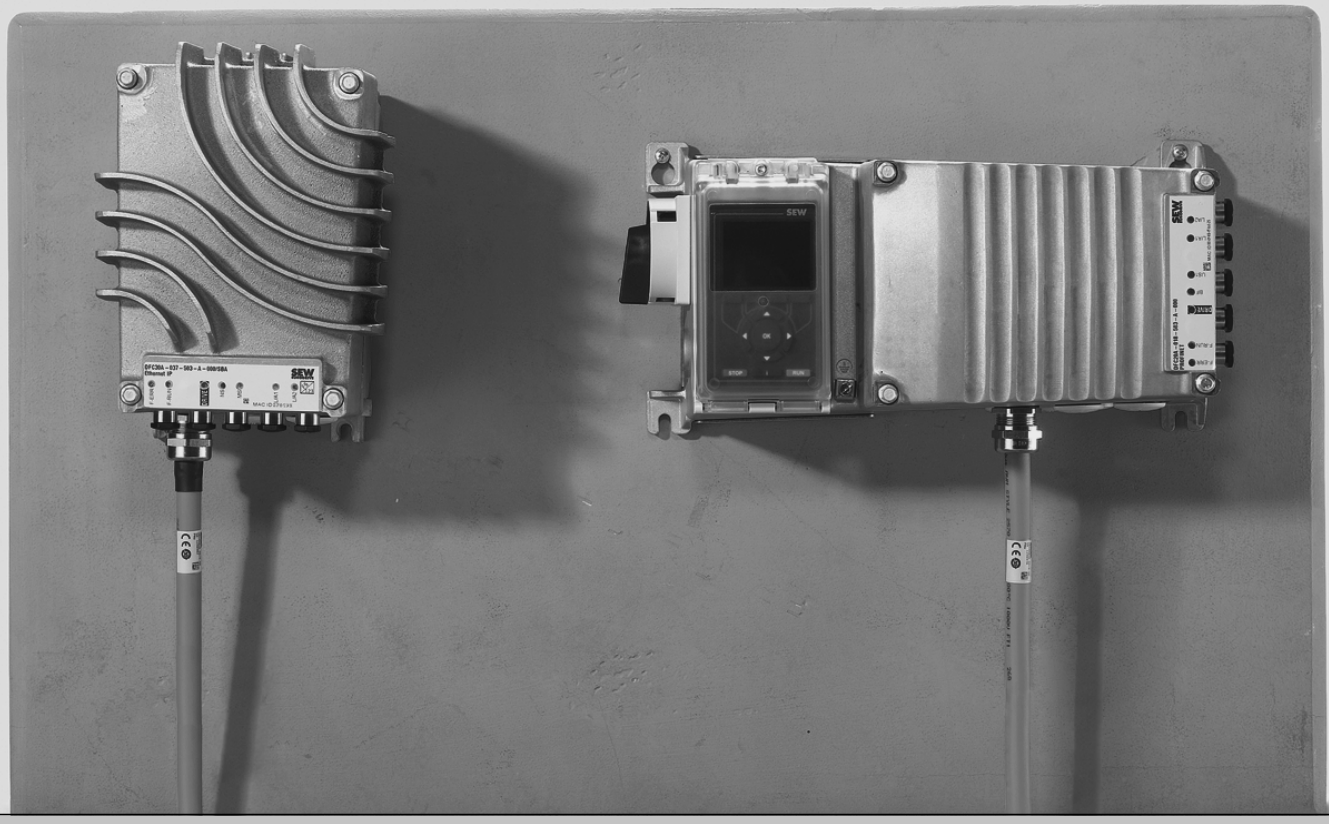
SEW EURODRIVE

Revision



Decentralized Inverters

MOVIMOT® flexible

MMF…/DBC, MMF…/DAC, MMF…/DFC, MMF…/DSI

Edition 10/2020

26855488/EN

Table of contents

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1 Revision

1.1 Description

INFORMATION

Corrections have been made for MOVIMOT® flexible that are described in this addendum. This document does not replace the detailed operating instructions.

Observe the following revised/added chapters:

- "General information" >
  - "Product names and trademarks" > "Trademark of Beckhoff Automation GmbH"
- "Safety notes" >
  - "Network security and access protection"
- "Device structure" >
  - "Example nameplate and type designation" > "Nameplate"
  - "Example nameplate and type designation" > "Type designation"
  - "Example of the optional nameplate "Plug connector positions""
- "Electrical installation" >
  - "Installation instructions" > "UL-compliant installation"
  - "Plug connectors" >
    "Plug connector positions connection box"
    "Using plug connectors assembled by yourself"
  - "Assignment of optional plug connectors" >
    "X1523: DC 24 V backup voltage, input"
    "X4142: Engineering interface"
    "X1207: AC 400 V connection (IN)"
  - "PC connection" >
    "Connection via interface adapter USM21A"
    "Connection via CBG21A or CBG11A keypad"
    "Adapter cable for connection to the engineering interface X4141"
- "Operation" >
  - "Load disconnector /R01 at the inverter output of MMF3../DAC"
  - "Load disconnector /R01 at the inverter output of MMF3../DFC, MMF3../DSI"
- "Service" >
  - "Description of status and operating indicators" (for MMF..-DSI only)
- "Technical data and dimension sheets" >
  - "Dimension drawings of plug connectors of the connection box"
- "Functional safety" >
  - "General information" > "Information"
  - "Safety-related conditions" > "Requirements on the installation"
  - "Connection variants" > "Connection via terminal X9"
  - "Connection variants" > "Connection via M12 plug connector X5504/X5505"

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1.2 Affected documents

This revision applies to the following documents:

- Operating instructions "Decentralized Inverters MOVIMOT® flexible MMF1..-C/DBC.., MMF3..-C/DBC.. (Binary)"
- Operating instructions "Decentralized Inverters MOVIMOT® flexible MMF1..-C/DAC.., MMF3..-C/DAC.. (AS-Interface)"
- Operating instructions "Decentralized Inverters MOVIMOT® flexible MMF1..-C/DFC.., MMF3..-C/DFC.. (PROFINET IO, EtherNet/IP™, Modbus TCP)"
- Operating instructions "Decentralized Inverters MOVIMOT® flexible MMF1..-C/DSI.., MMF3..-C/DSI.. (EtherCAT®/SBus^{PLUS})"

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2 General information

Only applies to decentralized inverters MMF1..-C/DSI.., MMF3..-C/DSI..

2.1 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

2.1.1 Trademark of Beckhoff Automation GmbH

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

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3 Safety notes

3.1 Network security and access protection

A bus system makes it possible to adapt electronic drive technology components to the particulars of the machinery within wide limits. There is a risk that a change of parameters that cannot be detected externally may result in unexpected but not uncontrolled system behavior and may have a negative impact on operational safety, system availability, or data security.

Ensure that unauthorized access is prevented, especially with respect to Ethernet-based networked systems and engineering interfaces.

Use IT-specific safety standards to increase access protection to the ports. For a port overview, refer to the respective technical data of the device in use.

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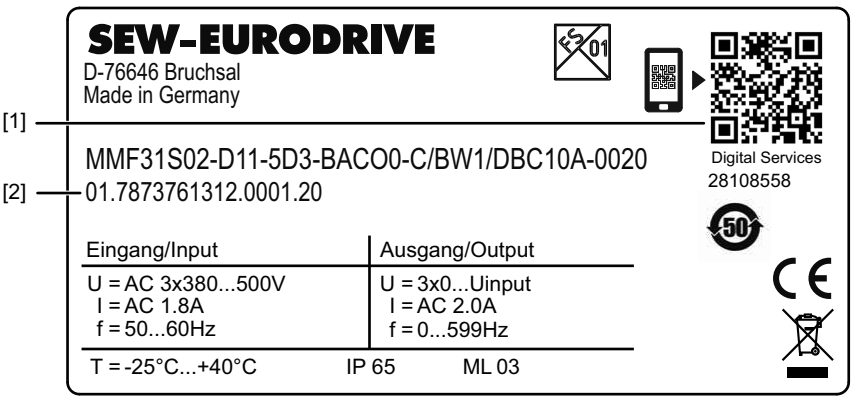
4 Device structure

4.1 Example nameplate and type designation

4.1.1 Nameplate

The following figure gives an example of a nameplate of the device. For the structure of the type designation, refer to chapter "Type designation".



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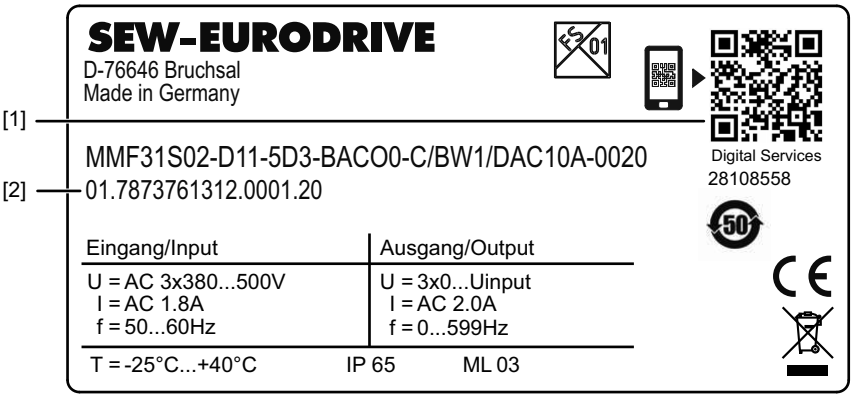
[1] 

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents and further services.

[2] Unique serial number

4.1.2 Nameplate

The following figure gives an example of a nameplate of the device. For the structure of the type designation, refer to chapter "Type designation".



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[1] 

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents and further services.

[2] Unique serial number

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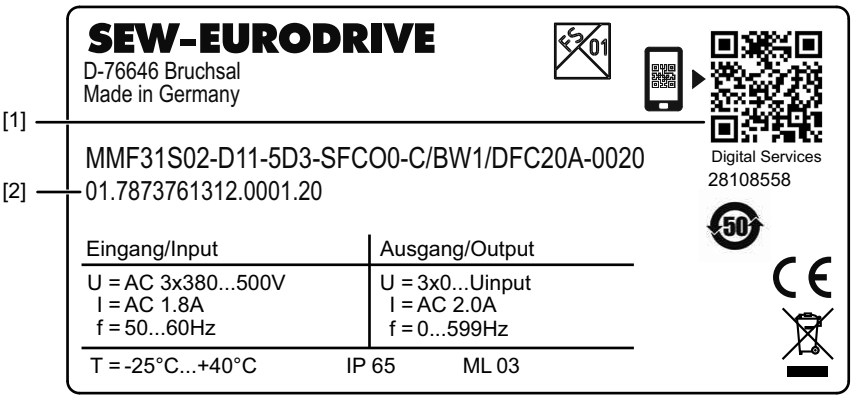
4.1.3 Nameplate

The following figure gives an example of a nameplate of the device. For the structure of the type designation, refer to chapter "Type designation".



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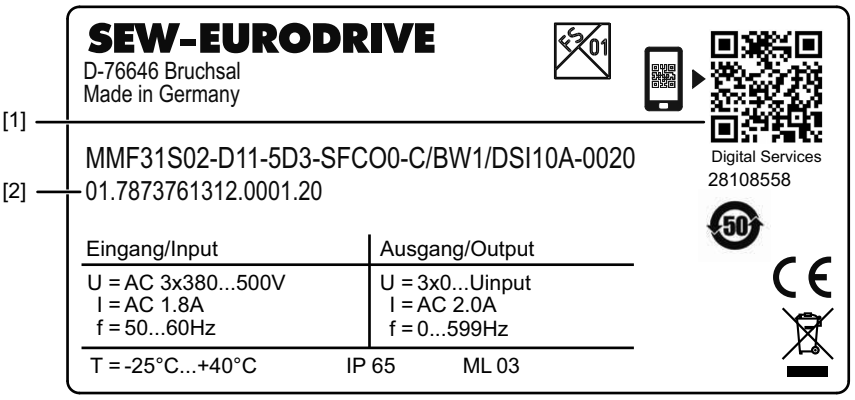
[1] 

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents and further services.

[2] Unique serial number

4.1.4 Nameplate

The following figure gives an example of a nameplate of the device. For the structure of the type designation, refer to chapter "Type designation".



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[1] 

Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents and further services.

[2] Unique serial number

4.1.5 Type designation

The following table shows the type designation of MOVIMOT® flexible **MMF31S02-D11-5D3-SFCO0-C/DSP/DSI10A-0020** as an example:

MMF	**Product family** MMF = MOVIMOT® flexible
3	**Variant** 1 = Device variant 1 3 = Device variant 3
1	**Flange dimensions for relevant electronics cover size** 1 = Suitable for electronics cover size 1 with or without cooling fins
S0	**Mechanics design** S0 = Housing with metric threads for cable entry
2	**Front module** 0 = Closed 1 = Engineering interface M12[1)] 2 = Prepared for CBG keypad[1)] 3 = Prepared for CBG local keypad[1)]
–	
D11	**Maintenance switch** 000 = Without switching element D11 = Load disconnector with feedback contact[1)] M11 = Load disconnector with feedback contact and line protection[1)] R01 = Load disconnector at the inverter output with contact signal for output stage inhibit[1)]
–	
5	**Connection voltage** 5 = AC 500 V
D	**Power section variant EMC** D = EMC filter with limit value category C3 (EN 61800-3)
3	**Connection type** 3 = 3-phase
–	
SF	**Connection unit** SF = System bus or fieldbus connection unit
CO	**Digital interface (MOVILINK® DDI)** DI = Integrated MOVILINK® DDI slave (for motors without digital interface) CO = MOVILINK® DDI interface via coaxial cable (for motors with digital interface)
0	**Board design** 0 = Standard connection board
–	

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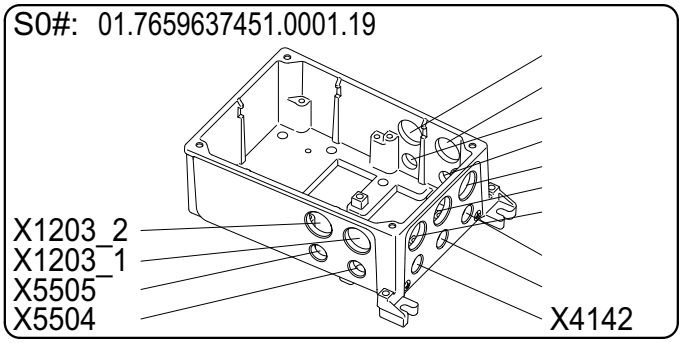
C	**Version** C = Generation C
/	
BW1	**Options** DSP = DynaStop® electrodynamic retarding function[2)] BES = Control module BES brake rectifier 24 V[3)] IV = Plug connector PE = Pressure compensation fitting for electronics BW1 = Integrated BG1 braking resistor ODI = Additional digital inputs
/	
DSI10A	**Electronics cover design** **D**irect **S**ystem Bus **I**nstallation: • DSI10A = EtherCAT®/SBus^{PLUS} (communication via M12) • DSI11A = EtherCAT®/SBus^{PLUS} (communication via MINI IO) • DSI12A = EtherCAT®/SBus^{PLUS} (communication via MINI IO), without digital inputs/outputs
–	
0020	**Nominal output current of the electronics cover** 0020 = 2.0 A 0025 = 2.5 A 0032 = 3.2 A 0040 = 4.0 A 0055 = 5.5 A

1) Only available in combination with MOVIMOT® flexible MMF3.
2) Not available in combination with BES option.
3) Not available in combination with DSP option.

4.2 Example of the optional nameplate "Plug connector positions"

4.2.1 Design MMF1.

The following figure shows an example of the optional nameplate "Plug connector positions":



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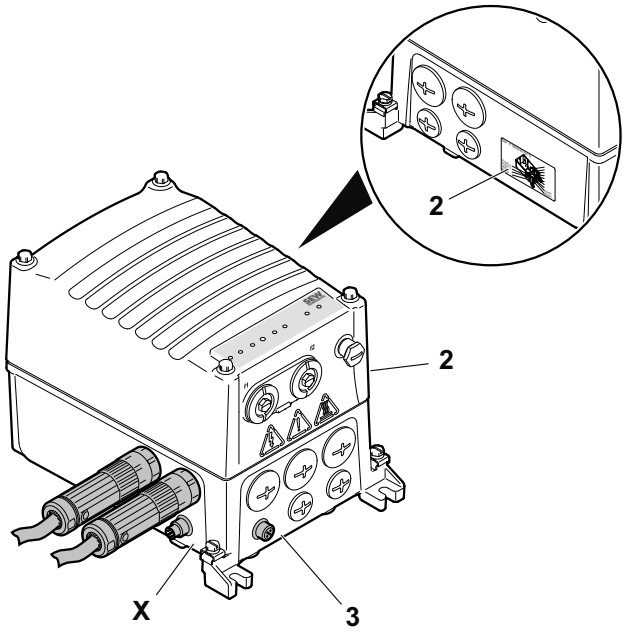
The nameplate shows the designations and positions of the plug connectors at the connection box. This nameplate can be installed in position 2.



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5 Electrical installation

5.1 Installation instructions

5.1.1 UL-compliant installation

INFORMATION

Due to UL requirements, the following chapters are always printed in English independent of the language of the publication:

Observe the following notes for UL-compliant installation:

The devices are for use only in industrial machinery NFPA 79 applications.

Field Wiring Power Terminals

- Use 60/75 °C copper wire only.
- Tighten terminals to 17.7 – 21.24 in-lbs (screw connect terminals only).

Short Circuit Current Rating

Suitable for use on a circuit capable of delivering not more than 65,000 rms symmetrical amperes when protected by 600 V maximum non-semiconductor fuses (Class CA, CB, CD, CF, G, J, K-1, K-5, RK1, RK5, T) or when protected by 500 V maximum inverse time circuit breakers having an interrupting rating not less than 65 kA rms symmetrical amperes.

Suitable for motor group installation on a circuit capable of delivering not more than 65,000 rms symmetrical amperes when protected by 600 V maximum non-semiconductor fuses (Class CA, CB, CD, CF, G, J, K-1, K-5, RK1, RK5, T) or when protected by 500 V maximum inverse time circuit breakers having an interrupting rating not less than 65 kA rms symmetrical amperes.

The max. voltage is limited to 500 V.

Branch Circuit Protection

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

For maximum branch circuit protection see table below.

SCCR: 65 kA /500 V when protected by	
Non-semiconductor fuses (currents are maximum values)	Inverse time circuit breakers (currents are maximum values)
40 A max./600 V	40 A max./500 V min.

Motor Overload Protection

The devices are provided with load and speed-sensitive overload protection and thermal memory retention upon shutdown or power loss.

The trip current is adjusted to 150% of the rated motor current.

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Surrounding Air Temperature Rating

The devices are suitable for an ambient temperature of 40 °C, max. 60 °C with de-rated output current. To determine the output current rating at temperatures above 40 °C, the output current should be de-rated by 3 % per K between 40 °C and 60 °C.

Wiring Diagrams

For wiring diagrams, refer to chapter "Electrical Installation".

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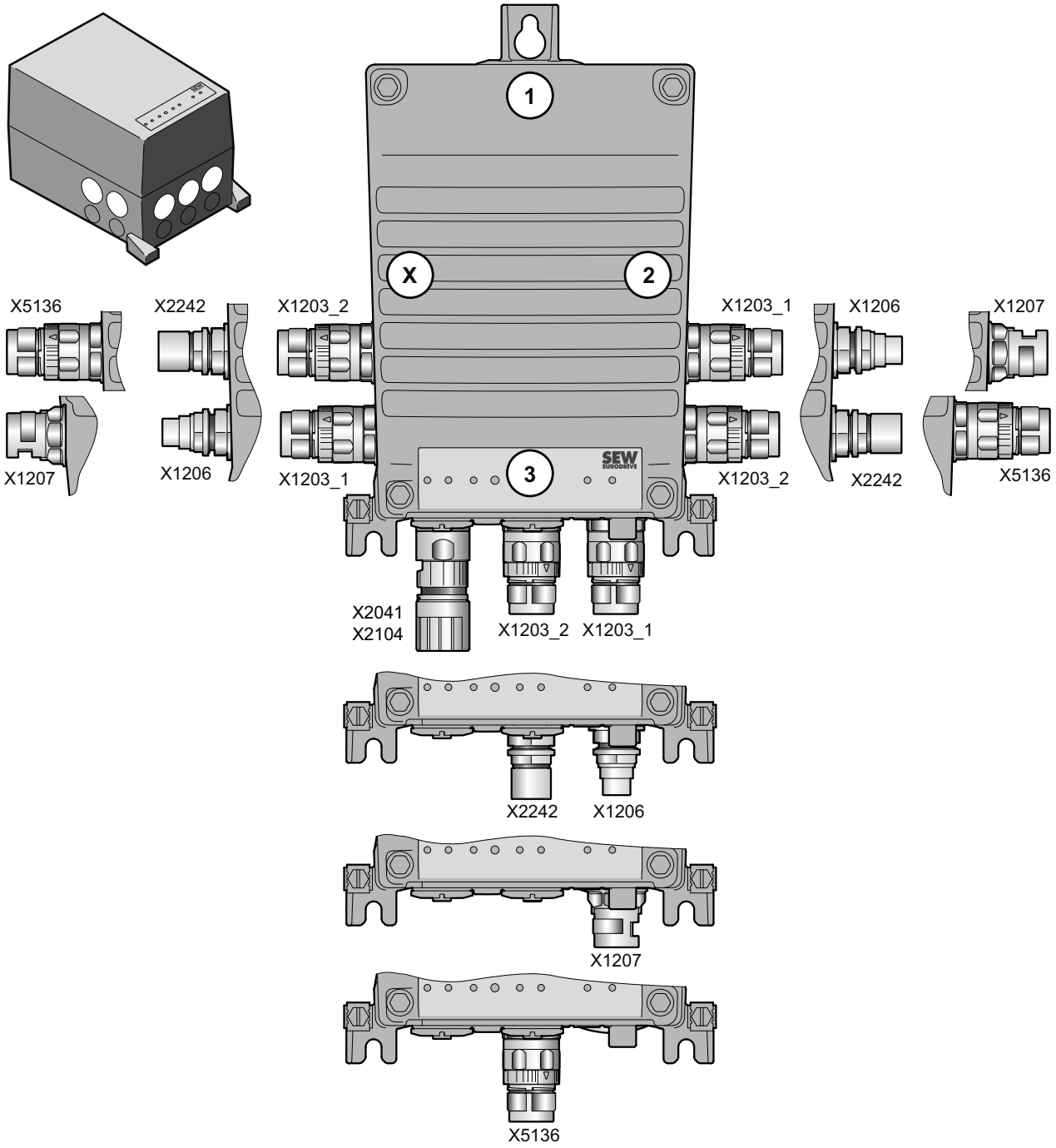
5.2 Plug connectors

5.2.1 Plug connector positions connection box

Design MMF1../DBC..

Cable entries M25

The following figure depicts the possible plug connector positions for the M25 cable entries:



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Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X1203_1	Black	AC 400 V connection[1)]	X, 2 or 3	• X1206 • X1207
X1203_2	Black	AC 400 V connection	X, 2 or 3	• X2242 • X5136
X1206	–	AC 400 V connection (IN)[2)]	X, 2 or 3	• X1203_1 • X1207
X2242	–	AC 400 V connection (OUT)	X, 2 or 3	• X1203_2 • X5136
X1207	Black	AC 400 V connection	X, 2 or 3	• X1203_1 • X1206
X5136	–	Digital inputs/outputs	X, 2 or 3	• X1203_2 • X2242
X2041	Brown	Connection for motors without digital interface	3	• X2104
X2104	None	Connection for motors with digital interface (MOVILINK® DDI)	3	• X2041

1) Plug connector X1203_1 can also be ordered separately (i.e. without plug connector X1203_2).

2) Plug connector X1206 can also be ordered separately (i.e. without plug connector X2242).

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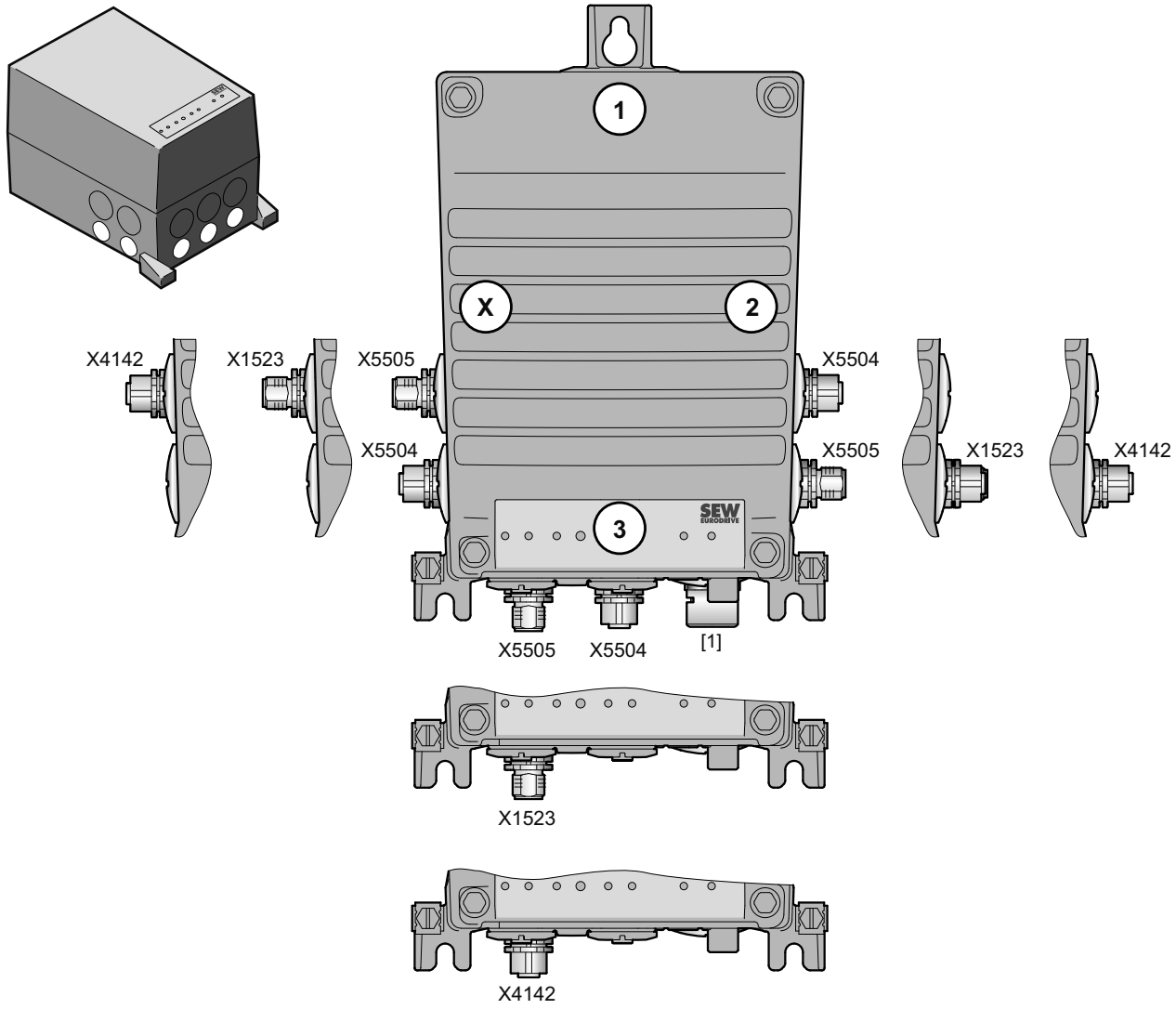
Cable entries M16

The following figure depicts the possible plug connector positions for the M16 cable entries:



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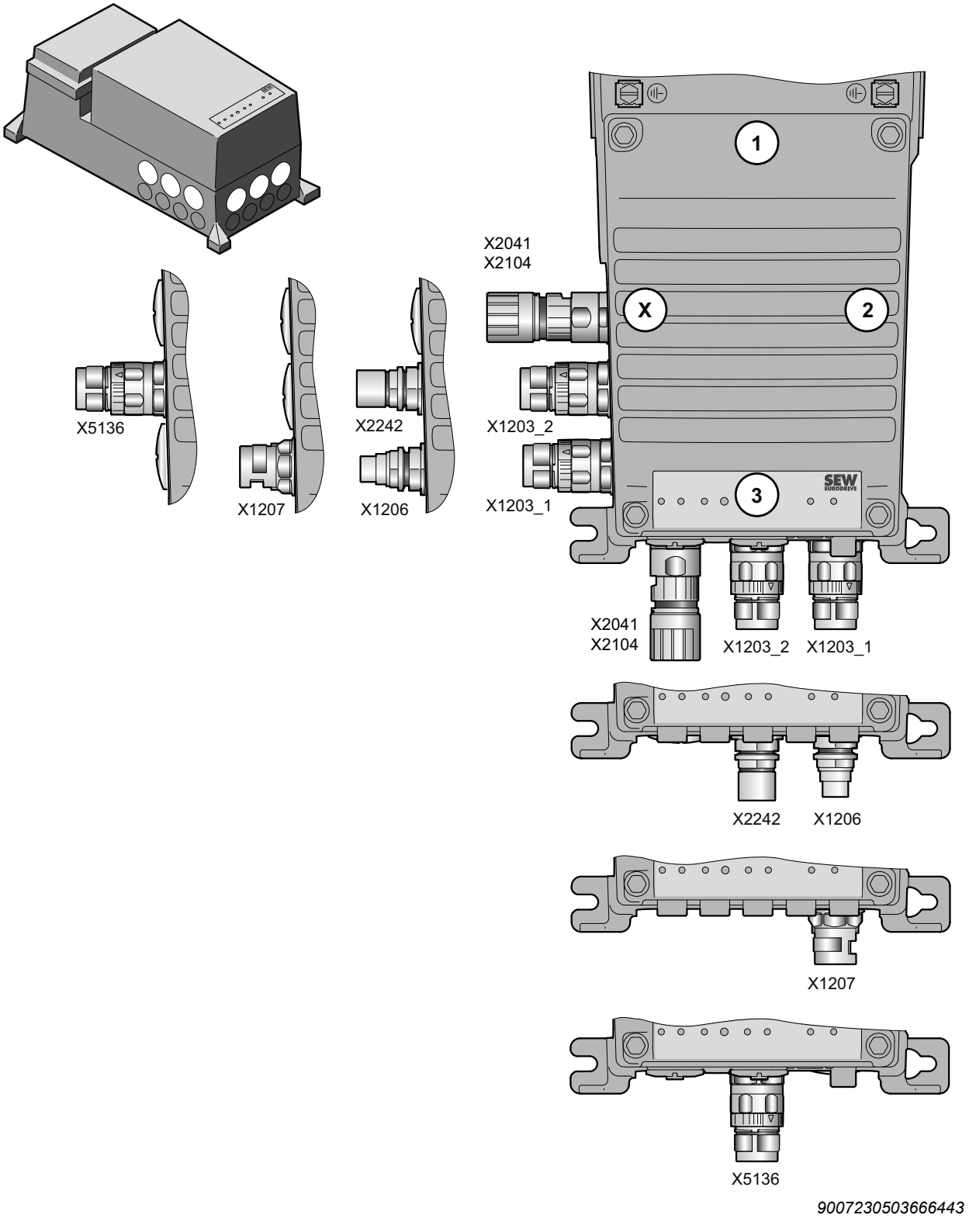
Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X5504	Yellow	STO (3-core connection)[1)]	X, 2 or 3	–
X5505	Yellow	STO (3-core connection)[1)]	X, 2 or 3	• X4142 • X1523
X1523	Light gray	DC 24 V backup voltage – input	X, 2 or 3	• X5505 • X4142
X4142	Red	Engineering interface	X, 2 or 3	• X5505 • X1523
–	–	[1] Optional pressure compensation	3	–

1) Plug connectors X5504 and X5505 can only be ordered together.

Design MMF3../DBC..

Cable entries M25

The following figure depicts the possible plug connector positions for the M25 cable entries:



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Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X1203_1	Black	AC 400 V connection[1)]	X or 3	• X1206 • X1207
X1203_2	Black	AC 400 V connection	X or 3	• X2242 • X5136
X1206	–	AC 400 V connection (IN)[2)]	X or 3	• X1203_1 • X1207
X2242	–	AC 400 V connection (OUT)	X or 3	• X1203_2 • X5136
X1207	Black	AC 400 V connection	X or 3	• X1203_1 • X1206
X5136	–	Digital inputs/outputs	X or 3	• X1203_2 • X2242
X2041	Brown	Connection for motors without digital interface	X or 3	• X2104
X2104	None	Connection for motors with digital interface (MOVILINK® DDI)	X or 3	• X2041

1) Plug connector X1203_1 can also be ordered separately (i.e. without plug connector X1203_2).

2) Plug connector X1206 can also be ordered separately (i.e. without plug connector X2242).

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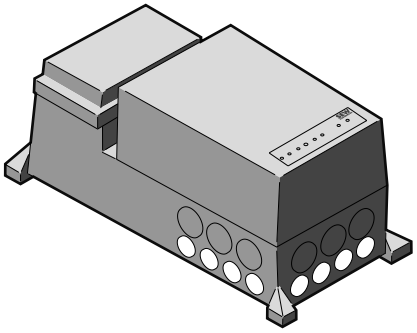
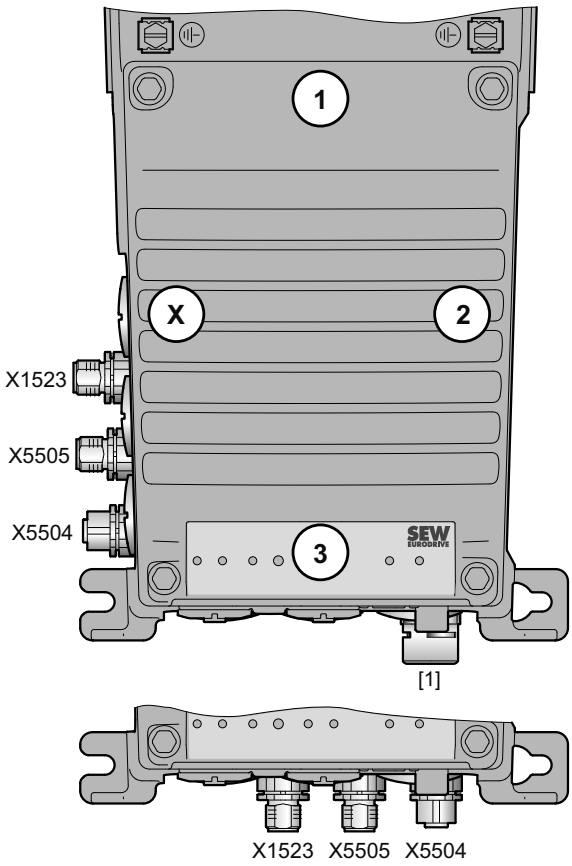
Cable entries M16

The following figure depicts the possible plug connector positions for the M16 cable entries:





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Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X5504	Yellow	STO (3-core connection)[1)]	X or 3	• Optional pressure compensation
X5505	Yellow	STO (3-core connection)[1)]	X or 3	–
X1523	Light gray	DC 24 V backup voltage – input	X or 3	–
–	–	[1] Optional pressure compensation	3	• X5504

1) Plug connectors X5504 and X5505 can only be ordered together.

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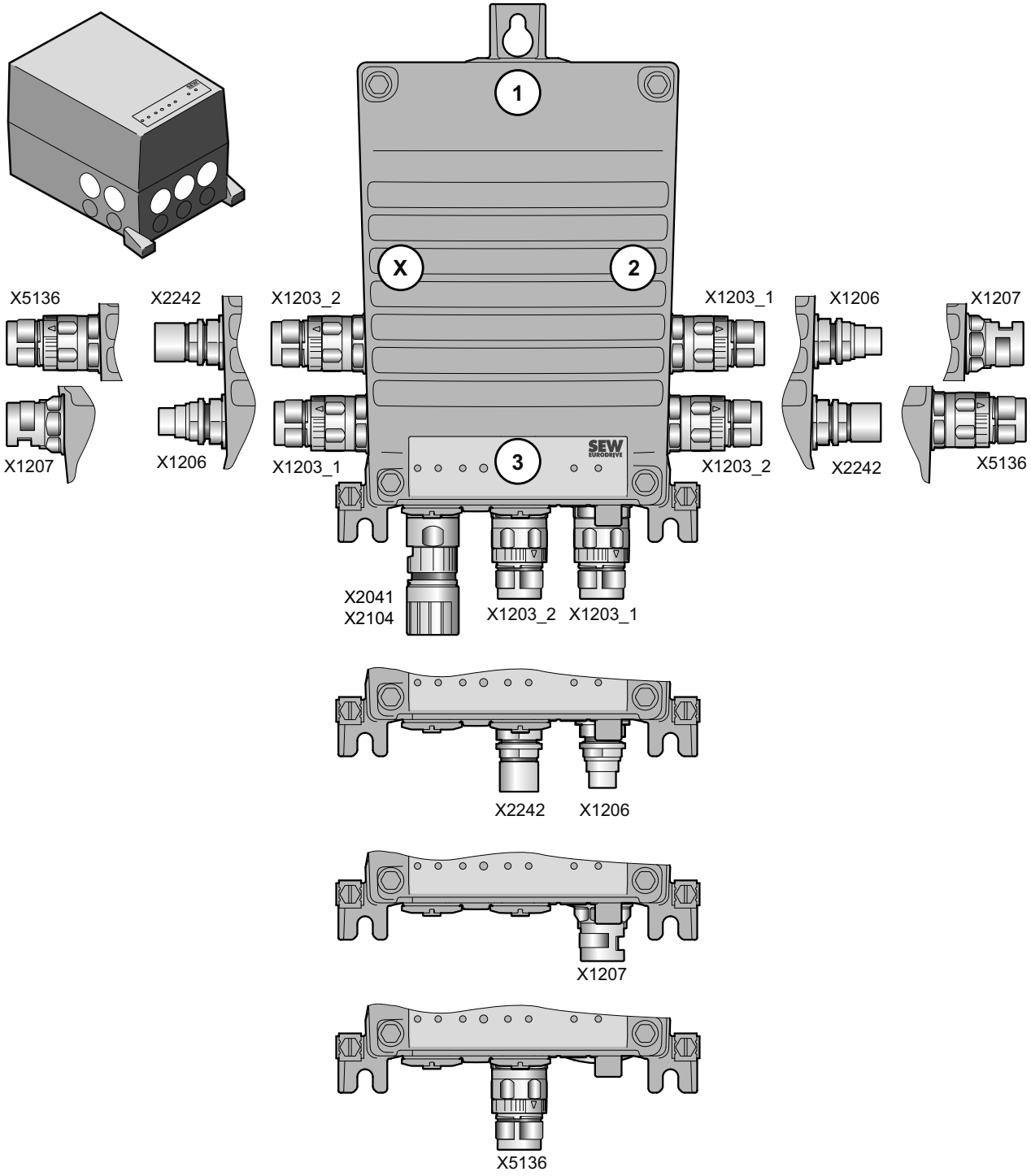
Design MMF1../DAC..

Cable entries M25

The following figure depicts the possible plug connector positions for the M25 cable entries:



33423954059

Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X1203_1	Black	AC 400 V connection[1)]	X, 2 or 3	• X1206 • X1207
X1203_2	Black	AC 400 V connection	X, 2 or 3	• X2242 • X5136
X1206	–	AC 400 V connection (IN)[2)]	X, 2 or 3	• X1203_1 • X1207
X2242	–	AC 400 V connection (OUT)	X, 2 or 3	• X1203_2 • X5136
X1207	Black	AC 400 V connection	X, 2 or 3	• X1203_1 • X1206
X5136	–	Digital inputs/outputs	X, 2 or 3	• X1203_2 • X2242
X2041	Brown	Connection for motors without digital interface	3	• X2104
X2104	None	Connection for motors with digital interface (MOVILINK® DDI)	3	• X2041

1) Plug connector X1203_1 can also be ordered separately (i.e. without plug connector X1203_2).

2) Plug connector X1206 can also be ordered separately (i.e. without plug connector X2242).

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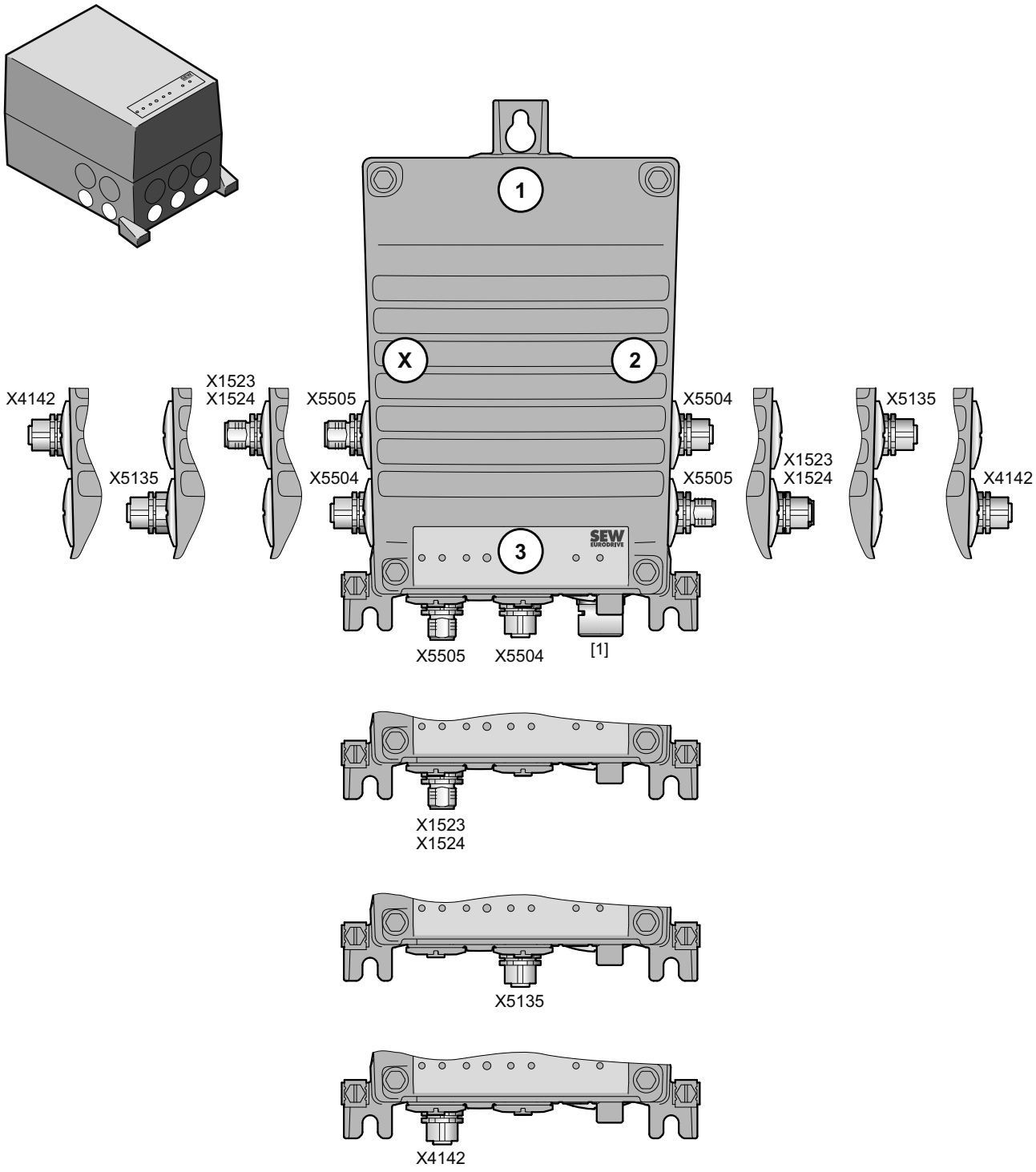
Cable entries M16

The following figure depicts the possible plug connector positions for the M16 cable entries:



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Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X5135	Black	Digital inputs	X, 2 or 3	• X5504
X5504	Yellow	STO (3-core connection)[1)]	X, 2 or 3	• X5135
X5505	Yellow	STO (3-core connection)[1)]	X, 2 or 3	• X4142 • X1523 • X1524
X1523	Light gray	DC 24 V backup voltage – input	X, 2 or 3	• X5505 • X4142 • X1524
X1524	Black	DC 24 V backup voltage (AUX-PWR)	X, 2 or 3	• X5505 • X4142 • X1523
X4142	Red	Engineering interface	X, 2 or 3	• X5505 • X1523 • X1524
–	–	[1] Optional pressure compensation	3	–

1) Plug connectors X5504 and X5505 can only be ordered together.

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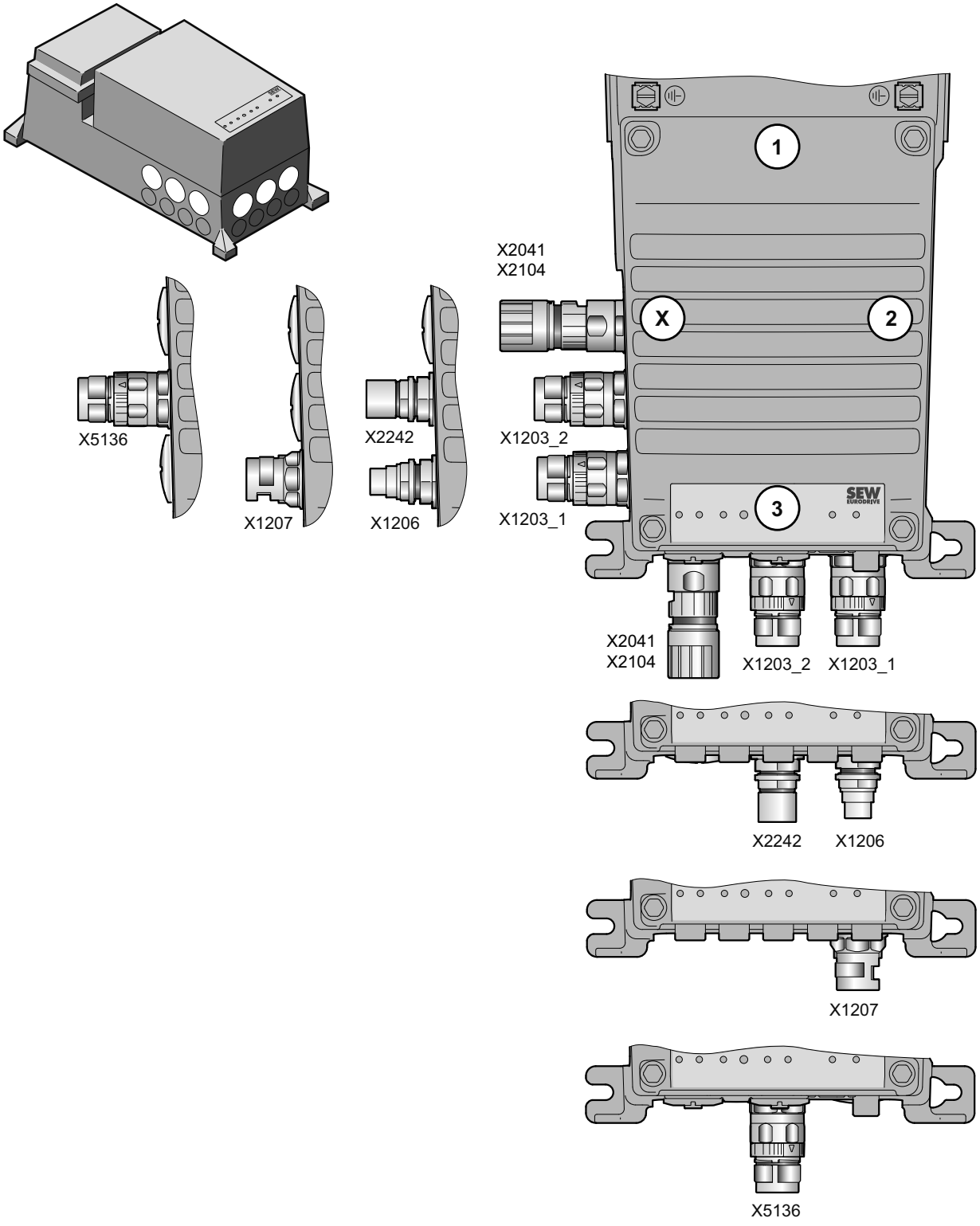
Design MMF3../DAC..

Cable entries M25

The following figure depicts the possible plug connector positions for the M25 cable entries:



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Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X1203_1	Black	AC 400 V connection[1)]	X or 3	• X1206 • X1207
X1203_2	Black	AC 400 V connection	X or 3	• X2242 • X5136
X1206	–	AC 400 V connection (IN)[2)]	X or 3	• X1203_1 • X1207
X2242	–	AC 400 V connection (OUT)	X or 3	• X1203_2 • X5136
X1207	Black	AC 400 V connection	X or 3	• X1203_1 • X1206
X5136	–	Digital inputs/outputs	X or 3	• X1203_2 • X2242
X2041	Brown	Connection for motors without digital interface	X or 3	• X2104
X2104	None	Connection for motors with digital interface (MOVILINK® DDI)	X or 3	• X2041

1) Plug connector X1203_1 can also be ordered separately (i.e. without plug connector X1203_2).

2) Plug connector X1206 can also be ordered separately (i.e. without plug connector X2242).

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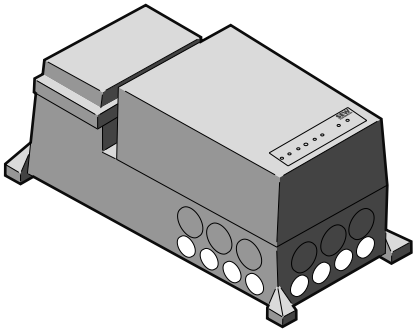
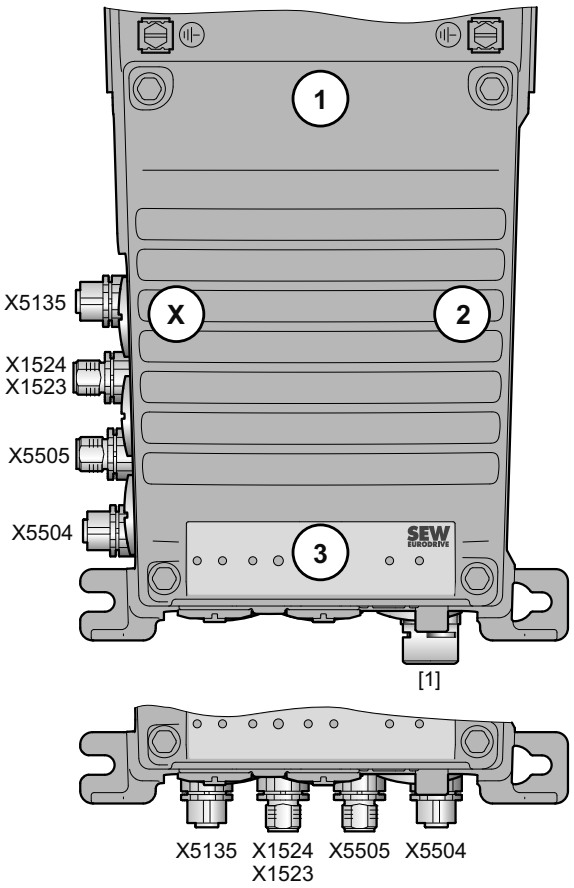
Cable entries M16

The following figure depicts the possible plug connector positions for the M16 cable entries:





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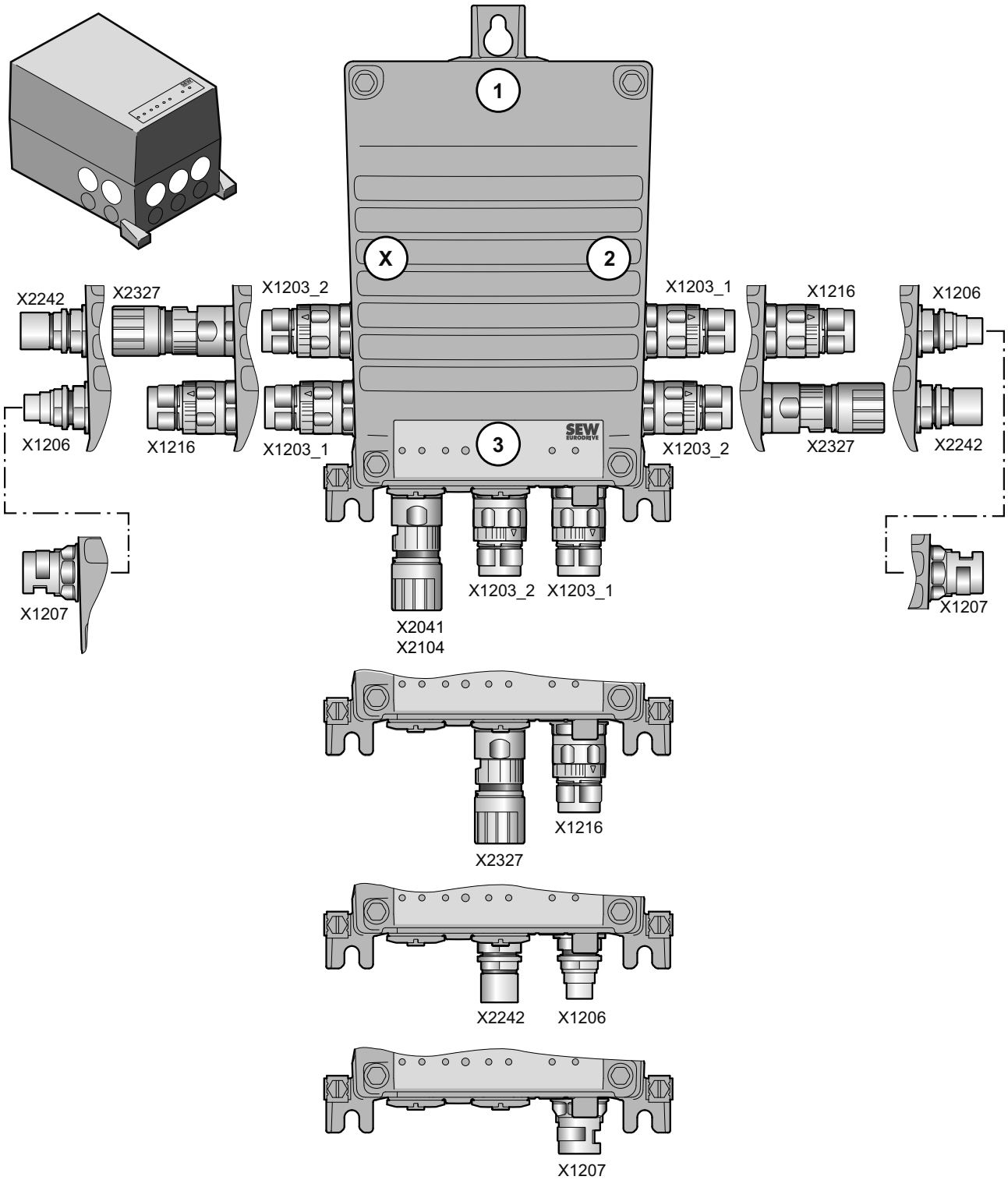
Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X5135	Black	Digital inputs	X or 3	–
X5504	Yellow	STO (3-core connection)[1)]	X or 3	• Optional pressure compensation
X5505	Yellow	STO (3-core connection)[1)]	X or 3	–
X1523	Light gray	DC 24 V backup voltage	X or 3	• X1524
X1524	Black	DC 24 V backup voltage (AUX-PWR)	X or 3	• X1523
–	–	[1] Optional pressure compensation	3	• X5504

1) Plug connectors X5504 and X5505 can only be ordered together.

Designs MMF1../DFC.. and MMF1../DSI..

Cable entries M25

The following figure depicts the possible plug connector positions for the M25 cable entries:



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Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X1203_1	Black	AC 400 V connection[1)]	X, 2 or 3	• X1216 • X1206 • X1207
X1203_2	Black	AC 400 V connection	X, 2 or 3	• X2327 • X2242
X1216	Black/green	Hybrid connection PA (IN) AC 400 V and DC 24 V backup voltage[2)]	X, 2 or 3	• X1203_1 • X1206 • X1207
X2327	Black/green	Hybrid connection PA (OUT) AC 400 V and DC 24 V backup voltage	X, 2 or 3	• X1203_2 • X2242
X1206	–	AC 400 V connection (IN)[3)]	X, 2 or 3	• X1203_1 • X1216 • X1207
X2242	–	AC 400 V connection (OUT)	X, 2 or 3	• X1203_2 • X2327
X1207	Black	AC 400 V connection	X, 2 or 3	• X1203_1 • X1216 • X1206
X2041	Brown	Connection for motors without digital interface	3	• X2104
X2104	None	Connection for motors with digital interface (MOVILINK® DDI)	3	• X2041

1) Plug connector X1203_1 can also be ordered separately (i.e. without plug connector X1203_2).

2) Plug connector X1216 can also be ordered separately (i.e. without plug connector X2327).

3) Plug connector X1206 can also be ordered separately (i.e. without plug connector X2242).

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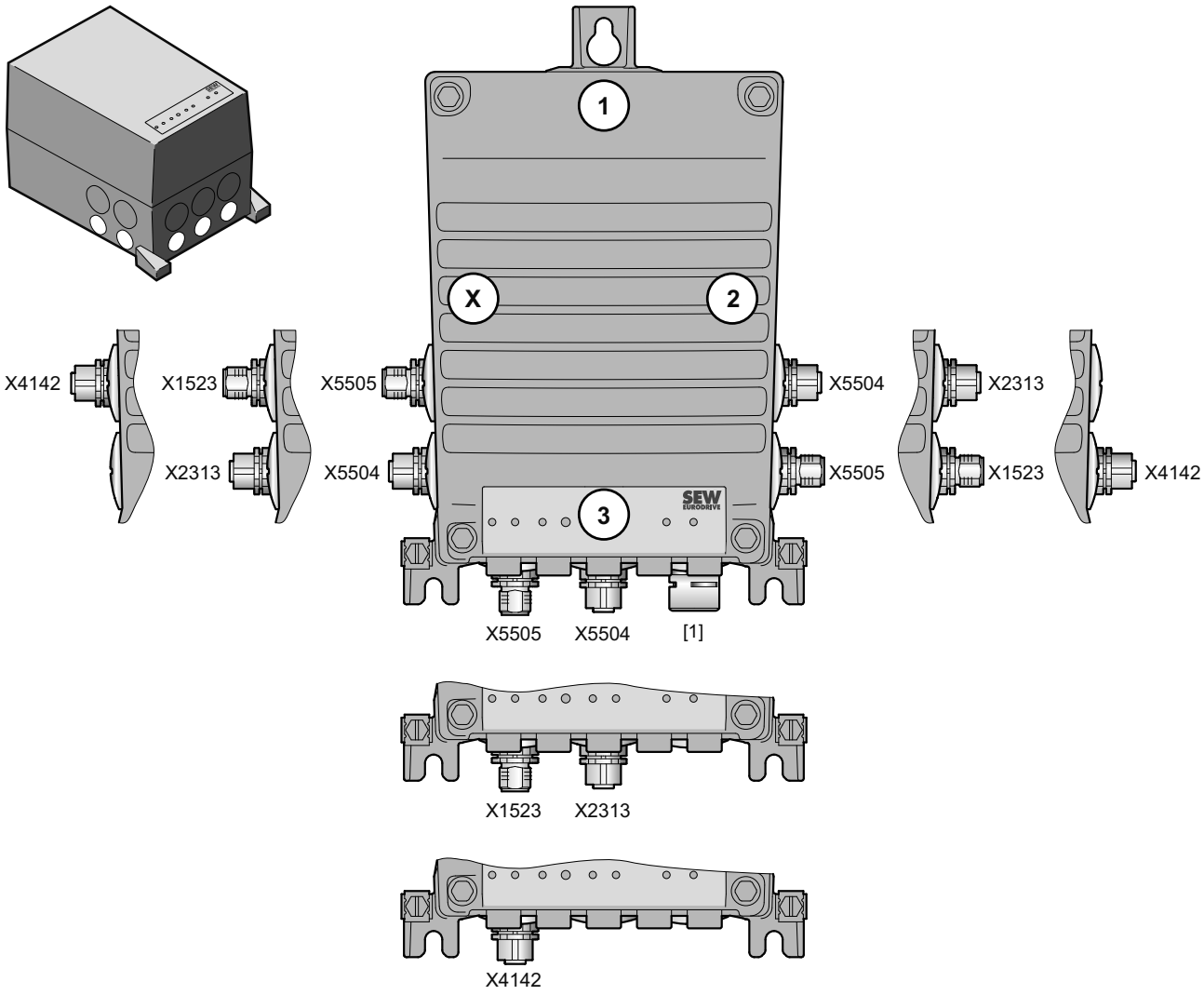
Cable entries M16

The following figure depicts the possible plug connector positions for the M16 cable entries:



27021623544110475

Plug connectors				Not together at a position with the plug connector:	
Designation	**Coding ring/ color**	**Function**	**Position**		
X5504	Yellow	STO (3-core connection)[1)]	X, 2 or 3	X2313	–
X5505	Yellow	STO (3-core connection)[1)]	X, 2 or 3	X1523	X4142
X1523	Light gray	DC 24 V backup voltage - input[2)]	X, 2 or 3	X5505	X4142
X2313	Light gray	DC 24 V backup voltage – output	X, 2 or 3	X5504	–
X4142	Red	Engineering interface	X, 2 or 3	X5505	X1523
–	–	[1] Optional pressure compensation	3	–	–

1) Plug connectors X5504 and X5505 can only be ordered together.

2) Plug connector X1523 can also be ordered separately (i.e. without plug connector X2313).

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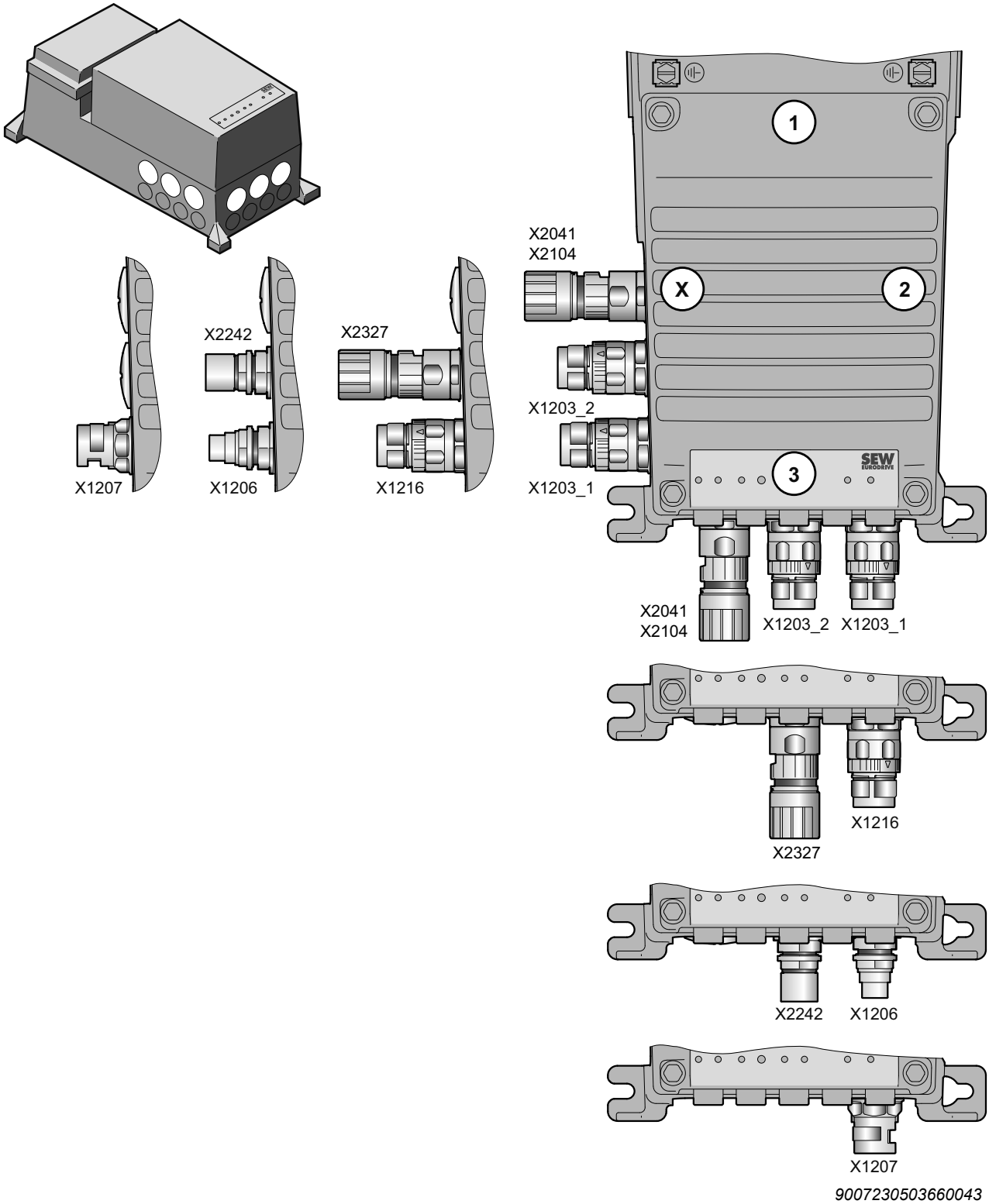
Designs MMF3../DFC.. and MMF3../DSI..

Cable entries M25

The following figure depicts the possible plug connector positions for the M25 cable entries:



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Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X1203_1	Black	AC 400 V connection[1)]	X or 3	• X1216 • X1206 • X1207
X1203_2	Black	AC 400 V connection	X or 3	• X2327 • X2242
X1216	Black/green	PA connection for AC 400 V and DC 24 V backup voltage (IN)[2)]	X or 3	• X1203_1 • X1206 • X1207
X2327	Black/green	PA connection for AC 400 V and 24 V backup voltage (OUT)	X or 3	• X1203_2 • X2242
X1206	–	AC 400 V connection (IN)[3)]	X or 3	• X1203_1 • X1216 • X1207
X2242	–	AC 400 V connection (OUT)	X or 3	• X1203_2 • X2327
X1207	Black	AC 400 V connection	X or 3	• X1203_1 • X1216 • X1206
X2041	Brown	Connection for motors without digital interface	X or 3	• X2104
X2104	None	Connection for motors with digital interface (MOVILINK® DDI)	X or 3	• X2041

1) Plug connector X1203_1 can also be ordered separately (i.e. without plug connector X1203_2).

2) Plug connector X1216 can also be ordered separately (i.e. without plug connector X2327).

3) Plug connector X1206 can also be ordered separately (i.e. without plug connector X2242).

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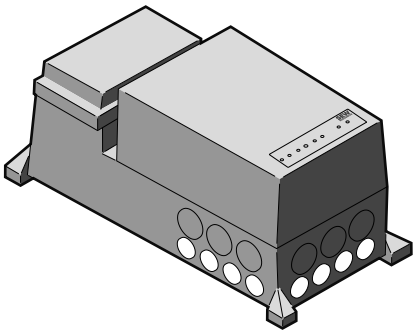
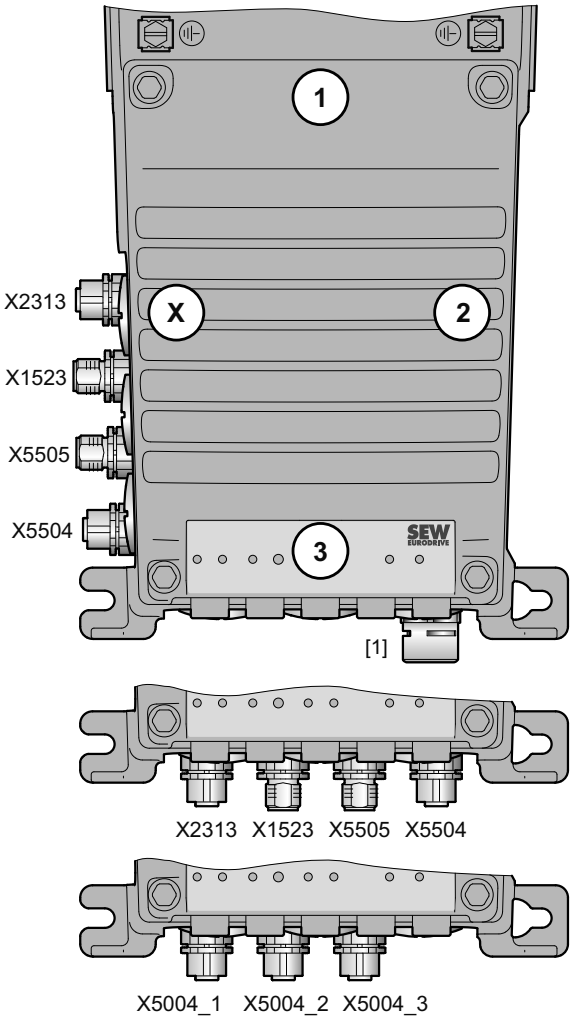
Cable entries M16

The following figure depicts the possible plug connector positions for the M16 cable entries:





27021623587191691

Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X5504	Yellow	STO (3-core connection)[1)]	X or 3	• Optional pressure compensation
X5505	Yellow	STO (3-core connection)[1)]	X or 3	• X5004_3
X1523	Light gray	DC 24 V backup voltage – input[2)]	X or 3	• X5004_2
X2313	Light gray	DC 24 V backup voltage – output	X or 3	• X5004_1
X5004_1	Black	Digital inputs[3)]	3	• X2313
X5004_2	Black	Digital inputs[3)]	3	• X1523
X5004_3	Black	Digital inputs[3)]	3	• X5505

Plug connectors				Not together at a position with the plug connector:
Designation	Coding ring/ color	Function	Position	
–	–	[1] Optional pressure compensation	3	• X5504

1) Plug connectors X5504 and X5505 can only be ordered together.
2) Plug connector X1523 can also be ordered separately (i.e. without plug connector X2313).
3) The plug connectors X5004_1, X5004_2, and X5004_3 can only be ordered as a bundle.

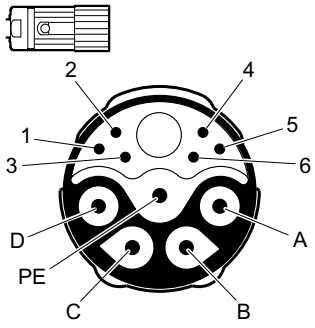
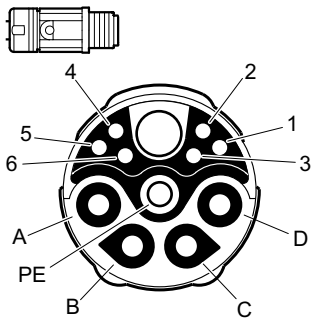
5.2.2 Using plug connectors assembled by yourself

The power plug connectors for assembling connection cables yourself, and the corresponding assembly tool set is available for order from TE Connectivity - Intercontec products.

Contact TE Connectivity - Intercontec products if the order designation is not available in the online order system of Intercontec.

Order information

The table below shows the order designations for connectors by TE Connectivity - Intercontec products with the matching coding for assembly by the customer:

Plug connector type		Outer cable diameter / core cross section of crimp contacts	Designation for order from the supplier TE Connectivity - Intercontec products
Plug connector AC 400 V Coding ring: Black	Cable plug (male, union nut) 	14 mm – 17 mm / 2.5 mm² – 4.0 mm²	H 51 A 019 MR 02 59 0102 000
		9.5 mm – 14.5 mm / 2.5 mm² – 4.0 mm²	H 51 A 019 MR 02 42 0102 000
		9.5 mm – 14.5 mm / 0.35 mm² – 2.5 mm²	H 51 A 019 MR 12 42 0102 000
	Cable socket (female/male thread) 	14 mm – 17 mm / 2.5 mm² – 4.0 mm²	H 52 A 013 FR 02 59 0102 000
		9.5 mm –14.5 mm / 2.5 mm² – 4.0 mm²	H 52 A 013 FR 02 42 0102 000
		9.5 mm – 14.5 mm / 0.35 mm² – 2.5 mm²	H 52 A 013 FR 17 42 0102 000

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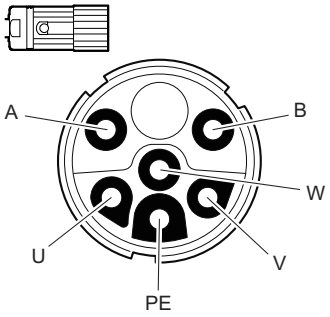
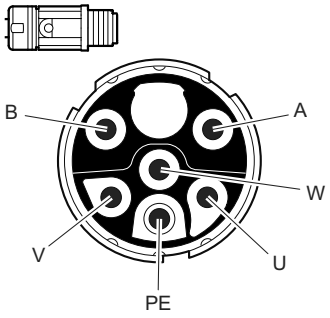
Plug connector type		Outer cable diameter / core cross section of crimp contacts	Designation for order from the supplier TE Connectivity - Intercontec products
PAC hybrid plug connector Coding ring: Gray/ green		–	Not approved for assembly by customer
PA hybrid plug connector Coding ring: Black/ green	Cable socket (female/ union nut) 	14 mm – 17 mm / 2.5 mm^2 – 4.0 mm^2 0.35 mm^2 – 2.5 mm^2	H 51 A 655 FR 20 92 0113 000
		14 mm – 17 mm / 0.35 mm^2 – 2.5 mm^2	H 51 A 655 FR 23 59 0113 000
	Cable plug (male/male thread) 	14 mm – 17 mm / 2.5 mm^2 – 4.0 mm^2 0.35 mm^2 – 2.5 mm^2	H 52 A 656 MR 24 92 0113 000
		14 mm – 17 mm / 0.35 mm^2 – 2.5 mm^2	H 52 A 656 MR 23 59 0113 000

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5.3 Assignment of optional plug connectors

⚠ WARNING

Electric shock when disconnecting or connecting voltage-carrying plug connectors.

Severe or fatal injuries

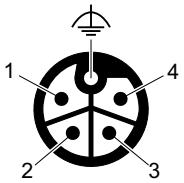
- Switch off the line voltage.
- Never plug or unplug plug connectors while they are energized.

5.3.1 X1523: DC 24 V backup voltage, input

The following table shows information about this connection:

Function
DC 24 V backup voltage input

Connection type
M12, 5-pin, male, L-coded, color: light gray

Connection diagram


Assignment		
Contact	**Signal**	**Description**
1	+24V/L1	DC 24 V input/L1 (for backup mode)
2	0V24/N2	0V24 reference potential/N2 (for DC 24 V /BES brake rectifier)
3	0V24/N1	0V24 reference potential/N1 (for backup mode)
4	+24V/L2	DC 24 V connection/L2 (for DC 24 V /BES brake rectifier)
⏚	FE	Functional earth

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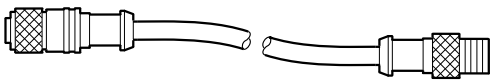
Connection cables

The following table provides an overview of the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M12, 5-pin, L-coded, female — M12, 5-pin, L-coded, male	CE/UL: 28114345	HELUKABEL® JZ-500	Variable 	5 × 2.5 mm² / DC 60 V
 M12, 5-pin, L-coded, female — Open	CE/UL: 28117786	HELUKABEL® JZ-500	Variable 	5 × 2.5 mm² / DC 60 V

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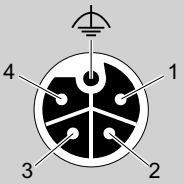
Connection of cables with open end

The following table shows the core assignment of cables with the following part number:

Part numbers
28117786

Assembly					
Open cable end			Description	Prefabricated plug connectors	
					
Core color/ core cross section	Identification	Assembly		Signal	Contact
Black 2.5 mm²	1	Not prefabricated	DC 24 V output/L1 (for backup voltage/supply)	+24V/L1	1
Black 2.5 mm²	2	Not prefabricated	0V24 reference potential/N2 (for DC 24 V /BES brake rectifier)	0V24/N2	2
Black 2.5 mm²	3	Not prefabricated	0V24 reference potential/N1 (for backup voltage/supply)	0V24/N1	3
Black 2.5 mm²	4	Not prefabricated	DC 24 V output/L2 (for DC 24 V /BES brake rectifier)	+24V/L2	4
Black 2.5 mm²	5	Not prefabricated	Functional earth	FE	⏚

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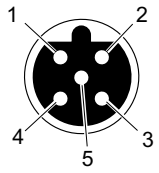
5.3.2 X4142: Engineering interface

The following table shows information about this connection:

Function
Engineering interface (CAN)

Connection type
M12-SPEEDCON, 5-pin, female, B-coded, color: red

Connection diagram


Assignment		
Contact	**Signal**	**Description**
1	Res.	Reserved
2	24V_OUT	DC 24 V auxiliary output[1)]
3	0V24_OUT	0V24 reference potential[1)]
4	CAN_H	CAN High connection
5	CAN_L	CAN Low connection

1) Only use this output to supply components by SEW-EURODRIVE.

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Connection cables

The following table provides an overview of the cables available for this connection:

Connection cables	Conformity/ part number	Length/installation type	Operating voltage
Connection to interface adapter USM21A: USK15A  M12-SPEED-CON, 5-pin, B-coded, male — RJ10	CE: 28139038	3.0 m 	DC 60 V
Connection to CBG.. keypad : USK25A  M12-SPEED-CON, 5-pin, B-coded, male — D-sub, 9-pin, male, angled	CE: 28139046	3.0 m 	DC 60 V

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5.3.3 X1207: AC 400 V connection (IN)

INFORMATION

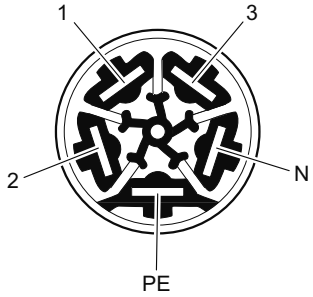
The number of permitted plug-in cycles for this connector is 10 times.

The following table shows information about this connection:

Function
AC 400 V connection (IN)

Connection type
QPD W 4PE2,5, QUICKON connector, female, PhoenixContact

Connection diagram



Assignment		
Contact	**Signal**	**Description**
1	L1	Line connection, phase L1 (IN)
2	L2	Line connection, phase L2 (IN)
3	L3	Line connection, phase L3 (IN)
PE	PE	PE connection
N	Res.	Reserved

INFORMATION

SEW-EURODRIVE does not offer prefabricated cables for this type of plug connector.

5.4 PC connection

Connect the PC to the drive unit before you start the engineering software MOVISUITE®.

You have several options to connect a PC to the device.

5.4.1 Connection via interface adapter USM21A

The USM21A interface adapter is used to connect the PC and the engineering interface of the device.

The data is transferred according to the USB 2.0 standard. It is also possible to work with a USB 3.0 interface.

You need the following components for the connection:

Component	Part number
USM21A interface adapter The following connection cables are included in the delivery: • USB 2.0 connection cable – USB type A/USB type B, – Length: 1.5 m • RJ10/RJ10 connection cable For connection to the engineering interface X31 – With 2 RJ10 plug connectors – Length: 3 m	28231449
Connection cable RJ10/M12 (USK15A) For connection to the X4141 engineering interface or to the M12 optional engineering interface at the front module of MMF3...: • With RJ10 plug connector • With M12 SPEEDCON plug connector, 5-pin, male, B-coded • Length: 3 m	28139038
RJ10/SUB-D9 connection cable For connection to the SUB-D9 optional engineering interface at the front module of MOVIMOT® flexible MMF3...2.. or MMF3...3..: • With RJ10 plug connector • With Sub-D9 plug connector, female • Length: 1.5 m	18123864
Retrofit set M12 engineering interface X4142 M12 SPEEDCON, 5-pin, B-coded, female	28273273

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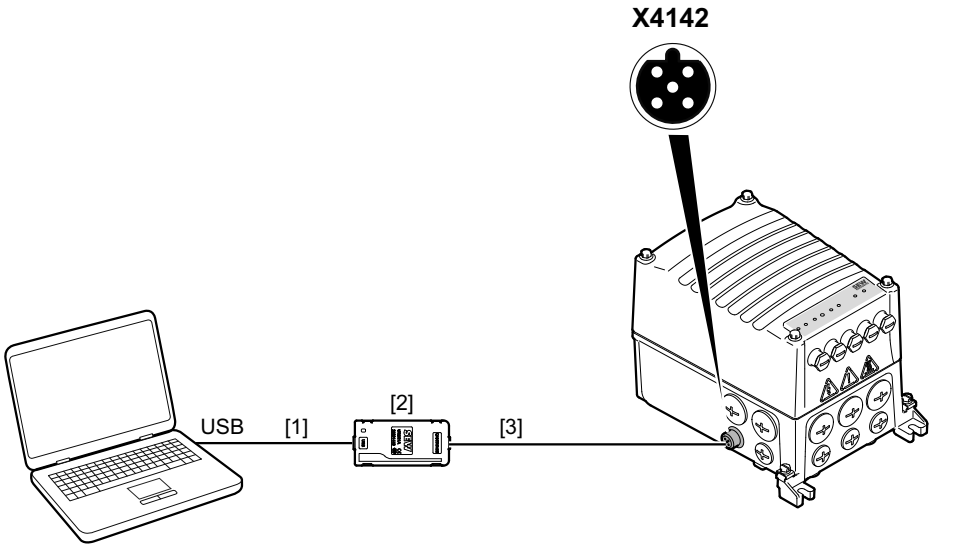
Connection to X4142 (M12 at the connection box)

The engineering interface X31 in the connection box is assigned to the internal wiring of plug connector X4142.

The following illustration shows how to connect the PC to the device:



9007225079150475

[1] USB 2.0 connection cable
(commercially available, included in the USM21A delivery)
[2] USM21A interface adapter
[3] Connection cable RJ10/M12 (USK15A)
(available for delivery from SEW-EURODRIVE, part number: 28139038)

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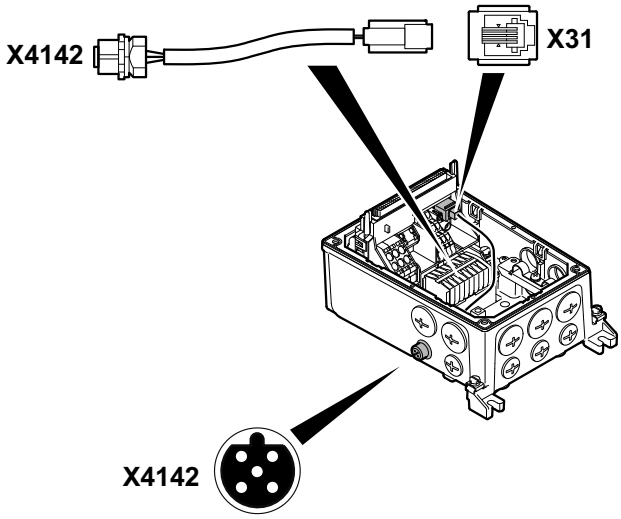
Installing the included engineering plug connector X4142

SEW-EURODRIVE supplies the engineering plug connector X4142 in some cases in an accessory bag (part number: 28273273) with the decentralized inverter. In this case, install the engineering plug connector X4142 to the connection box of the decentralized frequency inverter as follows:

1. It is essential that you observe the startup instructions.
2. Switch off the voltage supply and wait for at least 5 minutes.
3. Loosen the screws and remove the electronics cover from the connection box.
4. Plug in the plug connector RJ10 from outside through one of the permitted cable entry bores (for the permitted positions, see chapter "Plug connector positions"). Push the cable completely into the connection box.
5. Screw plug connector M12 into the cable entry bore. Fasten the nut of the M12 plug connector (tightening torque: 6 Nm).
6. Insert the RJ10 plug connector into plug connector X31 in the connection box. The following figure shows an example of the cable routing:



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7. Plug the electronics cover onto the connection box. Screw on the electronics cover with 4 screws (tightening torque: 6 Nm).

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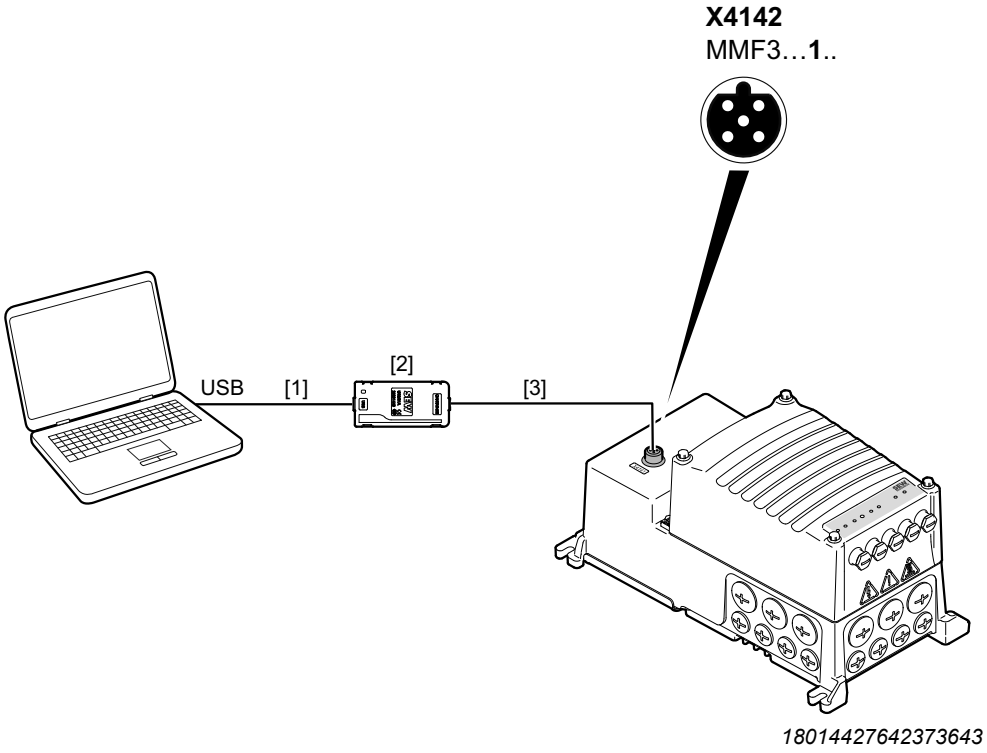
Connection to X4142 at the front module of MMF3.

The following figure shows how to connect the PC to the X4142 optional engineering interface at the front module of MOVIMOT® flexible MMF3...1..:



18014427642373643

[1] USB 2.0 connection cable
(commercially available, included in the delivery of the USM21A interface)
[2] USM21A interface adapter
[3] Connection cable RJ10/M12 (USK15A)
(available for delivery from SEW-EURODRIVE, part number: 28139038)

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5.4.2 Connection via CBG21A or CBG11A keypad

Use the CBG21A or CBG11A keypad to connect the PC and the engineering interface of the device.

The data is transferred according to the USB 2.0 standard. It is also possible to work with a USB 3.0 interface.

You need the following components for the connection:

Component	Part number
CBG21A keypad	28238133
CBG11A keypad	28233646
CBG.. connection cable D-sub/RJ10 (USK21A) For connecting the X31 engineering interface to the 24 V supply voltage • With D-sub plug connector 9-pin, male • With RJ10 plug connector • Length: 3 m	28117832
USB connection cable USB A/USB 2.0 Mini B For connecting the CBG.. keypad to the USB interface of the PC • With USB A plug connector • With USB 2.0 Mini B plug connector • Length: 3 m	25643517
CBG.. connection cable D-sub/M12, B-coded (USK25A) For connecting the X4142 engineering interface to the 24 V supply voltage • With D-sub plug connector 9-pin, male • With M12 SPEEDCON plug connector, 5-pin, male, B-coded • Length: 3 m	28139046

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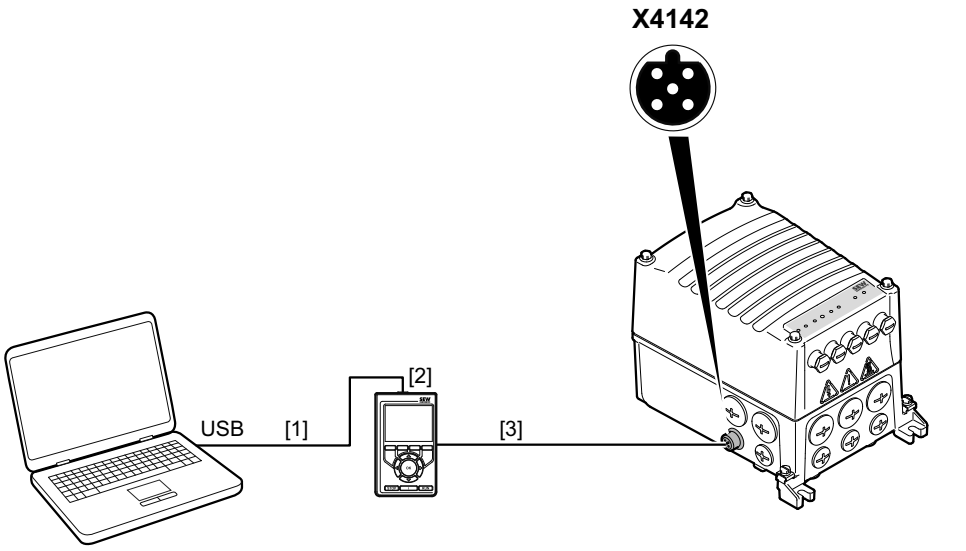
Connection to X4142 (M12 at the connection box)

The following illustration shows how to connect the PC to the device:



18014424348920843

[1] Connection cable USB A/USB 2.0 Mini B
(available for delivery from SEW-EURODRIVE, part number: 25643517)
[2] CBG21A or CBG11A keypad
[3] Connection cable D-Sub/M12 (USK25A)
(available for delivery from SEW-EURODRIVE, part number: 28139046)

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5.4.3 Adapter cables for connection to the engineering interface X4141

As part of product improvement, SEW-EURODRIVE has replaced the optional engineering interface X4141 (M12-A coded) with the engineering interface X4142 (M12-B coded).

In this context, SEW-EURODRIVE has also adapted the associated connection cables [3] for connection to the X4142 engineering interface.

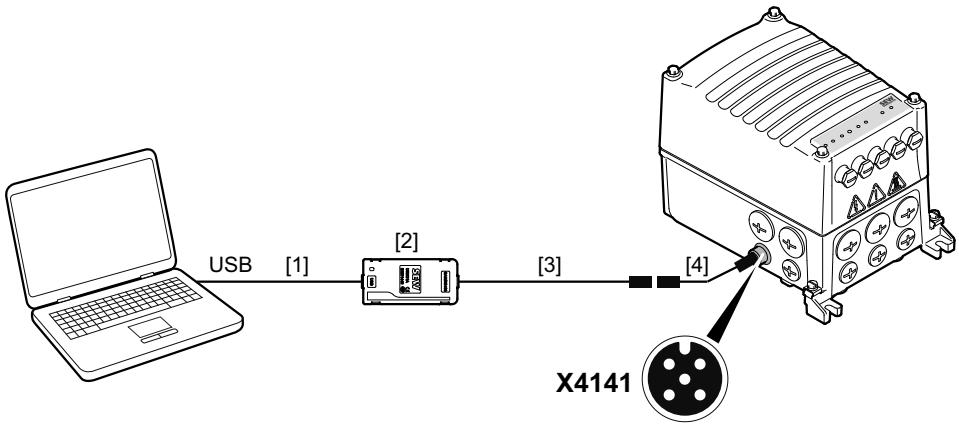
The adapter cable M12/M12 (USK54A) [4] allows for connection to the previous engineering interface X4141.

Component	Part number
Adapter cable M12/M12 (USK54A) • with M12-SPEEDCON plug connector, 5-pin, B-coded, female • with M12 plug connector, 5-pin, A-coded, male • Length: 0.3 m The adapter cable is required to connect the following connection cables to the engineering interface X4141: • Connection cable RJ10/M12 (USK15A) (for connection to interface adapter USM21A) • D-sub/M12 connection cable (USK25A) (for connection to the CBG.. keypad)	28146530

Using the adapter cable in conjunction with the USM21A interface adapter

Example MOVIFIT® flexible MMF1..

The engineering interface X31 in the connection box of the drive unit is assigned to the internal wiring of plug connector X4141.



33430043531

[1] USB 2.0 connection cable
(commercially available, included in the delivery of USM21A)
[2] USM21A interface adapter
[3] Connection cable RJ10/M12, B-coded, male (USK15A)
(available for delivery from SEW-EURODRIVE, part number: 28139038)
[4] Adapter cable M12, B-coded, female/M12, A-coded, male (USK54A)
(available for delivery from SEW-EURODRIVE, part number: 28146530)

The adapter cable is required to connect the connection cable RJ10/M12 (USK15A) to the previous engineering interface X4141.

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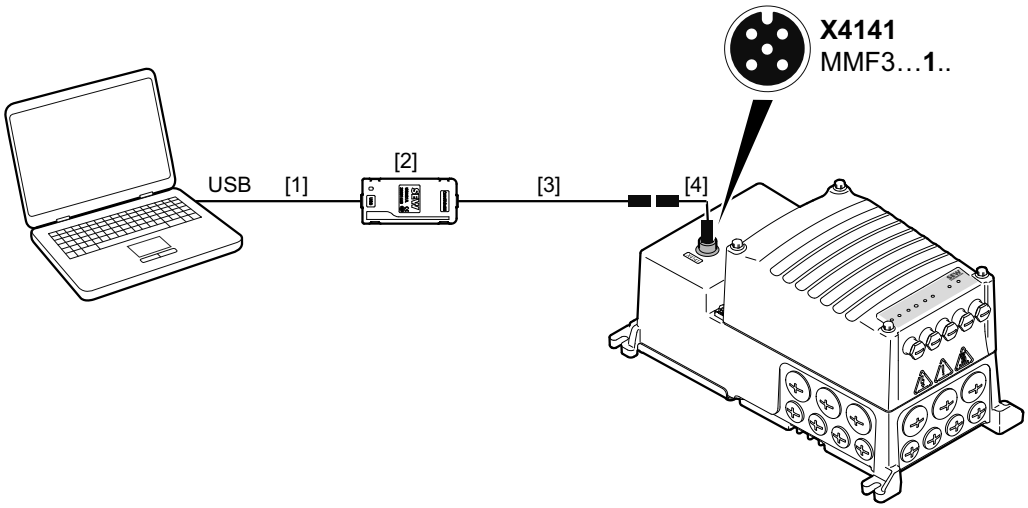
Example MOVIFIT® flexible MMF3..

The engineering interface X31 in the connection box of the drive unit is assigned to the internal wiring of plug connector X4141.



33429666955

[1] USB 2.0 connection cable
(commercially available, included in the delivery of USM21A)
[2] CBG.. keypad
[3] Connection cable D-Sub/M12, B-coded, male (USK25A)
(available for delivery from SEW-EURODRIVE, part number: 28139046)
[4] Adapter cable M12, B-coded, female/M12, A-coded, male (USK54A)
(available for delivery from SEW-EURODRIVE, part number: 28146530)

The adapter cable is required to connect the connection cable D-Sub/M12 (USK25A) to the previous engineering interface X4141.

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6 Operation

6.1 Load disconnector /R01 at the inverter output of MMF3../DAC

⚠ WARNING

Electric shock due to mixing up the load disconnector and its function.

Severe or fatal injuries.

- Before opening the device, check the type designation on the nameplate to see which load disconnector is installed in the device.
  - The optional load disconnectors **/D11** and **/M11** disconnect the 400 V power supply between the power terminals X1 and the electronics cover.
  - The optional load disconnector **/R01** at the inverter output disconnects the connection between the inverter output of the electronics cover (power output stage) and the motor connection terminals X2_A (terminals U, V, W).
- Note that the terminals of the devices with load disconnector **/R01** at the inverter output are also energized when the load disconnector /R01 is switched off. Avoid contact with the terminals.

NOTICE

Unexpected drive functions by using the load disconnector /R01 at the inverter output.

Possible damage to property.

- Do not use the load disconnector /R01 at the inverter output with the following motors and options:
  - Brakemotors
  - Option /DSP (DynaStop®)
  - Option /BES (24 V brake control)

NOTICE

Damage to the power semiconductors or increased wear of the switching contacts.

Possible damage to property.

- Only operate the load disconnector /R01 at the inverter output when the output stage is disabled.
- Make sure that the leading feedback contact of the load disconnector /R01 at the inverter output acts on digital input DI04 with the output stage inhibit function (corresponds to delivery state).
- Do not use digital input DI04 for other signals.

The load disconnector /R01 at the inverter output of MOVIMOT® flexible MMF3... is used to interrupt the connection between the inverter output of the electronics cover (power output stage) and the motor connection terminals X2_A (terminals U, V, W). The leading feedback contact (normally closed contact) of the load disconnector /R01

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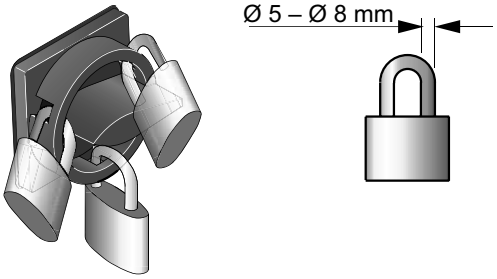
at the inverter output acts on digital input DI04 (output stage inhibit) of the unit. This means that the output stage is inhibited when the load disconnector is actuated. You can query the switching state of the load disconnector via the state of digital input DI04.

The load disconnector can be secured with 3 locks.



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6.2 Load disconnector /R01 at the inverter output of MMF3../DFC, MMF3../DSI

⚠ WARNING

Electric shock due to mixing up the load disconnector and its function.

Severe or fatal injuries.

- Before opening the device, check the type designation on the nameplate to see which load disconnector is installed in the device.
  - The optional load disconnectors **/D11** and **/M11** disconnect the 400 V power supply between the power terminals X1 and the electronics cover.
  - The optional load disconnector **/R01** at the inverter output disconnects the connection between the inverter output of the electronics cover (power output stage) and the motor connection terminals X2_A (terminals U, V, W).
- Note that the terminals of the devices with load disconnector **/R01** at the inverter output are also energized when the load disconnector /R01 is switched off. Avoid contact with the terminals.

NOTICE

Unexpected drive functions by using the load disconnector /R01 at the inverter output.

Possible damage to property.

- Do not use the load disconnector /R01 at the inverter output with the following motors and options:
  - Brakemotors
  - Option /DSP (DynaStop®)
  - Option /BES (24 V brake control)

NOTICE

Damage to the power semiconductors or increased wear of the switching contacts.

Possible damage to property.

- Only operate the load disconnector /R01 at the inverter output when the output stage is disabled.

The load disconnector /R01 at the inverter output of MOVIMOT® flexible MMF3... is used to interrupt the connection between the inverter output of the electronics cover (power output stage) and the motor connection terminals X2_A (terminals U, V, W). The leading feedback contact (normally closed contact) of the load disconnector /R01

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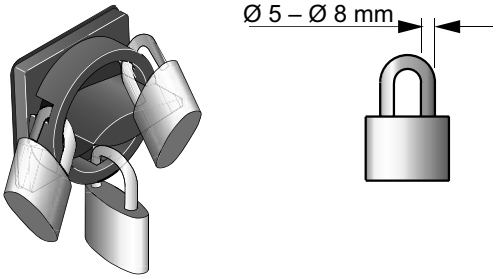
at the inverter output acts on digital input DI08 (output stage inhibit) of the unit. This means that the output stage is inhibited when the load disconnector is actuated. You can query the switching state of the load disconnector via the state of digital input DI08.

The load disconnector can be secured with 3 locks.



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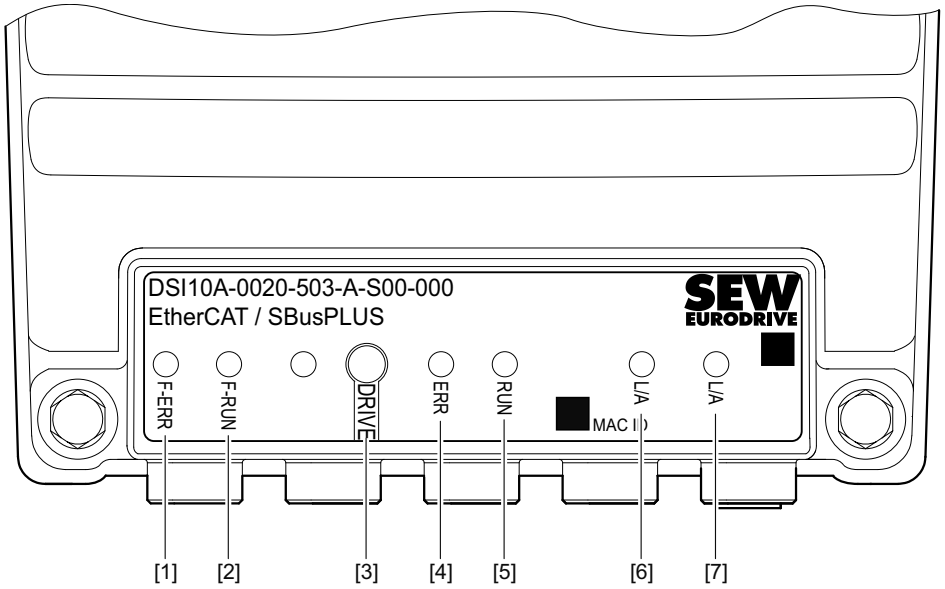
7 Service

Only applies to decentralized inverters MMF1..-C/DSI.., MMF3..-C/DSI..

7.1 Description of status and operating displays

7.1.1 LED indicators EtherCAT®/SBus^{Plus}

The following figure shows the LEDs of the EtherCAT®/SBus^{Plus} design:



18014426770357259

[1] "F-ERR" LED
[2] "F-RUN" LED
[3] "DRIVE" status LED
[4] "ERR" LED
[5] "RUN" LED
[6] "L/A" LED EtherCAT®/SBus^{PLUS} IN
[7] "L/A" LED EtherCAT®/SBus^{PLUS} OUT

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7.1.2 General LEDs

"F-ERR" LED

LED	Meaning
Off	• Device off. • No MOVISAFE® CSB51A safety option available.
Flashing sequence	Device identification for safety key ID query.
Green **Steady light**	Fault-free operation
Green **Flashing slowly**	Error in the operating state "Parameterization" • No parameterization exists. • Error in parameterization • Inconsistent parameterization • Current parameter set is not consistent with the safety key.
Yellow **Flashing quickly**	• Error suppression (muting) active. • Emergency mode is active.
Yellow **Steady light**	Warning: Error connection basic device
Red **Flashing slowly**	• Error can be acknowledged. • Fault outside of the device, cabling system fault • Reaction to limit value overshoot is active.
Red **Steady light**	Critical fault, cannot be acknowledged.

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"F-RUN" LED

LED	Meaning
Off	• Device off. • No MOVISAFE® CSB51A safety option available.
Flashing sequence	Device identification for safety key ID query.
Green **Steady light**	Device in operating state and parameter set approved.
Green **Flashing slowly**	Acceptance of the module has not yet taken place.
Green **Flashing quickly**	• Device booting up or initializing • Device in parameterization state
Yellow **Flashing slowly**	Device in the operating state with one or more of the following constraints: • Module controls the inverter. • Test mode
Yellow **Steady light**	STO drive safety function is active.
Red **Flashing slowly**	Device identification for parameterization
Red **Flashing quickly**	Firmware update, do not switch the device off.
Red **Steady light**	Critical fault, cannot be acknowledged.

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"DRIVE" status LED

LED	Operating status/		Meaning	Measure
	Fault code	Subfault code		
– **Off**	Not ready for operation		Line voltage absent.	Switch on the line voltage.
Yellow **Flashes very rapidly, 4 Hz**	Not ready for operation		Initialization phase	Wait for initialization to be completed.
Green/yellow **Flashes with changing colors, 0.5 Hz** **(1 x green, 1 x yellow)**	Ready but unit inhibited		The "STO" signal is active.	Deactivate the "STO" signal.
Yellow **Flashes slowly, 0.5 Hz**	Ready for operation, but manual mode/local mode, device inhibited		Line voltage is OK.	–
Yellow **Flashes rapidly, 2 Hz**	Ready		Deactivation of DynaStop® without drive enable is active.	–
Yellow **Steady light**	Ready but unit inhibited		Line voltage is OK. The output stage is inhibited.	–
Green **Flashes slowly, 0.5 Hz**	Unit enabled, but condition manual operation/local mode		The output stage is enabled. The motor is in operation.	–
Green **Flashes very rapidly, 4 Hz**	Unit enabled, but current limit active.		The drive is at the current limit.	Reduce the load.
Green **Steady light**	Unit enabled.		The output stage is enabled. The motor is in operation.	–
Yellow/red **Flashes with changing colors, 1 Hz** **(2 x yellow, 2 x red)**	Ready		A displaying fault is present. The output stage is inhibited.	Consult the “Fault table” chapter for possible measures to be taken.
Green/red **Flashes with changing colors, 1 Hz** **(2 × green, 2 × red)**	Ready		A displaying fault is present. The output stage is enabled. The motor is in operation.	Consult the “Fault table” chapter for possible measures to be taken.

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LED	Operating status/		Meaning	Measure
	Fault code	Subfault code		
Red **Flashes 1 Hz**	3	1	Ground fault	Consult the “Fault table” chapter for possible measures to be taken.
	4	1	Brake chopper fault	
	6	1	Line fault	
	7	1	DC link fault	
	8	1, 2, 3	Speed monitoring fault	
	9	1, 2, 5, 6, 9, 10	Control mode fault	
	10	1, 3 – 11	Data Flexibility fault	
	11	1 – 6	Temperature monitoring fault	
	12	1, 2	Brake fault	
	13	5, 24	Encoder 1 fault	
	16	5 – 8, 10, 20 – 27	Startup fault	
	19	1 – 9	Process data fault	
	20	2, 11	Device monitoring fault	
	23	4	Power section fault	
	25	2 – 7, 20, 21, 30, 31, 61, 70	Parameter memory monitoring	
	26	1, 3	External fault	
	28	1 – 12, 14	FCB drive function fault	
	29	1 – 4	Hardware limit switch fault	
	30	1 – 3	Software limit switch fault	
	31	1 – 4, 7, 9	Thermal motor protection fault	
	32	2 – 6, 12	Communication error	
	33	11, 12, 13	System initialization fault	
	34	1	Process data configuration fault	
	35	1 – 5	Function activation fault	
	42	1 – 3	Lag fault	
	44	2, 3, 4	Fault overcurrent phase U, V, W	
	46	2, 3, 50, 51, 52	Safety card fault	
	51	1	Analog processing fault	

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LED	Operating status/		Meaning	Measure
	Fault code	Subfault code		
Red **Steady light**	1	1, 2	Output stage monitoring fault	Contact SEW-EURODRIVE Service.
	4	2	Brake chopper fault	
	7	2	DC link fault	
	9	3, 4, 8	Control mode fault	
	10	2, 99	Data Flexibility fault	
	11	7, 8	Temperature monitoring fault	
	13	1, 3, 6, 7, 8, 9, 11, 13, 15, 22, 23	Encoder 1 fault	
	16	2, 11, 12. 30	Startup fault	
	17	7	Internal processor fault	
	18	1, 3,4, 7, 8, 9, 10, 12, 13	Software error	
	20	1, 7	Device monitoring fault	
	21	1	S-Drive 1 fault	
	23	5, 6, 7, 8	Power section fault	
	25	10, 12 – 19, 50, 51, 81	Parameter memory monitoring	
	28	13	FCB drive function fault	
	33	1, 2, 6, 7, 8, 10	System initialization fault	
	46	1	Safety card fault	

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LEDs "L/A" IN

LED	Meaning
Green Illuminated	Ethernet connection with the EtherCAT®/SBus^{PLUS} interface IN without bus activity.
Green Flashing (10Hz)	Ethernet connection with the EtherCAT®/SBus^{PLUS} interface IN with bus activity.
OFF	No Ethernet connection with the EtherCAT®/SBus^{PLUS} interface IN.

LEDs "L/A" OUT

LED	Meaning
Green Illuminated	Ethernet connection with the EtherCAT®/SBus^{PLUS} interface OUT without bus activity.
Green Flashing (10Hz)	Ethernet connection with the EtherCAT®/SBus^{PLUS} interface OUT with bus activity.
OFF	No Ethernet connection with the EtherCAT®/SBus^{PLUS} interface OUT.

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7.1.3 Bus-specific LEDs for EtherCAT®/SBus^{Plus}

"RUN" LED

LED	Meaning
Off	"INIT" state The interface is in "INIT" state.
Green **Flashing**	"PRE_OPERATIONAL" state Mailbox communication is possible. Process data communication is not possible.
Green **Flashing once**	"SAFE_OPERATIONAL" state Mailbox and process data communication is possible. Safety-related output signals are not output.
Green **Illuminated**	"OPERATIONAL Mode" state (operational) Mailbox and process data communication is possible.

"ERR" LED

LED	Meaning
Off	No fault The interface is in operating state.
Red **Flickering**	Boot error A BOOT error has occurred. "INIT" state has not been reached. However the "Change" parameter is set to "0x01:change/error".
Red **Flashing**	Invalid configuration A general configuration error has occurred.
Red **Flashing once**	Unprompted state change The slave application has changed the state automatically. The "Change" parameter is set to "0x01:change/error".
Red **Flashing twice**	Application watchdog timeout A watchdog timeout error has occurred in the application.
Red **Illuminated**	PDI[1)] Watchdog Timeout A PDI watchdog timeout error has occurred.

1) PDI = Process Data Interface

8 Technical data and dimension sheets

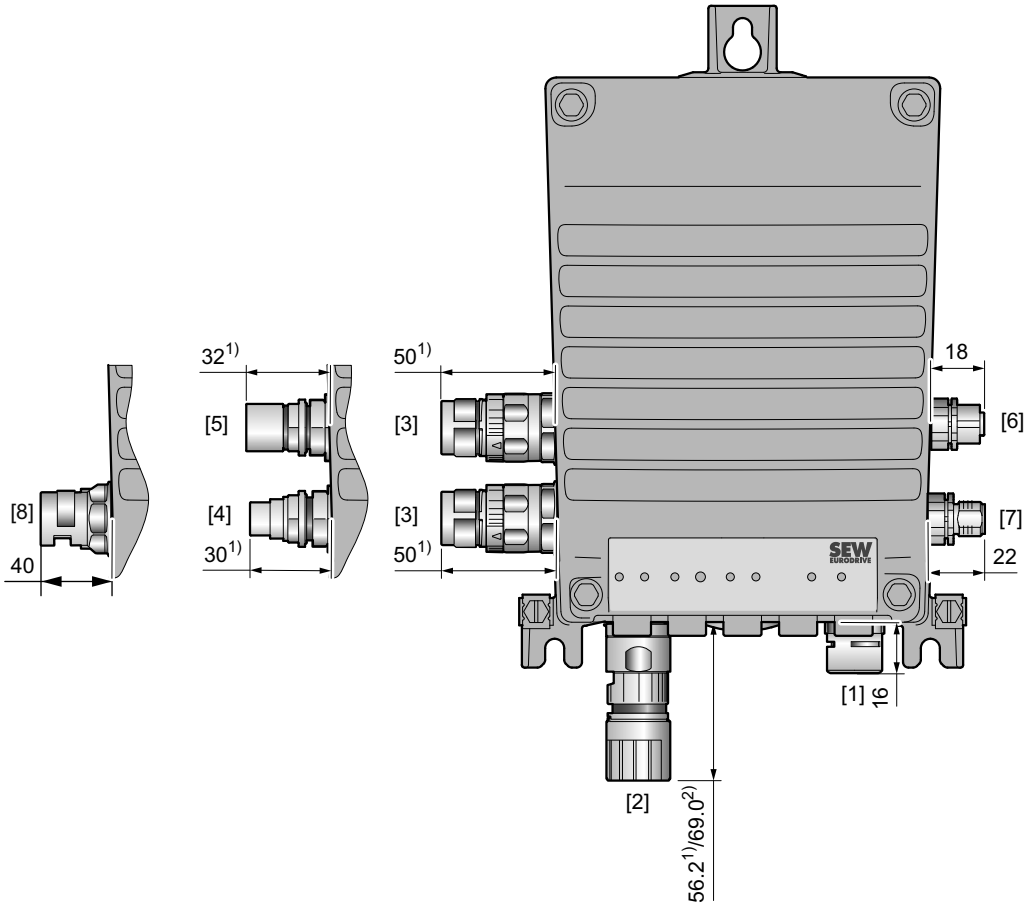
8.1 Dimension drawings of plug connectors in the connection box

8.1.1 Design MMF1.

Plug connectors

INFORMATION

- The following figure shows an example of the additional dimensions of the optional plug connectors for a possible plug connector configuration.
- For more information, refer to chapter "Plug connector positions".



9007230504057099

1) "Straight" plug connector variant M23
2) "Right-angle" plug connector variant M23
[1] Optional pressure compensation
[2] Plug connector design M23, with union nut, female
[3] Plug connector design M23, without union nut, female
[4] Plug connector design MQ15-X-Power, without union nut, male
[5] Plug connector design MQ15-X-Power, with union nut, female
[6] M12 plug connector design, female
[7] M12 plug connector design, male
[8] Plug connector design PhoenixContact, QPD W 4PE2.5, female

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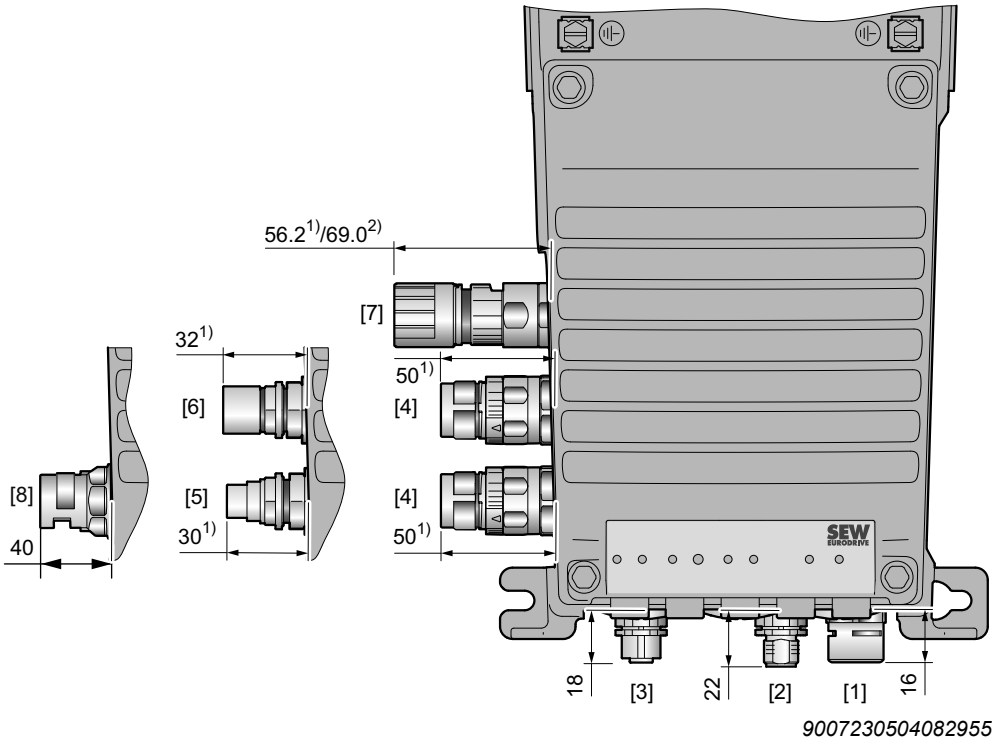
8.1.2 Design MMF3.

Plug connectors

INFORMATION

- The following figure shows an example of the additional dimensions of the optional plug connectors for a possible plug connector configuration.
- For more information, refer to chapter "Plug connector positions".



9007230504082955

1) "Straight" M23 plug connector design
2) "Right-angle" plug connector variant M23
[1] Optional pressure compensation
[2] M12 plug connector design, male
[3] M12 plug connector design, female
[4] Plug connector design M23, without union nut, female
[5] Plug connector design MQ15-X-Power, without union nut, male
[6] Plug connector design MQ15-X-Power, with union nut, female
[7] Plug connector design M23, with union nut, female
[8] Plug connector design PhoenixContact, QPD W 4PE2.5, female

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9 Functional safety

9.1 General information

9.1.1 Note

INFORMATION

For device designs with option /SBA for safe communication, you must also observe the information in the "MOVISAFE® CSB51A Safety Option" manual.

For information on the option designation, refer to chapter "Type designation of the electronics cover".

9.2 Safety-related conditions

9.2.1 Requirements on the installation

- The wiring technology used must comply with the standard EN 60204-1.
- The STO control cables must be routed according to EMC guidelines and as follows:
  - Shielded cables must be permanently (fixed) installed and protected against external damage, or equivalent measures must be taken.
  - Adhere to the regulations in force for the application.
  - The STO control cables from the external safety device to the axis must be installed with a cable length ≤ 100 m.
  - The user must take suitable measures to ensure that STO control cables are routed separately from the power lines of the drive. This does not apply to cables approved by SEW-EURODRIVE specifically for this application case.
- The STO function does not detect short circuits or interference voltage in the supply line. For this reason, one of the following 2 requirements must always be met:
  - No parasitic voltages can occur in the STO control cables.
  - The external safety controller can detect a crossfault from an external potential to the STO control lines.
- Observe without fail the values specified for safety components when designing the safety circuits.
- The STO signal (F_STO_P1, F_STO_P2, and F_STO_M) must not be used for feedback.
- For safety controllers/safety relays, you must only use grounded voltage sources with protective electrical separation (PELV) in accordance with EN 61131-2 and EN 60204-1.
- If several voltage sources are used, each voltage source must be connected to a PE system.
- When planning the installation, observe the technical data of the devices.
- Do not use the port 24 V_OUT of the device for safety-related applications. This voltage is only permitted to supply the M12 plug connector X5504 when the STO jumper is plugged in.

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- When the STO control cables are routed to Terminal X9 in the electronics cover, the cable ends must be covered with conductor end sleeves and the cables must be fixed close to the terminal X9 using cable ties. Other low-voltage signals can be bundled together with the STO signals.
- To use the drive unit in safety-related applications, remove the jumpers labeled with "Caution, remove jumper for safety operation" from the STO terminal X9. No labeled jumpers are available for those designs where the STO connection is performed using plug connectors. The installed jumper is relevant to the function.

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9.3 Connections variants

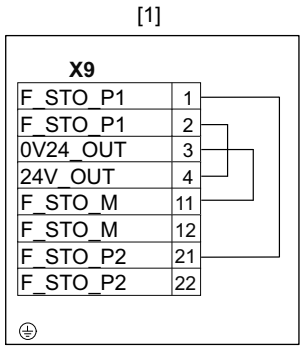
9.3.1 Connection via terminal X9

For detailed information on terminal X9, refer to chapter "Electrical Installation" > "Terminal assignment".

Wiring diagrams

Delivery state

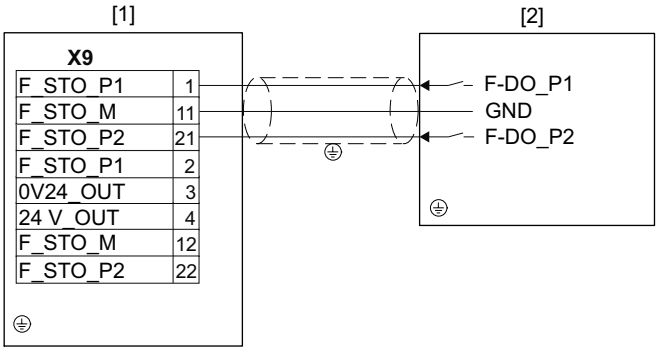
In delivery state, the terminals at the connection for safe disconnection X9 are jumpered. The jumpers are marked with the text "Caution, remove jumper for safety operation". To use the drive unit in safety-related applications, remove the jumpers from the STO terminal X9.



9007222815498379

[1] Drive unit

2-pole sourcing



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[1] Drive unit
[2] External safety device

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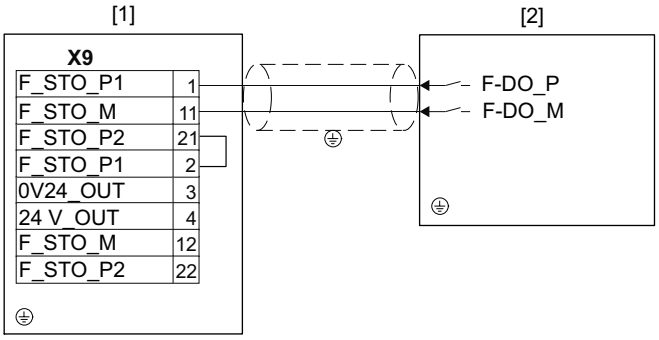
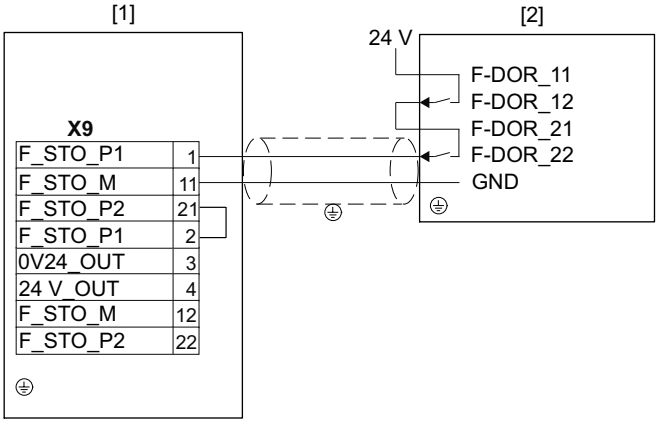
2-pole sourcing/sinking



9007222818872587

[1] Drive unit
[2] External safety device

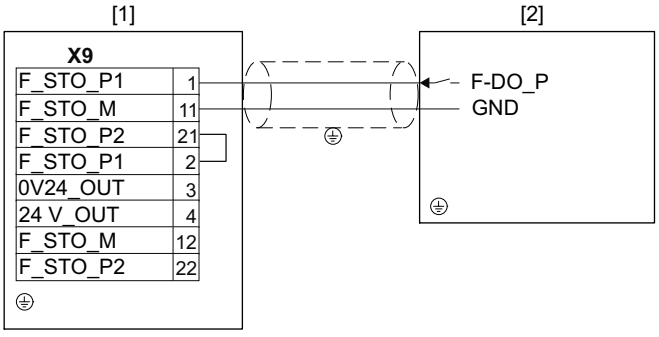
2-pole serial sourcing



9007222818944907

[1] Drive unit
[2] External safety device

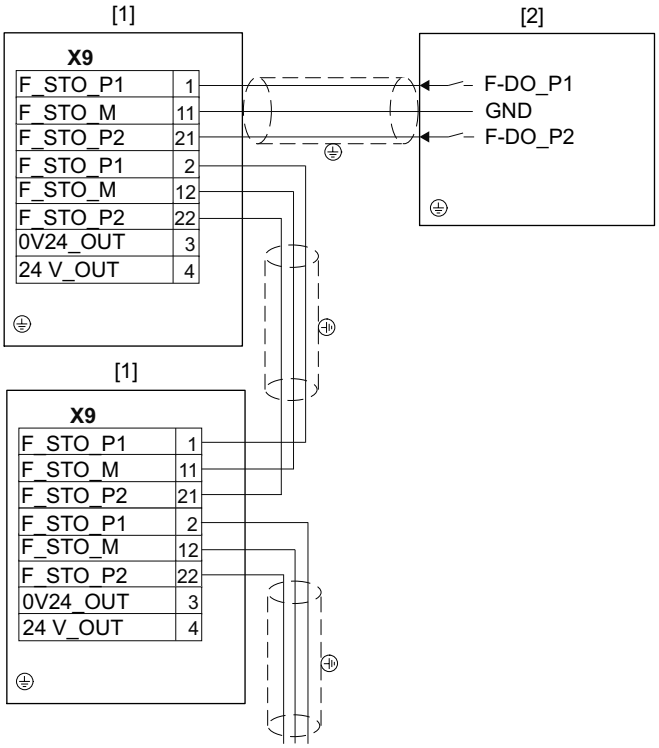
1-pole sourcing



9007222819398155

[1] Drive unit
[2] External safety device

STO group disconnection, 2-pole, sourcing



25228151435

[1] Drive unit
[2] External safety controller

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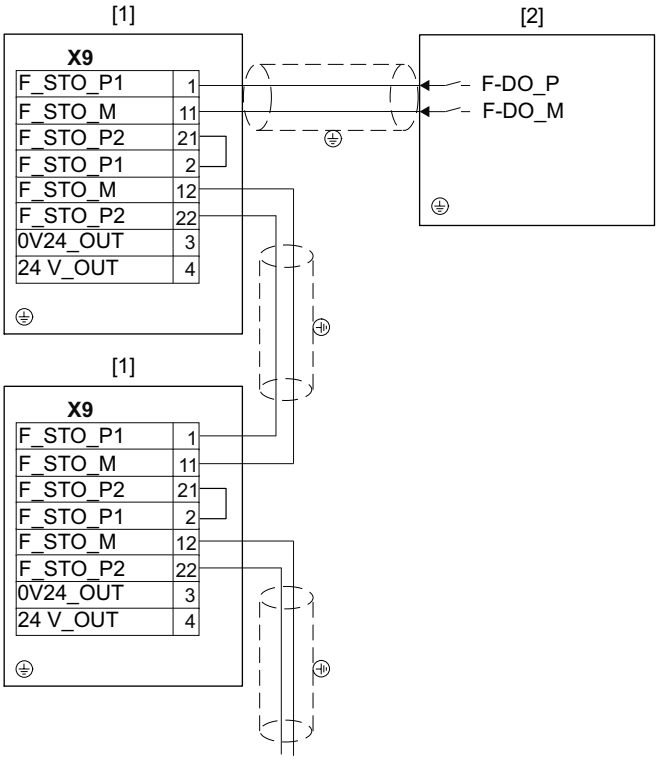
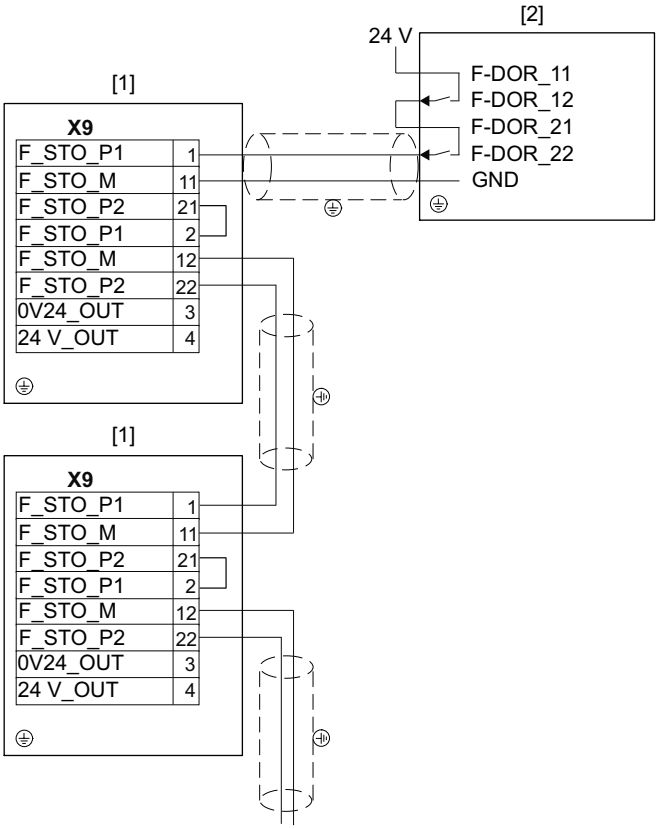
STO group disconnection, 2-pole, sourcing/sinking



25228157067

[1] Drive unit
[2] External safety controller

STO group disconnection, 2-pole, serial sourcing



25229441035

[1] Drive unit
[2] External safety controller

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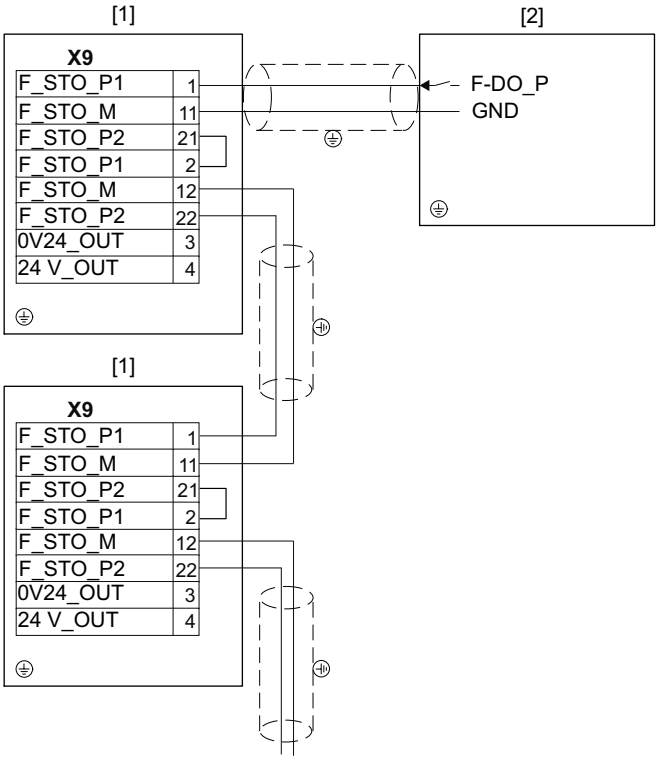
STO group disconnection, 1-pole, sourcing



25229445003

[1] Drive unit
[2] External safety controller

9.3.2 Connection via M12 plug connector X5504/X5505

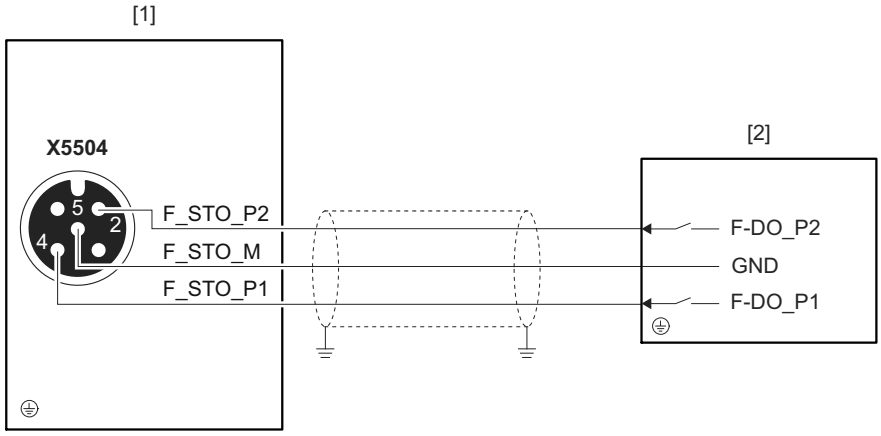
For further information on the connection of X5504/X5505, refer to chapter "Electrical installation" > "Assignment of optional plug connectors".

Wiring diagrams

Delivery state

In the delivery state, plug connector X5504 is not connected, this means the STO input is active. According to the safety concept, X5504 must be connected or temporarily jumpered using the optionally available STO jumper plug for staring up the unit.

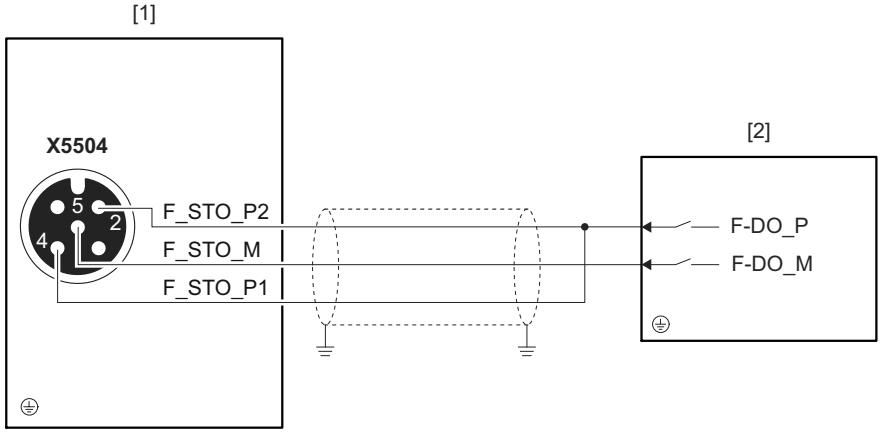
2-pole sourcing



23876274315

[1] Drive unit
[2] External safety device

2-pole sourcing/sinking



23876260491

[1] Drive unit
[2] External safety device

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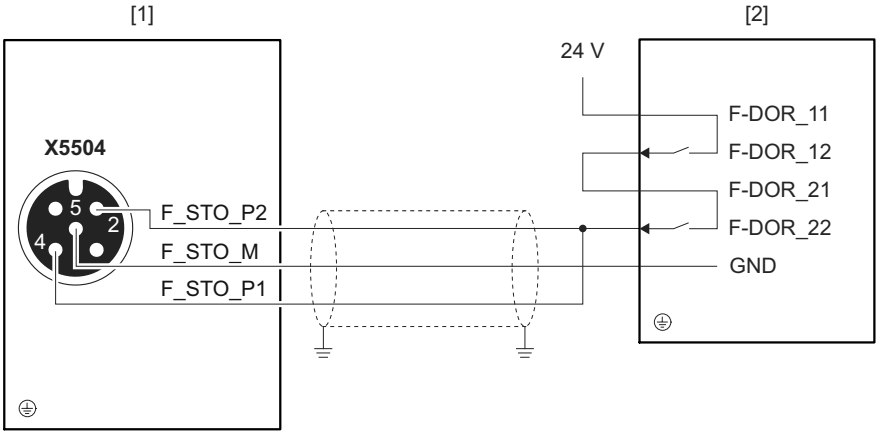
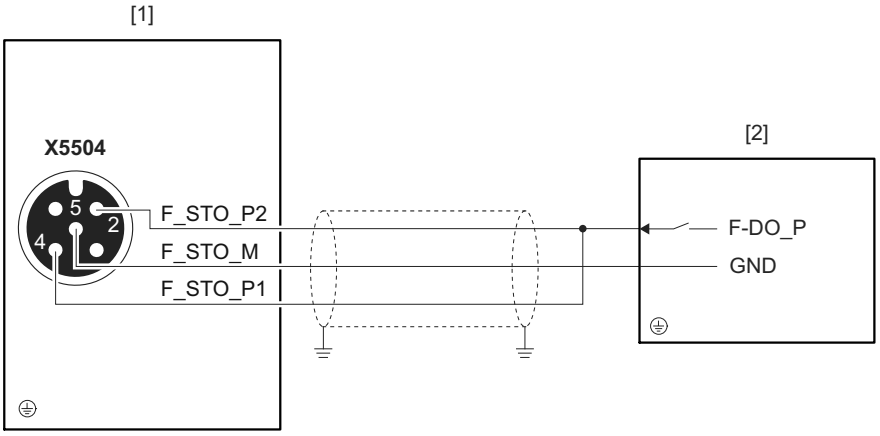
2-pole serial sourcing



23875551243

[1] Drive unit
[2] External safety device

1-pole sourcing



23875545995

[1] Drive unit
[2] External safety device

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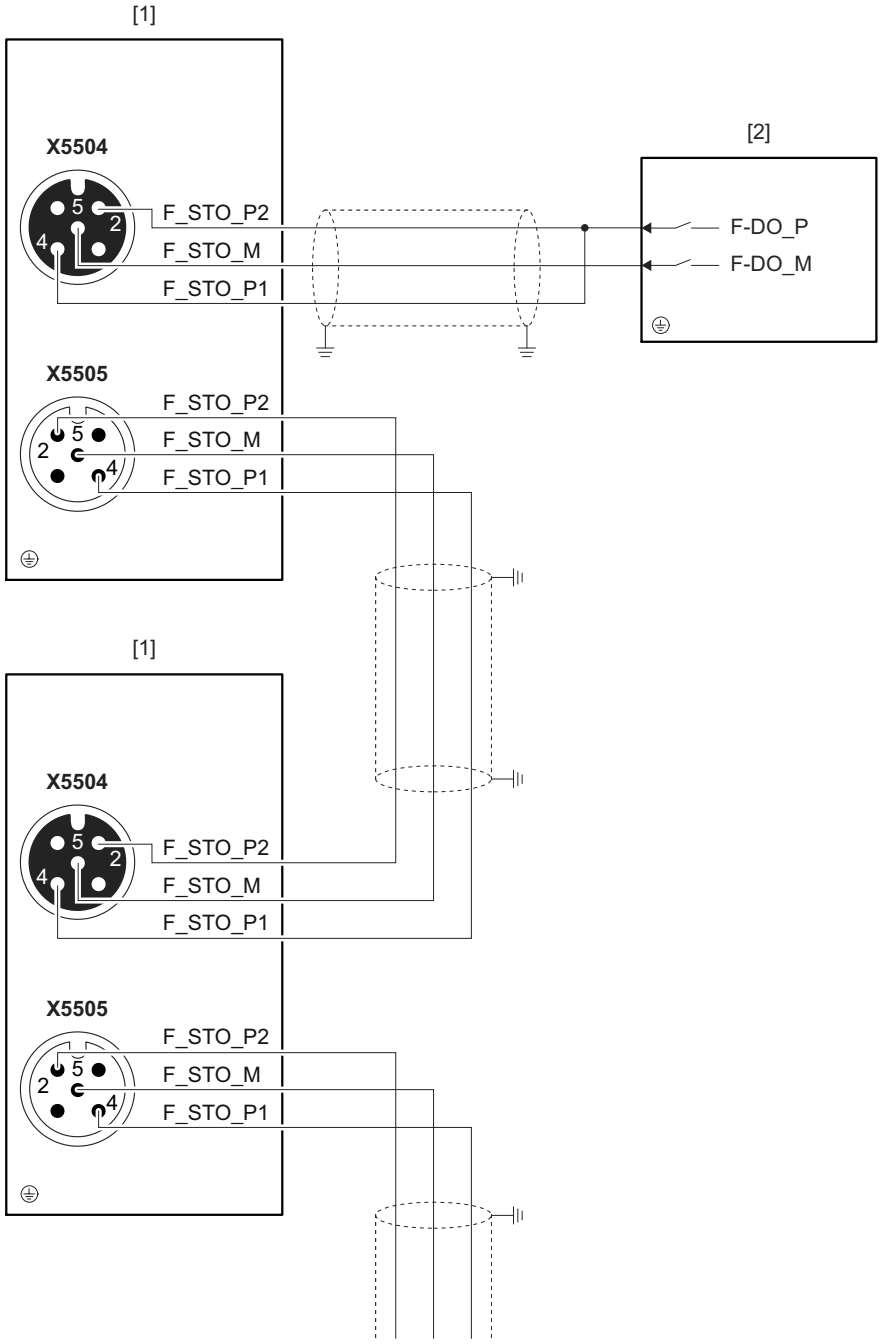
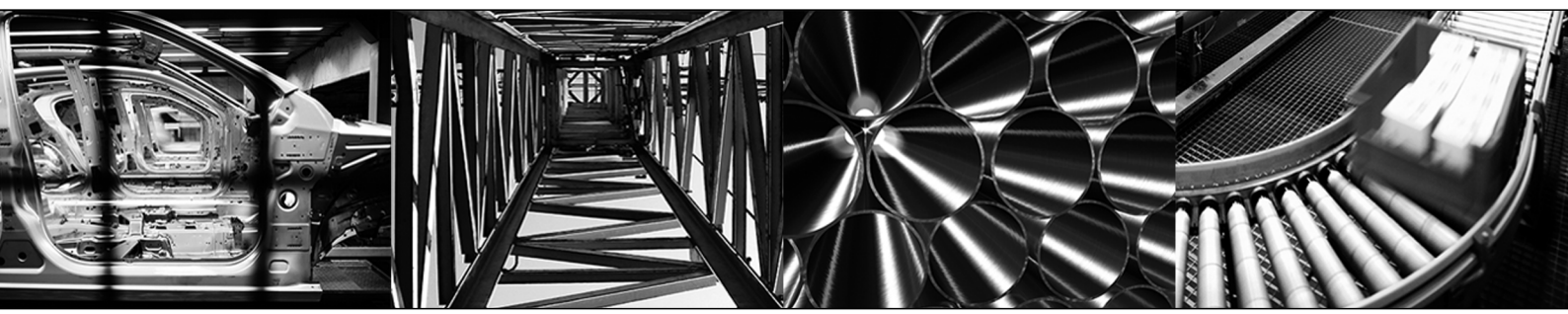
STO group disconnection, 2-pole, sourcing/sinking

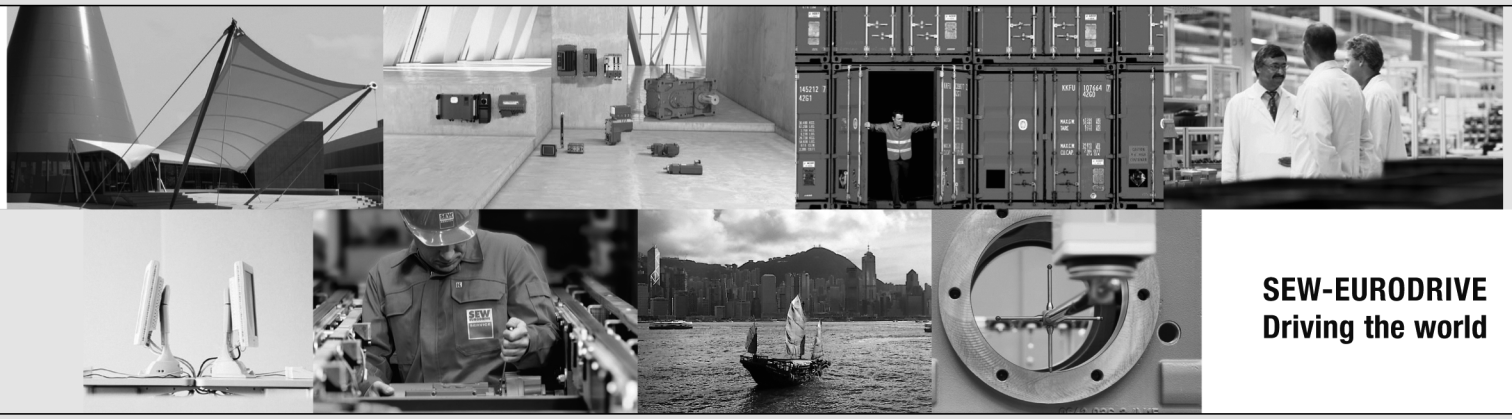


9007223142162187

[1] Drive unit
[2] External safety device

26855488/EN – 10/2020





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