SEW EURODRIVE

Product Manual

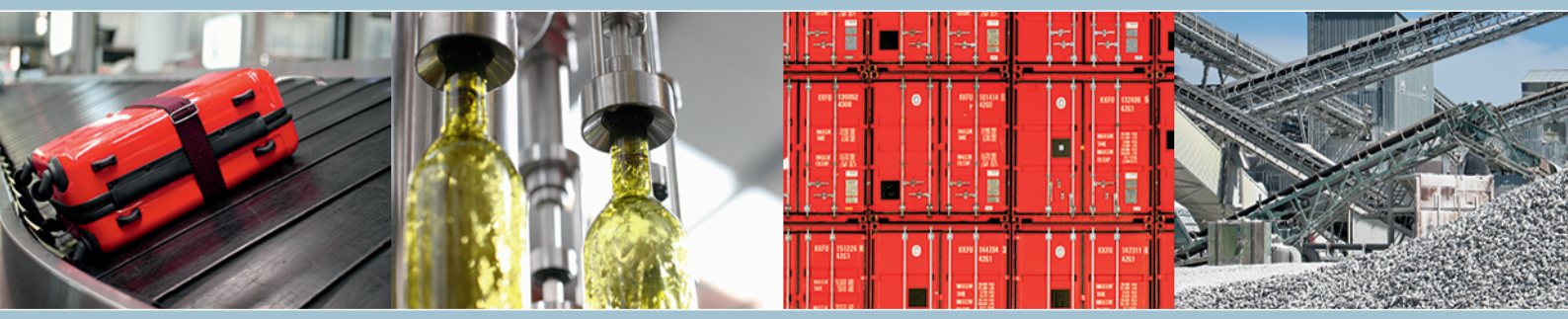
Decentralized Motion and Logic Controller

MOVI-C® FIELD CONTROLLER

MFC1../FHX

Edition 04/2024

31545823/EN



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1 General information

1.1 About this documentation

The documentation at hand is the original.

This documentation is an integral part of the product. The documentation is intended for all employees who perform work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the systems and their operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or if you require further information, contact SEW-EURODRIVE.

1.2 Other applicable documentation

Refer to the corresponding documentation for all other components.

Always use the latest edition of the documentation and the software.

The SEW-EURODRIVE website (www.sew-eurodrive.com) provides a wide selection of documents for download in various languages. If required, you can also order printed and bound copies of the documentation from SEW-EURODRIVE.

1.3 Structure of the safety notes

1.3.1 Meaning of signal words

The following table shows the graduation and meaning of the signal words in the safety notes.

Signal word	Meaning	Consequences if not observed
⚠ **DANGER**	Imminent danger	Death or severe injuries
⚠ **WARNING**	Possibly dangerous situation	Death or severe injuries
⚠ **CAUTION**	Possibly dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION	Useful information or tip: Simplifies handling of the product.	

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1.3.2 Structure of section-related safety notes

Section-related safety notes do not apply to a specific action but to several actions pertaining to one subject. The hazard symbols used either indicate a general hazard or a specific hazard.

This is the formal structure of a safety note for a specific section:

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

1.3.3 Meaning of the hazard symbols

The hazard symbols in the safety notes have the following meaning:

Hazard symbol	Meaning
	General hazard
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Warning of automatic restart

1.3.4 Structure of embedded safety notes

Embedded safety notes are directly integrated into the instructions just before the description of the dangerous step.

This is the formal structure of an embedded safety note:

⚠ **SIGNAL WORD!** Type and source of danger. Possible consequence(s) if disregarded. Measure(s) to prevent danger.

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1.4 Decimal separator in numerical values

In this document, a period is used to indicate the decimal separator.

Example: 30.5 kg

1.5 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

1.6 Recycling, reprocessing, reuse

SEW-EURODRIVE GmbH & Co KG strives to use as few new natural resources as possible in the production of its products. An important aspect of this is the circular economy with the recycling of materials as well as the inspection and/or reprocessing of returned components and their reuse in new products. SEW-EURODRIVE GmbH & Co KG only uses these processes if the resulting materials and components are of the same quality as new parts.

1.7 Product names and trademarks

The product names mentioned in this documentation are trademarks or registered trademarks of the respective titleholders.

1.7.1 Trademark of Beckhoff Automation GmbH

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

1.8 Copyright notice

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2 Safety notes

2.1 Preliminary information

The following general safety notes serve the purpose of preventing injury to persons and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components, also observe the relevant warning and safety notes.

2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following is carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- The national and regional regulations governing safety and the prevention of accidents
- Product safety label on the product
- All other associated project planning documents, installation and startup instructions, as well as wiring diagrams
- Do not assemble, install or operate damaged products
- All system-specific specifications and regulations

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

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2.3 Target group

Specialist for mechanical work

Any mechanical work may be performed only by adequately qualified specialists. Specialists in the context of this documentation are persons who are familiar with the design, mechanical installation, troubleshooting, and maintenance of the product, and who possess the following qualifications:

- Qualifications in the field of mechanics in accordance with the national regulations
- Familiarity with this documentation

Specialist for electrotechnical work

Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications:

- Qualifications in the field of electrical engineering in accordance with the national regulations
- Familiarity with this documentation

Additional qualifications

In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation.

The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.

Instructed persons

All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

2.4 IT security

2.4.1 Contact

If you need support with the configuration, contact SEW-EURODRIVE Service. You can obtain information about the latest security-related problems via e-mail or by visiting the Product Security Management webpage. Here you will find various contact options for reporting security-related problems.

2.4.2 IT security of the product

The product can be set to different access levels. Certain parameters are protected by these access levels. Authentication is implemented by using static access data. This data is not used to defend against attacks on IT security but to protect against unintentional modification.

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2.4.3 IT security of the environment

For drive and control components that are integrated into a network (e.g. a fieldbus, WLAN, or Ethernet network), it is possible to make settings even more remotely. This brings with it the risk of a parameter change that is not visible externally resulting in unexpected, but not uncontrolled system behavior, and this may impact negatively on operational security, system availability, or data security.

Make sure that unauthorized access is not possible, especially for WLAN- or Ethernet-based networked systems and engineering interfaces. Using IT-specific security standards, such as network segmentation, adds to the protection of access to the ports. For an overview of the ports and of the services provided by the communication interfaces, refer to Online Support. The IT security of the product is only guaranteed when used in an environment secured by defense-in-depth strategies.

Ensure that clear responsibility for security is guaranteed during operation. SEW-EURODRIVE recommends an IT security management system in accordance with ISO/IEC 27001 and ISO/IEC 62443-2-4.

2.5 Designated use

The product is intended for installation in electrical systems or machines.

In case of installation in electrical systems or machines, startup of the product is prohibited until it is determined that the machine meets the requirements stipulated in the local laws and directives. For Europe, Machinery Directive 2006/42/EC as well as the EMC Directive 2014/30/EU apply. Observe EN 60204-1 (Safety of machinery - electrical equipment of machines). The product meets the requirements stipulated in the Low Voltage Directive 2014/35/EU.

The standards given in the declaration of conformity apply to the product.

Technical data and information on the connection conditions are provided on the nameplate and in chapter "Technical data" in the documentation. Always comply with the data and conditions.

Unintended or improper use of the product may result in severe injury to persons and damage to property.

Do not use the product as a climbing aid.

2.5.1 Restrictions under the European WEEE Directive 2012/19/EU

Options and accessories from SEW-EURODRIVE may only be used in combination with products from SEW-EURODRIVE.

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2.5.2 Restrictions of use

The following applications are prohibited unless the device is explicitly designed for such use:

- Use in potentially explosive areas.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation.
- Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 61800-5-1.
- Use at an elevation of more than 3800 m above sea level.

The product can be used at altitudes above 1000 m above sea level up to 3800 m above sea level under the following conditions:

- The reduction of the nominal output current and/or line voltage is taken into account as per chapter "Technical data" in the associated product manual.
- Above 2000 m above sea level, the air and creepage distances are only sufficient for overvoltage class II according to EN 60664. At altitudes above 2000 m above sea level, limiting measures must therefore be taken that reduce the line side overvoltage from category III to category II for the entire system.
- If a protective electrical separation (in accordance with EN 61800-5-1 and EN 60204-1) is required, then implement this outside the product at altitudes of more than 2000 m above sea level.

2.6 Functional safety technology

The product must not perform any safety functions without a higher-level safety system unless explicitly allowed by the documentation.

2.7 Transportation

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product or the packaging is damaged, do not assemble, install, connect, or start up the product. If the packaging is damaged, the product itself may also be damaged.

Observe the following notes when transporting the device:

- Ensure that the product is not subject to mechanical impact.
- Before transportation, cover the connections with the supplied protection caps.
- Only place the product on the cooling fins or on the side without connectors during transportation.

If necessary, use suitable, adequately dimensioned transport aids.

Observe the notes on the climatic conditions in accordance with chapter "Technical data" in the corresponding product manual.

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2.8 Creating a safe working environment

Before you work on the product, ensure a safe working environment. Observe the following basic safety note:

2.8.1 Performing work on the product safely

Defective or damaged product

Never install defective or damaged products. Observe the following information to avoid injuries or damage:

- Before installation, check the product for external damage and replace a damaged product.

Hot surfaces

The surfaces of the product can become very hot during operation. Observe the following information to avoid burns:

- Let the product and its accessories cool down before touching it.
- Do not touch any surfaces of the product during operation, except for the control elements.
- Also observe the labels and hazard symbols on the product.

Falling load

Observe the following information to avoid death or severe injury due to falling loads:

- Do not stand under the load.
- Secure the area where loads can fall down.
- Use personal protective equipment (such as helmet and safety shoes).
- Use a suitable lifting tool (chain hoist, forklift) and transport protection.

Sharp edges

Observe the following information to avoid cuts caused by sharp or non-deburred cutting edges:

- Wear safety gloves.

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2.8.2 Performing electrical work safely

Observe the following information to perform electrical work safely:

Electrical work may only be performed by an electrically skilled person or an electronically instructed person under the supervision of an electrically skilled person.

The fact that the operation or display elements are no longer illuminated does not indicate that the product has been disconnected from the supply system and no longer carries any voltage.

Live parts

Always adhere to the 5 safety rules for all work on electrical components:

1. Disconnect.
2. Secure the device against a restart.
3. Check that no voltage is applied.
4. Ground and short-circuit.
5. Cover or isolate neighboring live parts.

Depending on the situation, it is possible to deviate from rules 4 and 5. Observe standard EN 50110-1.

Dangerous voltage

When the system is switched on, dangerous voltages are present at all power connections as well as any cables and terminals that are connected. This also applies even when the voltage supply has been disconnected at the device's switch disconnector or if the product is inhibited. Observe the following information to avoid the risk of electric shock:

- Do not touch any exposed live parts (e.g. male contacts, plug connectors, terminals).
- Secure all open live components with a touch guard.
- Ensure that the connection boxes are closed and screwed down before applying the supply voltage.
- Before applying the supply voltage, make sure that all required covers are mounted.

Danger due to electric arc

An electric arc may occur when plug-in connections are disconnected or connected while voltage is applied (e.g. connection between drive and control). In order to avoid damaging electrical components, observe the following information:

- Do not disconnect power connections during operation.
- Do not connect power connections during operation.
- Ensure that the product is de-energized before disconnecting and connecting the plug-in connections.

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Dangerous voltage

Voltage from charged capacitors can still be present in live product components or power connections after disconnecting from the supply voltage. Observe the following information:

- Observe the following waiting periods before performing electrical work and after disconnecting the supply voltage: **5 minutes**.
- Ensure that the unit is de-energized.
- Also observe the labels and hazard symbols on the product.

2.9 Installation/assembly

Ensure that the product is installed and cooled in accordance with the regulations in the documentation.

Protect the product from excessive mechanical strain. The product and its mounted components must not protrude into the path of persons or vehicles. Ensure that no components are deformed or no insulation spaces are modified, particularly during transportation. Electrical components must not be mechanically damaged or destroyed.

Observe the notes in chapter "Mechanical installation" in the documentation.

2.10 Protective separation

The product meets all requirements for protective separation of power and electronics connections in accordance with IEC 61800-5-1. The connected signal circuits must meet requirements according to SELV (**S**afety **E**xtra **L**ow **V**oltage) or PELV (**P**rotective **E**xtra **L**ow **V**oltage) to ensure protective separation. The installation must meet the requirements for protective separation.

In order to avoid exceeding the permitted contact voltages in SELV or PELV power circuits in the event of a fault, continuous equipotential bonding is required in the vicinity of these power circuits. If this is not possible, other preventive measures must be taken. These preventive measures are described in IEC 61800-5-1.

2.11 Electrical installation

The preventive measures and protection devices must comply with the applicable regulations (e.g. EN 60204-1 or EN 61800-5-1).

2.11.1 Stationary application

The necessary preventive measure for the product is:

Type of energy transfer	Preventive measure
Direct power supply	Ground connection

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2.12 Startup/operation

Observe the safety notes in chapters "Startup" and "Operation" in the associated product manual.

Depending on the degree of protection, products may have live, uninsulated, and sometimes moving or rotating parts as well as hot surfaces during operation.

Never plug or unplug plug connectors while they are energized.

Do not separate the connection to the product during operation. This may result in dangerous electric arcs damaging the product.

If you disconnect the product from the voltage supply, do not touch any live components or power connections because capacitors might still be charged. Observe the following minimum switch-off time:

5 minutes.

Observe the corresponding information signs on the product.

The fact that the operation LED and other display elements are no longer illuminated does not indicate that the product has been disconnected from the supply system and no longer carries any voltage.

Risk of burns: The surface temperature of the product can exceed 60 °C during operation. Do not touch the product during operation. Let the product cool down before touching it.

2.12.1 Switch disconnector

The switch disconnector only disconnects the line terminals for the connected external devices. The line terminals of the device are still connected to the line voltage after the switch disconnector is activated.

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3 Product description

3.1 MOVI-C® system overview

Modular, end-to-end, and scalable: The MOVI-C® modular automation system is your one-stop shop for every automation task. One manufacturer – one end-to-end solution. Including services, hardware and software, from planning and startup to operation and servicing. What does it have to offer? Maximum relief, future-proofing and the reassuring feeling of always having a contact person you can rely on.

3.1.1 Highlights of the MOVI-C® FIELD CONTROLLER

End-to-end	MOVI-C® allows users to switch between control cabinet installation and decentralized installation. The consistency of the functions and features is not dependent on the product family or type of installation.
Low-effort	Simple operation thanks to the software platform and pre-tested MOVIKIT® single- and multi-axis modules. Simplification of the installation process with hybrid cables and industrial plug connectors.
Time-saving	Quick replacement of the lower-level drive components through integrated data management and an auto-reload function.
Consistently decentralized	The high degree of protection offered by the housing of the decentralized controllers enables automation solutions without an additional control cabinet, even in challenging ambient conditions.
Relieving	Reduction of the capacity utilization of higher-level fieldbus networks. Reduction of system complexity thanks to the modular design of the entire system.
Foresighted	Systematic detection of the drive and automation technology's condition thanks to condition monitoring.

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3.1.2 Technical data

FHX25A	• Number of axes: – Interpolated: 2 – Not interpolated: 8 • CPU technology: DualCore ARM Cortex-A7, 1 GHz • Ethernet interface: 1 • System bus: EtherCAT®/SBusPLUS master with integrated star distributor • PROFINET device, EtherNet/IP™ adapter, Modbus TCP • OPC UA: Server/client • Memory: 512 MB SD memory card
FHX45A	• Number of axes: – Interpolated: 8 – Not interpolated: 8 • CPU technology: DualCore ARM Cortex-A7, 1 GHz • Ethernet interfaces: 1 • System bus: EtherCAT®/SBus^{PLUS} master with integrated star distributor • PROFINET device, EtherNet/IP™ adapter, Modbus TCP • OPC UA: Server/client • Memory: 512 MB SD memory card

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4 Technical data

4.1 General information

4.1.1 Air admission and accessibility

When installing the driven machine, make sure there is enough space in axial and radial direction for a sufficient supply of cooling air and unobstructed heat dissipation.

4.2 General technical data

Power loss	12 W
Interference immunity	EN 61800-3; 2nd environment (industrial environment)
Interference emission	EN 61800-3; category C1
Ambient temperature ϑ_{amb}	See chapter "Environmental conditions" (→ 🗎 20)
Operating mode	S1, continuous duty according to EN 60034-1
Type of cooling	Natural cooling to DIN 41751 and EN 61800-5-1
Degree of protection	Standard: IP65 according to EN 60529 (housing closed and all cable bushings sealed)
Pollution class	2 in accordance with IEC 60664-1
Overvoltage category	III in accordance with IEC 60664-1
Required preventive measures	Grounding of the device
Signaling functions	Display elements on the housing to indicate the device state
Current carrying capacity of terminals	• See chapter "Current carrying capacity of terminals" (→ 🗎 23) • For more information, refer to chapter "Electrical installation" > "Installation instructions" > "Permitted cable cross section of terminals" (→ 🗎 63).
Installation altitude	Up to h ≤ 1000 m: without restrictions The following restrictions apply to altitudes > 1000 m: • From 1000 m to max. 3800 m: I_N reduced by 1% per 100 m • From 2000 m to max. 3800 m: To maintain protective separation and the air gaps and creepage distances according to EN 61800-5-1, an overvoltage protection device must be connected upstream to reduce the overvoltages from category III to category II.
Proof of mechanical strength	See chapter "Environmental conditions" (→ 🗎 20)
Mass	3.7 kg

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4.3 Environmental conditions

4.3.1 Climatic conditions

Extended storage	Weatherproof IEC 60721-3-1; class 1K21, non-condensing, no condensation Deviating from the standard: Temperature -25 °C to +70 °C
Transport	Weatherproof IEC 60721-3-2; class 2K11, non-condensing, no condensation Deviating from the standard: Temperature -25 °C to +70 °C
Operation	Stationary use, weatherproof IEC 60721-3-3; class 3K22, non-condensing, no condensation Deviating from the standard: Temperature -25 °C to +60 °C

4.3.2 Special climatic conditions

Extended storage	Weatherproof IEC 60721-3-1 class 1Z1
Operation	Stationary use, weatherproof IEC 60721-3-3 class 3Z1

4.3.3 Biological conditions

Extended storage	Weatherproof IEC 60721-3-1 class 1B1
Transport	Weatherproof IEC 60721-3-2 class 2B1
Operation	Stationary use, weatherproof IEC 60721-3-3 class 3B1

4.3.4 Chemically active substances

Extended storage	Weatherproof IEC 60721-3-1 class 1C2 Deviating from the standard: no corrosive gases, no salt mist
Transport	Weatherproof IEC 60721-3-2 class 2C2, no sea water Deviating from the standard: no corrosive gases, no salt mist
Operation	Stationary use, weatherproof ISO 9223 class C3 Deviating from the standard: no corrosive gases, no salt mist

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4.3.5 Mechanically active substances

Extended storage	Weatherproof IEC 60721-3-1 class 1S10, no conductive dust
Transport	Weatherproof IEC 60721-3-2 class 2S1, no conductive dust
Operation	Stationary use, weatherproof IEC 60721-3-3 class 3S5, no conductive dust

4.3.6 Mechanical conditions

The specifications are characteristic values for the device test. The specifications are based on the test characteristic values according to IEC 60721-3-3 and correspond to class 3M7 according to EN 60721-3-3:1995.

Vibration (sinusoidal)	2 – 200 Hz: 3 g
Vibration (noise)	10 – 200 Hz: 1 m^2/s^3 200 – 500 Hz: 0.3 m^2/s^3 Corresponds to approx. 1.7 g_{rms} (g_{rms} = r.m.s. acceleration value)
Shocks (half sine)	25 g at 6 ms shock duration

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4.4 Technical data of the MOVI-C® FIELD CONTROLLER

4.4.1 Input

MOVI-C® FIELD CONTROLLER			MFC1..			
Electronics cover (controller)			FHX25A-N	FHX25A-E	FHX45A-N	FHX45A-E
Voltage supply for connected drive units						
	Nominal line voltage AC (according to EN 50160)	U_{line}	3 × AC 380 V – 500 V			
	Nominal line current AC	I_{line}	Corresponds to the output current ≤ 24 A (for MFC1.. **without** switch disconnector) ≤ 20 A (for MFC1.. **with** switch disconnector)			
	Line frequency	f_{line}	50 – 60 Hz ± 5%			
Voltage supply for electronics cover (controller)						
	Nominal voltage DC (according to IEC 61131-2)	U_{DC}	24 V (-15% – +20%)			
	Nominal current DC	I_{MAX}	500 mA			

4.4.2 Output

MOVI-C® FIELD CONTROLLER		MFC1..			
Electronics cover (controller)		FHX25A-N	FHX25A-E	FHX45A-N	FHX45A-E
Output voltage	U_{OUT}	Corresponds to the nominal line voltage U_{line}			
Output frequency	f_{OUT}	Corresponds to the line frequency I_{line}			
Nominal output current	I_N	≤ 24 A (for MFC1.. **without** switch disconnector) ≤ 20 A (for MFC1.. **with** switch disconnector)			

4.4.3 Electronics cover (controller)

MOVI-C® FIELD CONTROLLER		MFC1..			
Electronics cover (controller)		FHX25A-N	FHX25A-E	FHX45A-N	FHX45A-E
Memory		• Retain data: 32 kB • Retain persistent: 2 kB • Code, data, constants: 64 MB			
OMH25A or OMH45A SD memory card in the SD card slot		• PC-readable • Contains: – Firmware – IEC program – Application data • 512 MB memory			

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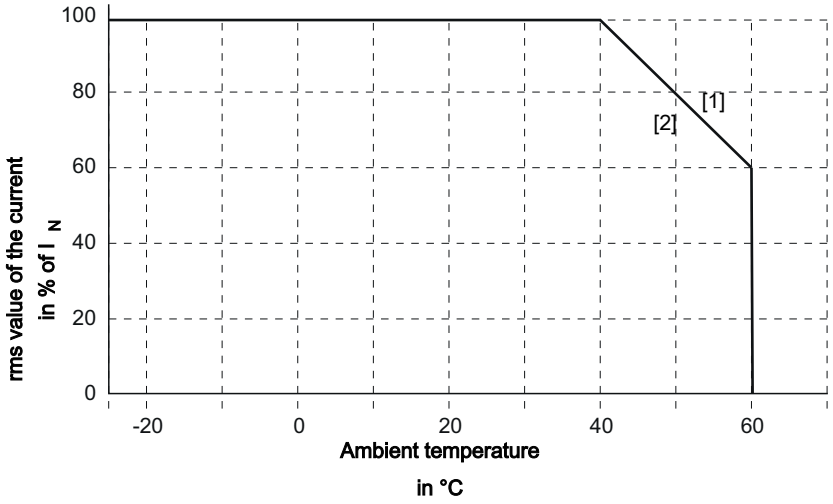
4.4.4 Derating factors

Derating depending on the ambient temperature

The following figure shows the I_N reduction depending on the ambient temperature:



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[1]	Characteristic 1	2 % I_N per K at 40 °C to 60 °C For MFC1.. **without** switch disconnector related to I_N = 24 A
[2]	Characteristic 2	2 % I_N per K at 40 °C to 60 °C For MFC1.. **with** switch disconnector related to I_N = 20 A

Derating depending on the installation altitude

Observe the information regarding the installation altitude in chapter "Technical data" > "General technical data" (→ 🗎 19) > "Installation altitude".

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Derating is based on typical operating conditions with a supply voltage of 24 V.

4.4.5 Current carrying capacity of terminals

Current carrying capacity of terminals		
Line terminals	X1_a X1_b	24 A (max. loop-through current for MFC1.. **without** switch disconnector) 20 A (max. loop-through current for MFC1.. **with** switch disconnector)
Control terminals	X9	10 A (max. loop-through current)

4.5 Interfaces

4.5.1 Interface description

The interfaces of the MOVI-C® FIELD CONTROLLER have the following functions:

- X43_1/X43_2 – EtherCAT®/SBus^{PLUS} interface for the master port
- X4233_1/X4233_3 – fieldbus interfaces for the slave port
- X4224 – engineering interface
- X9 – system bus interface and RS485 interface

4.5.2 PROFINET IO

Technical data for PROFINET IO interface

PROFINET IO	
Manufacturer ID	$010A_{hex}$
Device ID	15_{dec}
Connection technology	M12 plug connector
Baud rate	100 MBd (full duplex)
Application protocols	PROFINET IO, HTTP, SNMP, SEW Application Services
Port numbers used	80, 161, 310, PROFINET DCE/RPC Ports (dynamic via End Point Mapper)
Conformance class	C
Real time class	RT (Real Time), IRT (Isochronous Real Time)
Netload class	3
Topology detection	Yes (LLDP)
Auto addressing	Yes (LLDP, DCP)
I&M	1 – 5
Media redundancy	MRP
Shared device	Yes
Ethernet switch	2 ports, integrated
Technology	Cut Through, Store and Forward
Latency period Cut Through	5.5 µs
Latency period Store and Forward	Depending on package size
Application profiles	PROFIsafe, PROFIenergy
Permitted cable types	Category 5 and higher, class D according to IEC 11801
Maximum cable length (from switch to switch)	100 m
GSD file name	`GSDML-Vx.yz-SEW-MOVI-C-CONTROLLER-FHX25-FHX45-jjjjmmdd-hhmmss`
Bitmap file name	`GSDML-010A-000F-SEW-MOVI-C-FHXx5.bmp`

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Port overview

Port	TCP/ UDP	Function	Authorization
Dynamic port definition via End Point Mapper	UDP	PROFINET DCE/RPC	Reading and writing of all indexed parameters
EtherType 8892hex		Process data exchange	Controlling connection
EtherType 88B5hex		Address Editor from SEW-EURODRIVE	Reading and writing of all address parameters of the Ethernet interface
310	TCP/ UDP	Data Streaming	Reading and writing of all indexed parameters
161	UDP	SNMP	Reading on MIBs
80	TCP	Integrated web server	Reading
11740	TCP	3S Engineering	Reading and writing to the 3S system (controller only)

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4.5.3 EtherNet/IP™ and Modbus TCP

Technical data for the EtherNet/IP™, Modbus TCP interface

EtherNet/IP™, Modbus TCP	
Manufacturer ID	$013B_{hex}$
Device ID	• FHX25A: $1A_{hex}$ • FHX45A: $1B_{hex}$
Connection technology	M12 plug connector
Supported baud rate	100 MBd/10 MBd (full duplex, half duplex)
Application protocols	EtherNet/IP™, Modbus TCP, HTTP, SNMP, DHCP, SEW Application Services
Port numbers used	67/68, 80, 161, 310, 502, 2222, 44818
Permitted cable types	Category 5 and higher, class D according to IEC 11801
Maximum cable length (from switch to switch)	100 m
EDS file name	• FHX25A: `SEW MOVI-C CONTROLLER FHX25A.eds` • FHX45A: `SEW MOVI-C CONTROLLER FHX45A.eds`

Port overview

Port	TCP/ UDP	Function	Permission
EtherType 88B5hex		Address Editor from SEW-EURODRIVE	Reading and writing of all address parameters of the Ethernet interface
67/68	UDP	DHCP	Reading and writing of all address parameters of the Ethernet interface
80	TCP	HTTP	Reading and writing to indexed variables (inverter only)
161	UDP	SNMP	Reading on MIBs
310	TCP/ UDP	Data Streaming	Reading and writing of all indexed parameters
502	TCP	Modbus TCP	Process data exchange; reading and writing of all indexed parameters
2222	UDP	EtherNet/IP™	Process data-controlling connection
11740	UDP	3S Engineering	Reading and writing from the 3S system (controller only)
44818	TCP/ UDP	EtherNet/IP™	Parameter exchange; reading and writing of all indexed parameters

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4.5.4 Engineering interface

Port overview

Port	TCP/ UDP	Function	Authorization
21	TCP	FTP	Reading from and writing to the file system
23	TCP	Telnet	Reading OEM diagnostic data
11740 - 11743	TCP	CODESYS engineering	Reading and writing
1740 - 1743	UDP	CODESYS engineering	Reading and writing
310	TCP/ UDP	Data Streaming	Reading and writing of all indexed parameters
4840		CODESYS OPC UA server	
8080	HTTP	CODESYS web server	

INFORMATION

Ports 21 and 23 are initially closed and can be opened via the configuration.

INFORMATION

Use Telnet and FTP only during startup and only in a secure environment (e.g. behind a firewall at the system limits).

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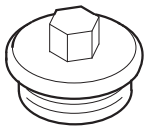
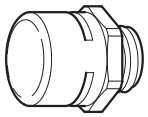
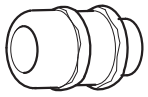
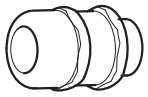
4.6 Screw fittings

4.6.1 Cable glands / screw plugs / pressure compensation

The following table shows the screw fittings and the screw plug optionally available from SEW-EURODRIVE:

Screw fitting type	Image	Content	Size	Tightening torque		Outer cable diameter	Tightening force[1]	Part number
				Threaded jacket	Cable clamping			
Screw plugs external hexagon (made of stainless steel)		10 pieces	M16 × 1.5	6.8 Nm	–	–	–	18247342
		10 pieces	M25 × 1.5	6.8 Nm	–	–	–	18247350
Pressure compensation screw fittings (made of stainless steel)		1 piece	M16 × 1.5	4.0 Nm	–	–	–	28214617
EMC-compliant cable gland (brass, nickel-plated)		10 pieces	M16 × 1.5	4.0 Nm	3.5 Nm	> 4 to 8 mm	75 N	18204783
		10 pieces	M25 × 1.5	7.0 Nm	5.0 Nm	> 8 to 11 mm	120 N	18204805
						> 11 to 16 mm	130 N	
EMC-compliant cable gland (made of stainless steel)		10 pieces	M16 × 1.5	4.0 Nm	3.5 Nm	> 4 to 8 mm	75 N	18216366
		10 pieces	M25 × 1.5	7.0 Nm	5.0 Nm	> 8 to 11 mm	120 N	18216382
						> 11 to 16 mm	130 N	

1) Fasten the cable in the cable gland so that it achieves the following cable pull-out force from the cable gland. This is usually achieved with the specified tightening torque of the cable clamp.

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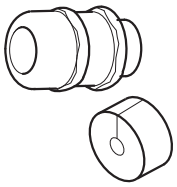
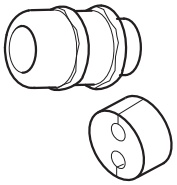
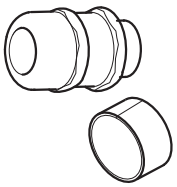
4.6.2 Cable glands of the Ethernet cable (mini I/O)

The following table shows the screw fittings for Ethernet cables optionally available from SEW-EURODRIVE:

Screw fitting type	Image	Contents	Size	Tightening torque	Inner diameter cable gland[1)]	Outer diameter cable	Part number
Cable gland for externally routed Ethernet cable with mini I/O plug connector (brass, nickel-plated)		10 pieces	M25 × 1.5	7 Nm	Ø 20 mm	6.5 mm	25676040
		10 pieces	M25 × 1.5	7 Nm	Ø 20 mm	2 × 6.5 mm	25676032
Cable gland for externally routed PAC/PSC hybrid cable with mini I/O plug connector (brass, nickel-plated)		10 pieces	M25 × 1.5	7 Nm	Ø 20 mm	14 – 20 mm	25675664

1) The inner diameter is suitable for mini-I/O plug connectors to be led through. This is also possible if a cable (Ø < 7 mm) is already led through.

The cable fastening in the cable gland must achieve the following cable pull-out force from the cable gland:

- Cable with outer diameter > 10 mm: ≥ 160 N
- Cable with outer diameter < 10 mm: = 100 N

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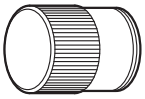
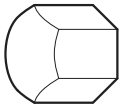
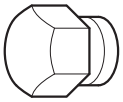
4.6.3 Screw fittings: Plug connectors

The following table shows the screw plugs for plug connectors optionally available from SEW-EURODRIVE:

Screw fitting type	Image	Contents	Size	Tightening torque	Part number
M23 plug for plug connector with male thread (stainless steel)		1 pieces	M23 × 1.5	Tighten to the stop	19094558
M12 plug for plug connector with male thread (stainless steel)		10 pieces	M12 × 1.0	2.3 Nm	18202799
M12 plug for plug connector with female thread (stainless steel)		10 pieces	M12 × 1.0	2.3 Nm	18202276

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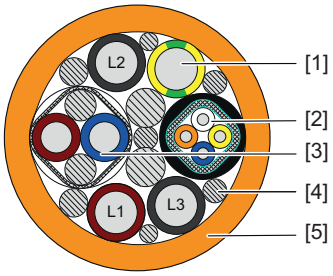
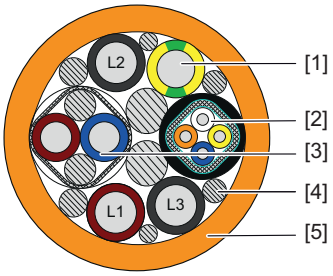
4.7 Connection cables

4.7.1 Specification PA, PAC, PSC hybrid cables

(AC 400 V, Ethernet and backup voltage or STO signal)

Mechanical design

The following table describes the mechanical design of the cable:

		HELUKABEL® Li9Y11-HF 28118707	HELUKABEL® Li9Y11-HF 28118715	HELUKABEL® Li9YYö 28118723	HELUKABEL® Li9YYö 28118731
Mechanical structure					
[1]	Conductors	4 × 2.5 mm²	4 × 4.0 mm²	4 × 2.5 mm²	4 × 4.0 mm²
	Conductor	Blank copper Class 6 to DIN EN 60228		Blank copper Class 5 to DIN EN 60228	
	Insulation	Polypropylene, 0.55 mm	Polypropylene, 0.6 mm	Polypropylene, 0.5 mm	Polypropylene, 0.6 mm
	Colors	Yellow/green, brown, black, gray			
[2]	Conductors	4x 0.34 mm², twisted			
	Conductor	Tinned copper, 7 wires			
	Insulation	Polyolefin, 0.4 mm			
	Shielding	Plastic laminated aluminum foil (metal side outside) Braided tinned Cu, conductive fleece, Optical coverage min. 85%			
	Colors	White, yellow, blue, orange			
	Diameter	approx. 5.4 mm			
[3]	Conductors	2 × 2.5 mm², twisted With filling elements		2 × 2.5 mm², twisted With filling elements	
	Conductor	Blank copper Class 6 to DIN EN 60228		Blank copper Class 5 to DIN EN 60228	
	Insulation	Polypropylene, 0.55 mm		Polypropylene, 0.5 mm	
	Shielding	Braided tinned Cu, polyester film, Optical coverage min. 85%			
	Colors	Blue, brown			
	Diameter	approx. 6.8 mm			
[4]	Filler	-			

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		HELUKABEL® Li9Y11-HF 28118707	HELUKABEL® Li9Y11-HF 28118715	HELUKABEL® Li9YYö 28118723	HELUKABEL® Li9YYö 28118731
[5]	Outer cable jacket	TPU Wall thickness 1.5 mm		PVC Wall thickness 1.5 mm	
	Color	Orange, similar to RAL2003			
	Label	SEW-EURODRIVE 28118707 Li9Y11Y-HF ..	SEW-EURODRIVE 28118715 Li9Y11Y-HF ..	SEW-EURODRIVE 28118723 Li9YY ..	SEW-EURODRIVE 28118731 Li9YY ..
	Diameter	15.5 mm ±0.4 mm	17.0 mm ±0.4 mm	15.3 mm ±0.3 mm	16.8 mm ±0.3 mm

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Technical data

The following table shows the technical data of the signal cable:

Properties	HELUKABEL® Li9Y11-HF 28118707	HELUKABEL® Li9Y11-HF 28118715	HELUKABEL® Li9YYö 28118723	HELUKABEL® Li9YYö 28118731
UL properties	UL758 (AWM) Sheath: UL Style 21209 Conductor: UL Style 11658	UL758 (AWM) Sheath: UL Style 21209 Conductor: UL Style 10492	UL758 (AWM) Sheath: UL Style 21179 Conductor: UL Style 1157	UL758 (AWM) Sheath: UL Style 21179 Conductor: UL Style 10492
	UL Style 21209 AWM I/II A/B 90 °C 1000 V FT1 E170315		UL Style 21179 AWM I/II A/B 90 °C 1000 V FT1 E170315	
Test voltage conductor/conductor	4 kV 50 Hz 5 min.			
Test voltage conductor/shield	4 kV 50 Hz 5 min.			
Operating voltage	Max. AC 1000 V			
Insulation resistance	≥ 500 MΩ/km			
Conductor resistance Conductors [1]	2.5 mm^2: ≤ 7.98 Ω/km	4.0 mm^2: ≤ 4.95 Ω/km	2.5 mm^2: ≤ 7.98 Ω/km	4.0 mm^2: ≤ 4.95 Ω/km
Conductors [2]	0.34 mm^2: ≤ 58.0 Ω/km			
Conductors [3]	2.5 mm^2: ≤ 7.98 Ω/km			
Capacitance Conductor/conductor [2]	50 pF ±15 pf/m at 800 Hz			
Mean surge impedance Conductor [2] (0.34 mm^2)	100 Ω ±15 Ω at 100 MHz			

Damping Conductors [2] (0.34 mm^2)	Frequency in MHz	Damping in dB/100 m	NEXT in dB
	1	≤ 2.3	≤ 65.3
	4	≤ 4.2	≤ 56.3
	10	≤ 6.8	≤ 50.3
	16	≤ 8.6	≤ 47.2
	20	≤ 9.7	≤ 45.8
	31.25	≤ 12.3	≤ 42.8
	62.5	≤ 18.0	≤ 38.4
	100	≤ 23.6	≤ 35.3

Screening attenuation Conductor [2] (0.34 mm^2)	30 to 100 MHz ≤ 65 dB

Properties	HELUKABEL® Li9Y11-HF 28118707	HELUKABEL® Li9Y11-HF 28118715	HELUKABEL® Li9YYö 28118723	HELUKABEL® Li9YYö 28118731
Coupling resistance Conductors [2] (0.34 mm²)	0.01 to 4 MHz: ≤ 20 mΩ/m 10 MHz: ≤ 50 mΩ/m 30 MHz: ≤ 150 mΩ/m			
Operating temperature	-40 °C to +90 °C (fixed installation) -20 °C to +60 °C (cable carrier)		-30 °C to +90 °C (fixed installation)	
Cable mass	ca. 356 kg/km	ca. 431 kg/km	ca. 340 kg/km	ca. 416 kg/km
Outer diameter	15.5 mm ±0.4 mm	17.0 mm ±0.4 mm	15.3 mm ±0.3 mm	16.8 mm ±0.3 mm
Use	Use for fixed installation Use for cable carrier		Use for fixed installation	
Bending radii	Min. 4 × outer diameter (fixed installation) Min. 8 × outer diameter (cable carrier)		Min. 4 × outer diameter (fixed installation)	
Bending cycles	Min. 5 million.		–	
Travel distance	Max. 20 m horizontal Max. 50 m vertical		–	
Travel speed	Max. 240 m/min		–	
Acceleration	Max. 30 m/s² at travel distance of 5 m Max. 15 m/s² at travel distance of 10 m Max. 5 m/s² at travel distance of 20 m		–	
Torsion	Max. 30 °/m		–	
Tensile strength	Max. ±50 N/mm² (static) Max. ±20 N/mm² (dynamic)		–	
Chemical characteristics	• Oil resistance according to DIN EN 60811-404, • Flame retardant according to IEC 60332-1-2, • Halogen-free according to DIN VDE 0472 T.815 • Silicone-free • CFC-free • Conform to RoHS		• Oil resistance according to DIN EN 60811-404, • Flame retardant according to IEC 60332-1-2, • Silicone-free • CFC-free • Conform to RoHS	

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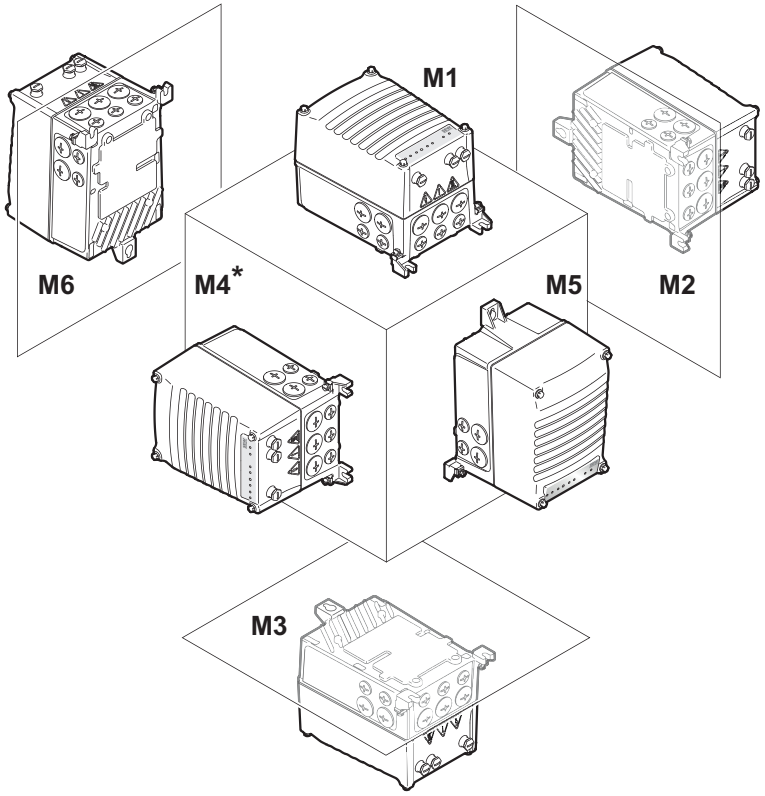
4.8 Mounting positions

4.8.1 MFC1.. design

The following mounting positions are possible for the device:



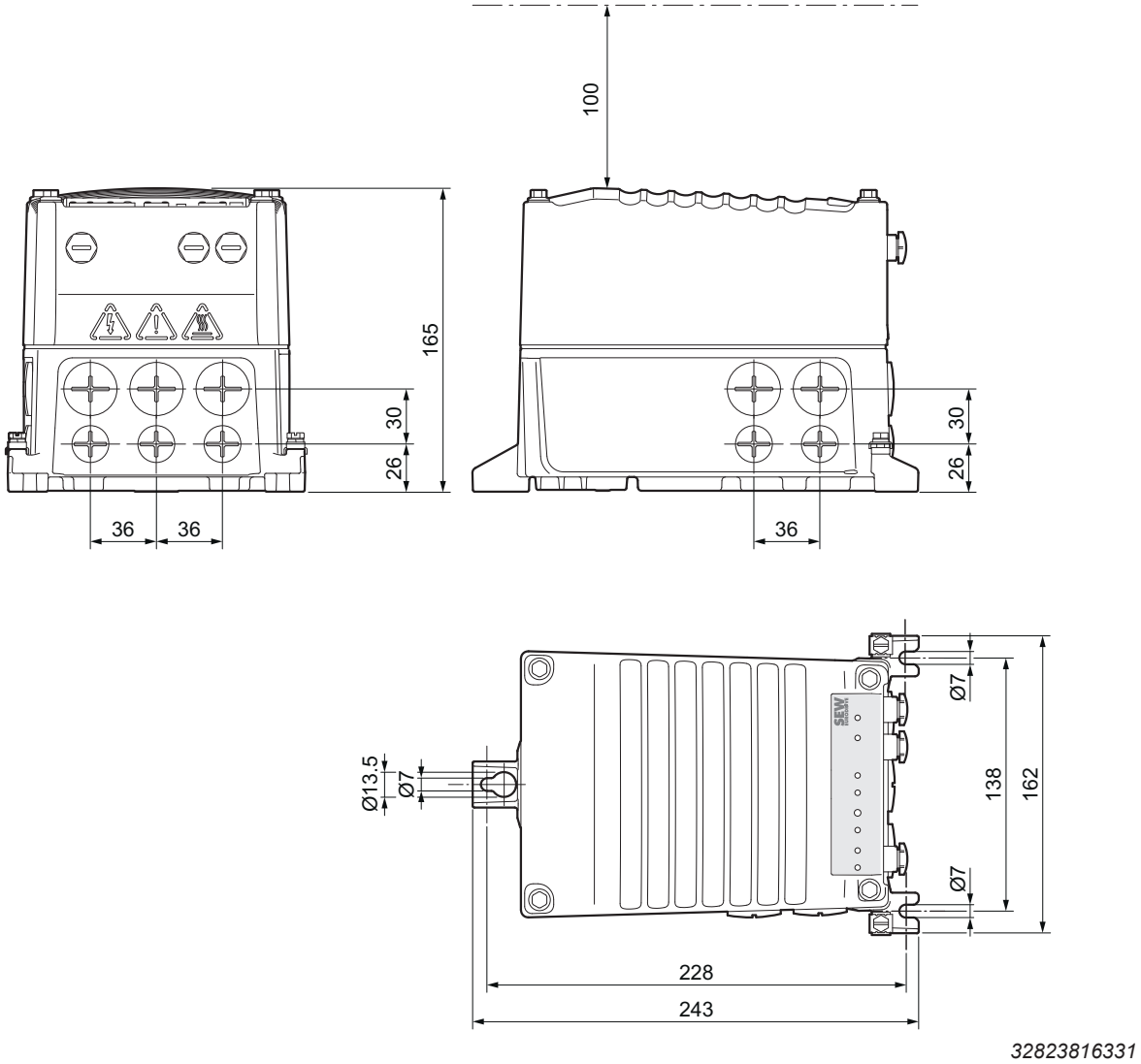
9007231422960779

* Mounting position M4 in combination with switch disconnector **not** permitted.

4.9 Device dimension drawings

4.9.1 Dimension drawing of the MFC1.. design

The following figure shows the dimensions of the device.

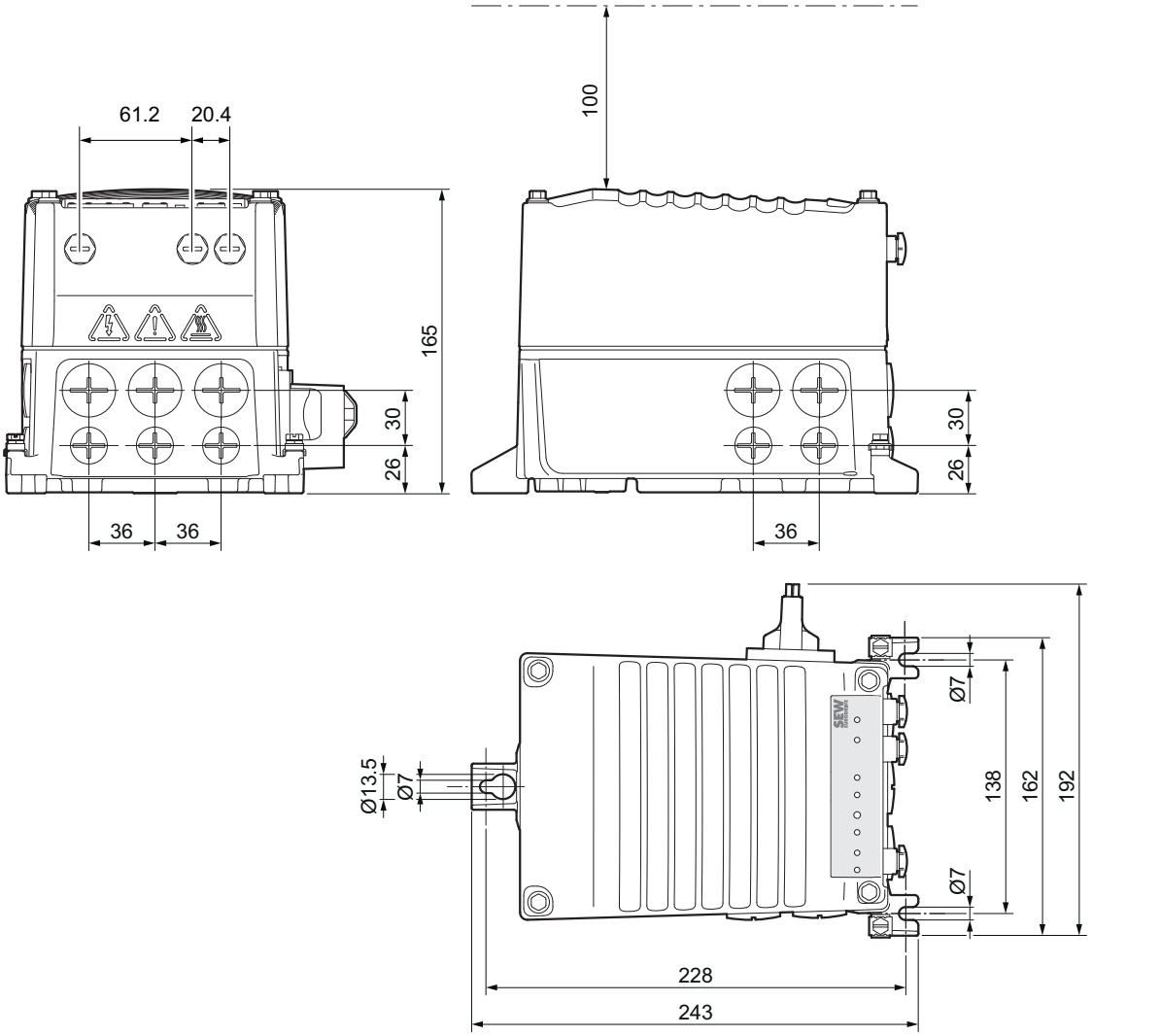


32823816331

All dimensions in mm.

4.9.2 Dimension drawing of the MFC1.. design with switch disconnector

The following figure shows the dimensions of the device.



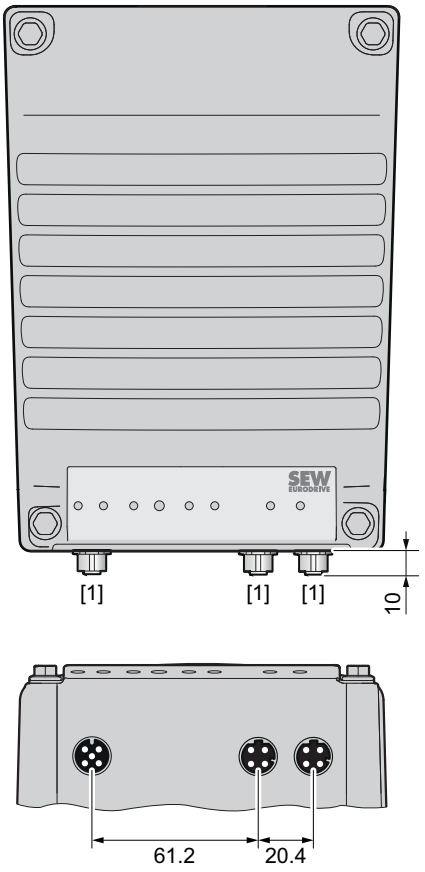
9007227976934027

All dimensions in mm.

4.10 Dimension drawings of plug connectors on the electronics cover

4.10.1 Dimension drawing of plug connectors on the electronics cover

The following figure shows the additional dimensions of the plug connectors:



9007231423050379

[1] M12 plug connector design, female

All dimensions in mm.

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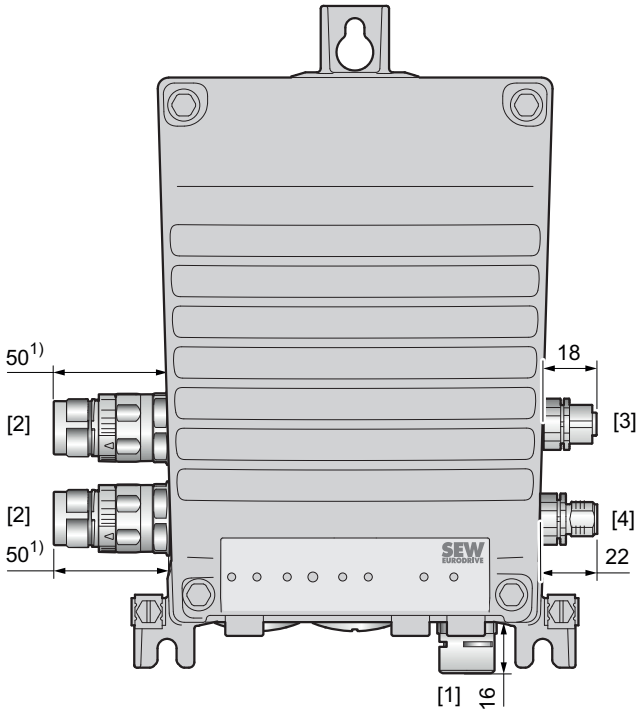
4.11 Dimension drawings of plug connectors in the connection box

4.11.1 Dimension drawings of the MFC1.. design

Dimension drawing of the MFC1.. design plug connectors

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 "Electrical installation" > "Plug connector" > "Plug connector positions ...".



28692454795

[1] Optional pressure compensation
[2] M23 plug connector design, female
[3] M12 plug connector design, female
[4] M12 plug connector design, male

All dimensions in mm.

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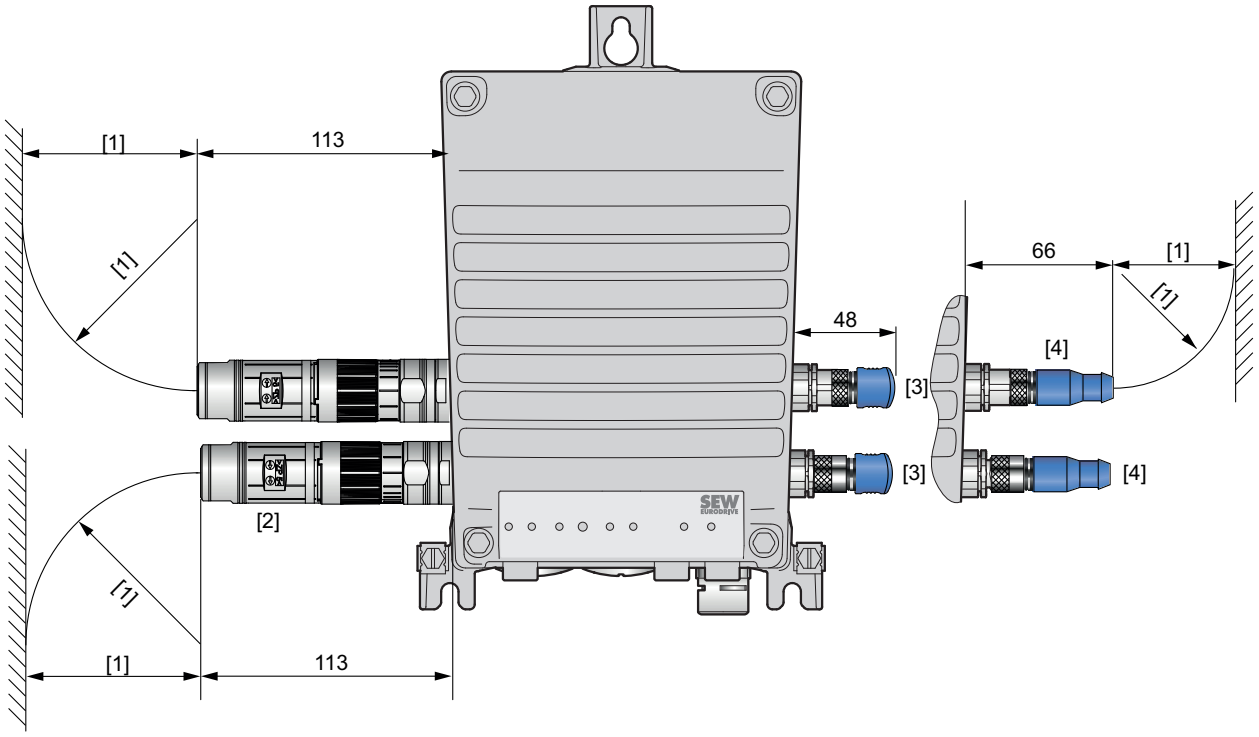
Dimension drawing of the MFC1.. design plug connectors including mating connector

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 "Electrical installation" > "Plug connector" > "Plug connector positions ...".



9007227947192203

[1] Distance according to the permitted bending radius of the cable
[2] "Straight" M23 plug connector design
[3] "Angled" M12 plug connector design
[4] "Straight" M12 plug connector design

All dimensions in mm.

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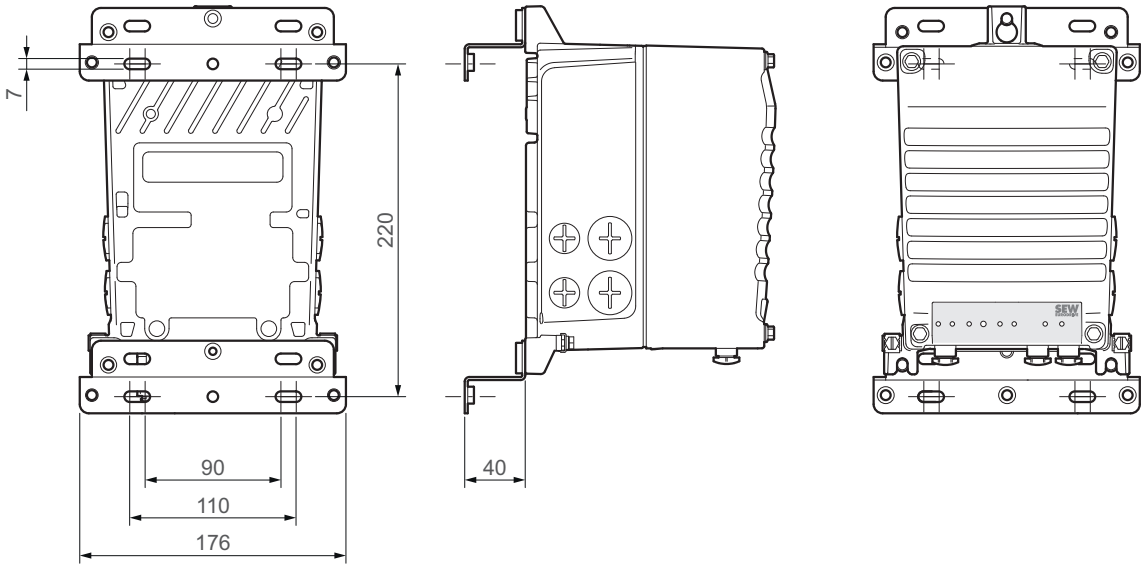
4.12 Dimension drawing of M01 mounting panel

4.12.1 Dimension drawing of the M01 mounting panel on the MFC1.. design

The following figure shows the dimensions of the M01 mounting panel on the MFC1 design:



32168416907

All dimensions in mm.

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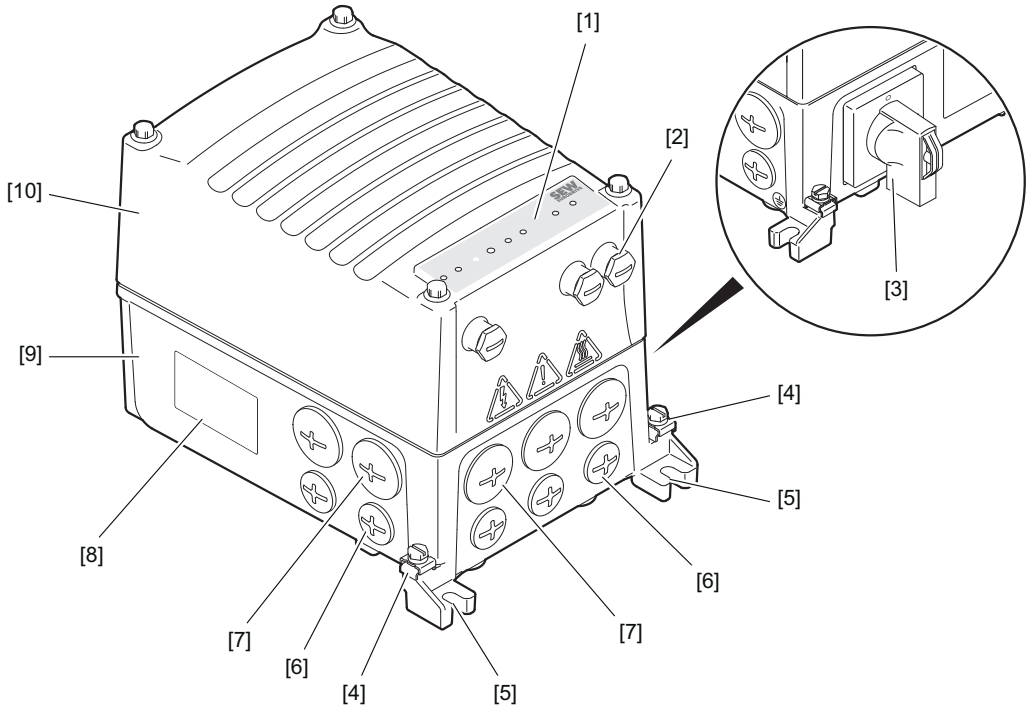
5 Device structure

5.1 MOVI-C® FIELD CONTROLLER Standard/Advanced

The MOVI-C® FIELD CONTROLLER consists of a decentralized controller (referred to as electronics cover in the following) and a connection box with field distributor functionality.



18014427029161355

[1] LED displays
[2] M12 plug connector
[3] Switch disconnector (optional) with feedback contact (with triple lock, color: red/black)
[4] Screws for PE connection
[5] Mounting lugs
[6] M16 cable glands
[7] M25 cable glands
[8] Nameplate
[9] Connection box
[10] Decentralized controller (referred to as electronics cover in the following)

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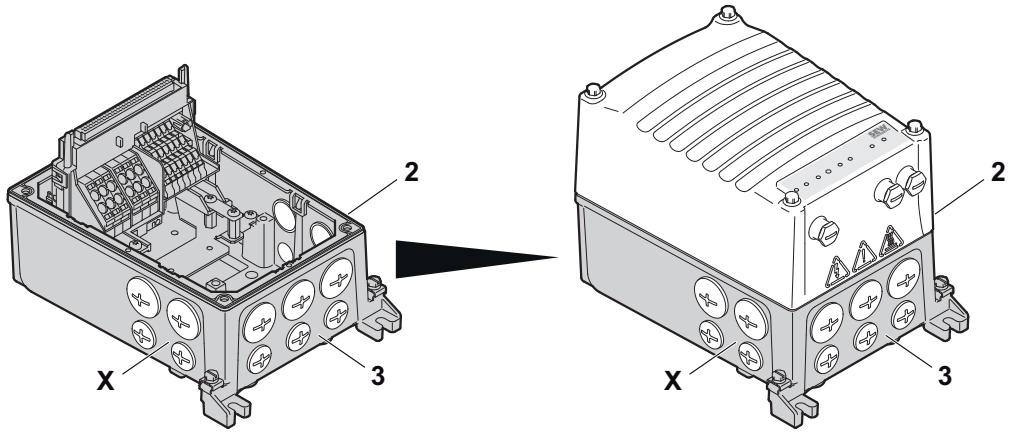
5.2 Cable entry position

5.2.1 MFC1.. design

The following cables entries are possible for the device:

- Position X + 2 + 3
  - X: 2 × M25 × 1.5 + 2 × M16 × 1.5
  - 2: 2 x M25 x 1.5 + 2 x M16 x 1.5 **(only in MFC1.. design without switch disconnector)**
  - 3: 3 × M25 × 1.5 + 3 × M16 × 1.5

The following figure shows the possible cable entries:



18014427029428747

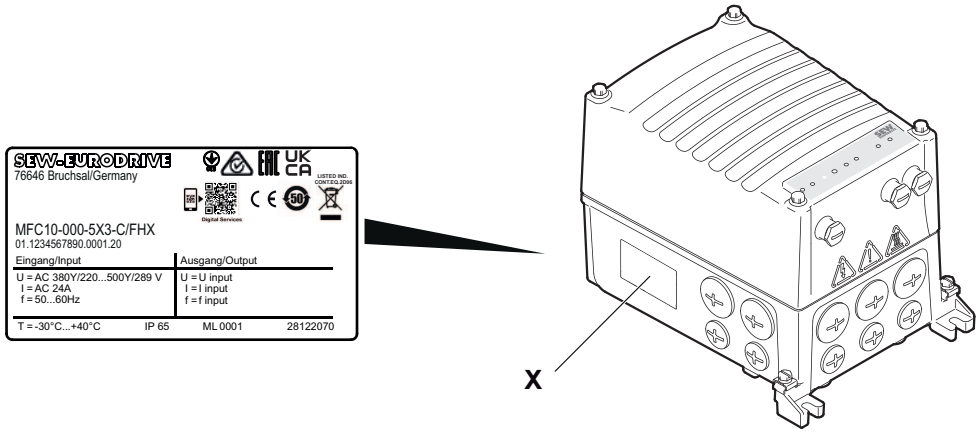
5.3 Nameplate position

5.3.1 MFC1.. design

The following nameplate positions are possible for the device:

- Nameplate of the complete device: Position X
- Optional nameplate: Position 2

The following figure shows an example of the position of the nameplates and labels on the device:

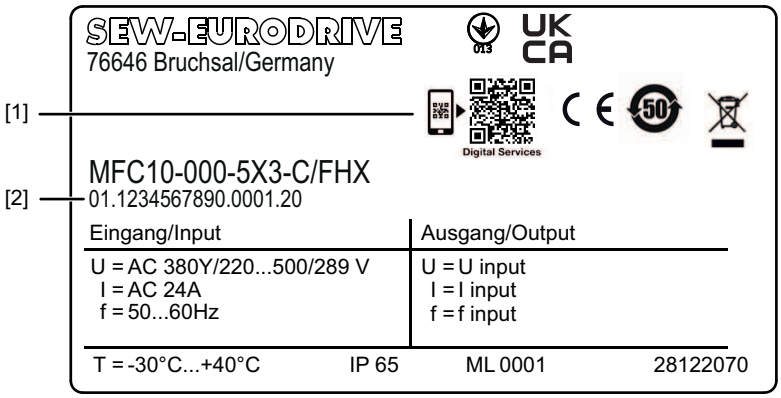


9007234875401227

5.4 Example of a nameplate and type designation

5.4.1 Nameplate

The following figure shows an example of the nameplate of the device. For the structure of the type designation, see chapter "Type designation ...".



9007234875398155

[1] Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. Here you will be able to access product-specific data, documents and further services.
The product manual of the device with further information is available in the "Documentation" > "Data and documents" area.

[2] Unique serial number

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5.4.2 Type designation

The following table shows the type designation of the MOVI-C® FIELD CONTROLLER standard/advanced:

MFC	**Product family** MFC = MOVI-C® FIELD CONTROLLER
1	**Variant** 1 = Device variant 1 for EtherCAT®/SBus^{PLUS} devices
0	**Front module** 0 = Closed
–	
000	**Switch disconnector** 000 = Without switching element D01 = Switch disconnector with feedback contact without line protection
–	
5	**Power connection** 5 = 380 – 500 V_{ac}
X	**Interference suppression** X = Without basic interference suppression
3	**Connection type** 3 = 3-phase
–	
C	**Version**
/	
FHX	**Electronics cover (controller) design** See chapter "Type designation of the electronics cover (controller)"
/	
IV	**Options** IV = Plug connector PE = Pressure compensation fitting

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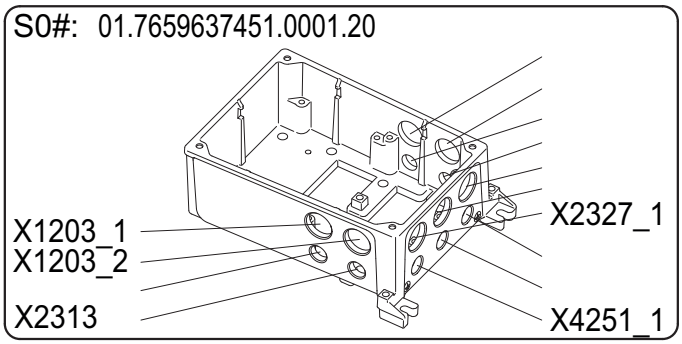
5.5 Example of the optional nameplate "Plug connector positions"

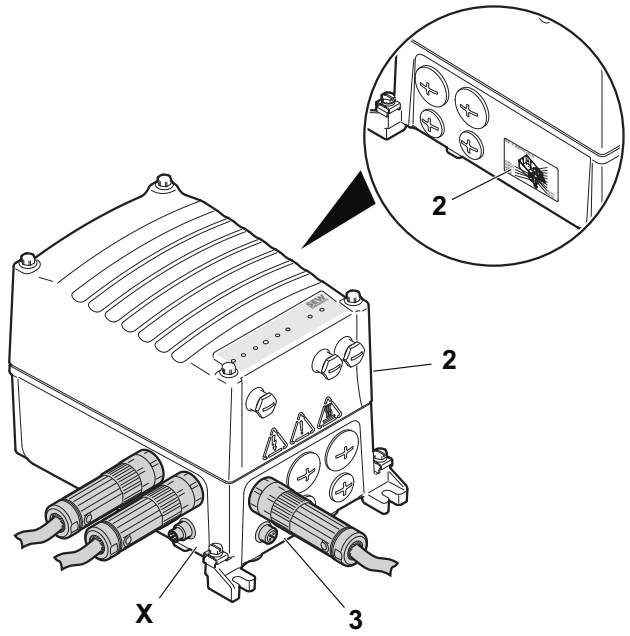
5.5.1 MFC1.. design

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



31659772811

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



9007227938476043

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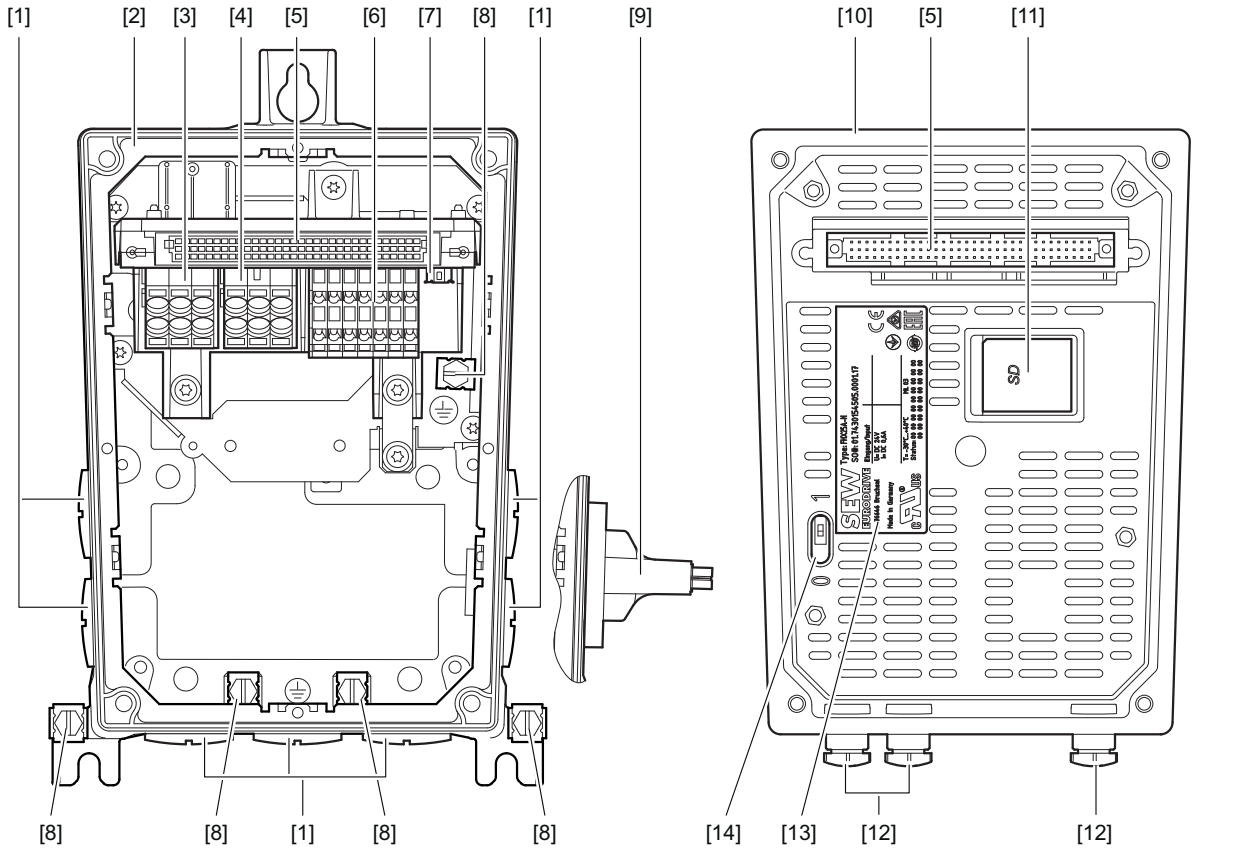
5.6 Electronics

5.6.1 Connection box and electronics cover (internal) of the MFC1.. design

The following figure shows the connection box and the bottom side of the electronics cover (controller):



9007227774833675

[1] Cable glands
[2] Connection box
[3] Connection for supply system
[4] Line connection of drive units
[5] Connector of connection unit for electronics cover (controller)
[6] Electronics terminal strip
[7] EtherCAT®/SBus^{PLUS} system bus connection
[8] Screws for PE connection
[9] Switch disconnector (optional)
[10] Electronics cover (controller)
[11] SD memory card
[12] Plug connectors
[13] Nameplate of electronics cover (controller)
[14] DIP switch S3

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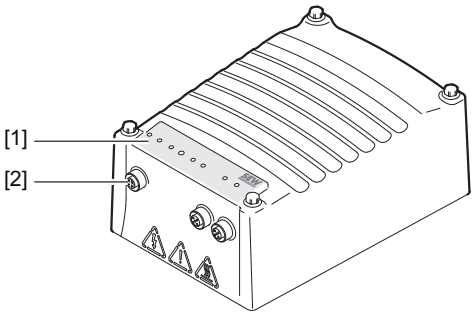
5.6.2 Electronics cover (outside)

The following figure shows an example of the electronics cover (controller) design:



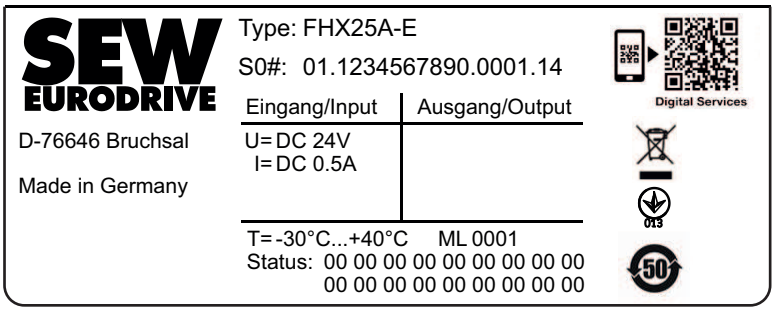
9007227776741899

[1] "LED displays" (→ 🗎 138)
[2] "Plug connectors" (→ 🗎 79)

5.7 Example nameplate and type designation of the electronics

5.7.1 Nameplate

The following figure shows an example of a nameplate of the electronics cover (controller). For the structure of the type designation, refer to chapter "Type designation of the electronics cover (controller)".



9007228725676555

5.7.2 Type designation of the electronics cover (controller)

The following table shows the type designation of the electronics cover (controller):

FHX	**Product family** FHX = MOVI-C® FIELD CONTROLLER
25	**Power class of controller** 25 = standard 45 = advanced
A	**Communication version**
–	
E	**Communication type** E = EtherNet/IP™, Modbus TCP N = PROFINET IO

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5.8 Example nameplate and type designation of the connection unit

5.8.1 Nameplate

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

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5.8.2 Type designation of the connection unit

The following table shows the type designation of the connection unit:

CU	**Product family** CU = Connection unit
F	**Hardware design** F = Design for decentralized controller (FHX)
1	**Size of the electronics cover** 1 = Suitable for electronics cover (controller)
S	**Fieldbus connection configuration** S = Fieldbus via M12 in the electronics cover (controller), system bus via MINI I/O plug connector
–	
FHX	**Variant** FHX = Decentralized controller
–	
5	**Connection voltage** 5 = AC 500 V
X	**Interference suppression** X = Without basic interference suppression
3	**Connection type** 3 = 3-phase
–	
C	**Version**

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5.9 Markings

The following table shows an example of the markings on the nameplate.

Mark	Definition
CE	The CE marking indicates compliance with the following European directives: • Low Voltage Directive 2014/35/EU[1)] • EMC Directive 2014/30/EU • Machinery Directive 2006/42/EC • Directive 2011/65/EU for limiting the use of certain hazardous substances in electrical and electronic equipment • Ecodesign Regulation 2019/1781
	The waste disposal of this product is performed in compliance with the WEEE Directive 2012/19/EU.
c UL us LISTED	The UL and cUL mark indicates UL approval. cUL is equally eligible for approval by the CSA.
UK CA	The UKCA mark indicates compliance with British guidelines.
	UA.TR (Declaration of conformity to Technical Regulation of Ukraine) The UA.TR mark on the nameplate certifies adherence to the technical regulations of Ukraine for the documented device series.
	The RCM mark indicates compliance with the technical regulations of the Australian Communications and Media Authority (ACMA).
	CMIM mark to confirm compliance with the technical regulations of Morocco. The CMIM mark is currently in preparation.

1) For products with functional safety, the requirements from the Low Voltage Directive are fulfilled by the Machinery Directive.

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6 Mechanical installation

6.1 Installation notes

Perform the following steps before installation:

1. ⚠ **WARNING!** Electric shock caused by dangerous voltages in the connection box. Severe or fatal injuries.
   De-energize the device. Pay attention to the 5 safety rules in chapter “Carrying out electrical work safely”.
2. Secure the output shaft of permanently excited motors against rotation. You thereby avoid an electric shock from the regenerative operation during the rotation of the shaft.
3. Secure the input and output elements with a touch guard. You thereby avoid injuries caused by rapid movements of the output elements.

6.2 Required tools and resources

You require the following tools and resources for mechanical installation:

- Set of wrenches, set of screwdrivers, set of socket wrenches
- Torque wrench
- If necessary, compensation elements (washers, spacing rings)
- Standard parts are not included in the delivery

6.3 Tolerances for torque ratings

Adhere to the specified torques with a tolerance of +/- 10%.

6.4 Installation requirements

Check that the following conditions have been met:

- The information on the nameplate of the device corresponds to the line voltage.
- The device is undamaged (no damage caused by transport or storage).
- The ambient temperature corresponds to the operating instructions and nameplate.
- The device must not be installed in the following ambient conditions:
  - Potentially explosive atmosphere
  - Oils
  - Acids
  - Gases
  - Vapors
  - Radiation
- For special designs: The device is designed in accordance with the actual ambient conditions.

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6.5 Installing the device

6.5.1 Notes

Observe the following information when installing the drive unit:

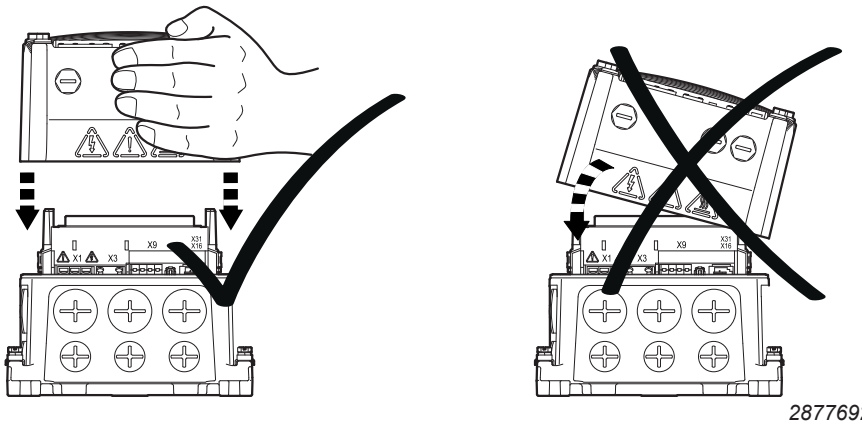
- Only install the device on a level, low-vibration, and torsionally rigid support structure.
- Check the validity of the degree of protection using the information in the operating instructions and the data on the nameplate.
- Make sure that the cooling air supply is unobstructed; warm exhaust air from other units must not influence the cooling.
- Use suitable cable glands for the supply leads (use reducing adapters if necessary).
- Seal the cable entries properly.
- Clean the sealing surfaces of the cover before reinstalling it.
- Observe the specified tightening torques. If no tightening torques are specified or available, observe the specifications in directive VDI 2230-1.

6.5.2 Electronics cover

Installing the electronics cover

Install the electronics cover as follows:

1. ⚠ **WARNING!** Risk of burns due to hot surfaces. Severe injuries.
   Let the device cool sufficiently before touching it.
2. **NOTICE!** Loss of the guaranteed degree of protection. Possible damage to property.
   When the electronics cover is removed from the connection box, you have to protect the electronics cover and the wiring space from humidity, dust or foreign particles.
3. Use only electronics covers that match the size.
4. Fit the electronics cover to the connection box. Make sure that the electronics cover does not become jammed.



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5. Screw the electronics cover onto the connection box with 4 screws. Tighten the screws step-by-step in diametrically opposite sequence with a tightening torque of 6.0 Nm.

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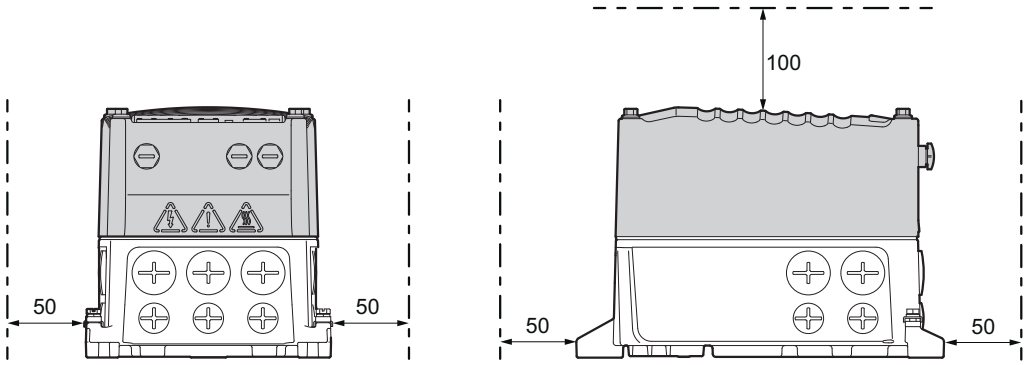
Minimum installation clearance

Note the minimum installation clearance required to remove the electronics cover. You can find detailed dimension drawings in chapter "Technical data" (→ 🗎 19).

MFC1.. design

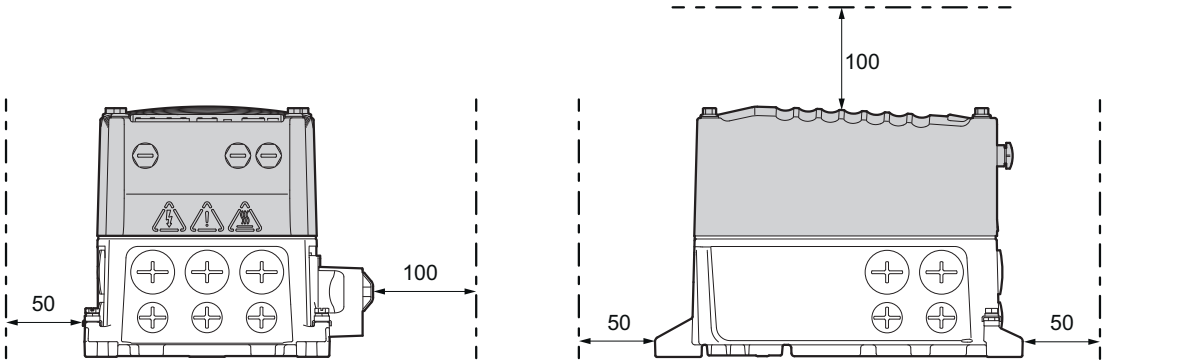
The following figure shows the minimum clearances when installing the device:



32834203659

MFC1.. design with switch disconnector

The following figure shows the minimum clearances when installing the device:



32451191307

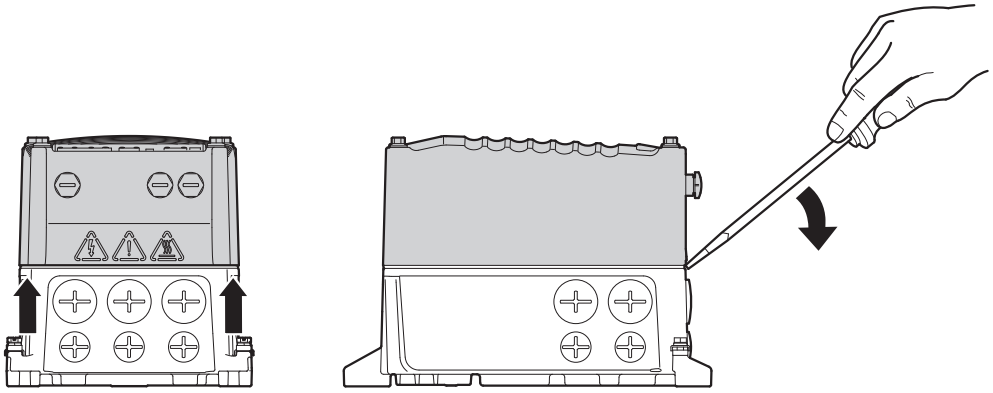
INFORMATION

SEW-EURODRIVE recommends a minimum clearance of 100 mm for access to the switch disconnector.

Removing the electronics cover

Remove the electronics cover as follows:

1. ⚠ **WARNING!** Risk of burns due to hot surfaces. Severe injuries.
   Let the device cool sufficiently before touching it.
2. Undo the screws of the electronics cover.
3. Lever the electronics cover off the connection box as shown in the following figure. Pay attention to the intended positions in the figure when doing this.



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4. **NOTICE!** Loss of the guaranteed degree of protection. Possible damage to property.
   When the electronics cover is removed from the connection box, you have to protect the electronics cover and the wiring space from humidity, dust or foreign particles.

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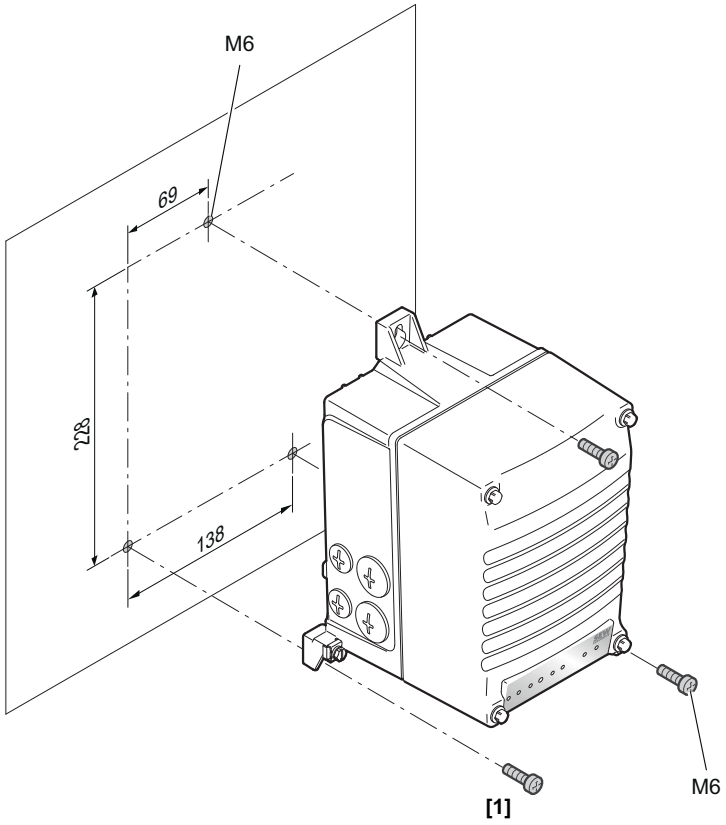
6.6 Mounting the device

6.6.1 Installing the MFC1.. design

Install the device according to the following figure.



32522307211

[1] Hex head screws 3 × M6 (tightening torque: 10 Nm)

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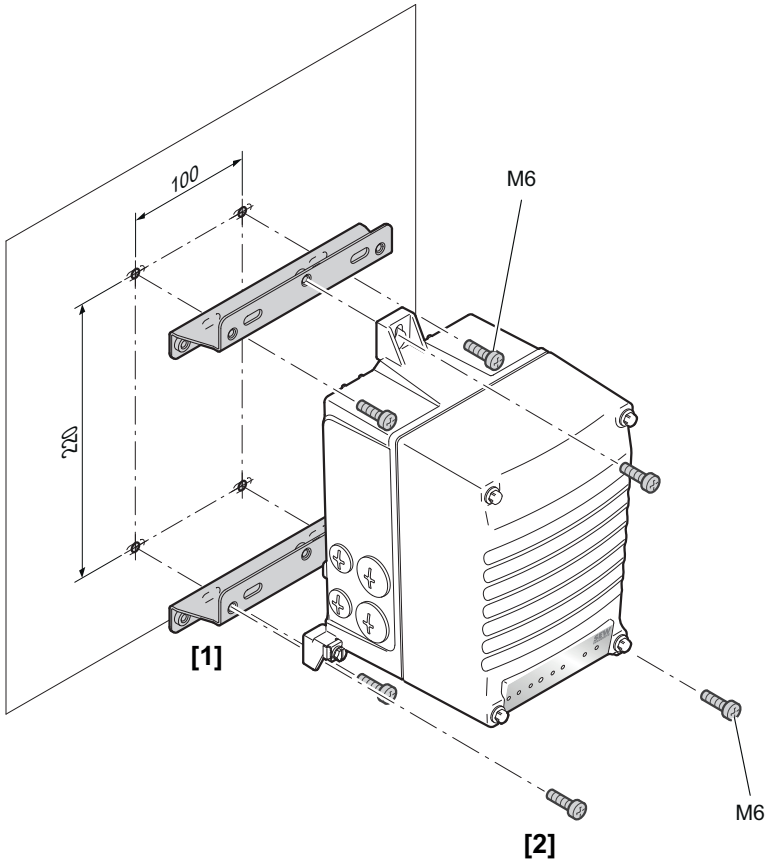
6.7 Mounting the device with mounting panel M01

6.7.1 Mounting the MFC1.. design with mounting panel M01

Install the device with mounting panel M01 according to the following figure.



31263212171

[1] Mounting panel M01 (stainless steel)
(available for delivery from SEW-EURODRIVE, part number: 28266129,
scope of delivery: 2 spacers, 4 hex head screws M6 × 20,
stainless steel)

[2] Hex head screws 4 × M6 (tightening torque: 8.5 Nm)

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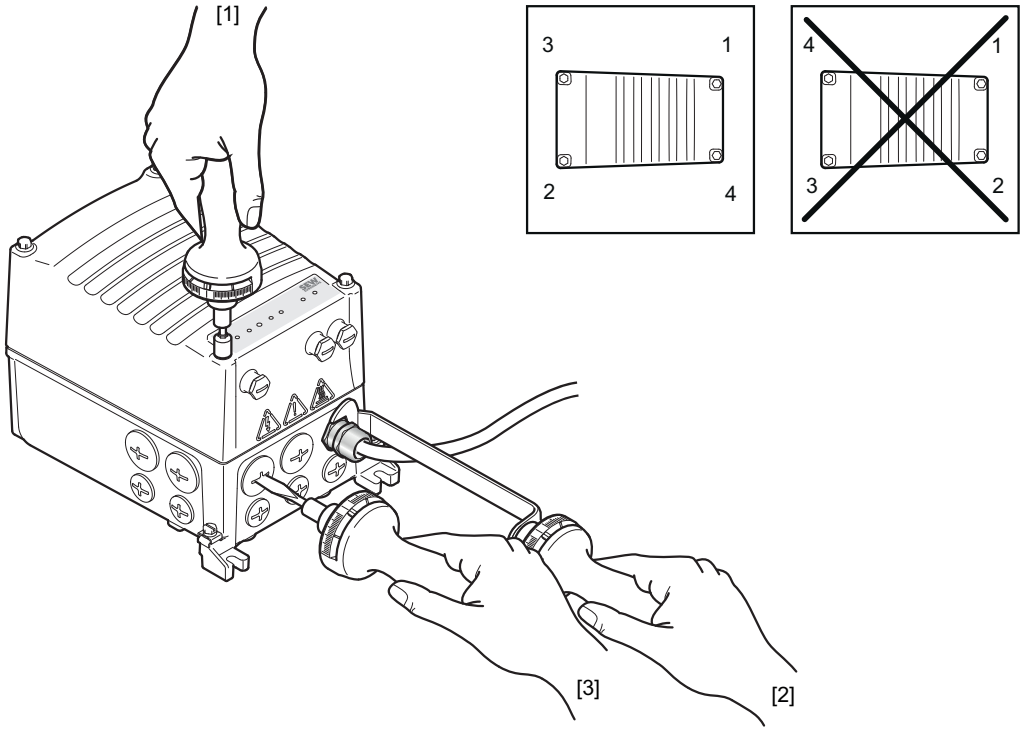
6.8 Tightening torques

6.8.1 MOVI-C® FIELD CONTROLLER example

The following figure shows an example of the installation of the threaded blanking plugs, cable glands and electronics cover. The number and position of threaded blanking plugs and cable bushings depend on the ordered variant.



41020311307

[1] Tighten the screws step by step in a diametrically opposite sequence with a tightening torque of 6.0 Nm.

[2] Tighten the cable gland with a tightening torque according to chapter "Mechanical installation" > "Tightening torques" > "Cable glands" (→ 🗎 58).

[3] Tighten the threaded plastic blanking plugs supplied by SEW-EURODRIVE with a tightening torque of 2.5 Nm.

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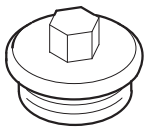
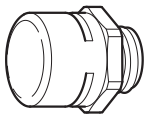
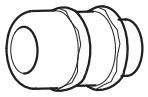
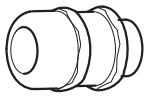
6.8.2 Cable glands / screw plugs / pressure compensation

The following table shows the screw fittings and the screw plug optionally available from SEW-EURODRIVE:

Screw fitting type	Image	Content	Size	Tightening torque		Outer cable diameter	Tightening force[1)]	Part number
				Threaded jacket	Cable clamping			
Screw plugs external hexagon (made of stainless steel)		10 pieces	M16 × 1.5	6.8 Nm	–	–	–	18247342
		10 pieces	M25 × 1.5	6.8 Nm	–	–	–	18247350
Pressure compensation screw fittings (made of stainless steel)		1 piece	M16 × 1.5	4.0 Nm	–	–	–	28214617
EMC-compliant cable gland (brass, nickel-plated)		10 pieces	M16 × 1.5	4.0 Nm	3.5 Nm	> 4 to 8 mm	75 N	18204783
		10 pieces	M25 × 1.5	7.0 Nm	5.0 Nm	> 8 to 11 mm	120 N	18204805
						> 11 to 16 mm	130 N	
EMC-compliant cable gland (made of stainless steel)		10 pieces	M16 × 1.5	4.0 Nm	3.5 Nm	> 4 to 8 mm	75 N	18216366
		10 pieces	M25 × 1.5	7.0 Nm	5.0 Nm	> 8 to 11 mm	120 N	18216382
						> 11 to 16 mm	130 N	

1) Fasten the cable in the cable gland so that it achieves the following cable pull-out force from the cable gland. This is usually achieved with the specified tightening torque of the cable clamp.

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7 Electrical installation

7.1 Installation planning taking EMC aspects into account

7.1.1 Notes on arranging and routing installation components

The correct operation of decentralized inverters depends on selecting the correct cables, providing correct grounding, and on a properly functioning equipotential bonding.

Always adhere to the **relevant standards**.

Note the following information.

7.1.2 EMC-compliant installation

INFORMATION

This drive system is not designed for operation on a public low voltage supply system that supplies residential areas.

This is a product with restricted availability in accordance with IEC 61800-3. This product may cause EMC interference. In this case, it is recommended for the user to take suitable measures.

7.1.3 Cable selection, routing and shielding

⚠ WARNING

Electric shock caused by faulty installation.

Severe or fatal injuries.

- Take the utmost care when installing the units.
- Observe the connection examples.

For important information on cable selection, cable routing and cable shielding, refer to chapter "Cable routing and cable shielding" (→ 🗎 75).

7.1.4 Equipotential bonding

Regardless of the PE connection, it is essential that **low-impedance, HF-capable equipotential bonding** is provided (see also EN 60204-1 or DIN VDE 0100-540):

- Provide for a connection over a wide area between the device and the mounting plate.
- To do so, use a ground strap (HF litz wire), for example, to connect the device and the grounding point of the system.
- Do not use the cable shields of data lines for equipotential bonding.

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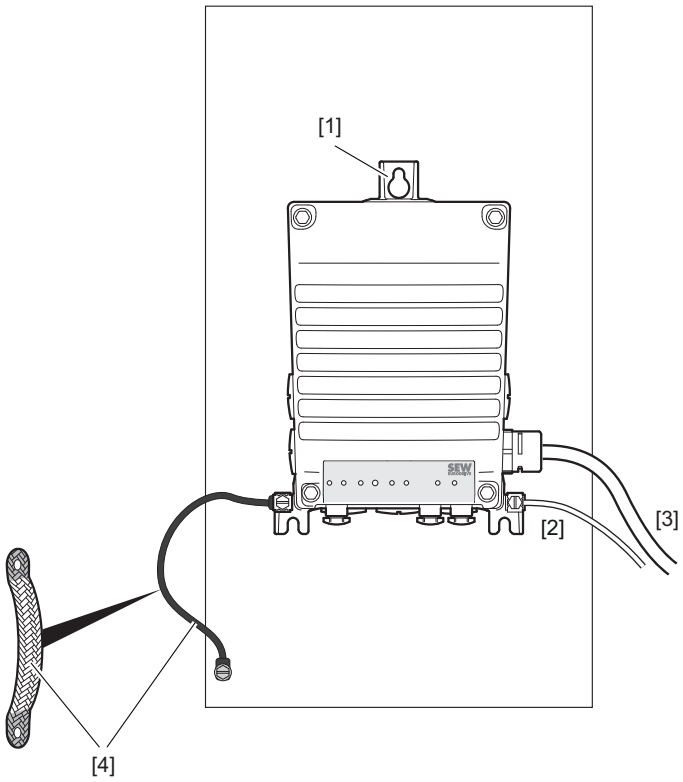
MFC1.. design

The following figure shows a connection over a wide surface area between the mounting plate and the device:



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[1] Conductive connection over a wide surface between the device and the mounting plate, in case the entire contact surface is conductive (e.g. unpainted).
[2] Second PE conductor via separate terminals (optional)
[3] PE conductor in the supply system cable
[4] EMC-compliant equipotential bonding, for example using a ground strap (HF litz wire). The contact surfaces must be conductive (free of paint).

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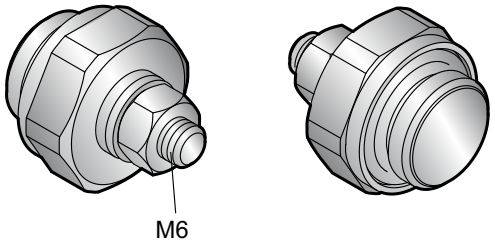
7.2 Equipotential bonding at the connection box

The following cable gland with an M6 threaded bolt provides an additional option for HF-compatible equipotential bonding on a connection box:



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	Tightening torque		Part number
	Cable gland	M6 nut for stud bolt	
M16 cable gland with M6 threaded bolt	4.0 Nm	3.0 Nm	08189234
M25 cable gland with M6 threaded bolt	7.0 Nm	3.0 Nm	08192685

You can install this cable gland in a connection box as long as a cable entry of size M16 or M25 is still free.

Screw the cable gland into the free cable entry and install the grounding cable (with ring cable lug) or the HF litz wire on the M6 threaded bolt.

7.3 Installation instructions

7.3.1 Permitted voltage systems

Information on voltage systems	Information on permissibility
TN and TT systems – voltage systems with directly grounded star point	Can be used without restrictions
IT systems – voltage systems with non-grounded star point	Contact SEW-EURODRIVE
Voltage systems with grounded outer conductor	Not permitted

7.3.2 Connecting supply system cables

Observe the following information when connecting the supply system cables:

- The nominal voltage and frequency of the device must correspond with the data of the supply system.
- Dimension the cable cross section according to the input current I_{line} for rated power (see product manual, chapter "Technical data").
- Install safety equipment F11/F12/F13 for line fuses at the beginning of the supply system cable behind the supply bus junction, see chapter "Wiring diagram".

  Dimension the safety equipment according to the cable cross section.
- When selecting the fuse, observe the information in the product manual > chapter "Technical data".
- Use only copper conductors with a permitted minimum temperature of 75 °C as connection cables.

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7.3.3 Permitted cable cross section of terminals

Line terminals X1_a, X1_b

Observe the permitted cable cross sections for installation:

Line terminals X1_a, X1_b	Without conductor end sleeve	With conductor end sleeve (with or without plastic collar)
Connection cross section	0.5 mm^2 – 6 mm^2	0.5 mm^2 – 6 mm^2
Stripping length	13 mm – 15 mm	

Control terminals X9

Observe the permitted cable cross sections for installation:

Control terminals X9	Without conductor end sleeve	With conductor end sleeve (without plastic collar)	With conductor end sleeve (with plastic collar)
Connection cross section	0.08 mm^2 – 2.5 mm^2	0.25 mm^2 – 2.5 mm^2 [1)]	0.25 mm^2 – 1.5 mm^2
Stripping length	5 mm – 6 mm		

[1)] 2.5 mm^2 only in combination with quadratically crimping (e.g. with WAGO® Variocrimp crimping tool)

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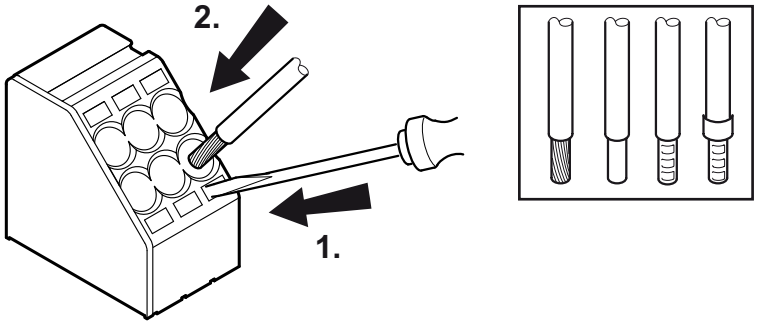
7.3.4 Actuating the line terminals X1_a, X1_b

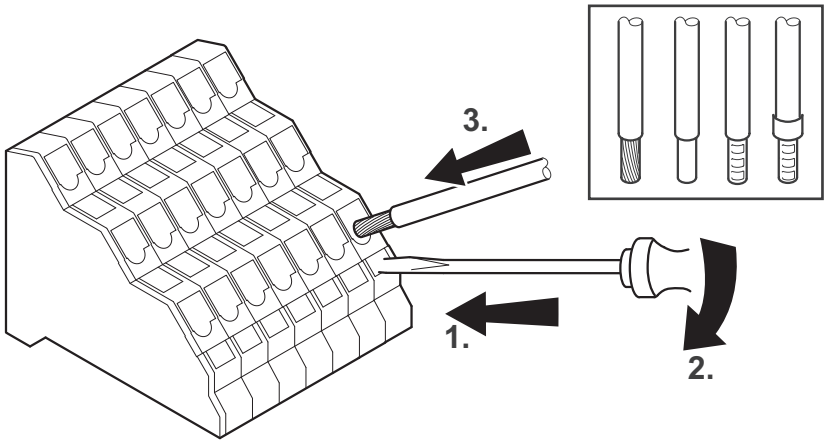
Adhere to the following sequence when actuating the line terminals X1_a and X1_b:



25649924107

7.3.5 Actuating control terminals X9

Adhere to the following sequence when actuating the X9 control terminals:



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7.3.6 Selecting the residual current device

The inverter can cause a direct current in the PE conductor.

Proceed as follows to select the residual current device:

1. If using a residual current device is not mandatory according to the standards, SEW-EURODRIVE recommends not using a residual current device.
2. ⚠ **WARNING!** No protection against electric shock if an incorrect type of residual current device is used. Severe or fatal injuries.
   If a residual current device (residual current device RCD or residual current monitor RCM) is provided, use an all-current-sensitive RCD or RCM of type B.
3. If a residual current device is required, select the residual current device according to the requirements for protecting persons, fire protection or system protection. Observe the tripping characteristic, the deceleration and the rated tripping current of the residual current device during selection.
4. During project planning, note that leakage currents which are as low as possible occur in the system for operational reasons.
5. If the operational leakage currents are too high, you can distribute the current supply among several RCDs.

7.3.7 Using the line contactor

Proceed as follows when using the line contractor:

1. Use only a contactor of utilization category AC-3 (EN 60947-4-1) as a line contactor.
2. **NOTICE!** Failing to observe the minimum switch-off time of the line contactor can cause material damage. Irreparable damage to the inverter or unforeseen malfunctions.
   After switching off the voltage supply, keep it switched off for at least 10 s.
   ⇨ Do not switch the voltage supply on or off at the line contactor more than once per minute.

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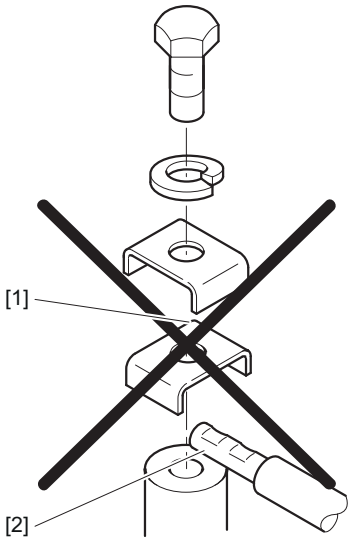
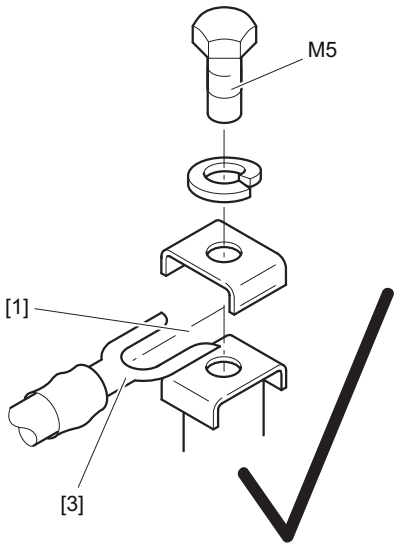
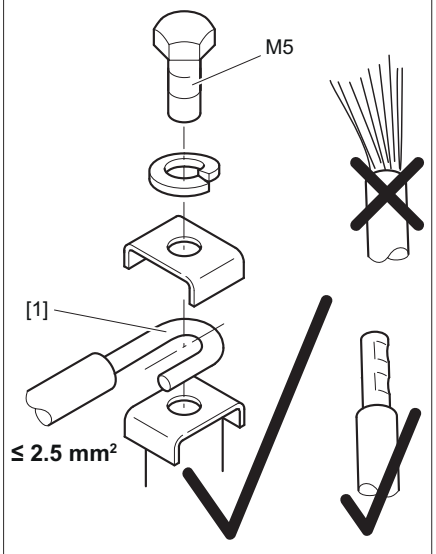
7.3.8 Notes on PE connection

1. Install the PE connection cable to the connection box as follows (screw tightening torque: 2.0 – 2.4 Nm).
2. ⚠ **WARNING!** Electric shock due to incorrect connection of PE Severe or fatal injuries.
   Observe the following notes for the PE connection.

Non-permitted mounting	Recommendation: Mounting with forked cable lug[1)] Permitted for all cross sections	Mounting with solid connecting wire or litz wire with conductor end sleeve[1)] Permitted for cross sections up to maximum 2.5 mm²
		

1) Use the specified material for the assembly that is included in the accessory bag.

[1] Install the PE connection cable between both U-shaped mounting panels.

[2] Incorrect installation sequence

[3] Forked cable lug suitable for M5 PE screws

7.3.9 Protection devices

- The units come equipped with integrated protection devices against overload and short circuit.
- The power contactor of the supply system cable must be realized through external overload devices.
- The relevant standards must be observed concerning the cable cross section, the voltage drop, and the type of routing that is used.

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7.3.10 Installation above 1000 m asl

The devices can be used at altitudes above 1000 m above sea level up to 3800 m above sea level under the following marginal conditions. The maximum altitude is limited due to the decreased dielectric strength at lower air density.

- The nominal motor current I_N is reduced due to the reduced cooling above 1000 m, see **product manual** > chapter "Technical data" (→ 🗎 19).
- Above 2000 m above sea level, the air and creepage distances are only sufficient for overvoltage category II. If the installation requires overvoltage category III, you will have to install additional external overvoltage protection to limit overvoltage peaks to 1.5 kV phase-to-phase and 2.5 kV phase-to-ground.
- If safe electrical disconnection is required, it must be implemented outside the device at altitudes of more than 2000 m above sea level (safe electrical disconnection in accordance with EN 61800-5-1).
- At installation altitudes between 2000 m and 3800 m above sea level, measures must be taken that reduce the line side overvoltage from category III to category II for the entire system.

7.3.11 UL-compliant installation

INFORMATION

Due to UL requirements, the following chapter is always printed in English and in some cases in French, regardless of the language of this documentation.

Observe the following notes for UL-compliant installation:

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

For use in a Pollution Degree 1 or Pollution Degree 2 environmental only.

Field Wiring Power Terminals

- Use 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 (models with maintenance switch not more than 5,000 rms) when protected by 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 (models with maintenance switch not more than 5,000 rms) 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.

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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.

WARNING - The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electric shock, current-carrying parts and other components of the controller should be examined and replaced if damaged. If burnout of the current element of an overload relay occurs, the complete overload relay must be replaced.

ATTENTION - LE DÉCLENCHEMENT DU DISPOSITIF DE PROTECTION DU CIRCUIT DE DÉRIVATION PEUT ÊTRE DÛ À UNE COUPURE QUI RÉSULTE D'UN COURANT DE DÉFAUT. POUR LIMITER LE RISQUE D'INCENDIE OU DE CHOC ÉLECTRIQUE, EXAMINER LES PIÈCES PORTEUSES DE COURANT ET LES AUTRES ÉLÉMENTS DU CONTRÔLEUR ET LES REMPLACER S'ILS SONT ENDOMMAGÉS. EN CAS DE GRILLAGE DE L'ÉLÉMENT TRAVERSÉ PAR LE COURANT DANS UN RELAIS DE SURCHARGE, LE RELAIS TOUT ENTIER DOIT ÊTRE REMPLACÉ.

For maximum branch circuit protection see table below.

SCCR: 65 kA/500 V 5 kA/500V (devices with maintenance switch) 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.

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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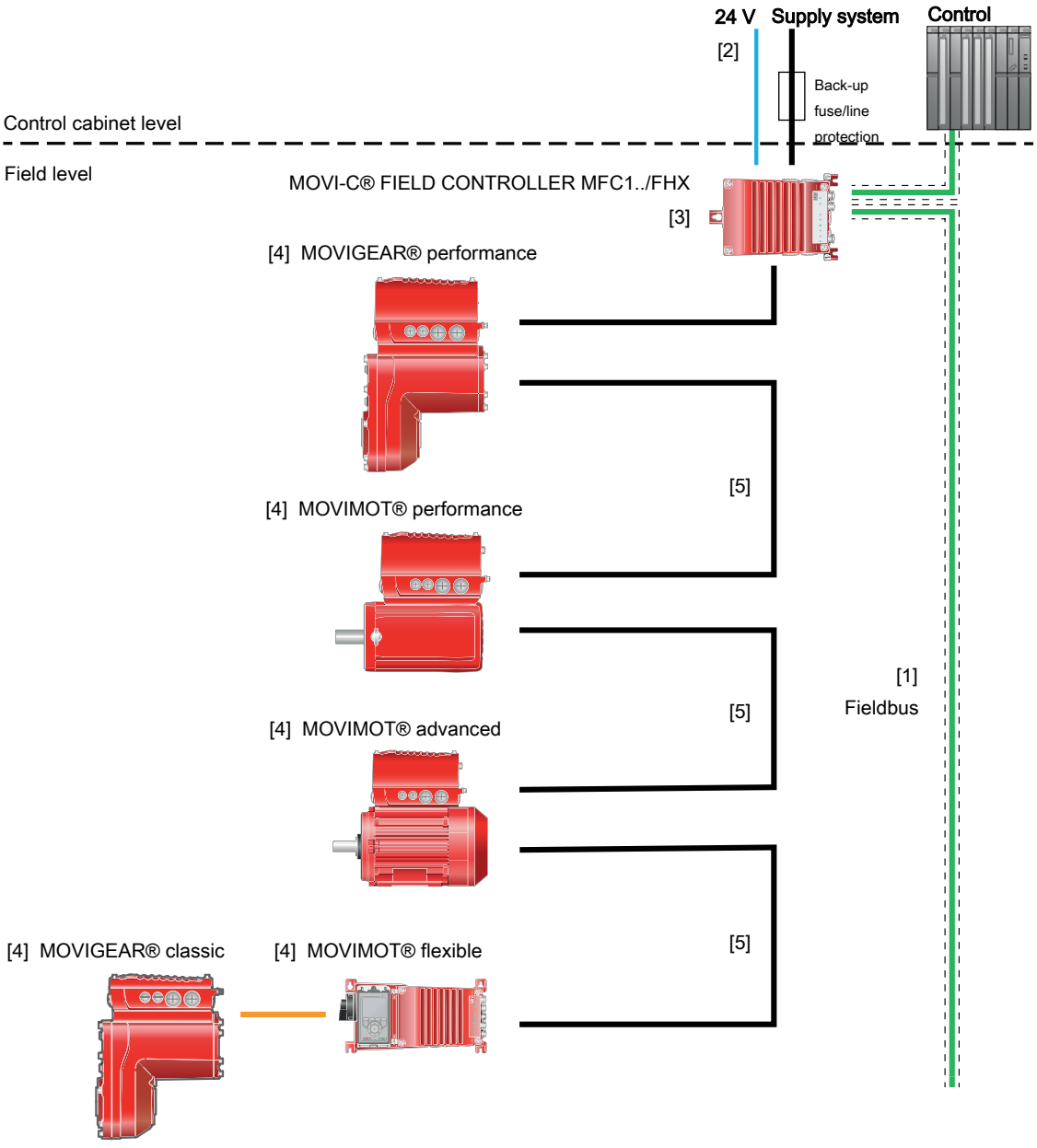
7.4 Installation topology (installation with PAC hybrid cable)

The following figure shows a basic installation topology with the device:



27021626478764555

[1] The maximum permitted cable length between the controller (PLC) and the MOVI-C® FIELD CONTROLLER is 100 m. The cable length may be reduced due to the technical data of the controller (PLC).
[2] The MOVI-C® FIELD CONTROLLER is not equipped with an integrated DC 24 V supply. The electronics must be supplied externally with DC 24 V.
[3] Decentralized motion and logic controller
[4] MOVI-C® decentralized drive technology
[5] PAC hybrid cable for 400 V power supply, DC 24 V supply, and EtherCAT®/SBus^{PLUS} communication

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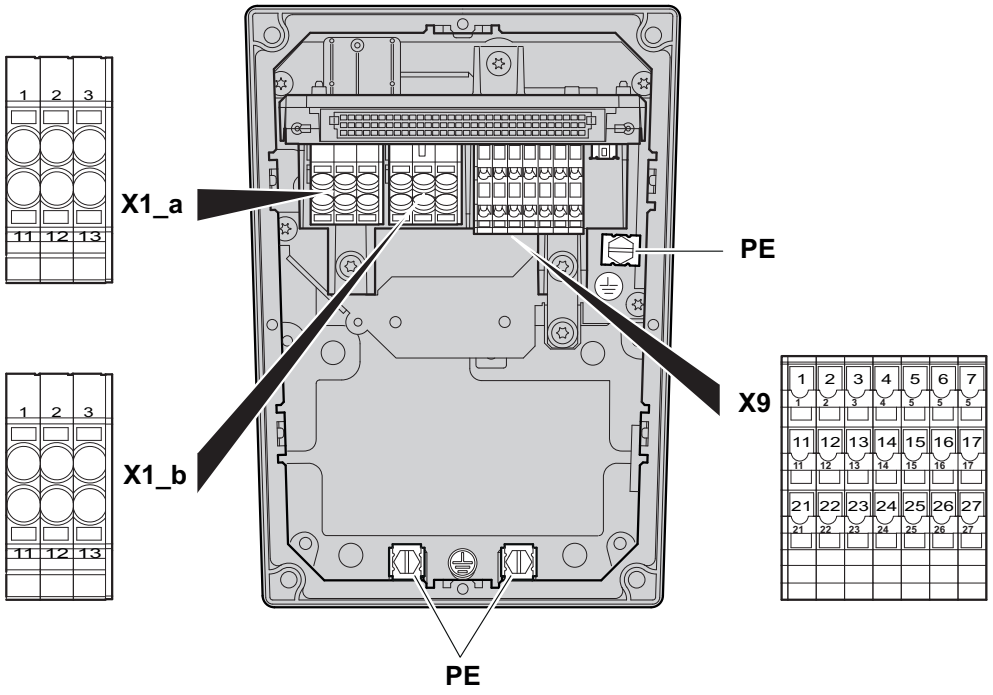
7.5 Terminal assignment of the MOVI-C® FIELD CONTROLLER

Attach units without a plug connector to the terminals as follows:

1. ⚠ **WARNING!** Electric shock caused by dangerous voltages in the connection box. Severe or fatal injuries.
   De-energize the device. Pay attention to the 5 safety rules in chapter "Carrying out electrical work safely". Afterwards, wait 5 minutes.
2. ⚠ **WARNING!** Risk of burns due to hot surfaces. Severe injuries.
   Let the device cool sufficiently before touching it.
3. Undo the screws of the electronics cover. Remove the electronics cover.
4. Route the cables through the cable glands into the connection box.
5. Connect the device according to the following terminal assignment.

The following figure shows the terminal assignment in the connection box of the device:



32854784011

The following table shows the terminal assignment of the device:

Terminal	No.	Marking	Function	
X1_a **line terminals**	1	Brown	L1	Line connection, phase L1 – IN
	2	Black	L2	Line connection, phase L2 – IN
	3	Gray	L3	Line connection, phase L3 – IN
	11	Brown	L1	Line connection, phase L1 – OUT
	12	Black	L2	Line connection, phase L2 – OUT
	13	Gray	L3	Line connection, phase L3 – OUT

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Terminal	No.	Marking	Function	
X1_b line terminals (can be disconnected in conjunction with a switch disconnector)	1	Brown	L1	Line connection of drive units, phase L1
	2	Black	L2	Line connection of drive units, phase L2
	3	Gray	L3	Line connection of drive units, phase L3
	11	Brown	L1	Line connection of drive units, phase L1
	12	Black	L2	Line connection of drive units, phase L2
	13	Gray	L3	Line connection of drive units, phase L3
⏚	–	–	PE	Protective earth connection

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Terminal	No.	Marking	Function	
X9 control terminals	1	–	+24 V	DC 24 V voltage
	2	–	+24 V	DC 24 V voltage
	3	–	+24 V	DC 24 V voltage
	4	–	+24 V	DC 24 V voltage
	5	–	+24 V	DC 24 V voltage
	6	–	CAN_H	CAN data cable (high), electrically isolated
	7	–	RS+	RS485 data cable (+), electrically isolated
	11	–	0V24	0V24 reference potential
	12	–	0V24	0V24 reference potential
	13	–	0V24	0V24 reference potential
	14	–	0V24	0V24 reference potential
	15	–	0V24	0V24 reference potential
	16	–	CAN_L	CAN data cable (low), electrically isolated
	17	–	RS-	RS485 data cable (-), electrically isolated
	21	–	24V_IN	DC 24 V voltage (IN)
	22	–	0V24_IN	0V24 reference potential (IN)
	23	–	res.	Reserved for internal connection[1)]
	24	–	24V_SW	Reserved for internal connection[1)] DC 24 V for feedback contact of switch disconnector
	25	–	DI_SW	Reserved for internal connection[1)] Input, feedback contact of switch disconnector
	26	–	CAN_GND	Reference potential for CAN data cable, electrically isolated
	27	–	RS_GND	Reference potential for RS485 data cable, electrically isolated

1) Only for internal wiring. The signal is not approved for connection or use at the customer site!

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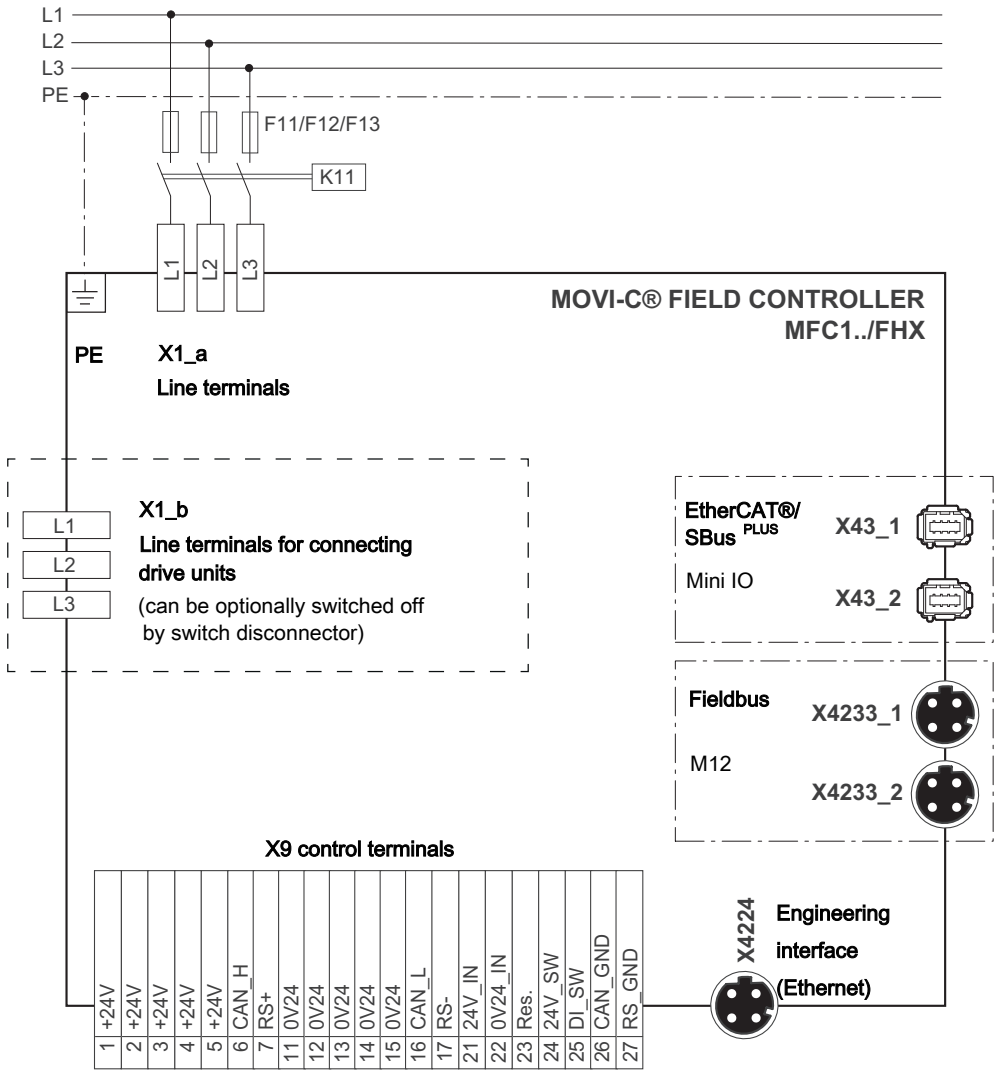
7.6 Connection diagram

The following figure shows the connections of the device:



27021626907447435

For the terminal assignment, refer to chapter "Terminal assignment of the MOVI-C® FIELD CONTROLLER" (→ 🗎 70).

For the positions of the plug connectors, refer to chapter "Plug connector positions of the MFC1.. design" (→ 🗎 81), "Plug connector positions at the electronics cover" (→ 🗎 84).

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7.7 Communication interfaces

7.7.1 CAN system bus

The communication interface is available for project-specific use. Before using the communication interface, contact SEW-EURODRIVE Service.

MOVILINK®, CANopen and the control of generation B inverters cannot be implemented via the communication interface.

7.7.2 RS485 interface

The communication interface is available for project-specific use. Before using the communication interface, contact SEW-EURODRIVE Service.

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7.8 Cable routing and cable shielding

7.8.1 Installation with separately routed Ethernet cable

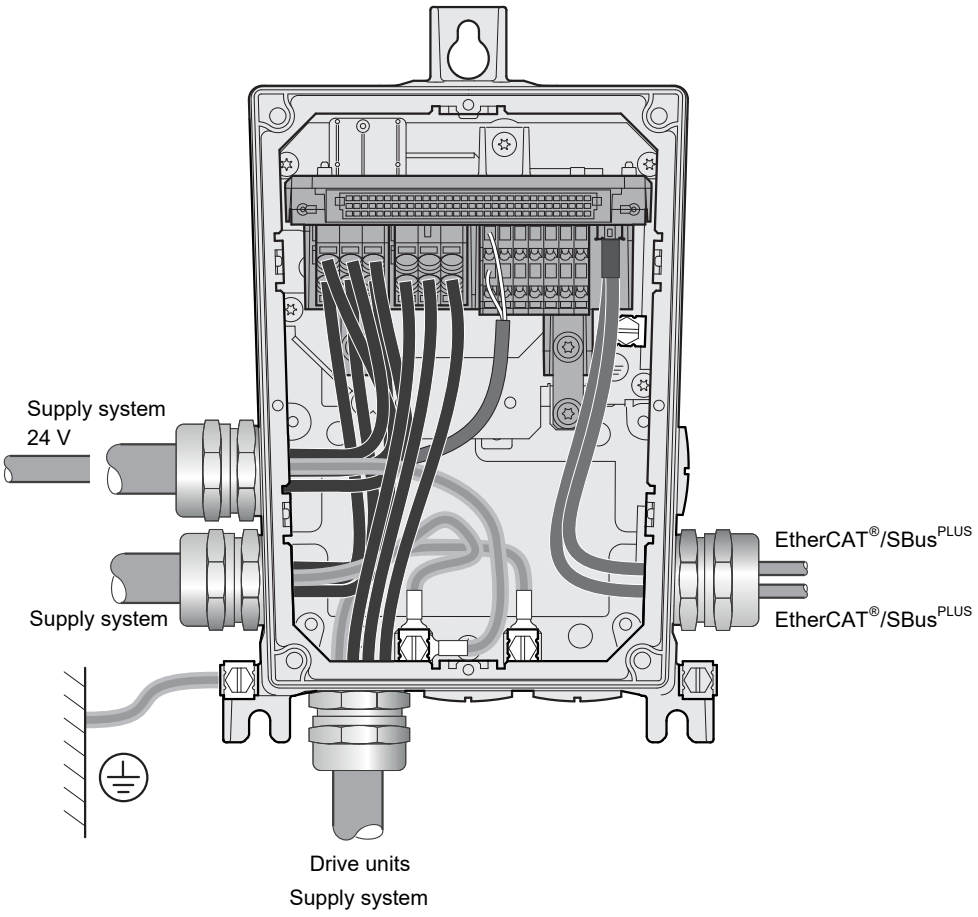
Notes on cable routing and shielding – Recommended cable routing

Note the following when routing and shielding the cables:

- Cable selection
  - For cable selection, note the chapter "Technical data and dimension sheets/ specification of recommended Ethernet connection cable" in the operating instructions.
  - You can use unshielded connection cables for the supply system connection.
- Cable shielding
  - Connect the cable shields to the optionally available EMC cable glands, see chapter "Cable glands".
- Observe the permitted bending radii of the installed cables for cable routing.

Cable routing of the MFC1.. design

The following figure shows the connections of the device:



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7.8.2 Installation with PA hybrid cable

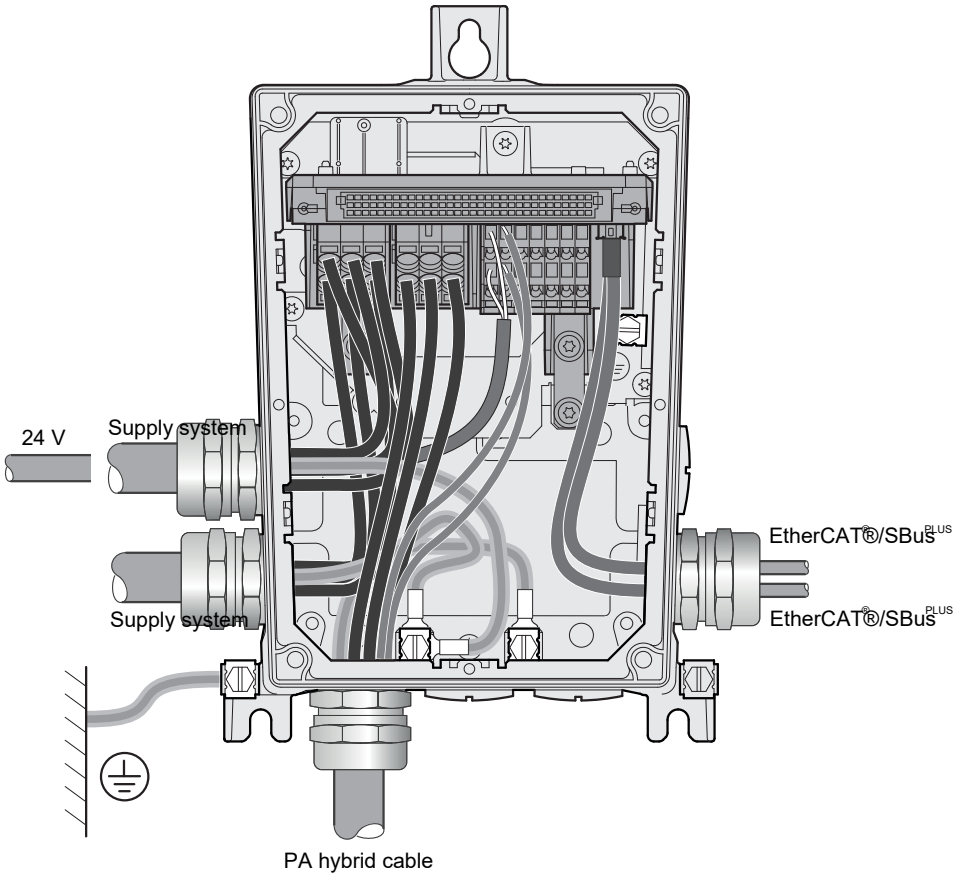
Notes on cable routing and shielding – Recommended cable routing

Note the following points for cable routing and cable shielding:

- Cable selection
  - When selecting cables, observe the recommended connection cables in the product manual > chapter "Technical data" > "Connection cables".
  - You can use unshielded connection cables as line connection cables.
- Cable shielding
  - Connect the cable shields to the optionally available EMC cable glands, see chapter "EMC cable glands".
- External braking resistor
  - Also observe the notes in chapter "Terminal assignment ...".
- Observe the permitted bending radii of the cables for cable routing.

Cable routing of the MFC1.. design

The following figure shows the connections of the device:



9007235048460427

7.8.3 Installation with PAC hybrid cable

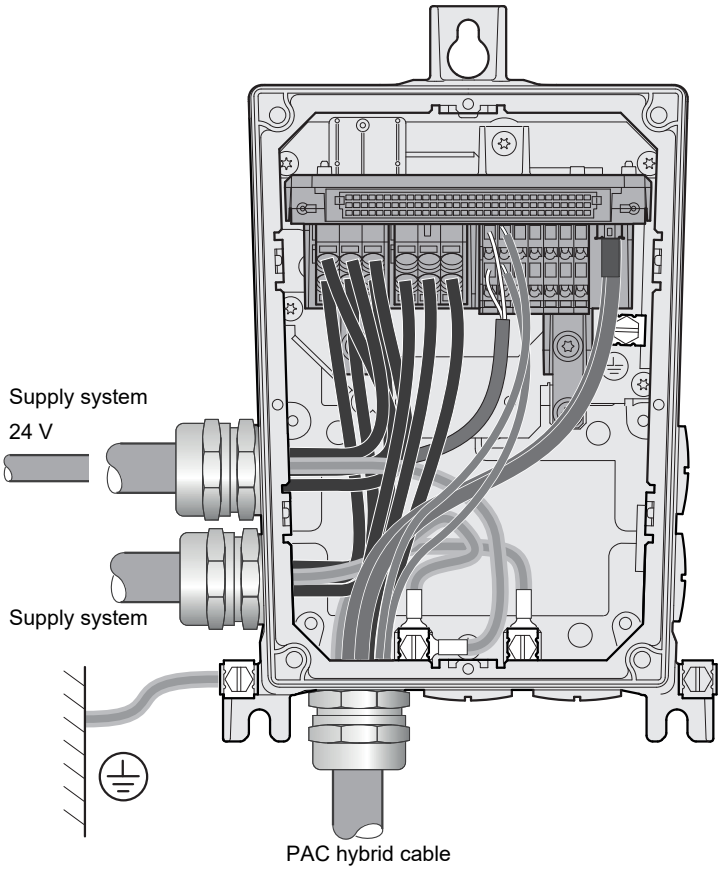
Notes on cable routing and shielding – Recommended cable routing

Note the following points for cable routing and cable shielding:

- Cable selection
  - When selecting cables, observe the recommended connection cables in the product manual > chapter "Technical data" > "Connection cables".
  - You can use unshielded connection cables as line connection cables.
- Cable shielding
  - Connect the cable shields to the optionally available EMC cable glands, see chapter "EMC cable glands".
- External braking resistor
  - Also observe the notes in chapter "Terminal assignment".
- Observe the permitted bending radii of the cables for cable routing.

Cable routing of the MFC1.. design

The following figure shows the connections of the device:



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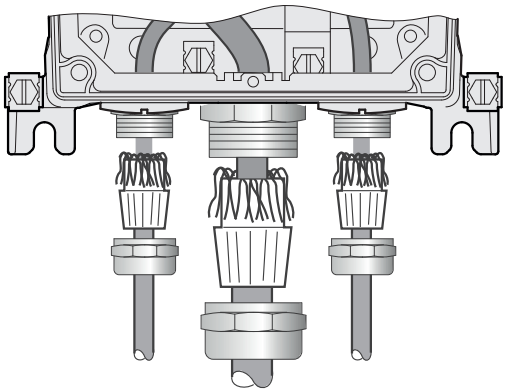
7.9 EMC cable glands

7.9.1 Cable shielding

For shielded cables, it is best to use EMC cable glands to connect the shield. EMC cable glands are available as option.



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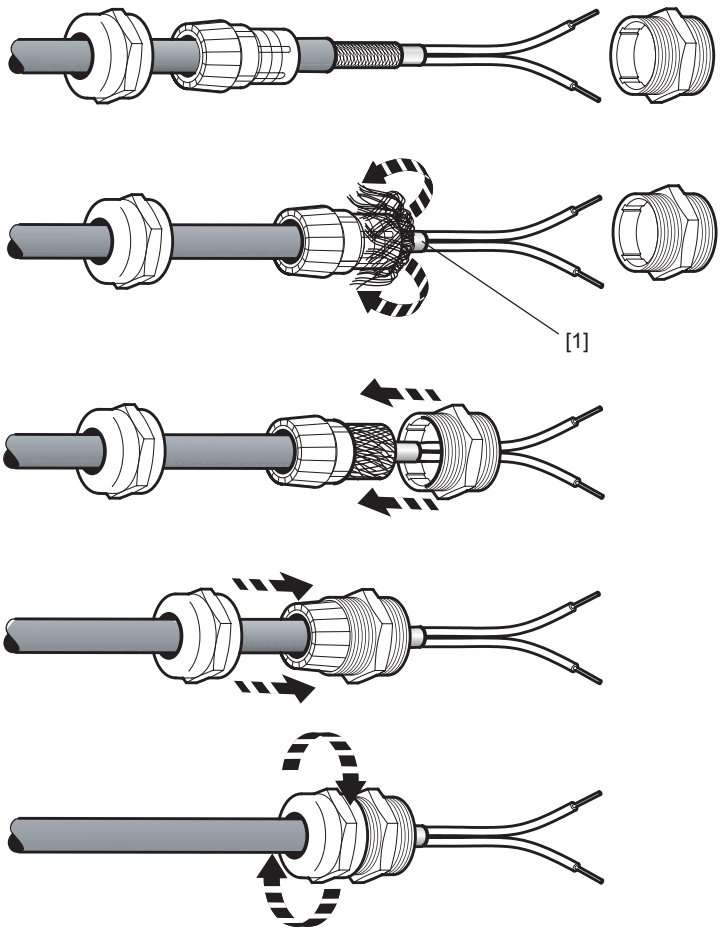
7.9.2 Assembly of EMC cable glands

Assemble the EMC cable glands supplied by SEW-EURODRIVE according to the following figure:



18014401170670731

[1] Cut off insulation foil and fold it back.

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7.10 Plug connectors

7.10.1 Representation of connections

The connection diagrams of the plug connectors depict the contact end of the connections.

7.10.2 Connection cables

INFORMATION

For more information about cable types, see chapter "Technical data".

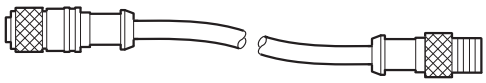
Connection cables are not included in the scope of delivery.

Prefabricated cables for connecting SEW-EURODRIVE components are available to order. For each connection, the available prefabricated cables are listed. Specify the part number and length of the required cable in your order.

The quantity and design of the required connection cables depend on the design of the devices and the components to be connected. This is why you do not need all listed cables.

Cable types

The table below shows the depictions used and what they mean:

Depiction	Meaning
	Suitable for cable carriers
	Not suitable for cable carriers
	Fixed length
	Variable length
	Cable cut off Not prefabricated
	Cable stripped (Partially) assembled

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Cable routing

Observe the permitted bending radii of the cables used when routing the cables. For further information, refer to the product manual > chapter "Technical data" > "Dimension drawings of plug connectors in the connection box" (→ 🗎 39).

Using prefabricated cables with plug connectors

SEW-EURODRIVE uses prefabricated cables for certifications, type tests, and approval of the devices. The cables available from SEW-EURODRIVE meet all the requirements necessary for the functions of the device and the connected components. Device considerations are always carried out for the basic device including all the components to be connected and the corresponding connection cable.

As such, SEW-EURODRIVE recommends using only the prefabricated cables listed in the documentation.

When using devices with integrated safety functions according to EN ISO 13849, you also have to adhere to all the conditions and requirements for the installation and routing of cables described in the documentation for the devices concerning functional safety.

Using third-party cables with or without plug connectors

If third-party cables are used – even if these cables are technically equivalent – SEW-EURODRIVE will not accept any liability and cannot guarantee compliance with device properties or that the device will function correctly.

If you use third-party cables for connecting the device and the connected components, you must ensure that the respective, national provisions are followed. Note that using third-party cables may unintentionally affect the technical characteristics of the device or unit network. This particularly applies to the following properties:

- Mechanical properties (e.g. IP protection class, cable carrier suitability)
- Chemical properties (e.g. silicone and halogen free, resistance to substances)
- Thermal properties (e.g. thermal stability, increase in device temperature, flammability class)
- EMC behavior (e.g. limit values, interference emission, compliance with normative interference immunity values)
- Functional safety (approvals according to EN ISO 13849-1)

Cables that are not explicitly recommended by SEW-EURODRIVE must at least meet the requirements of the following standards and be approved according to these connector standards:

- IEC 60309
- IEC 61984

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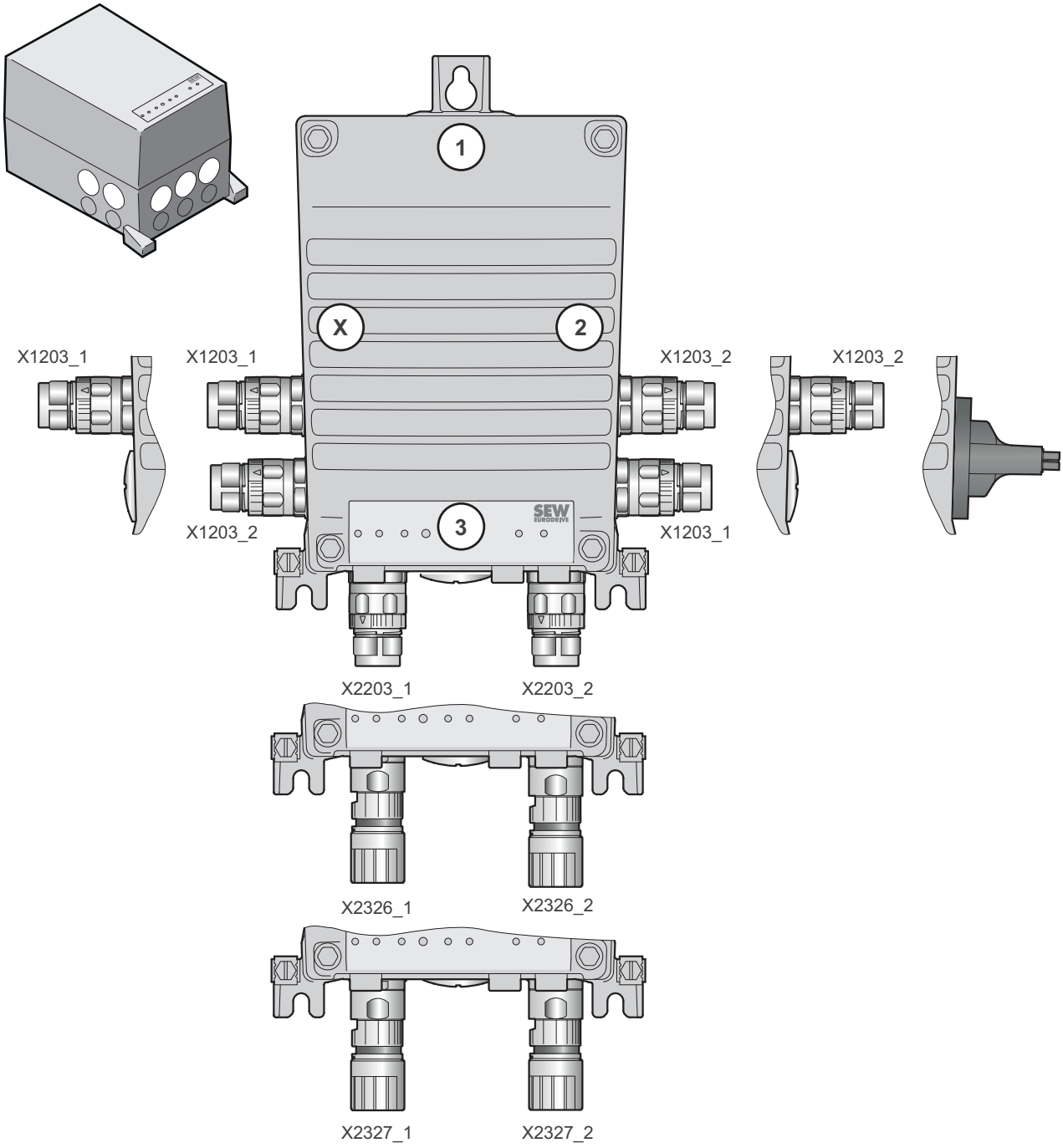
7.10.3 Plug connector positions of the MFC1.. design

Cable entries M25

The following figure shows possible plug connector positions:



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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" (→ 🗎 91)[1)]	X or 2[2)]	-
X1203_2	Black	"AC 400 V connection" (→ 🗎 91)	X or 2[2)]	-

Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X2203_1	Black	"AC 400 V connection" (→ 🗎 97) Drive units[3)]	3	• X2326_1 • X2327_1
X2203_2	Black	"AC 400 V connection" (→ 🗎 97) Drive units	3[2)]	• X2326_2 • X2327_2
X2326_1	Gray/green	"PAC hybrid connection (OUT)" (→ 🗎 103) Drive units AC 400 V connection DC 24 V backup voltage and Ethernet[4)]	3	• X2203_1 • X2327_1
X2326_2	Gray/green	"PAC hybrid connection (OUT)" (→ 🗎 103) Drive units AC 400 V connection DC 24 V backup voltage and Ethernet	3[2)]	• X2203_2 • X2327_2
X2327_1	Black/green	"PA hybrid connection (OUT)" (→ 🗎 108) Drive units AC 400 V connection DC 24 V backup voltage[5)]	3	• X2203_1 • X2326_1
X2327_2	Black/green	"PA hybrid connection (OUT)" (→ 🗎 108) Drive units AC 400 V connection DC 24 V backup voltage	3[2)]	• X2203_2 • X2326_2

1) Plug connector X1203_1 can also be ordered separately (i.e. without plug connector X1203_2).
2) Only available in the MFC1.. design without switch disconnector.
3) Plug connector X2203_1 can also be ordered separately (i.e. without plug connector X2203_2).
4) Plug connector X2326_1 can also be ordered separately (i.e. without plug connector X2326_2).
5) Plug connector X2327_1 can also be ordered separately (i.e. without plug connector X2327_2).

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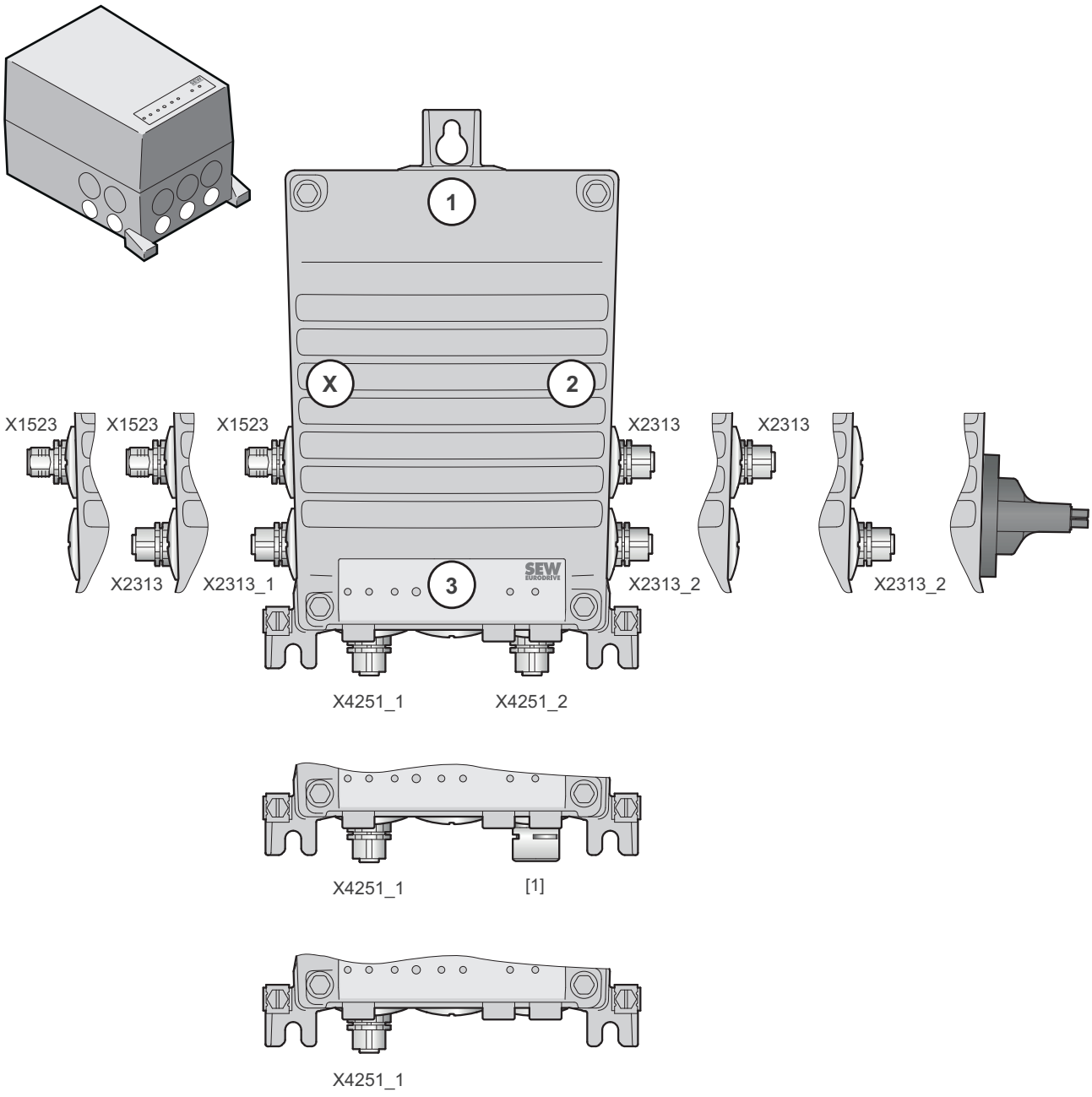
Cable entries M16

The following figure shows possible plug connector positions:



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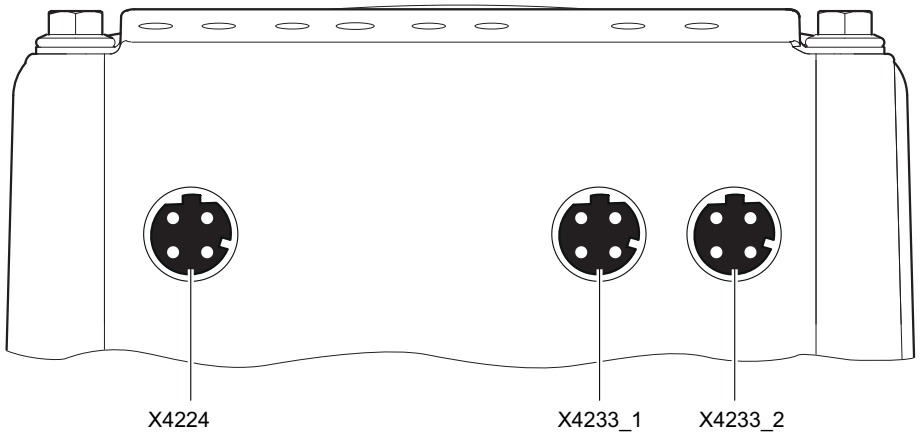
Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X1523	Black	"DC 24 V backup voltage – input" (→ 🗎 112)[1)]	X	-
X2313	Black	"DC 24 V backup voltage – output" (→ 🗎 115) (for further looping)	2[2)] or X[3)]	-

Plug connectors				Not together at a position with the plug connector:
Designation	**Coding ring/ color**	**Function**	**Position**	
X2313_1	Black	"DC 24 V backup voltage – output" (→ 🗎 115) Connection of drive units[4)]	X[2)]	Optional pressure compensation
X2313_2	Black	"DC 24 V backup voltage – output" (→ 🗎 115) Connection of drive units	2[2)]	Optional pressure compensation
X4251_1	-	EtherCAT®/SBus^{PLUS} (→ 🗎 118) Connection of drive units[5)]	3	-
X4251_2	-	EtherCAT®/SBus^{PLUS} (→ 🗎 118) Connection of drive units	3	Optional pressure compensation
-	-	[1] Optional pressure compensation	X, 2 and 3	• X4251_2 • X2313_1 • X2313_2

1) Plug connector X1523 can also be ordered separately (i.e. without plug connector X2313).
2) Only available in the MFC1.. design without switch disconnector.
3) Only available in the MFC1.. design with switch disconnector.
4) Plug connector X2313_1 can also be ordered separately (i.e. without plug connector X2313_2).
5) Plug connector X4251_1 can also be ordered separately (i.e. without plug connector X4251_2).

7.10.4 Plug connector positions at the electronics cover

The following figure shows an example of the plug connector positions on the electronics cover:



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Plug connector	Function
X4224	"Engineering interface (Ethernet)" (→ 🗎 124)
X4233_1	"Fieldbus/Ethernet interface, port 1" (→ 🗎 122)
X4233_2	"Fieldbus/Ethernet interface, port 2" (→ 🗎 123)

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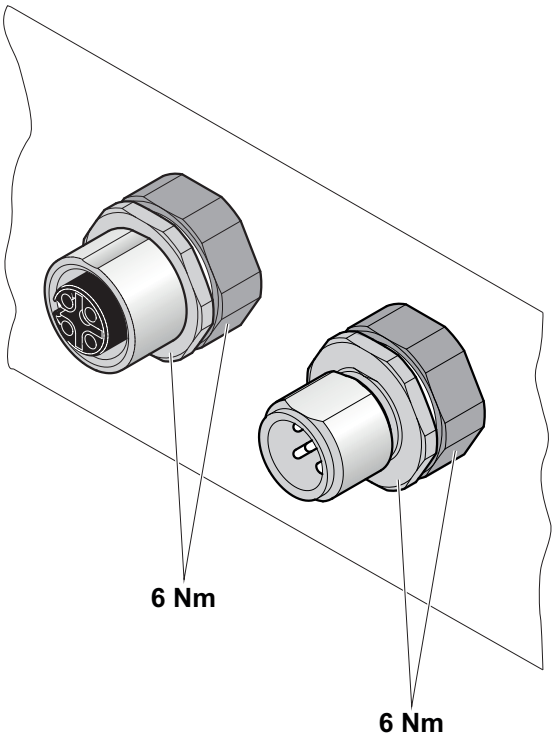
7.10.5 Plug connector variants

M12 plug connector at the connection box

M12 plug connectors at the connection box are pre-installed at delivery so they match the connection cables provided by SEW-EURODRIVE. Customers can adjust the alignment of plug connectors if required.

The following figure shows a schematic illustration with the permitted tightening torque:



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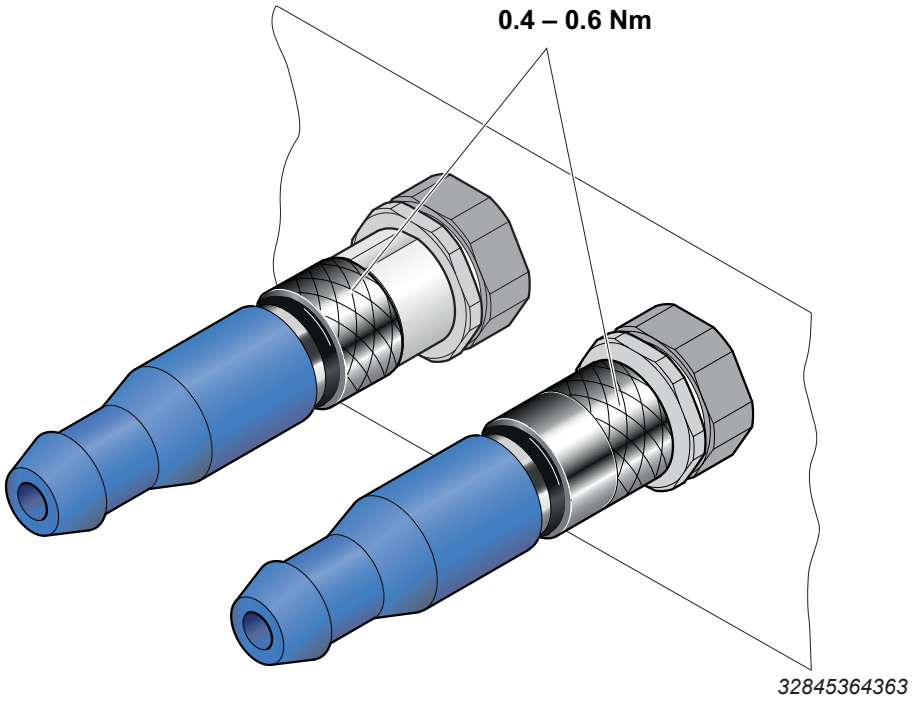
M12 plug connector with mating connector

The following figure shows a schematic illustration with the permitted tightening torques:



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INFORMATION

The M12 plug connectors are usually tightened with a torque of 0.4 – 0.6 Nm. Observe the data sheet of the used prefabricated cables.

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M23 plug connector

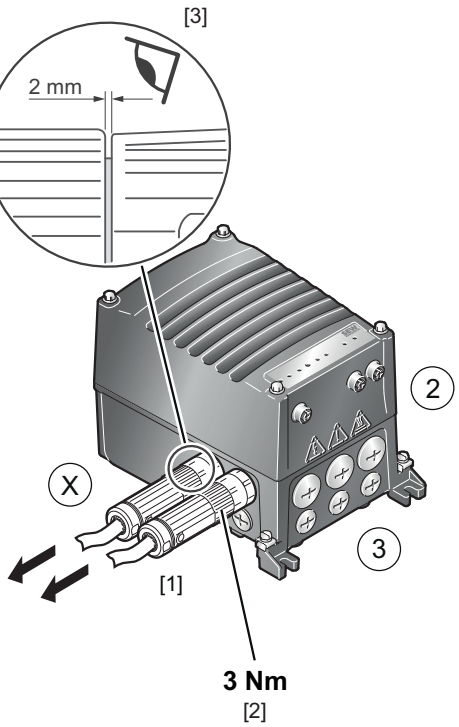
M23 plug connectors are available in the "Straight" plug connector design.

Observe the following information:

- Only align the plug connector when mounting and connecting the drive unit.
- Do not use pliers to adjust the plug connector.
- Turn the plug connector only with plugged-in mating connector.
- The gap between the connector and the socket is approx. 2 mm.
- Tighten the union nut of the M23 plug connector to 3 Nm.
- Make sure that the plug connector does not perform any permanent movements.

MOVI-C® FIELD CONTROLLER example

The following figure shows the installation of the straight M23 plug connector:



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[1] "Straight" design
[2] The tightening torque for the union nut is 3 Nm.
You can order suitable tools from TE Connectivity – Intercontec products:
- Torque wrench 3 Nm, 1/4" external square: C1.020.00
- Spanner wrench 1/4" square socket, suitable for the 923/723 series with SpeedTec equipment: C6.215.00

[3] Gap of approx. 2 mm between connector and socket

7.10.6 Using plug connectors assembled by yourself

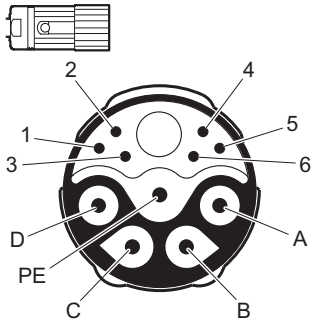
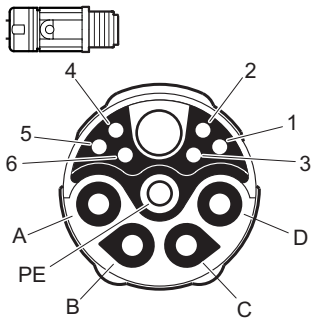
M23 plug connector by TE connectivity – Intercontec Products

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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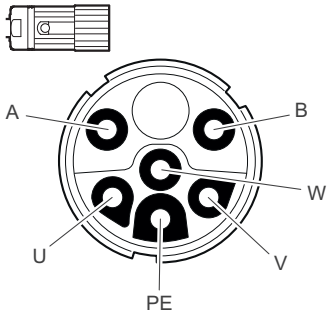
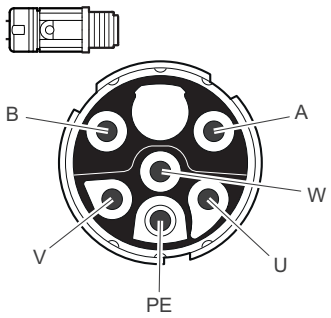
Plug connector type		Outer cable diameter/core cross section of crimp contacts	Designation for order from the supplier TE Connectivity - Intercontec products
PA hybrid plug connector Coding ring: Black/ green	Cable socket (female/ union nut) 	14 mm – 17 mm / 2.5 mm² – 4.0 mm² 0.35 mm² – 2.5 mm²	H 51 A 655 FR 20 92 0113 000
		14 mm – 17 mm / 0.35 mm² – 2.5 mm²	H 51 A 655 FR 23 59 0113 000
	Cable plug (male/male thread) 	14 mm – 17 mm / 2.5 mm² – 4.0 mm² 0.35 mm² – 2.5 mm²	H 52 A 656 MR 24 92 0113 000
		14 mm – 17 mm / 0.35 mm² – 2.5 mm²	H 52 A 656 MR 23 59 0113 000
PAC hybrid plug connector Coding ring: Gray/ green		–	Not approved for assembly by customer

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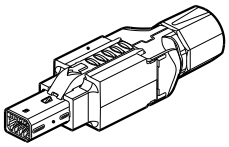
Mini-I/O plug connector

The following tables contains the part numbers and purchase order numbers of the mini-I/O plug connectors for customer assembly of mini I/O connection cables.

Connector type	Cable Outer diameter Core cross section	Cable Category	Purchase order number TE Connectivity Intercontec products (quantity)	Part number SEW-EURODRIVE (quantity)
Industrial mini I/O plug connector (male) Type 1 for field installation 	4.7 to 5.7 mm[1)] 4 × AWG22	CAT5e	1-2350278-1 (60 pieces)	25697064[1)] (1 piece)
	5.8 to 8.2 mm 4 × AWG22	CAT5e	1-2350323-1 (60 pieces)	25708775 (1 piece)
	4.7 to 5.7 mm 4 × AWG26 – AWG24	CAT5e	1-2350304-1 (60 pieces)	Not available
	5.7 to 8.2 mm 8 × AWG26 – AWG24	CAT6A	1-2350310-1 (60 pieces)	Not available

1) Suitable for use with PAC/PSC hybrid cables (cable type: HELUKABEL Li9Y11-HF, HELUKABEL Li9YYö)

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7.11 Assignment of optional plug connectors

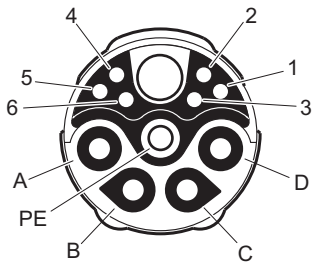
7.11.1 X1203_1 and X1203_2: AC 400 V connection

The following table provides information about this connection:

Function
AC 400 V connection for supplying the device/for looping through

Connection type
M23, SEW-EURODRIVE insert, Series 723, SpeedTec equipment, company: TE Connectivity – Intercontec products, female, coding ring: black, protected against contact

Connection diagram



Assignment

Contact	Function	
A	L1	Line connection, phase L1
B	L2	Line connection, phase L2
C	L3	Line connection, phase L3
D	Res.	Reserved
PE	PE	Protective earth connection
1	Res.	Reserved
2	Res.	Reserved
3	Res.	Reserved
4	Res.	Reserved
5	Res.	Reserved
6	Res.	Reserved

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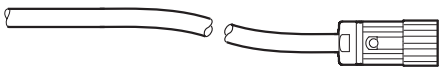
Connection cables

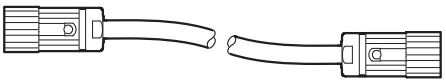
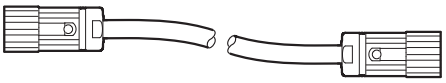
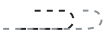
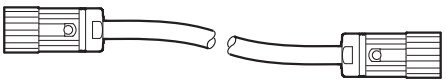
Cable cross section 1.5 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 Open — M23, coding ring: black, male	CE: 18180094	HELUKABEL® JZ-600	Variable 	1.5 mm² / AC 500 V

Cable cross section 2.5 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18127460	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	2.5 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18133959	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	2.5 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153267	HELUKABEL® – JZ-602	Variable 	2.5 mm² / AC 500 V

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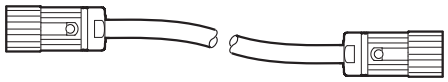
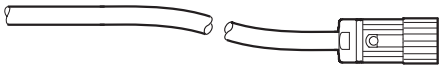
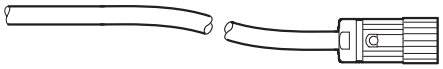
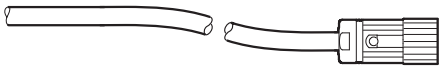
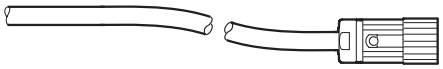
Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153275	HELUKABEL® MULTIFLEX® – 512	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	CE: 18127479	HELUKABEL® TOPFLEX® – 600-PVC	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	CE: 18133967	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153283	HELUKABEL® – JZ-602	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153291	HELUKABEL® MULTIFLEX® – 512	Variable	2.5 mm² / AC 500 V

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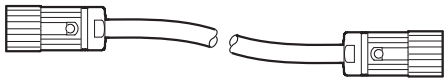
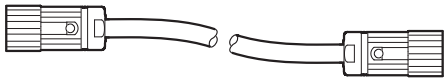
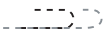
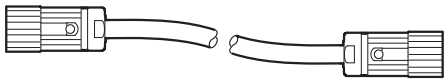
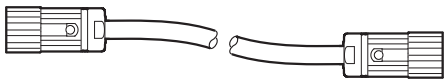
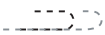
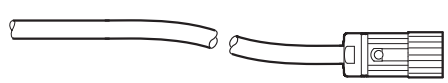
Cable cross section 4.0 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18127487	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18133975	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153305	HELUKABEL® – JZ-602	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153313	HELUKABEL® MULTIFLEX® – 512	Variable 	4.0 mm² / AC 500 V
 Open — M23, coding ring: black, male	CE: 18127495	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	4.0 mm² / AC 500 V

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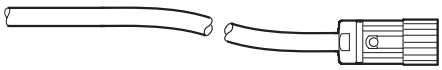
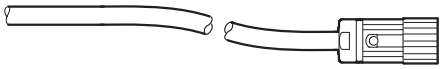
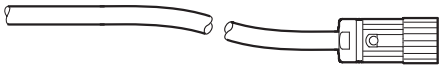
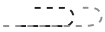
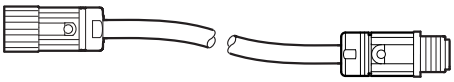
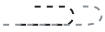
Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 Open — M23, coding ring: black, male	CE: 18133983	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	4.0 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153321	HELUKABEL® – JZ-602	Variable 	4.0 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153348	HELUKABEL® MULTIFLEX® – 512	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, female	UL: 18166318	HELUKABEL® MULTIFLEX® – 512	Variable 	4.0 mm² / AC 500 V

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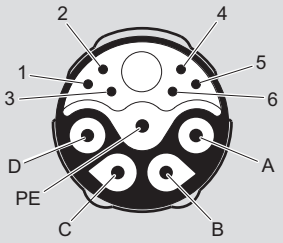
Connection of cables with open end

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

Part numbers
18180094, 18127479, 18133967, 18153283, 18153291, 18127495, 18133983, 18153321, 18153348

Assembly					
Open cable end			Description	Prefabricated plug connector	
					
Core color/ core cross section	Identification	Assembly		Signal	Contact
Black 1.5 mm² 2.5 mm² 4.0 mm²	1	Not prefabricated	Line connection, phase L1	L1	A
Black 1.5 mm² 2.5 mm² 4.0 mm²	2	Not prefabricated	Line connection, phase L2	L2	B
Black 1.5 mm² 2.5 mm² 4.0 mm²	3	Not prefabricated	Line connection, phase L3	L3	C
Green/yellow 1.5 mm² 2.5 mm² 4.0 mm²	-	Not prefabricated	PE connection	PE	PE

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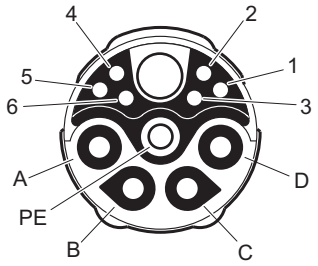
7.11.2 X2203_1 and X2203_2: AC 400 V connection

The following table provides information about this connection:

Function
AC 400 V connection for supplying connected devices and drive units

Connection type
M23, SEW-EURODRIVE insert, 723 series, SpeedTec equipment, company: TE Connectivity - Intercontec products, female, coding ring: black, protected against contact

Connection diagram



Assignment		
Contact	**Function**	
A	L1	Line connection of drive units, phase L1
B	L2	Line connection of drive units, phase L2
C	L3	Line connection of drive units, phase L3
D	Res.	Reserved
PE	PE	Protective earth connection
1	Res.	Reserved
2	Res.	Reserved
3	Res.	Reserved
4	Res.	Reserved
5	Res.	Reserved
6	Res.	Reserved

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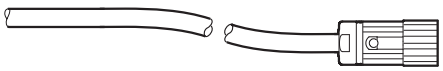
Connection cables

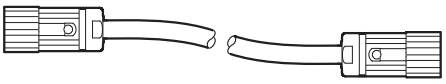
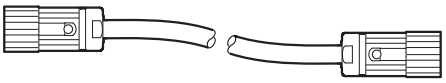
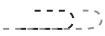
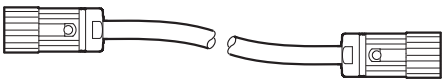
Cable cross section 1.5 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 Open — M23, coding ring: black, male	CE: 18180094	HELUKABEL® JZ-600	Variable 	1.5 mm² / AC 500 V

Cable cross section 2.5 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18127460	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	2.5 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18133959	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	2.5 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153267	HELUKABEL® – JZ-602	Variable 	2.5 mm² / AC 500 V

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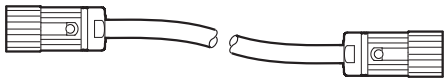
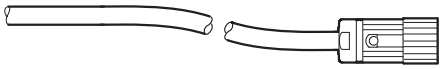
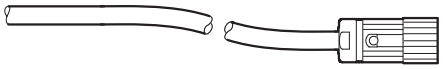
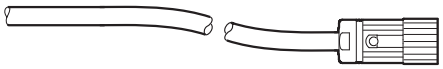
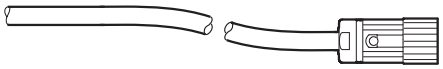
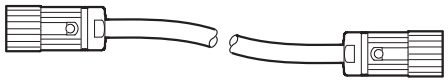
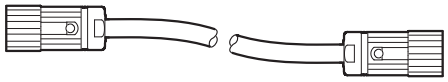
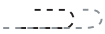
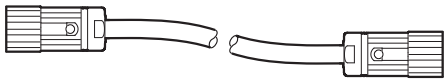
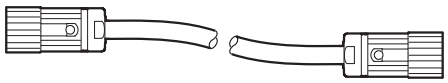
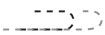
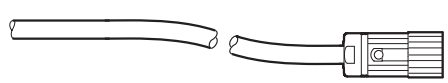
Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153275	HELUKABEL® MULTIFLEX® – 512	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	CE: 18127479	HELUKABEL® TOPFLEX® – 600-PVC	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	CE: 18133967	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153283	HELUKABEL® – JZ-602	Variable	2.5 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153291	HELUKABEL® MULTIFLEX® – 512	Variable	2.5 mm² / AC 500 V

Cable cross section 4.0 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18127487	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18133975	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153305	HELUKABEL® – JZ-602	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, male	UL: 18153313	HELUKABEL® MULTIFLEX® – 512	Variable 	4.0 mm² / AC 500 V
 Open — M23, coding ring: black, male	CE: 18127495	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	4.0 mm² / AC 500 V

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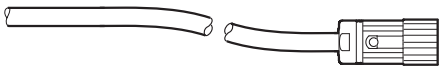
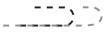
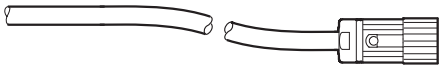
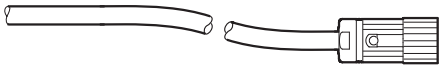
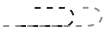
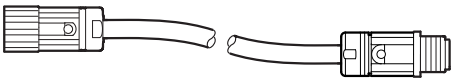
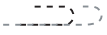
Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 Open — M23, coding ring: black, male	CE: 18133983	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	4.0 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153321	HELUKABEL® – JZ-602	Variable 	4.0 mm² / AC 500 V
 Open — M23, coding ring: black, male	UL: 18153348	HELUKABEL® MULTIFLEX® – 512	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: black, male — M23, coding ring: black, female	UL: 18166318	HELUKABEL® MULTIFLEX® – 512	Variable 	4.0 mm² / AC 500 V

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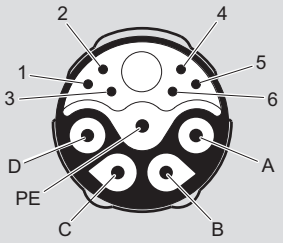
Connection of cables with open end

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

Part numbers
18180094, 18127479, 18133967, 18153283, 18153291, 18127495, 18133983, 18153321, 18153348

Assembly					
Open cable end			Description	Prefabricated plug connector	
					
Core color/ core cross section	Identification	Assembly		Signal	Contact
Black 1.5 mm² 2.5 mm² 4.0 mm²	1	Not prefabricated	Line connection, phase L1	L1	A
Black 1.5 mm² 2.5 mm² 4.0 mm²	2	Not prefabricated	Line connection, phase L2	L2	B
Black 1.5 mm² 2.5 mm² 4.0 mm²	3	Not prefabricated	Line connection, phase L3	L3	C
Green/yellow 1.5 mm² 2.5 mm² 4.0 mm²	-	Not prefabricated	PE connection	PE	PE

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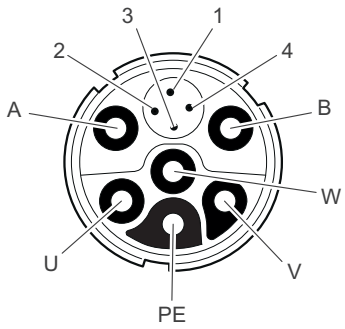
7.11.3 X2326_1 and X2326_2: PAC connection for AC 400 V, DC 24 V backup voltage and communication, output

The following table provides information about this connection:

Function
PAC connection for AC 400 V, DC 24 V backup voltage and Ethernet (OUT)

Connection type
M23, female, female thread with union nut, company: TE Connectivity – Intercontec products, SEW-EURODRIVE insert, Series 723, SpeedTec equipment, coding ring: gray/green, protected against contact

Connection diagram



Assignment		
Contact	**Function**	
U	L1	Line connection, phase L1 (OUT)
V	L2	Line connection, phase L2 (OUT)
W	L3	Line connection, phase L3 (OUT)
PE	PE	Protective earth connection
A	+24 V	DC 24 V input for backup mode (OUT)
B	0V24	0 V 24 reference potential for backup mode (OUT)
1	TX+	Ethernet TX+ (OUT)
2	TX-	Ethernet TX- (OUT)
3	RX+	Ethernet RX+ (OUT)
4	RX-	Ethernet RX- (OUT)

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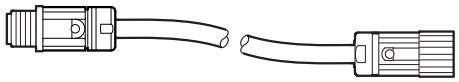
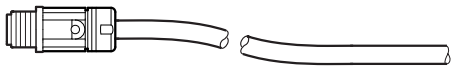
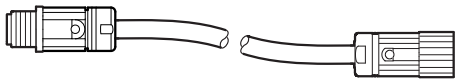
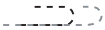
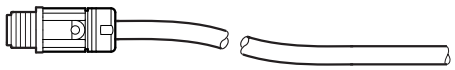
Connection cables

Cable cross section 2.5 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, male, coding ring: gray/green — *Connection cable/extension cable* — M23, female, coding ring: gray/green	CE/UL: 28129296	HELUKABEL® Li9YYö	Variable 	2.5 mm² AC 500 V
 M23, coding ring: gray/ green, male — *Connection cable* — Open	CE/UL: 28113780	HELU-KABEL® Li9YYö	Variable 	2.5 mm² / AC 500 V
 M23, coding ring: gray/ green, male — *Connection cable/extension cable* — M23, coding ring: gray/ green, female	CE/UL: 28113845	HELUKABEL® Li9Y11YHF	Variable 	2.5 mm² / AC 500 V
 M23, coding ring: gray/ green, male — *Connection cable* — Open	CE/UL: 28113802	HELUKABEL® Li9Y11YHF	Variable 	2.5 mm² / AC 500 V

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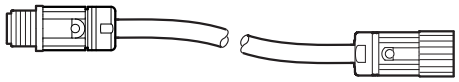
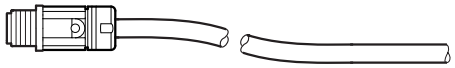
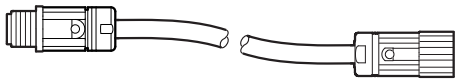
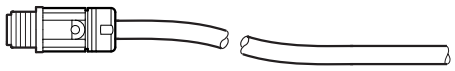
Cable cross section 4.0 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, male, coding ring: gray/green — *Connection cable/extension cable* — M23, female, coding ring: gray/green	CE/UL: 28129318	HELUKABEL® Li9YYö	Variable 	4.0 mm² AC 500 V
 M23, coding ring: gray/ green, male — Open	CE/UL: 28113799	HELUKABEL® LiYYö	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: gray/ green, male — *Connection cable/extension cable* — M23, coding ring: gray/ green, female	CE/UL: 28113853	HELUKABEL® LiY11YHF	Variable 	4.0 mm² / AC 500 V
 M23, coding ring: gray/ green, male — *Connection cable* — Open	CE/UL: 28113810	HELUKABEL® Li9Y11YHF	Variable	4.0 mm² / AC 500 V

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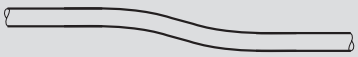
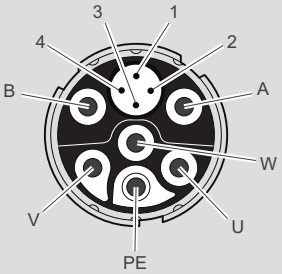
Connection of cables with open end

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

Part numbers
28113780, 28113802, 28113799, 28113810

Assembly					
Open cable end			Description	Prefabricated plug connector	
				M23, male, male thread, coding ring: gray/green	
					
Core color/core cross section	Identification	Assembly		Signal	Contact
Brown 2.5 mm² 4.0 mm²	L1	Not prefabricated	Connection of line phase L1	L1	U
Black 2.5 mm² 4.0 mm²	L2	Not prefabricated	Connection of line phase L2	L2	V
Gray 2.5 mm² 4.0 mm²	L3	Not prefabricated	Connection of line phase L3	L3	W
Green/yellow 2.5 mm² 4.0 mm²	-	Not prefabricated	Protective earth connection	PE	PE
Brown 2.5 mm²	-	Not prefabricated	DC +24 V	+24 V	A
Blue 2.5 mm²	-	Not prefabricated	0V24	0V24	B
Yellow 0.34 mm²	-	Not prefabricated	Ethernet TX+	TX+	1
Orange 0.34 mm²	-	Not prefabricated	Ethernet TX-	TX-	2
White 0.34 mm²	-	Not prefabricated	Ethernet RX+	RX+	3

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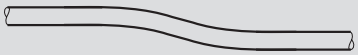
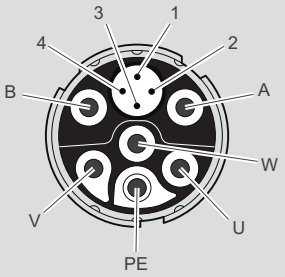
Assembly					
Open cable end			Description	Prefabricated plug connector	
				M23, male, male thread, coding ring: gray/green	
					
Core color/core cross section	Identification	Assembly		Signal	Contact
Blue 0.34 mm^2	-	Not prefabricated	Ethernet RX-	RX-	4

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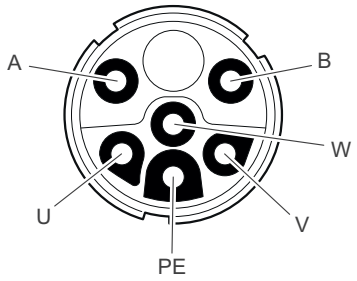
7.11.4 X2327_1 and X2327_2: PA connection for AC 400 V and DC 24 V backup voltage, output

The following table provides information about this connection:

Function
PA connection for AC 400 V and DC 24 V backup voltage (OUT)

Connection type
M23, female, female thread with union nut, SEW-EURODRIVE insert, 723 series, SpeedTec-capable, company: TE/Intercontec, male, coding ring: black/green, protected against contact

Connection diagram



Assignment		
Contact	**Function**	
U	L1	Line connection, phase L1 (OUT)
V	L2	Line connection, phase L2 (OUT)
W	L3	Line connection, phase L3 (OUT)
PE	PE	Protective earth connection
A	+24 V	DC 24 V output for backup mode (OUT)
B	0V24	0 V 24 reference potential for backup mode (OUT)

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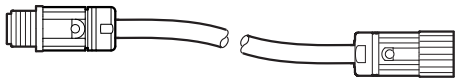
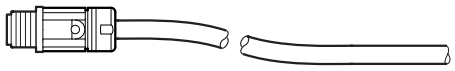
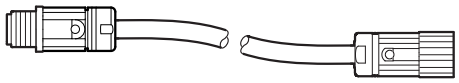
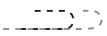
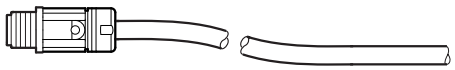
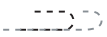
Connection cables

Cable cross section 2.5 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, male, coding ring: black/green — M23, female, coding ring: black/green	CE/UL: 28129326	HELUKABEL® Li9YYö	Variable 	2.5 mm² AC 500 V
 M23, male, coding ring: black/green — Open	CE/UL: 28114426	HELUKABEL® Li9YYö	Variable 	2.5 mm² AC 500 V
 M23, male, coding ring: black/green — M23, female, coding ring: black/green	CE/UL: 28114396	HELUKABEL® Li9YYö	Variable 	2.5 mm² AC 500 V
 M23, male, coding ring: black/green — Open	CE/UL: 28114442	HELUKABEL® Li9YYö	Variable 	2.5 mm² AC 500 V

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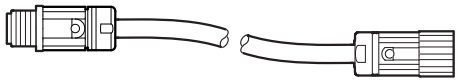
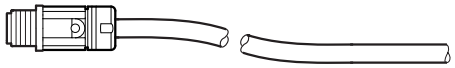
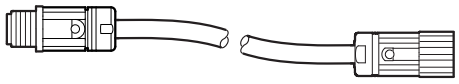
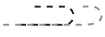
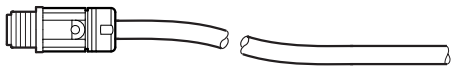
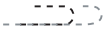
Cable cross section 4.0 mm²

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, male, coding ring: black/green — M23, female, coding ring: black/green	CE/UL: 28129334	HELUKABEL® Li9YYö	Variable 	4.0 mm² AC 500 V
 M23, male, coding ring: black/green — Open	CE/UL: 28114434	HELUKABEL® Li9YYö	Variable 	4.0 mm² AC 500 V
 M23, male, coding ring: black/green — M23, female, coding ring: black/green	CE/UL: 28114418	HELUKABEL® Li9YYö	Variable 	4.0 mm² AC 500 V
 M23, male, coding ring: black/green — Open	CE/UL: 28114450	HELUKABEL® Li9YYö	Variable 	4.0 mm² AC 500 V

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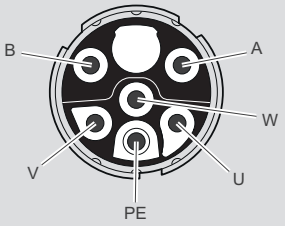
Connection of cables with open end

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

Part numbers
28114426, 28114442, 28114434, 28114450

Assembly					
Open cable end			Description	Prefabricated plug connector	
					
Core color/core cross section	Identification	Assembly		Signal	Contact
Brown 2.5 mm² 4.0 mm²	L1	Not prefabricated	Line connection, phase L1	L1	U
Black 2.5 mm² 4.0 mm²	L2	Not prefabricated	Line connection, phase L2	L2	V
Gray 2.5 mm² 4.0 mm²	L3	Not prefabricated	Line connection, phase L3	L3	W
Green/yellow 2.5 mm² 4.0 mm²	-	Not prefabricated	Protective earth connection	PE	PE
Brown 2.5 mm²	-	Not prefabricated	DC 24 V output	+24 V	A
Blue 2.5 mm²	-	Not prefabricated	0V24 reference potential	0V24	B
Yellow 0.34 mm²	-	Not prefabricated	Reserved[1)]	Res.	-
Orange 0.34 mm²	-	Not prefabricated	Reserved[1)]	Res.	-
White 0.34 mm²	-	Not prefabricated	Reserved[1)]	Res.	-
Blue 0.34 mm²	-	Not prefabricated	Reserved[1)]	Res.	-

1) Reserved wires must be isolated and fixed in the connection box.

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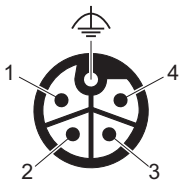
7.11.5 X1523: DC 24 V backup voltage, input

The following table provides information about this connection:

Function
Input DC 24 V backup voltage

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

Connection diagram


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

Devices with plug connectors X1523 and X2313 include additionally integrated auxiliary terminals which are exclusively intended for connecting the second voltage level (contacts 2 and 3). Do not change the installation of these auxiliary terminals.

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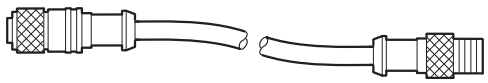
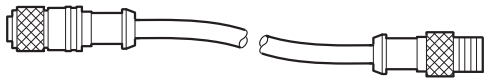
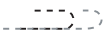
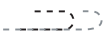
Connection cables

The following table shows 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: 28114345	HELUKABEL® JZ-500	Variable 	5 × 2.5 mm² / DC 60 V
 M12, 5-pin, L-coded, female — Open	CE: 28117786	HELUKABEL® JZ-500	Variable 	5 × 2.5 mm² / DC 60 V
 M12, 5-pin, L-coded, female — M12, 5-pin, L-coded, male	CE/UL: 28114353	HELUKABEL® Li9Y11Y-HF	Variable 	5 × 2.5 mm² / DC 60 V
 M12, 5-pin, L-coded, female — Open	CE/UL: 28117794	HELUKABEL® Li9Y11Y-HF	Variable 	5 × 2.5 mm² / DC 60 V

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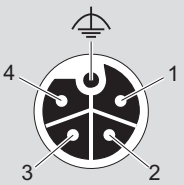
Connection of cables with open end

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

Part numbers
28117786

Assembly					
Open cable end			Description	Prefabricated plug connector	
					
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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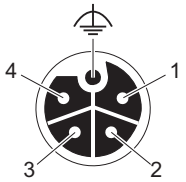
7.11.6 X2313, X2313_1 and X2313_2: DC 24 V backup voltage, output

The following table provides information about this connection:

Function
Output, DC 24 V backup voltage

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

Connection diagram


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

Devices with plug connectors X1523 and X2313 include additionally integrated auxiliary terminals which are exclusively intended for connecting the second voltage level (contacts 2 and 3). Do not change the installation of these auxiliary terminals.

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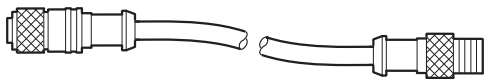
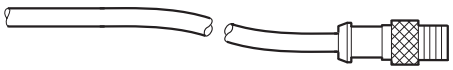
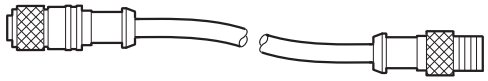
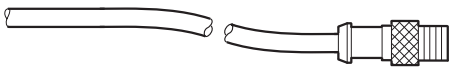
Connection cables

The following table shows 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: 28114345	HELUKABEL® JZ-500	Variable 	5 × 2.5 mm² / DC 60 V
 Open — M12, 5-pin, L-coded, male	CE: 28117751	HELUKABEL® JZ-500	Variable 	5 × 2.5 mm² / DC 60 V
 M12, 5-pin, L-coded, female — M12, 5-pin, L-coded, male	CE/UL: 28114353	HELUKABEL® Li9Y11Y-HF	Variable 	5 × 2.5 mm² / DC 60 V
 Open — M12, 5-pin, L-coded, male	CE/UL: 28117778	HELUKABEL® Li9Y11Y-HF	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 numbers:

Part numbers
28117751, 28117778

Assembly					
Open cable end			Description	Assembled plug connector	
					
Core color/ core cross section	Identification	Assembly		Signal	Contact
Black or brown 2.5 mm²	1	Not prefabricated	DC 24 V output/L1 (for backup voltage/supply)	+24V/L1	1
Black or blue 2.5 mm²	2	Not prefabricated	0V24 reference potential/N2 (for DC 24 V /BES brake rectifier)	0V24/N2	2
Black or white 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 or gray 2.5 mm²	5	Not prefabricated	Functional earth	FE	⏚

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7.11.7 X4251_1 and X4251_2: EtherCAT®/SBus^{PLUS}, output

The following table provides information about this connection:

Function
Output of EtherCAT®/SBus^{PLUS}

Connection type
M12, female, D-coded, female thread, Speedcon, protected against contact, color: turquoise

Connection diagram


Assignment		
Contact	**Function**	
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

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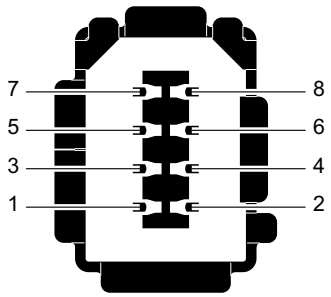
7.12 Assignment of the plug connectors in the connection unit

7.12.1 X43_1 and X43_2: Connection of EtherCAT®/SBus^{PLUS} for drive units (subnetwork)

The following table provides information about this connection:

Function
Connection for Ethernet-based fieldbus or subnetwork

Connection type
Industrial Mini I/O, socket block (female), type 1

Connection diagram


Assignment		
Contact	**Function**	
1	TX+	Transmit line (+)
2	TX-	Transmit line (-)
3	RX+	Receive line (+)
4	Res.	Reserved
5	Res.	Reserved
6	RX-	Receive line (-)
7	Res.	Reserved
8	Res.	Reserved

When connecting directly to plug connectors X43_1 and X43_2, you may only mount the cable gland of the connection cable in position 3.

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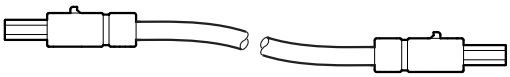
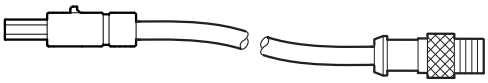
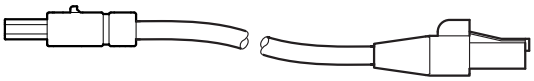
Connection cable

Cable cross section 0.14 mm²

The following tables list the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 Mini I/O, 8-pin, male — Mini I/O, 8-pin, male	CE: 28164563	HELUKAT® PROFINET A, CAT.5	Variable 	4 × 2 × 0.14 mm² / DC 30 V
 Mini I/O, 8-pin, male — M12, D-coded, 4-pin, male	CE: 28172477	HELUKAT® PROFINET A, CAT.5	Variable 	4 × 2 × 0.14 mm² / DC 30 V
 Mini I/O, 8-pin, male — RJ45, 8-pin, male	CE: 28164598	HELUKAT® PROFINET A, CAT.5	Variable 	4 × 2 × 0.14 mm² / DC 30 V
 Mini I/O, 8-pin, male — Open	CE: 28164571	HELUKAT® PROFINET A, CAT.5	Variable 	4 × 2 × 0.14 mm² / DC 30 V

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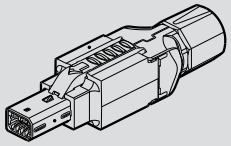
Connection of cables with open end

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

Part numbers
28164571

Assembly				
Assembled plug connector Mini IO (male)		Description	Open cable end	
				
Contact	Signal		Core color/ core cross section	Assembly
1 yellow	TX+	Transmit line (+)	Yellow 0.14 mm²	Not prefabricated
2 orange	TX-	Transmit line (-)	Orange 0.14 mm²	Not prefabricated
3 white	RX+	Receive line (+)	White 0.14 mm²	Not prefabricated
4 and 5	–	Reserved[1)]	–	–
6 blue	RX-	Receive line (-)	Blue 0.14 mm²	Not prefabricated
7 and 8	–	Reserved[1)]	–	–

1) Do not connect these conductors in the plug connector.

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7.13 Plug connector assignment at the electronics cover

7.13.1 X4233_1: Fieldbus/Ethernet interface, port 1

The following table provides information about this connection:

Function
Fieldbus/Ethernet interface, port 1

Connection type
M12, 4-pin, female, D-coded, color: black

Connection diagram


Assignment		
Contact	**Function**	
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

INFORMATION

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

SEW-EURODRIVE recommends using industrial Ethernet cables CAT 5e, 4-core for this connection.

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7.13.2 X4233_2: Fieldbus/Ethernet interface, port 2

The following table provides information about this connection:

Function
Fieldbus/Ethernet interface, port 2

Connection type
M12, 4-pin, female, D-coded, color: black

Connection diagram


Assignment		
Contact	**Function**	
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

INFORMATION

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

SEW-EURODRIVE recommends using industrial Ethernet cables CAT 5e, 4-core for this connection.

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7.13.3 X4224: Engineering interface (Ethernet)

The following table provides information about this connection:

Function
Engineering interface (Ethernet)

Connection type
M12, 4-pin, female, D-coded, color: black

Connection diagram


Assignment		
Contact	**Function**	
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

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7.14 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.

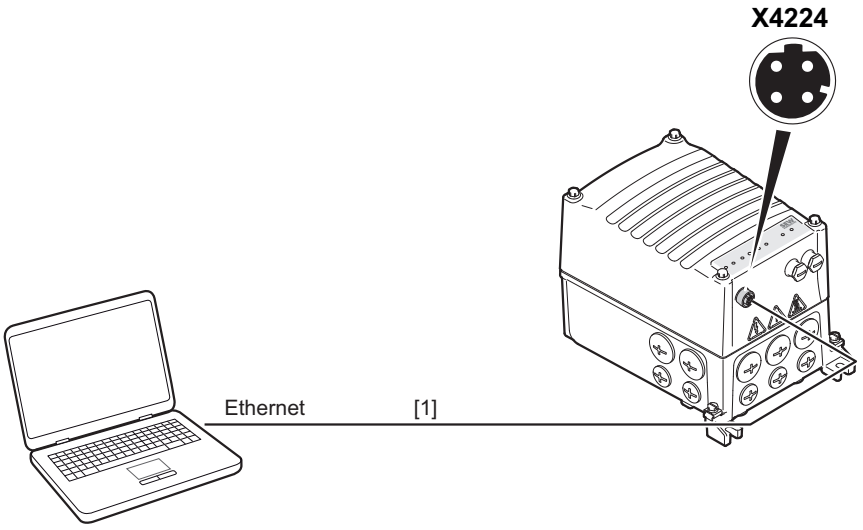
Observe the information in the **product manual** > chapter "Electrical installation" > "PC connection" including the sub-chapters.

7.14.1 Connection via Ethernet

You can establish a connection between PC and device using Ethernet.

Connection to X4224 (M12 at the electronics cover)

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



28695623819

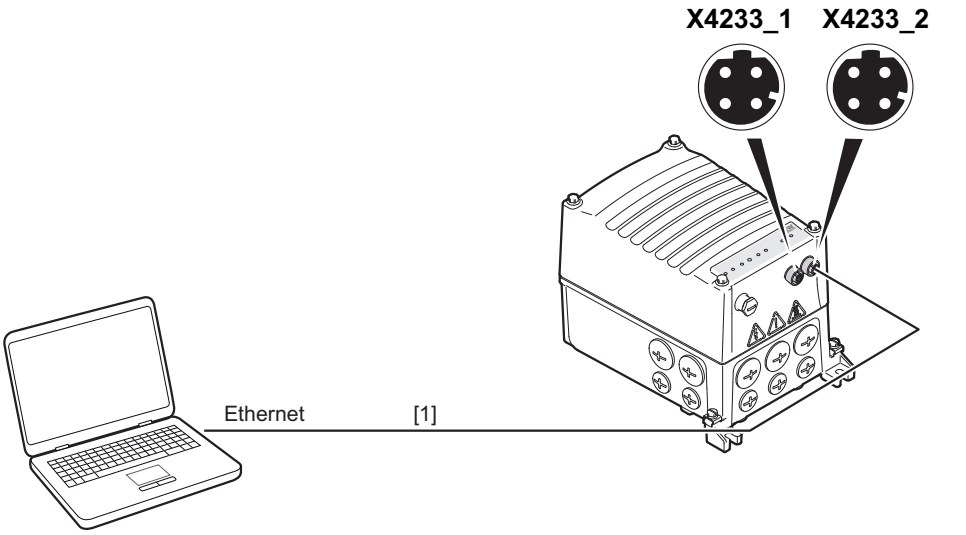
[1] Ethernet connection cable RJ45/M12 (commercial)
With M12 plug connector, 4-pin, male, D-coded

INFORMATION

For information on the IP address, see chapter "Startup" > "DIP switch S3".

Connection to X4233_1 or X4233_2 (M12 at the electronics cover)

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



9007227859445515

[1] Ethernet connection cable RJ45/M12 (commercial)
With M12 plug connector, 4-pin, male, D-coded

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8 Startup

8.1 Startup information

Perform the following steps before startup:

1. ⚠ **WARNING!** Electric shock caused by dangerous voltages in the connection box. Severe or fatal injuries.
   De-energize the device. Pay attention to the 5 safety rules in chapter "Carrying out electrical work safely". Afterwards, wait 5 minutes.
2. ⚠ **WARNING!** Risk of burns due to hot surfaces. Severe injuries.
   Let the device cool sufficiently before touching it.
3. **NOTICE!** Failing to observe the minimum switch-off time of the line contactor can cause material damage. Irreparable damage to the inverter or unforeseen malfunctions.
   After switching off the voltage supply, keep it switched off for at least 10 s.
   ⇨ Do not switch the voltage supply on or off at the line contactor more than once per minute.
4. Secure the output shaft of permanently excited motors against rotation. You thereby avoid an electric shock from the regenerative operation during the rotation of the shaft.
5. ⚠ **WARNING!** Faulty device behavior due to incorrect device setting. Severe or fatal injuries.
   Observe the following information.
   ⇨ Always have the installation carried out by trained specialists.
   ⇨ Only use settings that are correct for the function.
6. Install the protective covers of the system according to the instructions. This will avoid injuries.
   ⇨ Never start the device if the protective covers are not installed.
7. If necessary, remove the paint protection film from the LED displays.
8. If necessary, remove the paint protection film from the nameplates.
9. Product variants with a customer-specific parameter set ex works (.../P...) can start up automatically.

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8.2 Startup requirements

Startup is only required when you need to change the factory set parameterization.

In this case, the following conditions apply to startup:

- You have installed the device correctly both mechanically and electrically.
- You have performed a correct project planning for the device.
- Safety measures prevent accidental startup of devices.
- Safety measures prevent danger to people and machines.

Required hardware components:

- PC or laptop according to the product manual > chapter "PC connection" (→ 🗎 125).
- Interface cable and, if applicable, interface adapter according to product manual > chapter "PC connection"

Required software:

- MOVISUITE® engineering software from SEW-EURODRIVE

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8.3 DIP switch

8.3.1 Overview

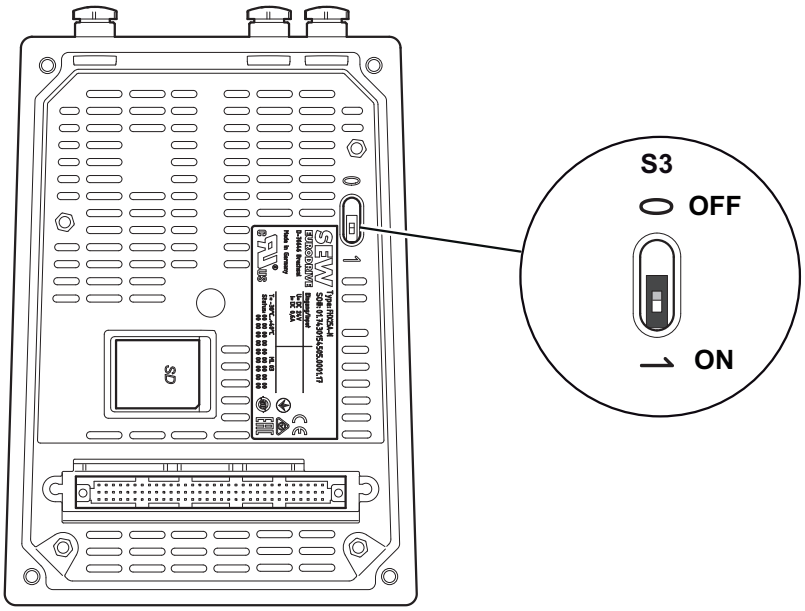
NOTICE

Damage to the DIP switches caused by unsuitable tools.

Damage to property.

- Set the DIP switches only using suitable tools, such as a slotted screwdriver with a blade width of ≤ 3 mm.
- The force used for setting the DIP switches must not exceed 5 N.

The following figure shows the DIP switch of the device:



32167773835

DIP switch S3

DIP switch	Position	Meaning
S3	**ON = "1"**	**IP address on the SD memory card set by user (standard IP address of the X4224 engineering interface on delivery: 192.168.10.4)**
	OFF = "0"	Standard IP address of the X4224 engineering interface: 192.168.10.4 (cannot be changed)

8.4 Setting a user-defined IP address (optional)

INFORMATION

If necessary, switching between default address and user-defined IP address is performed via the integrated DIP switch.

The MOVI-C® FIELD CONTROLLER reads the IP addresses to be used for communication from the `SewPlcIp.xml` file. This file is located on the OMH memory card in the "System" directory.

To change the IP addresses, do the following:

1. Access the file system on the MOVI-C® FIELD CONTROLLER via the engineering interface or using a card reader and navigate to the "System" directory.
2. Open the `SewPlcIp.Example.xml` file for editing in an editor.
3. In the file, replace the currently specified IP addresses with the ones you require.
4. Save the file and close the editor.
5. Rename the edited file into `SewPlcIp.xml`.

⇨ The new values are applied and used the next time the MOVI-C® FIELD CONTROLLER is started up.

⇨ After the first start-up after editing, the file can be deleted or renamed back to `SewPlcIp.Example.xml`.
INFORMATION: When the file is deleted, the default address (`192.168.10.4`) is not set again automatically.

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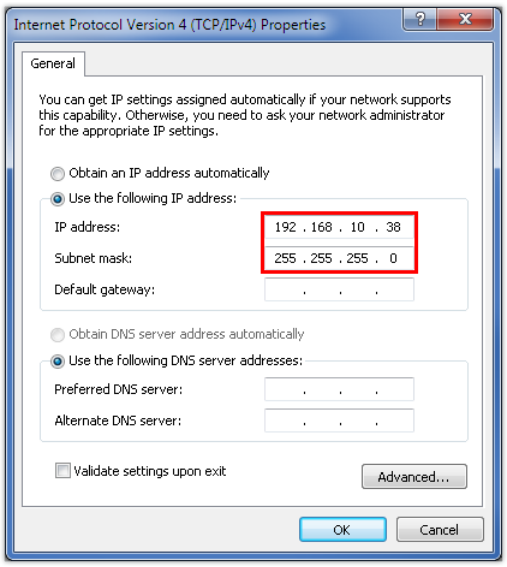
8.5 Connecting the engineering PC and MOVI-C® FIELD CONTROLLER

To ensure that the engineering PC can communicate via the X4224 engineering interface with the MOVI-C® FIELD CONTROLLER via Ethernet, both the devices must be connected in the same local network. For this purpose, the IP address parameters of the engineering PC must be set to the local network. The default IP address(es) of the Ethernet communication interface(s) can be found in chapter "DIP switch S3" (→ 🗎 129).

Proceed as follows:

1. Open the settings for the network via the Windows control panel.
2. Double-click on the adapter that is physically connected to the X4224 engineering interface of the MOVI-C® FIELD CONTROLLER.
3. Select the Internet protocol version 4 "TCP/IPv4" in the adapter properties.
4. Enter the IP address parameters of the engineering PC in the Internet protocol properties. Note that the IP address of the engineering PC is different from the IP address of all other network stations and is therefore unique. The network address (in this case, the first 3-address blocks) for all network stations must be identical and the station address (in this case, the last address block) of the engineering PC must be different from the network address of all other stations.



18014415915164555

⇨ In this example, the IP address of the engineering PC is: 192.168.10.38

8.6 Adding devices to MOVISUITE®

INFORMATION

For detailed information on how to use the MOVISUITE® engineering software, refer to the corresponding documentation.

INFORMATION

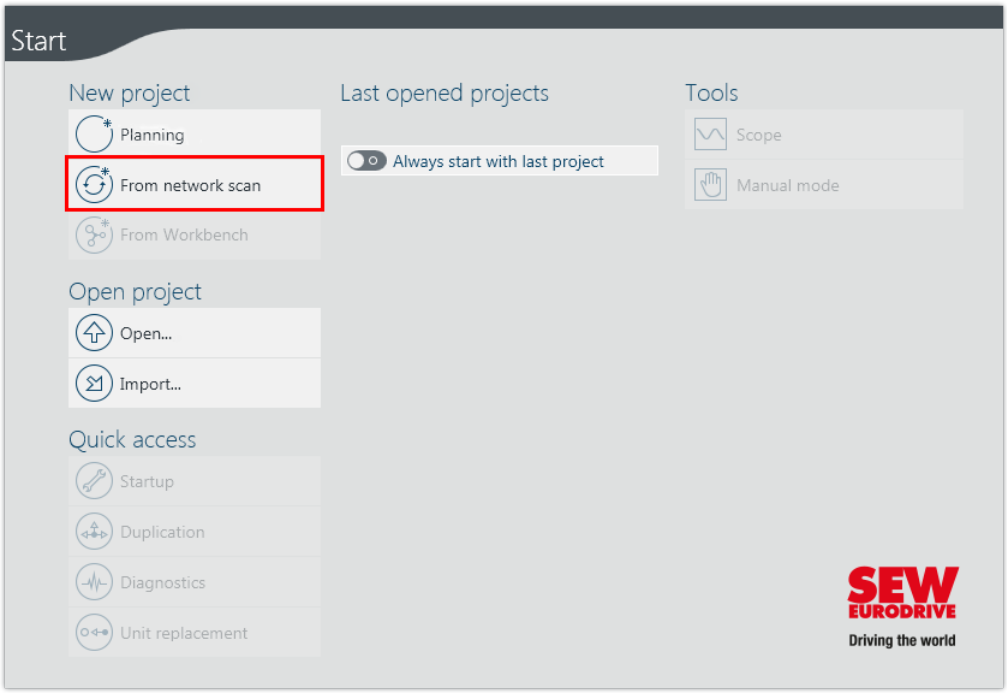
The process of adding a device to MOVISUITE® is shown here using the example of a control cabinet controller.

Proceed as follows:

✓ The engineering PC and the MOVI-C® FIELD CONTROLLER are connected via the engineering interface (X4224).

✓ Both devices are connected in the same local network and the IP address parameters of the engineering PC are set to the local network.

1. Start the MOVISUITE® engineering software.
2. Create a new MOVISUITE® project from a network scan.



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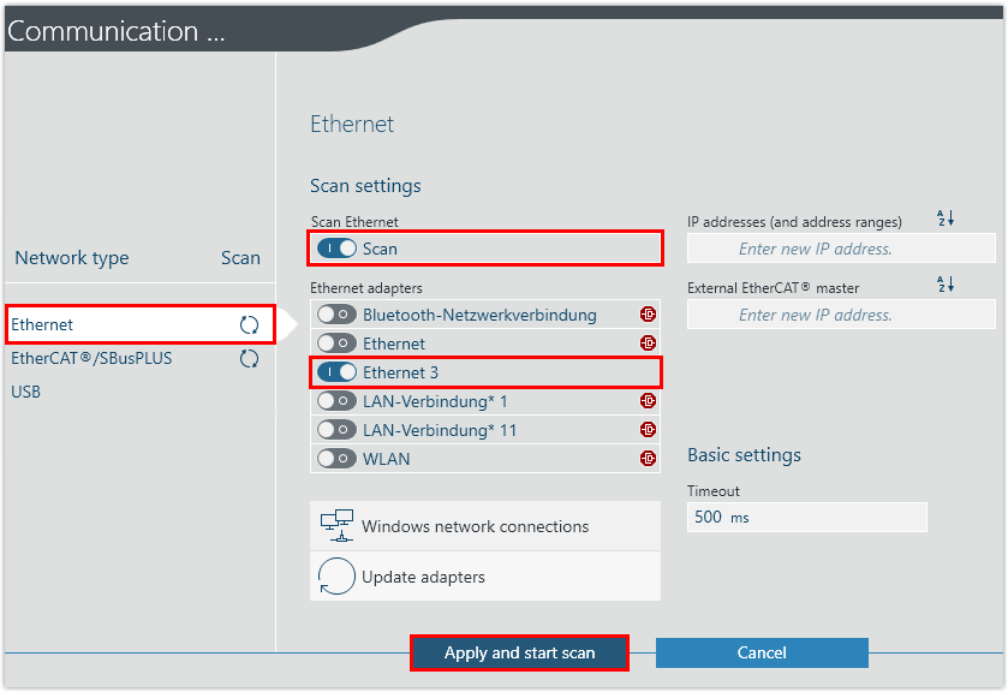
3. Select the network type (Ethernet) and activate the configured adapter (LAN connection). Apply the settings and perform the network scan.



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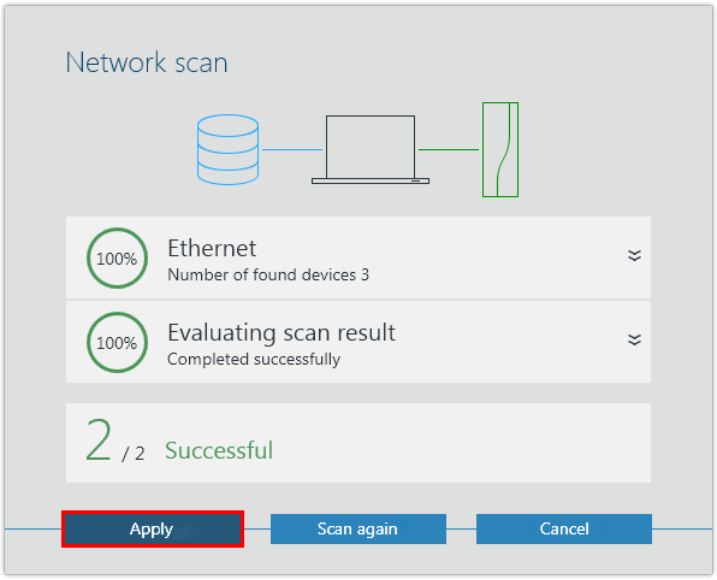
4. Add the scanned devices to MOVISUITE®.



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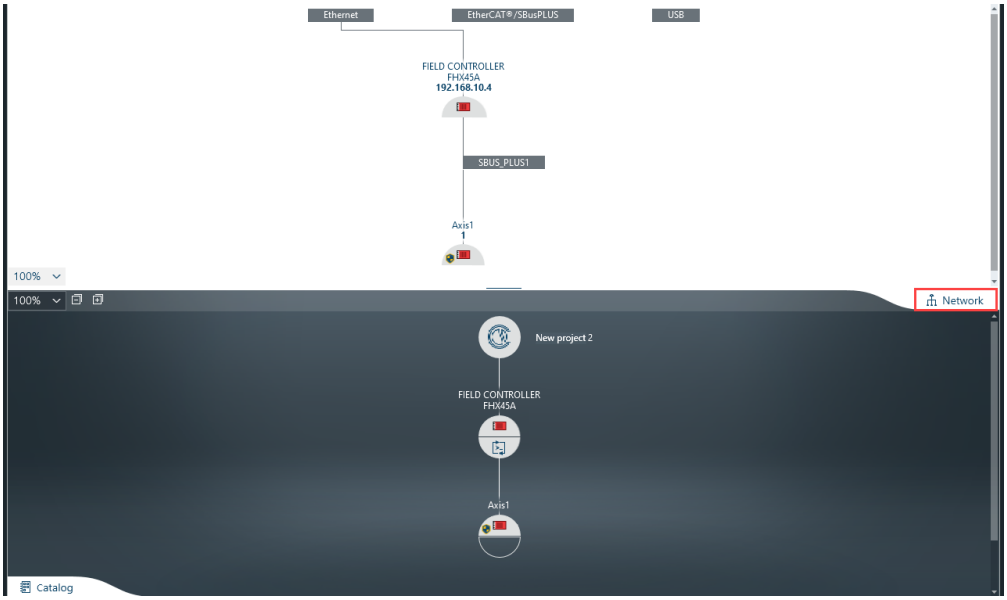
5. If necessary, load the device data into the MOVISUITE® project. Confirm the message stating that the device data has been successfully transferred.
   - ⇨ The devices are displayed in one of the MOVISUITE® views. **INFORMATION:** The display depends on the view used when MOVISUITE® was last closed.
   - ⇨ The combined network and function view shows all connected devices detected during the network scan.



43776119179

⇨ The tree view provides an overview of the entire project.

6. To toggle between the MOVISUITE® views, click the "Network" tab.
7. Enter a name for the device. The device will then be shown in the MOVISUITE® project under this name.

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⇨ The device has the following device name in this example: CONTROLLER UHX45A

8. Save the MOVISUITE® project.

9 Operation

9.1 Maintenance switch

9.1.1 Switch disconnector

⚠ WARNING

Electric shock due to dangerous voltages at the line terminals.

The switch disconnector D01 only disconnects the line voltage at the line terminals X1_b and thus to the connected drive units. Voltage is still present at the line terminals X1_a.

- A correct installation includes that terminals of the device are protected against contact.

NOTICE

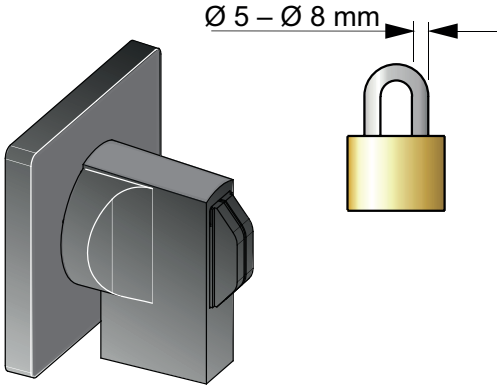
Increased wear of the switch contacts.

Destruction of the switch contacts.

- Do not operate the switch disconnector under load.

The switch disconnector of the device serves to interrupt the voltage supply of the connected drive units. The feedback contact of the switch disconnector is evaluated by the controller and can be queried via the device status bit "Maintenance switch position 'OFF'".

The switch disconnector can be secured with 3 locks.



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9.2 IT security

9.2.1 Hardening measures

Perform the following hardening measures:

- Regularly check if updates are available for your products.
- Report incidents concerning IT security by e-mail to cert@sew-eurodrive.com.
- Regularly check which Security Advisories are available in the Online Support of SEW-EURODRIVE.
- Evaluate the fault memories and diagnostics information of your products regularly and check whether there are entries that affect IT security.

9.2.2 Guidelines for secure operation

The engineering protocol from SEW-EURODRIVE allows authorized personnel to activate various service accesses on the device. Authentication is implemented by using static access data. This data is not used to defend against attacks on IT security but to protect against unintentional modification. This is the reason why it cannot be changed.

To prevent misuse of these service accesses, network access must be restricted according to the state of the art. For more information, refer to section "IT security of the environment" (→ 🗎 11).

9.2.3 Guidelines for user account management

The device has no user accounts.

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10 Service

NOTICE

Improper work on the devices can result in damage.

Damage to property.

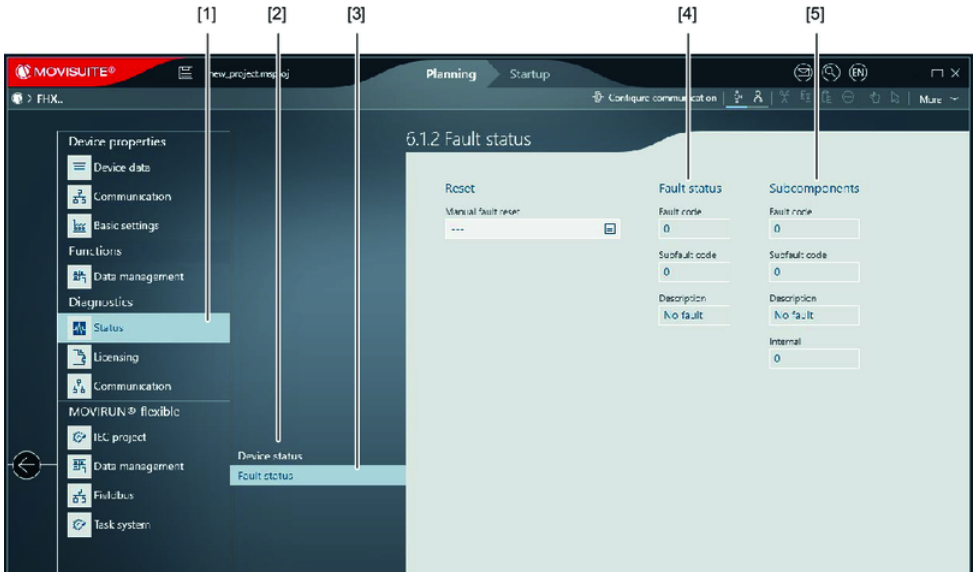
- Make sure that the devices from SEW-EURODRIVE are repaired by qualified specialists only.
- Consult SEW-EURODRIVE SERVICE.

10.1 Evaluating fault messages

10.1.1 MOVISUITE®

The following section shows a sample evaluation of a fault message in MOVISUITE®:

1. Open the parameter tree in MOVISUITE®.
2. In the parameter tree, select the "Status" node [1].
   ⇨ The **current fault messages** can be found in the "Fault status" group [3].
   ⇨ **Additional information** on the causes for the "Not ready" status can be found in the "Device status" group [2].



9007227994357387

[1] Status
[2] Device status
[3] Fault status
[4] Fault status of the main component
[5] Fault status of the subcomponent

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10.2 Resetting fault messages

⚠ WARNING

Removing the source of the malfunction or performing a reset can result in an automatic restart of the connected drives.

Severe or fatal injuries.

- Prevent the system from performing an unintentional startup.

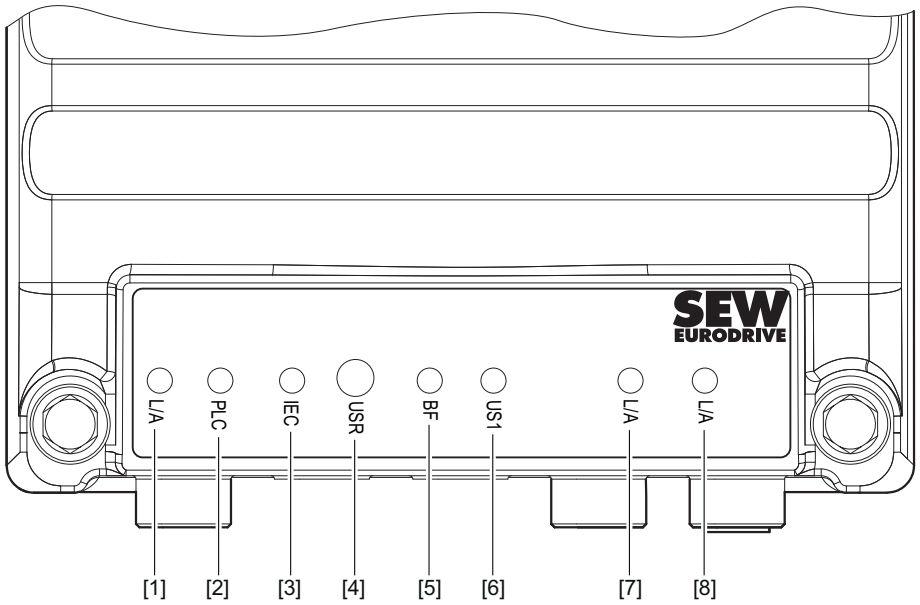
Acknowledge a fault message by:

- Switching the supply system off and on again.
- Using the controller/PLC: Send "reset command".

10.3 Status and operating displays

10.3.1 Overview of PROFINET IO LEDs

The following figure shows the LEDs of the PROFINET IO design:



36028825643260043

[1] "L/A" LED (X43_1/X43_2)
[2] "PLC" LED
[3] "IEC" LED
[4] "USR" LED
[5] "BF" LED
[6] "US1" LED
[7] "L/A" LED (X4233_1)
[8] "L/A" LED (X4233_2)

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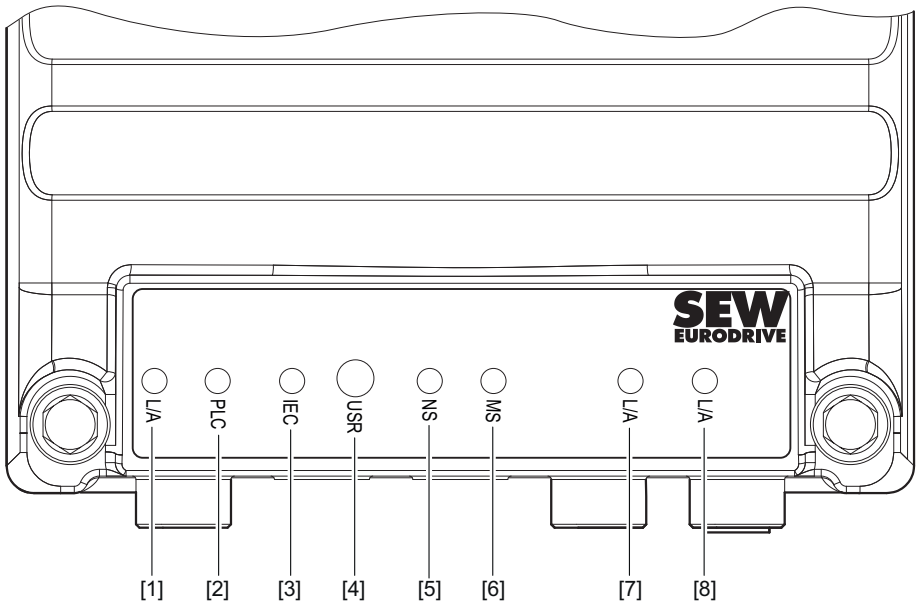
10.3.2 Overview of EtherNet/IP™, Modbus TCP LEDs

The following figure shows the LEDs of the EtherNet/IP™, Modbus TCP design:



36028825643443211

[1] "L/A" LED (X43_1/X43_2)
[2] "PLC" LED
[3] "IEC" LED
[4] "USR" LED
[5] "NS" LED
[6] "MS" LED
[7] "L/A" LED (X4233_1)
[8] "L/A" LED (X4233_2)

10.3.3 General LEDs

"L/A" status LED (X43_1/X43_2)

The following table describes the display functions of the "L/A" LED (X43_1/X43_2):

Status LED	Meaning
Green, illuminated	There is an Ethernet connection to the EtherCAT®/SBus^{PLUS} interface without bus activity.
Green, flashing at 10 Hz	There is an Ethernet connection to the EtherCAT®/SBus^{PLUS} interface with bus activity.
Off	There is no Ethernet connection to the EtherCAT®/SBus^{PLUS} interface.

"L/A" status LED (X4233_1)

The following table describes the display functions of the "L/A" LED (X4233_1):

Status LED	Meaning
Green	There is an Ethernet connection.
Orange, flashing	Data is currently being exchanged via the fieldbus interface.
Off	There is no Ethernet connection.

"L/A" status LED (X4233_2)

The following table describes the display functions of the "L/A" LED (X4233_2):

Status LED	Meaning
Green	There is an Ethernet connection.
Orange, flashing	Data is currently being exchanged via the fieldbus interface.
Off	There is no Ethernet connection.

"PLC" status LED

The following table describes the display functions of the "PLC" LED:

During boot phase

Status	Possible cause	Measure
Red	The firmware of the device fails to boot.	Contact SEW-EURODRIVE Service.
Orange	The SD memory card is not inserted.	Insert an SD memory card into the device.
	The data system of the SD memory card is corrupt.	Contact SEW-EURODRIVE Service.
Green	The SD memory card has faulty content.	Contact SEW-EURODRIVE Service.
Red, flashing at 1 Hz	The SD memory card has faulty content. The firmware of the device is faulty.	Contact SEW-EURODRIVE Service.

During operation

Status	Possible cause	Measure
Green, flashing at 0.5 Hz	The firmware of the device is running properly.	–
Red, flashing at 0.5 Hz	The firmware of the device is faulty.	Contact SEW-EURODRIVE Service.

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"IEC" status LED

The following table describes the display functions of the "IEC" LED:

Status	Meaning	Measure
Off	No IEC program is loaded.	Load an IEC program into the device.
Orange, flashing at 0.5 Hz	Program has stopped running.	Start the IEC program.
Red, flashing at 0.5 Hz	The IEC program is faulty.	Check and correct the IEC program.
Green, flashing at 0.5 Hz	The IEC program is running properly.	–

"USR" status LED

The following table describes the display functions of the "USR" LED:

LED	Meaning
Off, illuminated, or flashing	The function of the status LED is determined by the loaded application program. More information can be found in the manuals of the application programs.

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10.3.4 Bus-specific LEDs for PROFINET IO

"BF" LED

The following table describes the display functions of the "BF" LED:

LED	Meaning	Measure
– **Off**	The device has detected a connection to the PROFINET master.	–
Orange	The fieldbus slave (device) does not support the configured functions in the fieldbus master.	• Perform the configuration again.
Red **Illuminated**	The connection to the PROFINET master has failed. The device does not detect a connection to the PROFINET master (bus error).	• Check the PROFINET connection of the device. • Check all the cables in the PROFINET network. • Check the PROFINET device name in the fieldbus master and fieldbus slave.
	The PROFINET master is not in operation.	• Check the PROFINET master.
	Faulty process data configuration.	• Check the process data configuration.

"US1" LED

The following table describes the display functions of the "US1" LED:

Status	Possible cause	Measure
Green	The fieldbus electronics is running properly.	–
Green, flashing **Illuminated: 0.5 s** **Switched off: 3 s**	The fieldbus electronics is in energy-saving mode (standby mode).	–
Orange, flashing **Illuminated: 0.25 s** **Switched off: 0.25 s**	The fieldbus electronics is currently booting up after a reset.	–
Red	Error in the hardware of the device.	Switch the device off and back on again. If the fault occurs again, contact SEW-EURODRIVE Service.

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10.3.5 Bus-specific LEDs for EtherNet/IP™ and Modbus TCP

"NS" LED

The following table describes the display functions of the "NS" LED:

LED	Meaning	Measure
– **Off**	The device is switched off. No DC 24 V supply.	• Check the DC 24 V supply. • Switch on the device again.
	The IP address is not set.	• Set the IP address.
Green **Flashing**	The connection to the Ethernet master has failed. The device does not detect a connection to the Ethernet master (bus fault).	• Check the Ethernet connection of the device. • Check all Ethernet connections.
Green **Illuminated**	The IP address is set. The Ethernet connection has been established.	–
Red **Flashing**	The timeout time of the controlling connection has expired. The status is reset by restarting communication.	• Check the fieldbus connection. • Check the master/scanner. • Check all Ethernet connections.
Red **Illuminated**	A conflict was detected during IP address assignment.	• Check whether another device with the same IP address is available in the network. • Change the IP address of the device. • Check the DHCP settings for IP address assignment of the DHCP server (only when using a DHCP server).
Red/green **Flashing**	The device performs an LED test. This state may only be active for a short time during startup.	–
	The device has received the designated target unit network ID (TUNID). The LED will keep flashing until the device has received the APPLY_TUNID service and the validation is successfully completed.	

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"MS" LED

The following table describes the display functions of the "MS" LED:

LED	Meaning	Measure
– **Off**	No power supply or DC 24 V supply.	• Check the voltage supply.
Green **Flashing**	The device has not been configured yet.	• Configure the device. • Check the DHCP server connection (only if DHCP is activated and the state is persistent).
Green **Illuminated**	Device OK.	–
Red **Flashing**	A recoverable fault has occurred on the device.	• Check whether another device with the same IP address is available in the network. • Change the IP address of the device. • Check the DHCP settings for IP address assignment of the DHCP server (only when using a DHCP server).
Red **Illuminated**	An unrecoverable fault has occurred on the device.	• Switch on the device again. • Reset the device to the factory settings. • If this fault occurs repeatedly, replace the device or contact SEW-EURODRIVE Service.
Red/green **Flashing**	The device performs an LED test. This state may only be active for a short time during startup.	–
	The device is waiting for a target unit network ID (TUNID).	Assign a target unit network ID (TUNID) to the device.
	Parameterization of the device is required.	Check the parameterization of the CSB51A/CSL51A safety option.

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10.4 Fault description

10.4.1 Fault 150 Controller firmware – general device fault

Subfault: 150.1 **Description: Unknown fault**	
Response: No response	
Cause	Measure
MOVI-C® CONTROLLER firmware detected a severe fault that cannot be attributed to a precise device fault.	Check the log files for new entries with the severity "fault" or "exception" for further information. It might be necessary to activate the storage area of the log files in the file system of the MOVI-C® CONTROLLER. Acknowledging the fault will restart the MOVI-C® CONTROLLER. If the problem is still present, contact SEW-EURODRIVE Service.

Subfault: 150.2 **Description: Restart after exception handling**	
Response: No response	
Cause	Measure
The MOVI-C® CONTROLLER performed an exception handling followed by a restart. This can be caused by impermissible memory access, for example.	During exception handling, the MOVI-C® CONTROLLER stored a log file in the file system with further details on the exception. You can use the log file to eliminate the fault or use the information of the log file when contacting SEW-EURODRIVE Service. Acknowledging the fault will restart the MOVI-C® CONTROLLER.

Subfault: 150.3 **Description: Faulty booting**	
Response: No response	
Cause	Measure
Failed to start the MOVI-C® CONTROLLER properly. The configuration of the MOVI-C® CONTROLLER firmware might be wrong or corrupt.	Check the log files for new entries with the severity "fault" or "exception" for further information. It might be necessary to activate the storage area of the log files in the file system of the MOVI-C® CONTROLLER. Acknowledging the fault will restart the MOVI-C® CONTROLLER. If the problem is still present, contact SEW-EURODRIVE Service.

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Subfault: 150.4 Description: Fault in early booting phase		
	Response: No response	
	Cause	Measure
	Failed to start the MOVI-C® CONTROLLER properly in the early booting phase due to faults.	Check the log files for new entries with the severity "fault" or "exception" for further information. It might be necessary to activate the storage area of the log files in the file system of the MOVI-C® CONTROLLER. If the software packages are corrupt, load original SEW-EURODRIVE software packages onto the removable storage device again. Acknowledging the fault will restart the MOVI-C® CONTROLLER. If the problem is still present, contact SEW-EURODRIVE Service.

10.4.2 Fault 151 controller firmware – License Manager fault

Subfault: 151.1 Description: License Manager not working properly		
	Response: No response	
	Cause	Measure
	Internal software error	Contact SEW-EURODRIVE Service.

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10.5 Device replacement

10.5.1 Information

INFORMATION

When activating the delivery state of devices with the option /P (customer-specific parameter set), parameter settings are implemented that deviate from the default delivery state set by SEW-EURODRIVE.

10.5.2 Replacing the electronics cover

Replace the electronics cover as follows:

1. Observe the safety notes in chapter "Creating a safe working environment" (→ 🗎 13).
   ⇨ Make sure the device is de-energized. The 400 V line voltage and the 24 V backup voltage must be disconnected.
2. Loosen the screws and remove the electronics cover from the connection box.
3. Compare the data on the nameplate of the previous electronics cover with the data on the nameplate of the new electronics cover.

INFORMATION

Always replace the electronics cover with an electronics cover with the same type designation.

4. Set all the control elements (e.g. DIP switches, see chapter "Startup") on the new electronics cover in the same way as the control elements of the previous electronics cover.
5. Remove the SD memory card from the previous electronics cover. Insert this SD memory card into the new electronics cover.
6. Place the new electronics cover onto the connection box and screw it in place.
7. Supply the device with voltage.
8. Check the functionality of the new electronics cover.

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10.5.3 Replacing the SD memory card

Replace the SD memory card as follows:

1. Observe the safety notes in chapter "Creating a safe working environment" (→ 🗎 13).
   ⇨ Make sure the device is de-energized. The 400 V line voltage and the 24 V backup voltage must be disconnected.
2. Loosen the screws and remove the electronics cover from the connection box.
3. Remove the SD memory card from the electronics cover.
4. Compare the type designation of the SD memory card.

INFORMATION

The new SD memory card must have the same type designation as the previous SD memory card.

5. Insert the new SD memory card into the electronics cover.
6. Check the startup of the device.
   ⇨ If required, perform startup again or load a saved startup into the device.

INFORMATION

The variable values stored permanently on the MOVI-C® FIELD CONTROLLER are not stored on the SD memory card by default.

✓ Select one of the following procedures to store the variable values on the SD memory card:

- Program the application (IEC program) accordingly.
- Load the data backup into the MOVISUITE® engineering software via the project management function (in preparation).

7. Place the electronics cover onto the connection box and screw it in place.
8. Supply the device with voltage.
9. Check the functionality of the new electronics cover.

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10.5.4 Device replacement

Replace the device as follows:

1. Observe the safety notes in chapter "Creating a safe working environment" (→ 🗎 13).
   ⇨ Make sure the device is de-energized. The 400 V line voltage and the 24 V backup voltage must be disconnected.
2. If you replace the device including the electronics cover, you must also carry out the measures described in chapter "Replacing the electronics cover".
3. Remove the device. Observe the removal notes in chapter "Mechanical installation".
4. Compare the data on the nameplate of the old device with the nameplate data of the new device.

INFORMATION

Always replace the decentralized controller with a decentralized controller that has the same properties.

5. Install the device. Observe chapter "Mechanical installation".
6. Perform the installation according to chapter "Electrical installation".
7. Remove the SD memory card from the previous electronics cover. Insert this SD memory card into the new electronics cover.
8. Place the electronics cover onto the connection box and screw it in place.
9. Supply the device with voltage.
10. Check the function of the new device.

10.6 Device replacement in MOVISUITE®

10.6.1 Configuration data update

INFORMATION

When replacing a MOVI-C® FIELD CONTROLLER, observe the information in chapter "Installation" and in the "Safety notes" (→ 🗎 9).

INFORMATION

For information on replacing the drives, refer to the manual of the corresponding application inverter.

INFORMATION

The variable values permanently stored on the MOVI-C® FIELD CONTROLLER are not stored on the OMH memory card by default. To store the variable values on the OMH memory card, program a corresponding IEC program.

Do the following when replacing a MOVI-C® FIELD CONTROLLER:

1. In MOVISUITE®, open the configuration of the MOVI-C® FIELD CONTROLLER.
2. Open the "Data management" submenu.

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3. Under "Configuration data", enable the "Controller replacement function".
4. Click on the [Update configuration data] button.
   ⇨ The current failsafe data of the MOVI-C® FIELD CONTROLLER is stored once on the OMH memory card. All of the data that is required when replacing the MOVI-C® FIELD CONTROLLER is in this way stored on the OMH memory card so that the system can run again in the same way as before the replacement. A detailed list of the stored data can be found in the table below. This information may vary depending on the firmware version.

INFORMATION

The PROFINET device name is not saved and restored. To save the PROFINET device name, assign the name via the control software of the PLC or perform a topology-based naming so that the PLC project assigns the name automatically.

NV data	Category
IP settings	Backup and restore
IEC settings	Backup and restore
Customer-specific device designation	Backup and restore
Fieldbus parameters	Backup and restore
Time/date settings	Backup and restore
Device faults and info	Backup only, no restore
Device faults and info	Backup only, no restore
IEC RETAIN/PERSISTENT	Not backed up. To back up this data, contact SEW-EURODRIVE Service.

5. Insert the OMH memory card of the MOVI-C® FIELD CONTROLLER to be replaced into the corresponding card slot of the new MOVI-C® FIELD CONTROLLER.
   ⇨ The most recently saved failsafe data is transferred from the OMH memory card to the MOVI-C® FIELD CONTROLLER.

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10.6.2 Firmware update

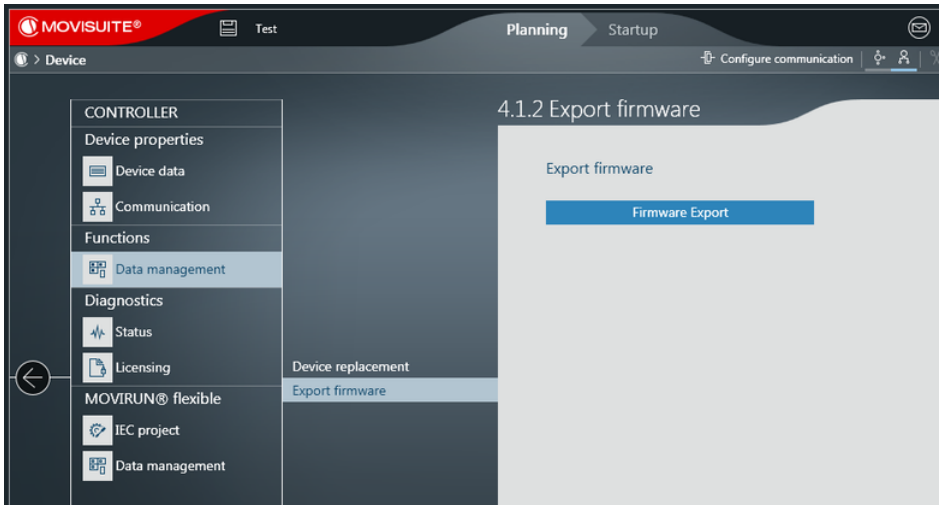
INFORMATION

The firmware update is shown below using the example of a control cabinet controller.

Perform the steps described in the following chapters to update the firmware of the MOVI-C® FIELD CONTROLLER.

Exporting a firmware image

1. Create a new project in MOVISUITE® via "Planning" in the "Start" menu.
2. In the function view of the MOVISUITE® project, add the required MOVI-C® CONTROLLER in the required version.
3. Click the MOVI-C® CONTROLLER in the MOVISUITE® project.
   ⇨ The configuration menu of the MOVI-C® CONTROLLER opens.
4. In the "Functions" section, open the "Data management" submenu and the "Export firmware" menu.



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5. Click the [Firmware Export] button in the "Export firmware" menu.
   ⇨ A dialog window opens where you can select the export directory.
6. Navigate to the export directory and confirm your selection by clicking [OK].

⇨ The firmware of the MOVI-C® CONTROLLER is stored in the selected export directory as a zip file (file name: FS.zip).

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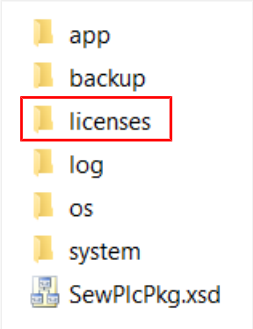
Copying a firmware image to the OMH memory card

✓ The steps described in chapter "Exporting a firmware image" have been performed. The firmware image of the MOVI-C® CONTROLLER is located on your computer as a ZIP archive.

1. Remove the OMH memory card from the MOVI-C® CONTROLLER.
2. To read the data stored on the OMH memory card, insert the card in a card reader connected to your computer. You can also use another suitable interface of your computer.
3. On your computer, use a file explorer to open the contents of the OMH memory card.
   ⇨ The "licenses" directory on the OMH memory card contains the SEW license file. To ensure that the licenses you have purchased remain valid, the SEW license file must again be contained in a "licenses" directory on the OMH memory card after the firmware update.



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4. To save your license files, copy the "licenses" directory locally to your computer.
5. Delete all files on the OMH memory card.
6. Unzip the ZIP archive of the required firmware image onto the OMH memory card. For more information on the export, refer to chapter "Exporting a firmware image".
7. From the "licenses" directory copied locally to your computer, copy the SEW license file to the "licenses" directory on the OMH memory card.

INFORMATION

Restoring the "licenses" directory after deleting the OMH memory card is also possible via the MOVISUITE® License Manager. For this purpose, carry out the following steps:

✓ Engineering PC and MOVI-C® CONTROLLER are connected.

✓ The engineering PC is connected to the Internet.

- Insert the OMH memory card into the MOVI-C® CONTROLLER.
- Open the License Manager via the context menu of the MOVI-C® CONTROLLER in MOVISUITE® in the "Tools" menu.
- Click on [Transfer licenses to the MOVI-C® CONTROLLER].

⇨ The firmware has been updated. Now you can create a new MOVISUITE® project.

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10.6.3 Logging function

The MOVI-C® FIELD CONTROLLER has a logging function, for example, to track the processing procedures in the event of an error. The logging function is disabled by default.

INFORMATION

To keep the write operations on the memory card low and in this way prevent a defect, the logging function should not be activated permanently.

To activate the logging function, do the following:

1. On your engineering PC connected to the MOVI-C® FIELD CONTROLLER, open the OMH memory card content using a file explorer.
2. Navigate to the "log" directory on the OMH memory card.
   ⇨ The "log" directory contains the `LogConfig.Example.xml` file.
3. Rename the `LogConfig.Example.xml` file into `LogConfig.xml`.

⇨ The logging function is now active.

10.7 SEW-EURODRIVE Service

10.7.1 Sending in a device for repair

If a fault cannot be repaired, contact SEW-EURODRIVE Service (see chapter "Address list").

Always provide the numbers of the status sticker when consulting with SEW-EURODRIVE electronics service. so our Service personnel can assist you more effectively.

Provide the following when you send in the device for repair:

- Serial number (see nameplate)
- Type designation
- Unit design
- Short description of the application (application, control type, etc.)
- Type of fault
- Surrounding circumstances
- Your own presumptions
- Preceding, unconventional events, etc.

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10.8 Shutdown

⚠ WARNING

Risk of burns due to hot surfaces.

Severe injuries.

- Let the devices cool down before touching them.

⚠ WARNING

Electric shock caused by dangerous voltages in the connection box. Dangerous voltages can still be present for up to 5 minutes after disconnection from the power supply system.

Severe or fatal injuries.

- Before removing the electronics cover, de-energize the device via a suitable external disconnection device.
- Secure the device against unintended re-connection of the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least the following time before removing the electronics cover: **5 minutes**

To shut down the device, de-energize the device using appropriate measures. Disconnect the 400 V line voltage and the 24 V backup voltage from the device.

10.9 Storage

Observe the following instructions when shutting down or storing the device:

- If you shut down and store the device for a longer period, you must close open cable bushings and cover contacts with protection caps.
- Make sure that the device is not subject to mechanical impact during storage.
- Observe the notes on storage temperature in the product manual > chapter "Technical data".

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10.10 Extended storage

10.10.1 Storage conditions

Observe the storage conditions specified in the following table for extended storage:

Climate zone	Packaging[1)]	Storage location[2)]	Storage duration
Temperate (Europe, USA, Canada, China and Russia, excluding tropical zones)	Packed in containers, with desiccant and moisture indicator sealed in plastic wrap.	Under roof, protected against rain and snow, no shock loads.	Up to 3 years with regular checks of the packaging and moisture indicator (relative humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity). No sudden temperature variations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors and no shocks.	2 years or more with regular inspections. Check for cleanness and mechanical damage during inspection. Check corrosion protection.
Tropical (Asia, Africa, Central and South America, Australia, New Zealand excluding temperate zones)	Packed in containers, with desiccant and moisture indicator sealed in plastic wrap. Protected against insect damage and mildew by chemical treatment.	Under a roof, protected against rain and free from shocks.	Up to 3 years with regular checks of the packaging and moisture indicator (relative humidity < 50%).
	Open	Under roof and enclosed at constant temperature and atmospheric humidity (5 °C < ϑ < 50 °C, < 50% relative humidity). No sudden temperature variations. Controlled ventilation with filter (free from dust and dirt). No aggressive vapors and no shocks. Protected against insect damage.	2 years or more with regular inspections. Check for cleanness and mechanical damage during inspection. Check corrosion protection.

1) The packaging must be carried out by an experienced company using the packaging materials that have been explicitly specified for the particular application.

2) SEW-EURODRIVE recommends storing the drive according to the mounting position.

10.10.2 Electronics

INFORMATION

For electronics components, adhere to the following notes in addition to the notes in chapters "Extended storage" > "Drive" and "Extended storage" > "Storage conditions".

If the device is in extended storage, connect it to the supply voltage for at least 5 minutes every 2 years. Otherwise, the device's service life may be reduced.

10.11 IT security guidelines for secure waste disposal

10.11.1 Removing the product from its intended environment

If the data stored on the product is considered relevant for IT security, remove it as described in the section "Secure removal of data stored in the product." (→ 🗎 156)

10.11.2 Removing reference and configuration data in the environment

Reference files, configuration files, log files, and other data belonging to the product can be stored in the environment on other devices, such as a higher-level controller or a local OPC-UA client. If the stored data is considered relevant for IT security, remove it from the corresponding devices.

10.11.3 Secure removal of data stored in the product

If the data stored locally on the product is classified as relevant for the IT security, contact the responsible SEW-EURODRIVE service for safe removal.

10.11.4 Removing a customer data backup

You can delete a customer data backup using the MOVISUITE® engineering software. To do so, in the parameter configuration of the corresponding device under [Basic setting] > [Data backup] > [Backup of customer-specific device parameters] click the [Delete] button.

Some of the data of the product is stored on removable storage media. If the data on the removable storage medium is classified as sensitive data from the operator's point of view and is not intended for later use, reset the device to the factory settings before disposing of the data. This also deletes the storage medium content.

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10.12 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

- Iron, steel or cast iron
- Stainless steel
- Magnets
- Aluminum
- Copper
- Electronic parts
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

  Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.
- Screens
- Capacitors
- Rechargeable batteries
- Batteries

Waste disposal according to WEEE Directive 2012/19/EU

This product and its accessories may fall within the scope of the country-specific application of the WEEE Directive. Dispose of the product and its accessories according to the national regulations of your country.

For further information, contact the responsible SEW-EURODRIVE branch or an authorized partner of SEW-EURODRIVE.

Waste disposal according to the Battery Directive 2006/66/EC

This product contains batteries or accumulators. Dispose of this product and the batteries or accumulators separately from the municipal waste according to the national regulations.

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11 Inspection and maintenance

11.1 Inspection and maintenance intervals

The following table shows the inspection and replacement intervals for the device:

Time interval	What should I do?	Who is permitted to perform the work?
When the electronics cover is opened after an operating period of ≥ 6 months	If you open the electronics cover after an operating period of ≥ 6 months, you must replace the gasket between the connection box and the electronics cover to ensure the IP protection class. The 6-month period can be shortened by harsh ambient/operating conditions, e.g. cleaning with aggressive chemicals or frequent temperature variations.	Specialists at customer site
Each time the electronics cover is opened	Visual inspection of the gasket between connection box and electronics cover: In case of damage, replace this gasket.	Specialists at customer site

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11.2 Inspection and maintenance work

11.2.1 Preliminary work regarding inspection and maintenance

Carry out the following steps before all inspection and maintenance work:

1. ⚠ **WARNING!** Electric shock caused by dangerous voltages in the connection box. Severe or fatal injuries.
   De-energize the device. Pay attention to the 5 safety rules in chapter "Carrying out electrical work safely". Afterwards, wait 5 minutes.
2. ⚠ **WARNING!** Risk of burns due to hot surfaces. Severe injuries.
   Let the device cool sufficiently before touching it.
3. Secure the output shaft of permanently excited motors against rotation. You thereby avoid an electric shock from the regenerative operation during the rotation of the shaft.

11.2.2 Cleaning the device

Observe the following information:

- Excessive dirt, dust or chips can have a negative impact on the function of the device and might even cause it to fail.
- It is therefore important to clean the device at regular intervals, at the latest after one year. This allows you to achieve sufficient heat dissipation.
- Insufficient heat dissipation can have undesirable consequences. The bearing service life is reduced by operating at impermissibly high temperatures (bearing grease decomposes).

11.2.3 Connection cables

Check the connection cables for damage at regular intervals. If the connection cables are damaged, replace them.

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11.2.4 Replacing the gasket between connection box and electronics cover

Procedure

NOTICE

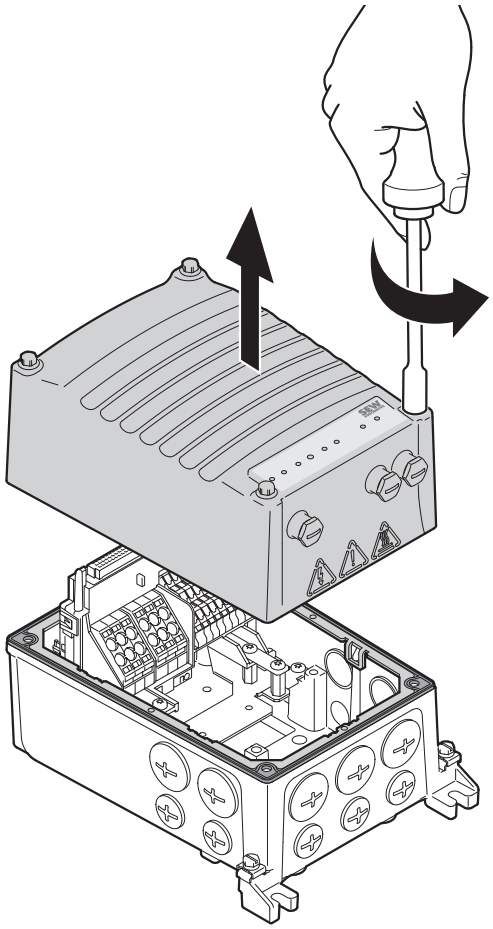
Loss of the guaranteed degree of protection.

Damage to property.

- When the cover is removed from the connection box, the cover and the wiring space must be protected from humidity, dust or foreign particles.

Replace the gasket of the MOVI-C® FIELD CONTROLLER as follows:

1. Perform the steps according to chapter "Preliminary work regarding inspection and maintenance" (→ 🗎 159).
2. Loosen the screws of the electronics cover and remove it.



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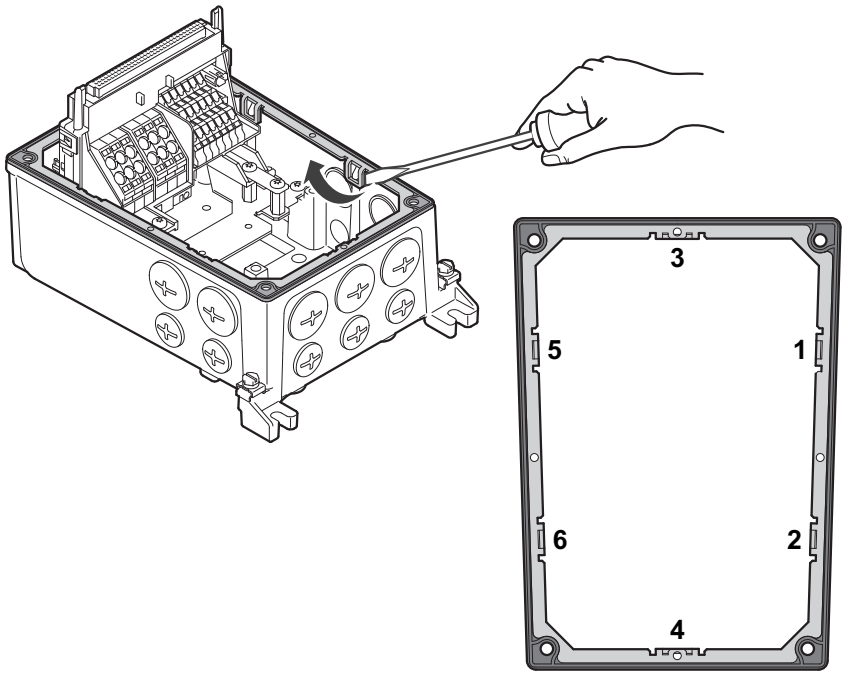
3. **NOTICE!** Loss of the guaranteed degree of protection. Possible damage to property. Make sure that the sealing surfaces are not damaged when removing the gasket.
   Loosen the used gasket by levering it off the retaining cams.
   ⇨ Disassembly will be easier if you adhere to the sequence shown in the following figure:



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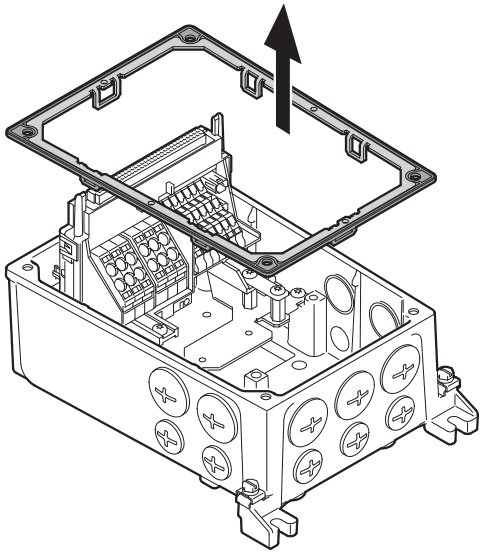
4. Remove the old gasket completely from the connection box.



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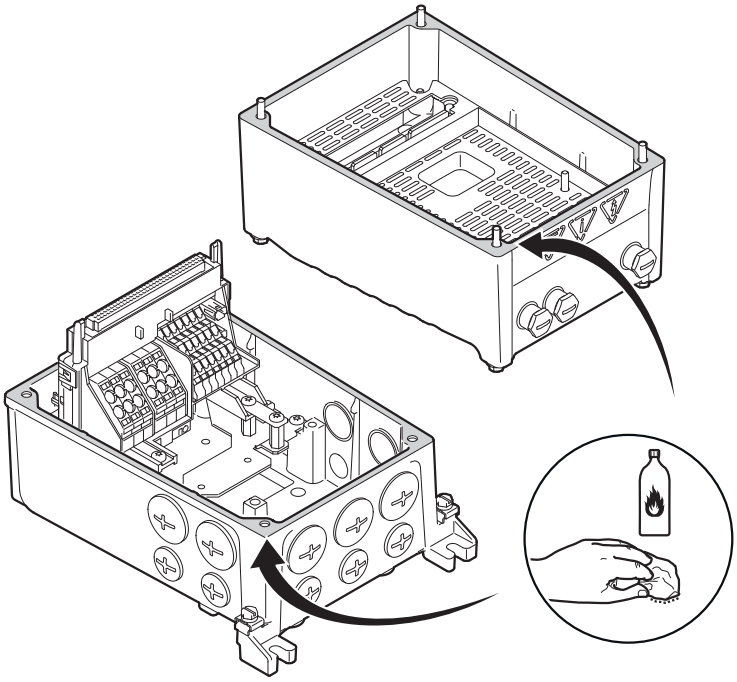
5. ⚠ **CAUTION!** Risk of injury due to sharp edges. Cutting injuries. Use protective gloves when cleaning. Ensure that work is carried out by trained specialists only. Carefully clean the sealing surfaces of the connection box and the electronics cover.



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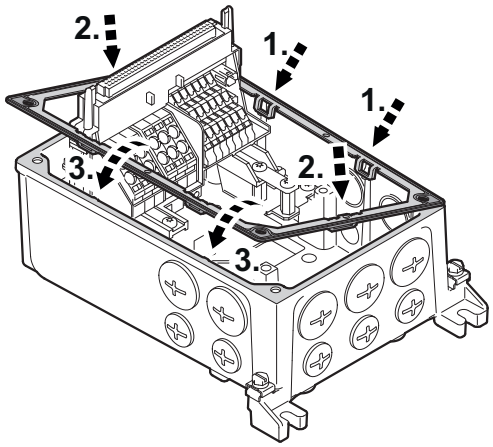
6. Place the new gasket on the connection box and fix it with the retaining cams. Installation will be easier if you adhere to the sequence shown.



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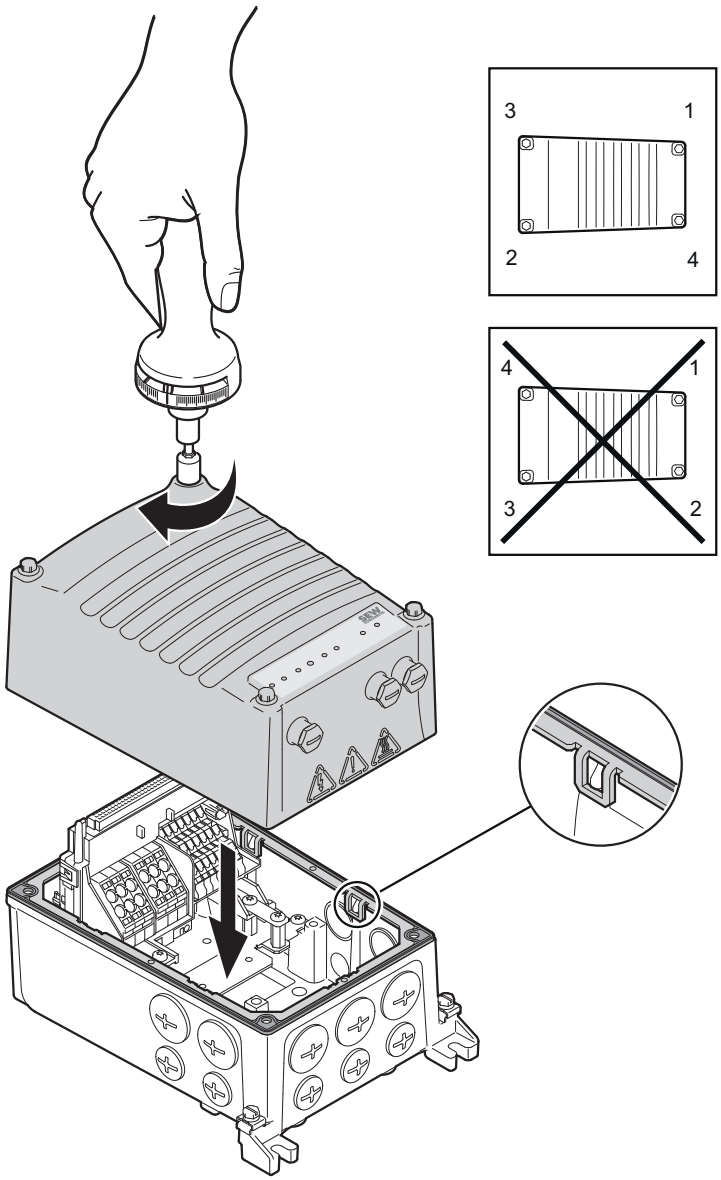
7. Check the installation and startup of the device using the applicable operating instructions.
8. Place the electronics cover back onto the connection box and secure it.
   ⇨ Proceed as follows when mounting the electronics cover: Insert the screws and tighten them in diametrically opposite sequence step by step with a tightening torque of 6.0 Nm.



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12 Address list

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	Nantes	SEW USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon	Tel. +33 2 40 78 42 00 dtcnantes@usocome.com
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Representation: Cameroon			
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Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 scc-mechanik@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Straße 12 76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
	MAXOLUTION® Factory Automation	SEW-EURODRIVE GmbH & Co KG Eisenbahnstraße 11 76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 sew@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 43 30823 Garbsen (Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 dtc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909551-21 Fax +49 89 909551-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 dtc-west@sew-eurodrive.de
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Melitta-Schiller-Straße 8 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de

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	Bremen	SEW-EURODRIVE GmbH & Co KG Allerkai 4 28309 Bremen	Tel. +49 421 33918-10 Fax +49 421 33918-22 dc-bremen@sew-eurodrive.de
	Hamburg	SEW-EURODRIVE GmbH & Co KG Hasselbinnen 11 22869 Schenefeld	Tel. +49 40298109-60 Fax +49 40298109-70 dc-hamburg@sew-eurodrive.de
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 dc-saarland@sew-eurodrive.de
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 dc-ulm@sew-eurodrive.de
	Würzburg	SEW-EURODRIVE GmbH & Co KG Nürnbergerstraße 118 97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 dc-wuerzburg@sew-eurodrive.de
Drive Service Hotline / 24 Hour Service			0 800 SEWHELP 0 800 7394357
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. Csillaghegyí út 13. 1037 Budapest	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 https://vov.is/ vov@vov.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited 302, NOTUS IT PARK, Sarabhai Campus, Beside Notus Pride, Genda Circle, Vadodara 390023 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 https://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 salespune@seweurodriveindia.com
	Tapukara	SEW-EURODRIVE India Private Limited Plot No SP-6-46, Tapukara, Karoli Industrial Area, No. 1, district : Alwar , Rajasthan - 301707	Tel. +91 265 3045200 Fax +91 265 3045300 tapukara.plant@seweurodriveindia.com

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India			
Sales	Gurgaon	SEW-EURODRIVE India Private Limited Global Business Park, Sector -26, M.G. Road, Sikanderpur Unit No. 205, 2nd Floor, Tower – D Gurugram 122002, Haryana	Tel. +91 9958376669 salesgurgaon@seweurodriveindia.com
Drive Center	Raipur	SEW-EURODRIVE India Private Limited Plot unit no. 129/17 P.O. GSI-Mandhar District: Raipur, State: Chhattisgarh	Tel. +91 8294630772 salesraipur@seweurodriveindia.com
Indonesia			
Registered Office Sales Service	Jakarta	PT SEW EURODRIVE INDONESIA Palma Tower, 16th Floor, Unit H & I, Jl R.A. Kartini II-S Kav 06 Pondok Pinang, Kebayoran Lama Jakarta Selatan 12310	Tel. +62 21 7593 0272 Fax +62 21 7593 0273 sales.indonesia@sew-eurodrive.com https://www.sew-eurodrive.com.sg
Sales	Medan	PT. Serumpun Indah Lestari Jl.Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com http://www.serumpunindah.com
	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
	Jakarta	PT. Agrindo Putra Lestari JL.Pantai Indah Selatan, Komplek Sentra Industri Terpadu, Pantai indah Kapuk Tahap III, Blok E No. 27 Jakarta 14470	Tel. +62 21 2921-8899 Fax +62 21 2921-8988 aplindo@indosat.net.id http://www.aplindo.com
	Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60111	Tel. +62 31 5990128 Fax +62 31 5962666 sales@triagri.co.id http://www.triagri.co.id
	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id http://www.cvmultimas.com
Ireland			
Sales Service	Dublin	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 http://www.alperton.ie info@alperton.ie
Israel			
Sales	Tel Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly Sales Service	Milan	SEW-EURODRIVE S.a.s. di SEW S.r.l. & Co. Via Bernini,12 20033 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 http://www.sew-eurodrive.it milano@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 27 21 21 81 05 Fax +225 27 21 25 30 47 info@sew-eurodrive.ci http://www.sew-eurodrive.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

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Kazakhstan			
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	Tashkent	Representative Office SEW-EURODRIVE Representative office in Uzbekistan 95A Amir Temur ave, office 401/3 100084 Tashkent	Tel. +998 97 134 01 99 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn
Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.lv info@alas-kuul.com
Lebanon			
Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Sales (Jordan, Kuwait , Saudi Arabia, Syria)	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 http://www.medrives.com info@medrives.com
Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.irseva.lt irmantas@irseva.lt
Luxembourg			
Representation: Belgium			
Macedonia			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Malaysia			
Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Mexico			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Technical Office	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 http://imt.mn/ imt@imt.mn

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Sales Service Assembly	Bouskoura	SEW-EURODRIVE Morocco SARL Parc Industriel CFCIM, Lot. 55/59 27182 Bouskoura Grand Casablanca	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma
Namibia			
Sales	Swakopmund	DB MINING & INDUSTRIAL SUPPLIES CC Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com
Netherlands			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Nigeria			
Sales	Lagos	Greenpeg Nig. Ltd 64C Toyin Street Opebi-Allen Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 http://www.greenpegltd.com sales@greenpegltd.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Hornebergvegen 11 B 7038 Trondheim	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L Nu Guazu No. 642 casi Campo Esperanza Santisima Trinidad Asuncion	Tel. +595 991 519695 Fax +595 21 3285539 sewpy@sew-eurodrive.com.py
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Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com http://www.ptcerna.com
Poland			
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Poland			
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Portugal			
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Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 http://www.sialco.ro sialco@sialco.ro
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 http://www.senemeca.com senemeca@senemeca.sn
Serbia			
Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. 9, Tuas Drive 2 Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Drive Technology Center	Bernolákovo	SEW-Eurodrive SK s.r.o. Priemyselná ulica 6267/7 900 27 Bernolákovo	Tel.+421 2 48 212 800 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
Slovenia			
Representation: Austria			
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED 32 O'Connor Place Eurodrive House Aeroton Johannesburg 2190 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 248-7289 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PROPRIETARY) LIMITED 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

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South Korea			
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	Busan	SEW-EURODRIVE Korea Co., Ltd. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
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Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Sri Lanka			
Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Swaziland			
Sales	Manzini	C G Trading Co. (Pty) Ltd Simunye street Matsapha, Manzini	Tel. +268 7602 0790 Fax +268 2 518 5033 charles@cgtrading.co.sz www.cgtradingswaziland.com
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 http://www.sew-eurodrive.se jonkoping@sew.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof AG Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 17 17 http://www.imhof-sew.ch info@imhof-sew.ch
Taiwan			
Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
Tanzania			
Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 http://www.sew-eurodrive.co.tz info@sew.co.tz
Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com https://www.sew-eurodrive.co.th
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

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Turkey			
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRIVE Ana Merkez Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90 262 9991000 04 Fax +90 262 9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Ukraine			
Assembly Sales Service	Dnipropetrovsk	SEW-EURODRIVE, LLC Robochya str., bld. 23-B, office 409 49008 Dnipro	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
United Arab Emirates			
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Uruguay			
Assembly Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esqina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-90 sewuy@sew-eurodrive.com.uy
USA			
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Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 202 W. Danieldale Rd. DeSoto, TX 75115	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	Tel. +1 864 439-7537 Fax +1 864 661 1167 IGOrders@seweurodrive.com
		SEW-EURODRIVE INC. 220 Finch Rd. Wellford, S.C. 29385-9630	
	Additional addresses for service provided on request!		
Vietnam			
Sales	Ho Chi Minh City	SEW-EURODRIVE PTE. LTD. RO at Hochiminh City Floor 8, KV I, Loyal building, 151-151 Bis Vo Thi Sau street, ward 6, District 3, Ho Chi Minh City, Vietnam	Tel. +84 937 299 700 huytam.phan@sew-eurodrive.com
	Hanoi	MICO LTD Quảng Trị - North Vietnam / All sectors except Construction Materials 8th Floor, Ocean Park Building, 01 Dao Duy Anh St, Ha Noi, Viet Nam	Tel. +84 4 39386666 Fax +84 4 3938 6888 nam_ph@micogroup.com.vn http://www.micogroup.com.vn
Zambia			
Representation: South Africa			

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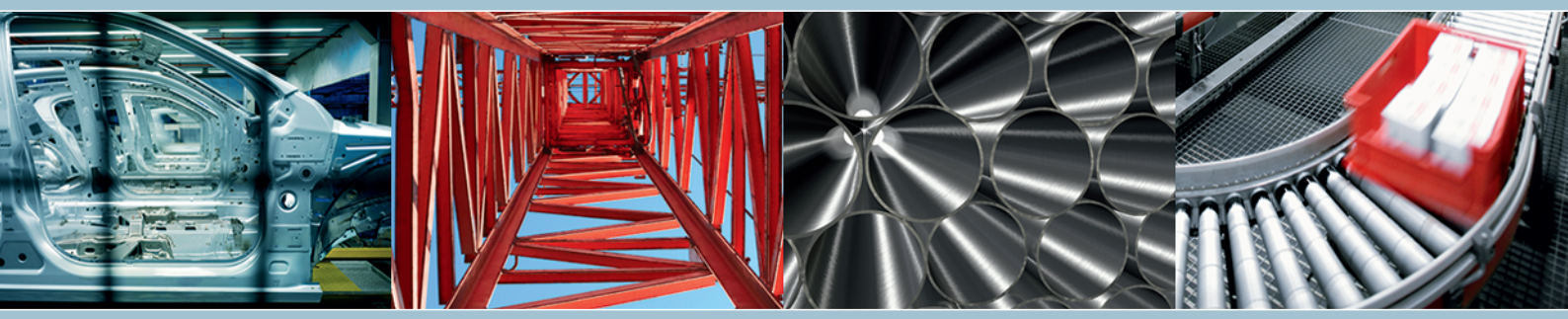

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