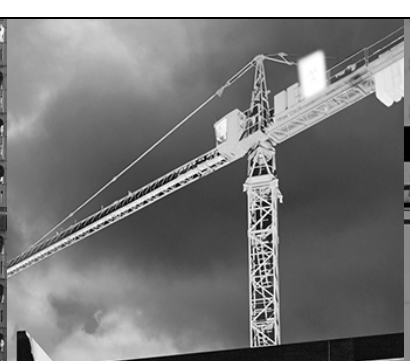
SEW EURODRIVE

Operating Instructions

Decentralized Drive Systems
MOVIFIT® FC

Edition 07/2012

17060826 / EN

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Contents

1 General Information

1.1 How to use this documentation

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

The documentation must be kept accessible and legible. Ensure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the entire documentation and have understood it. If you are unclear about any of the information in this documentation or require further information, please contact SEW-EURODRIVE.

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes, warnings regarding potential risks of damage to property, and other notes.

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

1.2.2 Structure of the section-related safety notes

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

This is the formal structure of a section-related safety note:

⚠ SIGNAL WORD

Nature and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to avoid the danger.

1.2.3 Structure of the embedded safety notes

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

This is the formal structure of an embedded safety note:

- **⚠ SIGNAL WORDNature and source of danger.**

  Possible consequence(s) if disregarded.

  – Measure(s) to avoid the danger.

1.3 Rights to claim under warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the documentation. Read the documentation before you start working with the unit.

1.4 Exclusion of liability

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

1.5 Copyright

1.6 Product names and brands

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

2 Safety Notes

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

2.1 Preliminary information

The following safety notes are primarily concerned with the use of MOVIFIT® units. If you use other SEW components, also refer to the safety notes for the respective components in the corresponding documentation.

Please also observe the supplementary safety notes in the individual chapters of this documentation.

2.2 General information

Never install damaged products or take them into operation. Submit a complaint to the shipping company immediately in the event of damage.

During operation, MOVIFIT® units can have live or bare parts as well as hot surfaces, depending on their enclosure.

Removing covers without authorization, improper use or incorrect installation and operation may result in severe injuries to persons or damage to machinery.

Refer to the documentation for additional information.

2.3 Target group

Only qualified electricians are authorized to install, start up or service the units or correct unit faults (observing IEC 60364 or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 as well as national accident prevention guidelines).

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

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

2.4 Designated use

MOVIFIT® is a component intended for installation in electrical systems or machines.

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

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

MOVIFIT® comples with the low voltage directive 2006/95/EC. The standards given in the declaration of conformity are used for MOVIFIT®.

You must observe the technical data and information on the connection requirements as provided on the nameplate and in the documentation.

2.4.1 Safety functions

MOVIFIT® may not perform any safety functions unless they are described and expressly approved.

For safety applications, ensure that the information in the following publication is observed.

- MOVIFIT® MC/FC – Functional Safety

Use only those components in safety applications that were explicitly designed and delivered for this purpose by SEW-EURODRIVE.

2.4.2 Hoist applications

Hoist applications with MOVIFIT® FC are only permitted if a special hoist startup procedure has been carried out.

MOVIFIT® FC must not be used as a safety device in hoist applications. Use monitoring systems or mechanical protection devices as safety equipment to avoid possible damage to property or injury to people.

2.5 Other applicable documentation

Note also the following documentation:

- "DR.71 – 225, 315 AC Motors" operating instructions
- and the manual of the fieldbus interface

  e.g. "MOVIFIT® Function Level "Classic" .."

  e.g. "MOVIFIT® Function Level "Technology" .."

2.6 Transportation and storage

You must observe the notes on transportation, storage and proper handling. Observe the climatic conditions as stated in the "Technical Data" sections.

2.7 Installation

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

Protect MOVIFIT® from improper strain.

The following applications are prohibited unless explicitly permitted:

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

2.8 Electrical connection

Observe applicable national accident prevention guidelines (e.g. BGV A3) when working on a live MOVIFIT® unit.

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

For notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, refer to chapter "Installation instructions". The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

Protective measures and protection devices must comply with the regulations in force (e.g. EN 60204-1 or EN 61800-5-1).

2.9 Safe disconnection

MOVIFIT® meets all requirements for safe disconnection of power and electronics connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.

2.10 Operation

Systems into which MOVIFIT® is installed must, if necessary, be equipped with additional monitoring and protection devices according to applicable safety regulations, accident prevention regulations, etc. Additional protective measures may be necessary for applications with increased potential risk. Changes to MOVIFIT® using the operating software are permitted.

Do not touch live components or power connections immediately after disconnecting MOVIFIT® from the supply voltage because some capacitors may still be charged. Wait at least for 1 minute after having switched off the supply voltage.

As soon as supply voltage is present at the MOVIFIT®, the ABOX must be closed (i.e., the MOVIFIT® EBOX and any hybrid cable connector must be connected and screwed on).

Do not disconnect the EBOX of the MOVIFIT® or any power plug connectors during operation. Doing so can lead to dangerous electric arcs forming, which can cause irreparable damage to the unit (fire risk, irreparable contacts).

Important: The MOVIFIT® aintenance switch only disconnects the integrated frequency inverter from the power supply. The terminals of the MOVIFIT® unit are still connected to the power supply after the maintenance switch is activated.

The unit may still be live and connected to the supply system, even if the operation LEDs and other display elements are no longer illuminated.

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

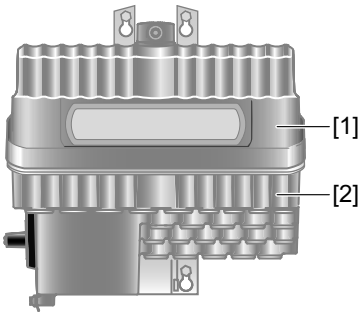
Caution: Danger of burns: The surface temperature of MOVIFIT® and the external options (e.g. the braking resistor heat sink) can exceed 60 °C during operation.

3 Unit Structure

3.1 MOVIFIT® FC

MOVIFIT® FC is a decentralized drive controller with integrated frequency inverter for controlling gearmotors.

The following figure shows a standard MOVIFIT® FC unit of size 1:



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[1] EBOX (active electronics unit)
[2] ABOX (passive connection unit)

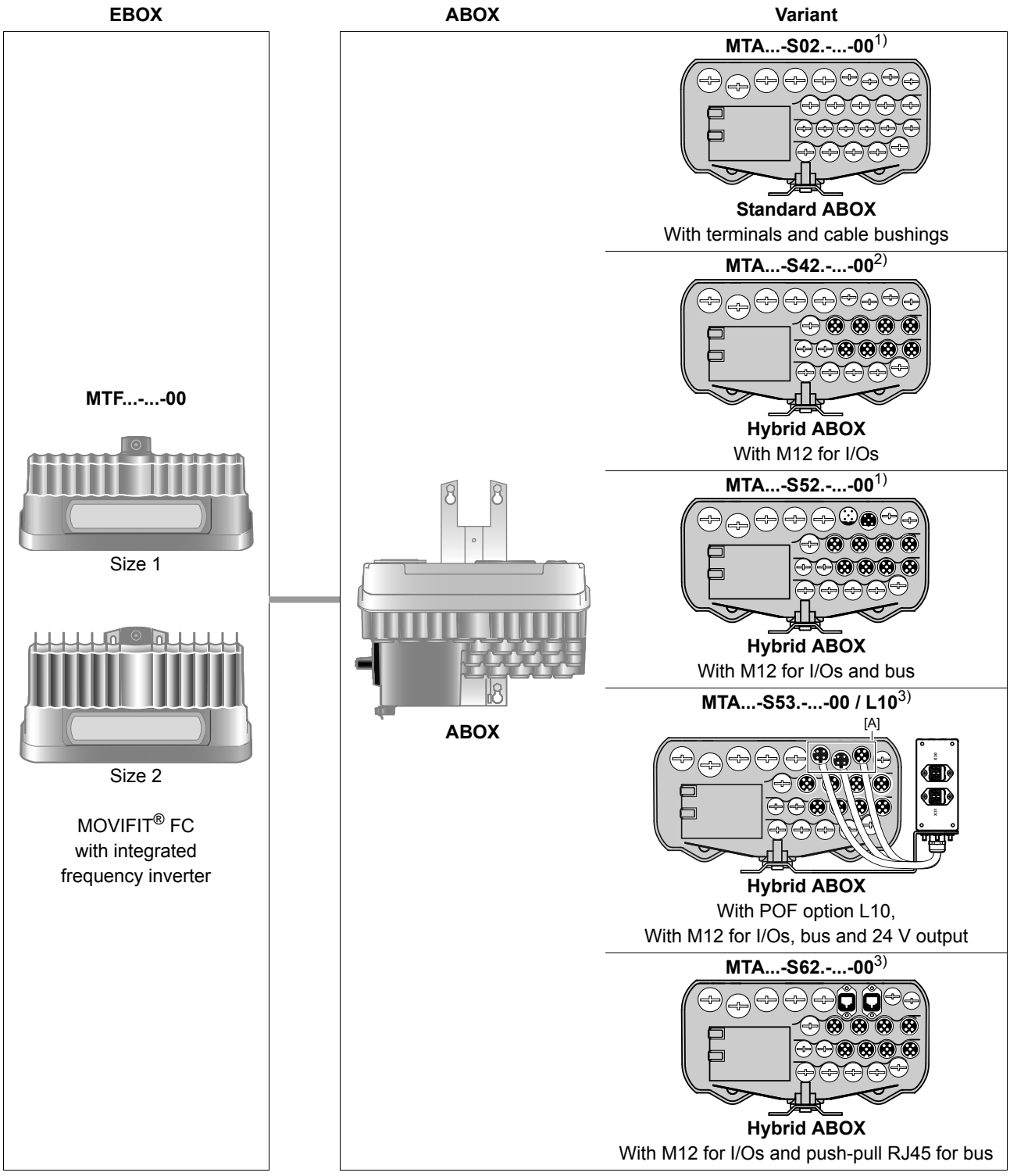
3.1.1 MOVIFIT® FC characteristics

MOVIFIT® FC is characterized by the following features:

- Parameterizable open-loop frequency inverter
- Power range from 0.37 to 4 kW (in two sizes)
- Integrated energy distribution
- Integrated brake management
- Optional braking resistor
- Optional maintenance switch
- Integrated fieldbus interface
  - PROFIBUS
  - PROFINET
  - PROFINET POF
  - DeviceNet
  - EtherNet/IP
  - Modbus/TCP
- Optional design without fieldbus interface as SBus slave
- Binary inputs/outputs
- CAN/SBus interface
- "Safe torque off" STO function
- Optional PROFIsafe extension /S11
  With 4 safe inputs and 2 safe outputs
- Simple and fast parameter setting via DIP switches (Easy mode)
- Extended parameter setting via fieldbus or diagnostic interface (Expert mode)

3.2 Overview of connection configurations

The following figures show the MOVIFIT® FC variants described in these operating instructions:



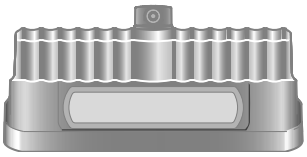
[A] The 3 M12 plug connectors (bus + 24 V) for connecting the POF option L10 are assigned at the factory.

1) In connection with DeviceNet: Micro-style connector for DeviceNet connection
2) Not available in connection with DeviceNet
3) Not available in connection with DeviceNet and PROFIBUS

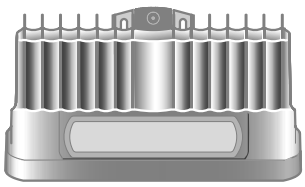
More variants are listed on the next page.

EBOX

MTF...-...-00



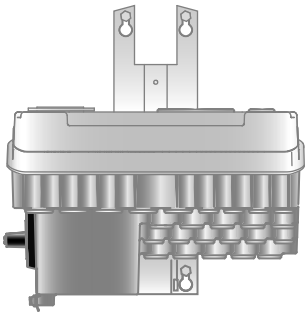
Size 1



Size 2

MOVIFIT® FC
with integrated
frequency inverter

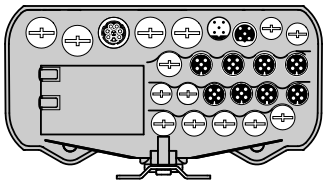
ABOX



ABOX

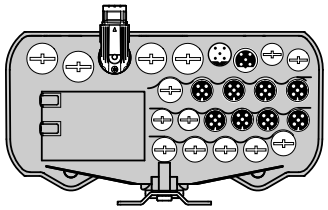
Variant

MTA...-I55.-...-00[1)]



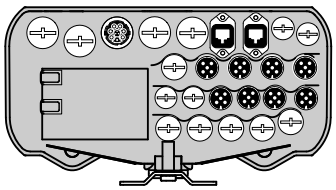
Hybrid ABOX
With 1 round connector (Intercontec)
1 x downwards motor output
and M12 for I/Os and bus

MTA...-G55.-...-00[1)]



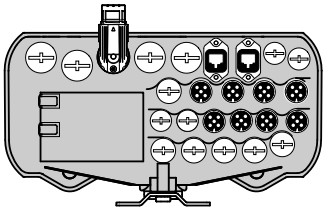
Hybrid ABOX
With 1 round connector (Intercontec)
1 x motor output at the front
and M12 for I/Os and bus

MTA...-I65.-...-00[2)]



Hybrid ABOX
With 1 round connector (Intercontec)
1 x downwards motor output,
M12 for I/Os
And push-pull RJ45 for bus

MTA...-G65.-...-00[2)]



Hybrid ABOX
With 1 round connector (Intercontec)
1 x motor output at the front
M12 for I/Os
And push-pull RJ45 for bus

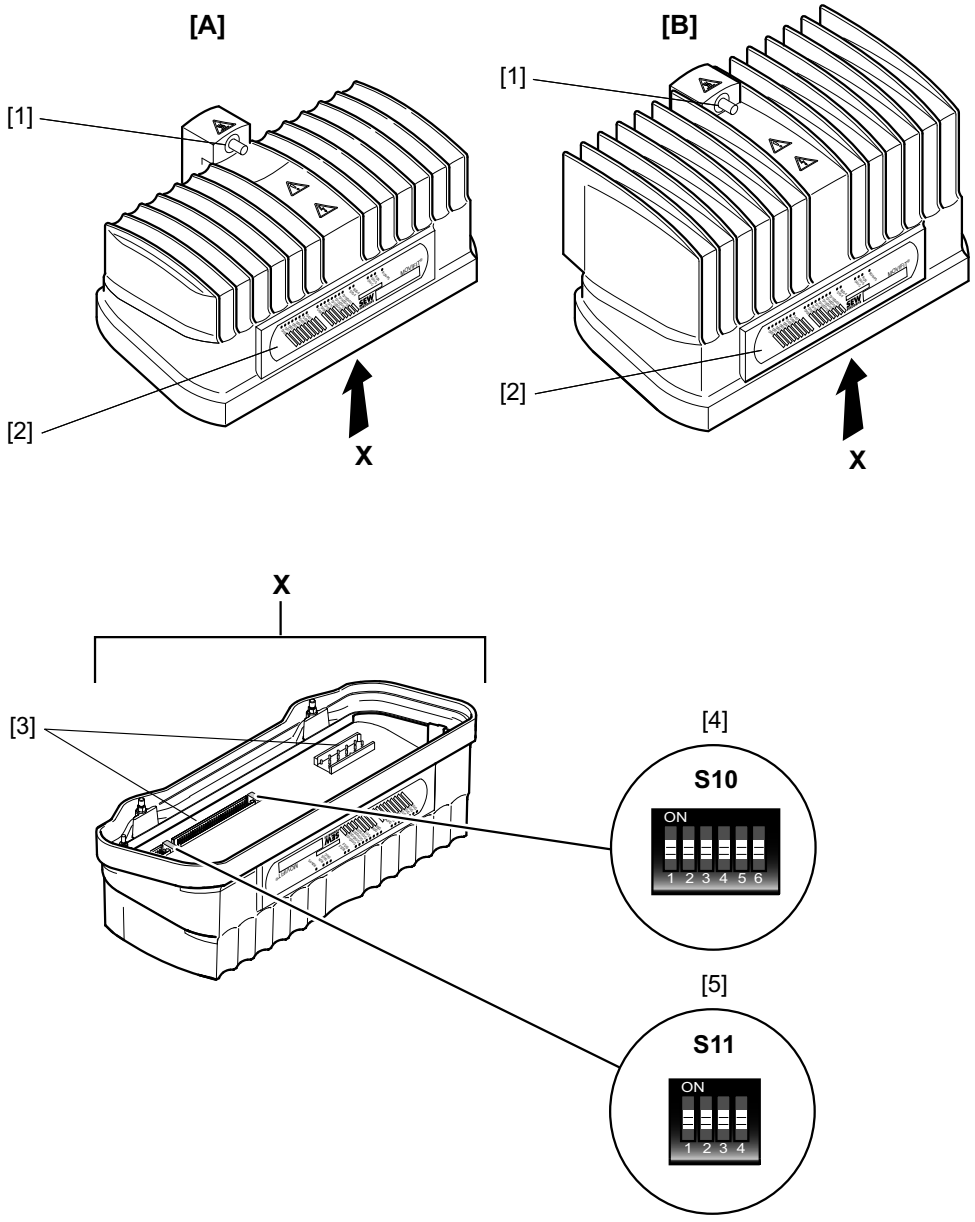
1) In connection with DeviceNet: Micro-style connector for DeviceNet connection

2) Not available in connection with DeviceNet and PROFIBUS

3.3 EBOX (active electronics unit)

The MOVIFIT® FC EBOX is a closed electronics unit with communication interface, binary inputs and outputs (I/Os), and frequency inverter:

EBOX "MTF...-....-00"



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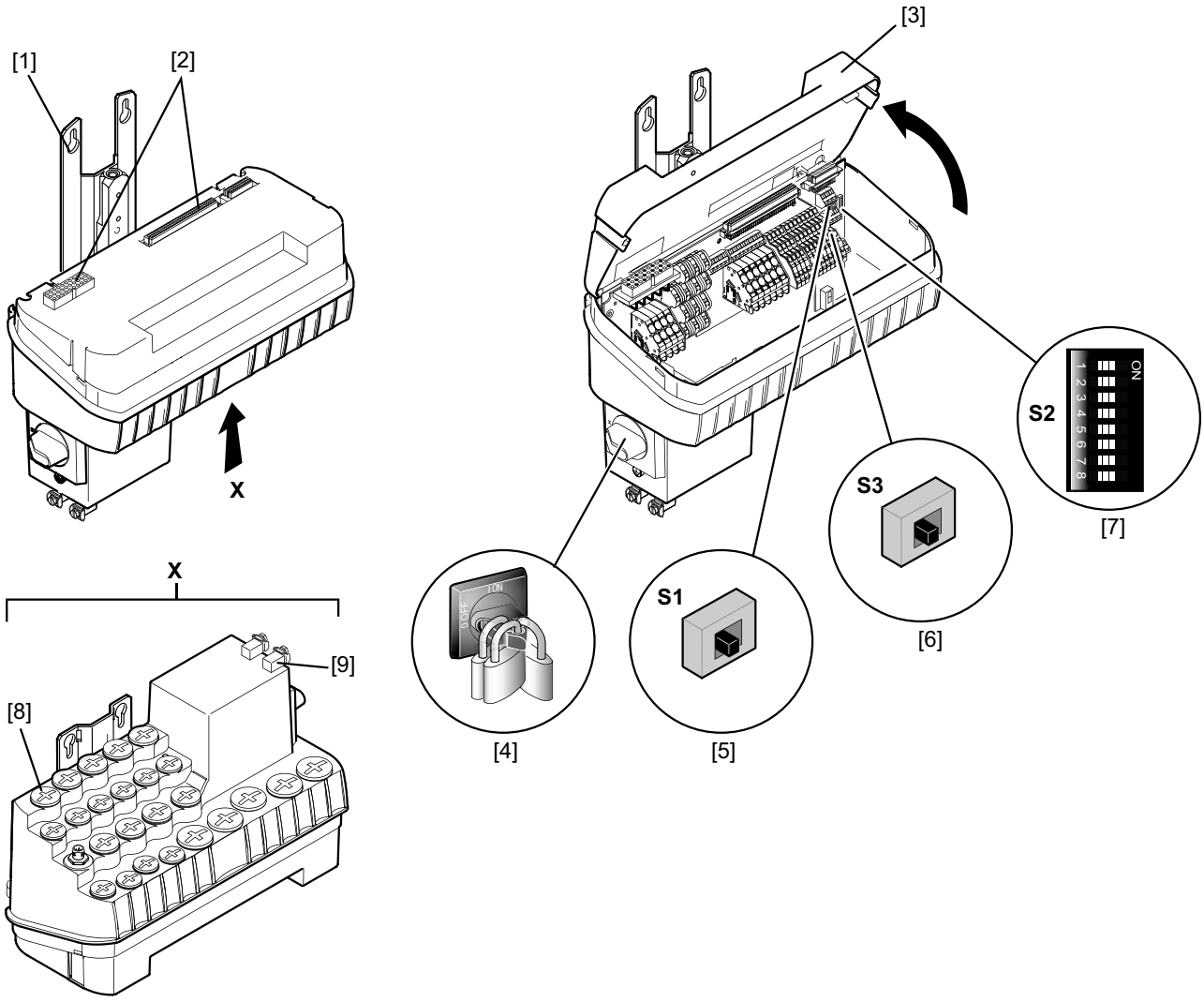
[A] Size 1
[B] Size 2
[1] Central opening/closing mechanism
[2] Operation LEDs for I/Os (can be labeled), communication, and unit state
[3] ABOX connection (connection box)
[4] DIP switch S10 for unit functions
[5] DIP switch S11 for IP parameters (only for PROFINET IO, EtherNet/IP, Modbus/TCP)

3.4 ABOX (passive connection unit)

The following figure shows an example of the MOVIFIT® FC ABOX:

ABOX "MTA...-....-00"



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[1] Mounting rail
[2] Connection to EBOX
[3] Protection cover
[4] Maintenance switch (triple lock)
[5] DIP switch S1 for bus termination
[6] DIP S3 switches for SBus bus termination
[7] DIP switch S2 for bus address (PROFIBUS and DeviceNet variants only)
[8] Diagnostics interface underneath the screw plug
[9] Grounding screws

3.5 Hygienic^{plus} variant (optional)

3.5.1 Properties

The Hygienic^{plus} variant has the following characteristics:

- IP66 in accordance with EN 60529 and IP69K according to DIN 40050-9 (MOVIFIT® housing closed and all cable bushings sealed according to the relevant degree of protection)
- Easy-to-clean housing (self-draining design)
- Surface with non-stick properties
- High impact resistance of the surface against mechanical damage
- Compatibility with cleansing agents having the following properties:
  - Alkaline
  - Acidic
  - Disinfectant

  Do not mix cleaning and disinfecting agents under any circumstances!

  Never mix acids and chloralkalis, as poisonous chlorine gas will result.

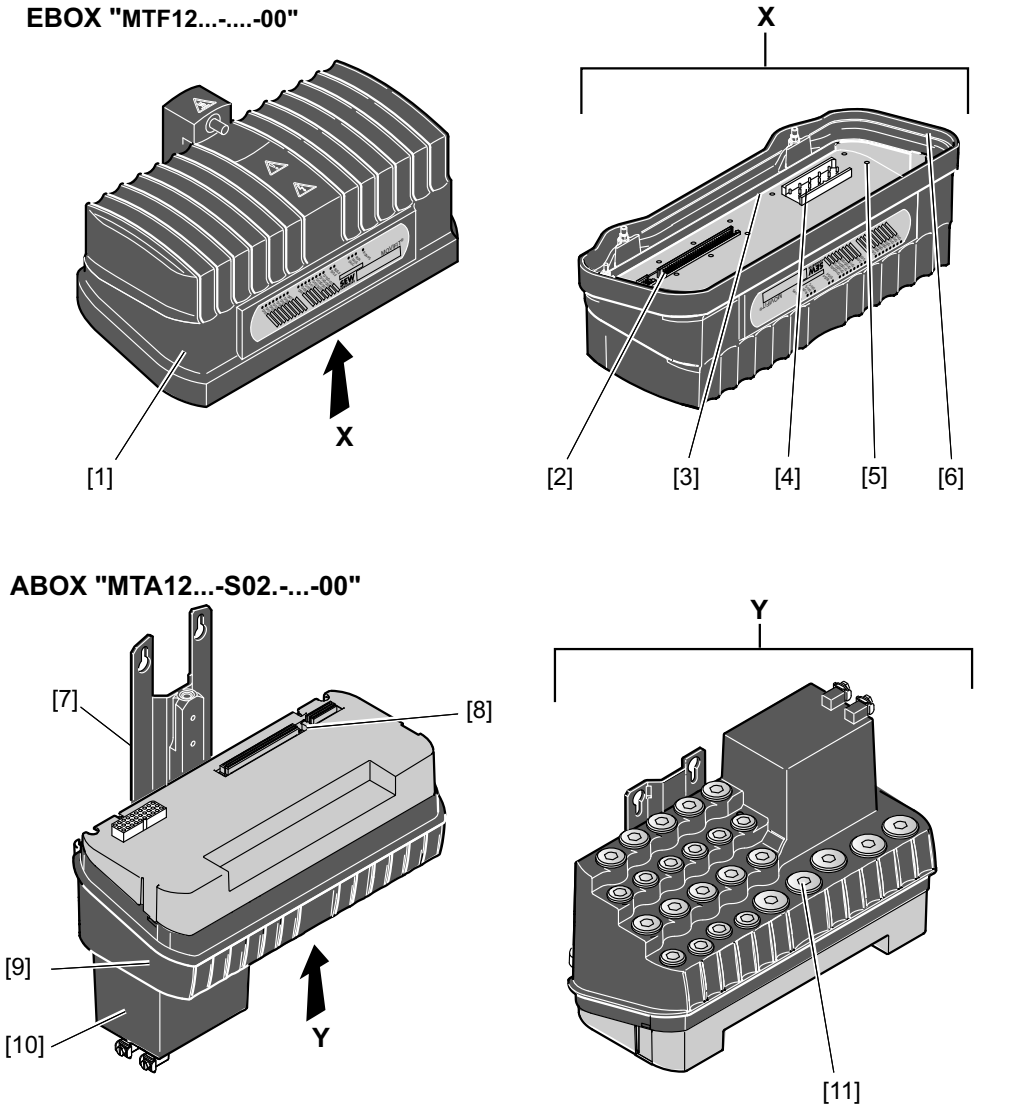
  Strictly observe the safety instructions of the cleaning agent manufacturer.
- Resistant to temperature fluctuations
- Resistant to condensation due to coated connection boards

INFORMATION

The Hygienic^{plus} design is only available in connection with the standard ABOX, "MTA12...-S02.-...-00".

For additional features of the Hygienic^{plus} variant, refer to the next page and chapter "Technical Data".

The following figure shows the additional features of MOVIFIT® units in the optional Hygienic^{plus} variant:



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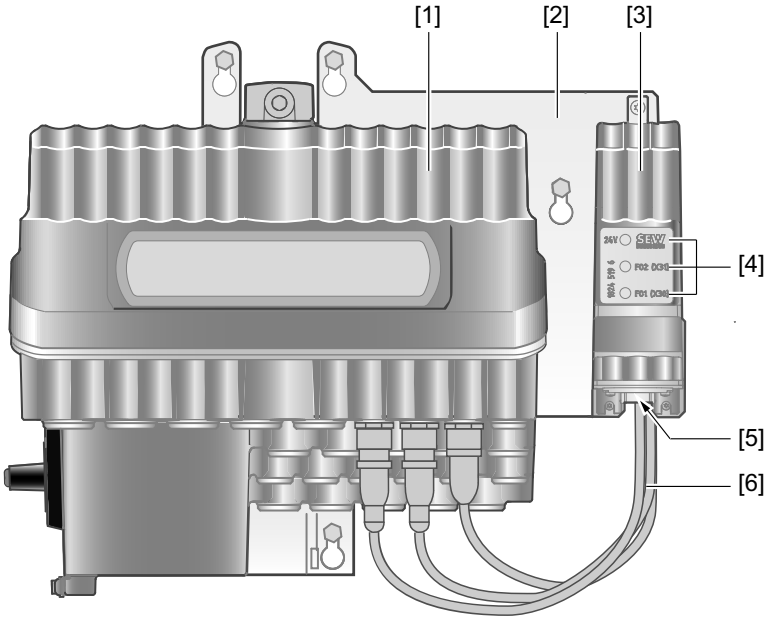
[1] EBOX with special surface treatment (only available in one color)
[2] Signal plug connector with gasket
[3] Gasket between ABOX and cover plate
[4] Power plug connector with gasket
[5] Screws with thread sealant
[6] Replaceable profile seal
[7] Mounting rail with surface coating (only available in one color)
[8] Connection board with increased resistance to moisture condensation (coated)
[9] ABOX with special surface treatment (only available in one color)
[10] In connection with the Hygienic^{plus} variant: Generally without maintenance switch
[11] Stainless steel screw plugs (optionally available)

3.6 MOVIFIT® with L10 PROFINET interface SCRJ/POF

3.6.1 Unit structure

The following figure shows MOVIFIT® with L10 PROFINET interface SCRJ/POF (POF option L10):



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[1] MOVIFIT®
[2] Special mounting rail
[3] POF option L10 (POF = **P**olymer **O**ptical **F**iber)
[4] Status LEDs
[5] X30 / X31 connections PROFINET POF
[6] Electrical connections between the POF option L10 and the ABOX
These connections are installed at the factory.

3.6.2 Functional description

The POF option L10 converts the optical signals that are transmitted via polymer optical fiber cables (POF) into electrical signals with PROFINET IO protocol and vice versa.

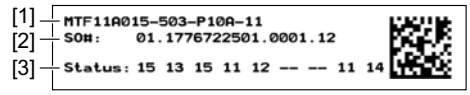
The POF option L10 makes it possible to connect the ABOX to the optical PROFINET IO.

3.7 Type designation MOVIFIT® FC

3.7.1 EBOX

Nameplate

The following figure shows an example of the outer nameplate of the EBOX of MOVIFIT® FC:



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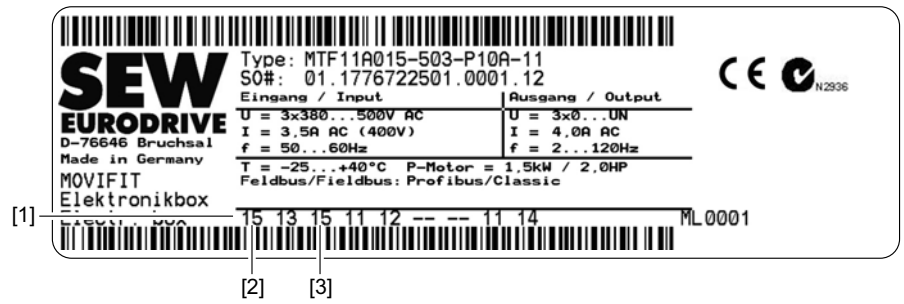
[1] EBOX type designation
[2] Serial number
[3] Status field

The following figure shows an example of the inner nameplate of the EBOX of MOVIFIT® FC:



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[1] EBOX status field
[2] Firmware status of control unit
[3] Firmware status of power section

Type designation

The following table shows an example of the type designation of the EBOX of MOVIFIT® FC:

MT F 11 A 015- 50 3 - P1 0 A - 00 / S11

EBOX option
S11 = PROFIsafe option S11[1)]

EBOX design
00 = DT/DV motor 400 V, 50 Hz
01 = DAS motor 400 V, 50 Hz
10 = DRS motor 400 V, 50 Hz
11 = DRE motor 400 V, 50 Hz
15 = DRS-DRE 50 – 60 Hz (global motor)

A = Version

Function level
0 = Classic
1 = Technology

Fieldbus
P1 = PROFIBUS E2 = PROFINET
D1 = DeviceNet Z1 = SBus slave
E3 = EtherNet/IP[2)], Modbus/TCP [2)]

Connection type
3 = 3-phase

Supply voltage
50 = AC 380 – 500 V

Unit power
003 = 0.37 kW
005 = 0.55 kW
007 = 0.75 kW
011 = 1.1 kW
015 = 1.5 kW
022 = 2.2 kW
030 = 3.0 kW
040 = 4.0 kW

Version A

Series
11 = Standard (IP65)
12 = Hygienic[plus] (IP69K)

Unit type
F = MOVIFIT® FC (frequency inverter)

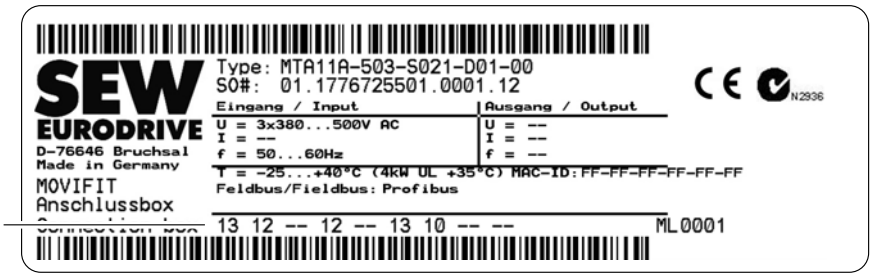
MT = MOVIFIT® unit series

1) Only available in connection with PROFIBUS or PROFINET IO
2) Available only in connection with "Technology" function level.

3.7.2 ABOX

Nameplate

The following figure shows an example nameplate of the ABOX of MOVIFIT® FC:



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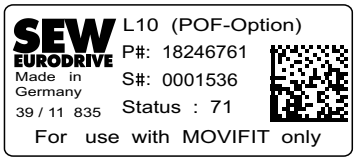
[1] ABOX status field

Nameplate of POF option L10

The following figure shows the nameplate of the POF option L10:



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Type designation The following table shows an example of the type designation of the ABOX of MOVIFIT® FC:

MTA11A - 503 - S021 - D01 - 00 / BW1 / M11

ABOX option 2
M11 = Stainless steel mounting rail
L10 = PROFINET interface SCRJ / POF (POF option L10) [1]

ABOX option 1
BW1 / BW2 = Integrated braking resistor

ABOX design
00 = Series

Maintenance switch
D01 = Load disconnector
M11 = Load disconnector and line protection up to 4 A[2]
M12 = Load disconnector and line protection up to 9 A [2]

Fieldbus
1 = PROFIBUS
2 = DeviceNet
3 = EtherNet/IP, PROFINET, Modbus/TCP

Connection configuration
S02 = Standard ABOX with terminals and cable glands
S42 = Hybrid ABOX with M12 for I/Os
S52 = Hybrid ABOX with M12 for I/Os + bus
S53 = Hybrid ABOX with M12 for I/Os + bus + 24 V output [1]
S62 = Hybrid ABOX with M12 for I/Os, push-pull RJ45 for bus
I55 = Hybrid ABOX with round connector (Intercontec), 1x downward motor output, M12 for I/Os + bus
G55 = Hybrid ABOX with round connector (Intercontec), 1x motor output at the front, M12 for I/Os + bus
I65 = Hybrid ABOX with round connector (Intercontec), 1x downward motor output, M12 for I/Os, push-pull RJ45 for bus
G65 = Hybrid ABOX with round connector (Intercontec), 1x motor output at the front, M12 for I/Os, push-pull RJ45 for bus

Connection type
3 = 3-phase

Supply voltage
50 = 380 V – 500 V:

A = Version

Series
11 = Standard (IP65)
12 = Hygienic^{plus} (IP69K)

Unit type
A = ABOX (connection box)

MT = MOVIFIT® unit series

1) The POF option L10 and the S53 connection configuration are only available in combination with each other.
2) Only available in connection with UL.

4 Mechanical Installation

4.1 General information

⚠ CAUTION

Risk of injury due to protruding parts, especially the mounting rail.

Risk of cutting or crushing.

- Cover sharp and protruding parts, especially the mounting rail, to protect against injury and damage.
- MOVIFIT® may only be installed by qualified personnel.

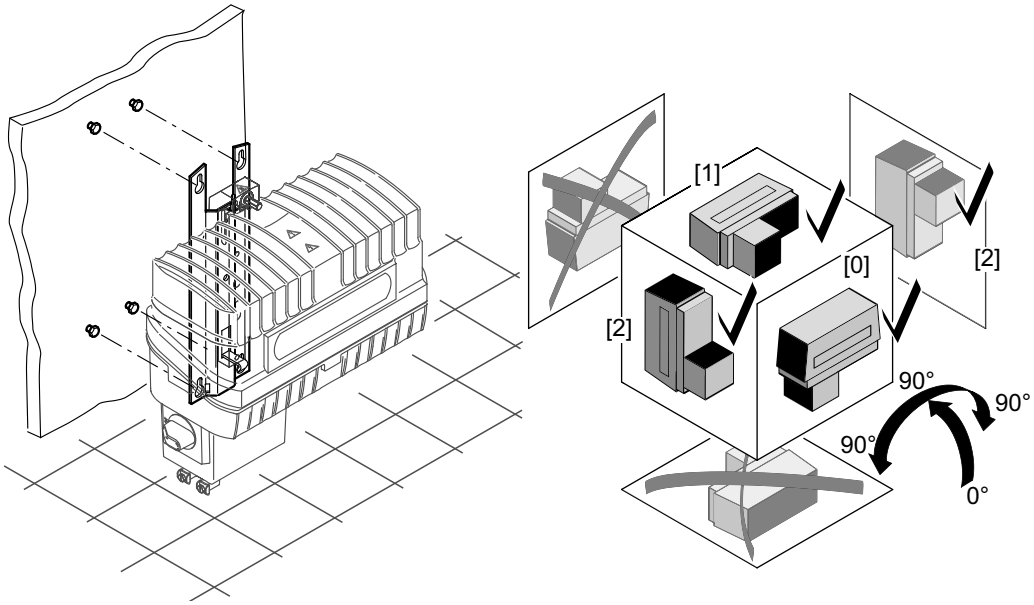
Observe the following notes on mechanical installation:

- Observe the general safety notes.
- Only install MOVIFIT® on a level, low-vibration, and torsionally rigid support structure, see "Mounting position" chapter.
- Comply with all instructions referring to the technical data and the permissible conditions where the unit is operated.
- Do only use provided attachment options when mounting the unit.
- When selecting and dimensioning the mounting and safety elements, observe the applicable standards, the technical data of the unit, as well as local circumstances.
- Use suitable screw fittings for the cables (use reducing adapters if necessary). Use suitable mating connectors for plug connectors.
- Cover the unused cable glands with screw plugs.
- Cover the unused plug connectors with blind caps.

4.2 Permitted mounting position

MOVIFIT® is attached by means of a mounting platform using the 4 screws already installed in the mounting surface. For detailed information, refer to chapter "Mounting" (page 26).

The following figure shows the permitted mounting positions for MOVIFIT®:



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[0] Mounting position 0 (standard)
[1] Mounting position 1 (tilted)
[2] Mounting position 2 (tilted)

INFORMATION

In this chapter, the standard variant with terminals and cable glands will be illustrated as an example. However, the installation notes appy to all variants.

All tilted mounting positions between mounting positions 0, 1, and 2 are permitted.

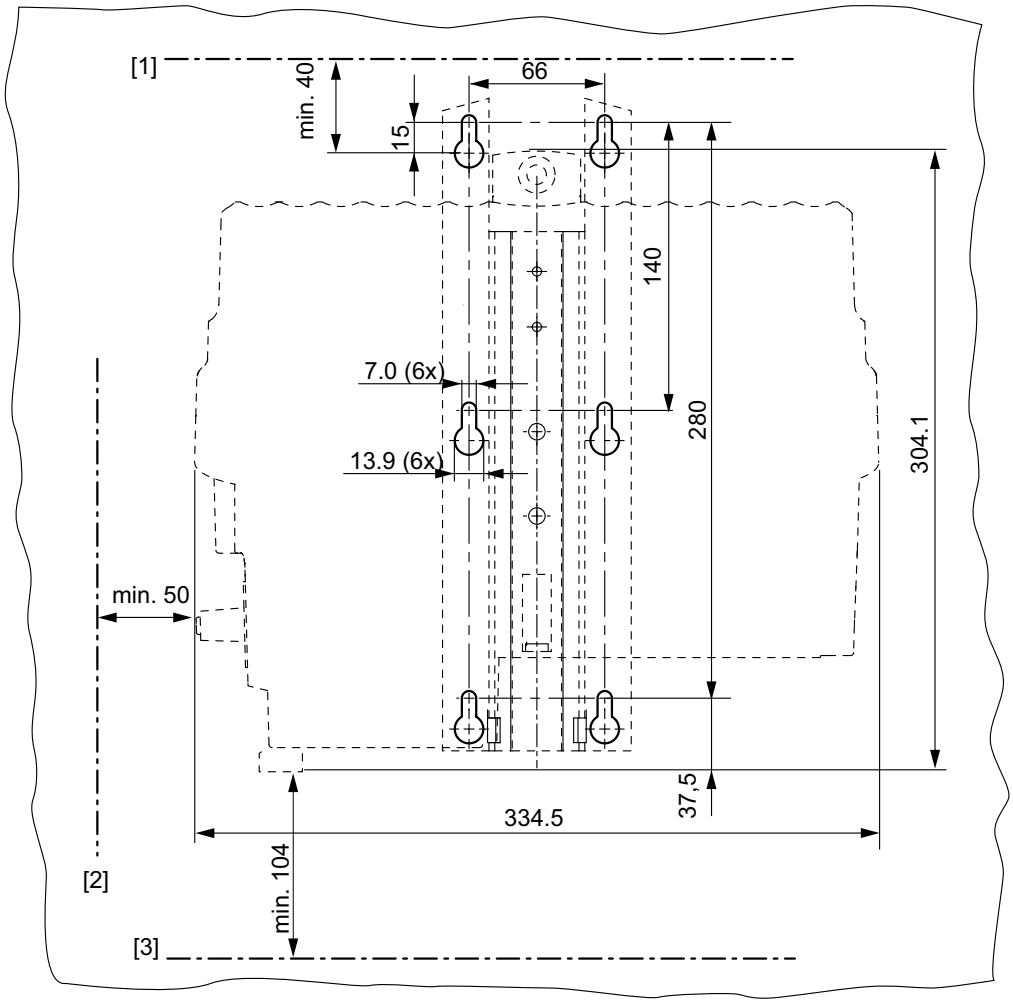
For MOVIFIT® with EBOX MTF11A-040-503.., the nominal output current I_N is reduced in tilted mounting positions, see chapter "Technical data".

4.3 Installation

4.3.1 Mounting rail

MOVIFIT® is equipped with a mounting rail to attach the unit to a level, low-vibration mounting surface using M6 bolts. For bore dimensions of the respective type of fixture, see the following figures.

Drilling template for standard mounting rail



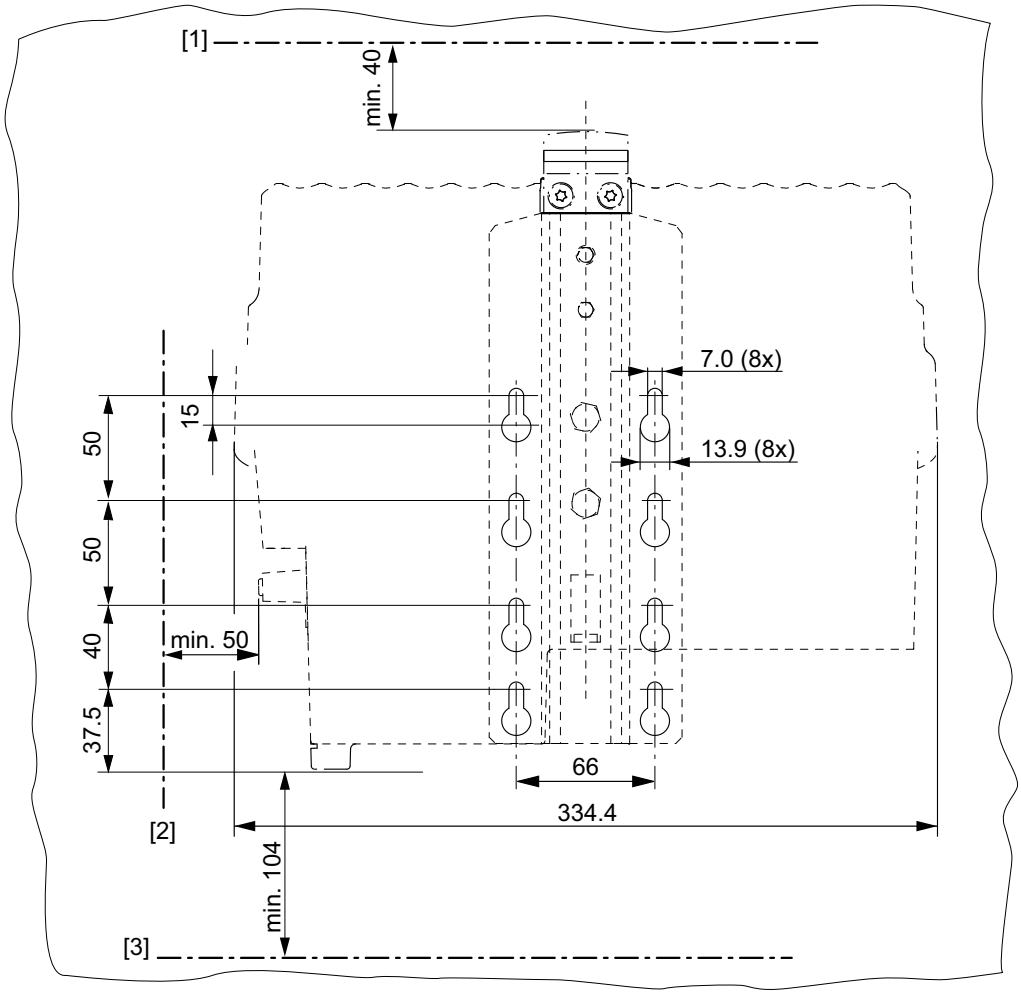
27021598522763275

INFORMATION

- [1] Observe the minimum installation clearance so that the EBOX can be removed from the ABOX.
- [2] Observe the minimum installation clearance required to operate the maintenance switch and to ensure heat dissipation for the unit.
- Make sure that the permitted bending radii of the cables used is not exceeded when connecting the cables.
- [3] Observe the minimum clearance of 104 mm at the bottom for all ABOXes with round connector (Intercontec) and downward motor output.
- Observe the minimum clearance of 191 mm at the front for all ABOXes with round connector (Intercontec) and motor output at the front.

For detailed dimension drawings, see the section "Technical data" / "Dimension drawings".

Drilling template for optional mounting rail /M11



18014399308791819

INFORMATION

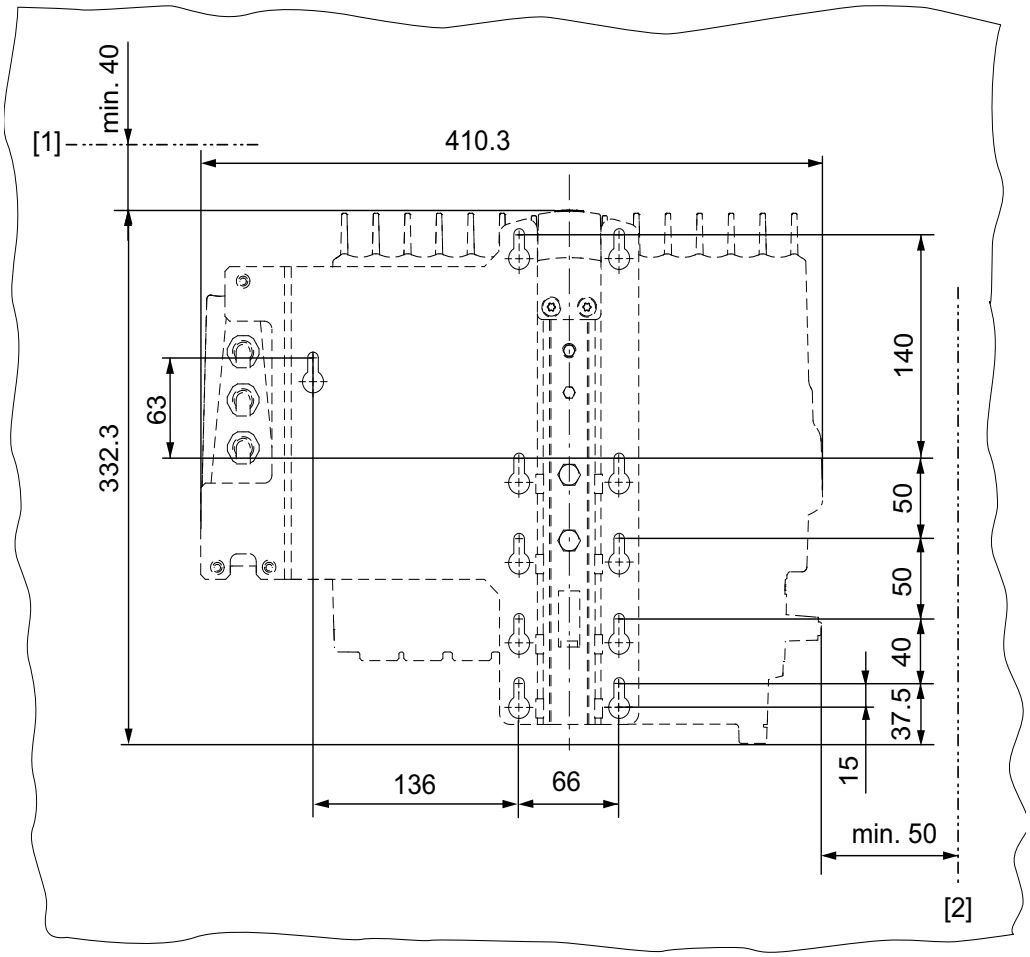
- [1] Observe the minimum installation clearance so that the EBOX can be removed from the ABOX.
- [2] Observe the minimum installation clearance required to operate the maintenance switch and to ensure heat dissipation for the unit.
- [3] Observe the minimum clearance of 104 mm at the bottom for all ABOXes with round connector (Intercontec) and downward motor output.
- Observe the minimum clearance of 191 mm at the front for all ABOXes with round connector (Intercontec) and motor output at the front.

For detailed dimension drawings, see the section "Technical data" / "Dimension drawings".

Drilling template for mounting rail (POF option L10)

The MOVIFIT® unit with the special mounting rail is mounted analogously to a unit with mounting rail /M11.

However, an additional retaining screw behind the POF option is necessary for this mounting rail, see following figure.



4763117579

INFORMATION

- [1] Observe the minimum installation clearance so that the EBOX can be removed from the ABOX.
- [2] Observe the minimum installation clearance required to operate the maintenance switch and to ensure heat dissipation for the unit.
- Make sure that the permitted bending radii of the cables used is not exceeded when connecting the cables.

For detailed dimension drawings, see the section "Technical data" / "Dimension drawings".

4.3.2 Fastening

⚠ CAUTION

Risk of crushing if the load falls.

Severe or fatal injuries.

- Do not stand under the load.
- Secure the danger zone.

⚠ CAUTION

Risk of injury due to protruding parts.

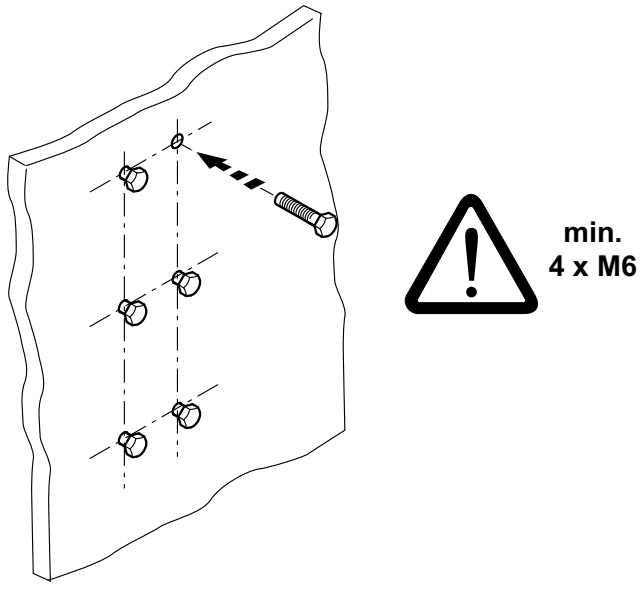
Risk of cutting or crushing.

- Cover sharp and protruding parts.
- The installation must only be carried out by qualified personnel.

1. Bore the holes required for mounting at least 4 bolts into the mounting surface according to the previous figures. SEW-EURODRIVE recommends bolts of size M6 and suitable dowel pins, if necessary.

2. Mount at least 4 screws on the mounting surface.

   Use appropriate washers or screw and washer assemblies for the mounting plates with special surface treatment on the Hygienic^{plus} variant.



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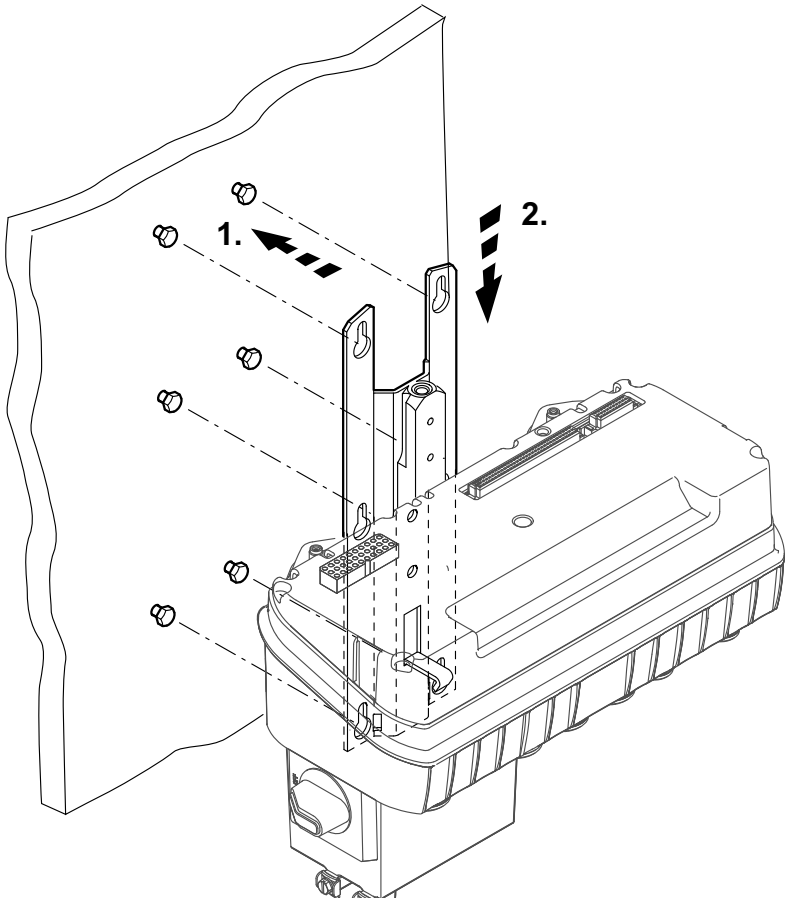
3. Attach the ABOX to the screws with the mounting plate



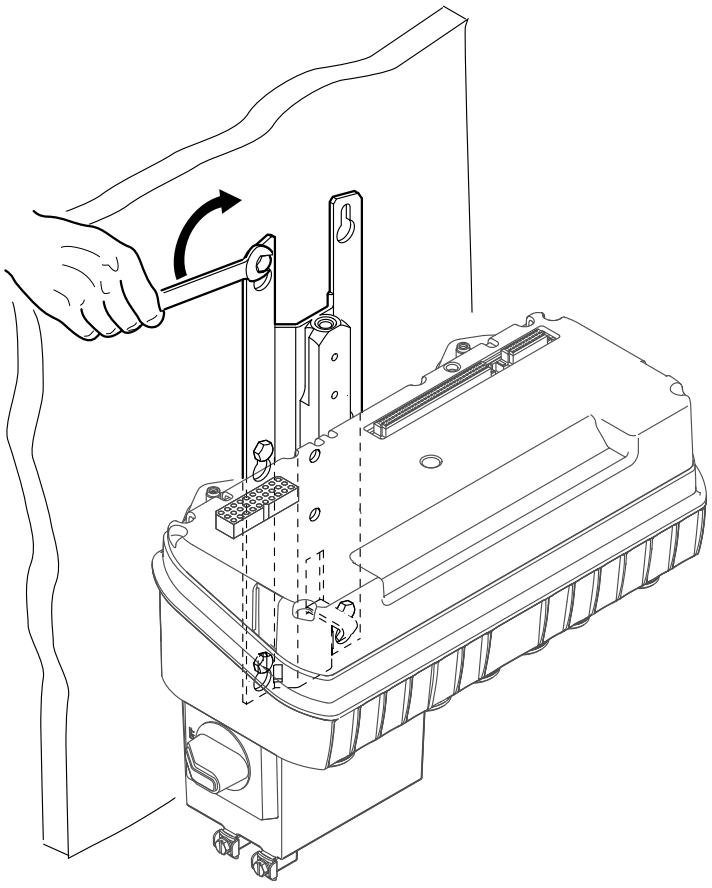
758565899

4. Tighten the screws.

   ⚠ **CAUTION** Risk of injury if the load falls.

   Minor injuries

   - Tighten at least 4 wall screws to ensure a secure fit after mounting.



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4.4 Central opening/closing mechanism

⚠ WARNING

Danger of burns due to hot surfaces of the MOVIFIT® unit.

Severe injuries.

- Do not touch the MOVIFIT® until it has cooled down sufficiently.

⚠ CAUTION

Risk of injury if the EBOX falls.

Minor injuries.

- Make sure that the EBOX cannot fall down when you are opening or closing it.

NOTICE

The enclosure specified in the technical data only applies when a unit is mounted correctly. MOVIFIT® can be damaged by moisture, dust or foreign particles when the EBOX is removed from the ABOX.

- Protect the ABOX and the EBOX when the unit is open.

⚠ NOTICE

The central opening/closing mechanism may be damaged.

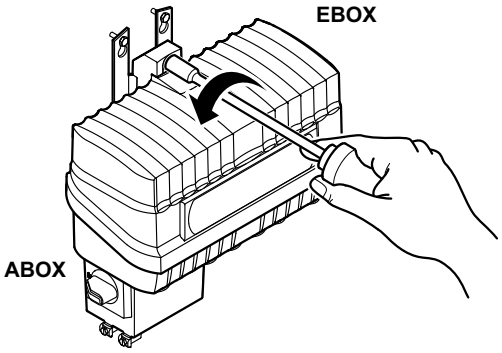
The central opening/closing mechanism may be destroyed.

- When opening/closing the EBOX in tilted mounting positions, make sure that the EBOX is aligned properly; guide the EBOX with your hand.

4.4.1 Opening

You need a socket wrench (SW8) for the central retaining screw.

1. Loosen the central retaining screw and continue to turn in counterclockwise direction until the EBOX does not move further up.



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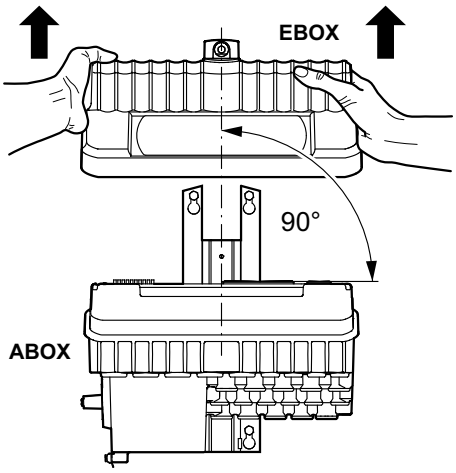
2. Remove the EBOX from the ABOX by lifting it upwards. Align the EBOX correctly.



813353099

4.4.2 Closing

You need a socket wrench (SW8) for the central retaining screw.

1. ⚠ **NOTICE** An improperly seated seal in the EBOX creates a strong counterforce when closing the MOVIFIT® unit.

   The central opening/closing mechanism may be damaged.

   - Make sure that the seal is properly seated in the groove of the EBOX.

     This means that

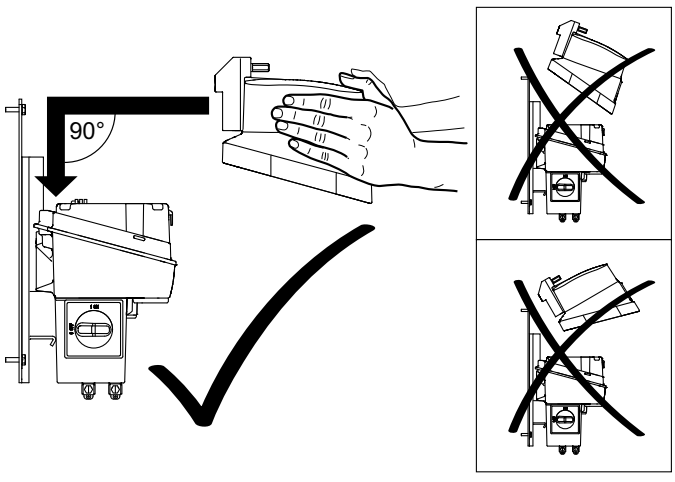
     – the seal is inserted into the groove over the entire circumference

     – and does not protrude from the groove.

2. Position the EBOX on the ABOX.

   - Align the EBOX correctly.
   - Only hold the EBOX on both sides.

     (See following figure).



813362059

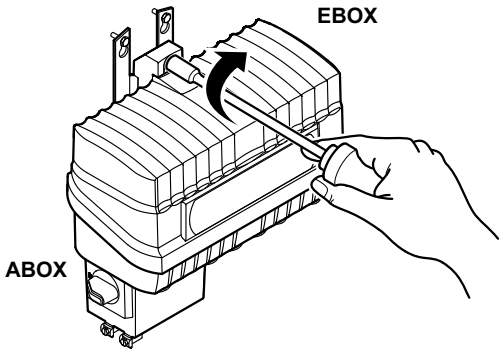
3. Check the EBOX for the correct position.

   ⚠ **NOTICE** The central opening/closing mechanism may be damaged.

   The central opening/closing mechanism may be destroyed.

   - In all tilted mounting positions, you must guide the EBOX manually when you are closing it.
   - Make sure that the EBOX is aligned correctly.

4. Tighten the retaining screw up to the stop using a tightening torque of 7 Nm.



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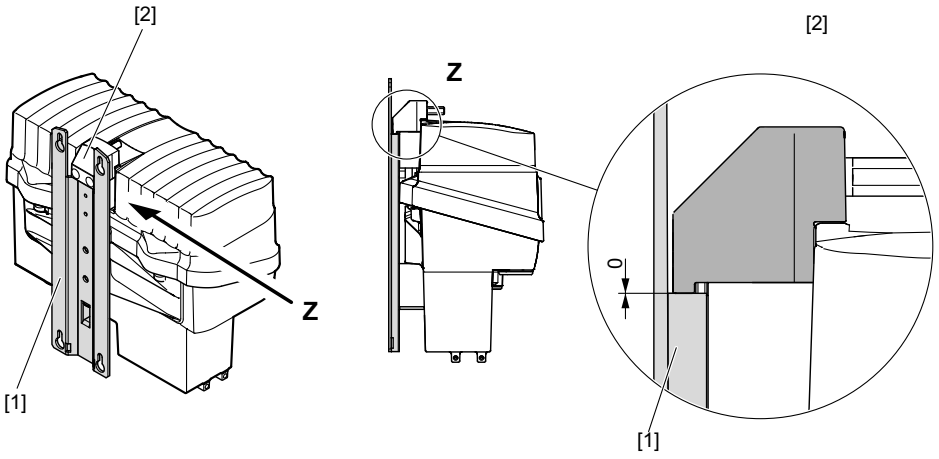
⚠ **NOTICE** If the torque is too high, the central opening/closing mechanism can be destroyed.

- Tighten the retaining screw with a maximum tightening torque of 7 Nm.
- If there is a noticeable counter torque, remove the EBOX again and check whether the gasket is seated properly. If necessary, press the gasket firmly into the groove.
- Never tighten the retaining screws with impermissibly high tightening torques.

5. MOVIFIT® is properly closed when the redirector of the closing mechanism [2] touches the mounting plate [1].



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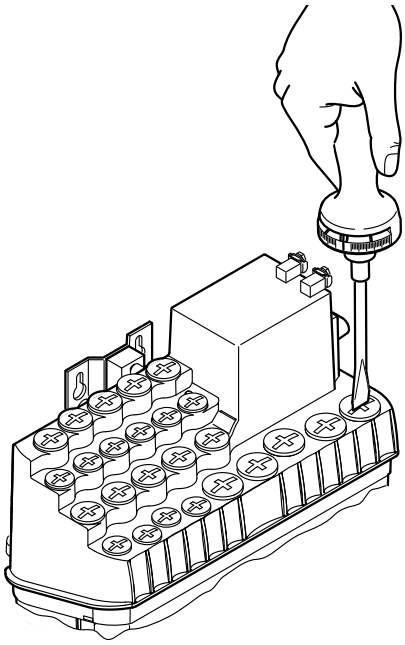
4.5 Tightening torques

4.5.1 Blanking plugs

Tighten the blanking plugs included in the delivery with 2.5 Nm:



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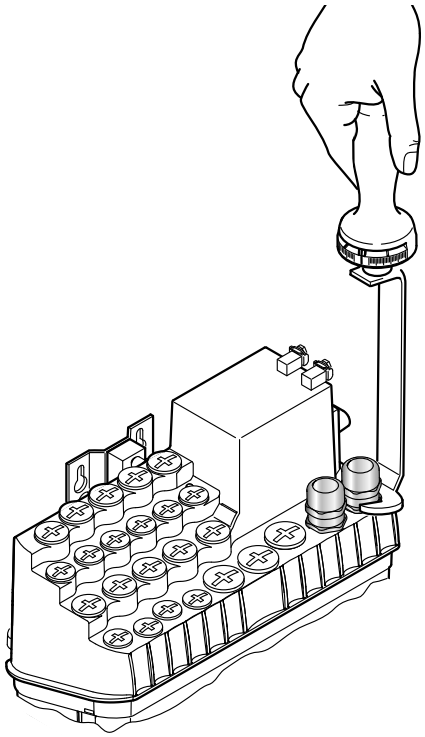
4.5.2 EMC cable glands

Tighten the EMC cable glands optionally supplied by SEW-EURODRIVE with the following torques:



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Screw fitting	Part number	Size	Tightening torque
EMC cable glands (nickel-plated brass)	1820 478 3	M16 x 1.5	3.5 Nm to 4.5 Nm
	1820 479 1	M20 x 1.5	5.0 Nm to 6.5 Nm
	1820 480 5	M25 x 1.5	6.0 Nm to 7.5 Nm
EMC cable glands (stainless steel)	1821 636 6	M16 x 1.5	3.5 Nm to 4.5 Nm
	1821 637 4	M20 x 1.5	5.0 Nm to 6.5 Nm
	1821 638 2	M25 x 1.5	6.0 Nm to 7.5 Nm

The cable retention in the cable gland must 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

4.6 MOVIFIT® Hygienic^{plus} variant

INFORMATION

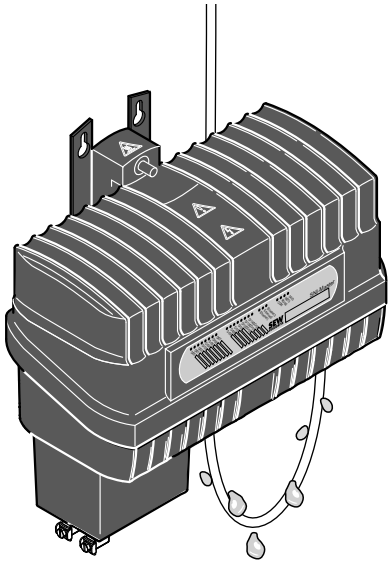
SEW-EURODRIVE guarantees that the Hygienic^{plus} special surface treatment is free from faults when delivered. Submit a complaint to the shipping company immediately after receiving the unit, if it is damaged.

Although the housing surfaces have a high impact resistance, they are to be handled with care. The corrosion protection can be affected by damages as a result from improper handling during transport, installation, operation, cleaning, etc. SEW-EURODRIVE is not liable for such damage.

4.6.1 Installation notes

Observe the following additional notes when installing MOVIFIT® in Hygienic^{plus} design:

- Make sure to prevent moisture and dirt from entering the unit during installation.
- After electrical installation and during assembly, check for damaged seals and sealing surfaces.
- Check the state of the profile seal in the EBOX when performing maintenance. If damaged: Consult SEW-EURODRIVE.
- MOVIFIT® only achieves degree of protection IP69K if
  - the delivered standard plastic screw plugs are replaced by suitable IP69K plugs made of stainless steel
  - and the permitted mounting position according to the following figure is observed.
- Make sure to install the cable with a drip loop; see the following figure:



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4.6.2 Tightening torques of Hygienic^{plus} variant

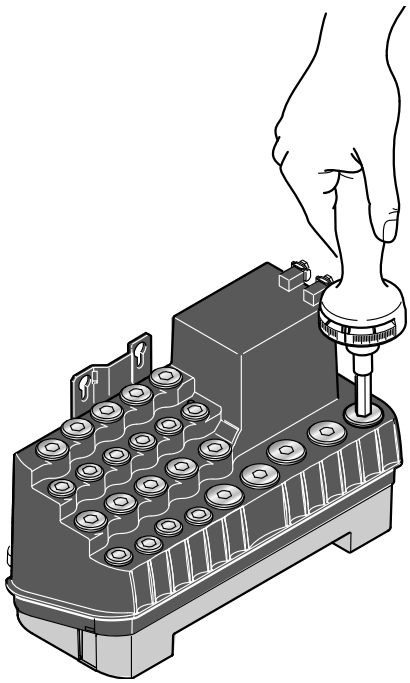
NOTICE

Loss of warranted degree of protection IP69K if the screw plugs are installed incorrectly or not at all.

Damage to the MOVIFIT® unit.

- MOVIFIT® only achieves degree of protection IP69K if the delivered standard plastic screw plugs are replaced by suitable IP69K plugs.
- Refer to chapter "Optional metal cable glands" (page 167) for the necessary screw plugs.
  Only the listed stainless steel screw plugs are suitable for degree of protection IP69K.

Blanking plugs Tighten the blanking plugs optionally included in the delivery with 2.5 Nm:



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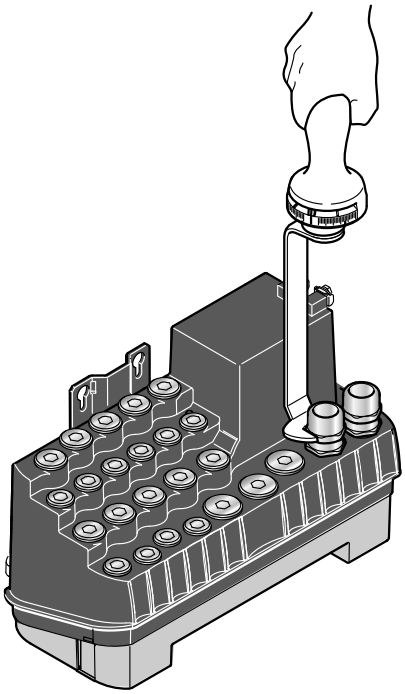
EMC cable glands

Tighten the EMC cable glands optionally supplied by SEW-EURODRIVE with the following torques:



512772875

Screw fitting	Part number	Size	Tightening torque
EMC cable glands (nickel-plated brass)	1820 478 3	M16x1.5	3.0 Nm to 4.0 Nm
	1820 479 1	M20x1.5	3.5 Nm to 5.0 Nm
	1820 480 5	M25x1.5	4.0 Nm to 5.5 Nm
EMC cable glands (stainless steel)	1821 636 6	M16x1.5	3.5 Nm to 4.5 Nm
	1821 637 4	M20x1.5	5.0 Nm to 6.5 Nm
	1821 638 2	M25x1.5	6.0 Nm to 7.5 Nm

The cable retention in the cable gland must 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

5 Electrical Installation

5.1 General information

Observe the following notes on electrical installation:

- Observe the general safety notes.
- Strictly observe all instructions as to the technical data and the permissible conditions regarding the place of installation.
- Use suitable screw fittings for the cables (use reducing adapters if necessary). With connector plug versions, you must use a suitable mating connector.
- Seal open cable entries with screw plugs.
- Use protective caps to seal plug connectors not in use.

5.2 Installation planning taking EMC aspects into account

INFORMATION

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

MOVIFIT® units can cause EMC interference within the permitted limit range according to EN 61800-3. In this case, it is recommended for the operator to take suitable measures.

For detailed information on EMC compliant installation, refer to the SEW publication Drive Engineering – Practical Implementation, "Electromagnetic Compatibility in Drive Engineering".

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

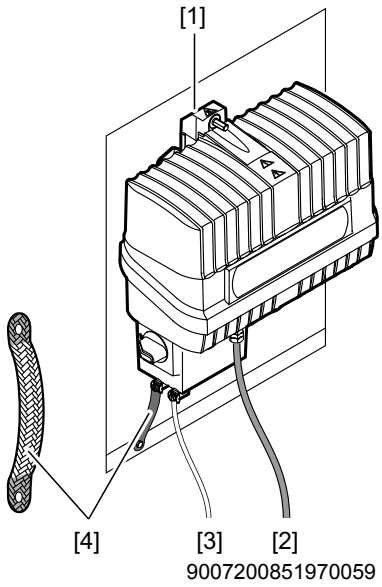
Always apply the **relevant standards**.

Observe the notes in the following chapters in particular.

5.2.1 Equipotential bonding

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

- Establish a connection over a wide surface area between the MOVIFIT® mounting rail and the system.
  (untreated, unpainted, uncoated mounting surface)
- To do so, use a ground strap (HF litz wire) to connect MOVIFIT® and the system's grounding point.



[1] Conductive connection over a large area between MOVIFIT® and the mounting rail
[2] PE conductor in the supply cable
[3] 2nd PE conductor via separate terminals
[4] EMC-compliant equipotential bonding, for example using a ground strap (HF litz wire)

- Do not use the cable shields of data lines for equipotential bonding.

5.2.2 Data lines and 24 V supply

Route data lines and 24 V supply separately from cables that emit interference (such as control cables of solenoid valves, motor cables).

5.2.3 Connection between MOVIFIT® and motor

Only use hybrid cables from SEW-EURODRIVE to connect MOVIFIT® with the motor:

5.2.4 Cable shields

- Must have good EMC properties (high shield attenuation)
- May not serve only as mechanical protection for the cable.
- Must be connected to a wide area of the unit's metal housing at the cable ends (see also chapter "Connecting the PROFIBUS cable" (page 55) and chapter "Connecting the hybrid cable" (page 56)).

5.3 Installation instructions (all variants)

5.3.1 Connecting supply system leads

- The rated voltage and frequency of the MOVIFIT® frequency inverter must correspond to the data for the supply system.
- Cable cross section according to input current I_{line} for rated power (see chapter "Technical Data").
- Install line fuses at the beginning of the supply system line behind the supply bus junction. Use D, D0, NH fuses or circuit breakers. Select the fuse size according to the cable cross section.
- Use contactor switch contacts from utilization category AC-3 according to EN 60947-4-1 to connect MOVIFIT® drives.
- Switch the MOVIFIT® FC output with inhibited output stage only.

5.3.2 Residual current device

⚠ WARNING

Electric shock due to incorrect RCD type.

Severe or fatal injuries.

MOVIFIT® can cause direct current in the protective earth conductor. In cases where a residual current device (RCD) is used for protection against direct or indirect contact, only install a type B RCD on the power supply end of the MOVIFIT®.

- Do not use a conventional RCD as a protective device. Universal current-sensitive RCDs (tripping current 300 mA) are permitted as a protective device. During normal operation of MOVIFIT®, leakage currents ≥ 3.5 mA can occur.
- SEW-EURODRIVE recommends that you do not use RCDs. However, if an RCD is stipulated for direct or indirect protection against contact, observe the note above in accordance with EN 61800-5-1.

5.3.3 Line contactor

- Use contactor switch contacts of utilization category AC-3 according to EN 60947-4-1 to connect the supply system cable.

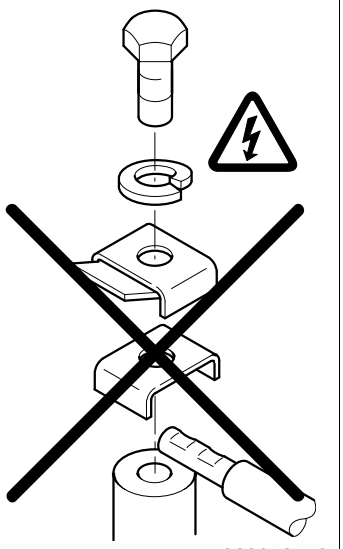
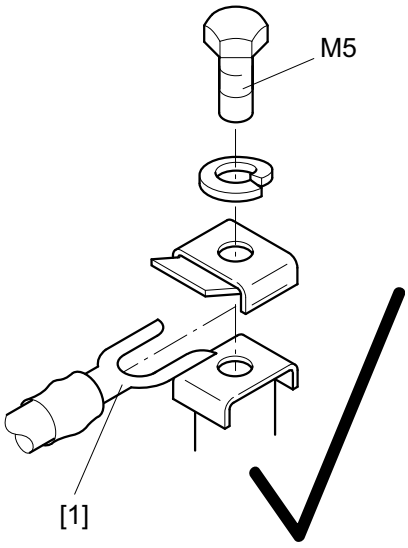
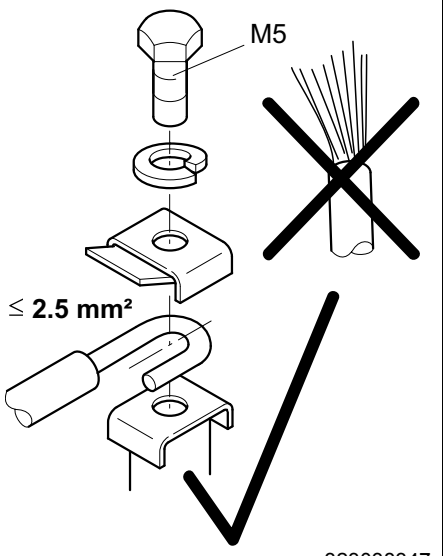
5.3.4 Notes on PE connection and/or equipotential bonding

⚠ WARNING

Electric shock due to incorrect connection of PE.

Severe, fatal injuries

- The permitted tightening torque for the retaining screws is 2.0 – 2.4 Nm.
- Observe the following notes regarding the PE connection:

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

[1] Forked cable lug suitable for M5 PE screws

Earth-leakage currents ≥ 3.5 mA may occur during normal operation. To meet the requirements of EN 61800-5-1, observe the following notes:

- The protective earth (PE) connection must meet the requirements for plants with high earth-leakage currents.
- This usually means
  - installing a PE connection cable with a minimum cross section of 10 mm^2
  - or installing a second PE connection cable in parallel with the original PE connection.

5.3.5 Definition PE, FE

⚠ WARNING

Electric shock due to incorrect connection of PE to the terminals marked with "F" (functional ground). The FE connections are not designed for this purpose. This means electrical safety is not guaranteed.

Severe or fatal injuries.

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

- **PE** refers to the mains-side protective earth connection. The PE conductor in the mains connection cable may only be connected with terminals marked with "PE". These are dimensioned for the max. permitted line connection cross section.
- **FE** refers to connections for "functional ground". You can connect any existing grounding conductor in the 24 V connection cable.

5.3.6 Meaning of the 24 V voltage levels

MOVIFIT® FC has a total of 4 different 24 V potential levels, which are electrically isolated from each other:

- 1) 24V_C: C = Continuous
- 2) 24V_S: S = Switched
- 3) 24V_P: P = Power section
- 4) 24V_O: O = Option

Depending on the requirements of the application, these can either be isolated, supplied externally, or connected to each other via a X29 distributor terminal.

1) 24V_C = Electronics and sensor supply

The 24V_C voltage level supplies:

- The MOVIFIT® control electronics
- The sensors connected to the sensor supply outputs VO24_I, VO24_II and VO24_III.

Do not disconnect the 24V_C voltage level during operation. If you do this, you can no longer control the MOVIFIT® unit via fieldbus or network, and the sensor signals are no longer processed.

When restarted, the MOVIFIT® unit needs a certain amount of time to boot.

2) 24V_S = Actuator supply

The 24V_S voltage level supplies:

- The binary outputs DO..
- The connected actuators
- The VO24_IV sensor supply output

The binary inputs DI12 – DI15 are connected to the reference potential 0V24_S (as these can be connected to the same connections as an alternative to the outputs).

To centrally deactivate the actuators of the plant, you can disconnect the 24V_S voltage level during operation, if required.

3) 24V_P = Inverter supply

The 24V_P voltage level supplies the integrated inverter with 24 V.

Depending on the application, the 24V_P voltage level can be supplied by 24V_C or 24V_S (via jumpers at X29) or externally. The required jumpers are included in the scope of delivery.

⚠ WARNING

During safe disconnection, 24V_P must be connected over a suitable emergency stop relay or a safety control.

Severe or fatal injuries.

- Note the wiring diagrams and the safety conditions of the "MOVIFIT® MC/FC – Functional Safety" manual.

Note that the integrated frequency inverter is no longer supplied with 24 V in case of safe disconnection. It will issue an error message.

4) 24V_O = Option supply

The 24V_O voltage level supplies:

- The integrated S11 option card
- the sensor/actuator interfaces on the S11 option card.

With PROFIsafe option S11, the complete safety electronics and the safe inputs/outputs are supplied from 24V_O.

⚠ WARNING

Danger due to improper safety shutdown when PROFIsafe option S11 is used.

Severe or fatal injuries.

- When using the PROFIsafe option S11, note the permitted wiring diagrams and safety conditions in the "MOVIFIT® MC/FC – Functional Safety" manual.

Depending on the application, the 24V_O voltage level is supplied by:

- The 24V_C voltage level
- The 24V_S voltage level (via jumpers at terminal X29)
- An external source.

Note that the entire S11 option card with the connected sensors and actuators is no longer supplied when the voltage level is disconnected. This causes an error message.

Connection of voltages

Connect the 24V_C and 24V_S voltage levels to terminal X20 with a large cable cross section. Loop the 24V_C and 24V_S voltage levels through to the next MOVIFIT® unit as "24 V power bus" with a large cable cross section.

Connect the 24V_P and 24V_O voltage levels to terminal X29.

INFORMATION

- For connection examples, refer to chapter "Power bus connection examples" (page 101).
- For the permitted connection cross sections, refer to chapter "Permitted connection cross sections" (page 53).

5.3.7 Plug connectors

All MOVIFIT® plug connectors are illustrated in these operating instructions with view on the contact end.

5.3.8 Operating braking resistors

Braking resistors dissipate the energy generated during braking operations and get hot in the process.

⚠ WARNING

Danger of burns due to hot surfaces of the braking resistors when loaded with P_N.

Severe burns.

- Choose a suitable installation location for the braking resistors.
- Do not touch the braking resistors until they have cooled down sufficiently.

The supply cables to the braking resistors carry a high pulsed DC voltage during normal operation.

5.3.9 Protection devices

MOVIFIT® drives are equipped with integrated protective overload devices, which make external devices obsolete.

5.3.10 EMC-compliant installation

INFORMATION

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

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

For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

With respect to the EMC regulation, frequency inverters cannot be operated as standalone units. Regarding EMC, they can only be evaluated when they are integrated in a drive system. Conformity is declared for a described, CE-typical drive system. These operating instructions contain further information.

5.3.11 UL-compliant installation

Power terminals

Note the following points for UL-compliant installation:

- Use only 75 °C copper wire.
- MOVIFIT® uses cage clamp terminals.

Short circuit current rating

Suitable for use in circuits that deliver a maximum of 200,000 A rms:

- MOVIFIT® FC, the max. voltage is limited to 500 V.

Branch circuit protection

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

The following table lists the maximum fuse rating.

Series	Max. fuse rating
MOVIFIT® FC	25 A / 600 V

Motor overload protection

- MOVIFIT® FC is equipped with motor overload protection with a trip current adjusted to 140% of the rated motor current.

Unit and line protection

- MOVIFIT® units in connection with ABOX MTA...-M11-.. or MTA....-M12-.. are equipped with unit and line protection.

Ambient temperature

- MOVIFIT® FC (except MTF1.A040-503...) is suitable for operation at an ambient temperature of 40 °C, max. 60 °C with derated output current. To determine the output current rating at higher than 40 °C, the output current should be derated 3.0% per °C between 40 °C and 60 °C.
- MOVIFIT® FC (MTF1.A040-503... only) is suitable for operation at an ambient temperature of 35 °C, max. 55 °C with derated output current. To determine the output current rating at higher than 35 °C, the output current should be derated 3.0% per °C between 35 °C and 55 °C.

ABOX-EBOX combination

- For UL-compliant installation, only the ABOX listed on the ABOX nameplate may be installed to the ABOX. UL certification only applies to the ABOX-EBOX combination listed on the nameplate.

INFORMATION

The UL certification only applies to operation on voltage supply systems with voltages to ground of max. 300 V. The UL-certification does not apply to operation on voltage supply systems with a non-grounded star point (IT systems).

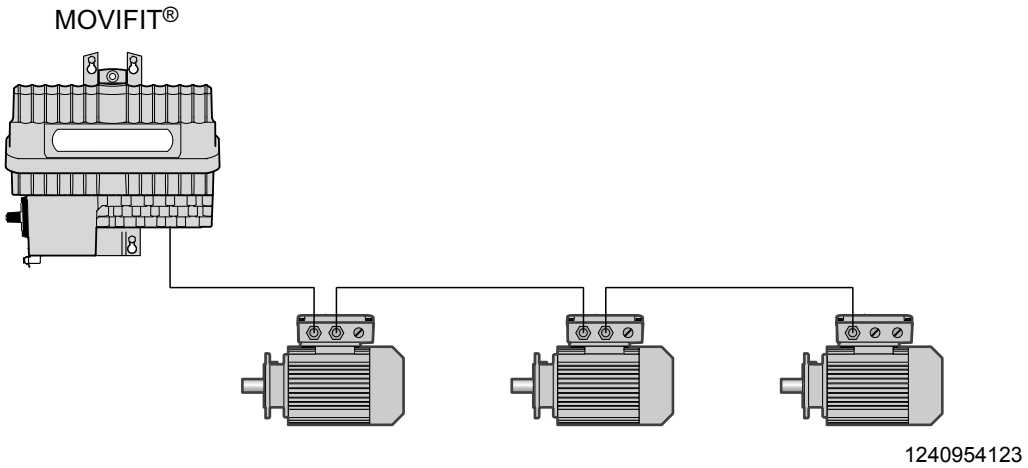
5.3.12 Installation altitude higher than 1000 m above sea level

MOVIFIT® units with supply voltages of 380 to 500 V can be used at altitudes above 1000 m asl up to 4000 m asl under the following conditions:

- The nominal continuous power is reduced due to the reduced cooling above 1000 m (see chapter "Technical Data").
- Above 1000 m asl, the air and creeping distances are only sufficient for overvoltage class 2. If the installation calls for 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 device at altitudes of more than 2000 m above sea level (safe electrical disconnection in accordance with EN 61800-5-1 and EN 60204-1, motor connector (Intercontec), according to EN60664-1 (DIN VDE 0110-1).
- At installation altitudes up to 2000 m asl, the permitted nominal line voltage is 3 × 500 V. Between 2000 m and 4000 m asl, the permitted line voltage is reduced by 6 V per 100 m.

5.4 Additional installation instructions for group drives

The following figure shows the prescribed installation for group drives with MOVIFIT® FC:



When installing such group drives, also follow the installation instructions below:

- The total of the nominal motor currents must not exceed the nominal output current of MOVIFIT® FC.
- Connect no more than 3 motors in series connection to the MOVIFIT® FC. The sum of the nominal motor currents may not exceed the nominal unit current of MOVIFIT® FC.
- The sum of all cable sections between MOVIFIT® FC and the motors must not exceed 15 m.
- Temperature monitoring of 2 motors is permitted with a TF temperature sensor for each motor.

  If you are using more than 2 motors, each motor must be equipped with a TH temperature switch.

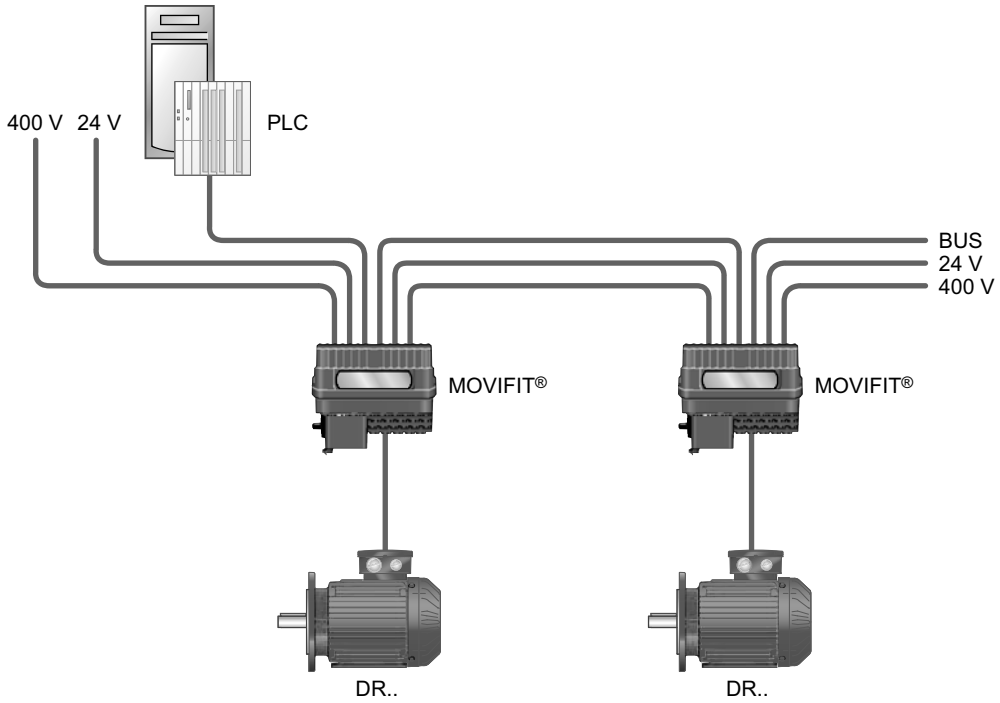
  Connect those TFs/THs to the MOVIFIT® FC in series connection.
- The motor brakes may be controlled using constant voltage only (alternative brake control system at startup using MOVITOOLS® MotionStudio). The rated voltage of all connected brakes must be equal.

INFORMATION

- For more information on motor/brake startup, refer to the manual "MOVIFIT® function level "Classic"..." or "MOVIFIT® function level "Technology" ...".
- When several motors are controlled via a MOVIFIT® FC drive (group drive), the internal motor protection model does not protect the connected motors against overheating.
  This is why the drive must be equipped with an internal or external braking resistor. The braking resistor dissipates the regenerative power during deceleration.

5.5 Installation topology (example)

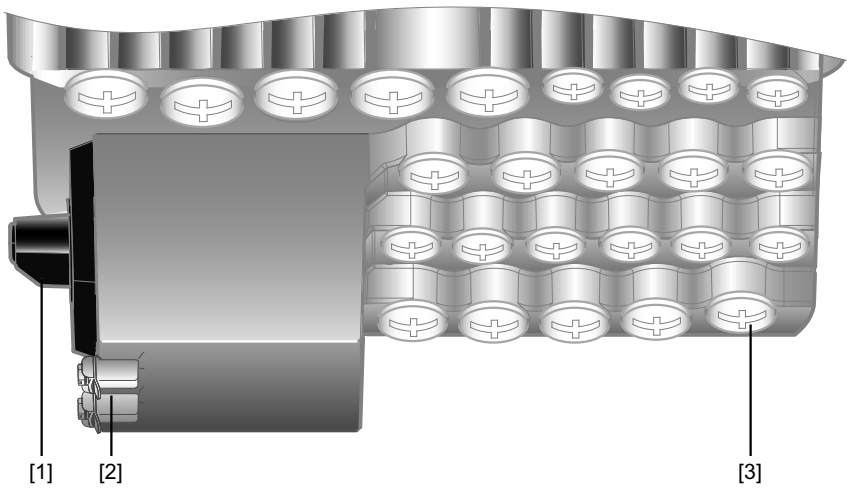
The following figure shows the general installation topology of MOVIFIT® FC:



5.6 Standard ABOX MTA...-S02.-...-00

5.6.1 Description

The following figure depicts the Standard ABOX with terminals and cable bushings:



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[1] Optional maintenance switch
[2] PE connection
[3] Diagnostics socket (RJ10) under the screw plug

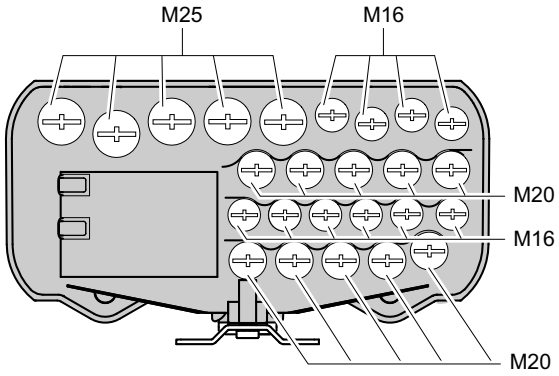
5.6.2 Variants

The following variants of the standard ABOX are available for MOVIFIT® FC (MTF):

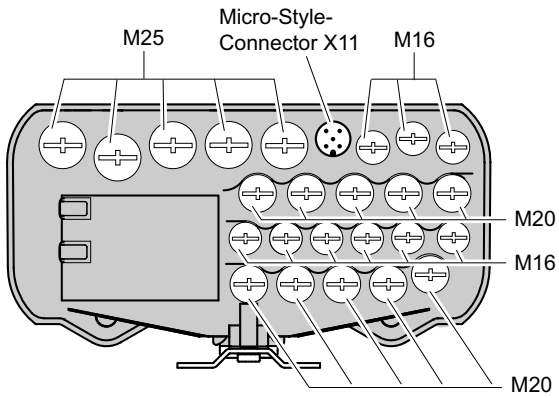
- MTA11A-503-**S02**.-...-00:
  - Optional internal or external braking resistor
  - Optional load break switch
  - Load break switch and line protection

The following figure shows the screw connections and plug connectors of the standard ABOX depending on the fieldbus interface:

PROFIBUS MTA11A-503-S02**1**-...-00
PROFINET
Ethernet/IP MTA11A-503-S02**3**-...-00
Modbus/TCP



DeviceNet MTA11A-503-S02**2**-...-00



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5.6.3 Additional installation instructions for MTA...-S02.-...-00

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

Terminal data	X1 / X20	X8 / X9	X25 / X30 / X31 / X35 / X45 / X81 / X91	X29
Connection cross section	0.2 – 6 mm^2	0.08 – 4[1] mm^2	0.08 – 2.5[1] mm^2	0.2 – 1.5[1] mm^2
	AWG 24 – AWG10	AWG 28 – AWG12[1]	AWG 28 – AWG14[1]	AWG 24 – AWG16[1]
Current carrying capacity (max. continuous current)	X1: 32 A X20: 16 A	20 A	10 A	10 A
Conductor stripping length	13 – 15 mm	8 – 9 mm	5 – 6 mm	9 – 10 mm

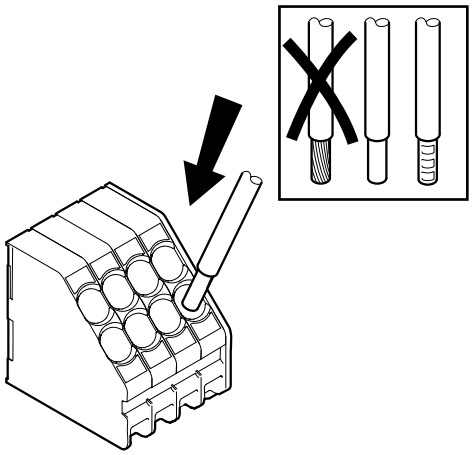
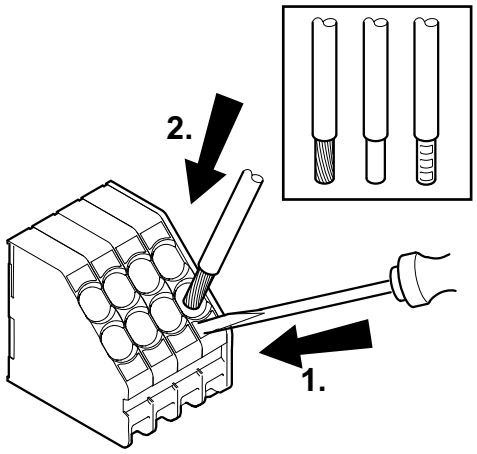
1) The maximum permitted cross-section is reduced by one unit when using conductor end sleeves (e.g. 2.5 mm^2 → 1.5 mm^2)

Conductor end sleeves

Use conductor end sleeves without insulating shrouds for terminals X1, X20, X8, and X9 (DIN 46228-1, material E-CU).

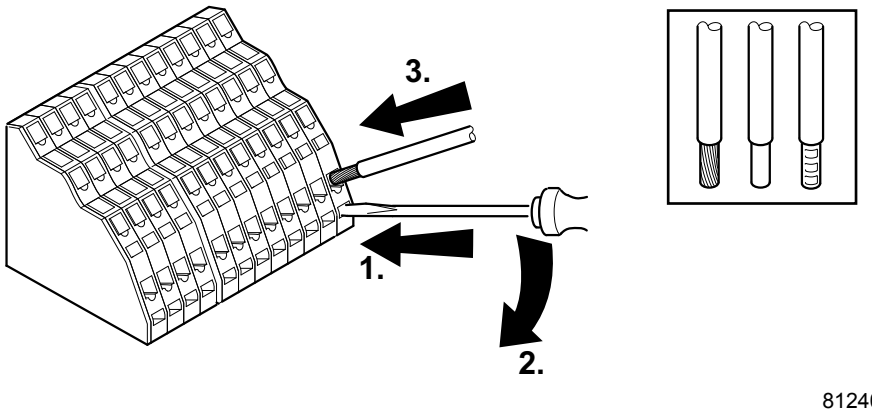
Actuating the terminals

Terminals X1, X20

Connect the conductor without screwdriver [1]	Connect the conductor with screwdriver [2]
 812406283	 812407947

1) Single-wire conductors and flexible conductors with conductor end sleeves can be installed directly (without using a tool) up to two cross section sizes below the rated cross section.
2) Untreated, flexible conductors or conductors with small cross sections cannot be directly inserted into the terminal. To open the clamping spring when you want to connect such conductors, push a screwdriver firmly into the actuation opening.

Terminals X8 / X81 / X9 / X91 / X29 / X45 / X25 / X30 / X31 / X35 [1]



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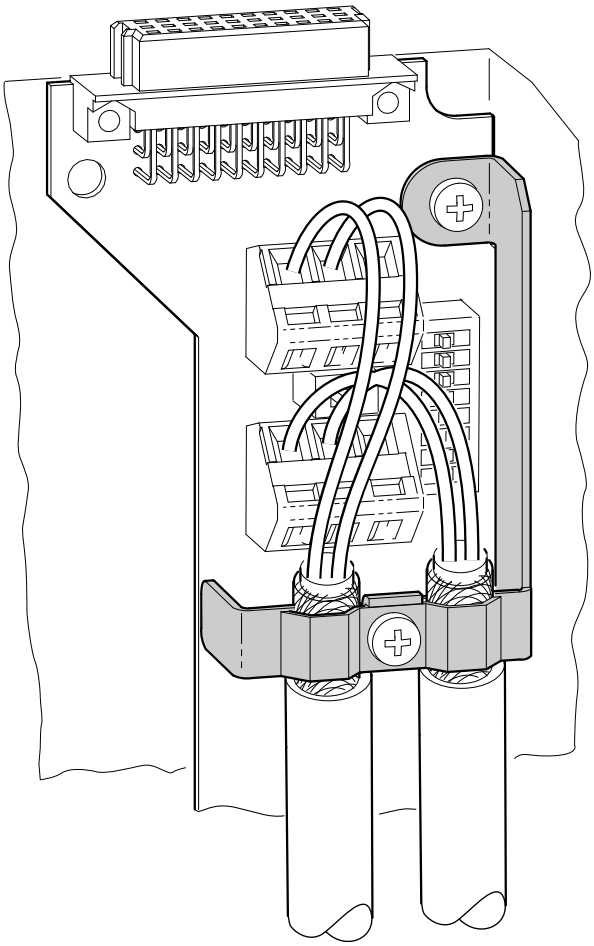
1) With these terminals, the conductor is always connected with a screwdriver irrespective of its type.

Connecting the PROFIBUS cable in MOVIFIT®

Observe the following guidelines of the PROFIBUS user organization (Internet: www.profibus.com) for your PROFIBUS installation:

- "Installation guidelines for PROFIBUS DP/FMS", order number 2.111 (German) or 2.112 (English)
- "Installation recommendations for PROFIBUS", order number 8.021 (German) or 8.022 (English)

Apply the cable shield of the PROFIBUS cable as follows:



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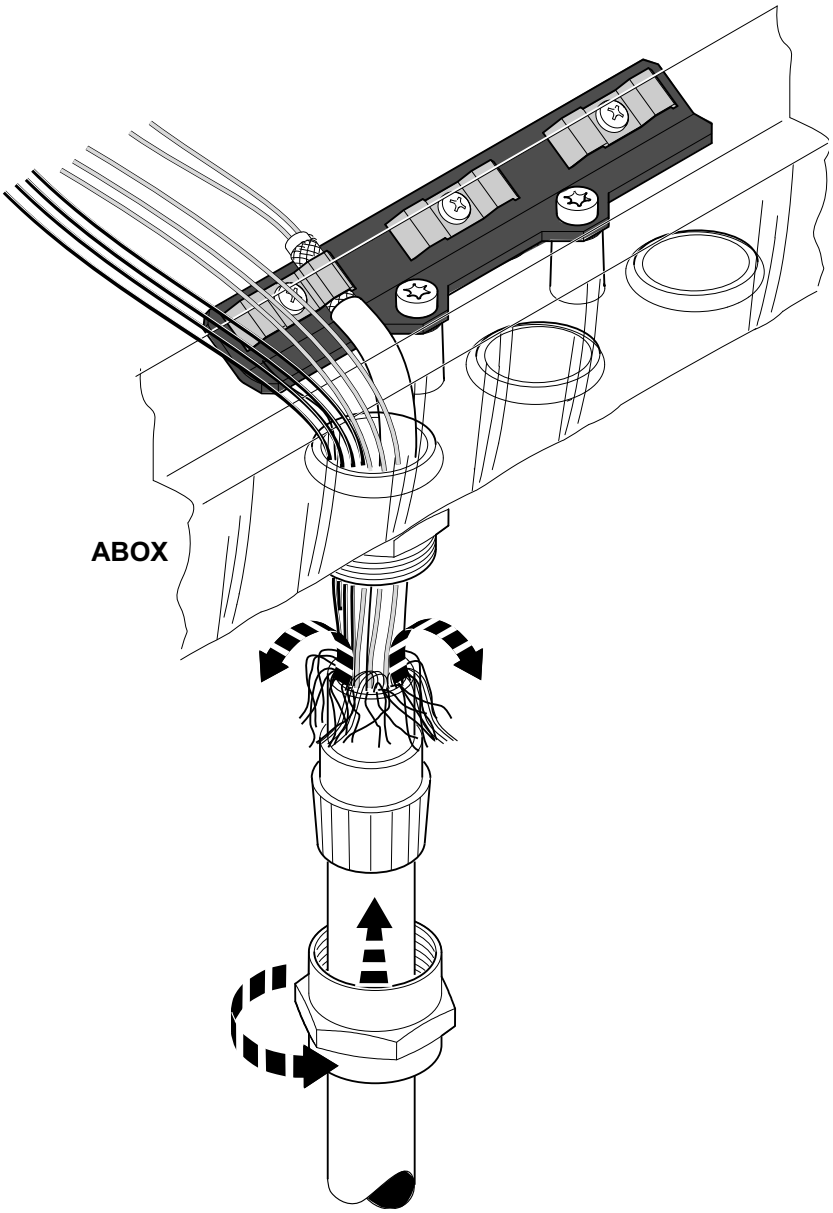
INFORMATION

- Note that the PROFIBUS connector cores inside the MOVIFIT® must be kept as short as possible and are always of equal length for the incoming and outgoing bus.
- The PROFIBUS is not interrupted when you remove the EBOX from the ABOX.

Connecting the hybrid cables

- SEW-EURODRIVE recommends using the shielded and prefabricated SEW hybrid cables specifically designed for connecting MOVIFIT® to the motor.

  See chapter "Electrical Installation" / "Hybrid cables".
- The outer shield of the hybrid cable must be attached to the housing of the unit using a suitable EMC cable gland.
- The inner shield of the hybrid cable must be connected via a shield plate in the MOVIFIT® ABOX as follows:



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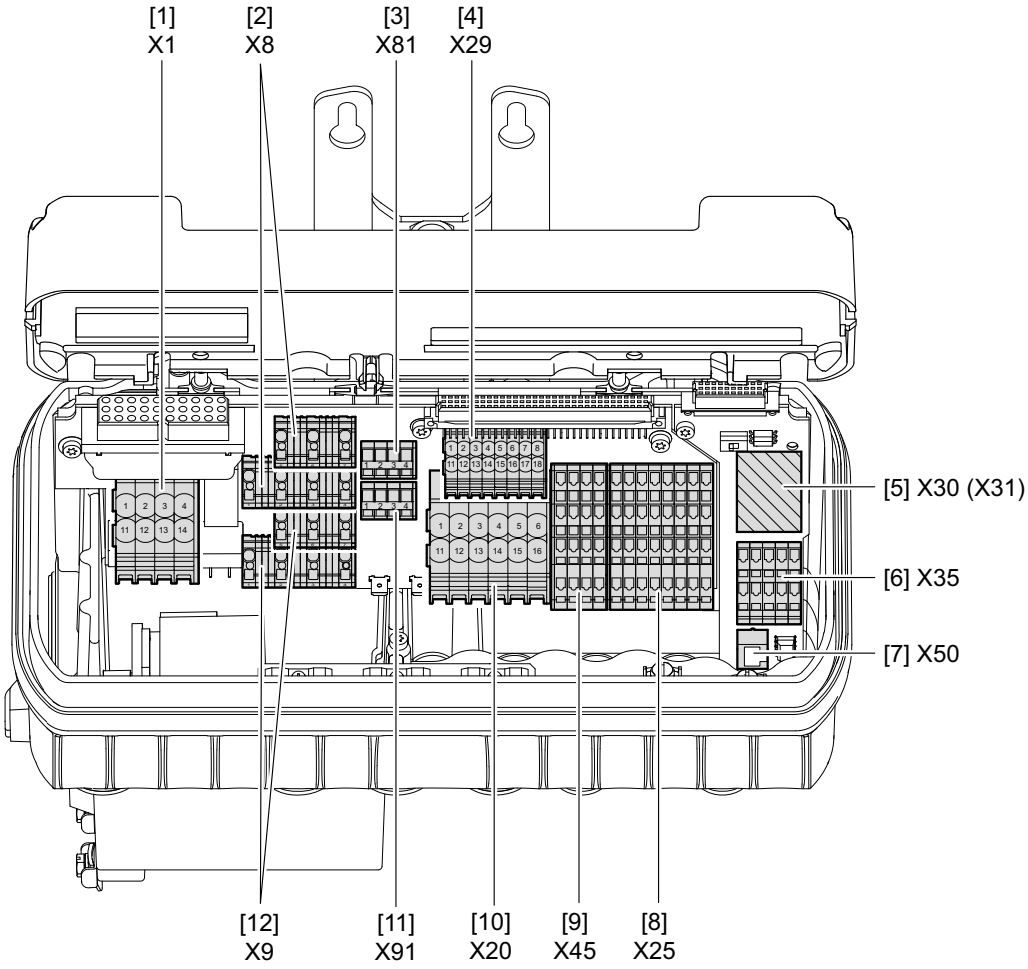
INFORMATION

- In contrast to the standard ABOX, the hybrid ABOXes MTA...-I..-...-00 and MTA...-G..-...-00 have no shield plates. Here, the cable shields must be connected via EMC cable glands.

5.6.4 Terminal positions

The following figure shows the position of the terminals in the ABOX:



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[1]	X1	Supply system terminals
[2]	X8	Terminals motor 1, motor phases and brake
[3]	X81	Terminals motor 1, TH/TF and brake output
[4]	X29	24 V distributor terminals
[5]	X30, (X31)	Fieldbus terminals or plug connectors, depending on the fieldbus The areas depending on the fieldbus system are shown hatched.
[6]	X35	SBus terminals CAN
[7]	X50	Diagnostics interface (RJ10, female)
[8]	X25	I/O terminal for binary inputs/outputs (connection of sensors + actuators)
[9]	X45	I/O terminals for safety-related, binary inputs/outputs (only in connection with PROFIsafe option card S11)
[10]	X20	24 V supply terminal (24 V power bus)
[11]	X91	Reserved
[12]	X9	Braking resistor connection terminals

5.6.5 Terminal assignment

⚠ WARNING

Electric shock due to dangerous voltages in the ABOX.

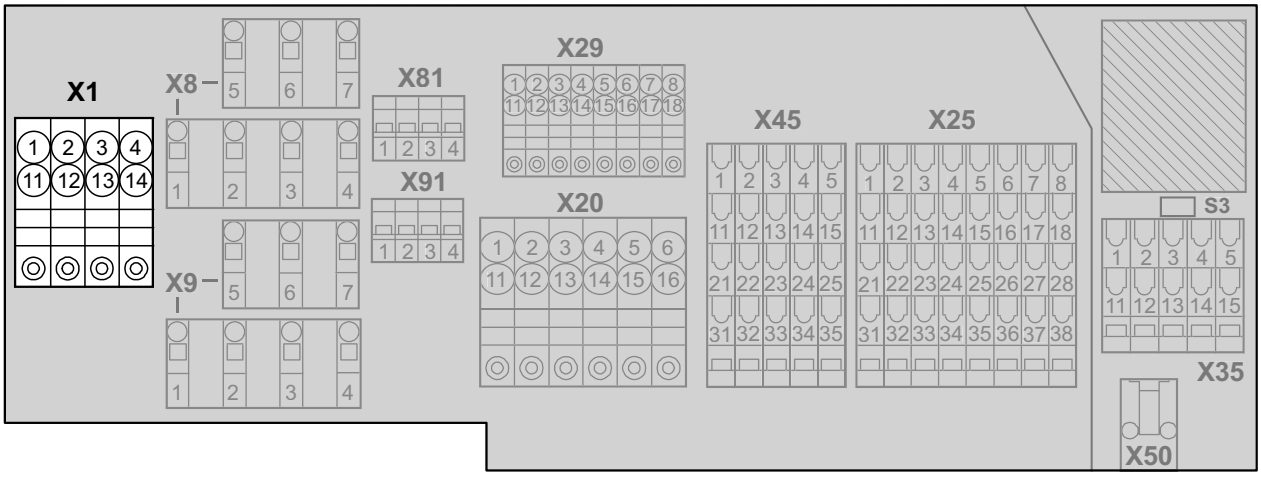
The maintenance switch only disconnects the integrated frequency inverter from the power supply. Voltage is still present at the terminals of MOVIFIT®.

Severe or fatal injuries.

- Switch off the power to the MOVIFIT® unit using a suitable external disconnecting device, and wait at least 1 minute before opening the wiring space.

The terminal diagrams depicted in this chapter differ depending on the fieldbus system used. The area dependent on the fieldbus is therefore represented as hatched and is described in the following sections.

X1: Line terminals (power bus)



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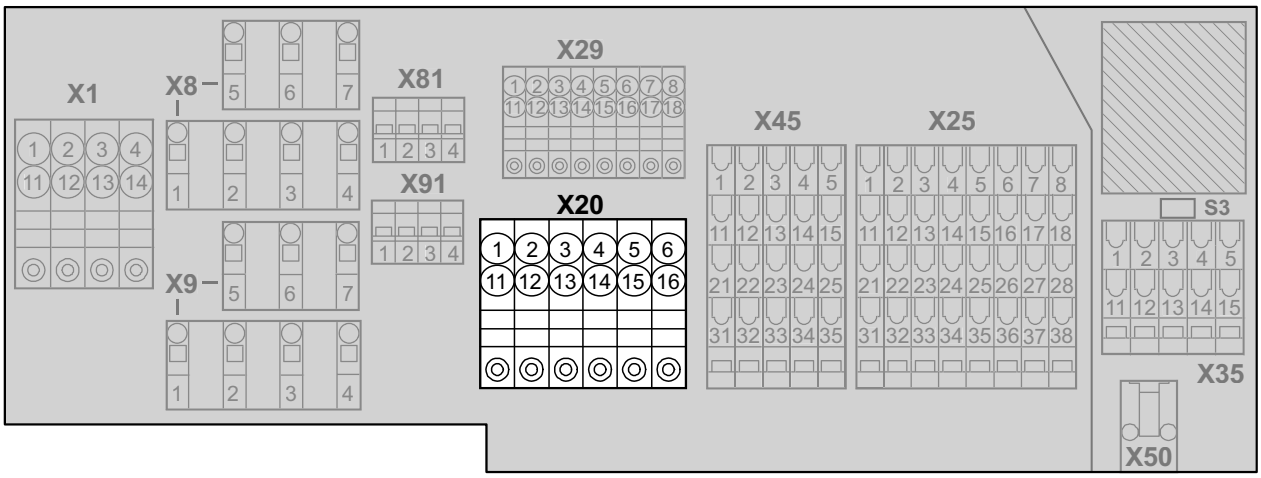
Line terminal (power bus)			
No.		**Name**	**Function**
X1	1	PE	Line connection PE (IN)
	2	L1	Line connection phase L1 (IN)
	3	L2	Line connection phase L2 (IN)
	4	L3	Line connection phase L3 (IN)
	11	PE	Line connection PE (OUT)
	12	L1	Line connection phase L1 (OUT)
	13	L2	Line connection phase L2 (OUT)
	14	L3	Line connection phase L3 (OUT)

X20: 24 V supply terminal (24 V power bus)



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24 V supply terminal (24 V power bus)			
No.		**Name**	**Function**
X20	1	FE	Functional earth (IN)
	2	+24V_C	+24 V continuous voltage supply (IN)
	3	0V24_C	0V24 reference potential – continuous voltage (IN)
	4	FE	Functional earth (IN)
	5	+24V_S	+24V supply – switched (IN)
	6	0V24_S	0V24 reference potential – switched (IN)
	11	FE	Functional earth (OUT)
	12	+24V_C	+24V continuous voltage supply (OUT)
	13	0V24_C	0V24 reference potential – continuous voltage (OUT)
	14	FE	Functional earth (OUT)
	15	+24V_S	+24V supply – switched (OUT)
	16	0V24_S	0V24 reference potential – switched (OUT)

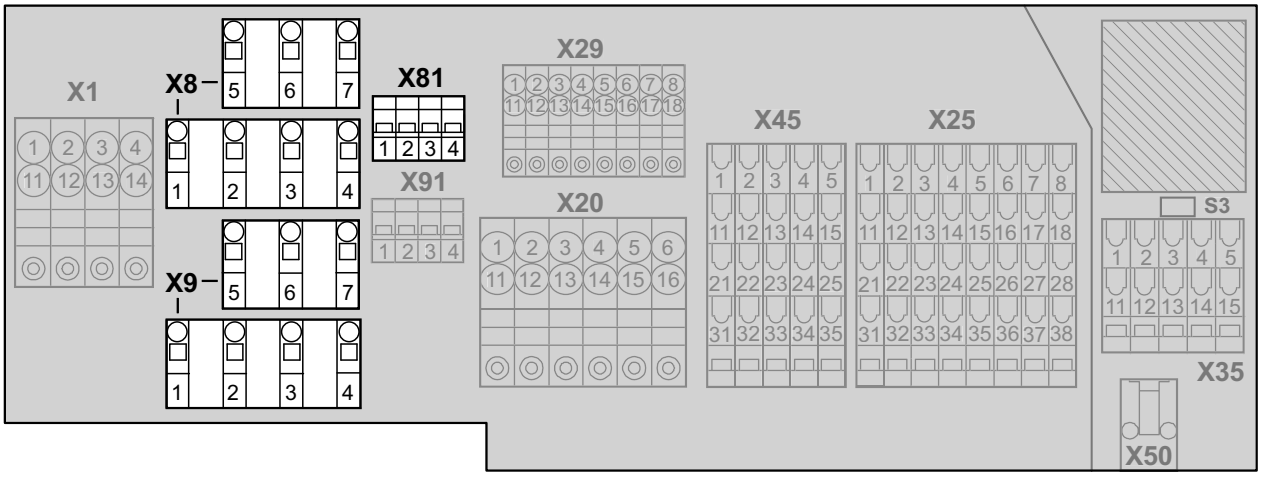
X8, X81, X9 and X91: Motor connection terminals

⚠ WARNING

Risk of crushing due to incorrect parameterization of the binary output DB00.

Severe or fatal injuries.

- If binary output DB00 is used to control the brake, do not change the parameters that define the functions of the binary output.
- Check the parameter settings before using the binary output to control the brake.



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Motor connection terminals (connection via hybrid cable)				
No.		**Name**	**Function for motor with SEW standard brake**	**Function for motor with 2-wire constant DC brake [1)]**
X8	1	PE	PE connection motor	
	2	U	Motor phase U output	
	3	V	Motor phase V output	
	4	W	Motor phase W output	
	5	15	SEW brake terminal 15 (blue)	DC brake connection (+)
	6	14	SEW brake terminal 14 (white)	No function
	7	13	SEW brake terminal 13 (red)	DC brake connection (-)
X81	1	TF+	Connection for TF temperature sensor / TH temperature switch (+) motor	
	2	TF-	Connection for TF temperature sensor / TH temperature switch (-) motor	
	3	DB00	Binary output "Brake released" = Factory setting (switching signal 24 V)	
	4	0V24_C	0V24 reference potential for brake output	
X9	1	PE	PE connection	
	2	-	Reserved	
	3	-	Reserved	
	4	-	Reserved	
	5	-R	Braking resistor connection "-R"	
	6	-	Reserved	
	7	+R	Braking resistor connection "+R"	
X91	1 – 4	-	Reserved	

1) Before starting up the MOVIFIT® FC drive with constant DC brake, you must connect an additional external braking resistor to the MOVIFIT®. The braking resistor is used to dissipate the regenerative energy.

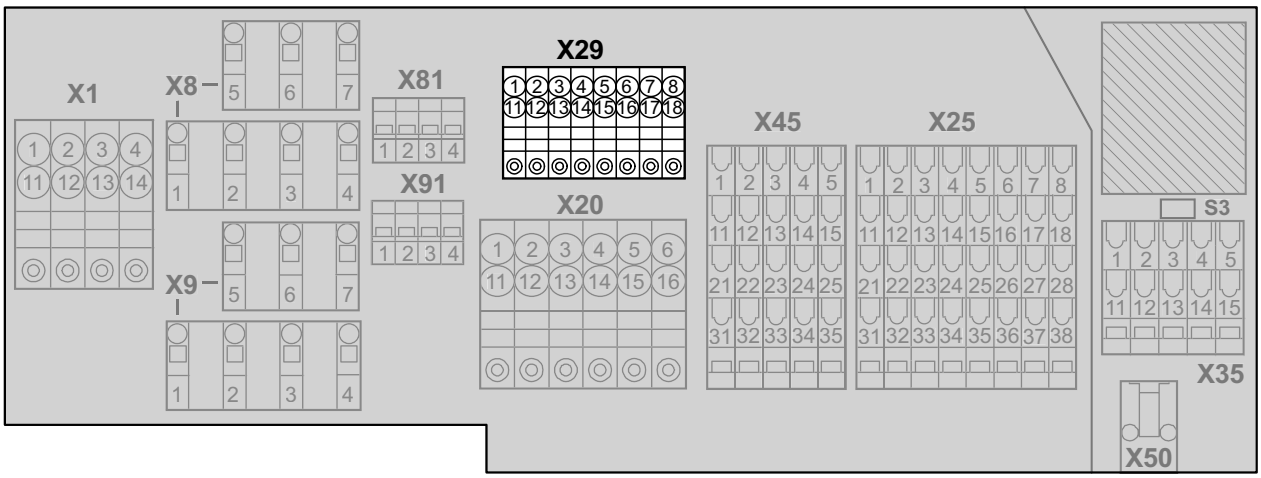
X29: 24 V distributor terminals

⚠ WARNING

Danger through unexpected unit behavior. When you use terminals X29/5, X29/6, X29/15, and X29/16 for a safe disconnection, you must observe the SEW manual "MOVIFIT® MC/FC – Functional Safety".

Severe or fatal injuries.

- Note the wiring diagrams and the safety conditions of the "MOVIFIT® MC/FC – Functional Safety" manual.



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24 V distributor terminal (distribution of supply voltage(s) to the integrated frequency inverter and option card)			
No.		**Name**	**Function**
X29	1	+24V_C	+24 V supply for binary inputs – continuous voltage (jumpered with X20/2)
	2	0V24_C	0V24 reference potential for binary inputs – continuous voltage (jumpered with X20/3)
	3	+24V_S	+24 V supply for binary outputs – switched (jumpered with X20/5)
	4	0V24_S	0V24 reference potential for binary outputs – switched (jumpered with X20/6)
	5	+24V_P	+24 V supply for integrated frequency inverter (IN)
	6	0V24_P	0V24 reference potential for integrated frequency inverter (IN)
	7	+24V_O	+24V supply for option card, supply
	8	0V24_O	0V24 reference potential for the option card, supply
	11	+24V_C	+24 V supply for binary inputs – continuous voltage (jumpered with X20/2)
	12	0V24_C	0V24 ref. potential for binary inputs – continuous voltage (jumpered with X20/3)
	13	+24V_S	+24 V supply for binary outputs – switched (jumpered with X20/5)
	14	0V24_S	0V24 reference potential for binary outputs – switched (jumpered with X20/6)
	15	+24V_P	+24 V supply for integrated frequency inverter (OUT)
	16	0V24_P	0V24 reference potential for integrated frequency inverter (OUT)
	17	+24V_O	+24V supply for option card, supply
	18	0V24_O	0V24 reference potential for the option card, supply

INFORMATION

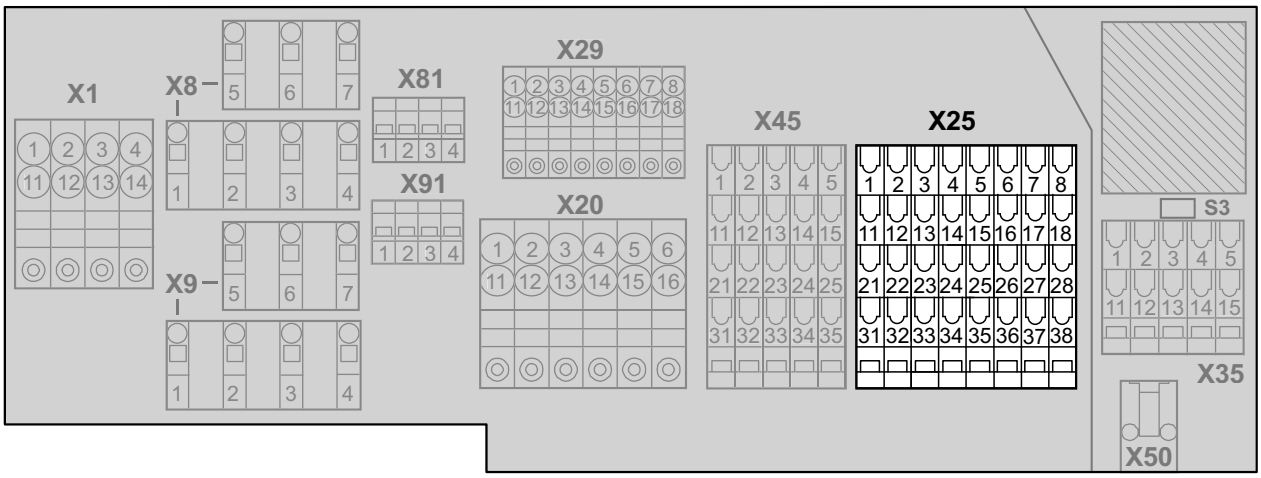
- The terminal assignment "X29" illustrated here applies as of status 11 of the wiring board. If you use a wiring board with another status, consult SEW-EURODRIVE.
- The status of the wiring board is indicated in the first status field of the ABOX nameplate:

Status: 11 11 -- 10 -- 10 10 -- --

Status of the wiring board

- You can find a nameplate example in chapter "Type designation" / "ABOX".

X25: I/O terminals



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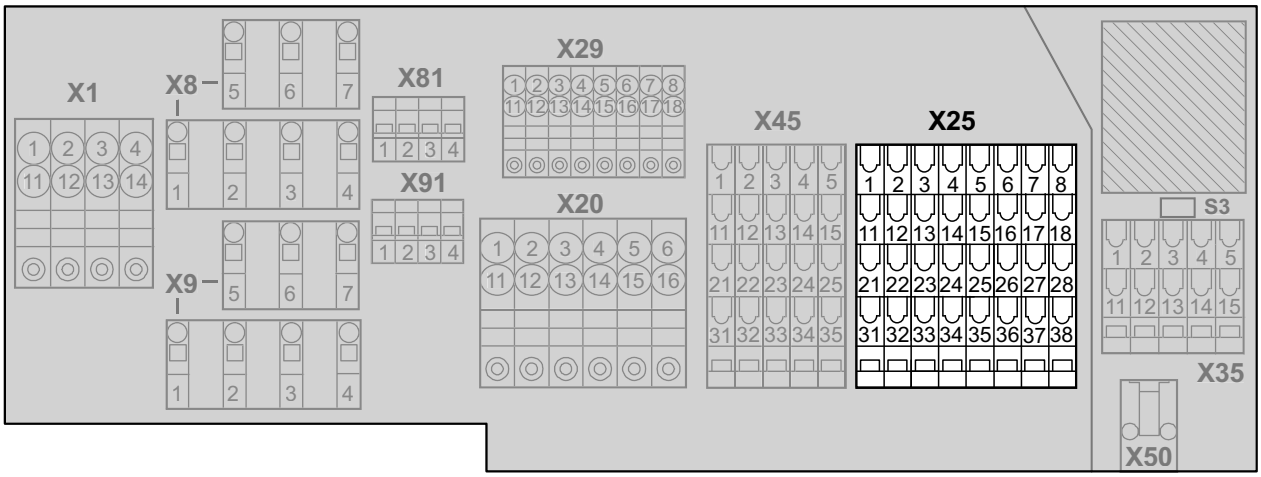
I/O terminal for binary inputs/outputs (connection of sensors + actuators)					
No.		**"Technology" function level with** • **PROFIBUS** • **DeviceNet** • **PROFINET, EtherNet/IP or Modbus/TCP** **"Classic" function level with** • **PROFINET**		**"Classic" function level with** • **PROFIBUS** • **DeviceNet**	
		Name	**Function**	**Name**	**Function**
X25	1	DI00	Binary input DI00 (switching signal)	DI00	Binary input DI00 (switching signal)
	2	DI02	Binary input DI02 (switching signal)	DI01	Binary input DI01 (switching signal)
	3	DI04	Binary input DI04 (switching signal) Encoder 1 connection, track A	DI02	Binary input DI02 (switching signal)
	4	DI06	Binary input DI06 (switching signal) Encoder 2 connection, track A	DI03	Binary input DI03 (switching signal)
	5	DI08	Binary input DI08 (switching signal) Encoder 3 connection, track A	DI04	Binary input DI04 (switching signal)
	6	DI10	Binary input DI10 (switching signal)	DI05	Binary input DI05 (switching signal)
	7	DI12 / DO00	Binary input DI120 / binary output DO00 (switching signal)	DI06 / DO00	Binary input DI06 / binary output DO00 (switching signal)
	8	DI14 / DO02	Binary input DI14 / binary output DO02 (switching signal)	DI07 / DO01	Binary input DI07 / binary output DO01 (switching signal)
	11	DI01	Binary input DI01 (switching signal)	**Terminals X25/11 to X25/18 are reserved with function level "Classic" (PROFIBUS or DeviceNet).**	
	12	DI03	Binary input DI03 (switching signal)		
	13	DI05	Binary input DI05 (switching signal) Encoder 1 connection, track B		
	14	DI07	Binary input DI07 (switching signal) Encoder 2 connection, track B		
	15	DI09	Binary input DI09 (switching signal) Encoder 3 connection, track B		
	16	DI11	Binary input DI11 (switching signal)		
	17	DI13 / DO01	Binary input DI13 / binary output DO01 (switching signal)		
	18	DI15 / DO03	Binary input DI15 / binary output DO03 (switching signal)		



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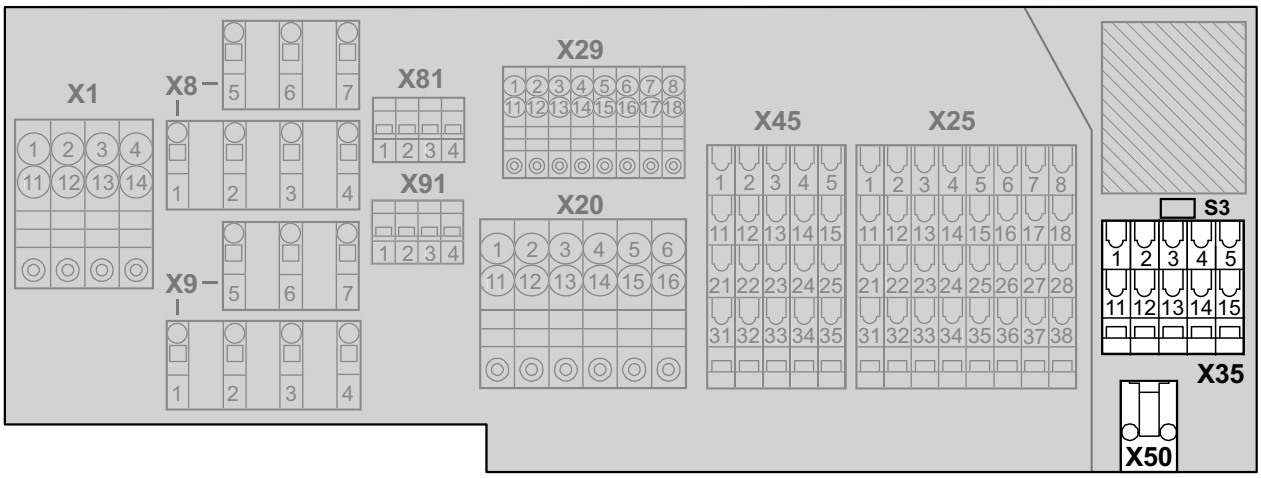
I/O terminal for binary inputs/outputs (connection of sensors + actuators)				
No.		**"Technology" function level with** • **PROFIBUS** • **DeviceNet** • **PROFINET, EtherNet/IP or Modbus/TCP** **"Classic" function level with** • **PROFINET**		**"Classic" function level with** • **PROFIBUS** • **DeviceNet**
		Name	**Function**	**Function**
X25	21	VO24-I	+24 V sensor supply, group I (DI00 – DI03) from +24V_C	+24 V sensor supply, group I (DI00 – DI01) from +24V_C
	22	VO24-I	+24 V sensor supply, group I (DI00 – DI03) from +24V_C	+24 V sensor supply, group I (DI00 – DI01) from +24V_C
	23	VO24-II	+24 V sensor supply, group II (DI04 – DI07) from +24V_C	+24 V sensor supply, group II (DI02 – DI03) from +24V_C
	24	VO24-II	+24 V sensor supply, group II (DI04 – DI07) from +24V_C	+24 V sensor supply, group II (DI02 – DI03) from +24V_C
	25	VO24-III	+24 V sensor supply, group III (DI08 – DI11) from +24V_C	+24 V sensor supply, group III (DI04 – DI05) from +24V_C
	26	VO24-III	+24 V sensor supply, group III (DI08 – DI11) from +24V_C	+24 V sensor supply, group III (DI04 – DI05) from +24V_C
	27	VO24-IV	+24 V sensor supply, group IV (DI12 – DI15) from +24V_S	+24 V sensor supply, group IV (DI06 – DI07) from +24V_S
	28	VO24-IV	+24 V sensor supply, group IV (DI12 – DI15) from +24V_S	+24 V sensor supply, group IV (DI06 – DI07) from +24V_S
	31	0V24_C	0V24 reference potential for sensors	
	32	0V24_C	0V24 reference potential for sensors	
	33	0V24_C	0V24 reference potential for sensors	
	34	0V24_C	0V24 reference potential for sensors	
	35	0V24_C	0V24 reference potential for sensors	
	36	0V24_C	0V24 reference potential for sensors	
	37	0V24_S	0V24 reference potential for actuators or sensors group IV	
	38	0V24_S	0V24 reference potential for actuators or sensors group IV	

X35: SBus terminals



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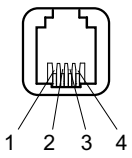
SBus terminals CAN			
No.		**Name**	**Function**
X35[1)]	1	CAN_GND	0V reference potential for SBus (CAN)
	2	CAN_H	SBus CAN_H – incoming
	3	CAN_L	SBus CAN_L – incoming
	4	+24V_C_PS	+24 V supply - continuous voltage for peripheral devices
	5	0V24_C	0V24 reference potential – continuous voltage for peripheral devices (jumpered with X20/3)
	11	CAN_GND	0V reference potential for SBus (CAN)
	12	CAN_H	SBus CAN_H – outgoing
	13	CAN_L	SBus CAN_L – outgoing
	14	+24V_C_PS	+24 V supply – continuous voltage for peripheral devices
	15	0V24_C	0V24 reference potential – continuous voltage for peripheral devices (jumpered with X20/3)

1) The X35 terminals can only be used with function level "Technology".

X50: Diagnostic interface

Function
Diagnostic interface
Connection type
RJ10, female
Wiring diagram



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Assignment			
No.		**Name**	**Function**
X50	1	+5V	5 V supply
	2	RS+	RS485 diagnostics interface
	3	RS-	RS485 diagnostics interface
	4	0V5	0 V reference potential for RS485

X45: I/O terminals for safety-related inputs/outputs

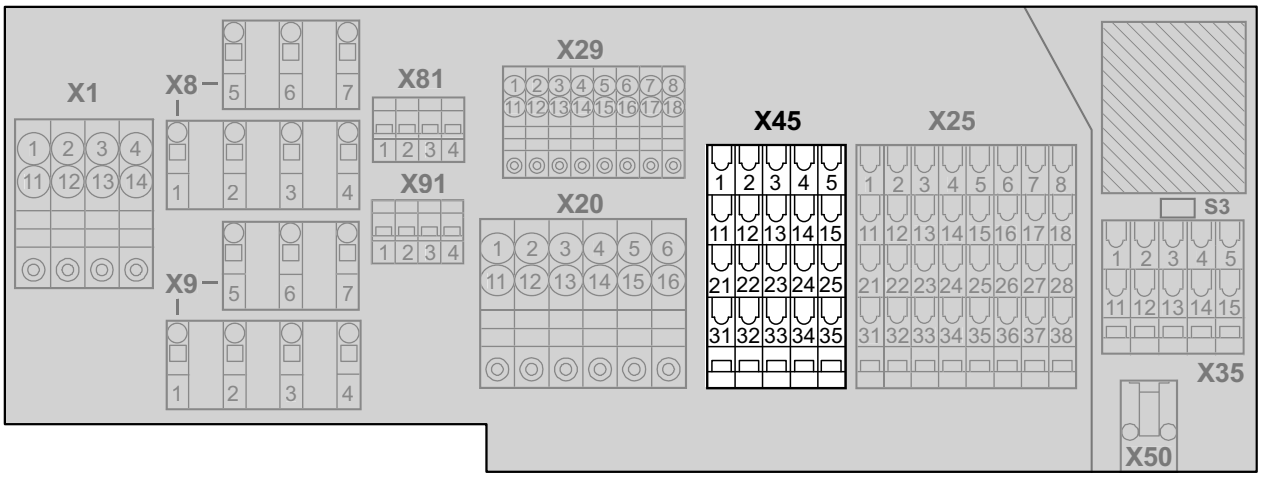
(only in connection with PROFIsafe option card S11)

⚠ WARNING

Danger through unexpected unit behavior When you are using terminals X45 for safe disconnection, you must observe the "MOVIFIT® MC/FC – Functional Safety" manual.

Severe or fatal injuries.

- When using the PROFIsafe option S11, note the permitted wiring diagrams and safety conditions in the "MOVIFIT® MC/FC – Functional Safety" manual.



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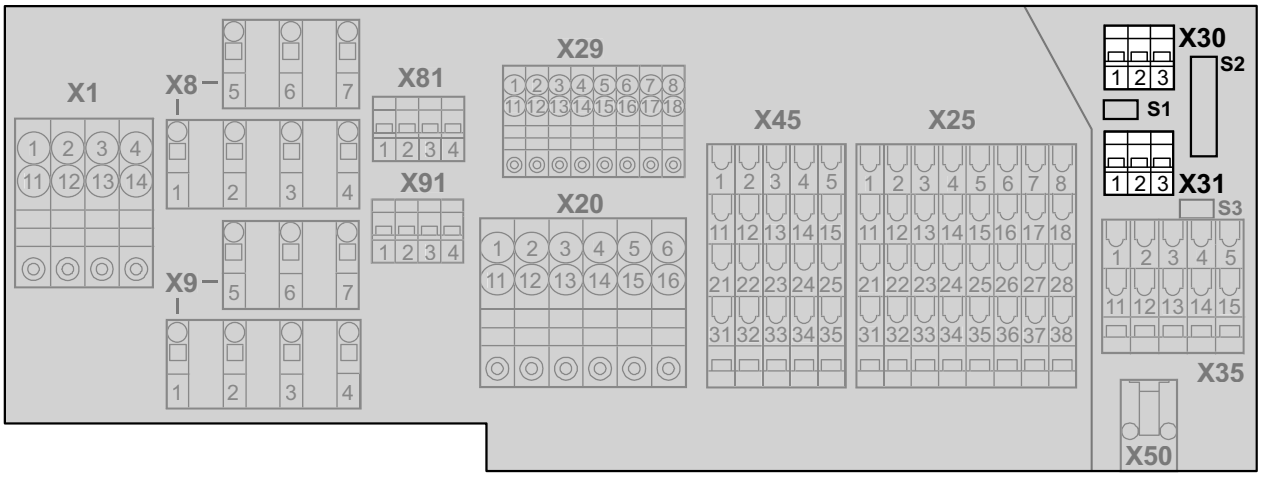
I/O terminals for safety-related inputs/outputs (only in connection with PROFIsafe option card S11)			
No.		**Name**	**Function**
X45	1	F-DI00	Safety-related binary input F-DI00 (switching signal)
	2	F-DI02	Safety-related binary input F-DI02 (switching signal)
	3	F-DO00_P	Safety-related binary output F-DO00 (P switching signal)
	4	F-DO01_P	Safety-related binary output F-DO01 (P switching signal)
	5	F-DO_STO_P	Safety-related binary output F-DO_STO (P switching signal) for safe disconnection (STO)
	11	F-DI01	Safety-related binary input F-DI01 (switching signal)
	12	F-DI03	Safety-related binary input F-DI03 (switching signal)
	13	F-DO00_M	Safety-related binary output F-DO00 (M switching signal)
	14	F-DO01_M	Safety-related binary output F-DO01 (M switching signal)
	15	F-DO_STO_M	Safety-related binary output F-DO_STO (M switching signal) for safe disconnection (STO)
	21	F-SS0	+24 V sensor supply for failsafe inputs F-DI00 and F-DI02
	22	F-SS0	+24 V sensor supply for failsafe inputs F-DI00 and F-DI02
	23	F-SS1	+24 V sensor supply for failsafe inputs F-DI01 and F-DI03
	24	F-SS1	+24 V sensor supply for failsafe inputs F-DI01 and F-DI03
	25	F-SS1	+24 V sensor supply for failsafe inputs F-DI01 and F-DI03
	31	0V24_O	OV24 reference potential for failsafe binary inputs/outputs
	32	0V24_O	OV24 reference potential for failsafe binary inputs/outputs
	33	0V24_O	OV24 reference potential for failsafe binary inputs/outputs
	34	0V24_O	OV24 reference potential for failsafe binary inputs/outputs
	35	0V24_O	OV24 reference potential for failsafe binary inputs/outputs

X30 and X31: PROFIBUS terminals

(only for PROFIBUS variants)

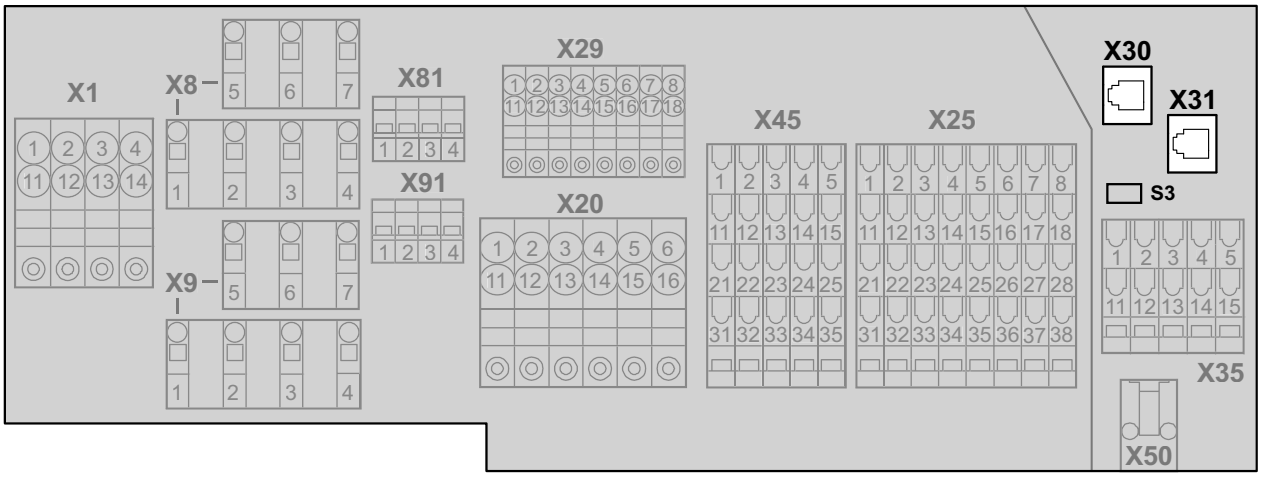


812542731

PROFIBUS terminals			
No.		**Name**	**Function**
X30	1	A_IN	PROFIBUS cable A – incoming
	2	B_IN	PROFIBUS cable B – incoming
	3	0V5_PB	0V5 reference potential for PROFIBUS (for measuring purposes only)
X31	1	A_OUT	PROFIBUS cable A – outgoing
	2	B_OUT	PROFIBUS cable B – outgoing
	3	+5V_PB	+5 V output PROFIBUS (for measuring purposes only)

X30 and X31: Ethernet plug connector

(only for PROFINET-IO, EtherNet/IP or Modbus/TCP variants)



812544395

Function
Ethernet connection • PROFINET IO • EtherNet/IP • Modbus/TCP
Connection type
RJ45
Wiring diagram

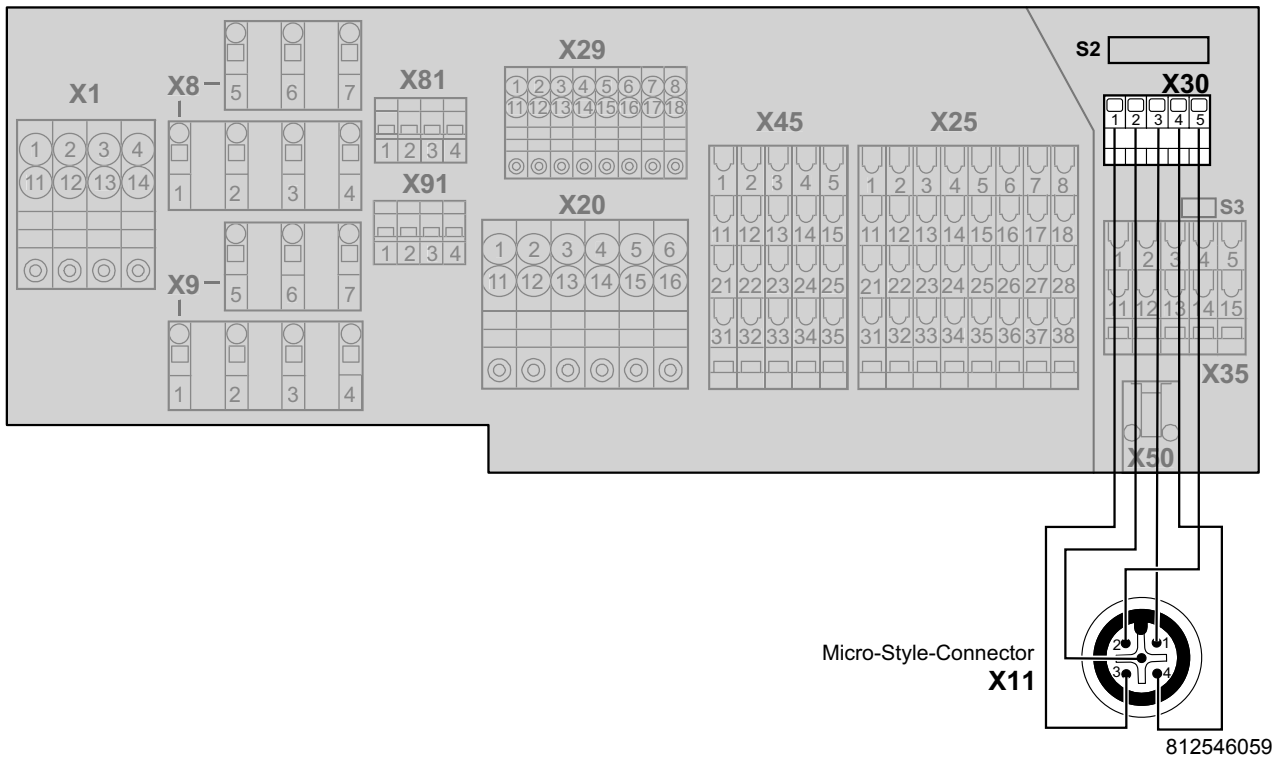
2354433675

Assignment

No.		**Name**	**Function**	
X30	1	TX+	Transmit line (+)	Ethernet port 1
	2	TX-	Transmit line (-)	
	3	RX+	Receive line (+)	
	4	res.	On 75 ohm discharge	
	5	res.	On 75 ohm discharge	
	6	RX-	Receive line (-)	
	7	res.	On 75 ohm discharge	
	8	res.	On 75 ohm discharge	
X31	1	TX+	Transmit line (+)	Ethernet port 2
	2	TX-	Transmit line (-)	
	3	RX+	Receive line (+)	
	4	res.	On 75 ohm discharge	
	5	res.	On 75 ohm discharge	
	6	RX-	Receive line (-)	
	7	res.	On 75 ohm discharge	
	8	res.	On 75 ohm discharge	

X11 / X30: DeviceNet plug connectors / terminals

(only for DeviceNet variants)



Function						
DeviceNet connection						
Connection type						
X30 terminals or X11 micro-style connector (A-coded)						
Assignment						
No.				**Name**	**Function**	**Color coding**
X11	1	X30	3	DRAIN	Equipotential bonding	Brown
	2		5	V+	DeviceNet voltage supply +24 V	White
	3		1	V-	DeviceNet reference potential 0V24	Blue
	4		4	CAND_H	CAN_H data line	Black
	5		2	CAND_L	CAN_L data line	Green/yellow

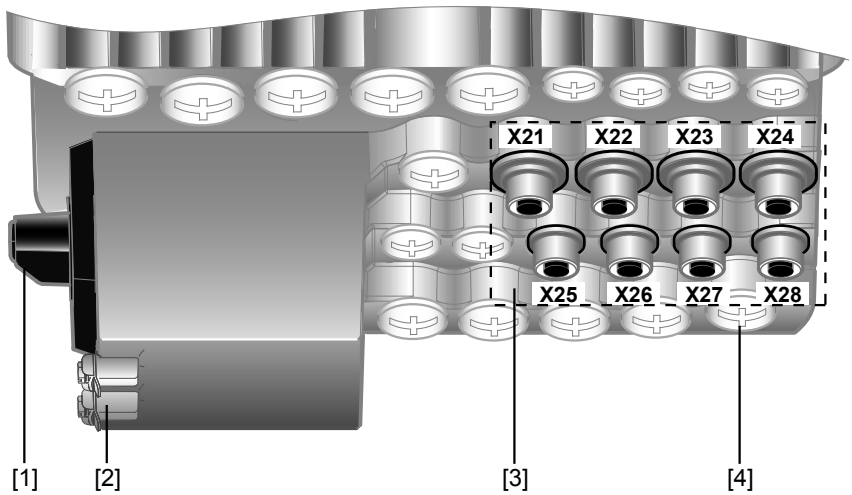
5.7 Hybrid ABOX MTA...-S42.-...-00

INFORMATION

- The hybrid ABOX is based on the standard ABOX MTA...-S02.-...-00. The following therefore only describes the additional plug connectors in comparison with the standard ABOX.
- For a description of the terminals, refer to chapter "Standard ABOX MTA...-S02.-...-00. (page 51)
- Customers cannot use terminal strip X25 in the ABOX because the described plug connectors are assigned to it.

5.7.1 Description

The following figure shows the hybrid ABOX with M12 plug connectors for connecting binary inputs/outputs:



9007200170028939

[1] Optional maintenance switch
[2] PE connection
[3] M12 plug connector for binary inputs/outputs
[4] Diagnostics socket (RJ10) under the screw plug

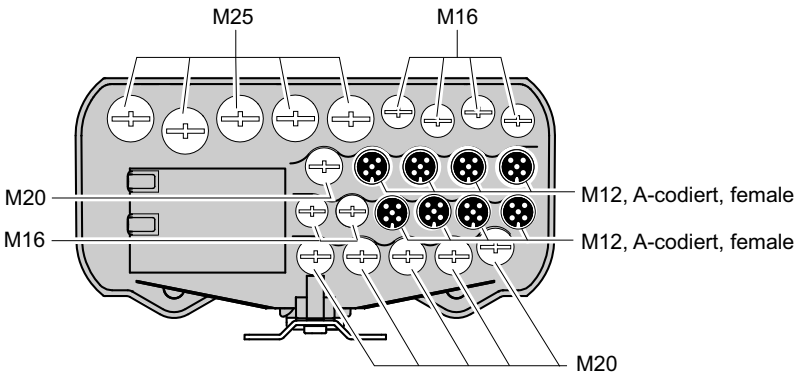
5.7.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT® FC (MTF):

- MTA11A-503-**S42**.-...-00:
  - Optional internal or external braking resistor
  - Optional load break switch
  - Load break switch and line protection

The following figure shows the cable glands and plug connectors of the hybrid ABOX:

PROFIBUS MTA11A-503-S42**1**-...-00
PROFINET
EtherNet/IP } MTA11A-503-S42**3**-...-00
Modbus/TCP



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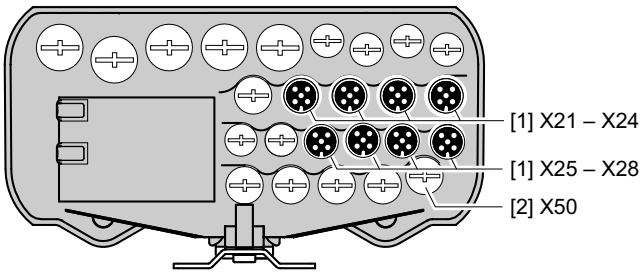
5.7.3 Plug connector positions

The following figure shows the plug connectors of the hybrid ABOX:



3570049547

[1]	X21 – X28	Binary inputs/outputs	(M12, 5-pole, female, A-coded)
[2]	X50	Diagnostic interface	(RJ10, female, under the screw plug)

INFORMATION

- The built-in M12 plug connectors have no specific alignment. This is why you should only use straight M12 mating connectors.
- You find the pin assignment of the plug connectors in the "Electrical Connections" chapter.
- To connect 2 sensors/actuators with an M12 plug connector, use the Y adapter with extension cable, see chapter "Y adapter" (page 92).

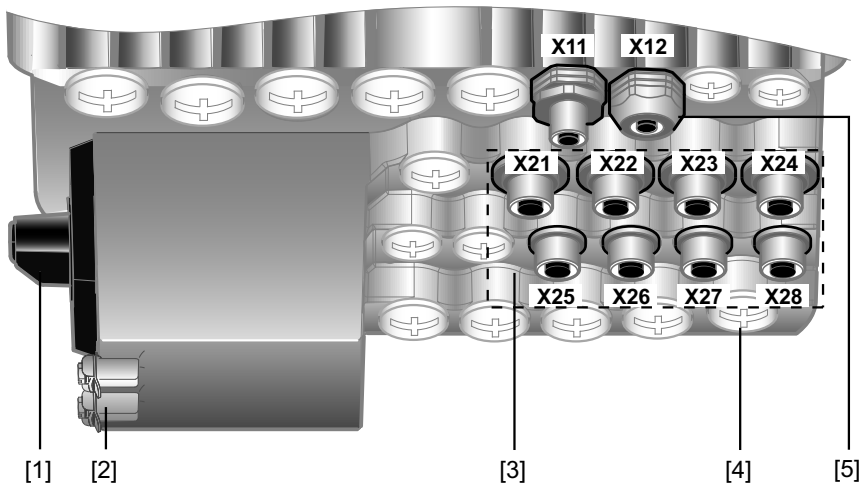
5.8 Hybrid ABOX MTA...-S52.-...-00

INFORMATION

- The hybrid ABOX is based on the standard ABOX MTA...-S02.-...-00. The following therefore only describes the additional plug connectors in comparison with the standard ABOX.
- For a description of the terminals, refer to chapter "Standard ABOX MTA...-S02.-...-00 (page 51).
- Customers cannot use terminal strips X25, X30 and X31 in the ABOX because the described plug connectors are assigned to them.

5.8.1 Description

The following figure shows the hybrid ABOX with M12 plug connectors for connecting binary inputs/outputs and the fieldbus:



9007200189509131

[1] Optional maintenance switch
[2] PE connection
[3] M12 plug connector for binary inputs/outputs
[4] Diagnostics socket (RJ10) under the screw plug
[5] M12 plug connector for the fieldbus connection

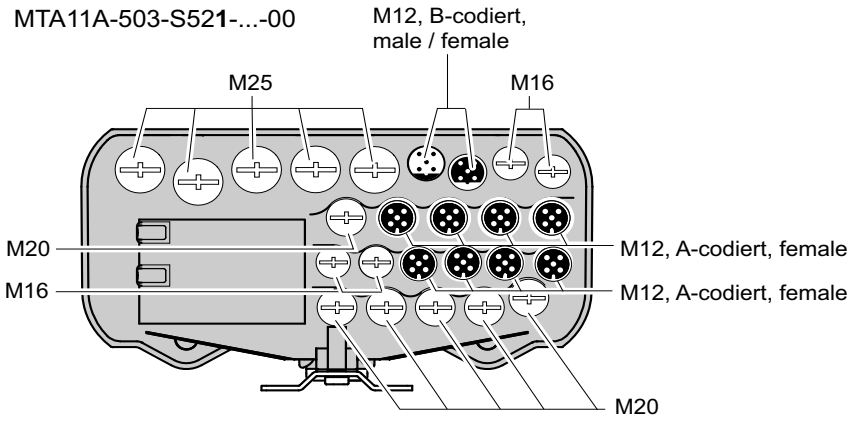
5.8.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT® FC (MTF):

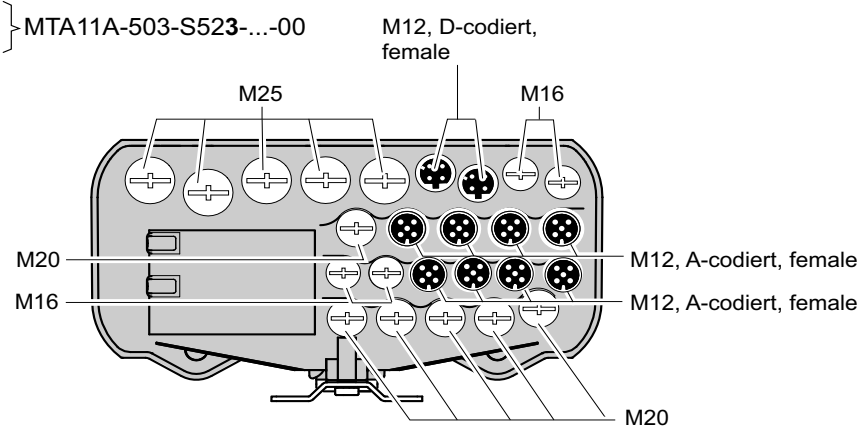
- MTA11A-503-**S52**.-...-00:
  - Optional internal or external braking resistor
  - Optional load break switch
  - Load break switch and line protection

The following figure shows the cable glands and plug connectors of the Hybrid ABOX depending on the fieldbus interface:

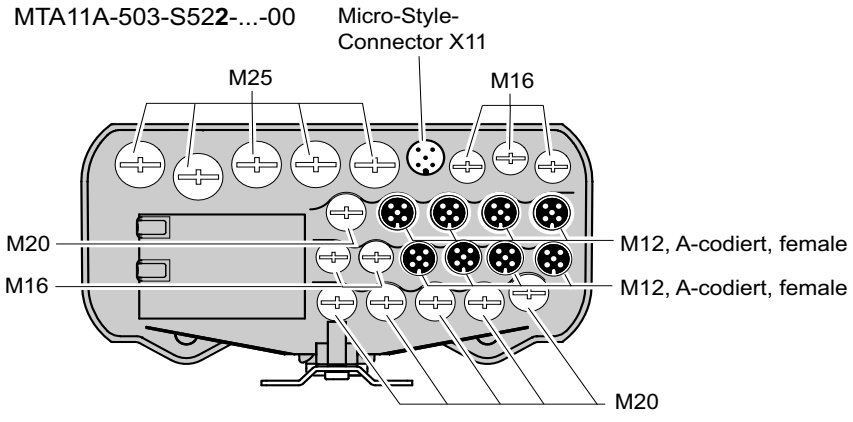
PROFIBUS MTA11A-503-S52**1**-...-00



PROFINET
EtherNet/IP
Modbus/TCP
MTA11A-503-S52**3**-...-00



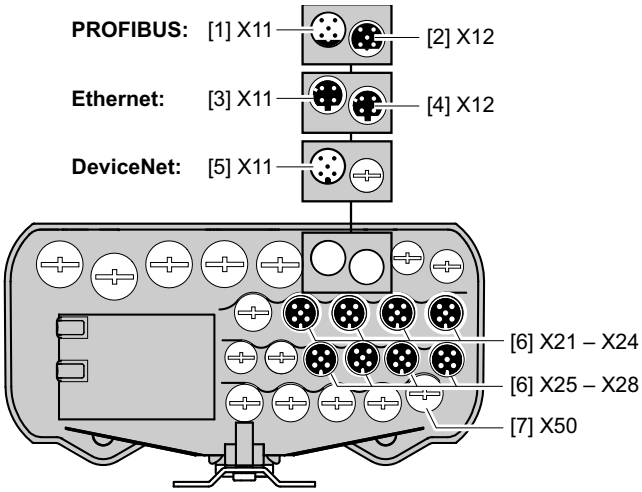
DeviceNet MTA11A-503-S52**2**-...-00



9007200170423819

5.8.3 Plug connector positions

The following figure shows the plug connectors of the hybrid ABOX:



3570202635

[1]	X11	PROFIBUS input	(M12, 5-pole, male, B-coded)
[2]	X12	PROFIBUS output	(M12, 5-pole, female, B-coded)
[3]	X11	Ethernet interface, port 1 (PROFINET, EtherNet/IP, Modbus/TCP)	(M12, 4-pole, female, D-coded)
[4]	X12	Ethernet interface, port 2 (PROFINET, EtherNet/IP, Modbus/TCP)	(M12, 4-pole, female, D-coded)
[5]	X11	DeviceNet interface	(Micro-style connector, male, A-coded)
[6]	X21 – X28	Binary inputs/outputs	(M12, 5-pole, female, A-coded)
[7]	X50	Diagnostic interface	(RJ10, female, under the screw plug)

INFORMATION

- The built-in M12 plug connectors have no specific alignment. This is why you should only use straight M12 mating connectors.
- You find the pin assignment of the plug connectors in the "Electrical Connections" chapter.
- To connect 2 sensors/actuators with an M12 plug connector, use the Y adapter with extension cable, see chapter "Y adapter" (page 92).

5.9 Hybrid ABOX MTA...-S533-...-00/L10

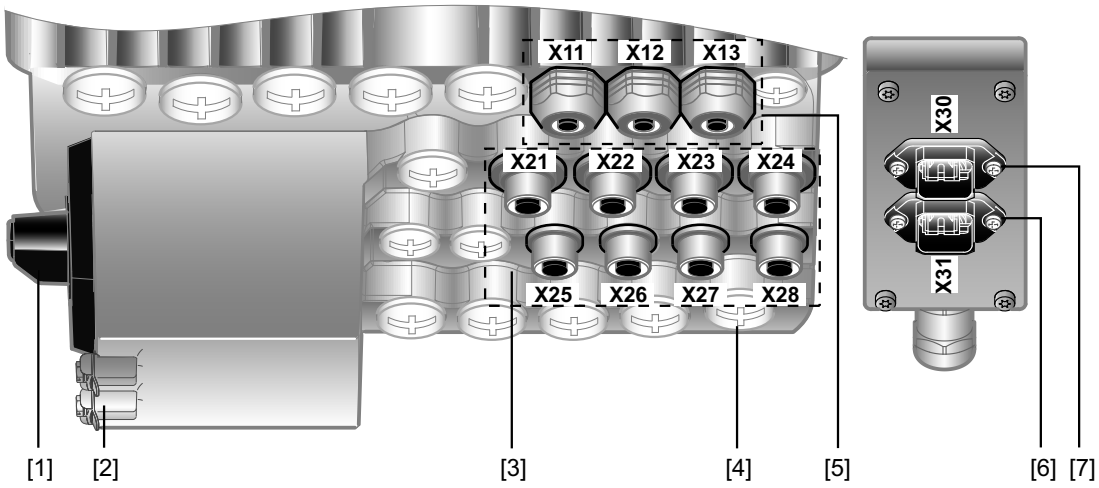
INFORMATION

- The hybrid ABOX is based on the standard ABOX MTA...-S02.-...-00. The following therefore only describes the additional plug connectors in comparison with the standard ABOX.
- For a description of the terminals, refer to chapter "Standard ABOX MTA...-S02.-...-00 (page 51).
- Customers cannot use terminal strips X25, X30, X31 and terminals X35/4, X35/5 in the ABOX because the described plug connectors are assigned to them.
- All electrical connections of the POF option L10 are installed at the factory.

5.9.1 Description

The following figure shows

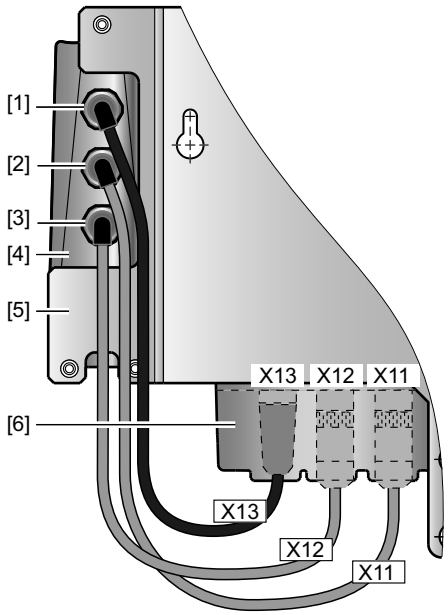
- the hybrid ABOX with
  - M12 plug connectors for connecting PROFINET IO (plugged at the factory)
  - M12 plug connectors for DC 24 V supply of the POF option L10 (plugged at the factory)
  - M12 plug connectors for connecting binary inputs/outputs
- and the POF option L10 with
  - push-pull plug connectors for connecting the PROFINET POF:



9007204313304587

[1] Optional maintenance switch
[2] PE connection
[3] M12 plug connector for binary inputs/outputs
[4] Diagnostics socket (RJ10) under the screw plug
[5] M12 plug connectors for the PROFINET IO interface and the DC 24 V supply (plugged at the factory)
[6] Push-pull SCRJ plug connector for the PROFINET POF interface, port 2
[7] Push-pull SCRJ plug connector for the PROFINET POF interface, port 1

The following figure shows the mounting rail and POF option L10 **from the back**:



5057677451

[1] DC 24 V supply — Cable gland (connected at the factory)
[2] PROFINET IO, port 1 — Cable gland (connected at the factory)
[3] PROFINET IO, port 2 — Cable gland (connected at the factory)
[4] POF option L10
[5] Mounting rail
[6] ABOX

INFORMATION

The plug connectors of the POF option L10 must be plugged in to connectors X11, X12 and X13 of the ABOX as shown in the figure above.

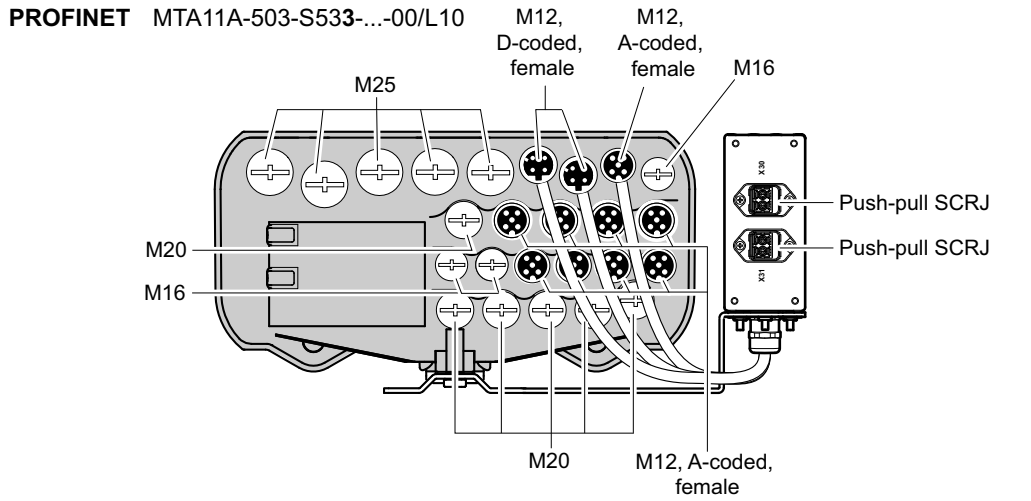
If plug connectors X11 and X12 are swapped, the network topology is not properly recognized by the higher-level controller.

5.9.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT® FC (MTF):

- MTA11A-503-**S53**.-..-00/L10:
  - Optional internal or external braking resistor
  - Optional load break switch
  - Optional load break switch and line protection[1)]

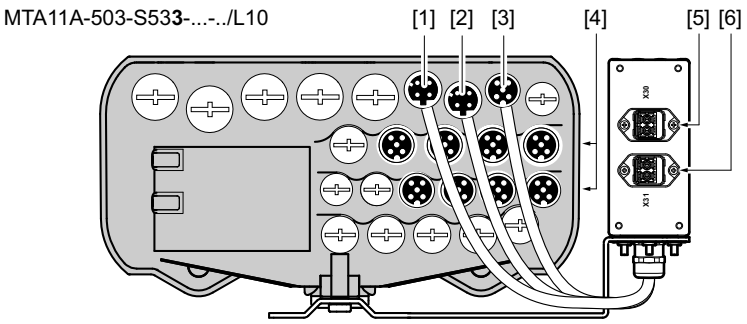
The following figure shows the cable glands and plug connectors of the hybrid ABOX with POF option L10:



1) In preparation

5.9.3 Plug connector positions

The following figure shows the plug connectors of MOVIFIT® with POF option L10:



5048967563

[1]	X11	PROFINET IO interface, port 1 (plugged at the factory)	M12, D coding, female
[2]	X12	PROFINET IO interface, port 2 (plugged at the factory)	M12, D coding, female
[3]	X13	DC 24 V supply of the POF option L10 (plugged at the factory)	M12, A-coded, female
[4]	X21 – X28	Binary inputs/outputs	M12, A-coded, female
[5]	X30	PROFINET POF interface, port 1	Push-pull SCRJ
[6]	X31	PROFINET POF interface, port 2	Push-pull SCRJ

INFORMATION

- The built-in M12 plug connectors have no specific alignment. This is why you should only use straight M12 mating connectors.
- You find the pin assignment of the plug connectors in the "Electrical Connections" chapter.
- To connect 2 sensors/actuators with an M12 plug connector, use the Y adapter with extension cable, see chapter "Y adapter" (page 92).

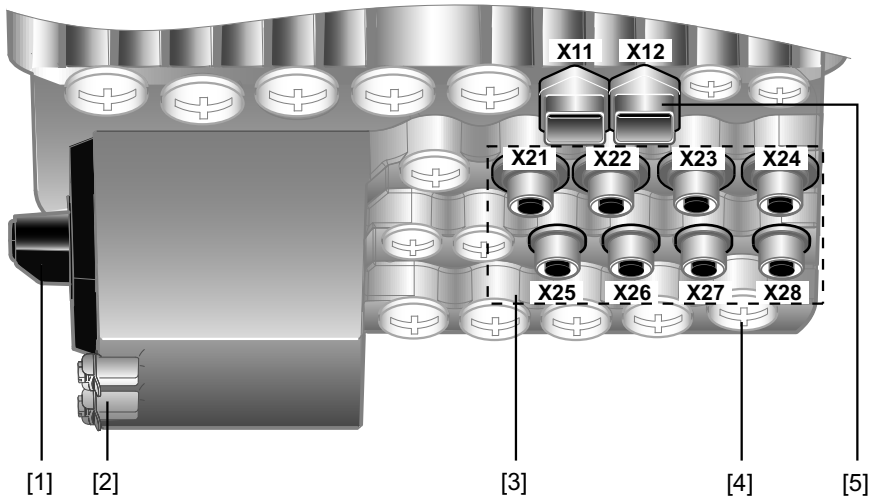
5.10 Hybrid ABOX MTA...-S62.-...-00

INFORMATION

- The hybrid ABOX is based on the standard ABOX MTA...-S02.-...-00. The following therefore only describes the additional plug connectors in comparison with the standard ABOX.
- For a description of the terminals, refer to chapter "Standard ABOX MTA...-S02.-...-00 (page 51).
- Customers cannot use terminal strips X25, X30 and X31 in the ABOX because the described plug connectors are assigned to them.

5.10.1 Description

The following figure shows the hybrid ABOX with M12 plug connectors for connecting binary inputs/outputs and push-pull RJ45 plug connectors for Ethernet:



9007200170414987

[1] Optional maintenance switch
[2] PE connection
[3] M12 plug connector for binary inputs/outputs
[4] Diagnostics socket (RJ10) under the screw plug
[5] Push-pull RJ45 plug connector for Ethernet interfaces

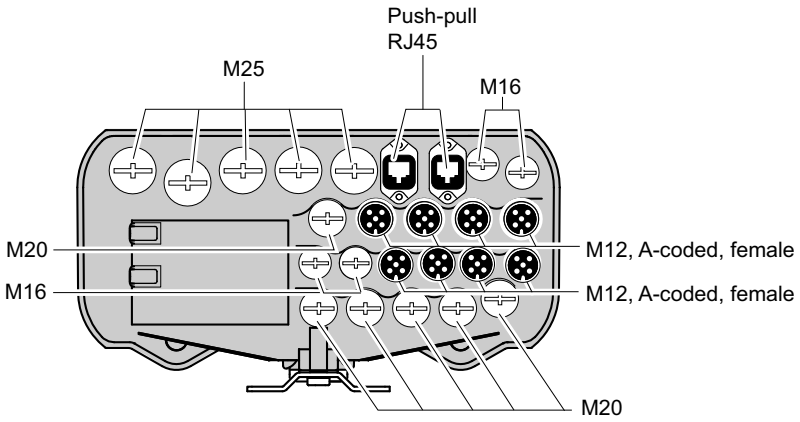
5.10.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT® FC (MTF):

- MTA11A-503-**S62**.-...-00:
  - Optional internal or external braking resistor
  - Optional load break switch
  - Load break switch and line protection

The following figure shows the cable glands and plug connectors of the hybrid ABOX:

PROFINET
EtherNet/IP
Modbus/TCP
} MTA11A-503-S62**3**-...-00



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5.10.3 Plug connector positions

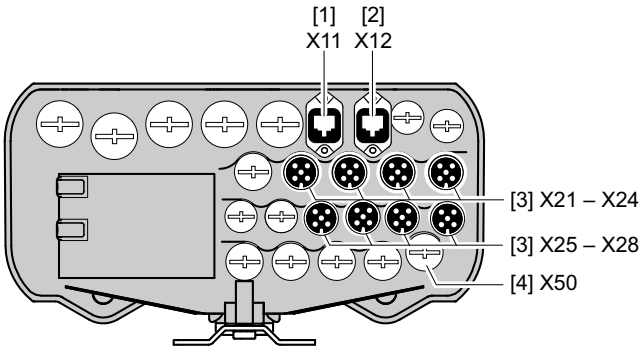
NOTICE

The RJ45 socket can be damaged by inserting commercially available RJ45 patch cables without push-pull connector housing.

Damage to the RJ45 socket.

- Only plug suitable push-pull RJ45 mating connectors according to IEC PAS 61076-3-117 into push-pull RJ45 sockets.
- Never use commercially available RJ45 patch cables without push-pull connector housing. These plug connectors do not snap in place when they are plugged. They may damage the socket and are therefore not suited.

The following figure shows the plug connectors of the hybrid ABOX:



3570215051

[1]	X11	Ethernet interface, port 1 (PROFINET, EtherNet/IP, Modbus/TCP)	(Push-pull RJ45, female)
[2]	X12	Ethernet interface, port 2 (PROFINET, EtherNet/IP, Modbus/TCP)	(Push-pull RJ45, female)
[3]	X21 – X28	Binary inputs/outputs	(M12, 5-pole, female, A-coded)
[4]	X50	Diagnostic interface	(RJ10, female, under the screw plug)

INFORMATION

- The built-in M12 plug connectors have no specific alignment. This is why you should only use straight M12 mating connectors.
- You find the pin assignment of the plug connectors in the "Electrical Connections" chapter.
- To connect 2 sensors/actuators with an M12 plug connector, use the Y adapter with extension cable, see chapter "Y adapter" (page 92).

5.11 Hybrid ABOX MTA...-I55.-...-00, MTA...-G55.-...-00

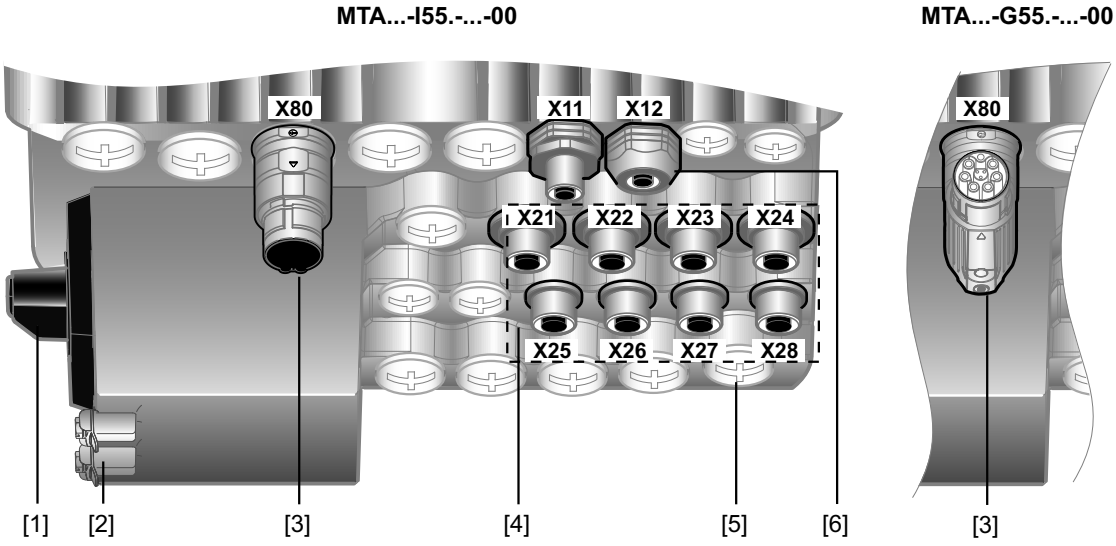
INFORMATION

- The hybrid ABOX is based on the standard ABOX MTA...-S02.-...-00. The following therefore only describes the additional plug connectors in comparison with the standard ABOX.
- For a description of the terminals, refer to chapter "Standard ABOX MTA...-S02.-...-00 (page 51)".
- In contrast to the standard ABOX, the hybrid ABOXes MTA...-I55.-...-00 and MTA...-G55.-...-00 have no shield plates. Here, the cable shields must be connected via EMC cable glands.
- Customers cannot use terminal strips X8, X81, X25, X30 and X31 in the ABOX because the described plug connectors are assigned to them.

5.11.1 Description

The following figure shows the hybrid ABOX with:

- 1 round connector (Intercontec):
  - Motor output pointing downward (only for MTA...-I55.-...-00)
  - Motor output pointing forward (only for MTA...-G55.-...-00)
- M12 plug connectors for binary inputs/outputs
- M12 plug connectors for the fieldbus



9007204010651915

[1] Optional maintenance switch
[2] PE connection
[3] Plug connector for motor
[4] M12 plug connector for binary inputs/outputs
[5] Diagnostics socket (RJ10) under the screw plug
[6] M12 plug connector for the fieldbus connection

5.11.2 Variants

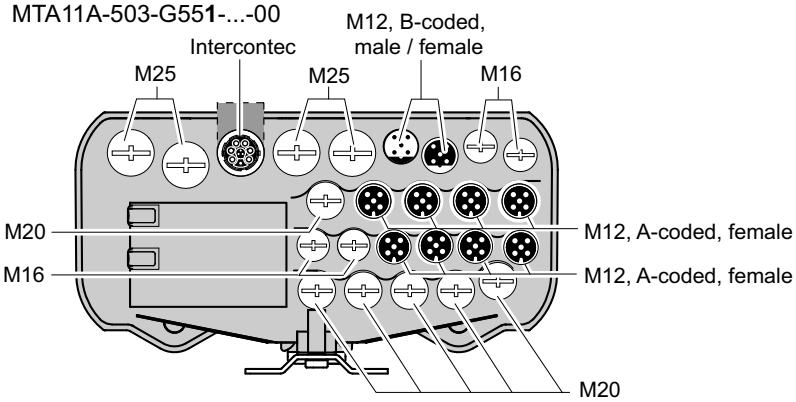
The following variants of the hybrid ABOX are available for MOVIFIT® FC (MTF):

- MTA11A-503-**I55**.-...-00 / MTA11A-503-**G55**.-...-00
  - Optional internal or external braking resistor
  - Optional load break switch
  - Optional load break switch and line protection[1)]

The following figure shows the cable glands and plug connectors of the Hybrid ABOX depending on the fieldbus interface:

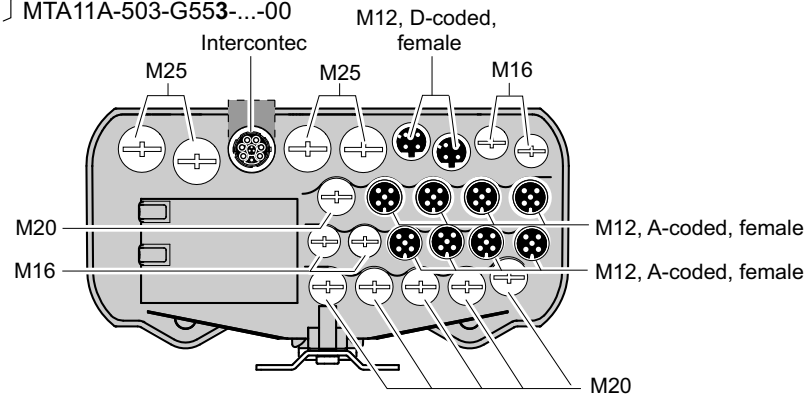
PROFIBUS

MTA11A-503-I55**1**-...-00
MTA11A-503-G55**1**-...-00



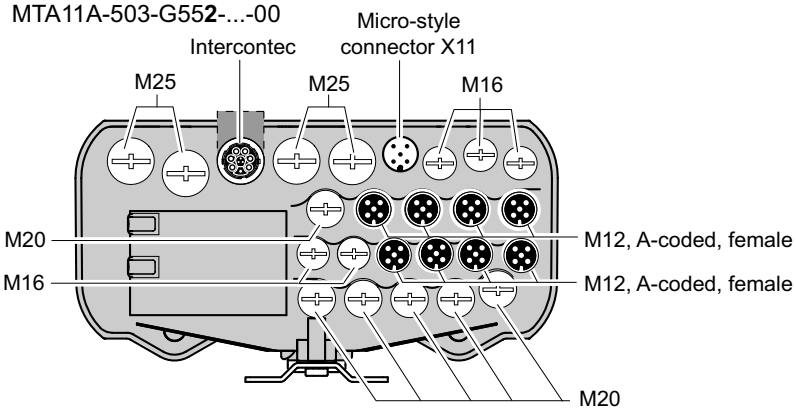
PROFINET
EtherNet/IP
Modbus/TCP

MTA11A-503-I55**3**-...-00
MTA11A-503-G55**3**-...-00



DeviceNet

MTA11A-503-I55**2**-...-00
MTA11A-503-G55**2**-...-00

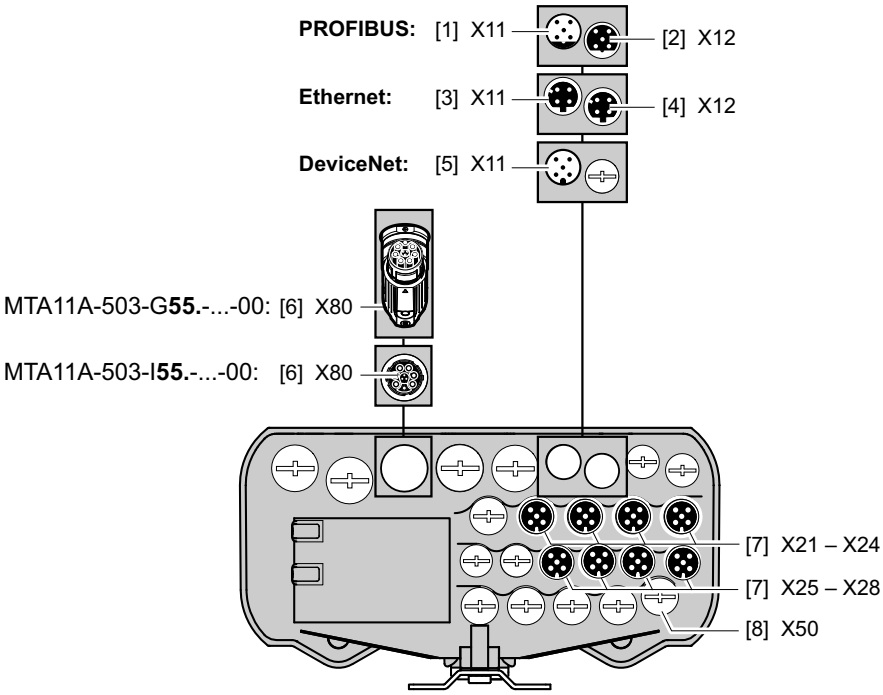


4755915275

1) In preparation

5.11.3 Plug connector positions

The following figure shows the plug connectors of the hybrid ABOX:



4758230795

[1]	X11	PROFIBUS input	(M12, 5-pole, male, B-coded)
[2]	X12	PROFIBUS output	(M12, 5-pole, female, B-coded)
[3]	X11	Ethernet interface, port 1 (PROFINET, EtherNet/IP, Modbus/TCP)	(M12, 4-pole, female, D-coded)
[4]	X12	Ethernet interface, port 2 (PROFINET, EtherNet/IP, Modbus/TCP)	(M12, 4-pole, female, D-coded)
[5]	X11	DeviceNet interface	(Micro-style connector, male, A-coded)
[6]	X80	Motor connection	(Intercontec 723 H-Tec, 7 + 3-pole, female)
[7]	X21 – X28	Binary inputs/outputs	(M12, 5-pole, female, A-coded)
[8]	X50	Diagnostic interface	(RJ10, female, under the screw plug)

INFORMATION

- The built-in M12 plug connectors have no specific alignment. This is why you should only use straight M12 mating connectors.
- You find the pin assignment of the plug connectors in the "Electrical Connections" chapter.
- To connect 2 sensors/actuators with an M12 plug connector, use the Y adapter with extension cable, see chapter "Y adapter" (page 92).

5.12 Hybrid ABOX MTA...-I65.-...-00, MTA...-G65.-...-00

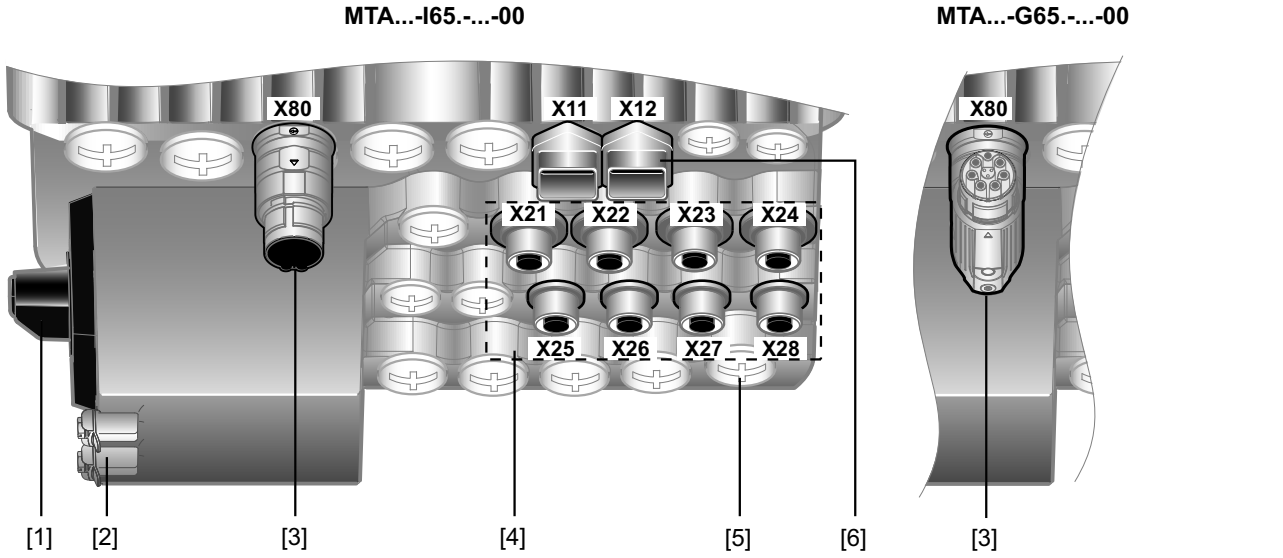
INFORMATION

- The hybrid ABOX is based on the standard ABOX MTA...-S02.-...-00. The following therefore only describes the additional plug connectors in comparison with the standard ABOX.
- For a description of the terminals, refer to chapter "Standard ABOX MTA...-S02.-...-00 (page 51).
- In contrast to the standard ABOX, the hybrid ABOXes MTA...-I65.-...-00 and MTA...-G65.-...-00 have no shield plates. Here, the cable shields must be connected via EMC cable glands.
- Customers cannot use terminal strips X8, X81, X25, X30 and X31 in the ABOX because the described plug connectors are assigned to them.

5.12.1 Description

The following figure shows the hybrid ABOX with:

- 1 round connector (Intercontec):
  - Motor output pointing downward (only for MTA...-I65.-...-00)
  - Motor output pointing forward (only for MTA...-G65.-...-00)
- M12 plug connectors for binary inputs/outputs
- Push-pull RJ45 plug connector for Ethernet connection



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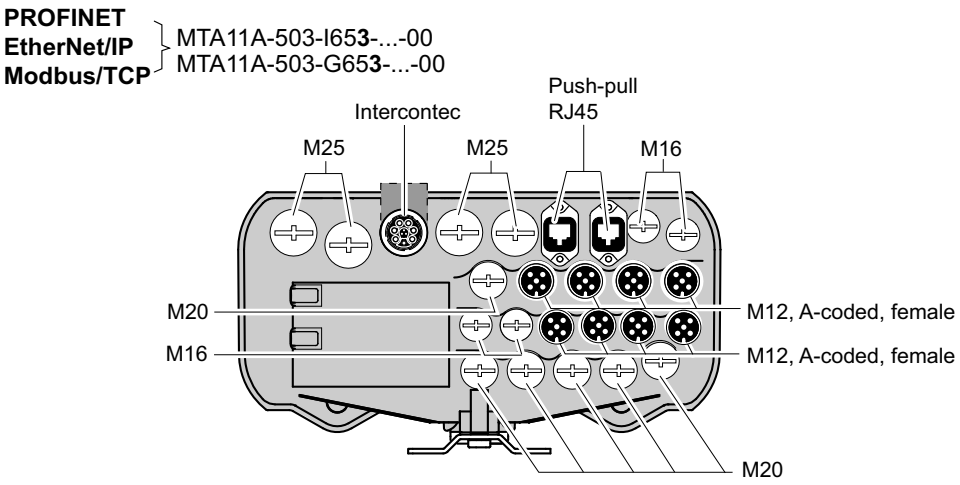
[1] Optional maintenance switch
[2] PE connection
[3] Plug connector for motor
[4] M12 plug connector for binary inputs/outputs
[5] Diagnostics socket (RJ10) under the screw plug
[6] Push-pull RJ45 plug connector for Ethernet connection

5.12.2 Variants

The following variants of the hybrid ABOX are available for MOVIFIT® FC (MTF):

- MTA11A-503-**I65**.-...-00 / MTA11A-503-**G65**.-...-00:
  - Optional internal or external braking resistor
  - Optional load break switch
  - Optional load break switch and line protection[1)]

The following figure shows the cable glands and plug connectors of the hybrid ABOX:



4758238987

1) In preparation

5.12.3 Plug connector positions

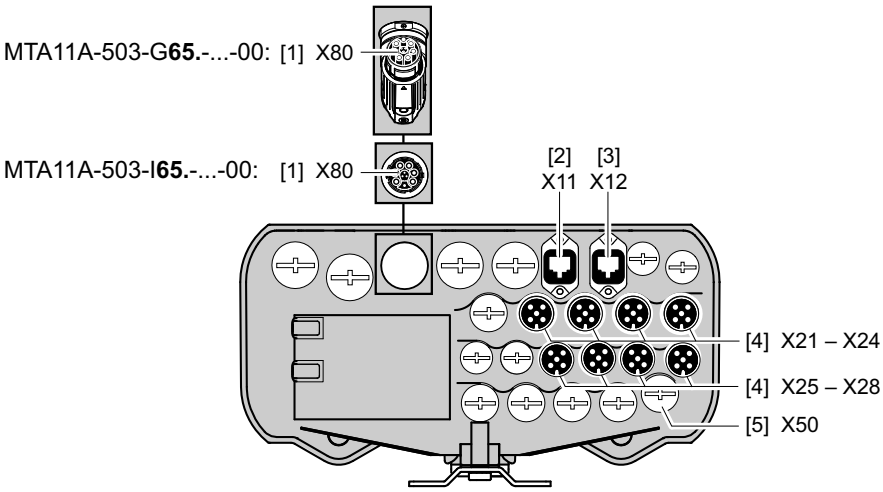
NOTICE

The RJ45 socket can be damaged by inserting commercially available RJ45 patch cables without push-pull connector housing.

Damage to the RJ45 socket.

- Only plug suitable push-pull RJ45 mating connectors according to IEC 61076-3-117 into push-pull RJ45 sockets.
- Never use commercially available RJ45 patch cables without push-pull connector housing. These plug connectors do not snap in place when they are plugged. They may damage the socket and are therefore not suited.

The following figure shows the plug connectors of the hybrid ABOX:



4758511883

[1]	X80	Motor connection	(Intercontec 723 H-Tec, 7 + 3-pole, female)
[2]	X11	Ethernet interface, port 1 (PROFINET, EtherNet/IP, Modbus/TCP)	(Push-pull RJ45, female)
[3]	X12	Ethernet interface, port 2 (PROFINET, EtherNet/IP, Modbus/TCP)	(Push-pull RJ45, female)
[4]	X21 – X28	Binary inputs/outputs	(M12, 5-pole, female, A-coded)
[5]	X50	Diagnostic interface	(RJ10, female, under the screw plug)

INFORMATION

- The built-in M12 plug connectors have no specific alignment. This is why you should only use straight M12 mating connectors.
- You find the pin assignment of the plug connectors in the "Electrical Connections" chapter.
- To connect 2 sensors/actuators with an M12 plug connector, use the Y adapter with extension cable. See chapter "Y adapter" (page 92).

5.13 Electrical connections

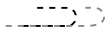
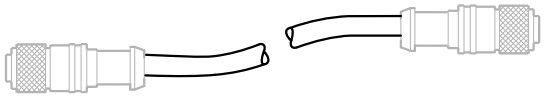
5.13.1 Connection cables

Connection cables are not included in the scope of delivery.

Prefabricated cables for connection between SEW components can be ordered from SEW-EURODRIVE at any time. They are described in the following sections. Specify the part number and length of the required cable in your order.

The number and type of required connection cables depend on the design of the units and the components to be connected. This is why not all cables in the list are actually required.

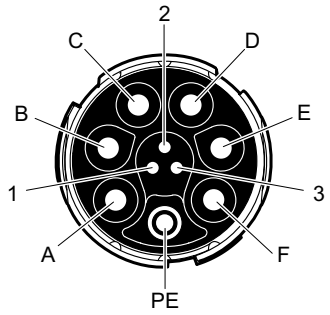
The following figures show the various cable types:

Cables	Length	Installation type
	Fixed length	Suitable for cable carrier installation 
	Variable length	Not suitable for cable carrier installation 

5.13.2 X80: Motor connection

(ABOX MTA...I55.-..., MTA...G55.-..., MTA...I65.-..., MTA...G65.-...)

The following table shows information about this connection:

Function		
Motor connection		
Connection type		
Intercontec 723 H-Tec, 7 + 3-pole, female (downward or to the front)		
Wiring diagram		
 4312557451		
Assignment		
No.	**Name**	**Function**
PE	PE	PE connection
A	U	Motor phase U output
B	V	Motor phase V output
C	W	Motor phase W output
D	13	SEW brake 13 (red)
E	14	SEW brake 14 (white)
F	15	SEW brake 15 (blue)
1	+24 V	Connection for temperature sensor TF/TH (+)
2	n.c.	Not connected
3	TF -	Connection for temperature sensor TF/TH (-)

5.13.3 X21 – X28: Binary inputs/outputs

Variants

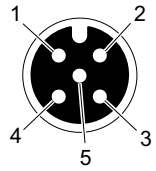
The number and assignment of binary inputs/outputs depends on

- the function level
- and the fieldbus interface of the MOVIFIT® unit.

I/O variant	MOVIFIT® variant	
	Function level	Fieldbus
12 DI + 4 DI/O	Technology	• PROFIBUS • PROFINET • EtherNet/IP • Modbus/TCP • DeviceNet
	Classic	• PROFINET • EtherNet/IP • Modbus/TCP
6 DI + 2 DI/O	Classic	• PROFIBUS • DeviceNet
4 DI	None	• SBus slave

Assignment

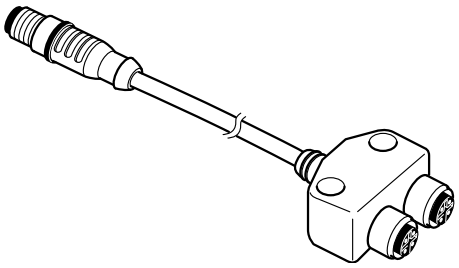
The following table shows information about these connections:

Function					
Binary inputs/outputs of the hybrid ABOX					
Connection type					
M12, 5-pole, female, A-coded					
Wiring diagram					
 2264816267					
I/O variant	**Assignment**				
12 DI 4 DI/O	**No.**	**X21**	**X22**	**X23** (Encoder 1 connection)	**X24** (Encoder 2 connection)
	1	VO24-I	VO24-I	VO24-II	VO24-II
	2	DI01	DI03	DI05 Track B	DI07 Track B
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI02	DI04 Track A	DI06 Track A
	5	n.c.	n.c.	n.c.	n.c.
	No.	**X25** (Encoder 3 connection)	**X26**	**X27**	**X28**
	1	VO24-III	VO24-III	VO24-IV	VO24-IV
	2	DI09 Track B	DI11	DI13 / DO01	DI15 / DO03
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI08 Track A	DI10	DI12 / DO00	DI14 / DO02
	5	n.c.	n.c.	n.c.	n.c.
6 DI + 2 DI/O	**No.**	**X21**	**X22**	**X23**	**X24**
	1	VO24-I	VO24-I	VO24-II	VO24-II
	2	res.	res.	res.	res.
	3	0V24_C	0V24_C	0V24_C	0V24_C
	4	DI00	DI01	DI02	DI03
	5	n.c.	n.c.	n.c.	n.c.
	No.	**X25**	**X26**	**X27**	**X28**
	1	VO24-III	VO24-III	VO24-IV	VO24-IV
	2	res.	res.	res.	res.
	3	0V24_C	0V24_C	0V24_S	0V24_S
	4	DI04	DI05	DI06 / DO00	DI07 / DO01
	5	n.c.	n.c.	n.c.	n.c.
4 DI	**No.**	**X21**	**X22**	**X23 - X28**	
	1	VO24	VO24	res.	
	2	DI101	DI103	res.	
	3	0V24_C	0V24_C	res.	
	4	DI100	DI102	res.	
	5	n.c.	n.c.	res.	

Y adapter

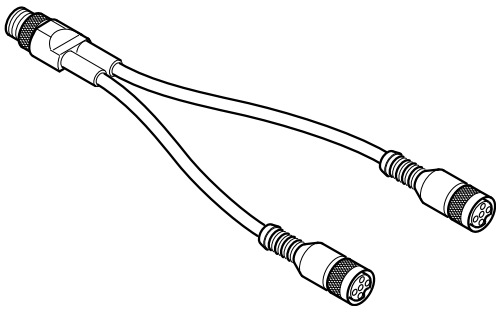
For connecting 2 sensors/actuators to an M12 plug connector, use a Y adapter with extension.

The Y adapter is available from different manufacturers:



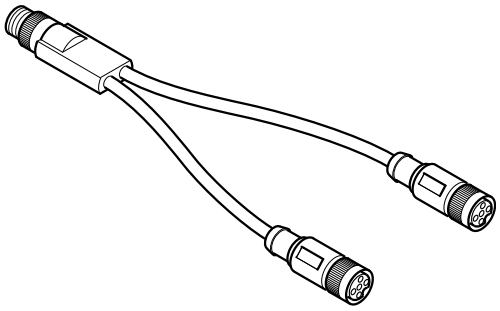
915294347

Manufacturer: Escha
Type: WAS4-0,3-2FKM3/..



1180380683

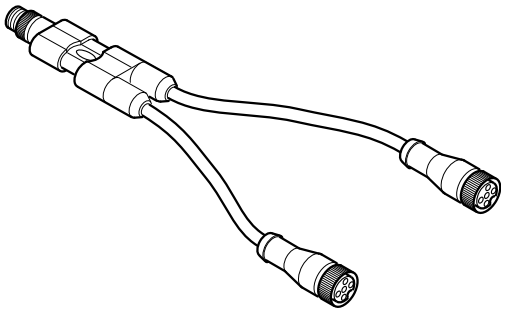
Manufacturer: Binder
Type: 79 5200 ..



1180375179

Manufacturer: Phoenix Contact
Type: SAC-3P-Y-2XFS SCO/.../...

The sheath of the cables is made of PVC. Provide suitable UV protection.



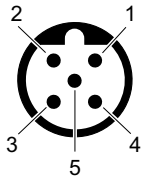
1180386571

Manufacturer: Murr
Type: 7000-40721-..

5.13.4 X11: PROFIBUS input

(ABOX MTA...S52.-..., MTA...I55.-..., MTA...G55.-...)

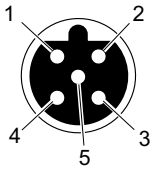
The following table shows information about this connection:

Function		
PROFIBUS input		
Connection type		
(M12, 5-pole, male, B-coded)		
Wiring diagram		
 2461813259		
Assignment		
No.	**Name**	**Function**
1	res.	Reserved
2	A_IN	PROFIBUS data line A
3	res.	Reserved
4	B_IN	PROFIBUS data line B
5	res.	Reserved

5.13.5 X12: PROFIBUS output

(ABOX MTA...S52.-..., MTA...I55.-..., MTA...G55.-...)

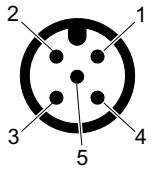
The following table shows information about this connection:

Function		
PROFIBUS output		
Connection type		
(M12, 5-pole, female, B-coded)		
Wiring diagram		
 2461813259		
Assignment		
No.	**Name**	**Function**
1	+5V	DC 5 V output
2	A_OUT	PROFIBUS data line A
3	0V5	0V5 reference potential
4	B_OUT	PROFIBUS data line B
5	res.	Reserved

5.13.6 X11: DeviceNet interface

(ABOX MTA...S52.-..., MTA...I55.-..., MTA...G55.-...)

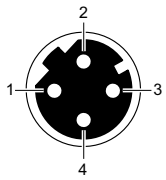
The following table shows information about this connection:

Function		
DeviceNet interface		
Connection type		
(Micro style connector, male, A-coded)		
Wiring diagram		
 2264818187		
Assignment		
No.	**Name**	**Function**
1	Drain	Shield/equipotential bonding
2	V+	DC 24 V input
3	V-	Reference potential
4	CAN_H	CAN data line (high)
5	CAN_L	CAN data line (low)

5.13.7 X11, X12: Ethernet interface

(ABOX MTA...S52.-..., MTA...S53.-..., MTA...I55.-..., MTA...G55.-...)

The following table shows information about this connection:

Function		
• PROFINET IO interface • EtherNet/IP interface • Modbus/TCP interface		
Connection type		
M12, 4-pole, female, D-coded		
Wiring diagram		
 2464600971		
Assignment		
No.	**Name**	**Function**
1	TX+	Transmit line (+)
2	RX+	Receive line (+)
3	TX-	Transmit line (-)
4	RX-	Receive line (-)

5.13.8 X11, X12: Ethernet interface

(ABOX MTA...S62.-..., MTA...I65.-.., MTA...G65.-..)

The following table shows information about this connection:

Function		
• PROFINET IO interface • EtherNet/IP IO interface • Modbus/TCP IO interface		
Connection type		
Push-pull RJ45		
Wiring diagram		
 2354433675		
Assignment		
No.	**Name**	**Function**
1	TX+	Transmit line (+)
2	TX-	Transmit line (-)
3	RX+	Receive line (+)
4	res.	Reserved
5	res.	Reserved
6	RX-	Receive line (-)
7	res.	Reserved
8	res.	Reserved

Connection cable

NOTICE

The RJ45 socket can be damaged by inserting commercially available RJ45 patch cables without push-pull connector housing.

Damage to the RJ45 socket.

- Only plug suitable push-pull RJ45 mating connectors according to IEC 61076-3-117 into push-pull RJ45 sockets.
- Never use commercially available RJ45 patch cables without push-pull connector housing. These plug connectors do not snap in place when they are plugged. They may damage the socket and are therefore not suited.

INFORMATION

Use only shielded cables for this connection.

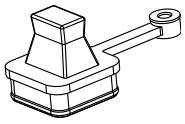
Closing plug, optional

NOTICE

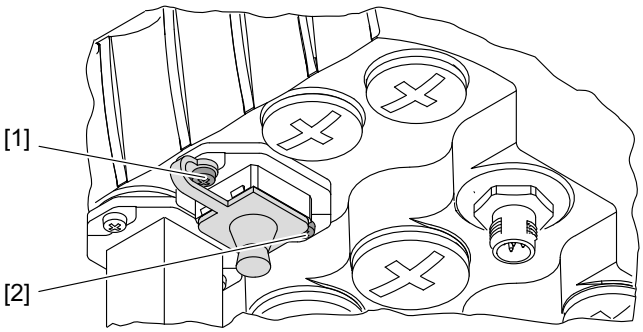
Loss of warranted degree of protection if the closing plugs are installed incorrectly or not at all.

Damage to the MOVIFIT® unit.

- If an RJ45 socket is not occupied by a plug connector, you must seal it with the following closing plug.

Type	Figure	Content	Part number
Ethernet closing plug for push-pull RJ45 socket		10 pcs	1822 370 2
		30 pcs	1822 371 0

To avoid losing the closing plug, you can secure it with the front retaining screw [1] of the socket, see following figure.



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Do not use the back screw [2] to secure the closing plug.

5.13.9 X30, X31: PROFINET POF interface

(ABOX MTA...S533-...-00/L10)

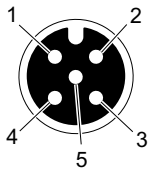
The following table shows information about this connection:

Function		
PROFINET interface SCRJ / POF (at POF option L10)		
Connection type		
Push-pull SCRJ		
Wiring diagram		
 3419100299		
Assignment		
No.	**Name**	**Function**
1	TX	Transmitting line (POF)
2	RX	Receiving line (POF)

5.13.10 X13: DC 24 V supply

(ABOX MTA...S533-...-00/L10)

The following table shows information about this connection:

Function		
DC 24 V supply of POF option L10 (at the ABOX, plugged at the factory)		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
 2264816267		
Assignment		
No.	**Name**	**Function**
1	+24V_C	24 V supply
2	res.	Reserved
3	0V24_C	Reference potential
4	res.	Reserved
5	res.	Reserved

5.14 Encoder connection

5.14.1 NV26 proximity sensor

Properties

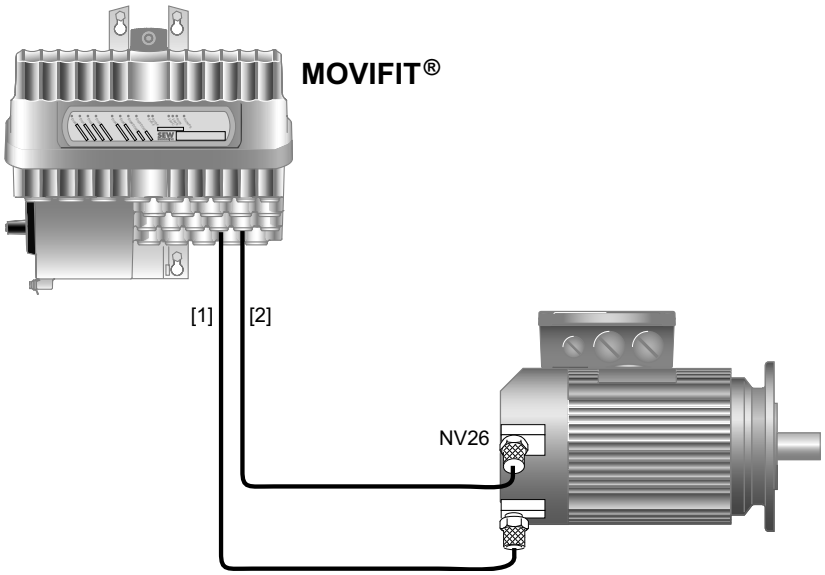
The NV26 proximity sensor offers the following features:

- 2 sensors with 6 pulses/revolution
- 24 increments/revolution with 4-fold evaluation
- Encoder monitoring and evaluation is possible with MOVIFIT® function level "Technology".

There must be a 45° angle between the sensors.

Installation

- Use shielded cables to connect the NV26 proximity sensor to the matching encoder inputs of MOVIFIT®.
  - For standard ABOX, see chapter "Terminal assignment" / "X25: I/O terminals".
  - For hybrid ABOX, see chapter "Electrical Connections" / "X21 – X28: binary inputs/outputs".



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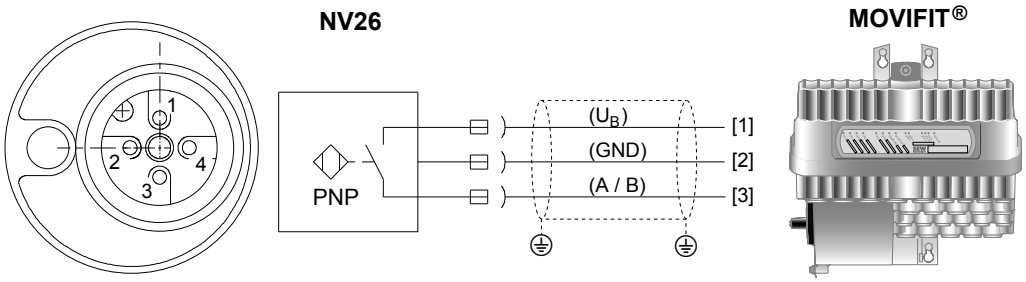
[1] Encoder input MOVIFIT® track B
[2] Encoder input MOVIFIT® track A

Wiring diagram



940197899

[1] +24 V supply voltage
[2] 0V24 reference potential
[3] Encoder input MOVIFIT® track A or track B

5.14.2 ES16 incremental encoder

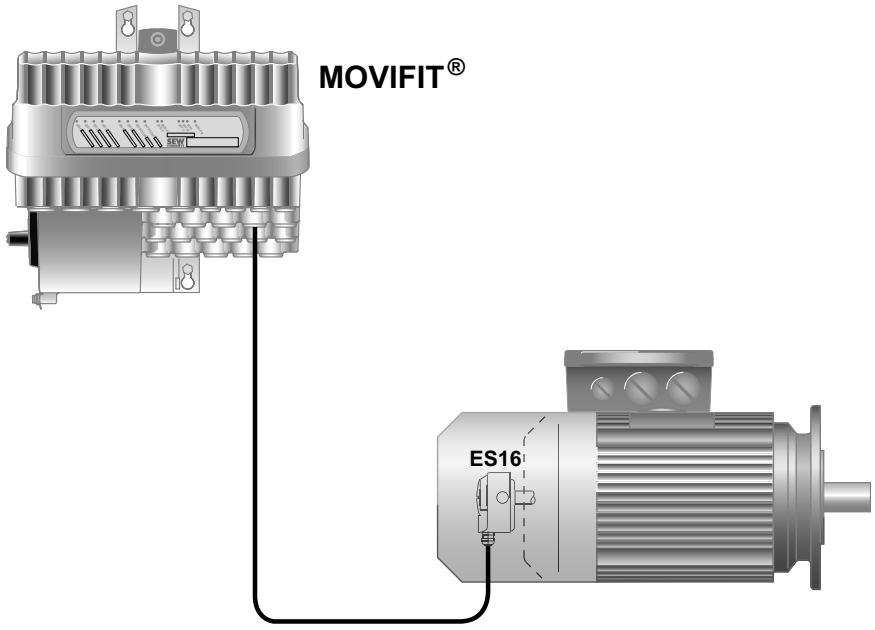
Properties

The ES 16 incremental encoder offers the following features:

- 6 pulses/revolutions for each track
- 24 increments/revolution with 4-fold evaluation
- Encoder monitoring and evaluation is possible with MOVIFIT® function level "Technology".

Installation

- Use a shielded cable to connect the ES16 incremental encoder to the matching encoder inputs of MOVIFIT®.
  - For standard ABOX, see chapter "Terminal assignment" / "X25: I/O terminals".
  - For hybrid ABOX, see chapter "Electrical Connections" / "X21 – X28: binary inputs/outputs".



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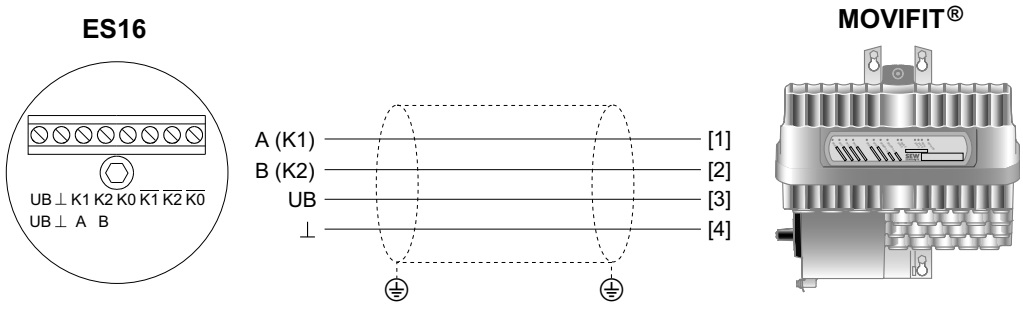
Wiring diagram



940061195

[1] Encoder input MOVIFIT® track A
[2] Encoder input MOVIFIT® track B
[3] +24 V supply voltage
[4] 0V24 reference potential

5.14.3 EI7. incremental encoder

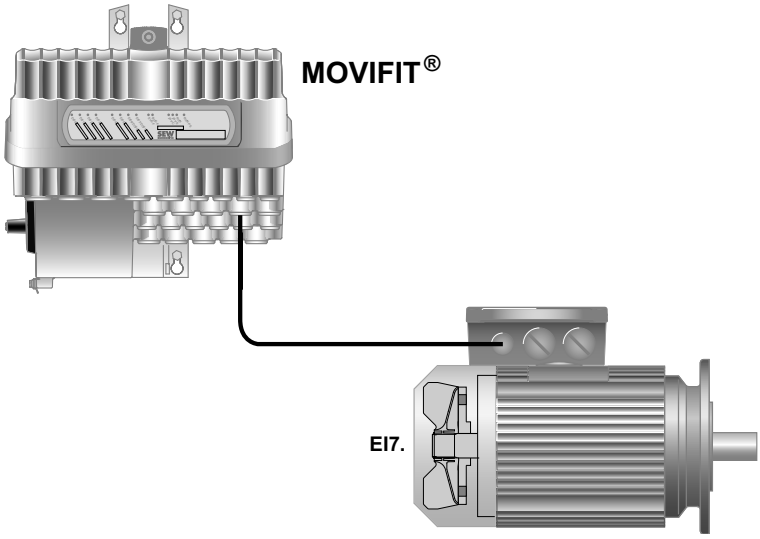
Properties

The EI7. incremental encoder offers the following features:

- HTL or sin/cos interface (MOVIFIT® does **not** evaluate sin/cos signals)
- **EI71:** 1 pulse/revolution => 4 increments/revolution[1)]
  EI72: 2 pulses/revolution => 8 increments/revolution[1)]
  EI76: 6 pulses/revolution => 24 increments/revolution[1)]
  EI7C: 24 pulses/revolution => 96 increments/revolution[1)]
  1) due to 4-fold evaluation
- Encoder monitoring and evaluation is possible with MOVIFIT® function level "Technology".

Installation

- Use a shielded cable to connect the EI7. incremental encoder to the matching encoder inputs of MOVIFIT®.
  - For standard ABOX, see chapter "Terminal assignment" / "X25: I/O terminals".
  - For hybrid ABOX, see chapter "Electrical Connections" / "X21 – X28: binary inputs/outputs".



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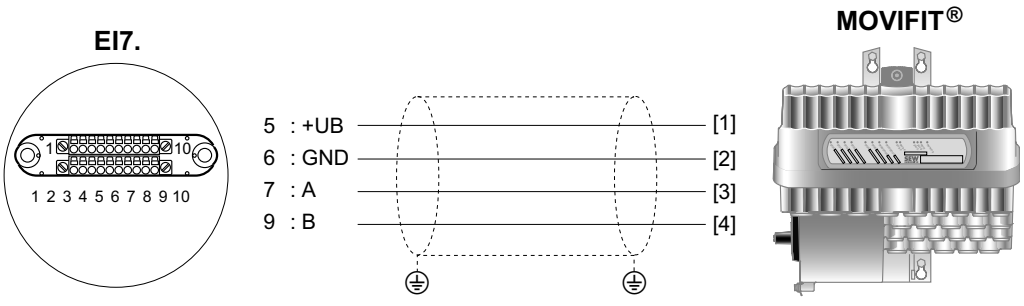
Wiring diagram



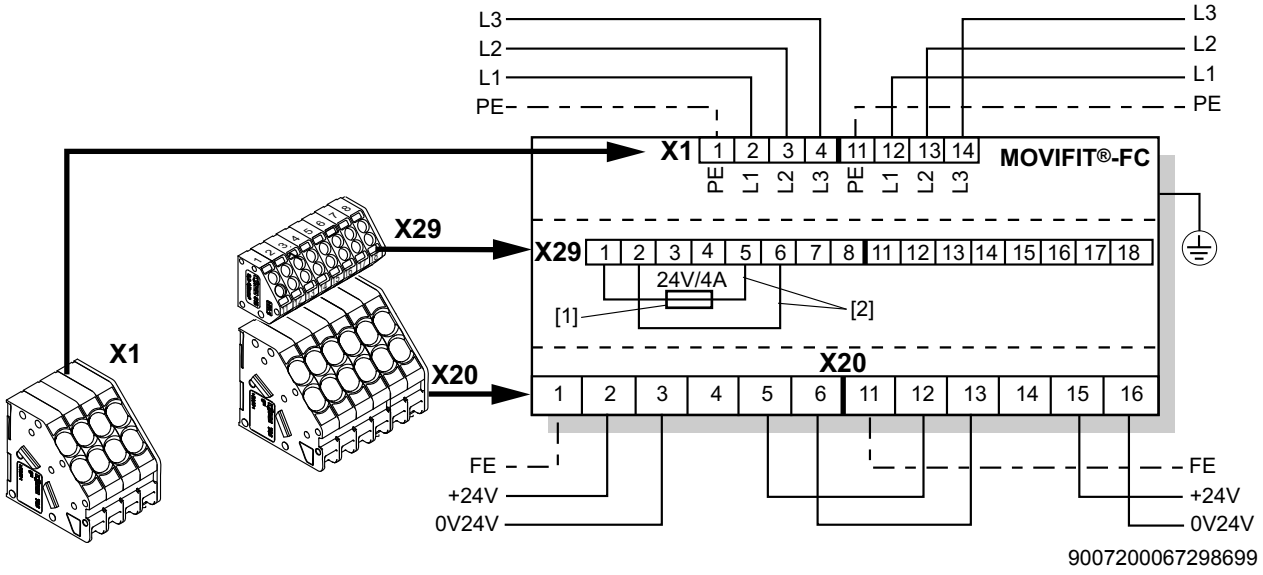
991622027

[1] +24 V supply voltage
[2] 0V24 reference potential
[3] Encoder input MOVIFIT® track A
[4] Encoder input MOVIFIT® track B

5.15 Power bus connection examples

5.15.1 Connection example with a common 24 V voltage circuit

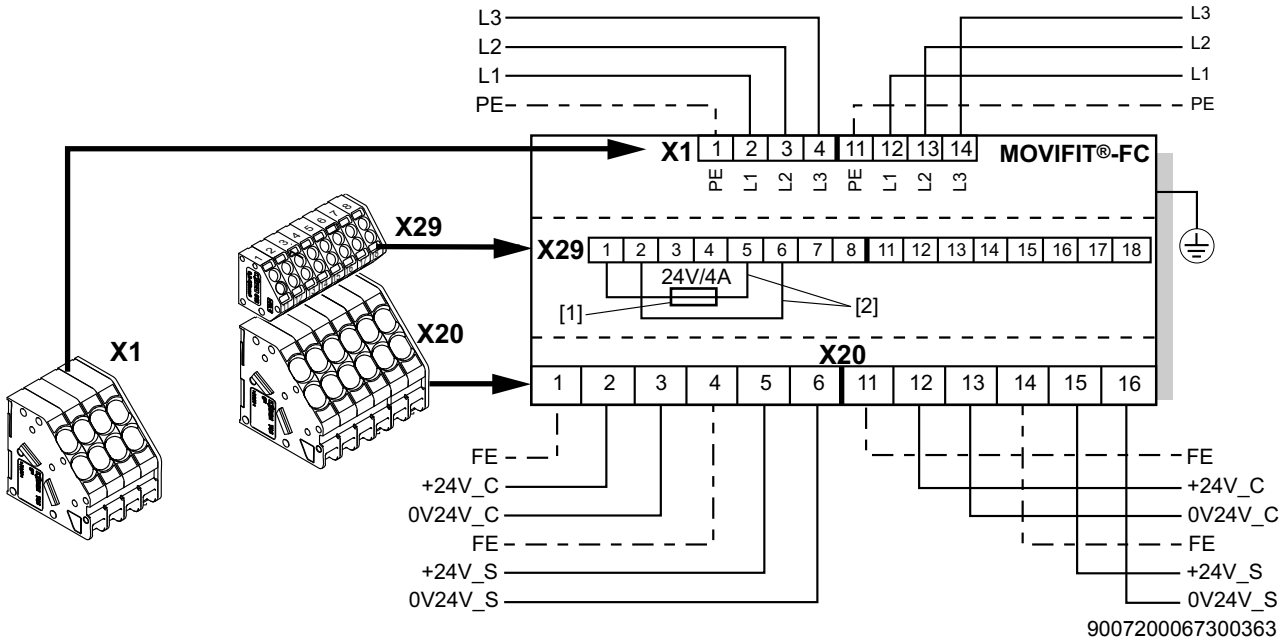
The following figure depicts a basic connection example for the power bus with a common 24 V voltage circuit for sensor/actuator supply. In the example, the integrated frequency inverter is supplied by the voltage 24V_C:



[1] Example (fuse 24 V / 4 A) for UL-compliant installation
[2] Example for integrated frequency inverter supply via 24V_C

5.15.2 Connection example with two separate 24 V voltage circuits

The following figure depicts a basic connection example for the power bus with two separate 24 V voltage circuits for sensor/actuator supply. In the example, the integrated frequency inverter is supplied by the voltage 24V_C:



[1] Example (fuse 24 V / 4 A) for UL-compliant installation
[2] Example for integrated frequency inverter supply via 24V_C

5.16 Fieldbus systems connection examples

5.16.1 PROFIBUS via terminals

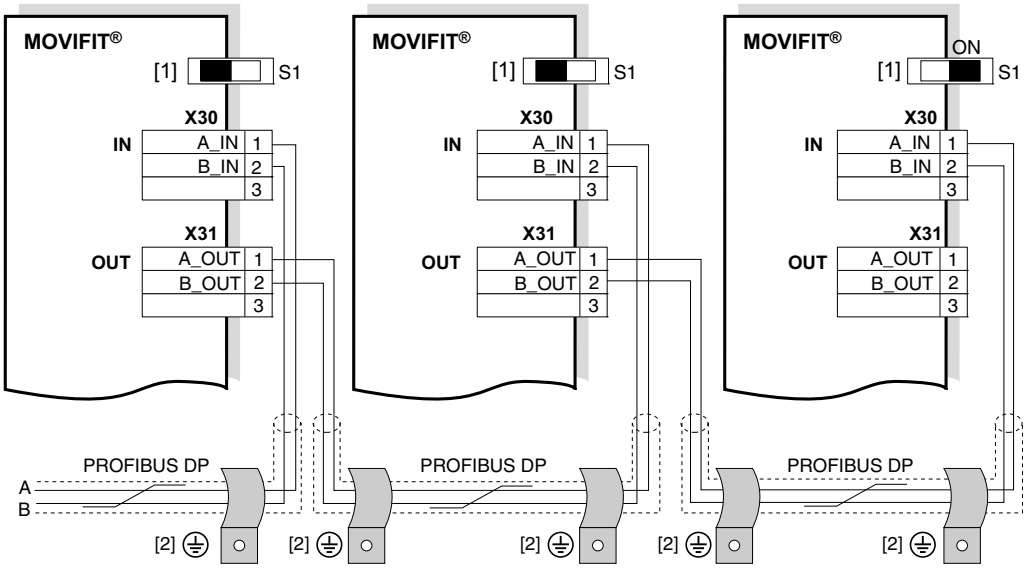
INFORMATION

The example applies for the following ABOXes:

- Standard ABOX MTA...-S02.-...-00
- Hybrid ABOX MTA...-S42.-...-00

The following illustration shows the PROFIBUS connection via terminals:

- If the MOVIFIT® unit is located at the end of a PROFIBUS segment, the unit can only be connected to the PROFIBUS network via the incoming PROFIBUS line.
- To prevent malfunctions in the bus system due to reflections, etc., the PROFIBUS segment must be terminated using bus terminating resistors at the first and last stations.
- The bus terminating resistors are already installed in the MOVIFIT® ABOX and can be activated using switch S1.



[1] DIP switch S1 = "ON" for bus termination
[2] Shield plate, see chapter "Connecting the PROFIBUS line" (page 55)

5.16.2 PROFIBUS via M12 plug connectors

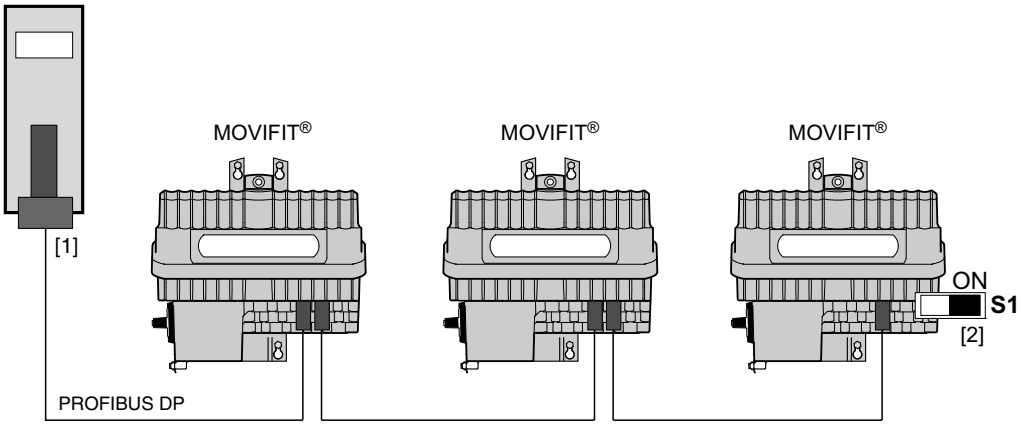
INFORMATION

The example applies for the following ABOX:

- Hybrid ABOX MTA...-S52.-...-00
- Hybrid ABOX MTA...-I65.-...-00
- Hybrid ABOX MTA...-G55.-...-00

The following figure shows the basic connection topology for PROFIBUS via M12 plug connectors:

- For the PROFIBUS connection, the ABOXes have M12 plug connectors. They comply with the recommendations of PROFIBUS directive no. 2.141 "Connection technology for PROFIBUS".
- To prevent malfunctions in the bus system due to reflections, etc., the PROFIBUS segment must be terminated using bus terminating resistors at the first and last stations.
- The bus terminating resistors are already installed in the MOVIFIT® ABOX and can be activated using switch S1.



[1] Bus terminating resistor on the controller
[2] DIP switch S1 = "ON" for bus termination

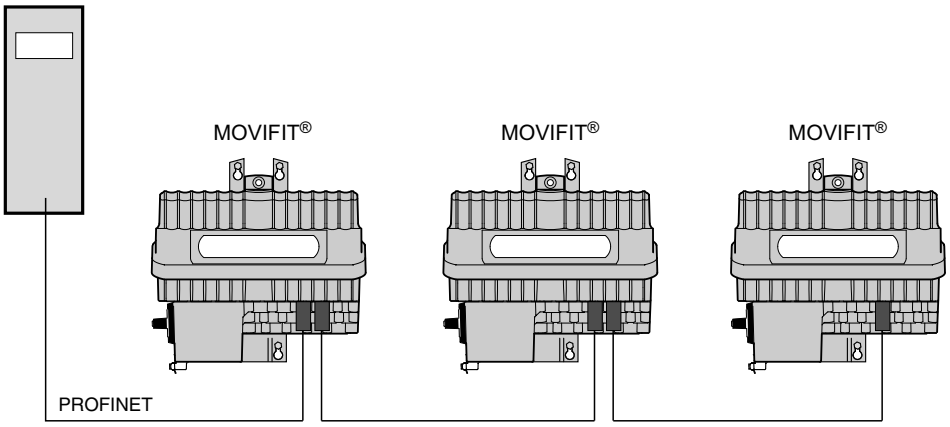
5.16.3 Ethernet (PROFINET IO, EtherNet/IP, Modbus/TCP)

INFORMATION

The example applies for the following ABOXes:

- Standard ABOX MTA...-S02.-...-00
- Hybrid ABOX MTA...-S42.-...-00
- Hybrid ABOX MTA...-S52.-...-00
- Hybrid ABOX MTA...-S62.-...-00
- Hybrid ABOX MTA...-I65.-...-00
- Hybrid ABOX MTA...-G55.-...-00
- Hybrid ABOX MTA...-I65.-...-00
- Hybrid ABOX MTA...-G65.-...-00

The following figure shows the basic connection topology for Ethernet (PROFINET IO, EtherNet/IP, Modbus/TCP) via RJ-45 plug connectors:



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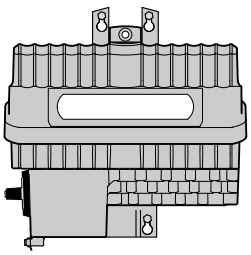
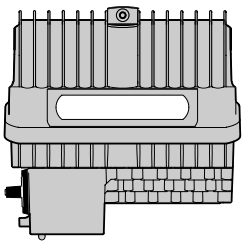
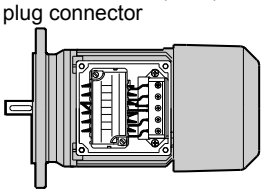
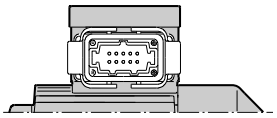
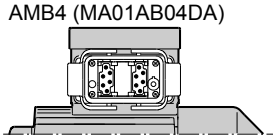
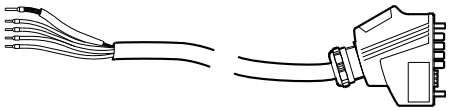
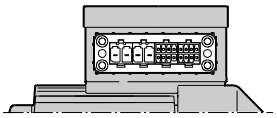
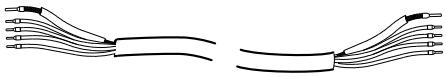
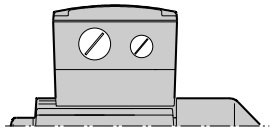
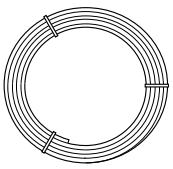
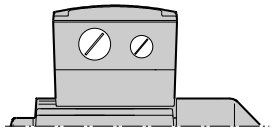
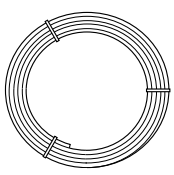
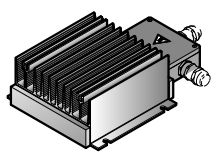
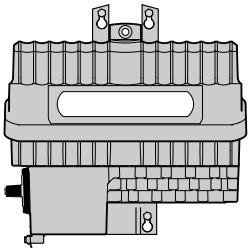
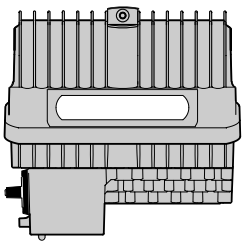
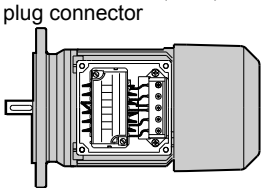
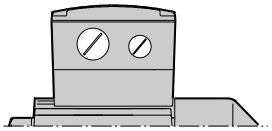
5.17 Hybrid cables

5.17.1 Overview

Hybrid cables are available for connecting MOVIFIT® FC and motors. The following table shows the available hybrid cables:

MOVIFIT® FC	Hybrid cable	Length	Cable type	Drive
Standard ABOX: **MTA...-S02.-...-00** **Hybrid ABOX:** **MTA...-S42.-...-00** **MTA...-S52.-...-00** **MTA...-S62.-...-00**  	Part No. DR63 / DT71-90 (⅄): 0819 967 1 Part No. DR63 / DT71-90 (△): 0819 969 8 Part No. DV100, DV112 DR.71-132 (⅄): 0819 970 1 Part No. DV100, DV112 DR.71-132 (△): 0819 874 8 	Variable	A	Motor with ISU4 (02CI) plug connector 
	Part No.: 0819 972 8 	Variable	A	Motor with ASB4 (BA01AB04DA) plug connector 
	Part No.: 0819 875 6 	Variable	A	Motor with plug connector AMB4 (MA01AB04DA) 
	Part No.: 0819 973 6 	Variable	A	Motor with APG4 plug connector 
	Part No. DR.71-100 (M4 ring cable lug): 0819 975 2 Part No. DR.112-132 (M5 ring cable lug): 1814 319 9 	Variable	A	Motor with cable glands 
	Part No.: 0817 953 0 / 30 m Part No.: 0817 953 0 / 100 m (Hybrid cable roll) 	30 m 100 m	A	Motor with cable glands DAS ASEPTIC motor 
	Part No.: 1172 378 5 (cable roll) 	30 m	-	External braking resistor 

MOVIFIT® FC	Hybrid cable	Length	Cable type	Drive
Hybrid ABOX: **MTA...-I55.-...-00** **MTA...-G55.-...-00** **MTA...-I65.-...-00** **MTA...-G65.-...-00**  	Part No. DR63 (⅄): 1813 841 1 Part No. DR63 (△): 1813 843 8 Part No. DR.71-132 (⅄): 1813 833 0 Part No. DR.71-132 (△): 1813 836 5 	Variable	A	Motor with ISU4 (02CI) plug connector 
	Part No. DR.71-100 (M4 ring cable lug) 1814 187 0 Part No. DR.112-132 (M5 ring cable lug) 1814 223 0 	Variable	A	Motor with cable glands 
	Part No.: 1814 105 6 (= Extension cable) 	Variable	A	Hybrid cable

5.17.2 Hybrid cable connection

With open cable end (MOVIFIT® end) and plug connector (motor end)

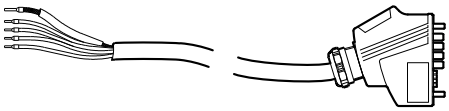
The table shows the assignment of the following hybrid cables:

- Part number: 0819 967 1
  0819 969 8
  0819 970 1
  0819 874 8

- Part number: 0819 972 8

- Part number: 0819 875 6

- Part number: 0819 973 6

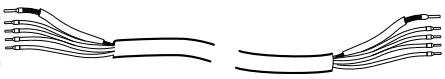


MOVIFIT® FC connecting terminal	Hybrid cable Color coding/marking
X8/1	Green/yellow
X8/2	Black/U1
X8/3	Black/V1
X8/4	Black/W1
X8/5	Blue/15
X8/6	White/14
X8/7	Red/13
X81/1	Black/1
X81/2	Black/2
The inner shield is connected via a shield plate, and the overall shield is connected via an EMC cable gland to the housing of the MOVIFIT® ABOX, see chapter "Connecting the hybrid cables" (page 56).	Shield end

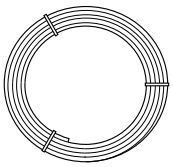
With open cable end (MOVIFIT® and motor end)

The table shows the assignment of the following hybrid cables:

- Part No.: 0819 975 2 (M4 ring cable lug)
  1814 319 9 (M5 ring cable lug)



- Part No.: 0817 953 0 / 30 m (cable roll)
  0817 953 0 / 100 m (cable roll)

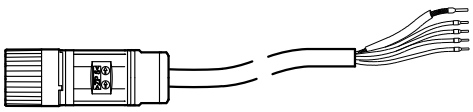


Connecting terminal MOVIFIT® FC	Hybrid cable Color coding/lettering	Connecting terminal Motor
X8/1	Green/yellow	PE terminal
X8/2	Black/U1	U1
X8/3	Black/V1	V1
X8/4	Black/W1	W1
X8/5	Blue/15	5a
X8/6	White/14	3a
X8/7	Red/13	4a
X81/1	Black/1	1a
X81/2	Black/2	2a
The inner shield is connected via a shield plate, and the overall shield is connected via an EMC cable gland to the housing of the MOVIFIT® ABOX, see chapter "Connecting the hybrid cables" (page 56).	Shield end	The inner shield is applied using the PE terminal, the overall shield with an EMC cable gland on the motor housing.

Plug connector (MOVIFIT® end) and open cable end (motor end)

The table shows the assignment of the following hybrid cables:

- Part No.: 1814 187 0 (M4 ring cable lug)
  1814 223 0 (M5 ring cable lug)



Hybrid cable Color coding/lettering	Connecting terminal Motor
Green/yellow	PE terminal
Black/U1	U1
Black/V1	V1
Black/W1	W1
Blue/15	5a
White/14	3a
Red/13	4a
Black/1	1a
Black/2	2a
Shield end	The inner shield is applied using the PE terminal, the overall shield with an EMC cable gland on the motor housing.

5.18 Wiring notes

5.18.1 Wiring notes for connecting the motor

- The motor phases U, V, W must be connected correctly to the terminals X8 / X81 of the ABOX so that the motor runs in the desired direction. The motor and temperature sensor must be connected to terminals X8 and X81 of the ABOX.

  ⚠ **WARNING** Risk of crushing due to reversed motor phases. Incorrect connection of the motor phases will result in a wrong direction of rotation of the motor and/or uncontrolled motor startup.

  Severe or fatal injuries.

  – Check the wiring before starting the motor.

5.18.2 Wiring notes for brakes

- Brakes with voltages below 40 V cannot be used in connection with MOVIFIT® FC.
- With SEW motors, the brake must be connected to the brake connection terminals of the ABOX without any other measures (no brake rectifier). This requires connecting an SEW brake for a voltage of 110 V, 120 V, 230 V, or 400 V.
- Non-SEW motors with a brake can be controlled with binary output DB00 and appropriate additional measures (e.g. brake rectifier).

  ⚠ **WARNING** Risk of crushing due to incorrect parameterization of the binary output DB00.

  Severe or fatal injuries.

  - If binary output DB00 is used to control the brake, do not change the parameters that define the functions of the binary output.
  - Check the parameter settings before using the binary output to control the brake.

5.19 Wiring check

Before connecting the system to the power source for the first time, you must perform a wiring check to prevent damage to persons, systems, and equipment caused by incorrect wiring:

- Remove the EBOX from the ABOX
- Check the insulation of the wiring in accordance with applicable national standards
- Check the grounding.
- Check the insulation between the supply system cable and the DC 24 V cable.
- Check the insulation between the supply system cable and the communication cable.
- Check the polarity of the DC 24 V cable
- Check the polarity of the communication line
- Ensure equipotential bonding between the MOVIFIT® units

5.19.1 After the wiring check

- Push the EBOX onto the ABOX and screw it on
- Seal all cable openings and plug connections that are not in use.

6 Startup

6.1 General information

INFORMATION

You must comply with the general safety notes in chapter "Safety Notes" during startup.

⚠ WARNING

Electric shock due to dangerous voltages in the ABOX.

Severe or fatal injuries.

- Before removing or installing the EBOX, de-energize the MOVIFIT® unit using a suitable external cut-off device.
- Wait for at least 1 minute before removing the EBOX.

⚠ WARNING

Danger of burns due to hot surfaces of the MOVIFIT® unit.

Severe injuries.

- Do not touch the MOVIFIT® until it has cooled down sufficiently.

⚠ WARNING

Uncontrolled unit behavior due to ineffective emergency stop circuit.

Severe or fatal injuries.

- Comply with the installation notes.
- The installation must only be carried out by qualified personnel.

⚠ WARNING

Unit malfunction due to incorrect unit setting.

Severe or fatal injuries.

- Observe the startup notes.
- The installation must only be carried out by qualified personnel.
- Check the parameters and data sets.
- Use only settings that are consistent with the function.

NOTICE

Danger due to arcing.

Damage to electrical components.

- Do not unplug the power connectors during operation. Do not plug in the power connectors during operation.
- Never remove the MOVIFIT® EBOX during operation.

INFORMATION

To ensure fault-free operation, do not disconnect or connect the signal cables during operation.

6.2 Requirements

The following conditions apply to startup:

- MOVIFIT® and the drive units must be installed correctly both mechanically and electrically.
- Appropriate safety measures prevent the drives from starting up unintentionally.
- Appropriate safety measures must be taken to prevent risk of injury or damage to the machine.

The following hardware is required for startup:

- PC or laptop
- Interface adapter
- Connection cable between PC and MOVIFIT®

The following software is required on the PC or laptop:

- MOVITOOLS® MotionStudio version 5.60 and higher.

6.3 Description of the DIP switches

INFORMATION

For information about the position of DIP switches S10 and S11, refer to the "EBOX" chapter.

For information about the position of DIP switches S1, S2 and S3, refer to the "ABOX" chapter.

NOTICE

Hazard caused by unsuitable tools.

Damage to the DIP switches.

- To set the DIP switches use only suitable tools, such as a slotted screwdriver with a blade width smaller than 3 mm.
- The force used for setting the DIP switches must not exceed 5 N.

6.3.1 DIP switch S1

Bus terminating resistor for PROFIBUS

- DIP switch S1 = OFF: Bus terminating resistor is not active.
- DIP switch S1 = ON: Bus terminating resistor is active.

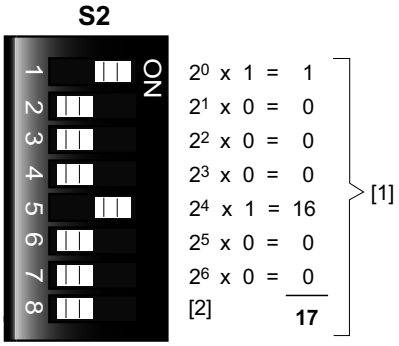
6.3.2 DIP switch S2

The function of DIP switch S2 depends on the type of fieldbus.

Function of DIP switch S2 for PROFIBUS

PROFIBUS address

You can set the PROFIBUS address at the DIP switches S2/1 – S2/7.



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[1] Example: Address 17
[2] Switch 8 = Reserved

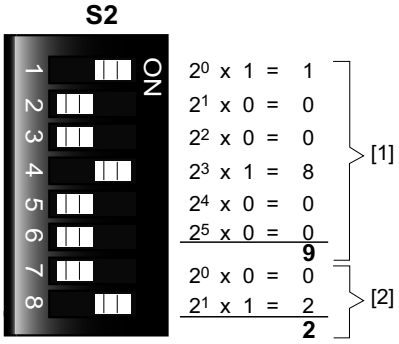
Addresses 1 to 125:	valid addresses
Addresses 0, 126, 127:	are not supported

Function of DIP switch S2 for DeviceNet

DeviceNet address (MAC ID) and baud rate

You can set the DeviceNet address (MAC ID) at the DIP switches S2/1 – S2/6.

You can set the DeviceNet baud rate at the DIP switches S2/7 – S2/8.



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[1] DeviceNet address setting
[2] Baud rate setting

6.3.3 DIP switch S3

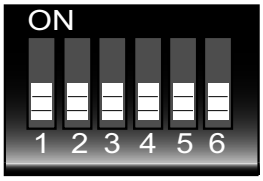
Bus terminating resistor for SBus

- DIP switch S3 = OFF: Bus terminating resistor is not active.
- DIP switch S3 = ON: Bus terminating resistor is active.

6.3.4 DIP switch S10

You can set the unit parameters at the DIP switches S10/2 – S10/6.

S10



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S10 Meaning	1 Startup mode	2 Operating mode	3 Motor/brake type	4 Motor connection type	5 Motor power	6 Hoist
ON	Expert mode	V/f	Motor type 2 / optional brake	Delta	One power rating lower	VFC & Hoist
OFF	Easy mode	VFC operation (only for 4-pole SEW motors)	Motor 1 / standard brake	Star	Adjusted	S10/2 active

DIP switch S10/1

Startup mode

- DIP switch S10/2 = ON: Expert mode

  In "Expert" startup mode, an extended scope of parameters is available. You can use the MOVITOOLS® MotionStudio software to adjust the parameters to the application.

- DIP switch S10/2 = OFF: Easy mode

  When selecting the "Easy" startup mode, you can start up MOVIFIT® quickly and easily using DIP switches S10/2 – S10/6.

DIP switch S10/2

Operating mode

- DIP switch S10/2 = ON: V/f operation for other motors
- DIP switch S10/2 = OFF: VFC operation for 4-pole motors

DIP switch S10/3

Motor/brake type

- When you are using IEC or NEMA motors (DT/DV), DIP switch S10/3 must always be set to OFF.
- For DX/DZ motors with rated voltages of 220/380 V, 60 Hz (only available in Brazil), and for aseptic motors (DAS), DIP switch S10/3 must be set to ON.
- When you are using DR motors with MOVIFIT® standard brakes, DIP switch S10/3 must always be set to OFF.
- When you are using DR motors with option brakes, DIP switch S10/3 must always be set to ON.

DIP switch S10/4

Motor connection type

- DIP switch S10/4 = ON: You must select this setting if the motor is operated in delta connection (refer to the tables on the following pages).
- DIP switch S10/4 = OFF: You must select this setting if the motor is operated in star connection (refer to the tables on the following pages).

DIP switch S10/5

Lower motor power rating

- When activated, this DIP switch enables MOVIFIT® to be assigned to a motor with a lower power rating. The nominal unit power is not affected.
- When using a motor with a lower power rating, the MOVIFIT® unit is one power level above the motor. This is why you can increase the overload capacity of the drive. A higher current can be provided briefly, leading to higher torque ratings.
- The aim of switch S10/5 is to achieve short-term utilization of the motor's peak torque. The unit's current level remains the same regardless of the switch setting. Blocking protection for the motor is adjusted depending on the switch position.
- When DIP switch S10/5 is activated, the motor cannot be operated with stall protection.

DT / DV					V =	AC 3 x 400 V, 50 Hz		
MOVIFIT®	Assigned DT/DV motor and brake[1]							
	S10/5 = OFF				S10/5 = ON			
	⅄ connection		△ connection		⅄ connection		△ connection	
	Motor	Brake	Motor	Brake	Motor	Brake	Motor	Brake
MTF..003..00	DT71D4	BMG05	DR63L4	BR03	DR63L4	BR03	-	-
MTF..005..00	DT80K4	BMG1	DT71D4	BMG05	DT71D4	BMG05	DR63L4	BR03
MTF..007..00	DT80N4	BMG1	DT80K4	BMG1	DT80K4	BMG1	DT71D4	BMG05
MTF..011..00	DT90S4	BMG2	DT80N4	BMG1	DT80N4	BMG1	DT80K4	BMG1
MTF..015..00	DT90L4	BMG2	DT90S4	BMG2	DT90S4	BMG2	DT80N4	BMG1
MTF..022..00	DV100M4	BMG4	DT90L4	BMG2	DT90L4	BMG2	DT90S4	BMG2
MTF..030..00	DV100L4	BMG4	DV100M4	BMG4	DV100M4	BMG4	DT90L4	BMG2
MTF..040..00	DV112M4	BMG8	DV100L4	BMG4	DV100L4	BMG4	DV100M4	BMG4

1) Possible brake voltages: 110 V, 230 V, 400 V

DAS					V =	AC 3 x 400 V, 50 Hz		
MOVIFIT®	Assigned DAS motor and brake[1]							
	S10/5 = OFF				S10/5 = ON			
	⅄ connection		△ connection		⅄ connection		△ connection	
	Motor	Brake	Motor	Brake	Motor	Brake	Motor	Brake
MTF..003..01	DAS80N4	BR1	DAS80K4	BR1	DAS80K4	BR1	-	-
MTF..005..01	DAS90S4	BR2	DAS80N4	BR1	DAS80N4	BR1	DAS80K4	BR1
MTF..007..01	DAS90L4	BR2	DAS90S4	BR2	DAS90S4	BR2	DAS80N4	BR1
MTF..011..01	DAS100M4	BR2	DAS90L4	BR2	DAS90L4	BR2	DAS90S4	BR2
MTF..015..01	DAS100L4	BR2	DAS100M4	BR2	DAS100M4	BR2	DAS90L4	BR2
MTF..022..01	-	-	DAS100L4	BR2	DAS100L4	BR2	DAS100M4	BR2
MTF..030..01	-	-	-	-	-	-	DAS100L4	BR2
MTF..040..01	-	-	-	-	-	-	-	-

1) Possible brake voltages: BR1 : 230 V, BR2: 230 V and 400 V

DRS				V = AC 3 x 400 V, 50 Hz								
MOVIFIT®	Assigned DRS motor and brake[1]											
	S10/5 = OFF						S10/5 = ON					
	⅄ connection			△ connection			⅄ connection			△ connection		
	Motor	Brake		Motor	Brake		Motor	Brake		Motor	Brake	
		Standard	Option		Standard	Option		Standard	Option		Standard	Option
MTF..003..10	DRS71 S4	BE05	BE1	DR63 L4	BR03	-	DR63 L4	BR03	-	-	-	-
MTF..005..10	DRS71 M4	BE1	BE05	DRS71 S4	BE05	BE1	DRS71 S4	BE05	BE1	DR63 L4	BR03	-
MTF..007..10	DRS80 S4	BE1	BE05	DRS71 M4	BE1	BE05	DRS71 M4	BE1	BE05	DRS71 S4	BE05	BE1
MTF..011..10	DRS80 M4	BE2	BE1	DRS80 S4	BE1	BE05	DRS80 S4	BE1	BE05	DRS71 M4	BE1	BE05
MTF..015..10	DRS90 M4	BE2	BE1	DRS80 M4	BE2	BE1	DRS80 M4	BE2	BE1	DRS80 S4	BE1	BE05
MTF..022..10	DRS90 L4	BE5	BE2	DRS90 M4	BE2	BE1	DRS90 M4	BE2	BE1	DRS80 M4	BE2	BE1
MTF..030..10	DRS100 M4	BE5	BE2	DRS90 L4	BE5	BE2	DRS90 L4	BE5	BE2	DRS90 M4	BE2	BE1
MTF..040..10	DRS100 LC4	BE5	BE2	DRS100 M4	BE5	BE2	DRS100 M4	BE5	BE2	DRS90 L4	BE5	BE2

1) Possible brake voltages: 120 V, 230 V, 400 V

DRE				V = AC 3 x 400 V, 50 Hz								
MOVIFIT®	Assigned DRS motor and brake[1]											
	S10/5 = OFF						S10/5 = ON					
	⅄ connection			△ connection			⅄ connection			△ connection		
	Motor	Brake		Motor	Brake		Motor	Brake		Motor	Brake	
		Standard	Option		Standard	Option		Standard	Option		Standard	Option
MTF..003..11	DRE80 S4 0.37 kW	BE05	BE1	DRE80 S4 0.25 kW	BE05	BE1	DRE80 S4 0.25 kW	BE05	BE1	-	-	-
MTF..005..11	DRE80 M4 0.55 kW	BE1	BE05	DRE80 S4 0.37 kW	BE05	BE1	DRE80 S4 0.37 kW	BE05	BE1	DRE80 S4 0.25 kW	BE05	BE1
MTF..007..11	DRE80 M4 0.75 kW	BE1	BE05	DRE80 M4 0.55 kW	BE1	BE05	DRE80 M4 0.55 kW	BE1	BE05	DRE80 S4 0.37 kW	BE5	BE1
MTF..011..11	DRE90 M4	BE2	BE1	DRE80 M4 0.75 kW	BE1	BE05	DRE80 M4 0.75 kW	BE1	BE05	DRE80 M4 0.55 kW	BE1	BE05
MTF..015..11	DRE90 L4	BE2	BE1	DRE90 M4	BE2	BE1	DRE90 M4	BE2	BE1	DRE80 M4 0.75 kW	BE1	BE05
MTF..022..11	DRE100 M4	BE5	BE2	DRE90 L4	BE2	BE1	DRE90 L4	BE2	BE1	DRE90 M4	BE2	BE1
MTF..030..11	DRE100 LC4	BE5	BE2	DRE100 M4	BE5	BE2	DRE100 M4	BE5	BE2	DRE90 L4	BE2	BE1
MTF..040..11	DRE132 S4	BE5	BE11	DRE100 LC4	BE5	BE2	DRE100 LC4	BE5	BE2	DRE100 M4	BE5	BE2

1) Possible brake voltages: 120 V, 230 V, 400 V

DRS – DRE (global motor)				V = AC 3 x 400 V, 50 Hz or AC 3 x 460 V, 60 Hz								
MOVIFIT®	Assigned DR motor and brake[1]											
	S10/5 = OFF						S10/5 = ON					
	⅄ connection			△ connection			⅄ connection			△ connection		
	Motor	Brake		Motor	Brake		Motor	Brake		Motor	Brake	
		Standard	Option		Standard	Option		Standard	Option		Standard	Option
MTF..003..15	DRS71 S4	BE05	BE1	DR63 L4[2]	BR03	BR03	DR63 L4[2]	BR03	BR03	-	-	-
MTF..005..15	DRS71 M4	BE1	BE05	DRS71 S4	BE05	BE1	DRS71 S4	BE05	BE1	DR63 L4[2]	BR03	BR03
MTF..007..15	DRE80 M4	BE1	BE05	DRS71 M4	BE1	BE05	DRS71 M4	BE1	BE05	DRS71 S4	BE05	BE1
MTF..011..15	DRE90 M4	BE2	BE1	DRE80 M4	BE1	BE05	DRE80 M4	BE1	BE05	DRS71 M4	BE1	BE05
MTF..015..15	DRE90 L4	BE2	BE1	DRE90 M4	BE2	BE1	DRE90 M4	BE2	BE1	DRE80 M4	BE1	BE05
MTF..022..15	DRE100 L4	BE5	BE2	DRE90 L4	BE2	BE1	DRE90 L4	BE2	BE1	DRE90 M4	BE2	BE1
MTF..030..15	DRE100 LC4	BE5	BE2	DRE100 L4	BE5	BE2	DRE100 L4	BE5	BE2	DRE90 L4	BE2	BE1
MTF..040..15	DRE132 S4	BE5	BE11	DRE100 LC4	BE5	BE2	DRE100 LC4	BE5	BE2	DRE100 L4	BE5	BE2

1) Possible brake voltages: 120 V, 230 V, 400 V

2) Incorporated in the data set, but only available as IEC motor (no global motor)

INFORMATION

The type of connected brake can be found on the nameplate of the motor.

The braking torque of the brake is listed in chapter "Braking torques".

DIP switch S10/6

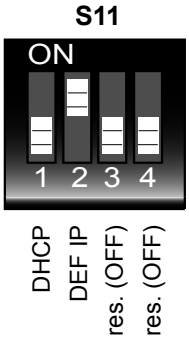
Hoist application

- DIP switch S10/6 = ON: You must select this setting when MOVIFIT® is to be used in a hoist application. The control mode is VFC mode for the hoist and 4-pole SEW motors.
- DIP switch S10/6 = OFF: The operating mode is selected according to DIP switch S10/2.

6.3.5 DIP switch S11

IP parameters for PROFINET IO, EtherNet/IP and Modbus/TCP

You can set the IP parameters for PROFINET IO, EtherNet/IP and Modbus/TCP at DIP switches S11/1 – S11/2.



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S11/1 "DHCP"	S11/2 "DEF IP"	Status
ON	**ON**	This combination of settings is not permitted. ???
ON	**OFF**	The MOVIFIT® unit awaits the IP parameter being assigned by a DHCP server.
OFF	**ON**	The IP parameters are set to the following default values when the DC 24 V voltage is switched on: • IP address: 192.168.10.4 • Subnet mask: 255.255.255.0 • Default gateway: 1.0.0.0 with EtherNet/IP • DHCP / Startup Configuration: Saved IP parameters (DHCP is deactivated)
OFF	**OFF**	The IP parameters set in the parameter tree are used On delivery, the above-mentioned default values are set.

6.4 Startup procedure

⚠ WARNING

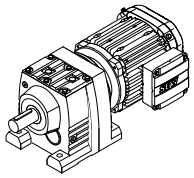
Danger due to improper safety shutdown in applications with safe disconnection.

Severe or fatal injuries.

- For systems with safe disconnection, observe the startup notes and safety conditions in the "MOVIFIT® MC/FC – Functional Safety" manual.

The following illustration gives an overview of the MOVIFIT® FC startup procedure and lists other applicable documentation:

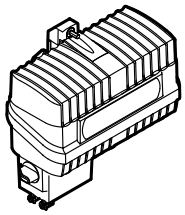
[1]



Motor startup

→ For information, refer to:
- the "DR.71-225, 315 AC Motors" operating instructions.
- or "DR/DV/DT/DTE/DVE AC Motors, CT/CV Asynchronous Servomotors" operating instructions

[2]



MOVIFIT® startup

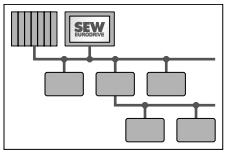
→ For information, refer to:
- Chaper "Startup" / "General information"
- Chapter "MOVIFIT® on the fieldbus"
- Chapter "Startup of the MOVIFIT® inverter"

[3]

Parameter setting[1] Programming with MOVITOOLS® MotionStudio

→ For information, refer to:
- Chapter "First steps with MOVITOOLS® MotionStudio"
- The "MOVIFIT® Function Level Classic .." manual [2]
- The "MOVIFIT® Function Level Technology .." manual [2]
- The "MOVI-PLC® Programming in the PLC Editor" manual

[4]



Fieldbus configuration

→ For information, refer to:
- Chapter "MOVIFIT® on the fieldbus"
- The "MOVIFIT® Function Level Classic .." manual [2]
- The "MOVIFIT® Function Level Technology .." manual [2]

1) Parameters can only be set in "Expert mode".

2) The "MOVIFIT® Function Level Classic" and "MOVIFIT® Function Level Technology" manuals are available in several fieldbus-specific variants.

6.5 Startup of MOVIFIT® on the fieldbus

INFORMATION

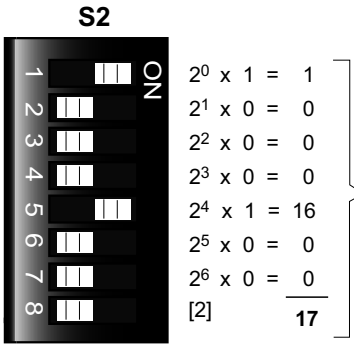
The entire fieldbus startup is carried out via software tools and is described in the respective manuals:

- "MOVIFIT® Function Level Classic .." manual
- "MOVIFIT® Function Level Technology .." manual

The "MOVIFIT® Function Level Classic" and "MOVIFIT® Function Level Technology" manuals are available in several fieldbus-specific variants.

6.5.1 Startup in conjunction with PROFIBUS

1. Check that MOVIFIT® is properly connected.
2. Set the PROFIBUS address at DIP switch S2 of the MOVIFIT® ABOX.



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[1] Example: Address 17
[2] Switch 8 = Reserved
Addresses 1 to 125: valid addresses
Addresses 0, 126, 127: are not supported

The following table uses address 17 as an example to show how to set the DIP switches for any bus address:

DIP switch setting	Significance
DIP 1 = ON	1
DIP 2 = OFF	2
DIP 3 = OFF	4
DIP 4 = OFF	8
DIP 5 = ON	16
DIP 6 = OFF	32
DIP 7 = OFF	64

3. Activate the bus termination of the MOVIFIT® unit that is the last bus station.
   - If the MOVIFIT® unit is located at the end of a PROFIBUS segment, the unit can only be connected to the PROFIBUS network via the incoming PROFIBUS line.

- To prevent malfunctions in the bus system due to reflections, etc., the PROFIBUS segment must be terminated at the first and last stations.

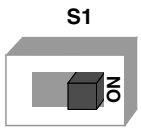
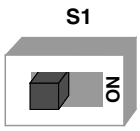
INFORMATION

The PROFIBUS is not interrupted when you remove the EBOX (electronics unit) from the ABOX (connection unit).

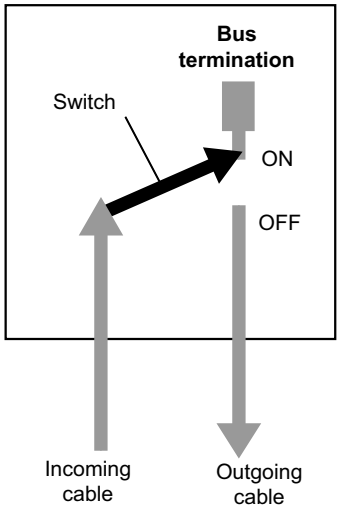
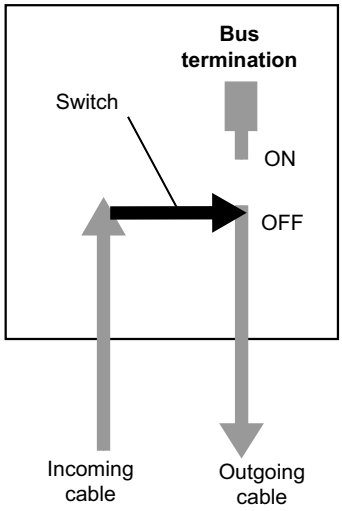
4. Start up the MOVIFIT® frequency inverter, see chapter "Startup of the MOVIFIT® inverter" (page 126).
5. Place the EBOX onto the ABOX and close it.
6. Switch on the 24V_C and 24V_S supply voltage(s). The corresponding control LEDs should now light up green.

Bus termination

The bus terminating resistors are already installed in the ABOX and can be activated using switch S1.

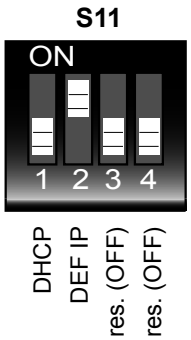
Bus termination ON = on	Bus termination OFF = off (factory setting)
 837515659	 837519755

The following table shows the functional principle of the bus termination switch:

Bus termination switch S1	
Bus termination ON = on	Bus termination OFF = off
 837562251	 837566347

6.5.2 Startup with PROFINET IO, EtherNet/IP, or Modbus/TCP

1. Check that MOVIFIT® is properly connected.
2. Start up the MOVIFIT® frequency inverter, see chapter "Startup of the MOVIFIT® inverter" (page 126).
3. Set DIP switch S11/2 "DEF IP" to "ON".



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This sets the address parameters to the following default values:

IP address:	192.168.10.4
Subnet mask:	255.255.255.0
Gateway:	1.0.0.0

4. Place the EBOX onto the ABOX and close it.
5. Switch on the 24V_C and 24V_S supply voltage(s). The corresponding control LEDs should now light up green.

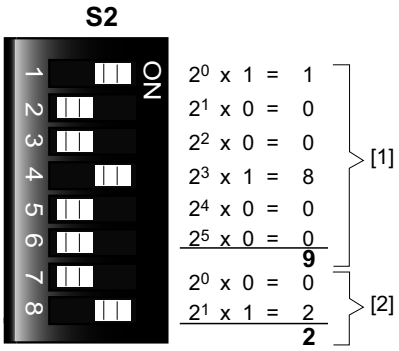
6.5.3 Startup in conjunction with DeviceNet

1. Check that MOVIFIT® is properly connected.
2. Set the DeviceNet address at DIP switch S2 of the ABOX.
3. Set the baud rate at DIP switch S2 of the ABOX.
4. Start up the MOVIFIT® frequency inverter, see chapter "Startup of the MOVIFIT® inverter" (page 126).
5. Place the EBOX onto the ABOX and close it.
6. Switch on the 24V_C and 24V_S supply voltage(s). The corresponding control LEDs should now light up green.

Setting the DeviceNet address (MAC ID) and baud rate

The DeviceNet address is set with DIP switches S2/1 – S2/6.

The Baud rate is set with DIP switches S2/7 – S2/8:



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[1] DeviceNet address setting
[2] Baud rate setting

In the following table, address 9 is used as an example to show how to set any bus address at the DIP switches:

DIP switch	Button position	Significance
S2/1	ON	1
S2/2	OFF	2
S2/3	OFF	4
S2/4	ON	8
S2/5	OFF	16
S2/6	OFF	32

The following table shows how to set the baud rate at the DIP switches:

Baud rate	Value	S2/7	S2/8
125 kBd	0	OFF	OFF
250 kBd	1	ON	OFF
500 kBd	**2**	**OFF**	**ON**
(reserved)	3	ON	ON

6.6 Starting up the MOVIFIT® frequency inverter

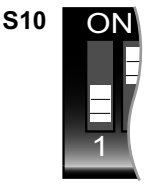
6.6.1 Startup mode

You can use one of the following startup modes to start the MOVIFIT® frequency inverter:

- MOVIFIT® FC can be started up quickly and easily in **Easy mode** using DIP switch S10.
- To operate the unit in **Expert mode**, set DIP switch S10/1 to "ON". This mode includes additional parameters. The parameters can be adjusted to the application using the "MOVITOOLS® MotionStudio" software tool (function levels "Classic" and "Technology").
- After activating Expert mode, the unit and its parameters are initialized once according to the setting of DIP switches S10/2 to S10/6.
- While Expert mode is active, DIP switches S10/2 to S10/6 are only re-effected when you set the *P802 Factory setting* parameter to "Delivery status". Otherwise, the system will ignore the changing of the DIP switch setting.

6.6.2 Startup in Easy mode

1. Set DIP switch S10/1 to "OFF".



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2. Set the unit parameters using DIP switches S10/2 to S10/6, see chapter "Description of DIP switches" / "DIP switch S10" (page 115).
3. Place the EBOX onto the ABOX and close it.
4. Switch on the 24 V supply voltage. The "24V_C" LED should now light up green.

Easy motor startup is now enabled; no further measures are required.

6.6.3 Startup of MOVIFIT® drives with constant voltage brakes

INFORMATION

- When you connect a MOVIFIT® drive with a constant voltage brake, note the specific terminal assignment for connecting the brake as specified in chapter "Terminal assignment" / "Motor terminals (page 60)".
- For notes on starting up the MOVIFIT® drive with a constant voltage brake, refer to the "MOVIFIT® Function Level Technology..." manual.

6.6.4 Advanced startup and parameter setting in Expert mode

Connecting the PC

The following figure shows the connection of a a PC/laptop to the diagnostic interface X50 of MOVIFIT®:

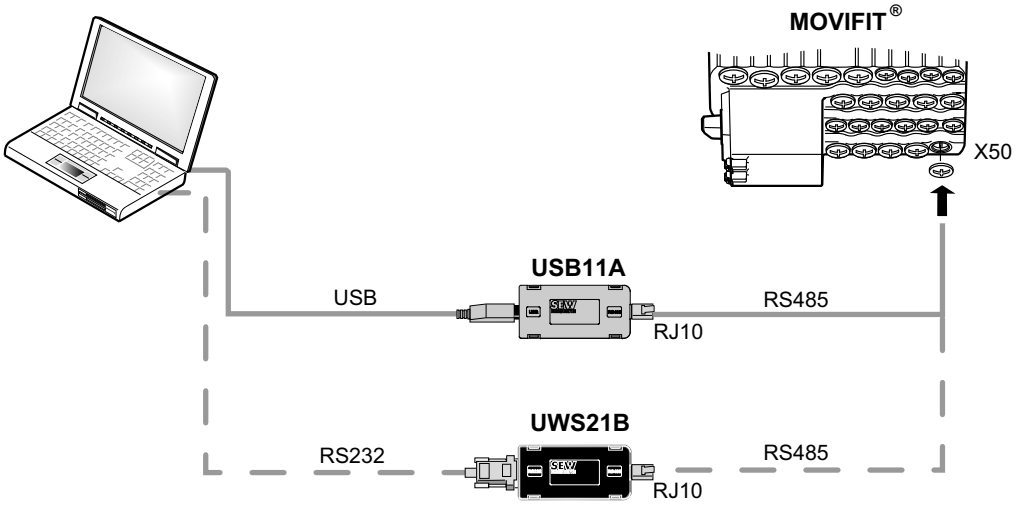
The diagnostic interface is located under the screw plug shown in the following figure.

You must remove the screw plug before plugging in the connector into the diagnostic interface.

⚠ **DANGER** Danger of burns due to hot surfaces of the MOVIFIT® or external options, e.g. braking resistor.

Severe injuries.

- Do not touch the MOVIFIT® unit and external options until they have cooled down sufficiently.



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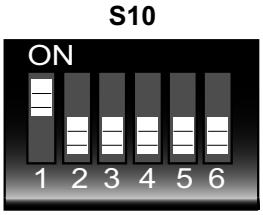
The diagnostic interface can be connected to a PC using one of the following options:

- USB11A with USB interface, part number 0 824 831 1
- UWS21B with serial interface RS232, part number 1 820 456 2

Activating Expert mode

1. Check that MOVIFIT® is properly connected.
2. Set DIP switch S10/1 to "ON".



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3. Place the EBOX onto the ABOX and close it.
4. Switch on the 24 V supply voltage. The "24V_C" LED should now light up green.

First steps with MOVITOOLS® MotionStudio

Starting the software and creating a project

Proceed as follows to start MOVITOOLS® MotionStudio and create a project:

1. Start the MOVITOOLS® MotionStudio from the Windows start menu via:

   [Start]/[Programs]/[SEW]/[MOVITOOLS MotionStudio]/[MOVITOOLS MotionStudio]
2. Create a project with name and storage location.

Establishing communication and scanning the network

Proceed as follows to establish a communication with MOVITOOLS® MotionStudio and to scan your network:

1. Set up a communication channel to communicate with your units.

   For additional information, refer to the manual "MOVIFIT® Function Level Classic.." or "MOVIFIT® Function Level Technology ..".
2. Scan your network (unit scan). To do so, click the [Start network scan] button [1] in the toolbar.

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Startup with MOVITOOLS® MotionStudio

The next steps for startup/parameter setting in Expert mode differs according to the MOVIFIT® function level selected. See the following manuals for more information:

- "MOVIFIT® Function Level "Classic" .." [1)]
- "MOVIFIT® Function Level "Technology" .." [1)]

1) The "MOVIFIT Function Level Classic" and "MOVIFIT Function Level Technology" manuals are available in several fieldbus-specific variants.

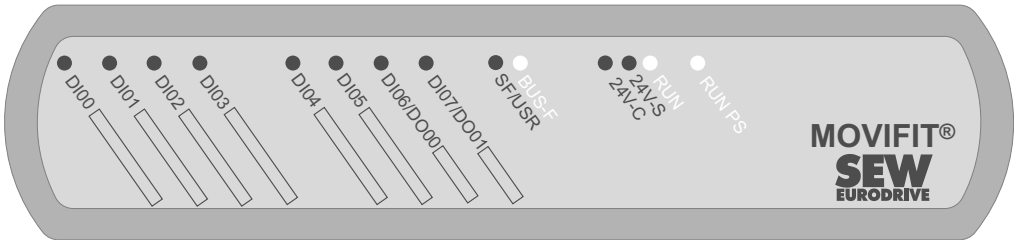
7 Operation

7.1 MOVIFIT® FC status LEDs

7.1.1 General LEDs

This chapter describes the fieldbus-independent and option-independent LEDs. These LEDs are shown as dark in the figures. The LEDs that are shown in white differ depending on which fieldbus version is used. They are described in the following sections. The following figures show examples of the PROFIBUS versions:

Function level "Classic" with PROFIBUS or DeviceNet



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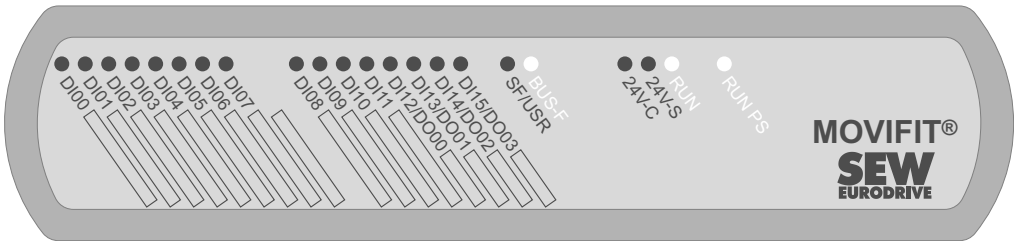
Function level "Classic" with PROFINET
Function level "Technology" with PROFIBUS, DeviceNet or PROFINET IO



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LEDs "DI.." and "DO.."

The following table shows the statuses of the "DI.." and "DO.." LEDs:

LED	State	Meaning
DI00 to DI15	**Yellow**	Input signal present at binary input DI..
	Off	Input signal at binary input DI.. open or "0".
DO00 to DO03	**Yellow**	DO.. output switched.
	Off	DO.. output logical "0"

LEDs "24V-C" and "24V-S"

The following table shows the states of the "24V-C" and "24V-S" LEDs:

LED	State	Meaning	Troubleshooting
24V-C	**Green**	24V_C continuous voltage is present.	-
	Off	24V_C continuous voltage is not present.	Check 24V_C voltage supply.
24V-S	**Green**	24V_S actuator voltage is present.	-
	Off	24V_S actuator voltage is not present.	Check 24V_S voltage supply.

LED "SF/USR"

The "SF/USR" LED indicates various statuses depending on the function level.

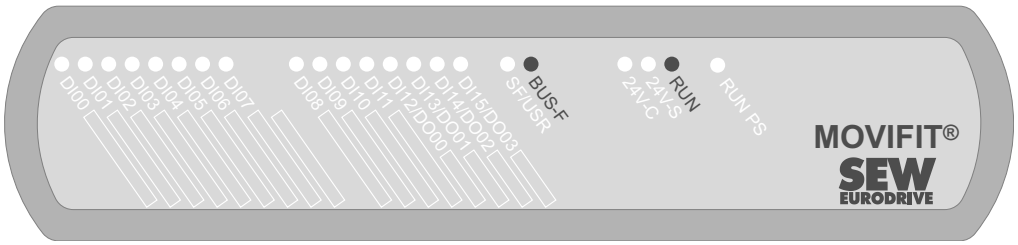
The following table shows the states of the "SF/USR" LED:

SF/USR	Function level		Meaning	Troubleshooting
	C	T		
Off	•		Standard operating state. MOVIFIT® is exchanging data with the connected drive system (integrated inverter).	-
Red	•		MOVIFIT® cannot exchange data with integrated inverter.	Check the DC 24 V supply of the integrated inverter.
Flashing red (2 s cycle)	•		MOVIFIT® initialization error or serious unit error	Incorrect card ID. Switch on MOVIFIT® again. If the fault is still present, replace the EBOX or contact SEW Service.
Flashing red	•		Other unit fault	Use MOVITOOLS® MotionStudio to read out the error status. Eliminate the cause of the fault and acknowledge this fault.
Off		•	IEC program is running.	-
Green		•	IEC program is running. The green lit LED is controlled by the IEC program.	Refer to the IEC program documentation for more information
Red		•	Boot project has not been started or has been cancelled due to an error.	Log in via MOVITOOLS® / PLC-Editor / Remote tool and start the boot project.
		•	MOVIFIT® initialization fault Wrong EBOX/ABOX combination	Incorrect card ID. Check the type of the MOVIFIT® EBOX. Use the correct EBOX on the ABOX and perform a complete startup procedure.
Flashing red		•	No IEC application program loaded.	Load an IEC application program and, if necessary, restart the integrated PLC.
Flashing yellow		•	The IEC application program has been loaded but is not executed (PLC = stop).	Check the IEC application program using MOVITOOLS® MotionStudio and, if necessary, restart the integrated PLC.
Flashing 1 x red and n x green		•	Fault status reported by the IEC program.	Refer to the IEC program documentation for more information on the statuses and the corresponding remedy

- Valid for selected function level:
  C = Function level "Classic"
  T = Function level "Technology"

7.1.2 Bus-specific LEDs for PROFIBUS

This section describes the bus-specific LEDs for PROFIBUS. In the following figure, the LEDs are shown as dark:



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"BUS-F" LED

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

BUS-F	RUN	Meaning	Troubleshooting
Off	**Green**	MOVIFIT® is exchanging data with the DP master.	-
Flashing red	**Green**	• The baud rate is detected. However, MOVIFIT® is not addressed by the DP master. • MOVIFIT® was not configured in the DP master or configured incorrectly.	• Check configuration of the DP master. • Check whether all the modules configured during project planning are permitted for the MOVIFIT® versions (MC, FC, SC).
Red	**Green**	• Connection to the DP master has failed. • MOVIFIT® does not detect baud rate. • Bus interruption • DP master not in operation	• Check the PROFIBUS-DP connection of MOVIFIT®. • Check the DP master. • Check all cables in your PROFIBUS DP network

"RUN" LED

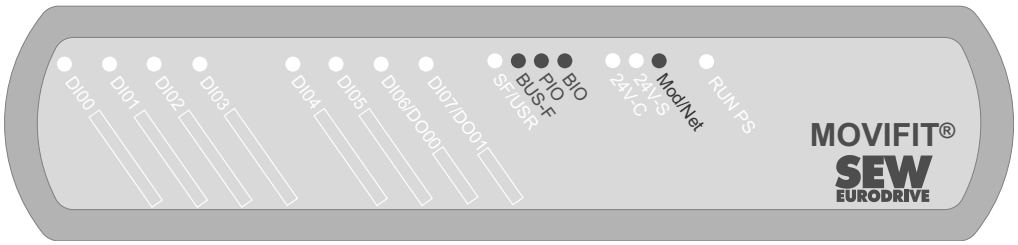
The following table shows the statuses of the "RUN" LED:

BUS-F	RUN	Meaning	Troubleshooting
X	**Off**	• MOVIFIT® not ready. • No 24 V power supply.	• Check DC 24 V supply. • Switch MOVIFIT® back on. Replace EBOX if problem occurs several times.
X	**Green**	MOVIFIT® componentshardware OK.	-
Off	**Green**	• Correct MOVIFIT® operation • MOVIFIT® is currently exchanging data with the DP master and all subordinate drive systems.	-
X	**Flashing green**	PROFIBUS address is set equal to 0 or higher than 125.	Check the PROFIBUS address set in the MOVIFIT® ABOX.
X	**Yellow**	MOVIFIT® is currently in the initialization phase.	-
X	**Red**	Internal unit error	Switch MOVIFIT® back on. Replace EBOX if problem occurs several times.

X Any state

7.1.3 Bus-specific LEDs for DeviceNet

This section describes the bus-specific LEDs for DeviceNet. In the following figure, the LEDs are shown as dark:



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"Mod/Net" LED

The function of the "Mod/Net" LED described in the following table is defined in the DeviceNet specification.

Mod/Net	Status	Meaning	Troubleshooting
Off	Not switched on / offline	• Unit is offline. • Unit is performing a DUP-MAC check. • Unit is switched off.	• Apply supply voltage via DeviceNet connector.
Flashing green (1 s cycle)	Online and in operational mode	• The unit is online and no connection has been established. • DUP-MAC check performed successfully. • A connection has not yet been established with a master. • Missing (incorrect) or incomplete configuration.	• Include the station in the master's scan list and start communication in the master.
Green	Online, operational mode and connected	• Unit is online. • Connection is active (established state).	-
Flashing red (1 s cycle)	Minor fault or connection timeout	• A correctable fault has occurred. • Polled I/O and/or bit-strobe I/O connections are in the timeout status. • A correctable error has occurred in the unit.	• Check the DeviceNet cable. • Check the timeout response (*P831*). If a response with error is set, reset the unit once the error has been corrected.
Red	Critical error or critical link failure	• An error that cannot be corrected has occurred. • BusOff status. • DUP-MAC check has detected an error.	• Check the DeviceNet cable. • Check the address (MAC ID). Is another unit already using the same address?

"PIO" LED

The "PIO" LED checks the polled I/O connection (process data channel).

The functionality is described in the following table.

PIO	Status	Meaning	Troubleshooting
Flashing green (500 ms cycle)	DUP-MAC check	• Unit is performing DUP-MAC check. • If the station does not leave this state after approx. 2 s, no other station has been found.	• Activate at least one other DeviceNet station in the network.
Off	Not switched on / Offline but no DUP-MAC check	• Unit is switched off. • Unit is in offline status.	• Switch on the unit. • Check whether the PIO connection type was activated in the master.
Flashing green (1 s cycle)	Online and in operational mode	• Unit is online. • DUP-MAC check performed successfully. • A PIO connection is being established with a master (configuring state). • Missing, incorrect or incomplete configuration.	• Check the unit configuration in the master.
Green	Online, operational mode and connected	• Unit is online. • A PIO connection has been established (established state).	-
Flashing red (1 s cycle)	Minor fault or connection timeout	• A correctable fault has occurred. • Invalid baud rate set at the DIP switches. • Polled I/O connection is in timeout status.	• Check the DeviceNet cable. • Check the positions of the DIP switches for the baud rate. • Check the timeout response (*P831*). If a response with error is set, reset the unit once the error has been corrected.
Red	Critical error or Critical link failure	• An error that cannot be corrected has occurred. • BusOff status. • DUP-MAC check has detected an error.	• Check the DeviceNet cable. • Check the address (MAC ID). Is another unit already using the same address?

"BIO" LED

The "BIO" LED checks the bit-strobe I/O connection.

The functionality is described in the following table.

BIO	Status	Meaning	Troubleshooting
Flashing green (500 ms cycle)	DUP-MAC check	• Unit is performing DUP-MAC check. • If the station does not leave this state after approx. 2 s, no other stations have been found.	• Activate at least one other DeviceNet station in the network.
Off	Not switched on / but not offline DUP-MAC check	• Unit is switched off. • Unit is in offline status.	• Switch on the unit. • Check whether the BIO connection type was activated in the master.
Flashing green (1 s cycle)	Online and in operational mode	• Unit is online. • DUP-MAC check performed successfully. • A BIO connection is being established with a master (configuring state). • Missing, incorrect or incomplete configuration.	• Check the unit configuration in the master.
Green	Online, operational mode and connected	• Unit is online. • A BIO connection has been established (established state).	-
Flashing red (1 s cycle)	Minor error or connection timeout	• A correctable fault has occurred. • Bit-strobe I/O connection is in timeout status.	• Check the DeviceNet cable. • Check the timeout response (*P831*). If a response with error is set, reset the unit once the error has been corrected.
Red	Critical error or Critical link failure	• An error that cannot be corrected has occurred. • BusOff status. • DUP-MAC check has detected an error.	• Check the DeviceNet cable. • Check the address (MAC ID). Is another unit already using the same address?

"BUS-F" LED

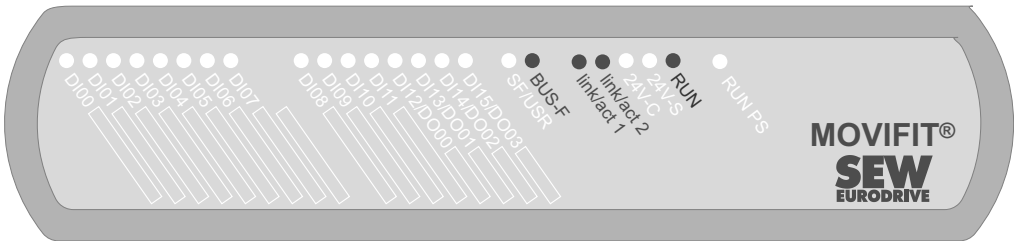
The "BUS-F" LED indicates the physical state of the bus node.

The functionality is described in the following table:

BUS-F	Status	Meaning	Troubleshooting
Off	No error	• The number of bus errors is within the normal range (error active state).	-
Flashing red (1 s cycle)	Bus warning	• The unit is performing a DUP-MAC check and cannot send any messages because no other stations are connected to the bus (error passive state).	• Activate another DeviceNet station in the network. • Check the wiring and terminating resistors.
Red	Bus error	• Bus off status. • The number of physical bus errors has increased despite switchover to error-passive state. Access to the bus is switched off.	• Check the setting for the address baud rate, wiring, and terminating resistors.
Yellow	Power off	• External voltage supply has been turned off or is not connected.	• Check the external voltage supply and wiring of the unit.

7.1.4 Bus-specific LEDs for PROFINET IO

This chapter describes the bus-specific LEDs for PROFINET IO. In the following figure, the LEDs are shown as dark:



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"RUN" LED

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

RUN	BUS-F	Meaning	Troubleshooting
Green	**X**	MOVIFIT® components hardware OK.	-
Green	**Off**	• Correct MOVIFIT® operation. • MOVIFIT® is currently exchanging data with the PROFINET master (data exchange) and all subordinate drive systems.	-
Off	**X**	• MOVIFIT® not ready. • No 24 V power supply.	Check DC 24 V supply. Switch MOVIFIT® back on. Replace EBOX if problem occurs repeatedly
Red	**X**	Error in the MOVIFIT® component hardware.	Switch MOVIFIT® back on. Replace EBOX if problem occurs repeatedly
Flashing green	**X**	MOVIFIT® components hardware does not start.	Switch MOVIFIT® back on. Replace EBOX if problem occurs repeatedly
Flashing yellow	**X**		
Yellow	**X**		

X Any state

"BUS-F" LED

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

RUN	BUS-F	Meaning	Troubleshooting
Green	**Off**	MOVIFIT® is currently exchanging data with the PROFINET master (data exchange).	-
Green	**Yellow, flashing yellow**	The STEP 7 hardware configuration contains a module that is not permitted.	Switch the STEP 7 hardware configuration to ONLINE and analyze the component status of the slots of the MOVIFIT® units.
Green	**Flashing green**, **flashing green/red**	The flashing function in the PROFINET master configuration is activated to visually localize the station.	-
Green	**Red**	• Connection to the PROFINET master has failed. • MOVIFIT® does not detect a link. • Bus interruption. • PROFINET master not in operation.	• Check the PROFINET connection of the MOVIFIT® • Check the PROFINET master. • Check all cables in your PROFINET network.

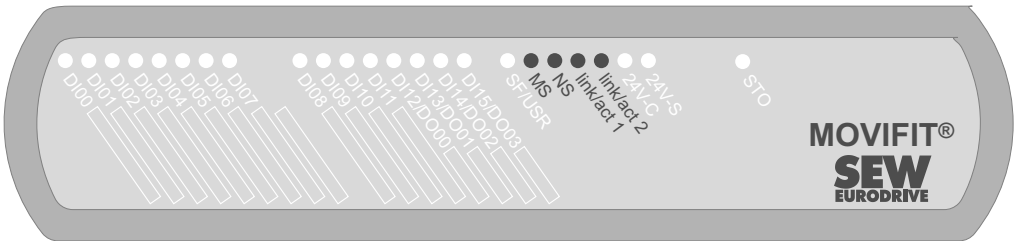
LEDs "link/act 1" and "link/act 2"

The following table lists the states of the "link/act 1" and "link/act 2" LEDs:

LED	Status	Meaning
link/act 1	Ethernet port 1 link = green act = yellow	• link = Ethernet cable connects device with other Ethernet stations. • act = active, Ethernet communication active.
link/act 2	Ethernet port 2 link = green act = yellow	

7.1.5 Bus-specific LEDs for Modbus/TCP and EtherNet/IP

This section describes the bus-specific LEDs for Modbus/TCP and EtherNet/IP. In the following figure, the LEDs are shown as dark:



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LEDs "MS" and "NS"

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

MS	NS	Meaning	Troubleshooting
Off		• MOVIFIT® not ready. • No DC 24 V supply.	• Check DC 24 V supply. • Switch MOVIFIT® back on. • Replace EBOX if problem occurs several times.
Flashing Red/green		• MOVIFIT® performs an LED test. • This status should only be activated briefly during startup.	-
Flashing red	**Red**	• Conflict detected while assigning the IP address. Another station in the network uses the same IP address.	• Check whether there is a unit in the network with the same IP address. • Change the IP address of the MOVIFIT® components • Check DHCP settings for IP address assignment of the DHCP server (only if a DHCP server is used).
Red	**X**	Error in the MOVIFIT® component hardware.	• Switch MOVIFIT® back on. • Restore MOVIFIT® factory settings. • Replace EBOX if problem occurs several times.
Flashing green	**Flashing green**	Application has been started.	-
Flashing green	**Off**	• MOVIFIT® does not have any IP parameters yet. • Starting TCP IP stack. • If the status continues and the DHCP DIP switch is activated, MOVIFIT® waits for data from the DCHP server	• Set DIP switch S11/1 of the DHCP server to "OFF". • Check the DHCP server connection (only if DHCP is activated and the status continues).
Green	**X**	MOVIFIT® components hardware OK.	-
X	**Flashing red**	• Timeout delay of the controlling connection has expired. • The state is reset by restarting communication.	• Check the bus connection on the unit MOVIFIT®. • Check the master/scanner. • Check all the cables in the Ethernet.
X	**Flashing green**	• No controlling connection.	-

MS	NS	Meaning	Troubleshooting
X	**Green**	• There is no controlling connection to a master/scanner.	-

X Any state

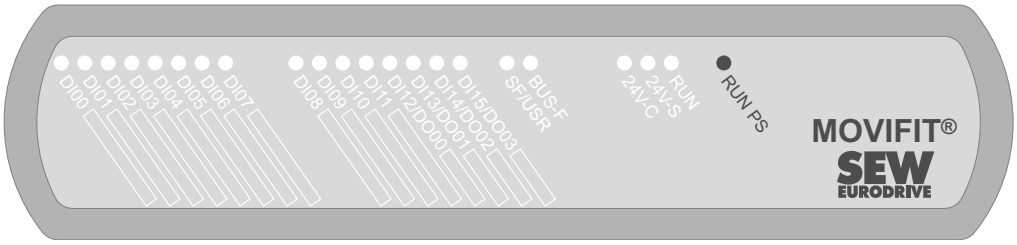
LEDs "link/act 1" and "link/act 2"

The following table lists the states of the "link/act 1" and "link/act 2" LEDs:

LED	Status	Meaning
link/act 1	Ethernet port 1 link = green act = yellow	• link = Ethernet cable connects device with other Ethernet stations. • act = active, Ethernet communication active.
link/act 2	Ethernet port 2 link = green act = yellow	

7.1.6 "RUN PS" LED (frequency inverter status LED)

The following figure shows the "RUN PS" LED (shown unlit). In the sample figure, the PROFIBUS version is shown with "Technology" function level:



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LED color	LED status	Operating state	Description
-	**Off**	Not ready for operation.	No 24 V power supply.
Yellow	**Flashes steadily**	Not ready for operation.	Self-test phase active or 24 V power supply present but supply voltage not OK.
Yellow	**Flashing steadily, fast**	Ready for operation.	Brake release without drive enable active.
Yellow	**Steady light**	Ready, but unit inhibited.	24 V power supply and supply voltage OK, but no enable signal.
Yellow	**2x flashing, break**	Ready, but manual operation without unit enable.	24 V power supply and supply voltage OK. Stop manual mode to activate automatic mode.
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.
Green	**Flashes steadily**	Ready for operation.	Standstill current function active

LED color	LED status	Operating state	Description
Red	**Steady light**	Not ready for operation.	Check 24 V supply. Make sure that there is a smoothed DC voltage with low ripple (residual ripple max. 13%) present.
			MOVIFIT® detected a non-plausible combination of DIP switch settings. Check 24V_C supply.
Red	**2x flashing, break**	Error 07	DC link voltage too high.
Red	**Flashing slowly**	Error 08	Speed monitoring error
		Error 09	Incorrect startup/parameter settings.
		Error 15	24 V supply voltage too low.
		Faults 17-24, 37	CPU error
		Error 25	EEPROM error
		Error 26	Fault at external terminal (only at slave unit)
		Error 38, 45	Unit/motor data error
		Error 90	Incorrect assignment of motor/inverter; Invalid DIP switch setting
		Error 94	Checksum error
		Error 97	Copy error
Red	**3x flashing, break**	Error 01	Overcurrent in output stage
		Error 11	Overtemperature in output stage
Red	**4x flashing, break**	Error 31	Temperature sensor tripped.
		Error 84	Motor overload
Red	**5x flashing, break**	Error 4	Overcurrent in brake chopper
		Error 89	Overtemperature in brake Incorrect assignment of motor-frequency inverter
Red	**6x flashing, break**	Error 06	Line phase failure
		Error 81	Start condition (only in hoist operation mode)
		Error 82	Open output

7.1.7 Option-specific LEDs

PROFIsafe option S11

⚠ WARNING

Observe the "MOVIFIT® MC / FC – Functional Safety" manual when using the PROFIsafe option S11.

Severe or fatal injuries.

- If you are using the PROFIsafe option S11, observe the additional notes on diagnostics and operation as well as the safety conditions specified in the "MOVIFIT® MC / FC – Functional Safety" manual.

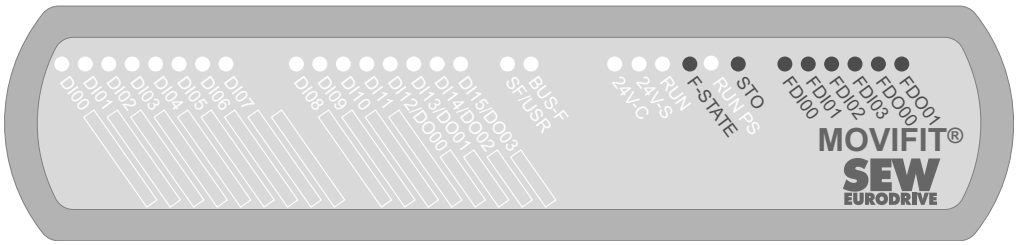
⚠ WARNING

Danger due to incorrect interpretation of the "FDI.", "FDO.", "STO" and "F-STATE" LEDs.

Severe or fatal injuries.

- The LEDs are not safety-oriented and may not be used as a safety device.

This section describes the option-specific LEDs for PROFIsafe option S11. In the following figure, these LEDs are shown as dark. In the sample figure, the PROFIBUS version is shown with "Technology" function level:



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LEDs "FDI." and "FDO."

The following table shows the statuses of the "FDI." and "FDO." LEDs:

LED	State	Meaning
FDI00	**Yellow**	HIGH level at input F-DI0
	Off	LOW level at input F-DI0 or open
FDI01	**Yellow**	HIGH level at input F-DI1
	Off	LOW level at input F-DI1 or open
FDI02	**Yellow**	HIGH level at input F-DI2
	Off	LOW level at input F-DI2 or open
FDI03	**Yellow**	HIGH level at input F-DI3
	Off	LOW level at input F-DI3 or open
FDO00	**Yellow**	Output F-DO0 active
	Off	Output F-DO0 inactive (switched off)

LED	State	Meaning
FDO01	**Yellow**	Output F-DO1 active
	Off	Output F-DO1 inactive (switched off)

"STO" LED

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

LED	State	Meaning
STO	**Yellow**	• Drive has stopped safely ("STO active").
	Off	• Drive has not stopped safely ("STO inactive").

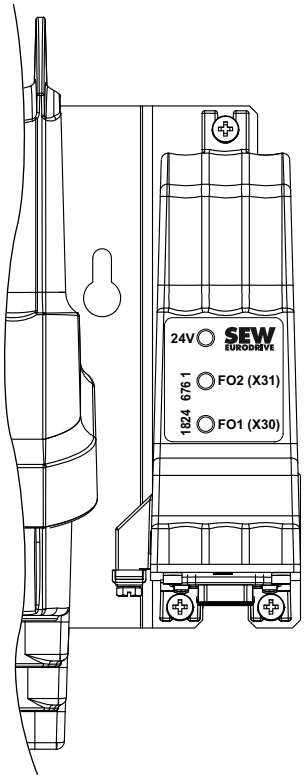
"F-STATE" LED

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

LED	State	Meaning	Troubleshooting
F-STATE	**Green**	• The S11 Option is currently performing a cyclical data exchange with the F-Host. • Standard operating state.	-
	Red	• Fault status in the safety part. • 24V_O supply voltage not available.	• Read diagnostics in F-Host. • Eliminate the cause of the fault and acknowledge in the F-Host.
	Off	• S11 option is currently in the initialization phase. • S11 option is not available or is not configured in the bus master (slot 1 is empty).	• Check voltage supply. • Check configuration of the bus master.
	Flashing red/ green	A fault occurred in the safety part; cause of the fault already remedied – acknowledgement required.	Acknowledge fault in the F-Host (reintegration).

LEDs of POF option L10

This chapter describes the status LEDs of the POF option L10:



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"24V" LED

The "24V" LED indicates the status of the 24 V supply.

LED status	Meaning	Troubleshooting
Off	24 V supply for the POF option is not available.	• Check whether MOVIFIT® is switched on. • Check the connections between MOVIFIT® and the POF option L10.
Green	24 V supply for the POF option is available.	–

"FO2" LED

The "FO2" LED indicates the status of the FO diagnostics at port 2 (X31).

LED status	Meaning	Troubleshooting
Off	POF port 2 is ok.	–
Red	Maintenance for POF port 2 required.	Perform maintenance for POF port 2, e.g. replace the POF cable.

"FO1" LED

The "FO1" LED indicates the status of the FO diagnostics at port 1 (X30).

LED status	Meaning	Troubleshooting
Off	POF port 1 is ok.	–
Red	Maintenance for POF port 1 required.	Perform maintenance for POF port 1, e.g. replace the POF cable.

7.2 Manual operation using the DBG keypad

7.2.1 Connection

MOVIFIT® units are equipped with an X50 diagnostics interface (RJ10 plug connector) for parameterization and manual operation.

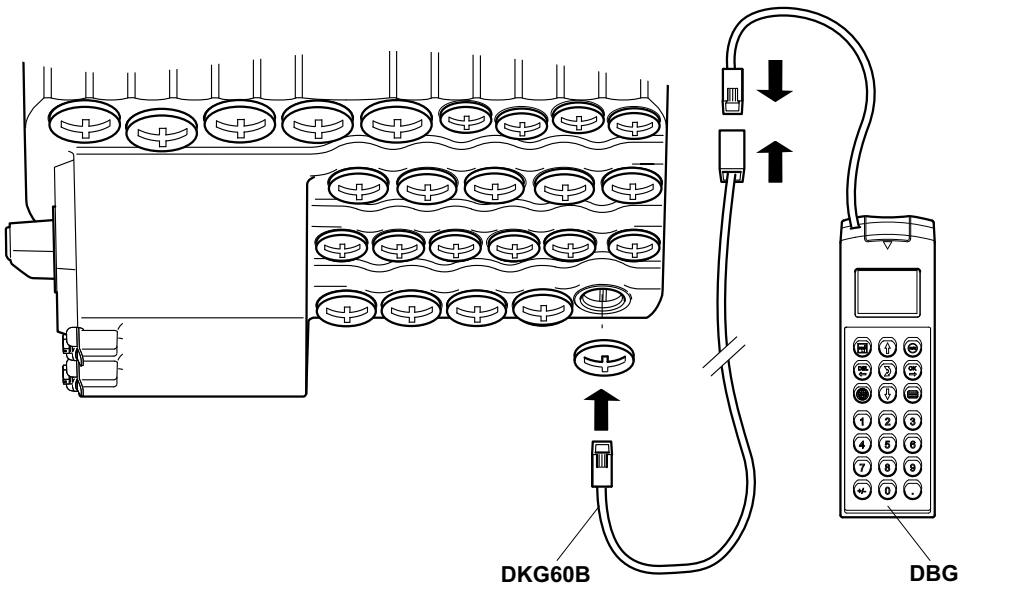
The X50 diagnostic interface is located under the screw plug shown in the following figure.

You must remove the screw plug before plugging in the connector into the diagnostic interface.

⚠ **DANGER** Danger of burns due to hot surfaces of the MOVIFIT® or external options, e.g. braking resistor.

Severe injuries.

- Do not touch the MOVIFIT® unit and external options until they have cooled down sufficiently.



You can also connect the DBG keypad to the MOVIFIT® using option DKG60B (5 m extension cable).

NOTICE Loss of the ensured degree of protection if the screw plug of the diagnostic interface X50 is not installed or not installed correctly.

Damage to the MOVIFIT® unit.

- Make sure the screw plug of the diagnostic interface has a seal and screw it in.

7.2.2 Operation

INFORMATION

For notes on operating the MOVIFIT® drive in manual operation, refer to the "MOVIFIT® Function Level 'Technology..'" or "MOVIFIT® Function Level 'Classic..'" manual.

8 Service

8.1 Unit diagnostics

INFORMATION

Depending on the function level in use, further diagnostic tools are available via MOVITOOLS® MotionStudio. These are described in the respective manuals:

- "MOVIFIT® Function Level Classic .." manual
- "MOVIFIT® Function Level Technology .." manual

These manuals are available in several, fieldbus-specific variants.

8.2 Error table

Error	Cause	Solution
Communication timeout (motor stops)	Error during communication via internal SBus	Check internal SBus connection.
DC link voltage too low, supply system off was detected (motor stops, without error code)	Supply voltage not present.	Check supply system leads, supply system voltage and 24 V electronics voltage for interruption.
	24 V electronics supply voltage not OK.	Check the 24 V electronics supply voltage. Permitted voltage: DC 24 V ± 25%, EN 61131-2. Residual ripple max. 13%.
	Motor restarts automatically as soon as the voltage reaches normal values.	
Error code 01 Overcurrent in output stage	Short circuit on inverter output	Check the connection between the inverter and the motor as well as the motor winding for short circuits. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Error code 04 Brake chopper	Overcurrent in brake output, resistor damaged, resistance too low.	Check the connection of the resistor/replace it.
Error code 06 Phase failure	Phase failure The error can only be detected when the drive is running under load.	Check the supply system cable for phase failure. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Error code 07 DC link voltage too high	Ramp time too short.	Extend the ramp time. Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Faulty connection between brake coil/braking resistor	Check the braking resistor/brake coil connection. Correct, if necessary. Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Incorrect internal resistance of brake coil/braking resistor	Check internal resistance of brake coil/braking resistor (see chapter "Technical Data"). Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Thermal overload in braking resistor → Wrong size of braking resistor selected.	Dimension the braking resistor correctly. Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Invalid voltage range of supply input voltage	Check supply input voltage for permitted voltage range. Reset the fault by switching off the DC 24 V supply voltage or using communication.

Error	Cause	Solution
Error code 08 **Speed monitoring**	Speed deviation due to operation at the current limit	Reduce the load on the drive Increase the n-monitoring delay time. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Error code 09 **Startup**	Faulty startup/parameterization (e.g. with MOVITOOLS® MotionStudio).	Repeat startup with correct settings. If this does not work (e.g. in Expert mode): • Set parameter *P802 Factory setting* to "Delivery state" once. • Switch to Easy mode once (DIP switch S10/2 = OFF). Reset the fault by switching off the DC 24 V supply voltage or using communication.
Error code 11 **Thermal overload of the output stage or internal unit error**	Ambient temperature too high.	Lower ambient temperature Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Heat build-up in the MOVIFIT®	Prevent heat build-up Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Drive load too high.	Reduce the load on the drive Reset the fault by switching off the DC 24 V supply voltage or using communication.
Error code 15 **24 V supply**	Supply voltages 24V_C and/or 24V_P are too low.	Check 24 V supply voltages 24V_C and/or 24V_P. Reset the fault by switching off the DC 24 V supply voltage or using the communication.
Error codes 17 to 24, 37 **CPU error**	CPU error	Reset the fault by switching off the DC 24 V supply voltage or using communication.
Error code 25 **EEPROM error**	Fault when accessing EEPROM	Set parameter *P802* to "Delivery state". Reset the error by switching off the DC 24 V supply voltage. Re-parameterize the unit. Consult SEW Service if the error re-occurs.
Error code 26 **External terminal**	Low signal on the terminal that was programmed with the "/External fault" function (only with SBus slave).	Remove/reset the external fault that is causing the signal at the "External fault" terminal.
Error code 38 **System software**	Unit data error	Contact SEW Service.
Error code 45 **Initialization**	Motor data error	Contact SEW Service.
Error code 47 **SBus communication**	Error during communication via internal SBus	Check voltage supply of control unit.
Error code 81 **Start condition**	The motor could not be supplied with the correct amount of current during the pre-magnetizing time.	Check connection between MOVIFIT® inverter and motor.
	2 or all output phases interrupted.	
Error code 82 **Open output**	The motor could not be supplied with the correct amount of current during the pre-magnetizing time.	Check connection between MOVIFIT® inverter and motor.
	Rated motor power too small in relation to rated inverter power.	

Error	Cause	Solution
Error code 84 **Thermal overload of motor**	Motor ambient temperature too high.	Reduce motor ambient temperature. Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Heat build-up at the motor.	Prevent heat build-up at the motor. Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Motor load too high.	Reduce the load on the motor Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Motor speed too low.	Increase speed. Reset the fault by switching off the DC 24 V supply voltage or using communication.
Error code 89 **Thermal overload of brake coil or brake coil defective, brake coil connected incorrectly**	Set ramp time is too short.	Increase the set ramp time. Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Brake inspection of motor necessary.	Brake inspection (see the motor operating instructions) Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Brake is connected incorrectly.	Check brake coil connection. Reset the fault by switching off the DC 24 V supply voltage or using communication.
	Combination of drive (brake coil) and MOVIFIT® FC frequency inverter not possible.	Check the combination of drive (brake coil) and MOVIFIT® FC frequency inverter if the error is signaled shortly after the first enable. Reset the error by switching off the DC 24 V supply voltage or via communication.
	Incorrect setting of DIP switch S10/5 for combinations of "MOVIFIT®" and "Motor with a lower power rating".	For combinations of "MOVIFIT® FC" and "motor with a lower power rating", check/correct the setting of DIP switch S10/5. Reset the error by switching off the DC 24 V supply voltage or via communication.
		Contact SEW Service
Error code 90 **Output stage detection**	Incorrect assignment of motor/inverter; invalid DIP switch setting.	Correct the DIP switch settings. Reset the error by switching off the DC 24 V supply voltage or via communication.
Error code 94 **EEPROM error**	Defective EEPROM	Contact SEW Service.
Error code 97 **Copy error**	Error during data transmission.	Repeat copying process. Restore the delivery status and re-parameterize the unit.

8.3 Inspection/maintenance

8.3.1 MOVIFIT® unit

The MOVIFIT® unit does not require maintenance. SEW-EURODRIVE does not prescribe any inspection or maintenance work for the MOVIFIT® unit.

8.3.2 Motor

The controlled motor requires regular inspection and maintenance work.

Observe the notes and instructions in chapter "Inspection/Maintenance" of the motor operating instructions.

8.3.3 Gear unit (only for gearmotors)

The gear unit of the controlled motor requires regular inspection and maintenance work.

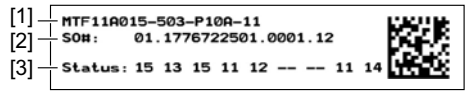
Observe the notes and instructions in chapter "Inspection/Maintenance" of the gear unit operating instructions.

8.4 SEW Electronics Service

If a fault cannot be solved, please contact the SEW-EURODRIVE Service (see the section "Address List").

Please have the following information at hand when you consult the SEW Service:

- EBOX type designation [1]
- Serial number [2]
- Digits in the status field [3]
- Brief description of the application
- Nature of the fault
- Accompanying circumstances (e.g. initial startup)
- Your own assumptions
- Any unusual events preceding the problem, etc.



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[1] EBOX type designation
[2] Serial number
[3] Status field

8.5 Shutdown

To shut down the MOVIFIT® unit, de-energize the unit using appropriate measures.

⚠ WARNING

Electric shock due to charged capacitors.

Severe or fatal injuries.

- Observe a minimum switch-off time of 1 minute after disconnecting the power supply.

8.6 Storage

Observe the following instructions when shutting down or storing MOVIFIT® units:

- If you shut down and store the MOVIFIT® unit for a longer period, you must close open cable entries and cover contacts with protective caps.
- Make sure that the unit is not subject to mechanical impact during storage.

Observe the notes on storage temperature in section "Technical Data".

8.7 Extended storage

If the unit is stored for a long time, connect it to the supply system voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

8.7.1 Procedure when maintenance has been neglected

The capacitors used in the inverters are subject to aging effects when de-energized. This effect can damage the capacitors if the unit is connected using the nominal voltage after a longer period of storage. If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. After you have completed the regeneration process, the unit can be used immediately or stored again for an extended period with maintenance.

The following stages are recommended:

AC 400/500 V units:

- Stage 1: AC 0 V to AC 350 V within a few seconds
- Stage 2: AC 350 V for 15 minutes
- Stage 3: AC 420 V for 15 minutes
- Stage 4: AC 500 V for 1 hour

8.8 Disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic components

Dispose of all components in accordance with applicable regulations!

9 Technical Data

9.1 CE marking, UL approval and C-Tick

9.1.1 CE marking

- Low voltage directive:

  The MOVIFIT® drive system complies with the regulations of Low Voltage Directive 2006/95/EC.

- Electromagnetic compatibility (EMC):

  MOVIFIT® FC units are designed for use as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided that you comply with the installation instructions, the CE marking requirements for the entire machine/system in which they are installed are satisfied on the basis of EMC Directive 2004/108/EC. For detailed information on EMC-compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

CE

The CE mark on the nameplate indicates conformity with the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.

9.1.2 UL approval

c UL us
LISTED

UL and cUL approval has been granted for the MOVIFIT® FC unit series.

9.1.3 C-Tick

C-Tick approval has been granted for the MOVIFIT® FC unit series. C-Tick certifies conformity with ACA (Australian Communications Authority) standards.

9.2 Variant with operating point 400 V / 50 Hz

MOVIFIT® type		MTF11A 003-503	MTF11A 005-503	MTF11A 007-503	MTF11A 011-503	MTF11A 015-503	MTF11A 022-503	MTF11A 030-503	MTF11A 040-503
		Size 1					Size 2		
Apparent output power at V_{line} = AC 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_{line}	AC 3 x 380 V / **400 V** / 415 V / 460 V / 500 V V_{line} = AC 380 V -10 % – AC 500 V +10 %							
Line frequency	f_{line}	50 – 60 Hz ± 10 %							
Nominal line current (with V_{line} = AC 400 V)	I_{line}	AC 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 7.3 A
Output voltage	V_O	0 – V_{line}							
Output frequency **Resolution** **Operating point**	f_A	2 – 120 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz							
Nominal output current	I_N	AC 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 8.7 A
Motor power S1	P_{Mot}	**0.37 kW** 0.5 HP	**0.55 kW** 0.75 HP	**0.75 kW** 1.0 HP	**1.1 kW** 1.5 HP	**1.5 kW** 2.0 HP	**2.2 kW** 3.0 HP	**3.0 kW** 4.0 HP	**4.0 kW** 5.2 HP
PWM frequency		4 / 8 / **16**[1] kHz **(factory setting: 16 kHz)**							
Current limitation	I_{max}	Motor and regenerative: 160 % at ⅄ and △							
External braking resistor	R_{min}	150 Ω					68 Ω		
Cable length between MOVIFIT® and motor		Max. 15 m (with SEW hybrid cable, type A)							
Hybrid cable shielding		Connect outer shield via EMC cable glands, connect inner shield via EMC shield clamps (not for ABOX with Intercontec round connector), see chapter "Installation instructions"							
Interference immunity		Meets EN 61800-3							
Interference emission		Limit value class C3 to EN 61800-3							
Motor protection		Thermistor							
Duty type		S1 (EN 60034-1), S3 max. cycle duration 10 minutes							
Cooling type (DIN 41751)		Self-cooling							
Degree of protection		Standard: IP65 in accordance with EN 60529 (MOVIFIT® housing closed and all cable entries and plug connections sealed)							
		Hygienic^{plus} variant: IP66 in accordance with EN 60529 and IP69K according to DIN 40050-9 (MOVIFIT® housing closed and all cable bushings sealed according to the relevant degree of protection)							
Ambient temperature		-25 – +40 °C (P_N derating: 3% I_N per K to max. 60 °C)							
Climate class		EN 60721-3-3, class 3K3							
Storage temperature[2]		-25 – +85 °C (EN 60721-3-3, class 3K3)							
Permissible oscillation and impact load		According to EN 50178							
Overvoltage category		III according to IEC 60664-1 (DIN VDE 0110-1)							
Pollution class		2 according to IEC 60664-1 (DIN VDE 0110-1) within the housing							
Installation altitude. **(see chapter "Electrical Installation – Installation instructions")**	h	h ≤ 1000 m: no derating h > 1000 m: I_N derating by 1% per 100 m h > 2000 m: V_{line} derating by AC 6 V per 100 m h_{max} = 4000 m							
Derating for tilted mounting positions **(see chapter "Mechanical Installation" / "Mounting position")**		S1 duty: I_N = 100 %							S1 duty: I_N = 90 %
		S3 duty: I_N = 100 %							
Mass		EBOX "MTF...-....-00" (MOVIFIT® FC) size 1: about 3.5 kg EBOX "MTF...-....-00" (MOVIFIT® FC) size 2: about 5.6 kg Standard ABOX: about 4.5 kg Hybrid ABOX: about 4.8 kg							

1) 16 kHz PWM frequency (low-noise): The unit switches to lower cycle frequencies depending on the heat sink temperature and load.

2) If the unit is stored for a long time, connect it to the supply system voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

9.3 Variant with operating point 460 V / 60 Hz

MOVIFIT® type		MTF11A 003-503	MTF11A 005-503	MTF11A 007-503	MTF11A 011-503	MTF11A 015-503	MTF11A 022-503	MTF11A 030-503	MTF11A 040-503
		Size 1					Size 2		
Apparent output power at V_{line} = AC 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	
Supply voltages **Permitted range**	V_{line}	AC 3 x 380 V / 400 V / 415 V / **460 V** / 500 V V_{line} = AC 380 V -10 % – AC 500 V +10 %							
Line frequency	f_{line}	50 – 60 Hz ± 10 %							
Nominal line current (with V_{line} = AC 400 V)	I_{line}	AC 1.1 A	AC 1.4 A	AC 1.7 A	AC 2.1 A	AC 3.0 A	AC 4.3 A	AC 5.8 A	AC 6.9 A
Output voltage	V_O	0 – V_{line}							
Output frequency **Resolution** **Operating point**	f_A	2 – 120 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz							
Nominal output current	I_N	AC 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 8.7 A
Motor power S1	P_{Mot}	**0.37 kW** 0.5 HP	**0.55 kW** 0.75 HP	**0.75 kW** 1.0 HP	**1.1 kW** 1.5 HP	**1.5 kW** 2.0 HP	**2.2 kW** 3.0 HP	**3.7 kW** 5.0 HP	**4.0 kW** 5.4 HP
PWM frequency		4 / 8 / **16**[1] kHz **(factory setting: 16 kHz)**							
Current limitation	I_{max}	Motor and regenerative: 160 % at ⅄ and △							
External braking resistor	R_{min}	150 Ω					68 Ω		
Cable length between MOVIFIT® and motor		Max. 15 m (with SEW hybrid cable, type A)							
Hybrid cable shielding		Connect outer shield via EMC cable glands, connect inner shield via EMC shield clamps (not for ABOX with Intercontec round connector), see chapter "Installation instructions"							
Interference immunity		Meets EN 61800-3							
Interference emission		Limit value class C3 to EN 61800-3							
Motor protection		Thermistor							
Duty type		S1 (EN 60034-1), S3 max. cycle duration 10 minutes							
Cooling type (DIN 41751)		Self-cooling							
Degree of protection		Standard: IP65 in accordance with EN 60529 (MOVIFIT® housing closed and all cable entries and plug connections sealed)							
		Hygienic^{plus} variant: IP66 in accordance with EN 60529 and IP69K according to DIN 40050-9 (MOVIFIT® housing closed and all cable bushings sealed according to the relevant degree of protection)							
Ambient temperature		-25 – +40 °C (P_N derating: 3 % I_N per K to max. 60 °C)							
Climate class		EN 60721-3-3, class 3K3							
Storage temperature[2]		-25 – +85 °C (EN 60721-3-3, class 3K3)							
Permissible oscillation and impact load		According to EN 50178							
Overvoltage category		III according to IEC 60664-1 (DIN VDE 0110-1)							
Pollution class		2 according to IEC 60664-1 (DIN VDE 0110-1) within the housing							
Installation altitude (see chapter "Electrical Installation – Installation instructions")	h	h ≤ 1000 m: no derating h > 1000 m: I_N derating by 1% per 100 m h > 2000 m: V_{line} derating by AC 6 V per 100 m h_{max} = 4000 m							
Derating for tilted mounting positions (see chapter "Mechanical Installation" / "Mounting position")		S1 duty: I_N = 100 %							S1 duty: I_N = 90 %
		S3 duty: I_N = 100 %							
Mass		EBOX "MTF...-....-00" (MOVIFIT® FC) size 1: about 3.5 kg EBOX "MTF...-....-00" (MOVIFIT® FC) size 2: about 5.6 kg Standard ABOX: about 4.5 kg Hybrid ABOX: about 4.8 kg							

1) 16 kHz PWM frequency (low-noise): The unit switches to lower cycle frequencies depending on the heat sink temperature and load.

2) If the unit is stored for a long time, connect it to the supply system voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.

9.4 Electronics data

General electronics data	
Electronics and sensor supply 24V_C (continous)	V_{IN} = DC 24 V -15% / +20% according to EN 61131-2 Current consumption: I_E ≤ 500 mA, typically 200 mA (for MOVIFIT® electronics) • Plus up to 1500 mA (for sensor supply depending on the number and type of sensors) • Plus up to 2000 mA (4 with 500 mA each or 1 sensor supply [1]) • Plus up to 250 mA, (for inverter electronics) [1]
Actuator supply 24V_S (switched)	V_{IN} = DC 24 V -15% / +20% according to EN 61131-2 I_E ≤ 2000 mA (4 outputs with 500 mA or 1 sensor supply – group 4 with 500 mA)
Inverter supply 24V_P	V_{IN} = DC 24 V -15% / +20% according to EN 61131-2 I_E ≤ 250 mA, typically 180 mA
Option supply 24V_O **Own consumption** **Total current consumption**	V_{IN} = DC 24 V -15% / +20% according to EN 61131-2 I_E ≤ 250 mA Own consumption + output current FDO00 + FDO01 + STO + F sensor supply
Electrical isolation	Separate potentials for: • Fieldbus connection (X30, X31) potential-free • SBUS connection (X35/1-3) potential-free • 24V_C for MOVIFIT® electronics, diagnostics interface (X50) and digital inputs (DI..) - group I to III • 24V_S for binary outputs (DO..) and binary inputs (DI..) – group IV • 24V_P for integrated frequency inverters • Isolation between safety electronics (24V_O) and all other supply voltages
Shielding of bus cables	Apply using EMC metal cable glands or EMC shield clamps (see chapter "Installation instructions")

1) If 24V_S and 24V_P are supplied via 24V_C, these currents must be added up!

9.5 Binary inputs

Binary inputs	Function level "Classic" with PROFIBUS or DeviceNet	Function level "Technology" with PROFIBUS or DeviceNet Function level "Classic" or "Technology" with PROFINET, EtherNet/IP, or Modbus/TCP
Number of inputs	6 – 8	12 – 16
Input type	PLC-compatible according to EN 61131-2 (digital inputs type 1) R_i about 4 kΩ, sampling cycle ≤ 5 ms Signal level: +15 V – +30 V "1" = contact closed -3 V – +5 V "0" = contact open	
Number of simultaneously controllable inputs	8	16 at 24 V 8 at 28.8 V
Sensor supply (4 groups) **Rated current** **Permitted total current** **Internal voltage drop**	DC 24 V to EN 61131-2, interference voltage proof and short circuit proof 500 mA per group 2 A / 1 A at ambient temperatures above 30 °C Max. 2 V	
Potential reference	Group III → 24V_C Group IV → 24V_S	

9.6 Binary outputs DO00 – DO03

Binary outputs	Function level "Classic" with PROFIBUS or DeviceNet	Function level "Technology" with PROFIBUS or DeviceNet Function level "Classic" or "Technology" with PROFINET, EtherNet/IP, or Modbus/TCP
Number of outputs	0 – 2	0 – 4
Output type **Rated current** **Permitted total current** **Leakage current** **Internal voltage drop**	PLC-compatible to EN 61131-2, interference voltage proof and short-circuit proof 500 mA 2 A / 1 A at ambient temperatures above 30 °C Max. 0.2 mA Max. 2 V	
Potential reference	24V_S	

9.7 Binary output DB00

Binary output	
Output type **Rated current** **Leakage current** **Internal voltage drop**	PLC-compatible to EN 61131-2, interference voltage proof and short-circuit proof 150 mA Max. 0.2 mA Max. 2 V
Potential reference	24V_C

9.8 Interfaces

9.8.1 SBus interface

SBus	
SBus interface **(not with function level "Classic")**	Interface to other SBUS-capable SEW units CAN bus to CAN specification 2.0, parts A and B
Connection technology	Terminals M12
Transmission technology	ISO 11898 compliant
Bus termination	120 Ω terminating resistor, can be activated using DIP switch S3.

9.8.2 RS485 interface

RS485	
RS485 interface	Diagnostic interface, not electrically isolated from MOVIFIT® electronics
Connection technology	RJ10 socket

9.8.3 Fieldbus interfaces

One of the following protocols can be used for communication depending on the EBOX and ABOX variants:

PROFIBUS interface

PROFIBUS		
Function level	**Classic**	**Technology**
PROFIBUS protocol option	PROFIBUS-DP/DPV1	
Supported baud rates	9.6 kBd – 1.5 MBd / 3 – 12 MBd (with automatic detection)	
Bus termination	Can be activated via DIP switch S1	
Maximum line length		
9.6 kBd:	1200 m	
19.2 kBd:	1200 m	
93.75 kBd:	1200 m	
187.5 kBd:	1000 m	
500 kBd:	400 m	
1.5 MBd:	200 m	
12 MBd:	100 m To extend the length, several segments can be coupled using repeaters. The max. expansion/cascading depth can be found in the manuals for the DP Master or the repeater modules.	
Address setting	Addresses 1 to 125 can be set using DIP switches in the connection box.	
DP ID number	Classic $600A_{hex}$ (24586_{dec})	Technology $600B_{hex}$ (24587_{dec})
GSD file name	Classic `SEW_600A.GSD`	Technology `SEW_600B.GSD`
Bitmap file name	Classic `SEW600AN.BMP SEW600AS.BMP`	Technology `SEW600BN.BMP SEW600BS.BMP`

PROFINET IO interface

PROFINET		
Function level	**Classic**	**Technology**
PROFINET protocol option	PROFINET IO RT	
Supported baud rates	100 Mbit/s (full duplex)	
SEW ID number	$010A_{hex}$	
Device ID number	2	
Connection technology	M12, RJ45 (push-pull) and RJ45 plug connector (in ABOX)	
Integrated switch	Supports auto-crossing, auto-negotiation	
Permitted cable types	Category 5 and higher, class D according to IEC 11801	
Maximum line length (from switch to switch)	100 m according to IEEE 802.3	
GSD file name	`GSDML-V2.2-SEW-MTX-yyyymmdd.xml`	`GSDML-V2.1-SEW-MTX-yyyymmdd.xml`
Bitmap file name	`SEW-MTX-Classic.bmp`	`SEW-MTX-Technology.bmp`

POF option L10

Option	POF option L10
Function	Interface adapter
Input voltage	DC 24 V ±25 % (supplied by the ABOX from 24_C)
Current consumption	Typically 150 mA Max. 300 mA
Optical interfaces	X30 and X31 Transmission according to IEEE 802-3 Ethernet 100BASE-TX full duplex and Ethernet 100BASE-FX
Maximum segment length	50 m distance between MOVIFIT® units
Degree of protection	IP65
Ambient temperature	-25 – +50 °C
Storage temperature	-25 – +85 °C

EtherNet/IP interface

EtherNet/IP	
Function level	**Technology**
Automatic baud rate detection	10 MBd / 100 MBd
Connection technology	M12, RJ45 (push-pull) and RJ45 plug connector (in ABOX)
Integrated switch	Supports auto-crossing, auto-negotiation
Maximum line length	100 m according to IEEE 802.3
Addressing	4 byte IP address or MAC ID (00-0F-69-xx-xx-xx) configurable via DHCP server or MOVITOOLS® MotionStudio version 5.5 and higher, Default address 192.168.10.4 (depending on S11 DIP switch setting)
Manufacturer ID (vendor ID)	$013B_{hex}$
Name of EDS files	`SEW_MOVIFIT_TECH_ENIP.eds`
Name of icon files	`SEW_MOVIFIT_TECH_ENIP.ico`

Modbus/TCP interface

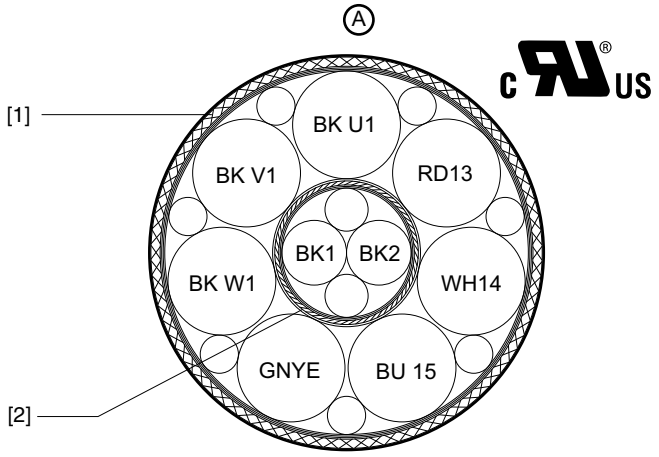
Modbus/TCP	
Function level	**Technology**
Automatic baud rate detection	10 MBd / 100 MBd
Connection technology	M12, RJ45 (push-pull) and RJ45 plug connector (in ABOX)
Integrated switch	Supports auto-crossing, auto-negotiation
Maximum line length	100 m according to IEEE 802.3
Addressing	4 byte IP address or MAC ID (00-0F-69-xx-xx-xx) configurable via DHCP server or MOVITOOLS® MotionStudio version 5.5 and higher, Default address 192.168.10.4 (depending on S11 DIP switch setting)
Manufacturer ID (vendor ID)	$013B_{hex}$
Supported services	FC3, FC16, FC23, FC43

DeviceNet interface

DeviceNet interface		
Function level	**Classic**	**Technology**
Protocol variant	Master-slave connection set with polled I/O and bit-strobe I/O	
Supported baud rates	500 kBd 250 kBd 125 kBd	
DeviceNet cable length 500 kBd 250 kBd 125 kBd	See DeviceNet specification V 2.0 100 m 250 m 500 m	
Bus termination	120 Ω (switch on externally)	
Process data configuration	See "MOVIFIT® Classic .. function level" manual	See "MOVIFIT® Technology .. function level" manual
Bit-strobe response	Checkback signal of the unit status via bit-strobe I/O data	
Address setting	DIP switch	
Name of EDS files	`SEW_MOVIFIT_Classic.eds`	`SEW_MOVIFIT_TECH_DNET.eds`
Name of icon files	`SEW_MOVIFIT_Classic.ico`	`SEW_MOVIFIT_TECH_DNET.ico`

9.9 Hybrid cables – cable type "A"

9.9.1 Mechanical design



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[1] Overall shield
[2] Shield

Cable type	**A** 817 953 0
• Supply cores:	7 x 1.5 mm^2
• Control core pair:	2 x 0.75 mm^2
• Conductor insulation:	TPE-E (polyester)
• Conductor:	Bare E-Cu strand, extra fine wires with individual wire 0.1 mm
• Shield:	Made of tinned E-Cu wire
• Overall diameter:	Max. 15.9 mm
• Color of outer cable sheath:	Black
• Cable sheath insulation:	TPE-U (polyurethane)

9.9.2 Electrical properties

• Conductor resistance for 1.5 mm^2 (at 20 °C):	Max. 13 Ω/km
• Conductor resistance for 0.75 mm^2 (at 20 °C):	Max. 26 Ω/km
• Operating voltage for 1.5 mm^2 core:	Max. 600 V according to c UL us
• Operating voltage for 0.75 mm^2 core:	Max. 600 V according to c UL us
• Insulation resistance at 20 °C:	Min. 20 MΩ x km

9.9.3 Mechanical properties

- Suitable for cable carriers
  - Bending cycles > 2.5 million
  - Travel speed ≤ 3 m/s
- Bending radius in the cable carrier: 10 x diameter
  for fixed routing: 5 x diameter
- Torsional strength (e.g. rotary table applications)
  - Torsion ±180° for a cable length of > 1 m
  - Torsional cycles > 100.000

INFORMATION

You will have to check the mechanical marginal conditions if you encounter reversed bending and high torsional load for a length of < 3 m. Please contact SEW-EURODRIVE in such cases.

9.9.4 Thermal properties

- Processing and operation: –30 °C – +90 °C (load capacity according to DIN VDE 0298-4)
  –30 °C – +80 °C according to c UL us
- Transport and storage: –40 °C – +90 °C (load capacity according to DIN VDE 0298-4)
  –30 °C – +80 °C according to c UL us
- Flame-retardant according to UL1581 Vertical Wiring Flame Test (VW-1)
- Flame-retardant according to CSA C22.2 Vertical Flame Test (FT-1)

9.9.5 Chemical properties

- Oil-resistant according to DIN VDE 0472 part 803 method B
- General fuel resistance (such as diesel, gasoline) according to DIN ISO 6722 parts 1 and 2
- General resistance to acids, alkalis, cleaning agents
- General resistance against dusts (e.g. bauxite, magnesite)
- Insulation and cable jacket material is halogen free according to DIN VDE 0472 part 815
- Within the specified temperature range, free from substances interfering with wetting agents (silicone-free)

9.10 Braking torques

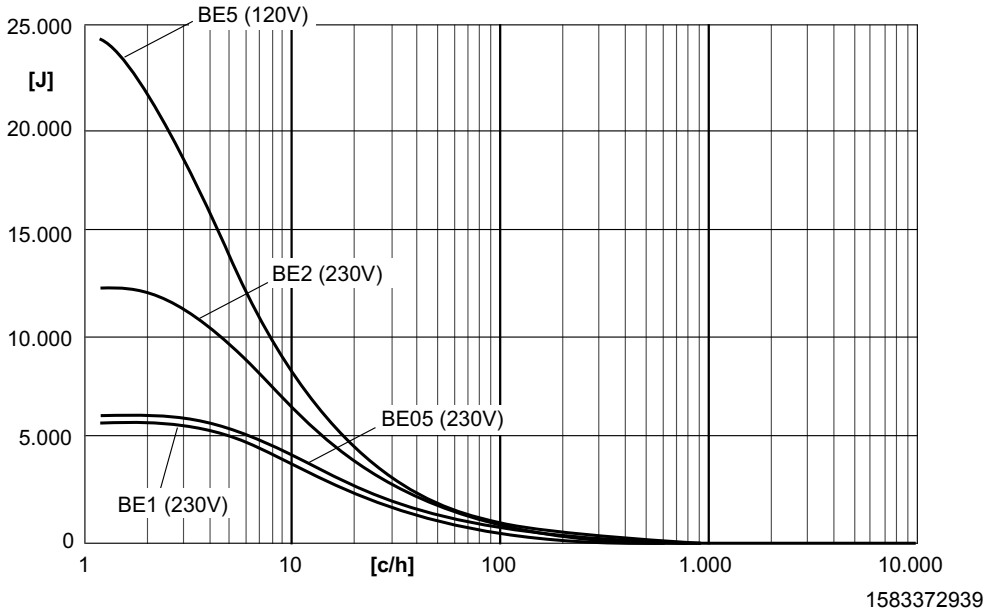
The following table shows the technical data of the brakes. The type and number of brake springs determines the level of the braking torque. Maximum braking torque $M_{B\ max}$ is installed as standard, unless specified otherwise in the order. Other brake spring combinations can produce the reduced braking torque values $M_{B\ red}$.

Brake Type	For motor size	$M_{B\ max}$ [Nm]	Reduced braking torques $M_{B\ red}$ [Nm]						
BMG02	**DT56**	1.2	0.8						
BR03	**DR63**	3.2	2.4	1.6	0.8				
BMG05	**DT71 / DT80**	5.0	4	2.5	1.6	1.2			
BMG1	**DT80**	10	7.5	6					
BMG2	**DT90 / DV100**	20	16	10	6.6	5			
BMG4	**DV100**	40	30	24					
BMG8	**DV112M**	55	45	37	30	19	12.6	9.5	
	DV132S	75	55	45	37	30	19	12.6	9.5
BE05	**DRS71S4**	5.0	3.5	2.5	1.8				
BE1	**DRS71M4 – DRP90M4**	10	7.0	5.0					
BE2	**DRS80M4 – DRP100M4**	20	14	10	7.0				
BE5	**DRS90L4 – DRS112M4** **DRE100M4 – DRE132S4** **DRP100L4 – DRP112M4**	55	40	28	20				
BE11	**DRS132S4**	110	80	55	40				

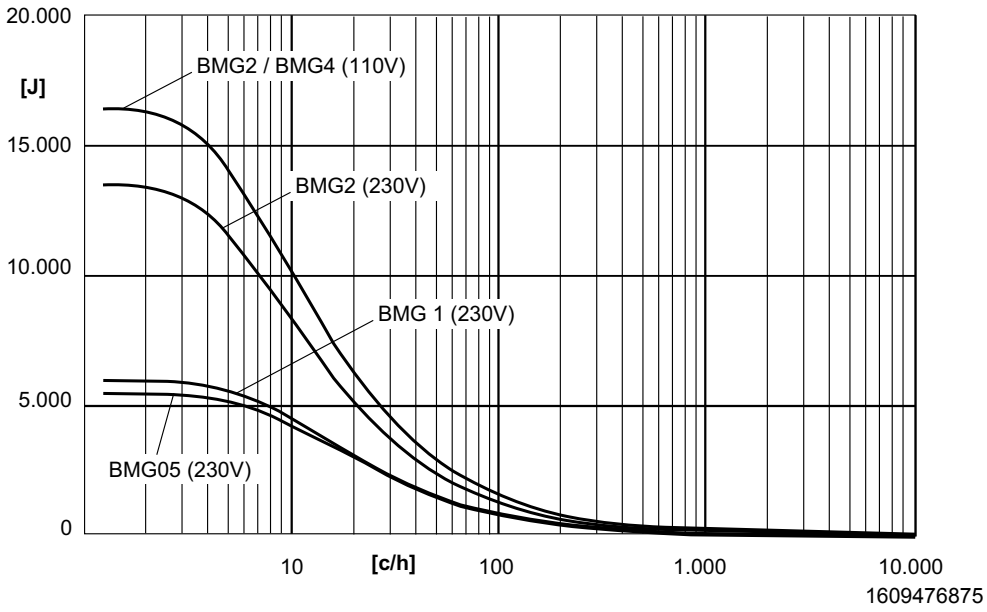
$M_{B\ max}$ Maximum braking torque $M_{B\ red}$ Reduced braking torque

9.11 4Q operation for motors with mechanical brake

- The brake coil can be used as a braking resistor in 4-Q operation.
- Brake voltage is generated internally within the unit, which means it is grid-independent.
- The following figures show the regenerative load capacities of the internal brake coils. If the regenerative load capacity is not sufficient for the application, connect an additional braking resistor (see the following chapter).
- The following figure shows the load capacity of the DR motor brake coils:

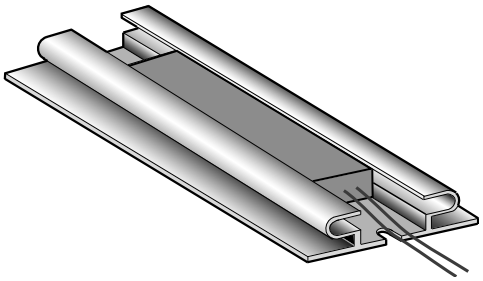


- The following figure shows the load capacity of the DT/DV motor brake coils:



9.12 Internal braking resistors

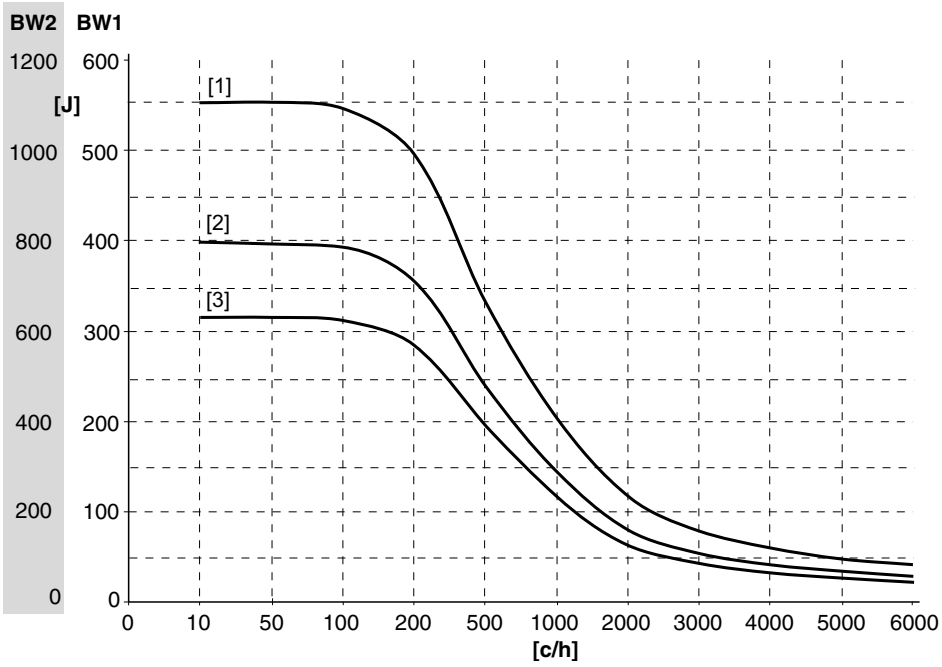
9.12.1 Assignment



839084939

MOVIFIT® type	Braking resistor	Part number
MFT11A003... to MFT11A015...	BW1T	1820 705 7
MFT11A022... to MFT11A040...	BW2T	1820 754 5

9.12.2 Regenerative load capacity



839089035

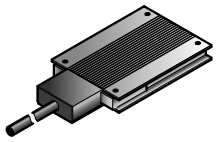
[c/h] cycles per hour
[1] Brake ramp 10 s
[2] Brake ramp 4 s
[3] Brake ramp 0.2 s

9.13 External braking resistors

9.13.1 Assignment

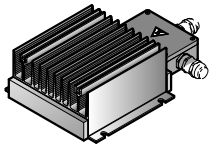
MOVIFIT® type	Braking resistor	Part number	Protective grid
MFT11A003... to MFT11A015...	BW200-003/K-1.5	0 828 291 9	0 813 152 X
	BW200-005/K-1.5	0 828 283 8	-
	BW150-006-T	1 796 956 5	-
MFT11A022... to MFT11A040...	BW100-003/K-1.5	0 828 293 5	0 813 152 X
	BW100-005/K-1.5	0 828 286 2	-
	BW068-006-T	1 797 000 8	-
	BW068-012-T	1 797 001 6	-

9.13.2 BW100... BW200...



	BW100-003/ K-1.5	BW100-005/ K-1.5	BW200-003/ K-1.5	BW200-005/ K-1.5
Part number	0 828 293 5	0 828 286 2	0 828 291 9	0 828 283 8
Function	Dissipating the regenerative energy			
Degree of protection	IP65			
Resistance	100 Ω	100 Ω	200 Ω	200 Ω
Power in S1, 100% cdf	100 W	200 W	100 W	200 W
Dimensions W x H x D	146 x 15 x 80 mm	152 x 15 x 80 mm	146 x 15 x 80 mm	152 x 15 x 80 mm
Cable length	1.5 m			

9.13.3 BW150..., BW068...



	BW150-006-T	BW68-006-T	BW68-012-T
Part number	1 796 956 5	1 797 000 8	1 797 001 6
Function	Dissipating the regenerative energy		
Degree of protection	IP66		
Resistance	150 Ω	68 Ω	68 Ω
Power rating according to UL in S1, 100% cdf	600 W	600 W	1200 W
Dimensions W x H x D	285 x 75 x 174 mm	285 x 75 x 174 mm	635 x 75 x 174 mm

9.14 Hygienic^{plus} variant:

9.14.1 Properties of sealing materials and surfaces

Sealing material property

EPDM is the standard sealing material for the Hygienic^{plus} version. The following table shows a selection of EPDM properties. Take this information into account when planning your system.

Property	EPDM stability
Alkali resistance	Very good
Resistance to aging	Very good
Ammonia (no water)	Very good
Ethanol	Very good
Gasoline resistance	low
Vapor	up to 130 °C
Hot water	Very good
Lye	Very good
Carbonic acid	Very good
Methanol	Very good
Sodium chloride	Very good
Oil (vegetable, ethereal)	good to medium
Oil and grease resistance	low
Ozone resistance	Very good
Phosphoric acid (50%)	Very good
Nitric acid (40%)	good
Hydrochloric acid (38 %)	Very good
Acid resistance	Very good
Sulfuric acid (30 %)	Very good
Silicone oils and greases	Very good
Drinking water	Very good
Suds (laundry detergent)	Very good
Sugar (watery)	Very good
Permitted temperature range	-25 – +150 °C

INFORMATION

The low rated stability of EPDM in case of contact with mineral oils, gasoline, grease etc. results from the fact that EPDM swells when it comes into contact with these materials. However, these chemicals do not destroy EPDM.

Surface properties

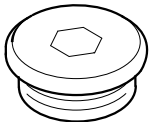
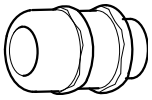
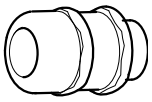
- Advanced antistick surface properties
- Surface roughness
  - R_a < 1.6 to 2
- Resistance to acidic and alkaline cleaning agents
  - Sulfuric acid (10 %)
  - Caustic soda (10%)

  Do not mix cleaning and disinfecting agents under any circumstances!

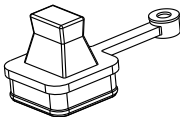
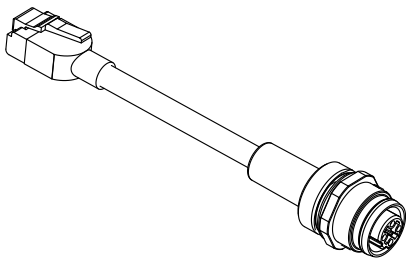
  Never mix acids and chloralkalis, as poisonous chlorine gas will result.

  Strictly observe the safety instructions of the cleaning agent manufacturer.
- Resistance to materials at the place of installation
  - Grease
  - Mineral oils
  - Edible oils
  - Gasoline
  - Alcohol
  - Solvent
- Resilient against shock and impact load
- Impact-resistant
- Resistant to temperature change
  - -25 – 60 °C
  - Increased temperature for cleaning processes: 80 ˚C
- Water jet resistant
  - Approx. 100 l/min
- Steam cleaning (according to DIN 40050 part 9)
  - Max. 80 – 100 bar (approx. 15 l/min)
  - Max. 80 °C (30 seconds)
- Light resistant
  - Direct sunlight

9.14.2 Optional metal cable glands and protective caps

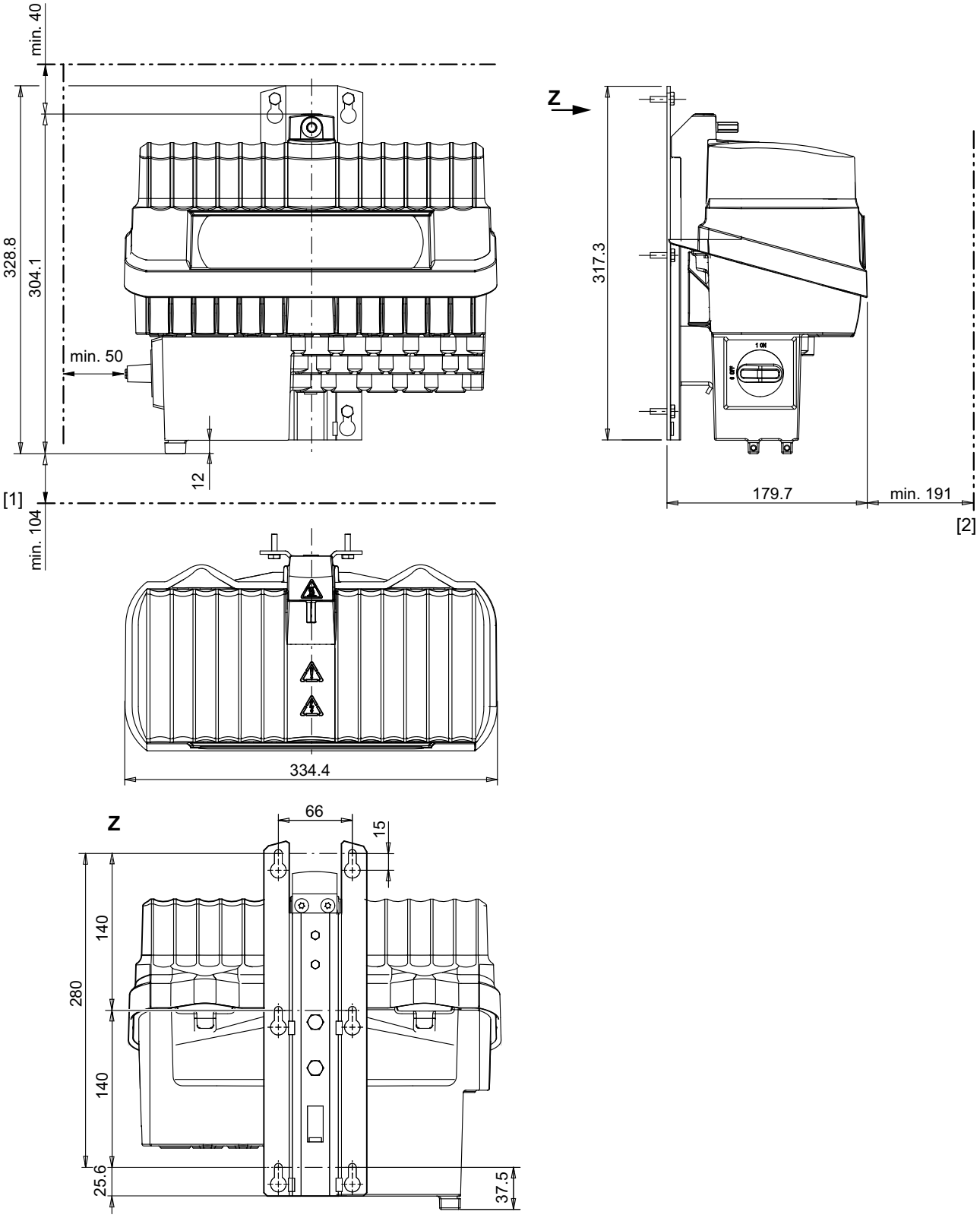
Type	Degree of protection	Figure	Content	Size	Part number
Stainless steel screw plugs	IP69K		10 pcs	M16 x 1.5	1820 223 3
			10 pcs	M20 x 1.5	1820 224 1
			10 pcs	M25 x 1.5	1820 226 8
EMC cable gland (brass, nickel plated)	IP66		10 pcs	M16 x 1.5	1820 478 3
			10 pcs	M20 x 1.5	1820 479 1
			10 pcs	M25 x 1.5	1820 480 5
EMC cable gland (stainless steel)	IP69K		10 pcs	M16 x 1.5	1821 636 6
			10 pcs	M20 x 1.5	1821 637 4
			10 pcs	M25 x 1.5	1821 638 2

9.15 Options and accessories

Type	Figure	Content	Part number
Ethernet closing plug for push-pull RJ45 socket		10 pcs	1822 370 2
		30 pcs	1822 371 0
RJ45-M12 Ethernet adapter RJ45 (internal) M12 (external) 2 required for each unit.		1 pc	1328 168 2

9.16 Dimension drawings

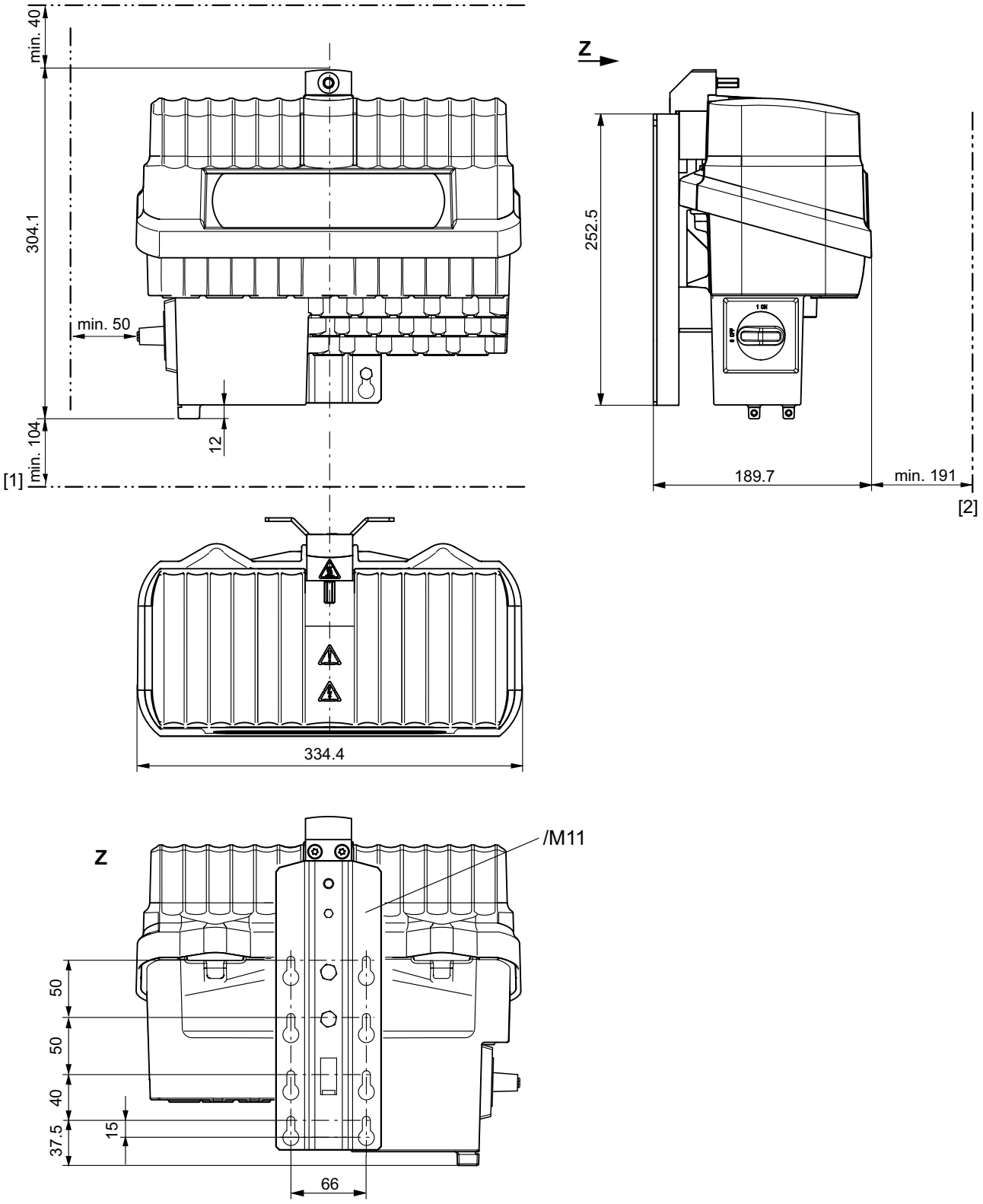
9.16.1 MOVIFIT® FC, (0.37 – 1.5 kW) with standard mounting rail



18014399348645003

[1] The clearance of 104 mm below is only necessary for ABOXes with round connector (Intercontec) motor output pointing downward.
[2] The clearance of 191 mm at the front is only necessary for ABOXes with round connector (Intercontec) motor output pointing forward.

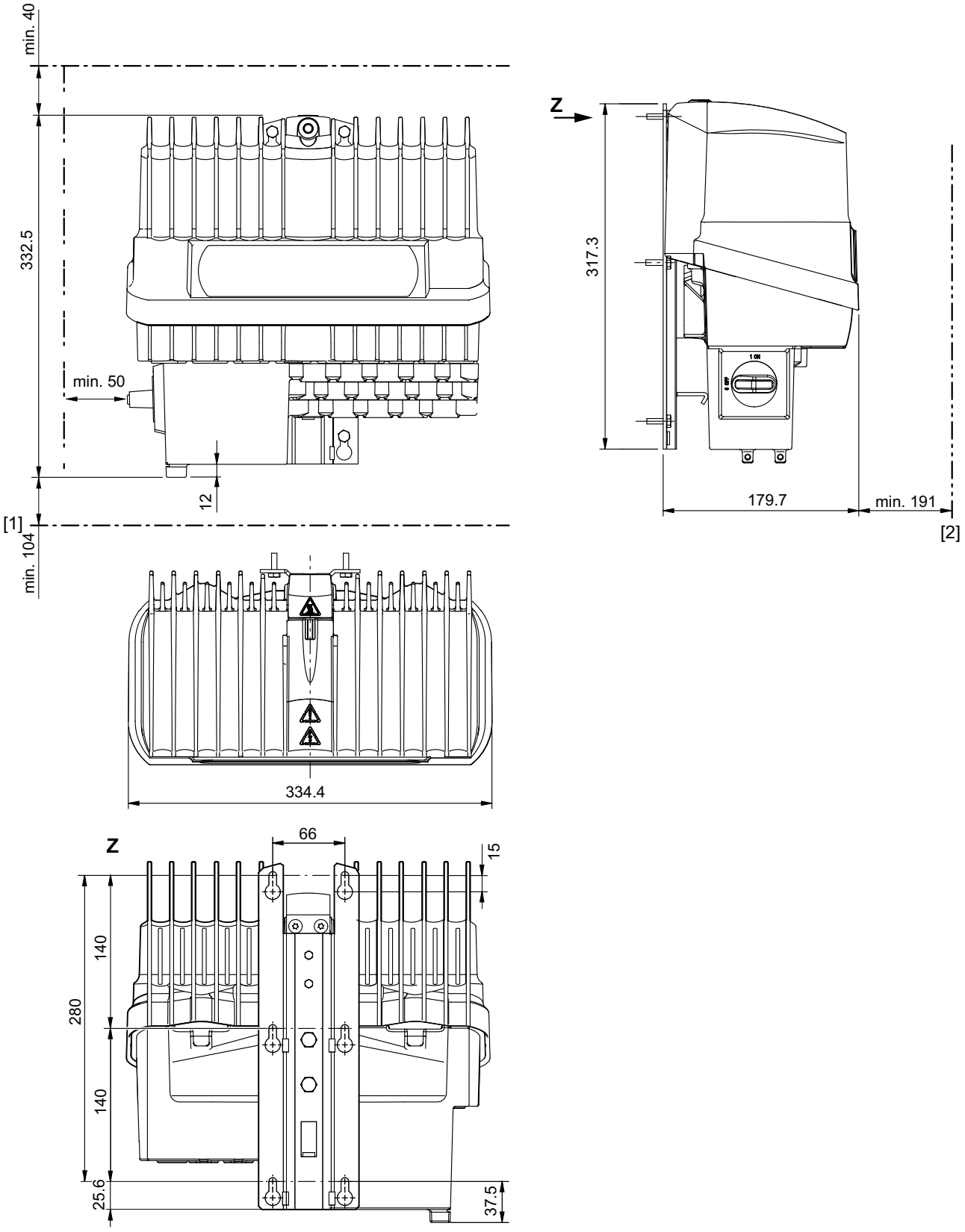
9.16.2 MOVIFIT® FC, (0.37 – 1.5 kW) with optional stainless steel mounting rail /M11



3665756811

[1] The clearance of 104 mm below is only necessary for ABOXes with round connector (Intercontec) motor output pointing downward.
[2] The clearance of 191 mm at the front is only necessary for ABOXes with round connector (Intercontec) motor output pointing forward.

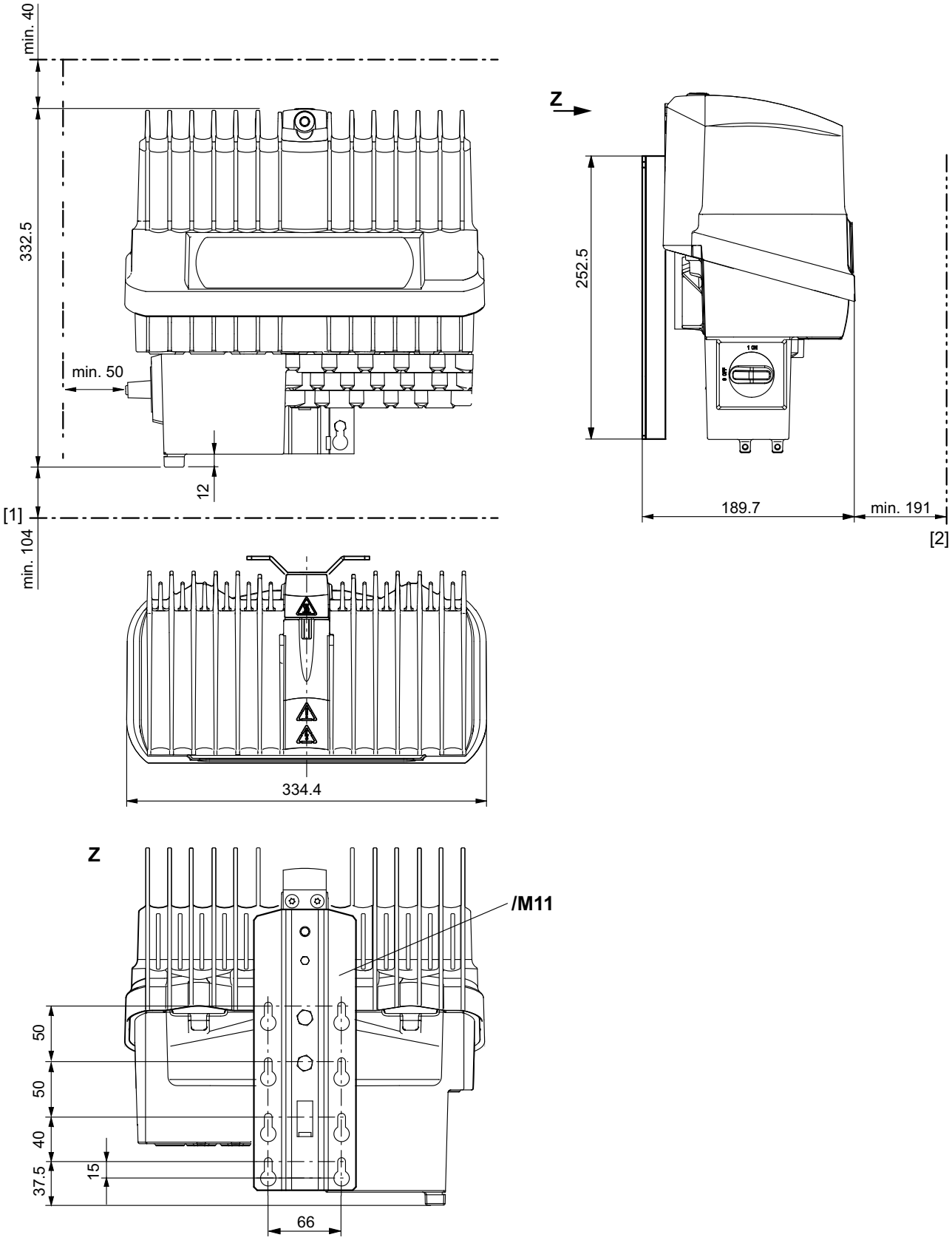
9.16.3 MOVIFIT® FC, (2.2 – 4 kW) with standard mounting rail



18014399348649355

[1] The clearance of 104 mm below is only necessary for ABOXes with round connector (Intercontec) motor output pointing downward.
[2] The clearance of 191 mm at the front is only necessary for ABOXes with round connector (Intercontec) motor output pointing forward.

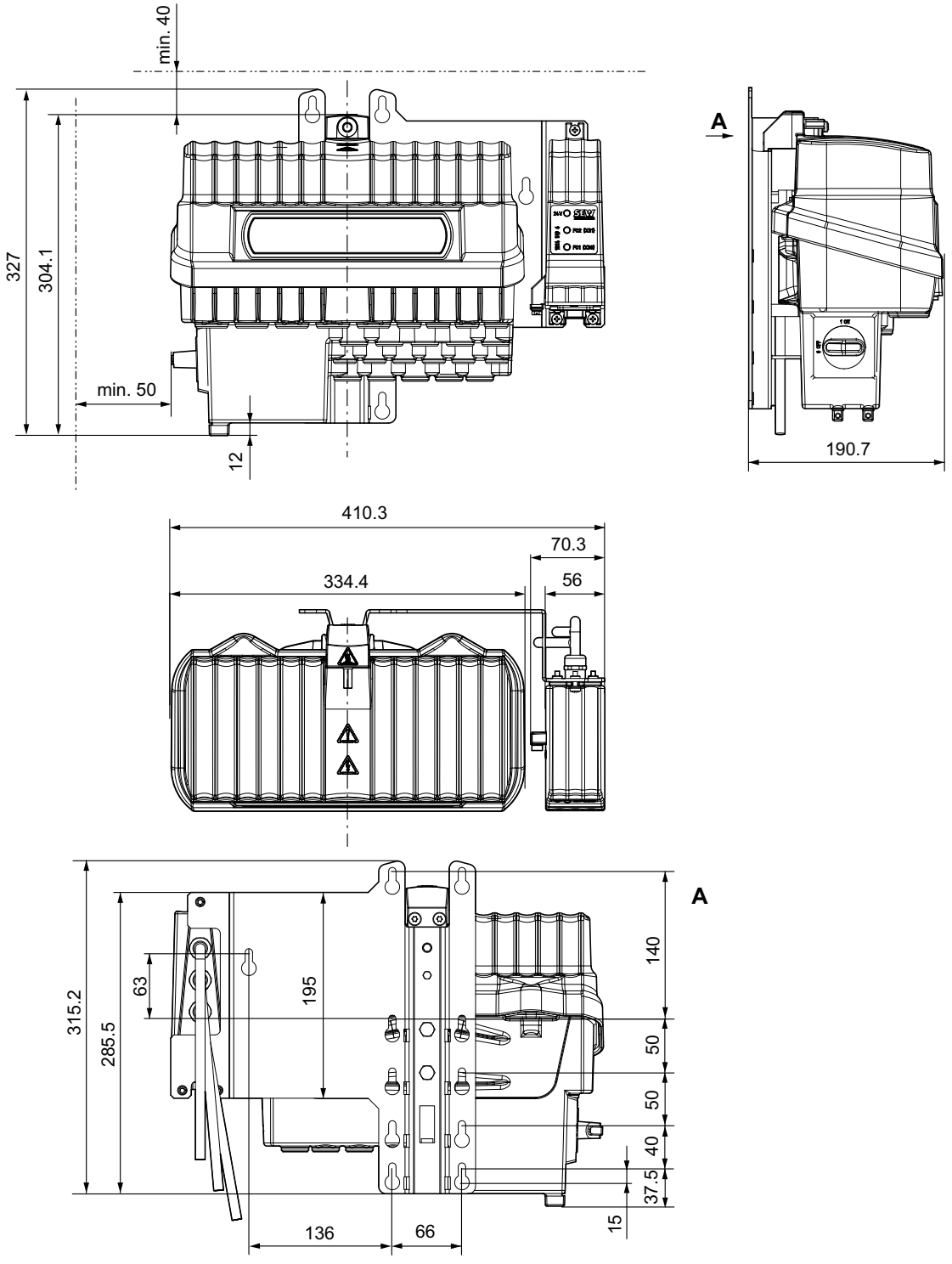
9.16.4 MOVIFIT® FC, (2.2 – 4 kW) with optional stainless steel mounting rail /M11



3713271179

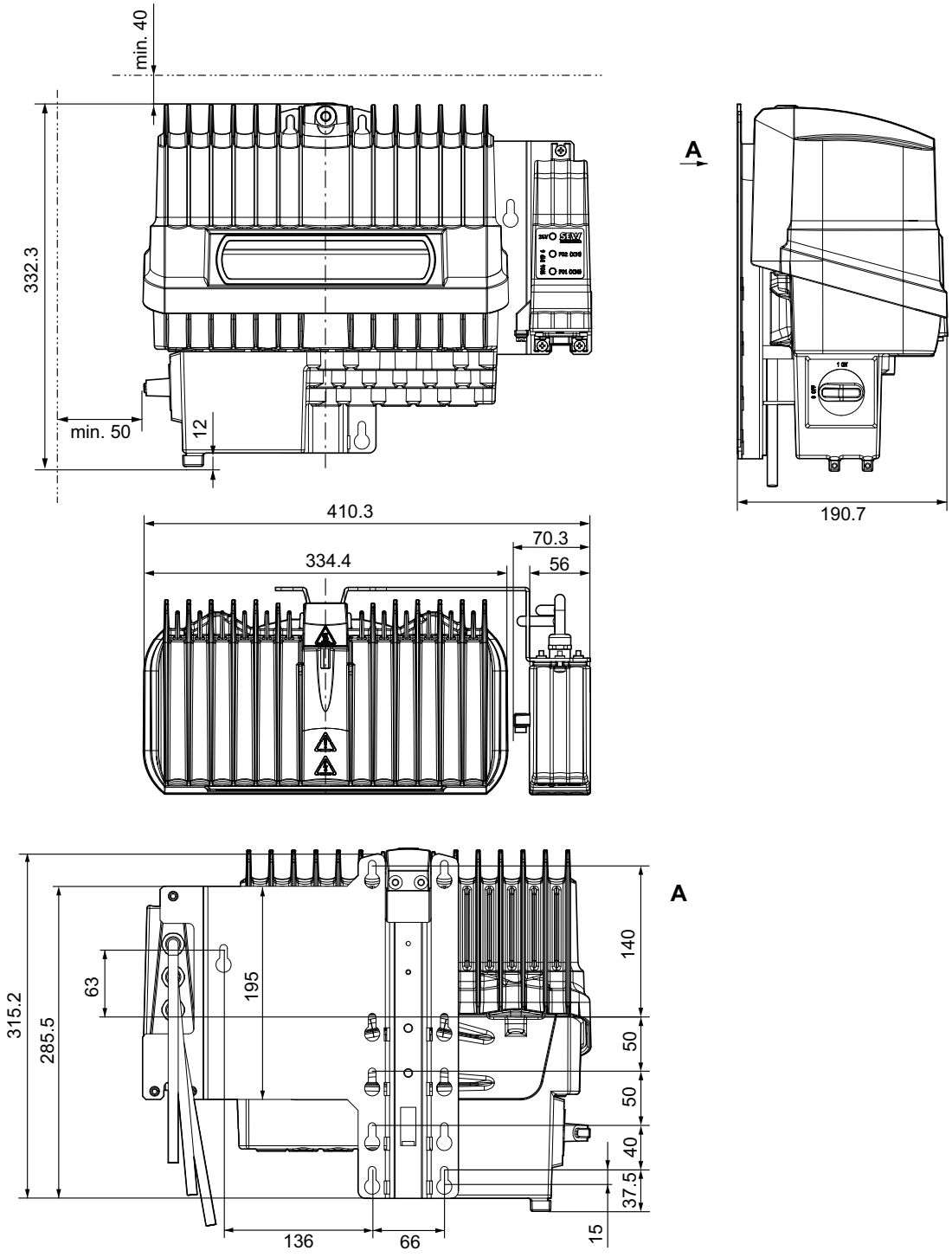
[1] The clearance of 104 mm below is only necessary for ABOXes with round connector (Intercontec) motor output pointing downward.
[2] The clearance of 191 mm at the front is only necessary for ABOXes with round connector (Intercontec) motor output pointing forward.

9.16.5 MOVIFIT® FC, (0.37 – 1.5 kW) with POF option L10



18014402366515211

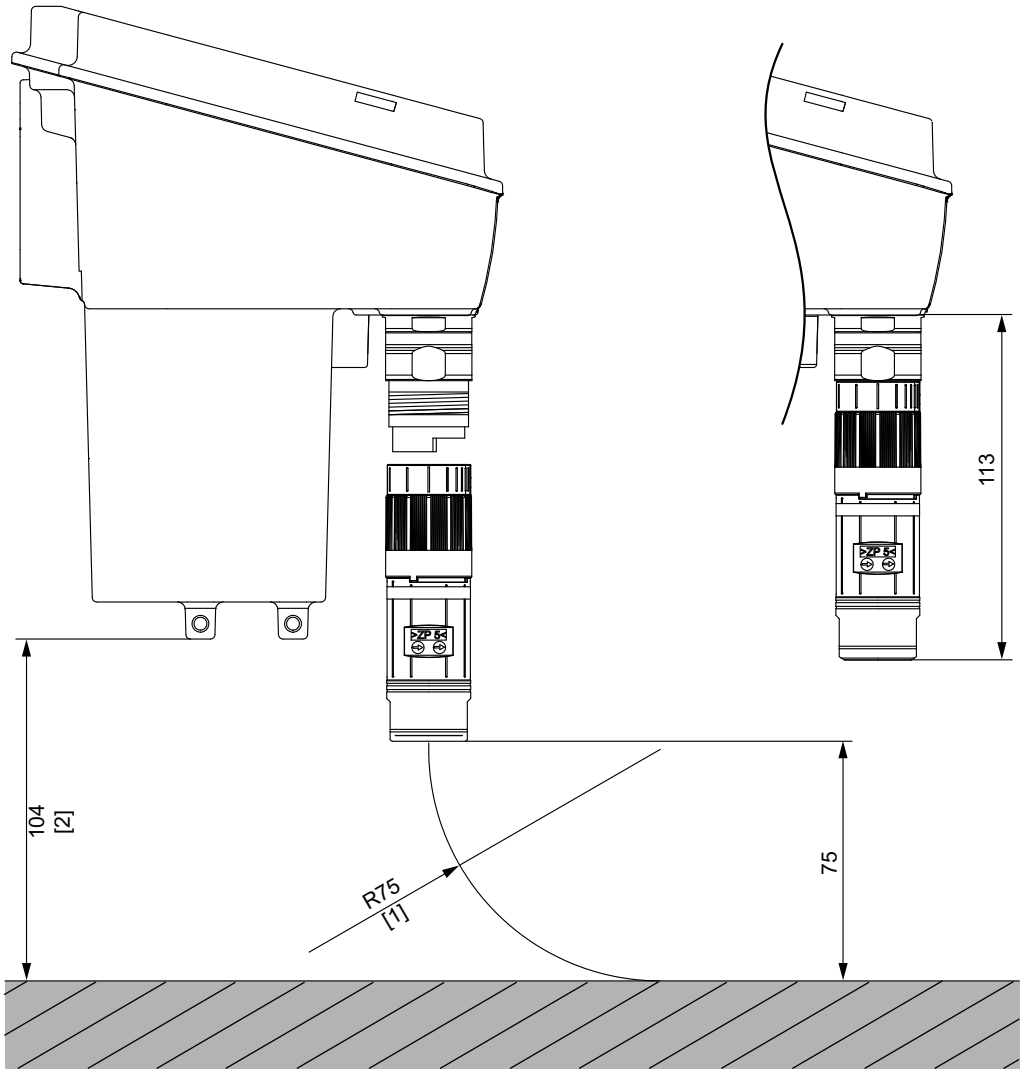
9.16.6 MOVIFIT® FC, (2.2 – 4 kW) with POF option L10



4385759883

9.16.7 ABOX with round connector (Intercontec), motor output pointing downward

The following figure shows the minimum installation clearance of the hybrid ABOX with round connector and motor output pointing downward.

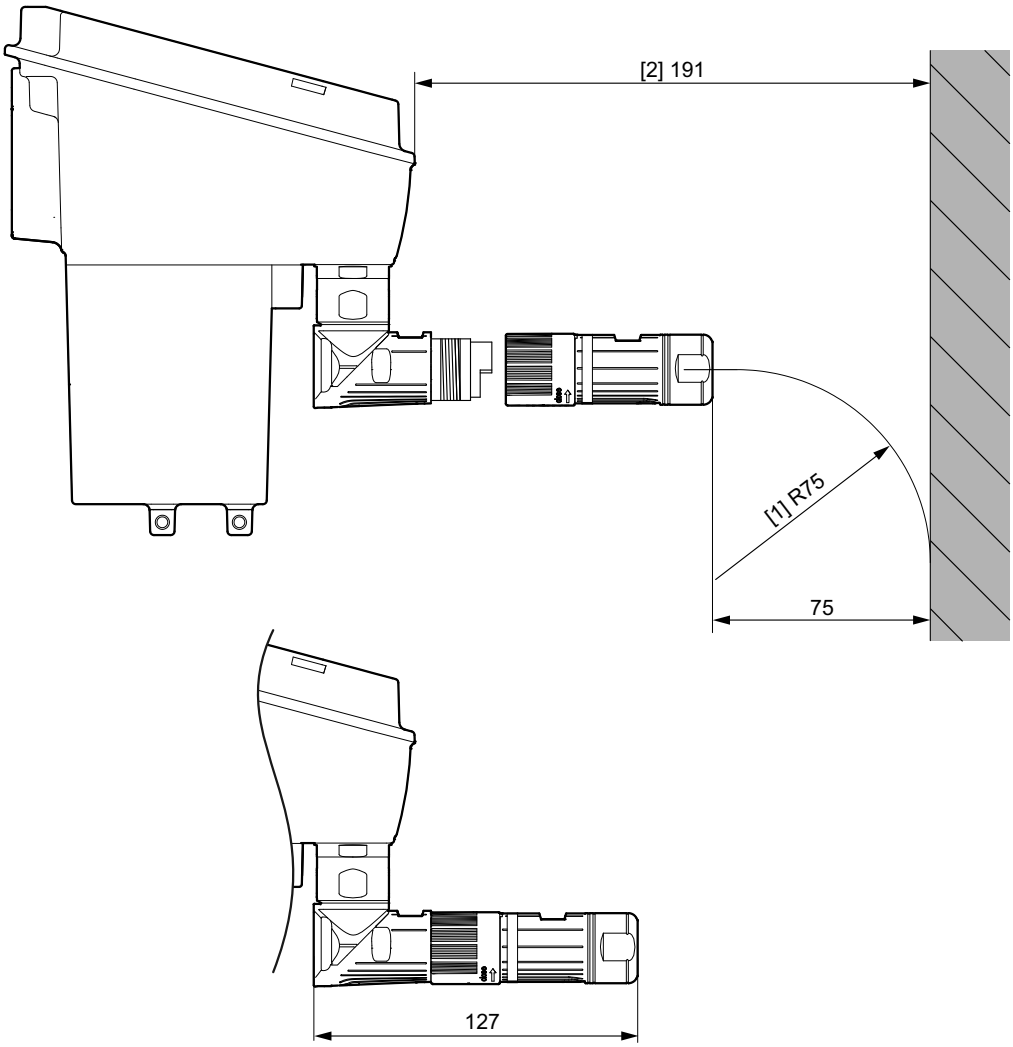


36028801787793163

[1] Smallest permitted pending radius of bulk cable: 75 mm
[2] Minimum distance to the bottom of the ABOX: 104 mm

9.16.8 ABOX with round connector (Intercontec), motor output pointing forward:

The following figure shows the minimum installation clearance of the hybrid ABOX with round connector and motor output pointing forward.



9007204023573387

[1] Smallest permitted pending radius of bulk cable: 75 mm
[2] Minimum distance to the front of the ABOX: 191 mm

10 Declaration of Conformity

EC Declaration of Conformity

900070010

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

units of the series	**MOVIFIT® FC** **MOVIFIT® MC**	
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
applied harmonized standards	**EN 13849-1:2008** **EN 61800-5-1:2007** **EN 61800-3:2007**	**5)**

1) These products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal	11.12.09	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

3122942731

EC Declaration of Conformity

900080010

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the

units of the series	**MOVIFIT® FC** **MOVIFIT® MC**	
in connection with	**S11**	**PROFIsafe®**
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
applied harmonized standards	**EN 13849-1:2008** **EN 62061: 2006** **EN 61800-5-1:2007** **EN 61800-3:2007**	**5)** **5)**

1) These products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.

5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal	21.12.09	Johann Soder	
Place	Date	Managing Director Technology	a) b)

a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

3122944651

11 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
Production / Industrial Gears	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Service Competence Center	**Central**	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@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
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357 14 euro cents/min on the German landline network. Max 42 euro cents/min from a German mobile network. Prices for mobile and international calls may differ.
	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
Production	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15

France			
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com

Argentina			
Assembly **Sales**	**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 http://www.sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

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

Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by

Belgium			
Assembly **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Center	**Industrial Gears**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brazil			
Production **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Brazil			
Assembly **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conparq 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 - Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br

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

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago**	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 http://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 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn

China			
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
	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. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales **Assembly** **Service**	**Prague**	SEW-EURODRIVE CZ s.r.o. Lužná 591 16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	HOT-LINE +420 800 739 739 (800 SEW SEW)	**Servis:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz

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

Egypt			
Sales **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 EI Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	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 http://www.sew-eurodrive.fi sew@sew.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate 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
	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911

Greece			
Sales	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

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 http://www.sew-eurodrive.hu office@sew-eurodrive.hu

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodrivein-dia.com
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com

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 info@alperton.ie http://www.alperton.ie

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

Italy			
Assembly **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Japan			
Assembly **Sales** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com

Lebanon			
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com

Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt

Luxembourg			
Assembly **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be

Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg

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

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

Morocco			
Sales **Service**	**Mohammedia**	SEW EURODRIVE SARL Z.I. Sud Ouest - Lot 28 2ème étage Mohammedia 28810	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 sales@dbmining.in.na

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	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 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Pakistan			
Sales	**Karachi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk

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 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa Hotline 24H Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@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**	**Bucharest**	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 RUS-195220 St. Petersburg	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. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com

Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	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-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 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 info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

South Korea			
Assembly **Sales** **Service**	**Ansan**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Swaziland			
Sales	**Manzini**	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200	Tel. +268 2 518 6343 Fax +268 2 518 5033 engineering@cgtrading.co.sz

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

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sanayi Ticaret Limited Şirketi Gebze Organize Sanayi Bölgesi 400.Sokak No:401 TR-41480 Gebze KOCAELİ	Tel. +90-262-9991000-04 Fax +90-262-9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Assembly **Sales** **Service**	**Dnipropetrovsk**	SEW-EURODRIVE 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

United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

USA			
Production **Assembly** **Sales** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in 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 ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Vietnam			
Sales	**Ho Chi Minh City**	**All sectors except for ports, mining and offshore:** Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn truongtantam@namtrung.com.vn khanh-nguyen@namtrung.com.vn
		Ports, mining and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn

Zambia			
Sales	**Kitwe**	EC Mining Limited Plots No. 5293 & 5294,Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe	Tel. +260 212 210 642 Fax +260 212 210 645 sales@ecmining.com http://www.ecmining.com

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SEW-EURODRIVE
Driving the world

SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023
D-76642 Bruchsal/Germany
Phone +49 7251 75-0
Fax +49 7251 75-1970
sew@sew-eurodrive.com

➞ **www.sew-eurodrive.com**