SEW EURODRIVE

Manual

Drive System for Decentralized Installation

Fieldbus Interface and Field Distributor for MOVI-SWITCH® Control

Edition 09/2015

22121900/EN

Contents

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1 Valid components

This manual applies to the following products:

Connection of module ..Z.1. with fieldbus interface for controlling MOVI-SWITCH®		
	4 x I / 2 x O (terminals) 	**4 x I / 2 x O (M12)** 
PROFIBUS	MFP21D/Z21D	MFP22D/Z21D
PROFINET IO	–	MFE52A/Z21D
EtherNet/IP™	–	MFE62A/Z21D
EtherCAT®	–	MFE72A/Z21D
DeviceNet™	MFD21A/Z31A	MFD22A/Z31A

..Z.3. field distributor with fieldbus interface to control MOVI-SWITCH®		
	no I/O 	**4 x I / 2 x O (M12)** 
PROFIBUS	MFP21D/Z23**W**	MFP22D/Z23**W**
PROFINET IO	–	MFE52A/Z23**W**
EtherNet/IP™	–	MFE62A/Z23**W**
EtherCAT®	–	MFE72A/Z23**W**
DeviceNet™	MFD21A/Z33**W**	MFD22A/Z33**W**

..Z.6. field distributor with fieldbus interface to control MOVI-SWITCH®		
	4 x I / 2 x O (terminals) 	**4 x I / 2 x O (M12)** 
PROFIBUS	MFP21D/Z26**W**/AF.	MFP22D/Z26**W**/AF.
PROFINET IO	–	MFE52A/Z26**W**/AF.
EtherNet/IP™	–	MFE62A/Z26**W**/AF.
EtherCAT®	–	MFE72A/Z26**W**/AF.

The digital inputs/outputs (I/Os) are partially used for controlling MOVI-SWITCH®, see chapter "Electrical installation".

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2 General information

2.1 About this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the product.

Make sure this documentation is accessible and legible. Ensure 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. If you are unclear about any of the information in this documentation or require further information, contact SEW-EURODRIVE.

2.2 Structure of the safety notes

2.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER**	Imminent hazard	Severe or fatal injuries.
⚠ **WARNING**	Possible dangerous situation	Severe or fatal injuries.
⚠ **CAUTION**	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment.
INFORMATION	Useful information or tip: Simplifies handling of the drive system.	

2.2.2 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.

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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 risk of crushing
	Warning of suspended load
	Warning of automatic restart

2.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

- ⚠ **SIGNAL WORD** Type and source of hazard.

  Possible consequence(s) if disregarded.

  – Measure(s) to prevent the hazard.

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2.3 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 unit!

2.4 Exclusion of liability

Read the information in this documentation, otherwise safe operation is impossible. You must comply with the information contained in this documentation to achieve the specified product characteristics and performance features. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, SEW-EURODRIVE assumes no liability for defects.

2.5 Other applicable documentation

Also observe the following publications:

- "AC Motor" operating instructions
- "MOVI-SWITCH® 1E/2S" operating instructions
- Fieldbus system manual
  - "PROFIBUS-fieldbus interfaces, field distributors" (only for PROFIBUS)
  - "PROFINET IO-fieldbus interfaces, field distributors" (only for PROFINET IO)
  - "EtherNet/IP™-fieldbus interfaces, field distributors" (only for EtherNet/IP™)
  - "EtherCAT®-fieldbus interfaces, field distributors" (only for EtherCAT®)
  - "DeviceNet™/CANopen-fieldbus interfaces, field distributors" (only for DeviceNet™)

These publications are available for download or order on the Internet (**http://www.sew-eurodrive.com**).

2.6 Product names and trademarks

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2.7 Copyright notice

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3 Safety notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The user must ensure that the basic safety notes are read and observed. Ensure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read the operating instructions and manual carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, contact SEW-EURODRIVE.

3.1 Preliminary information

The following safety notes are principally concerned with the use of MOVI-SWITCH®. If you use other SEW components, also refer to the safety notes for these particular components in the corresponding documentation.

Also observe the additional safety notes provided in the individual chapters of this documentation.

3.2 General

Never install or operate damaged products. In the event of damage, submit a complaint to the shipping company immediately.

During operation, MOVI-SWITCH® drives can have live, bare and movable or rotating parts as well as hot surfaces, depending on their degree of protection.

Removing required covers without authorization, improper use or incorrect installation and operation may result in severe injury to persons, or damage to machinery. Refer to the documentation for additional information.

3.3 Target group

Only qualified personnel is authorized to perform installation, startup, troubleshooting or maintenance (observing EN 60364 and CENELEC HD 384 or DIN VDE 0100 and EN 60664-1, as well as national accident prevention guidelines).

Qualified electricians in the context of these basic safety notes are all persons familiar with setup, assembly, startup and operation of the product who possess the necessary qualifications.

All persons involved in any other work, such as transportation, storage, operation and waste disposal, must be trained appropriately.

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3.4 Designated use

Field distributors and fieldbus interfaces are components intended for installation in electrical systems or machines.

In case of installation in machines, startup of the field distributors and fieldbus interfaces (i.e. start of designated operation) is prohibited until it is determined that the machine meets the requirements stipulated in the Machinery Directive 2006/42/EC.

Startup (i.e. the start of designated use) is only permitted under observance of EMC Directive 2004/108/EC.

The field distributors and fieldbus interfaces meet the requirements stipulated in Low Voltage Directive 2006/95/EC. The standards listed in the declaration of conformity are applied to the field distributors and fieldbus interfaces.

Technical data and information on the connection requirements are provided on the nameplate and in the documentation; these must be observed under all circumstances.

3.4.1 Safety functions

The MOVI-SWITCH® drives may not perform safety functions, unless these functions are described and expressly permitted.

3.4.2 Lifting applications

MOVI-SWITCH® drives are suitable for lifting applications to a limited degree only.

MOVI-SWITCH® drives are not designed for use as safety devices in lifting applications.

3.5 Transportation/storage

Observe the notes on transportation, storage and proper handling. Comply with the requirements for climatic conditions stated in chapter "Technical data". Tighten attached lifting eyes securely. They are designed to handle the mass of the MOVI-SWITCH® drive. Do not attach any additional loads. Use suitable, sufficiently rated handling equipment (e.g. rope guides) if required.

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3.6 Installation

The units must be installed and cooled according to the regulations and specifications in the corresponding documentation.

Protect the MOVI-SWITCH® drives from excessive strain.

The following applications are **prohibited** unless explicitly permitted:

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications with strong mechanical oscillation and impact loads; see chapter "Technical data".

3.7 Electrical connection

Observe the applicable national accident prevention guidelines when working on live MOVI-SWITCH® drives (e.g. BGV A3).

Perform electrical installation according to the pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

Preventive measures and protection devices must correspond to the regulations in force (e.g. EN 60204 or EN 61800-5-1).

3.8 Protective separation

MOVI-SWITCH® drives meet all requirements for protective separation of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for protective separation to ensure protective separation.

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3.9 Operation

Systems with integrated MOVI-SWITCH® drives must be equipped with additional monitoring and protection devices according to the applicable safety guidelines, such as the law governing technical equipment, accident prevention regulations, etc. Additional preventive measures may be required for applications with increased hazard potential.

Before removing the connection box cover/MOVI-SWITCH® control unit, disconnect the MOVI-SWITCH® drive from the supply system.

The connection box must remain closed during operation, i.e. the terminal box cover/ MOVI-SWITCH® control unit must be installed.

The fact that the operation LED is no longer illuminated does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.

Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive re-starting automatically. If this is not permitted for the driven machine for safety reasons, disconnect the unit from the supply system before you start troubleshooting.

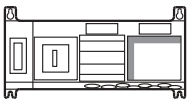
NOTICE Risk of burns: The MOVI-SWITCH® drive surface temperature can exceed 60 °C during operation.

3.10 Supplementary safety notes for field distributors

3.10.1 MFZ.3W field distributor

- Disconnect the unit from the power supply system before removing the fieldbus interface or the motor connector. Dangerous voltages may still be present for up to 1 minute after disconnection from the power supply.
- The fieldbus interface and the connector of the hybrid cable must be connected to the field distributor and fastened during operation.

3.10.2 MFZ.6W field distributor



- Before removing the connection box cover for the line connection, disconnect the unit from the power supply system. Dangerous voltages may still be present for up to 1 minute after disconnection from the power supply.
- NOTICE: The switch only disconnects the MOVI-SWITCH® unit from the power supply. The terminals of the field distributor are still connected to the power supply after activating the maintenance switch.
- During operation, the connection box cover for the line connection and the connector of the hybrid cable must be connected to the field distributor and fastened.

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4 Unit structure

4.1 MOVI-SWITCH® on fieldbus and power bus

4.1.1 MOVI-SWITCH®

MOVI-SWITCH® is a compact and heavy-duty gearmotor for power ratings up to 3 kW with integrated switching and protection functions. Versions are available with an electronic star bridge connector for one direction of rotation, or with a reversing starter with contact.

The drive is switched on/off using DC 24 V control signals if the supply voltage is permanently connected. The control usually transfers the signals to decentralized I/O components via fieldbus communication.

The thermal winding monitoring with evaluation and the brake management are integrated in the drive unit. The number of required I/O points is minimized.

4.1.2 Fieldbus interfaces MF..

SEW-EURODRIVE fieldbus interfaces support communication via all commercial fieldbus interfaces. PROFIBUS, PROFINET IO, EtherNet/IP™, EtherCAT® and DeviceNet™ are available.

The fieldbus interfaces are based on a module terminal box with connecting terminals and a plug-in fieldbus module. These interfaces can be installed directly onto MOVI-SWITCH® or they can be mounted separately.

The bus connection occurs via terminals or plug connectors. The MOVISWITCH® gearmotors and additional sensors or actuators can be connected to the bus either using terminals or plug connectors, depending on the design.

4.1.3 MF../Z.3W, MF../Z.6W.. field distributors

MF../Z.3W, und MF../Z26W.. field distributors have been specifically designed for connecting MOVI-SWITCH® and provide an efficient means of connecting the drives to the supply system, the DC 24 V control voltage and the fieldbus.

The field distributors are based on the bus interfaces technology with additional connection technology for supply system distribution. Mounting the field distributors close to the motor simplifies decentralized installation.

SEW-EURODRIVE offers the matching hybrid cables to complete the system. The hybrid cable for connecting field distributor and MOVI-SWITCH® combines control signals and energy supply in one cable sheath. Hybrid cables are supplied as pre-fabricated cables with plug connectors.

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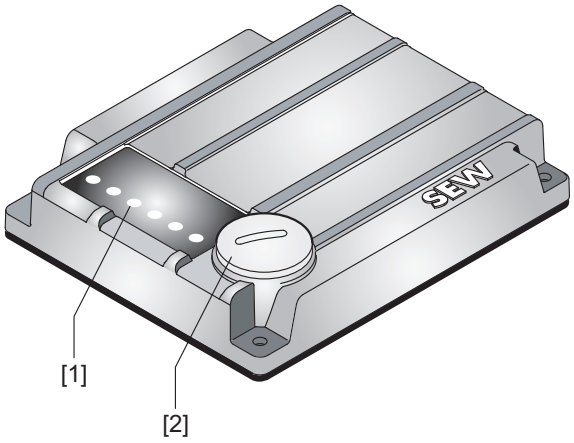
4.2 Fieldbus interface

4.2.1 MF.21 fieldbus interface

The following figure shows the MF.21 fieldbus interface:

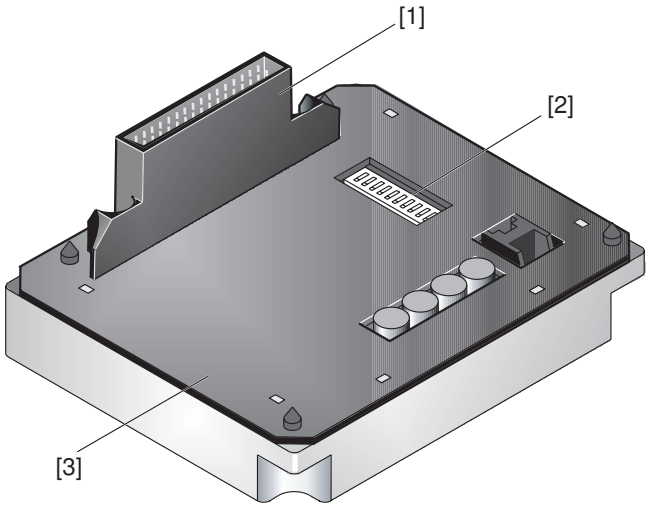


1132777611

[1] Status LEDs
[2] Diagnostic interface (below screw fitting)

Interface bottom side

The following figure depicts the bottom side of the fieldbus interface:



1132786955

[1] Connection to connection module
[2] DIP switches (dependent on variant)
[3] Seal

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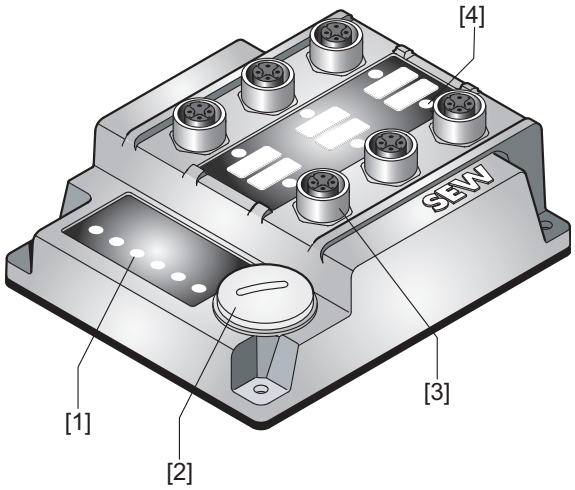
4.2.2 MF.22 fieldbus interface

The following figure shows the MF.22 fieldbus interface:

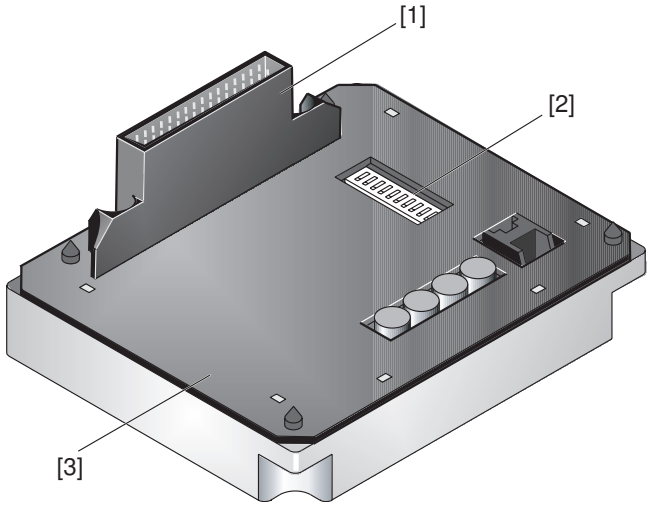


1132781835

[1] Status LEDs
[2] Diagnostic interface (below screw fitting)
[3] M12 connection sockets
[4] Status LED

Interface bottom side

The following figure depicts the bottom side of the fieldbus interface:

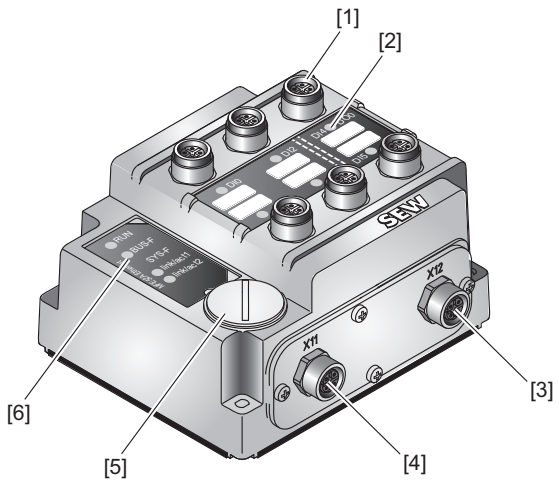


1132786955

[1] Connection to connection module
[2] DIP switches (dependent on variant)
[3] Seal

4.2.3 MFE52 fieldbus interface

The following figure shows the MFE52 fieldbus interface:

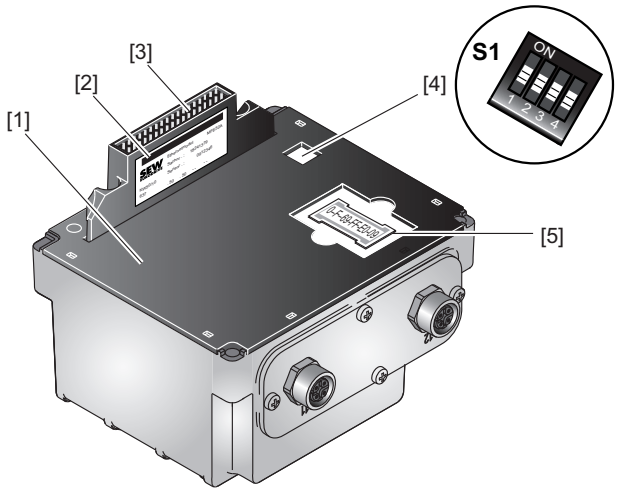


9007202575522315

[1] M12 connection sockets for digital inputs/outputs
[2] Status LEDs of digital inputs/outputs
[3] X12 PROFINET IO connection port 2
[4] X11 PROFINET IO connection port 1
[5] Diagnostic interface (below screw fitting)
[6] Status LEDs

Interface bottom side

The following figure depicts the bottom side of the fieldbus interface:



9007202575698955

[1] Seal
[2] Nameplate
[3] Connection to connection module
[4] DIP switch S1
[5] Memory card with MAC-ID

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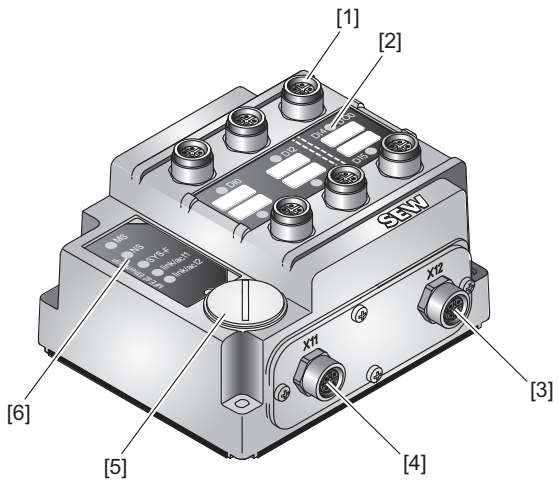
4.2.4 MFE62 fieldbus interface

The following figure shows the MFE62A fieldbus interface:

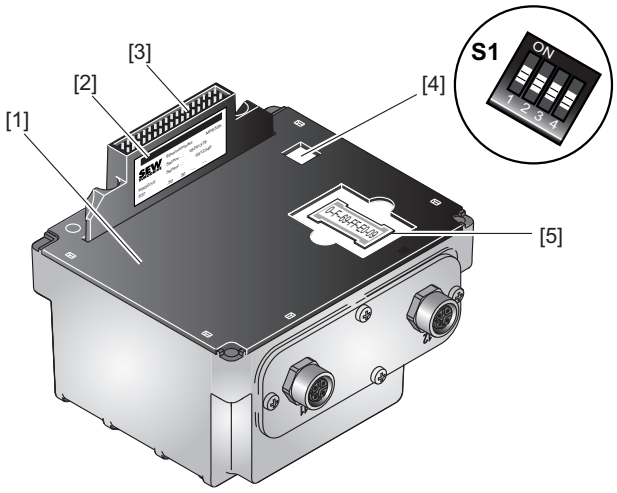


14491191179

[1] M12 connection sockets for digital inputs/outputs
[2] Status LEDs of digital inputs/outputs
[3] X12 connection EtherNet/IP™ port 2
[4] X11 connection EtherNet/IP™ port 1
[5] Diagnostic interface (below screw fitting)
[6] Status LEDs

Interface bottom side

The following figure depicts the bottom side of the fieldbus interface:



9007202575698955

[1] Seal
[2] Nameplate
[3] Connection to connection module
[4] DIP switch S1
[5] Memory card with MAC-ID

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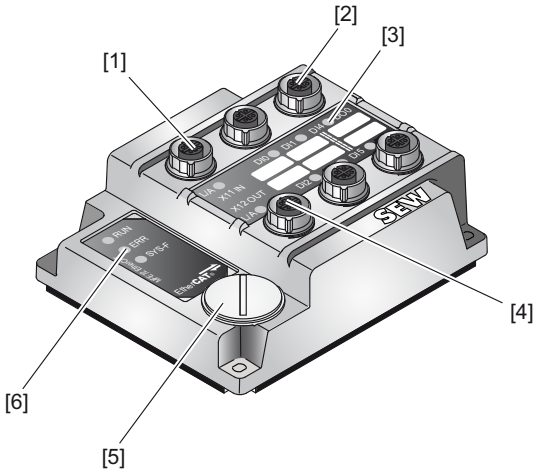
4.2.5 MFE72 fieldbus interface

The following figure shows the MFE72A fieldbus interface:

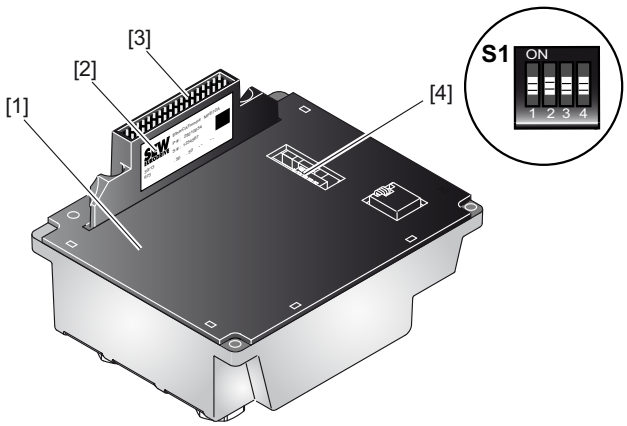


8816327179

[1] X11 connection EtherCAT®, IN
[2] M12 connection sockets for digital inputs/outputs
[3] Status LEDs of digital inputs/outputs
[4] X12 connection EtherCAT®, OUT
[5] Diagnostic interface (below screw fitting)
[6] Status LEDs

Interface bottom side

The following figure depicts the bottom side of the fieldbus interface:



8817978891

[1] Seal
[2] Nameplate
[3] Connection to connection module
[4] DIP switch S1

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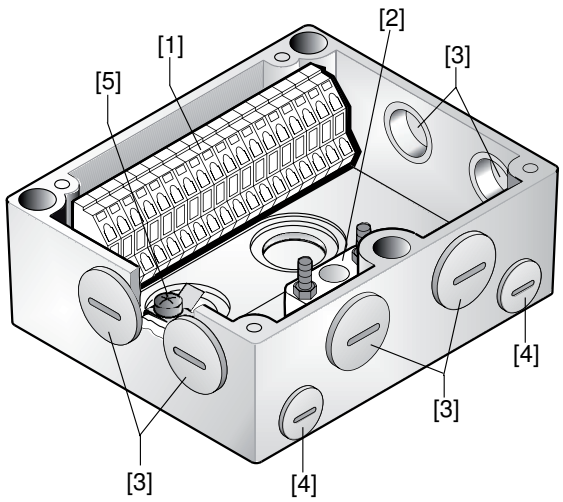
4.2.6 Unit structure of MFZ connection module

The following figure shows the MFZ connection module.



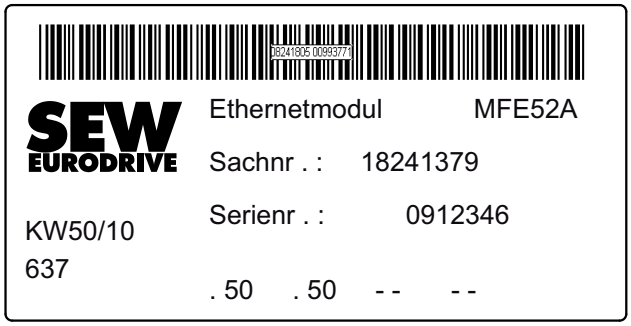
9007200390917003

[1] Terminal strip X20
[2] Isolated terminal block for 24 V through-wiring
(NOTICE: Do not use for shielding.)
[3] M20 cable gland
[4] M12 cable gland
[5] Grounding terminal
The scope of delivery includes 2 EMC cable glands.

4.3 Type designation of fieldbus interfaces

4.3.1 Nameplate

The following figure shows a sample nameplate of a **MFE52A** fieldbus interface:



3597252107

4.3.2 Type designation

The following table shows the type designation of the fieldbus interface:

MFE	**Fieldbus interface**		
	MFP..	=	PROFIBUS
	MFE..	=	PROFINET IO, EtherNet/IP™ or EtherCAT®
	MFD..	=	DeviceNet™
52	**Connections**		
	21 = 4 x I / 2 x O		(connection via terminals)
	22 = 4 x I / 2 x O		(connection via plug connector + terminals)
	32 = 6 x I		(connection via plug connector + terminals)
	52 = 4 x I / 2 x I/O		(connection via plug connector + terminals) for PROFINET IO
	62 = 4 x I / 2 x I/O		(connection via plug connector + terminals) for EtherNet/IP™
	72 = 4 x I / 2 x I/O		(connection via plug connector + terminals) for EtherCAT®
A	**Variant**		
/			
Z21	**Connection module**		
	Z21	=	For PROFIBUS, PROFINET IO, EtherNet/IP™ and EtherCAT®
	Z31	=	For DeviceNet™
D	**Variant**		

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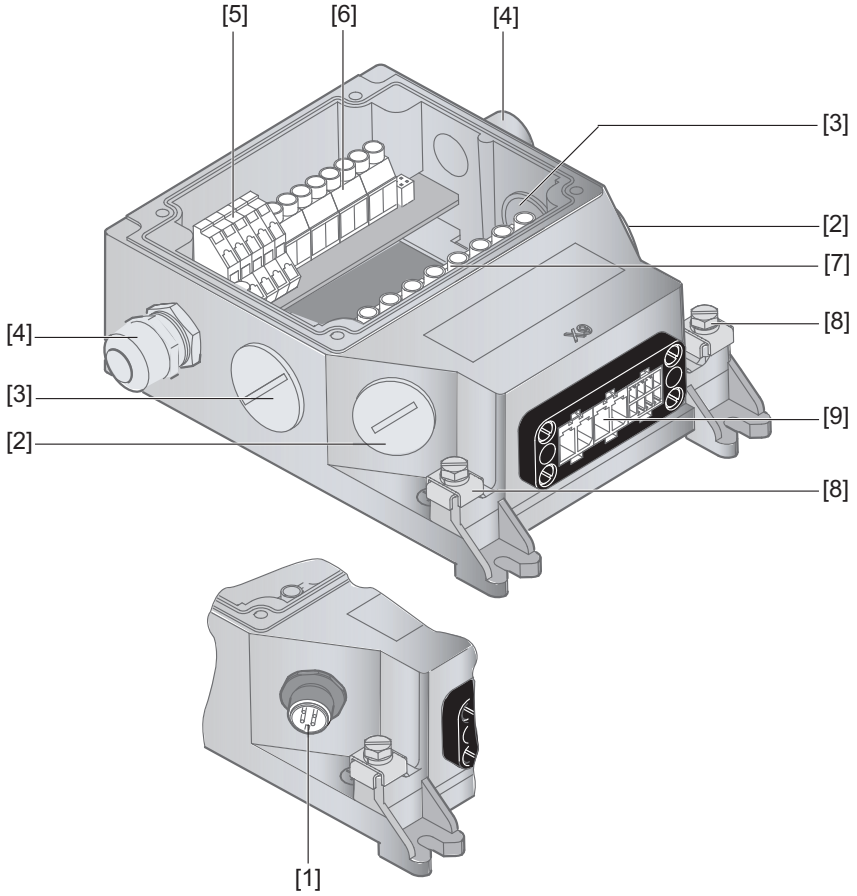
4.4 Field distributor

4.4.1 MF.../Z.3W field distributors



9007200390936971

[1] For DeviceNet™: Micro-style connector/M12 connector (X11)
[2] 2 x M20 x 1.5
[3] 2 x M25 x 1.5
[4] 2 x M16 x 1.5 (scope of delivery includes 2 EMC cable glands)
[5] Terminals for fieldbus connection (X20)
[6] Terminals for 24 V connection (X21)
[7] Terminals for power supply and PE connection (X1)
[8] Equipotential bonding connection
[9] Socket for connecting hybrid cable to MOVI-SWITCH® (X9)

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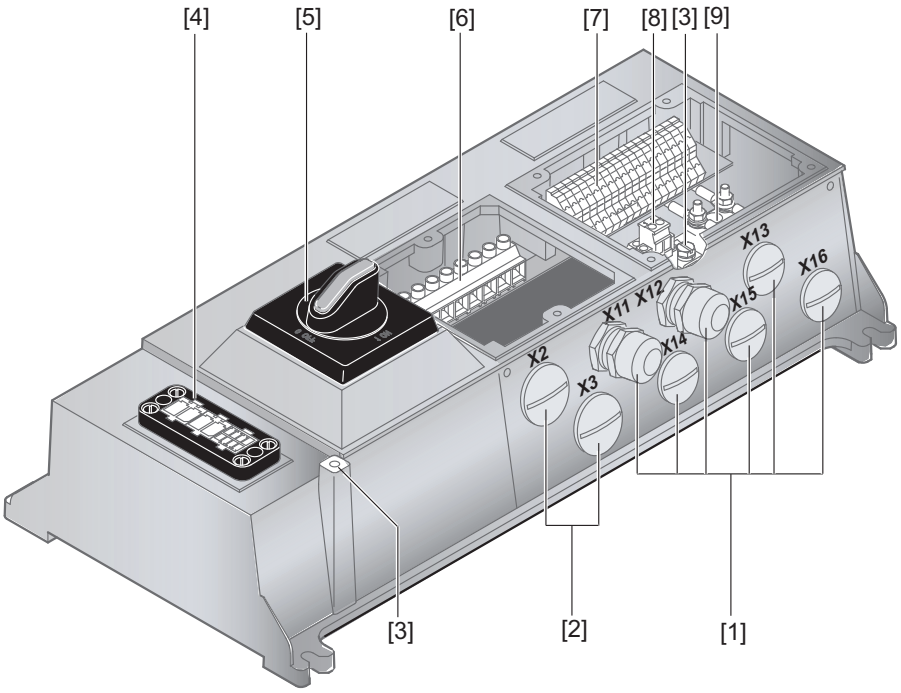
4.4.2 MF.../Z.6W.. field distributor

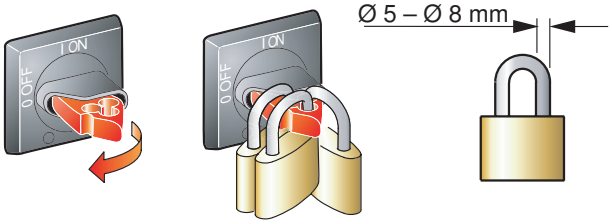


1136203659

[1] 6 x M20 x 1.5 (delivery includes 2 EMC cable glands)
For DeviceNet™: Micro-style connector/M12 connector (X11)
[2] 2 x M25 x 1.5
[3] Equipotential bonding connection
[4] Socket for connecting hybrid cable to MOVI-SWITCH® (X9)
[5] Maintenance switch **with line protection** (triple lock, color: black/red)

Only for MFZ26J design: Optional integrated feedback for position of the maintenance switch.

The feedback is evaluated at digital input DI0 (see chapter "Connection of MF.. fieldbus interface inputs/outputs").



[6] Terminals for power supply and PE connection (X1)
[7] Terminals for bus, sensor, actuator, 24 V connection (X29)
[8] Pluggable terminal "Safety Power" for 24 V supply (X40)
[9] Terminal block for 24 V through-wiring (X29),
internal connection to 24 V on X20

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4.5 Type designation field distributor

4.5.1 Example MF.../Z.3W

The following table shows the type designation of the MF../Z.3W field distributors:

MFE 52A	**Fieldbus interface**		
	MFP..	=	PROFIBUS
	MFE..	=	PROFINET IO, EtherNet/IP™ or EtherCAT®
	MFD..	=	DeviceNet™
/			
Z23	**Connection module**		
	Z23	=	for PROFIBUS, PROFINET IO, EtherNet/IP™ and EtherCAT®
	Z33	=	For DeviceNet™
W	**Variant**		
	W	=	For MOVI-SWITCH®

4.5.2 Example MF.../Z.6W..

The following table shows the type designation of the MF../Z.6W.. field distributors:

MFE 52A	**Fieldbus interface**		
	MFP..	=	PROFIBUS
	MFE..	=	PROFINET IO, EtherNet/IP™ or EtherCAT®
	MFD..	=	DeviceNet™
/			
Z26	**Connection module**		
	Z26	=	for PROFIBUS, PROFINET IO, EtherNet/IP™ and EtherCAT®
	Z36	=	For DeviceNet™
W	**Variant**		
	W	=	For MOVI-SWITCH®
/			
AF0	**Connection technology**		
	AF0	=	Metric cable entry
	AF1	=	With micro-style connector/M12 connector for DeviceNet™
	AF2	=	M12 plug connector for PROFIBUS
	AF3	=	M12 plug connector for PROFIBUS + M12 plug connector for DC 24 V supply

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5 Mechanical installation

5.1 Installation instructions

INFORMATION

On delivery, field distributors are equipped with transportation protection covering the plug connector of the outgoing motor circuit (hybrid cable).

This only guarantees the degree of protection IP40. To obtain the specified degree of protection, remove the transport protection and plug on the appropriate mating connector. Screw them together.

5.1.1 Assembly

- Field distributors may only be mounted on a level, vibration-proof and torsionally rigid support structure.
- Use M5 screws and suitable washers for attaching the **MF../Z.3W** field distributor. Tighten screws with a torque wrench (permitted tightening torque 2.8 – 3.1 Nm).
- Use M6 screws and suitable washers for attaching the **MF..Z.6W** field distributor. Tighten screws with a torque wrench (permitted tightening torque 3.1 – 3.5 Nm).

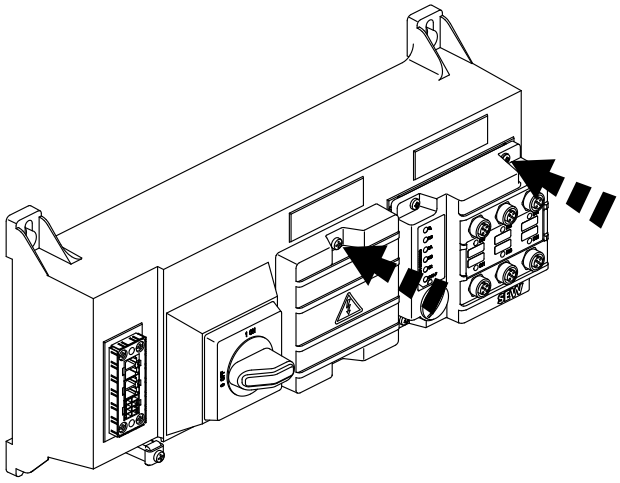
5.1.2 Installation in damp locations or in the open

Observe the following notes for mounting the fieldbus interface and the field distributor in damp locations or outdoors:

- Use suitable cable glands for the cables. Use reducing adapters, if necessary.
- Seal open cable entries and M12 connection sockets with screw plugs.
- When the cable entry on the side is used, route the cable with a drip loop.
- Thoroughly clean the sealing surface of the fieldbus interface and of the connection box cover before re-installing.

5.2 Tightening torques

5.2.1 Fieldbus interface / connection box cover



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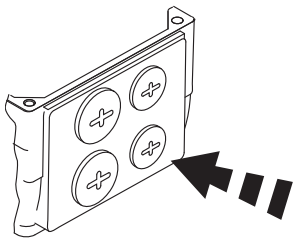
Tighten the screws on the fieldbus interfaces or connection box cover using 2.5 Nm in diametrically opposite sequence.

5.2.2 Screw plugs for cable entries

Tighten screw plugs with 2.5 Nm.



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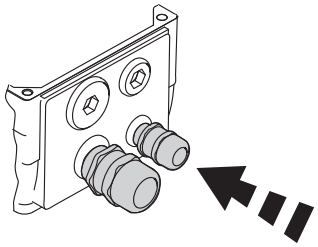
5.2.3 EMC cable glands



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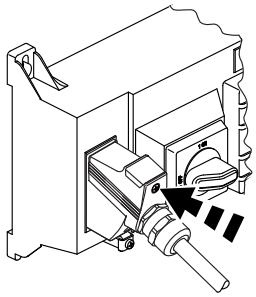
Tighten EMC cable glands supplied by SEW-EURODRIVE using the following torque ratings:

Screw fitting	Tightening torque
M12 x 1.5	2.5 Nm – 3.5 Nm
M16 x 1.5	3.0 Nm – 4.0 Nm
M20 x 1.5	3.5 Nm – 5.0 Nm
M25 x 1.5	4.0 Nm – 5.5 Nm

The cable retention in the cable gland must be able to withstand the following removal force:

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

5.2.4 Motor cable



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Tighten screws for motor cables using 1.2 – 1.8 Nm.

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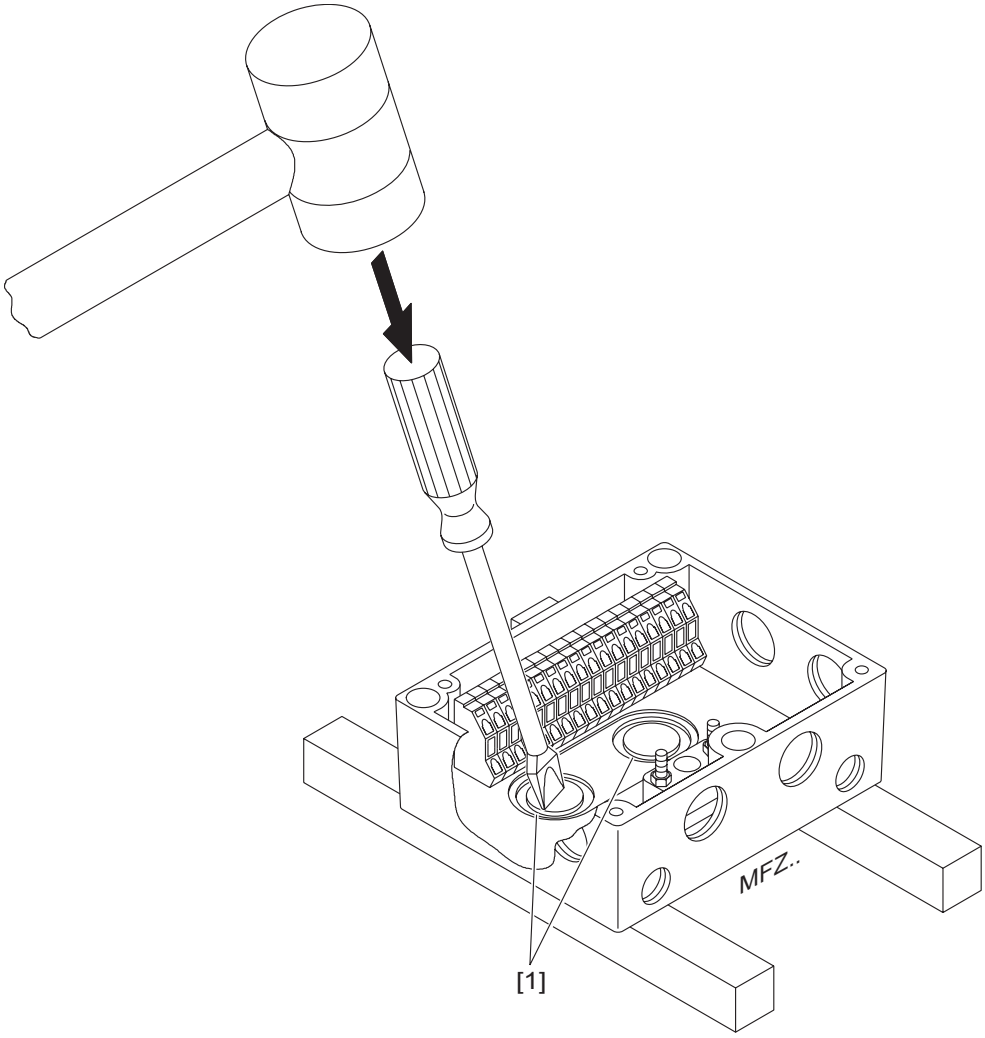
5.3 Fieldbus interfaces MF..

The MF.. fieldbus interfaces can be installed as follows:

- Installation on the MOVI-SWITCH® connection box
- Installation in the field (= mounting close to the motor)

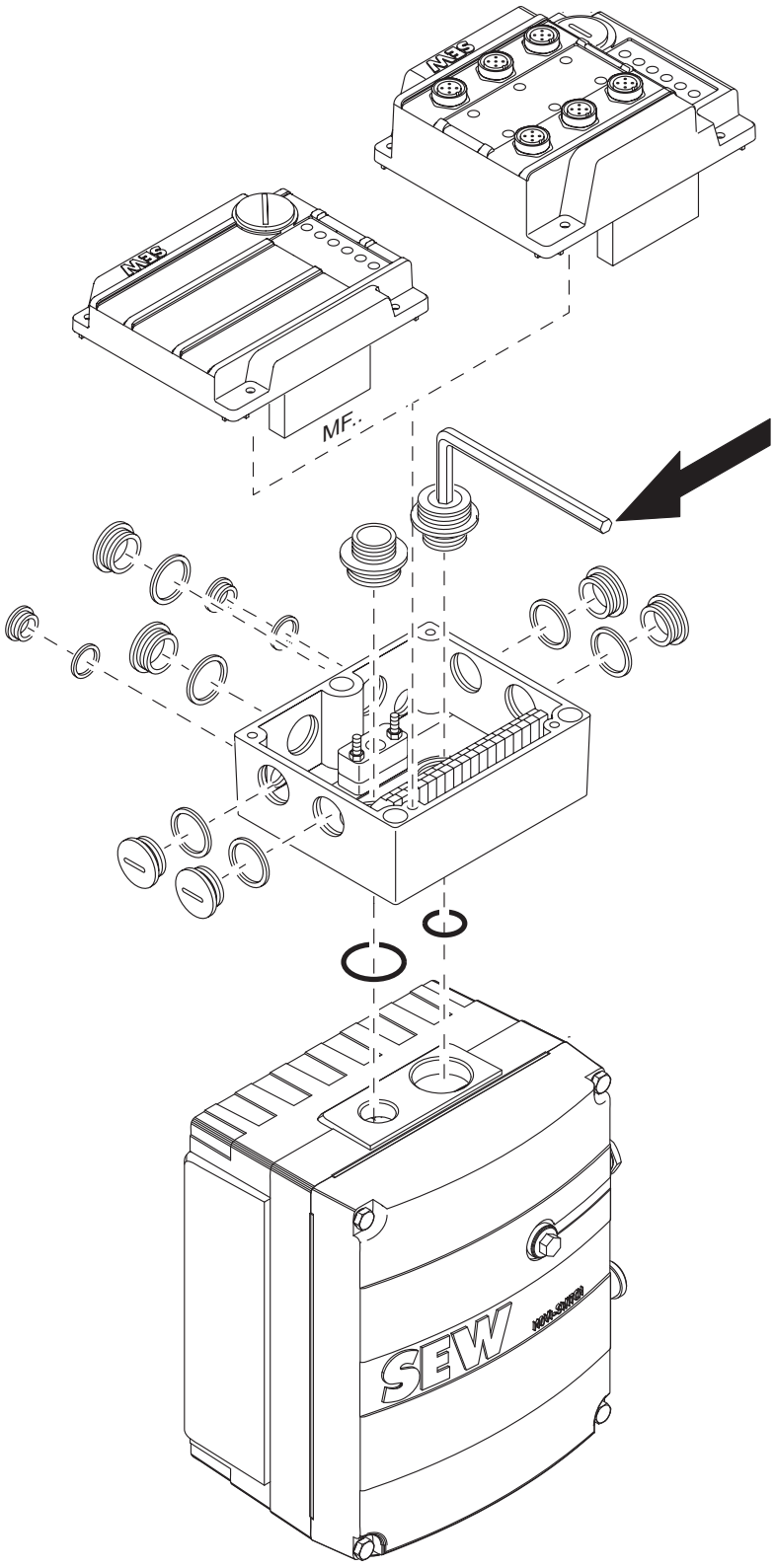
5.3.1 Installation on the MOVI-SWITCH® connection box

1. Remove knock outs on MFZ bottom side from the inside, as illustrated in the following figure:



1138656139 If necessary, deburr any break lines that occur after the knock outs [1] have been removed.

2. Install the fieldbus interface on the MOVI-SWITCH® connection box according to the following figure:



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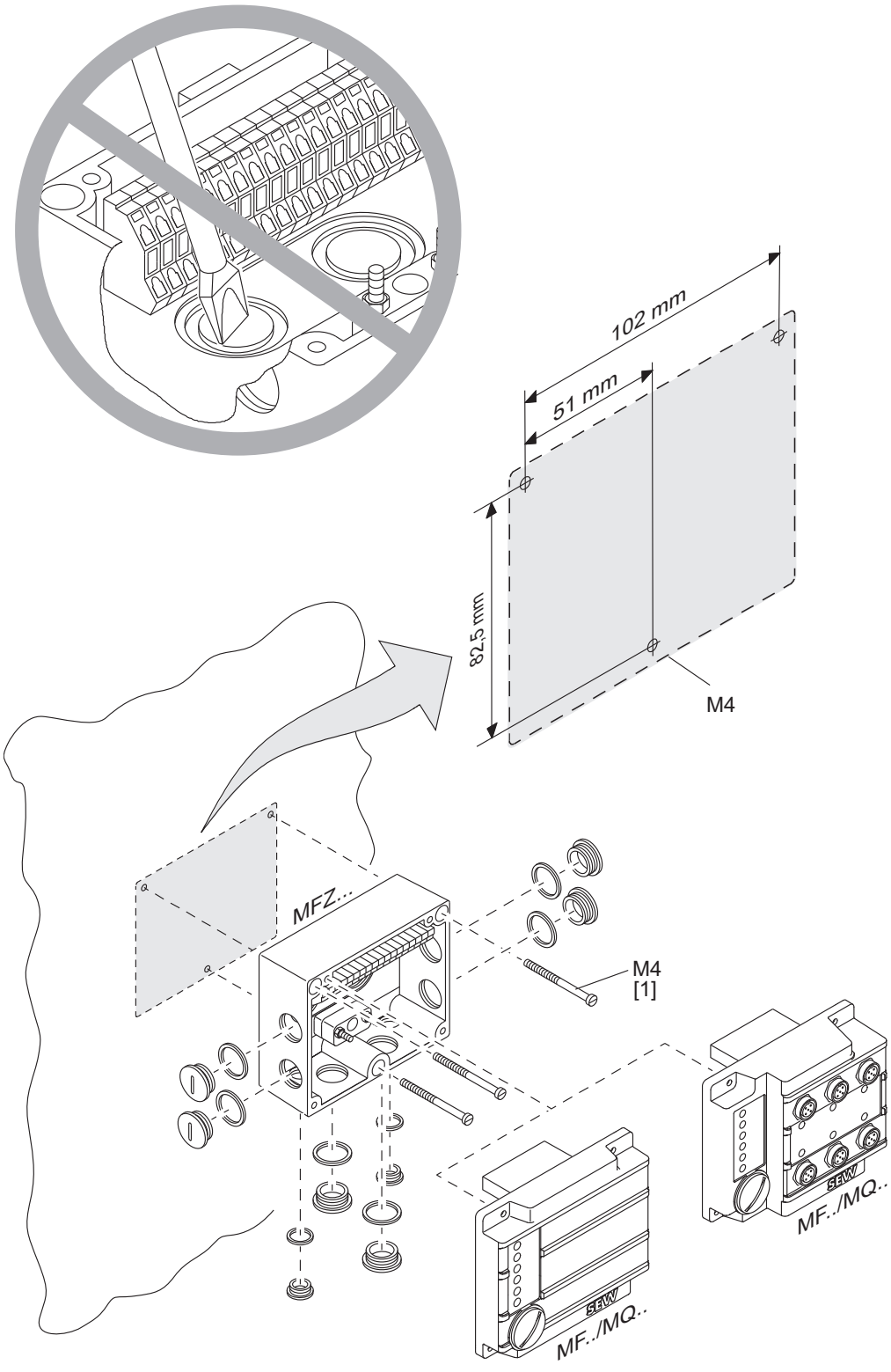
5.3.2 Installation in the field

The following figure shows the installation of an MF../MQ.. fieldbus interface close to the motor:



[1] Length of screws min. 40 mm

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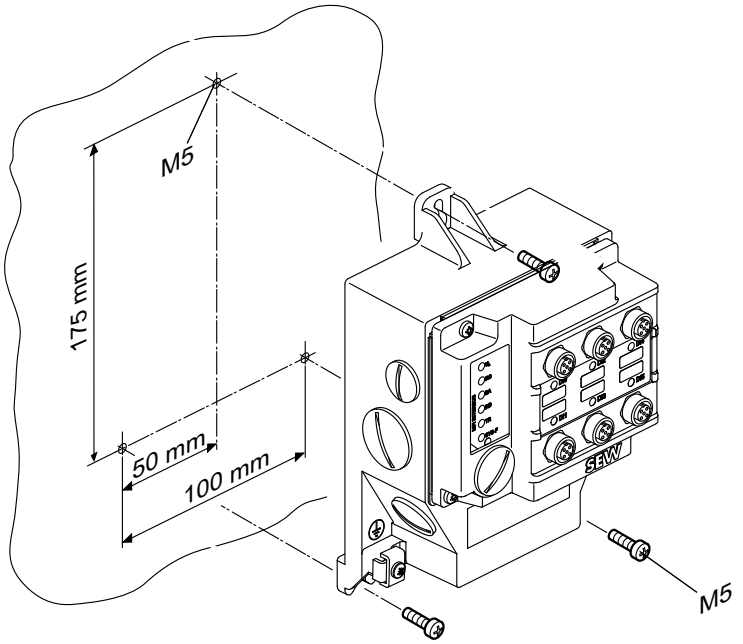
5.4 Field distributor

5.4.1 Installation of MF../Z.3., MQ../Z.3. field distributors

The following figure shows the mounting dimensions for ..Z.3. field distributors:



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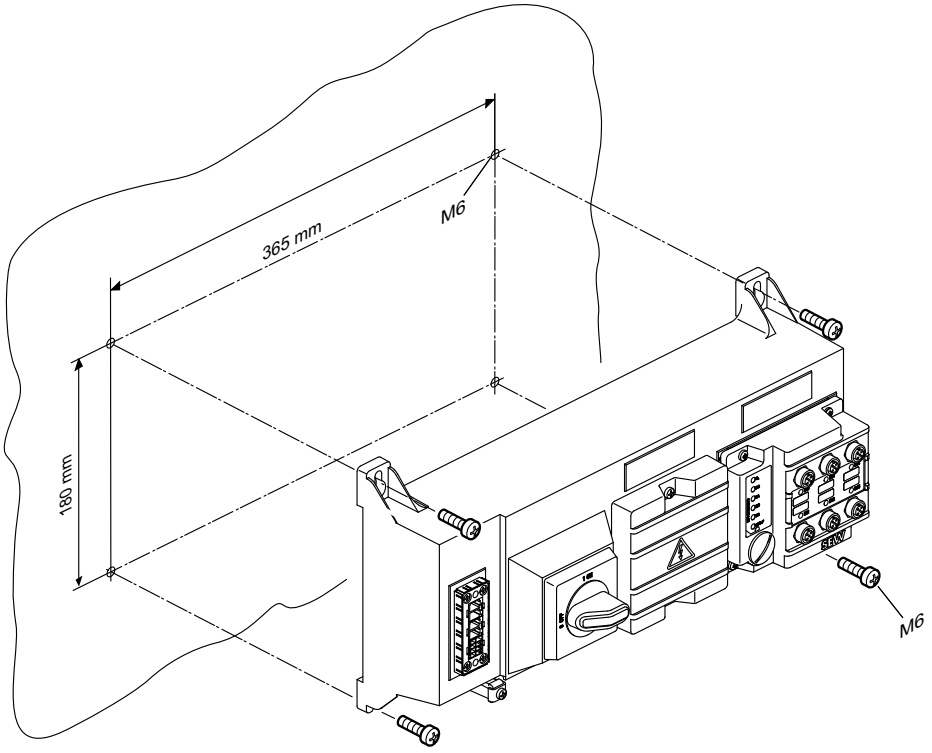
5.4.2 Installation of MF../Z.6., MQ../Z.6. field distributors

The following figure shows the mounting dimensions for ..Z.6. field distributors:



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6 Electrical installation

6.1 Installation planning considering EMC aspects

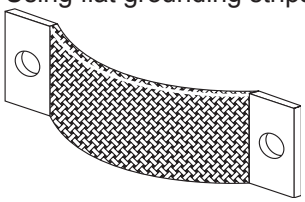
6.1.1 Notes on arranging and routing installation components

Successful installation of decentralized drives depends on selecting the correct cables, providing correct grounding and a functioning equipotential bonding.

Always adhere to the **relevant standards**. Also observe the following points in particular:

- **Equipotential bonding**
  - Low resistance and HF-capable equipotential bonding must be provided independent of the functional earth (PE connection) (see also VDE 0113 or VDE 0100 part 540),

    for example by:
  - Flat contact surface connection of metal components
  - Using flat grounding strips (HF litz wire)



- **Data lines and 24 V supply**
  - Route data lines and 24 V supply separately from cables that emit interference (such as control cables of solenoid valves, motor cables).
- **Field distributor**
  - We recommend using prefabricated SEW-EURODRIVE hybrid cables, especially designed for connecting field distributors and motors.
- **Cable glands**
  - Only use cable glands with screen contact over a large area. Note the information on selection and correct installation of cable glands.
- **Cable shields**
  - Must have good EMC properties (high screening attenuation).
  - It must protect the cable mechanically and serve as shielding.
  - It must be connected flat to the unit's metal housing (via EMC metal cable glands) at the cable ends (see the further notes in this chapter on selection and correct installation of cable glands).
- Additional information is available in the SEW-EURODRIVE publication **"Drive Engineering – Practical Implementation, EMC in Drive Engineering."**

6.2 Installation instructions for fieldbus interfaces, field distributors

6.2.1 Connecting supply system leads

- The nominal voltage and frequency of the MOVI-SWITCH® device must correspond to the data of the supplying system.

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- Select the cable cross section according to the input current I_{line} for rated power. For further information, refer to chapter "Technical data".
- Install fuses at the beginning of the power supply cables behind the supply bus junction.

  The following fuses are permitted:

  – Fuses in utilization category gG
  – Power circuit breakers with characteristic B or C
  – Motor circuit breaker

  Size the fuses according to the cable cross section.

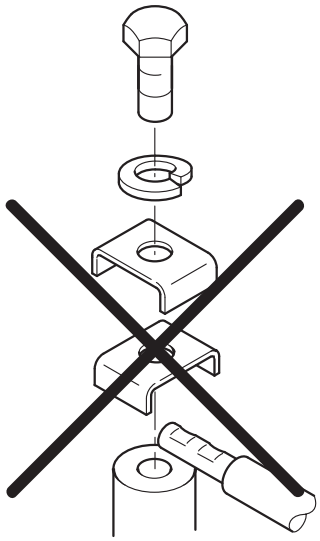
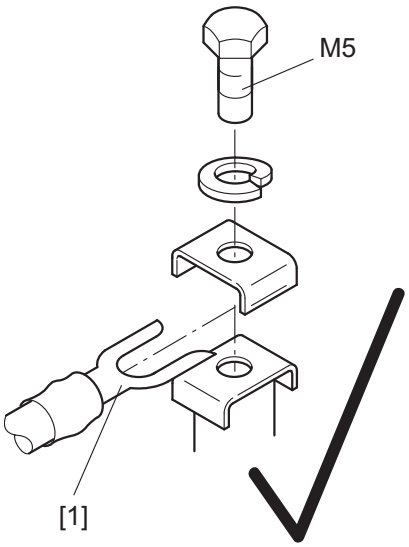
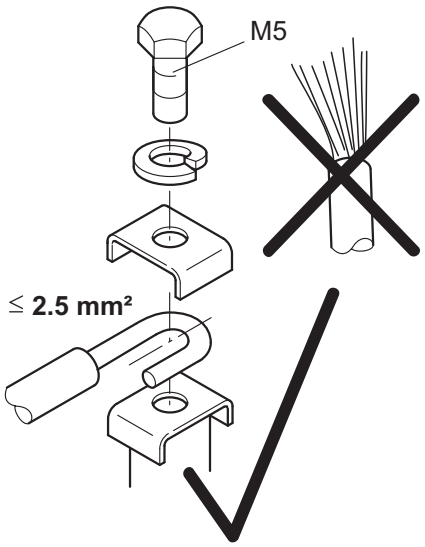
6.2.2 Notes on PE connection

⚠ WARNING

Electric shock due to incorrect connection of PE.

Severe, fatal injuries

- The permitted tightening torque for the screw fitting is 2.0 – 2.4 Nm.
- Observe the following notes regarding PE connection.

Prohibited assembly	Recommendation: Assembly with forked cable lug Permitted for all cross sections	Assembly with solid connecting wire Permitted for cross section up to max. 2.5 mm²
		

[1] Forked cable lug suitable for M5 PE screws

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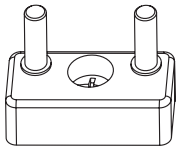
6.2.3 Permitted connection cross section and current carrying capacity of the terminals

	Power terminals X1, X21 (screw terminals)	Control terminals X20 (cage clamp terminals)
Connection cross section	0.2 mm^2 – 4 mm^2	0.08 mm^2 – 2.5 mm^2
Current carrying capacity	32 A max. continuous current	12 A max. continuous current

The permitted tightening torque of the power terminals is 0.6 Nm.

6.2.4 Looping through the DC 24 V supply voltage in the MFZ.1 module terminal box

- There are 2 M4 x 12 studs in the connection area of the DC 24 V supply. The studs can be used for looping the DC 24 V supply voltage.



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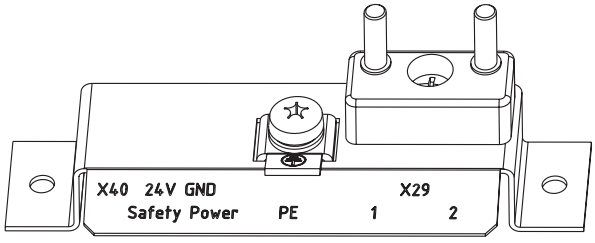
- The terminal studs have a current carrying capacity of 16 A.
- The permitted tightening torque for the hex nuts of the terminal studs is 1.2 Nm ± 20%.

6.2.5 Additional connection options for the MFZ.6W field distributor

- The connection part of the DC 24 V supply comprises an X29 terminal block with 2 M4 x 12 studs.



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- The X29 terminal block can be used as an alternative to the X20 terminal (see chapter "Unit Structure") for looping through the DC 24 V supply voltage. Both studs are connected internally to the 24 V connection at terminal X20.

Terminal assignment			
No.		**Name**	**Function**
X29	1	24 V	0V24 reference potential for module electronics and sensors (studs, jumpered with terminal X20/11)
	2	GND	0V24 reference potential for module electronics and sensors (studs, jumpered with terminal X20/13)

- The guide values for both studs are:
  - Current carrying capacity: 16 A
  - Permitted tightening torque for the hex nuts: 1.2 Nm ± 20 %

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6.2.6 Installation above 1000 m amsl

MOVI-SWITCH® drives can also be operated with line voltages of 380 – 500 V at an altitude of 1000 – 4000 m amsl. Therefore, observe the following basic conditions.

- At heights above 1000 m amsl, the nominal continuous power is reduced due to reduced cooling: I_N reduction by 1% per 100 m.
- At altitudes of 2000 – 4000 m amsl limiting measures must be taken, which reduce the line side overvoltage from category III to category II for the entire system.

6.2.7 Protective devices

MOVI-SWITCH® drives are equipped with integrated protection devices against motor overload. External motor protection elements will not be necessary.

⚠ WARNING

Insufficient protection of the leads.

Severe or fatal injuries.

- When mounting MOVI-SWITCH® close to the motor, the applicable regulations concerning line protection must be observed.
- The protection of the lead between MOVI-SWITCH® and the motor must be ensured by appropriate dimensioning or optional line protection components.

6.2.8 UL-compliant installation

- Use only copper conductors with approved temperature range (60/75 °C) as connection cable.
- MOVI-SWITCH® is suited for operation on voltage supply systems with grounded star point (TN and TT systems) supplying a maximum line current of AC 5000 A and having a maximum nominal voltage of AC 500 V. The performance data of the fuses must not exceed 25A/600 V.
- Use only certified units with a limited output voltage (U ≤ DC 30 V) and limited output current (I ≤ 8 A) as an external DC 24 V voltage source.
- UL certification only applies to operation on voltage networks with voltages to ground up to a maximum of 300 V.

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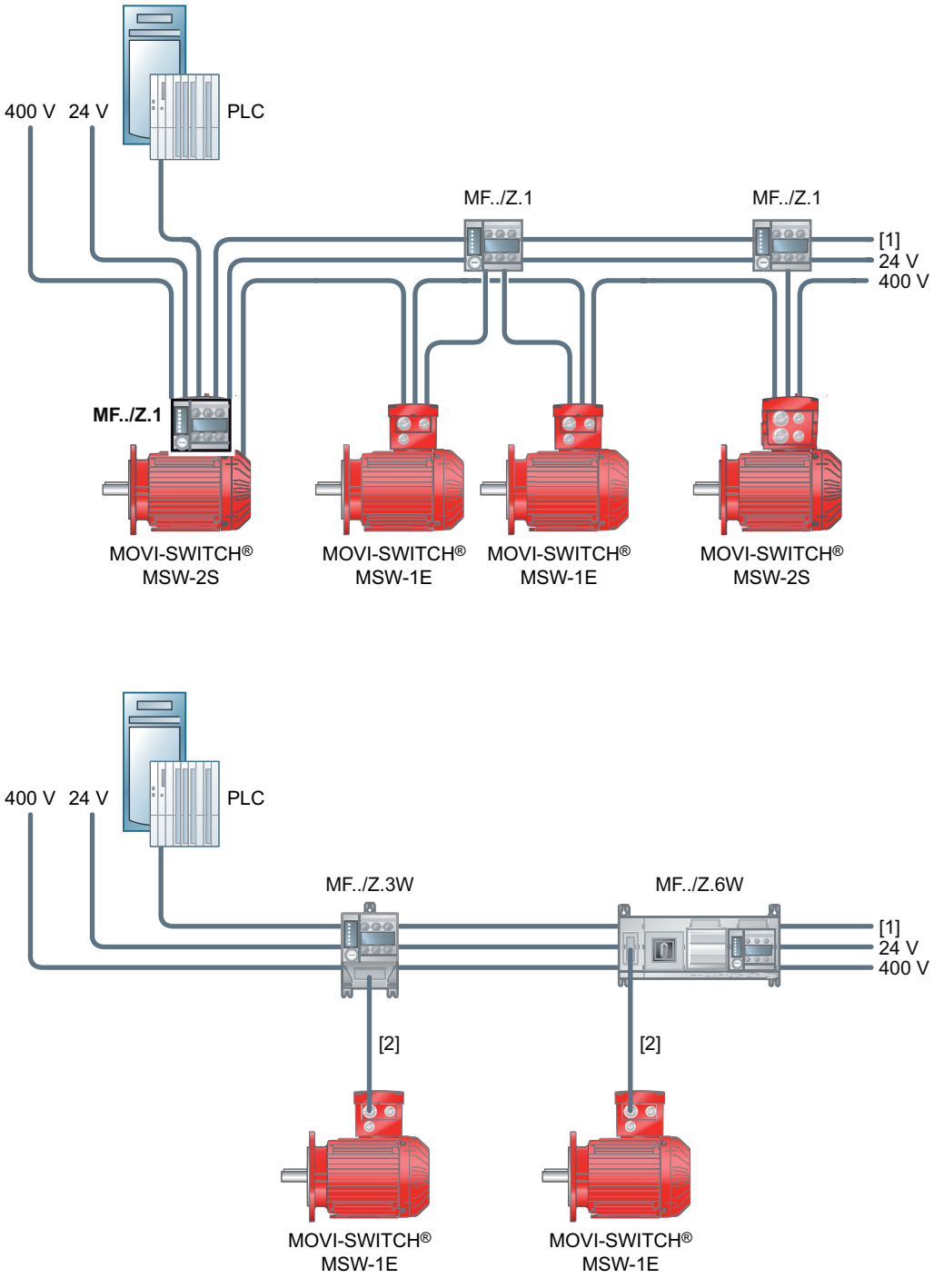
6.3 Installation topology

The following figure shows the basic installation topology of the MOVI-SWITCH® drive with fieldbus interface/field distributor:



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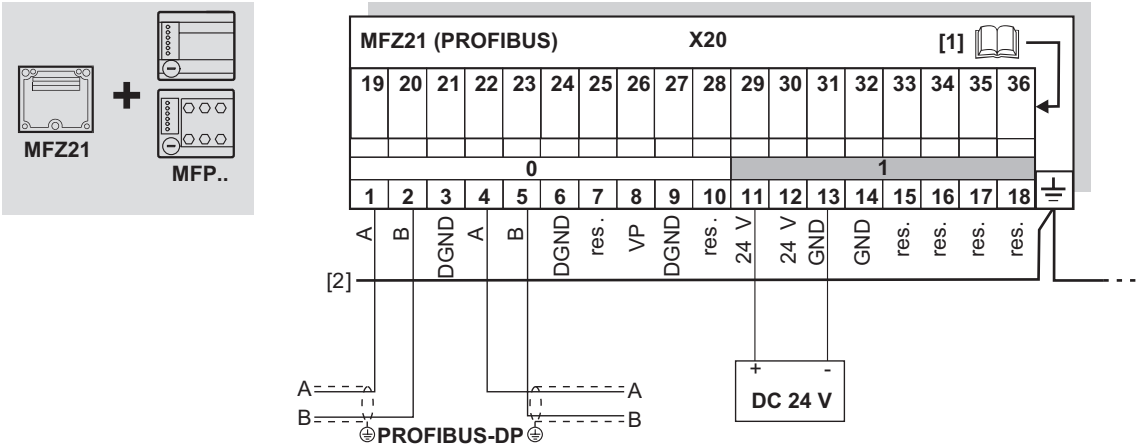
[1] Fieldbus

[2] Hybrid cable

6.4 Connecting PROFIBUS

6.4.1 Connection of MFZ21 connection module with MFP...

MFZ21 connection module with MPF21, MFP22 PROFIBUS interface



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0 = Potential level 0 **1** = Potential level 1

[1] Assignment of terminals 19 - 36 (→ 🗎 61)

[2] Ensure equipotential bonding between all bus stations.

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	A	Input	PROFIBUS DP data line A (incoming)
	2	B	Input	PROFIBUS DP data line B (incoming)
	3	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	4	A	Output	PROFIBUS DP data line A (outgoing)
	5	B	Output	PROFIBUS DP data line B (outgoing)
	6	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	7	-	-	Reserved
	8	VP	Output	+5 V output (max. 10 mA) (for test purposes only)
	9	DGND	-	Reference potential for VP (terminal 8, for test purposes only)
	10	-	-	Reserved
	11	24 V	Input	24 V voltage supply for module electronics and sensors
	12	24 V	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND	-	0V24 reference potential for module electronics and sensors
	14	GND	-	0V24 reference potential for module electronics and sensors
	15	-	-	Reserved
	16	-	-	Reserved
	17	-	-	Reserved
	18	-	-	Reserved

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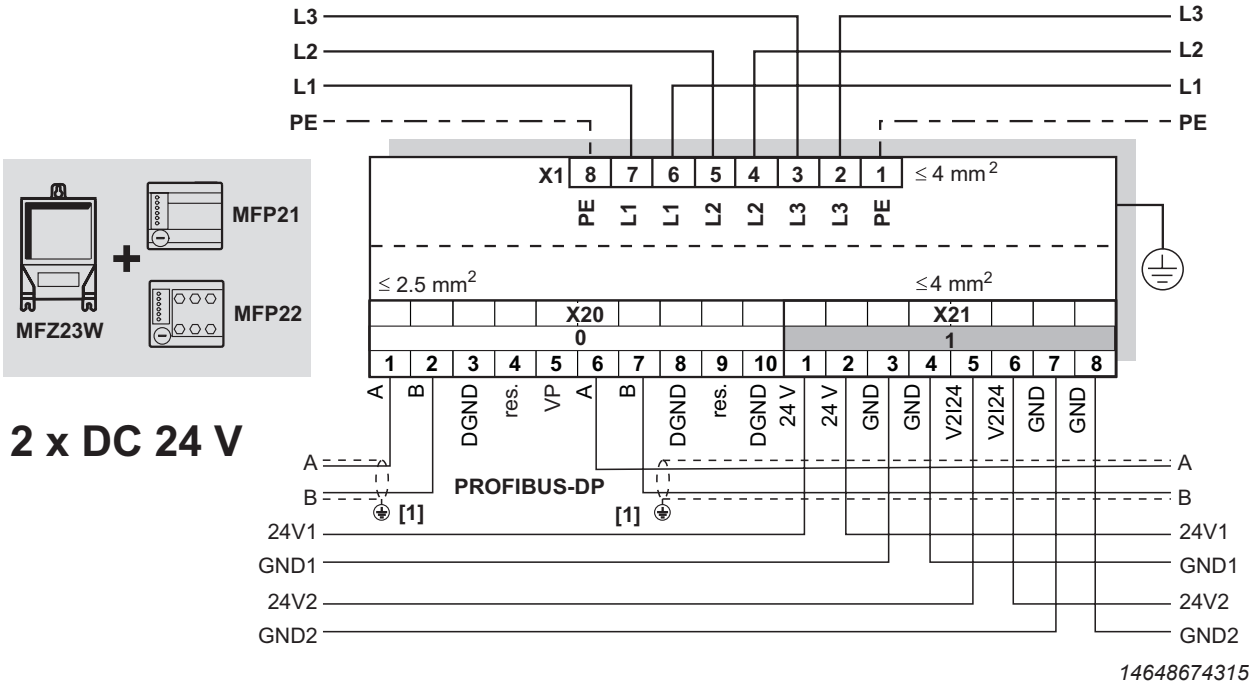
6.4.2 Connection of MFZ23W field distributor with MFP...

MFZ23W connection module with MFP21, MFP22 PROFIBUS interface and 2 separate DC 24 V voltage circuits



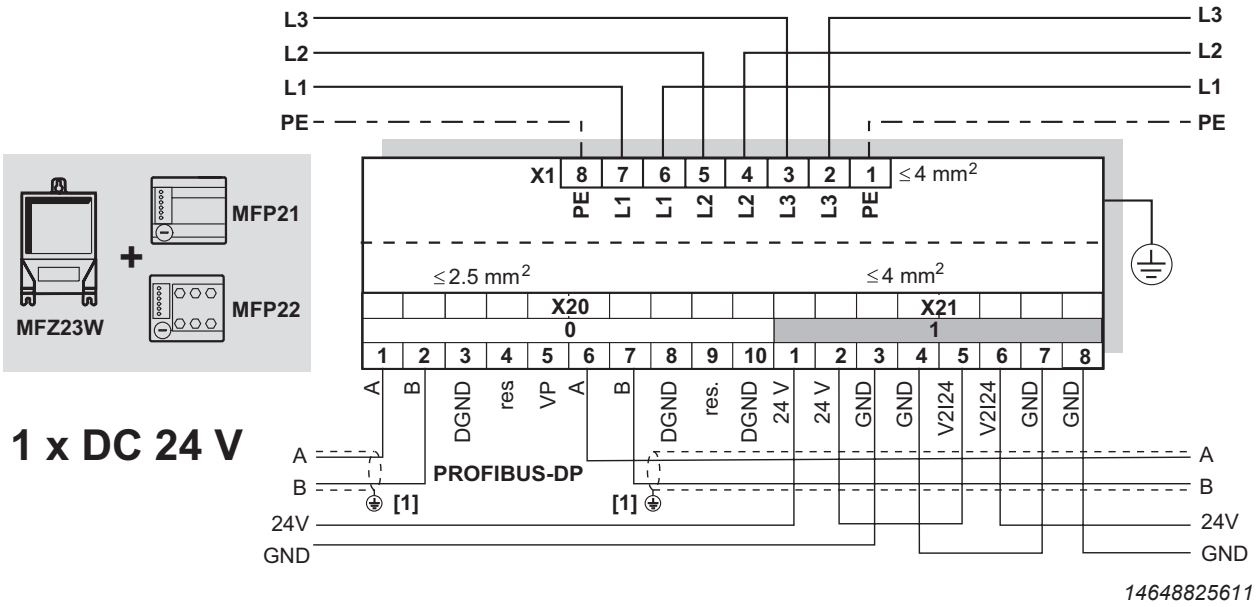
0 = Potential level 0 **1** = Potential level 1

[1] EMC metal cable gland

NOTICE: The MFZ.3W connection module only has one 24 V reference potential (GND). In case of 2 separate DC 24 V voltage circuits, the reference potentials are connected within the device.

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	A	Input	PROFIBUS DP data line A (incoming)
	2	B	Input	PROFIBUS DP data line B (incoming)
	3	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	4	-	-	Reserved
	5	VP	Output	+5 V output (max. 10 mA) (for test purposes only)
	6	A	Output	PROFIBUS DP data line A (outgoing)
	7	B	Output	PROFIBUS DP data line B (outgoing)
	8	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	9	-	-	Reserved
	10	DGND	-	Reference potential for VP (terminal 8, for test purposes only)
X21	**1**	24 V	Input	24 V voltage supply for module electronics, sensors and MOVI-SWITCH®
	2	24 V	Output	24 V voltage supply (jumpered with terminal X21/1)
	3	GND	-	0V24 reference potential
	4	GND	-	0V24 reference potential
	5	V2I24	Input	24 V voltage supply for actuators (digital outputs, MOVI-SWITCH® control)
	6	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X21/5
	7	GND	-	Reference potential 0V24V
	8	GND	-	Reference potential 0V24V

MFZ23W connection module with MFP21, MFP22 PROFIBUS interface and 1 shared DC 24 V voltage circuit



0 = Potential level 0 **1** = Potential level 1

[1] EMC metal cable gland

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	A	Input	PROFIBUS DP data line A (incoming)
	2	B	Input	PROFIBUS DP data line B (incoming)
	3	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	4	-	-	Reserved
	5	VP	Output	+5 V output (max. 10 mA) (for test purposes only)
	6	A	Output	PROFIBUS DP data line A (outgoing)
	7	B	Output	PROFIBUS DP data line B (outgoing)
	8	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	9	-	-	Reserved
	10	DGND	-	Reference potential for VP (terminal 8, for test purposes only)
X21	**1**	24 V	Input	24 V voltage supply for module electronics, sensors and MOVI-SWITCH®
	2	24 V	Output	24 V voltage supply (jumpered with terminal X21/1)
	3	GND	-	0V24 reference potential
	4	GND	-	0V24 reference potential
	5	V2I24	Input	24 V voltage supply for actuators (digital outputs, MOVI-SWITCH® control)
	6	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X21/5
	7	GND	-	Reference potential 0V24V
	8	GND	-	Reference potential 0V24V

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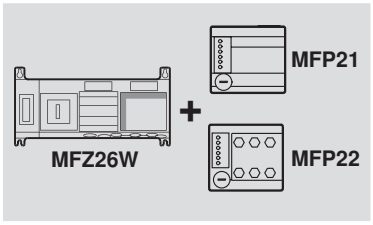
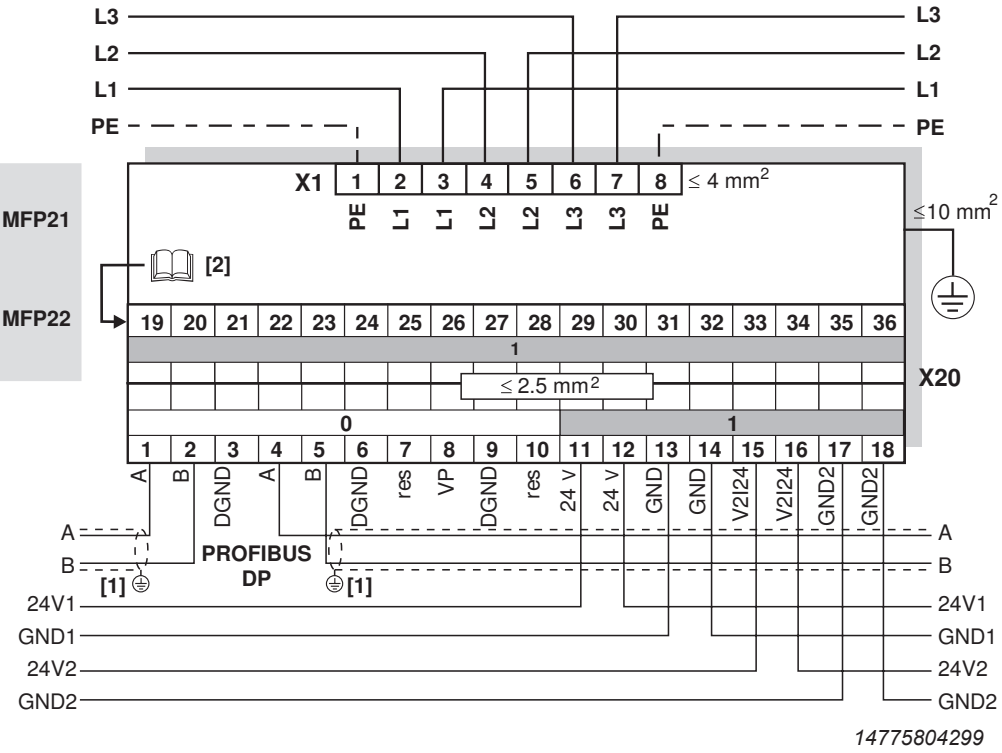
6.4.3 Connection of MFZ26W field distributor with MFP..

MFZ26W connection module with MFP21, MFP22 PROFIBUS interface and 2 separate DC 24 V voltage circuits



2 x DC 24 V



0 = Potential level 0 **1** = Potential level 1

[1] EMC metal cable gland

[2] Assignment of terminals 19 - 36 (→ 🖹 61)

NOTICE: The MFZ.6W connection module only has one 24 V reference potential (GND). In case of 2 separate DC 24 V voltage circuits, the reference potentials are connected within the device.

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	A	Input	PROFIBUS DP data line A (incoming)
	2	B	Input	PROFIBUS DP data line B (incoming)
	3	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	4	A	Output	PROFIBUS DP data line A (outgoing)
	5	B	Output	PROFIBUS DP data line B (outgoing)
	6	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	7	-	-	Reserved
	8	VP	Output	+5 V output (max. 10 mA) (for test purposes only)
	9	DGND	-	Reference potential for VP (terminal 5, for test purposes only)
	10	-	-	Reserved
	11	24 V	Input	24 V voltage supply for module electronics and sensors
	12	24 V	Output	24 V voltage supply jumpered with terminal X20/11
	13	GND	-	0V24 reference potential
	14	GND	-	0V24 reference potential
	15	V2I24	Input	24 V voltage supply for actuators (digital outputs)
	16	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X20/15
	17	GND	-	Reference potential 0V24V
	18	GND	-	Reference potential 0V24V

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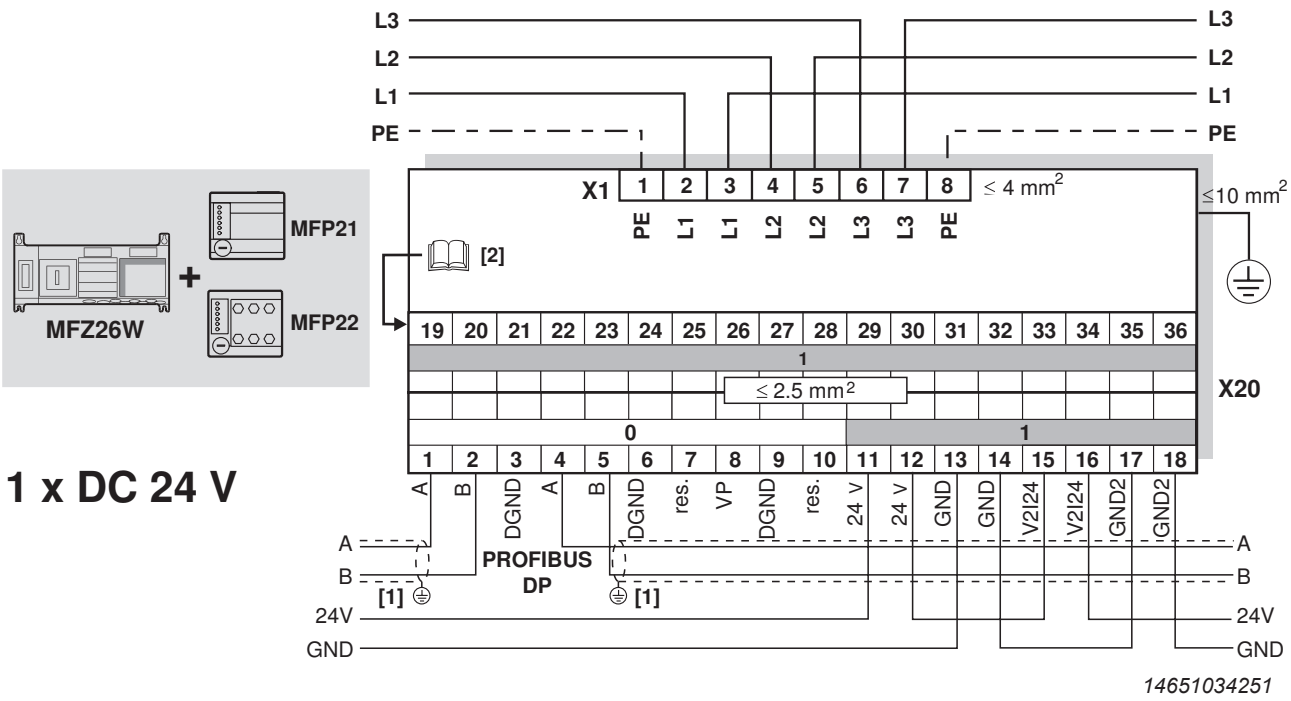
MFZ26W connection module with MFP21, MFP22 PROFIBUS interface and 1 shared DC 24 V voltage circuit



0 = Potential level 0 **1** = Potential level 1

[1] EMC metal cable gland

[2] Assignment of terminals 19 - 36 (→ 🗎 61)

Terminal assignment				
No.		Name	Direction	Function
X20	1	A	Input	PROFIBUS DP data line A (incoming)
	2	B	Input	PROFIBUS DP data line B (incoming)
	3	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	4	A	Output	PROFIBUS DP data line A (outgoing)
	5	B	Output	PROFIBUS DP data line B (outgoing)
	6	DGND	-	Data reference potential for PROFIBUS DP (for test purposes only)
	7	-	-	Reserved
	8	VP	Output	+5 V output (max. 10 mA) (for test purposes only)
	9	DGND	-	Reference potential for VP (terminal 5, for test purposes only)
	10	-	-	Reserved
	11	24 V	Input	24 V voltage supply for module electronics and sensors
	12	24 V	Output	24 V voltage supply jumpered with terminal X20/11
	13	GND	-	0V24 reference potential
	14	GND	-	0V24 reference potential
	15	V2I24	Input	24 V voltage supply for actuators (digital outputs)
	16	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X20/15
	17	GND	-	Reference potential 0V24V
	18	GND	-	Reference potential 0V24V

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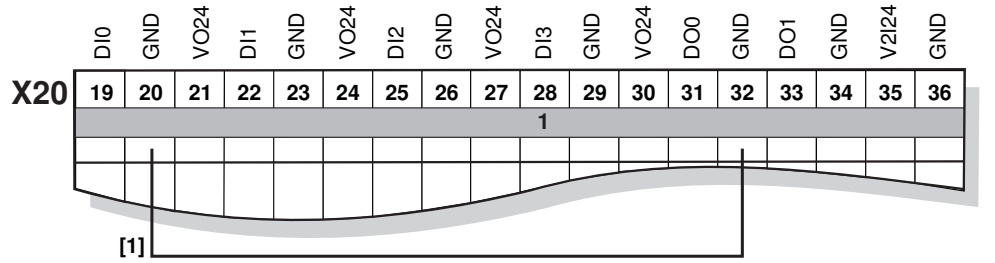
6.4.4 Connection of MF.. fieldbus interfaces inputs/outputs (I/O)

Connection via terminals

MFZ26W	in combination with	MFP21 MFP22



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1 = Potential level 1

[1] The wire break is pre-installed. It is required for operation and should not be removed.

No.		Name	Direction	Function
X20	**19**	DI0	Input	Switching signal from sensor 1 assigned for MOVI-SWITCH®
	20	GND	-	0V24 reference potential for sensor 1
	21	V024	Output	24 V voltage supply for sensor 1
	22	DI1	Input	Control signal of sensor 2
	23	GND	-	0V24 reference potential for sensor 2
	24	V024	Output	24 V voltage supply for sensor 2
	25	DI2	Input	Control signal of sensor 3
	26	GND	-	0V24 reference potential for sensor 3
	27	V024	Output	24 V voltage supply for sensor 3
	28	DI3	Input	Control signal of sensor 4
	29	GND	-	0V24 reference potential for sensor 4
	30	V024	Output	24 V voltage supply for sensor 4
	31	DO0	Output	Switching signal from actuator 1 assigned for MOVI-SWITCH®
	32	GND	-	0V24 reference potential for actuator 1
	33	DO1	Output	Switching signal from actuator 2 assigned when connecting MOVI-SWITCH® 2S/CB0
	34	GND	-	0V24 reference potential for actuator 2
	35	V2I24	Input	24 V voltage supply for actuators, jumpered with terminal 15 or 16
	36	GND	-	0V24 reference potential for actuators, jumpered with terminal 17 or 18

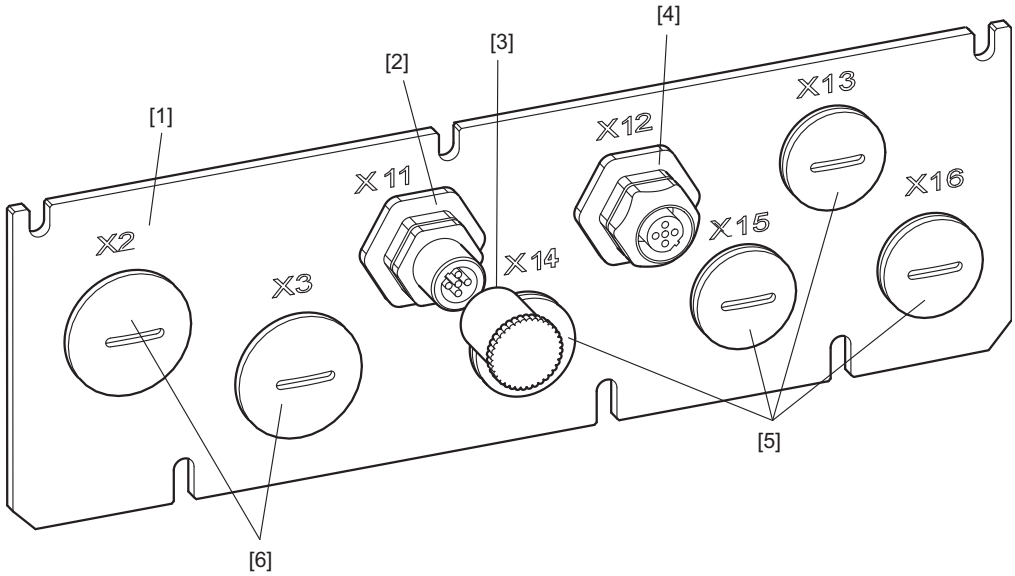
6.4.5 Bus connection with optional connection technology

AF2 mounting flange

As an alternative to the standard design AF0, mounting flange AF2 can be combined with the field distributor for MFZ26W PROFIBUS.

AF2 comes equipped with a M12 connector system for PROFIBUS connection. The unit comes equipped with an X11 connector for the incoming and an X12 socket for the outgoing PROFIBUS.

The M12 connectors have a "reverse-key coding" design (also referred to as B or W coding).



1143352459

[1] Front sheet metal
[2] M12 connector, incoming PROFIBUS (X11)
[3] Protection cap
[4] M12 socket, outgoing PROFIBUS (X12)
[5] M20 screw plug
[6] M25 screw plug

Mounting flange AF2 complies with the recommendations from PROFIBUS Directive no. 2.141, "Connection technology for PROFIBUS".

INFORMATION

In contrast to the standard design, the switchable bus termination at the MFP interface is not available if AF2 is used. A pluggable bus termination (M12) must be used **in the last station** in place of the outgoing X12 bus connection.

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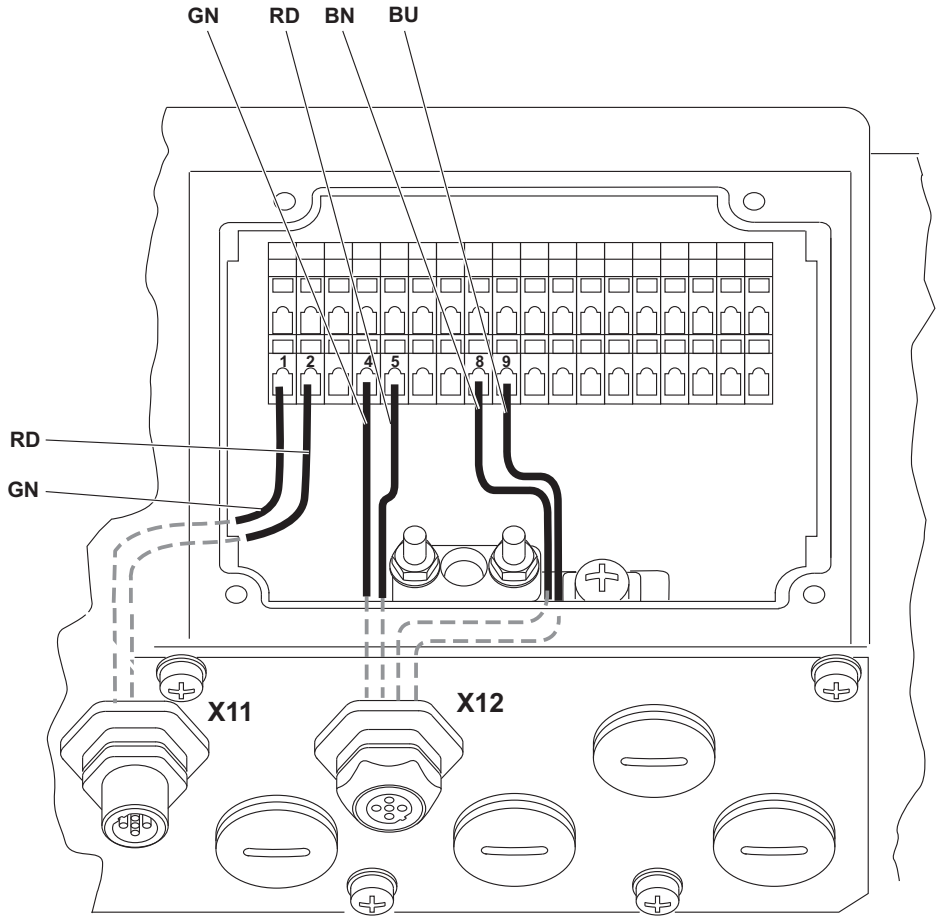
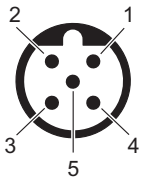
AF2 wiring



1143562251

X11: PROFIBUS input

The following table shows information about this connection:

Function		
PROFIBUS input		
Connection type		
(M12, 5-pole, male, B-coded)		
Wiring diagram		
		
Assignment		
No.	**Name**	**Function**
1	Res.	Reserved
2	A_IN	PROFIBUS data line A
3	Res.	Reserved
4	B_IN	PROFIBUS data line B
5	Res.	Reserved
Thread	–	Shield or protective earth

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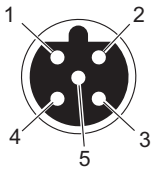
X12: PROFIBUS output

The following table shows information about this connection:

Function		
PROFIBUS output		
Connection type		
(M12, 5-pole, female, B-coded)		
Wiring diagram		
		
Assignment		
No.	**Name**	**Function**
1	+5V	DC 5 V output
2	A_OUT	PROFIBUS data line A
3	0V5	0V5 reference potential
4	B_OUT	PROFIBUS data line B
5	Res.	Reserved
Thread	–	Shield or protective earth

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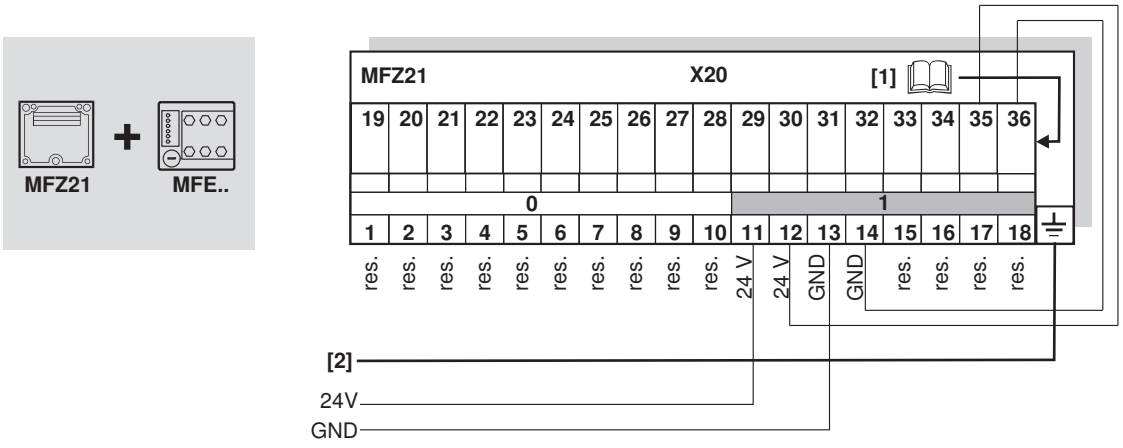
6.5 PROFINET IO, EtherNet/IP™, EtherCAT® connection

6.5.1 Connection of MFZ21 connection module with MFE...

MFZ21 connection module with MFE.. Ethernet interface



14779785611

0 = Potential level 0 **1** = Potential level 1

[1] Assignment of terminals 19 - 36 (→ 🗎 61)

[2] Ensure equipotential bonding between all bus stations.

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1 –10**	Res.	–	Reserved
	11	24 V	Input	24 V voltage supply for module electronics and sensors
	12	24 V	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND	-	0V24 reference potential for module electronics and sensors
	14	GND	-	0V24 reference potential for module electronics and sensors
	15	Res.	-	Reserved
	16	Res.	-	Reserved
	17	Res.	-	Reserved
	18	Res.	-	Reserved

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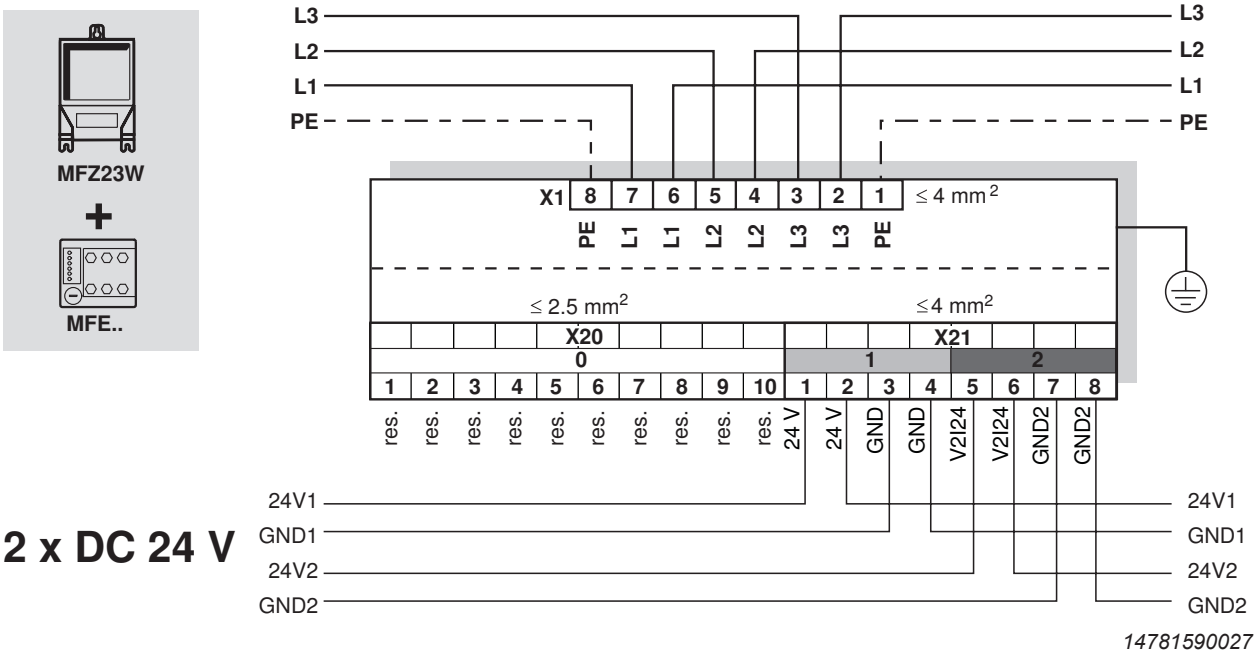
6.5.2 Connection of MFZ23W field distributor with MFE...

MFZ23W connection module with MFE.. Ethernet interface and 2 separate DC 24 V voltage circuits

(only for a configuration with 4 inputs/2 outputs)



0 = Potential level 0 1 = Potential level 1 2 = Potential level 2

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1 – 10**	Res.	–	Reserved
X21	**1**	24 V	Input	24 V voltage supply For module electronics, sensors DI0 - DI3
	2	24 V	Output	24 V voltage supply For module electronics, sensors DI0 - DI3 Bypassed with terminal X21/1
	3	GND	-	0V24 reference potential For module electronics, sensors DI0 - DI3
	4	GND	-	0V24 reference potential For module electronics, sensors DI0 - DI3
	5	V2I24	Input	24 V voltage supply For actuators (digital outputs) and sensors DI4 – DI5
	6	V2I24	Output	24 V voltage supply For actuators (digital outputs) and sensors DI4 – DI5 jumpered with terminal X21/5
	7	GND2	-	0V24V reference potential for actuators and sensors DI4 – DI5
	8	GND2	-	0V24V reference potential for actuators and sensors DI4 – DI5

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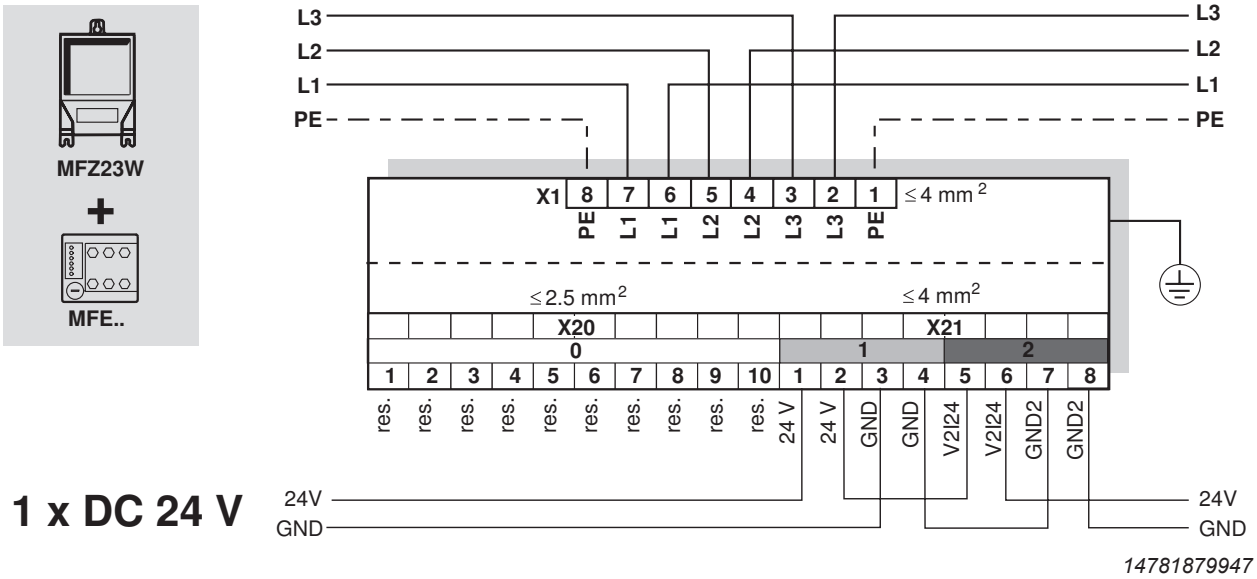
MFZ23W connection module with MFE.. Ethernet interface and 1 shared DC 24 V voltage circuit

(for a configuration with 6 inputs or with 4 inputs/2 outputs)



0 = Potential level 0 1 = Potential level 1 2 = Potential level 2

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1 – 10**	Res.	–	Reserved
X21	**1**	24 V	Input	24 V voltage supply for module electronics, sensors
	2	24 V	Output	24 V voltage supply (jumpered with terminal X21/1)
	3	GND	-	0V24 reference potential for module electronics, sensors
	4	GND	-	0V24 reference potential for module electronics, sensors
	5	V2I24	Input	24 V voltage supply for actuators (digital outputs)
	6	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X21/5
	7	GND2	-	0V24 reference potential for actuators
	8	GND2	-	0V24 reference potential for actuators

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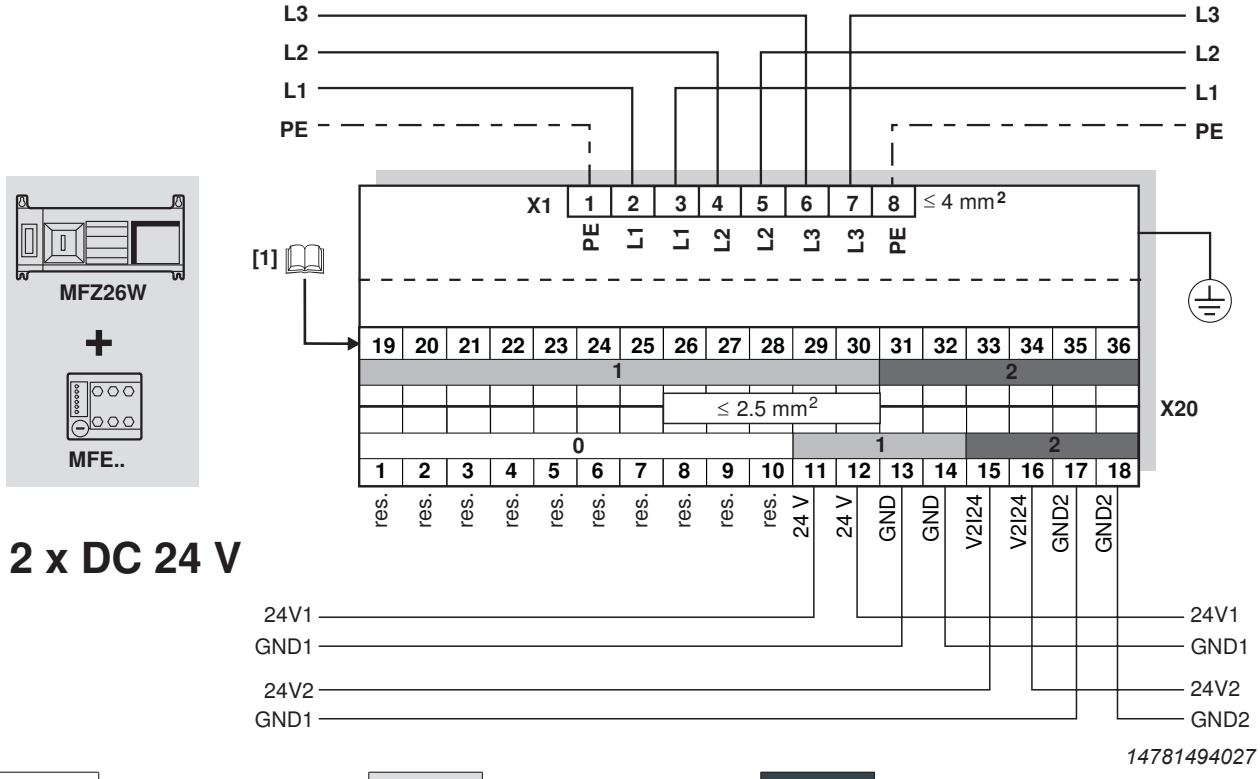
6.5.3 Connection of MFZ26W field distributor with MFE..

MFZ26W connection module with MFE.. Ethernet interface and 2 separate DC 24 V voltage circuits

(only for a configuration with 4 inputs/2 outputs)



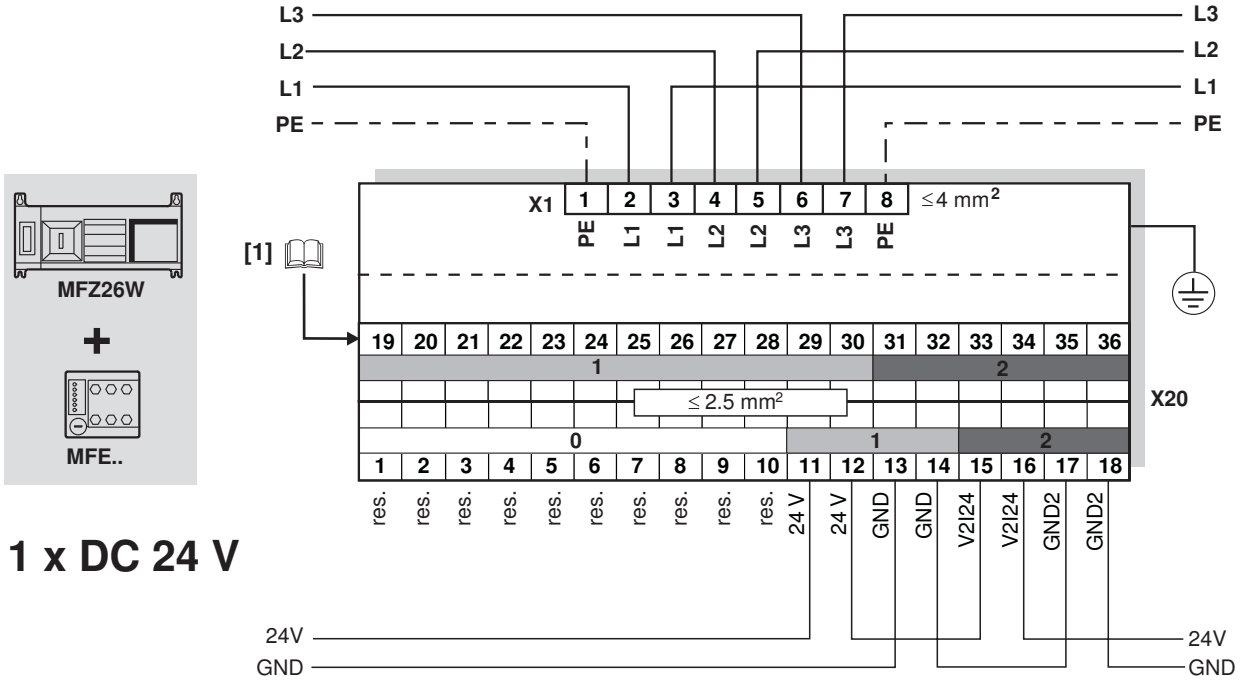
0 = Potential level 0 1 = Potential level 1 2 = Potential level 2

[1] Assignment of terminals 19 - 36 (→ 🗎 61)

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1 – 10**	Res.	–	Reserved
	11	24 V	Input	24 V voltage supply For module electronics and sensors DI0 – DI3
	12	24 V	Output	24 V voltage supply For module electronics and sensors DI0 – DI3 jumpered with terminal X20/11
	13	GND	-	0V24 reference potential for module electronics and sensors DI0 – DI3
	14	GND	-	0V24 reference potential for module electronics and sensors DI0 – DI3
	15	V2I24	Input	24 V voltage supply For actuators (digital outputs) and sensors DI4 – DI5
	16	V2I24	Output	24 V voltage supply For actuators (digital outputs) and sensors DI4 – DI5 jumpered with terminal X20/15
	17	GND2	-	0V24 reference potential for actuators (digital outputs) and sensors DI4 – DI5
	18	GND2	-	0V24 reference potential for actuators (digital outputs) and sensors DI4 – DI5

MFZ26W connection module with MFE.. Ethernet interface and 1 shared DC 24 V voltage circuit

(for a configuration with 6 inputs or with 4 inputs/2 outputs)



14781529867

0 = Potential level 0 | 1 = Potential level 1 | 2 = Potential level 2

[1] Assignment of terminals 19 - 36 (→ 🗎 61)

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1 – 10**	Res.	–	Reserved
	11	24 V	Input	24 V voltage supply for module electronics and sensors
	12	24 V	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND	-	0V24 reference potential for module electronics and sensors
	14	GND	-	0V24 reference potential for module electronics and sensors
	15	V2I24	Input	24 V voltage supply for actuators (digital outputs)
	16	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X20/15
	17	GND2	-	0V24V reference potential for actuators (digital outputs)
	18	GND2	-	0V24V reference potential for actuators (digital outputs)

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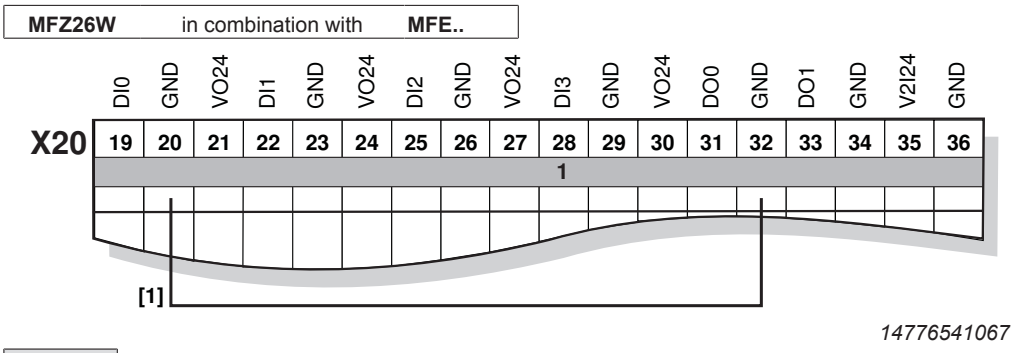
6.5.4 Connection of MF.. fieldbus interfaces inputs/outputs (I/O)

Connection via terminals



14776541067

1 = Potential level 1

[1] The wire break is pre-installed. It is required for operation and should not be removed.

No.		Name	Direction	Function
X20	**19**	DI0	Input	Switching signal from sensor 1 assigned for MOVISWITCH®
	20	GND	-	0V24 reference potential for sensor 1
	21	V024	Output	24 V voltage supply for sensor 1
	22	DI1	Input	Control signal of sensor 2
	23	GND	-	0V24 reference potential for sensor 2
	24	V024	Output	24 V voltage supply for sensor 2
	25	DI2	Input	Control signal of sensor 3
	26	GND	-	0V24 reference potential for sensor 3
	27	V024	Output	24 V voltage supply for sensor 3
	28	DI3	Input	Control signal of sensor 4
	29	GND	-	0V24 reference potential for sensor 4
	30	V024	Output	24 V voltage supply for sensor 4
	31	DO0	Output	Switching signal from actuator 1 assigned for MOVI-SWITCH®
	32	GND	-	0V24 reference potential for actuator 1
	33	DO1	Output	Switching signal from actuator 2 assigned when connecting MOVI-SWITCH® 2S/CB0
	34	GND	-	0V24 reference potential for actuator 2
	35	V2I24	Input	24 V voltage supply for actuators, jumpered with terminal 15 or 16
	36	GND	-	0V24 reference potential for actuators, jumpered with terminal 17 or 18

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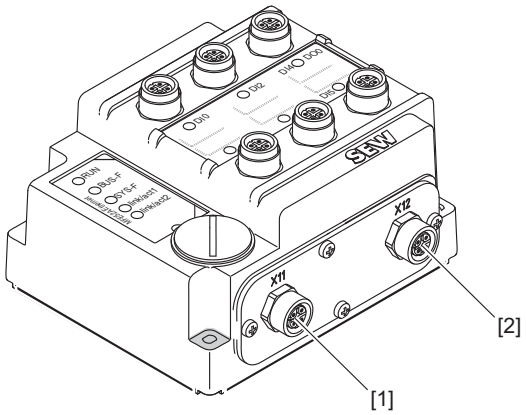
6.5.5 Connection of PROFINET IO

The following figure shows the connections of the PROFINET IO bus:



9007202600365067

[1] X11, PROFINET IO connection, port 1
[2] X12, PROFINET IO connection, port 2

The following table shows the pin assignment of the PROFINET IO ports X11 and X12:

Function		
PROFINET IO interface		
Connection type		
M12, 4-pole, female, D-coded		
Wiring diagram		
 3545032843		
Assignment		
No.	**Name**	**Function**
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

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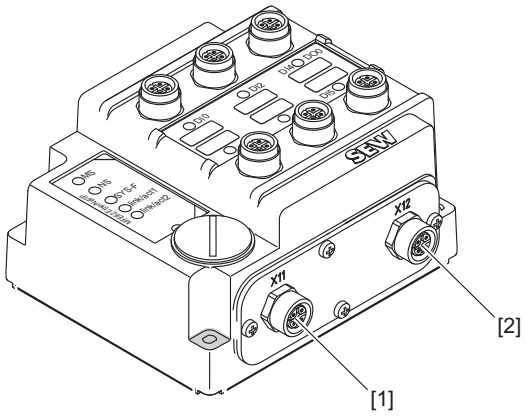
6.5.6 Connection of EtherNet/IP™

The following figure shows the connections of the EtherNet/IP™ bus:



14493430027

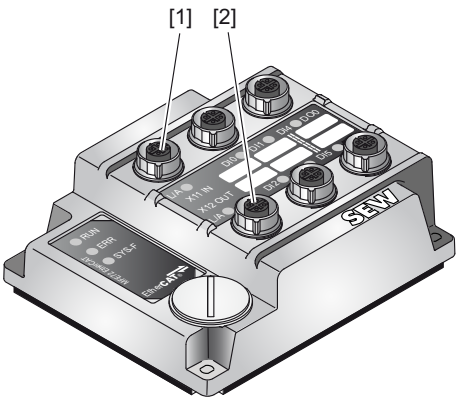
[1] X11, connection EtherNet/IP™, port 1
[2] X12, connection EtherNet/IP™, port 2

The following table shows the pin assignment of the EtherNet/IP™ ports X11 and X12:

Function		
EtherNet/IP™ interface		
Connection type		
M12, 4-pole, female, D-coded		
Wiring diagram		
 3545032843		
Assignment		
No.	**Name**	**Function**
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

6.5.7 Connection of EtherCAT®

The following figure shows the connections of the EtherCAT® bus:



8817703947

[1] X11, connection EtherCAT®, IN

[2] X12, connection EtherCAT®, OUT

The following table shows the pin assignment of the EtherCAT® ports X11 and X12:

Function		
EtherCAT® Interface		
Connection type		
M12, 4-pole, female, D-coded		
Wiring diagram		
 3545032843		
Assignment		
No.	**Name**	**Function**
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

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6.5.8 The integrated Ethernet switch

You can use the integrated Ethernet switch to achieve line topologies known from the fieldbus technology. Other bus topologies, such as star or tree, are also possible. Ring topologies are not supported.

INFORMATION

The number of Industrial Ethernet switches connected in line affects the telegram runtime. If a telegram passes through the units, the telegram runtime is delayed by the store & forward function of the Ethernet switch:

This means the more units a telegram has to pass through, the higher the telegram runtime is.

- For a telegram length of 64 bytes by approximately 10 µs (at 100 Mbit/s)
- For a telegram length of 1500 bytes by approximately 130 µs (at 100 Mbit/s)

Auto-crossing

The two ports leading out of the Ethernet switch have auto-crossing functionality. This means that they can use both patch and cross-over cables to connect to the next Ethernet node.

Auto-negotiation

The baud rate and duplex mode are negotiated by both Ethernet nodes when establishing the connection. For this purpose, both Ethernet ports of the Ethernet connection support an auto-negotiation functionality and work with a baud rate of either 100 Mbit or 10 Mbit in full duplex or half-duplex mode.

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6.5.9 Routing the Ethernet cable

NOTICE

In case of fluctuations in the ground potential, a compensating current may flow via the bilaterally connected shield that is also connected to the protective earth (PE). Make sure you supply adequate equipotential bonding in accordance with relevant VDE regulations in such a case.

Only use shielded cables and connection elements that meet the requirements of category 5, class D according to IEC 11801 edition 2.0.

The following measures ensure the best possible EMC properties:

- Manually tighten the mounting screws on the connectors, modules and equipotential bonding conductors.
- Use only connectors with a metal housing or a metalized housing.
- Route signal and bus cables in separate cable ducts. Do not route them parallel to power cables (motor leads).
- Use metallic, grounded cable racks in industrial environments.
- Route the signal cable and the corresponding equipotential bonding close to each other using the shortest possible route.
- Avoid using plug connectors to extend bus cables.
- Route the bus cables closely along existing grounding surfaces.

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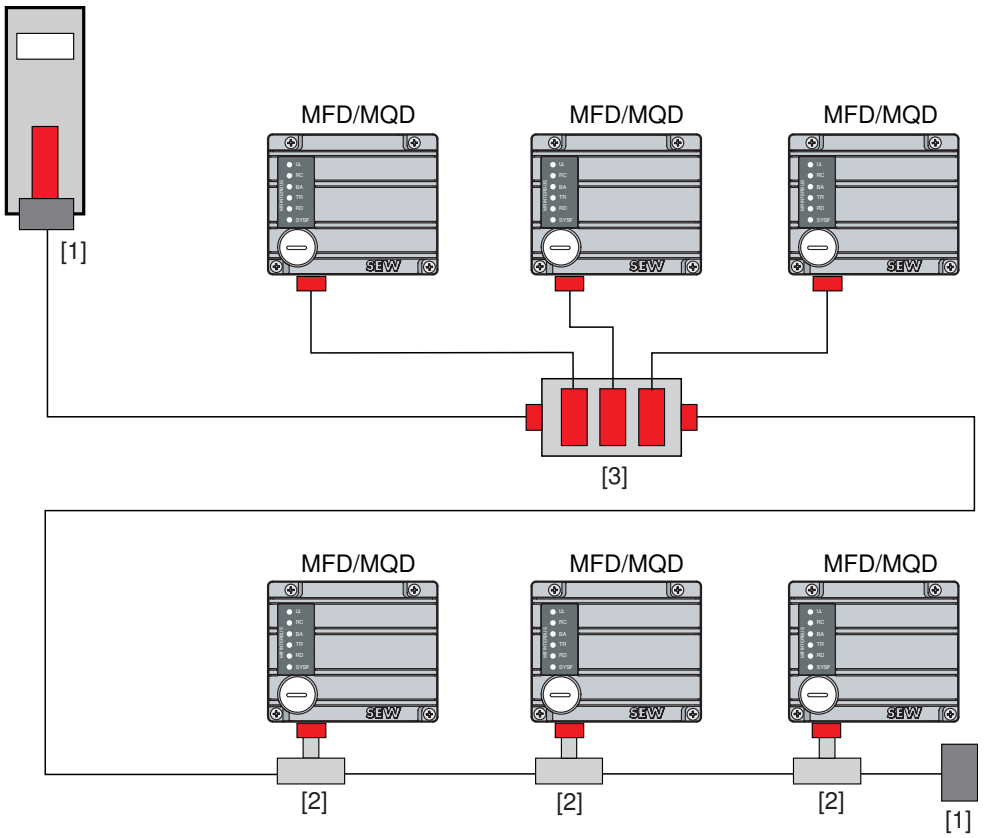
6.6 DeviceNet™ connection

6.6.1 DeviceNet™ connection possibilities

MFD fieldbus interfaces can be connected via a multiport or T connector. In case the connection to the fieldbus interface MFD is removed, the other stations will not be influenced. The bus can remain active.



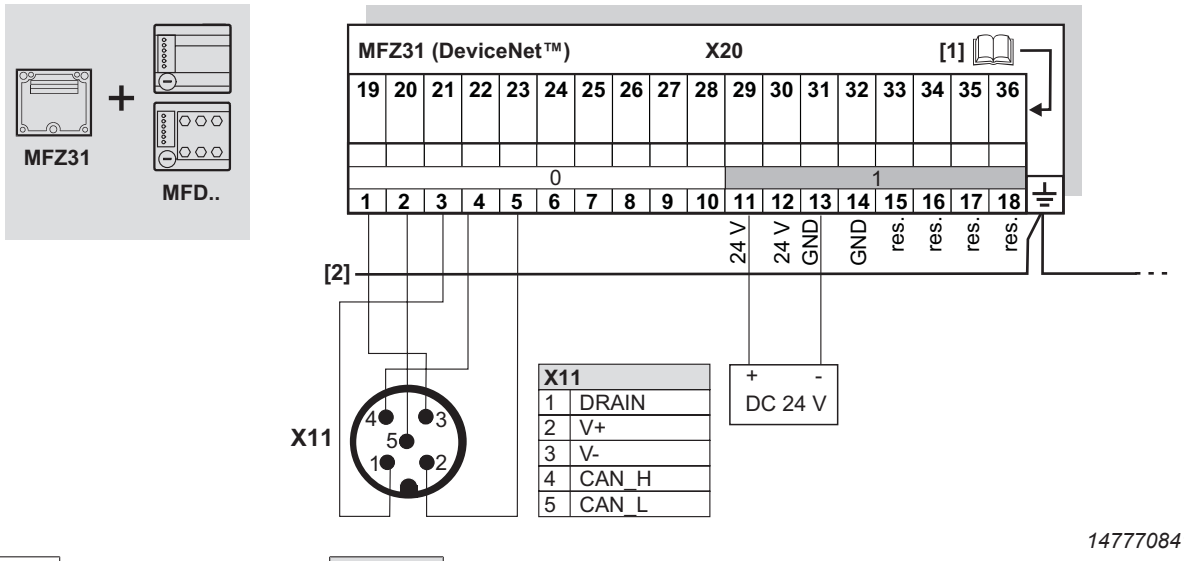
[1] Bus terminating resistor 120 Ω
[2] T Connector
[3] Multiport

INFORMATION

Observe the wiring instructions of DeviceNet™ specification 2.0.

6.6.2 Connection of MFZ31 connection module with MFD..

MFZ31 connection module with MFD.. DeviceNet™ interface



14777084171

0 = Potential level 0 **1** = Potential level 1

[1] Assignment of terminals 19 - 36 (→ 🗎 61)

[2] Ensure equipotential bonding between all bus stations.

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	V-	Input	DeviceNet™ reference potential 0V24
	2	CAN_L	Input/output	CAN_L data cable
	3	DRAIN	Input	Equipotential bonding
	4	CAN_H	Input/output	CAN_H data cable
	5	V+	Input	DeviceNet™ voltage supply 24 V
	6	-	-	Reserved
	7	-	-	Reserved
	8	-	-	Reserved
	9	-	-	Reserved
	10	-	-	Reserved
	11	24 V	Input	24 V voltage supply for module electronics and sensors
	12	24 V	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND	-	0V24 reference potential for module electronics and sensors
	14	GND	-	0V24 reference potential for module electronics and sensors
	15	-	-	Reserved
	16	-	-	Reserved
	17	-	-	Reserved
	18	-	-	Reserved

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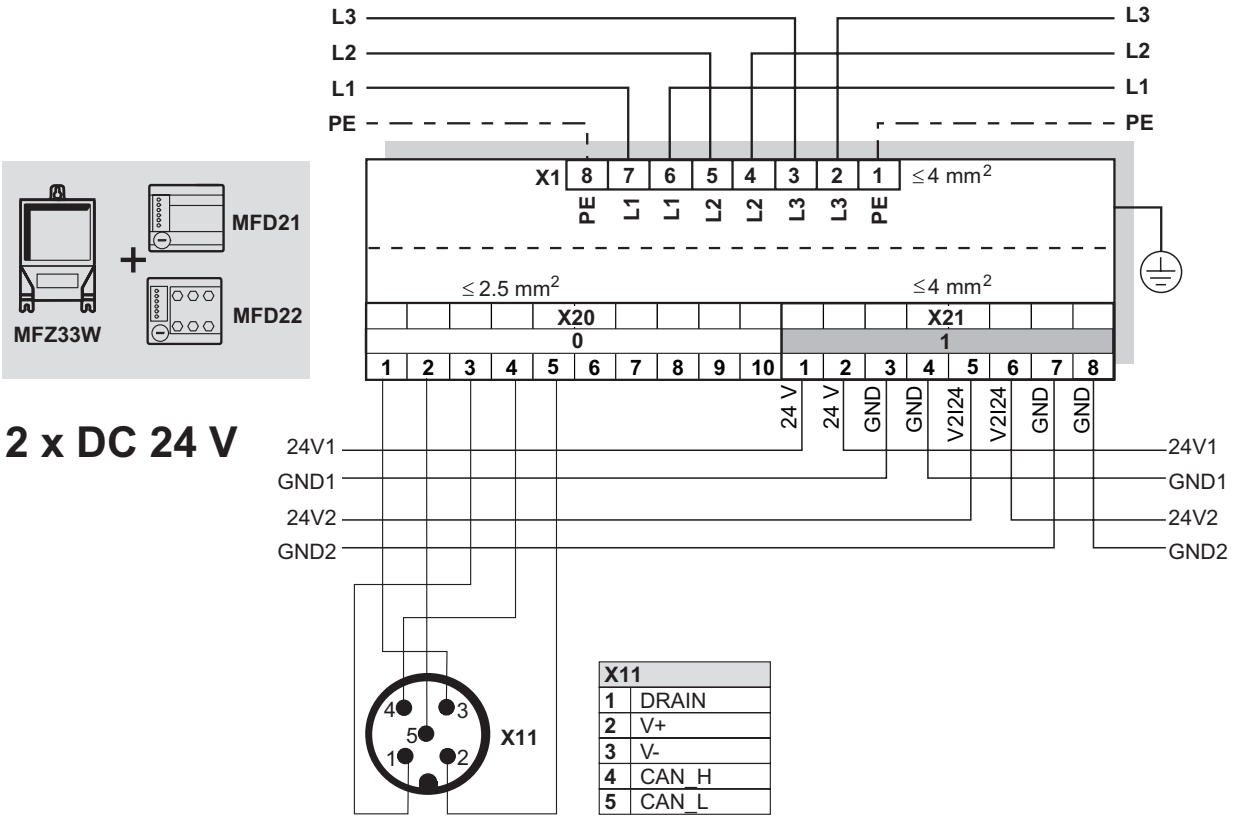
6.6.3 Connection of MFZ33W field distributor with MFD...

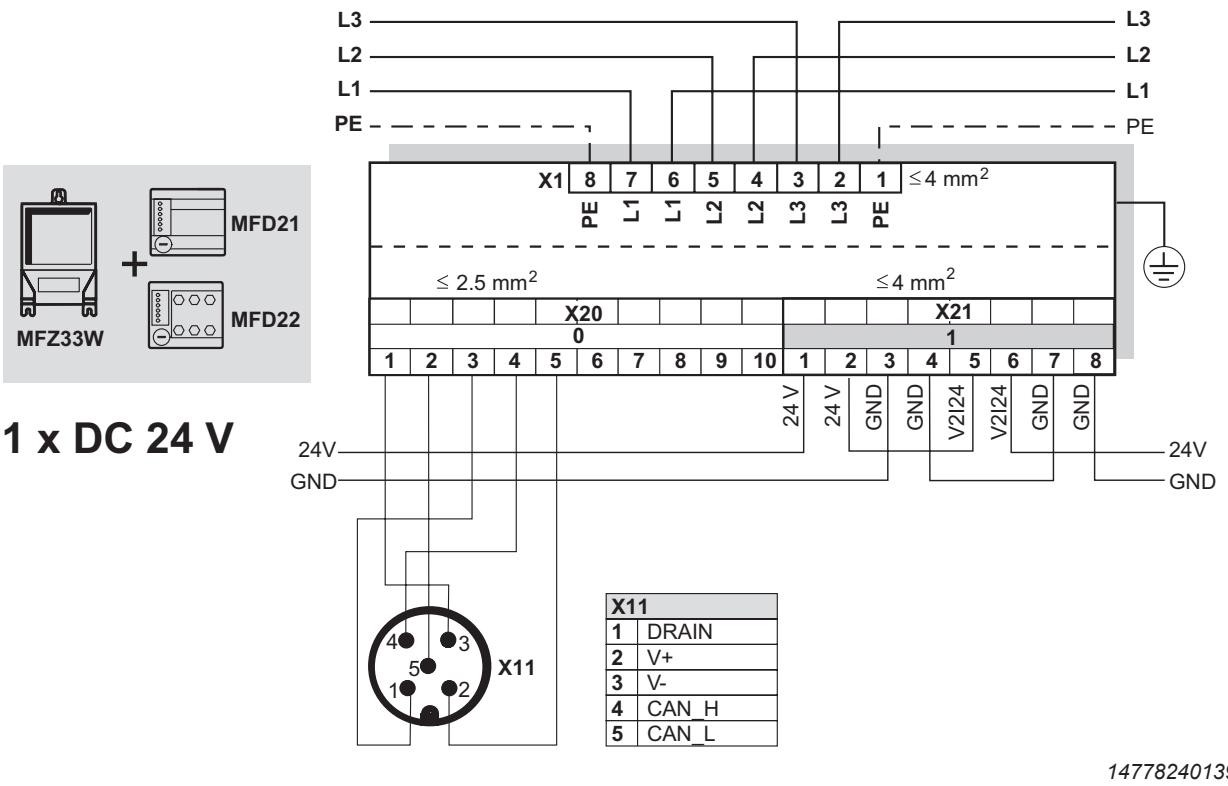
MFZ33 connection module with MFD21, MFD22 DeviceNet™ interface and 2 separate DC 24 V voltage circuits



0 = Potential level 0 **1** = Potential level 1

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	V-	Input	DeviceNet™ reference potential 0V24
	2	CAN_L	Input/output	CAN L data cable
	3	DRAIN	Input	Equipotential bonding
	4	CAN_H	Input/output	CAN H data cable
	5	V+	Input	DeviceNet™ voltage supply 24 V
	6 - 10	-	-	Reserved
X21	**1**	24 V	Input	24 V voltage supply for module electronics, sensors and MOVI-SWITCH®
	2	24 V	Output	24 V voltage supply (jumpered with terminal X21/1)
	3	GND	-	0V24 reference potential
	4	GND	-	0V24 reference potential
	5	V2I24	Input	24 V voltage supply for actuators (digital outputs, MOVI-SWITCH® control)
	6	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X21/5
	7	GND	-	Reference potential 0V24V
	8	GND	-	Reference potential 0V24V

MFZ33W connection module with MFD21, MFD22 DeviceNet™ interface and 1 shared DC 24 V voltage circuit



0 = Potential level 0 **1** = Potential level 1

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	V-	Input	DeviceNet™ reference potential 0V24
	2	CAN_L	Input/output	CAN L data cable
	3	DRAIN	Input	Equipotential bonding
	4	CAN_H	Input/output	CAN H data cable
	5	V+	Input	DeviceNet™ voltage supply 24 V
	6 - 10	-	-	Reserved
X21	**1**	24 V	Input	24 V voltage supply for module electronics, sensors and MOVI-SWITCH®
	2	24 V	Output	24 V voltage supply (jumpered with terminal X21/1)
	3	GND	-	0V24 reference potential
	4	GND	-	0V24 reference potential
	5	V2I24	Input	24 V voltage supply for actuators (digital outputs, MOVI-SWITCH® control)
	6	V2I24	Output	24 V voltage supply for actuators (digital outputs) jumpered with terminal X21/5
	7	GND	-	Reference potential 0V24V
	8	GND	-	Reference potential 0V24V

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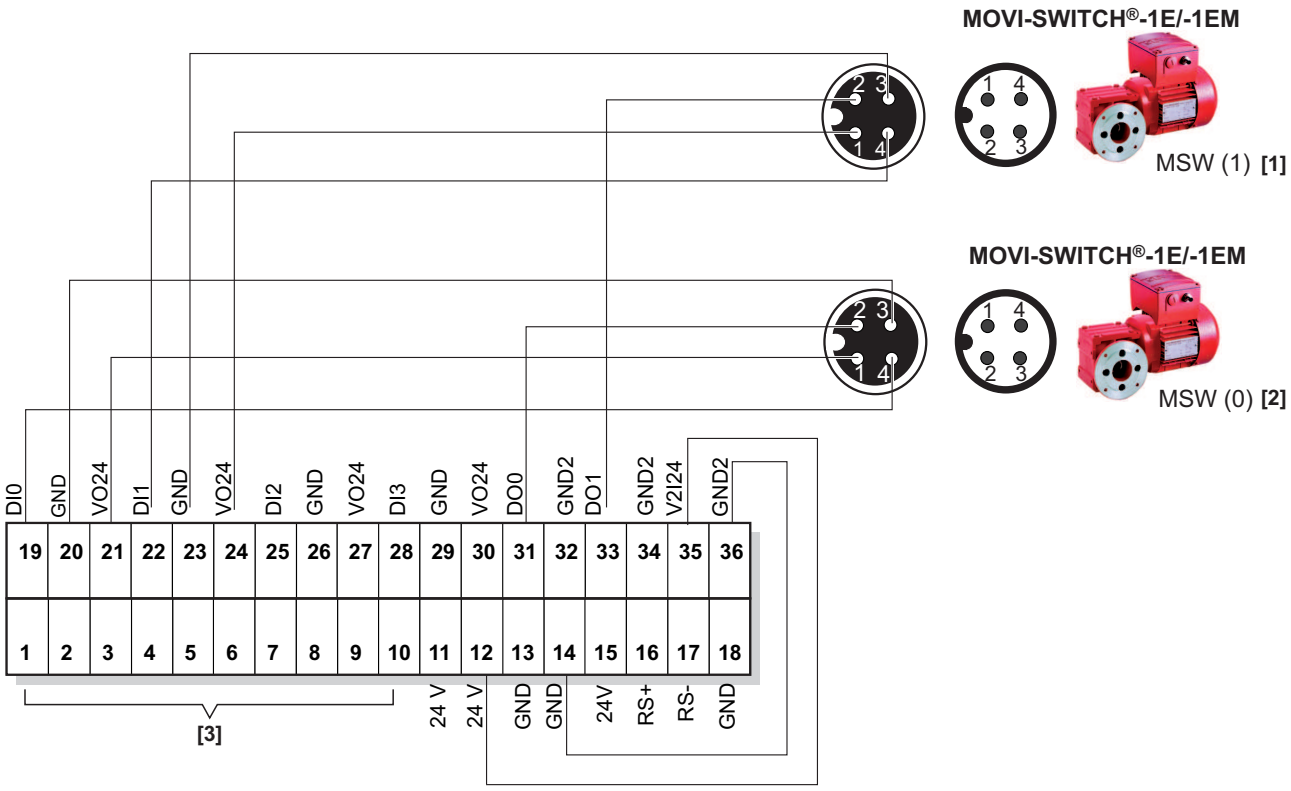
6.7 Connection of MFZ.1 connection module with MOVI-SWITCH®

6.7.1 Connection example 2 x MOVI-SWITCH® 1E with MF..

Connection via terminals (MF.2. fieldbus interface)



14783744651

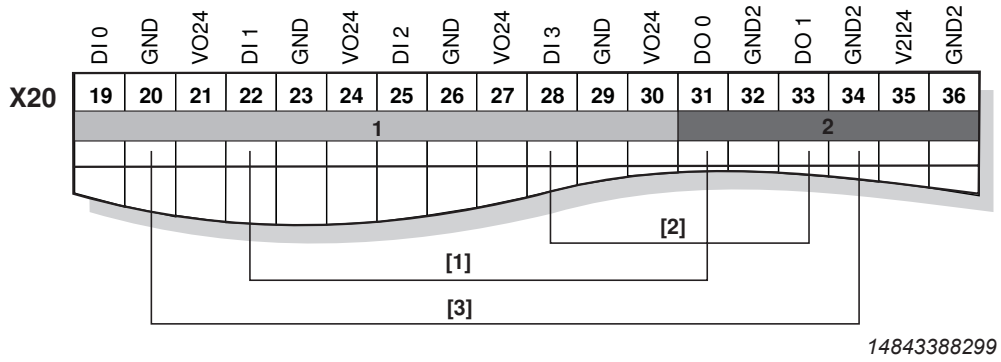
[1] The MOVI-SWITCH® drive is controlled via digital input DI1.
[2] The MOVI-SWITCH® drive is controlled via digital input DI0.
[3] The assignment depends on the fieldbus.

Unassigned inputs when connecting 2 x MOVI-SWITCH® 1E/1EM

Terminal assignment				
No.		Name	Direction	Function
X20	19 – 24	-	-	Assigned by MOVI-SWITCH®
	25	DI2	Input	Control signal of sensor 3
	26	GND	-	0V24 reference potential for sensor 3
	27	V024	Output	24 V voltage supply for sensor 3
	28	DI3	Input	Control signal of sensor 4
	29	GND	-	0V24 reference potential for sensor 4
	30	V024	Output	24 V voltage supply for sensor 4
	31 – 36	DI0	Input	Assigned by MOVI-SWITCH®

Connection via M12 plug connector (MF.22, MFE52, MFE62 fieldbus interface)

The required outputs must be internally jumpered to the sockets used according to the following figure.



14843388299

[1] Digital output DO0 is thus on pin 2 of socket DI0.
[2] Digital output DO1 is thus on pin 2 of socket DI2. The jumper is only required when connecting 2 x MOVI-Switch® to a fieldbus interface.
[3] The jumper is only required when the fieldbus node was installed with 2 separate 24 V voltage circuits.

After the outputs have been jumpered to the input sockets, 2 x MOVI-SWITCH® 1E/1EM can be connected to the M12 sockets DI0 and DI2.

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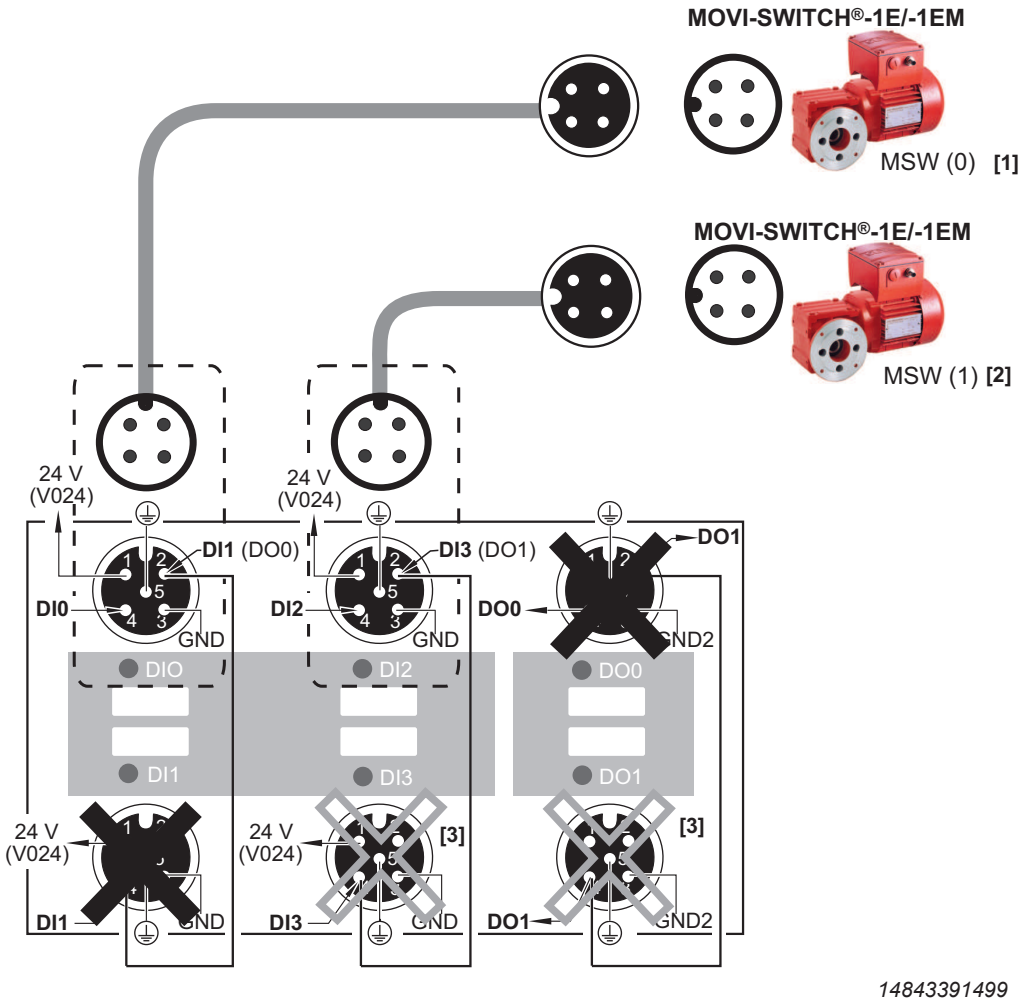
In this case, the input socket DI1 + DI3 and the output socket DO0 + DO1 can no longer be used.

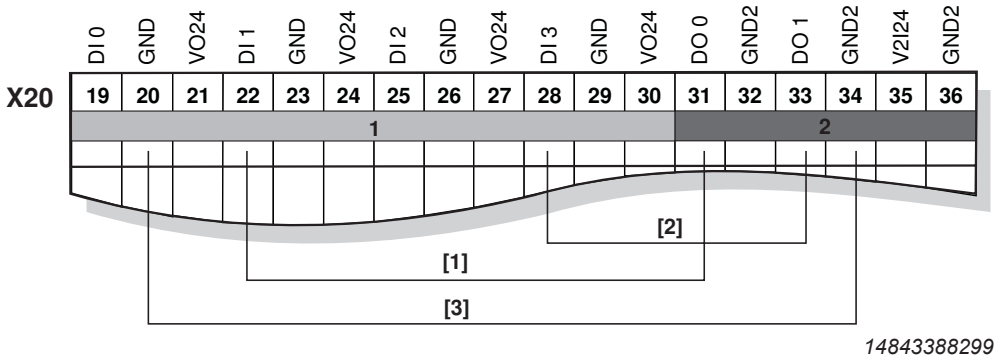


14843391499

[1] The MOVI-SWITCH® drive is controlled via digital input DI00.
[2] The MOVI-SWITCH® drive is controlled via digital input DI01.
[3] DI3 and DO1 can be used when connecting **1** MOVI-SWITCH®.
DI3 and DO1 cannot be used when connecting **2** MOVI-SWITCH® units.

Connection via M12 plug connector (MFE72 fieldbus interface)

The required outputs must be internally jumpered to the sockets used according to the following figure.



14843388299

[1] Digital output DO0 is thus on pin 2 of socket DI0.
[2] Digital output DO1 is thus on pin 2 of socket DI2. The jumper is only required when connecting 2 x MOVI-Switch® to a fieldbus interface.
[3] The jumper is only required when the fieldbus node was installed with 2 separate 24 V voltage circuits.

After the outputs have been jumpered to the input sockets, 2 x MOVI-SWITCH® 1E/1EM can be connected to the M12 sockets DI0 and DI2.

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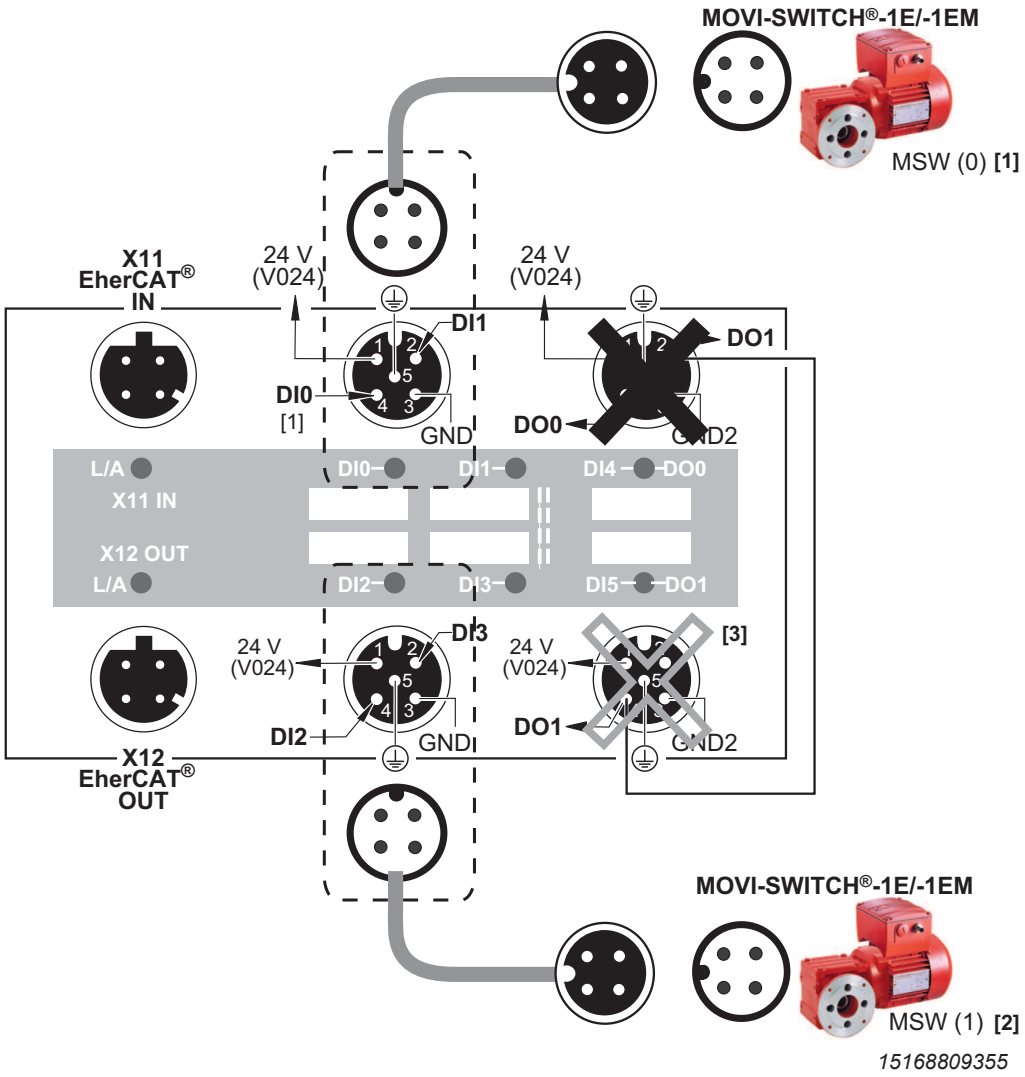
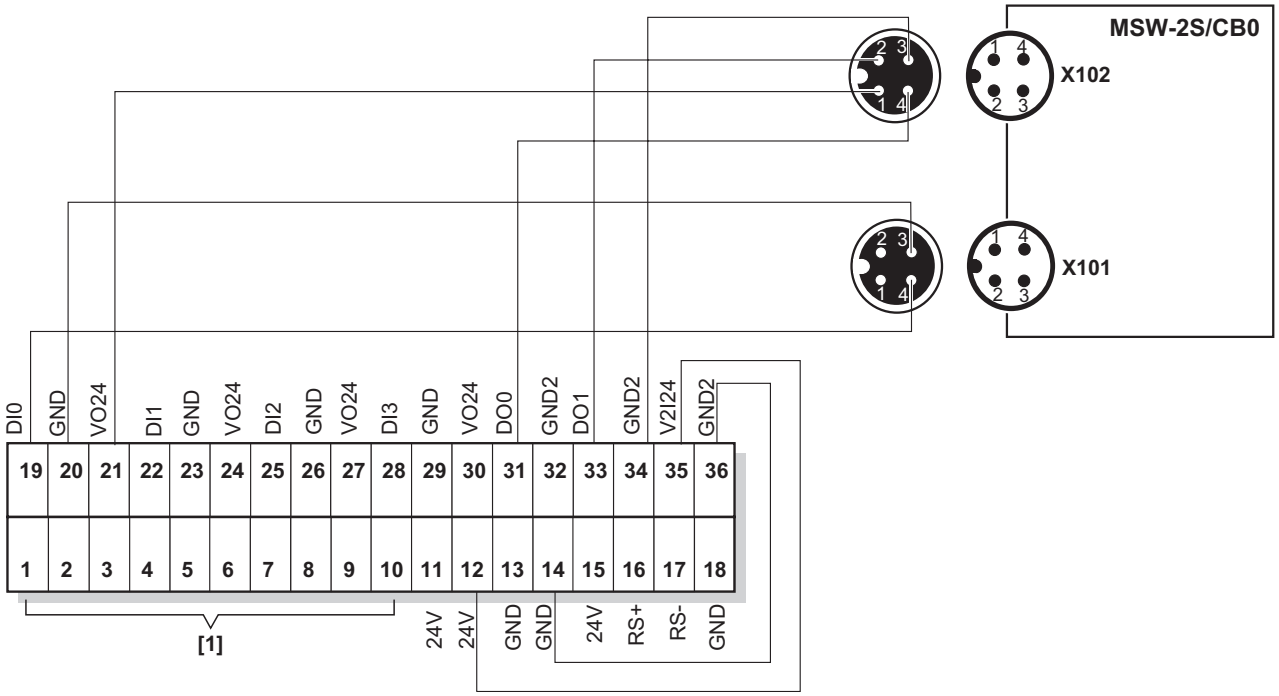
In this case, the input socket DI1 + DI3 and the output socket DO0 + DO1 can no longer be used.



[1] The MOVI-SWITCH® drive is controlled via digital input DI0.
[2] The MOVI-SWITCH® drive is controlled via digital input DI2.
[3] DO1 can be used when connecting **1** MOVI-SWITCH®.
DO1 cannot be used when connecting **2** MOVI-SWITCH® units.

6.7.2 Connection example MOVI-SWITCH®2S/CB0 with MF..

Connection via terminals (MF.2. fieldbus interface)



14850895371

[1] The assignment depends on the fieldbus.

Unassigned inputs when connecting MOVI-SWITCH® 2S

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**19 – 21**	-	-	Assigned by MOVI-SWITCH®
	22	DI1	Input	Control signal of sensor 2
	23	GND	-	0V24 reference potential for sensor 2
	24	V024	Output	24 V voltage supply for sensor 2
	25	DI2	Input	Control signal of sensor 3
	26	GND	-	0V24 reference potential for sensor 3
	27	V024	Output	24 V voltage supply for sensor 3
	28	DI3	Input	Control signal of sensor 4
	29	GND	-	0V24 reference potential for sensor 4
	30	V024	Output	24 V voltage supply for sensor 4
	31 – 36	DI0	Input	Assigned by MOVI-SWITCH®

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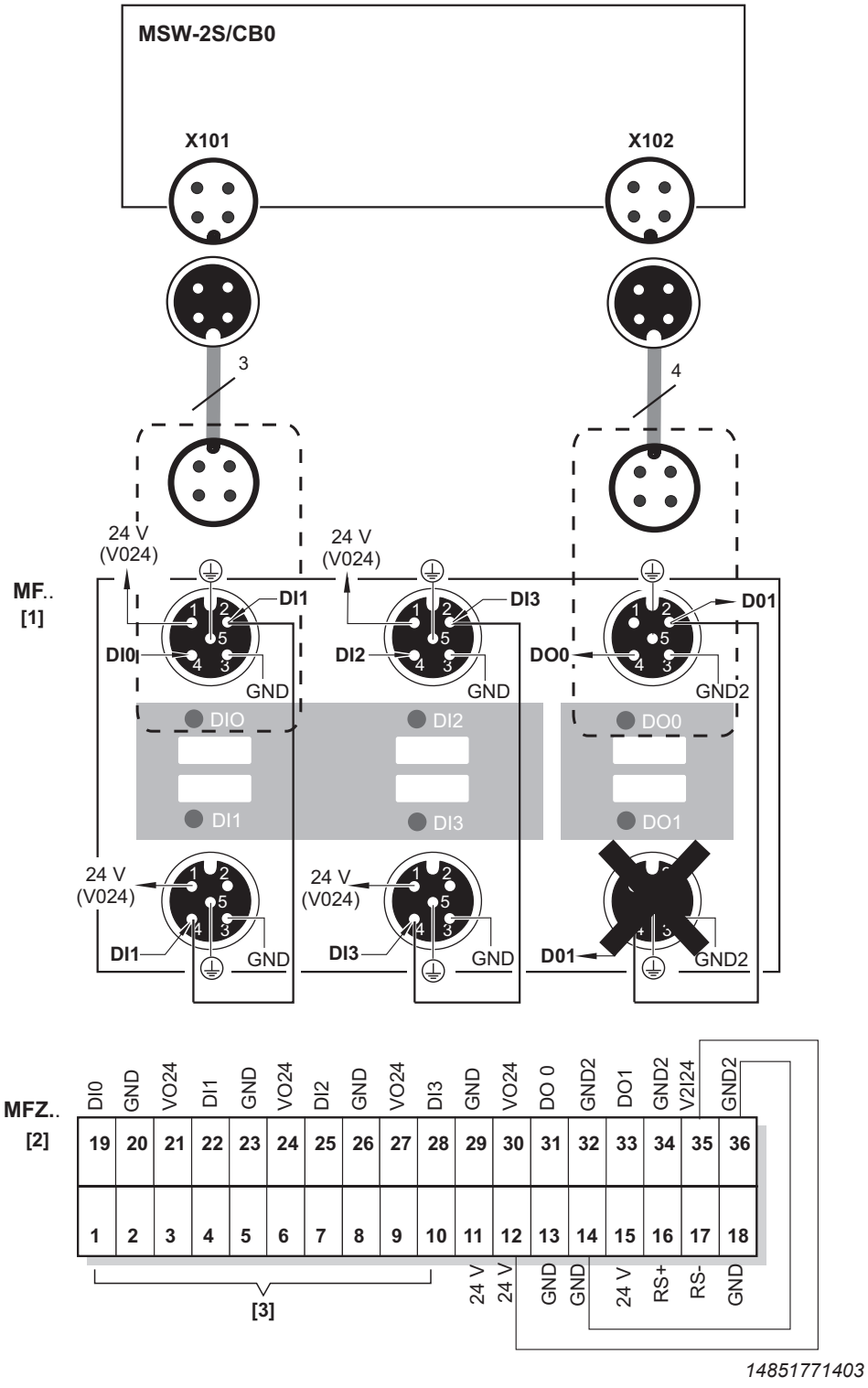
Connection via M12 plug connector (MF.22, MFE52, MFE62 fieldbus interface)

The following diagram illustrates the connection of a MOVI-SWITCH® 2S/CB0 to an MF.22 fieldbus interface via an M12 connector. The output socket DO1 cannot be used.

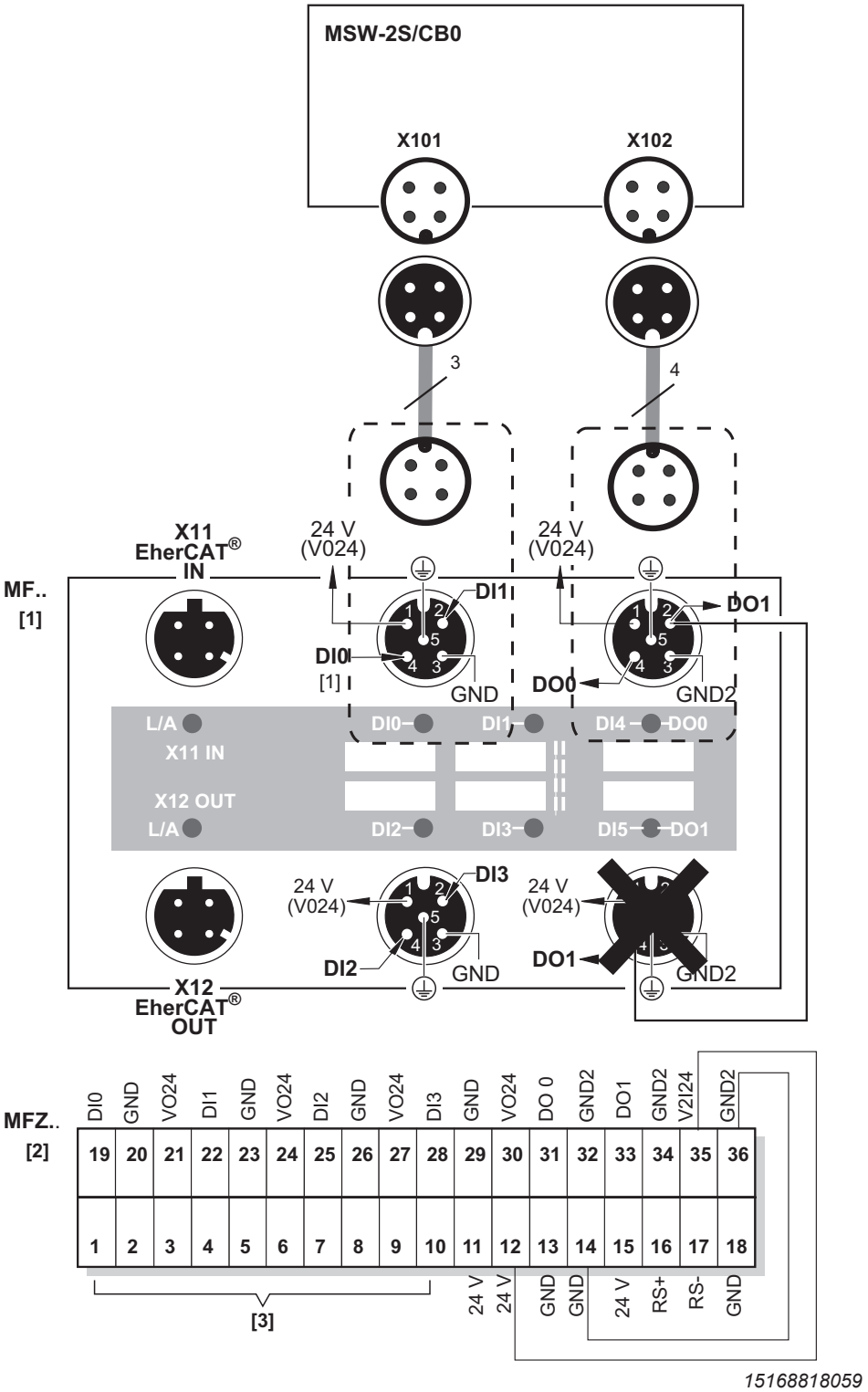


14851771403

[1] Fieldbus interface
[2] Connection module
[3] The assignment depends on the fieldbus.

Connection via M12 plug connector (MFE72 fieldbus interface)

The following diagram illustrates the connection of a MOVI-SWITCH® 2S/CB0 to an MF.72 fieldbus interface via an M12 connector. The output socket DO1 cannot be used.

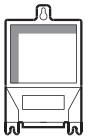
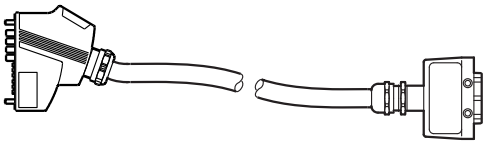
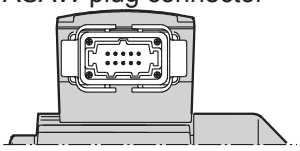
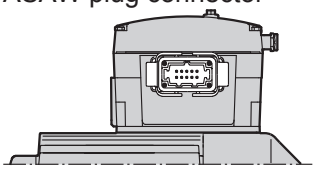
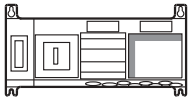
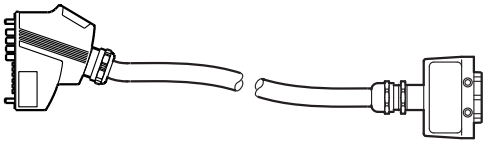
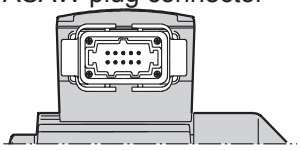
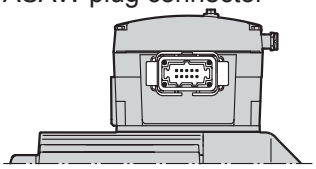


[1] Fieldbus interface
[2] Connection module
[3] The assignment depends on the fieldbus.

6.8 Connection of MFZ.3W, MFZ26W field distributors with MOVI-SWITCH®

6.8.1 Hybrid cable

The field distributor and MOVI-SWITCH® drive are connected using a prefabricated hybrid cable. The following table shows possible combinations:

Field distributor	Hybrid cable	Drive
Z.3W 	Part number: 08183686 	**DR../MSW/ASAW** MOVI-SWITCH® 1E ASAW plug connector 
		DR../MSW/CB0/RE2A/ ASAW MOVI-SWITCH® 2S with ASAW plug connector 
Z.6W.. 	Part number: 08183686 	**DR../MSW/ASAW** MOVI-SWITCH® 1E ASAW plug connector 
		DR../MSW/CB0/RE2A/ ASAW MOVI-SWITCH® 2S with ASAW plug connector 

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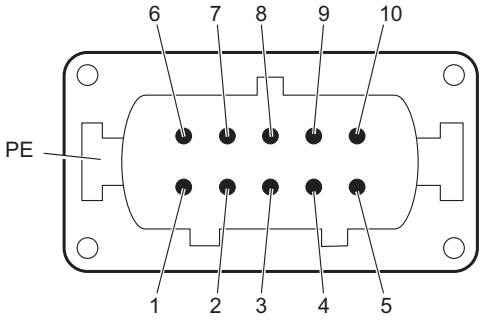
6.8.2 ASAW plug connector

The following table shows information about this connection:

Function				
Field distributor connection (at MOVI-SWITCH® connection box)				
Connection type				
Han® 10 ES male (built-on housing with 2 clips)				
Wiring diagram				
 *14897511819*				
Assignment				
No.	**DR../MSW/ASAW** MOVI-SWITCH® 1E		**DR../MSW/CB0/RE2A/ASAW** MOVI-SWITCH® 2S	
	Name	**Function**	**Name**	**Function**
PE	PE	Line connection PE	PE	Line connection PE
1	U1	Line connection phase L1 (CW rotation) Line connection phase L2 (CCW rotation)	L1	Line connection phase L1
2	V1	Line connection phase L2 (CW rotation) Line connection phase L1 (CCW rotation)	L2	Line connection phase L2
3	W1	Line connection phase L3	L3	Line connection phase L3
4	24 V	DC 24 V voltage supply	24V	DC 24 V voltage supply
5	0V24	0V24 reference potential	0V24	0V24 reference potential
6	RUN	Control signal DC 24 V 0: Stop 1: Start	R	Control signal DC 24 V for CW rotation 0: Stop 1: Start
7	–	Reserved	L	Control signal DC 24 V for CCW rotation 0: Stop 1: Start
8	–	Reserved	–	Reserved
9	DO24V	Plug connector monitoring[1)]	DO24V	Plug connector monitoring[1)]
10	OK	Feedback ready for operation (DC 24 V) 0: Not ready for operation 1: Ready for operation	OK	Feedback ready for operation (DC 24 V) 0: Not ready for operation 1: Ready for operation

1) Plug connector monitoring is only possible with a suitable electrical installation.

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6.8.3 Unassigned inputs/outputs on the field distributor

MF.22/Z.3W, MF.23/Z.3W, MFP22/Z26W, MFE52A, MFE62A

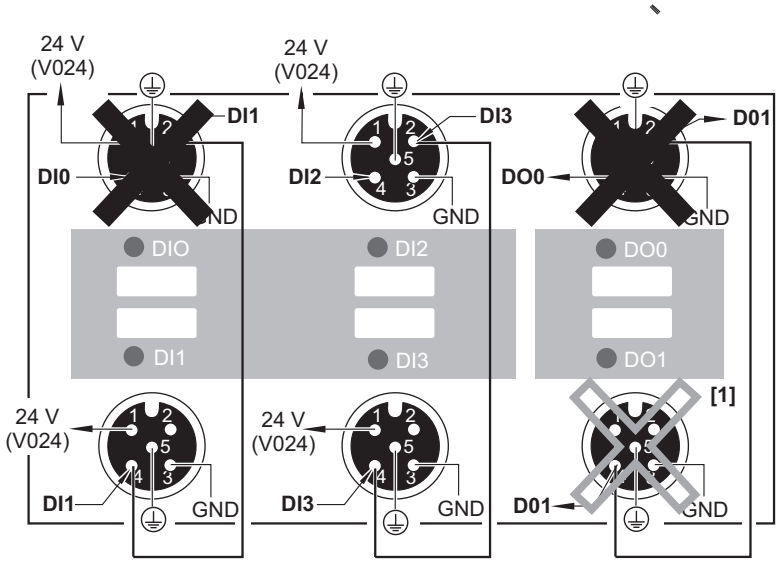
NOTICE

Loss of the ensured degree of protection if the screw plug is not installed or not installed correctly.

Damage to the fieldbus interface.

- Close all unused M12 cable connections with suitable screw plugs.

- Connect sensors/actuators via the M12 sockets.
- When using outputs: Connect 24 V to V2I24.



14907895947

[1] With MOVI-SWITCH® 1E: Output DO1 can be used.
With MOVI-SWITCH® 2S: Output DO1 cannot be used.

MFE72A

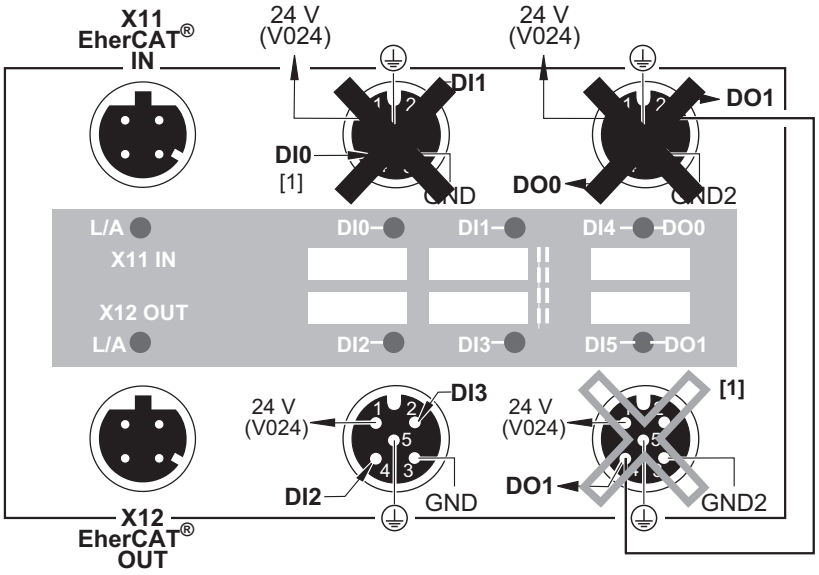
NOTICE

Loss of the ensured degree of protection if the screw plug is not installed or not installed correctly.

Damage to the fieldbus interface.

- Close all unused M12 cable connection with suitable screw plugs.

- Connect sensors/actuators via the M12 sockets.
- When using outputs: Connect 24 V to V2I24.



15169402507

[1] With MOVI-SWITCH® 1E: Output DO1 can be used.
With MOVI-SWITCH® 2S: Output DO1 cannot be used.

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6.9 Wiring check

In order to prevent injury to persons or damage to the plant, check the wiring as described below before you connect the voltage supply for the first time:

- Remove all fieldbus interfaces from the connection module.
- Disconnect all plug connectors of the motor connection (hybrid cable) from the field distributor.
- Check the insulation of the wiring in accordance with applicable national standards.
- Check the grounding.
- Check the insulation between the supply system cable and the DC 24 V cable.
- Check the insulation between supply system cable and communication cable.
- Check the polarity of the DC 24 V cable.
- Check the polarity of the communication line.
- Check the mains phase sequence.
- Ensure equipotential bonding between the fieldbus interfaces.

6.9.1 After the wiring check

- Connect and fasten all motor connections (hybrid cable).
- Plug in and fasten all fieldbus interfaces.
- Install all connection box covers.
- Seal any plug connections not in use.

6.9.2 Connecting the PROFIBUS cable in the field distributor

Make sure the PROFIBUS connection leads are:

- As short as possible in the field distributor
- and of equal length for incoming and outgoing bus.

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7 Startup

7.1 Startup instructions

⚠ WARNING

Risk of crushing due to missing or defective protective covers.

Severe or fatal injuries.

- Install the protective covers of the unit according to the regulations, see the operating instructions of the gear unit.
- Never start the unit if the protective covers are not installed.

⚠ WARNING

Electric shock caused by dangerous voltages in the connection box and field distributor.

Severe or fatal injuries.

- Disconnect the field distributor from the power supply.

⚠ WARNING

Unit malfunction due to incorrect unit setting.

Severe or fatal injuries.

- Observe the startup notes.
- Installation may only be carried out by qualified personnel.
- Only use settings that are suitable for operation.

INFORMATION

- Switch off the DC 24 V voltage supply before removing/installing the fieldbus interface.
- The bus connection of the incoming and outgoing fieldbus is integrated in the connection module, which means the fieldbus can be operated even when the module electronics have been disconnected.

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7.2 Startup with PROFIBUS

7.2.1 Startup procedure

⚠ WARNING

Electric shock caused by voltage in the field distributor.

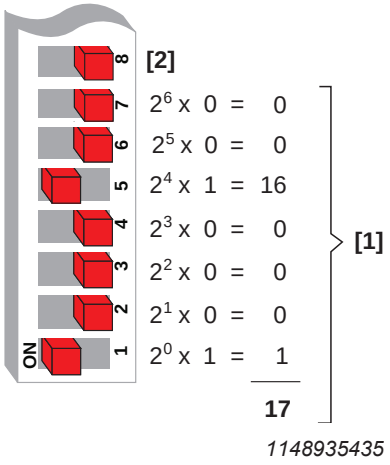
Severe or fatal injuries.

- Disconnect the field distributor from the power supply.

INFORMATION

- Switch off the DC 24 V voltage supply before removing/installing the fieldbus interface.
- The bus connection of the incoming and outgoing fieldbus is integrated in the connection module, which means the fieldbus can be operated even when the module electronics have been disconnected.

1. Check the MOVI-SWITCH® drive and the field distributor for correct connection.
2. Set the PROFIBUS address on the MFP fieldbus interface. Use DIP switches 1 – 7 to set the PROFIBUS address (factory setting: address 4).



1148935435

[1] Example: Address 17

[2] Switch 8 = Reserved

Address 0 through 125:	valid address
Address 126:	is not supported
Address 127:	Broadcast

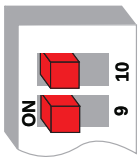
In the following table, address 17 is used to show how to determine the DIP switch settings for any bus address.

Calculation	Rest	DIP switch position	Significance
17/2 = 8	1	DIP 1 = "ON"	1
8/2 = 4	0	DIP 2 = "OFF"	2
4/2 = 2	0	DIP 3 = "OFF"	4
2/2 = 1	0	DIP 4 = "OFF"	8
1/2 = 0	1	DIP 5 = "ON"	16
0/2 = 0	0	DIP 6 = "OFF"	32
0/2 = 0	0	DIP 7 = "OFF"	64

3. Connect the bus terminating resistors of the MFP fieldbus interface to the last bus node.

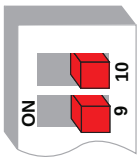
- If the MFP fieldbus interface is located at the end of a PROFIBUS segment, it is only connected to the PROFIBUS network via the incoming PROFIBUS cable (terminals 1/2).
- To prevent malfunctions in the bus system due to reflections, etc., the PROFIBUS segment must be terminated using bus terminating resistors at the first and last stations.
- The bus terminating resistors are already implemented in the MFP fieldbus interface and can be activated using 2 DIP switches (see following figure). Bus termination is implemented for cable type A according to EN 50170 (volume 2).

Bus termination **ON = on**



Bus termination **OFF = off**

(factory setting)



INFORMATION

When using field distributors with mounting flange AF2, not the following information:

- If you use the AF2 mounting flange, you **cannot** use the optional bus termination on the fieldbus interface MFP.
- A pluggable bus termination (M12) must be used in the last station instead of the outgoing bus connection X12.

4. Place the fieldbus interface MFP on the field distributor and tighten with screws.
5. Switch on the DC 24 V supply voltage for the fieldbus interface MFP and the MOVI-SWITCH® control unit. The green "RUN" LED of the MFP fieldbus interface should now light up and the red "SYS-F" LED should go out.
6. Perform the project planning for the fieldbus interface MFP in the DP master.

INFORMATION

For a detailed functional description of the PROFIBUS interfaces, refer to the "PROFIBUS Interfaces and Field Distributors" manual.

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7.2.2 Configuration (project planning) of PROFIBUS master

There are "GSD files" for the DP master configuration. These files are copied into special directories in the project planning software and updated as part of this software. Refer to the relevant configuration software manuals for details on the procedure.

INFORMATION

The latest version of the GSD files is always available on the Internet at the following address: **http://www.sew-eurodrive.de/**

Project planning for the MFP PROFIBUS-DP interface

- Read the notes in the `README.TXT` file.
- Install the GSD file "`SEW_6001.GSD`" (starting with version 1.5) according to the instructions in the project planning software for the DP master. After successful installation, the "MFP + MOVI-SWITCH" unit appears in the list of slave stations.
- Add the fieldbus interface under the name "MFP + MOVI-SWITCH" into the PROFIBUS structure and assign the PROFIBUS address.
- Select the process data configuration required for your application (see chapter "Function of MFP PROFIBUS Interface" in the "PROFIBUS Interfaces, Field Distributors" manual).
- Enter the I/O or periphery addresses for the configured data widths. Save the configuration.
- Expand your application program by the data exchange with the MFP. Process data transfer is not consistent. Do not use SFC14 and SFC15 to transfer process data; they are only required for the parameter channel.
- Once you have saved the project, loaded it in the DP master and started the DP master, the "Bus-F" LED of the MFP should go out. If this is not the case, check the wiring and terminating resistors of the PROFIBUS and the project planning, especially the PROFIBUS address.

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7.3 Startup with PROFINET IO

7.3.1 TCP/IP addressing and subnetworks

Introduction

The settings for the address of the IP protocol are made using the following parameters

- MAC ID
- IP address
- Subnet mask
- Standard gateway

The addressing mechanisms and subdivision of the IP networks into subnetworks are explained in this chapter to help you set the parameters correctly.

MAC ID

The MAC (**M**edia **A**ccess **C**ontroller) ID is the basis for all address settings. The MAC ID is a worldwide unique 6-byte value (48 bits) assigned to the Ethernet device. The MAC ID of SEW Ethernet devices is 00-0F-69-xx-xx-xx. The MAC ID is difficult to handle for larger networks. This is why freely assignable IP addresses are used.

IP address

The IP address is a 32-bit value that uniquely identifies a node in the network. An IP address is represented by 4 decimal numbers separated by decimal points.

Example: 192.168.10.4

Each decimal number stands for one byte (= 8 bits) of the address and can also be represented using binary code (see following table).

Byte 1		Byte 2		Byte 3		Byte 4
11000000	.	10101000	.	00001010	.	00000100

The IP address comprises a network address and a node address (see following table).

Network address	Node address
192.168.10	4

The part of the IP address that denotes the network and the part that identifies the node are determined by the network class and the subnet mask.

Node addresses cannot consist of only zeros or ones (binary) because they represent the network itself or a broadcast address.

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Network classes

The first byte of the IP address determines the network class and as such represents the division into network addresses and node addresses.

Range of values Byte 1	Network class	Complete network address (example)	Explanation
0 – 127	A	10.1.22.3	10 = network address 1.22.3 = node address
128 – 191	B	172.16.52.4	172.16 = network address 52.4 = node address
192 – 223	C	192.168.10.4	192.168.10 = network address 4 = node address

This rough division is not sufficient for a number of networks. They also use an explicit, adjustable subnet mask.

Subnetwork mask

A subnet mask is used to divide the network classes into even finer sections. Like the IP address, the subnet mask is represented by 4 decimal numbers separated by decimal points.

Example: 255.255.255.128

Each decimal number stands for one byte (= 8 bits) of the subnet mask and can also be represented using binary code (→ following table).

Byte 1		Byte 2		Byte 3		Byte 4
11111111	.	11111111	.	11111111	.	10000000

If you compare the IP addresses with the subnet masks, you see that in the binary representation of the subnet mask all ones determine the network address and all the zeros determine the node address (see following table).

		Byte 1		Byte 2		Byte 3		Byte 4
IP address	decimal	192	.	168.	.	10	.	129
	binary	11000000	.	10101000	.	00001010	.	10000001
Subnet mask	decimal	255	.	255	.	255	.	128
	binary	11111111	.	11111111	.	11111111	.	10000000

The class C network with the address 192.168.10. is further subdivided by the subnet mask 255.255.255.128. 2 networks are created with the address 192.168.10.0 and 192.168.10.128.

The following node addresses are permitted in the two networks:

- 192.168.10.1 – 192.168.10.126
- 192.168.10.129 – 192.168.10.254

The network nodes use logic AND operation for the IP address and the subnet mask to determine whether there is a communication partner in the same network or in a different network. If the communication partner is in a different network, the standard gateway is addressed for passing on the data.

Standard gateway

The standard gateway is also addressed via a 32-bit address. The 32-bit address is represented by 4 decimal numbers separated by decimal points.

Example: 192.168.10.1

The standard gateway establishes a connection to other networks. In this way, a network node that wants to address another node can use logic AND operation with the IP address and the subnet mask to decide whether the desired node is located in the same network. If this is not the case, the node addresses the standard gateway (router), which must be part of the actual network. The standard gateway then takes on the job of transmitting the data packages.

7.3.2 Setting the IP address parameters

Initial startup

On delivery, the MFE fieldbus interface has the following IP address parameters:

Standard IP address	Subnet mask
192.168.10.4	255.255.255.0

Changing the IP address parameters after initial startup

INFORMATION

With Ethernet units, the IP address is assigned via the engineering system of the IO controller. In this case, it is not mandatory to set the IP address using MOVITOOLS® MotionStudio.

The IP address parameters can be accesses via the Ethernet fieldbus connection or the service interface.

You can change the IP address parameters via Ethernet by one of the following methods:

- Using the MOVITOOLS® MotionStudio software.
- Using the SEW Address Editor (→ 🗎 80).

If the IP address parameters have been assigned to the fieldbus interface unit via a DHCP server, you can only change the parameters by adjusting the settings of the DHCP server.

The ways of changing the IP address parameters only come into effect once the supply voltage (including DC 24 V) has been switched off and back on again.

You can set the type of IP address assignment via the *DHCP Startup Control* parameter in the parameter tree of the MFE fieldbus interface in MOVITOOLS® MotionStudio.

- "Stored IP parameters" setting

  The stored IP address parameters are used.
- "DHCP" setting

  The IP address parameters are requested by a DHCP server.

SEW Address Editor

You can also use the SEW Address Editor to access the IP settings of the fieldbus interface without the Ethernet settings of the PC and fieldbus interface having to match.

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The IP settings of all SEW units can be defined and displayed in the local subnetwork using the Address Editor in MOVITOOLS® MotionStudio. For more information, refer to chapter "Operation of MOVITOOLS® MotionStudio" in the fieldbus interface manual.

- In this way, you can determine the necessary settings for the PC from an application during operation. This gives you access to the necessary diagnostics and engineering tools via Ethernet.
- When starting up a unit, the IP settings for the MFE fieldbus interface can be assigned without changing the network connections or PC settings. This is **not** possible if parameter *DHCP Startup Control* is set to "DHCP".

For safe assignment of the units displayed in the Address Editor, a label with the MAC ID of the unit is attached to the memory card of the fieldbus interface (for connection via X11 and X12).

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7.3.3 Startup procedure

⚠ WARNING

Electric shock caused by voltage in the field distributor.

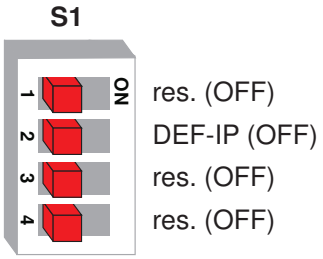
Severe or fatal injuries.

- Disconnect the field distributor from the power supply.

INFORMATION

- Switch off the DC 24 V voltage supply before removing/installing the fieldbus interface.

1. Check the MOVI-SWITCH® drive and the field distributor for correct connection.
2. Make sure that DIP switch S1/2 "DEF-IP" of the MFE fieldbus interface is set to "OFF".



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3. Place the MFE fieldbus interface on the field distributor and tighten with screws.
4. Switch on the DC 24 V supply voltage for the MFE fieldbus interface and the MOVI-SWITCH® control unit.

Startup has been completed successfully when the MFE... fieldbus interface shows the following.

- The green "RUN" LED lights up.
- The red "SYS-F" LED is **not** lit.

Perform the project planning for the MFE fieldbus interface in the controller.

INFORMATION

For a detailed functional description of the fieldbus interfaces, refer to the "PROFINET IO Interfaces and Field Distributors" manual.

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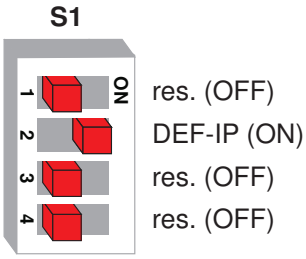
7.3.4 Resetting the IP address to its default value

To reset the IP address to its default value, proceed as follows:

1. Disconnect the 24 V voltage supply.
2. Remove the MFE Ethernet interface from the field distributor.
3. At the MFE Ethernet interface, set DIP switch S1/2 "DEF-IP" to "ON".



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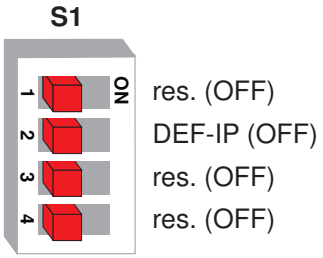
⇨ This sets the address parameters to the following default values:

IP address:	192.168.10.4
Subnet mask:	255.255.255.0
Gateway:	0.0.0.0

4. Re-install the MFE Ethernet interface on the field distributor.
5. Turn on the 24 V voltage supply and wait until the "MS" LED lights up green.
6. Remove the MFE Ethernet interface from the field distributor.
7. At the MFE Ethernet interface, set DIP switch S1/2 "DEF-IP" to "OFF".



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⇨ This resets the IP address to the delivery state.

8. Re-set the IP address if necessary.
9. Switch on the line voltage of the field distributor.

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7.4 Startup with EtherNet/IP™

7.4.1 TCP/IP addressing and subnetworks

Introduction

The settings for the address of the IP protocol are made using the following parameters

- MAC ID
- IP address
- Subnet mask
- Standard gateway

The addressing mechanisms and subdivision of the IP networks into subnetworks are explained in this chapter to help you set the parameters correctly.

MAC ID

The MAC (**M**edia **A**ccess **C**ontroller) ID is the basis for all address settings. The MAC ID is a worldwide unique 6-byte value (48 bits) assigned to the Ethernet device. The MAC ID of SEW Ethernet devices is 00-0F-69-xx-xx-xx. The MAC ID is difficult to handle for larger networks. This is why freely assignable IP addresses are used.

IP address

The IP address is a 32-bit value that uniquely identifies a node in the network. An IP address is represented by 4 decimal numbers separated by decimal points.

Example: 192.168.10.4

Each decimal number stands for one byte (= 8 bits) of the address and can also be represented using binary code (see following table).

Byte 1		Byte 2		Byte 3		Byte 4
11000000	.	10101000	.	00001010	.	00000100

The IP address comprises a network address and a node address (see following table).

Network address	Node address
192.168.10	4

The part of the IP address that denotes the network and the part that identifies the node are determined by the network class and the subnet mask.

Node addresses cannot consist of only zeros or ones (binary) because they represent the network itself or a broadcast address.

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Network classes

The first byte of the IP address determines the network class and as such represents the division into network addresses and node addresses.

Range of values Byte 1	Network class	Complete network address (example)	Explanation
0 – 127	A	10.1.22.3	10 = network address 1.22.3 = node address
128 – 191	B	172.16.52.4	172.16 = network address 52.4 = node address
192 – 223	C	192.168.10.4	192.168.10 = network address 4 = node address

This rough division is not sufficient for a number of networks. They also use an explicit, adjustable subnet mask.

Subnetwork mask

A subnet mask is used to divide the network classes into even finer sections. Like the IP address, the subnet mask is represented by 4 decimal numbers separated by decimal points.

Example: 255.255.255.128

Each decimal number stands for one byte (= 8 bits) of the subnet mask and can also be represented using binary code (→ following table).

Byte 1		Byte 2		Byte 3		Byte 4
11111111	.	11111111	.	11111111	.	10000000

If you compare the IP addresses with the subnet masks, you see that in the binary representation of the subnet mask all ones determine the network address and all the zeros determine the node address (see following table).

		Byte 1		Byte 2		Byte 3		Byte 4
IP address	decimal	192	.	168.	.	10	.	129
	binary	11000000	.	10101000	.	00001010	.	10000001
Subnet mask	decimal	255	.	255	.	255	.	128
	binary	11111111	.	11111111	.	11111111	.	10000000

The class C network with the address 192.168.10. is further subdivided by the subnet mask 255.255.255.128. 2 networks are created with the address 192.168.10.0 and 192.168.10.128.

The following node addresses are permitted in the two networks:

- 192.168.10.1 – 192.168.10.126
- 192.168.10.129 – 192.168.10.254

The network nodes use logic AND operation for the IP address and the subnet mask to determine whether there is a communication partner in the same network or in a different network. If the communication partner is in a different network, the standard gateway is addressed for passing on the data.

Standard gateway

The standard gateway is also addressed via a 32-bit address. The 32-bit address is represented by 4 decimal numbers separated by decimal points.

Example: 192.168.10.1

The standard gateway establishes a connection to other networks. In this way, a network node that wants to address another node can use logic AND operation with the IP address and the subnet mask to decide whether the desired node is located in the same network. If this is not the case, the node addresses the standard gateway (router), which must be part of the actual network. The standard gateway then takes on the job of transmitting the data packages.

7.4.2 Setting the IP address parameters

In the delivery state, parameter *DHCP Startup Control* of the MFE62 fieldbus interface is set to "DHCP". Thus, the MFE62 fieldbus interface has no valid IP address at the beginning of the initial startup.

If the MFE62 fieldbus interface is not connected to the DHCP server, the "MS" LED flashes green in a 1 s cycle.

The IP address of the MFE62 fieldbus interface can be set via the central DHCP server. The DHCP server in included in the Rockwell software delivery.

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7.4.3 Startup procedure

⚠ WARNING

Electric shock caused by voltage in the field distributor.

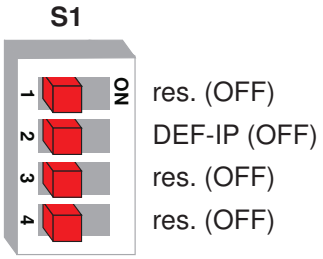
Severe or fatal injuries.

- Disconnect the field distributor from the power supply.

INFORMATION

- Switch off the DC 24 V voltage supply before removing/installing the fieldbus interface.

1. Check the MOVI-SWITCH® drive and the field distributor for correct connection.
2. Make sure that DIP switch S1/2 "DEF-IP" of the MFE fieldbus interface is set to "OFF".



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3. Place the MFE fieldbus interface on the field distributor and tighten with screws.
4. Switch on the DC 24 V supply voltage for the MFE fieldbus interface and the MOVI-SWITCH® control unit.

Startup has been completed successfully when the "MS" LED at the MFE... fieldbus interface lights up green.

Perform the project planning for the MFE fieldbus interface in the controller.

INFORMATION

For a detailed functional description of the fieldbus interfaces, refer to the "EtherNet/IP™ Interfaces, Field Distributors" manual.

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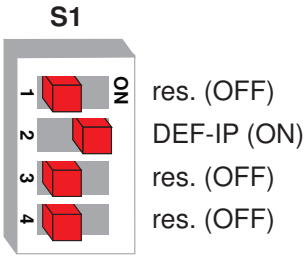
Resetting the IP address to default value

To reset the IP address to its default value, proceed as follows:

1. Disconnect the 24 V voltage supply.
2. Remove the MFE Ethernet interface from the field distributor.
3. At the MFE Ethernet interface, set DIP switch S1/2 "DEF-IP" to "ON".



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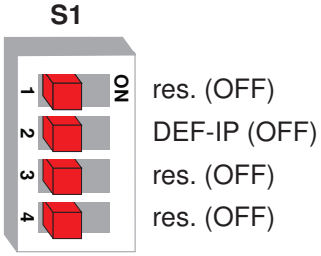
⇨ This sets the address parameters to the following default values:

IP address:	192.168.10.4
Subnet mask:	255.255.255.0
Gateway:	0.0.0.0

4. Re-install the MFE Ethernet interface on the field distributor.
5. Turn on the 24 V voltage supply and wait until the "MS" LED lights up green.
6. Remove the MFE Ethernet interface from the field distributor.
7. At the MFE Ethernet interface, set DIP switch S1/2 "DEF-IP" to "OFF".



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⇨ This resets the IP address to the delivery state.

8. Re-set the IP address if necessary.
9. Switch on the line voltage of the field distributor.

7.5 Startup with EtherCAT®

7.5.1 Startup procedure

⚠ WARNING

Electric shock caused by voltage in the field distributor.

Severe or fatal injuries.

- Disconnect the field distributor from the power supply.

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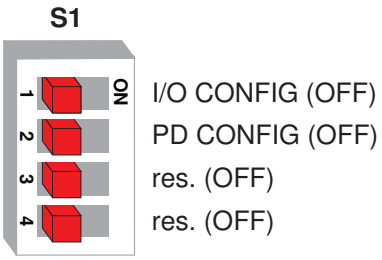
INFORMATION

- Switch off the DC 24 V voltage supply before removing/installing the fieldbus interface.
- The bus connection of the incoming and outgoing fieldbus is integrated in the connection module, which means the fieldbus can be operated even when the module electronics have been disconnected.

1. Check the MOVI-SWITCH® drive and the field distributor for correct connection.
2. Set the S1/1 and S1/2 DIP switches on the MFE fieldbus interface according to your system's requirements.



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DIP switch	Designation	Explanation
S1/1	I/O CONFIG	Configuration of digital inputs and outputs Set the S1/1 DIP switch to **"Off"**.
S1/2	PD CONFIG	Reserved Set the S1/2 DIP switch to **"Off"**.

3. Place the MFE fieldbus interface on the field distributor and tighten with screws.
4. Switch on the DC 24 V supply voltage of the fieldbus interface.

Startup has been completed successfully when the MFE... fieldbus interface shows the following.

- The green "RUN" LED lights up.
- The red "SYS-F" LED is **not** lit.

Perform the project planning for the MFE fieldbus interface in the controller.

INFORMATION

For a detailed functional description of the fieldbus interfaces, refer to the "EtherCAT® Interfaces, Field Distributors" manual.

7.6 Startup with DeviceNet™

7.6.1 Startup procedure

⚠ WARNING

Electric shock caused by voltage in the field distributor.

Severe or fatal injuries.

- Disconnect the field distributor from the power supply.

INFORMATION

- Switch off the DC 24 V voltage supply before removing/installing the fieldbus interface.
- The bus connection of the incoming and outgoing fieldbus is integrated in the connection module, which means the fieldbus can be operated even when the module electronics have been disconnected.

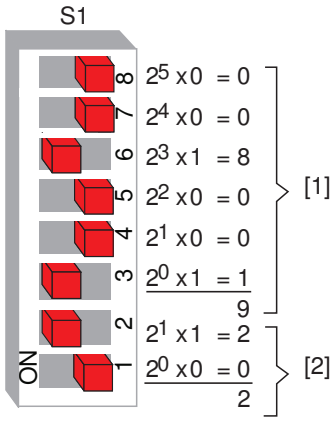
1. Check the MOVI-SWITCH® drive and the field distributor for correct connection.
2. Set the DeviceNet™ address (MAC ID) and the process data configuration at the MFD fieldbus interface.
3. Connect the DeviceNet™ cable.
4. Place the MFP fieldbus interface on the field distributor and tighten with screws.
5. Switch on the DC 24 V supply voltage for the fieldbus interface MFD and the MOVI-SWITCH® control unit. The green "Mod/Net" LED of the MFD fieldbus interface must now light up and the red "SYS-F" LED must go out.
6. Perform the project planning for the MFD fieldbus interface in the DeviceNet™ master.

INFORMATION

For a detailed functional description of DeviceNet™ interfaces, refer to the "DeviceNet™/CANopen Interfaces, Fieldbus Distributors" manual.

7.6.2 Setting DeviceNet™ address (MAC ID) and baud rate

The baud rate is set with DIP switches S1/1 and S1/2. The DeviceNet™ address (MAC ID) is set using DIP switches S1/3 – S1/8. The figure below shows an example of the address and baud rate setting.



[1] Address (MAC-ID) (Set: address 9)

Factory setting: Address 63

Valid addresses: 0 to 63

[2] Baud rate

Factory setting: 500 kBd

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Determining the DIP switch setting for any address

The following table uses address 9 as example to show how to determine the DIP switch settings for any bus address.

Calculation	Rest	DIP switch position	Significance
9/2 = 4	1	DIP S1/3 = ON	1
4/2 = 2	0	DIP S1/4 = OFF	2
2/2 = 1	0	DIP S1/5 = OFF	4
1/2 = 0	1	DIP S1/6 = ON	8
0/2 = 0	0	DIP S1/7 = OFF	16
0/2 = 0	0	DIP S1/8 = OFF	32

Set the baud rate

The following table shows how to set the baud rate using DIP switches S1/1 and S1/2:

Baud rate	Value	DIP S1/1	DIPS1/2
125 kBd	0	OFF	OFF
250 kBd	1	ON	OFF
500 kBd	**2**	**OFF**	**ON**
(reserved)	3	ON	ON

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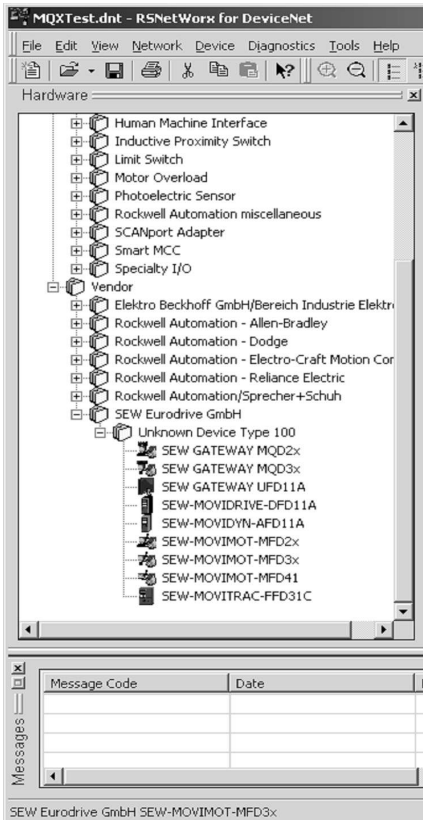
7.6.3 Configuration (project planning) for DeviceNet™ master

You will need the corresponding "EDS files" for configuring the DeviceNet™ master. The most current version of the "EDS files" is available on the internet at http://www.sew-eurodrive.de. The files are installed using the configuration software (RSNetWorx). The exact installation procedure is described in the manuals of the corresponding configuration software.

Configuration (project planning) of the MFD DeviceNet™ interface

1. Install the EDS file using the project planning software (RSNetWorx). The slave station can then be found in the "SEW-Eurodrive Profile" folder under one of the following names:
   - SEW-MOVIMOT-MFD2x
   - SEW-MOVIMOT-MFD3x
   - SEW Gateway MQD2x
   - SEW Gateway MQD3x
2. Create a new project or open an existing project. Import all network components using "Start Online Build".
3. For configuration of the MFD DeviceNet™ interface, double click the MFD symbol. You can then read the parameters of the assembly.
4. To enable contacting the MFD DeviceNet™ interface via the control, the MFD DeviceNet™ interface must be provided with a memory area for exchanging data (e.g. using RSNetWorx). The documentation accompanying your configuration software contains detailed information.
5. Set the process data length and the I/Os using the configuration software.

   For controlling MOVI-SWITCH®, select the process data configuration "0PD + I/O".



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After downloading the configuration in the DeviceNet™ scanner (master), the "Mod/Net" LED of the MFD fieldbus interface lights up green. This means, a connection to the master has been established.

The "PIO" and "BIO" LEDs indicate whether the process data connections are established.

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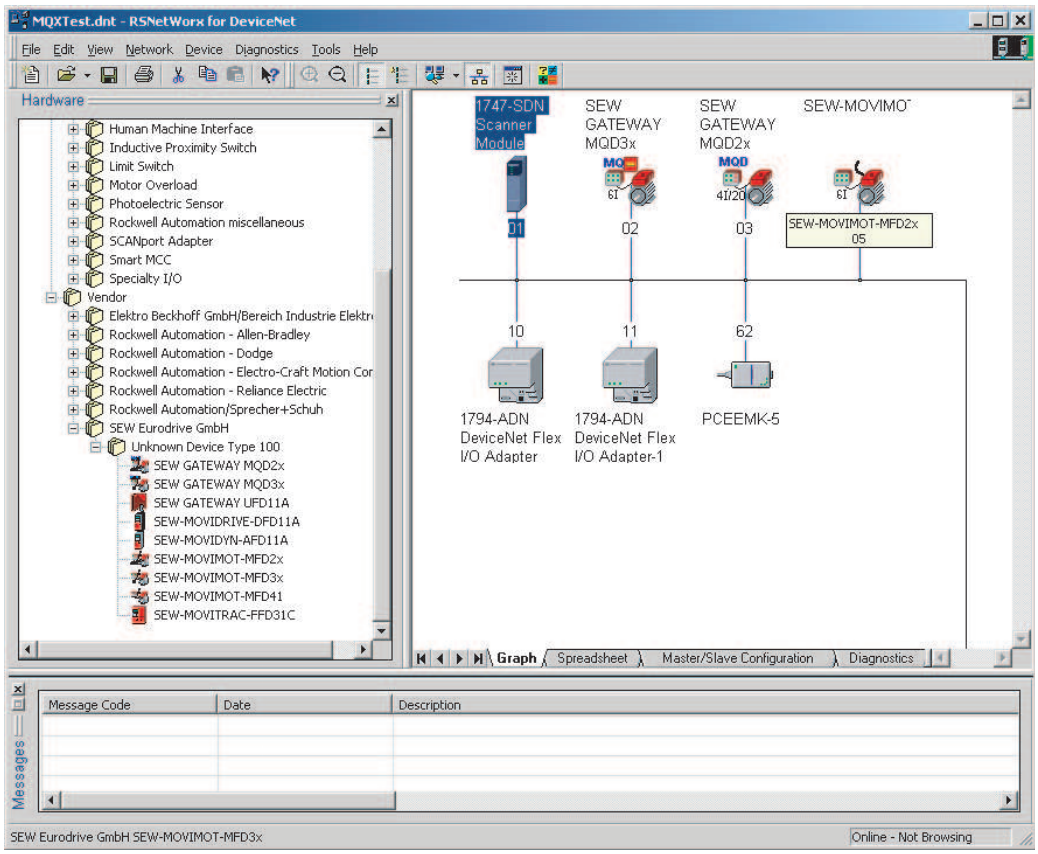
7.6.4 Network startup using RSNetWorx

The following illustration shows the RSNetWorx network manager.



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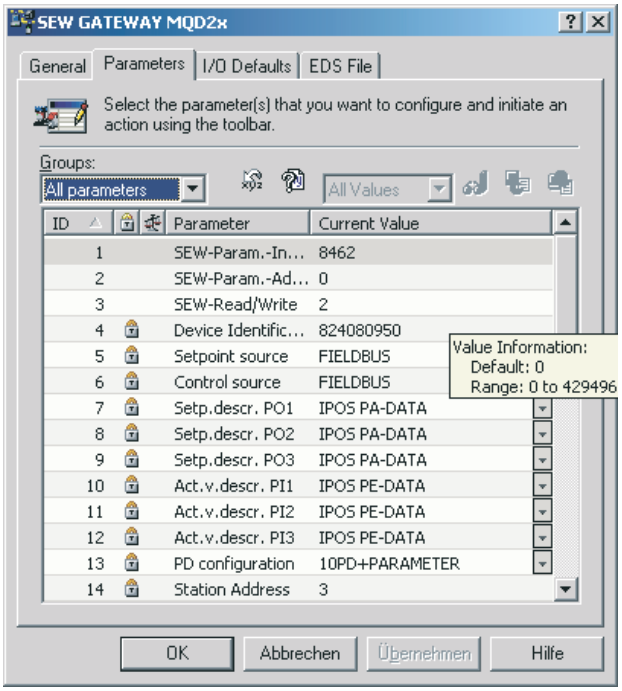
Adjusting parameters using RSNetWorx

The RSNetWorx network manager allows for scanning of connected units. Double-clicking the icon of the connected device (e.g. MQD2x) opens a diagnostics window that allows for monitoring important fieldbus parameters and process data words. The set process data length can be viewed in parameter 13.



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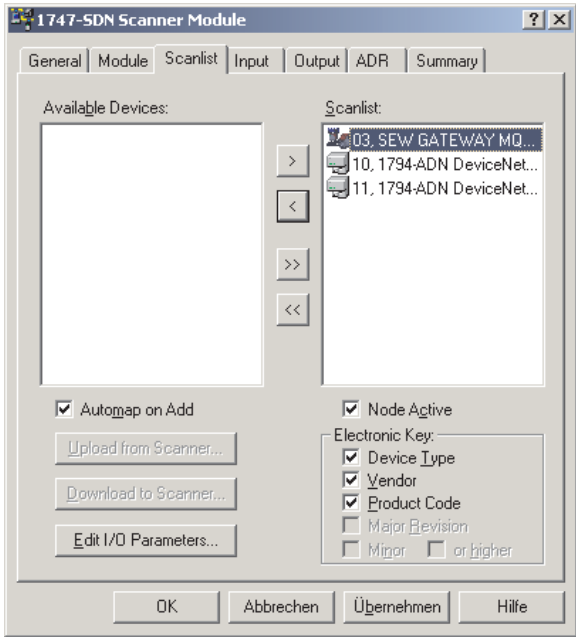
Starting the scanner

Next, the scanner must be started up and the scan list (see illustration below) must be generated.

Double-click on the scanner to open the startup window.



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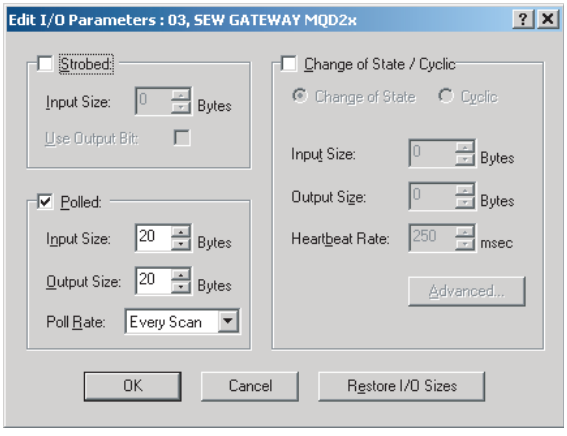
Add the SEW fieldbus interface (e.g. SEW Gateway MQD2x) to the scan list in the Scanlist tab.

Double-click the device in the scan list to set its PD length.

The I/O parameter window opens.

Set the process data length for the "Polled I/O" and "Bit strobe I/O" connection. Note that the PD length of the unit is specified in Bytes. This is why it must be multiplied by 2.

Example: 10 PD requires a setting of 20 bytes.



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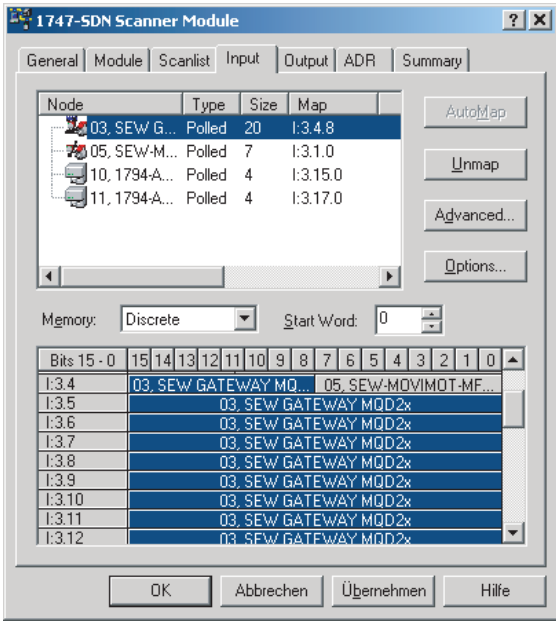
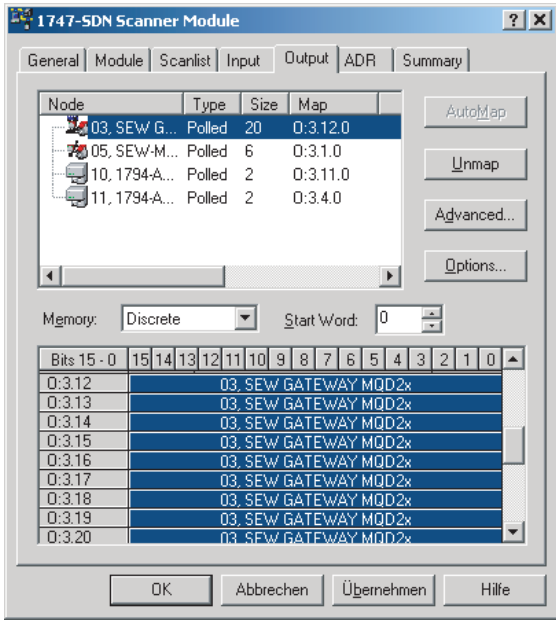
Setting the process data length

In the "Input" and "Output" tabs, the input/output data must be allocated to the PLC memory area. The assignment can be performed using the discrete I/O memory area or the M-files (see the description of the PLC).





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8 Function

8.1 LEDs of the MFP.. PROFIBUS interface

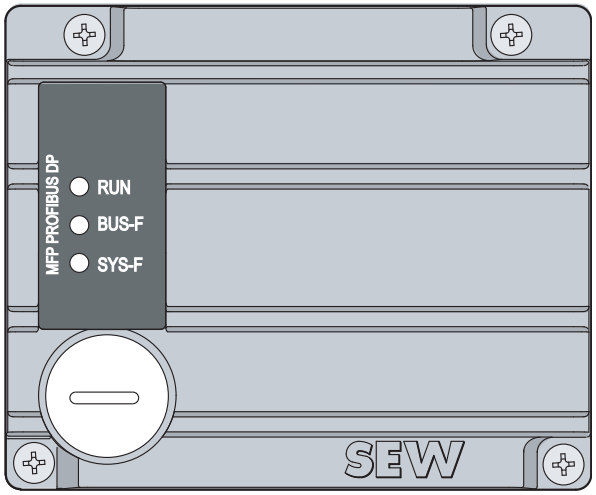
8.1.1 LED display

The PROFIBUS interface MFP has 3 diagnostic LEDs.

- LED "RUN" (green) for displaying the normal operating state.
- LED "BUS-F" (red) for displaying errors at the PROFIBUS DP.
- "SYS-F" LED (red) for displaying system errors.

  The "SYS-F" LED is generally without any function in the DP configurations "0PD + I/DO" and "0PD + DI."

The following figure shows the MFP21D fieldbus interface as an example:



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"RUN" LED (green)

LED RUN	LED BUS-F	LED SYS-F	Meaning	Measure
On	x	x	MFP component hardware is OK.	–
On	Off	Off	Correct MFP operation. MFP is currently exchanging data with the DP master (data exchange).	–
Off	x	x	MFP is not ready for operation. No DC 24 V supply.	• Check the 24 V DC voltage supply. • Switch the MFP interface back on. If this occurs repeatedly, replace the MFP fieldbus interface.
Flashing	x	x	PROFIBUS address is set higher than 125.	• Check the set PROFIBUS address in the MFP fieldbus interface.

x = any status

"BUS-F" LED (red)

The following table shows the statuses of the "BUS-F" LED:

LED RUN	LED BUS-F	LED SYS-F	Meaning	Measure
On	**Off**	x	MFP is currently exchanging data with the DP master (data exchange).	–
On	**Flash-ing**	x	Baud rate is detected, but not addressed by DP master. MFP was not configured in DP master or configured incor-rectly.	• Check the project plan-ning of the DP master.
On	**On**	x	Connection to the DP master has failed. MFP does not detect baud rate. Bus interruption. DP master not in operation.	• Check the PROFIBUS DP connection of the MFP. • Check the DP master. • Check all cables in your PROFIBUS DP network.

x = any status

"SYS-F" LED

The following table shows the states of the "SYS-F" LED:

LED SYS-F	Meaning	Measure
Red Lights up	Normal operating state of the fieldbus interface.	-

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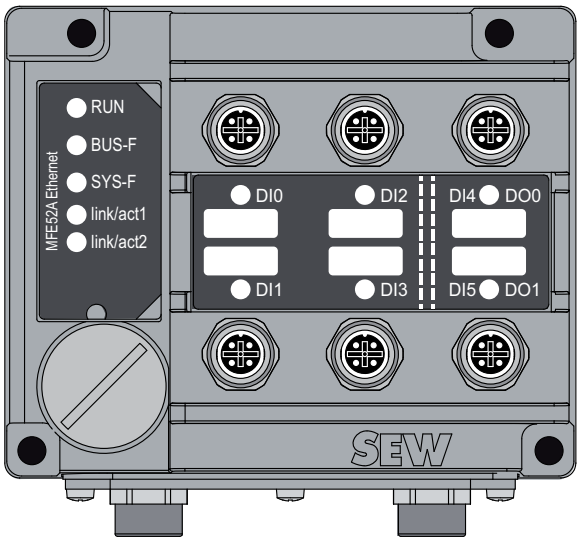
8.2 LEDs of the MFE52A PROFINET IO interface

8.2.1 Meaning of the LED display

The MFE PROFINET IO interface has 5 LEDs for diagnostic purposes.

- The "RUN" LED indicates the operating state of the MFE fieldbus interface.
- The "BUS-F" LED for displaying errors in the PROFINET IO.
- The "Link/act1" LED indicates the activity of the PROFINET port 1 (X11).
- The "Link/act2" LED indicates the activity of the PROFINET port 2 (X12).
- "SYS-F" LED for displaying system errors.



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"RUN" LED

The following table shows the statuses of the "RUN" LED:

LED RUN	LED BUS-F	Meaning	Measure
Green Lights up	X	MFE component hardware is OK.	-
Green Lights up	Off	Proper operation. MFE is currently exchanging data with the PROFINET master (data exchange).	-
Off Lights up	X	MFE is not ready for operation. No 24 V voltage supply.	Check the 24 V DC voltage supply. Switch on the MFE again. Replace MFE if problem occurs several times.
Red Lights up	X	Error in the MFE component hardware.	Switch on the MFE again. Replace MFE if problem occurs several times.

LED RUN	LED BUS-F	Meaning	Measure
Green Flashing	X	MFE component hardware does not start.	Switch on the MFE again. Replace MFE if problem occurs several times.
Yellow Flashing	X		
Yellow Lights up	X		

X Any state

"BUS-F" LED

The following table shows the statuses of the "BUS-F" LED:

LED RUN	LED BUS-F	Meaning	Measure
Green Lights up	**Off**	MFE is currently exchanging data with the PROFINET master (data exchange).	–
Green Lights up	**Green** Flashing	The flashing function in the PROFINET master configuration is activated to visually localize the station.	–
	Green/red Flashing		
Green Lights up	**Red** Lights up	Connection to the PROFINET master has failed. MFE does not detect a link. Bus interruption. PROFINET master not in operation.	• Check the PROFINET connection of the MFE. • Check the PROFINET master. • Check all the cables in the PROFINET network.

"SYS-F" LED

The following table shows the states of the "SYS-F" LED:

LED SYS-F	Meaning	Measure
Red Lights up	Normal operating state of the fieldbus interface.	-

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LEDs "Link/act1" and "Link/act2"

The following table shows the statuses of the "Link/act1" and "Link/act2" LEDs:

LED	Meaning
Green Lights up	PROFINET cable connects device with other Ethernet stations.
Red Flashing	"Localizing" function activated. The LED flashes red when the "Localize" check box was activated in the MOVITOOLS® MotionStudio Address Editor.
Yellow Lights up	Ethernet communication is active.

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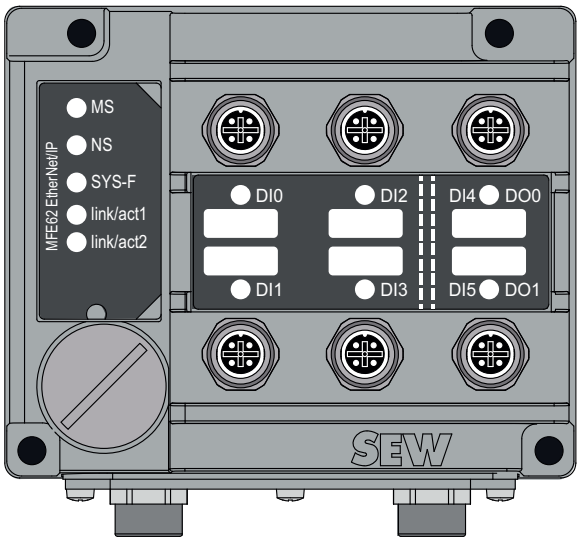
8.3 LEDs of the MFE62A EtherNet/IP™ interface

8.3.1 Meaning of LED display

The MFE EtherNet/IP™ interface has 5 LEDs for diagnostic purposes.

- The "MS" LED indicates the operating state of the MFE fieldbus interface.
- The "NS" LED indicates the operating state of the EtherNet/IP™ network.
- "SYS-F" LED for displaying system errors.
- The "Link/act1" LED indicates the activity of the EtherNet/IP™ port 1 (X11).
- The "Link/act2" LED indicates the activity of the EtherNet/IP™ port 2 (X12).



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LEDs "MS" and "NS"

The following table lists the statuses of the "MS" (Module Status) and "NS" (Network Status) LEDs:

LED		Meaning	Measure
MS Off	**NS** Off	MFE62 not ready for operation. No DC 24 V supply.	• Check DC 24 V supply. • Switch MFE62 on again. • If this occurs repeatedly, replace MFE62.
MS Red/ green Flashing	**NS** Red/ green Flashing	MFE62 is performing an LED test. This status should only be activated briefly during startup.	-
MS Red Flashing	**NS** Red Lights up	Conflict detected while assigning the IP address. Another station in the network uses the same IP address.	• Check whether there is a unit in the network with the same IP address. • Change the IP address of the MFE62. • Check the DHCP settings for assigning an IP address of the DHCP server (only when a DHCP server is used).

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LED		Meaning	Measure
MS Red Lights up	**NS** X	Error in the MFE62 assembly hardware.	• Switch MFE62 on again. • Restore MFE62 to factory settings. • If this occurs repeatedly, replace MFE62.
MS Green Flashing	**NS** Off	MFE62 does not have any IP parameters yet. Starting TCP IP stack. If the status continues and the DHCP DIP switch is activated, MFE62 waits for data from the DCHP server.	• Set DIP switch S11/1 of the DHCP server to "OFF". • Check the DHCP server connection (only if DHCP is activated and the status continues).
MS Green Lights up	**NS** X	MFE62 assembly hardware OK.	-
MS X	**NS** Red Flashing	Timeout delay of the controlling connection has expired. The state is reset by restarting communication.	• Check the bus connection of the MFE62. • Check the master/scanner. • Check all the cables in the Ethernet.
MS X	**NS** Green Flashing	No controlling connection.	-
MS X	**NS** Green Lights up	There is no controlling connection to a master/scanner.	-

X Any state

"SYS-F" LED

The following table shows the states of the "SYS-F" LED:

LED SYS-F	Meaning	Measure
Red Lights up	Normal operating state of the fieldbus interface.	-

LEDs "Link/act1" and "Link/act2"

The following table shows the statuses of the "Link/act1" and "Link/act2" LEDs:

LED	Meaning
Green Lights up	Ethernet cable connects device to other Ethernet stations.
Red Flashing	"Localizing" function activated. The LED flashes red when the "Localize" check box was activated in the MOVITOOLS® MotionStudio Address Editor.
Yellow Lights up	Ethernet communication is active.

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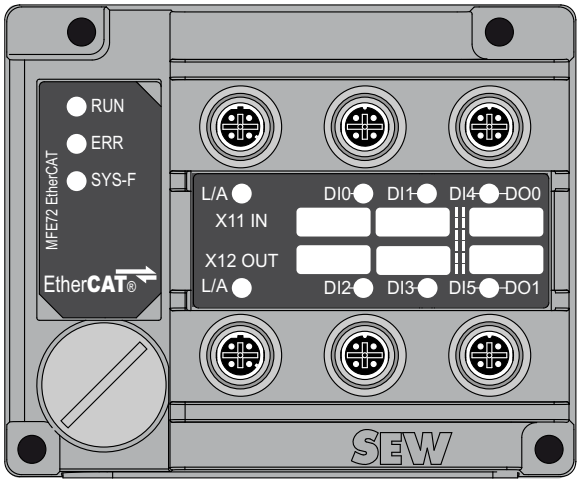
8.4 LEDs of the MFE72A EtherCAT® interface

8.4.1 Meaning of LED display

The MFE EtherCAT® interface has 5 LEDs for diagnostic purposes.

- The "RUN" LED indicates the operating state of the MFE fieldbus interface.
- The "ERR" LED displays errors in EtherCAT®.
- "SYS-F" LED for displaying system errors.
- The "L/A" (link/act) LEDs signal the activity of EtherCAT® ports X11 and X12.



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"RUN" LED

The "RUN" LED signals the operating state of the MFE EtherCAT® interface.

LED	Operating status	Meaning
Off	INIT	The MFE EtherCAT® interface is in the INIT status.
Green Flashing	PRE-OPERATIONAL	Mailbox communication is possible but no process data communication.
Green Lights up 1 time	SAFE-OPERATIONAL	Mailbox and process data communication is possible. The slave outputs are not output yet.
Green Lights up	OPERATIONAL	Mailbox and process data communication is possible.

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"SYS-F" LED

The following table shows the states of the "SYS-F" LED:

LED SYS-F	Meaning	Measure
Red Lights up	Normal operating state of the fieldbus interface.	-

"L/A" LED (Link/Activity)

Each EtherCAT® port for incoming EtherCAT® cables (X11 IN) and outgoing EtherCAT® cables (X12 OUT) has a "L/A" LED (Link/Activity). It indicates whether the EtherCAT® connection to the preceding or following unit is available and active.

The following table shows the statuses of the "L/A" LEDs:

LED	Meaning
Off	No EtherCAT® connection.
Green Lights up	EtherCAT® cable is connected.
Green Flickering	Ethernet communication is active.
Red Flashing	Ethernet communication is inactive.

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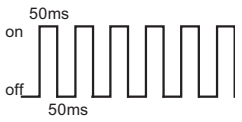
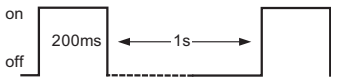
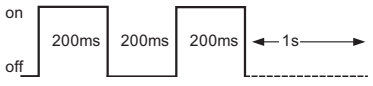
"ERR" LED

The "ERR" LED indicates an EtherCAT® error.

LED	Meaning
Off	EtherCAT® communication from the MFE EtherCAT® interface is in operating state.
Red Flickering	A boot error was detected. The state INIT was achieved, but the "Change" parameter in the AL status register has been set to "0x01:change/error".
Red Flashing	Invalid configuration.
Red Lights up 1 time	The slave application has automatically changed the EtherCAT® state. The "Change" parameter in the AL state register is set to "0x01:change/error".
Red Lights up 2 time	A watchdog timeout has occurred in the application.
Red Lights up	A PDI watchdog timeout occurred.

Definition of the display statuses

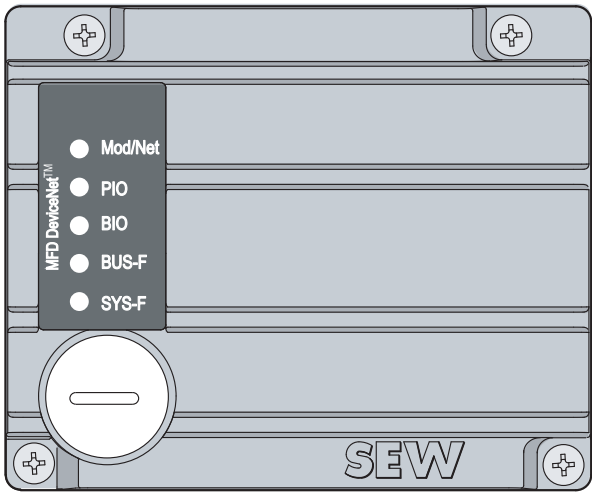
LED display	Definition	Timeline
Illuminated	Display is lighted permanently.	
Off	Display does not light up.	
Flickering	The display switches between on and off with a frequency of 10 Hz.	
Flickering 1 time	The display flickers once very shortly, followed by an off phase.	
Flashing	Display switches on and off at a frequency of 2.5 Hz (200 ms on, 200 ms off).	
Lights up 1 time	The display flashes once shortly (200 ms), followed by a longer off phase (1,000 ms).	
Lights up 2 time	The display lights up twice in rapid succession, followed by an off phase.	

8.5 LEDs of the MFD.. DeviceNet™ interface

8.5.1 Description of the LED display

The MFD DeviceNet™ interface has 5 LEDs for diagnostic purposes:

- Mod/Net LED (green/red) for displaying the module and network status.
- PIO LED (green/red) for displaying the status of the process data channel.
- BIO LED (green/red) for displaying the status of the bit-strobe process data channel.
- BUS-F LED (red) for displaying the bus status.
- SYS-F LED (red) for displaying system errors.



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Power-up test

All LEDs are tested once the unit has been switched on. The LEDs are switched on in the following sequence:

Time	LED Mod/Net	LED PIO	LED BIO	LED BUS-F	LED SYS-F
0 ms	**Green**	Off	Off	Off	Off
250 ms	**Red**	Off	Off	Off	Off
500 ms	Off	**Green**	Off	Off	Off
750 ms	Off	**Red**	Off	Off	Off
1000 ms	Off	Off	**Green**	Off	Off
1250 ms	Off	Off	**Red**	Off	Off
1500 ms	Off	Off	Off	**Red**	Off
1750 ms	Off	Off	Off	Off	**Red**

The unit then checks whether another station with the same address has already been connected (DUP-MAC check). If another station with the same address is found, the unit switches off and the LEDs "Mod/Net", "PIO" and "BIO" are lit permanently in red.

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"Mod/Net" LED (green/red)

The range of functions of the "Mod/Net" LED (module/network status LED) is defined in the DeviceNet™ specification. The following table describes this functionality:

LED	Operating status	Meaning	Measure
Off	Not switched on/ offline	Unit is in offline state. Unit is performing a DUP-MAC check. Unit is switched off.	• Apply supply voltage via the DeviceNet™ connector.
Green Flashing (1 s cycle)	Online and in operational mode	DUP-MAC check performed successfully. A connection has not yet been established with a master. Missing, incorrect or incomplete configuration.	• The station must be included in the master's scan list and communication must be started in the master.
Green	Online, operational mode and connected	Online connection has been established with a master. Connection is active (established state).	-
Red Flashing (1 s cycle)	Minor fault or connection timeout	Polled I/O or/and bit-strobe I/O connections are in timeout state. A correctable fault has occurred in the unit or bus system.	• Check DeviceNet™ cable. • Check timeout response. If a response with error is set, reset the unit once the error has been corrected.
Red	Critical error or critical link failure	An error that cannot be corrected has occurred. BusOff. DUP-MAC check has detected an error.	• Check DeviceNet™ cable. • Check address (MAC ID) (does another unit have the same address?).

"PIO" LED (green/red)

The "PIO" LED checks the polled I/O connection (process data channel). The functionality is described in the following table:

LED	Operating status	Meaning	Measure
Green Flashing (125 ms cycle)	DUP-MAC check	Unit is performing DUP-MAC check.	• If the station does not leave this state after approx. 2 s, no other station has been found. • At least one other DeviceNet™ station must be activated.

LED	Operating status	Meaning	Measure
Off	Not switched on / offline but not DUP-MAC check	Unit is in offline state. Unit is switched off.	• This connection type has not been activated. • The connection must be switched on in the master.
Green Flashing (1 s cycle)	Online and in operational mode	Unit is online. DUP-MAC check performed successfully. A PIO connection is being established with a master (configuring state). Missing, incorrect or incomplete configuration.	• The current station has been detected by the master, but a different device type was expected. • Re-perform the configuration in the master.
Green	Online, operational mode and connected	Online. A PIO connection has been established (established state).	-
Red Flashing (1 s cycle)	Minor fault or connection timeout	A correctable fault has occurred. Polled I/O connection is in timeout state.	• Check DeviceNet™ cable. • Check timeout response (*P831*). If a response with error is set, reset the unit once the error has been corrected.
Red	Critical error or critical link failure	An error that cannot be corrected has occurred. BusOff. DUP-MAC check has detected an error.	• Check DeviceNet™ cable. • Check address (MAC ID) (does another unit have the same address?).

"BIO" LED (green/red)

The "BIO" LED checks the bit-strobe I/O connection. The functionality is described in the following table:

LED	Operating status	Meaning	Measure
Green Flashing (125 ms cycle)	DUP-MAC check	Unit is performing DUP-MAC check.	• If the station does not leave this state after approx. 2 s, no other station has been found. • At least one other DeviceNet™ station must be activated.

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LED	Operating status	Meaning	Measure
Off	Not switched on / offline but no DUP-MAC check	Unit is in offline state. Unit is switched off.	• This connection type has not been activated. • The connection must be switched on in the master.
Green Flashing (1 s cycle)	Online and in operational mode	Unit is online. DUP-MAC check performed successfully. A BIO connection is being established with a master (configuring state). Missing, incorrect or incomplete configuration.	• The current station has been detected by the master, but a different device type was expected. • Re-perform the configuration in the master.
Green	Online, operational mode and connected	Online. A BIO connection has been established (established state).	-
Red Flashing (1 s cycle)	Minor fault or connection timeout	A correctable fault has occurred. Bit-strobe I/O connection is in timeout state.	• Check DeviceNet™ cable. • Check timeout response (*P831*). If a response with error is set, reset the unit once the error has been corrected.
Red	Critical error or critical link failure	An error that cannot be corrected has occurred. BusOff. DUP-MAC check has detected an error.	• Check DeviceNet™ cable. • Check address (MAC ID) (does another unit have the same address?).

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"BUS-F" LED (red)

The "BUS-F" LED indicates the physical state of the bus node. The functionality is described in the following table:

LED	Operating status	Meaning	Measure
Off	Error active state	The number of bus errors is in the normal range.	-
Red Flashing (125 ms cycle)	Error passive state	The unit is performing a DUP-MAC check and cannot send any messages because no other stations are connected to the bus.	• Switch on at least one more station if no other stations are switched on.
Red Flashing (1 s cycle)	Error passive state	The number of physical bus errors is too high. No more error messages are actively written to the bus.	• Check the cabling and the terminating resistors if this error occurs during ongoing communication.
Red	BusOff state	The number of physical bus errors has increased despite switchover to error/ passive state. Access to the bus is switched off.	• Check the wiring, terminating resistors, baud rate and address (MAC ID).

"SYS-F" LED

The following table shows the states of the "SYS-F" LED:

LED SYS-F	Meaning	Measure
Red Lights up	Normal operating state of the fieldbus interface.	-

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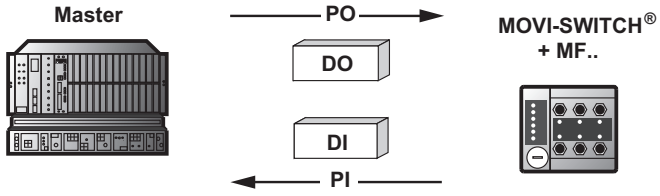
9 Controlling MOVI-SWITCH® via fieldbus

9.1 Principle

MOVI-SWITCH® is controlled via the digital inputs/outputs of the MF.. fieldbus interfaces. The process data configuration "0PD + I/O" must be selected. For more information, refer to chapter "Startup".

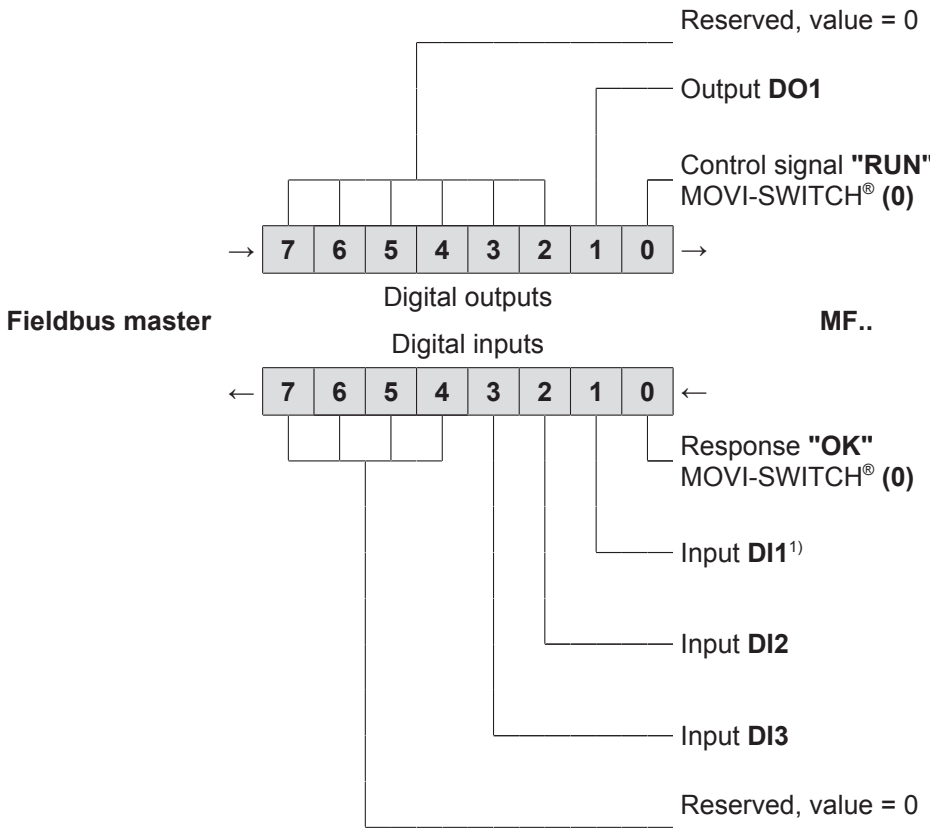


PO	Process output data	PI	Process input data
DO	Digital outputs	DI	Digital inputs

9.2 Controlling via I/O byte or I/O word

The following chapter describes the assignment of the I/O byte or I/O word to control MOVI-SWITCH®. The electrical installation of the unit is performed according to the example connections in the chapter "Electrical installation".

9.2.1 Controlling 1 x MOVI-SWITCH® 1E/1EM (with MF../Z.1., MF../Z.3W, MF../Z.6W)



1) The input DI1 cannot be used when "DO0" is jumpered with "DI1".

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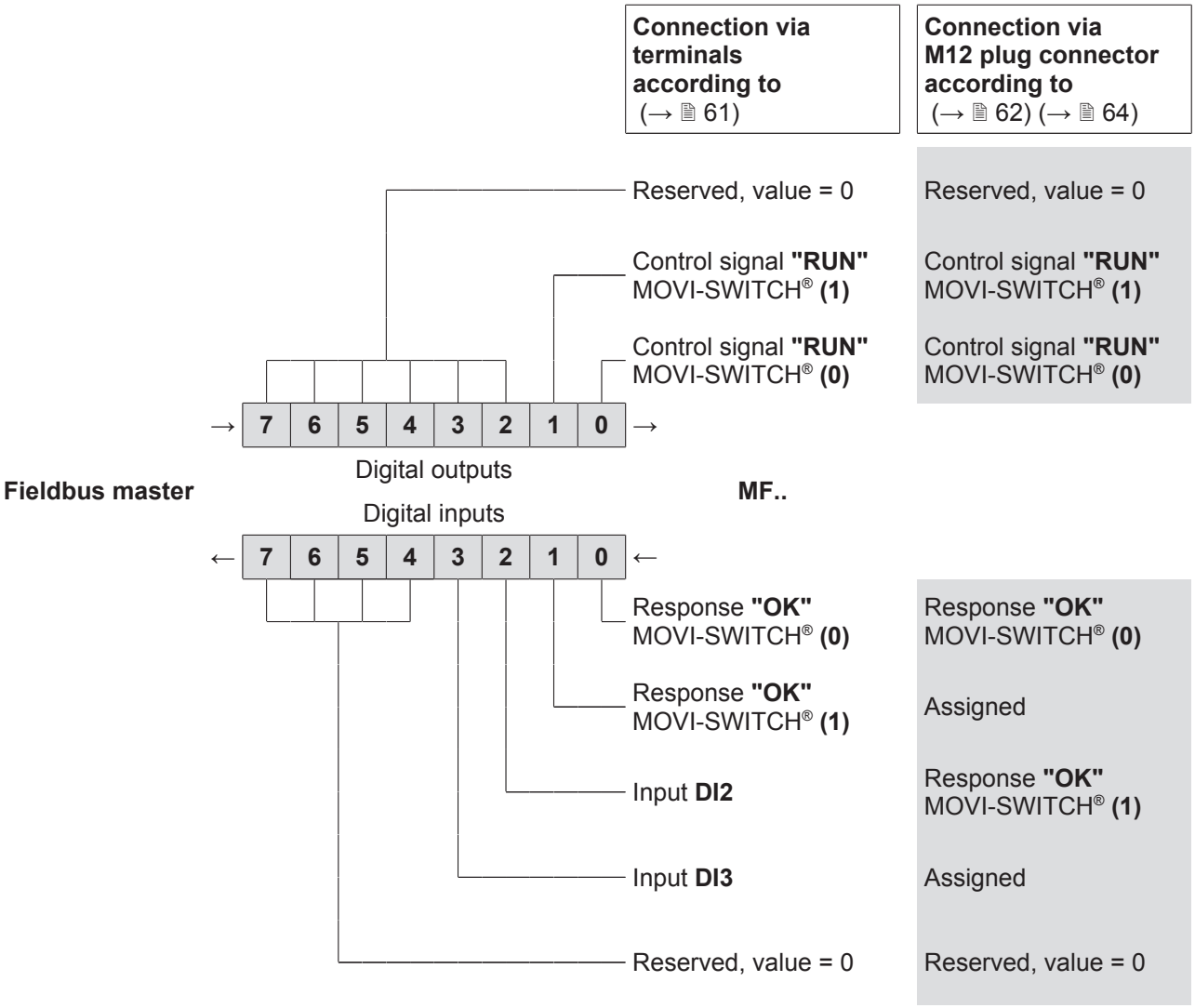
9.2.2 Controlling 2 x MOVI-SWITCH® 1E/1EM (with MF../Z.1)



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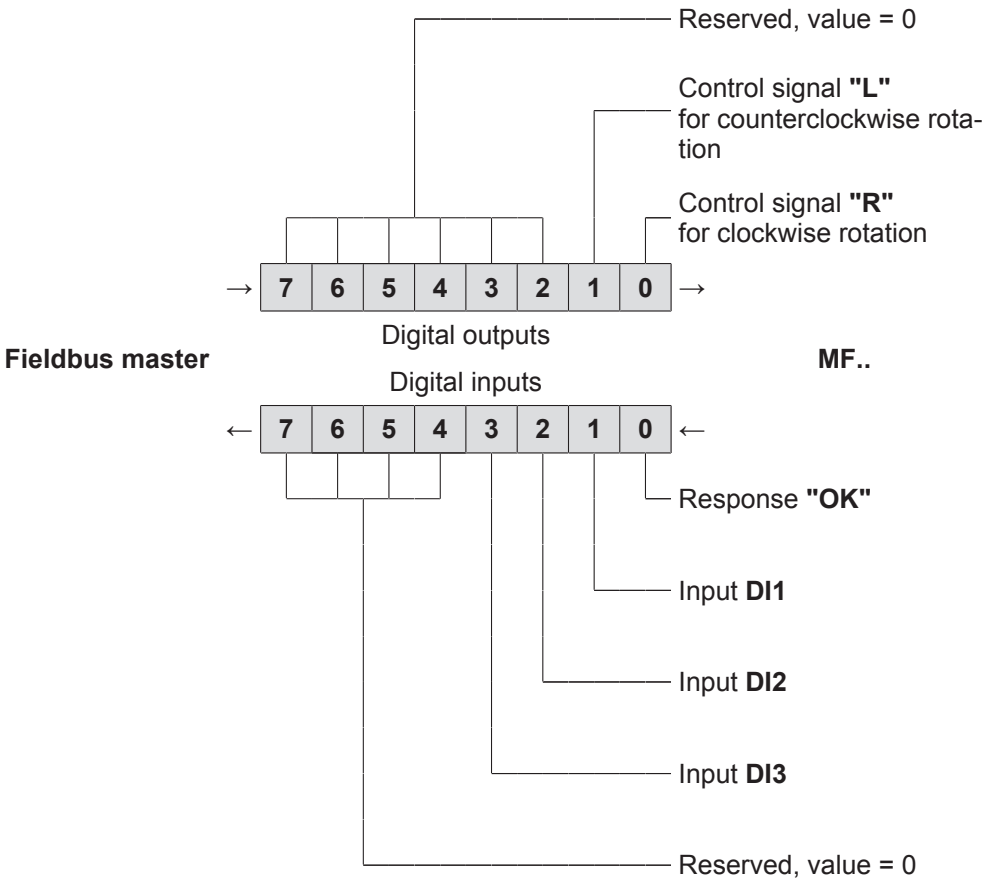
9.2.3 Controlling 1 x MOVI-SWITCH® 2S (with MF../Z.1, MF../Z.3W, MF../Z.6W)



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10 Technical data

10.1 Technical data MFP.. PROFIBUS interface

MFP electrical specification	
Part number	
MFP21D	08236240
MFP22D	08236259
Power supply to MFP control electronics	U = +24 V +/- 25 %, I_E ≤ 150 mA
Electrical insulation	• PROFIBUS-DP connection isolated • Between logic and 24 V supply voltage • Between logic and periphery/drive via optocoupler
Bus connection technology	Two cage clamp terminals each for incoming and outgoing bus cables (optional M12)
Shielding	Via EMC metal cable glands
Digital inputs (sensors)	PLC-compatible according to EN 61131-2 (digital inputs type 1) Ri ≈ 3.0 kΩ, Sampling cycle about 5 ms
Signal level	15 V – +30 V: "1" = contact closed -3 V – +5 V: "0" = contact open
Sensor supply	DC 24 V according to EN 61131-2, Interference-voltage-proof and short-circuit-proof
Rated current	Σ 500 mA
Internal voltage drop	max. 1 V
Digital outputs (actuators)	PLC-compatible to EN 61131-2, interference-voltage-proof and short-circuit-proof
Signal level	"0" = 0 V "1" = 24 V
Rated current	500 mA
Leakage current	max. 0.2 mA
Internal voltage drop	max. 1 V
Length of RS485 cable	30 m between MFP and drive if installed separately
Ambient temperature	-25 °C – 60 °C
Storage temperature	-25 °C – 85 °C
Degree of protection	IP65 (installed on MFZ.. connection module, all plug connections sealed)

PROFIBUS specifications	
PROFIBUS protocol variant	PROFIBUS DP
Supported baud rates	9.6 kBd – 1.5 MBd / 3 – 12 MBd (with automatic detection)
Bus termination	integrated, can be set via DIP switch to EN 50170 (V2)

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PROFIBUS specifications	
Permitted cable length for PROFIBUS	• 9.6 kBd: 1200 m • 19.2 kBd: 1200 m • 93.75 kBd: 1200 m • 187.5 kBd: 1000 m • 500 kBd: 400 m • 1.5 MBd: 200 m • 12 MBd: 100 m To extend the length, several segments can be coupled using repeaters. The maximum expansion/cascading depth can be found in the manuals for the DP master or the repeater modules.
DP ident number	6001_{hex} (24577_{dec})
DP configurations without DI/DO	2 PD, configuration: 113_{dec}, 0_{dec} 3 PD, configuration: 114_{dec}, 0_{dec}
DP configurations with DI/DO	2 PD + DI/DO, configuration: 113_{dec}, 48_{dec} 3 PD + DI/DO, configuration: 114_{dec}, 48_{dec} 0 PD + DI/DO, configuration: 0_{dec}, 48_{dec},
DP configurations with DI	2 PD + DI, configuration: 113_{dec}, 16_{dec} 3 PD + DI, configuration: 114_{dec}, 16_{dec} 0 PD + DI, configuration: 0_{dec}, 16_{dec}, Universal configuration for direct entry of configurations
Set-Prm application data	Max. 10 bytes, Hex parameterization: 00,00,00,00,00,00,00,00,00,00 diagnostic alarm active (default) 00,**01**,00,00,00,00,00,00,00,00 diagnostic alarm not active
Length of diagnostics data	Max. 8 bytes, incl. 2 bytes equipment-specific diagnostics
Address settings	Not supported, adjustable via DIP switch
GSD file name	`SEW_6001.GSD`
Bitmap file name	`SEW6001N.BMP` `SEW6001S.BMP`

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10.2 Technical data MFE52A PROFINET IO interface

MFE52A electrical specifications	
Part number	18241379
MFE electronics supply	U = +24 V +/- 25 %, I_E ≤ 150 mA
Electrical insulation	• PROFINET IO connection isolated • Between logic and 24 V supply voltage • Between logic and periphery/drive via optocoupler
Bus connection technology	2 x M12 plug connector
Digital inputs (sensors)	PLC-compatible according to EN 61131-2 (digital inputs type 1), Ri ≈ 3.0 kΩ Sampling cycle about 5 ms
Signal level	15 V – +30 V: "1" = contact closed -3 V – +5 V: "0" = contact open
Sensor supply	DC 24 V according to EN 61131-2, Interference-voltage-proof and short-circuit-proof
Rated current	Σ 500 mA
Internal voltage drop	max. 1 V
Digital outputs (actuators)	PLC-compatible according to EN 61131-2, interference-voltage-proof and short-circuit-proof
Signal level	"0" = 0 V "1" = 24 V
Rated current	500 mA
Leakage current	max. 0.2 mA
Internal voltage drop	max. 1 V
Length of RS485 cable	30 m between MFE and drive if installed separately
Ambient temperature	-25 °C – 60 °C
Storage temperature	-25 °C – 85 °C
Degree of protection	IP65 (installed on MFZ.. connection module, all plug connections sealed)

PROFINET IO specification	
PROFINET IO protocol variant	PROFINET IO RT
Supported baud rates	100 Mbit/s (full duplex)
SEW ID	$010A_{hex}$
Device ID	6
Connection technology	M12 plug connector
Integrated switch	Supports auto-crossing, auto-negotiation
Permitted cable types	Category 5 and higher, class D according to IEC 11801
Maximum cable length (from switch to switch)	100 m according to IEEE 802.3
GSD file name	`GSDML-V2.1-SEW-MFE-jjjjmmtt.xml`

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PROFINET IO specification	
Bitmap file name	SEW_MFE.bmp
Module name for configuration:	SEW-MFE
Supported data set:	Index 47
Supported slot number:	Recommended: 0
Profile ID:	0
Max. length	240 bytes

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10.3 Technical data of the MFE62A EtherNet/IP™ interface

MFE62A electrical specifications	
Part number	28230280
MFE electronics supply	U = +24 V +/- 25 %, I_E ≤ 150 mA
Electrical insulation	• EtherNet/IP™ connection isolated • Between logic and 24 V supply voltage • Between logic and periphery/drive via optocoupler
Bus connection technology	2 x M12 plug connector
Shielding	Via EMC metal cable glands
Digital inputs (sensors)	PLC-compatible according to EN 61131-2 (digital inputs type 1), Ri ≈ 3.0 kΩ, Sampling cycle about 5 ms
Signal level	15 V – +30 V: "1" = contact closed -3 V – +5 V: "0" = contact open
Sensor supply	DC 24 V according to EN 61131-2, Interference-voltage-proof and short-circuit-proof
Rated current	Σ 500 mA
Internal voltage drop	max. 1 V
Digital outputs (actuators)	PLC-compatible to EN 61131-2, interference-voltage-proof and short-circuit-proof
Signal level	"0" = 0 V "1" = 24 V
Rated current	500 mA
Leakage current	max. 0.2 mA
Internal voltage drop	max. 1 V
Length of RS485 cable	30 m between MFE and drive if installed separately
Ambient temperature	-25 °C – 60 °C
Storage temperature	-25 °C – 85 °C
Degree of protection	IP65 (installed on MFZ.. connection module, all plug connections sealed)

Specifications of EtherNet/IP™	
Supported baud rates	10 and 100 Mbit/s
Connection technology	M12 plug connector
Integrated switch	Supports auto-crossing, auto-negotiation
Permitted cable types	Category 5 and higher, class D according to IEC 11801
Maximum cable length (from switch to switch)	100 m according to IEEE 802.3

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Specifications of EtherNet/IP™	
Addressing	4 byte IP address or MAC-ID (00-0F-69-xx-xx-xx) Can be configured using the DHCP server or MOVITOOLS® MotionStudio Address default value: 192.168.10.4
Vendor ID	$013B_{hex}$
EDS file name	`SEW_GATEWAY_MFE62A.eds`
ICO file name	`SEW_GATEWAY_MFE62A.ico`

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10.4 Technical data for MFE72A EtherCAT® interface

MFE72A electrical specifications	
Part number	28210034
Electronics supply	U = +24 V +/- 25 %, I_E ≤ 150 mA
Electrical insulation	• EtherCAT® connection isolated • Between logic and 24 V supply voltage • Between logic and periphery/drive via optocoupler
Bus connection technology	2 x M12 plug connector
Digital inputs (sensors)	PLC-compatible according to EN 61131-2 (digital inputs type 1), Ri ≈ 3.0 kΩ Sampling cycle about 1 ms
Signal level	15 V – +30 V: "1" = contact closed -3 V – +5 V: "0" = contact open
Permitted cable length	max. 30 m
Sensor supply	DC 24 V according to EN 61131-2, Interference-voltage-proof and short-circuit-proof
Rated current	Σ 500 mA
Internal voltage drop	max. 1 V
Digital outputs (actuators)	PLC-compatible to EN 61131-2, interference-voltage-proof and short-circuit-proof
Signal level	"0" = 0 V "1" = 24 V
Rated current	500 mA
Leakage current	max. 0.2 mA
Internal voltage drop	max. 1 V
Permitted cable length	max. 30 m
Length of RS485 cable	30 m between MFE72A and drive if installed separately
Ambient temperature	-25 °C – 60 °C
Storage temperature	-25 °C – 85 °C
Degree of protection	IP65 (installed on MFZ.. connection module, all plug connections sealed)

Specifications of EtherCAT®	
Standards	IEC 61158, IEC 61784-2
Supported baud rate	100 Mbit/s (full duplex)
Connection technology	2 x M12 plug connector
Bus termination	Not integrated, as bus termination is activated automatically.
OSI layer	Ethernet II
Station address	Setting via EtherCAT® master
XML file name	`SEW_MFE72A.xml`
Vendor ID	0x59 (CANopenVendor ID)

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Specifications of EtherCAT®	
EtherCAT® services	CoE, FoE and EoE(VoE)

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10.5 Technical data of the MFD.. DeviceNet™ interface

MFD electrical specification	
Part number	
MFD21A	08235511
MFD22A	0823552X
MFD electronics supply via DeviceNet™	V = 11 V – 25 V according to DeviceNet™ specification I_E ≤ 100 mA
Input voltage for inverters and sensors (terminal 11/13)	V = +24 V +/- 25 %
Electrical insulation	DeviceNet™ potential and inputs/outputs DeviceNet™ potential and drive
Bus connection technology	Male micro-style connector (M12)
Digital inputs (sensors)	PLC-compatible according to EN 61131-2 (digital inputs type 1), Ri ≈ 3.0 kΩ, Sampling cycle about 5 ms
Signal level	15 V – +30 V: "1" = contact closed -3 V – +5 V: "0" = contact open
Sensor supply	DC 24 V according to EN 61131-2, Interference-voltage-proof and short-circuit-proof
Rated current	Σ 500 mA
Internal voltage drop	max. 1 V
Digital outputs (actuators)	PLC-compatible according to EN 61131-2, interference-voltage-proof and short-circuit-proof
Signal level	"0" = 0 V; "1" = 24 V
Rated current	500 mA
Leakage current	max. 0.2 mA
Internal voltage drop	max. 1 V
Length of RS485 cable	30 m between MFD and drive if installed separately
Ambient temperature	-25 °C – 60 °C
Storage temperature	-25 °C – 85 °C
Degree of protection	IP65 (installed on MFZ.. connection module, all plug connections sealed)

Specification of DeviceNet™	
Protocol variant	Master-slave connection set with polled I/O and bit-strobe I/O
Supported baud rates	500 kBd 250 kBd 125 kBd

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Specification of DeviceNet™	
Cable length DeviceNet™ 500 kBd 250 kBd 125 kBd	See DeviceNet™ specification V 2.0 100 m 200 m 400 m
Bus termination	120 ohm (requires external triggering)
Process data configuration without DI/DO MFD21 / MFD22 / MFD32	2 PD 3 PD
Process data configuration with DI/DO MFD21 / MFD22	2 PD + DI/DO 3 PD + DI/DO 0 PD + DI/DO
Process data configuration with DI MFD32	2 PD + DI 3 PD + DI 0 PD + DI
Address setting	DIP switch
Process data length	DIP switch
I/O enable	DIP switch
EDS file name	`MFD2x.eds` `MFD3x.eds`
Bitmap file name	`MFD2x.bmp` `MFD3x.bmp`
Name of icon file	`MFD2x.ico` `MFD3x.ico`

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10.6 Technical data for field distributors

10.6.1 MF.../Z.3W field distributors

MF../Z.3W	
Ambient temperature	-25 °C – 60 °C
Storage temperature	-25 °C – 85 °C
Degree of protection	IP65 (fieldbus interface and motor connection cable attached and fastened, all plug connections sealed)
Interface	PROFIBUS, PROFINET IO, EtherNet/IP™, EtherCAT®, DeviceNet™
Permitted motor cable length	max. 30 m (with SEW hybrid cable, type B) If the motor cable cross section is smaller than the supply system lead cross section, note the line fusing!
Mass	Approx. 1.3 kg

10.6.2 MF.../Z.6W.. field distributor

MF../Z.6W	
Maintenance switch	Load interrupter switch and line protection Type: ABB MS 325 – 9 + HK20 Switching: black/red, triple lock
Ambient temperature	-25 °C – 55 °C
Storage temperature	-25 °C – 85 °C
Degree of protection	IP65 (fieldbus interface, power supply connection cover and motor connection cable attached and fastened, all plug connections sealed)
Interface	PROFIBUS, PROFINET IO, EtherNet™, EtherCAT®, DeviceNet™
Permitted motor cable length	max. 30 m (with SEW hybrid cable, type B)
Mass	Approx. 3.6 kg

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11 Address list

Algeria			
Sales	Algiers	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 http://www.reducom-dz.com info@reducom-dz.com
Argentina			
Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 http://www.sew-eurodrive.com.ar sewar@sew-eurodrive.com.ar
Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Austria			
Assembly Sales Service	Vienna	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Bangladesh			
Sales	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Tel. +88 01729 097309 salesdhaka@seweurodrivebangladesh.com
Belarus			
Sales	Minsk	Foreign Enterprise Industrial Components RybalkoStr. 26 BY-220033 Minsk	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by
Belgium			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
Brazil			
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Estrada Municipal José Rubim, 205 – Rodovia Santos Dumont Km 49 Indaiatuba – 13347-510 – SP	Tel. +55 19 3835-8000 sew@sew.com.br
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

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Cameroon			
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Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 2757 7000 Fax +56 2 2757 7001 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl
China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 78, 13th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 http://www.sew-eurodrive.cn info@sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Taiyuan	SEW-EURODRIVE (Taiyuan) Co,. Ltd. No.3, HuaZhang Street, TaiYuan Economic & Technical Development Zone ShanXi, 030032	Tel. +86-351-7117520 Fax +86-351-7117522 taiyuan@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk
Colombia			
Assembly Sales Service	Bogota	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co

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Croatia			
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Assembly Sales Service	Hostivice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	+420 800 739 739 (800 SEW SEW)	Service Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Denmark			
Assembly Sales Service	Copenhagen	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 95 8500 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies 33 El Hegaz ST Heliopolis, Cairo	Tel. +20 222566299 Fax +20 2 22594-757 http://www.copam-egypt.com copam@copam-egypt.com
Estonia			
Sales	Tallin	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 http://www.alas-kuul.ee veiko.soots@alas-kuul.ee
Finland			
Assembly Sales Service	Hollola	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Santasalonkatu 6, PL 8 FI-03620 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 http://www.sew-eurodrive.fi sew@sew.fi
France			
Production Sales Service	Hagenau	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Production	Forbach	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
	Brumath	SEW-USOCOME 1 rue de Bruxelles F-67670 Mommenheim	Tel. +33 3 88 37 48 48
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan – B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15

France			
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Étang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Gabon			
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Germany			
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 – D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str. 10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf P.O. Box Postfach 1220 – D-76671 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Werk Östringen Franz-Gurk-Straße 2 D-76684 Östringen	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oestringen@sew-eurodrive.de
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 scc-mechanik@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 scc-elektronik@sew-eurodrive.de
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-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 D-08393 Meerane (Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 dtc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 dtc-west@sew-eurodrive.de
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 D-12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de
	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE Gebäude W130 Raum 101 D-67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 dc-ludwigshafen@sew-eurodrive.de
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 D-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 D-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 D-97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 dc-wuerzburg@sew-eurodrive.de
Drive Service Hotline / 24 Hour Service			+49 800 SEWHELP +49 800 7394357

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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
	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911
Greece			
Sales	Athens	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-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. H-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 IS-104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 http://www.varmaverk.is vov@vov.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200 Fax +91 265 3045300 http://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 35301400 salespune@seweurodriveindia.com
Indonesia			
Sales	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
	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
	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

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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	Solaro	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 79 97 81 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pècheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 21 21 81 05 Fax +225 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 hamamatsu@sew-eurodrive.co.jp
Kazakhstan			
Sales	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	SEW-EURODRIVE LLP Representative office in Mongolia Suite 407, Tushig Centre Seoul street 23, Sukhbaatar district, Ulaanbaatar 14250	Tel. +976-77109997 Fax +976-77109997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn
Kenya			
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Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C LV-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

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Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.irseva.lt irmantas@irseva.lt
Luxembourg			
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be
Macedonia			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Madagascar			
Sales	Antananarivo	Ocean Trade BP21bis. Andraharo Antananarivo 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg
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
Mexiko			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Technical Office	Ulaanbaatar	SEW-EURODRIVE LLP Representative office in Mongolia Suite 407, Tushig Centre Seoul street 23, Sukhbaatar district, Ulaanbaatar 14250	Tel. +976-77109997 Fax +976-77109997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn
Morocco			
Sales Service	Mohammedia	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma
Namibia			
Sales	Swakopmund	DB Mining & Industrial Services 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 NL-3044 AS Rotterdam Postbus 10085 NL-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

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New Zealand			
	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	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos	Tel. +234 1 217 4332 http://www.eisnl.com team.sew@eisnl.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	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 De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sewpy@sew-eurodrive.com.py
Peru			
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			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	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			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 P-3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly Sales Service	St. Petersburg	ЗАО «СЕВ-ЕВРОДРАЙФ» а. я. 36 195220 Санкт-Петербург	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

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Sambia			
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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 SRB-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. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel.+421 2 33595 202, 217, 201 Fax +421 2 33595 200 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 Mobile +421 907 671 976 sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 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
South Korea			
Assembly Sales Service	Ansan	SEW-EURODRIVE KOREA CO., LTD. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-eurodrive.kr master.korea@sew-eurodrive.com

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South Korea			
	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
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 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 PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55 303 Jönköping Box 3100 S-55 003 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 A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 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 central.mailbox@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
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
Turkey			
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRİVE Hareket Sistemleri San. Ve TIC. Ltd. Sti 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

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Ukraine			
Assembly Sales Service	Dnipropetrovsk	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
United Arab Emirates			
Sales Service	Sharjah	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae
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			
Production Assembly Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
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. 3950 Platinum Way Dallas, Texas 75237	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
	Additional addresses for service in USA provided on request!		
Uzbekistan			
Technical Office	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
Venezuela			
Assembly Sales Service	Valencia	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net
Vietnam			
Sales	Ho Chi Minh City	Nam Trung Co., Ltd Huế - South Vietnam / Construction Materials 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 khanh-nguyen@namtrung.com.vn http://www.namtrung.com.vn
	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

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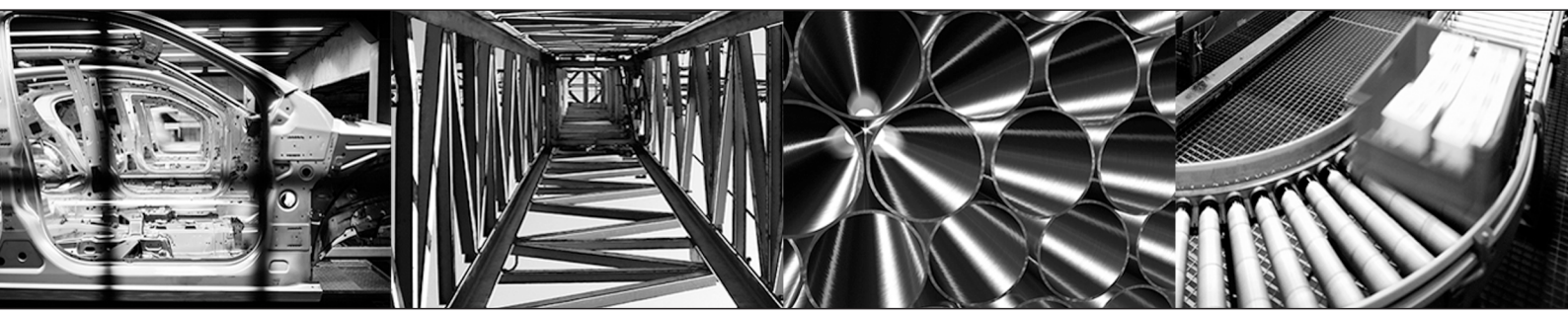

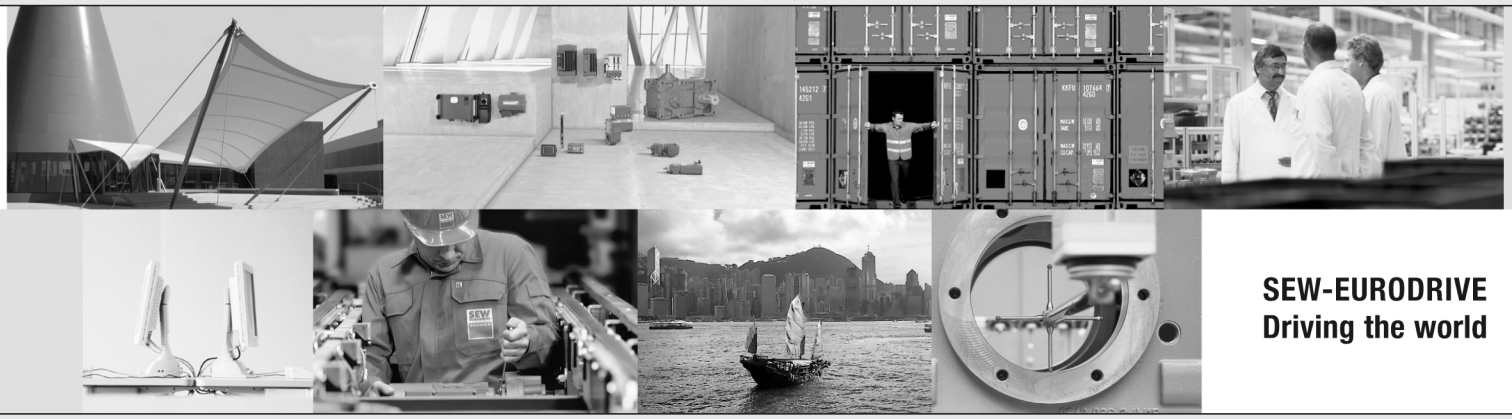

SEW-EURODRIVE
Driving the world

SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023
76642 BRUCHSAL
GERMANY
Phone +49 7251 75-0
Fax +49 7251 75-1970
sew@sew-eurodrive.com
➞ **www.sew-eurodrive.com**