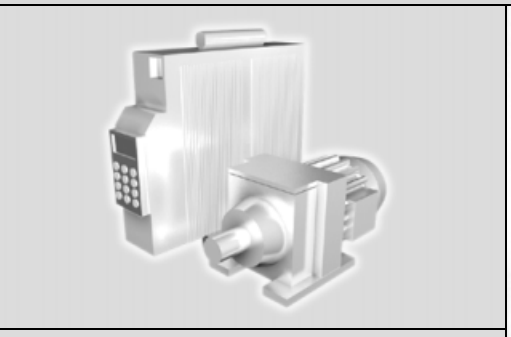
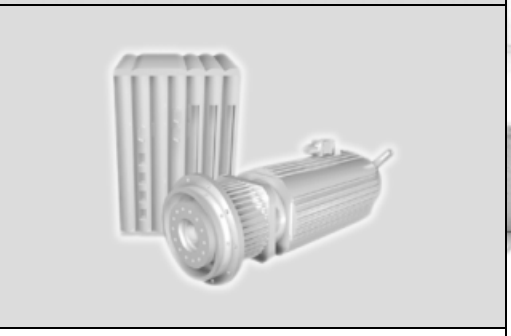
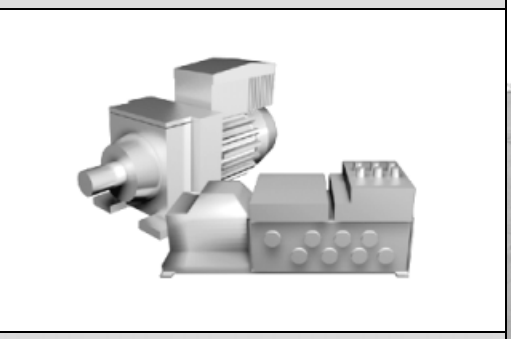
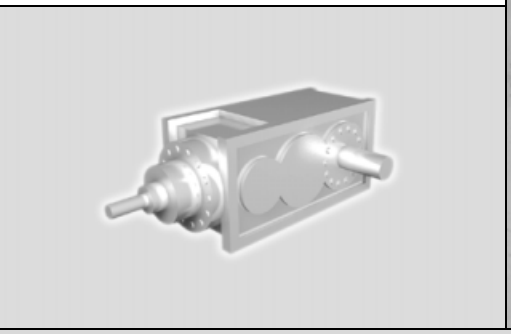
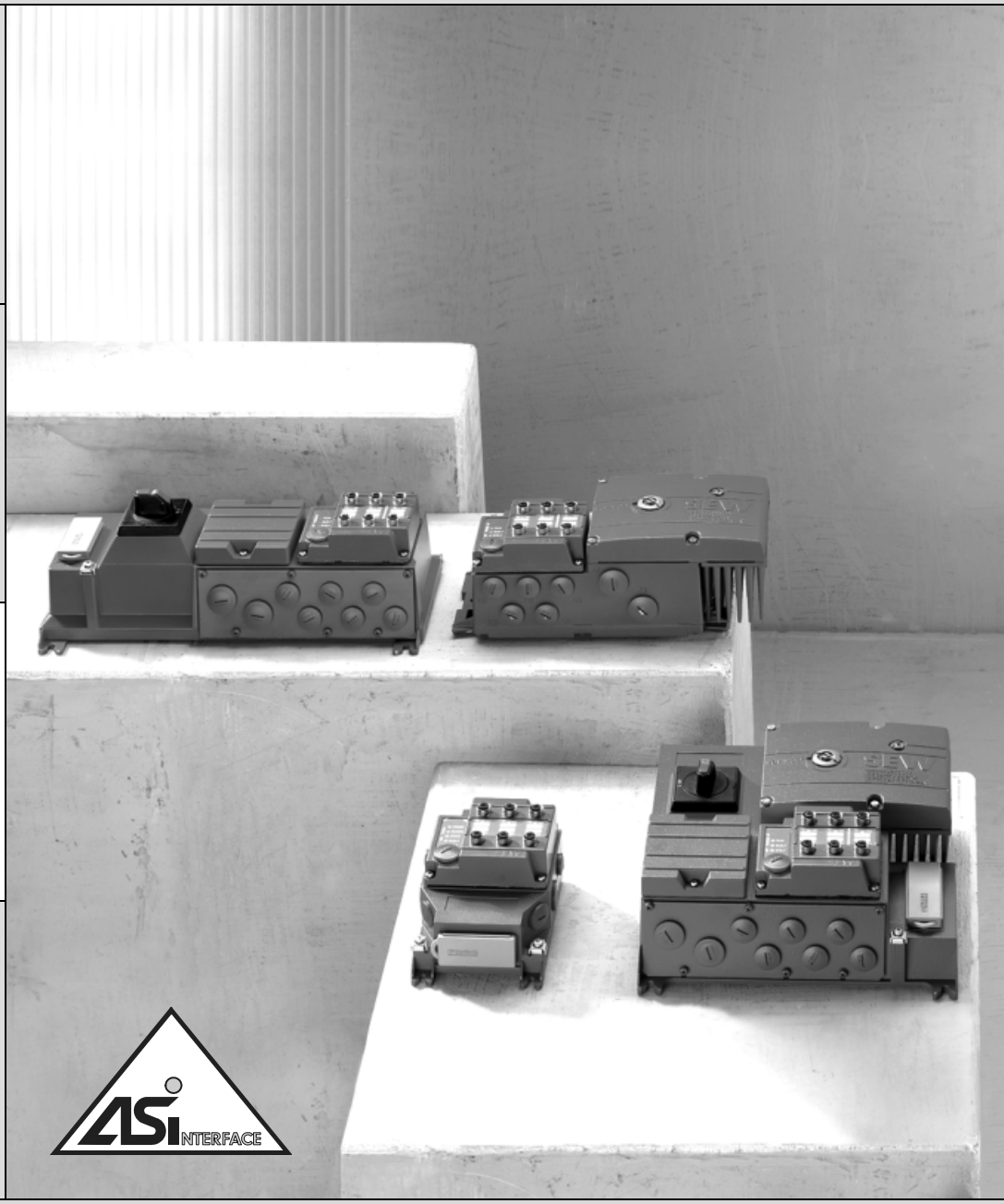
SEW EURODRIVE











Drive System for Decentralized Installation AS-Interface Interfaces, AS-Interface Field Distributors

Edition 07/2006
114002226 / EN

Manual

SEW EURODRIVE

1 Applicable Components

This manual applies to the following products:

Connection module ..Z.1. with fieldbus interface		
	4 x I / 2 x O (terminals) 	**4 x I / 2 x O (M12)** 
AS-interface	MFK 21A/Z61A	MFK 22A/Z61A

Field distributor ..Z.3. with fieldbus interface		
	no I/O 	**4 x I / 2 x O (M12)** 
AS-interface	MFK 21A/Z63A	MFK 22A/Z63A

Field distributor ..Z.6. with fieldbus interface		
	4 x I / 2 x O (terminals) 	**4 x I / 2 x O (M12)** 
AS-interface	MFK 21A/Z66F/AF6	MFK 22A/Z66F/AF6

Field distributor ..Z.7. with fieldbus interface		
	4 x I / 2 x O (terminals) 	**4 x I / 2 x O (M12)** 
AS-interface	MFK21A/MM../Z67F.	MFK22A/MM../Z67F.

Field distributor ..Z.8. with fieldbus interface		
	4 x I / 2 x O (terminals) 	**4 x I / 2 x O (M12)** 
AS-interface	MFK21A/MM../Z68F./AF6	MFK22A/MM../Z68F./AF6

2 Important Notes

Safety and Warning Notes

Always observe the safety and warning information in this documentation.

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the unit and the environment.

Tips and useful information.

Other applicable documentation

- "MOVIMOT® MM..C" operating instructions
- "DR/DV/DT/DTE/DVE AC Motors, CT/CV Asynchronous Servomotors" operating instructions
- "IPOS^{plus}® Positioning and Sequence Control System" manual
- When operating MOVIMOT® units or field distributors in safety applications, observe the supplementary publications "Safe Disconnection for MOVIMOT® – Conditions" and "Safe Disconnection for MOVIMOT® – Applications." **Use only those components in safety applications that were explicitly delivered in this design by SEW-EURODRIVE.**

Designated use

- MOVIMOT® drives are intended for industrial systems. They comply with the applicable standards and regulations and meet the requirements of the Low Voltage Directive 73/23/EEC.
- MOVIMOT® is suitable for hoist applications to a limited degree only.
- Technical data and information on approved conditions on site can be found on the nameplate and in this manual.
- You must comply with this information.
- Do not start up the unit (operate in the designated fashion) until you have established that the machine complies with the EMC Directive 89/336/EEC and that the conformity of the end product has been determined in accordance with the Machinery Directive 98/37/EEC (with reference to EN 60204).

Operating environment

The following uses are prohibited unless the unit has been designed expressly for this purpose:

- Use in explosion-proof areas
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications which are subject to mechanical vibration and shock loads in excess of the requirements in EN 50178
- Use in applications in which the MOVIMOT® inverter undertakes independent safety functions (without higher-level safety systems) to ensure the safety of machines and personnel

Disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastics
- Electronic components

Dispose of all components in accordance with applicable regulations.

3 Safety Notes

3.1 Safety notes for MOVIMOT® drives

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

- Only specialists with the appropriate accident prevention training are allowed to perform installation, startup and service work. These specialists must also comply with the regulations in force (for example, EN 60204, VBG 4, DIN-VDE 0100/0113/0160) when performing this work.

- Preventive measures and protection devices must correspond to the regulations in force (for example, EN 60204 or EN 50178).

  Required preventive measures: Grounding the MOVIMOT® and field distributor.

- The unit meets all requirements for reliable isolation of power and electronics connections in accordance with EN 50178. All connected circuits must also satisfy the requirements for reliable isolation so as to guarantee reliable isolation.

- Before disconnecting, disconnect the MOVIMOT® inverter from the mains. Dangerous voltage may still be present for up to one minute after disconnection from the power supply.

- As soon as supply voltage is present at the MOVIMOT® unit or field distributor, close the terminal box or field distributor and install the MOVIMOT® inverter.

- The fact that the status LED and other display elements are no longer illuminated does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.

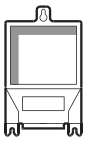
- Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Removing the cause of this problem or performing a reset can result in the motor re-starting on its own. If, for safety reasons, this is not permitted for the driven machine, the MOVIMOT® inverter must be disconnected from the power supply before correcting the problem.

- Danger of burns: The surface temperature of the MOVIMOT® inverter (especially of the heat sink) can exceed 60 °C (140 °F) during operation.

- If MOVIMOT® is used for emergency stops, the supplementary documentation "Safe Disconnection for MOVIMOT®" must be observed. Use only those components in safety applications that were explicitly delivered in this design by SEW-EURODRIVE.

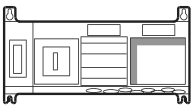
3.2 Supplementary safety notes for field distributors

MFZ.3.



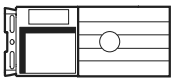
- Disconnect the unit from the power supply system before removing the bus module or the motor connector. Dangerous voltage may still be present for up to one minute after disconnection from the power supply.
- The bus module and the connector of the hybrid cable must be connected to the field distributor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

MFZ.6.



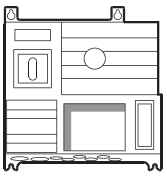
- Before removing the terminal box cover for the power supply connection, disconnect the unit from the power supply system. Dangerous voltage may still be present for up to one minute after disconnection from the power supply.
- Important: The switch only disconnects the MOVIMOT® unit from the power supply. The terminals of the field distributor are still connected to the power supply after activating the maintenance switch.
- During operation, the terminal box cover for the power supply connection and the plug of the hybrid cable must be connected to the field distributor and fastened.

MFZ.7.



- Before removing the MOVIMOT® inverter, disconnect the unit from the power supply system. Dangerous voltage may still be present for up to one minute after disconnection from the power supply.
- The MOVIMOT® inverter and the connector of the hybrid cable must be connected to the field distributor and fastened during operation.

MFZ.8.

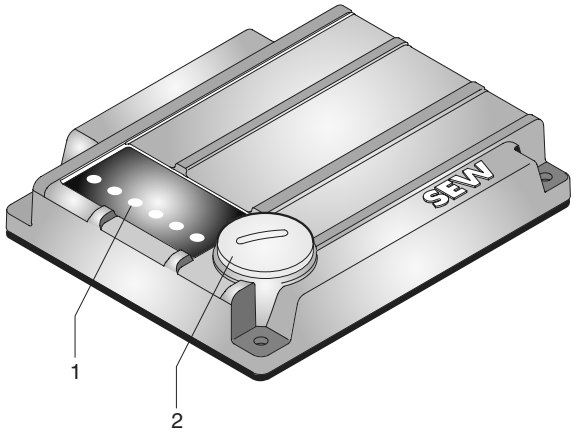


- Disconnect the unit from the power supply system before removing the terminal box cover for the power supply connection or the MOVIMOT® inverter. Dangerous voltage may still be present for up to one minute after disconnection from the power supply.
- Important: The maintenance switch only disconnects the connected motor from the power supply system. The terminals of the field distributor are still connected to the power supply after activating the maintenance switch.
- During operation, the terminal box cover for the power supply connection, the MOVIMOT® inverter, and the plug of the hybrid cable must be connected to the field distributor and fastened.

4 Unit Design

4.1 Fieldbus interfaces

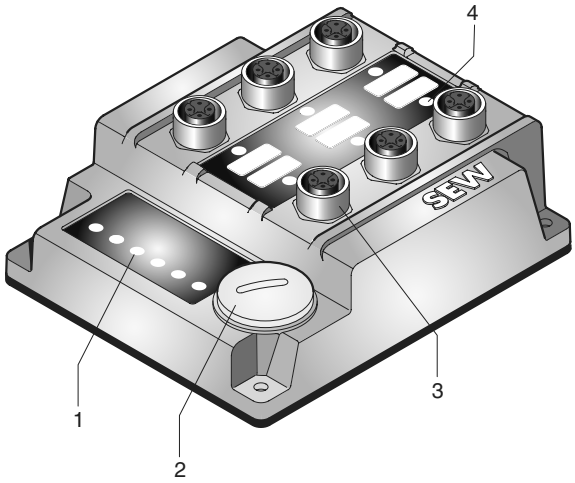
MF.21/MQ.21 fieldbus interfaces



50353AXX

1 Diagnostic LEDs
2 Diagnostics interface (behind the screw plug)

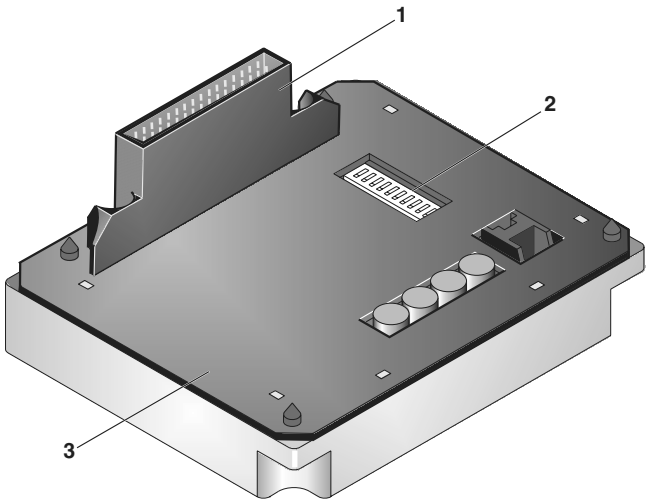
MF.22, MF.32, MQ.22, MQ.32 fieldbus interfaces



50352AXX

1 Diagnostic LEDs
2 Diagnostics interface (behind the screw plug)
3 M12 connection sockets
4 Status LED

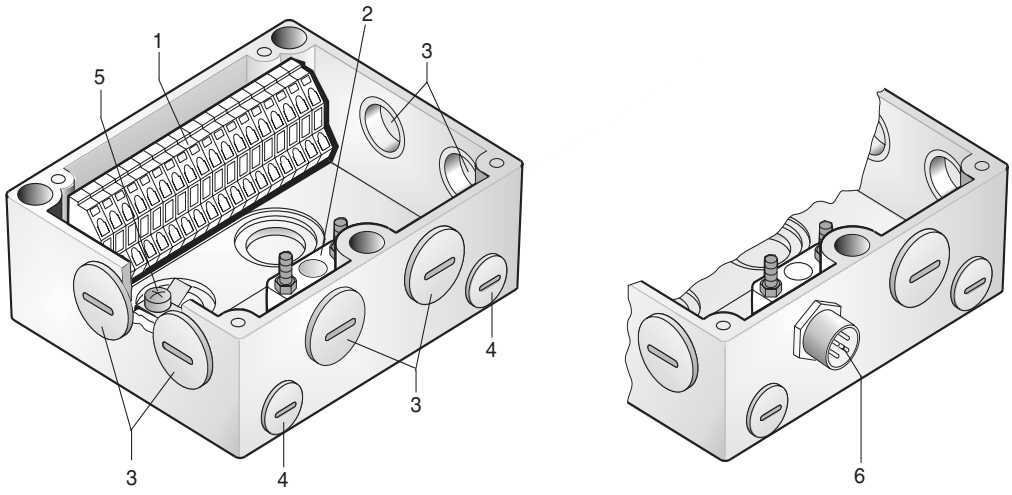
Bottom of module (all MF../MQ.. variants)



01802CDE

1 Connection to connection module
2 DIP switches (dependent on variant)
3 Gasket

Unit design of MFZ… connection module



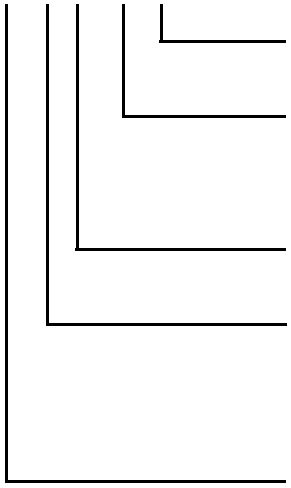
06169AXX

1 Terminal strip (X20)
2 Isolated terminal block for 24 V through-wiring
(Important: Do not use for shielding!)
3 M20 cable gland
4 M12 cable gland
5 Grounding terminal
6 For DeviceNet and CANopen: Micro-style connector/M12 connector (X11)
For AS-interface: AS-interface M12 connector (X11)

The scope of delivery includes two EMC cable glands.

4.2 Unit designation of AS-interface interfaces

MFK 21 A / Z61 A



Variant

Connection module:
Z11 = for InterBus
Z21 = for PROFIBUS
Z31 = for DeviceNet and CANopen
Z61 = for AS-interface

Variant

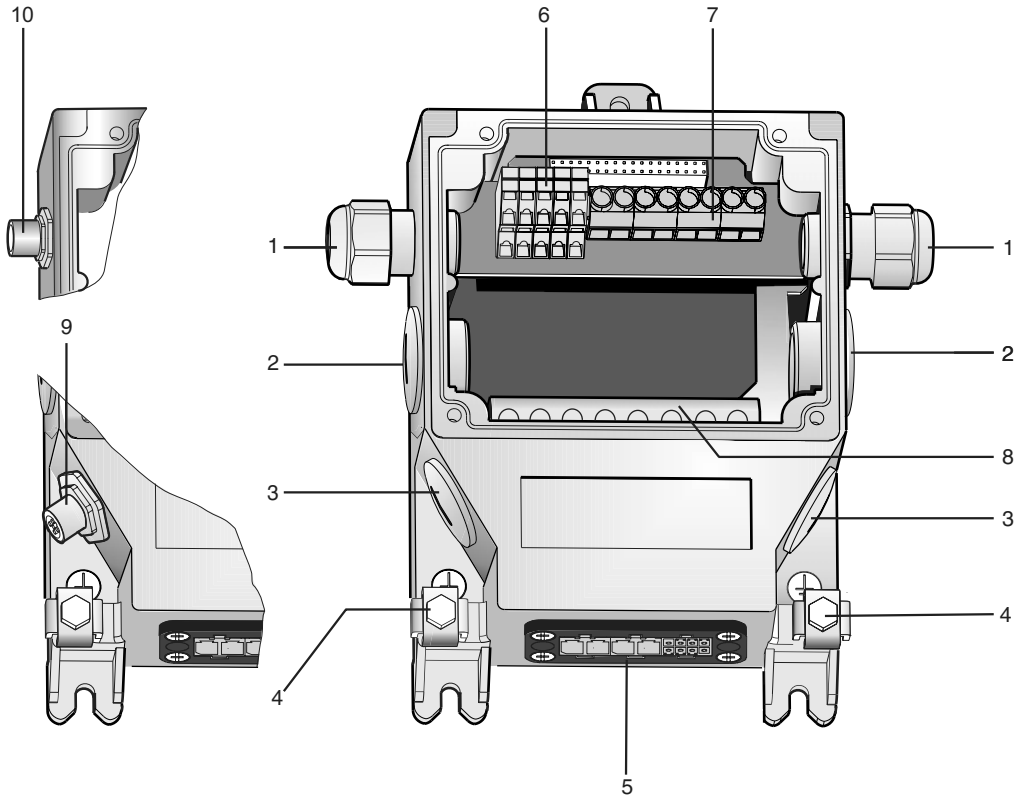
21 = 4 x I / 2 x O (connection via terminals)
22 = 4 x I / 2 x O (connection via plug connector + terminals)
32 = 6 x I (connection via plug connector + terminals)

23 = 4 x I / 2 x O (FO rugged line, only for InterBus)
33 = 6 x I (FO rugged line, only for InterBus)

MFI.. = InterBus
MQI.. = InterBus with integrated minicontroller
MFP.. = PROFIBUS
MQP.. = PROFIBUS with integrated minicontroller
MFD.. = DeviceNet
MQD.. = DeviceNet with integrated minicontroller
MFO.. = CANopen
MFK.. = AS-interface

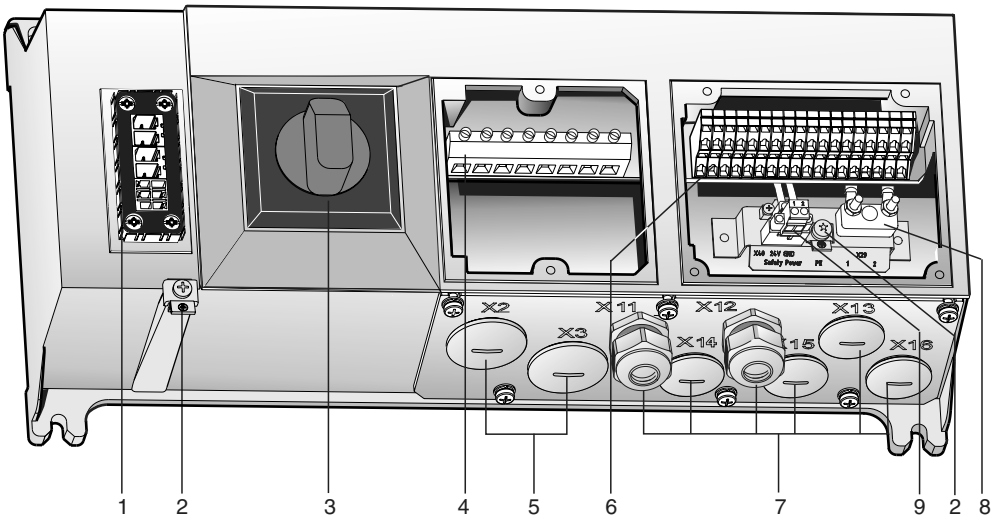
4.3 Field distributor

MF.../Z.3., MQ.../Z.3. field distributors



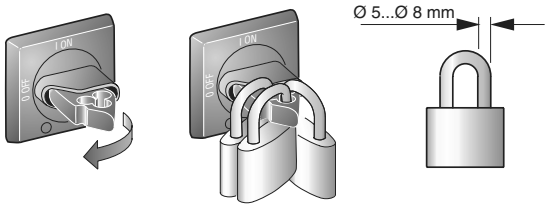
1 2 x M16 x 1.5 (scope of delivery includes two EMC cable glands)
2 2 x M25 x 1.5
3 2 x M20 x 1.5
4 Equipotential bonding connection
5 Hybrid cable connection to MOVIMOT® (X9)
6 Terminals for fieldbus connection (X20)
7 Terminals for 24 V connection (X21)
8 Terminals for power supply and PE connection (X1)
9 For DeviceNet and CANopen: Micro-style connector/M12 connector (X11)
10 For AS-interface: AS-interface M12 connector (X11)

MF.../Z.6., MQ.../Z.6. field distributors



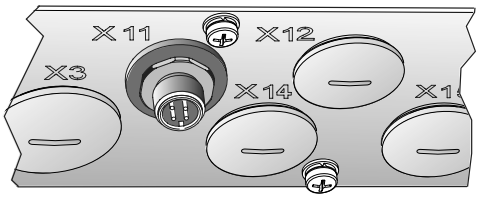
05903AXX

1 Hybrid cable connection to MOVIMOT® (X9)
2 Equipotential bonding connection
3 Maintenance switch **with line protection** (triple lock, color: black/red)
Only for MFZ26J: Optional integrated feedback for position of the maintenance switch.
The feedback is evaluated at digital input DI0 (see the section "Connection of inputs and outputs (I/O) of fieldbus interfaces MF../MQ..")



03546AXX

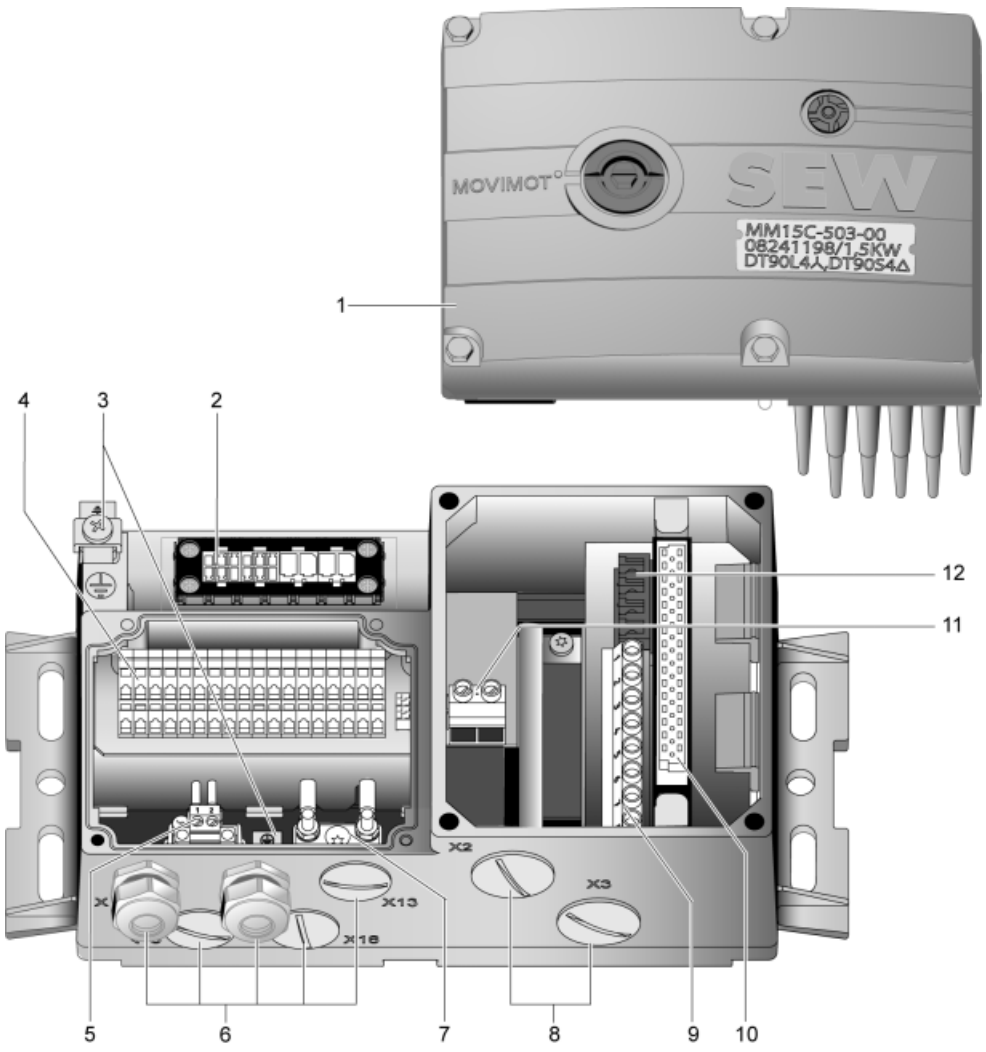
4 Terminals for power supply and PE connection (X1)
5 2 x M25 x 1.5
6 Terminals for bus, sensor, actuator, 24 V connection (X20)
7 6 x M20 x 1.5 (scope of delivery includes two EMC cable glands)
For DeviceNet and CANopen: Micro-style connector/M12 connector (X11), see the following figure
For AS-interface: AS-interface M12 connector (X11), see following figure



06115AXX

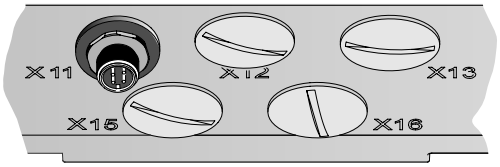
8 Terminal block for 24 V through-wiring (X29), internal connection to 24 V on X20
9 Pluggable terminal "Safety Power" for 24 V MOVIMOT® supply (X40)

MF.../MM../Z.7., MQ.../MM../Z.7. fieldbus distributors



51174AXX

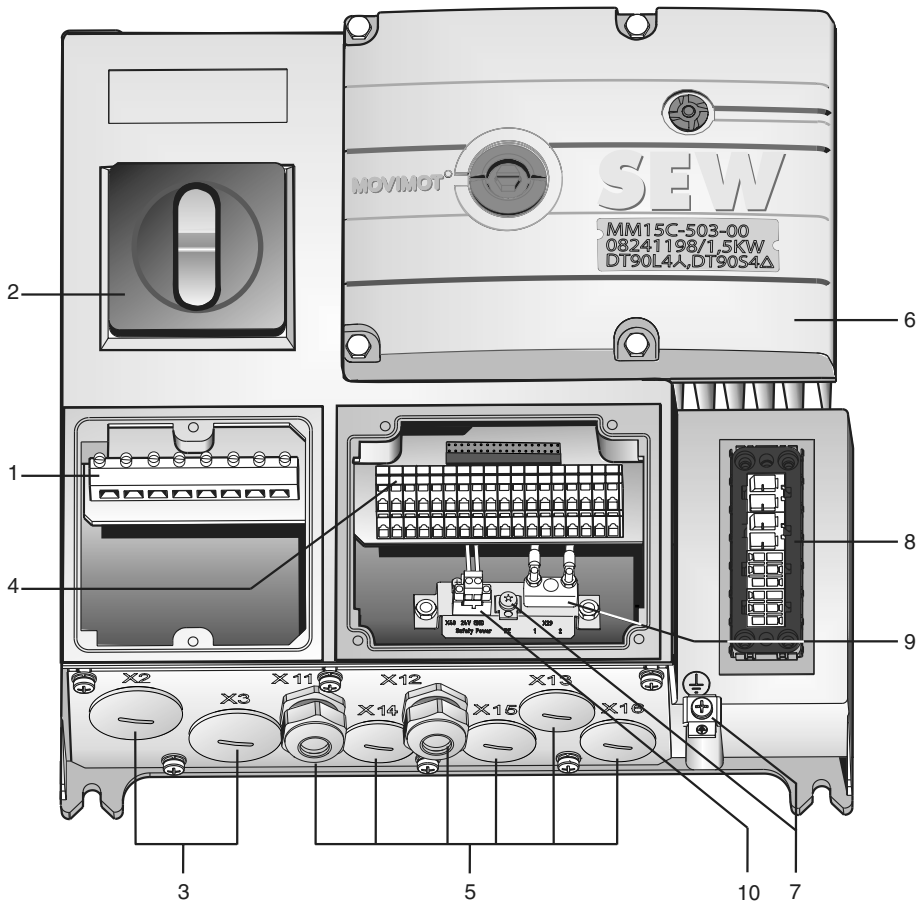
1 MOVIMOT® frequency inverter
2 Hybrid cable connection, connection to AC motor (X9)
3 Equipotential bonding connection
4 Terminals for bus, sensor, actuator, 24 V connection (X20)
5 Pluggable terminal "Safety Power" for 24 V MOVIMOT® supply (X40)
6 5 x M20 x 1.5 cable gland (scope of delivery includes two EMC cable glands)
For DeviceNet and CANopen: Micro-style connector/M12 connector (X11), see the following figure
For AS-interface: AS-interface M12 connector (X11), see following figure



51325AXX

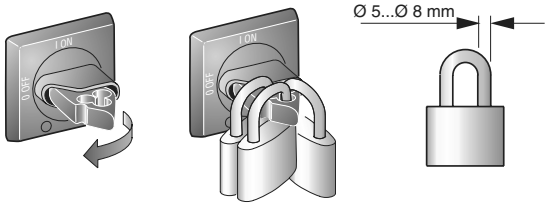
7 Terminal block for 24 V through-wiring (X29), internal connection to 24 V on X20
8 2 x M25 x 1.5 cable glands
9 Terminals for power supply and PE connection (X1)
10 Connection to frequency inverter
11 Terminal for integrated brake resistor
12 Terminals for enabling the direction of rotation

MF.../MM../Z.8.,
MQ.../MM../Z.8.
field distributors



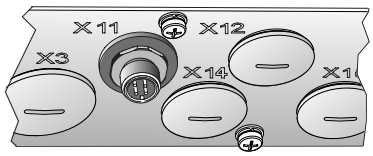
05902AXX

1 Terminals for power supply and PE connection (X1)
2 Maintenance switch (triple lock, color: black/red)
Only for MFZ28J: Optional integrated feedback for position of the maintenance switch. The feedback is evaluated at digital input DI0 (see the section "Connection of inputs and outputs (I/O) of fieldbus interfaces MF../MQ..")



03546AXX

3 2 x M25 x 1.5 cable glands
4 Terminals for bus, sensor, actuator, 24 V connection (X20)
5 6 x M20 x 1.5 cable gland (scope of delivery includes two EMC cable glands)
For DeviceNet and CANopen: Micro-style connector/M12 connector (X11), see the following figure
For AS-interface: AS-interface M12 connector (X11), see following figure



06115AXX

6 MOVIMOT® frequency inverter
7 Equipotential bonding connection
8 Hybrid cable connection, connection to AC motor (X9)
9 Terminal block for 24 V through-wiring (X29), internal connection to 24 V on X20
10 Pluggable terminal "Safety Power" for 24 V MOVIMOT® supply (X40)

4.4 Unit designation of AS-interface field distributors

Example:
MF.../Z.3.,
MQ.../Z.3.

MFK21A/Z63A

Connection module
Z13 = for InterBus
Z23 = for PROFIBUS
Z33 = for DeviceNet and CANopen
Z63 = for AS-interface

Fieldbus interface
MFI../MQI.. = InterBus
MFP../MQP.. = PROFIBUS
MFD../MQD.. = DeviceNet
MFO.. = CANopen
MFK.. = AS-interface

Example:
MF.../Z.6.,
MQ.../Z.6.

MFK21A/Z66F/AF6

Connection technology
AF0 = Metric cable entry
AF1 = with micro-style connector/M12 connector for DeviceNet and CANopen
AF2 = M12 plug connector for PROFIBUS
AF3 = M12 plug connector for PROFIBUS + M12 plug connector for 24 V_{DC} supply
AF6 = M12 plug connector for AS-interface connection

Connection module
Z16 = for InterBus
Z26 = for PROFIBUS
Z36 = for DeviceNet and CANopen
Z66 = for AS-interface

Fieldbus interface
MFI../MQI.. = InterBus
MFP../MQP.. = PROFIBUS
MFD../MQD.. = DeviceNet
MFO.. = CANopen
MFK.. = AS-interface

Example
MF.../MM../Z.7.,
MQ.../MM../Z.7.

MFK22A/MM15C-503-00/Z67F 0

Connection type
0 = ⅄ / 1 = △

Connection module
Z17 = for InterBus
Z27 = for PROFIBUS
Z37 = for DeviceNet and CANopen
Z67 = for AS-interface

MOVIMOT® inverter

Fieldbus interface
MFI../MQI.. = InterBus
MFP../MQP.. = PROFIBUS
MFD../MQD.. = DeviceNet
MFO.. = CANopen
MFK.. = AS-interface

Example:
MF.../MM../Z.8.,
MQ.../MM../Z.8.

MFK22A/MM22C-503-00/Z68F 0/AF6

Connection technology
AF0 = Metric cable entry
AF1 = with micro-style connector/M12 connector for DeviceNet and CANopen
AF2 = M12 plug connector for PROFIBUS
AF3 = M12 plug connector for PROFIBUS + M12 plug connector for 24 V_{DC} supply
AF6 = M12 plug connector for AS-interface connection

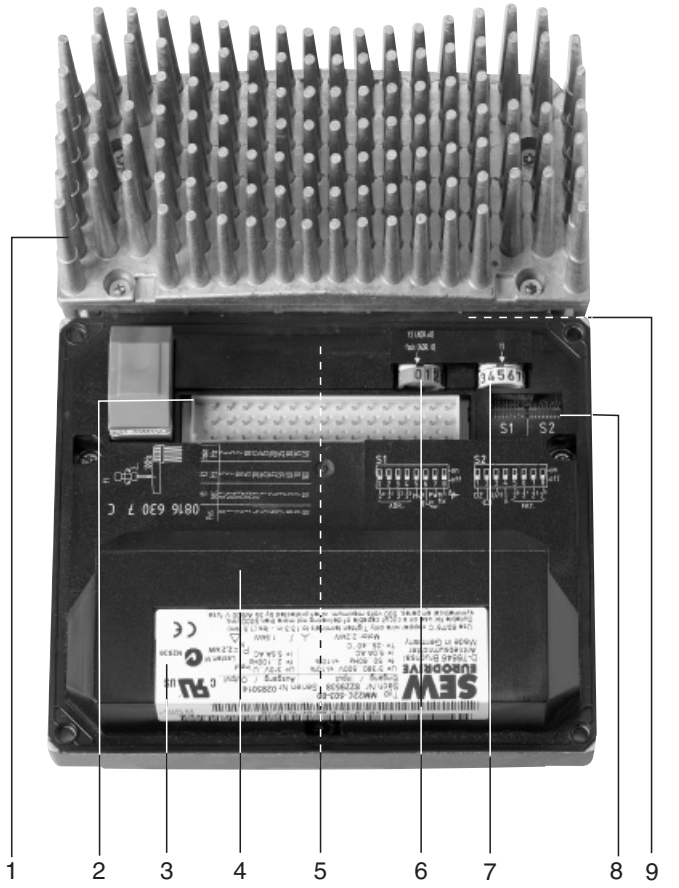
Connection type
0 = ⅄ / 1 = △

Connection module
Z18 = for InterBus
Z28 = for PROFIBUS
Z38 = for DeviceNet and CANopen
Z68 = for AS-interface

MOVIMOT® inverter

Fieldbus interface
MFI../MQI.. = InterBus
MFP../MQP.. = PROFIBUS
MFD../MQD.. = DeviceNet
MFO.. = CANopen
MFK.. = AS-interface

4.5 MOVIMOT® frequency inverters (integrated in Z.7/Z.8 field distributors)



1. Heat sink
2. Plug for connection between connection unit and inverter
3. Electronics nameplate
4. Protection cover for inverter electronics
5. Setpoint potentiometer f1 (not shown), accessible through a cable gland on top of the terminal box cover
6. Setpoint switch f2 (green)
7. Switch t1 for integrator ramp (white)
8. DIP switches S1 and S2 (for settings, see section "Startup")
9. Status LED (visible from the top of the terminal box cover, see the "Diagnostics" section)

5 Mechanical Installation

5.1 Installation instructions

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

This only guarantees enclosure IP40. To attain the specified enclosure rating, remove the transport protection and plug on the appropriate mating connector. Screw them together.

Installation

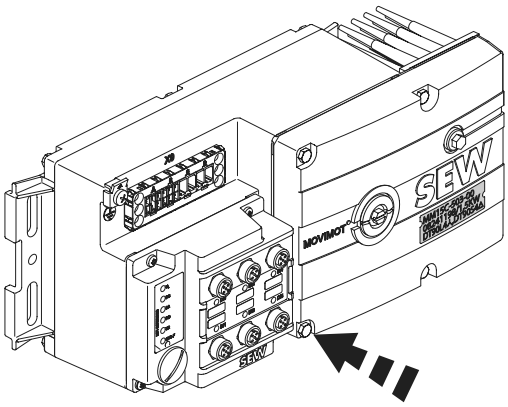
- Fieldbus interfaces / field distributors are only allowed to be mounted on a level, vibration-proof and torsionally rigid support structure.
- Use M5 screws and suitable washers for attaching the **MFZ.3** field distributor. Tighten screws with torque wrench (permitted tightening torque 2.8 to 3.1 Nm (25...27 lb.in)).
- Use M6 screws and suitable washers for installation of **MFZ.6**, **MFZ.7** or **MFZ.8** field distributors. Tighten screws with torque wrench (permitted tightening torque 3.1 to 3.5 Nm (27...31 lb.in)).

Installation in damp locations or outdoors

- Use suitable screw fittings for the cables (use reducing adapters if necessary).
- Seal open cable entries and M12 connection sockets with screw plugs.
- When the cable entry is located on the side of the unit, install the cable using a drip loop.
- Check the sealing surfaces before reassembling the bus module/connection box cover. Clean the surfaces if necessary.

5.2 Tightening torques

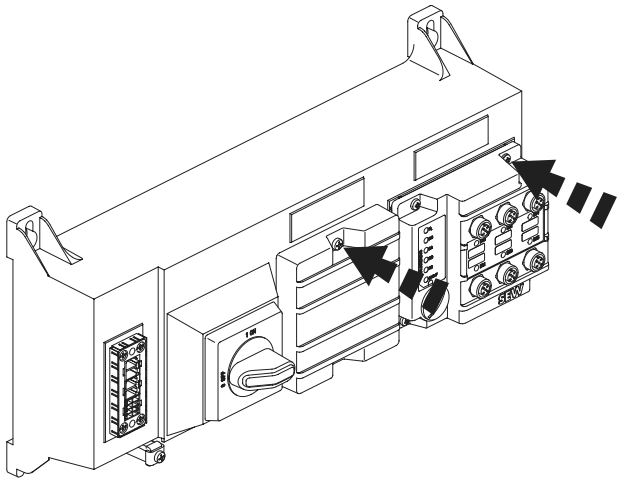
MOVIMOT® inverter:



57670AXX

Tighten the screws on the MOVIMOT® inverter using 3.0 Nm (27 lb.in) working diagonally across.

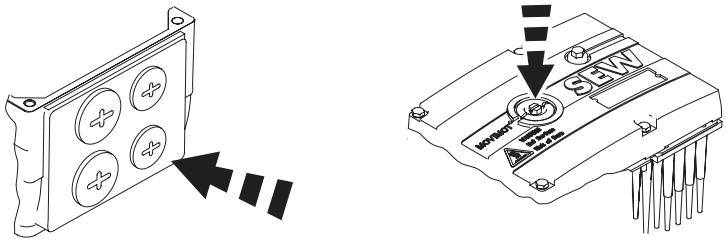
Fieldbus interfaces/terminal box cover:



57671AXX

Tighten the screws on the fieldbus interfaces or terminal box cover using 2.5 Nm (22 lb.in) working diagonally across.

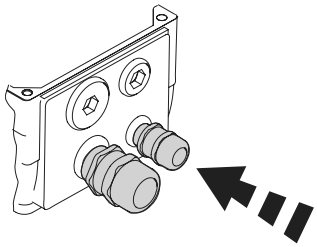
Blanking plug for cable entries, F1 potentiometer plug



57672AXX

Tighten blanking plugs and F1 potentiometer plugs using 2.5 Nm (22 lb.in).

EMC cable glands



56360AXX

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

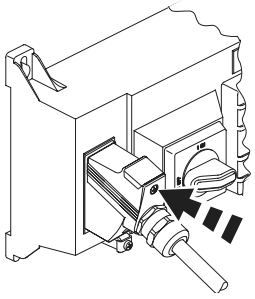
Screw fitting	Tightening torque
M12 x 1.5	2.5 Nm to 3.5 Nm (22...31 lb.in)
M16 x 1.5	3.0 Nm to 4.0 Nm (27...35 lb.in)
M20 x 1.5	3.5 Nm to 5.0 Nm (31...44 lb.in)
M25 x 1.5	4.0 Nm to 5.5 Nm (35...49 lb.in)

The cable retention in the cable gland has to withstand the following removal force of the cable from the cable gland:

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

Motor cables

Tighten screws for motor cables using 1.2 to 1.8 Nm (11...16 lb.in).



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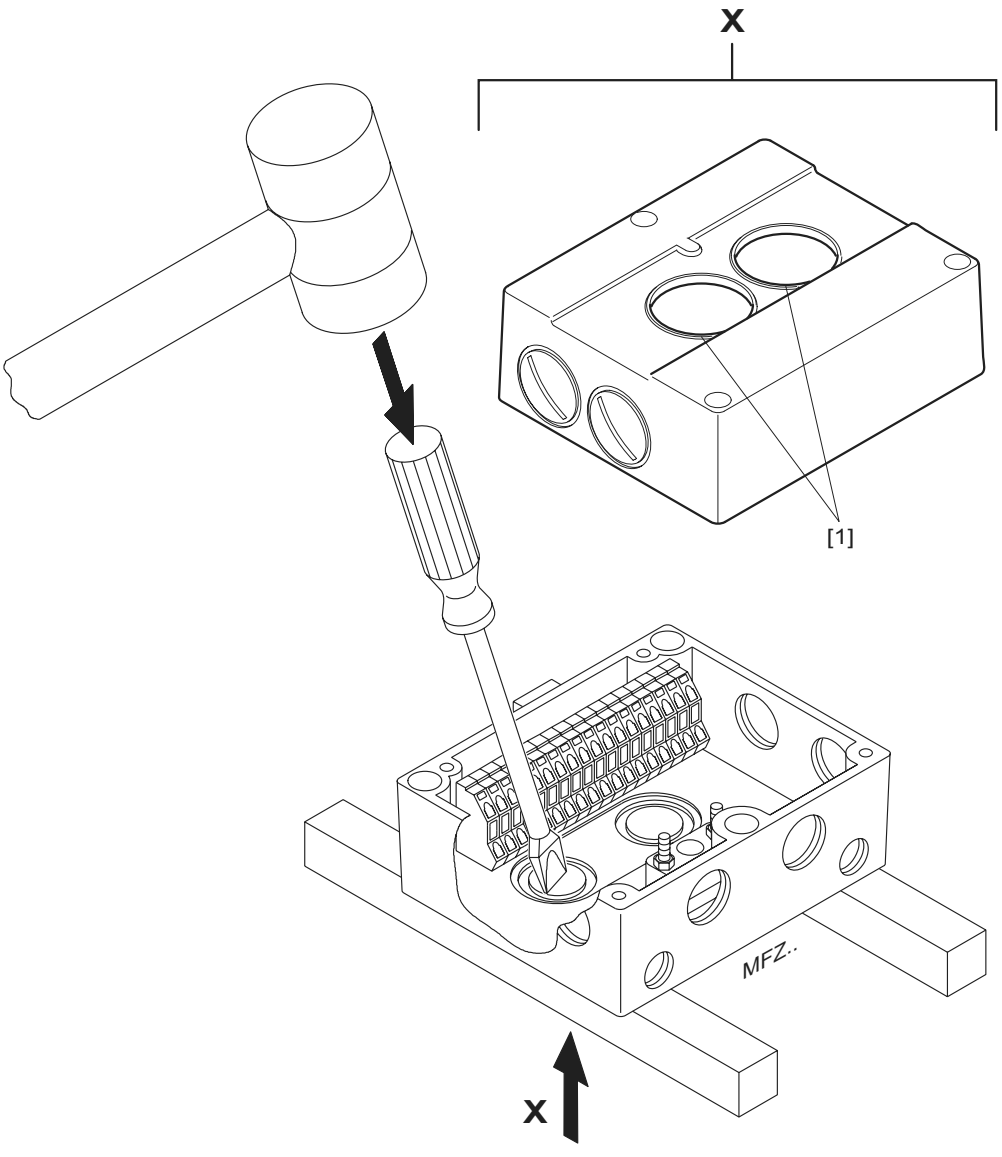
5.3 Fieldbus interfaces MF../MQ..

MF../MQ.. fieldbus interfaces can be installed as follows:

- Installation on MOVIMOT® terminal box
- Installation in the field

Installation on MOVIMOT® terminal box

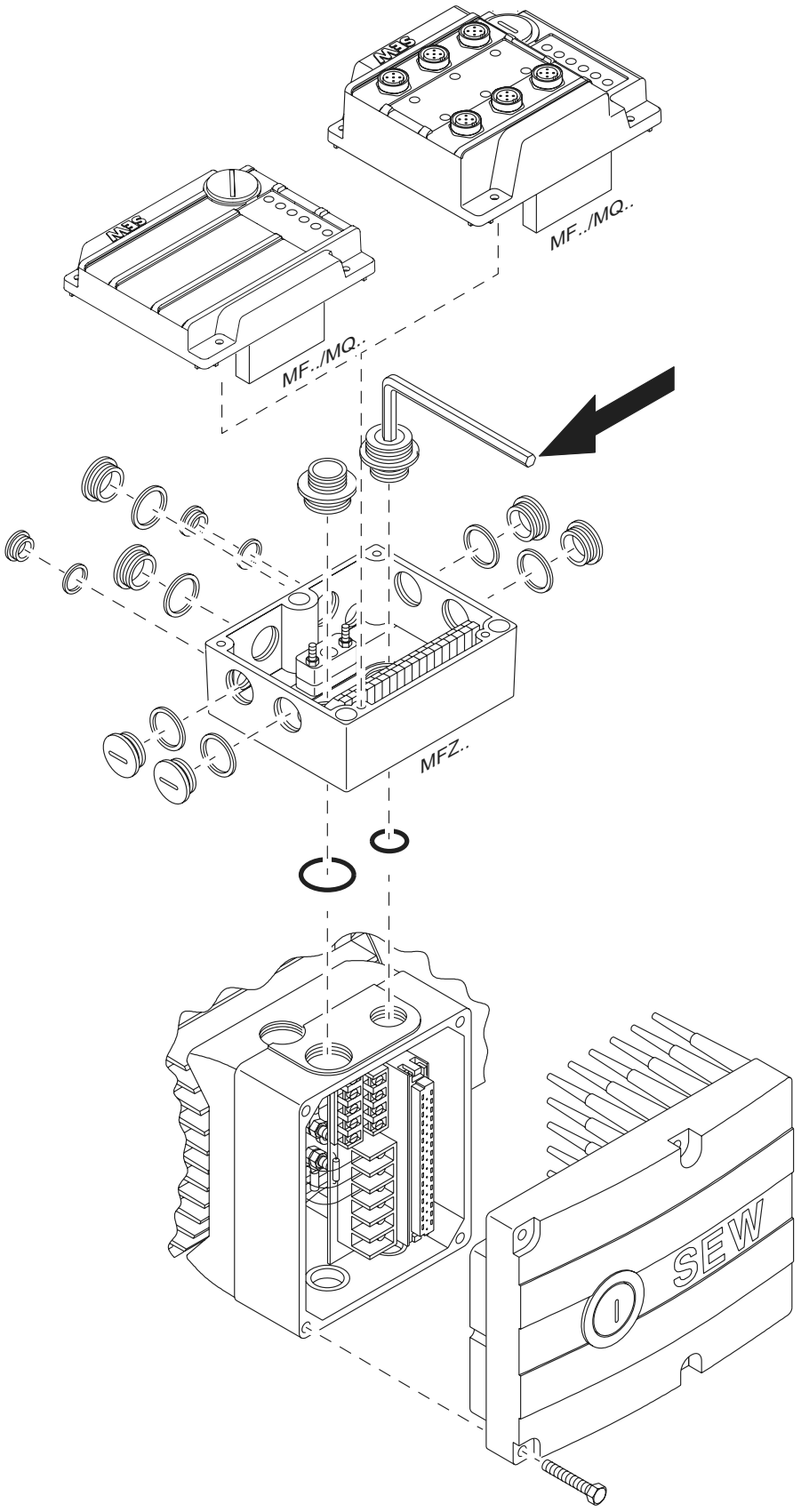
1. Remove knock outs on MFZ underside from the inside, as illustrated in the following figure:



57561AXX

[1] The break lines that occur after the knock outs have been removed may have to be deburred.

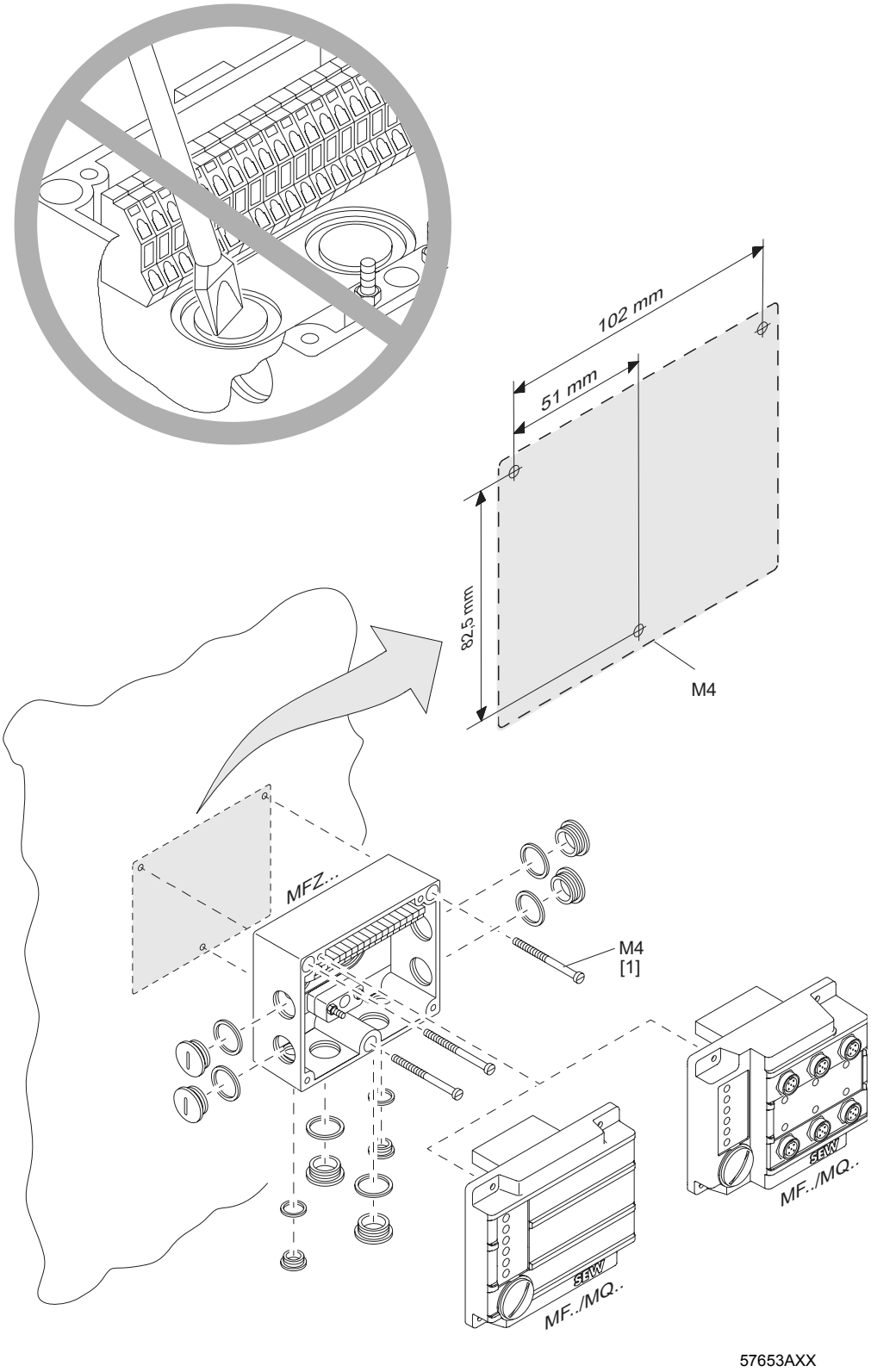
2. Install the fieldbus interface to the MOVIMOT® terminal box according to the following figure:



51250AXX

Installation in the field

The following figure shows the installation of an MF../MQ.. fieldbus interface in the field:

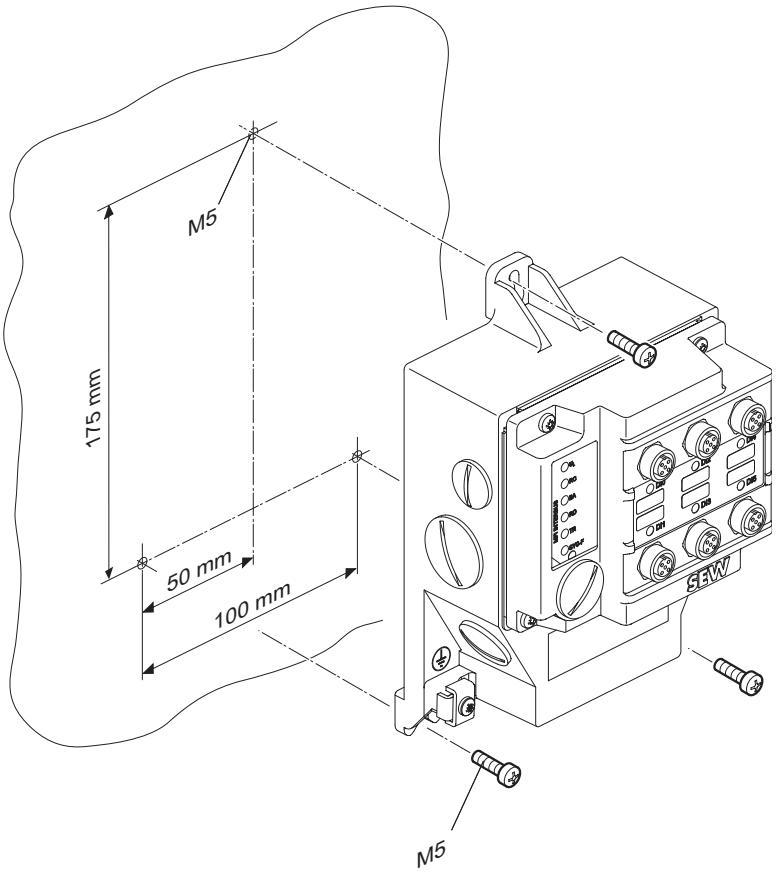


[1] Length of screws min. 40 mm

5.4 Field distributor

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

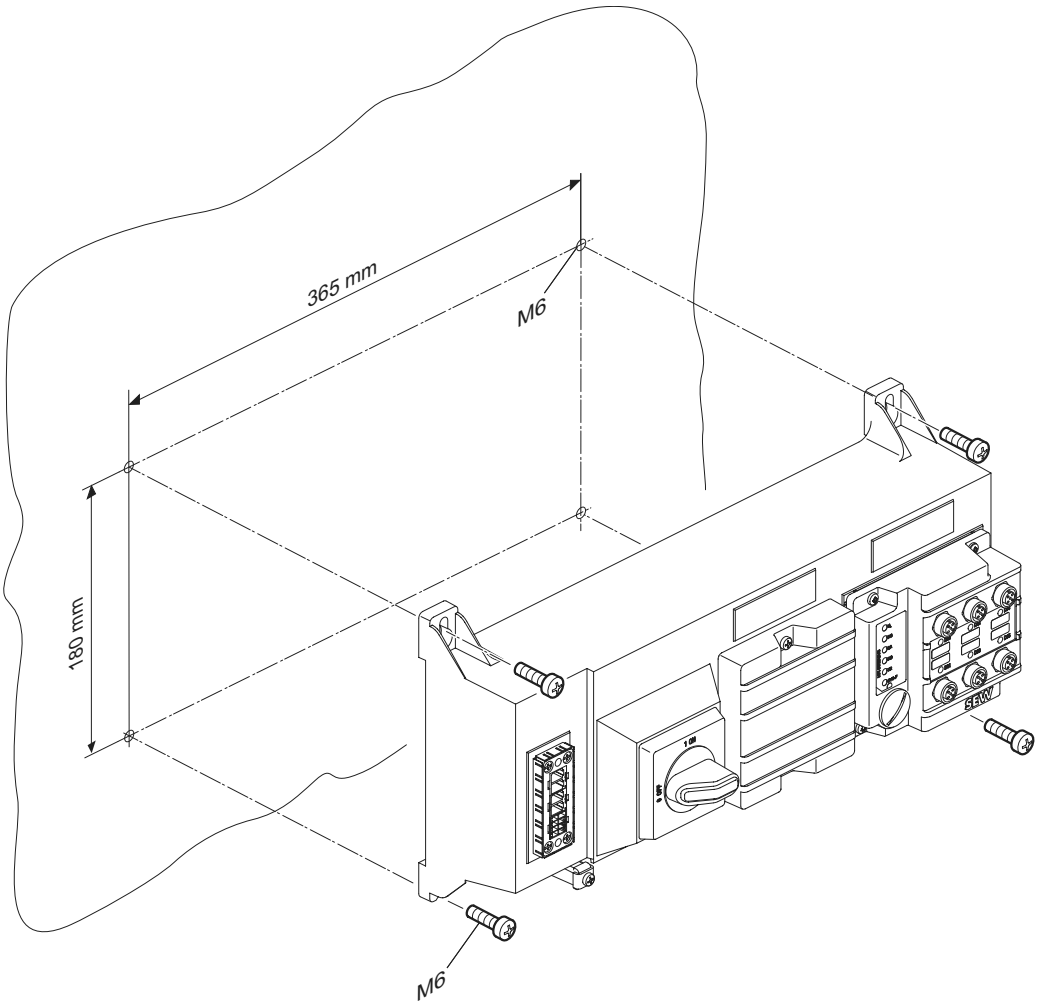
The following figure shows the mounting dimensions for ..Z.3. field distributors:



51219AXX

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

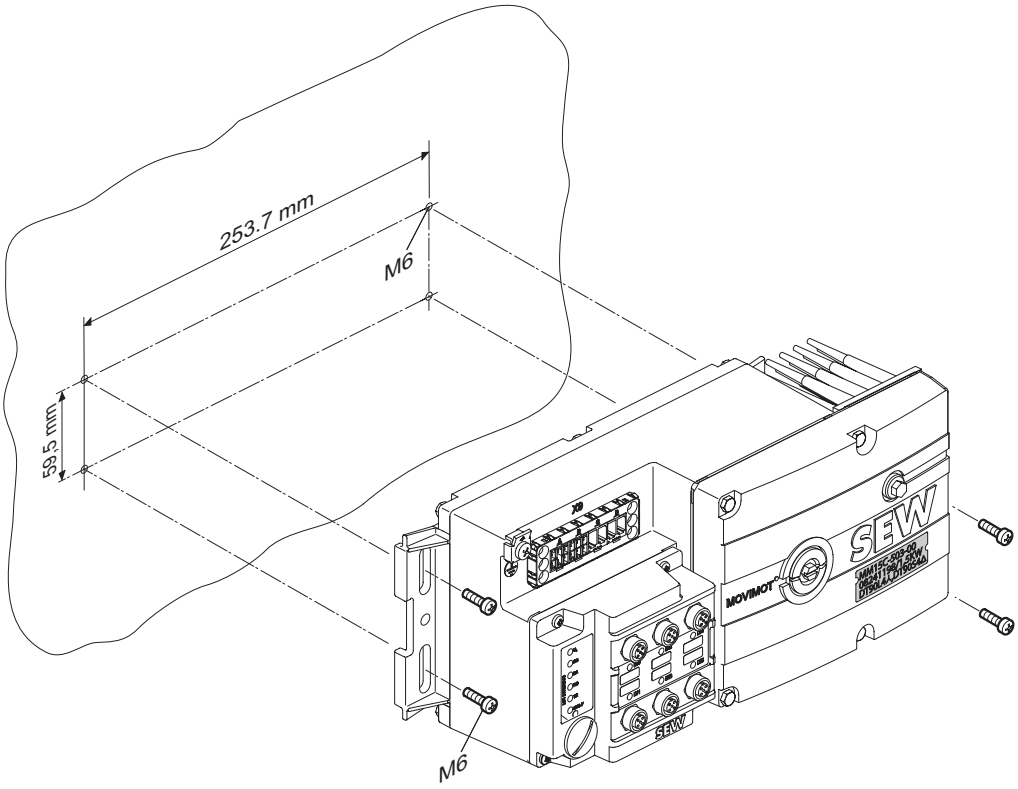
The following figure shows the mounting dimensions for ..Z.6. field distributors:



51239AXX

Installation of MF.../MM../Z.7., MQ.../MM../Z.7. field distributors

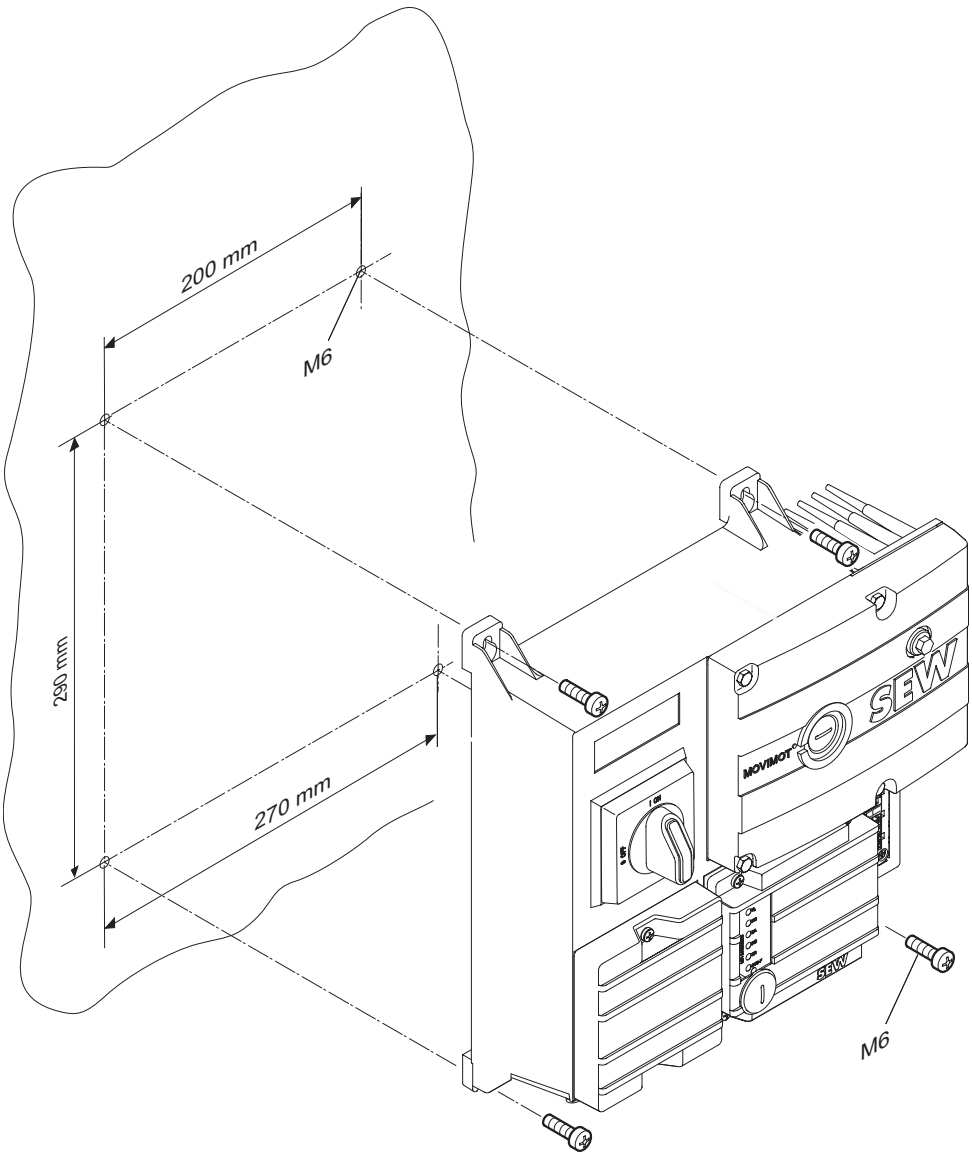
The following figure shows the mounting dimensions for ..Z.7. field distributors:



51243AXX

Installation of the MF.../MM03-MM15/Z.8., MQ.../MM03-MM15/Z.8. field distributors (size 1)

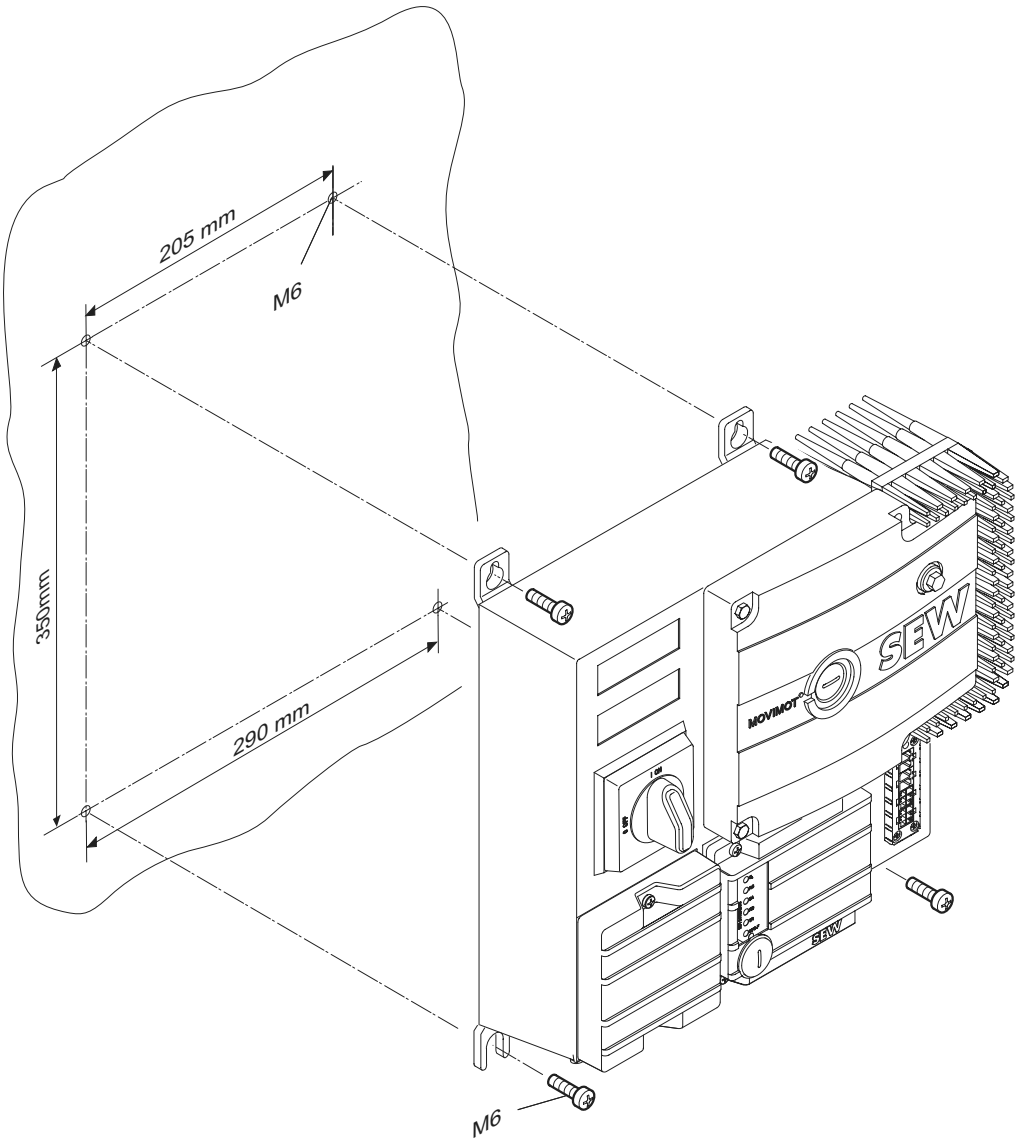
The following figure shows the mounting dimensions for ..Z.8. field distributors (size 1):



57649AXX

Installation of MF.../MM22-MM3X/Z.8., MQ.../MM22-MM3X/Z.8. field distributors (size 2)

The following figure shows the mounting dimensions for ..Z.8. field distributors (size 2):



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6 Electrical Installation

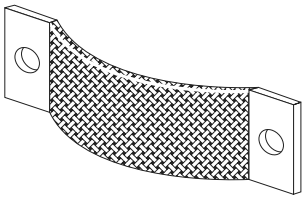
6.1 Installation planning taking EMC aspects into account

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.

The **relevant standards** must be applied in all cases. You also need to consider the following points:

- **Equipotential bonding**
  - Low-impedance HF-capable potential compensation must be provided independent of the functional ground (PE terminal) (see also VDE 0113 or VDE 0100 Part 540) for example through
    - Flat contact surface connection of metal (system) components
    - Using flat grounding strips (HF litz wire)



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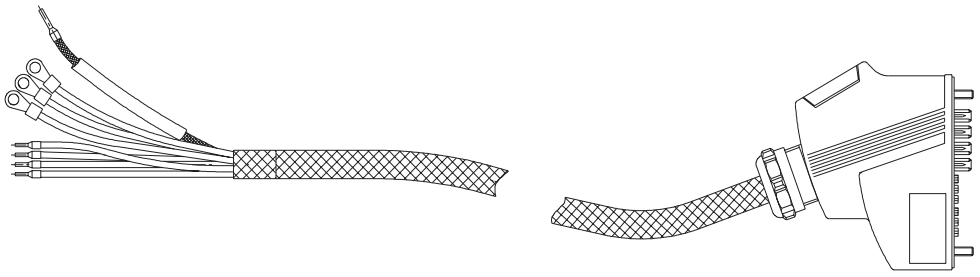
  - Do not use the cable shield of data lines for equipotential bonding.
- **Data lines and 24 V supply**
  - These lines must be routed separately from cables subject to interference (for example, control cables for solenoid valves, motor feeders)
- **Field distributor**
  - We recommend using prefabricated SEW hybrid cables especially designed for the connection of field distributors and motors.



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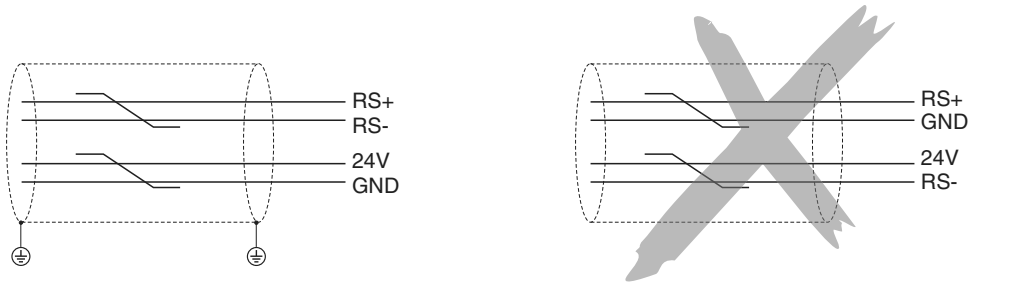
- **Cable glands**
  - Select a cable gland with large contact surface shield (consult the notes on selection and appropriate assembly of cable glands).
- **Cable shield**
  - Must have good EMC characteristics (high shield attenuation)
  - May not only serve as a means of mechanical protection for the cable.
  - Must be connected with the metal housing of the unit (via EMC metal cable glands) at the flat contact surface cable ends (consult the notes on selection and appropriate installation of cable glands).
- **Additional information is available in the SEW publication "Drive Engineering – Practical Implementation, Electromagnetic Compatibility (EMC) in Drive Engineering".**

Example for connection of the MF../MQ.. fieldbus module and MOVIMOT®

If MF../MQ.. fieldbus module and MOVIMOT® are installed separately, the RS-485 connection must be implemented as follows:

- **Carrying the 24 V_{DC} supply**
  - Use shielded lines
  - Apply shielding to the housing of both units via EMC metal cable glands (consult the notes on appropriate assembly of EMC metal cable glands)
  - Strands twisted in pairs (see the following illustration)



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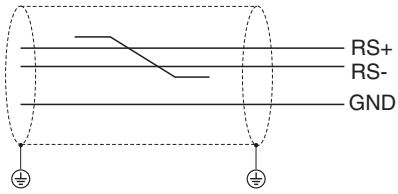
- **Without carrying the 24 V_{DC} supply:**

  If the MOVIMOT® is supplied with 24 V_{DC} via separate lead wire, the RS-485 connection must be designed as follows:

  - Use shielded lines
  - Apply shielding to the housing of both units via EMC metal cable glands (consult the notes on selection and appropriate assembly of cable glands)
  - The GND reference potential must be provided for the RS-485 interface
  - Strands twisted (see the following illustration)



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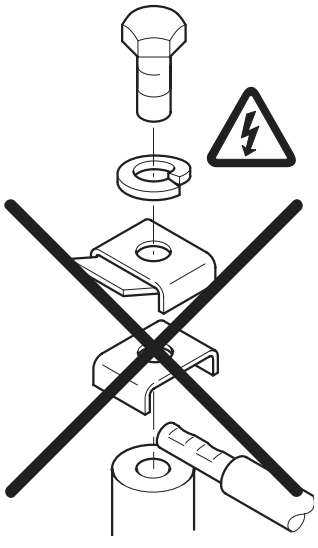
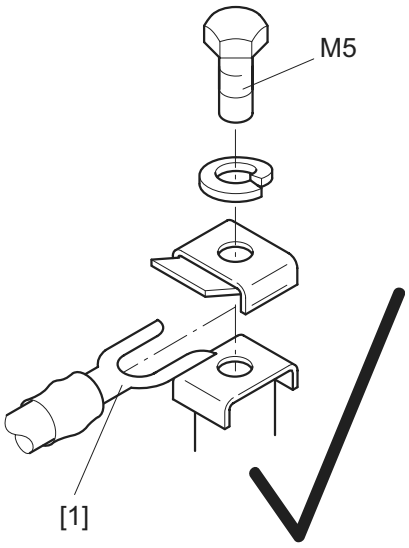
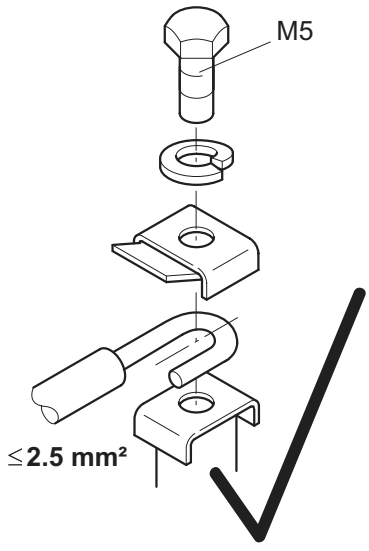
6.2 Installation instructions for fieldbus interfaces, field distributors

Connecting supply system leads

- The rated voltage and frequency of the MOVIMOT® inverter must correspond to the data for the power supply system.
- Line cross-section: according to input current I_{mains} for rated power (see Technical Data).
- Install line fuses at the beginning of the supply system lead behind the supply bus junction. Use D, D0, NH fuses or line protection switches. Select the fuse size according to the line cross-section.
- Do not use a conventional earth leakage circuit-breaker as a protection device. Universal current-sensitive earth-leakage circuit breakers ("type B") are permitted as a protection device. During normal operation of MOVIMOT® drives, earth-leakage currents of > 3.5 mA can occur.
- In accordance with EN 50178, a second PE connection (with at least the same cross-section as the supply system lead) is required parallel to the protective earth conductor via separate points of connection. Leakage currents > 3.5 mA may arise in service.
- Use contactor switch contacts from utilization category AC-3 according to IEC 158 to connect MOVIMOT® drives.
- SEW recommends using earth-leakage monitors with pulse-code measurement for voltage supply systems with non-grounded star point (IT systems). Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter.

Notes on PE connection and/or equipotential bonding

Observe the following notes regarding PE connection and/or equipotential bonding. The permitted tightening torque for the screw fitting is 2.0 to 2.4 Nm (18...21 lb.in).

Prohibited assembly sequence	Recommendation: Assembly with forked cable lug Permitted for all cross-sections	Assembly with thick connecting wire Permitted for cross-sections up to max. 2.5 mm²
 57461AXX	 57463AXX	 57464AXX

[1] Forked cable lug suitable for M5 PE screws

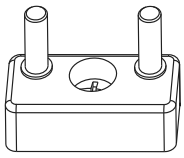
Permitted connection cross-section and current carrying capacity of the terminals

	X1, X2 Power terminals (screw terminals)	X20 Control Terminals (cage clamp terminals)
Connection cross-section (mm^2)	0.2 mm^2 – 4 mm^2	0.08 mm^2 – 2.5 mm^2
Connection cross-section (AWG)	AWG 24 – AWG 10	AWG 28 – AWG 12
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 (5 lb.in).

Daisychaining the 24 V_{DC} supply voltage for MFZ.1 module carrier:

- There are two M4 x 12 studs in the connection area of the 24 V_{DC} supply. The studs can be used for daisychaining the 24 V_{DC} supply voltage.

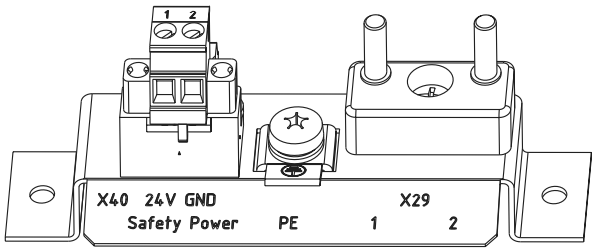


05236AXX

- 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 (11 lb.in) ± 20%.

Additional connection options with MFZ.6, MFZ.7 and MFZ.8 field distributors

- The connection part of the 24 V_{DC} supply comprises a X29 terminal block with two M4 x 12 studs and a pluggable X40 terminal.



05237AXX

- The X29 terminal block can be used as an alternative to the X20 terminal for daisy-chaining the 24 V_{DC} supply voltage. Both studs are connected internally to the 24 V connection at terminal X20.

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

- The plug-in terminal X40 ("Safety Power") is intended for the external 24 V_{DC} supply of the MOVIMOT® inverter using an emergency stop relay.

  This setup allows for the operation of a MOVIMOT® drive in safety applications. For more information, refer to the publications "Safe Disconnection for MOVIMOT® MM..C – Conditions" and "Safe Disconnection for MOVIMOT MM..C – Applications"

Terminal assignment			
No.		**Name**	**Function**
X40	1	24 V	24 V MOVIMOT® voltage supply for disconnection with emergency stop relay
	2	GND	0V24 MOVIMOT® reference potential for disconnection with emergency stop relay

- On delivery, terminal X29/1 is jumpered with X40/1 and terminal X29/2 with X40/2 so that the MOVIMOT® inverter is supplied by the same 24 V_{DC} voltage as the fieldbus module.
- The current carrying capacity of both studs is 16 A, the permitted tightening torque of the hex nuts is 1.2 Nm (11 lb.in) ± 20%.
- The current carrying capacity of screw terminal X40 is 10 A, the connection cross-section is 0.25 mm^2 to 2.5 mm^2 (AWG24 to AWG12) and the permitted tightening torque is 0.6 Nm (5 lb.in).

Installation at 1000 meters above sea level (msl) or higher

MOVIMOT® drives with supply voltages of 380 to 500 V can be used at altitudes from 1000 msl up to 4000 msl under the following peripheral conditions.[1)]

- The rated continuous power is reduced based on the reduced cooling above 1000 m (see MOVIMOT® operating instructions).
- Above 2,000 msl, the air and creeping distances are only sufficient for overvoltage class 2. If the installation requires overvoltage class 3, you will have to install additional external overvoltage protection to limit overvoltage peaks to 2.5 kV phase-to-phase and phase-to-ground.
- If safe electrical disconnection is required, it must be implemented outside the unit at altitudes of 2,000 msl (safe electrical disconnection in accordance with EN 61800-5-1).
- The permitted rated supply voltage of 3 x 500 V up to 2,000 msl is reduced by 6 V for every 100 m to a maximum of 3 x 380 V at 4,000 msl.

Protection devices

- MOVIMOT® drives are equipped with integrated overload protection devices, which make external devices obsolete.

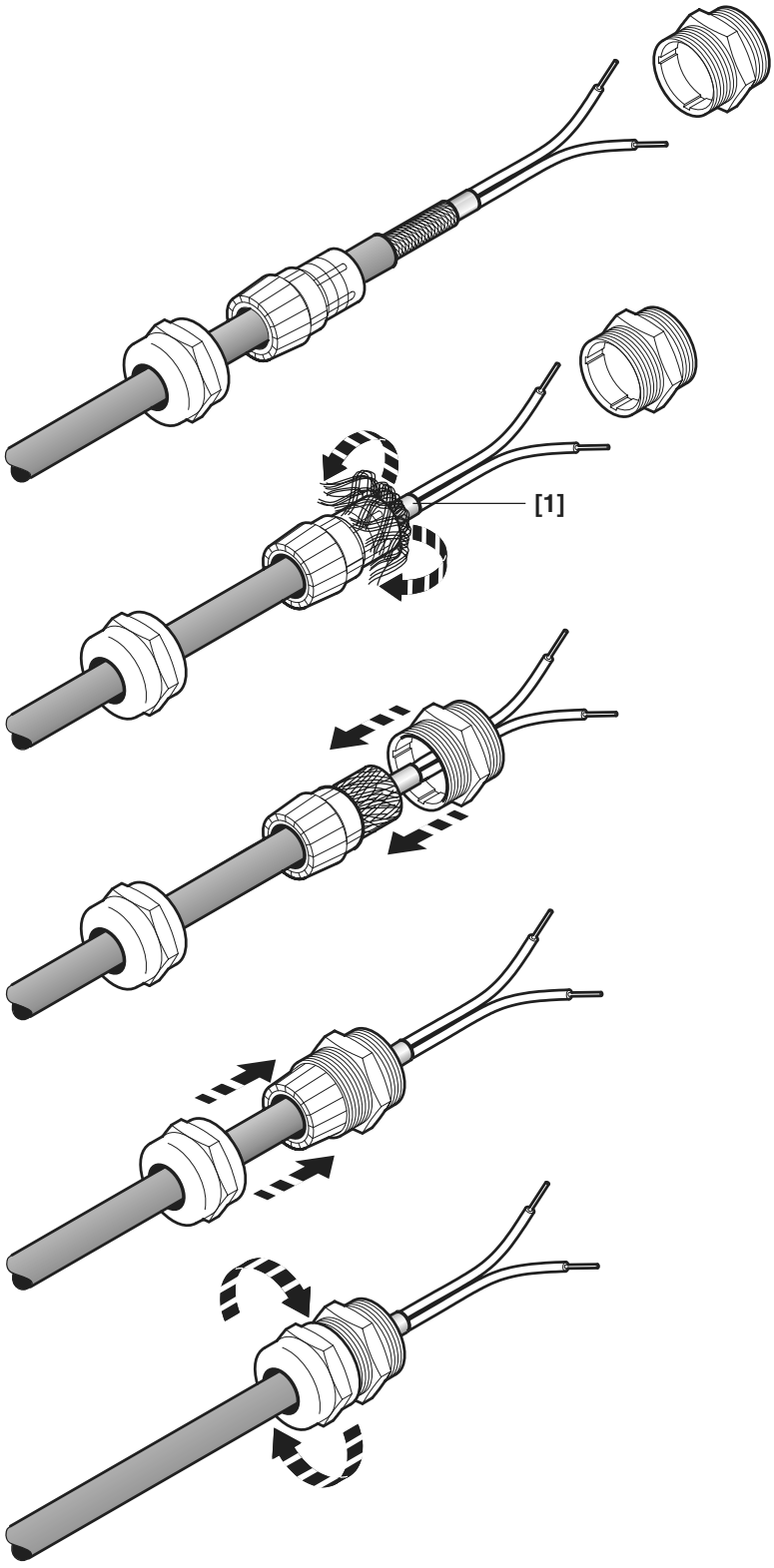
UL-compliant field distributor installation

- Use only copper cables with the temperature range 60/75 °C (140/167 °F) as a connection cable.
- MOVIMOT® units are suited for operation on voltage supply systems with a grounded star point (TN and TT systems) supplying a maximum supply current of 5000 A_{AC} and a maximum rated voltage of 500 V_{AC}. To ensure UL-compliant installation, the performance data for fuses installed in MOVIMOT® units may not exceed 35 A/600 V.
- Use only tested units with limited output voltage (V_{max} = 30 V_{DC}) and limited output current (I = 8 A) as external 24 V_{DC} voltage supply sources.
- The UL certification only applies to operation on voltage supply systems with voltages to ground up to a maximum of 300 V.

1) The maximum altitude is limited by creeping distances and encapsulated components, such as electrolytic capacitors.

EMC metal cable glands

Install the EMC metal cable glands from SEW as follows:



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[1] Important: Cut off the insulating foil, do not peel it back.

Wiring check

Before connecting the system to the power for the first time, check the wiring **to prevent possible damage to persons, systems and equipment** caused by incorrect wiring.

- Remove all bus modules from the connection module
- Disconnect all MOVIMOT® inverters from the connection module (only with MFZ.7, MFZ.8)
- Disconnect all plug connectors of the motor connection (hybrid cable) from the field distributor
- Check the insulation of the cabling in accordance with applicable national standards
- Check the grounding
- Check the insulation between the supply system cable and the 24 V_{DC} cable
- Check insulation between the supply system cable and communication line
- Check the polarity of the 24 V_{DC} cable
- Check the polarity of the communication line
- Check the mains phase sequence
- Ensure equipotential bonding between the fieldbus interfaces

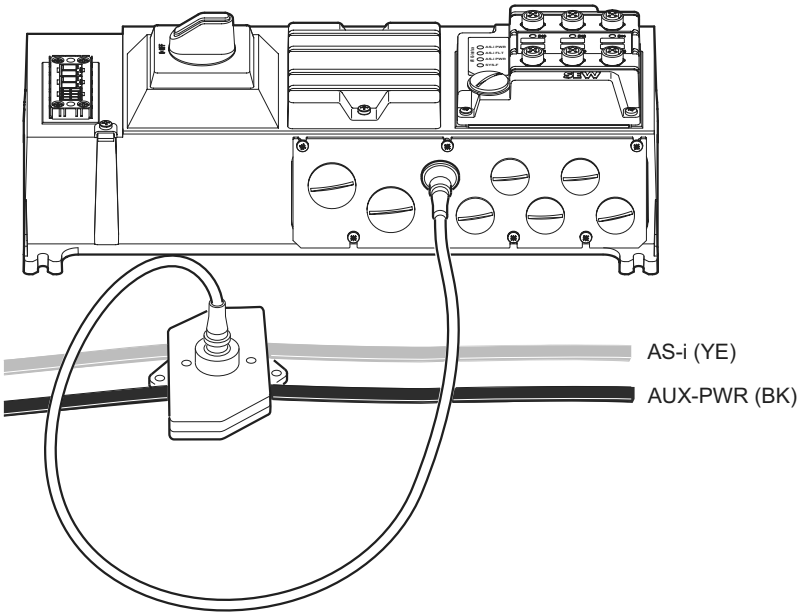
After the wiring check

- Connect and fasten all motor connections (hybrid cable)
- Connect and fasten all bus modules
- Install and fasten all MOVIMOT® inverters (for MFZ.7, MFZ.8 only)
- Install all terminal box covers
- Cover any plug connections not in use

6.3 AS-interface cable connection

The MFK.. AS-interface must be connected with the AS-interface network using the yellow AS-interface cable. Use the AS-interface M12 plug connector integrated in the corresponding connection module (for example, MFK../Z66/AF6 field distributor) for the connection. In addition, the MFK AS-interface must be supplied with 24 V auxiliary power supply.

AS-interface and 24 V connection via yellow and black cable with double pick-off



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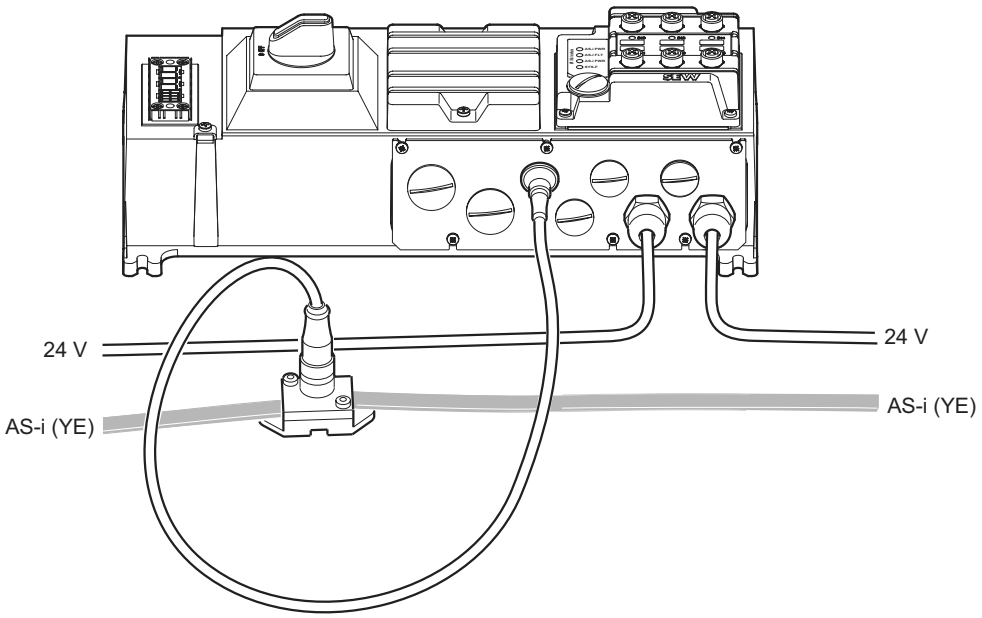
AS-interface connection via yellow cable, 24 V supply via round cable



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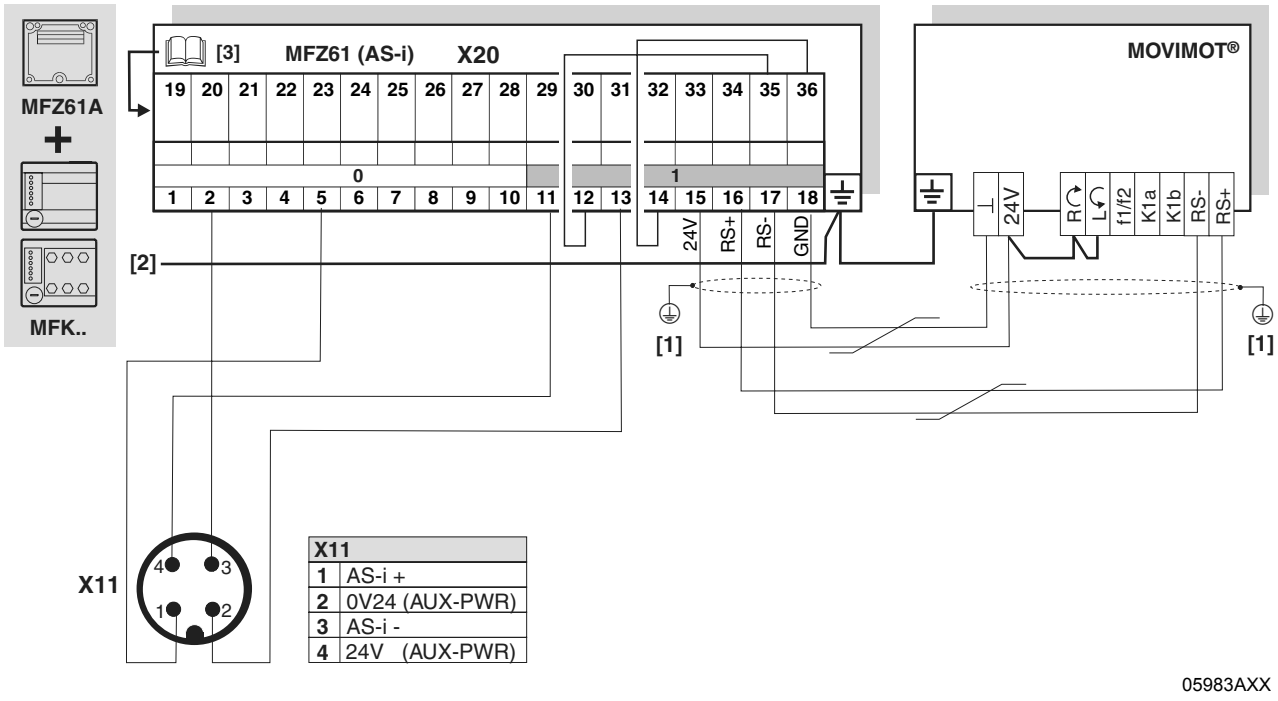
Any additional connections (depending on the selected connection module) are described in the following sections.

6.4 Connection with double pick-off

Connection of MFZ61 module carrier with MOVIMOT®

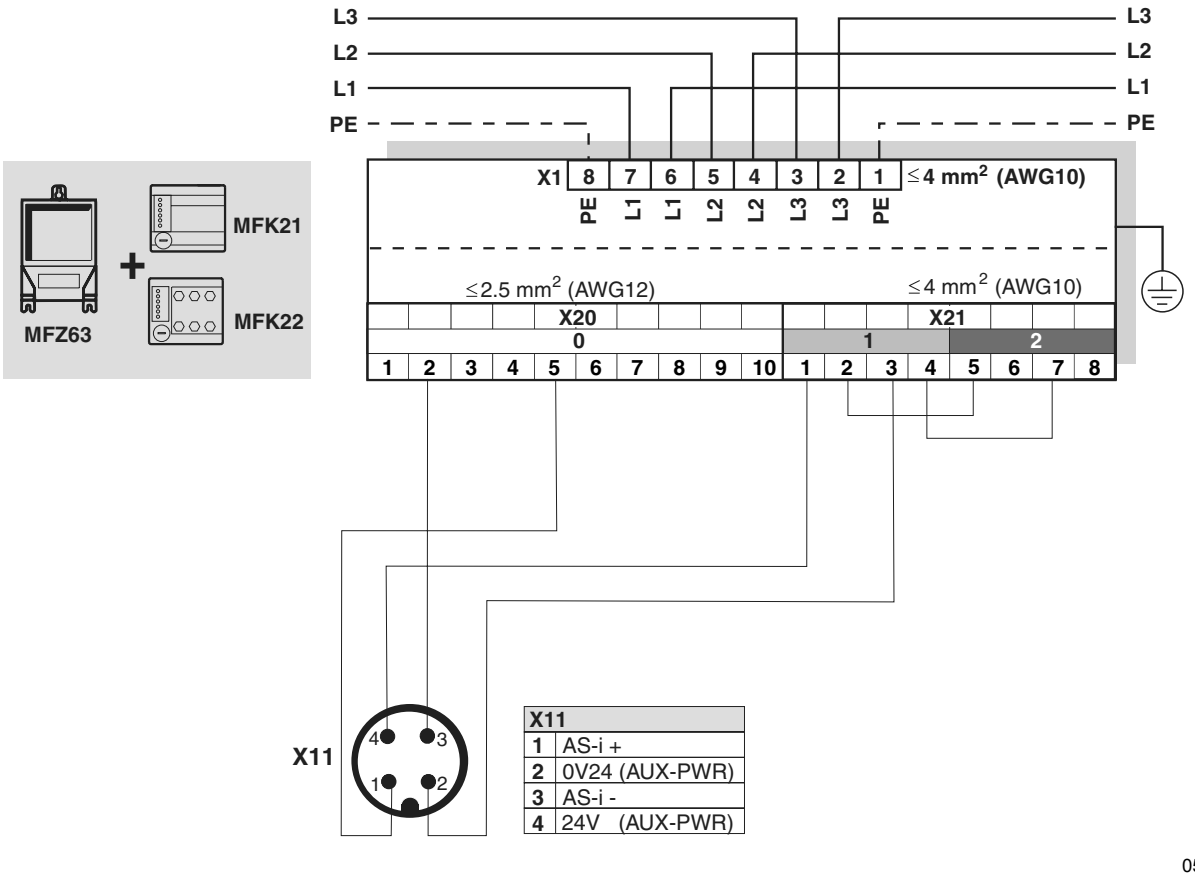


0 = Potential level 0 **1** = Potential level 1

[1] If MFZ11/MOVIMOT® are mounted separately:
Connect the shield of the RS-485 cable using the EMC metal cable gland on MFZ and the MOVIMOT® housing.
[2] Ensure equipotential bonding between all bus stations
[3] Assignment of terminals 19-36 starting on page 45

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	–	–	Reserved
	2	AS-interface –	Input/output	AS-interface data cable and electronics supply for MFK
	3	–	–	Reserved
	4	–	–	Reserved
	5	AS-interface +	Input/output	AS-interface data cable and electronics supply for MFK
	6	–	–	Reserved
	7	–	–	Reserved
	8	–	–	Reserved
	9	–	–	Reserved
	10	–	–	Reserved
	11	24 V (AUX PWR)	Input	24 V voltage supply for MOVIMOT®, sensors
	12	24 V (AUX PWR)	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND (AUX PWR)	–	0V24 Reference potential for MOVIMOT® and sensors
	14	GND (AUX PWR)	–	0V24 Reference potential for MOVIMOT® and sensors
	15	24 V	–	24 V voltage supply for MOVIMOT® (jumpered with terminal X20/11)
	16	RS+	–	Communication link to MOVIMOT® terminal RS+
	17	RS-	–	Communication link to MOVIMOT® terminal RS-
	18	GND	–	0V24 Reference potential for MOVIMOT® (jumpered with X20/13)

Connection of MFZ63 field distributor



X11	
1	AS-i +
2	0V24 (AUX-PWR)
3	AS-i -
4	24V (AUX-PWR)

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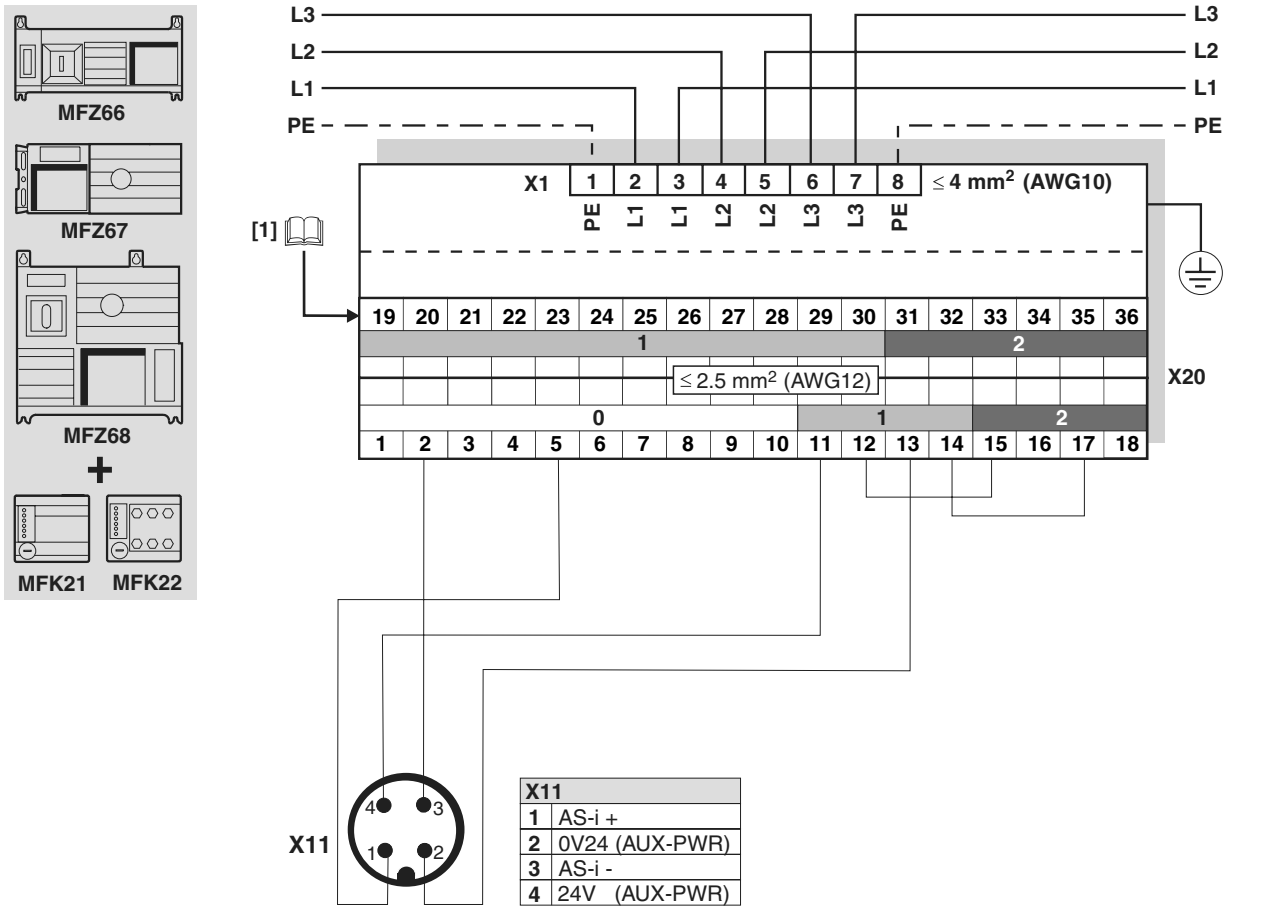
0 = Potential level 0 **1** = Potential level 1 **2** = Potential level 2

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	–	–	Reserved
	2	AS-interface –	Input/output	AS-interface data cable and electronics supply for MFK
	3	–	–	Reserved
	4	–	–	Reserved
	5	AS-interface +	Input/output	AS-interface data cable and electronics supply for MFK
	6-10	–	–	Reserved
X21	**1**	24 V (AUX PWR)	Input	24 V voltage supply for MOVIMOT® and sensors
	2	24 V (AUX PWR)	Output	24 V voltage supply (jumpered with terminal X21/1)
	3	GND (AUX PWR)	–	0V24 reference potential for MOVIMOT® and sensors
	4	GND (AUX PWR)	–	0V24 reference potential for MOVIMOT® and 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	–	0V24V reference potential for actuators

Connection of MFZ66, MFZ67, MFZ68 field distributors



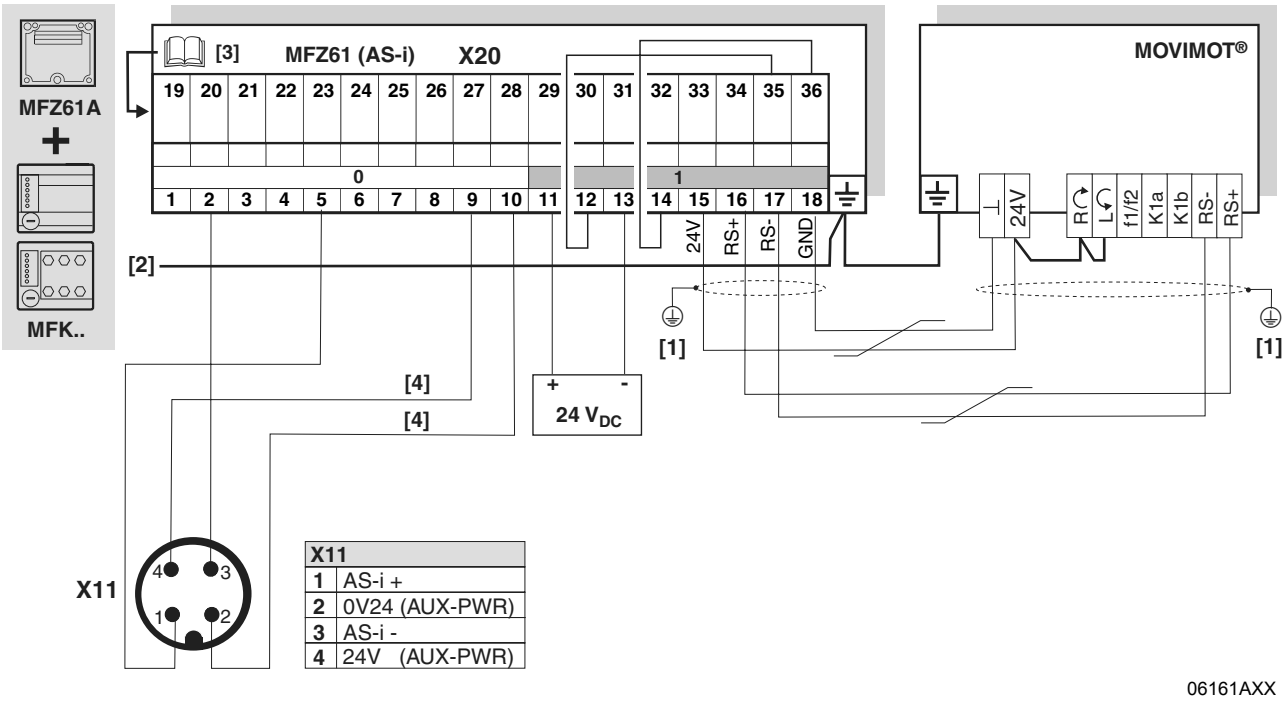
0 = Potential level 0 **1** = Potential level 1 **2** = Potential level 2

[1] 📖 Assignment of terminals 19-36 starting on page 45

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	–	–	Reserved
	2	AS-interface –	Input/output	AS-interface data cable and electronics supply for MFK
	3	–	–	Reserved
	4	–	–	Reserved
	5	AS-interface +	Input/output	AS-interface data cable and electronics supply for MFK
	6-10	–	–	–
	11	24 V (AUX PWR)	Input	24 V voltage supply for sensors
	12	24 V (AUX PWR)	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND (AUX PWR)	–	0V24 reference potential for sensors
	14	GND (AUX PWR)	–	0V24 reference potential for 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
	18	GND2	–	0V24V reference potential for actuators

6.5 Connection with single pick-off and 24 V loop

Connection of MFZ61 module carrier with MOVIMOT®



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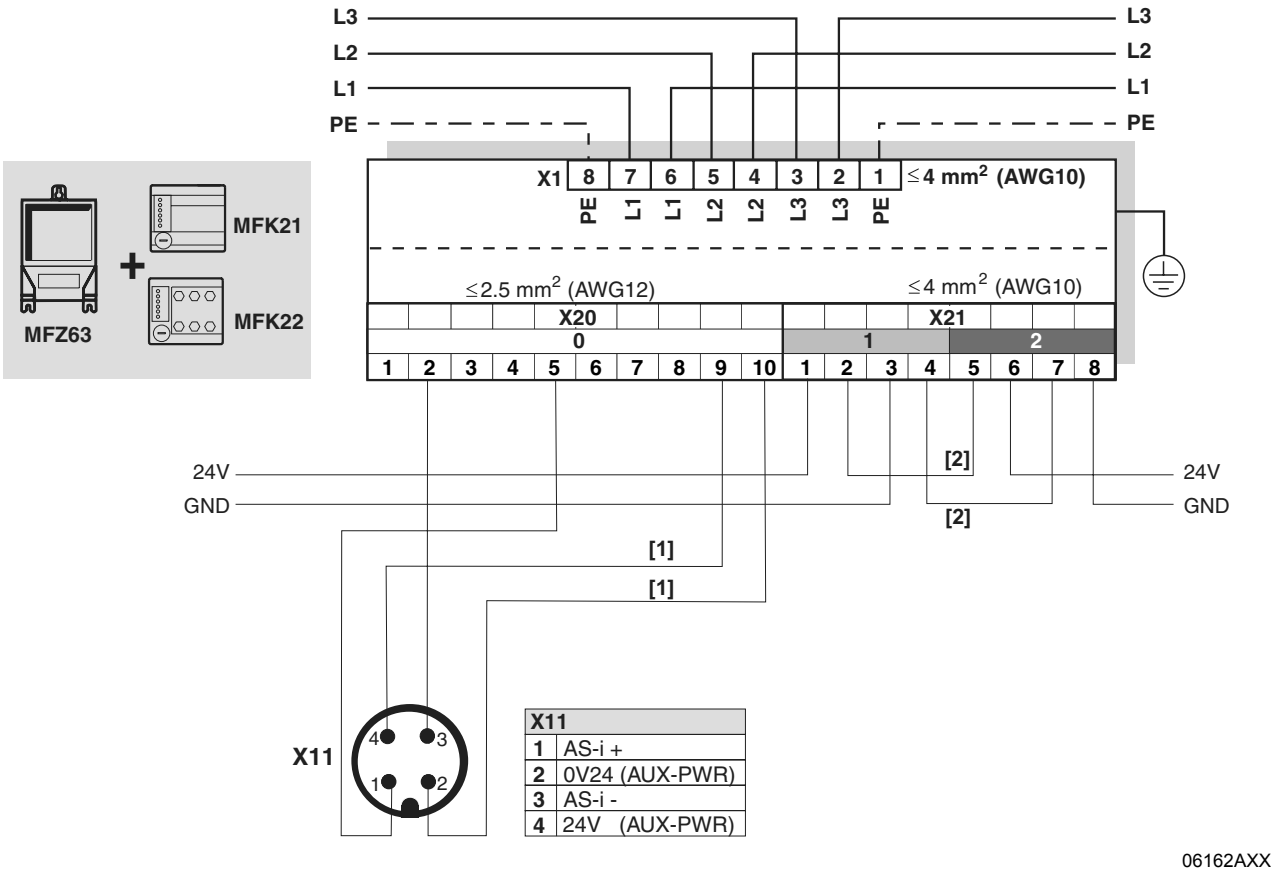
0 = Potential level 0 **1** = Potential level 1

[1] If MFZ11/MOVIMOT® are mounted separately:
Connect the shield of the RS-485 cable using the EMC metal cable gland on MFZ and the MOVIMOT® housing
[2] Ensure equipotential bonding between all bus stations
[3] Assignment of terminals 19-36 starting on page 45
[4] Cables must be rewired by the customer

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	–	–	Reserved
	2	AS-interface –	Input/output	AS-interface data cable and electronics supply for MFK
	3	–	–	Reserved
	4	–	–	Reserved
	5	AS-interface +	Input/output	AS-interface data cable and electronics supply for MFK
	6	–	–	Reserved
	7	–	–	Reserved
	8	–	–	Reserved
	9	–	–	Reserved
	10	–	–	Reserved
	11	24 V (AUX PWR)	Input	24 V voltage supply for MOVIMOT®, sensors
	12	24 V (AUX PWR)	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND (AUX PWR)	–	0V24 reference potential for MOVIMOT® and sensors
	14	GND (AUX PWR)	–	0V24 reference potential for MOVIMOT® and sensors
	15	24 V	–	24 V voltage supply for MOVIMOT® (jumpered with terminal X20/11)
	16	RS+	–	Communication link to MOVIMOT® terminal RS+
	17	RS-	–	Communication link to MOVIMOT® terminal RS-
	18	GND	–	0V24 reference potential for MOVIMOT® (jumpered with X20/13)

Connection of MFZ63 field distributor

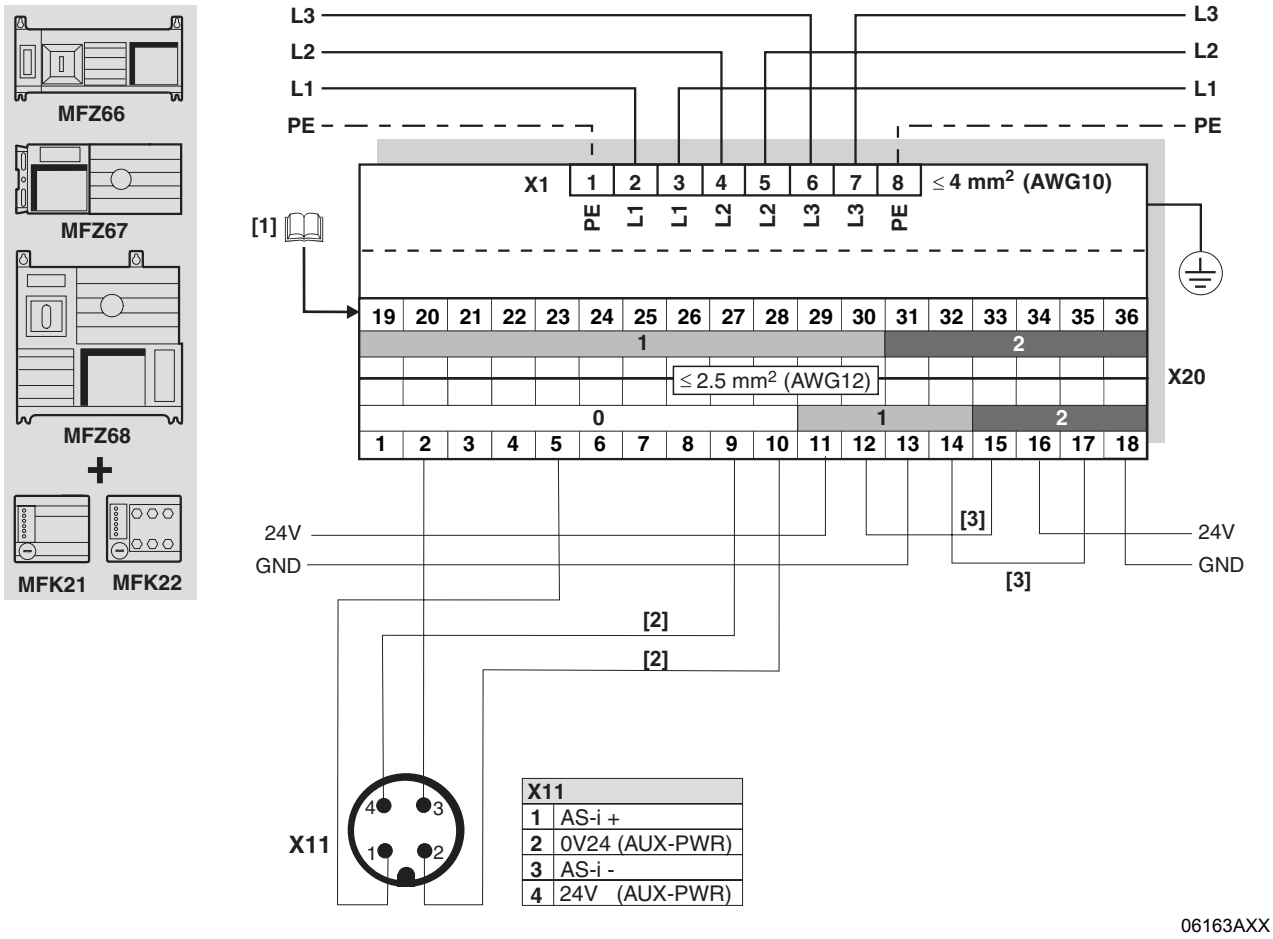


[1] Cables must be rewired by the customer
[2] Factory installed jumpers 0.75 mm²

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

Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	–	–	Reserved
	2	AS-interface –	Input/output	AS-interface data cable and electronics supply for MFK
	3	–	–	Reserved
	4	–	–	Reserved
	5	AS-interface +	Input/output	AS-interface data cable and electronics supply for MFK
	6-10	–	–	Reserved
X21	**1**	24 V (AUX PWR)	Input	24 V voltage supply for MOVIMOT® and sensors
	2	24 V (AUX PWR)	Output	24 V voltage supply (jumpered with terminal X21/1)
	3	GND (AUX PWR)	–	0V24 reference potential for MOVIMOT® and sensors
	4	GND (AUX PWR)	–	0V24 reference potential for MOVIMOT® and 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	–	0V24V reference potential for actuators
	8	GND2	–	0V24V reference potential for actuators

Connection of MFZ66, MFZ67, MFZ68 field distributors



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

[1] Assignment of terminals 19-36 starting on page 45
[2] Cables must be rewired by the customer
[3] Factory installed jumpers 0.75 mm²

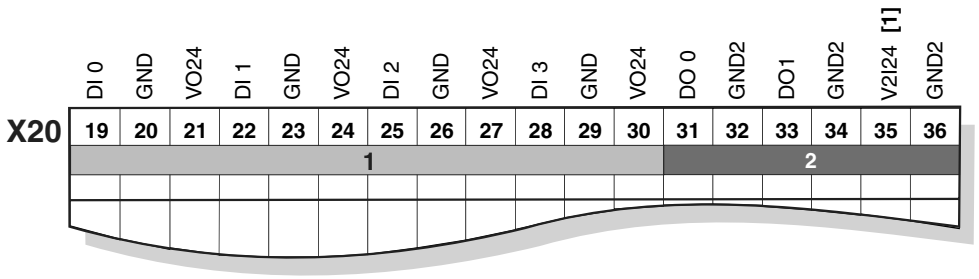
Terminal assignment				
No.		**Name**	**Direction**	**Function**
X20	**1**	–	–	Reserved
	2	AS-interface –	Input/output	AS-interface data cable and electronics supply for MFK
	3	–	–	Reserved
	4	–	–	Reserved
	5	AS-interface +	Input/output	AS-interface data cable and electronics supply for MFK
	6-10	–	–	–
	11	24 V (AUX PWR)	Input	24 V voltage supply for sensors
	12	24 V (AUX PWR)	Output	24 V voltage supply (jumpered with terminal X20/11)
	13	GND (AUX PWR)	–	0V24 reference potential for sensors
	14	GND (AUX PWR)	–	0V24 reference potential for 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
	18	GND2	–	0V24V reference potential for actuators

6.6 Connection: Inputs/outputs (I/O) of AS-interface interfaces MFK..

Connection via terminals of..

...fieldbus interfaces with 4 digital inputs and 2 digital outputs:

MFZ.1 **MFZ.6** **MFZ.7** **MFZ.8**	in combination with	**MF.21** **MF.22** **MF.23**	**MQ.21** **MQ.22**



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[1] Only MFI23: Reserved
All other MF.. modules: V2I24

1	= Potential level 1
2	= Potential level 2

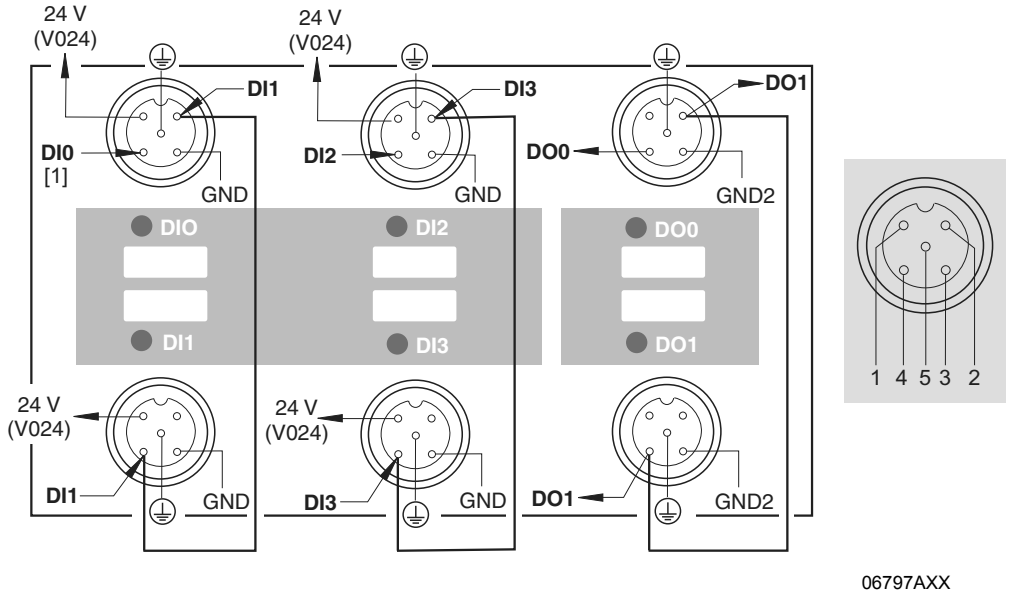
No.		Name	Direction	Function
X20	**19**	DI0	Input	Switching signal from sensor 1[1)]
	20	GND	–	0V24 reference potential for sensor 1
	21	V024	Output	24 V voltage supply for sensor 1[1)]
	22	DI1	Input	Switching signal from sensor 2
	23	GND	–	0V24 reference potential for sensor 2
	24	V024	Output	24 V voltage supply for sensor 2
	25	DI2	Input	Switching signal from sensor 3
	26	GND	–	0V24 reference potential for sensor 3
	27	V024	Output	24 V voltage supply for sensor 3
	28	DI3	Input	Switching signal from 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
	32	GND2	–	0V24 reference potential for actuator 1
	33	DO1	Output	Switching signal from actuator 2
	34	GND2	–	0V24 reference potential for actuator 2
	35	V2I24	Input	24 V voltage supply for actuators **Only for MFI23: Reserved** **Only for MFZ.6, MFZ.7 and MFZ.8: Jumpered with terminal 15 or 16**
	36	GND2	–	0V24 reference potential for actuators **Only for MFZ.6, MFZ.7 and MFZ.8: Jumpered with terminal 17 or 18**

1) Used in conjunction with field distributors MFZ26J and MFZ28J for maintenance switch feedback signal (NO contact). Evaluation using control is possible.

Connection via M12 plug connector of...

MF.22, MQ.22, MF.23 fieldbus interfaces with four digital inputs and two digital outputs:

- Connect sensors/actuators using either M12 sockets or terminals.
- When using outputs: Connect 24 V to V2I24 / GND2
- Connect dual-channel sensors/actuators to DI0, DI2 and DO0 DI1, DI3 and DO1 can no longer be used.

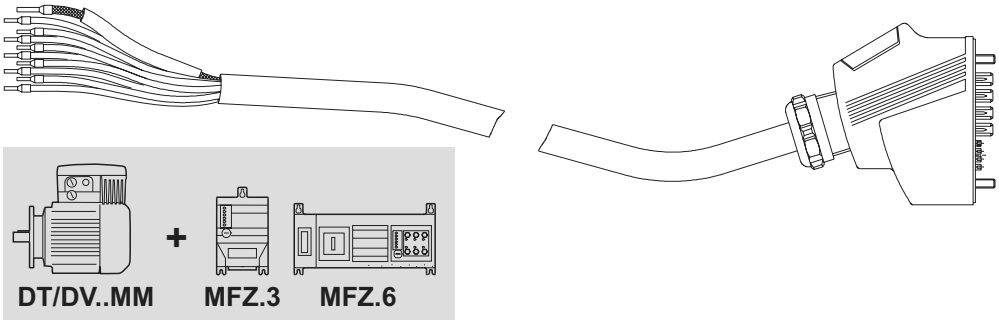


[1] Do not use DI0 in combination with field distributors MFZ26**J** and MFZ28**J**.

Important: Connections that are not in use must be covered with M12 closing caps to guarantee enclosure IP65.

6.7 Connection of prefabricated cables

Connection between MFZ.3. or MFZ.6. field distributor and MOVIMOT® (part number 0 186 725 3)



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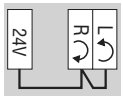
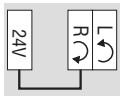
Cable assignment MOVIMOT® terminal	Core color/Designation
L1	Black/L1
L2	Black/L2
L3	Black/L3
24 V	Red/24 V
⊥	White/0 V, white/0 V
RS+	Orange/RS+
RS-	Green/RS-
PE terminal	Green/yellow + shield end

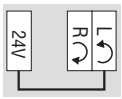
Note enabling of the direction of rotation



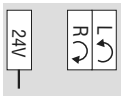
Both directions of rotation are enabled



Only CW operation enabled; Setpoint specifications for CCW operation result in standstill of drive

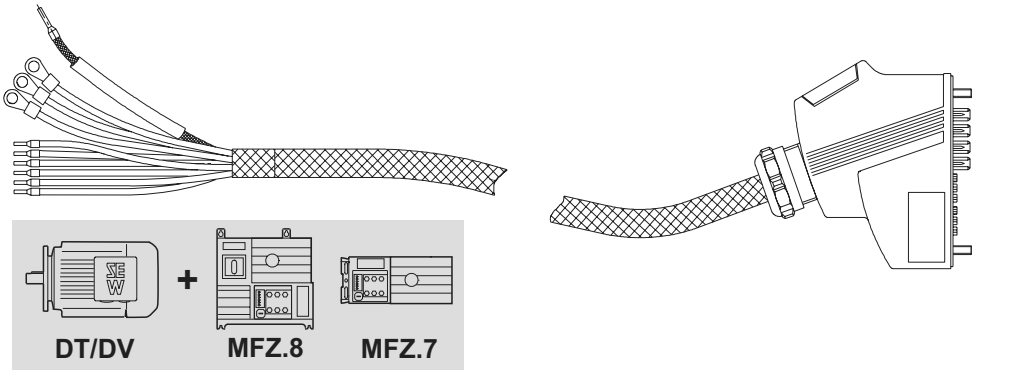


Only counterclockwise (CCW) operation is enabled; Setpoint specifications for clockwise (CW) operation result in standstill of drive



Drive is inhibited or brought to a stop

Connection of MFZ.7. or MFZ.8. field distributor and AC motors (part number 0 186 742 3)



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The outer shield of the cable must be attached to the housing of the motor terminal box using an EMC metal cable gland.

Cable assignment	
Motor terminal	**Core color/Designation**
U1	Black/U1
V1	Black/V1
W1	Black/W1
4a	Red/13
3a	White/14
5a	Blue/15
1a	Black/1
2a	Black/2
PE terminal	Green-yellow + shield end (internal shield)

Motor assignment → MF../MM../Z.7., MQ../MM../Z.7. field distributor

1400 1/min:

Power [kW]	Motor ⅄	Field distributor	
		with MF.. fieldbus interface	with MQ.. fieldbus interface
0.25	DFR63L4/TH	– MF../ **MM03C** / Z.7F **0** / **BW1**[1)]	– MQ../ **MM03C** / Z.7F **0** / **BW1**[1)]
	DFR63L4/**BMG**/TH .	– MF../ **MM03C** / Z.7F **0**[1)]	– MQ../ **MM03C** / Z.7F **0**[1)]
0.37	DT71D4/TH	MF../ **MM03C** / Z.7F **0** / **BW1** MF../ **MM05C** / Z.7F **0** / **BW1**[1)]	MQ../ **MM03C** / Z.7F **0** / **BW1** MQ../ **MM05C** / Z.7F **0** / **BW1**[1)]
	DT71D4/**BMG**/TH .	MF../ **MM03C** / Z.7F **0** MF../ **MM05C** / Z.7F **0**[1)]	MQ../ **MM03C** / Z.7F **0** MQ../ **MM05C** / Z.7F **0**[1)]
0.55	DT80K4/TH	MF../ **MM05C** / Z.7F **0** / **BW1** MF../ **MM07C** / Z.7F **0** / **BW1**[1)]	MQ../ **MM05C** / Z.7F **0** / **BW1** MQ../ **MM07C** / Z.7F **0** / **BW1**[1)]
	DT80K4/**BMG**/TH .	MF../ **MM05C** / Z.7F **0** MF../ **MM07C** / Z.7F **0**[1)]	MQ../ **MM05C** / Z.7F **0** MQ../ **MM07C** / Z.7F **0**[1)]
0.75	DT80N4/TH	MF../ **MM07C** / Z.7F **0** / **BW1** MF../ **MM11C** / Z.7F **0** / **BW1**[1)]	MQ../ **MM07C** / Z.7F **0** / **BW1** MQ../ **MM11C** / Z.7F **0** / **BW1**[1)]
	DT80N4/**BMG**/TH .	MF../ **MM07C** / Z.7F **0** MF../ **MM11C** / Z.7F **0**[1)]	MQ../ **MM07C** / Z.7F **0** MQ../ **MM11C** / Z.7F **0**[1)]
1.1	DT90S4/TH	MF../ **MM11C** / Z.7F **0** / **BW1** MF../ **MM15C** / Z.7F **0** / **BW1**[1)]	MQ../**MM11C**/Z.7F **0**/**BW1** MQ../ **MM15C** / Z.7F **0** / **BW1**[1)]
	DT90S4/**BMG**/TH .	MF../ **MM11C** / Z.7F **0** MF../ **MM15C** / Z.7F **0**[1)]	MQ../ **MM11C** / Z.7F **0** MQ../ **MM15C** / Z.7F **0**[1)]
1.5	DT90L4/TH	MF../ **MM15C** / Z.7F **0** / **BW1** –	MQ../ **MM15C** / Z.7F **0** / **BW1** –
	DT90L4/**BMG**/TH .	MF../ **MM15C** / Z.7F **0** –	MQ../ **MM15C** / Z.7F **0** –

1) Combination with increased short-term torque

2900 1/min:

Power [kW]	Motor△	Field distributor	
		with MF.. fieldbus interface	with MQ.. fieldbus interface
0.37	DFR63L4 / TH	MF../ **MM03C** / Z.7F **1** / **BW1** MF../ **MM05C** / Z.7F **1** / **BW1**[1)]	MQ../ **MM03C** / Z.7F **1** / **BW1** MQ../ **MM05C** / Z.7F **1** / **BW1**[1)]
	DFR63L4 / **BMG** / TH .	MF../ **MM03C** / Z.7F **1** MF../ **MM05C** / Z.7F **1**[1)]	MQ../ **MM03C** / Z.7F **1** MQ../ **MM05C** / Z.7F **1**[1)]
0.55	DT71D4 / TH	MF../ **MM05C** / Z.7F **1** / **BW1** MF../ **MM07C** / Z.7F **1** / **BW1**[1)]	MQ../ **MM05C** / Z.7F **1** / **BW1** MQ../ **MM07C** / Z.7F **1** / **BW1**[1)]
	DT71D4 / **BMG** / TH .	MF../ **MM05C** / Z.7F **1** MF../ **MM07C** / Z.7F **1**[1)]	MQ../ **MM05C** / Z.7F **1** MQ../ **MM07C** / Z.7F **1**[1)]
0.75	DT80K4 / TH	MF../ **MM07C** / Z.7F **1** / **BW1** MF../ **MM11C** / Z.7F **1** / **BW1**[1)]	MQ../ **MM07C** / Z.7F **1** / **BW1** MQ../ **MM11C** / Z.7F **1** / **BW1**[1)]
	DT80K4 / **BMG** / TH .	MF../ **MM07C** / Z.7F **1** MF../ **MM11C** / Z.7F **1**[1)]	MQ../ **MM07C** / Z.7F **1** MQ../ **MM11C** / Z.7F **1**[1)]
1.1	DT80N4 / TH	MF../ **MM11C** / Z.7F **1** / **BW1** MF../ **MM15C** / Z.7F **1** / **BW1**[1)]	MQ../ **MM11C** / Z.7F **1** / **BW1** MQ../ **MM15C** / Z.7F **1** / **BW1**[1)]
	DT80N4 / **BMG** / TH .	MF../ **MM11C** / Z.7F **1** MF../ **MM15C** / Z.7F **1**[1)]	MQ../ **MM11C** / Z.7F **1** MQ../ **MM15C** / Z.7F **1**[1)]
1.5	DT90S4 / TH	MF../ **MM15C** / Z.7F **1** / **BW1** –	MQ../ **MM15C** / Z.7F **1** / **BW1** –
	DT90S4 / **BMG** / TH .	MF../ **MM15C** / Z.7F **1** –	MQ../ **MM15C** / Z.7F **1** –

1) Combination with increased short-term torque

Motor assignment → MF../MM../Z.8., MQ../MM../Z.8. field distributor

1400 1/min:

Power [kW]	Motor	Field distributor	
		with MF.. fieldbus interface	with MQ.. fieldbus interface
0.25	DFR63L4 / TH	– MF../ **MM03C** / Z.8F **0** / **BW1** / AF..[1)]	– MQ../ **MM03C** / Z.8F **0** / **BW1** / AF..[1)]
	DFR63L4 / **BMG** / TH .	– MF../ **MM03C** / Z.8F **0** / AF..[1)]	– MQ../ **MM03C** / Z.8F **0** / AF..
0.37	DT71D4 / TH	MF../ **MM03C** / Z.8F **0** / **BW1** / AF.. MF../ **MM05C** / Z.8F **0** / **BW1** / AF..[1)]	MQ../ **MM03C** / Z.8F **0** / **BW1** / AF.. MQ../ **MM05C** / Z.8F **0** / **BW1** / AF..[1)]
	DT71D4 / **BMG** / TH .	MF../ **MM03C** / Z.8F **0** / AF.. MF../ **MM05C** / Z.8F **0** / AF..[1)]	MQ../ **MM03C** / Z.8F **0** / AF.. MQ../ **MM05C** / Z.8F **0** / AF..[1)]
0.55	DT80K4 / TH	MF../ **MM05C** / Z.8F **0** / **BW1** / AF.. MF../ **MM07C** / Z.8F **0** / **BW1** / AF..[1)]	MQ../ **MM05C** / Z.8F **0** / **BW1** / AF.. MQ../ **MM07C** / Z.8F **0** / **BW1** / AF..[1)]
	DT80K4 / **BMG** / TH .	MF../ **MM05C** / Z.8F **0** / AF.. MF../ **MM07C** / Z.8F **0** / AF..[1)]	MQ../ **MM05C** / Z.8F **0** / AF.. MQ../ **MM07C** / Z.8F **0** / AF..[1)]
0.75	DT80N4 / TH	MF../ **MM07C** / Z.8F **0** / **BW1** / AF.. MF../ **MM11C** / Z.8F **0** / **BW1** / AF..[1)]	MQ../ **MM07C** / Z.8F **0** / **BW1** / AF.. MQ../ **MM11C** / Z.8F **0** / **BW1** / AF..[1)]
	DT80N4 / **BMG** / TH .	MF../ **MM07C** / Z.8F **0** / AF.. MF../ **MM11C** / Z.8F **0** / AF..[1)]	MQ../ **MM07C** / Z.8F **0** / AF.. MQ../ **MM11C** / Z.8F **0** / AF..[1)]
1.1	DT90S4 / TH	MF../ **MM11C** / Z.8F **0** / **BW1** / AF.. MF../ **MM15C** / Z.8F **0** / **BW1** / AF..[1)]	MQ../ **MM11C** / Z.8F **0** / **BW1** / AF.. MQ../ **MM15C** / Z.8F **0** / **BW1** / AF..[1)]
	DT90S4 / **BMG** / TH .	MF../ **MM11C** / Z.8F **0** / AF.. MF../ **MM15C** / Z.8F **0** / AF..[1)]	MQ../ **MM11C** / Z.8F **0** / AF.. MQ../ **MM15C** / Z.8F **0** / AF..[1)]
1.5	DT90L4 / TH	MF../ **MM15C** / Z.8F **0** / **BW1** / AF.. MF../ **MM22C** / Z.8F **0** / **BW2** / AF..[1)]	MQ../ **MM15C** / Z.8F **0** / **BW1** / AF.. MQ../ **MM22C** / Z.8F **0** / **BW2** / AF..[1)]
	DT90L4 / **BMG** / TH .	MF../ **MM15C** / Z.8F **0** / AF.. MF../ **MM22C** / Z.8F **0** / AF..[1)]	MQ../ **MM15C** / Z.8F **0** / AF.. MQ../ **MM22C** / Z.8F **0** / AF..[1)]
2.2	DV100M4 / TH	MF../ **MM22C** / Z.8F **0** / **BW2** / AF.. MF../ **MM30C** / Z.8F **0** / **BW2** / AF..[1)]	MQ../ **MM22C** / Z.8F **0** / **BW2** / AF.. MQ../ **MM30C** / Z.8F **0** / **BW2** / AF..[1)]
	DV100M4 / **BMG** / TH .	MF../ **MM22C** / Z.8F **0** / AF.. MF../ **MM30C** / Z.8F **0** / AF..[1)]	MQ../ **MM22C** / Z.8F **0** / AF.. MQ../ **MM30C** / Z.8F **0** / AF..[1)]
3	DV100L4 / TH	MF../ **MM30C** / Z.8F **0** / **BW2** / AF.. MF../ **MM3XC** / Z.8F **0** / **BW2** / AF..[1)]	MQ../ **MM30C** / Z.8F **0** / **BW2** / AF.. MQ../ **MM3XC** / Z.8F **0** / **BW2** / AF..[1)]
	DV100L4 / **BMG** / TH .	MF../ **MM30C** / Z.8F **0** / AF.. MF../ **MM3XC** / Z.8F **0** / AF..[1)]	MQ../ **MM30C** / Z.8F **0** / AF.. MQ../ **MM3XC** / Z.8F **0** / AF..[1)]

1) Combination with increased short-term torque

2900 1/min:

Power [kW]	Motor△	Field distributor	
		with MF.. fieldbus interface	with MQ.. fieldbus interface
0.37	DFR63L4 / TH	MF../ **MM03C** / Z.8F **1** / **BW1** / AF.. MF../ **MM05C** / Z.8F **1** / **BW1** / AF..[1)]	MQ../ **MM03C** / Z.8F **1** / **BW1** / AF.. MQ../ **MM05C** / Z.8F **1** / **BW1** / AF..[1)]
	DFR63L4 / **BMG** / TH .	MF../ **MM03C** / Z.8F **1** / AF.. MF../ **MM05C** / Z.8F **1** / AF..[1)]	MQ../ **MM03C** / Z.8F **1** / AF.. MQ../ **MM05C** / Z.8F **1** / AF..[1)]
0.55	DT71D4 / TH	MF../ **MM05C** / Z.8F **1** / **BW1** / AF.. MF../ **MM07C** / Z.8F **1** / **BW1** / AF..[1)]	MQ../ **MM05C** / Z.8F **1** / **BW1** / AF.. MQ../ **MM07C** / Z.8F **1** / **BW1** / AF..[1)]
	DT71D4 / **BMG** / TH .	MF../ **MM05C** / Z.8F **1** / AF.. MF../ **MM07C** / Z.8F **1** / AF..[1)]	MQ../ **MM05C** / Z.8F **1** / AF.. MQ../ **MM07C** / Z.8F **1** / AF..[1)]
0.75	DT80K4 / TH	MF../ **MM07C** / Z.8F **1** / **BW1** / AF.. MF../ **MM11C** / Z.8F **1** / **BW1** / AF..[1)]	MQ../ **MM07C** / Z.8F **1** / **BW1** / AF.. MQ../ **MM11C** / Z.8F **1** / **BW1** / AF..[1)]
	DT80K4 / **BMG** / TH .	MF../ **MM07C** / Z.8F **1** / AF.. MF../ **MM11C** / Z.8F **1** / AF..[1)]	MQ../ **MM07C** / Z.8F **1** / AF.. MQ../ **MM11C** / Z.8F **1** / AF..[1)]
1.1	DT80N4 / TH	MF../**MM11C**/Z.8F **1**/**BW1**/AF.. MF../ **MM15C** / Z.8F **1** / **BW1** / AF..[1)]	MQ../ **MM11C** / Z.8F **1** / **BW1** / AF.. MQ../ **MM15C** / Z.8F **1** / **BW1** / AF..[1)]
	DT80N4 / **BMG** / TH .	MF../ **MM11C** / Z.8F **1** / AF.. MF../ **MM15C** / Z.8F **1** / AF..[1)]	MQ../ **MM11C** / Z.8F **1** / AF.. MQ../ **MM15C** / Z.8F **1** / AF..[1)]
1.5	DT90S4 / TH	MF../ **MM15C** / Z.8F **1** / **BW1** / AF.. MF../ **MM22C** / Z.8F **1** / **BW2** / AF..[1)]	MQ../ **MM15C** / Z.8F **1** / **BW1** / AF.. MQ../ **MM22C** / Z.8F **1** / **BW2** / AF..[1)]
	DT90S4 / **BMG** / TH .	MF../ **MM15C** / Z.8F **1** / AF.. MF../ **MM22C** / Z.8F **1** / AF..[1)]	MQ../ **MM15C** / Z.8F **1** / AF.. MQ../ **MM22C** / Z.8F **1** / AF..[1)]
2.2	DT90L4 / TH	MF../ **MM22C** / Z.8F **1** / **BW2** / AF.. MF../ **MM30C** / Z.8F **1** / **BW2** / AF..[1)]	MQ../ **MM22C** / Z.8F **1** / **BW2** / AF.. MQ../ **MM30C** / Z.8F **1** / **BW2** / AF..[1)]
	DT90L4 / **BMG** / TH .	MF../ **MM22C** / Z.8F **1** / AF.. MF../ **MM30C** / Z.8F **1** / AF..[1)]	MQ../ **MM22C** / Z.8F **1** / AF.. MQ../ **MM30C** / Z.8F **1** / AF..[1)]
3	DV100M4 / TH	MF../ **MM30C** / Z.8F **1** / **BW2**/ AF.. MF../ **MM3XC** / Z.8F **1** / **BW2**/ AF..[1)]	MQ../ **MM30C** / Z.8F **1** / **BW2**/ AF.. MQ../ **MM3XC** / Z.8F **1** / **BW2**/ AF..[1)]
	DV100M4 / **BMG** / TH .	MF../ **MM30C** / Z.8F **1** / AF.. MF../ **MM3XC** / Z.8F **1** / AF..[1)]	MQ../ **MM30C** / Z.8F **1** / AF.. MQ../ **MM3XC** / Z.8F **1** / AF..[1)]

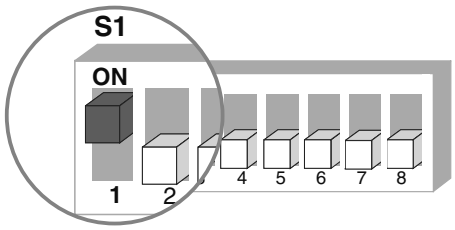
1) Combinations with increased short-term torque

7 Startup

7.1 Startup procedure

- We recommend switching off all voltage supplies before removing/attaching the AS-interface (MFK).
- The AS-interface connection is permanently secured using the connection technology described on page 38, so that the AS-interface mains operation can continue even after removal of the interface.
- In addition, observe the notes in the section "Supplementary Field Distributor Startup Information".

1. Check that MOVIMOT® and the AS-interface connection module (MFZ61, MFZ63, MFZ66, MFZ67 or MFZ68) are connected correctly.
2. Set DIP switch S1/1 (on MOVIMOT®) to ON (= address 1).



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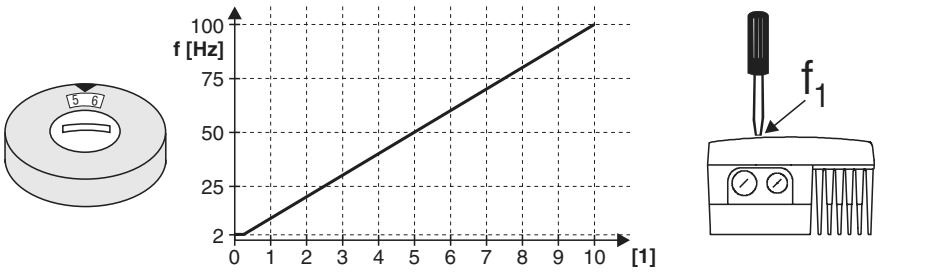
3. Use setpoint potentiometer f1 (on MOVIMOT®) to set maximum speed.



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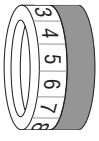
[1] Potentiometer setting

4. Reinstall screw plug of the cover (with gasket).
5. Set the minimum frequency f_{min} with switch f2 (on MOVIMOT®).

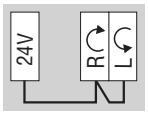
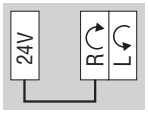
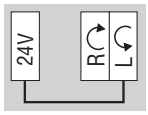
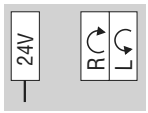
Function	Setting										
Detent position	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency f_{min} [Hz]	2	5	7	10	12	15	20	25	30	35	40

6. Depending on the selected function module, set the ramp time with switch t1 (on MOVIMOT®) (not relevant for function module 1). The ramp times are based on a setpoint step change of 50 Hz.



Function	Setting										
Detent position	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0,1	0,3	0,2	0,5	0,7	1	2	3	5	7	10

7. Check whether the requested direction of rotation has been enabled (on MOVIMOT®).

Terminal R	Terminal L	Meaning
Activated	Activated	• Both directions of rotation are enabled
		
Activated	Not activated	• Only CW operation enabled • Preselected setpoints for CCW operation result in standstill of drive
		
Not activated	Activated	• Only CCW operation enabled • Preselected setpoints for CW operation result in standstill of drive
		
Not activated	Not activated	• Unit is inhibited or drive brought to a stop
		

8. The required AS-interface address is assigned either via an addressing device (see the following section) or later via a master (see the description of your AS-interface master).
9. Switch on AS-interface voltage and 24 V auxiliary voltage. The LEDs AS-interface PWR LED and AUX-PWR LED will illuminate in green and the SYS-F-LED must go out.

7.2 Assigning the AS-interface address

Fieldbus interfaces with integrated AS-interface are supplied with address 0. Addresses (address 1 to 31) are assigned as follows:

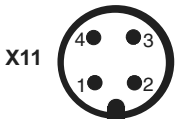
- Address assignment occurs automatically within a configured AS-interface system when replacing fieldbus interfaces. The following prerequisites must be fulfilled:
  - The new fieldbus interface must have address 0.
  - If you need to replace multiple fieldbus interfaces, you must exchange them individually (one after another).
- Manual address assignment is carried out using the system master (you must connect the fieldbus interfaces to the AS-interface cable one after another so that multiple fieldbus interfaces will not have the same address).
- Manual address assignment is carried out using the AS-interface hand-held programming device (before connecting the fieldbus interfaces to the AS-interface cable, see the following section).

Assigning the slave address using a hand-held programming device

AS-interface hand-held programming devices offer the following functions:

- Reading and changing an AS-interface slave address
- Reading the AS-interface profile
- Reading and changing data bits
- Function check and test run. You will need an external voltage supply (AUX-PWR) for the function check and test run, as the hand-held programming devices do not provide enough power for operation.

When using a hand-held programming device, you need a two-core connection cable that fits onto the AS-interface plug connector of the field bus interface (see the following figure).



1: AS-Interface +
2: 0V24 [1]
3: AS-Interface -
4: 24V [1]

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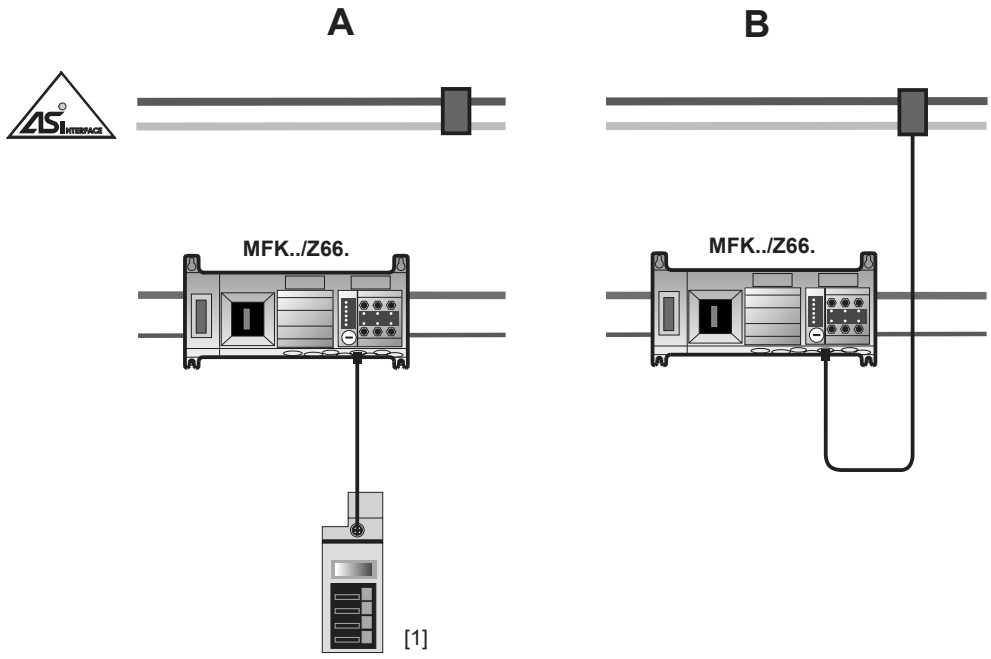
[1] Pins 2 + 4 are not required for assigning the address.

- **Only connect the hand-held programming device via pin 1 (AS-interface +) and 3 (AS-interface –) with the AS-interface plug connector.**

Example

Example: Each AS-interface station is individually addressed (A) and reintegrated in the AS-interface (B).



[1] AS-interface addressing device

8 Function of AS-Interface Interface MFK..

The AS-interface interface MFK allows you to control MOVIMOT® AC motors. It is an AS-interface slave with a 7.4-profile "four bit mode" slave (IO=7, ID=4, ID1=F, ID2=0).

You control the MOVIMOT® via AS-interface in cyclical operation via 4 bit. The meaning of the data bits is determined by the active function module. The individual function modules have the parameters (FP = function module parameter) that can be read and written via the 7.4 protocol paramter channel via AS-interface. You can also select the active function module via the paramter channel. Function module 1 is activated as the factory setting by default (only function modules 1 and 11 are available at the moment).

8.1 Overview of function modules

The following table shows the function modules that are currently integrated.

Function Module	Drive Function	I/O Function	Additional Information
1	• 6 Fixed setpoints • 3 Ramps • Motor potentiometer function (+ Ramp) • Brake release without enable	• 2 Sensors (DI2, DI3) • Motor potentiometer up and down • No outputs	Page 57
2 to 10	Not installed	Not installed	–
11	–	• 4 inputs (DI0, DI1, DI2, DI3) • 2 outputs (DO0, DO1)	Page 60

8.2 Description of function modules

Function module 1

The following section describes the cyclical data exchange between master and slave.

Data transmission master → slave

The following table shows the data transfer from master to slave:

4 Bit Coded	Meaning
$0000_{bin} = 0_{dec}$	Rapid stop/inhibit
$0001_{bin} = 1_{dec}$	Stop/inhibit (uses ramp down)
$0010_{bin} = 2_{dec}$	Enable + setpoint n11
$0011_{bin} = 3_{dec}$	Enable + setpoint n12
$0100_{bin} = 4_{dec}$	Enable + setpoint n13
$0101_{bin} = 5_{dec}$	Enable + setpoint n21
$0110_{bin} = 6_{dec}$	Enable + setpoint n22
$0111_{bin} = 7_{dec}$	Enable + setpoint n23
$1000_{bin} = 8_{dec}$	Motor potentiometer: Enable CW operation
$1001_{bin} = 9_{dec}$	Motor potentiometer: Enable CCW operation
$1010_{bin} = 10_{dec}$	Reserved
$1011_{bin} = 11_{dec}$	Reserved
$1100_{bin} = 12_{dec}$	Reserved
$1101_{bin} = 13_{dec}$	Reserved
$1110_{bin} = 14_{dec}$	Brake release without enable with activated MOVIMOT® DIP switch S2/2 (refer to the MOVIMOT® operating instructions for more information)
$1111_{bin} = 15_{dec}$	Reset (only works when a MOVIMOT® error occurs)

Data transmission slave → master

The following table shows the data transfer from slave to master:

4 Bit Coded (Individually)	Meaning
Bit 0	Ready signal
Bit 1	Enabled
Bit 2	Digital input DI2
Bit 3	Digital input DI3

Function module 1 parameters

The following table describes the parameters for function module 1:

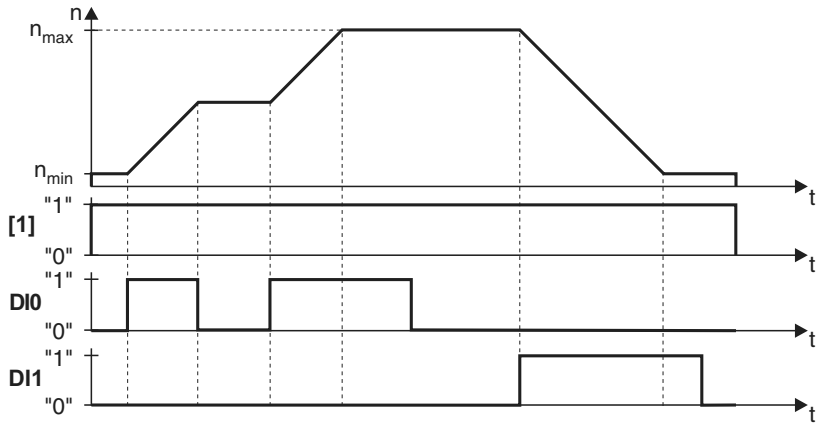
Index		Access Type	Type	Default	Meaning
20_{hex}	32_{dec}	Read/write	INT16	5 % = 0333_{hex}	Setpoint n11
21_{hex}	33_{dec}	Read/write	INT16	25 % = 1000_{hex}	Setpoint n12
22_{hex}	34_{dec}	Read/write	INT16	50 % = 2000_{hex}	Setpoint n13
23_{hex}	35_{dec}	Read/write	INT16	–5 % = $FCCD_{hex}$	Setpoint n21
24_{hex}	36_{dec}	Read/write	INT16	–25 % = $F000_{hex}$	Setpoint n22
25_{hex}	37_{dec}	Read/write	INT16	–50 % = $E000_{hex}$	Setpoint n23
26_{hex}	38_{dec}	Read/write	UINT16	1000	Ramp up [ms]
27_{hex}	39_{dec}	Read/write	UINT16	1000	Ramp down [ms]
28_{hex}	40_{dec}	Read/write	UINT16	100	Rapid stop ramp [ms]
29_{hex}	41_{dec}	Read/write	UINT16	20000	Motor potentiometer ramp [ms]
$2A_{hex}$	42_{dec}	Read	UINT16	0	Status
$2B_{hex}$	43_{dec}	Read	UINT16	0	Error no. as in diagnostics string

Function of motor potentiometer

The motor potentiometer function is used for continuous speed control. The ramp times refer to a setpoint change of Δf = 50 Hz.

Ramp up/ramp down → Index 41_{dec}

- Setting range: 0.2 ... 20 ... 50 s
- The drive starts with n_{min} (f_{min}) following a 24 V power off/24 V power on or after withdrawal of the enable.
- The ramp is active if the drive is enabled with motorized potentiometer function (AS-interface code "8" or "9") and one of the two corresponding input terminals (DI0 or DI1) features a "1" signal.



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[1] AS-interface = "8" or "9"

MOVIMOT® additional functions in conjunction with function module 1

The following table must be observed when using the MOVIMOT® additional functions. A detailed description of the additional functions can be found in the "MOVIMOT® MM..C" operating instructions.

Additional Function		Limitations for MOVIMOT® Integrated in the Motor	Limitations for MOVIMOT® Integrated in Field Distributor Z.7 and Z.8
1	MOVIMOT® with increased ramp times	–	–
2	MOVIMOT® with adjustable current limitation (error if exceeded)	–	–
3	MOVIMOT® with adjustable current limitation (switchable via terminal f1/f2)	–	–
4	MOVIMOT® with bus parameter setting	**Not possible**	**Not possible**
5	MOVIMOT® with motor protection in Z.7 and Z.8 field distributor	**Not possible**	Bus parameter setting not possible
6	MOVIMOT® with maximum 8 kHz PWM frequency	–	–
7	MOVIMOT® with rapid start/stop	Rapid stop function (bit 9) not possible	Rapid stop function (bit 9) not possible
			The mechanical brake can only be controlled by MOVIMOT®. It is not possible to control the brake using the relay output.
8	MOVIMOT ® with minimum frequency 0 Hz	Not possible when motor potentiometer function is used	Not possible when motor potentiometer function is used
9	MOVIMOT® for hoist applications	Rapid stop function (bit 9) not possible	**Not possible**
10	MOVIMOT® with minimum frequency 0 Hz and reduced torque at low frequencies	Not possible when motor potentiometer function is used	Not possible when motor potentiometer function is used
11	Monitoring of power supply phase failure deactivated	–	–
12	MOVIMOT® with rapid start/stop and motor protection in Z.7 and Z.8 field distributors	**Not possible**	Rapid stop function (bit 9) not possible
			The mechanical brake can only be controlled by MOVIMOT®. It is not possible to control the brake using the relay output.
13	MOVIMOT® for hoist applications with extended n-monitoring	Rapid stop function (bit 9) not possible	**Not possible**
14	MOVIMOT® with deactivated slip compensation	–	–

Function module 11

The following section describes the cyclical data exchange between master and slave with activated function module 11.

Data transmission master → slave

The following table shows the data transfer from master to slave:

4 Bit Coded	Meaning
Bit 0	Digital output DO0
Bit 1	Digital output DO1
Bit 2	–
Bit 3	–

Data transmission slave → master

The following table shows the data transfer from slave to master:

4 Bit Coded	Meaning
Bit 0	Digital input DI0
Bit 1	Digital input DI1
Bit 2	Digital input DI2
Bit 3	Digital input DI3

No parameters are assigned to function module 11.

8.3 Index assignment of function modules

The parameters of the function modules are each 16 bit values. These are interpreted with or without a plus/minus sign, depending on the parameter.

Index	Meaning	Access	Default Value
0_{dec}	Active function module	Read/write only if MOVIMOT® is not enabled Value = 1 = function module 1 Value = 11 = function module 11	1
1_{dec} to 31_{dec}	Reserved	Read/write	0
32_{dec} to 63_{dec}	Function module 1 parameters		
64_{dec} to 383_{dec}	Reserved		

The description of the function module begins on page 57.

8.4 Notes on transferring parameters

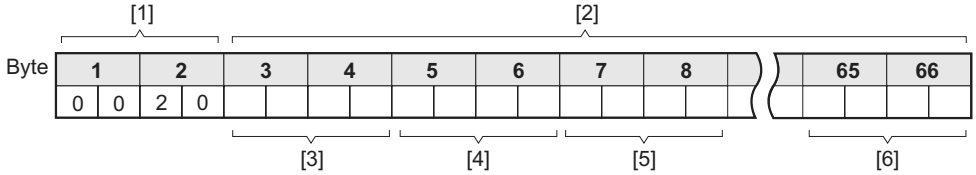
MOVIMOT® can be operated during the transfer of parameters/diagnostics strings. If the transfer takes more than 1.2 seconds, the MOVIMOT® drive is stopped via PO1.

Index 0 changes the active function module and can only be written when the MOVIMOT® drive is not enabled. If the MOVIMOT® drive is enabled during the writing of index 0, the value is not adopted (no error message is generated).

- **Important: If parameter data is exchanged continuously and in quick succession between the controller and MFK, then under certain conditions (with few AS-interface slaves), the cyclical (binary) data transfer is prevented. This is an AS-interface system behavior and cannot be changed by the unit manufacturer.**
- **Due to this system behavior, it is not possible to control or switch off the MOVIMOT® drive, especially when operating with function module 1.**
- **Solution: Avoid exchanging parameter data.**

8.5 Write parameter string

When writing parameters, the first two bytes are interpreted as the start index.



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[1] Start index (example: Index $32_{dec} = 20_{hex}$)
[2] Parameter data (max. 64 bytes)
[3] Data for parameter "start index"
[4] Data for parameter "start index + 1"
[5] Data for parameter "start index + 2"
[6] Data for parameter "start index + 31"

The following bytes (max. 64) are the data written in the subsequent indexes. The first byte is the higher value byte. An even number of bytes must always be transferred.

If only two bytes are written, only the index will be set for the next read command. No parameters are changed.

Example

Speed values n11 to n23 are set in function module 1:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
0 0	2 0	0 6	6 7	1 9	0 0	2 6	6 C	3 0	0 7	3 9	A 2	E 0	0 0
Start index		10%		40%		60%		75%		90%		– 50%	
		Index 20		Index 21		Index 22		Index 23		Index 24		Index 25	

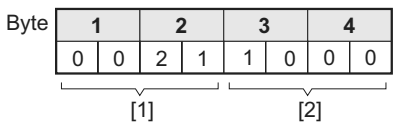
You can read about calculating the speed in the section "MOVILINK® unit profile".

8.6 Read parameter string

The two bytes of the parameter written last are always read. Each read process raises the index by 1. If nothing has been read or written since the unit was switched on, then the index is set to 0.

In order to read a particular index, a 2 byte write command must be sent that sets the index for the next read command.

When reading a parameter, the first two bytes identify the index. The following two bytes depict the content (date) of the index read. The first byte of each is the higher value byte.



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[1] Index to be read (Example index 33_{dec} 21_{hex})
[2] Date from index (Example n12 = 1000_{hex} = 25%)

8.7 Read diagnostics

Use the diagnostics string to read out the current process data of the MOVILINK® profile via the AS-interface.

Structure of the 16 Byte long diagnostics string

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	2 7	1 C	0 2	0 6	0 0	0 0	0 0	0 0	0 0	6 4	0 2	0 6	0 0	0 0	0 E	0 6
	[1]		[2]		PO1		PO2		PO3		PI1		PI2		PI3	

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PO = Process output data
PI = Process input data
[1] = Version
[2] = Status report
Communication to MOVIMOT® is OK = PI1
Communication to MOVIMOT® interrupted = $5B20_{hex}$ (system fault)

If no data exchange with the MOVIMOT® has taken place, then:
- PO1 = 0
- PO2 = 0
- PO3 = 0
- PI1 = 0020_{hex}
- PI2 = 0000_{hex}
- PI3 = 0020_{hex}

Communication faults

If there is a fault in communication with MOVIMOT®, PI1 is set to $5B20_{hex}$. The status report can issue the PI1 status and the following fault codes:

- EEPROM fault: 19 20_{hex} – 25_{dec} 32_{dec} → Inverter is inhibited
- Short circuit output: 53 20_{hex} – 83_{dec} 32_{dec}

8.8 MFK system fault/MOVIMOT® fault

The communication link between MFK and MOVIMOT® is interrupted if the MFK signals a system fault ("SYS-FAULT" LED continuously lit). This system fault is reported to the PLC as fault code 91_{dec} via the diagnostics channel and by way of the status words of the process input data. **Since this system fault generally calls attention to cabling problems or a missing 24 V supply of the MOVIMOT® inverter, a RESET by control word is not possible. As soon as the communication link is reestablished, the fault will automatically reset itself.** Check the electrical connection of the MFK and MOVIMOT®. The process input data return a bit pattern with a fixed definition in the event of a system fault. This is because valid MOVIMOT® status information is no longer available. Consequently, only status word bit 5 (malfunction) and the fault code can be used for evaluation in the controller. All other information is invalid.

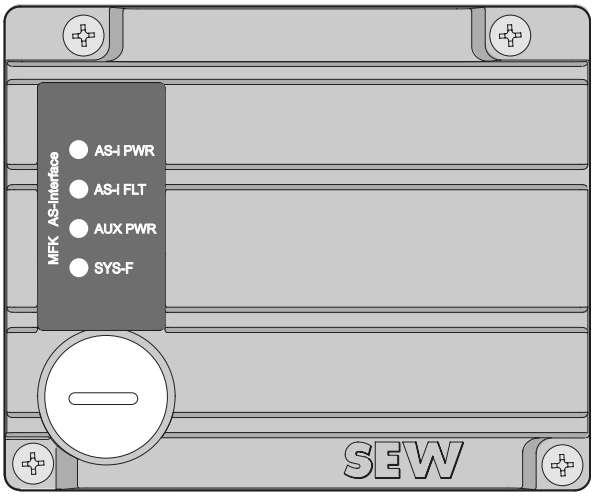
Process input word	Hex value	Meaning
PI1: Status word 1	$5B20_{hex}$	Fault code 91 ($5B_{hex}$), bit 5 (malfunction) = 1 no other status information is valid.
PI2: Current actual value	0000_{hex}	Invalid information
PI3: Status word 2	0020_{hex}	Bit 5 (malfunction) = 1 all other status information invalid.
Input byte of digital inputs	XX_{hex}	The input information of the digital inputs continues to be updated.

The input information of the digital inputs continues to be updated, and can, therefore, continue to be evaluated within the controller (if planned for in the function module).

8.9 Meaning of the LED display

The AS-interface interface MFK has 4 diagnostic LEDs:

- AS-interface PWR LED
- AS-interface FLT LED
- AUX PWR LED
- SYS-F LED



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"AS-interface PWR" LED

LED	Meaning	Troubleshooting
Green	AS-interface supply is OK	–
Off	AS-interface supply missing	Check the connection of the AS-interface cable

"AS-interface FLT" LED

LED	Meaning	Troubleshooting
Off	AS-interface communication is OK	–
Red	No AS-interface data exchange (if no AS-interface data exchange takes place for more than 50 ms, the LED is lit and the MOVIMOT® drive is inhibited (PO1=0000_{hex})	• Check the connection of the AS-interface master • Check project planning in the AS-interface master

"AUX PWR" LED

LED	Meaning	Troubleshooting
Green	24 V auxiliary voltage is OK	–
Off	24 V auxiliary voltage missing	Check the connection of the 24 V_{DC} auxiliary voltage

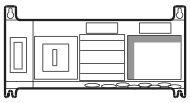
SYS-F LED (red)

LED	Meaning	Troubleshooting
Off	• Normal operating status of the MFK and MOVIMOT®	–
Flashes 1x	• MFK operating status is OK, MOVIMOT® reports a fault • Short circuit in a digital output or in the sensor supply V024	• Evaluate the error number of MOVIMOT® status word 1 in the controller. • Reset MOVIMOT® via the controller • Refer to the MOVIMOT® operating instructions for more information
Flashes 2x	• MOVIMOT® does not respond to setpoints from the AS-interface master because PD data is not enabled.	• Check DIP switches S1/1..4 on the MOVIMOT®. Set RS-485 address 1 to enable the PO data.
On	• Communication link between MFK and MOVIMOT® is disrupted or interrupted.	• Check the electrical connection between MFK and MOVIMOT® (Terminals RS+ and RS-)
	• Maintenance switch on the field distributor is set to OFF	• Check setting of maintenance switch on field distributor

9 Supplementary Field Distributor Startup Information

Startup is carried out according to the section "Startup with AS-interface." In addition, please observe the following notes about the startup of field distributors.

9.1 MF.../Z.6., MQ.../Z.6. field distributors



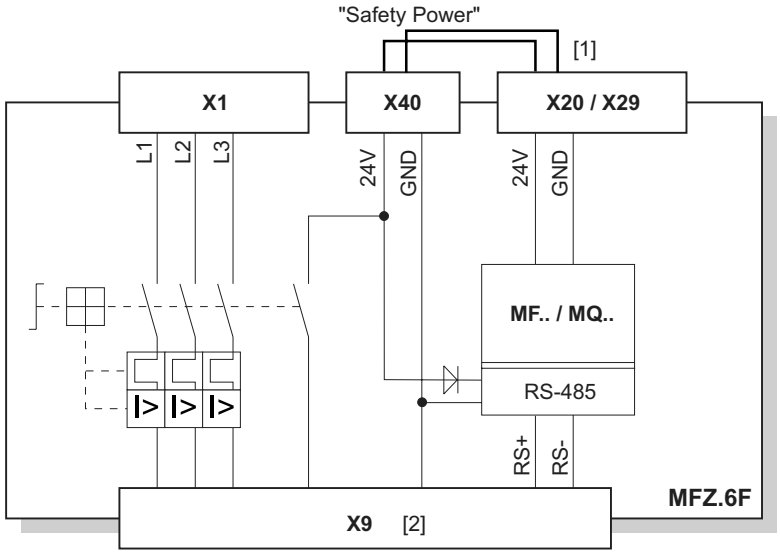
Maintenance switch

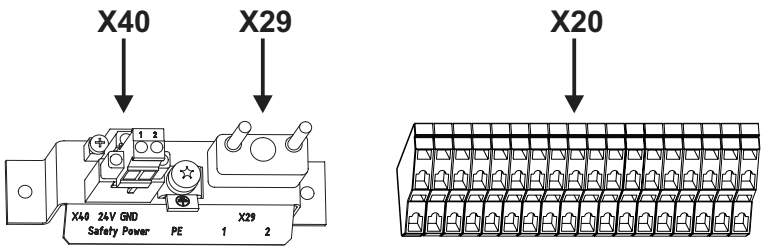
The maintenance/line protection switch of the Z.6. field distributor protects the hybrid line against overload and switches the

- power supply of the MOVIMOT®
- 24-V_{DC} supply of the MOVIMOT®

Important: The maintenance/line protection switch disconnects only the MOVIMOT® motor from the power supply system, not the field distributor.

Block diagram:

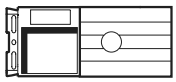




05976AXX

[1] Jumper for supply of MOVIMOT® from 24 V_{DC} voltage for MF../MQ.. fieldbus module (wired at factory)
[2] Hybrid cable connection

9.2 Field distributors MF.../MM../Z.7., MQ.../MM../Z.7.



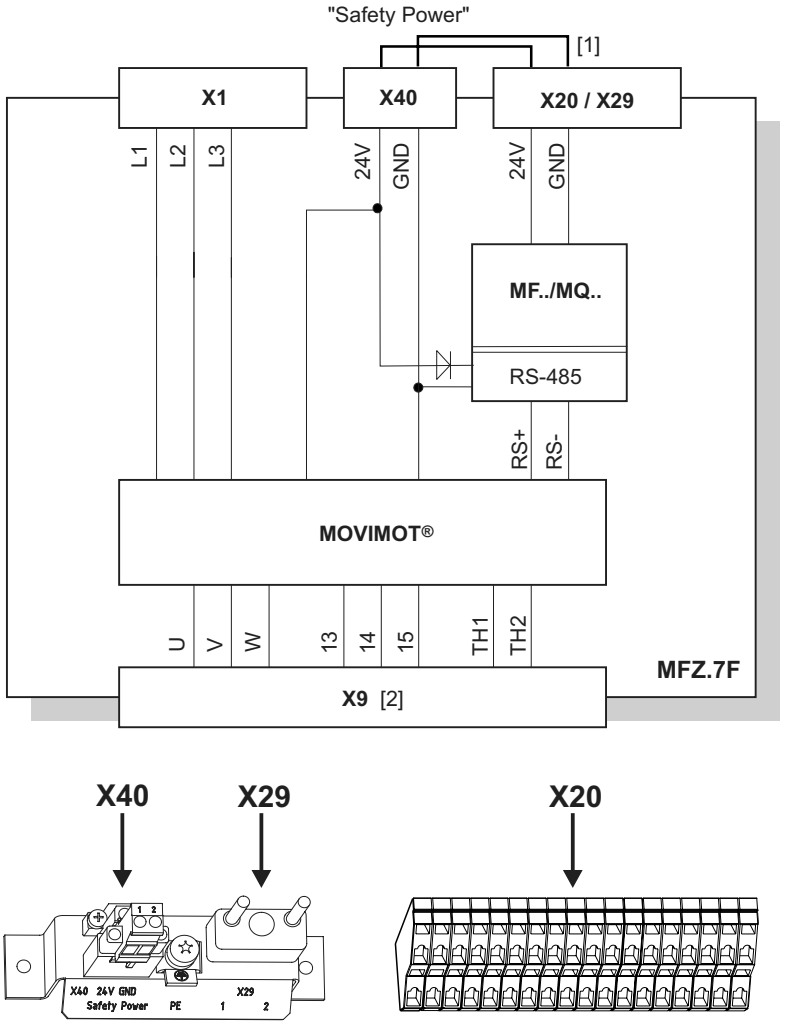
Check the connection type for the connected motor

Use the following figure to check that the selected connection type is identical for the field distributor and the connected motor.

03636AXX

Important: For brake motors: Do not install brake rectifiers inside the terminal box of the motor.

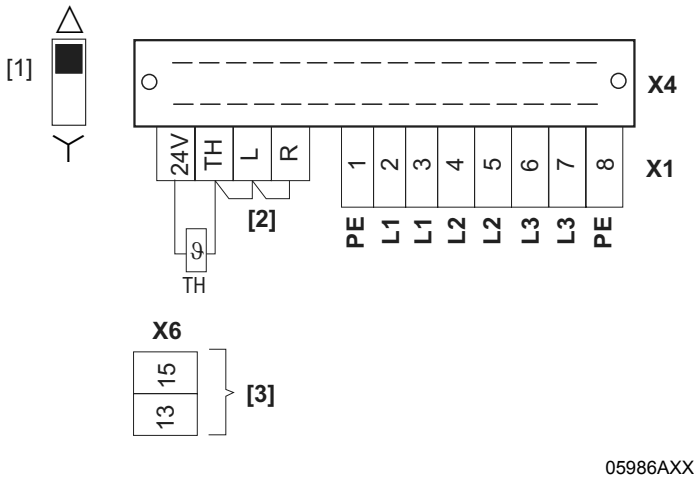
Block diagram



06803AXX

[1] Jumper for supply of MOVIMOT® from 24 V_{DC} voltage for MF../MQ.. fieldbus module (wired at factory)
[2] Hybrid cable connection

Internal wiring of the MOVIMOT® inverter in the field distributor

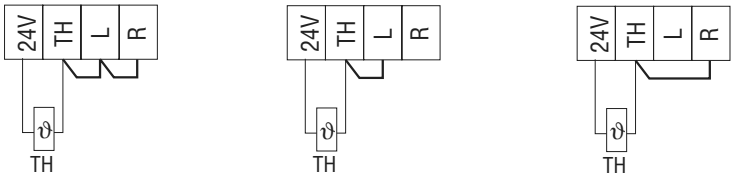


05986AXX

[1] DIP switch for setting the method of connection
Make sure that the method of connection for the connected motor matches the setting of the DIP switch.

[2] **Note the enabled direction of rotation**
(Both directions of rotation are enabled as standard)

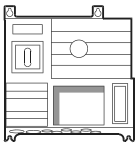
Both directions of rotation are enabled	Only direction **CCW operation** is enabled	Only operation direction **CW operation** is enabled



04957AXX

[3] Connection for internal braking resistor (in motors without brake only)

9.3 MF.../MM../Z.8., MQ.../MM../Z.8. field distributors



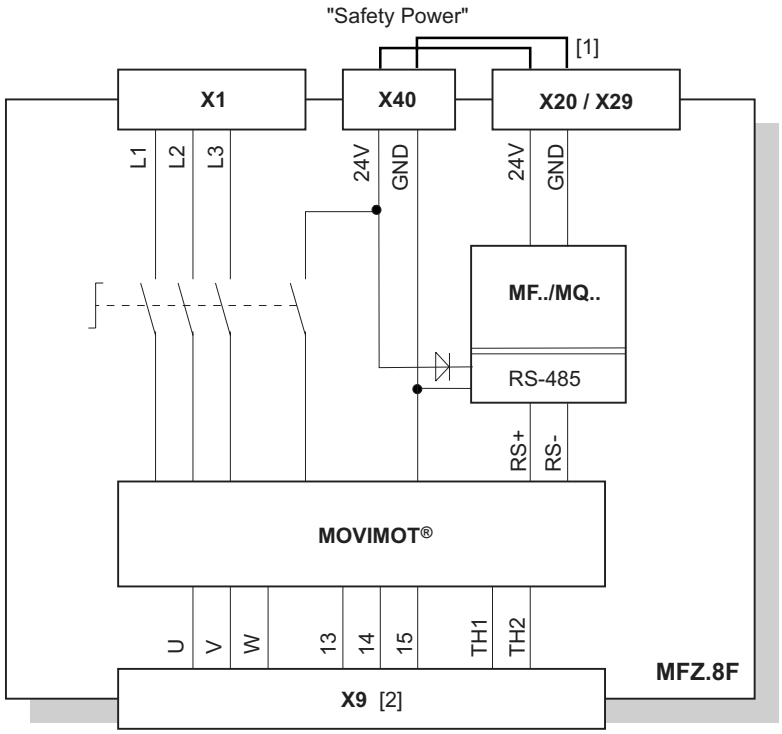
Maintenance switch

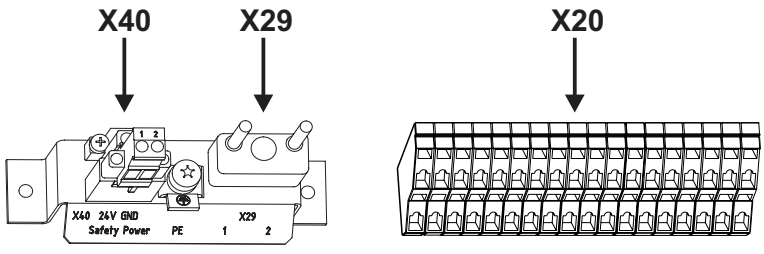
The maintenance switch of the Z.8. field distributor switches the

- power supply of the MOVIMOT®
- 24-V_{DC} supply of the MOVIMOT®

Important: The maintenance switch disconnects the MOVIMOT® inverter with connected motor from the power supply system, but not the field distributor.

Block diagram:





05977AXX

[1] Jumper for supply of MOVIMOT® from 24 V_{DC} voltage for MF../MQ.. fieldbus module (wired at factory)
[2] Hybrid cable connection

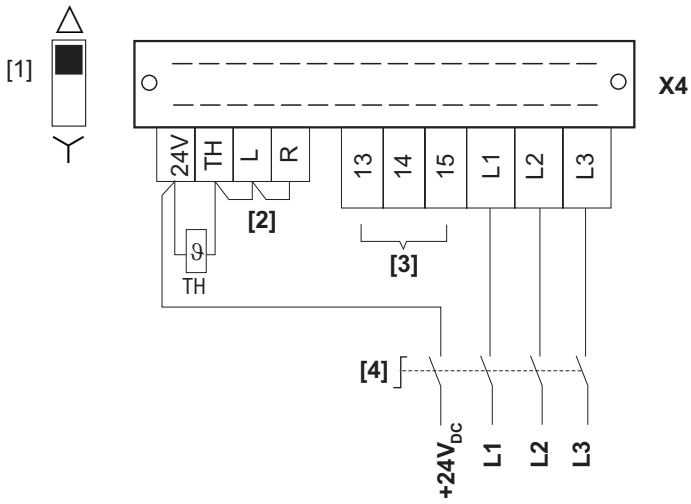
Check the connection type for the connected motor

Use the following figure to check that the selected connection type is identical for the field distributor and the connected motor.

03636AXX

Important: For brake motors: Do not install brake rectifiers inside the terminal box of the motor.

Internal wiring of the MOVIMOT® inverter in the field distributor

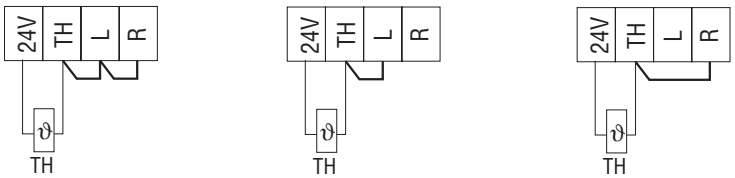


05981AXX

[1] DIP switch for setting the method of connection
Make sure that the method of connection for the connected motor matches the setting of the DIP switch.

[2] **Note the enabled direction of rotation**
(Both directions of rotation are enabled as standard)

Both directions of rotation are enabled	Only direction **CCW operation** is enabled	Only operation direction **CW operation** is enabled



04957AXX

[3] Connection for internal braking resistor (in motors without brake only)

[4] Maintenance switch

9.4 MOVIMOT® frequency inverter integrated in the field distributor

The following section describes the differences in the use of the MOVIMOT® frequency inverter integrated in the field distributor compared to use when it is integrated in the motor.

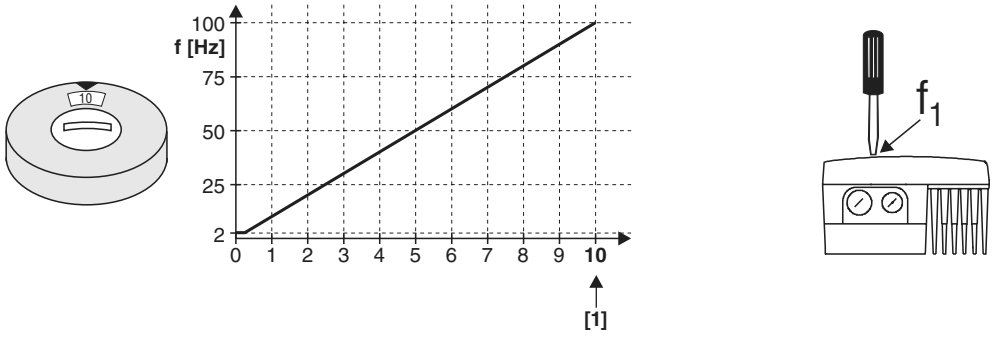
Different factory settings for MOVIMOT® integrated in the field distributor

Note the differences in the factory settings when using MOVIMOT® integrated in Z.7 or Z.8. field distributors. The remaining settings are identical to those for MOVIMOT® integrated in the motor. Refer to the "MOVIMOT® MM..C" operating instructions.

DIP switch S1:

S1	1	2	3	4	5	6	7	8
Meaning	**RS-485 Address**				**Motor Protection**	**Motor Power Increment**	**PWM Frequency**	**No-Load Damping**
	2^0	2^1	2^2	2^3				
ON	**1**	1	1	1	**Off**	Motor one rating smaller	**Variable** (16,8,4 kHz)	On
OFF	0	**0**	**0**	**0**	On	**Adjusted**	4kHz	**Off**

Setpoint potentiometer f1:



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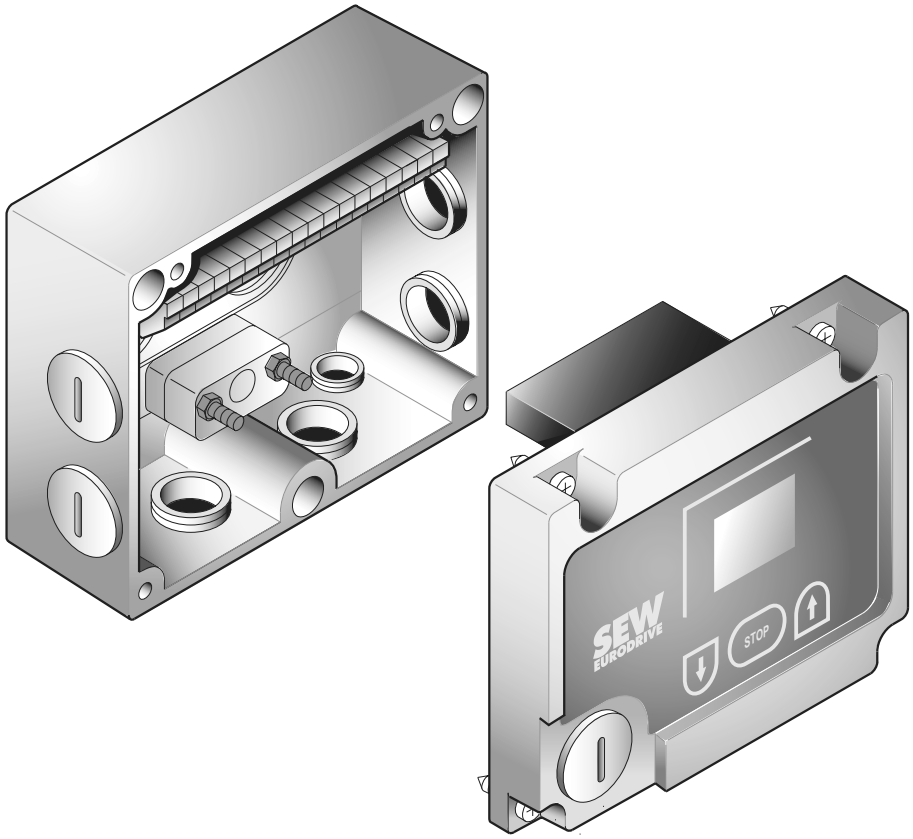
[1] Factory setting

10 MFG11A Keypad

Function The MFG11A keypad is plugged onto any MFZ.. connection module instead of a fieldbus interface for manual control of a MOVIMOT® drive.



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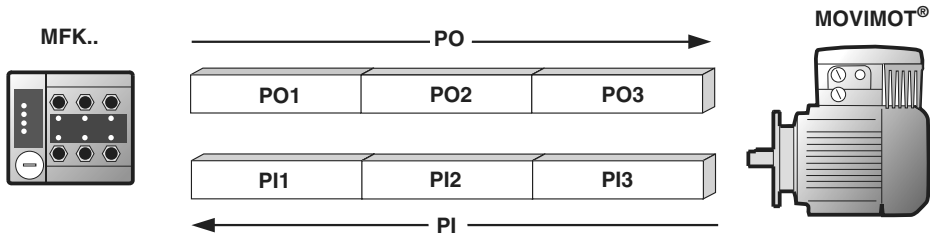
Use

Operating the MFG11A option	
Display	Negative display value e. g.  = CCW operation Positive display value e. g.  = CW operation The display value is based on the speed set using the setpoint potentiometer f1. Example: Display "50" = 50% of the speed set using the setpoint potentiometer. Important: If the display is "0", the drive is turning at f_{min}.
Increase speed	For CW operation:  For CCW operation 
Reduce speed	For CW operation:  For CCW operation 
Inhibit MOVIMOT®	Press the button:  Display = 
Enable MOVIMOT®	 **or**  Important: After enable, MOVIMOT® accelerates to the value and direction of rotation saved last.
Change in direction of rotation from CW to CCW	1.  Until display =  2. Press  again to change the direction of rotation from CW to CCW
Change in direction of rotation from CCW to CW	1.  Until display =  2. Press  again to change the direction of rotation from CCW to CW

When the 24 V supply is switched back on, the module is always in STOP status (display = OFF). When selecting the direction using the arrow key, the drive (setpoint) starts from 0.

11 MOVILINK® Unit Profile

The AS-interface interface MFK.. and MOVIMOT® communicate via the uniform MOVILINK® profile for SEW-EURODRIVE drive inverter with 3 process data.



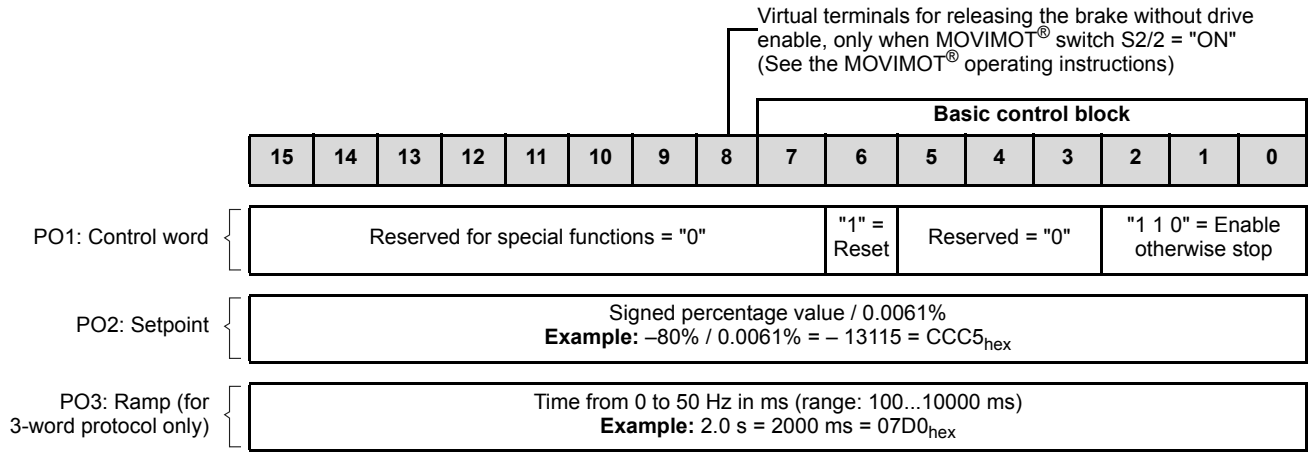
PO = Process output data
PO1 = Control word
PO2 = speed (%)
PO3 = Ramp

PI = Process input data
PI1 = Status word 1
PI2 = Output current
PI3 = Status word 2

Process output data

Process output data is sent from the master controller to the MOVIMOT® inverter (control information and setpoints). However, it only becomes effective in MOVIMOT® if the RS-485 address in the MOVIMOT® (DIP switches S1/1 to S1/4) is set to a value other than 0. MOVIMOT® can be controlled using the following process output data:

- PO1: Control word
- PO2: Speed [%] (setpoint)
- PO3: Ramp



Control word, bits 0...2

The "Enable" control command is specified with bits 0...2 by entering the control word = 0006_{hex}. The CW and/or CCW input terminal must also be set to +24 V (jumpered) to enable the MOVIMOT®.

The "Stop" control command is issued by resetting bit 2 = "0". Use the stop command 0002_{hex} to enable compatibility with other SEW inverter series. MOVIMOT® always triggers a stop at the current ramp whenever bit 2 = "0", regardless of the status of bit 0 and bit 1.

Control word bit 6 = Reset

In the event of a malfunction, the fault can be acknowledged by setting bit 6 = "1" (Reset). For reasons of compatibility, any control bits not assigned must be set to the value 0.

Speed [%]

The speed setpoint is specified as a percentage value based on the maximum speed set with the f1 setpoint potentiometer.

Coding: $C000_{hex}$ = –100% (CCW operation)
4000_{hex} = +100% (CW operation)
→ 1 digit = 0.0061%

Example: 80% f_{max}, CCW rotation:

Calculation: –80% / 0.0061 = $–13115_{dec}$ = $CCC5_{hex}$

Ramp

The current integrator in the process output data word PO3 is transferred if the process data exchange takes place using three process data words. The ramp generator set with switch t1 is used if MOVIMOT® is controlled by two process data.

Coding: 1 digit = 1 ms

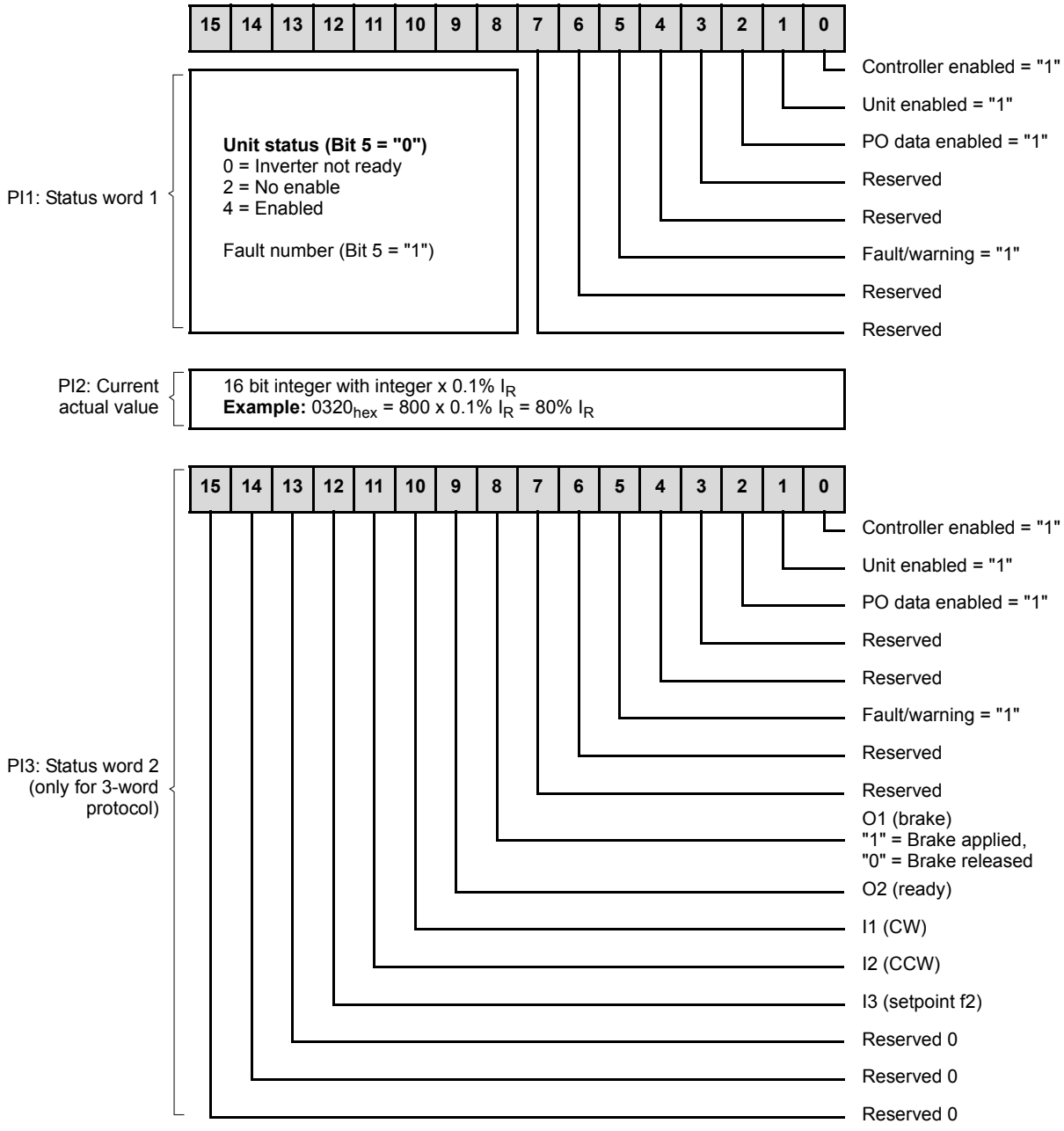
Range: 100...10000 ms

Example: 2.0 s = 2000 ms = 2000_{dec} = $07D0_{hex}$

Process input data

The MOVIMOT® inverter sends back process input data to the higher-level controller. The process input data consists of status and actual value information. MOVIMOT® supports the following process input data:

- PI1: Status word 1
- PI2: Output current
- PI3: Status word 2



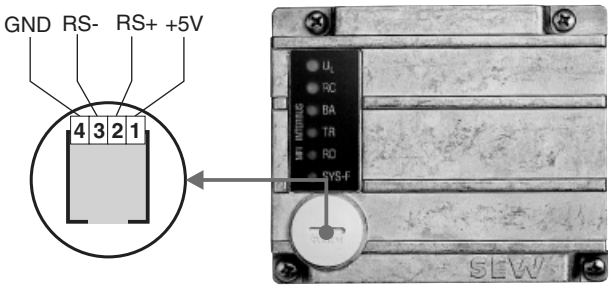
12 MFK Diagnostics

12.1 MFK diagnostics interface

Structure of the diagnostics interface

The diagnostics interface is located at potential level 0; the same potential as the module electronics. This applies for all MF../MQ.. fieldbus interfaces. For the MFK.. AS-interface interfaces, the diagnostics interface is located at the MOVIMOT® potential.

The interface can be accessed via a 4-pin plug connector RJ10. The interface is located underneath the cable gland on the module cover.



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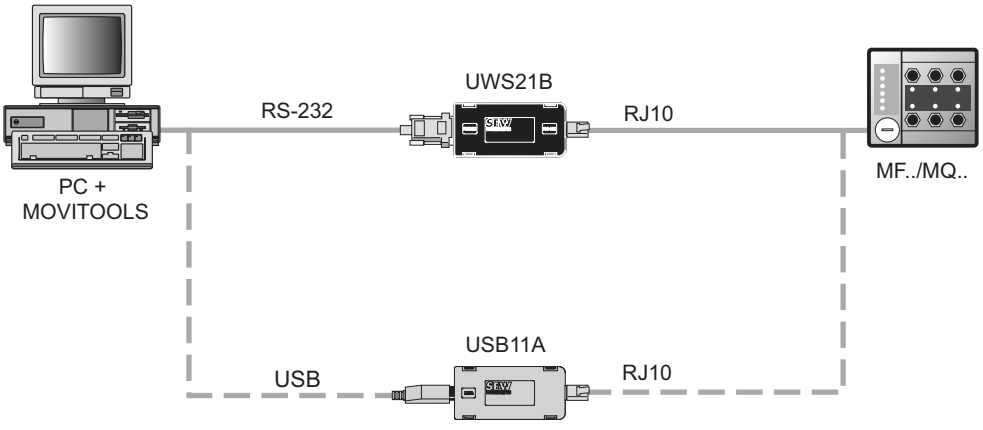
Interface adapter

The diagnostics interface can be connected to a PC using one of the following options:

- UWS21B with serial interface RS-232, part number 1 820 456 2
- USB11A with USB interface, part number 0 824 831 1



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Scope of delivery:

- Interface adapter
- Cable with RJ10 plug connector
- Interface cable RS-232 (UWS21B) or USB (USB11A)

Relevant diagnostics parameters

The MOVITOOLS® Shell software enables diagnostics for MOVIMOT® via the diagnostic interface of the MF.. fieldbus interfaces.

Display values – 00. Process values

MOVIMOT® returns the output current as process value.

Menu Number	Parameter Name	Index	Meaning/Implementation
004	Output current [% In]	8321	MOVIMOT® output current

Display values – 01. Status displays

The MOVIMOT® status is interpreted and shown in the status display.

Menu Number	Parameter Name	Index	Meaning/Implementation
010	Inverter status	8310	MOVIMOT® inverter status
011	Operating state	8310	Operating status of MOVIMOT®
012	Fault status	8310	MOVIMOT® fault status

Display values – 04. Binary inputs option

The digital inputs of the MF.. fieldbus interfaces are shown as optional MOVIMOT® inputs. Since these inputs do not have a direct effect on the MOVIMOT®, the terminal assignment is set to "No function".

Menu Number	Parameter Name	Index	Meaning/Implementation
040	Binary inputs DI10	8340	Status of MF.. binary inputs DI0
041	Binary inputs DI11	8341	Status of MF.. binary inputs DI1
042	Binary inputs DI12	8342	Status of MF.. binary inputs DI2
043	Binary inputs DI13	8343	Status of MF.. binary inputs DI3
044	Binary inputs DI14	8344	Status of MF.. binary inputs DI4
045	Binary inputs DI15	8345	Status of MF.. binary inputs DI5
048	Binary inputs DI10 ..DI17	8348	State of all binary inputs

Display values – 06. Binary outputs option

The digital outputs of the MF.. fieldbus interfaces are shown as optional MOVIMOT® outputs. Since these outputs do not have a direct effect on the MOVIMOT®, the terminal assignment is set to "No function".

Menu Number	Parameter Name	Index	Meaning/Implementation
060	Binary outputs DO10	8352	Status of MF.. binary outputs DO0
061	Binary outputs DO11	8353	Status of MF.. binary outputs DO
068	Binary outputs DO10 to DO17	8360	Status of MF.. binary outputs DO0 and DO1

Display values – 07. Unit data

The unit data displays information on MOVIMOT® and the MF.. fieldbus interface.

Menu Number	Parameter Name	Index	Meaning/Implementation
070	Unit type	8301	Unit type MOVIMOT®
072	Option 1	8362	Unit type option 1 = MF.. Type
074	Firmware option 1	8364	Firmware part number MF..
076	Firmware basic unit	8300	MOVIMOT® firmware part number

Display values – 09. Bus diagnostics

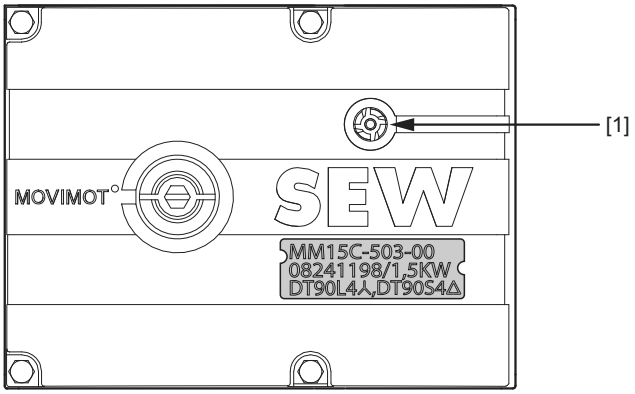
This menu item represents all fieldbus data.

Menu Number	Parameter Name	Index	Meaning/Implementation
090	PD configuration	8451	PD configuration set for MOVIMOT®
091	Fieldbus type	8452	Fieldbus type of MF..
092	Fieldbus baud rate	8453	Baud rate of MF..
093	Fieldbus address	8454	Fieldbus address of MF.. DIP switches
094	PO1 setpoint [hex]	8455	PO1 setpoint from fieldbus master to MOVIMOT®
095	PO2 setpoint [hex]	8456	PO2 setpoint from fieldbus master to MOVIMOT®
096	PO3 setpoint [hex]	8457	PO3 Setpoint from fieldbus master to MOVIMOT®
097	PI1 actual value [hex]	8458	PI1 actual value from MOVIMOT® to fieldbus master
098	PI2 actual value [hex]	8459	PI2 actual value from MOVIMOT® to fieldbus master
099	PI3 actual value [hex]	8460	PI3 Actual value from MOVIMOT® to fieldbus master

13 MOVIMOT® Diagnostics

13.1 Status LED

The status LED is located on the top of the MOVIMOT® inverter (see the following figure).



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[1] MOVIMOT® status LED

Meaning of the LED statuses

The three-color LED signals the operating and fault statuses.

LED color	LED status	Operating status	Description
–	Off	Not ready for operation	No 24 V power supply
Yellow	Flashing evenly	Not ready for operation	Self-test phase active or 24 V power supply present but supply voltage not OK
Yellow	Flashing evenly, fast	Ready for operation	Brake release without drive enable active (only with S2/2 = "ON")
Yellow	Steady light	Ready, but unit inhibited	24 V power supply and supply voltage OK, but no enable signal
Green/ yellow	Flashing with alternating colors	Ready, but timeout	Faulty communication with cyclical data exchange
Green	Steady light	Unit enabled	Motor in operation
Green	Flashing evenly, fast	Current limit active	Drive operating at current limit
Red	Steady light	Not ready for operation	Check 24 V_{DC} supply. Make sure that there is a smoothed DC voltage with low ripple (residual ripple max. 13%) present
Red	2 flashes, pause	Fault 07	DC link voltage too high
Red	Flashing slowly	Fault 08	Speed monitoring fault (only with S2/4=ON)
		Fault 90 Fault 09	Incorrect assignment of motor – inverter (e. g. MM03 – DT71D4 △)
		Fault 17 to 24, 37	CPU fault
		Faults 25, 94	EEPROM fault
Red	3 flashes, pause	Fault 01	Overcurrent in output stage
		Fault 11	Overtemperature in output stage
Red	4 flashes, pause	Fault 84	Overtemperature in motor Incorrect assignment of motor – frequency inverter
Red	5 flashes, pause	Fault 89	Overtemperature in brake Incorrect assignment of motor – frequency inverter
Red	6 flashes, pause	Fault 06	Power supply phase failure

13.2 Fault table

Fault	Cause/Solution
Communication timeout (motor comes to a stop without fault code)	A Missing connection ⊥, RS+, RS- between MOVIMOT® and RS-485 master. Check and establish connection, especially earth. B EMC influence Check shielding of data lines and improve, if necessary. C Incorrect type (cyclical) in acyclical data transfer, protocol time between the individual telegrams is higher than 1s (timeout time). Check the number of MOVIMOT® units connected to the master (a maximum of 8 MOVIMOT® units can be connected as slaves for cyclical communication). Shorten telegram cycle or select telegram type "acyclical".
DC link voltage too low, supply system off was detected (motor stops, without fault code)	Check supply system leads, supply voltage and 24 V electronics supply voltage for interruption. Check the value of the 24 V electronics supply voltage (permitted voltage range 24 V ± 25%, EN 61131-2 residual ripple max. 13 %) Motor restarts automatically as soon as the voltage reaches normal values.
Fault code 01 **Overcurrent in output stage**	Short circuit on inverter output. Check the connection between the inverter output and the motor as well as the motor winding for short circuits. Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the fault.
Fault code 06 **Phase failure** (The fault can only be detected when the drive is at load)	Check the supply system cable for phase failure. Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the error.
Fault code 07 **DC link voltage too high**	A Ramp time too short → Increase ramp time. B Faulty connection between brake coil and braking resistor. → Check the connection between braking resistor and brake coil. Correct, if necessary. C Incorrect internal resistance of brake coil/braking resistor → Check the internal resistance of the brake coil/braking resistor (see the "Technical Data" section). D Thermal overload in braking resistor → Wrong size of braking resistor selected. E Invalid voltage range of the supply input voltage → check supply input voltage for valid voltage range Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the error.
Fault code 08 **Speed monitoring**	Speed monitoring has tripped, drive is overloaded → Reduce drive load. Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the error.
Fault code 11 **Thermal overload of the output stage or internal unit fault**	• Clean the heat sink • Lower ambient temperature • Prevent heat build-up • Reduce the load on the drive Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the error.
Fault codes 17 to 24, 37 **CPU fault**	Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the error.
Fault codes 25, 94 **EEPROM fault**	Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the fault.
Fault code 84 **Thermal overload of motor**	• When the MOVIMOT® inverter is installed close to the motor, set DIP switch S1/5 to "ON". • For combinations of the "MOVIMOT® and motor with one lower power increment", check the setting of DIP switch S1/6. • Lower ambient temperature • Prevent heat build-up • Reduce the load on the motor • Increase speed • Check the combination of the drive and MOVIMOT® frequency inverter if the fault is signaled shortly after the first enable. • The temperature monitoring in the motor (TH winding thermostat) has tripped when using MOVIMOT® with the selected additional function 5 → Reduce load on the motor. Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the fault.

Fault	Cause/Solution
Fault code 89 **Thermal overload of brake coil or brake coil defective, brake coil connected incorrectly**	• Increase set ramp time • Brake inspection (see Sec. "Inspection and Maintenance") • Check brake coil connection • Contact SEW Service • Check the combination of the drive (brake coil) and MOVIMOT® frequency inverter if the fault is signaled shortly after the first enable. • For combinations of the "MOVIMOT® and motor with one lower power increment", check the setting of DIP switch S1/6. Reset the fault by switching off the 24 V_{DC} supply voltage or resetting the fault.
Fault code 91 **Communication error between fieldbus gateway and MOVIMOT® (this fault is generated by the bus module)**	• Check electrical connection between fieldbus gateway and MOVIMOT® (RS-485). • The fault is automatically reset after removing the cause, a reset by control word is not possible.

14 Technical Data

14.1 Technical data MFK.. AS-interface interface

MFK electrical specification	
Power supply to MFK control electronics (via yellow AS-interface cable)	according to AS-interface specification 2.11, max. 150 mA
Input voltage for inverter and sensors (24 V auxiliary voltage)	V = +24V +/- 25%
Current consumption of auxiliary power supply ("AS-interface black")	max. 2 A, polarity reversal protected (250 mA MOVIMOT® + sensor supply + actuators)
Electrical isolation	AS-interface connection and module electronics isolated between module electronics and peripherals / MOVIMOT® / diagnostics interface via optocoupler
Bus connection technology	M12 (A coded)
Binary inputs (sensors) Signal level	PLC-compatible to EN 61131-2 (digital inputs type 1), Ri ≈ 3 kΩ, sampling time approx. 5 ms +15 V...+30 V "1" = Contact made / –3 V...+5 V "0" = Contact not made
Sensor supply Rated current Internal voltage drop	24 V_{DC} to EN 61131-2, interference voltage proof and short-circuit proof Σ 500 mA max. 1 V
Binary outputs (actuators) Signal level Rated current Leakage current Internal voltage drop	PLC-compatible to EN 61131-2, interference-voltage proof and short-circuit proof "0" = 0 V, "1" = 24 V 500 mA Max. 0.2 mA max. 1 V
Line length RS-485	30 m between MFK.. and MOVIMOT® if installed separately
Ambient temperature	–25 °C...60 °C (-13 °F…140 °F)
Storage temperature	–25 °C...85 °C (-13 °F…185 °F)
Enclosure	IP65 (installed on MFZ.. connection module, all plug connections sealed)

Specification of AS-interface	
Protocol option	AS-interface slave with a S-7.4 profile "four bit mode slave"
AS-interface profile	S-7.4
I/O configuration	7_{hex}
ID code	4_{hex}
ext. ID code1	F_{hex}
ext. ID code2	0_{hex}
Address	1 to 31 (factory setting: 0) can be changed as often as required

14.2 Technical data for field distributors

Technical data of MF../Z.3., MQ../Z.3.

MF../Z.3. MQ../Z.3.	
Ambient temperature	–25 °C...60 °C (-13 °F…140 °F)
Storage temperature	–25 °C...85 °C (-13 °F…185 °F)
Enclosure	IP65 (fieldbus interface and motor connection cable attached and fastened, all plug connections sealed)
Interface	PROFIBUS, InterBus, DeviceNet, CANopen, AS-interface
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.
Weight	Approx. 1.3 kg

Technical data of MF../Z.6., MQ../Z.6.

MF../Z.6. MQ../Z.6.	
Maintenance switch	Load interrupter switch and line protection Type: ABB MS 325 – 9 + HK20 Switch activation: black/red, triple lock
Ambient temperature	–25 °C...55 °C (-13 °F…131 °F)
Storage temperature	–25 °C...85 °C (-13 °F…185 °F)
Enclosure	IP65 (fieldbus interface, power supply connection cover and motor connection cable attached and fastened, all plug connections sealed)
Interface	PROFIBUS, InterBus, DeviceNet, CANopen, AS-interface
Permitted motor cable length	max. 30 m (with SEW hybrid cable, type B)
Weight	Approx. 3.6 kg

Technical data of MF../MM../Z.7., MQ../MM../Z.7. field distributor

Field distributor type		MF../MM..-503-00/Z.7 MQ../MM..-503-00/Z.7				
		MM03C	**MM05C**	**MM07C**	**MM11C**	**MM15C**
Apparent output power with V_{mains} = 380…500 V	S_N	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA
Supply voltages **Permitted range**	V_{mains}	3 x 380 V_{AC} / **400 V_{AC}** / 415 V_{AC} / 460 V_{AC} / 500 V_{AC} V_{Mains} = 380 V_{AC} – 10%...500 V_{AC} + 10%				
Supply frequency	f_{Mains}	50 Hz ... 60 Hz ± 10%				
Rated mains current **(with V_{Mains} = 400 V_{AC})**	I_{Mains}	1.3 A_{AC}	1.6 A_{AC}	1.9 A_{AC}	2.4 A_{AC}	3.5 A_{AC}
Output voltage	U_A	0... V_{Mains}				
Output frequency **Resolution** **Operating point**	f_A	2...100 Hz 0.01 Hz 400 V at 50 Hz/100 Hz				
Rated output current	I_R	1.6 A_{AC}	2.0 A_{AC}	2.5 A_{AC}	3.2 A_{AC}	4.0 A_{AC}
Motor power S1	P_{Mot}	**0.37 kW**	**0.55 kW**	**0.75 kW**	**1.1 kW**	**1.5 kW**
Motor power S3 25% CDF						
PWM frequency		4 / 8 / **16**[1] kHz				
Current limitation	I_{max}	**motor:** 160% with ⅄ and △ **Regenerative:** 160% with ⅄ and △				
Maximum motor cable length		15 m (with SEW hybrid cable, type A)				
External braking resistor	R_{min}	150 Ω				
Interference immunity		fulfills EN 61800-3				
Interference emission		Conforms to EN 61800-3 and class A limit to EN 55011 and EN 55014				
Ambient temperature	ϑ_A	–25 °C...40 °C (-13 °F…104 °F) (P_N reduction: 3% I_R per K to max. 60 °C (140 °F))				
Storage temperature	ϑ_L	–25 °C...85 °C (-13 °F…185 °F)				
Enclosure		IP65 (fieldbus interface, power supply connection cover and motor connection cable attached and fastened, all plug connections sealed)				
Operating mode		DB (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes				
Cooling type (DIN 41 751)		Self-cooling				
Installation altitude		h ≤ 1000 m (P_N reduction: 1% per 100 m starting at an altitude of 1000 m, see also the "Electrical Installation – Installation Instructions" section in the MOVIMOT® operating instructions)				
Ext. electronics supply	Te. 11 Te. 13	V = +24 V ± 25%, EN 61131-2, residual ripple max. 13% I_E ≤ 250 mA, type 150 mA at 24 V (only MOVIMOT®) Input capacitance 100 µF				
Interface		PROFIBUS, InterBus, DeviceNet, CANopen, AS-interface				
Weight		Approx. 3.6 kg				

1) 16 kHz PWM frequency (low-noise). When DIP SWITCH S1/7 = ON (factory setting), the units operate with a 16 kHz PWM frequency (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature.

Technical data of MF../MM../Z.8., MQ../MM../Z.8. field distributor

Type of field distributor		MF../MM..-503-00/Z.8 MQ../MM..-503-00/Z.8							
		MM03C	**MM05C**	**MM07C**	**MM11C**	**MM15C**	**MM22C**	**MM30C**	**MM3XC**
Apparent output power with V_{Mains} = 380…500 V	S_N	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA	6.7 kVA
Supply voltages **Permitted range**	V_{mains}	3 x 380 V_{AC} / **400 V_{AC}** / 415 V_{AC} / 460 V_{AC} / 500 V_{AC} V_{Mains} = 380 V_{AC} – 10%...500 V_{AC} + 10%							
Supply frequency	f_{Mains}	50 Hz ... 60 Hz ± 10%							
Rated mains current **(with V_{Mains} = 400 V_{AC})**	I_{Mains}	1.3 A_{AC}	1.6 A_{AC}	1.9 A_{AC}	2.4 A_{AC}	3.5 A_{AC}	5.0 A_{AC}	6.7 A_{AC}	8.6 A_{AC}
Output voltage	U_A	0... V_{mains}							
Output frequency **Resolution** **Operating point**	f_A	2...100 Hz 0.01 Hz 400 V at 50 Hz/100 Hz							
Rated output current	I_R	1.6 A_{AC}	2.0 A_{AC}	2.5 A_{AC}	3.2 A_{AC}	4.0 A_{AC}	5.5 A_{AC}	7.3 A_{AC}	9.6 A_{AC}
Motor power S1	P_{Mot}	**0.37 kW**	**0.55 kW**	**0.75 kW**	**1.1 kW**	**1.5 kW**	**2.2 kW**	**3.0 kW**	**3.0 kW**
Motor power S3 25% CDF									**4.0 kW**
PWM frequency		4/8/**16**[1] kHz							
Current limitation	I_{max}	**motor:** 160% with ⅄ and △ **Regenerative:** 160% with ⅄ and △							
Maximum motor cable length		15 m (with SEW hybrid cable, type A)							
External braking resistor	R_{min}	150 Ω					68 Ω		
Interference immunity		Fulfills EN 61800-3							
Interference emission		Conforms to EN 61800-3 and class A limit to EN 55011 and EN 55014							
Ambient temperature	ϑ_A	–25° C...40° C (-13 °F…104 °F) (P_N reduction: 3 % I_R per K to max. 55 °C (131 °F))							[2]
Storage temperature	ϑ_L	–25 °C...85 °C (-13 °F…185 °F)							
Enclosure		IP65 (fieldbus interface, power supply connection cover and motor connection cable attached and fastened, all plug connections sealed)							
Operating mode		DB (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes							
Cooling type (DIN 41 751)		Self-cooling							
Installation altitude		h ≤ 1000 m (P_N reduction: 1% per 100 m starting at an altitude of 1000 m, see also the "Electrical Installation – Installation Instructions" section in the MOVIMOT® operating instructions)							
Ext. electronics supply	Te. 11 Te. 13	V = +24 V ± 25%, EN 61131-2, residual ripple max. 13% I_E ≤ 250 mA, type 150 mA at 24 V (only MOVIMOT®) Input capacitance 100 µF							
Maintenance switch		Switch disconnector Type: ABB OT16ET3HS3ST1 Switch activation: Black/red, triple lock							
Interface		PROFIBUS, InterBus, DeviceNet, CANopen, AS-interface							
Weight		Size 1: Approx. 5.2 kg Size 2: Approx. 6.7 kg							

1) 16 kHz PWM frequency (low-noise). When DIP SWITCH S1/7 = ON (factory setting), the units operate with a 16 kHz PWM frequency (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature.

2) –25 °C...40 °C (-13 °F…104 °F) with S3 25 % CDF (up to 55 °C (131 °F) with S3 10% CDF)

Index of Changes

The following is a list of changes in the individual sections

Unit design

- New section "Tightening Torques"

Electrical installation

- Installation instructions for fieldbus interfaces / field distributors
  - New section "Notes regarding PE connection or equipotential bonding"
- Section "Connection via pre-fabricated cable"
  - New section "Motors → field distributor assignment"

Supplementary field distributor startup information

- Section "MF.../MM../Z.7., MQ.../MM../Z.7. field distributors"
  - Block diagram has been revised

MFK Diagnostics

- Section "Interface adapter"
  - Option USB11A has been revised

Index

Address List

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
Service **Competence Center**	**Central** Gear units / Motors	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte-gm@sew-eurodrive.de
	Central Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-mitte-e@sew-eurodrive.de
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	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
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
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
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Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 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
	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	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://sew-eurodrive.at sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 4322-99 Fax +237 4277-03

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.reynolds@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	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 Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

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 75770-00 Fax +56 2 75770-01 www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 gm-tianjin@sew-eurodrive.cn http://www.sew-eurodrive.com.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew.com.cn
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	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 sewcol@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luzna 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Mustamäe tee 24 EE-10620Tallin	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, 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

Hong Kong			
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Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi • Baroda - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com mdoffice@seweurodriveindia.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

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 lirazhandasa@barak-online.net

Italy			
Assembly **Sales** **Service**	**Milano**	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 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Mexico			
Assembly **Sales** **Service**	**Queretaro**	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrail Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Morocco			
Sales	**Casablanca**	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 richard.miekisiak@premium.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES 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

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 dipar@yubc.net

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. Rybnicna 40 SK-83107 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 http://www.sew.sk sew@sew-eurodrive.sk
	Zilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Zilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 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 11 494-3104 http://www.sew.co.za dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.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

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

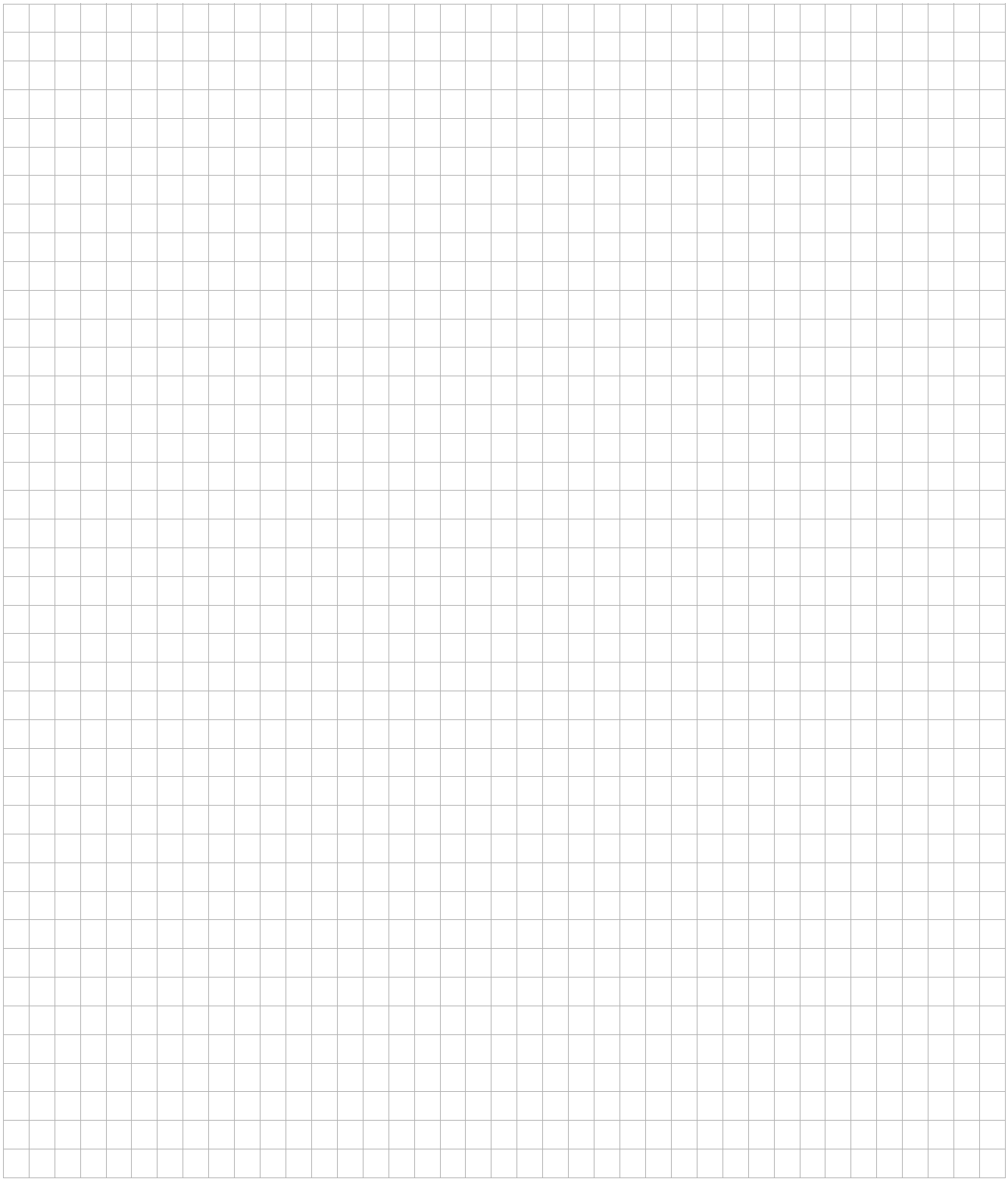
Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 164 3838014/15 Fax +90 216 3055867 sew@sew-eurodrive.com.tr

Ukraine			
Sales **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	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 Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	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
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

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 sewventas@cantv.net sewfinanzas@cantv.net



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