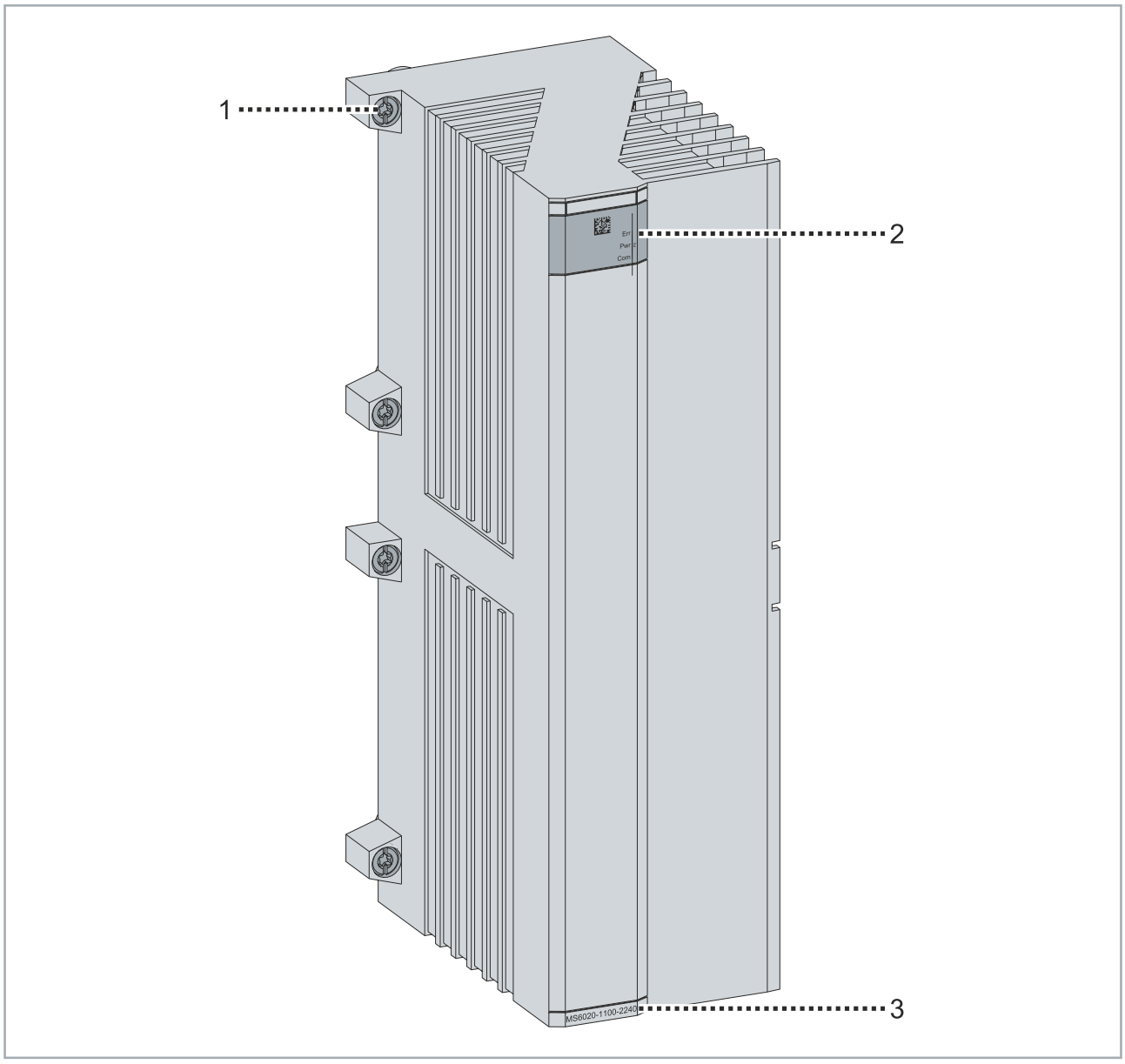
Improper use

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

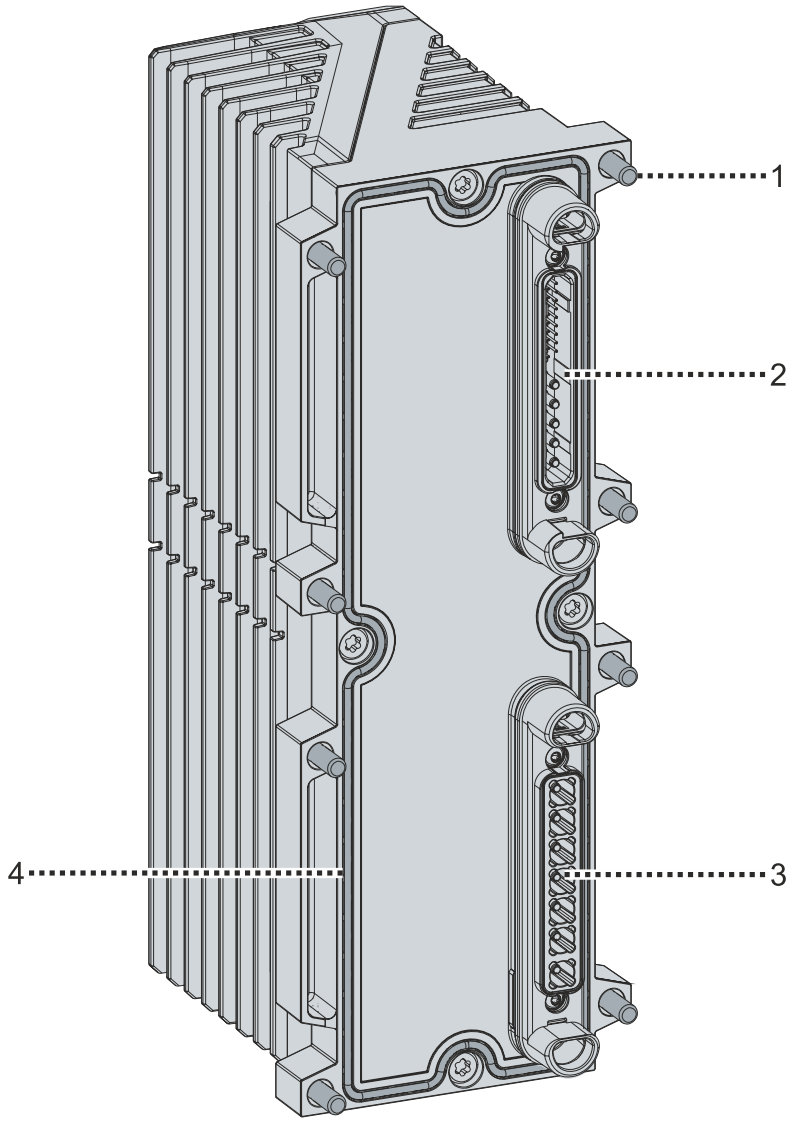
2 Product overview

The MS6xxx series system modules are available in different performance classes and allow power supplies to be used as stand-alone modules. The MS6020-1100-2240 power supply provides 24 V DC and up to 20 A for the system.

The internal power supply is fed with 400...480 V AC from the baseplate on the primary side. Other modules on the same baseplate can use the 24 V DC internally across all data slots or forward it to any external 24 V devices as required.



Position	Name
1	Fastening screw, captive, 8 x
2	Status display
3	Module name



Position	Name
1	Fastening screw, captive, 8 x
2	Data connector
3	Power connector
4	Seal

2.1 Product functions

2.1.1 Power supply 24 V DC

The power supply generates a regulated output voltage of 24 V_{DC} and makes it available on the baseplate as the supply voltage U_B for other MX-System modules.

The power supply is protected against overload. An automatic overvoltage shutdown switches off the power supply if the output voltage becomes too high due to an internal error.

2.1.2 Parallel use

NOTICE

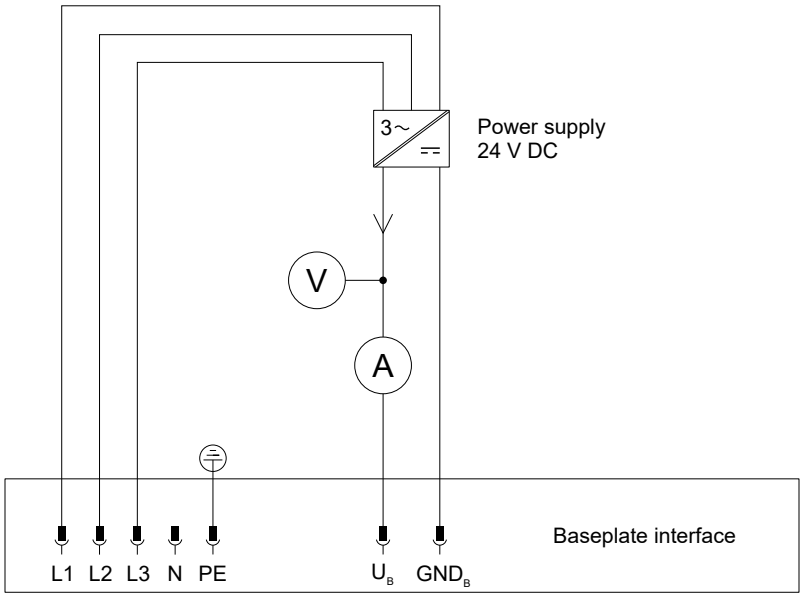
Risk of overcurrent

Risk of defect.

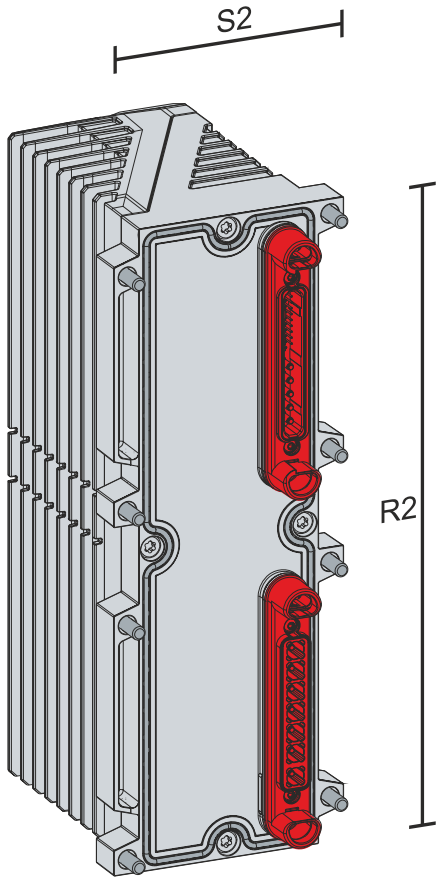
- Ensure that the current carrying capacity of the baseplate is not exceeded.

You can operate two MS6020-1100-2240 units in parallel to increase the rated output current.

2.2 Block diagram



2.3 Baseplate interface

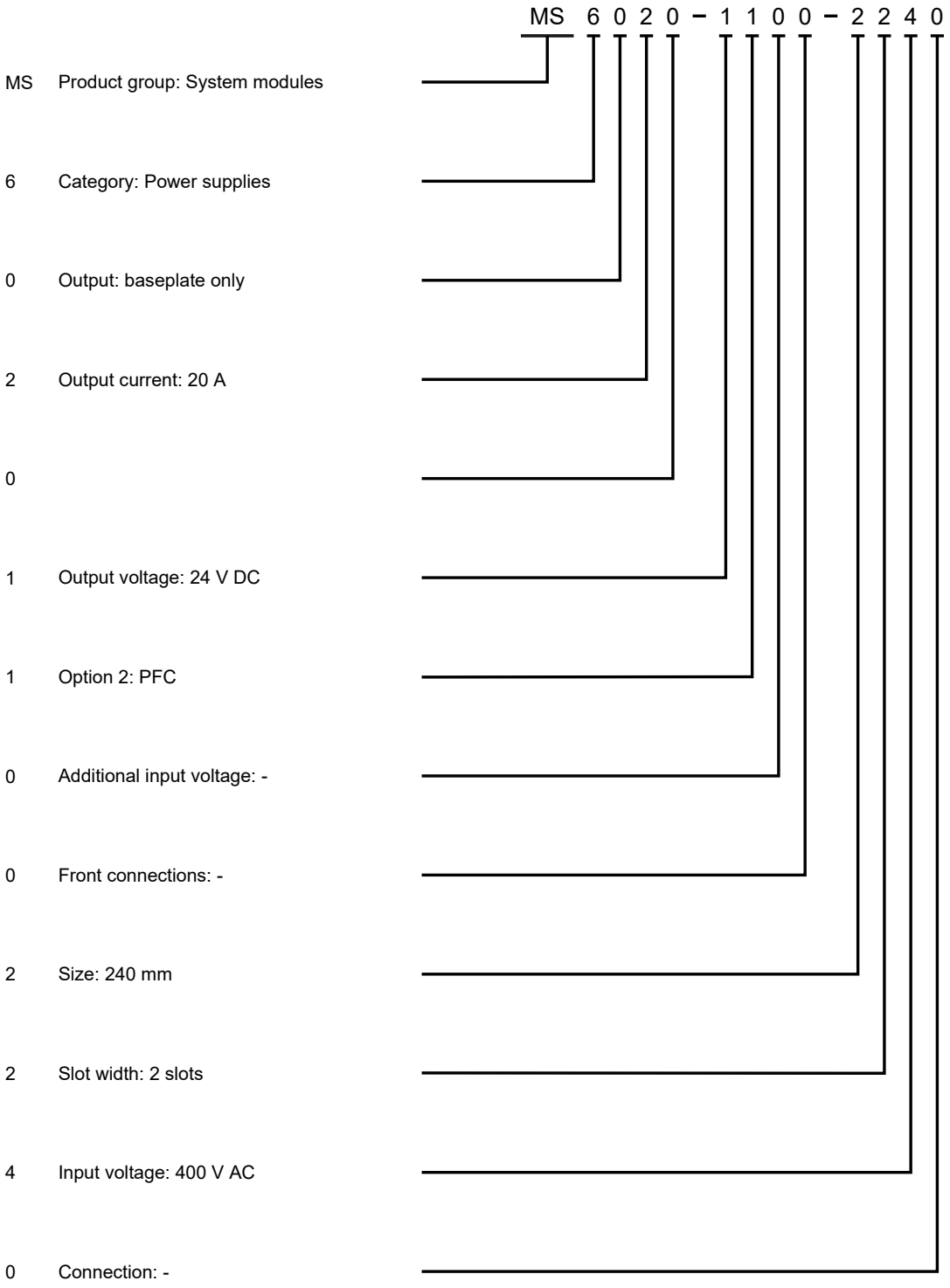


The module requires one data slot and one power slot in two rows **R2**. Due to the design, two data slots **S2** and two power slots **S2** of a baseplate are required next to each other:

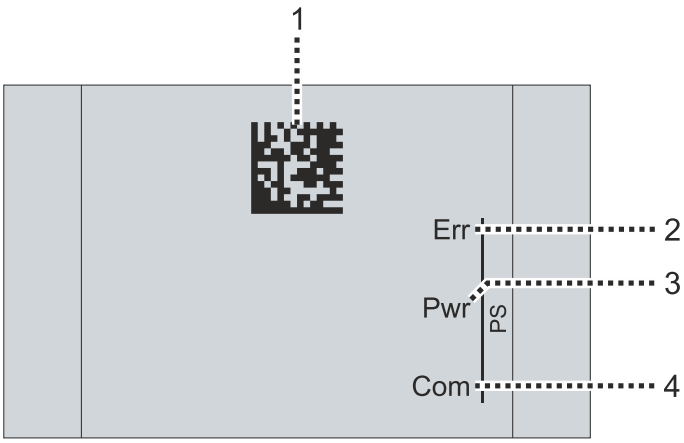
Slots required in	1-row baseplates	2-row baseplates	3-row baseplates
Row 1	—	2	—
Row 2	—	2*	2
Row 3	—	—	2

* The 2-row baseplates *MB21xx-0000-4000*, *MB21xx-0000-6000* and *MB21xx-0000-8000* have data slots and power slots in row 2. The module must be mounted in a power slot.

2.4 Type key


MS 6 0 2 0 – 1 1 0 0 – 2 2 4 0
MS Product group: System modules
6 Category: Power supplies
0 Output: baseplate only
2 Output current: 20 A
0
1 Output voltage: 24 V DC
1 Option 2: PFC
0 Additional input voltage: -
0 Front connections: -
2 Size: 240 mm
2 Slot width: 2 slots
4 Input voltage: 400 V AC
0 Connection: -

2.5 Status display

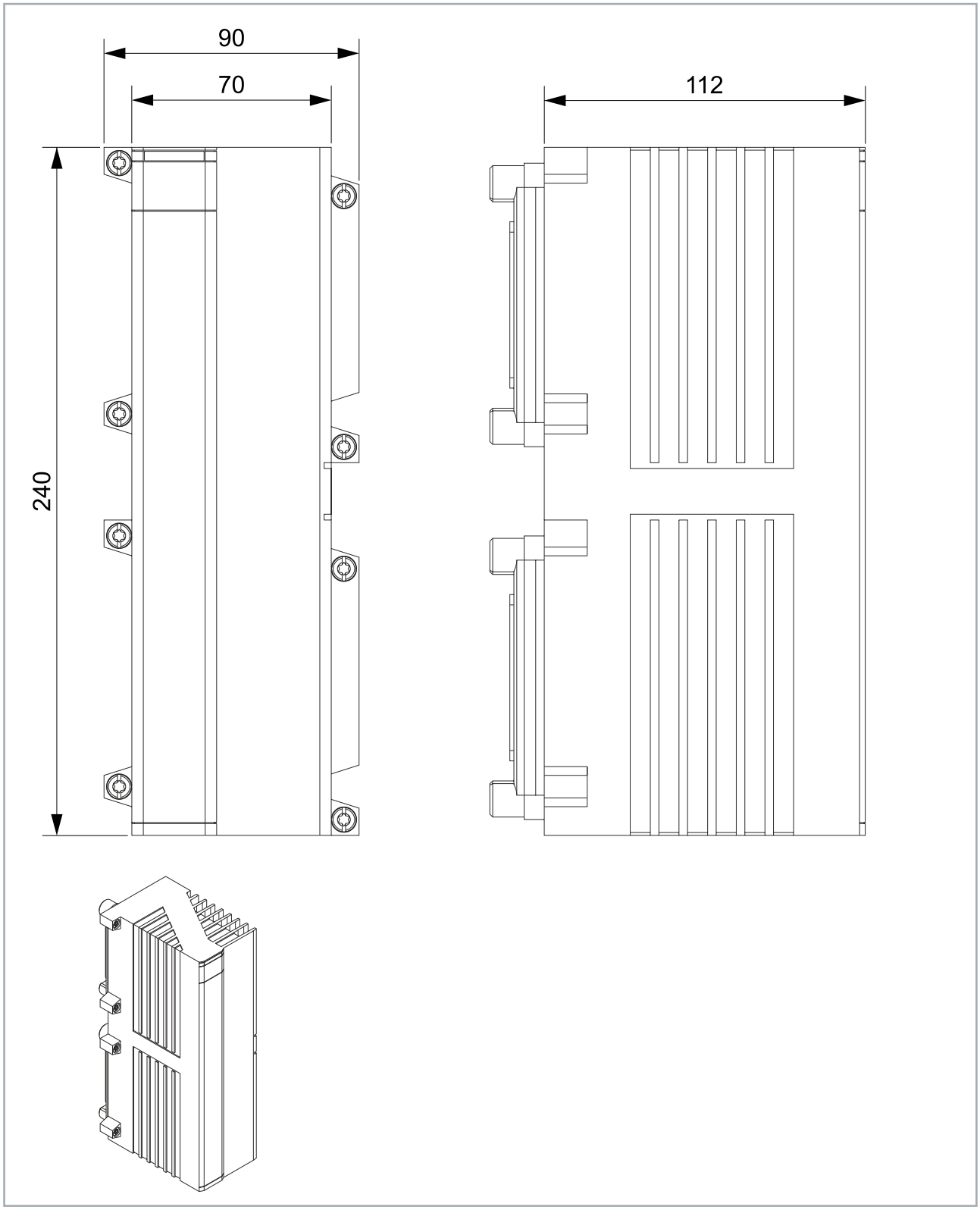


PS - Status display for the power supply

Position	Status display	Status	Explanation
1	-	-	Beckhoff Identification Code as DataMatrix code
2	Err	off	No error exists
		red illuminated	Error collection LED
3	Pwr	off	No 24 V DC output voltage available
		green illuminated	24 V DC output voltage available.
4	Com	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 • 1 power connector
Hot Swap	No
Current consumption 3.3 V	10 mA
EtherCAT	Without distributed clocks

Power supply	
Input voltage V_{In}	3~ 400-500 V AC (-15 % … +10 %)
Input frequency f_{In}	50-60 Hz (±10 %)
Current consumption I_{In}	0.8 A per phase at V_{In} = 400 V AC: 0.7 A per phase at V_{In} = 480 V AC
Power factor λ	0.94
Switch-on energy	1 mC at V_{In} = 400 V AC: 1.2 mC at V_{In} = 480 V AC
Output voltage V_{OUT}	24 V DC in the factory setting adjustable up to 28 V DC
Overvoltage limitation	33 V DC Max. 36 V DC
Output current I_{OUT}	20 A at V_{Out} = 24 V DC 7.14 A at V_{Out} = 28 V DC
Short-circuit current	27 A
Output capacitance	5100 µF
Output type	PELV
Parallel use	permissible, max. 2 modules
Output decoupling for redundancy	no
Feeding back into the output	permissible
Efficiency	95.1 % at V_{In} = 400 V AC 94.8 % at V_{In} = 480 V AC
Power loss	23.3 W at V_{In} = 400 V AC, V_{Out} = 24 V DC, I_{OUT} = 20 A 24.3 W at V_{In} = 480 V AC, V_{Out} = 24 V DC, I_{OUT} = 20 A

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

Device safety	
Separation between main and control circuits	Double or reinforced electrical isolation
Protection class	I

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)	2
Height (rows)	2
Dimensions W × H × D	90 mm × 240 mm × 112 mm
Material	Zinc die-cast and aluminum die-cast
Cooling	Convection
Weight	-
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 Power supply

This software function enables configuration, control and diagnosis of the power supply integrated in the module.
It is implemented by the EtherCAT profile 5001.00911 "Power Supply", or "PSU" for short.

► Full description of this software function in the Beckhoff Information System: Link

4.1.1 Process Data Objects (PDO)

The process data objects are disabled on delivery. You can enable them via the Predefined PDO Assignments.

PSU Inputs

Variable	Data type	Description
Warning	BOOL	Warning message
Error	BOOL	Error message. The output voltage has been switched off.
I2T Warning	BOOL	The I²T warning threshold (0x8000:11) was exceeded.
DC OK	BOOL	The output voltage is within the permissible range.
Overrange	BOOL	One of the measured values is outside the measurable range.
Input Cycle Counter	BIT2	A 2-bit counter that is incremented each time the input data in the process image is updated.
Output Voltage	REAL32	The present output voltage in V.
Output Current	REAL32	The present output current in A.
I2T Utilization	UINT8	The current I²T utilization.
Info Data 1	UINT16	Additional information. The content of these variables can be selected in parameter 8001:19.
Info Data 2	UINT16	Additional information. The content of these variables can be selected in parameter 8001:21.

PSU Outputs

Variable	Data type	Description
Disable Output	BOOL	Disables the output.
Reset	BOOL	Resets an error message and switches the output voltage back on.

5 Mechanical installation

Required tools

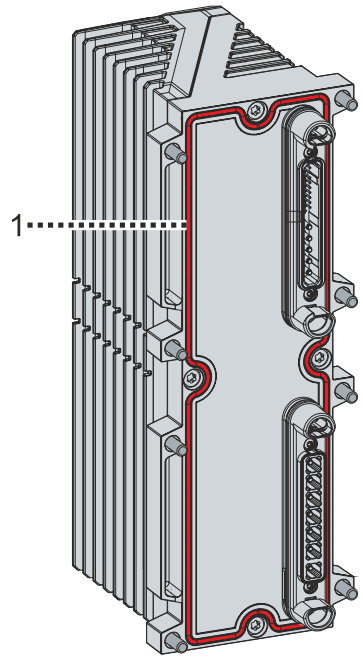
- Torx T25 screwdriver
- Torque wrench 5 Nm

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.

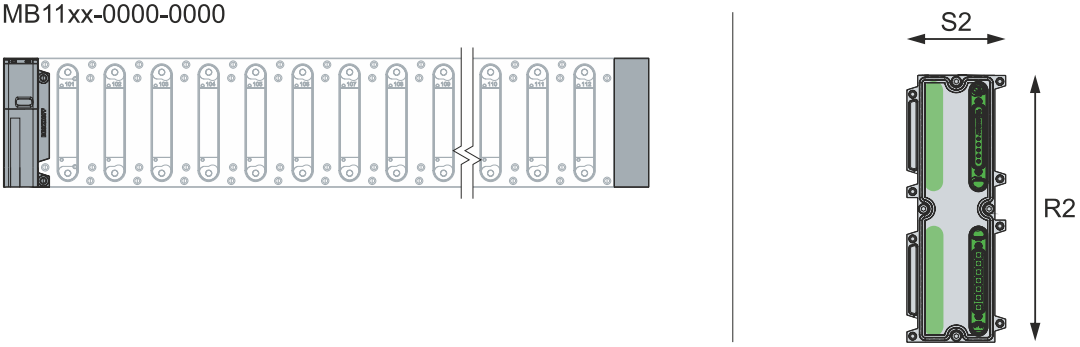


1. Check the seal [1] of the module for wear and damage
2. Replace worn and damaged seals

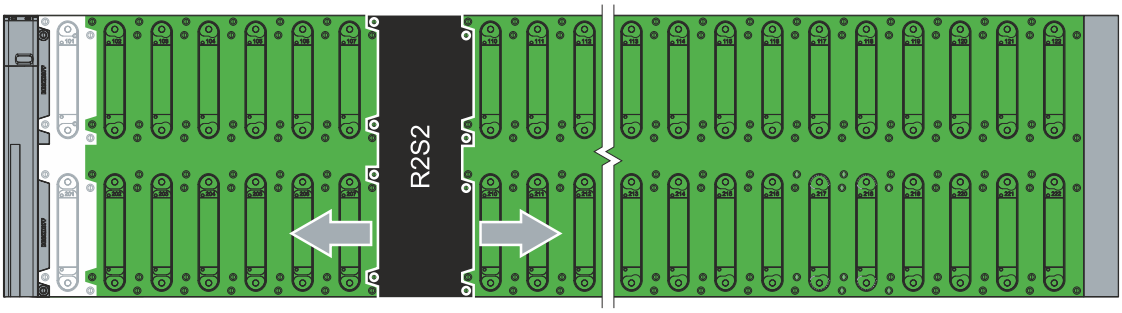
5.2 Placement of the module on the baseplate

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

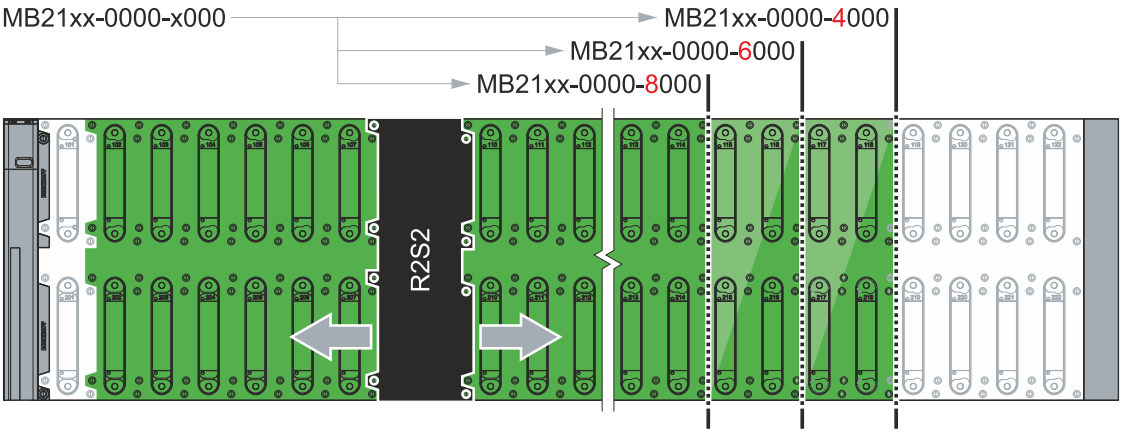
MB11xx-0000-0000



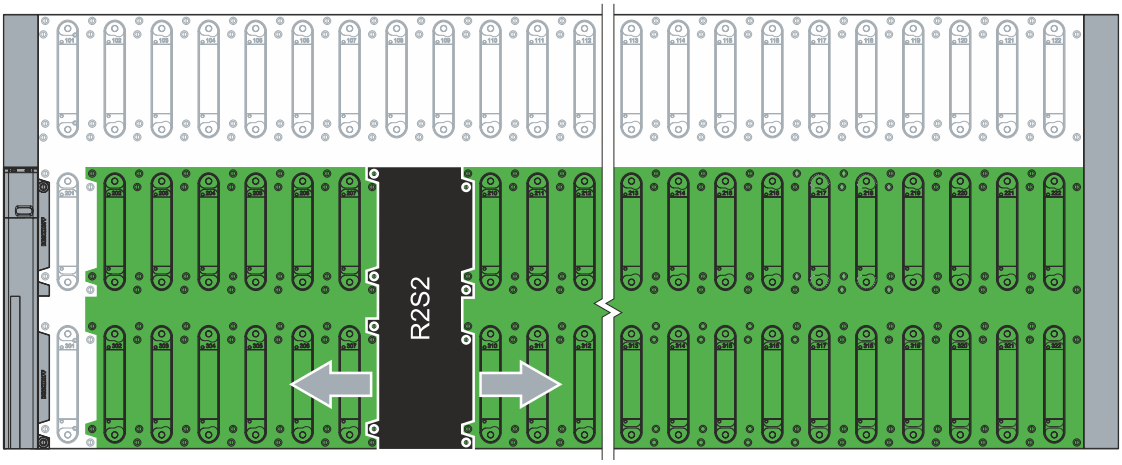
MB21xx-0000-0000



MB21xx-0000-x000



MB31xx-0000-0000



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

The module has no connections on the front.

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 [▶ 16].

7.1 Requirements

- Components show no signs of damage
- Screw connections of the components are correctly tightened

7.2 Commissioning

NOTICE

The supply voltage activates the power supply

As soon as the external supply voltage is applied, the power supply is automatically active and outputs UB = 48 V DC to the baseplate. This behavior cannot be set.

- 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

⚠ CAUTION

Danger to life due to exposed contacts with dangerous voltages

After disassembling the module, the contacts of the power connectors in the baseplate are exposed. Touching the contacts can lead to death or injury from electric shock.

- Shutdown the input voltage before disassembly.

NOTICE

This device is not hot-swappable

Disassembling this device under voltage can lead to material damage.

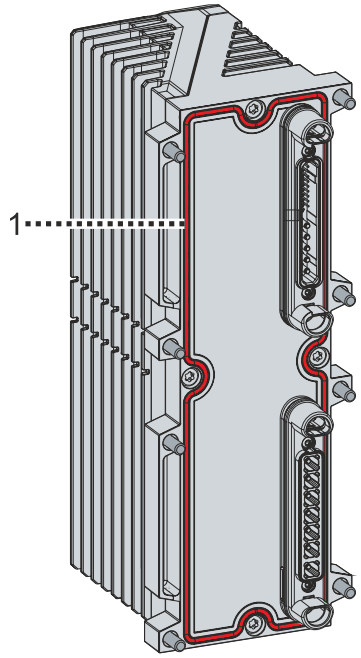
- Switch off the supply voltage before disassembling.

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

Further information on this can be found in the chapter Technical data [▶ 16] 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 [▶ 28].

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

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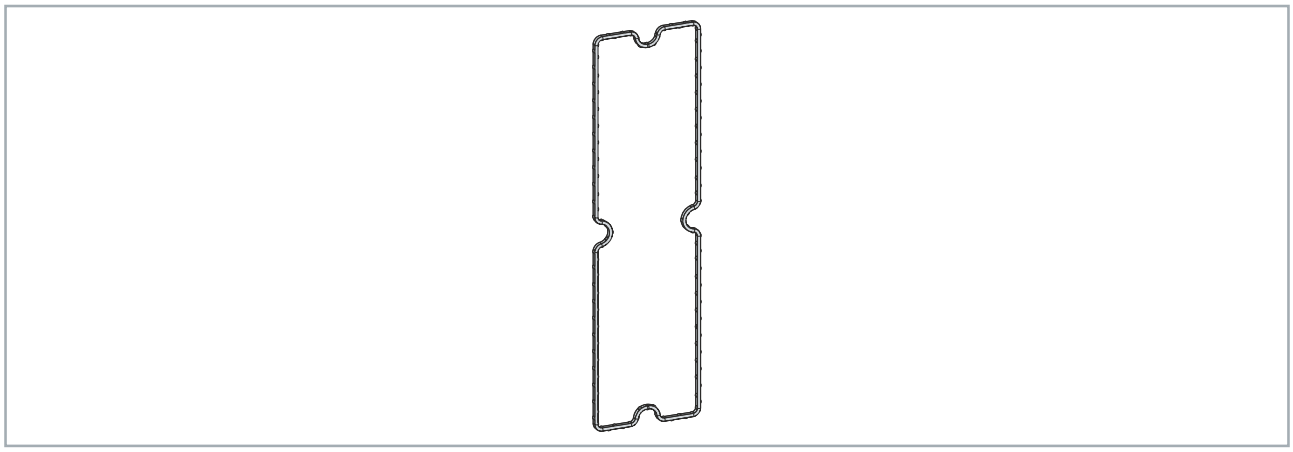
9.3 Accessories

Suitable accessories can be found on the product website:

https://www.beckhoff.com/ms6020-1100-2240

The following items are also available for replacing worn parts:

MX seal S2R2



The S2R2 seal is available to replace worn and damaged seals on a 2-row MX module with two slots.

Trademark statements

More Information:
www.beckhoff.com/ms6020-1100-2240

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