



SEW
EURODRIVE



MOVI-SWITCH[®]-1E/-2S

With DRS/DRE/DRP AC Motor

Edition 05/2008

16650026 / EN

Operating Instructions





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1 General Information

1.1 Structure of the safety notes

The safety notes in these operating instructions are structured as follows:

Symbol	SIGNAL WORD!		
 General hazard		Nature and source of hazard. Possible consequence(s) if disregarded. • Measure(s) to avoid the hazard.	
Symbol	Signal word	Meaning	Consequences if disregarded
Example: General hazard	HAZARD!	Imminent hazard	Severe or fatal injuries
 Specific hazard, e.g. electric shock	WARNING!	Possible hazardous situation	Severe or fatal injuries
 Specific hazard, e.g. electric shock	CAUTION!	Possible hazardous situation	Minor injuries
 STOP	STOP!	Possible damage to property	Damage to the drive system or its environment
 NOTE	NOTE	Useful information or tip. Simplifies handling of the drive system.	

1.2 Right to claim under limited warranty

Adhering to the operating instructions is a prerequisite for fault-free operation and the fulfillment of any right to claim under warranty. Read the operating instructions before you start working with the unit.

Make sure that the operating instructions are available to persons responsible for the system and its operation as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

1.3 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the MOVI-SWITCH® drive and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE does not assume 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.



1.4 Copyright notice

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Any reproduction, modification, distribution or unintended use, in whole or in part, is prohibited.



2 Safety Notes

The following basic safety notes are intended to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and observed. Make sure 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, please contact SEW-EURODRIVE.

2.1 General

Never install or start up damaged products. Submit a complaint to the shipping company immediately in the event of damage.

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

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property. Refer to the documentation for additional information.

2.2 Target group

Only qualified personnel is authorized to install, startup 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.

Any activities regarding transportation, storage, operation, and disposal must be carried out by persons who have been instructed appropriately.

2.3 Designated use

- MOVI-SWITCH® drives are intended for industrial systems. They comply with the applicable standards and regulations and meet the requirements of the Low Voltage Directive 73/23/EEC.
- Technical data and information on approved conditions on site can be found on the nameplate and in these operating instructions.
- You must comply with this information!
- Do not start up the unit (operate in the designated fashion) until you have established that the machine complies with the EMC Directive 2004/108/EC and that the end product categorically conforms to Machinery Directive 98/37/EC (with reference to EN 60204).



2.3.1 Safety functions

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

2.3.2 Hoist applications

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

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

2.4 Other applicable documentation

Note also the following documentation:

- "AC Motors DRS/DRE/DRP" operating instructions
- "Fieldbus Interfaces/Field Distributors for Controlling MOVI-SWITCH®" manual

2.5 Transportation, storage

You must observe the notes on transportation, storage and proper handling. Comply with the requirements for climatic conditions stated in sec. "Technical Data". Tighten installed eyebolts securely. They are designed for the weight of the MOVI-SWITCH® drive. Do not attach any additional loads. Use suitable, sufficiently rated handling equipment (e.g. rope guides) if required.

2.6 Installation

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

Protect the MOVI-SWITCH® drives from excessive strain.

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

- Use in potentially explosive areas
- 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" (see page 84)".



2.7 Electrical Connection

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

Perform electrical installation according to the pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). Additional information is contained in the documentation.

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 or EN 61800-5-1).

2.8 Safe disconnection

MOVI-SWITCH[®] drives meet all requirements for safe disconnection of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.

2.9 Operation

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

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

The terminal box must remain closed during operation, i.e. the terminal box cover and the MOVI-SWITCH[®] control unit must be screwed on.

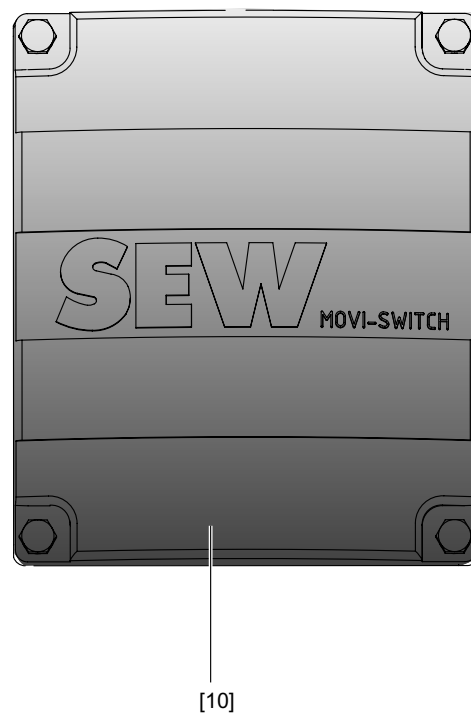
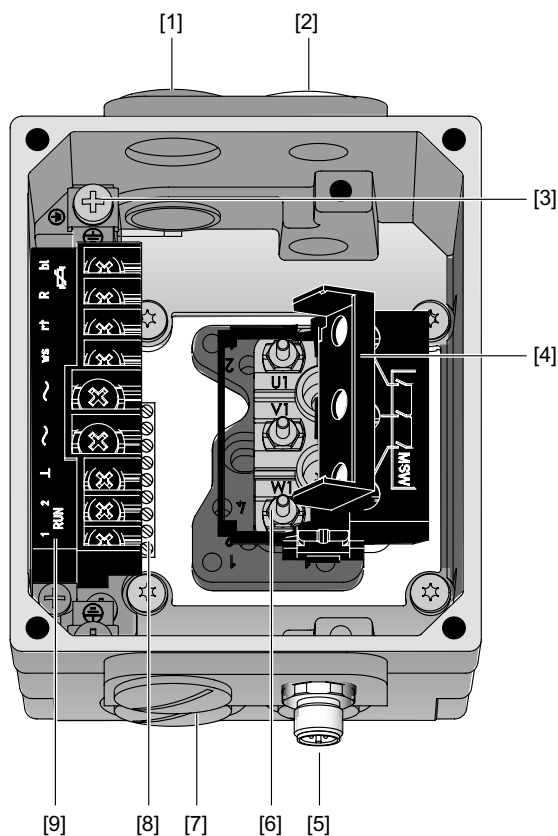
Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive re-starting automatically. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the supply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

Caution! Danger of burns: The MOVI-SWITCH[®] surface temperature can exceed 60 °C during operation!



3 Unit Design

3.1 MOVI-SWITCH®-1E

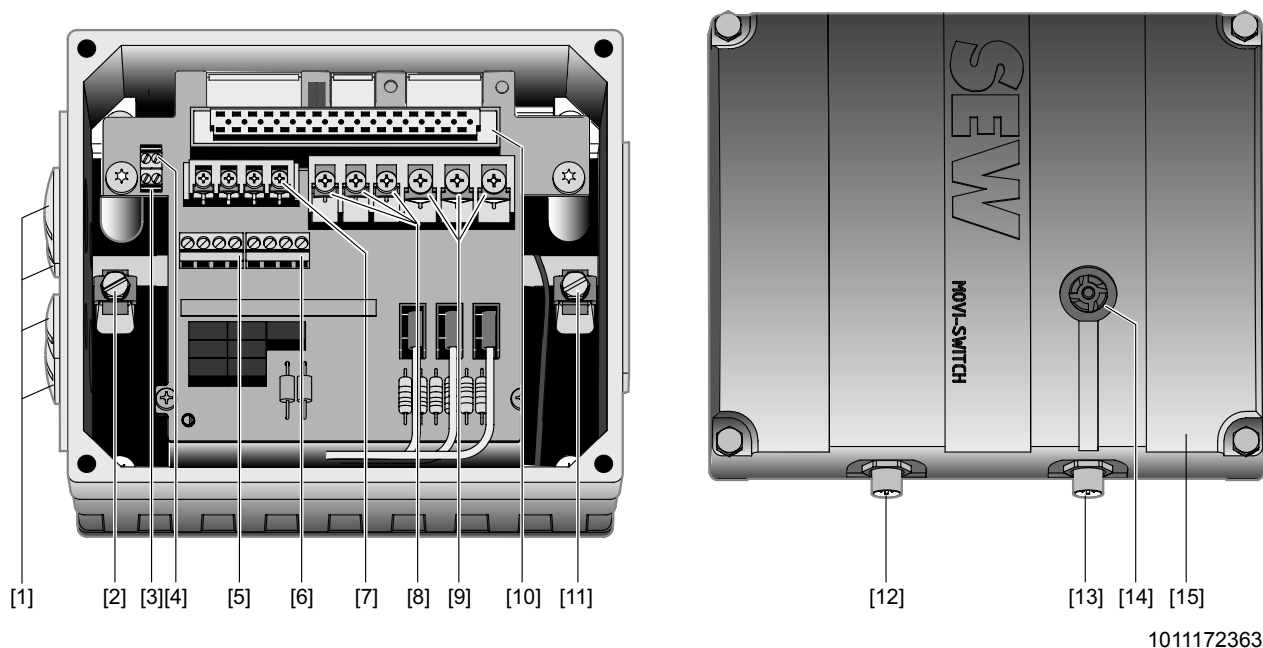


1061229067

- [1] Cable gland 2 x M25 x 1.5
- [2] Cable gland M16 x 1.5
- [3] Screw for PE connection ⊕
- [4] Protective cover for supply system connections
- [5] M12 connector AVS1, standard coding (connection for control signals)
- [6] Supply system connection (L1, L2, L3)
- [7] Cable gland 2 x M25 x 1.5
- [8] MOVI-SWITCH® module
- [9] BGW brake control (only with brake motors)
- [10] Terminal box cover



3.2 MOVI-SWITCH®-2S



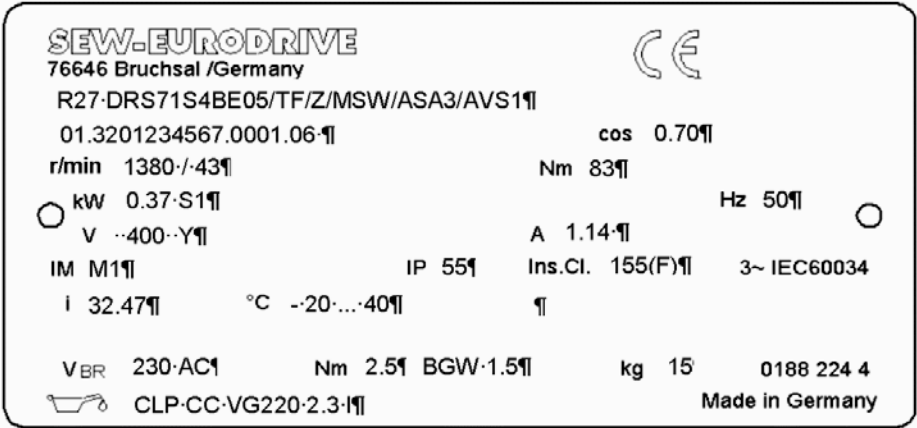
- [1] Cable glands
- [2] Screw for PE connection ⊥
- [3] Terminals X6 for ready signal (for CB0 design only)
- [4] Terminals X11 for internal wiring
- [5] Terminals X5 for internal wiring
- [6] Terminals X4 for internal wiring
- [7] Terminals X1:
 - CB0 design: for voltage supply and direction of rotation signals
 - CK0 design: for AS-Interface and auxiliary voltage (AUX-PWR)
- [8] Terminals X1 for brake connection
- [9] Terminals X1 for supply system connection (L1, L2, L3)
- [10] Connection to MOVI-SWITCH® control unit
- [11] Screw for PE connection ⊥
- [12] M12 plug X102
- [13] M12 plug X101
- [14] Status LED
- [15] MOVI-SWITCH® control unit



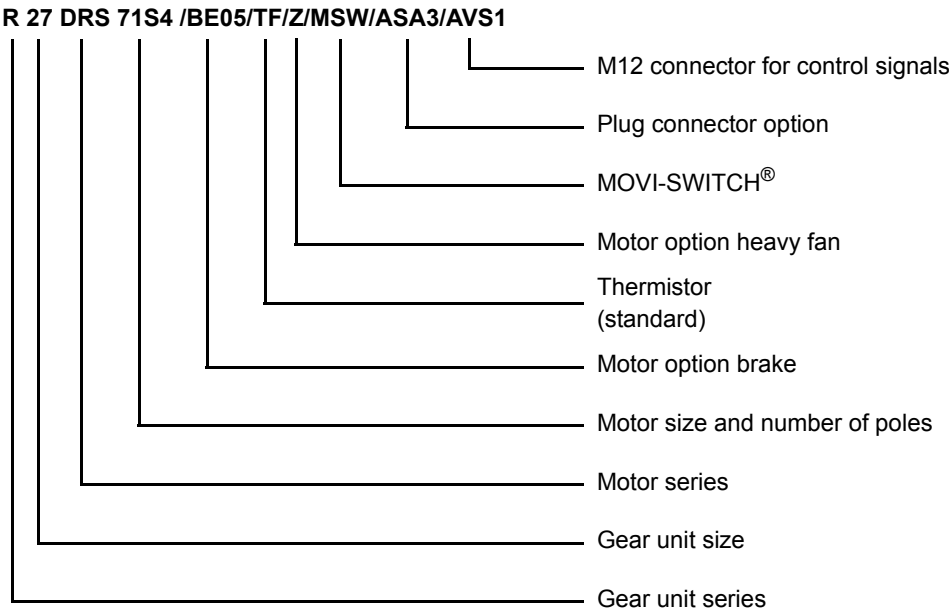
Unit Design

Nameplate, unit designation of MOVI-SWITCH®-1E (example)

3.3 Nameplate, unit designation of MOVI-SWITCH®-1E (example)



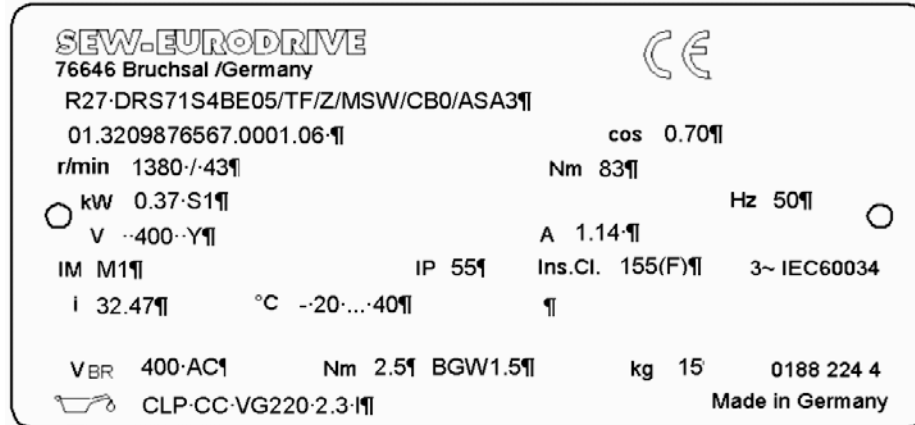
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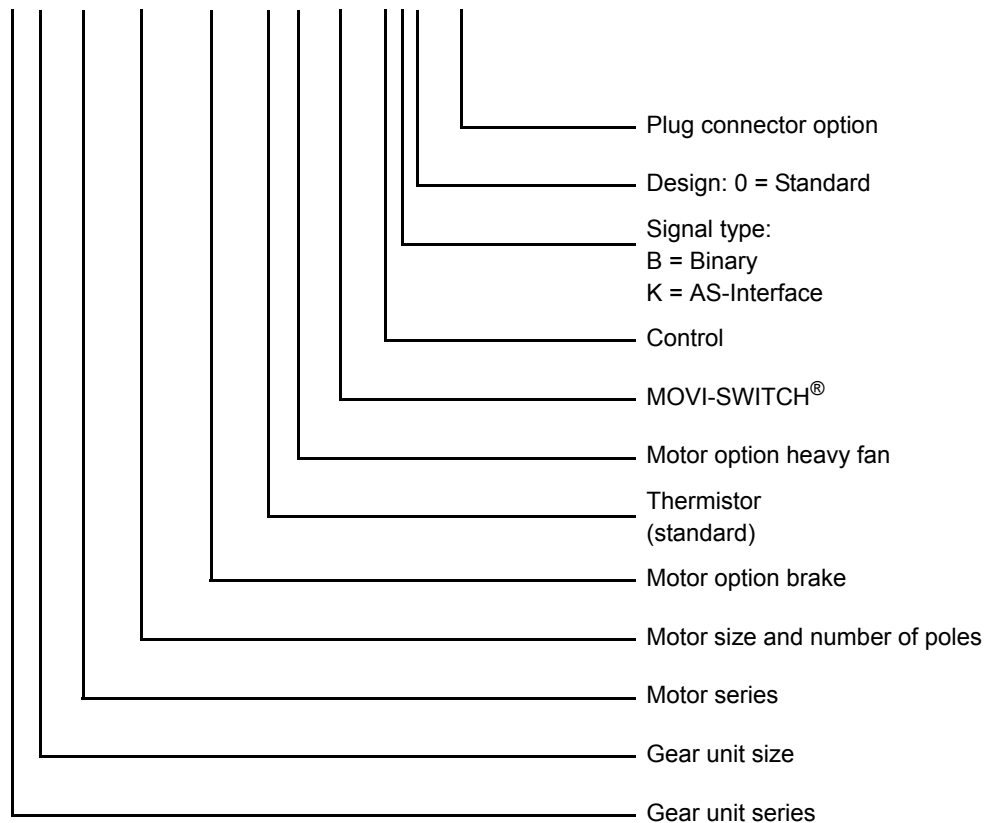
3.4 Nameplate, unit designation MOVI-SWITCH®-2S

3.4.1 Sample motor nameplate



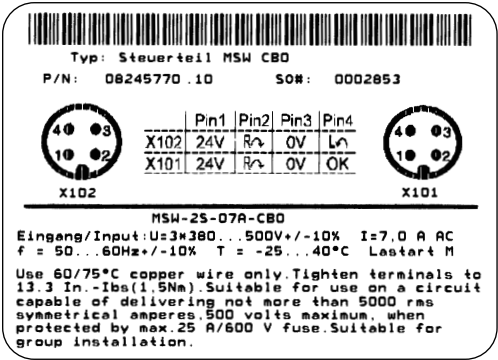
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R 27 DRS 71S4 /BE05/TF/Z/MSW/CB0/ASA3

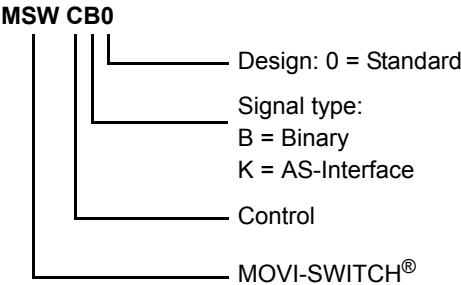




3.4.2 Sample electronics nameplate



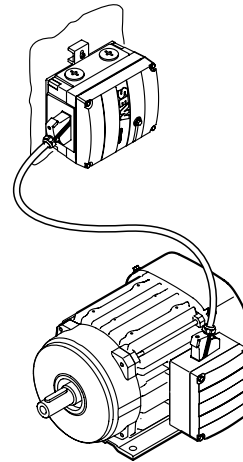
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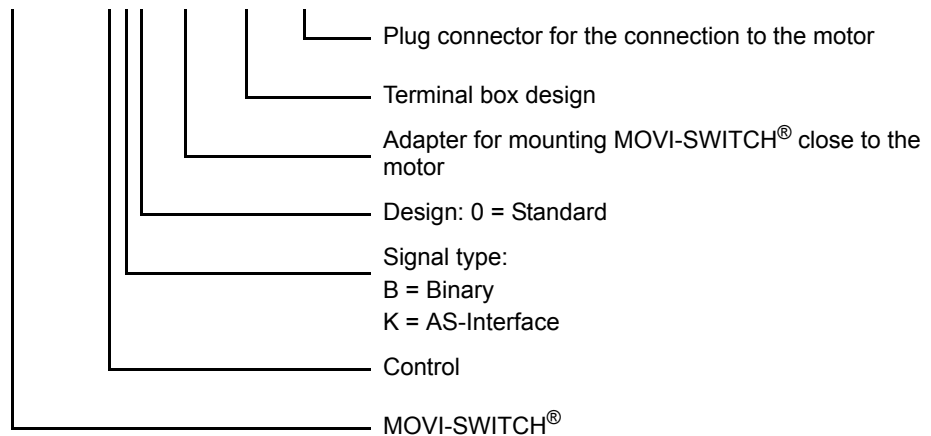
3.4.3 "Mounting close to the motor" design with option P22A

The following illustration shows an example for mounting of the MOVI-SWITCH® unit close to the motor with corresponding nameplate and unit designation:



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MSW-2S-07A/CB0/P22A/RI2A/ALA4





4 Mechanical Installation (All MOVI-SWITCH® Variants)

4.1 Installation instructions

4.1.1 Before you start

The MOVI-SWITCH® drive may only be installed if:

- The entries on the nameplate of the drive match the voltage supply system.
- The drive is undamaged (no damage caused by transportation or storage).
- You have ensured that there are no oils, acids, gases, vapors, radiation, etc. present

Installation tolerances

Shaft end	Flanges
Diameter tolerance according to EN 50347 <ul style="list-style-type: none"> • ISO j6 with $\varnothing \leq 26$ mm • ISO k6 with $\varnothing \leq 38$ mm up to ≤ 48 mm • ISO m6 for $\varnothing > 55$ mm • Center bore in accordance with DIN 332, shape DR.. 	Centering shoulder tolerance in accordance with EN 50347 <ul style="list-style-type: none"> • ISO j6 with $\varnothing \leq 250$ mm • ISO h6 for $\varnothing > 300$ mm

4.1.2 Mounting the MOVI-SWITCH® drive

Observe the following mounting instructions:

- Install/mount MOVI-SWITCH® only in the specified mounting position on a level, vibration-free, and torsionally rigid support structure.
- Clean the output shafts thoroughly to ensure they are free of anti-corrosion agents (use a commercially available solvent). Do not expose the bearings and shaft seals to the solvent – damage to the material!
- Carefully align MOVI-SWITCH® and the driven machine to avoid placing any unacceptable strain on motor shafts (observe permitted overhung and axial loads).
- Do not butt or hammer the shaft end.
- Use an appropriate cover to prevent objects or fluids from entering in vertical mounting positions.
- Ensure the cooling air supply is unobstructed and that air heated by other apparatus cannot be drawn in again.
- Balance components for subsequent mounting on the shaft with a half key (output shafts are balanced with a half key). Any condensation drain holes are closed with plastic plugs and must not be opened unless needed.
- Open condensation drain holes are not permitted. They would render the assigned degrees of protection void.



4.1.3 Installation in damp locations or in the open

Observe the following notes for mounting the MOVI-SWITCH® drive in damp areas or in the open:

- Use suitable cable glands for the supply leads (use reducing adapters if necessary).
- Coat the threads of cable glands and filler plugs with sealing compound and tighten them well – then coat them again.
- Seal the cable entries well
- Clean the sealing faces of the terminal box cover/MOVI-SWITCH® control unit well before reassembly.
- Touch up the corrosion protection coating if damaged anywhere
- Check enclosure according to nameplate.

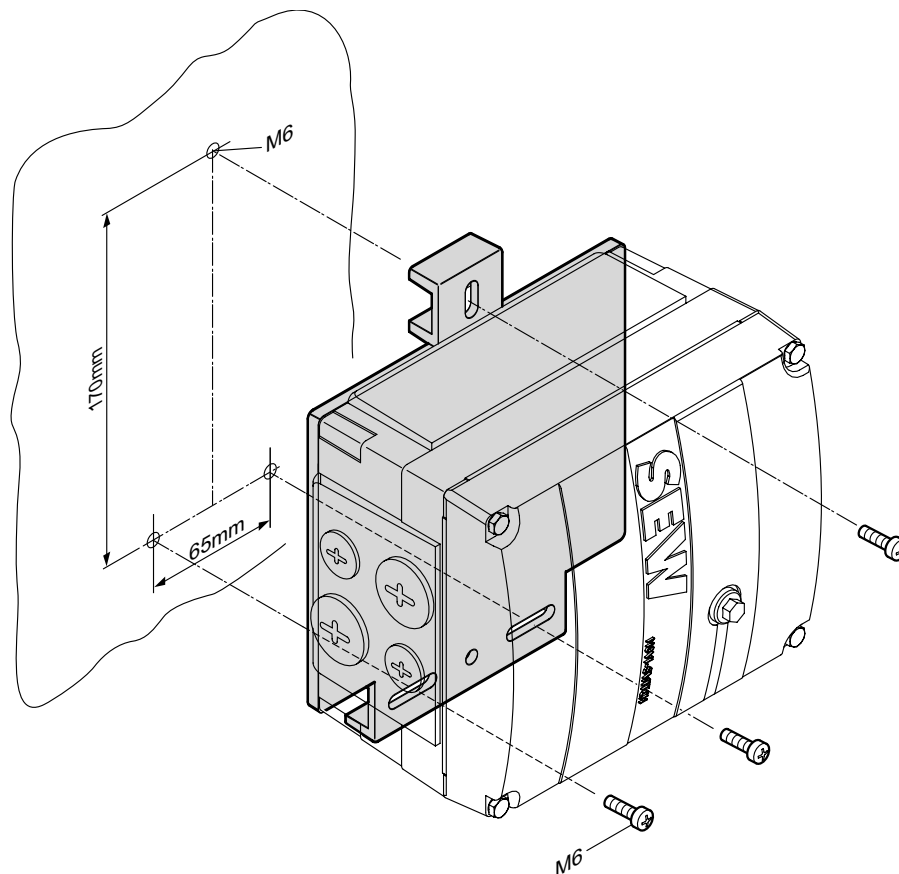


Mechanical Installation (All MOVI-SWITCH® Variants)

Mounting MOVI-SWITCH® with option P22A close to the motor

4.2 Mounting MOVI-SWITCH® with option P22A close to the motor

The following figure shows the mounting dimensions for mounting the MOVI-SWITCH® terminal box with option P22A close to the motor.



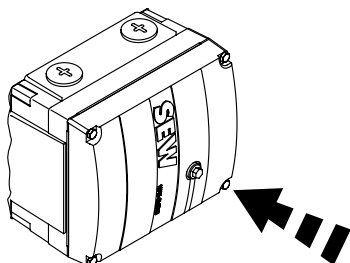
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4.3 Tightening torques

4.3.1 MOVI-SWITCH® control unit/terminal box

Tighten the screws on the MOVI-SWITCH® control unit using 3.0 Nm (26.6 lb.in) working diagonally across.



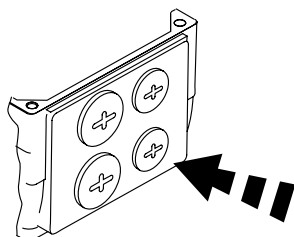
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4.3.2 Cable glands

It is essential to observe the manufacturer's specifications for the cable glands.

4.3.3 Blanking plug cable glands

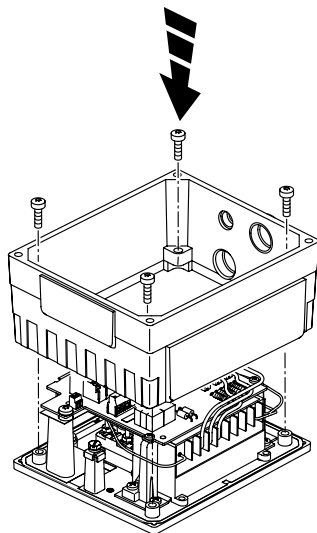
Tighten blanking plugs using 2.5 Nm (22.1 lb.in).



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4.3.4 Modular terminal box

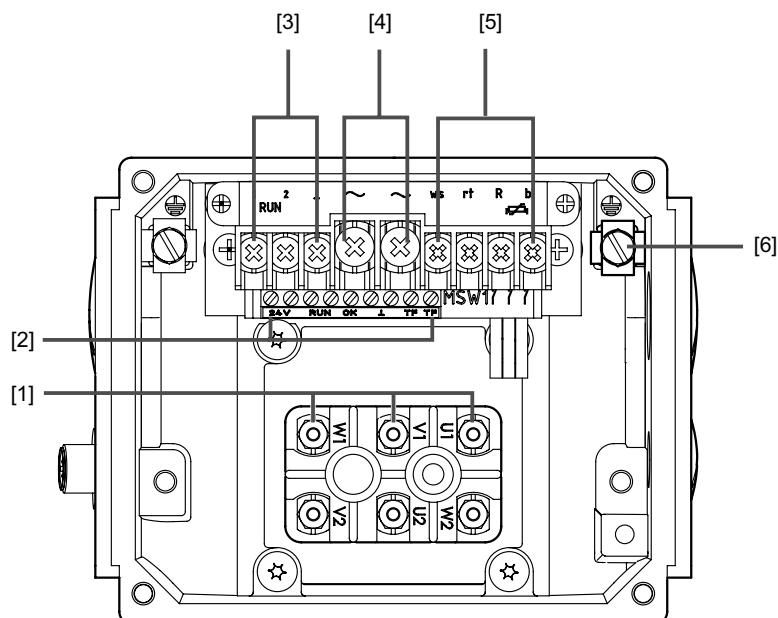
For fastening the terminal box on the mounting plate, tighten screws using 3.3 Nm (29.2 lb.in).



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4.3.5 Tightening torques for terminals (MOVI-SWITCH®-1E)

Use the following tightening torques for terminals during installation:



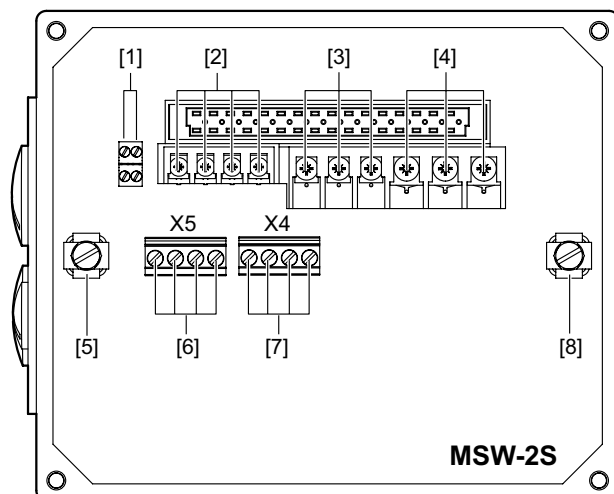
991568395

- [1] 1.6 – 2.0 Nm (14.2 lb.in – 17.7 lb.in)
- [2] 0.3 – 0.5 Nm (3.0 lb.in – 4.5 lb.in)
- [3] 0.5 – 0.7 Nm (4.4 lb.in – 6.2 lb.in)
- [4] 1.2 – 1.6 Nm (10.6 lb.in – 14.2 lb.in)
- [5] 0.5 – 0.7 Nm (4.4 lb.in – 6.2 lb.in)
- [6] 2.0 – 2.4 Nm (17.7 lb.in – 21.2 lb.in)



4.3.6 Tightening torques for terminals (MOVI-SWITCH®-2S)

Use the following tightening torques for terminals during installation:



991608075

- [1] 0.5 – 0.7 Nm (4.4 lb.in – 6.2 lb.in)
- [2] 0.5 – 0.7 Nm (4.4 lb.in – 6.2 lb.in)
- [3] 0.8 – 1.1 Nm (7.1 lb.in – 9.7 lb.in)
- [4] 1.2 – 1.6 Nm (10.6 lb.in – 14.2 lb.in)
- [5] 2.0 – 2.4 Nm (17.7 lb.in – 21.2 lb.in)
- [6] 0.5 – 0.7 Nm (4.4 lb.in – 6.2 lb.in)
- [7] 0.5 – 0.7 Nm (4.4 lb.in – 6.2 lb.in)
- [8] 2.0 – 2.4 Nm (17.7 lb.in – 21.2 lb.in)



5 Electrical Installation

5.1 Installation instructions

5.1.1 Connecting supply system leads

- The rated voltage and frequency of the MOVI-SWITCH[®] drive must correspond to the data for the supply system (line).
- Wire cross section: according to input current I_{line} for rated power (see chapter Technical Data (see page 84)).
- Use conductor end sleeves without insulating shrouds (DIN 46228 part 1, material E-CU).
- Install line fuses at the beginning of the supply system line behind the supply bus junction. Use D, DO, NH fuses or circuit breakers. Select the fuse size according to the cable cross section.

5.1.2 Connecting the DC 24 V power supply

- Supply the MOVI-SWITCH[®] drive either via the external DC 24 V voltage and/or via AS-Interface data line¹⁾.

5.1.3 Conventional control (via binary commands)

- Connect the required control leads²⁾ (e.g. CW/Stop, CCW/Stop)
- Route the control cables separately from the supply system cables.

5.1.4 Permitted wire cross section of the terminals

Permitted wire cross section of the MOVI-SWITCH[®] 1E terminals and diameter of the terminal studs:

Terminal board	MOVI-SWITCH [®] module (for internal wiring)	BGW brake control (only with brake motor, for internal wiring)	
		Power terminals	Control terminals
M4	0.25 mm ² - 1.0 mm ²	1.0 mm ² - 4.0 mm ² (2 x 4.0 mm ²)	0.25 mm ² - 1.0 mm ² (2 x 0.75 mm ²)
	AWG22 – AWG17	AWG17 – AWG10 (2 x AWG10)	AWG22 – AWG17 (2 x AWG18)

Permitted wire cross section of the MOVI-SWITCH[®] 2S terminals:

Power terminals	Control terminals (for internal wiring)
1.0 mm ² - 4.0 mm ² (2 x 4.0 mm ²)	0.25 mm ² - 1.0 mm ² (2 x 0.75 mm ²) Except for OK terminals X6/X11: 1 x 0.25 mm ² – 0.75 mm ²
AWG17 – AWG10 (2 x AWG10)	AWG22 – AWG17 (2 x AWG18) Except for OK terminals X6/X11: 1 x AWG22 – AWG18

1) For MSW-2S CK0 design only

2) For MSW-1E and MSW-2S CB0 only



5.1.5 Protective devices

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

	<p>! WARNING!</p> <p>Insufficient protection of the leads.</p> <p>Severe or fatal injuries.</p> <ul style="list-style-type: none"> When mounting MOVI-SWITCH® close to the motor, the applicable regulations concerning line protection must be observed! The protection of the lead between MOVI-SWITCH® and the motor must be ensured by appropriate dimensioning or optional line protection components!
--	--

5.1.6 Notes on PE connection

	<p>! HAZARD!</p> <p>Incorrect connection of PE.</p> <p>Death, severe injuries or damage to property from electric shock.</p> <ul style="list-style-type: none"> The permitted tightening torque for the screw fitting is 2.0 to 2.4 Nm (18...21 lb.in). Observe the following notes regarding the PE connection:
--	---

Prohibited assembly sequence	Recommendation: Assembly with forked cable lug Permitted for all cross sections	Assembly with thick connecting wire Permitted for cross sections up to max. 2.5 mm ²
 323042443	 [1] 323034251	 ≤ 2.5 mm ² 323038347

[1] Forked cable lug suitable for M5 PE screws

**5.1.7 Installation above 1000 m asl**

MOVI-SWITCH® drives with line voltages of 380 to 500 V can be used at altitudes above 1000 m asl up to 4000 m asl under the following peripheral conditions.¹⁾

- The rated continuous power is reduced based on the reduced cooling above 1000 m (see chapter Technical Data (see page 84)).
- Above 2000 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 above 2,000 m asl (safe electrical disconnection in accordance with EN 61800-5-1).
- The permitted rated supply voltage of 3 x 500 V up to 2,000 m asl is reduced by 6 V for every 100 m to a maximum of 3 x 380 V at 4,000 m asl.

5.1.8 UL-compliant installation

- Use only copper conductors with a permitted temperature range (60/75°C) as connection cables.
- MOVI-SWITCH® is suited for operation on voltage supply systems with grounded star (TN and TT systems) supplying a maximum supply current of AC 5000 A and having a maximum voltage of AC 500 V. The performance data of the fuses must not exceed 25 A/600 V.
- Only use tested units with a limited output voltage ($V \leq \text{DC } 30 \text{ V}$) and limited output current ($I \leq 8 \text{ A}$) as an external DC 24 V voltage source.
- The UL certification only applies to operation on voltage supply systems with voltages to ground up to a maximum of 300 V.

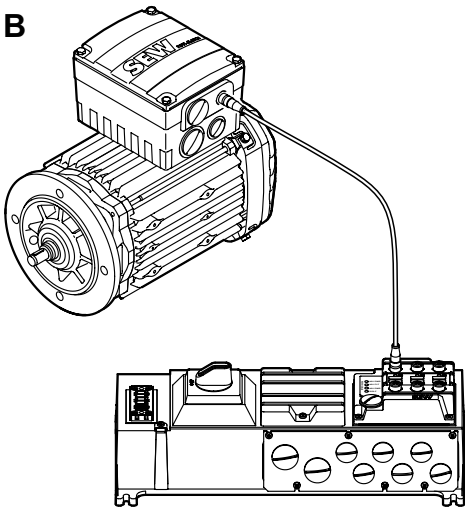
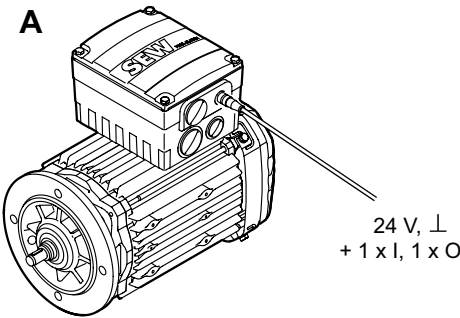
1) The maximum altitude is limited by creeping distances and flameproof components such as electrolytic capacitors.



5.2 MOVI-SWITCH®-1E

5.2.1 Connection options for control signals

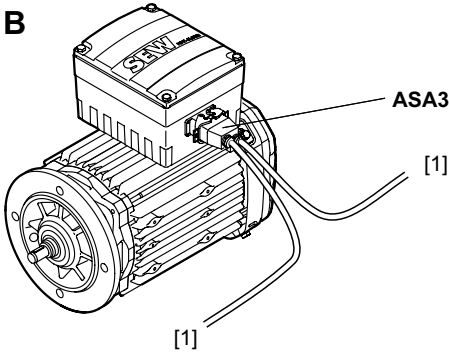
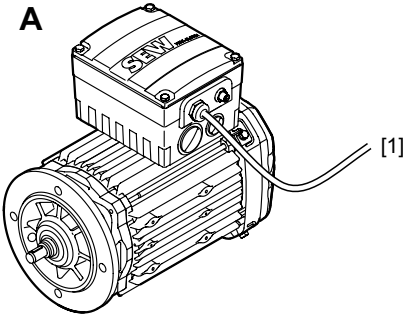
Design	A	B
Control signals	Binary signals (e.g. PLC)	MF../MQ.. fieldbus interface
Additional information	(see page 27)	"Fieldbus Interfaces/Field Distributors for Controlling MOVI-SWITCH®" manual



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5.2.2 Connection options for power

Design	A	B
Unit designation	MSW/AVS1	MSW/AVS1/ASA3
Supply system connection	Terminal stud on motor terminal board	ASA3 plug connector
Additional information	(see page 27)	(see page 30)



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[1] Supply system



5.2.3 Connection via field distributor

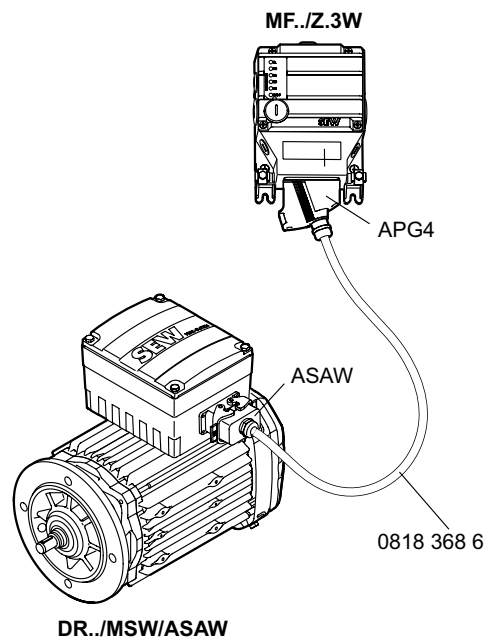
MF../Z.3W, and MF../Z.6W.. field distributors have been specifically designed for connecting MOVI-SWITCH®. They provide a simple means of connecting the drives to the supply system, the DC 24 V control voltage and the fieldbus.



NOTE

For detailed information about connecting the MOVI-SWITCH® drive via MF../Z3.W field distributor, refer to the "Fieldbus Interfaces/Field Distributors for Controlling MOVI-SWITCH®" manual.

Example



1070293771



NOTE

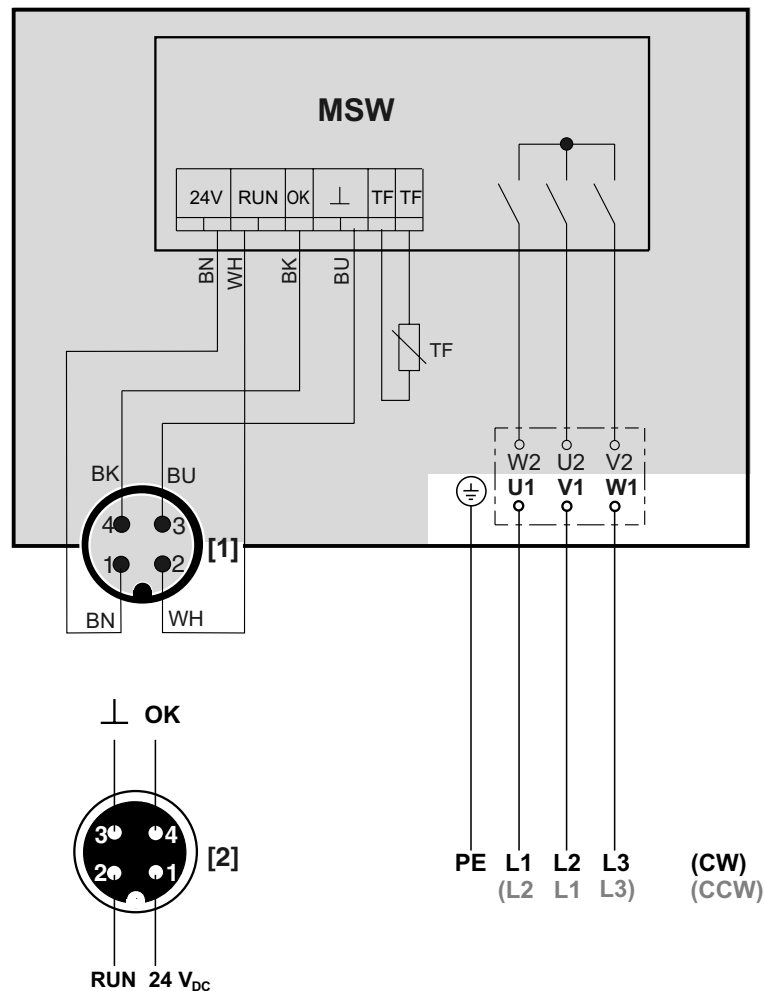
The direction of rotation of the motor can be reversed by switching two current phases at the input terminal of the field distributor or at the motor terminal board in the MOVI-SWITCH®-1E terminal box.



5.2.4 Description of the control signals (M12 connection)

PIN	Assign-ment	Function
1	24 V	Power supply voltage DC 24 V
2	RUN	DC 24 V control signals, high = start, low = stop
3	⊥	Reference potential 0V24
4	OK	Checkback signal Ready for operation, DC 24 V, high = ready for operation, low = overtemperature or no 24 V supply

5.2.5 Connection of MOVI-SWITCH®-1E without brake control



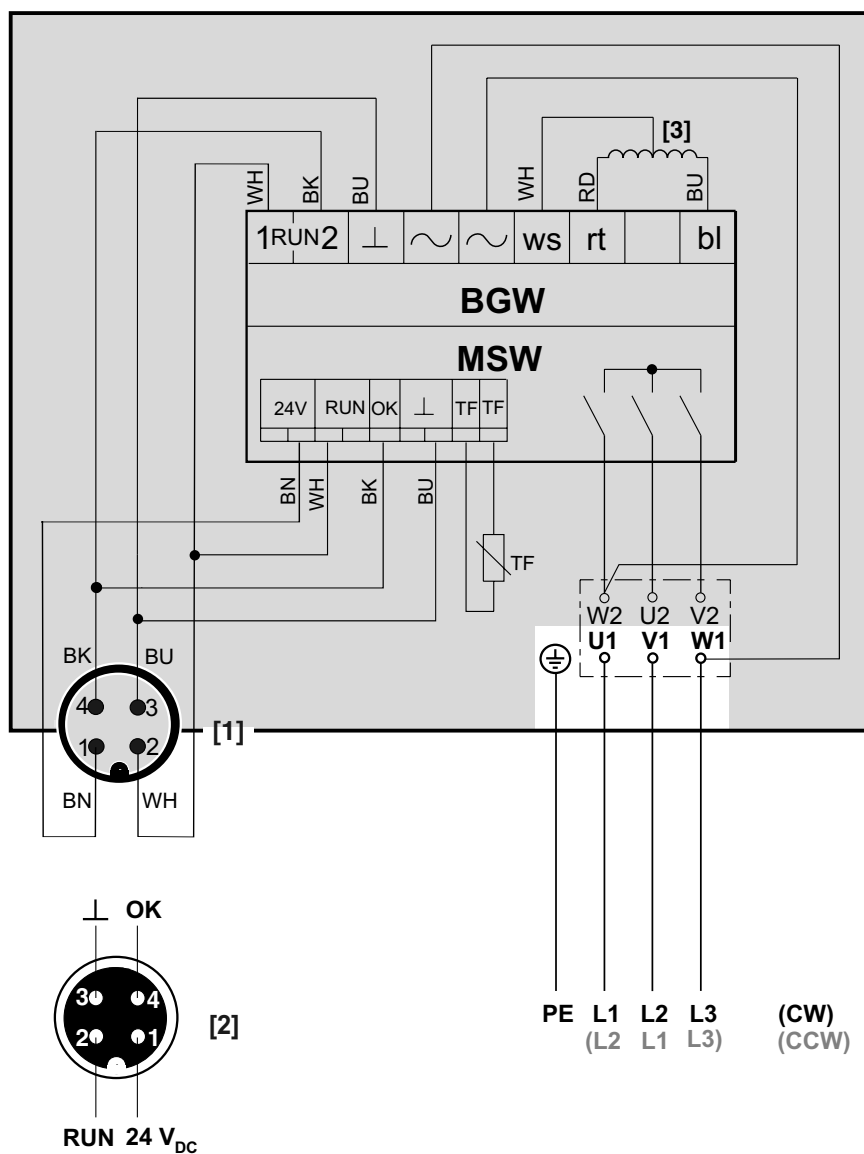
- [1] M12 connector AVS1 (standard coding)
 [2] M12 socket (standard coding)
 CW Clockwise rotation
 CCW Counterclockwise rotation

Wired at the factory



5.2.6 MOVI-SWITCH®-1E with BGW brake control

Brake voltage = supply voltage/ $\sqrt{3}$ (phase-star point)



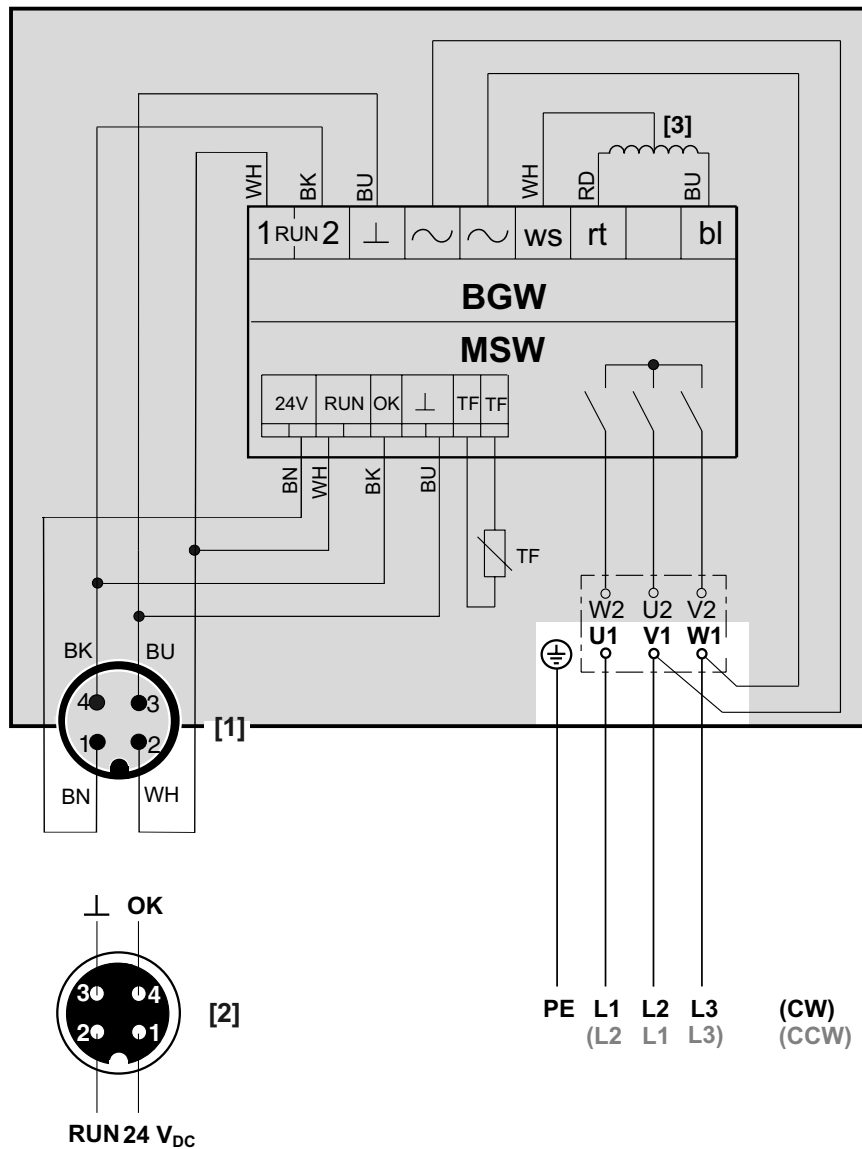
995487115

- [1] M12 connector AVS1 (standard coding)
- [2] M12 socket (standard coding)
- [3] Brake coil
- CW Clockwise rotation
- CCW Counterclockwise rotation

Wired at the factory



Brake voltage = supply voltage (phase-phase)

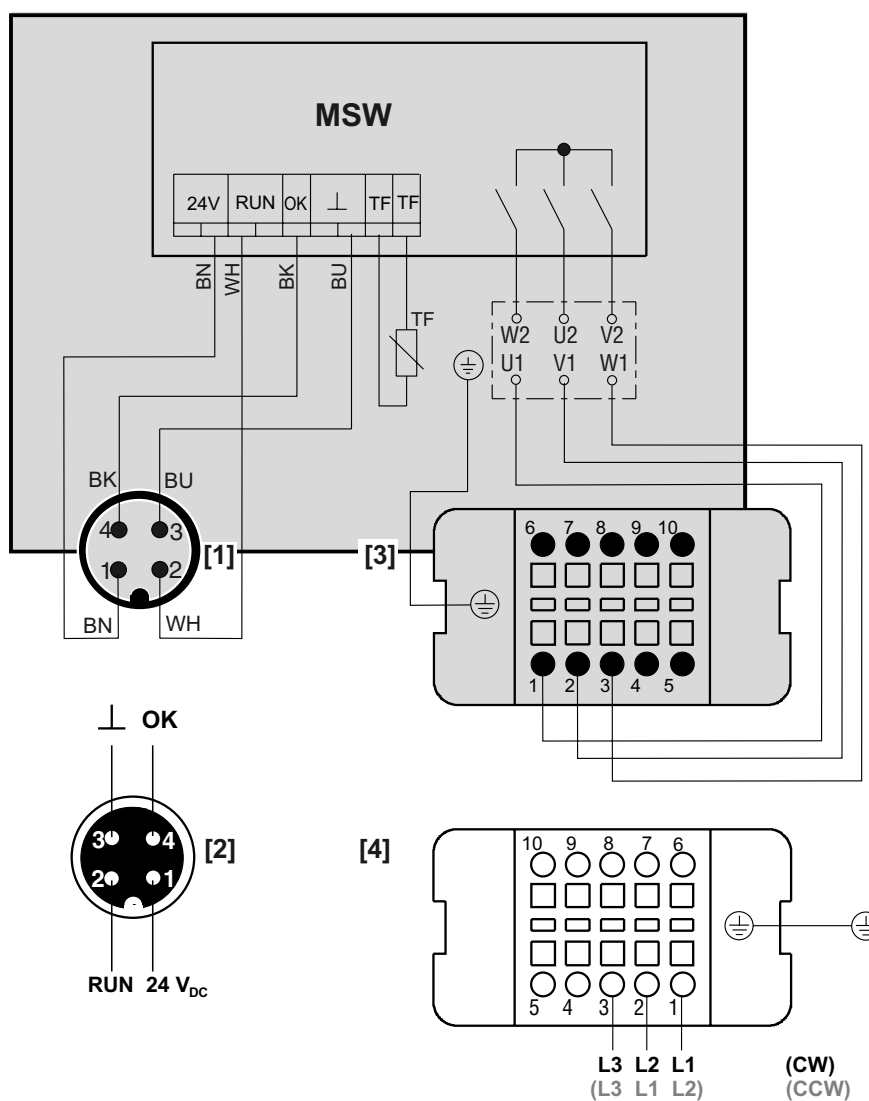


995937419

- [1] M12 connector AVS1 (standard coding)
- [2] M12 socket (standard coding)
- [3] Brake coil
- CW Clockwise rotation
- CCW Counterclockwise rotation

 Wired at the factory

5.2.7 MOVI-SWITCH®-1E with optional ASA3 plug connector (without brake control)



996056843

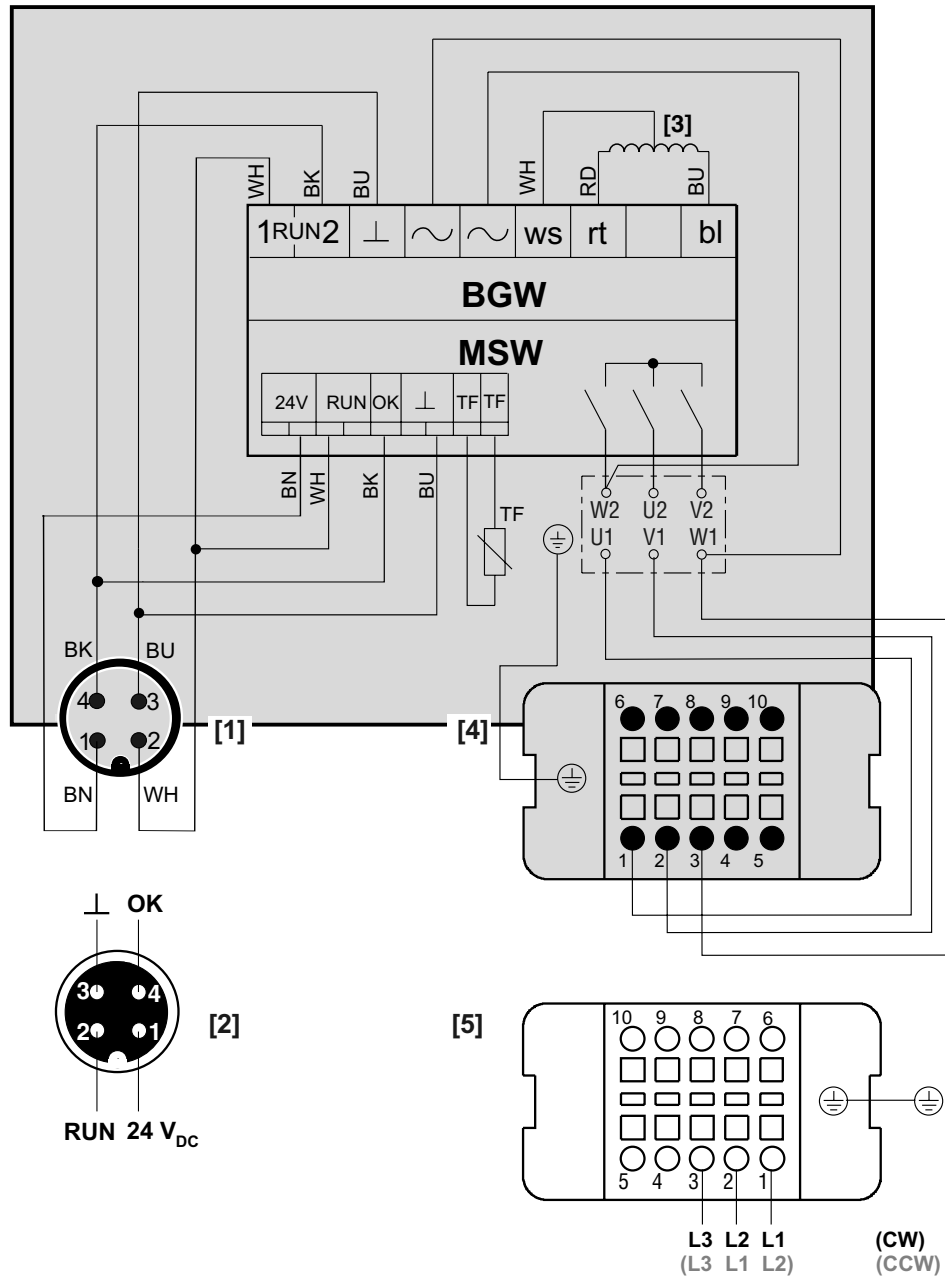
- | | |
|-----|--------------------------------------|
| [1] | M12 connector AVS1 (standard coding) |
| [2] | M12 socket (standard coding) |
| [3] | ASA3 plug connector (plug) |
| [4] | Plug connector (socket) |
| CW | Clockwise rotation |
| CCW | Counterclockwise rotation |

Wired at the factory



5.2.8 MOVI-SWITCH®-1E with optional ASA3 plug connector (with BGW brake control)

Brake voltage = supply voltage / $\sqrt{3}$ (phase-star point)



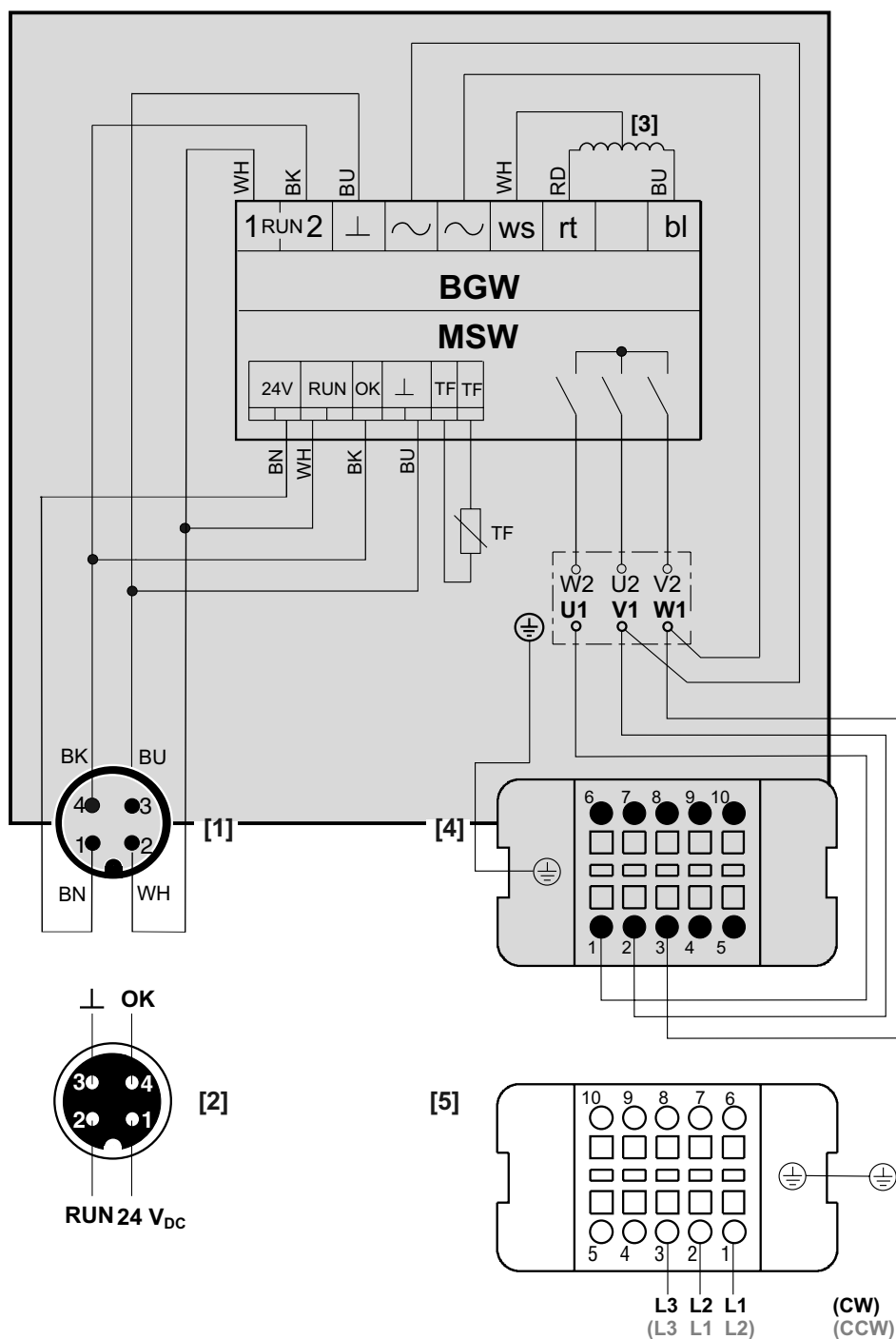
- [1] M12 connector AVS1 (standard coding)
- [2] M12 socket (standard coding)
- [3] Brake coil
- [4] ASA3 plug connector (plug)
- [5] Plug connector (socket)
- CW Clockwise rotation
- CCW Counterclockwise rotation

 Wired at the factory

996112907



Brake voltage = supply voltage (phase-phase)



996168715

- [1] M12 connector AVS1 (standard coding)
- [2] M12 socket (standard coding)
- [3] Brake coil
- [4] ASA3 plug connector (plug)
- [5] Plug connector (socket)
- CW Clockwise rotation
- CCW Counterclockwise rotation

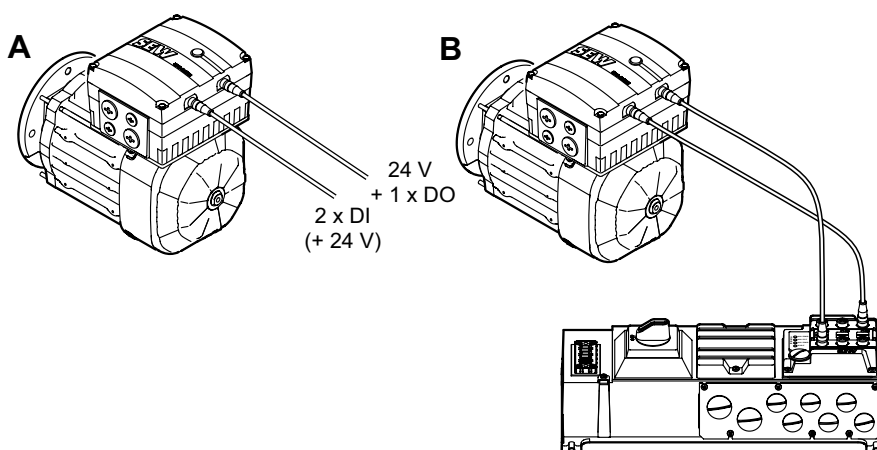
 Wired at the factory



5.3 MOVI-SWITCH®-2S/CB0 (binary control)

5.3.1 Connection options for control signals (for field and motor mounting)

Design	A	B
Unit designation	DR../MSW/CB0	DR../MSW/CB0
Control signals	Binary signals (e.g. PLC)	MF../MQ.. fieldbus interface
Additional information	(see page 36)	"Fieldbus Interfaces/Field Distributors for Controlling MOVI-SWITCH®" manual

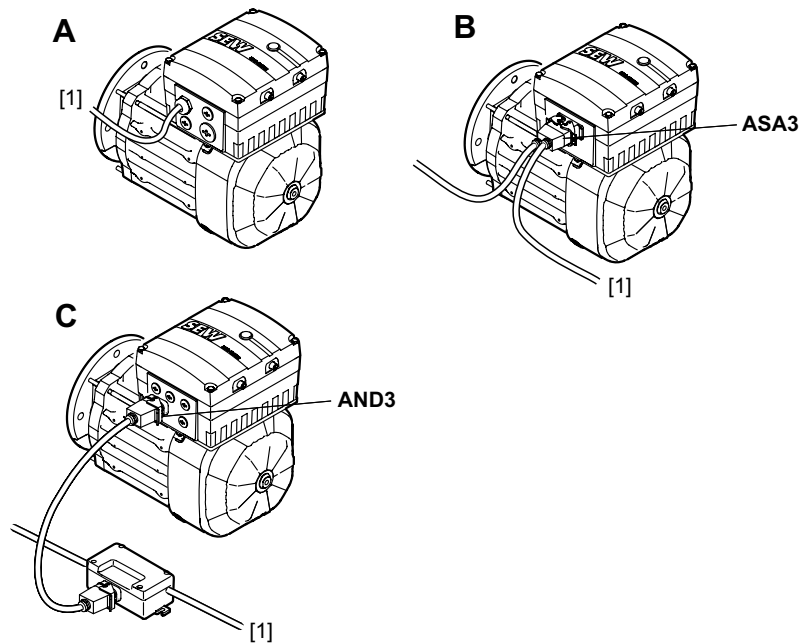


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5.3.2 Connection options for power (for field and motor mounting)

Design	A	B	C
Unit designation	DR../MSW/CB0	DR../MSW/CB0/ASA3	DR../MSW/CB0/AND3
Supply system connection	Terminals	ASA3 plug connector	AND3 plug connector
Additional information	(see page 37)	(see page 38)	(see page 39)



1070704779

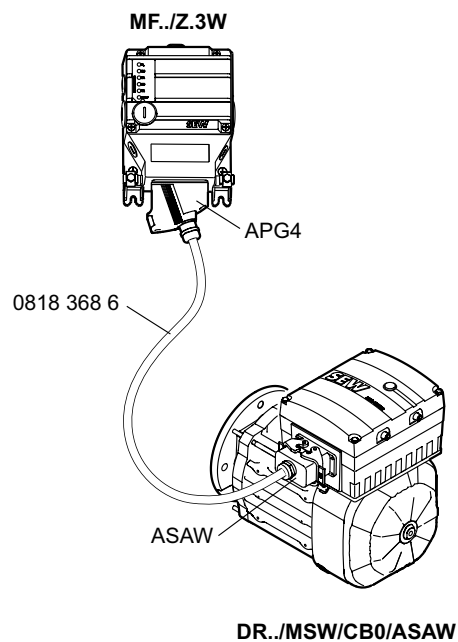


5.3.3 Connection via field distributor

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

	NOTE
	For detailed information about connecting the MOVI-SWITCH® drive via MF.../Z3.W field distributor, refer to the "Fieldbus Interfaces/Field Distributors for Controlling MOVI-SWITCH®" manual.

Example



1070704779

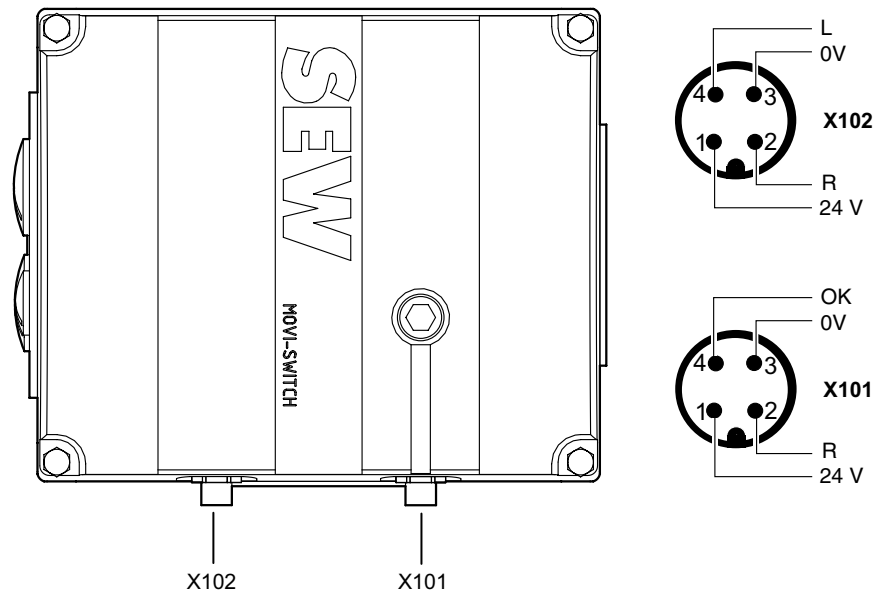


Electrical Installation

MOVI-SWITCH®-2S/CB0 (binary control)

5.3.4 Connector assignment for MOVI-SWITCH®-2S/CB0 control unit

The following illustration shows the assignment of the X102 and X101 plugs.



996559883

PIN	Assign-ment	Function
X102	1 24 V	Power supply voltage DC 24 V, jumpered with X101/1
	2 R	Control signal DC 24 V for CW rotation, high = start, low = stop (jumpered with X101/2)
	3 \perp	Reference potential 0V24 (jumpered with X101/3)
	4 L	Control signal DC 24 V for CCW rotation, high = start, low = stop
X101¹⁾	1 24 V	Power supply voltage DC 24 V, (jumpered with X102/1)
	2 R	Control signal DC 24 V for CW rotation, high = start, low = stop (jumpered with X102/2)
	3 \perp	Reference potential 0V24 (jumpered with X102/3)
	4 OK	Checkback signal Ready for operation, DC 24 V, high = ready for operation

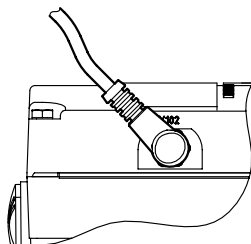
1) Plug is compatible with M12 plug of MOVI-SWITCH® design 1E



NOTE

If angular plug connectors are used for the connection for X102 and X101, they can only be mounted in the position shown in the following figure!

For this reason, it is recommended using straight plug connectors!

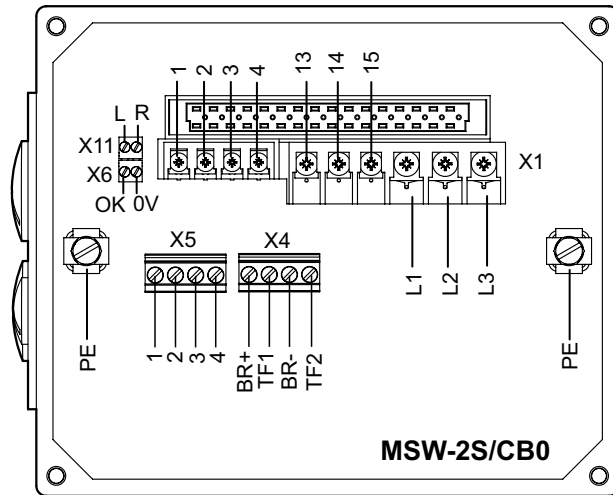


996605323



5.3.5 Terminal assignment of terminal box

The following figure shows the assignment of MOVI-SWITCH®-2S/CB0 terminals.



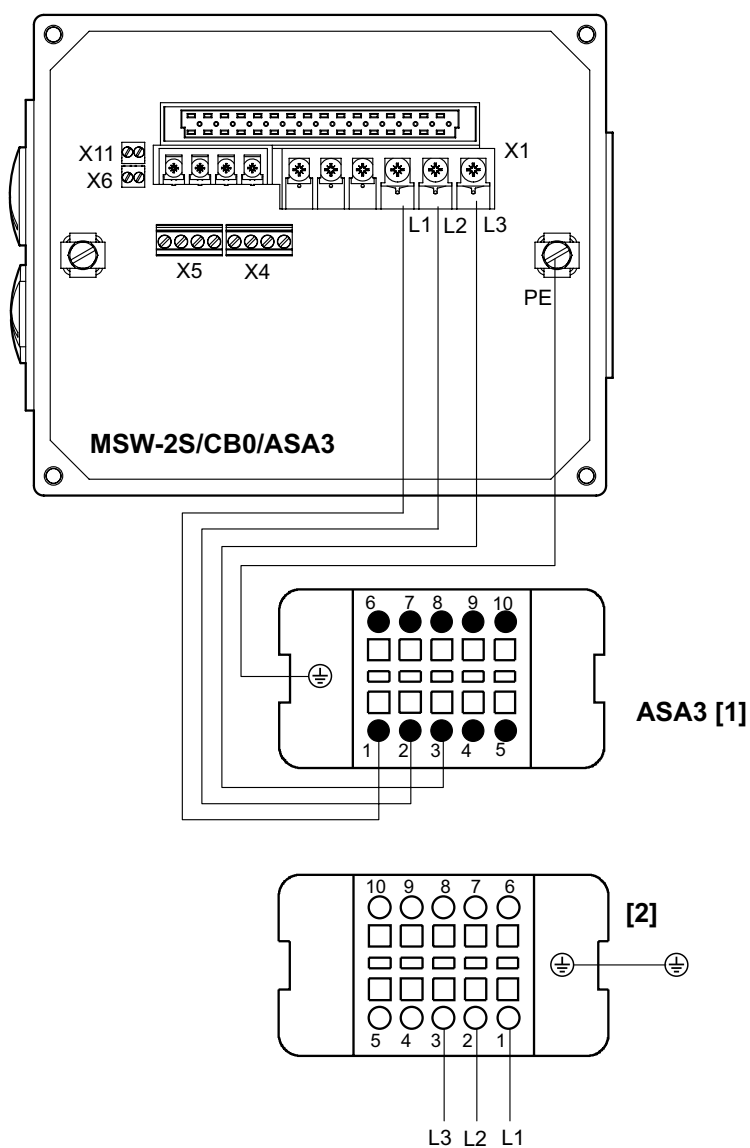
996676363

Terminal	Function
X1	L1 Supply system terminal
	L2 Supply system terminal
	L3 Supply system terminal
	13 Brake connection (red)
	14 Brake connection (white)
	15 Brake connection (blue)
	1 24 V alternate 24 V supply (reserved for plug connector variants)
	2 L CCW/stop (reserved for plug connector variants)
	3 0V GND (reserved for plug connector variants)
	4 R CW/stop (reserved for plug connector variants)
X4	BR+ for internal wiring
	TF1 for internal wiring
	BR- for internal wiring
	TF2 for internal wiring
X5	1 for internal wiring
	2 for internal wiring
	3 for internal wiring
	4 for internal wiring
X6	OK for internal wiring
	0V for internal wiring
X11	L for internal wiring
	R for internal wiring



5.3.6 Assignment of ASA3 plug connectors

The following illustration shows the assignment of the optional ASA3 plug connector.



997311499

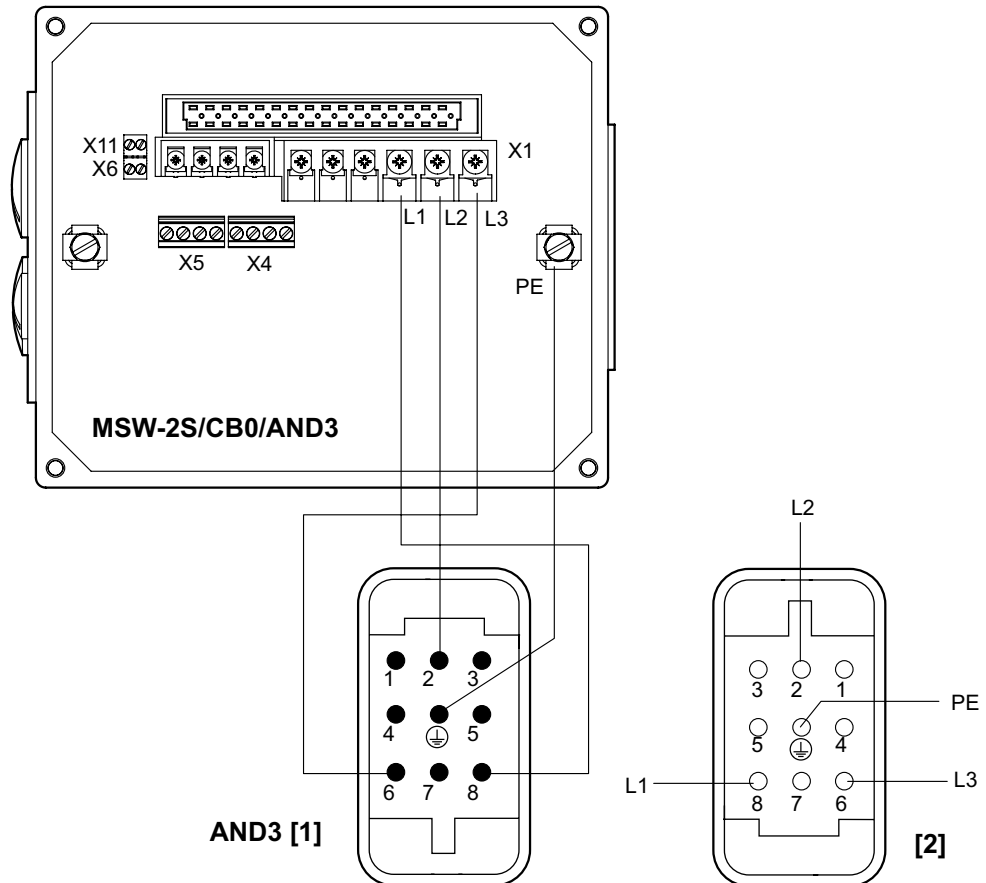
[1] ASA3 plug connector (plug)

[2] Plug connector (socket)



5.3.7 Assignment of AND3 plug connectors

The following illustration shows the assignment of the optional AND3 plug connector.



997383947

- [1] Plug connector AND3 (plug)
[2] Plug connector (socket)

5.3.8 Connection between MOVI-SWITCH® and motor when mounting close to the motor

If the MOVI-SWITCH®-2S control unit with option P22 is mounted close to the motor, it is connected to the motor with a pre-fabricated cable.

The following designs are possible on the MOVI-SWITCH® side:

- A: MSW-2S-07A/C.0/P22A/RI2A/**APG4**
MSW-2S-07A/C.0/**CC15**/P22A/RI2A/**APG4** (with line protection)
- B: MSW-2S-07A/C.0/P22A/RI2A/**ALA4**
MSW-2S-07A/C.0/**CC15**/P22A/RI2A/**ALA4** (with line protection)

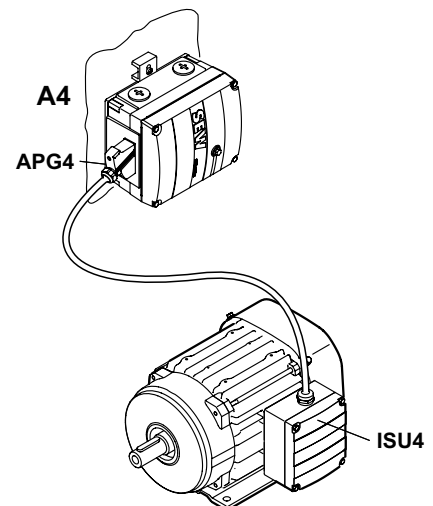
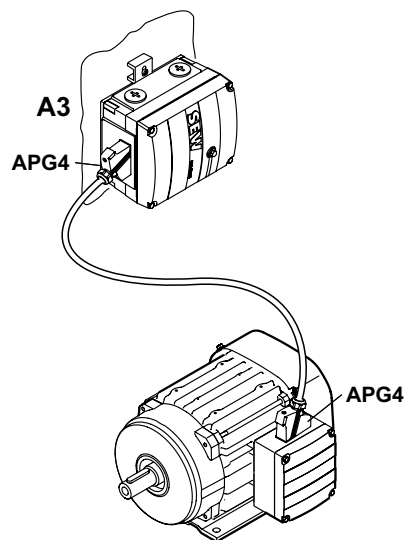
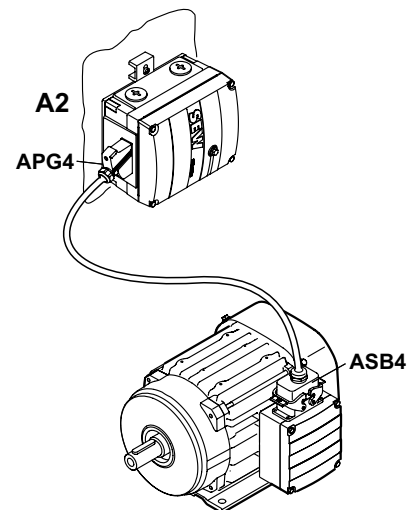
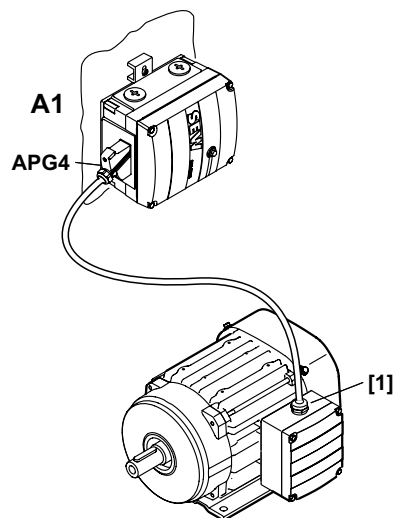


Electrical Installation

MOVI-SWITCH®-2S/CB0 (binary control)

The APG4 design results in the following connection options to the motor, depending upon the hybrid cable used:

Design	A1	A2	A3	A4
MOVI-SWITCH®	APG4	APG4	APG4	APG4
Motor	Cable gland / terminals	ASB4	APG4	ISU4
Hybrid cable	0817 887 9	0817 889 5	0186 741 5	0593 278 5 人 (DR.63) 0593 755 8 人 (DR.71-DR.112)
Additional information	(see page 42)			



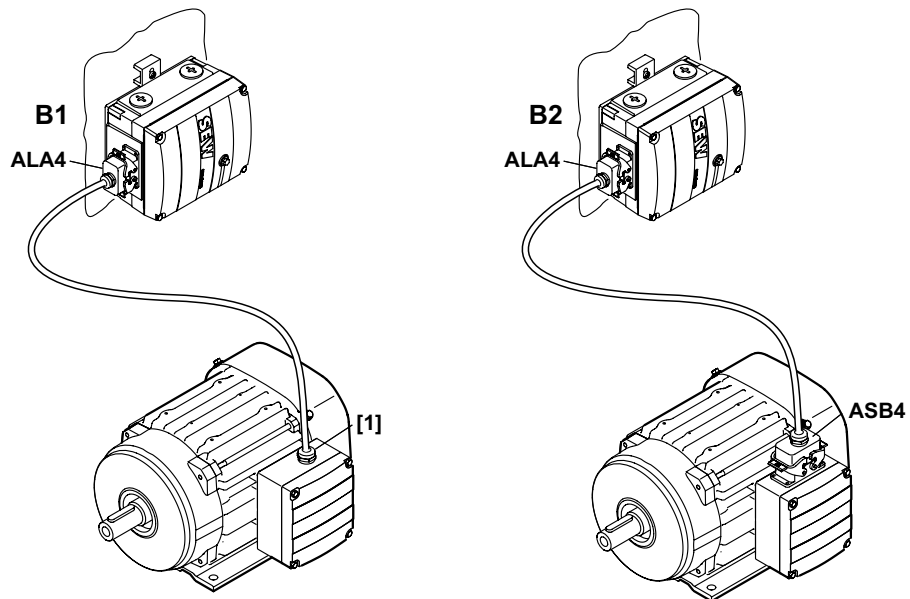
1070941451

[1] Connection via cable gland



The ALA4 design results in the following connection options to the motor, dependent upon the hybrid cable used:

Design	B1	B2
MOVI-SWITCH®	ALA4	ALA4
Motor	Cable gland / terminals	ASB4
Hybrid cable	0817 886 0	0817 888 7
Additional information	(see page 42)	

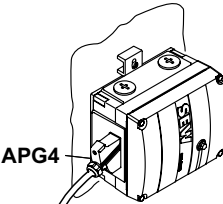
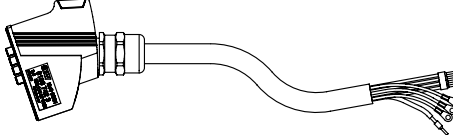
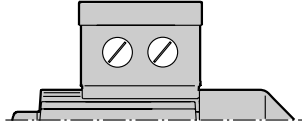
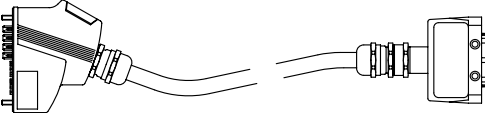
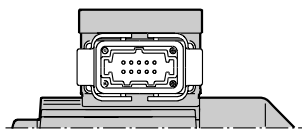
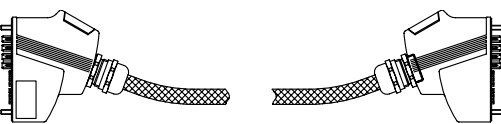
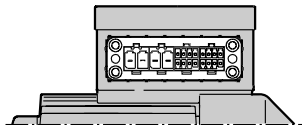
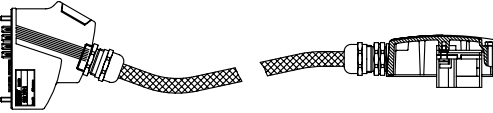
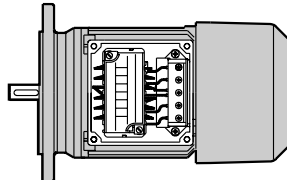
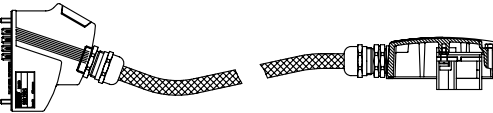
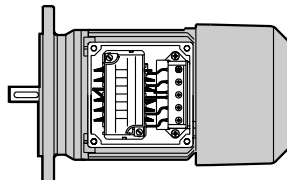
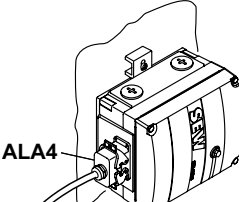
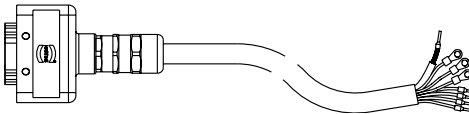
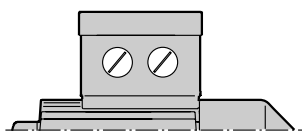
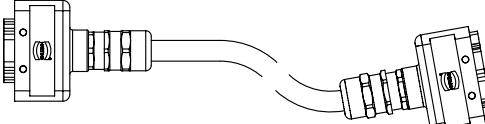
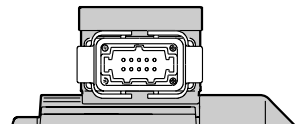


1071000331

[1] Connection via cable gland



5.3.9 Hybrid cable

MOVI-SWITCH®	Design	Hybrid cable	Drive
MSW-2S../C.0/P22A/RI2A/ APG4 MSW-2S../C.0/CC15/P22A/ RI2A/APG4¹⁾ 	A1	Part number: 0817 887 9 	AC motors with cable gland 
	A2	Part number: 0817 889 5 	AC motors with ASB4 plug connector 
	A3	Part number: 0 186 741 5 	AC motors with APG4 plug connector 
	A4	Part number: 0 593 278 5 (人) 	AC motors with plug connector ISU4 Size DR.63 
	A4	Part number: 0 593 755 8 (人) 	AC motors with plug connector ISU4 Size DR.71 - DR.112 
MSW-2S../C.0/P22A/RI2A/ ALA4 MSW-2S../C.0/CC15/P22A/ RI2A/ALA4¹⁾ 	B1	Part number: 0817 886 0 	AC motors with cable gland 
	B2	Part number: 0817 888 7 	AC motors with ASB4 plug connector 

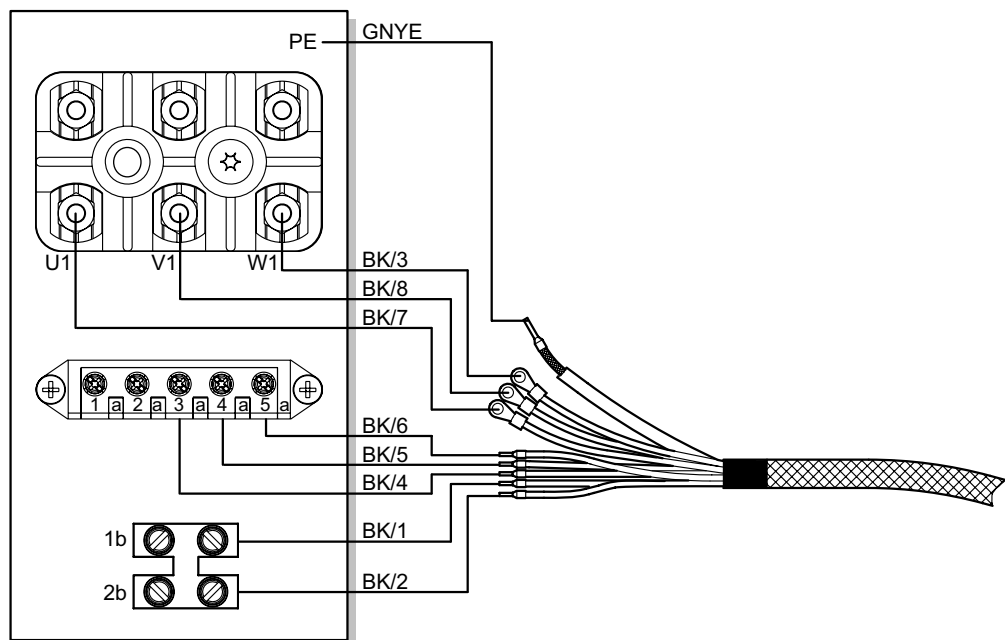
1) with line protection



5.3.10 Hybrid cable connection

The following tables shows the conductor assignment in hybrid cables with part no. 0817 887 9 and 0817 886 0 and the corresponding motor terminals:

Motor terminal	Wire color/hybrid cable designation
U1	Black/7
V1	Black/8
W1	Black/3
3a	Black/4
4a	Black/5
5a	Black/6
1b	Black / 1 (shielded)
2b	Black / 2 (shielded)
PE terminal	Green / yellow + shield end (internal shield)



1008298379



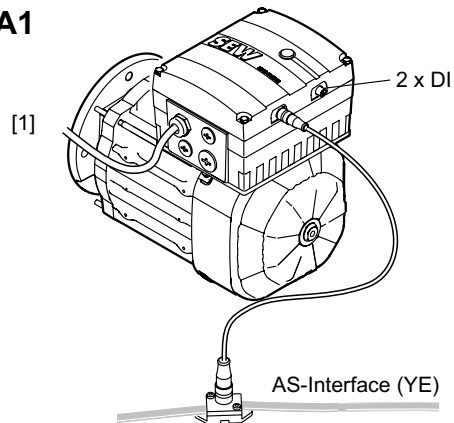
5.4 MOVI-SWITCH®-2S/CK0 (control with AS-Interface)

5.4.1 Connection options for supply system and control

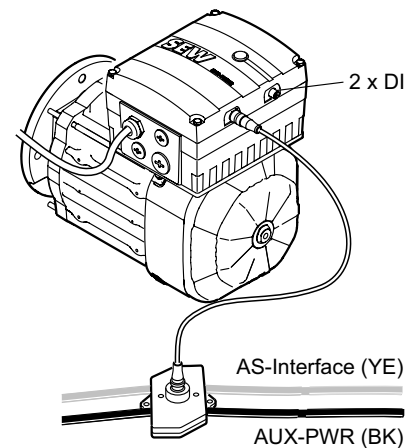
Design A: DR../MSW/CK0

Design	A1	A2
Unit designation	DR../MSW/CK0	DR../MSW/CK0/RA2A
Switch S1	0	1
AS-Interface connection	Yellow AS-Interface cable via connector X102	Yellow AS-Interface cable via connector X102
24 V supply	Yellow AS-Interface cable via connector X102	Black AS-Interface cable via connector X102
Supply system connection	Terminals	Terminals
Additional information	(see page 47), (see page 46)	

A1



A2



1071478667

[1] Supply system



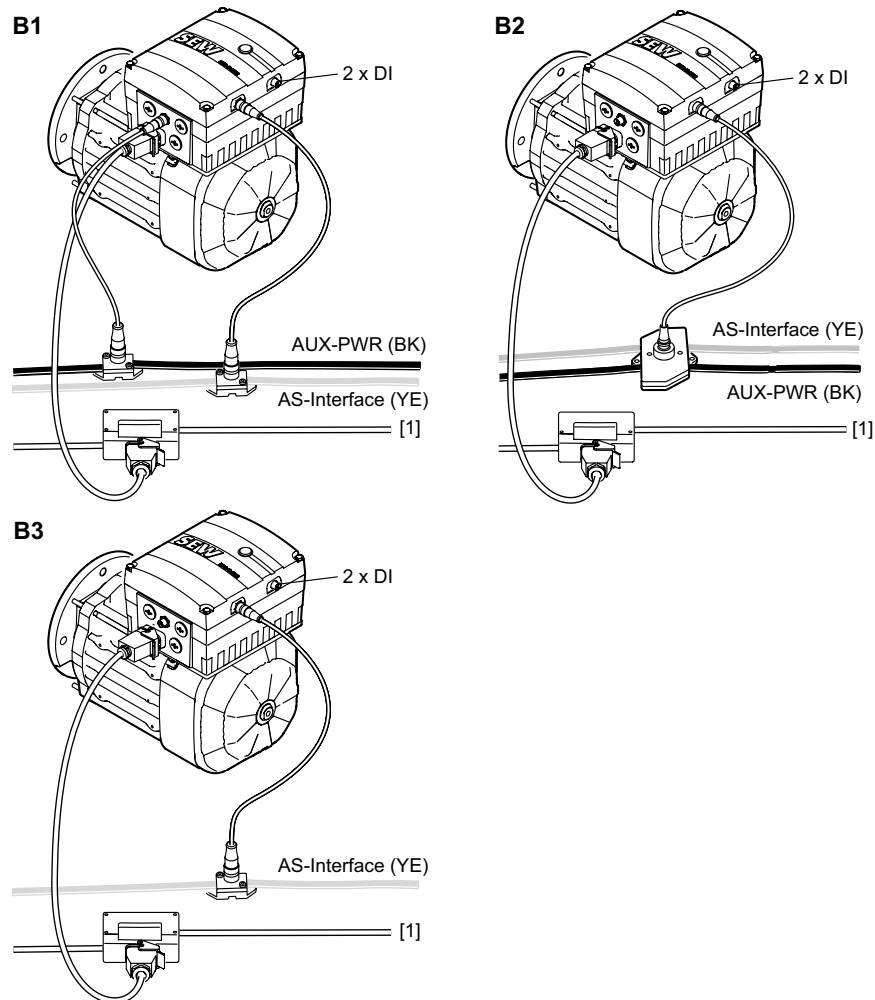
NOTE

The designs listed above are also valid for mounting the MOVI-SWITCH® terminal box with option P22A close to the motor.



Design B: DR../MSW/CK0/AND3/AVS0

Design Unit designation	B1 DR../MSW/CK0/AND3/ AVS0	B2 DR../MSW/CK0/AND3/ AVS0	B3 DR../MSW/CK0/AND3/ AVS0
Switch S1	1	1	0
AS-Interface connection	Yellow AS-Interface cable via connector X102	Yellow AS-Interface cable via connector X102	Yellow AS-Interface cable via connector X102
24 V supply	Black AS-Interface cable via connector AVS0 (terminal box)	Black AS-Interface cable via connector X102	Yellow AS-Interface cable via connector X102
Supply system connection	AND3 plug connector	AND3 plug connector	AND3 plug connector
Additional information	(see page 48), (see page 46)		



1071551755

[1] Supply system



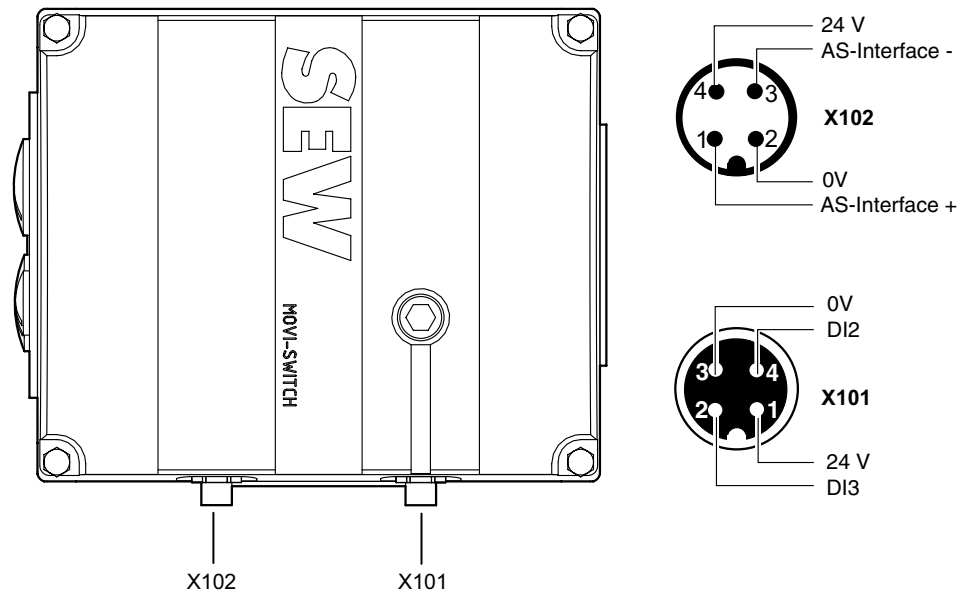
NOTE

The designs listed above are also valid for mounting the MOVI-SWITCH® terminal box with option P22A close to the motor.



5.4.2 Connector/socket assignment for MOVI-SWITCH®-2S/CK0 control unit

The following illustration shows the assignment of the plug X102 and X101.



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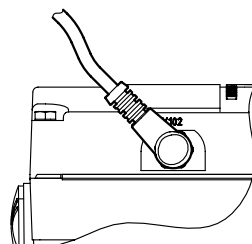
PIN	Assign- ment	Function
X102	1	AS-Inter- face + AS-Interface data cable + Voltage supply for MSW, if switch AUX-PWR (S1) = 0
	2	⊥ Reference potential 0V24
	3	AS-Inter- face - AS-Interface data cable - Voltage supply for MSW, if switch AUX-PWR (S1) = 0
	4	24 V DC 24 V power supply, if switch AUX-PWR (S1) = 1 (as an alternative to the power supply via AS-Interface data cable)
X101	1	24 V DC 24 V power supply for sensors
	2	DI3 Control signal of sensor 2
	3	⊥ 0V24 reference potential for sensors
	4	DI2 Control signal of sensor 1



NOTE

If angular plug connectors are used for the connection for X102 and X101, they can only be mounted in the position shown in the following figure!

For this reason, it is recommended using straight plug connectors!

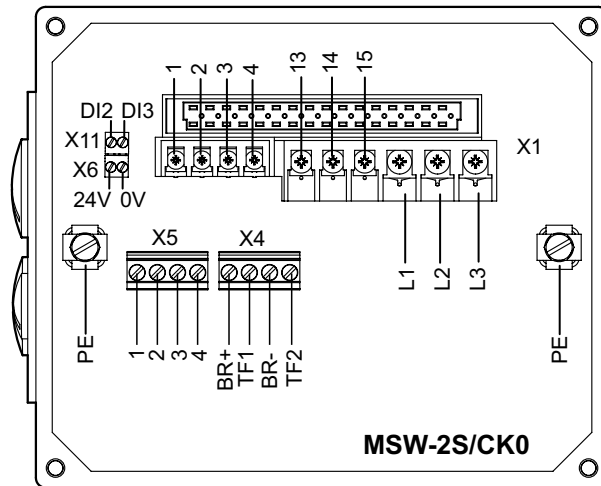


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5.4.3 Terminal assignment

The following figure shows the assignment of MOVI-SWITCH®-2S/CK0 terminals.

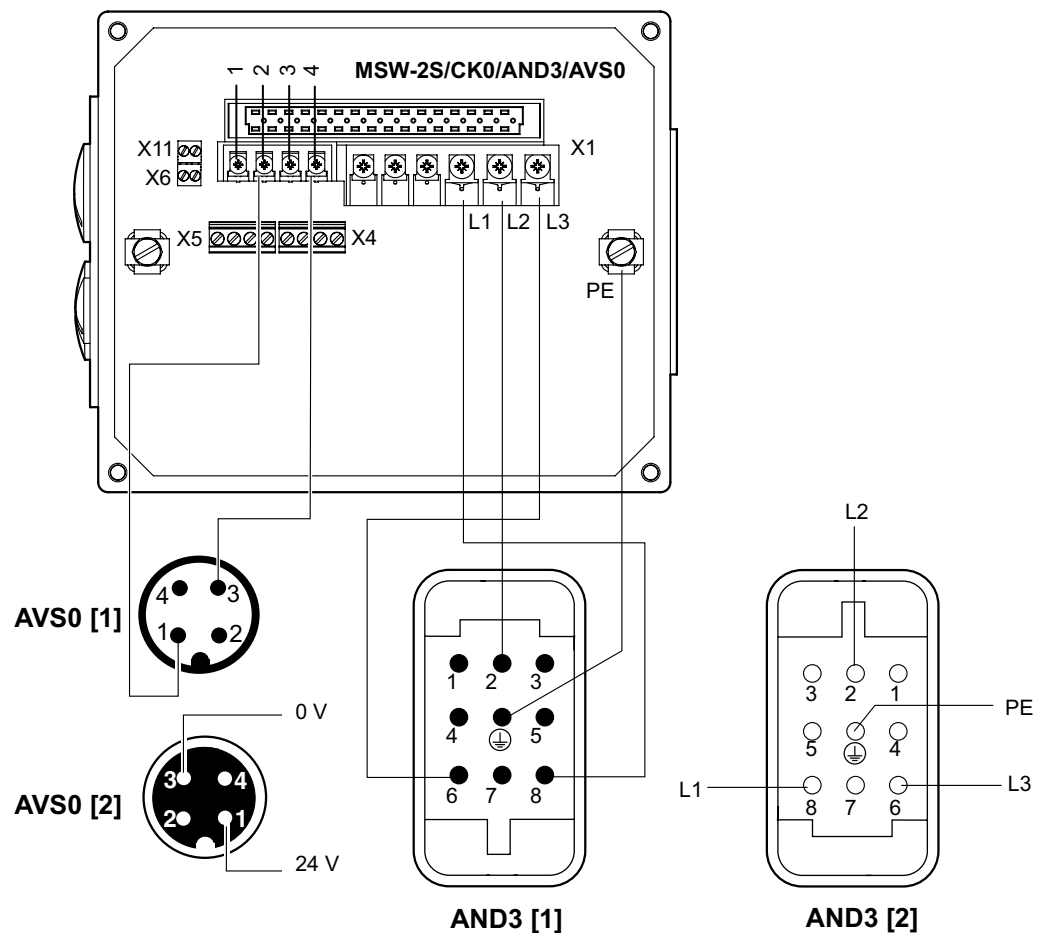


1009137035

Terminal	Function
X1	L1 Supply system terminal
	L2 Supply system terminal
	L3 Supply system terminal
	13 Brake connection
	14 Brake connection
	15 Brake connection
	1 AS-Interface + AS-Interface data cable + (reserved for plug connector variants)
	2 24 V: DC 24 V power supply (reserved for plug connector variants)
	3 AS-Interface - AS-Interface data cable - (reserved for plug connector variants)
X4	4 0V24 reference potential 0V24 (reserved for plug connector variants)
	BR+ for internal wiring
	TF1 for internal wiring
	BR- for internal wiring
X5	TF2 for internal wiring
	1 for internal wiring
	2 for internal wiring
	3 for internal wiring
X6	4 for internal wiring
	24 V for internal wiring
X11	0 V for internal wiring
	DI2 for internal wiring
X11	DI3 for internal wiring



5.4.4 Variant with AND3 + AVS0



1009420939

- [1] AVS0 plug connector (plug, standard coding)
- [2] Plug connector (socket, standard coding)
- [3] Plug connector AND3 (plug)
- [4] Plug connector (socket)

5.4.5 Connection between MOVI-SWITCH® and motor when mounted close to the motor

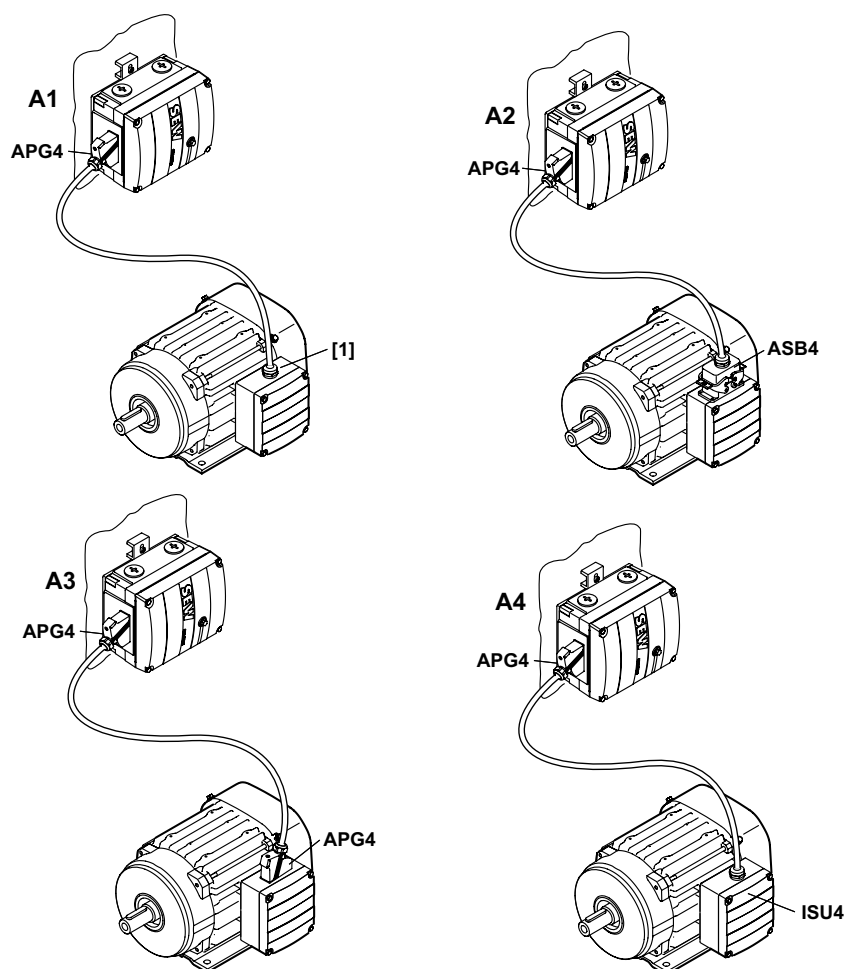
If the MOVI-SWITCH®-2S control unit with option P22 is mounted close to the motor, it is connected to the motor with a pre-fabricated cable. The following designs are possible on the MOVI-SWITCH® side:

- A: MSW-2S-07A/C.0/P22A/RI2A/**APG4**
MSW-2S-07A/C.0/**CC15**/P22A/RI2A/**APG4** (with line protection)
- B: MSW-2S-07A/C.0/P22A/RI2A/**ALA4**
MSW-2S-07A/C.0/**CC15**/P22A/RI2A/**ALA4** (with line protection)



The APG4 design results in the following connection options to the motor, dependent upon the hybrid cable used:

Design	A1	A2	A3	A4
MOVI-SWITCH®	APG4	APG4	APG4	APG4
Motor	Cable gland / terminals	ASB4	APG4	ISU4
Hybrid cable	0817 887 9	0817 889 5	0186 741 5	0593 278 5 人 (DR.63) 0593 755 8 人 (DR.71-DR.112)
Additional information	(see page 51)			



1070941451

[1] Connection via cable gland

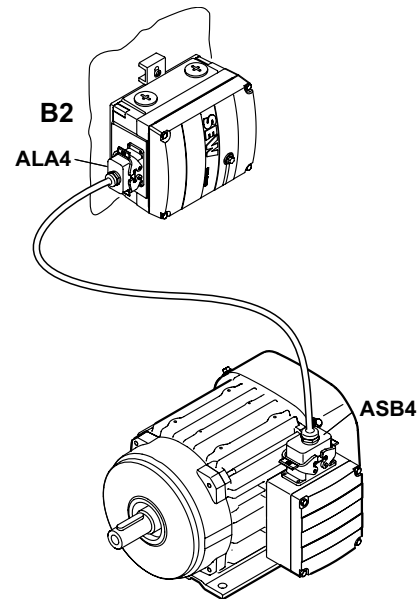
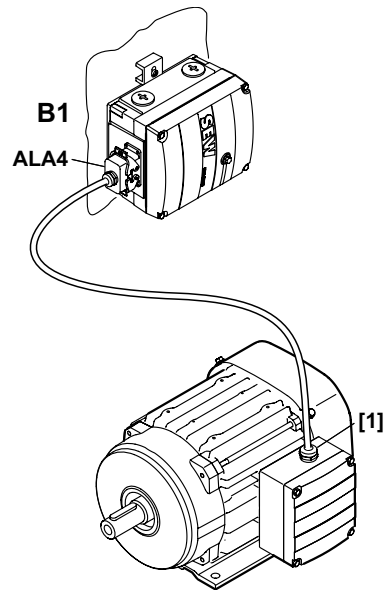


Electrical Installation

MOVI-SWITCH®-2S/CK0 (control with AS-Interface)

The ALA4 design results in the following connection options to the motor, dependent upon the hybrid cable used:

Design	B1	B2
MOVI-SWITCH®	ALA4	ALA4
Motor	Cable gland / terminals	ASB4
Hybrid cable	0817 886 0	0817 888 7
Additional information	(see page 51)	

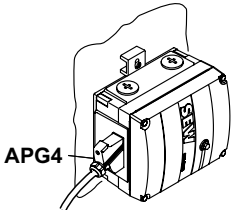
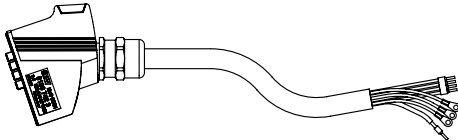
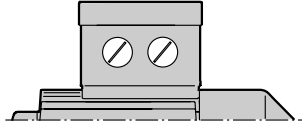
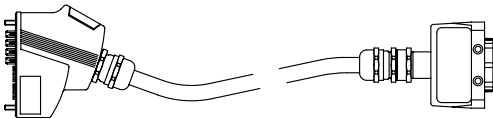
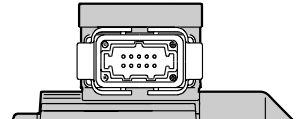
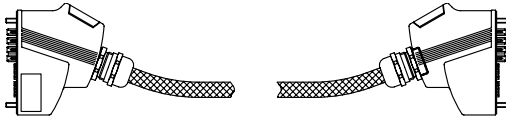
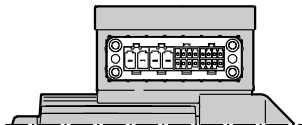
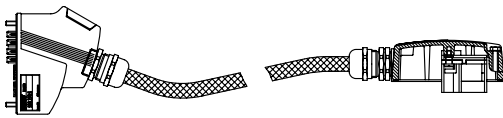
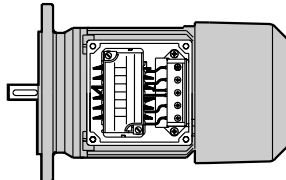
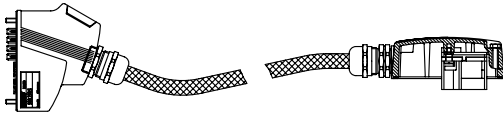
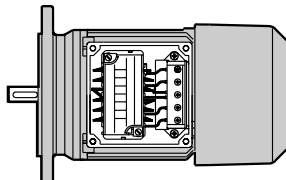
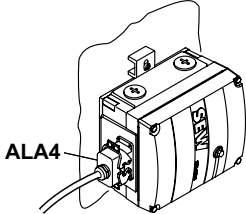
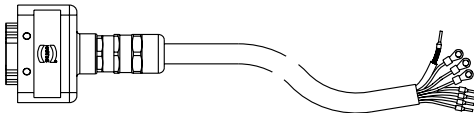
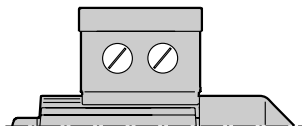
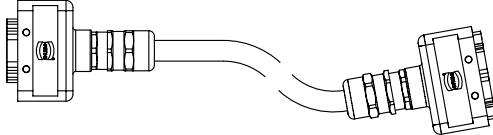
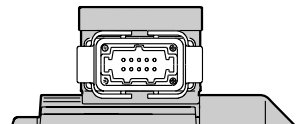


1071000331

[1] Connection via cable gland



5.4.6 Hybrid cable

MOVI-SWITCH®	Design	Hybrid cable	Drive
MSW-2S../C.0/P22A/RI2A/ APG4 MSW-2S../C.0/CC15/P22A/ RI2A/APG4¹⁾ 	A1	Part number: 0817 887 9 	AC motors with cable gland 
	A2	Part number: 0817 889 5 	AC motors with ASB4 plug connector 
	A3	Part number: 0 186 741 5 	AC motors with APG4 plug connector 
	A4	Part number: 0 593 278 5 (人) 	AC motors with plug connector ISU4 Size DR.63 
	A4	Part number: 0 593 755 8 (人) 	AC motors with plug connector ISU4 Size DR.71 - DR.112 
MSW-2S../C.0/P22A/RI2A/ ALA4 MSW-2S../C.0/CC15/P22A/ RI2A/ALA4¹⁾ 	B1	Part number: 0817 886 0 	AC motors with cable gland 
	B2	Part number: 0817 888 7 	AC motors with ASB4 plug connector 

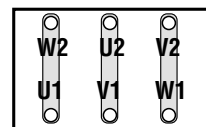
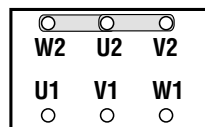
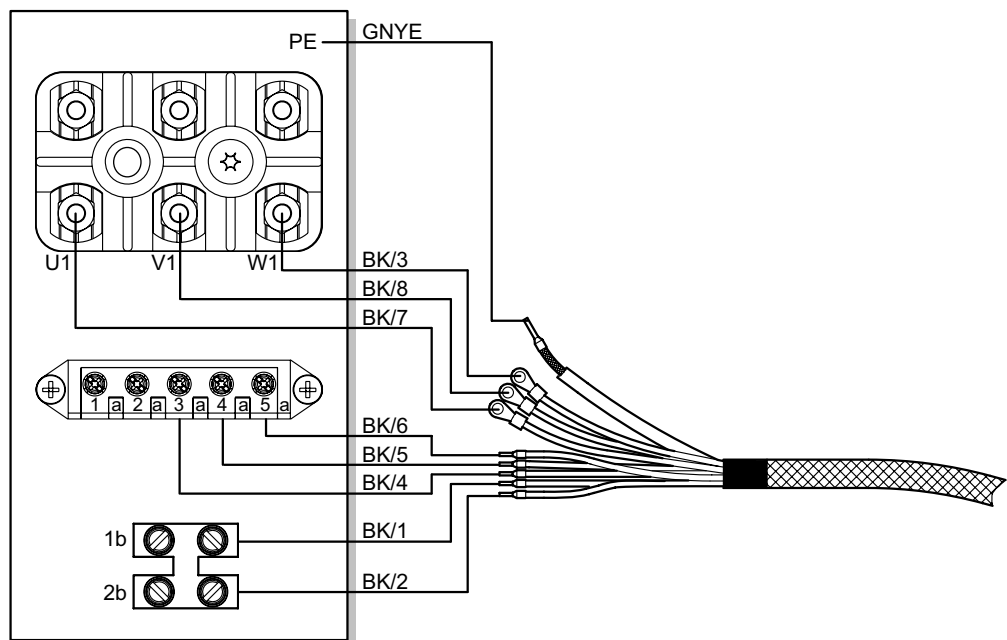
1) with line protection



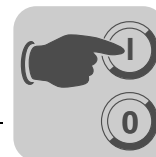
5.4.7 Hybrid cable connection

The following tables shows the conductor assignment in hybrid cables with part no. 0817 887 9 and 0817 886 0:

Motor terminal	Core color / designation
U1	Black/7
V1	Black/8
W1	Black/3
3a	Black/4
4a	Black/5
5a	Black/6
1b	Black / 1 (shielded)
2b	Black / 2 (shielded)
PE terminal	Green / yellow + shield end (internal shield)



1008298379



6 Startup


6.1 Startup notes (all MOVI-SWITCH® variants)

Before startup, make sure that

- the drive is undamaged and not blocked,
- all connections have been established correctly,
- the direction of rotation of the motor/gearmotor is correct,
- and all protective covers have been installed correctly.

During startup, make sure that

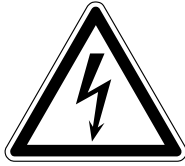
- the motor is running correctly (no speed fluctuations, no loud noises, etc.).

	<p>STOP!</p>
	<p>On brake motors with a self-reengaging manual brake release, the hand lever must be removed after startup! A bracket is provided for storing the lever on the outside of the motor.</p>



6.2 Starting up MOVI-SWITCH®-1E

6.2.1 Starting the motor



! HAZARD!

Voltage is always present in the terminal box (even when the motor is at a standstill).

Severe or fatal injuries from electric shock.

- Before opening the terminal box, de-energize it and safeguard it against unintentional power-up.

1. Check the connection of the MOVI-SWITCH® drive.
2. Connect the supply system voltage.
3. The drive is switched on/off using the control signal "RUN" if the supply voltage is connected permanently (terminals U1, V1, W1).

6.2.2 Monitoring

- The power semiconductors of the motor switch and motor winding are subject to thermal monitoring.
- If an overload occurs, the MOVI-SWITCH® drive switches off automatically.
- The monitoring status is indicated by the 24 V output signal "OK".
- The "OK" output signal must be evaluated by a higher-level controller (e.g. PLC).



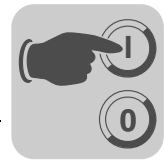
! HAZARD!

If signal "RUN" = "1", there is a risk that, after the drive has been switched off due to overtemperature, the drive might restart automatically after cooling down.

Severe or fatal injuries.

- If automatic restarting could pose a risk to persons or components, you must implement an external restart lock.

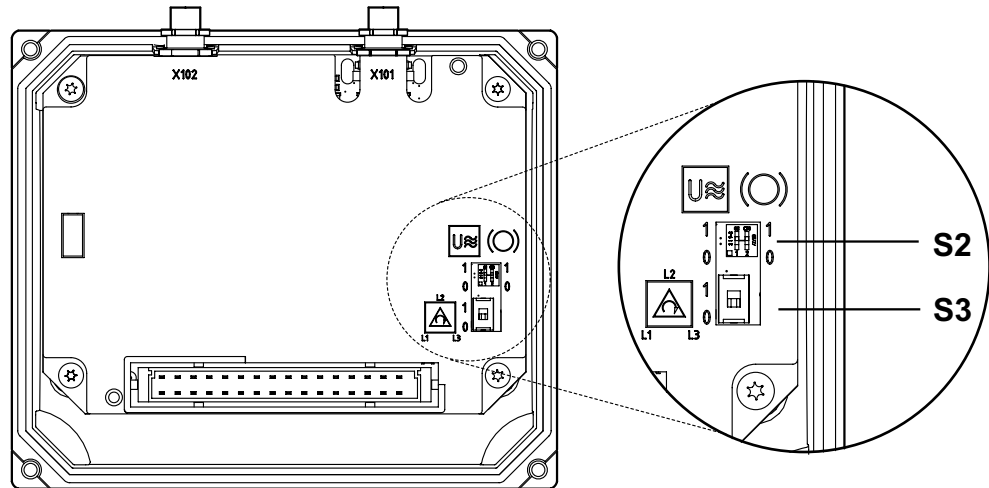
- The MOVI-SWITCH® module is protected against overvoltages.



6.3 Starting up MOVI-SWITCH®-2S/CB0 (binary control)




6.3.1 Description of DIP switches

MOVI-SWITCH®-2S/CB0 has 2 DIP switches (S2 and S3). The functions are listed in the following table.



1013697931

Description of the DIP switches

Status	 S3	 S2/1	 S2/2
1	Monitoring of phase sequence is activated	Monitoring of supply and phase fault is activate	Reserved for special designs
0	Monitoring of phase sequence is deactivated	Monitoring of supply and phase fault deactivated	

DIP switches S3

DIP switch S3 is used for monitoring the phase sequence

S3 = 1: The motor of direction is determined by the control terminals, i.e. it is independent of the phase sequence of the power supply.

S3 = 0: The motor of direction is determined by the phase sequence of the power supply and the control terminals. Changing the phases changes the direction of rotation.



Startup

Starting up MOVI-SWITCH®-2S/CB0 (binary control)

DIP switch S2/1

DIP switch S2/1 is used to set the supply system and phase failure monitoring function.

S2/1 = 1: Supply system and phase failure monitoring is active. The "OK" output signal must be evaluated by a higher-level controller (e.g. PLC).

	HAZARD!
	<p>Motor restarts automatically when supply system voltage is present again. Severe or fatal injuries.</p> <ul style="list-style-type: none"> If automatic restarting could pose a risk to persons or components, you must implement an external restart lock.

S2/1 = 0: Supply system and phase failure monitoring is not active. The MOVI-SWITCH® drive does not distinguish between supply system or phase failure.

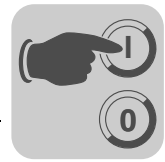
6.3.2 Starting the motor

	HAZARD!
	<p>Voltage is always present in the terminal box (even when the motor is at a standstill). Severe or fatal injuries from electric shock.</p> <ul style="list-style-type: none"> Before opening the terminal box, de-energize it and safeguard it against unintentional power-up.

1. Check the connection of the MOVI-SWITCH® drive.
2. Connect the supply system voltage.
3. The drive is switched on/off using the control signals "CW" or "CCW" if the supply voltage is connected permanently (terminals L1, L2, L3).

6.3.3 Temperature monitoring

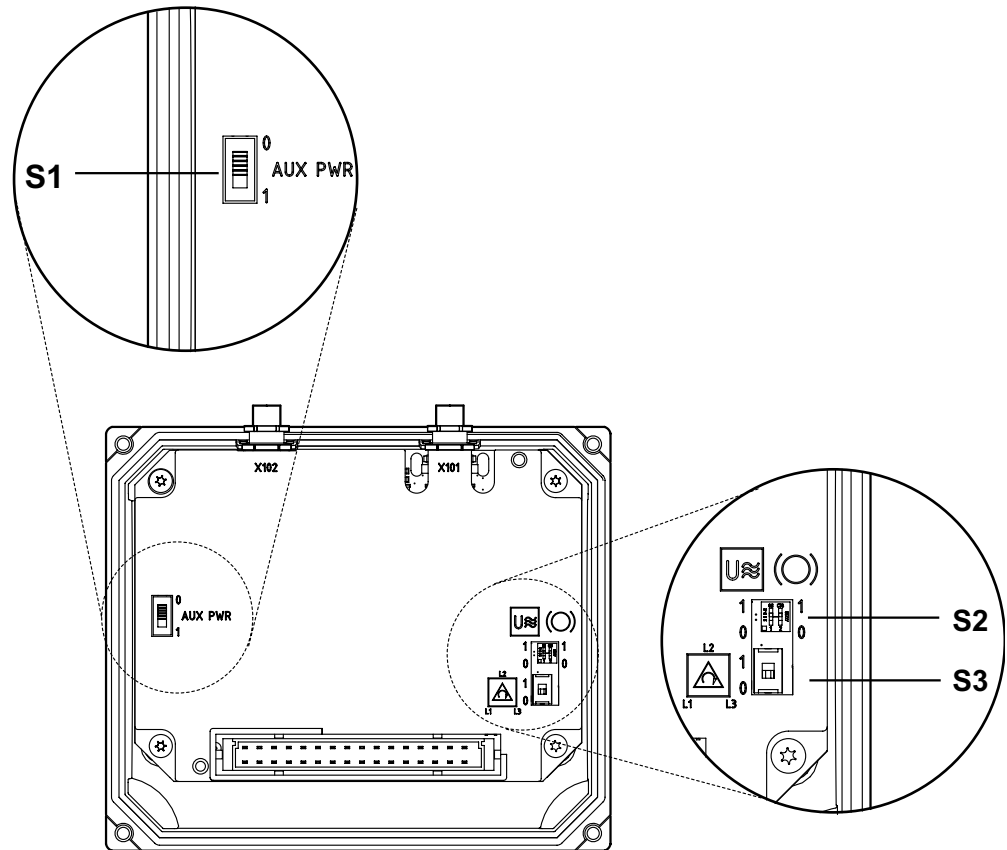
- The temperature of the motor winding is monitored.
- If an overload occurs, the MOVI-SWITCH® drive switches off automatically.
- The monitoring status is indicated by the 24 V output signal "OK".
- The "OK" output signal must be evaluated by a higher-level controller (e.g. PLC).



6.4 Starting up MOVI-SWITCH®-2S/CK0 (control via AS-Interface)

6.4.1 Description of DIP switches

MOVI-SWITCH®-2S-CK0 has 3 DIP switches (S1, S2 and S3). The functions are listed in the following tables.






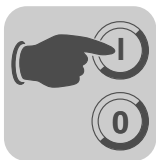
1014376715

AUX-PWR (S1) switch:

Status	AUX-PWR (S1)
0	24 V supply via AS-Interface data cable
1	24 V supply via AUX-PWR (X102 pin 4 + pin 2)

DIP switches S2 and S3:

Status	 S3	 S2/1	 S2/2
1	Monitoring of phase sequence is activated	Monitoring of supply and phase fault is activate	Reserved for special designs
0	Monitoring of phase sequence is deactivated	Monitoring of supply and phase fault deactivated	



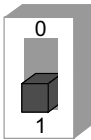
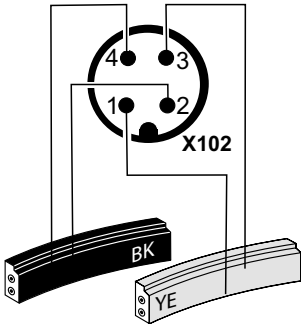
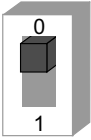
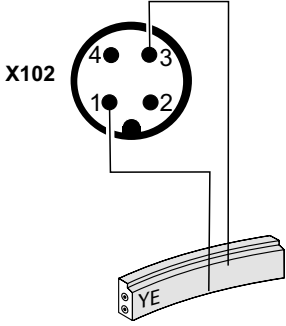
Startup

Starting up MOVI-SWITCH®-2S/CK0 (control via AS-Interface)

DIP switch S1

DIP switch S1 sets the type of 24 V power supply.

Please observe the notes in chapter "Connection options for supply and control" (see page 44).

Switch	24 V supply
AUX-PWR (S1) switch = 1  AUX-PWR (S1) 1014453131	Supplying MOVI-SWITCH® via AUX-PWR (e.g. black cable)  1014552459
AUX-PWR (S1) switch = 0  AUX-PWR (S1) 1014601355	Supplying MOVI-SWITCH® via the AS-Interface data cable  1014637451

DIP switches S3

DIP switch S3 is used for setting phase sequence monitoring.

- S3 = 1:** The motor of direction is determined by the control terminals, i.e. it is independent of the phase sequence of the power supply.
- S3 = 0:** The motor of direction is determined by the phase sequence of the power supply and the control terminals. Changing the phases changes the direction of rotation.



DIP switch S2/1

DIP switch S2/1 is used to set the supply system and phase failure monitoring function.

S2/1 = 1: Supply system and phase failure monitoring is active. The "OK" output signal must be evaluated by a higher-level controller (e.g. PLC).

	HAZARD!
	<p>Motor restarts automatically when supply system voltage is present again. Severe or fatal injuries.</p> <ul style="list-style-type: none"> If automatic restarting could pose a risk to persons or components, you must implement an external restart lock.

S2/1 = 0: Supply system and phase failure monitoring is not active. The MOVI-SWITCH® drive does not distinguish between supply system or phase failure.

6.4.2 Data from AS-Interface master to MOVI-SWITCH®

The following table shows the 4 data bits that are transferred from the AS-Interface master to the MOVI-SWITCH® drive:

Bit	Function
D0	CW operation/stop "R"
D1	CCW operation/stop "L"
D2	-
D3	Enable/reset

6.4.3 Data from MOVI-SWITCH® to the AS-Interface master

The following table shows the 4 data bits that are transferred via AS-Interface from the MOVI-SWITCH® drive back to the master:

Bit	Function
D0	Ready signal, "OK"
D1	-
D2	Sensor 1 (M12 socket, pin 4)
D3	Sensor 2 (M12 socket, pin 2)

**6.4.4 Assigning the slave address**

MOVI-SWITCH® drives with integrated AS-Interface are supplied with address 0 ex works. The AS-Interface address (address 1 to 31) is assigned as follows:

- Addresses are assigned automatically within a configured AS-Interface system when replacing a MOVI-SWITCH® drive. The following prerequisites must be fulfilled for this purpose:
 - The new MOVI-SWITCH® drive must have address 0.
 - If you need to replace multiple MOVI-SWITCH® drives, you must exchange them individually (one after another).
- Manual address assignment via the system master.

The drives must be connected to the AS-Interface cable one after another. This prevents that MOVI-SWITCH® drives have the same address.

- Manual address assignment using a hand-held AS-Interface programming device.

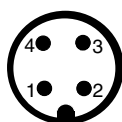
Before connecting the MOVI-SWITCH® drive to the AS-Interface cable, read the following chapter.

Assigning the slave address using a hand-held programming device

Hand-held AS-Interface programming devices offer the following functions:

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

You need a 2-core connection cable for using a hand-held programming device. This cable connects the hand-held programming device to the AS-Interface plug connector at MOVI-SWITCH®-2S-CK0 (see following figure).



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

1015744523

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

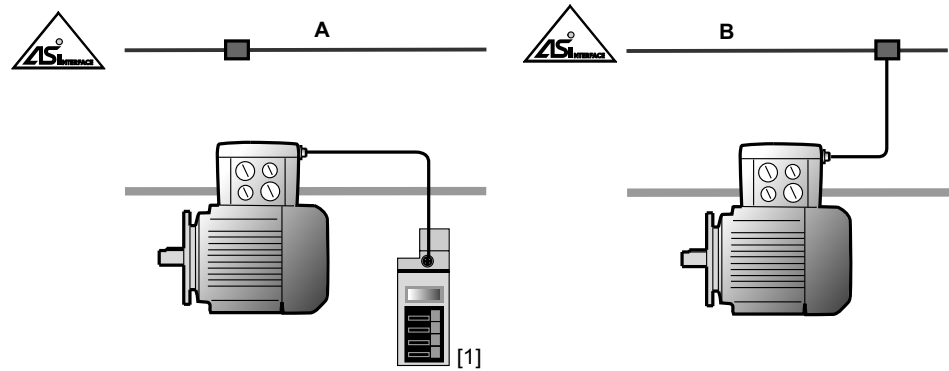
**STOP!**

- The hand-held programming device may only be connected via pins 1 "AS-Interface +" and 3 "AS-Interface -" with the AS-Interface plug connector.
- For address assignment via a hand-held programming device, the AUX-PWR switch (S1) in the MOVI-SWITCH® control unit must be set to 1!
- Once address assignment is complete, the AUX-PWR switch (S1) must be set according to the type of 24 V power supply.



Example

Each AS-Interface station is disconnected from the network individually and assigned an address with the hand-held programming device (A). Then the station is connected to AS-Interface again (B).



1015780363

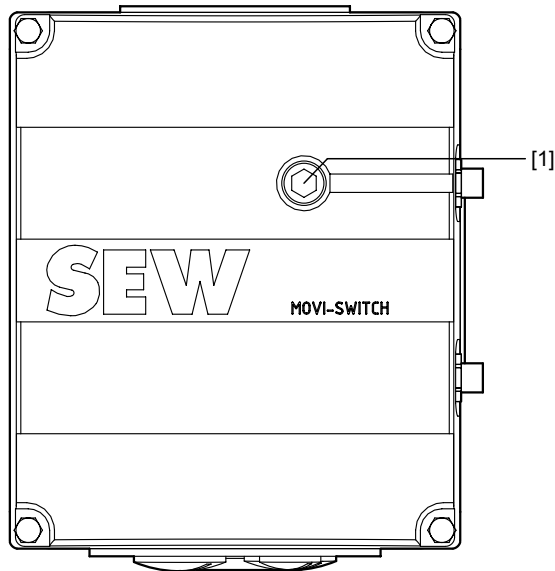
[1] AS-Interface addressing device



7 Operation

7.1 Operating display (binary control)

The 3-colored status LED is located in the cover of the MOVI-SWITCH® terminal box (see following figure).



1014078603

[1] Status LED

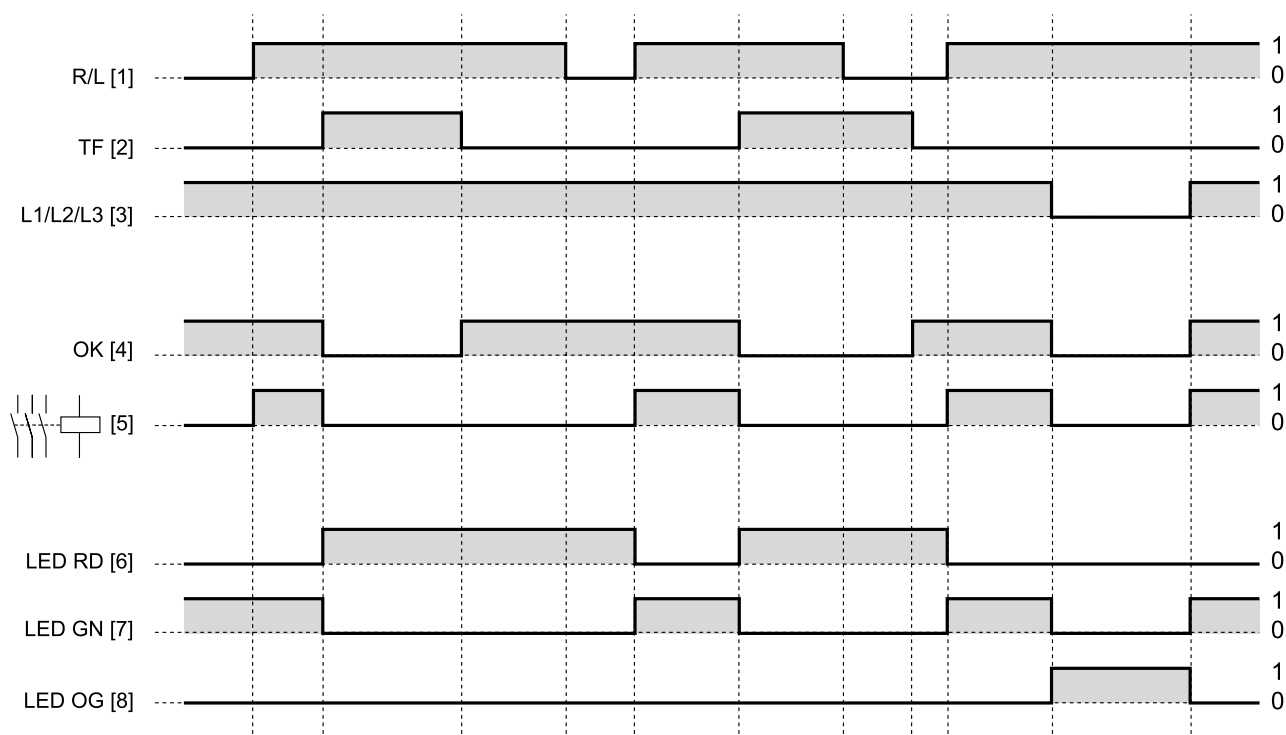
The LED can assume the following states:

Status LED	Operating status
Off	No 24 V power supply
Orange ¹⁾	24V supply available, supply system or phase fault
Red ²⁾	TF triggered
Green	Ready for operation (24 V supply available, supply system available)

- 1) This state is displayed as long as the supply system/phase failure lasts. Once the supply or phase fault has been repaired, the drive restarts automatically.
- 2) The error message is displayed until a new enable signal is received. The enable signal can only be issued once the fault has been corrected (indicated by the OK output).



7.1.1 LED status depends on signal level when supply system failure monitoring is active



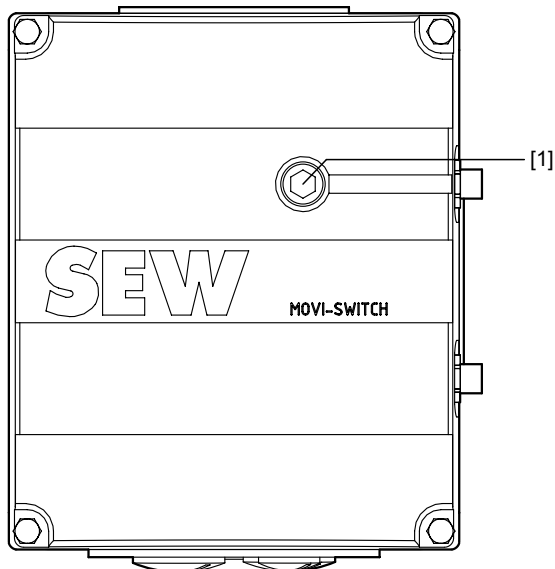
1014316939

- [1] Enable CW or CCW
- [2] TF signal
- [3] Line voltage
- [4] Ready signal
- [5] Motor contactor
- [6] LED red
- [7] LED green
- [8] LED orange



7.2 Operating display (control via AS-Interface)

The 2-colored status LED is located in the cover of the MOVI-SWITCH® terminal box (see following figure).



1014078603

[1] Status LED

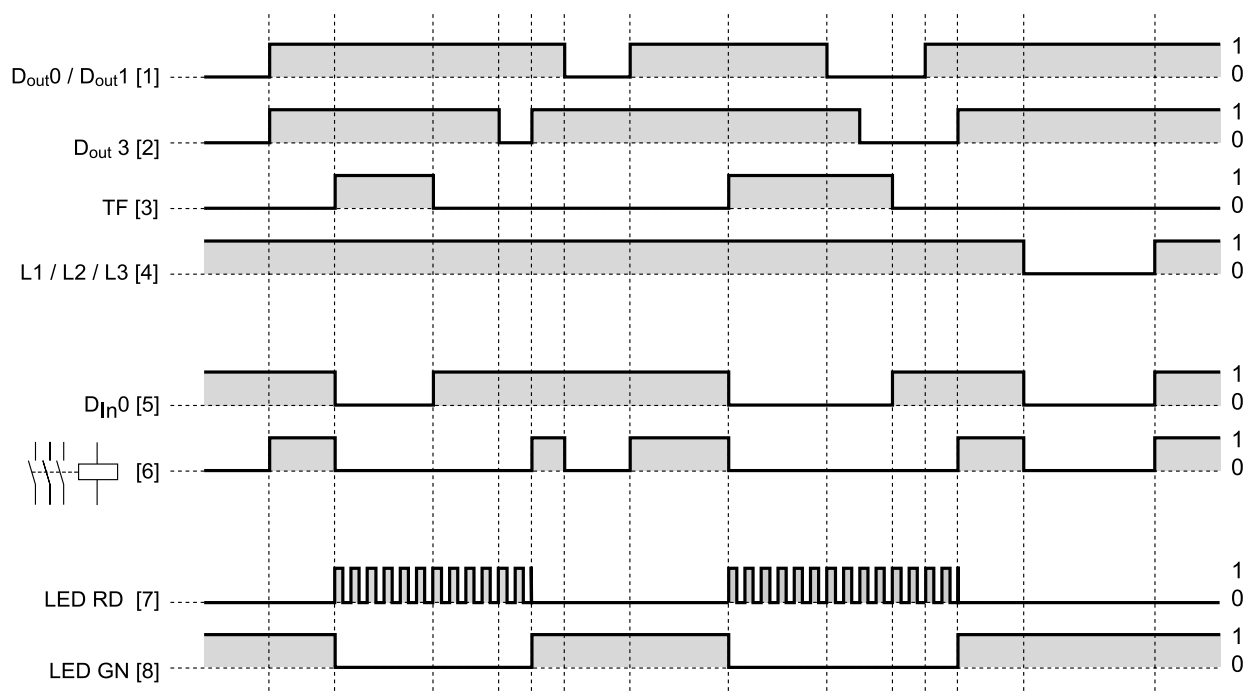
The LED can assume the following states:

Status LED	Operating status
Off	No connection to AS-Interface
Green	Normal operation (24 V supply and communication available, no error message)
Red	<ul style="list-style-type: none"> AS-Interface communication interrupted Slave address 0 set Slave address not configured in the AS-Interface master. Master in protected operating mode
Flashing red ¹⁾	Overtemperature in motor

1) The error message is displayed until a reset is performed by switching the enable signal off and on again. The reset (bit D3) can only be performed once the motor temperature is back down to normal values.



7.2.1 LED status depends on signal level when supply system failure monitoring is active (S2/1 = 1)



1014974475

- [1] Enable CW or CCW
- [2] Enable/reset
- [3] TF signal
- [4] Line voltage
- [5] Ready signal
- [6] Motor contactor
- [7] LED red (flashing)
- [8] LED green



8 Service

8.1 MOVI-SWITCH®-1E

Problem	Possible cause	Solution
Drive turns in the wrong direction	<ul style="list-style-type: none"> Incorrect phase sequence 	<ul style="list-style-type: none"> Swap two phases on the terminal board
Motor does not run, no current consumption	<ul style="list-style-type: none"> No supply system voltage 	<ul style="list-style-type: none"> Check incoming cable, correct Check line protection fuse, replace
	<ul style="list-style-type: none"> No control voltage 	<ul style="list-style-type: none"> Check DC 24 V signal (terminal 24 V), correct
	<ul style="list-style-type: none"> No enable signal 	<ul style="list-style-type: none"> Check "RUN" signal (terminal "RUN"), repair control error
	<ul style="list-style-type: none"> Not ready, OK signal LOW 	<ul style="list-style-type: none"> No control voltage (terminal 24 V), correct "OK" output connected to ground, correct Motor too hot, let it cool down, reduce load TF not connected, check connections, correct
Motor buzzes, high current consumption	<ul style="list-style-type: none"> Mechanical components blocking Brake does not release Winding defective 	<ul style="list-style-type: none"> Correct mechanical fault Service brakes according to chapter "Inspection and Maintenance" Replace drive

8.2 MOVI-SWITCH®-2S

Problem	Possible cause	Solution
Drive turns in the wrong direction	<ul style="list-style-type: none"> Phase sequence incorrect and DIP switch S3 deactivated 	<ul style="list-style-type: none"> Swap two phases on the terminal board Activate DIP switch S3 (S3 = 1)
	<ul style="list-style-type: none"> Odd number of gear unit stages 	<ul style="list-style-type: none"> Adjust CW/CCW operation in controller
Motor does not run, no current consumption	<ul style="list-style-type: none"> No supply system voltage 	<ul style="list-style-type: none"> Check incoming cable, correct Check line protection fuse, replace
	<ul style="list-style-type: none"> No control voltage 	<ul style="list-style-type: none"> Check DC 24 V signal (terminal 24 V), correct
	<ul style="list-style-type: none"> CW or CCW enable signal is missing 	<ul style="list-style-type: none"> Enable signal (terminal R/L), repair control fault
	<ul style="list-style-type: none"> CW or CCW enable signal set simultaneously 	
Motor buzzes, high current consumption	<ul style="list-style-type: none"> Not ready, OK signal LOW 	<ul style="list-style-type: none"> No control voltage (terminal 24 V), correct "OK" output connected to ground, correct Motor too hot, let it cool down, reduce load TF not connected, check connections, correct Supply voltage/phase is missing
	<ul style="list-style-type: none"> Mechanical components blocking 	<ul style="list-style-type: none"> Correct mechanical fault Service brake in accordance with the instructions in the chapter "MOVI-SWITCH® Inspection and Maintenance" Replace drive
	<ul style="list-style-type: none"> Brake does not release 	
	<ul style="list-style-type: none"> Winding defective 	



8.3 Modular terminal box

We recommend purchasing pre-fabricated MOVI-SWITCH® 2S drives with the correct position of cable entries. In exceptional cases, the position of cable entries may be rotated to the opposite side.

8.3.1 Turning the modular terminal box



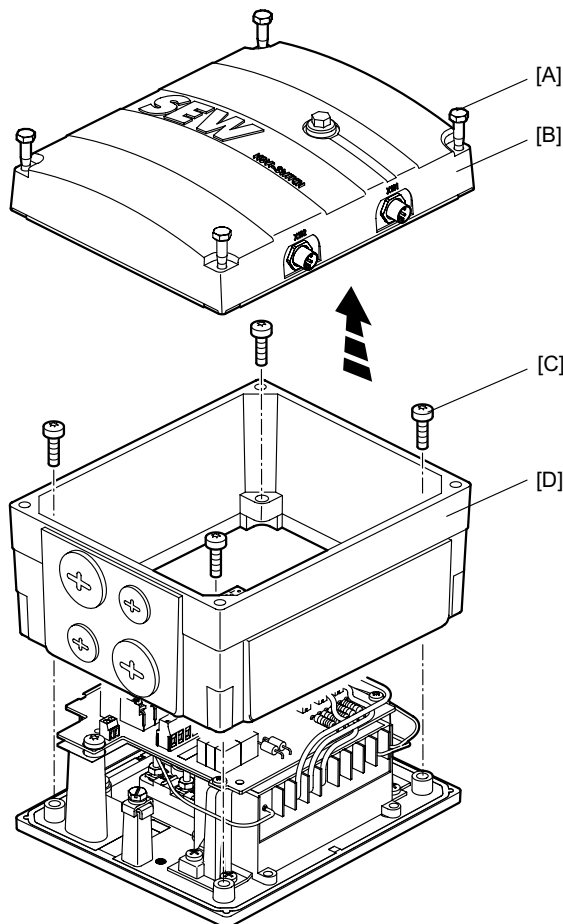
HAZARD!

High voltages are present in the terminal box and at the drive.

Severe or fatal injuries from electric shock.

- Before opening the terminal box, de-energize the drive and safeguard it against unintentional power-up.

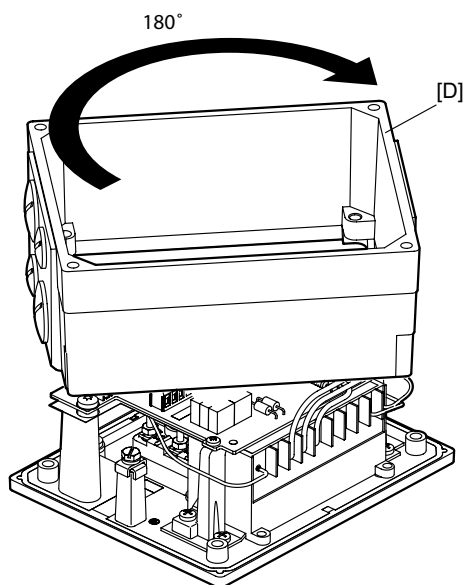
1. Label the connections before disconnecting them for later re-installation.
2. Disconnect the supply system, control and sensor connections.
3. Remove screws [A] and detach the MOVI-SWITCH® control unit [B].
4. Remove the screws [C] and detach the terminal box [D].



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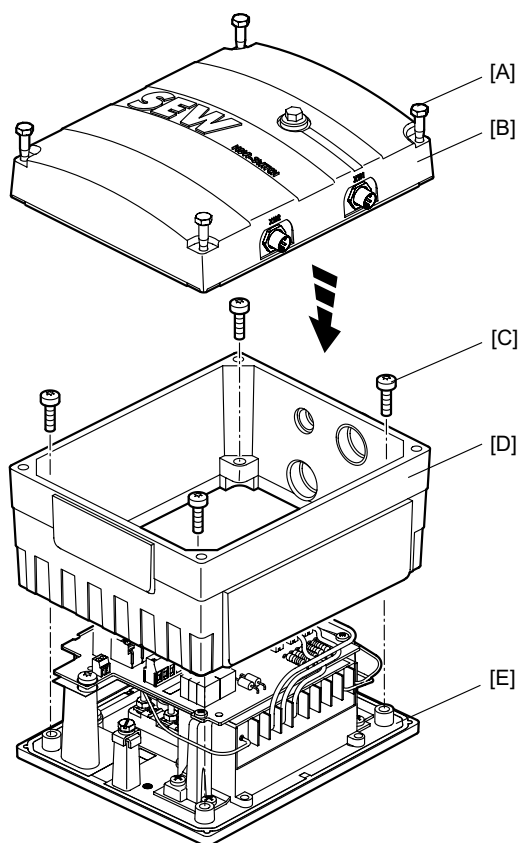


5. Rotate the terminal box [D] by 180°.



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6. Place the terminal box [D] on the mounting plate [E] and fasten it with screws [C] (observe chapter "Tightening torques" (see page 19)).
7. Re-establish the connection.
8. Replace the MOVI-SWITCH® control unit [B] and fasten it with screws [A] (observe chapter "Tightening torques" (see page 19)).



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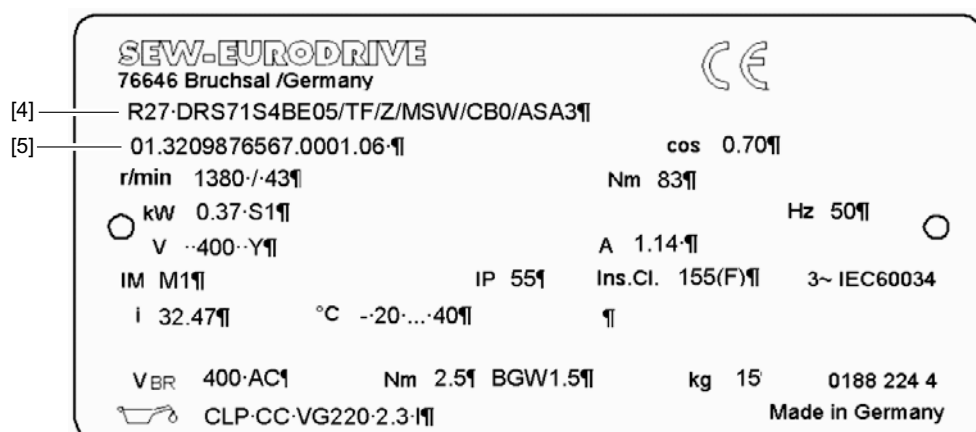
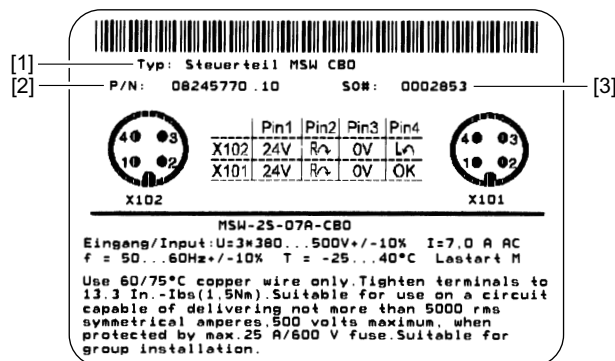


8.4 SEW Service

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

If the components configured in the order confirmation are not in stock, delivery will take up to eight weeks (as before).

- Unit designation on electronics nameplate [1]
- Part number [2]
- Serial number [3]
- Type designation on motor nameplate [4]
- Serial number [5]
- Short application description (application, control type)
- Type of fault
- Accompanying circumstances (e.g. initial startup)
- Your own presumptions
- Any unusual events preceding the problem, etc.



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8.5 Disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic components

Dispose of all components in accordance with applicable regulations!



9 Inspection/Maintenance

	<p>! HAZARD!</p> <p>Dangerous voltages are present at the motors!</p> <p>Severe or fatal injuries from electric shock.</p> <ul style="list-style-type: none"> De-energize MOVI-SWITCH® before starting work and protect it against unintentional restart!
	<p>! WARNING!</p> <p>The motors can become very hot during operation!</p> <p>Danger of burns.</p> <ul style="list-style-type: none"> Touch the motors only after they have cooled down sufficiently.
	<p>! HAZARD!</p> <p>Risk of fatal injury if the hoist falls.</p> <p>Severe or fatal injuries.</p> <ul style="list-style-type: none"> Secure or lower hoist drives (danger of falling)!
	<p>NOTES</p> <ul style="list-style-type: none"> The figures in the following chapter are examples of the MOVI-SWITCH®-1E design. The inspection and maintenance work for MOVI-SWITCH®-2S is identical with that for MOVI-SWITCH®-1E.

Use only genuine spare parts in accordance with the valid parts list!



9.1 Inspection and maintenance intervals

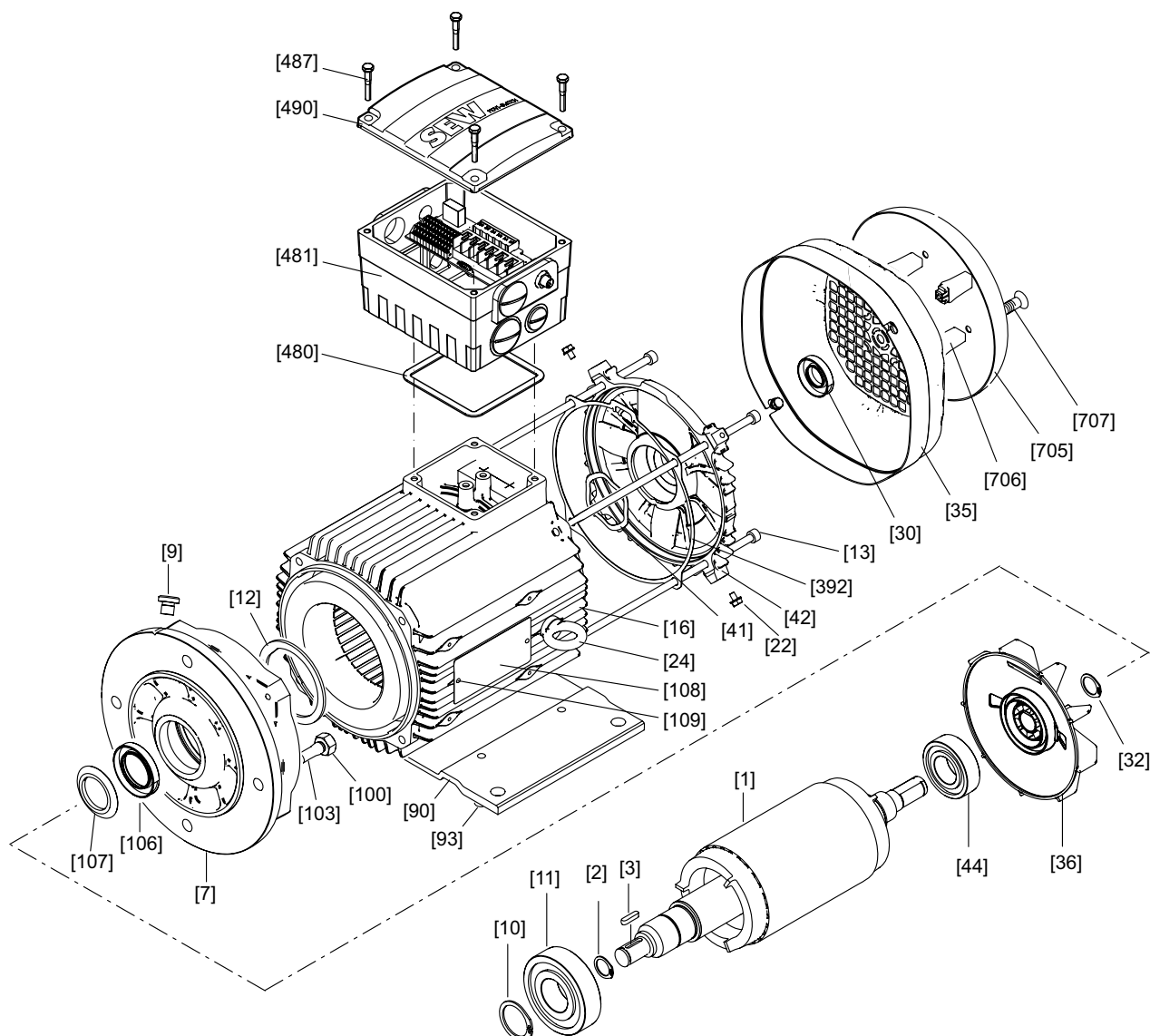
Unit/unit part	Time interval	What do I do?
Brake	<ul style="list-style-type: none"> If used as a working brake: at least every 3000 hours of operation¹⁾ If used as a holding brake: Every 2 to 4 years, depending on operating conditions¹⁾ 	Inspecting the brake <ul style="list-style-type: none"> • measure the brake disk thickness • brake disk, lining • Measure and adjust working air gap • Pressure plate • Carrier/gearing • Pressure rings <ul style="list-style-type: none"> • Suck off any abrasion • Inspect the switch contacts and replace them if necessary (e.g. in case of burn-out)
Motor	<ul style="list-style-type: none"> Every 10,000 operating hours 	Inspecting the motor: <ul style="list-style-type: none"> • Check ball bearings and replace if necessary • Replace the oil seal • Clean the cooling air passages
Motor with backstop (only for MOVI-SWITCH®-1E)		<ul style="list-style-type: none"> • Change the low-viscosity grease of the backstop
Drive	<ul style="list-style-type: none"> • Varies (depending on external factors) 	<ul style="list-style-type: none"> • Touch up or renew the surfaces/ anticorrosion coating

1) The amount of wear depends on many factors and may be high. The machine designer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents (e.g. "Project Planning for Drives").



9.2 Inspection/maintenance for DR.71-DR.112 motors

9.2.1 Basic design of DR.71-DR.112



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[1] Rotor	[32] Circlip	[109] Grooved pin
[2] Circlip	[35] Fan guard	[392] Seal
[3] Key	[36] Fan	[480] Seal
[7] Flanged endshield	[41] Shim washer	[481] Terminal box
[9] Screw plug	[42] B-side endshield	[487] Terminal box screws
[10] Circlip	[44] Deep groove ball bearing	[490] Terminal box cover
[11] Deep groove ball bearing	[90] Base plate	[705] Protective cover
[12] Circlip	[93] Pan head screw	[706] Spacers
[13] Machine screw	[100] Hex nut	[707] Pan head screw
[16] Stator	[103] Stud	
[22] Hex head screw	[106] Oil seal	
[24] Lifting eyebolt	[107] Oil flinger	
[30] Oil seal	[108] Nameplate	


9.2.2 Inspection steps for DR.71-DR.112 motors

HAZARD!

Risk of crushing if the drive starts up unintentionally and danger of electrical voltages. Severe or fatal injuries.

- Prior to any measures, de-energize the motor and protect it against unintentional re-start!
- Strictly observe the following instructions.

1. Remove forced cooling fan and encoder, if installed.
2. Remove fan guard [35] and fan [36].
3. Remove machine screws [13] from the flanged endshield [7] and take the B-side endshield [42] and stator [16] off the flanged endshield.
4. Visual inspection: Is there any moisture or gear unit oil inside the stator?
 - If not, proceed to step 7
 - If there is condensation, proceed to step 5
 - If there is gear oil, have the motor repaired by a specialist workshop
5. If there is moisture inside the stator:
 - Gearmotors: Remove the motor from the gear unit
 - Motors without a gear unit: Remove the A-flange
 - Remove the rotor [1]
6. Clean the winding, dry it and check it electrically.
7. Replace the grooved ball bearings [11] [44] with permitted ball bearings.
See sec. "Permitted anti-friction bearing types" (see page 88).
8. Reseal the shaft:
 - A-side: Replace oil seal [106]
 - B-side: Replace oil seal [30]
 Coat the sealing lip with grease (Klüber Petamo GHY 133).
9. Reseal the stator seat:
 - Seal the sealing surface with duroplastic sealing compound (operating temperature -40...180 °C), such as "Hylomar L Spezial".
 - Replace gasket [392]
10. Install the motor and accessory equipment.



Backstop lubrication (only for MOVI-SWITCH®-1E)

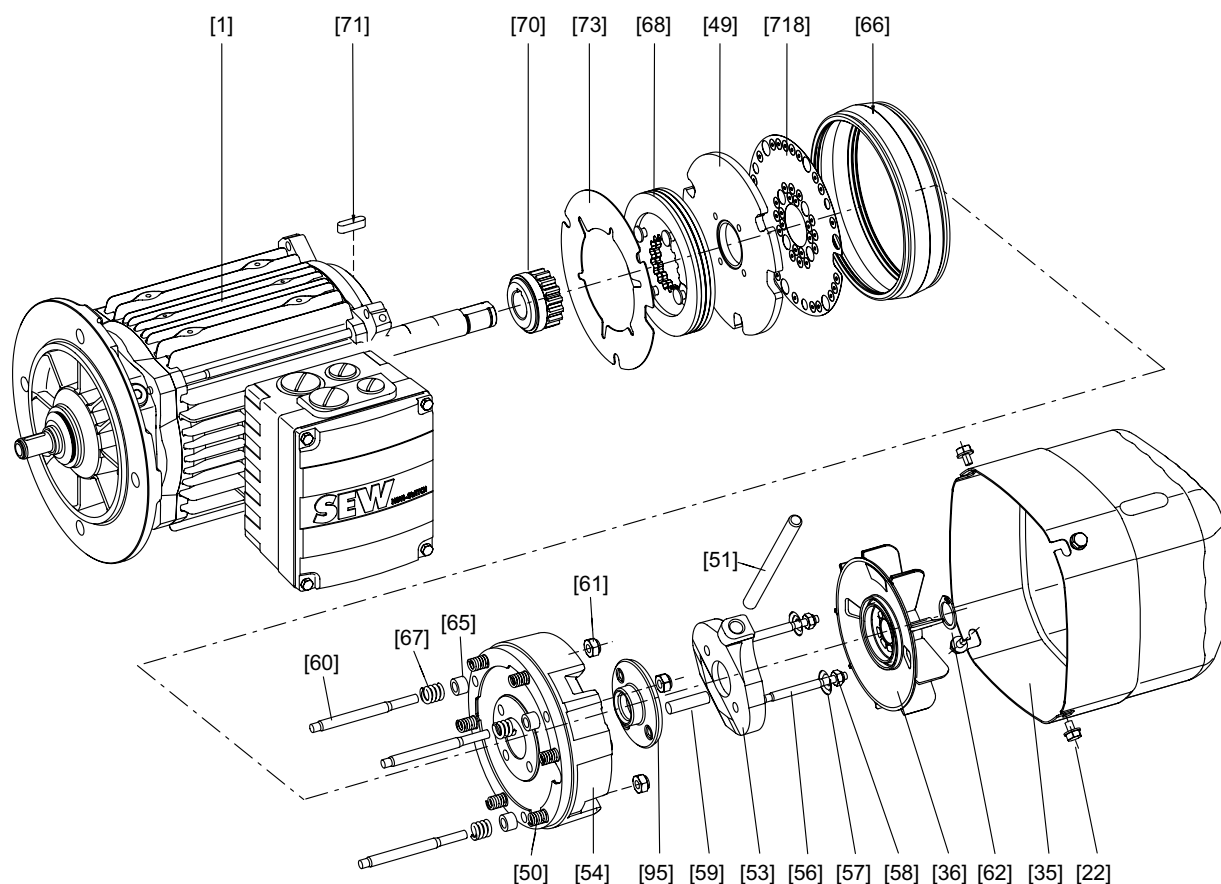
The backstop is supplied with the corrosion protection low-viscosity grease Mobil LBZ. If you want to use a different grease, make sure it complies with NLGI class 00/000, with a base oil viscosity of 42 mm²/s at 40 °C on a lithium soap and mineral oil base. The application temperature range is from -50 °C to +90 °C. See the following table for the amount of grease required.

Motor type	71/80	90/100	112
Grease [g]	9	15	15



9.3 Inspection/maintenance for DR.71-DR.112 brakemotors

9.3.1 Basic design of DR.71-DR.80 brakemotors

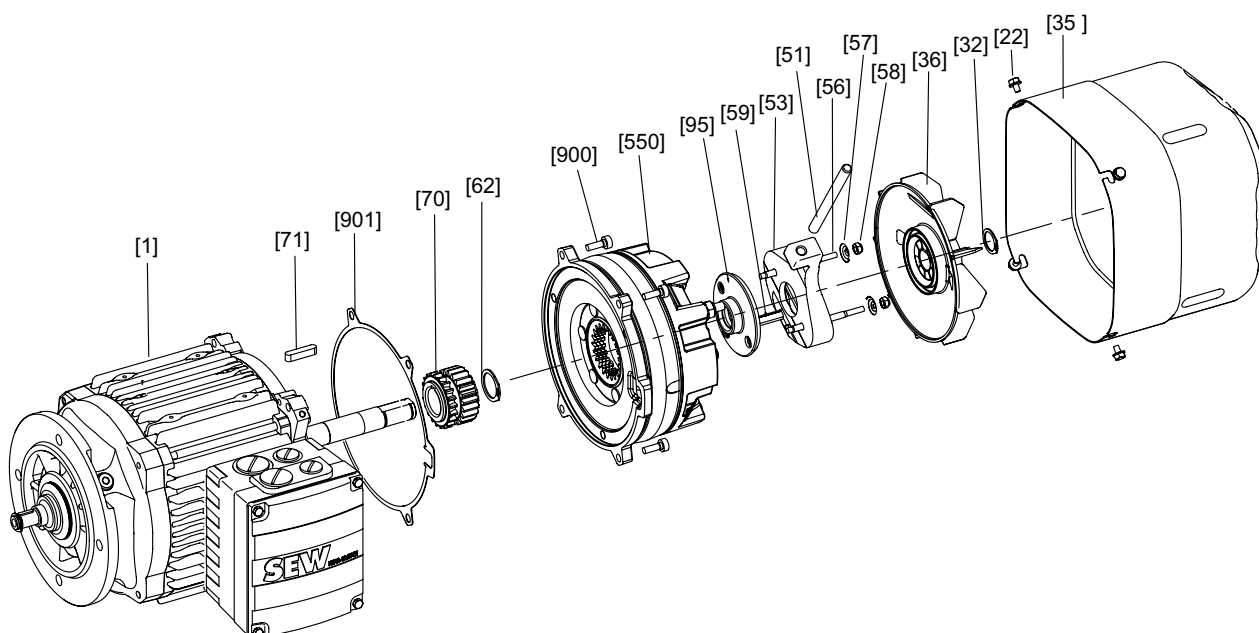


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[1] Motor with brake endshield	[56] Stud	[62] Circlip
[22] Hex head screw	[57] Conical coil spring	[70] Carrier
[35] Fan guard	[58] Setting nut	[71] Key
[36] Fan	[59] Parallel pin	[73] Niro disk
[49] Pressure plate	[60] Stud 3x	[95] Sealing ring
[50] Brake spring	[61] Hex nut	[718] Damping plate
[11] Magnet, complete	[65] Pressure ring	
[51] Hand lever	[66] Rubber sealing collar	
[53] Releasing lever	[67] Counter spring	
[54] Magnet, complete	[68] Brake disk	



9.3.2 Basic design of DR.90-DR.112 brakemotors

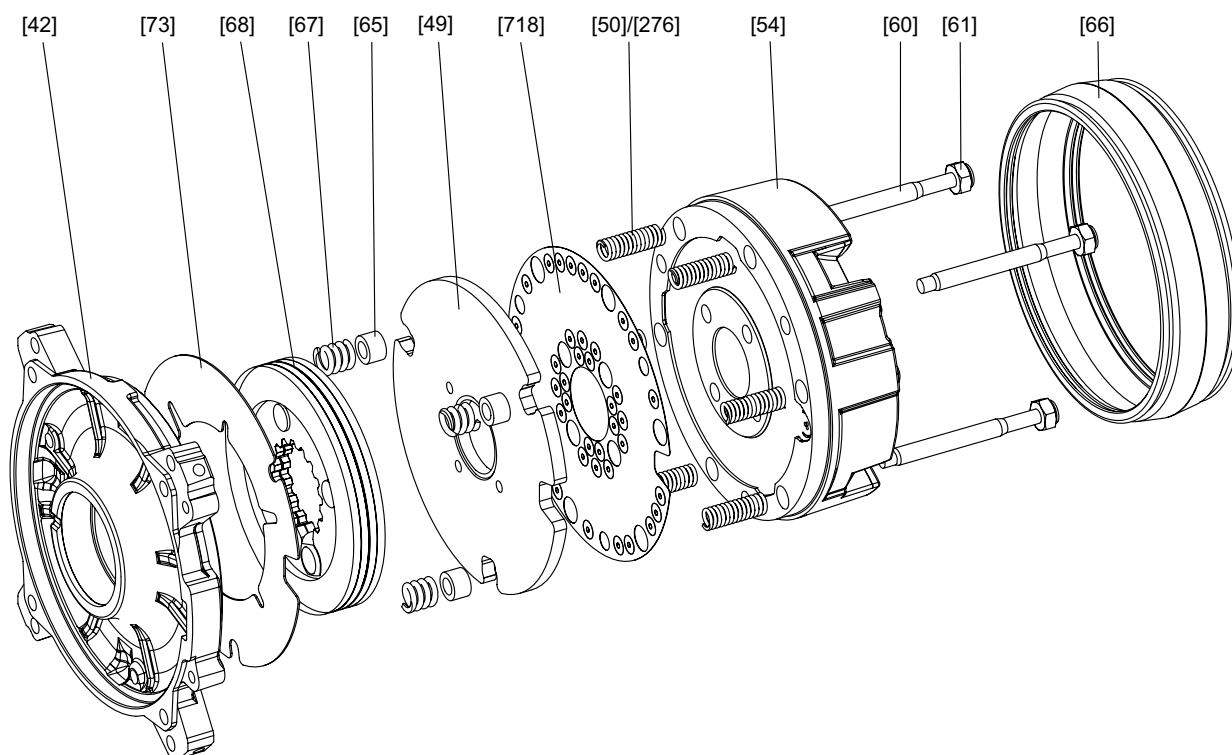


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[1] Motor with brake endshield	[53] Releasing lever	[70] Carrier
[22] Hex head screw	[56] Stud	[95] Sealing ring
[32] Circlip	[57] Conical coil spring	[550] Pre-assembled brake
[35] Fan guard	[58] Setting nut	[900] Screw
[36] Fan	[59] Parallel pin	[901] Seal
[51] Hand lever	[62] Circlip	



9.3.3 Basic design of BE05-BE2 brake (for DR.71-DR.80 brakemotor)



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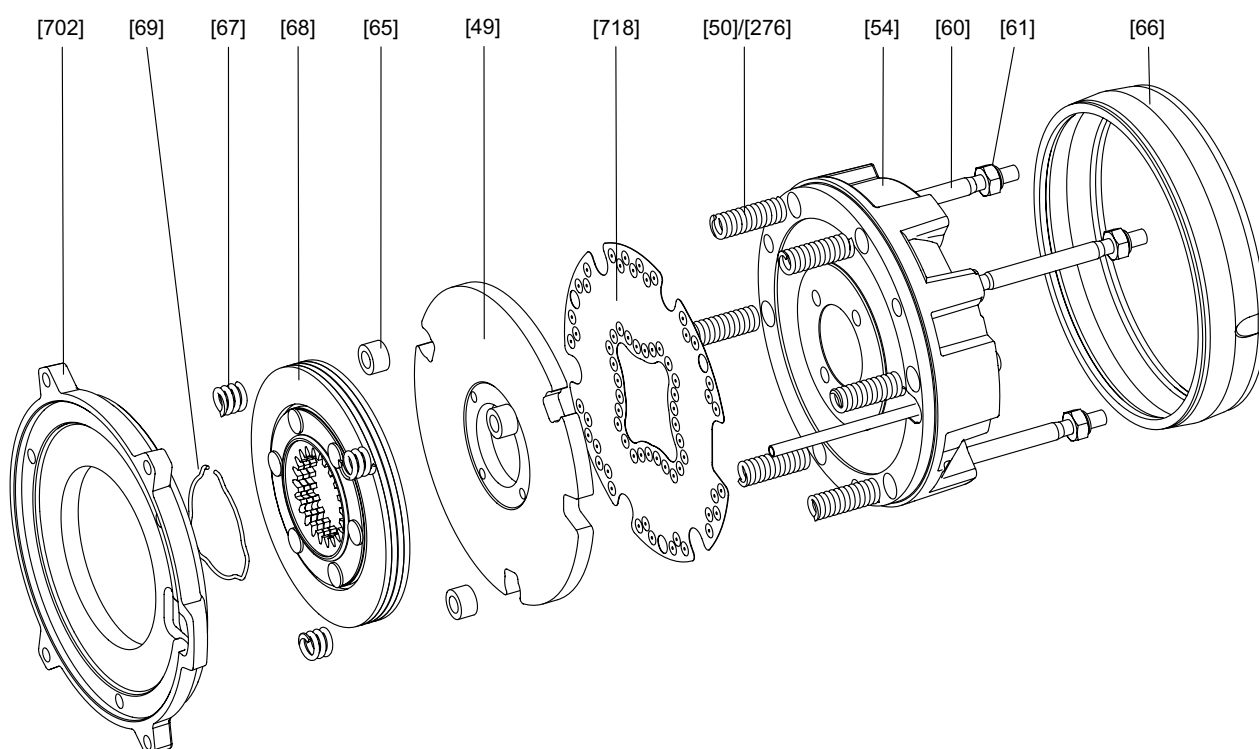
[42] Brake endshield
 [49] Pressure plate
 [50] Brake spring (normal)
 [54] Magnet, complete
 [60] Stud 3x

[61] Hex nut
 [65] Pressure ring
 [66] Rubber sealing collar
 [67] Counter spring
 [68] Brake disk

[73] Niro disk
 [276] Brake spring (blue)
 [718] Damping plate



9.3.4 Basic design of the BE1-BE11 brake (for DR.90-DR.112 brakemotor)



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[49] Pressure plate	[65] Pressure ring	[276] Brake spring (blue)
[50] Brake spring (standard)	[66] Rubber sealing collar	[702] Friction disk
[54] Magnet, complete	[67] Counter spring	[718] Damping plate
[60] Stud 3x	[68] Brake disk	
[61] Hex nut	[69] Circular spring	


9.3.5 Inspection steps for DR.71-DR.112 brakemotors

HAZARD!

Risk of crushing if the drive starts up unintentionally and danger of electrical voltages. Severe or fatal injuries.

- Prior to any measures, de-energize the motor and protect it against unintentional re-start!
- Strictly observe the following instructions.

1. Remove forced cooling fan and encoder, if installed.
2. Remove fan guard [35] and fan [36].
3. Remove machine screws [13] from the flanged endshield [7] and take the B-side endshield [42] and stator [16] off the flanged endshield.
4. Remove the brake cable from the rectifier.
5. Push the brake off the stator and carefully lift it off.
6. Pull the stator back by approx. 3 to 4 cm.
7. Visual inspection: Is there any moisture or gear unit oil inside the stator?
 - If not, proceed to step 10
 - If there is condensation, proceed to step 8
 - If there is gear oil, have the motor repaired by a specialist workshop
8. If there is moisture inside the stator:
 - Gearmotors: Remove the motor from the gear unit
 - Motors without a gear unit: Remove the A-flange
 - Remove the rotor [1]
9. Clean the winding, dry it and check it electrically.
10. Replace the grooved ball bearings [11] [44] with permitted ball bearings.
See sec. "Permitted anti-friction bearing types" (see page 88).
11. Reseal the shaft:
 - A-side: Replace oil seal [106]
 - B-side: Replace oil seal [30]
 Coat the sealing lip with grease (Klüber Petamo GHY 133).
12. Reseal the stator seat:
 - Seal the sealing surface with duroplastic sealing compound (operating temperature -40...180 °C), such as "Hylomar L Spezial".
 - Replace sealing [392].
13. Install the motor, the brake and accessory equipment.



9.3.6 Setting the working air gap of the BE05-BE11 brake



HAZARD!

Risk of crushing if the drive starts up unintentionally.

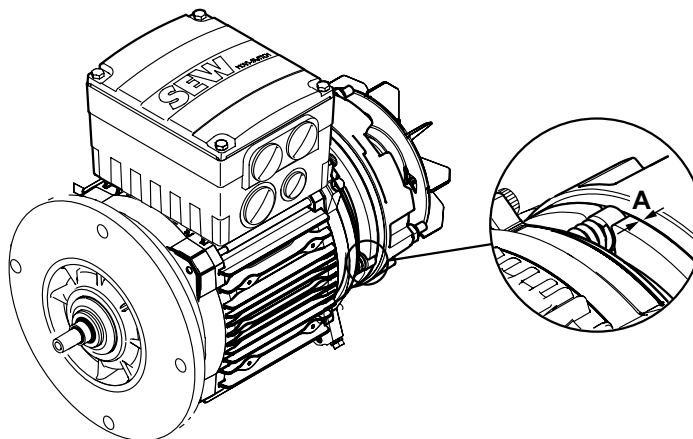
Severe or fatal injuries.

- Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup!
- Carefully observe the following operation steps!

1. Remove the following:
 - Forced cooling fan and encoder (if installed)
 - Flange cover or fan guard [35]
2. Push the rubber sealing collar [66] aside,
 - loosen the clamp, if necessary
 - Suck off any abrasion
3. Measure the brake disk [68]:
 - Minimum brake disk thickness see sec. "Work done, working air gap and braking torque of the brake" (see page 87).
 - Replace the brake disk, if necessary.

See sec. "Replacing the brake disk of brakes BE05-BE11" (see page 82).
4. Measure the working air gap A (see following figure)
(use a feeler gauge and measure at 3 points offset by 120°):
 - between the pressure plate [49] and damping plate [718]
5. Tighten the hex nuts [61]:
6. Tighten the setting sleeves
 - until working air gap is set correctly.

See sec. "Work done, working air gap and braking torque of the brake" (see page 87).
7. Put the rubber sealing collar back in place and re-install the dismantled parts.



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9.3.7 Replacing the brake disk of BE05-BE11 brakes

When installing a new brake disk, inspect the other removed parts as well and fit new ones if necessary.

	<p>HAZARD!</p> <p>Risk of crushing if the drive starts up unintentionally.</p> <p>Severe or fatal injuries.</p> <ul style="list-style-type: none"> • Isolate the motor and brake from the power supply before starting work, safeguarding them against accidental startup! • Carefully observe the following operation steps!
--	--

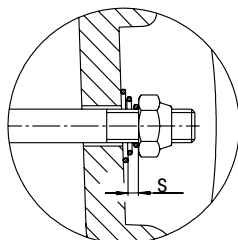
	<p>NOTES</p> <ul style="list-style-type: none"> • The brake of DR.71-DR.80 motor sizes cannot be removed from the motor because the BE brake is directly installed on the brake endshield of the motor. • The brake of DR.90-DR.112 motor sizes can be removed from the motor for replacing the brake disk because the BE brake is pre-installed on the brake endshield of the motor with a friction disk .
--	--

1. Remove the following:
 - Forced cooling fan and encoder (if installed)
 - Flange cover or fan guard [35], circlip [32]/[62] and fan [36]
2. Remove the brake cable from the rectifier.
3. Remove the rubber sealing collar [66].
4. Loosen hex nuts [61], carefully pull off the magnet [54] (brake cable!) and take out the brake springs [50].
5. Remove the damping plate [718], pressure plate [49] and brake disk [68], and clean the brake components.
6. Install a new brake disk.
7. Re-install the brake components,
 - except for the fan and the fan guard, because the working air gap has to be set first, see section "Setting the working air gap of BE05-BE11 brakes" (see page 81).



8. With manual brake release: Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (see following figure).

This floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.



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Brake	Floating clearance "s" [mm]
BE05; BE1; BE2	1.5
BE5; BE11	2

9. Put the rubber sealing collar back in place and re-install the dismantled parts.



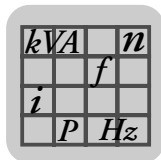
NOTES

- The lockable manual brake release (type HF) is already released if a resistance is encountered when operating the setscrew.
- The self-reengaging manual brake release (type HR) can be operated with normal hand pressure.
- In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance! A bracket is provided for storing the lever on the outside of the motor.



NOTE

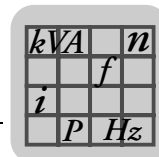
Important: After replacing the brake disk, the maximum braking torque is reached only after several cycles.



10 Technical Data

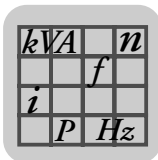
10.1 Technical data of MOVI-SWITCH®-1E

MOVI-SWITCH®-1E		
Supply voltages (motor-dependent)	V _{supply}	AC 3 x 380 V / 400 V / 415 V / 460 V / 480 V / 500 V ± 10%
Line frequency (motor-dependent)	f _{supply}	50 Hz ... 60 Hz ± 10%
Rated operating current (at 400 V) (motor-dependent)	I _{max} I _{min}	AC 7.0 A ≥ 0.5 A
Position of normal use		Any
Motor protection		Thermistor
Module protection		Temperature shutdown 89 to 100 °C Temperature hysteresis typ. 5 K
Maximum starting frequency		1800 cycles/h
Cycle times		typ. 10 ms
Interference resistance		Meets EN 61800-3
Interference emission		Conforms to EN 61800-3 and class A limit of EN 55011 and EN 55014
Ambient temperature	θ _U	-25 °C...40 °C (P _{rated} reduction: 3 % I _{rated} per K to max. 60 °C), no moisture condensation
Storage temperature	θ _L	-25 °C...85 °C (EN 60721-3-3, class 3K3)
Climate class		3 K3
Pollution class		2 according to IEC 60664-1 (VDE 0110-1)
Degree of protection (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering)
Duty cycle		S1 (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes
Cooling type (DIN 41,751)		Self-cooling
Installation altitude		h ≤ 1,000 m: No power reduction h > 1,000 m: P _{rated} reduction by 1 % per 100 m h > 2000 m: V _{supply} reduction by AC 6 V per 100 m, to max. 3 x 380 V at 4000 m asl h _{max} = 4,000 m (see also chapter "Electrical Installation – Installation instructions")
Power supply to control electronics (M12 connector AVS1)	Pin 1 (24 V) Pin 3 (0 V)	V = +24 V ± 25 %, EN 61131-2, residual ripple max. 13 % I _E ≤ 50 mA (without I _{OK})
Binary inputs		Isolated via optocoupler; PLC compatible (EN 61131-2) R _i ≈ 3.0 kΩ, I _E ≈ 10 mA, sampling interval ≤ 5 ms
Signal level		+13 V to +30 V = "1" = Contact closed -3 V to +5 V = "0" = Contact open
Control functions (M12 connector AVS1)	Pin 2	RUN/stop
"OK" output (M12 connector AVS1)	Pin 4	Response time ≤ 10 ms
Signaling function (M12 connector AVS1)	Pin 4	Output for ready signal Checkback signal Ready for operation (high): V _{OK} > V _{-3V} 24V - with voltage present (24 V + supply system) - in case no error was detected - at end of self-testing phase (when unit is turned on)
	I _{OK}	Current for checkback max. 0.65 A, short-circuit proof



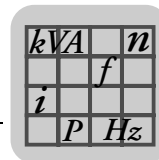
10.2 Technical data of MOVI-SWITCH®-2S/CB0

MOVI-SWITCH® 2S-CB0		
Supply voltages (motor-dependent)	V_{supply}	AC 3 x 380 V / 400 V / 415 V / 460 V / 480 V / 500 V \pm 10%
Line frequency (motor-dependent)	f_{supply}	50 Hz ... 60 Hz \pm 10%
Rated operating current (at 400 V) (motor-dependent)		I_{max} AC 7.0 A
Position of normal use		Any
Contactor switching cycles		\geq 5 million at $I_E \leq 4.0$ A utilization category AC3 \geq 1 million at $I_E \leq 7.0$ A utilization category AC3
AC3 maximum starting frequency		600 cycles/h
Short-circuit fuse classification type 1		25 A
Cycle times		On/off period: < 50 ms Reversing time: 85 ms to 150 ms
Interference resistance		Meets EN 61800-3
Interference emission		Conforms to EN 61800-3 and class A limit of EN 55011 and EN 55014
Ambient temperature	ϑ_U	-25 °C...40 °C (P_{rated} reduction: 3 % I_{rated} per K to max. 60 °C), no moisture condensation
Storage temperature	ϑ_L	-25 °C...85 °C (EN 60721-3-3, class 3K3)
Climate class		3 K3
Pollution class		2 according to IEC 60664-1 (VDE 0110-1)
Degree of protection (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering)
Duty cycle		S1 (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes
Cooling type (DIN 41,751)		Self-cooling
Motor protection		Thermistor (non-floating connection terminals)
Installation altitude		$h \leq 1,000$ m: No power reduction $h > 1,000$ m: P_{rated} reduction by 1 % per 100 m $h > 2000$ m: V_{supply} reduction by AC 6 V per 100 m, to max. 3 x 380 V at 4000 m asl $h_{\text{max}} = 4,000$ m (see also chapter "Electrical Installation – Installation instructions")
Power supply to control electronics M12/X102	Pin 1 (24 V) Pin 3 (0 V)	V_{in} = +24 V 25 %, EN 61131-2, residual ripple max. 13 % P_{in} \leq 7 W across the entire input voltage range $I_{E \text{ max}}$ \leq 350 mA at $V_{\text{in}} = 18$ V input voltage $I_{E \text{ typ}}$ = 250 mA at $V_{\text{in}} = 24$ V input voltage
Binary inputs		Isolated via optocoupler; PLC compatible (EN 61131-2) $R_i \approx 3.0$ k Ω , $I_E \approx 10$ mA, sampling interval ≤ 5 ms
Signal level		+13 V to +30 V = "1" = Contact closed -3 V to +5 V = "0" = Contact open
Control functions M12/X102	Pin 2 Pin 4	CW/stop CCW/stop
Activation / deactivation delay		< 50 ms (delay between receiving the activation/deactivation command and switching the motor on/off)
OK output (M12/X101)	Pin 4	Response time ≤ 10 ms
Signaling function (M12/X101 pin 4)		Output for ready signal Checkback signal Ready for operation (high): $V_{\text{OK}} > V_{-3}$ V 24V - with voltage present (24 V + supply system) - in case no error was detected - at end of self-testing phase (when unit is turned on)
	I_{OK}	Current for checkback max. 0.65 A, short-circuit proof



10.3 Technical data of MOVI-SWITCH®-2S/CK0 (with integrated AS-Interface)

MOVI-SWITCH®-2S-CK0		
Supply voltages (motor-dependent)	V_{supply}	AC 3 x 380 V / 400 V / 415 V / 460 V / 480 V / 500 V \pm 10%
Line frequency (motor-dependent)	f_{supply}	50 Hz ... 60 Hz \pm 10%
Rated operating current (at 400 V) (motor-dependent)		I_{max} AC 7.0 A
Position of normal use		Any
Contactor switching cycles		\geq 5 million at $I_E \leq 4.0$ A utilization category AC3 \geq 1 million at $I_E \leq 7.0$ A utilization category AC3
AC3 maximum starting frequency		600 cycles/h
Short-circuit fuse classification type 1		25 A
Cycle times		On/off period: < 50 ms Reversing time: 85 ms to 150 ms
Interference resistance		conforms to EN 61800-3
Interference emission		Conforms to EN 61800-3 and class A limit of EN 55011 and EN 55014
Ambient temperature	ϑ_U	-25 °C – 40 °C (P_{rated} reduction: 3 % I_{rated} per K to max. 60 °C), no moisture condensation
Storage temperature	ϑ_L	-25 °C...85 °C (EN 60721-3-3, class 3K3)
Climate class		3 K3
Pollution class		2 according to IEC 60664-1 (VDE 0110-1)
Degree of protection (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering)
Duty cycle		S1 (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes
Cooling type (DIN 41751)		Self-cooling
Motor protection		Thermistor (non-floating connection terminals)
Installation altitude		$h \leq 1,000$ m: No power reduction $h > 1,000$ m: P_{rated} reduction by 1 % per 100 m $h > 2000$ m: $V_{\text{supply system}}$ reduction: AC 6 V per 100 m, to max. 3 x 380 V at 4000 m asl $h_{\text{max}} = 4,000$ m (see also chapter "Electrical Installation – Installation instructions")
Power supply to control electronics M12/X102 S1-AUX-PWR = "0"	Pin 1 (AS-Interface +) Pin 3 (AS-Interface -)	$V_{\text{in AS-Interface}} = [+22 \text{ V} \dots +32 \text{ V}]$ Without sensor supply: $P_{\text{in AS-Interface}} \leq 6 \text{ W}$ across the entire input voltage range $I_{\text{E AS-Interface max}} \leq 270 \text{ mA}$ at $V_{\text{in AS-Interface}} = 22 \text{ V}$ input voltage $I_{\text{E AS-Interface typ}} = 220 \text{ mA}$ at $V_{\text{in AS-Interface}} = 26.5 \text{ V}$ input voltage $I_{\text{E AS-Interface}} = 420 \text{ mA}$ to EN50195 section 8.2.3.2
Power supply to control electronics M12/X102 S1-AUX-PWR = "1"	Pin 1 (AS-Interface +) Pin 3 (AS-Interface -) Pin 4 (24 V) Pin 2 (0 V)	$V_{\text{in AS-Interface}} = [+22 \text{ V} \dots +32 \text{ V}]$ $I_{\text{E AS-Interface}} \leq 50 \text{ mA}$ $V_{\text{in AUX-PWR}} = +24 \text{ V } 25 \%, \text{ EN 61131-2, residual ripple max. } 13\%$ Without sensor supply: $P_{\text{in AUX-PWR}} \leq 6 \text{ W}$ across the entire input voltage range $I_{\text{E AUX-PWR max}} \leq 350 \text{ mA}$ at $V_{\text{in AUX-PWR}} = 18 \text{ V}$ input voltage $I_{\text{E AUX-PWR typ}} = 250 \text{ mA}$ at $V_{\text{in AUX-PWR}} = 24 \text{ V}$ input voltage

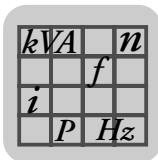


MOVI-SWITCH®-2S-CK0		
		A PELV power supply (Protective Extra Low Voltage) to IEC 60364-4-41 with safe disconnection is mandatory for the AUX PWR auxiliary supply.
Control functions Outputs	Bit D0 Bit D1 Bit D3	CW/stop CCW/stop Enable/reset
Control functions Inputs	Bit D0 Bit D2 Bit D3	Ready signal, "OK" Sensor 1 (M12 socket, pin 4) Sensor 2 (M12 socket, pin 2)
AS-Interface profile		S-7.F.E (free profile)
I/O configuration		7 _{hex}
ID code		F _{hex}
ID2 code		E _{hex}
Address		1 to 31 (factory setting: address 0)
Watchdog		≥ 40 ms (all outputs de-energized)
Sensor connection M12 / X101		
Voltage supply	Pin 1 (+24V) Pin 3 (0V)	V _{out sensor} = +24 V 25 % I _{out sensor max} = 100 mA, short-circuit proof
Binary inputs DI2 / DI3 Signal level Signal delay	Pin 2 (DI3) Pin 4 (DI2)	PNP switching "1": U ≥ 10 V, I ≥ 6 mA (max. 10 mA) "0": U ≤ 5 V, I ≤ 2 mA < 5 ms

10.4 Work done, working air gap, braking torque of the brake

Brake type	Work done until maintenance [10 ⁶ J]	Working air gap [mm]		Brake disk [mm]	Braking torque settings				
		min. ¹⁾	max.		Braking torque [Nm]	Type and number of brake springs		Order numbers for brake springs	
				min.		Normal	Blue	Normal	Blue
BE05	120	0.25	0.6	9.0	5.0	2	4	135,017 X	1 374 137 3
					3.5	2	2		
					2.5	-	6		
					1.8	-	3		
BE1	120	0.25	0.6	9.0	10	6	-	135,017 X	1 374 137 3
					7.0	4	2		
					5.0	2	4		
BE2	165	0.25	0.6	9.0	20	6	-	1 374 024 5	1 374 052 0
					14	2	4		
					10	2	2		
					7.0	-	4		
BE5	260	0.25	0.9	9.0	55	6	-	1 374 070 9	1 374 071 7
					40	2	4		
					28	2	2		
					20	-	4		
BE11	640	0.3	1.2	10.0	110	6	-	1 374 183 7	1 374 184 7
					80	2	4		
					55	2	2		
					40	-	4		

1) When checking the working air gap, note: Parallelism tolerances on the brake disk may cause deviations of ±0.15 mm after a test run.



10.5 Permitted rolling bearing types

Motor type	A-side bearing		B-side bearing	
	IEC motor	Gearmotor	Three-phase current motor	Brakemotor
DR.71	6204-2Z-J-C3	6303-2Z-J-C3	6203-2Z-J-C3	6203-2RS-J-C3
DR.80	6205-2Z-J-C3	6304-2Z-J-C3	6304-2Z-J-C3	6304-2RS-J-C3
DR.90-DR.100	6306-2Z-J-C3		6205-2Z-J-C3	6205-2RS-J-C3
DR.112	6308-2Z-J-C3		6207-2Z-J-C3	6207-2RS-J-C3



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
Service Compe- tence 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
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	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
	Additional addresses for service in Germany provided on request!		
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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.usocomme.com sew@usocomme.com
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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
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Additional addresses for service in France provided on request!			



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Assembly Sales Service	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar 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
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Service Competence Center	Industrial Gears	SEW Caron-Vector 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
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Additional addresses for service in Brazil provided on request!			
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Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net
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Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
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	Additional addresses for service in Canada provided on request!		
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China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 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
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
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Hungary			
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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, Ferryroad Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
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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



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Assembly Sales Service	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) sewis@sew-eurodrive.pl
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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
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Sales Service	București	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly Sales Service	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn
Serbia			
Sales	Beograd	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu
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



Slovakia			
	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
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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 jhainsworth@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 hengela@sew.co.za
Spain			
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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



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Sales	Tunis	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn
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Assembly Sales Service	Istanbul	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419164, 3838014, 3738015 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Ukraine			
Sales Service	Dnepropetrovsk	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
USA			
Production Assembly Sales Service Cooporate Offices	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
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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



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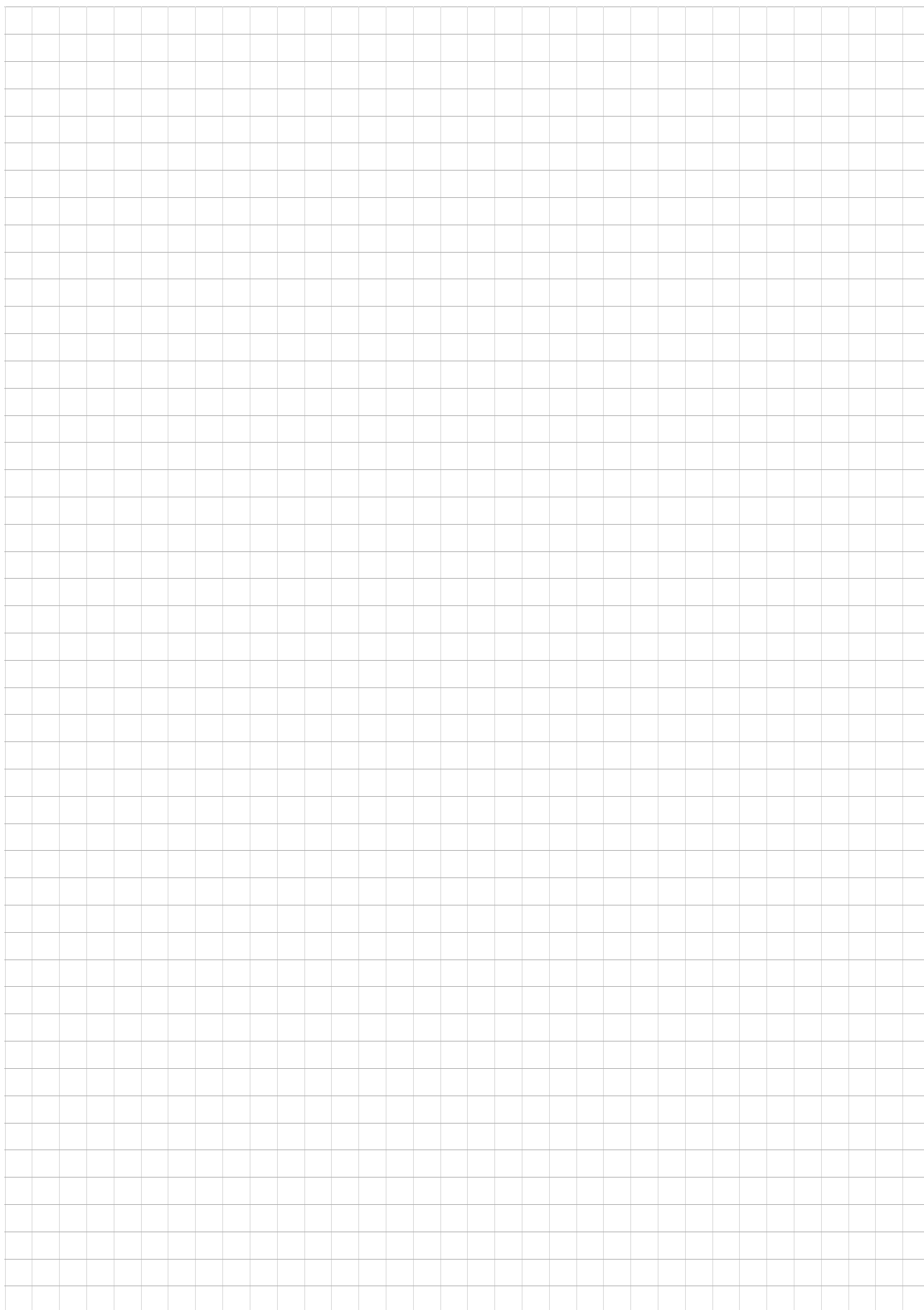


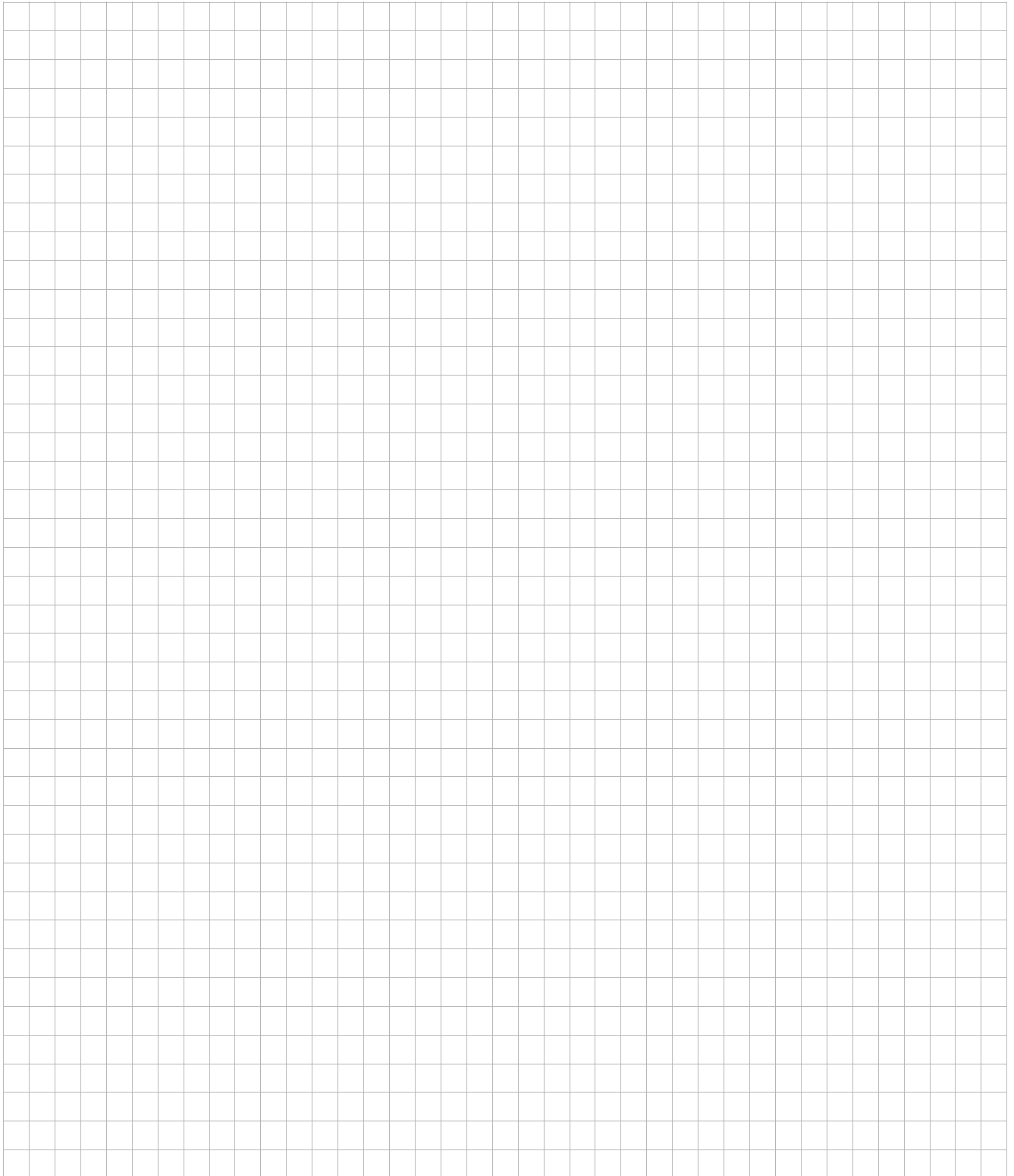
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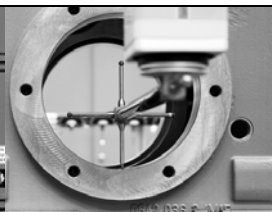
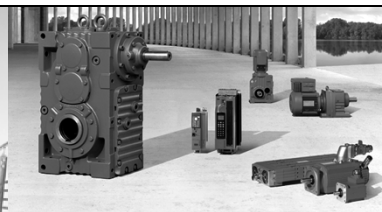
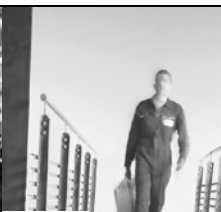
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SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023 · D-76642 Bruchsal / Germany
Phone +49 7251 75-0 · Fax +49 7251 75-1970
sew@sew-eurodrive.com

→ www.sew-eurodrive.com