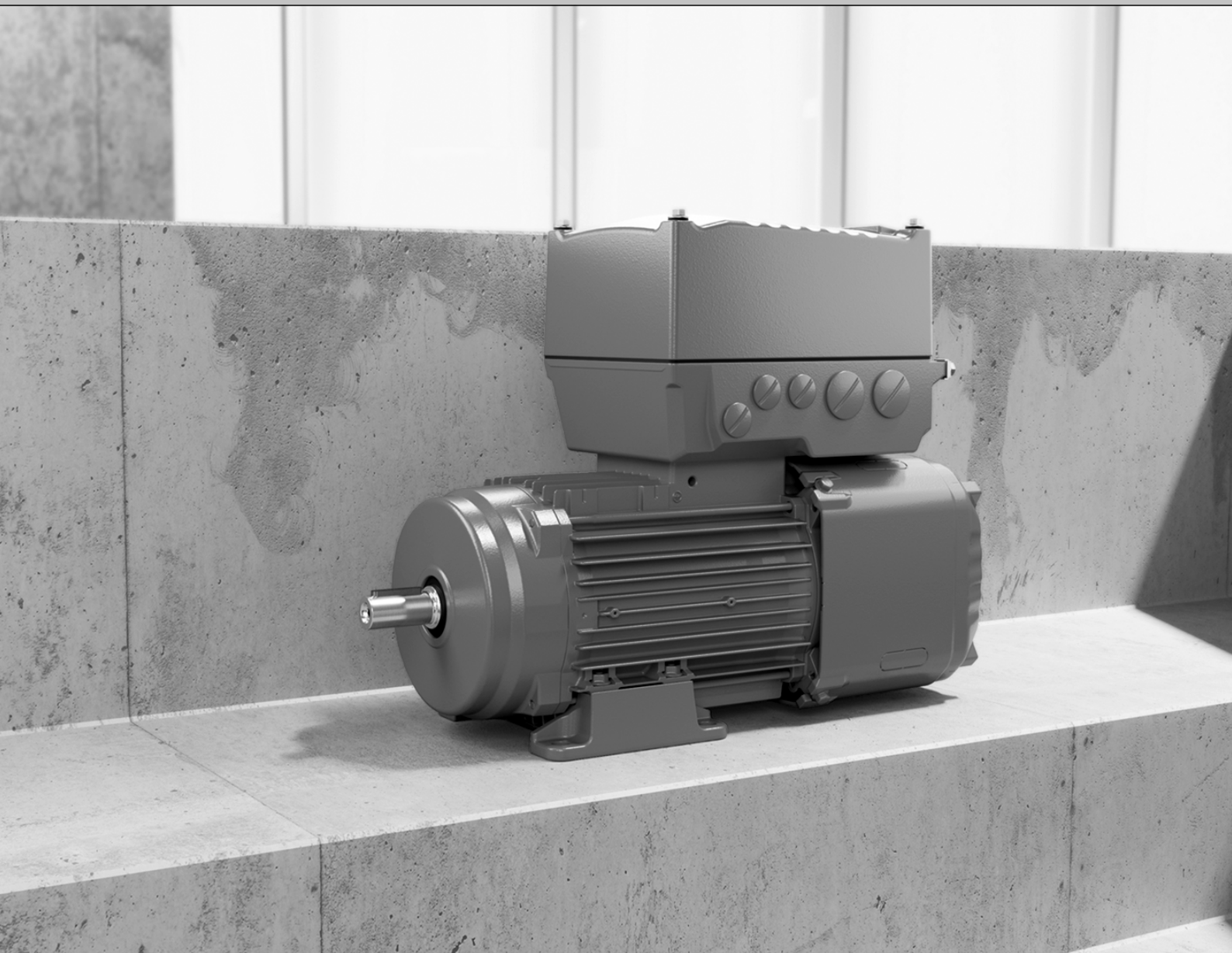




SEW
EURODRIVE

Operating Instructions



Mechatronic Drive Unit

MOVIMOT® advanced DAC

DRN..DAC., DR2C..DAC.. (AS-Interface)



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1 General information

1.1 Structure of the safety notes

1.1.1 Meaning of signal words

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

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

1.1.2 Meaning of the hazard symbols

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

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

2 Safety notes for MOVIMOT® advanced

2.1 Target group

Specialist for mechanical work	Any mechanical work may be performed only by adequately qualified specialists. Specialists in the context of this documentation are persons who are familiar with the design, mechanical installation, troubleshooting, and maintenance of the product, and who possess the following qualifications: • Qualifications in the field of mechanics in accordance with the national regulations • Familiarity with this documentation
Specialist for electrotechnical work	Any electrotechnical work may be performed only by electrically skilled persons with a suitable education. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications: • Qualifications in the field of electrical engineering in accordance with the national regulations • Familiarity with this documentation
Additional qualifications	In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation. The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.
Instructed persons	All work in the areas of transport, storage, installation, operation and waste disposal may only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

2.2 Designated use

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

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

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

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

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

Do not use the product as a climbing aid.

2.2.1 Lifting applications

To avoid danger of fatal injury by falling hoists, observe the following points when using the product in lifting applications:

- The product is not designed for use as a safety device in lifting applications.
- Use additional monitoring systems or mechanical protection devices.

2.2.2 Restrictions of use

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

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

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

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

2.3 Functional safety technology

The product includes the STO safety sub-function. As an option, additional safety sub-functions can be included for the product.

The safety sub-functions are deactivated in the delivery state. The product may not perform any safety function without higher-level safety systems.

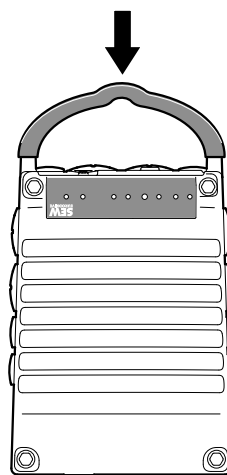
To use the STO safety sub-function or other safety sub-functions, please follow the product manual and the manual for the optional safety function of this device.

2.4 Transportation

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

The lifting eye is designed to carry only the mass of the motor without gear unit. Tighten the retaining screws of the lifting eye. Mounted gear units have separate suspension attachments, which must be used according to the gear unit operating instructions when lifting the gearmotor. Do not mount any additional loads.

The following figure depicts the position of the lifting eye of the motor without gear unit.



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Remove the lifting eye before connecting the PE cable, see chapter "Electrical installation" > "Installation instructions".

Store the lifting eye for future service work, see chapter "Service" > "Device replacement".

Observe the following notes when transporting the device:

- Always use all attachment points if available. The attachment points are designed to carry only the mass of the product. Do not apply any additional loads.
- Ensure that the product is not subject to mechanical impact.

If necessary, use suitable, sufficiently dimensioned handling equipment.

Do not transport or store the product on the fan guard.

2.5 Creating a safe working environment

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

2.5.1 Performing work on the product safely

Defective or damaged product

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

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

Hot surfaces

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

- Let the product and its accessories cool down before touching it.
- Do not touch any surfaces of the product during operation, except for the control elements.
- Observe the information signs and product safety labels on the product.

Falling load

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

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

Rotating parts

When working on the product, there may be a risk of exposed rotating parts and uncontrolled movement of the components. Observe the following information to avoid body parts getting crushed or pulled in:

- Switch off the product before you start working on it.
- Observe all technical data of the product.
- Do not reach into the hazard zone.
- Observe the 5 safety rules.

Sharp edges

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

- Wear safety gloves.

2.5.2 Performing electrical work safely

Observe the following information to perform electrical work safely:

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

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

Dangerous voltage

When the system is switched on, dangerous voltages are present at all power connections as well as any cables and terminals that are connected. This also applies even when the product is inhibited and the motor is in an idle state. Observe the following information to avoid the risk of electric shock:

- Do not touch any exposed live parts (e.g. male contacts, connectors, terminals).
- Secure all open live components with a touch guard.
- Ensure that the connection boxes are closed and screwed down before applying the supply voltage.
- Before applying the supply voltage, make sure that all required covers are mounted.
- Secure the output shaft against rotation when working without touch guard.

Danger due to electric arc

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

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

Dangerous voltage

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

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

2.6 Installation/assembly

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

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

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

2.7 Protective separation

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

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

2.8 Electrical installation

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

2.8.1 Stationary application

The necessary preventive measure for the product is:

Type of energy transfer	Preventive measure
Direct power supply	Ground connection

2.8.2 Regenerative operation

The drive is operated as a generator due to the kinetic energy of the system/machine. Before opening the connection box, secure the output shaft against rotation.

2.9 Startup/operation

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

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

Never plug or unplug connectors while they are energized.

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

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

5 minutes.

Observe the corresponding information signs on the product.

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

Mechanical blocking or internal protective functions of the product can cause a motor standstill. Removing the cause of this problem or performing a reset can result in the machine or the system re-starting on its own. First, disconnect the product from the supply system before you start troubleshooting.

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

3 Device structure

3.1 Example nameplate and type designation of the drive unit

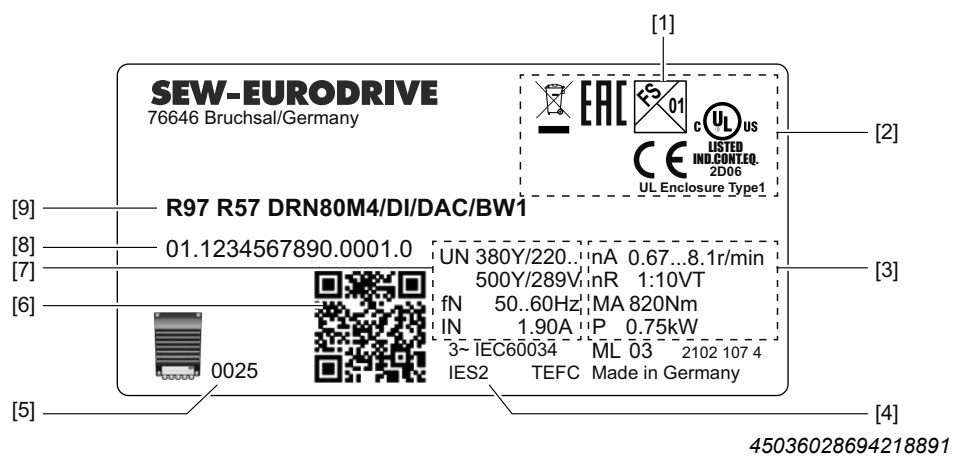
3.1.1 MOVIMOT® advanced nameplates

The MOVIMOT® advanced drive unit is always equipped with 2 nameplates:

- Nameplate 1: Data of the drive unit.
- Nameplate 2: Data of the motor and additional data of the drive unit.

Nameplate 1 (MOVIMOT® advanced DAC drive unit)

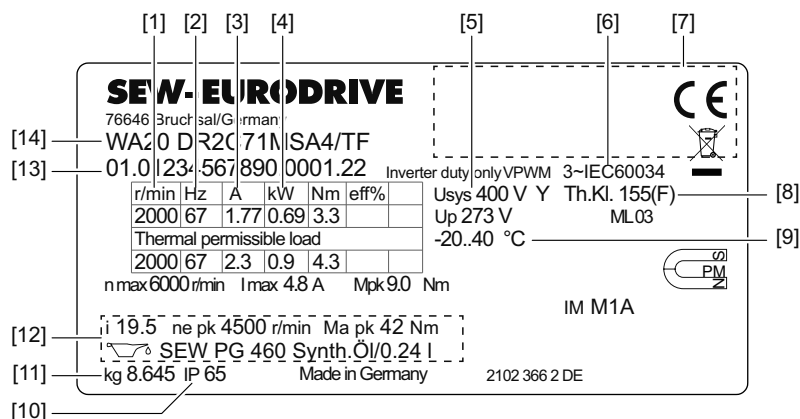
The following figure shows an example of a drive unit nameplate. The format of the type designation can be found in chapter "Type designation ...".



- [1] FS logo
- [2] Identification/approvals of the drive unit
- [3] Mechanic output data of the drive unit
- Output speed range
 - Speed setting range
 - Nominal torque
 - Nominal power
- [4] System efficiency of the drive unit
- [5] Nominal output current of the electronics cover (inverter)
0020 = 2.0 A
to
0160 = 16.0 A
- [6]  Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents, and further services. **In the "Documentation" > "Data and documents" area, the product manual of the device with further information is available.**
- [7] Electrical input data of the drive unit
- Voltage range
 - Line frequency range
 - Nominal line current (at 400 V)
- [8] Serial number of the drive unit
- [9] Type designation of the drive unit

Nameplate 2 (..DR2C.. motor)

The following figure shows an example of a nameplate of the WA...DR2C... gearmotor.

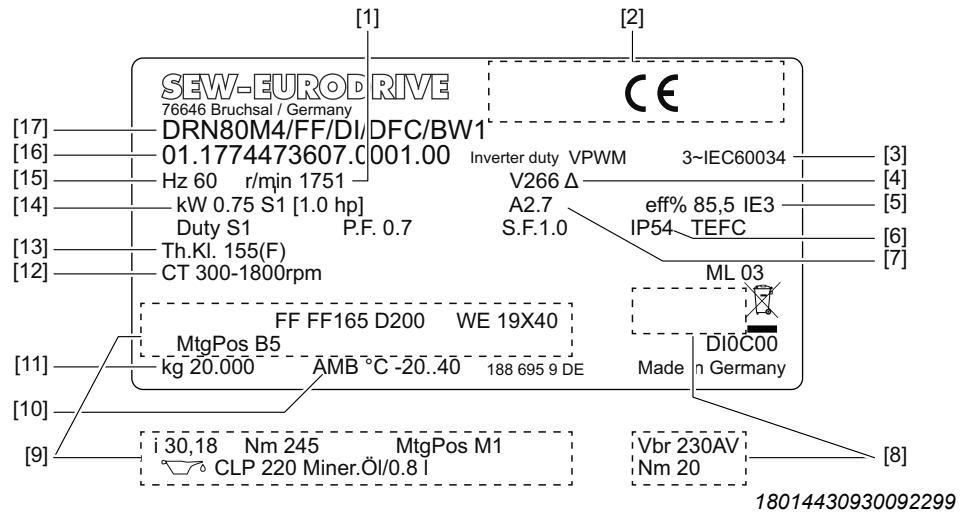


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- [1] Rated speed of the motor
- [2] Rated frequency of the motor
- [3] Rated current in the connection type of the motor
- [4] Rated power of the motor
- [5] Efficiency and IE class of the motor at the rated point
- [6] Nominal voltage and connection type of the motor
- [7] Number of phases and rating/performance standards
- [8] Identification/approvals of the motor
- [9] Thermal class of motor
- [10] Ambient temperature range of the drive unit
- [11] Degree of protection of the drive unit
- [12] Weight of drive unit
- [13] Gear unit data:
 - Gear unit ratio
 - Output speed of the gear unit
 - Output torque of the gear unit
 - Oil type and oil fill volume
- [14] Serial number of the drive unit
- [15] Type designation of the drive unit

Nameplate 2 (DRN.. motor)

The following image shows an example of a nameplate of the DRN.. motor



- [1] Rated speed of the motor
- [2] Identification/approvals of the motor
- [3] Number of phases and rating/performance standards
- [4] Nominal voltage and connection type of the motor
- [5] IE class and efficiency of the motor at the rating point
- [6] Degree of protection of the drive unit
- [7] Rated current in the connection type of the motor
- [8] Only for motors with brake:
 - Brake supply voltage
 - Deceleration torque of the brake
- [9] For motors without a gear unit:
 - Flange
 - Shaft end
 - Mounting position
- For motors with gear units:
 - Gear unit ratio
 - Output torque of the gear unit
 - Mounting position
 - Oil type and oil fill volume
- [10] Ambient temperature range of the drive unit
- [11] Weight of drive unit
- [12] Speed range of the motor
- [13] Motor thermal class
- [14] Rated power of the motor
- [15] Rated frequency of the motor
- [16] Serial number of the drive unit
- [17] Type designation of the drive unit

3.1.2 Type designation MOVIMOT® advanced DAC

The following table shows the type designation of the drive unit.

R	Gear unit series¹⁾ R = Primary gear unit
87	Gear unit size²⁾
DRN	Product family DRN = Asynchronous motor of the DRN.. series DR2C = DR2C.. series energy-efficient motor
80	Motor size 71, 80, 90, 100, 112, 132 for MOVIMOT® advanced with DRN.. motor 71, 80, 90, 100 for MOVIMOT® advanced with DR2C.. motor
S	Motor length S = Short MS = Medium short M = Medium L = Long MK = Medium (short version) LS = Long Short
4	Number of poles 4 = 4-pole motor
/	
BE1	Brake BE03 = E03 brake BE05 = E05 brake BE1 = BE1 brake BE2 = BE2 brake BE5 = BE5 brake BE11 = BE11 brake BE20 = BE20 brake
HF	Brake options HF = Manual brake release, lockable HR = Manual brake release, automatic disengaging function
/	
DI	Digital motor integration DI = Digital Interface
/	
DAC	Communication version DAC = Direct AS-Interface Communication
/	

IV	Option
	IV = Connector at the connection box
	TF = Motor protection
	D11 = Switch disconnecter with feedback contact
	BW1 = Integrated BW 1 braking resistor
	BW2 = Integrated BW 2 braking resistor
	PE = Pressure compensation fitting electronics
	AL = Metal fan
	C = Canopy
	RI = Reinforced winding insulation
	2W = Shaft end on the motor/brakemotor

1) You can find more gear unit series in the gearmotor catalog

2) You can find more gear unit sizes in the gearmotor catalog

3.2 Electronics

3.2.1 Overview of electronics cover

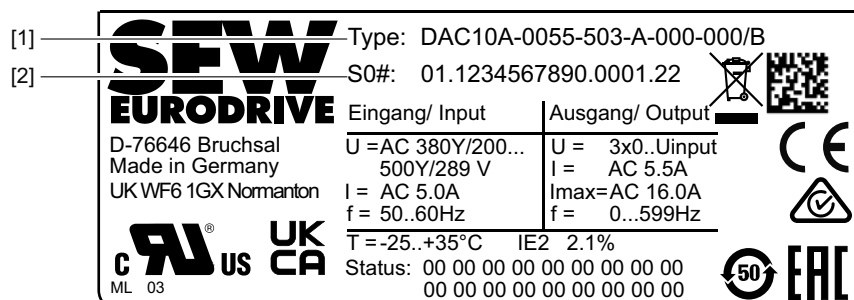
Devices with the following electronics covers are available depending on the nominal output current:

Electronics cover			
Nominal out-put current	Type designation	Size	Image
2.0 A	DAC...-0020..	Size 1 without cooling fins	
2.5 A	DAC...-0025..		
3.2 A	DAC...-0032..		
4.0 A	DAC...-0040..	Size 1 with cooling fins	
5.5 A	DAC...-0055..		
7.0 A	DAC...-0070..	Size 2 without fan	
9.5 A	DAC...-0095..		
12.5 A	DAC...-0125..	Size 2 with fan	
16.0 A	DAC...-0160..		

3.3 Example nameplate and type designation of electronics

3.3.1 Inner nameplate of DAC.. electronics cover

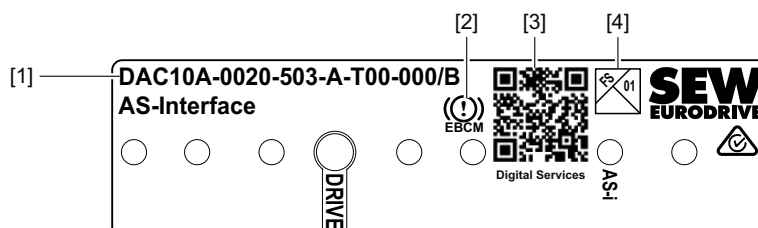
The following figure gives an example of a nameplate of the electronics cover. For the structure of the type designation, refer to chapter "Type designation of the electronics cover ...".



- [1] Type designation of the electronics cover
- [2] Unique serial number of the electronics cover
- [2] DataMatrix code with the unique serial number of the electronics cover

3.3.2 Outer nameplate of DAC.. electronics cover

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



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- [1] Type designation of the electronics cover
- [2] Identification of the optional HV brake control /B
- [3] Product label with QR code. The QR code can be scanned. You will be redirected to the digital services of SEW-EURODRIVE. There, you have access to product-specific data, documents, and further services.
- [3] In the "Documentation" > "Data and documents" area, the product manual of the device with further information is available.
- [4] FS logo

3.3.3 Type designation of DAC.. electronics cover

The following table shows the type designation of the electronics cover:

DAC	Product family DAC = Electronics cover D irect A S-Interface C ommunication
1	Communication type 1 = AS-Interface
0	Connection configuration 0 = M12 connector on electronics cover (standard)
A	Communication version
–	
0020	Nominal output current of the electronics cover 0020 = 2.0 A 0025 = 2.5 A 0032 = 3.2 A 0040 = 4.0 A 0055 = 5.5 A 0070 = 7.0 A 0095 = 9.5 A 0125 = 12.5 A 0160 = 16.0 A
–	
5	Connection voltage 5 = AC 500 V
0	Power section variant EMC 0 = Basic interference suppression 1 = IT system design
3	Connection type 3 = 3-phase
–	
A	Version
–	
T	Device variant T = Technology profile (fieldbus connection)
0	Technology level 0 = Technology level 0 (standard)
0	Application level 0 = Application level 0 (standard)
–	

000	MOVIKIT® version 000 = No MOVIKIT® module loaded ex-works
/	
B	Operating mode options B = Brake control C = Specific customer identification D = Device-specific parameterization of the delivery state P = Customer-specific parameterization

3.4 Markings

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

	The CE marking indicates compliance with the following European directives: • Low Voltage Directive 2014/35/EU¹⁾ • EMC Directive 2014/30/EU • Machinery Directive 2006/42/EC • Directive 2011/65/EU for limiting the use of certain hazardous substances in electrical and electronic equipment • Ecodesign Regulation 2019/1781
	The waste disposal of this product is performed in compliance with the WEEE Directive 2012/19/EU.
	The UL and cUL mark indicates UL approval. cUL is equally eligible for approval by the CSA.
	The UKCA mark indicates compliance with British directives (see UK declaration of conformity or UK declaration of incorporation).
	The EAC mark indicates compliance with the requirements of the technical regulations of the Customs Union (Eurasian Economic Union), Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Russia.
	The UA.TR mark declares conformity with the technical regulations of Ukraine.
	The RCM mark indicates compliance with the technical regulations of the Australian Communications and Media Authority (ACMA).
	The China RoHS mark indicates compliance with the directive SJ/T 11364-2014 regarding the restriction of use of certain hazardous substances in electrical and electronic equipment and its packaging.

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

3.5 FS logo description

The FS logo on the nameplate is based on the combination of safety-related components that is installed.

The following FS logo variants are possible:

	Device with STO connection via terminals or connectors
	Device with safe communication to activate STO via the MOVISAFE® CSB51A safety option

4 Mechanical installation

4.1 Installation notes

Perform the following steps before installation:

1. **▲ WARNING!** Electric shock caused by dangerous voltages in the connection box. Severe or fatal injuries.
De-energize the device. Pay attention to the 5 safety rules in chapter "Carrying out electrical work safely".
2. Secure the output shaft of permanently excited motors against rotation. You thereby avoid an electric shock from the regenerative operation during the rotation of the shaft.
3. Equip the input and output elements (e.g. customer shaft with contact shoulder or clamping ring, shrink disk) with a touch guard. You will also avoid injuries caused by rapid movements of the output elements.
4. Before releasing shaft connections, make sure that there are no active torsional moments present (tensions within the system).

4.2 Tolerances for torque ratings

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

4.3 Installation requirements

Check that the following conditions have been met:

- The information on the drive unit's nameplate must match the voltage supply system.
- The drive unit is undamaged (no damage caused by shipping or storage).
- Ambient temperature according to the operating instructions, nameplate and lubricant table in the gearmotor catalog "DRN63 – 315, DR2S56 – 80, DR2L71 – 80".
- The drive unit must not be installed in the following ambient conditions:
 - Potentially explosive atmosphere
 - Oils
 - Acids
 - Gases
 - Vapors
 - Radiation
- For special designs: The drive unit is designed in accordance with the actual ambient conditions.
- Clean the output shafts and flange surfaces thoroughly to ensure that they are free of anti-corrosion agents, contamination or similar. Use a commercially available solvent. Do not expose the sealing lips of the oil seals to the solvent – damage to the material.
- When the drive is installed in abrasive ambient conditions, protect the output end oil seals against wear.

4.4 Setting up the drive unit

4.4.1 Notes

Pay attention to the following information when installing the drive unit:

- Perform the steps described in chapter "Installation notes" (→  22) before installing the drive unit:
- Only install the drive unit on a level, low-vibration, and torsionally rigid support structure.
- Observe the mounting position specified on the motor nameplate.
- Thoroughly remove any anti-corrosion agent from the shaft end. Use a commercially available solvent. Do not allow the solvent to penetrate the bearings and sealing rings as this could damage the material.
- Align the motor carefully to avoid placing any unacceptable strain on the motor shafts. Observe the permitted overhung and axial loads specified in the respective gearmotor catalog.
- Do not jolt or hammer the shaft end.
- Ensure sufficient clearance around the unit to allow for adequate cooling air supply. Warm outlet air from other units must not affect the cooling.
- Balance components that were subsequently mounted to the shaft with a half key (output shafts are balanced with a half key).
- Use suitable cable glands for the supply leads (use reducing adapters if necessary).
- Ensure that the cable bushing is properly sealed.
- Thoroughly clean the sealing surfaces of the cover before reassembly.
- If the corrosion protection coating is damaged, restore the coating.
- Check whether the degree of protection specified in the operating instructions and on the nameplate is permitted in the ambient conditions on site.
- Observe the information of Directive VDI 2230-1 on determining the tightening torques for mounting the drive unit to the application.

4.4.2 Changing the mounting position

Please pay attention to the following information if you use the drive unit in a different mounting position from the one indicated in the order:

- **Adjust the position of the breather valve, if necessary.**

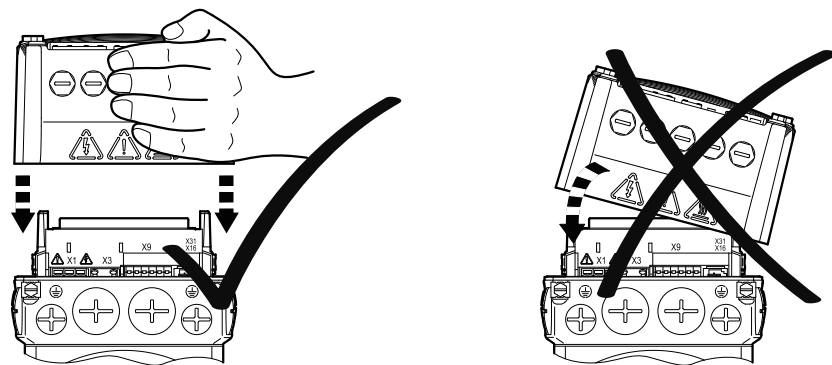
Also follow the information in the "Gearmotors .. MOVIMOT® advanced" catalog.

4.4.3 Electronics cover

Installing the electronics cover

Install the electronics cover as follows:

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



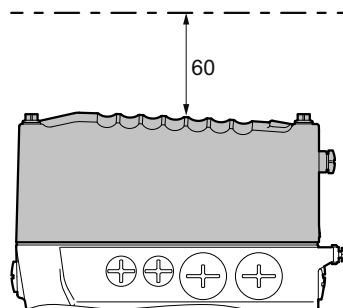
25337980043

5. Screw the electronics cover onto the connection box with 4 screws. Gradually tighten the screws in diametrically opposite sequence.
 - ⇒ Tightening torque for size 1 electronics cover: 6.0 Nm
 - ⇒ Tightening torque for size 2 electronics cover: 9.5 Nm

Likewise install the size 2 electronics cover.

Minimum mounting distance

Note the minimum installation clearance required to remove the electronics cover. The following image shows the minimum mounting distance for electronics cover size 1:



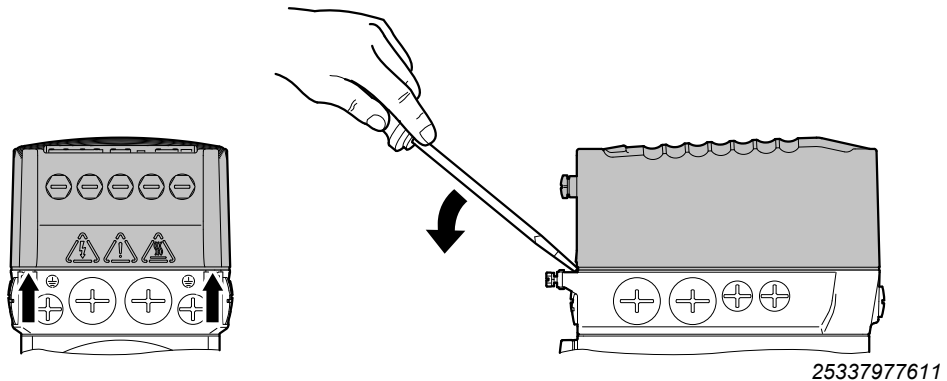
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The permissible minimum mounting distance for electronics covers size 1 and size 2 is the same. You can find detailed dimensional drawings in the product manual > chapter "Dimension drawings of the drive unit".

Removing the electronics cover

Remove the electronics cover as follows:

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



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

Likewise install the electronics cover size 2.

4.4.4 Installation in damp areas or in the open

Drive units are supplied in corrosion-resistant design for use in damp areas or in the open. Repair any damage to the paint work if necessary.

4.4.5 Derating depending on the installation altitude

Follow product manual > chapter "Technical data" > "Derating factors".

4.4.6 Painting the drive unit

If necessary, paint the drive unit as follows:

1. Perform the steps according to chapter "Installation notes".
2. Clean the surface of the drive unit.
⇒ Make sure that the surface of the drive unit is free of grease.
3. **NOTICE!** Breather valves and oil seals might be damaged when painting or re-painting. Damage to property.
Thoroughly cover the breather valves and sealing lip of the oil seals with strips.
4. Paint the drive unit.
5. Remove the designation strips.

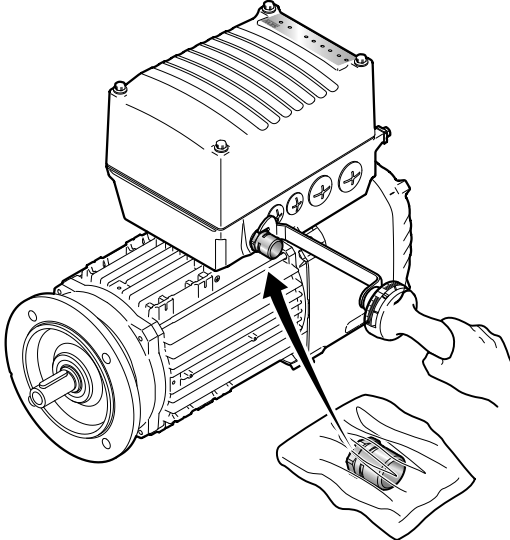
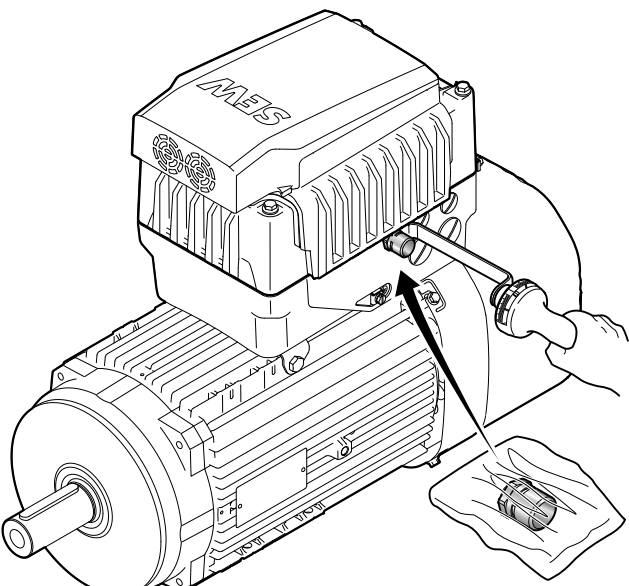
4.4.7 Pressure compensation on electronics (option /PE)

Fitting the provided pressure compensation fitting (option/PE)

For designs with an included pressure compensation fitting (option /PE), install the fitting depending on the mounting position used. The tightening torque is 4.0 Nm.

Pressure compensation fitting installation positions

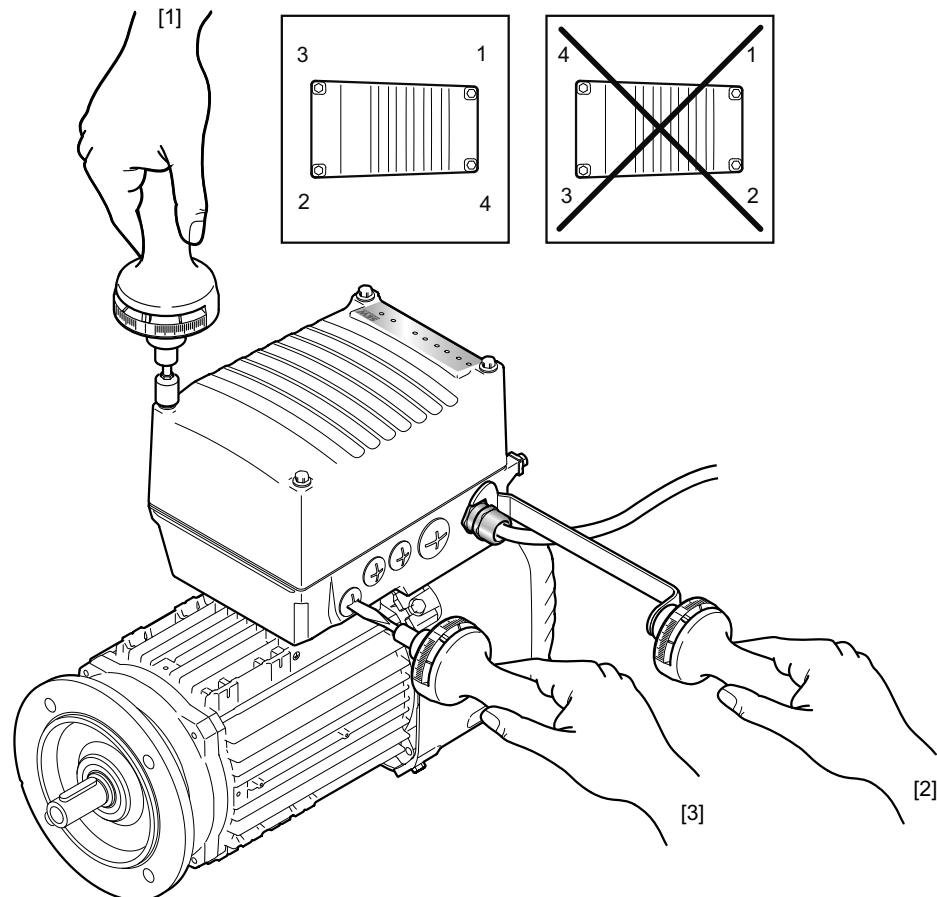
The following table shows the installation location-dependent mounting positions of the pressure compensation fitting (option/PE):

Mounting position B5	
Mounting is possible in positions X or 2.	
Size 1 	Size 2 
Mounting positions V1 and V2 only possible after consultation with SEW-EURODRIVE.	

4.5 Tightening torques

4.5.1 Examples of MOVIMOT® advanced

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

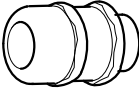


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- [1] Tighten the screws in diametrically opposite sequence with a tightening torque of 6.0 Nm (for size 1) or 9.5 Nm (for size 2).
- [2] Tighten the cable gland with a tightening torque according to chapter "Tightening torques for cable glands".
- [3] Tighten the threaded plastic blanking plugs supplied by SEW-EURODRIVE with a tightening torque of 2.5 Nm.

4.5.2 Tightening torques for cable glands

Tighten the EMC cable glands **optionally** included in the delivery by SEW-EURODRIVE with the following torques:

Screw fitting type	Image	Content	Size	Tightening torque		Outer diameter of cable	Tightening force ¹⁾	Part number
				Threaded jacket	Cable clamping			
EMC-compliant cable gland (brass, nickel-plated)		10 pieces	M16 x 1.5	4.0 Nm	3.5 Nm	> 4 to 8 mm	75 N	18204783
		10 pieces	M25 x 1.5	7.0 Nm	5.0 Nm	> 8 to 11 mm	120 N	18204805
						> 11 to 16 mm	130 N	
EMC-compliant cable gland (stainless steel)		10 pieces	M16 x 1.5	4.0 Nm	3.5 Nm	> 4 to 8 mm	75 N	18216366
		10 pieces	M25 x 1.5	7.0 Nm	5.0 Nm	> 8 to 11 mm	120 N	18216382
						> 11 to 16 mm	130 N	

1) The cable fastening in the cable gland must achieve the specified cable pull-out force from the cable gland. This is usually achieved with the specified tightening torque of the cable clamping.

5 Electrical installation

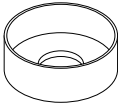
5.1 Installation instructions

5.1.1 Permitted voltage systems

Information on voltage supply systems	Information on permissibility
TN and TT systems – voltage systems with directly grounded star point	Use is possible without restrictions.
IT systems – voltage systems with non-grounded star point	Operation with an electronics cover of size 1 in IT system design is permitted (...-513-....)! For devices with electronics cover of size 2, mount an insulating bushing according to chapter "Installing the insulating bushing" (→ 30). - For use in IT systems, SEW-EURODRIVE recommends using insulation monitors with pulse-code measurement. Using such devices prevents false tripping of the insulation monitor due to the earth capacitance of the inverter. - The EMC limit values for interference emission are not specified for IT systems. The EMC limits for interference emission specified in the product manual, chapter "Technical data" do not apply to IT system designs.
Voltage systems with grounded outer conductor	Use is prohibited.

Mounting of insulating bushing (only with electronics cover size 2)

The electronics covers of size 2 are compatible with IT systems only if you mount an insulating bushing. When ordering the electronics cover, SEW-EURODRIVE supplies the insulating bushing as a single item in an accessory bag, provided it has been selected separately. The insulating bushing is not included in the delivery as standard. Alternatively, you can order the insulating bushing separately as an accessory (1, 5 or 10 pieces) later:

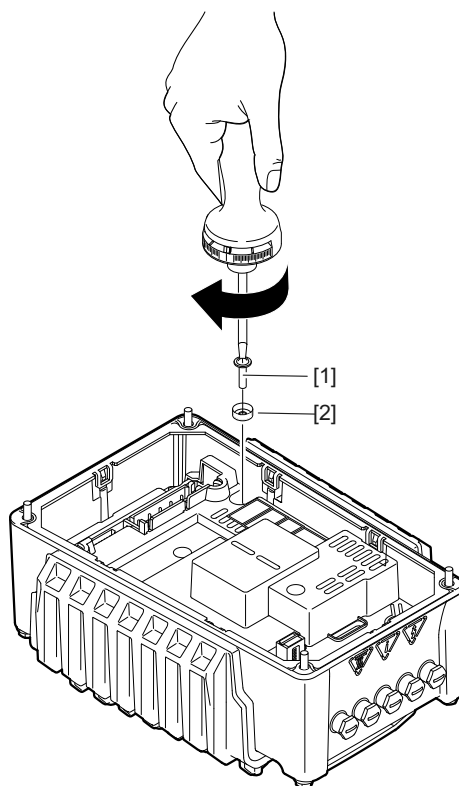
Image of insulating socket	Contents	Part number
	1 pc.	28284437
	5 pc.	28284445
	10 pc.	28284453

Mounting

When electrically installing a device with an electronics cover of size 2 in IT systems, mount the insulating bushing in the electronics cover as follows:

- Observe the notes in chapter "Preliminary work regarding inspection and maintenance".
- Loosen the 4 screws of the electronics cover and remove it.

3. Loosen the screw [1] of the electronics cover.
4. Screw the screw [1] with the insulating bushing [2] into the electronics cover. Tighten the screw with a tightening torque of 1.4 to 1.6 Nm.



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5. Place the electronics cover onto the connection box and fasten the electronics cover.
 - ⇒ Insert/screw in the screws and tighten them in a diametrically opposed sequence step by step with a tightening torque of 9.5 Nm.

5.1.2 Connecting supply system cables

Observe the following information when connecting the supply system cables:

- The nominal voltage and frequency of the device must correspond with the data of the supply system.
- Dimension the cable cross section according to the input current I_{line} for rated power, see **product manual** > chapter "Technical data".
- Install safety equipment F11/F12/F13 for line fuses at the beginning of the supply system cable behind the supply bus junction, see chapter "Connection diagram".
Dimension the safety equipment according to the cable cross section.
- When selecting the fuse, observe the information in the **product manual** > chapter "Technical data".
- Use only copper conductors with a permitted minimum temperature of 75 °C as connection cables.

5.1.3 Permitted cable cross section of terminals

Line terminals X1

Observe the permitted cable cross sections for installation:

Line terminals X1	Without conductor end sleeve	With conductor end sleeves (with or without plastic collar)
Connection cross section	0.5 mm ² – 6 mm ²	0.5 mm ² – 6 mm ²
Stripping length	13 mm – 15 mm	

Line terminals X1a

Observe the permitted cable cross sections for installation:

Line terminals X1a	Without conductor end sleeve	With conductor end sleeves (with or without plastic collar)
Connection cross section	0.2 mm ² – 6 mm ²	0.25 mm ² – 4 mm ²
Stripping length	10 mm – 12 mm	

Terminals X3 for braking resistor

Observe the permitted cable cross sections for installation:

Terminals X3 for braking resistor	Without conductor end sleeve	With conductor end sleeve (with or without plastic collar)
Connection cross section	0.08 mm ² – 4.0 mm ²	0.25 mm ² – 2.5 mm ²
Stripping length	8 mm – 9 mm	

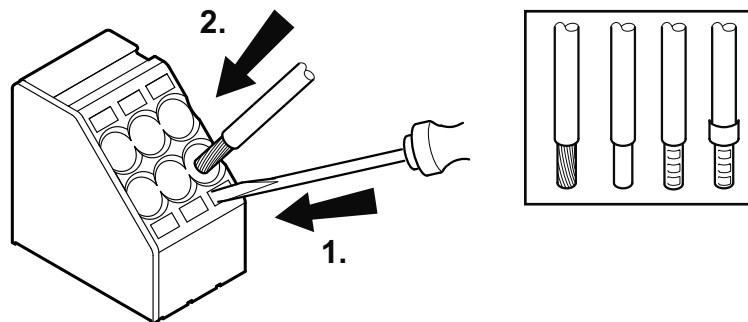
Control terminals X9

Observe the permitted cable cross sections for installation:

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

5.1.4 Activating line terminals X1

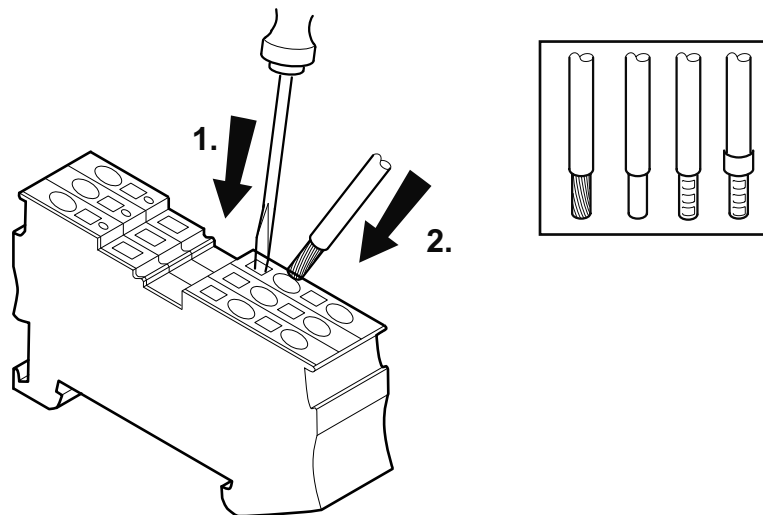
Adhere to the following sequence when actuating the line terminals X1:



25649924107

5.1.5 Actuating line terminals X1a

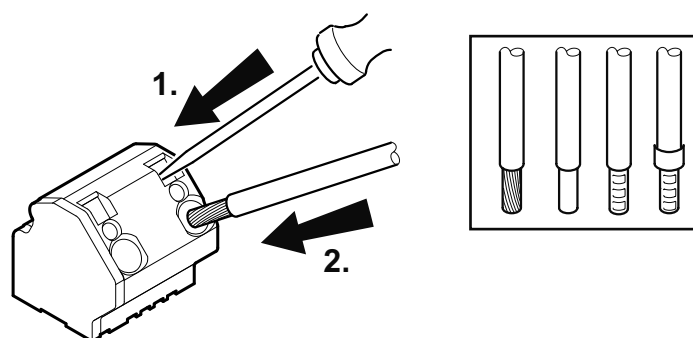
Adhere to the following sequence when actuating the line terminals X1a:



34682210443

5.1.6 Activating terminals X3 for the braking resistor

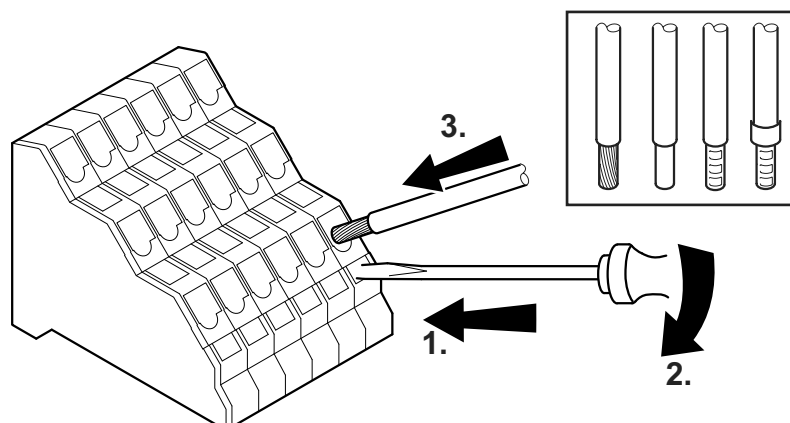
Adhere to the following sequence when actuating the X3 terminals for the braking resistor:



25650172171

5.1.7 Activating control terminals X9

Observe the following sequence when actuating the X9 control terminals:



30508870539

5.1.8 Selecting the residual current device

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

Proceed as follows to select the residual current device:

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

5.1.9 Using the line contactor

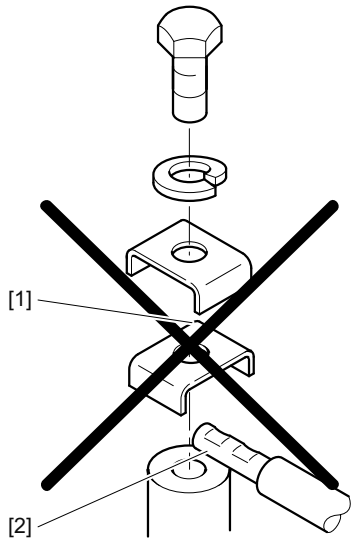
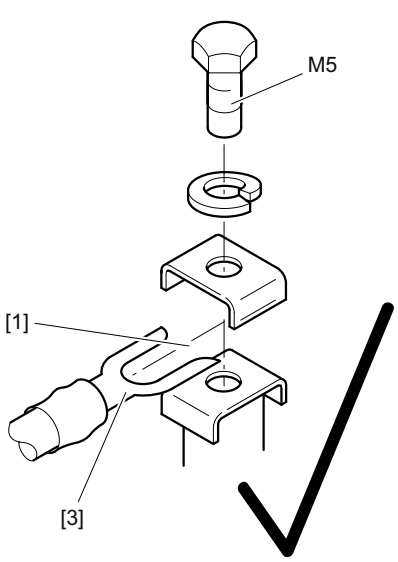
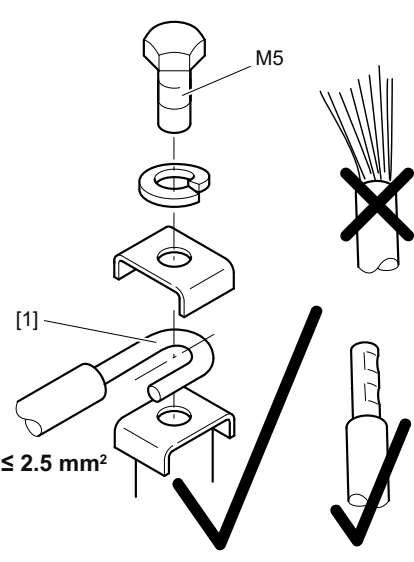
Proceed as follows when using the line contractor:

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

5.1.10 Notes on PE connection

PE connection to devices with a lifting eye

- The handle is only used to transport the unit. The handle is **not** required for operation.
1. Remove the lifting eye. Store the lifting eye for future service work.
 2. **⚠ WARNING!** Electric shock due to faulty PE connection. Death or serious injury.
Fit the PE connection cable to the connection box in accordance with the following figures (screw tightening torque: 2.0 – 2.4 Nm).

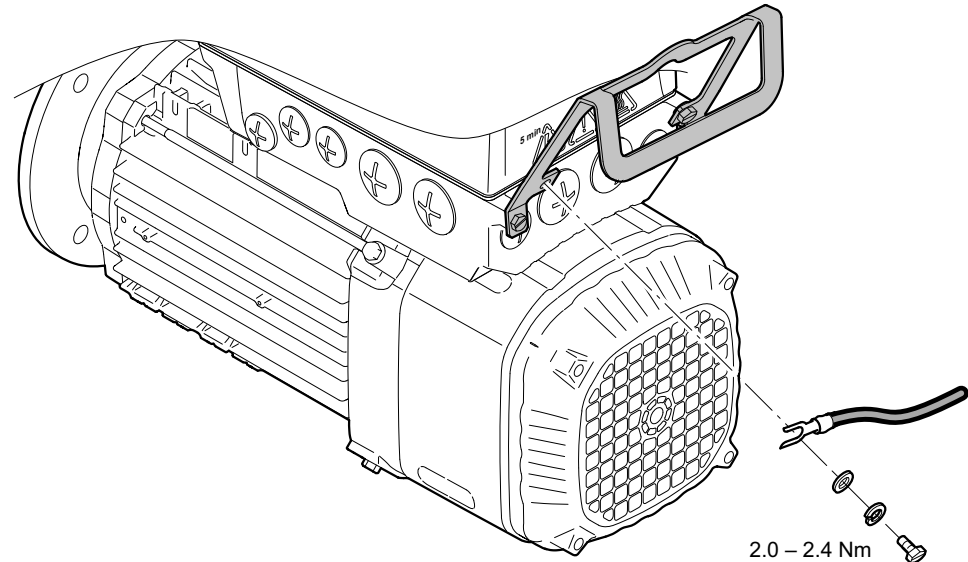
Non-permitted mounting	Recommendation: Mounting with forked cable lug ¹⁾ Permitted for all cross sections	Mounting with solid connecting wire or litz wire with conductor end sleeve ¹⁾ Permitted for cross sections up to maximum 2.5 mm ²
	 9007222159700491	 18014421414430219

- 1) Use the specified material for the assembly that is included in the accessory bag.
- [1] Install the PE connection cable between both U-shaped mounting panels.
- [2] Incorrect installation sequence
- [3] Forked cable lug suitable for M5 PE screws

PE connection to devices with hoop guard

The optional hoop guard is used to protect the connectors on the electronics cover. Do not remove the guard bracket.

1. Connect the PE cable to the guard bracket according to the following figure.



2. **⚠ WARNING!** Electric shock due to faulty PE connection. Death or serious injury. Install the PE cable on the hoop guard as follows (tightening torque of the screw: 2.0 – 2.4 Nm).

Recommendation: Mounting with forked cable lug¹⁾ Permitted for all cross sections	Mounting with solid connecting wire or litz wire with conductor end sleeve¹⁾ Permitted for cross section up to max. 2.5 mm²

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

[1] Install the PE connection cable between the washer and the guard plate.

[2] Forked cable lug suitable for M5 PE screws

Leakage currents

During normal operation, leakage currents ≥ 3.5 mA may occur. In order to fulfill EN 61800-5-1, observe the following information:

- The ground connection (PE) must be installed in such a way that it meets the requirements for systems with high leakage currents.
- This usually means
 - installing a PE connection cable with a minimum cross section of 10 mm^2 (copper conductor)
 - or installing a second PE connection cable in parallel to the protective earth. The cross section of the second PE connection cable must be at least as large as the cross section of the PE.

According to DIN EN 61800-5-1, the second PE connection is not required if the line connection is equipped with a connector for industrial applications (according to IEC 60309) and if the supply system cable has a cross section of $\geq 2.5 \text{ mm}^2$.

INFORMATION



According to the IEC 60309-1 standard > chapter "General requirements for connectors, sockets and couplings for industrial applications", the M23 circular connectors from TE Connectivity - Intercontec products of the 723 series comply with connectors for industrial applications.

5.1.11 Installation with protective separation

The electronics cover meets all requirements for protective separation of power and electronics connections in accordance with EN 61800-5-1. The connected signal circuits and the DC 24 V voltage supply must meet the requirements according to SELV (**S**afety **E**xtra **L**ow **V**oltage) or PELV (**P**rotective **E**xtra **L**ow **V**oltage) to ensure protective separation. The installation must meet the requirements for protective separation.

5.1.12 Protection devices

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

5.1.13 Installation above 1000 m amsl

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

- The nominal motor current I_N is reduced due to the reduced cooling above 1000 m, see **product manual** > chapter "Technical data".
- Above 2000 m above sea level, the air and creepage distances are only sufficient for overvoltage category II. If the installation requires overvoltage category III, you will have to install additional external overvoltage protection to limit overvoltage peaks to 1.5 kV phase-to-phase and 2.5 kV phase-to-ground.

- If safe electrical disconnection is required, it must be implemented outside the device at altitudes of more than 2000 m above sea level (safe electrical disconnection in accordance with EN 61800-5-1).
- At installation altitudes between 2000 m and 3800 m above sea level, measures must be taken that reduce the line side overvoltage from category III to category II for the entire system.

5.1.14 UL-compliant installation



INFORMATION

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

Observe the following notes for UL-compliant installation:

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

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

Field Wiring Power Terminals

- Use 75 °C copper wire only.
- Tighten terminals to 17.7 – 21.24 in-lbs (screw connect terminals only).

Short Circuit Current Rating

Suitable for use on a circuit capable of delivering not more than 65,000 rms symmetrical amperes when protected by 600 V nonsemiconductor fuses (Class CA, CB, CD, CF, G, J, K-1, K-5, RK1, RK5, T) or when protected by 500 V minimum inverse time circuit breakers having an interrupting rating not less than 65 kA rms symmetrical amperes.

For MOVIMOT® advanced, when used with optional Load Disconnect Switch:

Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes when protected by 600 V nonsemiconductor fuses (Class CA, CB, CD, CF, G, J, K-1, K-5, RK1, RK5, T) or when protected by 500 V minimum inverse time circuit breakers having an interrupting rating not less than 5 kA rms symmetrical amperes.

The max. voltage is limited to 500 V.

Suitable for motor group installation on a circuit capable of delivering not more than 65,000 rms symmetrical amperes when protected by, 600 V maximum nonsemiconductor fuses (Class CA, CB, CD, CF, G, J, K-1, K-5, RK1, RK5, T) or when protected by 500 V maximum inverse time circuit breakers having an interrupting rating not less than 65 kA rms symmetrical amperes.

For MOVIMOT® advanced, when used with optional Load Disconnect Switch:

Suitable for motor group installation on a circuit capable of delivering not more than 5,000 rms symmetrical amperes when protected by, 600 V maximum nonsemiconductor fuses (Class CA, CB, CD, CF, G, J, K-1, K-5, RK1, RK5, T) or when protected by 500 V maximum inverse time circuit breakers having an interrupting rating not less than 5 kA rms symmetrical amperes.

The max. voltage is limited to 500 V.

Branch Circuit Protection

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

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

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

For maximum branch circuit protection see table below.

SCCR: 65 kA /500 V 5 kA /500 V (devices with maintenance switch) when protected by	
Non-semiconductor fuses (currents are maximum values)	Inverse time circuit breakers (currents are maximum values)
40 A max./600 V	40 A max./500 V min.

Motor Overload Protection

The devices are provided with load and speed-sensitive overload protection and thermal memory retention upon shutdown or power loss.

The trip current is adjusted to 150 % of the rated motor current.

Surrounding Air Temperature Rating

The devices are suitable for an ambient temperature of 40 °C, max. 60 °C with de-rated output current. To determine the output current rating at temperatures above 40 °C, the output current should be de-rated by 3 % per K between 40 °C and 60 °C.

Wiring Diagrams

For wiring diagrams, refer to chapter "Electrical Installation".

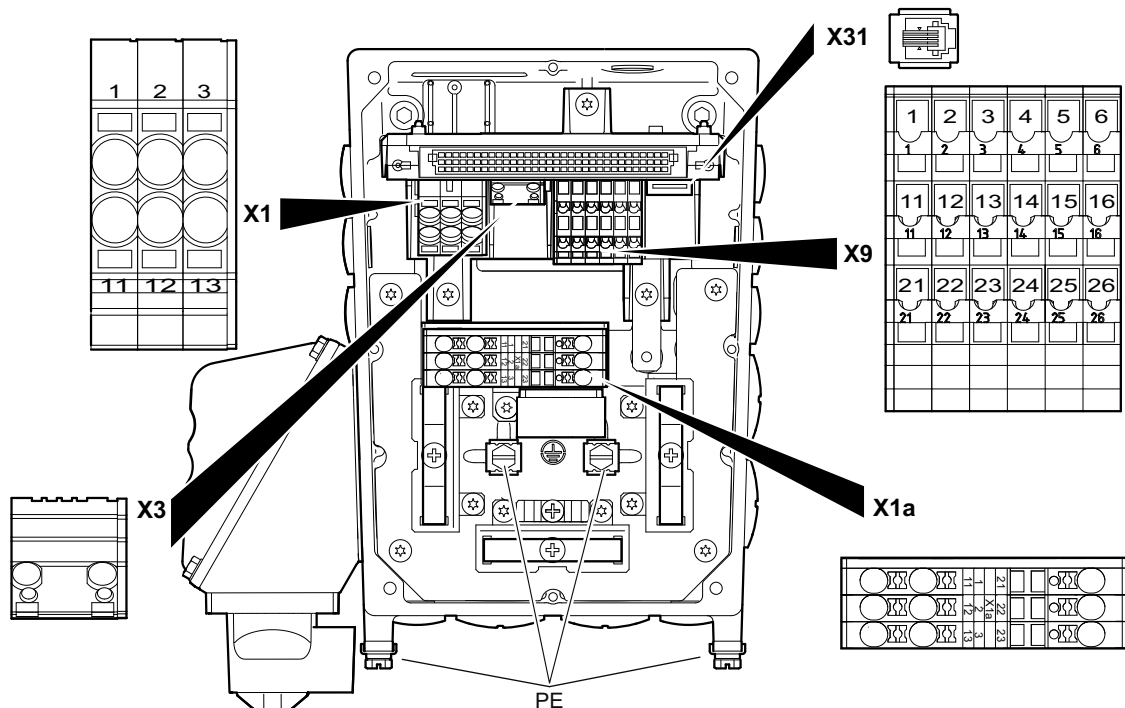
5.2 Terminal assignment of MOVIMOT® advanced DAC

Attach units without a connector to the terminals as follows:

1. **⚠ WARNING!** Electric shock caused by dangerous voltages in the connection box. Severe or fatal injuries.
De-energize the device. Pay attention to the 5 safety rules in chapter "Carrying out electrical work safely". Afterwards, wait 5 minutes.
2. **⚠ WARNING!** Risk of burns due to hot surfaces. Severe injuries.
Let the device cool sufficiently before touching it.
3. Undo the screws of the electronics cover. Remove the electronics cover.
4. Route the cables through the cable glands into the connection box.
5. If terminal X3 for connecting the braking resistor is occupied with an optional internal braking resistor and the capacity of this braking resistor is insufficient, you can alternatively connect an external braking resistor as follows:
 - ⇒ Undo the connections of the internal braking resistor.
 - ⇒ Insulate and fix the connections of the internal braking resistor. Ensure that the connections are electrically isolated from all other components.
 - ⇒ Connect the external braking resistor. When doing this, pay attention to the installation instructions of the unit and the external braking resistor.
6. Connect the device according to the following "terminal assignment" (→ 41).

5.2.1 Connection box size 1

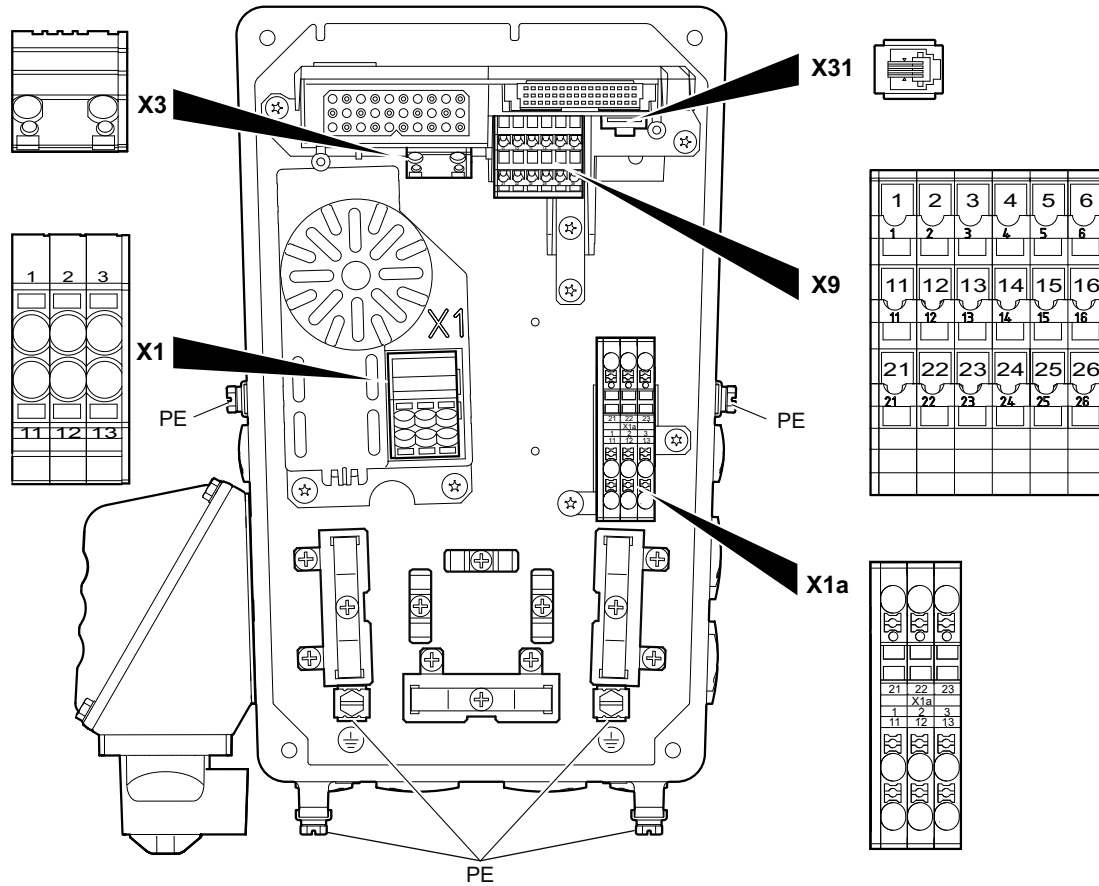
The following image shows the terminals of MOVIMOT® advanced DAC, size 1:



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5.2.2 Connection box size 2

The following image shows the terminals of MOVIMOT® advanced DAC, size 2:



34443087371

5.2.3 Assignment

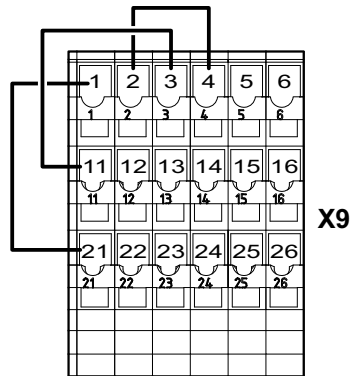
The following table shows the terminal assignment of MOVIMOT® advanced DAC:

Terminal	No.	Marking	Function	
X1¹⁾ Line terminals Without option /D11 (switch disconnector)	1	brown	L1	Line connection, phase L1 – IN
	2	black	L2	Line connection, phase L2 – IN
	3	gray	L3	Line connection, phase L3 – IN
	11	brown	L1	Line connection, phase L1 – OUT
	12	black	L2	Line connection, phase L2 – OUT
	13	gray	L3	Line connection, phase L3 – OUT
X1a line terminals With option /D11 (switch disconnector)	1	gray	L1	Line connection, phase L1 – IN
	2	gray	L2	Line connection, phase L2 – IN
	3	gray	L3	Line connection, phase L3 – IN
	11	gray	L1	Line connection, phase L1 – OUT
	12	gray	L2	Line connection, phase L2 – OUT
	13	gray	L3	Line connection, phase L3 – OUT

Terminal	No.	Marking	Function	
	–	–	PE	Protective earth connection
X3 braking re- sistor termi- nals	1	–	BW	Braking resistor connection
	2	–	BW	Braking resistor connection
X9 control termi- nals	1	yellow	F_STO_P1	Input STO+
	2	yellow	F_STO_P1	Input STO+ (to loop through)
	3	–	0V24_OUT	0 V 24 reference potential for DC 24 V output
	4	–	24V_OUT	DC 24 V output
	5	–	DI01	Digital input DI01
	6	–	DI02	Digital input DI02
	11	yellow	F_STO_M	Input STO_ground
	12	yellow	F_STO_M	Input STO_ground (to loop through)
	13	–	24V_IN	DC 24 V supply
	14	–	DOR-C	Relay output DO R, common con- tact
	15	–	DI03	Digital input DI03
	16	–	DI04	Digital input DI04
	21	yellow	F_STO_P2	Input STO+
	22	yellow	F_STO_P2	Input STO+ (to loop through)
	23	–	0V24_IN	0 V 24 reference potential for DC 24 V supply
	24	–	DOR-NO	Relay output DO R, NO contact
	25	–	0V24_OUT	0 V 24 reference potential for DC 24 V output
	26	–	24V_OUT	DC 24 V output
X31 engineering interface	1	–	0V24_OUT	0 V 24 reference potential for DC 24 V auxiliary output
	2	–	CAN_L	CAN Low connection
	3	–	CAN_H	CAN High connection
	4	–	24V_OUT	DC 24 V auxiliary output

1) With the switch disconnecter option, the line terminal X1 is assigned to the internal wiring.

The following figure shows the factory-installed jumpers at the X9 terminals:



29006177419

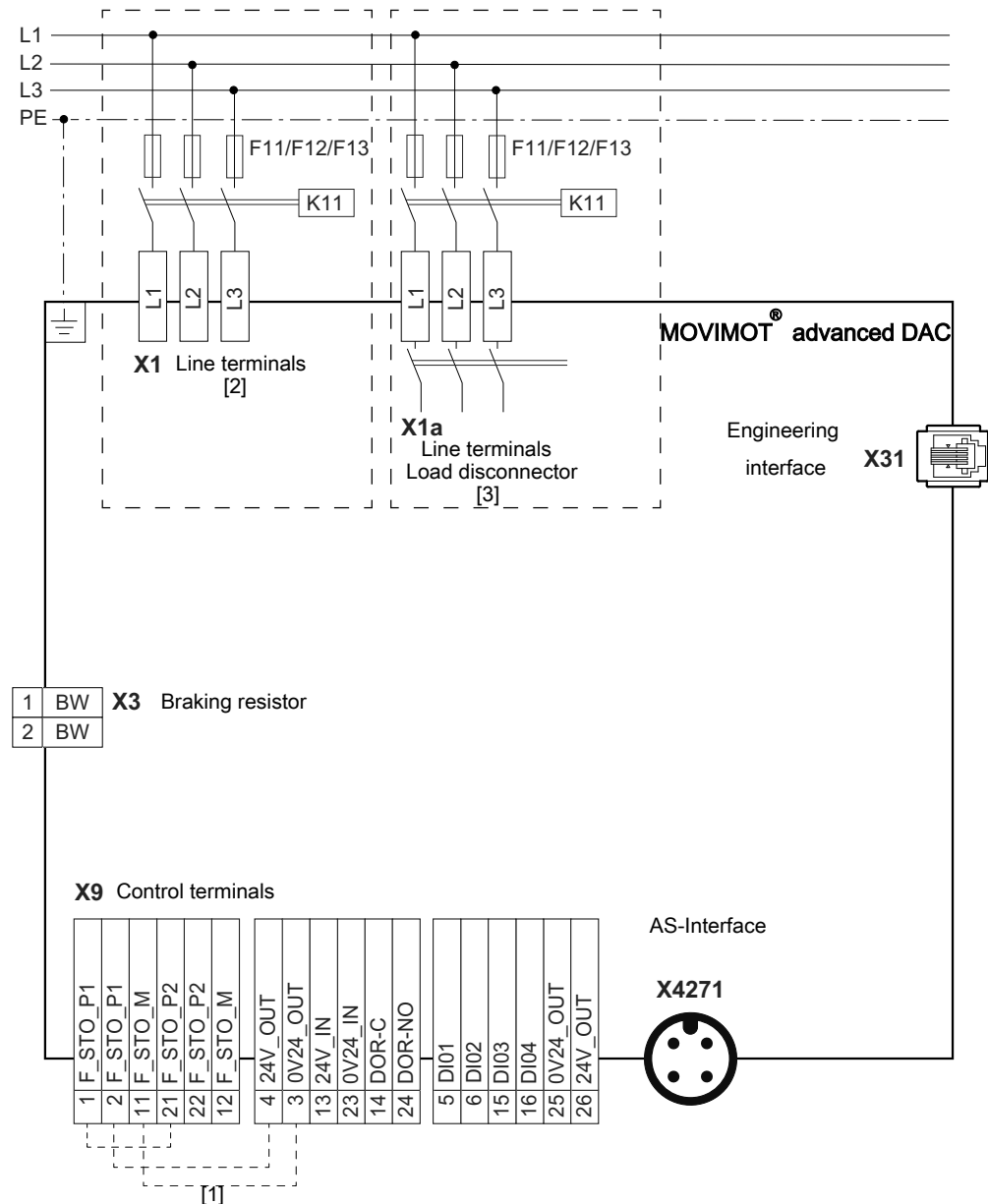
These jumpers are not present in the following designs:

- Designs with connectors with STO function

Additional information is available in the product manual > chapter "Project planning for functional safety" and chapter "Connection variants functional safety".

5.3 MOVIMOT® advanced DAC connection diagram

The following figure shows the connections of the device:



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- [1] Jumpers installed at the factory for designs without connectors with STO function. You can find more information in the product manual > chapter "Project planning for functional safety".
- [2] Line terminals X1 only **without** switch disconnecter
- [3] Line terminals X1a only **with** switch disconnecter

For terminal assignment, see chapter "Terminal assignment of MOVIMOT® advanced DAC" (→ 40).

The connector positions can be found in chapters "Connector positions, size 1" (→ 49), "Connector positions, size 2" (→ 52).

5.4 Cable routing and cable shielding

5.4.1 Accessory bag with installation equipment (part number 18241395)

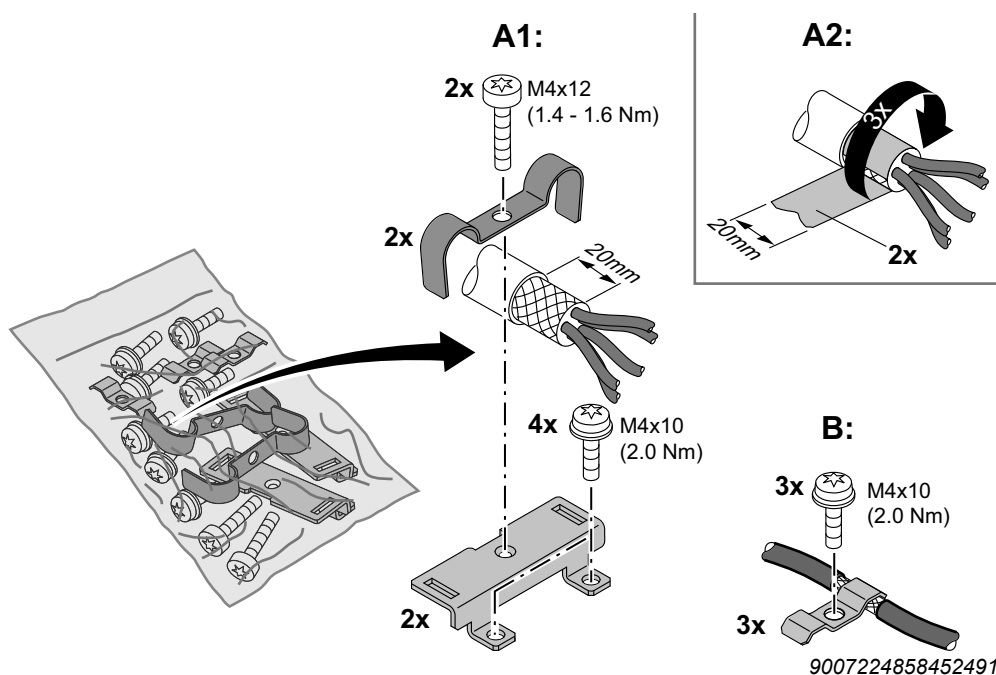
INFORMATION



For some installation variants, you do not need all the parts of the accessory kit.

The delivery of each drive unit includes the following accessory bag with installation materials for cable shielding (exception: Does not apply when all possible connections were ordered in connector design):

- **A1: Installation material for line and hybrid cables:**
2 × shield clamps with shield plate and screws to connect the shield of line cables or hybrid cables (outer shield).
- **A2: Conductive film:**
2 × pieces of conductive film to wind around the braid shield. Use the conductive film if required.
- **B: Installation equipment for signal lines:**
3 × shield clamps with screw to connect the shield of line cables (e.g. STO).

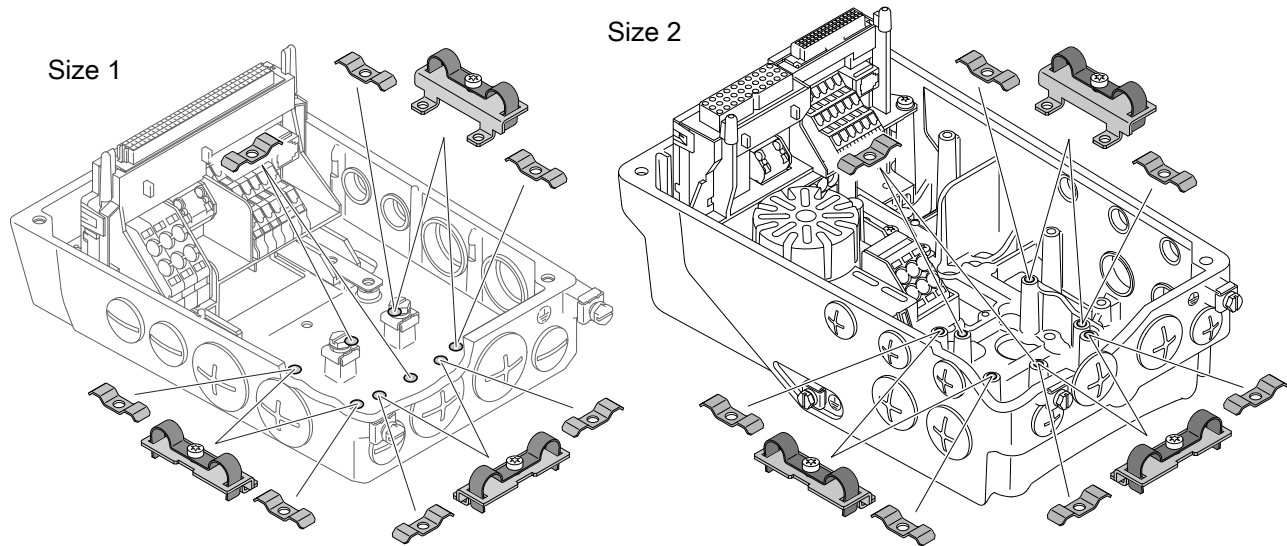


5.4.2 General installation options

The following chapters show common examples and contain important notes on cable selection and cable routing.

Assembly of installation materials

The following image illustrates the assembly of the installation material:



5.4.3 Installation with separately routed AS-Interface/AUX-PWR cable

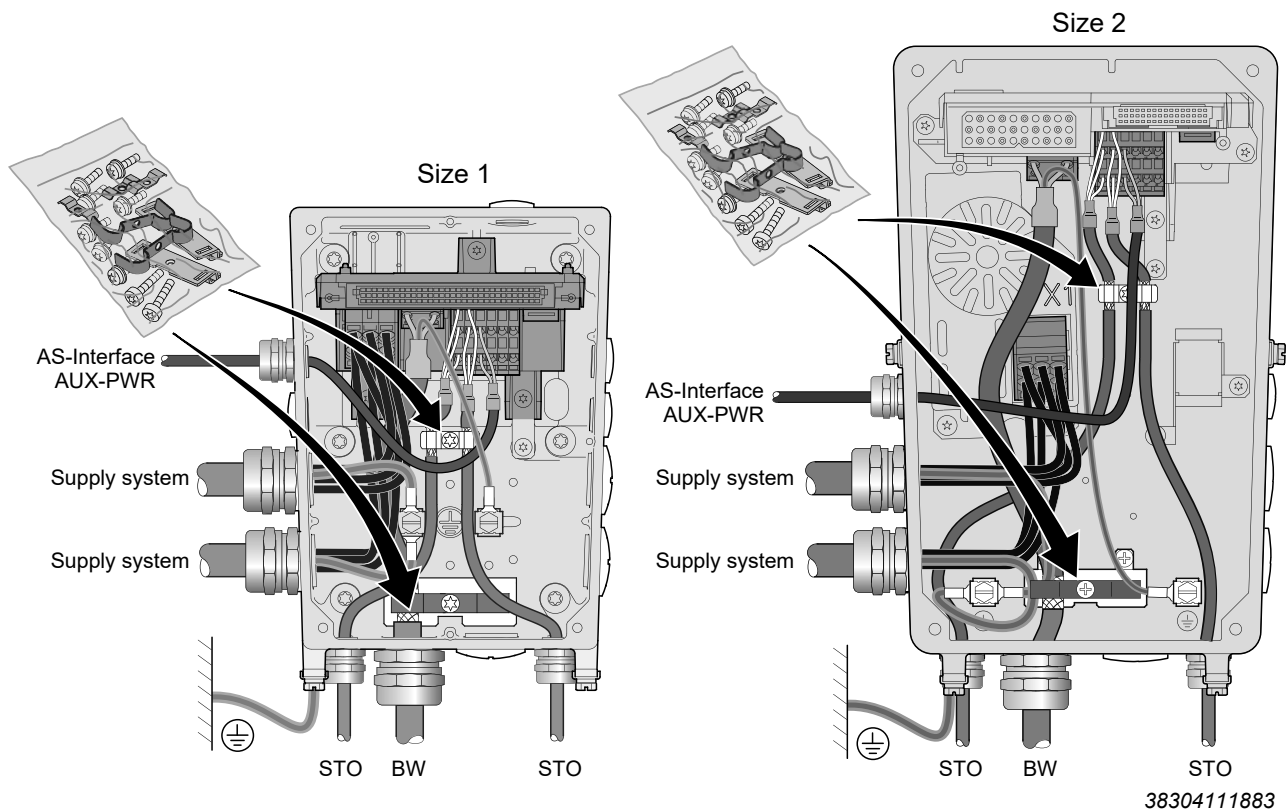
Notes on cable routing and shielding – Recommended cable routing

Note the following points for cable routing and cable shielding:

- Cable selection
 - When selecting cables, observe the recommended connection cables in the product manual > chapter "Technical data" > "Connection cables".
 - You can use unshielded connection cables as line connection cables.
- Cable shielding
 - Connect the shields of the cables to the metal housing of the unit using the shield clamps of the accessory bag. To do so, expose the shield in the area of the shield contact surface.
 - As an alternative, you can use optionally available EMC cable glands to connect the shield of cables, see "EMC cable glands" chapter.
- External braking resistor
 - Also observe the notes in chapter "Terminal assignment ...".
- Observe the permitted bending radii of the cables for cable routing.

Cable routing AS-Interface

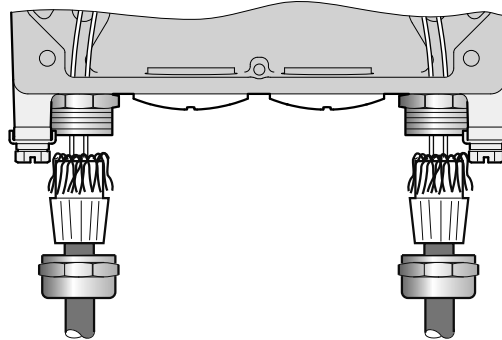
The following figure shows an example of the basic cable routing.



5.5 EMC cable glands

5.5.1 Cable shielding (alternative)

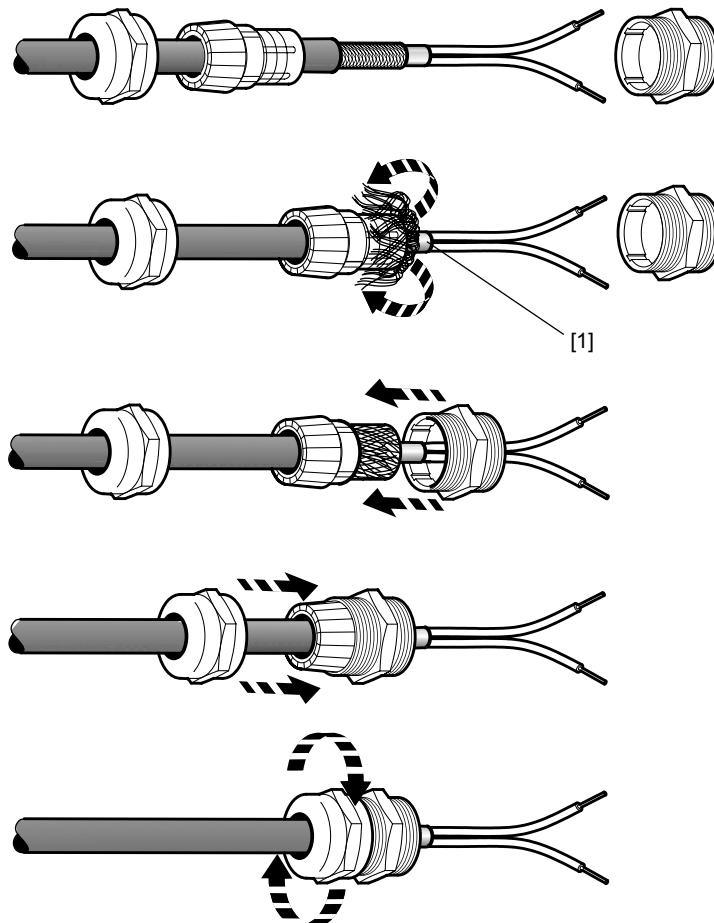
As an alternative to using shield clamps for shielded cables (e.g. control cables, STO cables, power cables), you can use EMC cable glands, which are available as an option, to connect the shield.



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5.5.2 Assembly of EMC cable glands

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



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

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Connector				Not together at a position with the connector socket:
Designation	Coding ring/ color	Function	Position	
X1203_1	Black	"AC 400 V connection" ⁽¹⁾	X, 2, or 3	• X1206 • X1207 • X1217
X1203_2	Black	"AC 400 V connection"	X, 2, or 3	• X2242 • X5136 • X2328
X1206	-	"AC 400 V connection (IN)" ⁽²⁾	X, 2, or 3	• X1203_1 • X1207 • X1217
X2242	-	"AC 400 V connection (OUT)"	X, 2, or 3	• X1203_2 • X2328 • X5136
X1207	Black	"AC 400 V connection"	X, 2, or 3	• X1203_1 • X1206 • X1217
X1217	-	"PA hybrid connection (IN)" ⁽³⁾ AC 400 V and DC 24 V backup voltage	X, 2, or 3	• X1203_1 • X1206 • X1207
X2328	-	"Hybrid connection PA (OUT)" AC 400 V and DC 24 V backup voltage	X, 2, or 3	• X1203_2 • X2242 • X5136
X5504	Yellow	"STO" ⁽⁴⁾ (3-wire connection)	X, 2, or 3	• X2304 • X5135
X5505	Yellow	"STO " (3-wire connection)	X, 2, or 3	• X1523 • X1524 • X4142
X2304	-	"Connection of external braking resistor"	X, 2, or 3	• X5504 • X5135
X5136	-	"Digital inputs/outputs"	X, 2, or 3	• X1203_2 • X2242 • X2328
X5135	-	"Digital inputs/outputs"	X, 2, or 3	• X5504 • X2304
X1523	Light gray	"DC 24 V backup voltage – input"	X, 2, or 3	• X5505 • X1524 • X4142
X1524	Black	"DC 24 V backup voltage" (AUX-PWR)	X, 2, or 3	• X5505 • X1523 • X4142

Connector				Not together at a position with the connector socket:
Designation	Coding ring/ color	Function	Position	
X4142	Red	"Engineering interface"	X, 2, or 3	• X5505 • X1523 • X1524
-	-	[1] Optional pressure compensation	X or 2	• Optional connection for equipotential bonding
-	-	[2] Optional connection for equipotential bonding	X or 2	• Optional pressure compensation

1) Connector X1203_1 can also be ordered separately (i.e. without connector X1203_2).

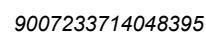
2) Connector X1206 can also be ordered separately (i.e. without connector X2242).

3) Connector X1217 can also be ordered separately (i.e. without connector X2328).

4) Connectors X5504 and X5505 can only be ordered together.

Cable entry M25

The following figure shows possible connector positions:

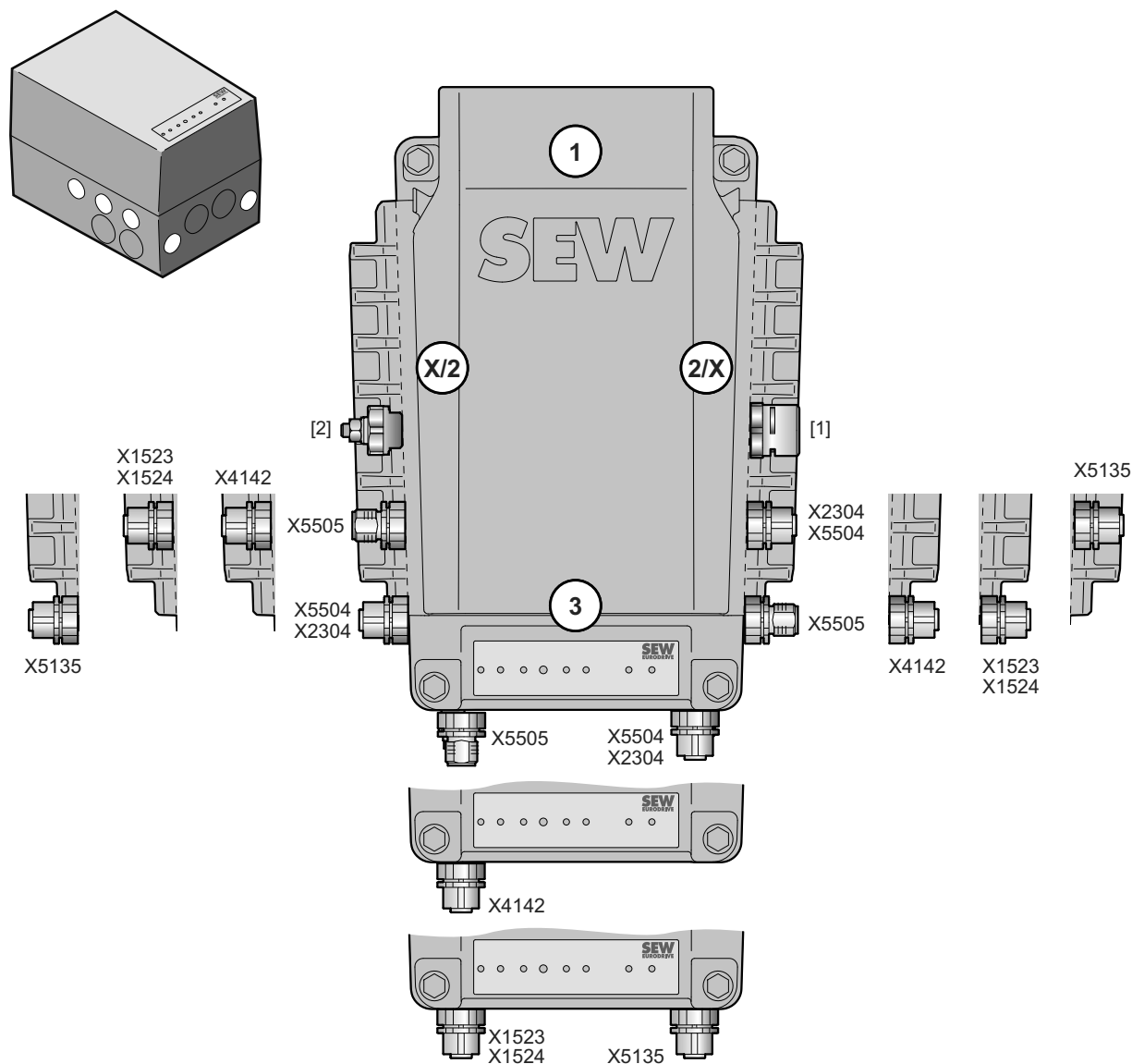


Connectors				Not together at a position with the connector:
Designation	Coding ring/ color	Function	Position	
X1203_1	Black	"AC 400 V connection" ¹⁾	X, 2 or 3	• X1206 • X1207 • X1217
X1203_2	Black	"AC 400 V connection"	X, 2 or 3	• X5136
X1206	-	"AC 400 V connection (IN)"	X, 2 or 3	• X1203_1 • X1207 • X1217
X1207	Black	"AC 400 V connection"	X, 2 or 3	• X1203_1 • X1206 • X1217
X1217	-	"Hybrid connection PA (IN)" AC 400 V and DC 24 V backup voltage	X, 2 or 3	• X1203_1 • X1206 • X1207
X5136	-	"Digital inputs/outputs"	X, 2 or 3	• X1203_2

1) Connector X1203_1 can also be ordered separately (i.e. without connector X1203_2).

Cable entry M16

The following figure shows possible connector positions:



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Connector				Not together at a position with the connector socket:
Designation	Coding ring/ color	Function	Position	
X5504	Yellow	"STO" ¹⁾ (3-wire connection)	X, 2, or 3	• X2304 • X5135
X5505	Yellow	"STO" (3-wire connection)	X, 2, or 3	• X4142 • X1523 • X1524
X2304	-	"Connection of external braking resistor"	X, 2, or 3	• X5504 • X5135
X5135	-	"Digital inputs/outputs"	X, 2, or 3	• X5504 • X2304

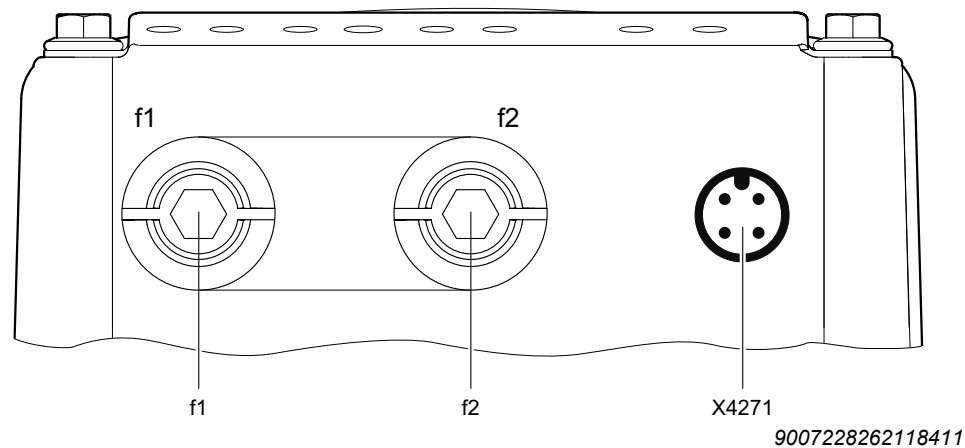
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Connector				Not together at a position with the connector socket:
Designation	Coding ring/ color	Function	Position	
X1523	Light gray	"DC 24 V backup voltage – input"	X, 2, or 3	• X5505 • X4142 • X1524
X1524	Black	"DC 24 V backup voltage" (AUX-PWR)	X, 2, or 3	• X5505 • X4142 • X1523
X4142	Red	"Engineering interface"	X, 2, or 3	• X5505 • X1523 • X1524
-	-	[1] Optional pressure compensation	X or 2	• Optional connection for equipotential bonding
-	-	[2] Optional connection for equipotential bonding	X or 2	• Optional pressure compensation

1) Connectors X5504 and X5505 can only be ordered together.

5.6.3 Connector positions at the DAC.. electronics cover

The following figure shows an example of the positions of the potentiometers and connectors:



Designation	Function
f1	"Potentiometer f1" (→ 62) (underneath the screw plug)
f2	"Potentiometer f2" (→ 62) (underneath the screw plug)
X4271	"AS-Interface"

5.6.4 STO jumper plug (three-pin)

**▲ WARNING**

Safe disconnection of the device is not possible when the jumper plug is used.

Severe or fatal injuries.

- Only use the jumper plug if the device is not used to fulfill any safety function.

**▲ WARNING**

Disabling of the safety-related disconnection of further devices due to parasitic voltages when using an STO jumper plug.

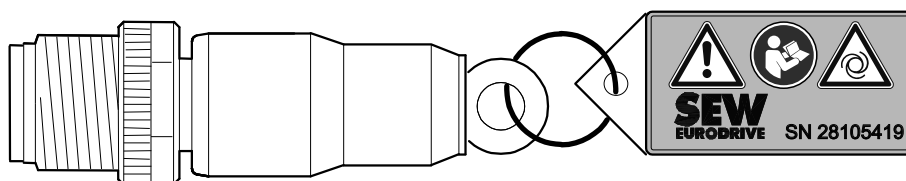
Severe or fatal injuries.

- Only use the STO jumper plug when all incoming and outgoing STO connections have been removed from the device.

A printed red tag is attached to the STO jumper plug.

The STO jumper plug can be connected to the STO connector X5504 of the device. The STO jumper plug deactivates the safety functions of the device.

The following figure shows the STO jumper plug with the printed **red** tag, part number 28105419:



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5.7 PC connection

Connect the PC to the drive unit before you start the engineering software MOVISUITE®.

You have several options to connect a PC to the drive unit.

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

6 Startup

6.1 Startup notes

Perform the following steps before startup:

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

INFORMATION



Premagnetization of an asynchronous motor without brake can cause an alignment process and thus a rotor movement.

6.1.1 Lifting applications

Perform the following additional steps before starting up the lifting applications:

1. **▲ WARNING!** Danger from falling hoist. Severe or fatal injuries.
Observe the following information.
 - ⇒ Do not use the device alone as a safety device for the lifting application.
 - ⇒ Use additional monitoring systems or mechanical protection devices as a safety device.
2. **▲ WARNING!** Danger from falling hoist. Severe or fatal injuries.
Do not use the "Release brake/deactivate DynaStop® for FCB01" function in lifting devices or applications with loads that may potentially fall down. Disable the function as follows:
 - ⇒ Deactivate the function of DIP switch S1/2 via parameter *Functions > Inputs/outputs > Basic device > DIP switch functions > Release brake/deactivate DynaStop® for FCB01 – enable > Deactivation = "1"* (yes).
 - ⇒ Disable the function via parameter *Functions > Drive functions > FCB01 Output stage inhibit > Release brake/deactivate DynaStop® for FCB01 – enable = "0"* (No).
3. In the MOVISUITE® engineering software, configure the parameters according to the lifting application requirements and its safety assessment.
 - ⇒ Set the parameter *Functions > Drive functions > FCB01 Output stage inhibit > Apply brake with STO = "1"* (Yes).
 - ⇒ Set the parameter *Functions > Drive functions > FCB01 Output stage inhibit > Activate with DynaStop®* according to the requirements of the application. Observe the notes in chapter "DynaStop® in conjunction with STO".
4. Check the setting of the parameter *Drive train > ASx drive train > Controller > Motor behavior > Hoist preload* in the MOVISUITE® engineering software. Set the parameter in accordance with the lifting application requirements.
5. Set the parameter *Functions > Monitoring functions > Control functions > Speed monitoring > Delay time* according to the requirements of the application. SEW-EURODRIVE recommends setting the *Delay time* parameter to a value ≤ 100 ms.
 - ⇒ The *Hoist preload* parameter influences the integrator behavior of the speed controller in its initial value reentering control. The following settings are available:
 - ⇒ "Off" (= default): The integrator always starts with the value "0". Adjustment is made to an existing load torque.
 - ⇒ "Save": The integrator value that was present at the time of opening the speed control loop is retained. If the load torque has not changed, no adjustment is necessary when closing the speed control loop.
 - ⇒ "Initialization value": With the "Torque preload" parameter, you can specify the load torque to the speed controller as the initial value in the range -1000% – 1000% of the nominal motor torque. You can set this parameter during startup or optimization of the drive. As an alternative, you can use a local setpoint or a channel of the process data buffer for this purpose. If the direction of rotation is positive in the stroke direction, enter a positive value and vice versa.
6. Set the parameter *Functions > Monitoring functions > Control functions > Speed monitoring > Delay time* according to the requirements of the application. SEW-EURODRIVE recommends setting the *Delay time* parameter to a value ≤ 100 ms.

6.2 Startup requirements

NOTICE

Gear unit overload.

Damage to the gear unit.

- Observe the peak torque of the gear unit when you configure the current limit and torque limit.
- Check the current limits and torque limits and adjust them, if necessary.

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

In this case, the following conditions apply to startup:

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

Required hardware components:

- PC or laptop according to the product manual > chapter "PC connection" (→ 56).
- Interface cable and, if applicable, interface adapter according to product manual > chapter "PC connection"

Required software:

- MOVISUITE® engineering software from SEW-EURODRIVE

6.2.1 Torque limiting

NOTICE

Gear unit overloaded by the motor.

Damage to property.

- Limit the maximum output torque to the torque which is specified on the nameplate.

Also follow the information in the "Gearmotors .. MOVIMOT® advanced" catalog.

6.3 Parameterization mode

The following parameterization modes are available to perform the device startup:

Easy mode

Easy startup with predefined control interface.

- Setting parameters, setpoints, and additional functions can only be set using the mechanical setting elements (potentiometer and DIP switch) at the device.
- Startup does not require any software or keypads.
- When you switch to Easy mode, all parameters are reset to the delivery state.
- All device parameters are write-protected.

Exceptions:

- You can also change the parameters for device address configuration and the parameterization mode when the device is set to Easy mode.

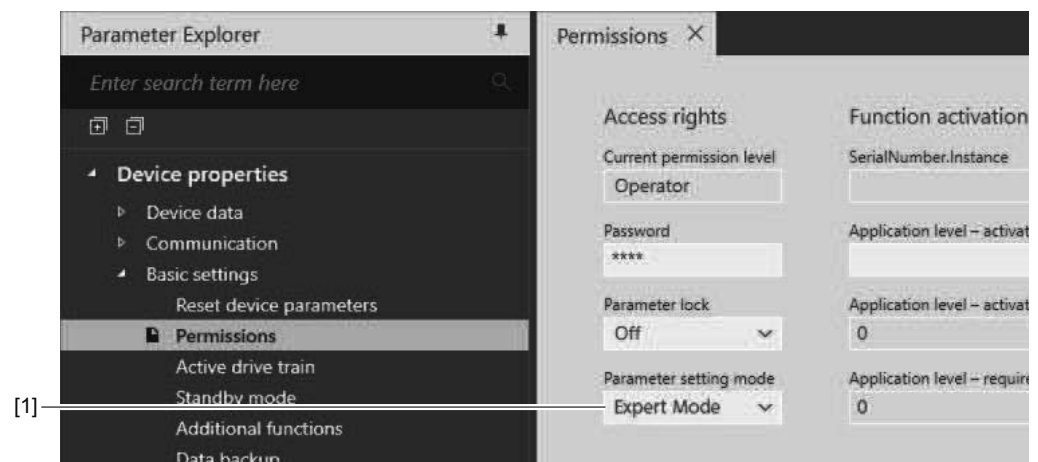
Easy mode is only available up to firmware version < 11.

Expert mode

Expert mode is a parameterization mode that allows full access to all device functions via the MOVISUITE® engineering software or the CBG.. keypad.

- The predefined connection interfaces of the device can be adjusted to the requirements of the application.
- You can deactivate the mechanical setting elements. In this way, you activate their parameterized substitute values.
- You can set the device parameters.

The parameterization mode can be set via the MOVISUITE® engineering software or the CBG.. keypad.



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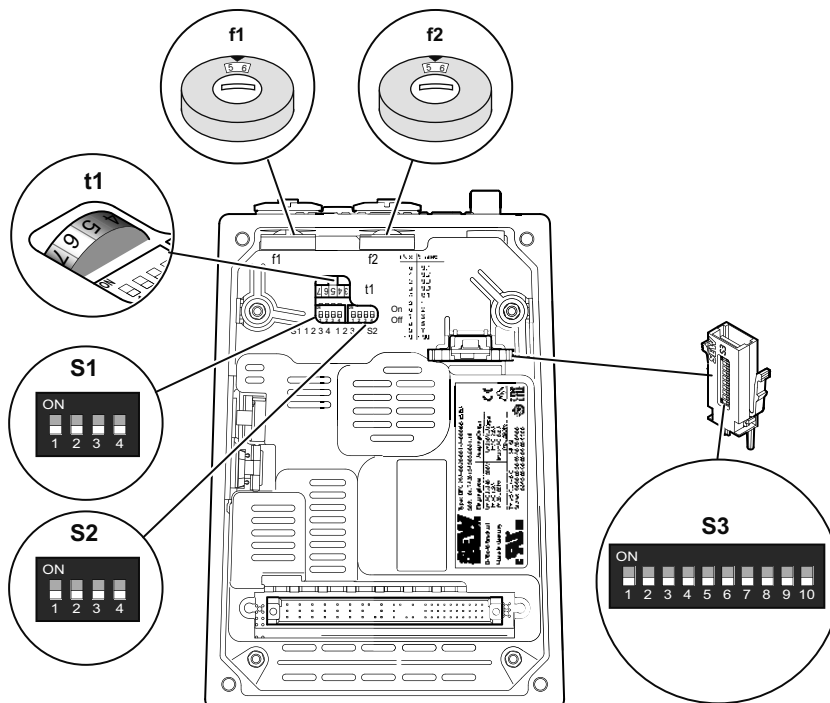
[1] Basic settings > authorizations > parameterization mode > Expert mode

6.4 Control elements

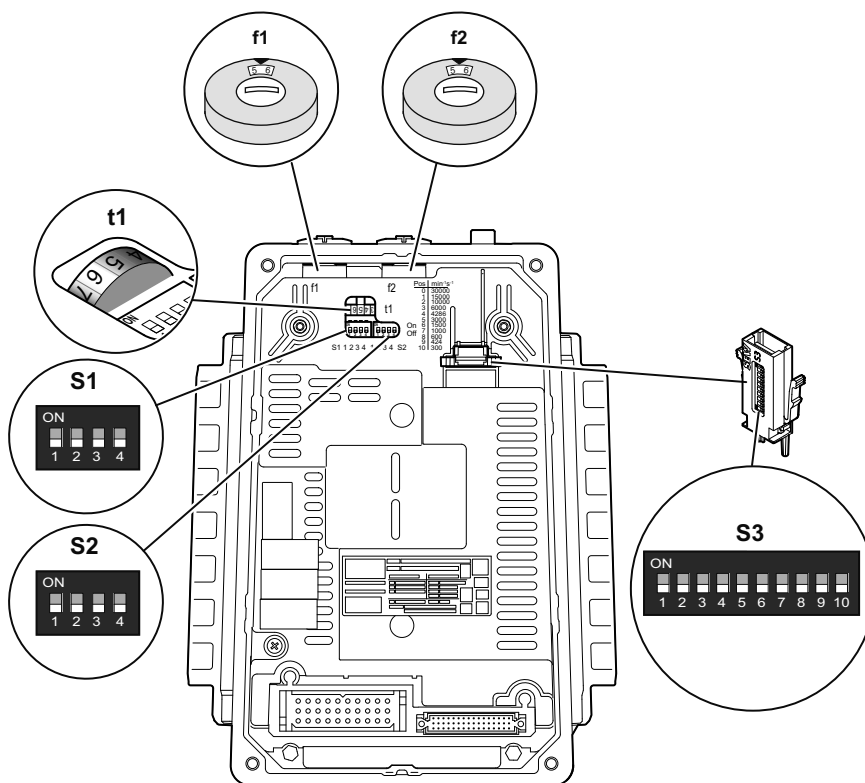
6.4.1 Overview of control elements

The following figure gives an overview of the control elements at the electronics cover.

Size 1



Size 2



f1 Potentiometer f1
t1 Potentiometer t1
S1 DIP switch S1

f2 Potentiometer f2 (underneath the screw plug)
S2 DIP switch S2
S3 DIP switch S3

6.4.2 Potentiometer f1

NOTICE

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

Damage to the device.

- After setting the setpoint, make sure the screw plug of the potentiometer has a seal and screw it in.

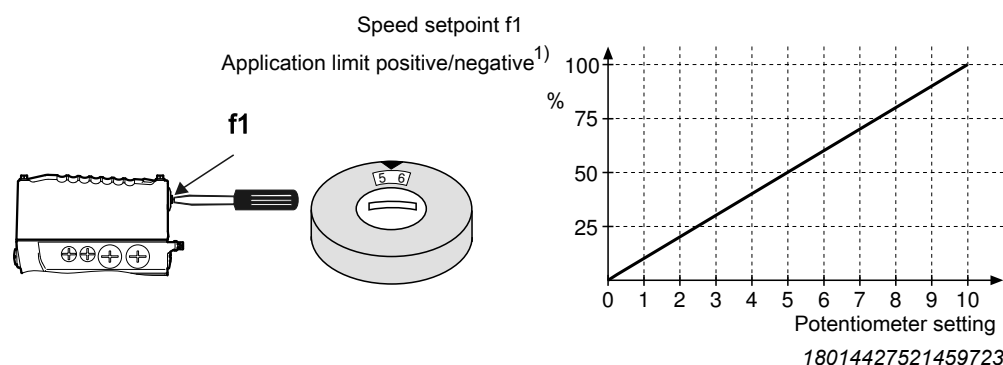
Use the f1 potentiometer to adjust speed setpoint f1.

- When the device is set to Easy mode, the predefined setpoint is always active at the potentiometer f1.

Easy mode is only available up to firmware version < 11.

- The potentiometer f1 can be deactivated in Expert mode. In this case, the parameterizable replacement value is activated as speed setpoint f1.

The following figure shows how to scale the speed setpoint f1 using potentiometer f1:



- 1) Depending on the selected direction of rotation, the parameter *Application limit – positive speed* or the parameter *Application limit – negative speed* are used to scale the speed setpoint f1.

For the application limit, refer to the MOVISUITE® parameter tree in the following menu: *Functions > Monitoring functions > Limit values > Application limit*.

6.4.3 Potentiometer f2

NOTICE

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

Damage to the device.

- After setting the setpoint, make sure the screw plug of the potentiometer has a seal and screw it in.

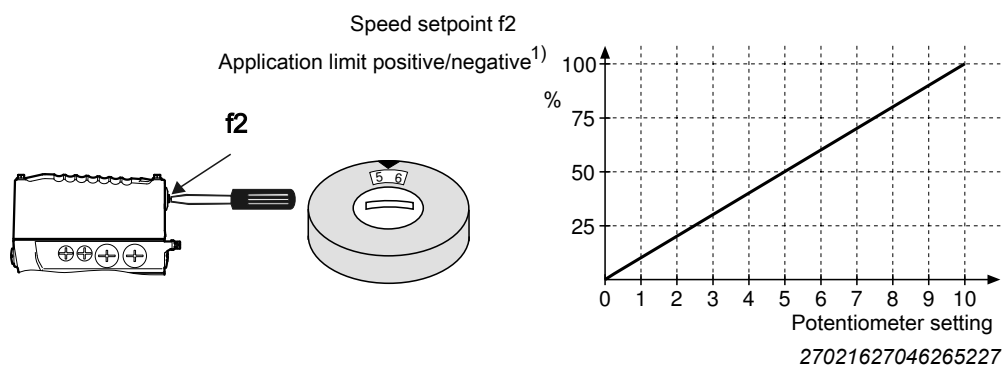
Use the potentiometer f2 to adjust speed setpoint f2.

- When the device is set to Easy mode, the predefined setpoint is always active at the potentiometer f2.

Easy mode is only available up to firmware version < 11.

- The potentiometer f2 can be deactivated in Expert mode. In this case, the parameterizable replacement value is activated as speed setpoint f2.

The following figure shows how to scale the speed setpoint f2 using potentiometer f2:



- 1) Depending on the selected direction of rotation, the parameter *Application limit positive* or the parameter *Application limit negative* are used to scale the speed setpoint f2.
For the application limit, refer to the MOVISUITE® parameter tree in the following menu: *Functions > Monitoring functions > Limit values > Application limit*.

6.4.4 Potentiometer t1

Use the potentiometer t1 to set the acceleration/deceleration setpoint t1.

- When the device is set to Easy mode, the predefined setpoint is always active at the potentiometer t1.

Easy mode is only available up to firmware version < 11.

- The potentiometer t1 can be deactivated in Expert mode.

In this case, the parameters *Acceleration 1* and *Deceleration 1* of the fixed setpoint processing are activated.



The following table lists the scaling of acceleration/deceleration setpoint t1 depending on the setting of potentiometer t1:

Potentiometer t1											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Acceleration/deceleration min ⁻¹ s ⁻¹	30000	15000	10000	6000	4286	3000	1500	1000	600	429	300
Ramp time ¹⁾ s	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10

1) Alternative information on the equivalent ramp times for acceleration/deceleration based on a speed change of 3000 min⁻¹.

6.5 DIP switches

6.5.1 Overview

NOTICE

Damage to the DIP switches caused by unsuitable tools.

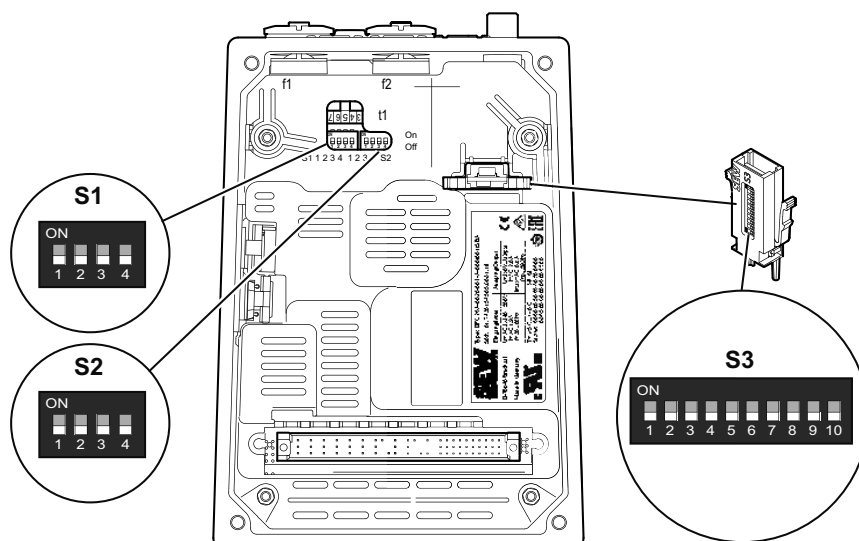
Damage to property.

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

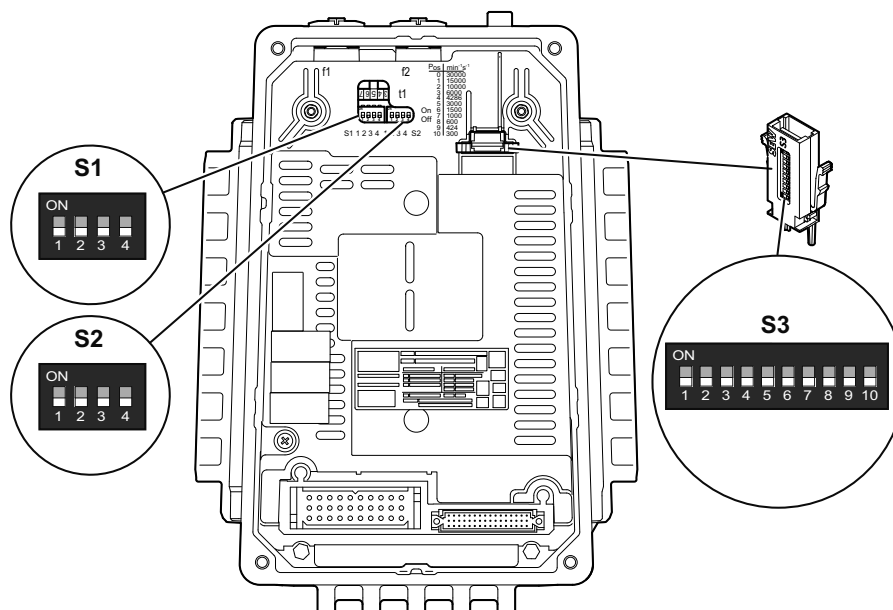
Overview of DIP switches

The following figure shows the DIP switches of the drive unit:

Size 1



Size 2



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DIP switch S1

The following table shows the functions of DIP switch S1:

DIP switch	S1			
	1	2	3	4
Meaning	Direction of rotation reversal	Release brake/deactivate DynaStop® with FCB01 – enable	Speed monitoring deactivation	Reserved
ON	On	On	Speed monitoring off	On
OFF	Off¹⁾	Off¹⁾	Speed monitoring On²⁾	Off¹⁾

1) The factory settings are shown in boldface.

2) Factory settings are indicated in bold.

You must not alter the factory setting of the S1/4 DIP switch = OFF.

DIP switch S2

The following table shows the functions of DIP switch S2:

DIP switch	S2			
	1	2	3	4
	Reserved	Selection of AS-Interface slave type/profile		
		Bit 2 ⁰	Bit 2 ¹	Bit 2 ²
ON	–	1	1	1
OFF	–	0	0	0

You must not alter the factory setting of the S2/1 DIP switch = OFF.

DIP switch S3

The S3 DIP switches on the memory module are reserved.

Do not change the factory setting of the S3 DIP switches = OFF.

6.5.2 Description of the DIP switches

DIP switch S1/1: Reversing the direction of rotation

INFORMATION



The direction of rotation is reversed depending on the setting of the DIP switch and of the parameter drive train 1 > Controller > *Direction of rotation reversal*. If both settings are active, the speed setpoint is not inverted (logical XOR).

You can reverse the direction of rotation of the drive using this DIP switch.

- OFF (S1/1 = OFF): The drive turns clockwise for a positive setpoint and counter-clockwise for a negative setpoint.
- ON (S1/1 = ON): The drive turns counterclockwise for a positive setpoint and clockwise for a negative setpoint.

DIP switch S1/2: Releasing the brake / deactivating DynaStop® with FCB 01 – enable

⚠ WARNING



Risk from falling loads.

This can result in severe or fatal injuries.

- Do not enable the function "Releasing the brake / deactivating DynaStop®" for hoist applications and applications with potentially falling loads.

INFORMATION



If the function of this DIP switch is deactivated via parameter access, the last active setting of the relevant parameter is maintained.

Use this DIP switch to enable the function "Releasing the brake / deactivating DynaStop® with FCB 01" even when the drive is disabled.

- OFF (S1/2 = OFF): The function "Releasing the brake / deactivating DynaStop® with FCB 01" is inhibited.
- ON (S1/2 = ON): The function "Releasing the brake / deactivating DynaStop® with FCB 01" is enabled.

When the function block FCB 01 is active, you can release the brake or deactivate DynaStop® using a digital input or an actuated process data bit.

INFORMATION



You can find more information on deactivating DynaStop® without a drive release in the product manual > chapter "Operation".

DIP switch S1/3: Deactivating the speed monitoring**INFORMATION**

If the function of this DIP switch is deactivated via parameter access, the last active setting of the relevant parameter is maintained.

This DIP switch is used to disable speed monitoring.

- Speed monitoring OFF (S1/3 = ON): Speed monitoring is not active.
- Speed monitoring ON (S1/3 = OFF): Speed monitoring is active.

Speed monitoring is used to protect the drive in case of blockage.

When speed monitoring is active and the drive operates at the current limit for longer than 1 second (factory settings), the drive unit triggers the fault "Speed monitoring". The drive unit signals the fault, for example via the "DRIVE" status LED. The current limit must be reached permanently for the duration of the delay time before the monitoring function trips.

DIP switches S2/2 – S2/4: Selection of AS-Interface slave type/profile

Use this DIP switch to select the station type and the profile for the AS-Interface communication.

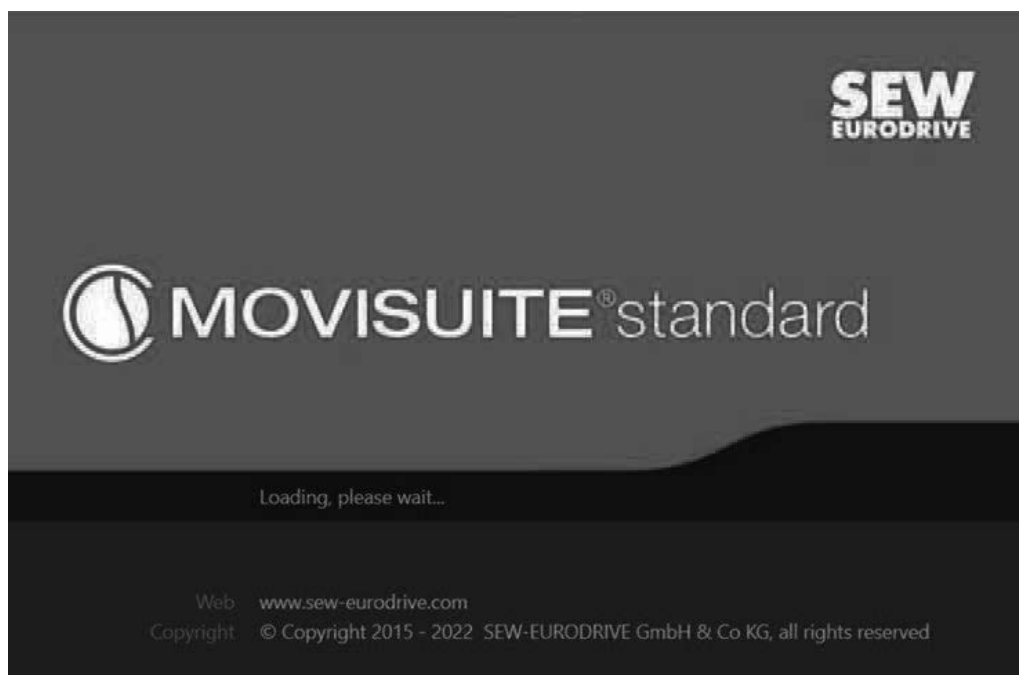
DIP switch			Station type	Station profile
S2/2	S2/3	S2/4		
OFF	OFF	OFF	Binary station 4 DI/4 DO	S-7.F
ON	OFF	OFF	Double station 4 DI/4 DO	A station: S-7.A.7 (CTT3)
			A station for drive controller	B station: S-7.A.5 (CTT2)
			B station for parameter communication	
OFF	ON	OFF	A/B station 4 DI/4 DO A station or B station ¹⁾	S-7.A.7 (CTT3)
ON	ON	OFF	Double station 8 DI/8 DO	A station ²⁾ : S-7.A.A (CTT3)
			A station for drive controller	B station: S-7.A.5 (CTT2)
			B station for parameter communication	
OFF	OFF	ON	A/B station 8 DI/8 DO A station or B station ¹⁾	S-7.A.A (CTT3) ²⁾
ON	OFF	ON	Reserved	
OFF	ON	ON	Reserved	
ON	ON	ON	Reserved	

1) Defined by the address of the station.

2) The S-7.A.A profile (8 DI/8 DO) is designed by AS-Interface for analog data transmission, which is why the data bits in the PLC are located in the data blocks for analog data.

6.6 Startup with MOVISUITE® engineering software

The inverters are started up using the MOVISUITE® engineering software from SEW-EURODRIVE.



The motor is started up in drive train 1.

When using a motor from SEW-EURODRIVE, select the motor type from the catalog or enter the nameplate. You can perform the startup for motors and encoders from SEW-EURODRIVE with an electronic nameplate based on the data contained there.

When using a third-party motor, enter the corresponding nominal motor data. SEW-EURODRIVE recommends performing a motor parameter measurement using the FCB 25 for third-party motors.

The engineering software can be operated intuitively and is not described further in this document.

6.7 Startup with the CBG21A keypad

Using the CBG21A keypad, startup can be performed intuitively guided by the symbols and functions of the color display.

Further information can be found in the **product manual** > chapter "Startup" > "Start-up with the CBG21A keypad", including the sub-chapters.

INFORMATION



You cannot take a drive train into operation using a keypad with this drive unit. You can adjust the drive train with the MOVISUITE® engineering software.

6.8 Process data configuration

In Easy mode¹⁾ the following process data configuration is active.

In Expert mode, you can assign different functions to the individual data bits.

1) Easy mode is only available up to firmware version < 11.

6.8.1 Control word 1

Control word 1 – Cyclic data bits of the AS-Interface				
DO (AS-Interface)	PA1 ¹⁾ (Device)	Function	Usable data width of the AS- interface Slave profile	
DO 0	0	Positive direction of rotation	4 bits	8 bits
DO 1	1	Negative direction of rotation		
DO 2	2	Potentiometer f2		
DO 3	3	Output stage enable/fault reset		
DO 4	4	Fixed speed setpoint bit 0		
DO 5	5	Fixed speed setpoint bit 1		
DO 6	6	FCB 13 Stop at application limit		
DO 7	7	Release brake/deactivate DynaStop® with FCB 01		
–	8	No function		
–	9	No function		
–	10	No function		
–	11	No function		
–	12	No function		
–	13	No function		
–	14	No function		
–	15	No function		

1) PA data word 1

6.8.2 Status word 1

Status word 1 – Cyclic data bits of the AS-Interface				
DI (AS- Interface)	PE1 ¹⁾ (Device)	Function	Usable data width of the AS- interface Slave profile	
DI 0	0	Ready for operation	4 bits	8 bits
DI 1	1	Local mode/manual mode active		
DI 2	2	DI 01		
DI 3	3	DI 02		
DI 4	4	Motor stopped – filtered		
DI 5	5	STO active		
DI 6	6	Electromechanical capacity utilization pre- warning		
DI 7	7	Faults		
–	8	No function		
–	9	No function		
–	10	No function		
–	11	No function		
–	12	No function		
–	13	No function		
–	14	No function		
–	15	No function		

1) PE data word 1

6.8.3 Control word 2

INFORMATION



You can configure the switch-on state of the parameter bits in the slave configuration in the AS-Interface master. The default setting of the value of the parameter bits is usually "1".

Control word 2 – Acyclic parameter bits of the AS-Interface				
PO (AS-Interface)	PA2 ¹⁾ (Device)	Function		Usable data width of the AS- interface Device profile
PO 0	0	No function		4 bits
PO 1	1	No function		
PO 2	2	No function		
PO 3	3	Bits reserved for AS-In- terface -> Bit permanently set to "0"	A/B slave, Double device	
		No function	Binary device	
–	4	No function		
–	5	No function		
–	6	No function		
–	7	No function		
–	8	No function		
–	9	No function		
–	10	No function		
–	11	No function		
–	12	No function		
–	13	No function		
–	14	No function		
–	15	No function		

1) PA data word 2

7 Operation

7.1 Maintenance switch

7.1.1 Switch disconnecter /D11



⚠ WARNING

Electric shock due to dangerous voltages at the line terminals.

The switch disconnecter disconnects the electronics cover from the voltage supply. Voltage is still present at the terminals of the device.

- A correct installation includes that terminals of the device are protected against contact.
- Secure the device against unintended reconnection of the voltage supply.
- Wait for at least the following time before removing the electronics cover:
5 minutes

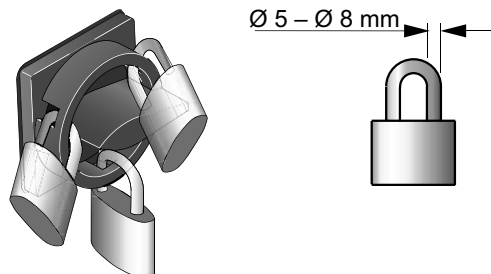
NOTICE

Premature aging of the switch contacts.

- Do not operate the switch disconnecter under load.

The switch disconnecter of the device serves to interrupt the voltage supply of the electronics cover. The control unit of the decentralized inverter will remain supplied after the load disconnecter is opened only if the optional, external DC 24 V backup voltage is connected.

The load disconnecter can be secured with 3 locks.



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7.2 Drive unit behavior in case of a voltage failure

The motor of the drive unit has the following function when the drive is in motion:

In case of a voltage failure, the drive unit uses the motion energy (energy recovery) to supply the electronics cover with voltage. The inverter in the electronics cover realizes a controlled motor deceleration.

If the regenerated energy is not sufficient, the inverter activates the holding function.

8 Service

NOTICE

Improper work on the drive units can result in damage.

Damage to property.

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

8.1 Failures of the mechanical drive

Follow the information in the "DR..71-315, DRN63-315, DR2..56-80 AC motors" operating instructions and in the add-on to the "DR2C... AC motors" supplement to the operating instructions.

8.1.1 Motor malfunctions

The following table shows fault diagnostics options for malfunctions of the motor:

Fault	Possible cause	Measure
Motor heats up excessively and trips an error	Overload	Measure power, use larger motor or reduce load if necessary, check travel profile
	Ambient temperature too high	Observe permitted temperature range
	Insufficient cooling	Clean the drive
Running noise on motor	Bearing damage	• Contact SEW-EURODRIVE Service • Replace motor
	Vibration of rotating parts	Rectify cause, possible imbalance
Oil leaks in the connection box or at the motor/gear unit connection (only with gearmotors)	Internal seal defective	• Contact SEW-EURODRIVE • Have seal changed by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE

8.1.2 Brake malfunctions

The following table shows fault diagnostics options for malfunctions of the brake:

Fault	Possible cause	Measure
Brake does not re-lease	Electronics cover defective	• Contact SEW-EURODRIVE Service • Replace electronics cover
	Max. permitted working air gap exceeded because brake lining worn down	• Contact SEW-EURODRIVE • Have brake lining replaced by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE
	Brake defective	• Contact SEW-EURODRIVE • Have brake replaced by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE
Motor does not brake	Brake lining worn	• Contact SEW-EURODRIVE • Have brake lining replaced by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE
	Incorrect braking torque	• Contact SEW-EURODRIVE • Have braking torque changed by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE
	Oil leakage (only with gearmotors)	• Contact SEW-EURODRIVE • Have leakage remedied by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE

8.2 Resetting fault messages



⚠ WARNING

Eliminating the cause of the problem or performing a reset may result in the drive re-starting automatically.

Severe or fatal injuries.

- Prevent unintended startup.

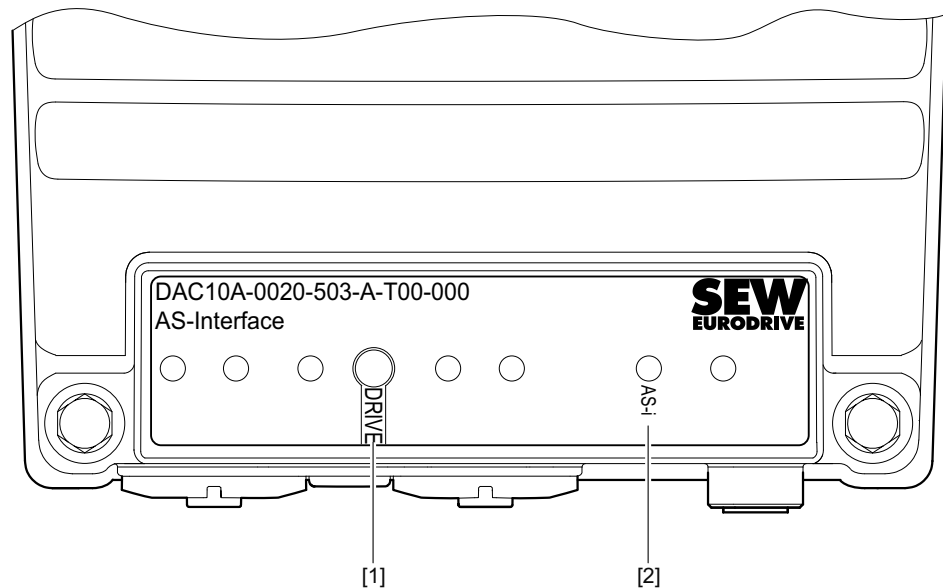
Acknowledge fault message by:

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

8.3 Description of status and operating displays

8.3.1 LED displays of AS-Interface

The following figure shows an example of the LEDs of the AS-Interface design:



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- [1] "DRIVE" status LED
[2] LED "AS-i"

8.3.2 General LEDs

"DRIVE" status LED

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

LED	Operating status/		Meaning	Measure
	Error code	Suberror code		
– Off	Not ready for operation		Line voltage absent.	Power on the line voltage.
Yellow Flashing very rapidly, 4 Hz	Not ready for operation		Initialization phase	Wait until initialization is complete.
Green/yellow Flashing with changing colors, 0.5 Hz (1 × green, 1 × yellow)	Ready for operation, but device inhibited.		The "STO" signal is active.	Deactivate the "STO" signal.
Yellow Flashing slowly, 0.5 Hz	Ready for operation, but manual mode/local mode, device inhibited.		Line voltage is OK.	–
Yellow Flashes rapidly, 2 Hz	Ready		Deactivating DynaStop® without drive enable active.	–
Yellow Steady light	Ready for operation, but device inhibited.		Line voltage is OK. The output stage is inhibited.	–
Green Flashing slowly, 0.5 Hz	Device enabled, but condition manual operation/local mode		The output stage is enabled. The motor is in operation.	–
Green Flashing very rapidly, 4 Hz	Device enabled, but current limit active.		The drive is at the current limit.	Reduce the load.
Green Steady light	Device enabled.		The output stage is enabled. The motor is in operation.	–
Yellow/red Flashing with changing colors, 1 Hz (2 × yellow, 2 × red)	Ready		A displaying error is present. The output stage is inhibited.	Refer to chapter "Error description" in the product manual for possible measures.

LED	Operating status/ Error code		Meaning	Measure
	Error code	Suberror code		
Green/red Flashing with changing colors, 1 Hz (2 × green, 2 × red)	Ready		A displaying error is present. The output stage is enabled. The motor is in operation.	Refer to chapter "Error description" in the product manual for possible mea- sures.

LED	Operating status/		Meaning	Measure
	Error code	Suberror code		
Red Flashing, 1 Hz	3	1	Ground error	Refer to chapter "Error description" in the product manual for possible measures.
	4	1	Brake chopper error	
	6	1	Line error	
	7	1	DC link error	
	8	1, 2, 3	Speed monitoring error	
	9	1, 2, 5, 6, 9, 10	Control mode error	
	10	1, 3 – 11	Data Flexibility error	
	11	1 – 6	Temperature monitoring error	
	12	1, 2	Brake error	
	13	5, 24	Encoder 1 error	
	16	5 – 8, 10, 20 – 27	Startup error	
	19	1 – 9	Process data error	
	20	2, 11	Device monitoring error	
	23	4	Power section error	
	25	2 – 7, 20, 21, 30, 31, 61, 70	Parameter memory monitoring	
	26	1, 3	External error	
	28	1, 12 – 14	FCB drive function error	
	29	1 – 4	Hardware limit switch error	
	30	1 – 3	Software limit switch error	
	31	1 – 4, 7, 9	Thermal motor protection error	
	32	2 – 6, 12	Communication error	
	33	11, 12, 13	System initialization error	
	34	1	Process data configuration error	
	35	1 – 5	Function activation error	
	42	1 – 3	Lag error	
	44	2, 3, 4	Error overcurrent phase U, V, W	
	46	2, 3, 50 51, 52	Safety card error	
	51	1	Analog processing error	

LED	Operating status/		Meaning	Measure
	Error code	Suberror code		
Red Steady light	1	1, 2	Output stage monitoring error	Contact SEW-EURODRIVE Service.
	4	2	Brake chopper error	
	7	2	DC link error	
	9	3, 4, 8	Control mode error	
	10	2, 99	Data Flexibility error	
	11	7, 8	Temperature monitoring error	
	13	1, 3, 6, 7, 8, 9, 11, 13, 15, 22, 23	Encoder 1 error	
	16	2, 11, 12. 30	Startup error	
	17	7	Internal processor error	
	18	1, 3, 4, 7, 8, 9, 10, 12, 13	Software error	
	20	1, 7	Device monitoring error	
	21	1	S-Drive 1 error	
	23	5, 6, 7, 8	Power section error	
	25	10, 12 – 19, 50, 51, 81	Parameter memory monitoring	
	28	13	FCB drive function error	
	33	1, 2, 6, 7, 8, 10	System initialization error	
	46	1	Safety card error	

8.3.3 Bus-specific LEDs for AS-Interface

LED "AS-i"

The following table describes the display functions of the "AS-i" LED:

LED	Operating status/	Meaning	Measure
– Off	Not ready for operation	Line voltage absent.	Power on the line voltage. Wait until initialization is complete.
		The firmware of the subcomponent is not compatible to the used hardware.	Contact SEW-EURODRIVE Service.
		The firmware of the subcomponent cannot be started.	Contact SEW-EURODRIVE Service.
Green Steady light	Ready	The device works in normal operation.	–
Yellow Flashing	Not ready for operation	A firmware update of the sub component is running.	Wait for the update to be completed.
Red Flashing	Not ready for operation	The communication to the AS-Interface master is interrupted.	Check the AS-Interface connection of the device. Check the configuration of the AS-Interface master. Check all connections of the AS-Interface installation.
1 × red, 1 × yellow Flashing	Not ready for operation	The device address is set to 0.	Set a valid device address.
2 × red, 2 × yellow Flashing	Not ready for operation	The AS-Interface master has detected an address conflict. The address is used by another device.	Set an unused device address.
Red Steady light	Not ready for operation	The AS-Interface communication is interrupted.	Check the AS-Interface connection of the device. Check all connections of the AS-Interface installation.

8.4 Device replacement

8.4.1 Note



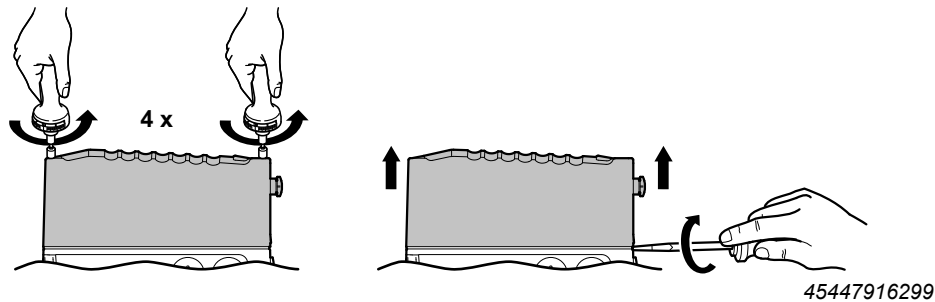
INFORMATION

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

8.4.2 Replacing the electronics cover

Replace the electronics cover as follows:

1. Observe the safety notes in chapter "Creating a safe working environment" (→ 9).
⇒ Make sure the device is de-energized. The 400 V line voltage and the 24 V backup voltage must be disconnected.
2. Loosen the screws and remove the electronics cover from the connection box.



3. Compare the data on the nameplate of the previous electronics cover with the data on the nameplate of the new electronics cover.



INFORMATION

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

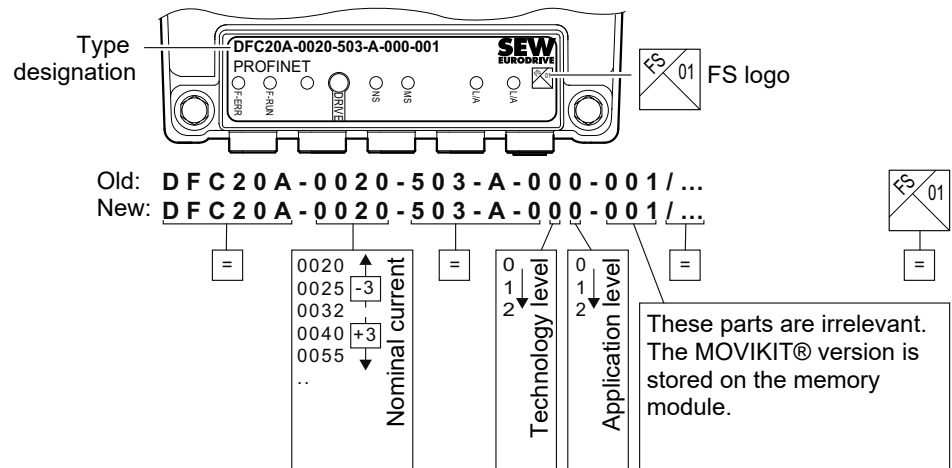
It is permitted to use an electronics cover with a nominal output current that is up to 3 times higher or lower than the value of the old electronics cover.

- However, if you use an electronics cover with a higher nominal output current, the power at the output shaft will not be increased.
- When you use an electronics cover with a lower nominal output current than the old electronics cover, the power at the output shaft may no longer be high enough to meet the requirements.



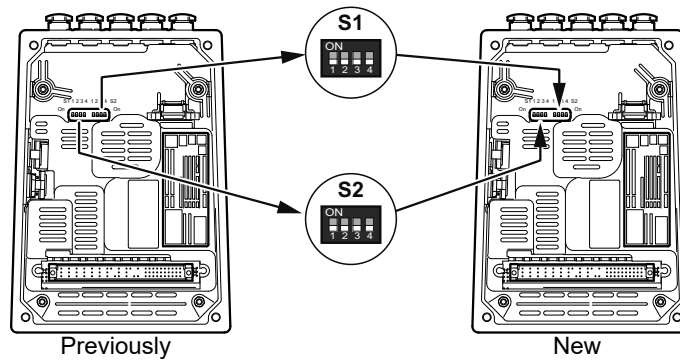
INFORMATION

In safety-related applications, replace an electronics cover only with an electronics cover with the same FS logo.



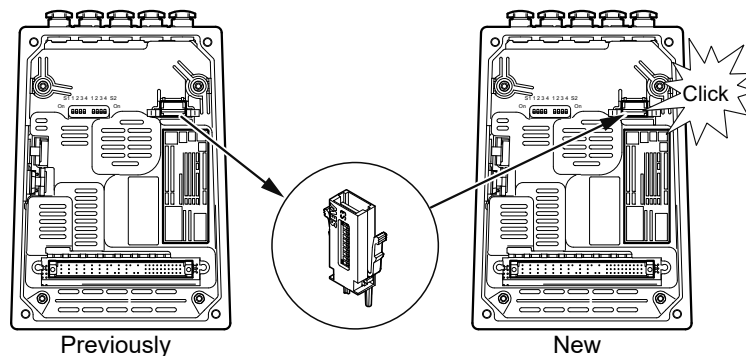
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- Set all the control elements (e.g. DIP switches; see chapter "Startup" (→ 64)) on the new electronics cover in the same way as the control elements of the previous electronics cover.



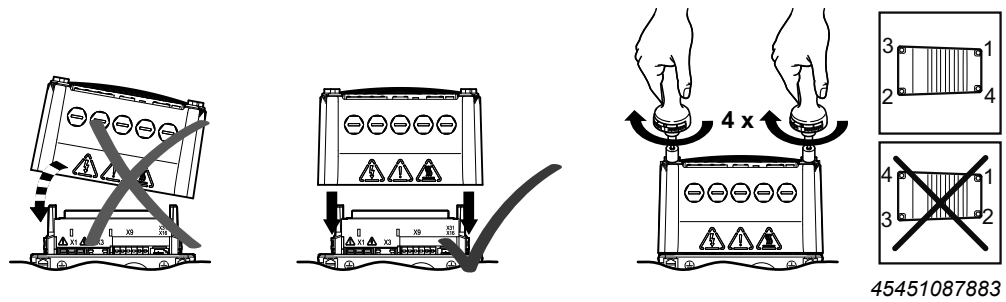
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- Remove the replaceable memory module from the old electronics cover. Insert the replaceable memory module in the new electronics cover.

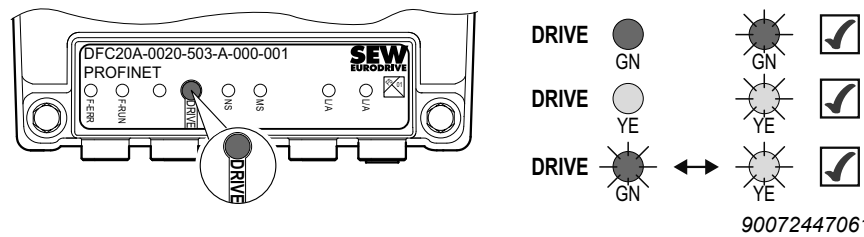


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- Place the new electronics cover onto the connection box and screw it in place.



7. Supply the device with voltage.
8. Check the functionality of the new electronics cover.



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9. If the device contains an optional safety card, a safety acknowledgment may be required. This acknowledgment cancels the start inhibit on the safety card.

8.4.3 Replacing the memory module

Replace the memory module as follows:

1. Observe the safety notes in chapter "Creating a safe working environment" (→ 9).
 - ⇒ Make sure the device is de-energized. The 400 V line voltage and the 24 V backup voltage must be disconnected.
2. Loosen the screws and remove the electronics cover from the connection box.
3. Remove the memory module from the old electronics cover.
4. Compare the part number and the status of the memory module.

INFORMATION



The new memory module must have the same part number and the same (or a higher) status as the old memory module.

5. Set the DIP switches on the new memory module in the same way as the control elements of the previous memory module.
6. Insert the new memory module into the electronics cover.
7. Place the electronics cover onto the connection box and screw it in place.
8. Supply the device with voltage.
9. Check the startup of the device.
 - ⇒ If required, perform startup again or load a saved startup into the device.
 - ⇒ For devices with safety card, check the startup of the safety card. For further information, refer to the product manual > chapter "Project planning for functional safety" > "Safety conditions" > "Startup requirements".
10. Check the functionality of the new electronics cover.

If the device was ordered with the option /P "Parameters ex works", the customer-specific parameter set is saved on the supplied memory module upon delivery.

When ordering a new memory module using the part number, no data set is stored on the memory module.

- Start up the device manually.
- As an alternative, start up the device with a previously saved data set.

8.4.4 Replacing the drive unit

Replace the drive unit as follows:

1. Consider the safety notes in chapter: "Creating a safe working environment" (→ 9).
2. Install the lifting eyes to the drive unit, see chapter "Service" > "Device replacement" > "Installing the lifting eyes" (→ 87).
3. Remove the drive unit. Observe the "removal notes" in chapter "Mechanical installation".
4. Compare the data on the nameplates of the old drive unit with the data on the nameplates of the new drive unit.



INFORMATION

Always replace the drive unit with a drive unit that has the same properties.

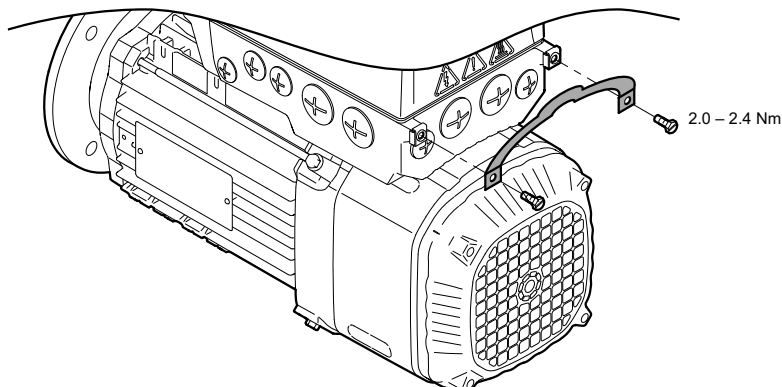
In safety-related applications, replace a drive unit only with a drive unit with the same FS logo.

5. Mount the drive unit. Observe chapter "Mechanical installation" (→ 22).
6. Remove the lifting eyes from the new drive unit. Store the lifting eyes for future service work.
7. Perform the installation according to chapter "Electrical installation" (→ 30).
8. Set all the control elements (e.g. DIP switches, see chapter "Startup" (→ 64)) on the new electronics cover in the same way as the controls of the previous electronics cover.
9. Remove the memory module from the old electronics cover. Insert this memory module in the new electronics cover.
10. Place the electronics cover onto the connection box and screw it in place.
11. Supply the drive with voltage.
12. Check whether the new drive unit is functioning properly.

8.4.5 Installing the lifting eye for motors without gear units

Install the lifting eye as follows:

1. Remove the PE connection cable.
2. Install the lifting eye for transportation as depicted in the following image:



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8.5 Shutdown



⚠ WARNING

Risk of burns due to hot surfaces.

Severe injuries.

- Let the devices cool down before touching them.



⚠ WARNING

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

Severe or fatal injuries.

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

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

8.6 Waste disposal

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

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

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

- Oil and grease

Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.

- Screens
- Capacitors



Waste disposal according to WEEE Directive 2012/19/EU

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

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

9 Inspection and maintenance

9.1 Inspection and maintenance intervals

The following table shows the inspection intervals:

Time interval	What to do?	Who is permitted to perform the work?
When the electronics cover is opened after an operating period of ≥ 6 months.	When the electronics cover is opened after an operating period of ≥ 6 months, the gasket between the connection box and the electronics cover must always be replaced. The 6-month period can be shortened by harsh ambient/operating conditions, e.g. cleaning with aggressive chemicals or frequent temperature variations.	Specialists at customer site
Each time the electronics cover is opened	Visual inspection of the gasket between connection box and electronics cover: Replace the gasket if it is damaged or separating from the connection box.	Specialists at customer site
Varying (depending on external factors)	Touch up or renew the surface/anti-corrosion coating	Specialists at customer site

9.1.1 Motor

Follow the information in the "DR..71-315, DRN63-315, DR2..56-80 AC motors" operating instructions and in the add-on to the "DR2C... AC motors" supplement to the operating instructions.

9.1.2 Brake

Follow the information in the "DR..71-315, DRN63-315, DR2..56-80 AC motors" operating instructions and in the add-on to the "DR2C... AC motors" supplement to the operating instructions.

9.2 Inspection and maintenance work

9.2.1 Preliminary work regarding inspection and maintenance

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

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

9.2.2 Replacing the output oil seal

1. Follow the information in the "Inspection and maintenance intervals" chapter in the "DR..71-315, DRN63-315, DR2..56-80 AC motors" operating instructions and in the add-on to the "DR2C... AC motors" supplement to the operating instructions.
2. Perform the steps according to chapter "Preliminary work regarding inspection and maintenance" (→ 90).
3. Remove the drive unit from the system.
4. **NOTICE!** Oil seals below 0 °C can become damaged during installation. Damage to property.
Store oil seals at ambient temperatures over 0 °C. If necessary, heat the oil seals before installation. When changing the oil seal, ensure that there is an adequate grease deposit between the dust and sealing lip, depending on the design.
⇒ When using dual oil seals, fill the gap up to a third with grease.
⇒ Do not reinstall the oil seal on the same run mark.
5. Touch up or renew the surface/anti-corrosion coating.

9.2.3 Replacing the gasket between connection box and electronics cover

Spare part kit

The gasket is available as a spare part (1, 10 or 50 pieces) from SEW-EURODRIVE.

Contents	Part number of gasket for size 1	Part number of gasket for size 2
1 piece	18187765	28131738
10 pieces	28266161	28278097
50 pieces	28266188	28284356

Work steps with electronics cover size 1

NOTICE

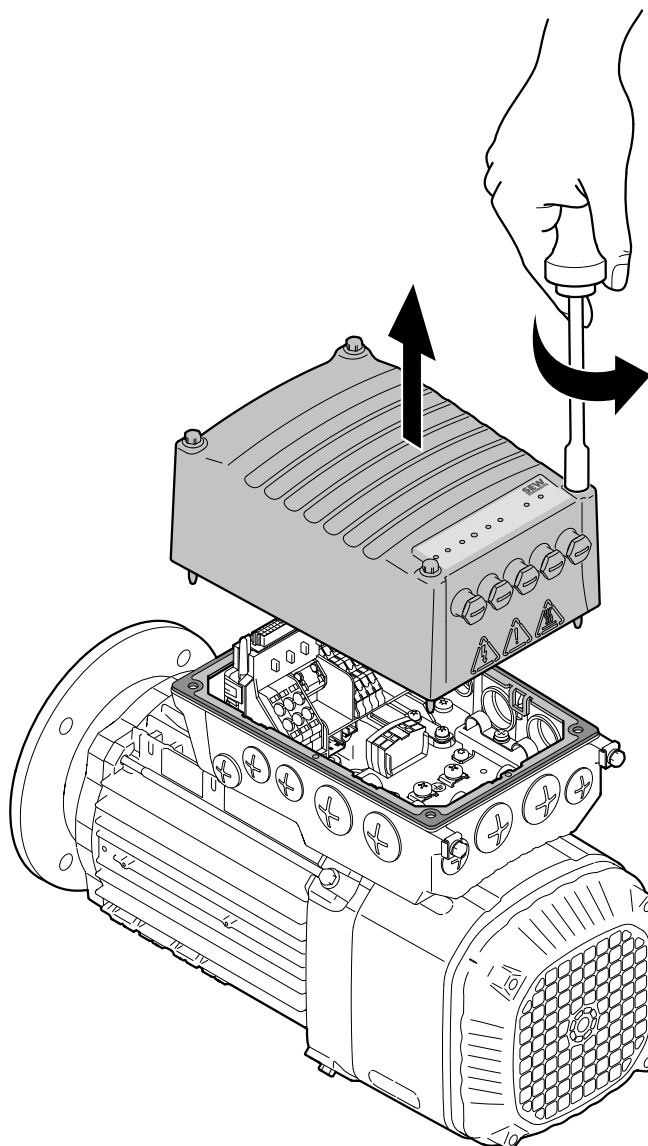
Loss of the guaranteed degree of protection.

Damage to property.

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

Replace the seal of MOVIMOT® advanced as follows:

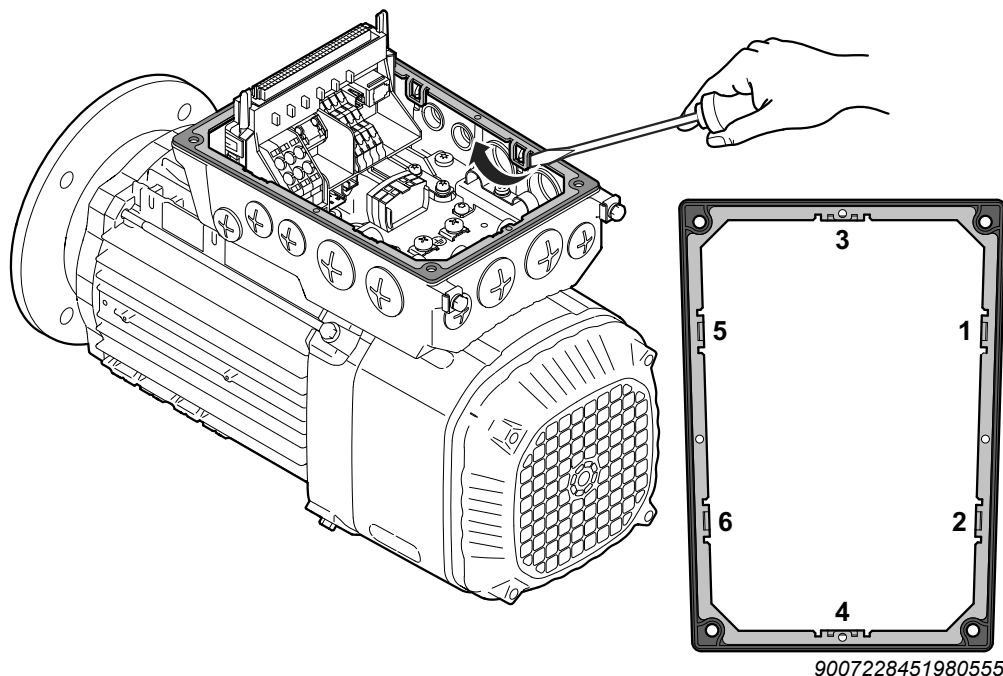
1. Perform the steps described in the "Preliminary work regarding inspection and maintenance" (→ 90) chapter.
2. Loosen the screws from the electronics cover and remove them.



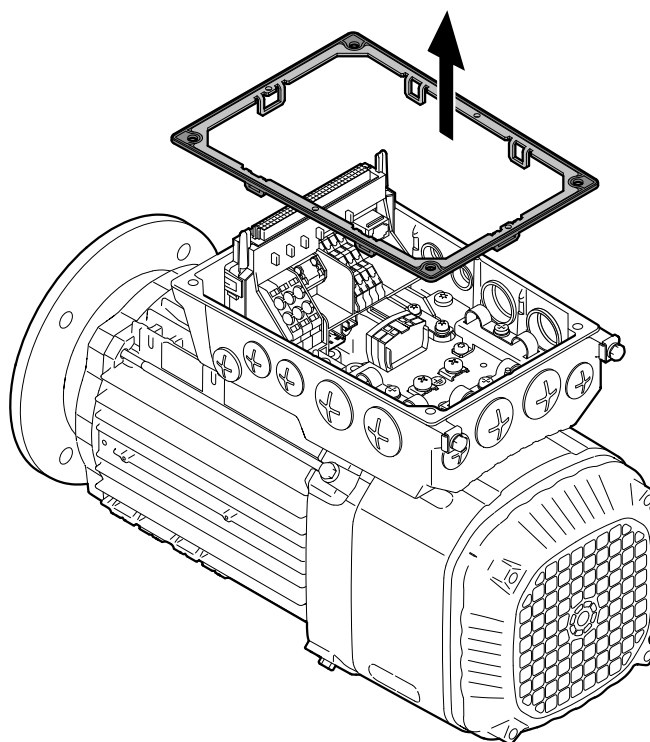
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3. **NOTICE!** Loss of the guaranteed degree of protection. Damage to property. Make sure not to damage the sealing surfaces when removing the gasket. Loosen the used gasket by levering it off the retaining cams.

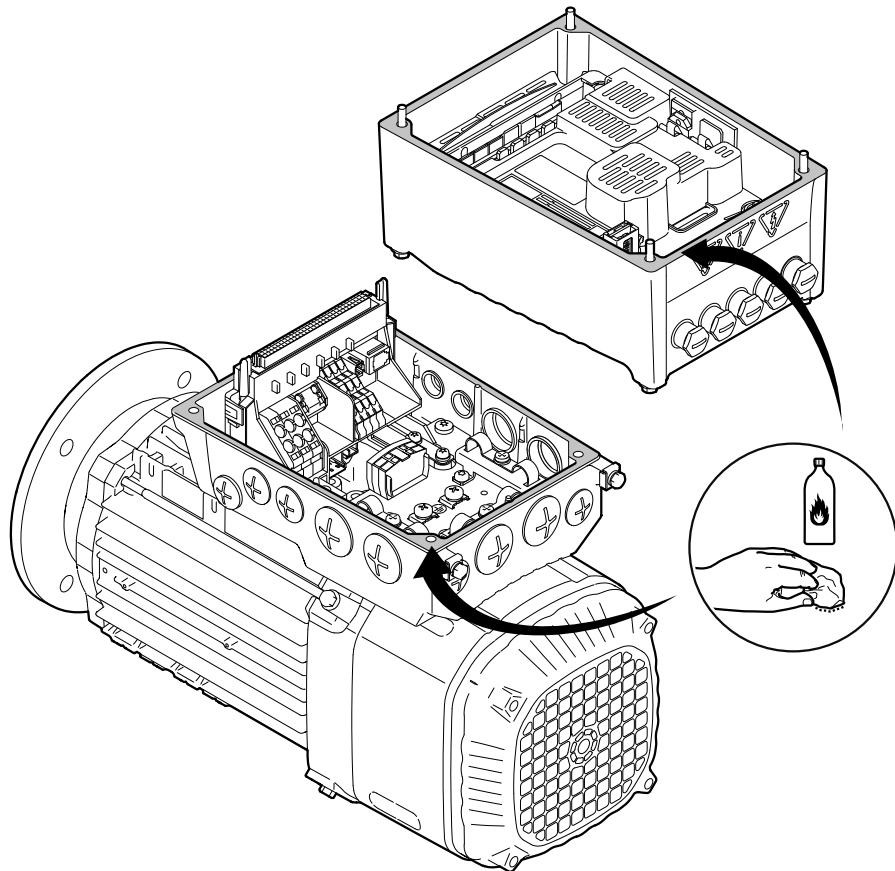
⇒ Doing so will be easier if you adhere to the sequence shown in the figure below.



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

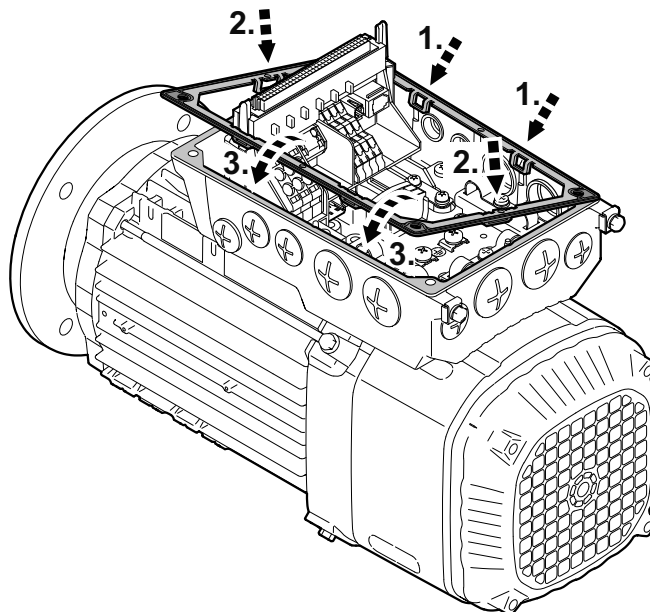


5. **⚠ CAUTION!** Risk of injury due to sharp edges. Cutting injuries. Use protective gloves when cleaning. Ensure that work is carried out by trained specialists only. Carefully clean the sealing surfaces of the connection box and electronics cover.



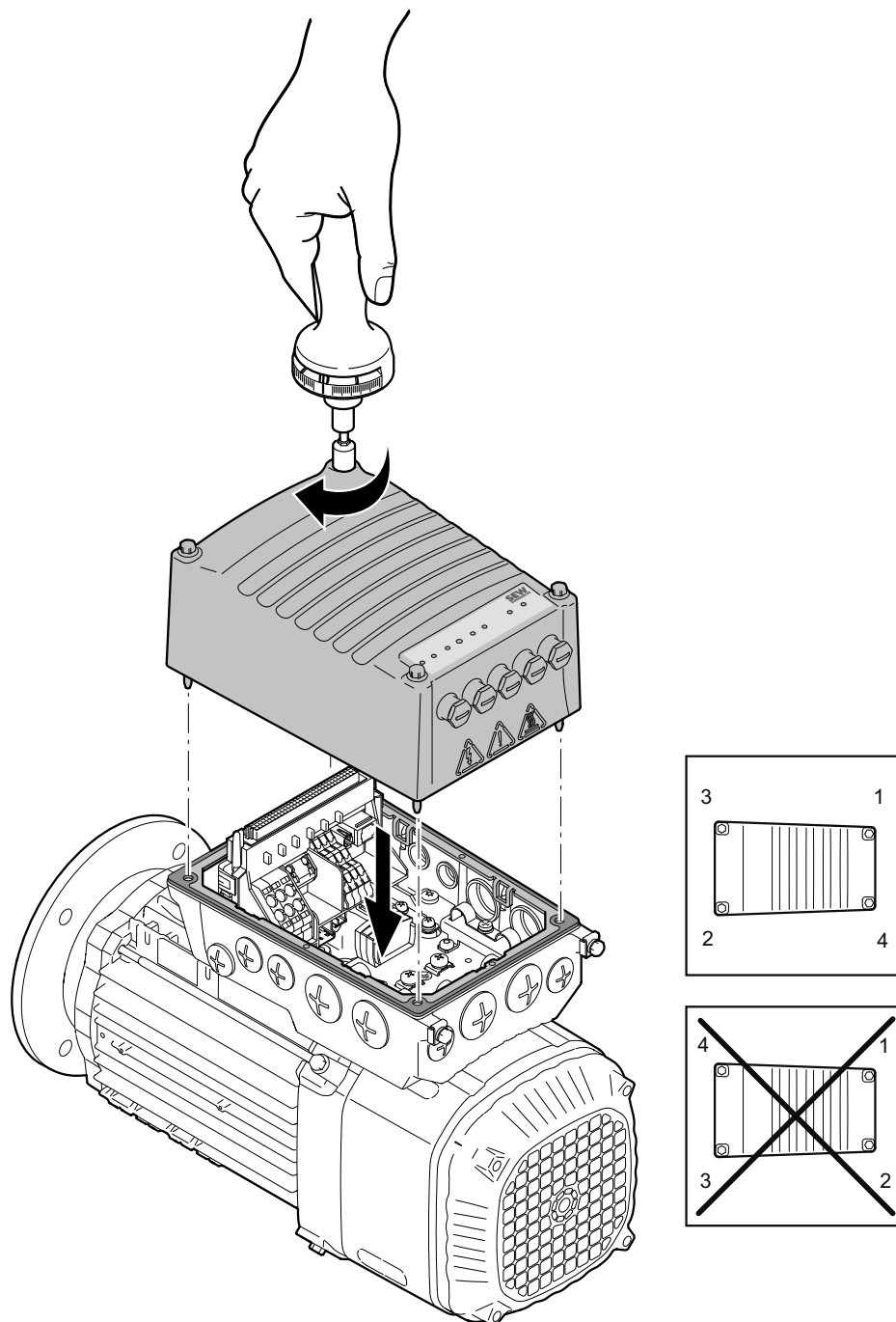
9007228456900619

6. Place the new gasket on the connection box and fix it with the retaining cams. Installation is facilitated if you follow the illustrated order.



9007228456903051

7. Check the installation and startup of the unit using the corresponding, applicable operating instructions.
8. Place the electronics cover back onto the connection box and secure it.
 - ⇒ Pay attention to the following procedure when screwing on the electronics cover: Insert/screw in the screws and tighten them in diametrically opposite sequence **step by step** with a tightening torque of 6.0 Nm.



9007228456905483

Work steps with electronics cover size 2

NOTICE

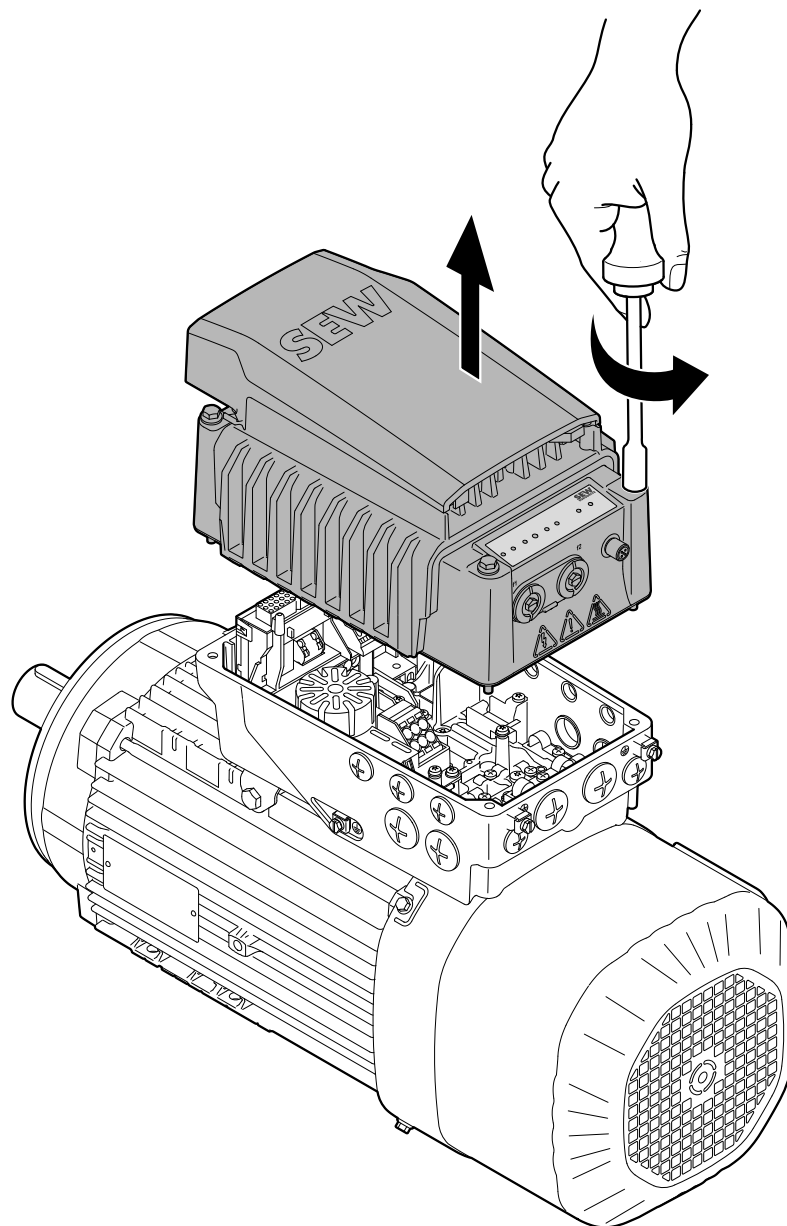
Loss of the guaranteed degree of protection.

Damage to property.

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

Replace the seal of MOVIMOT® advanced as follows:

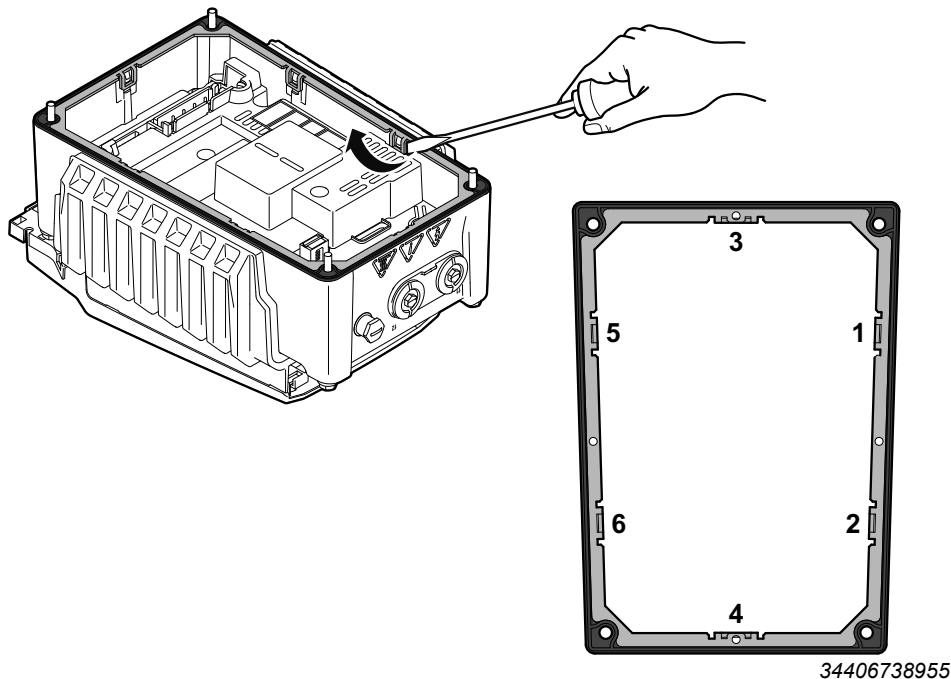
1. Perform the steps described in the "Preliminary work regarding inspection and maintenance" (→ 90) chapter.
2. Loosen the screws from the electronics cover and remove them.



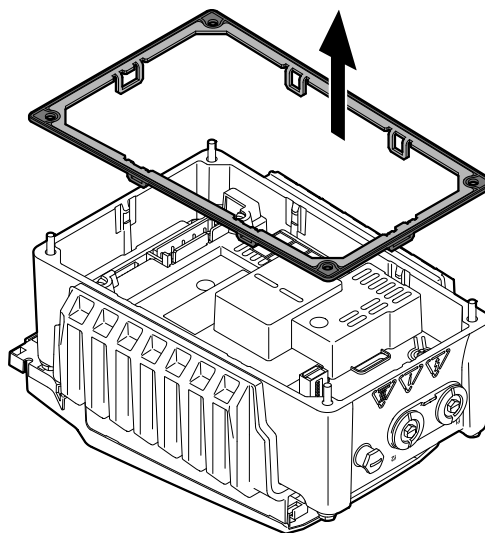
34406736523

3. **NOTICE!** Loss of the guaranteed degree of protection. Damage to property. Make sure not to damage the sealing surfaces when removing the gasket. Loosen the used gasket by levering it off the retaining cams.

⇒ Doing so will be easier if you adhere to the sequence shown in the figure below.

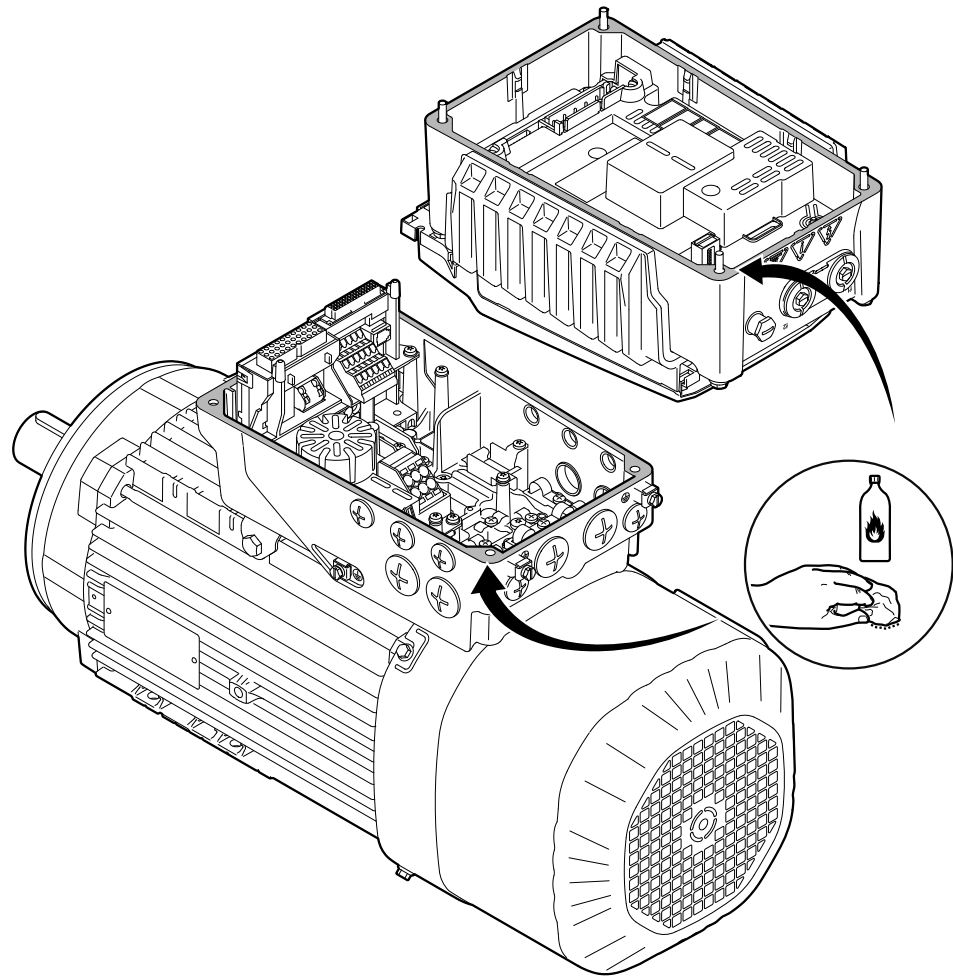


4. Remove the old gasket completely from the electronics cover.



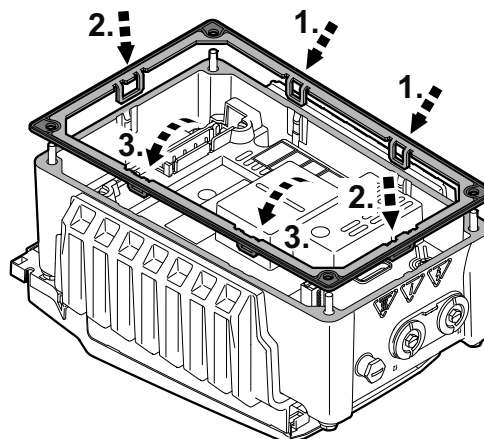
34406741387

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



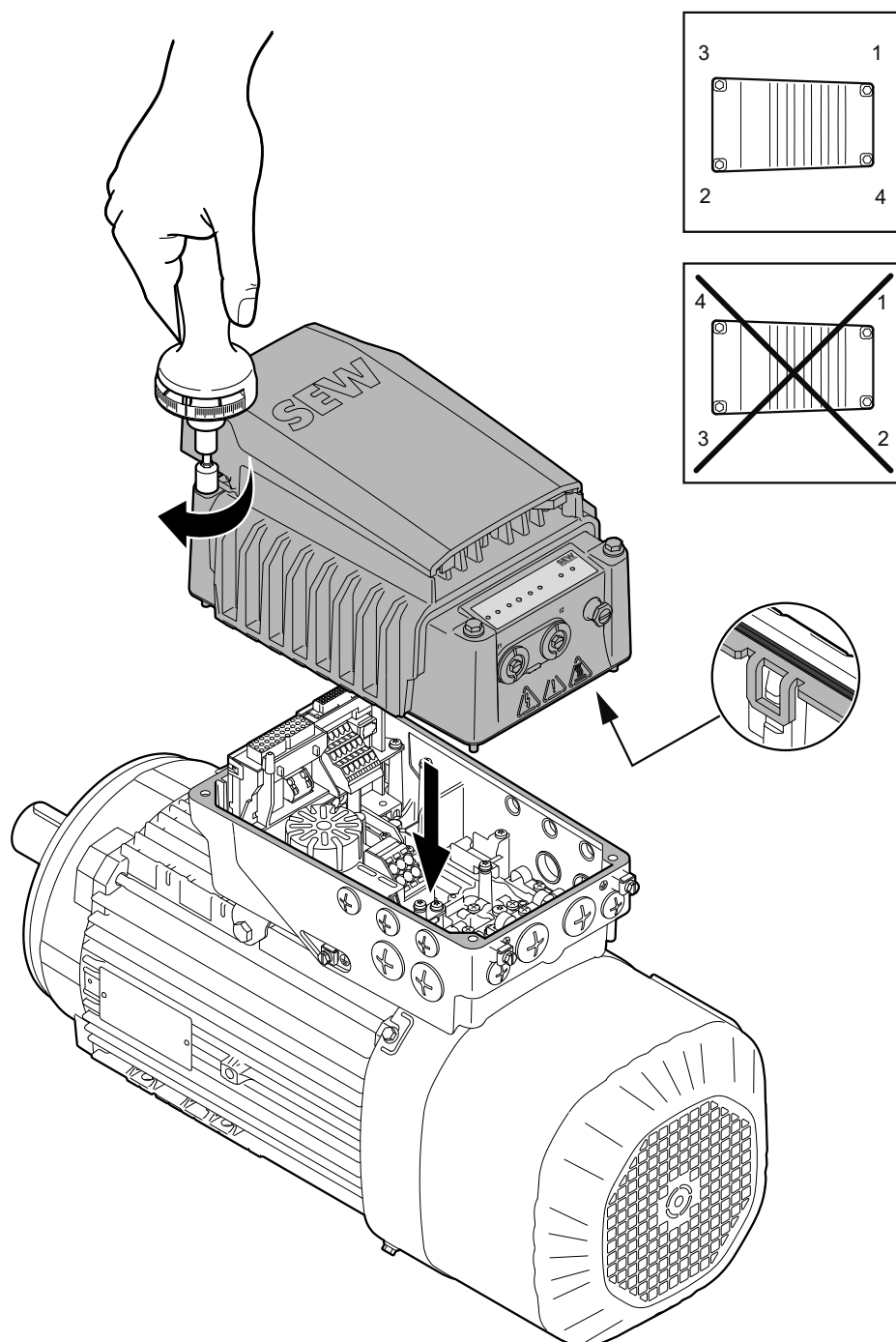
34406743819

6. Place the new gasket on the electronics cover and fix it in position with the retaining cams. Installation is facilitated if you follow the illustrated order.



34406746251

7. Check the installation and startup of the unit using the corresponding, applicable operating instructions.
8. Place the electronics cover back onto the connection box and secure it.
 - ⇒ Pay attention to the following procedure when screwing on the electronics cover: Insert/screw in the screws and tighten them in diametrically opposite sequence **step by step** with a tightening torque of 9.5 Nm.



34406748683

10 Contacting SEW-EURODRIVE

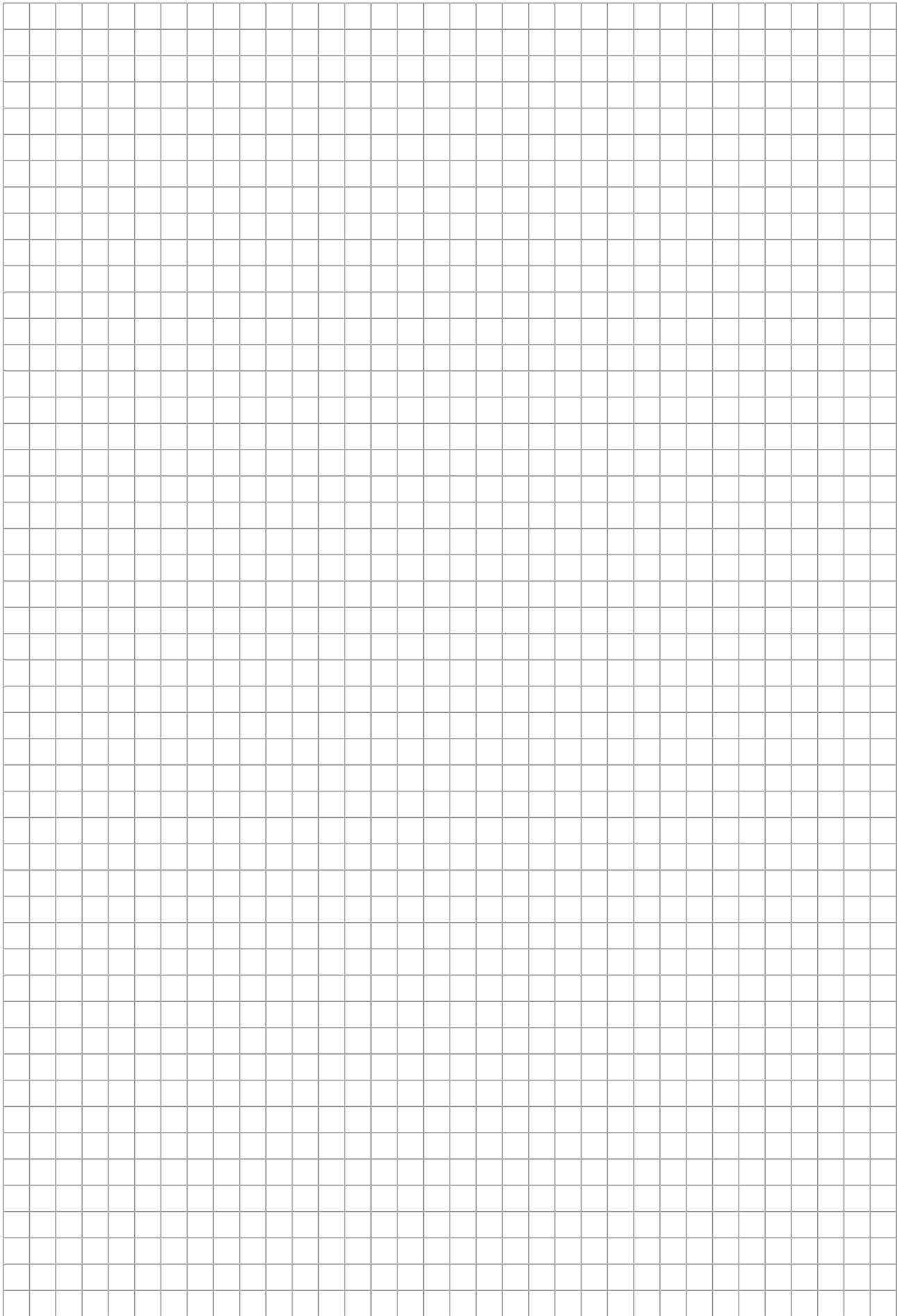
You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

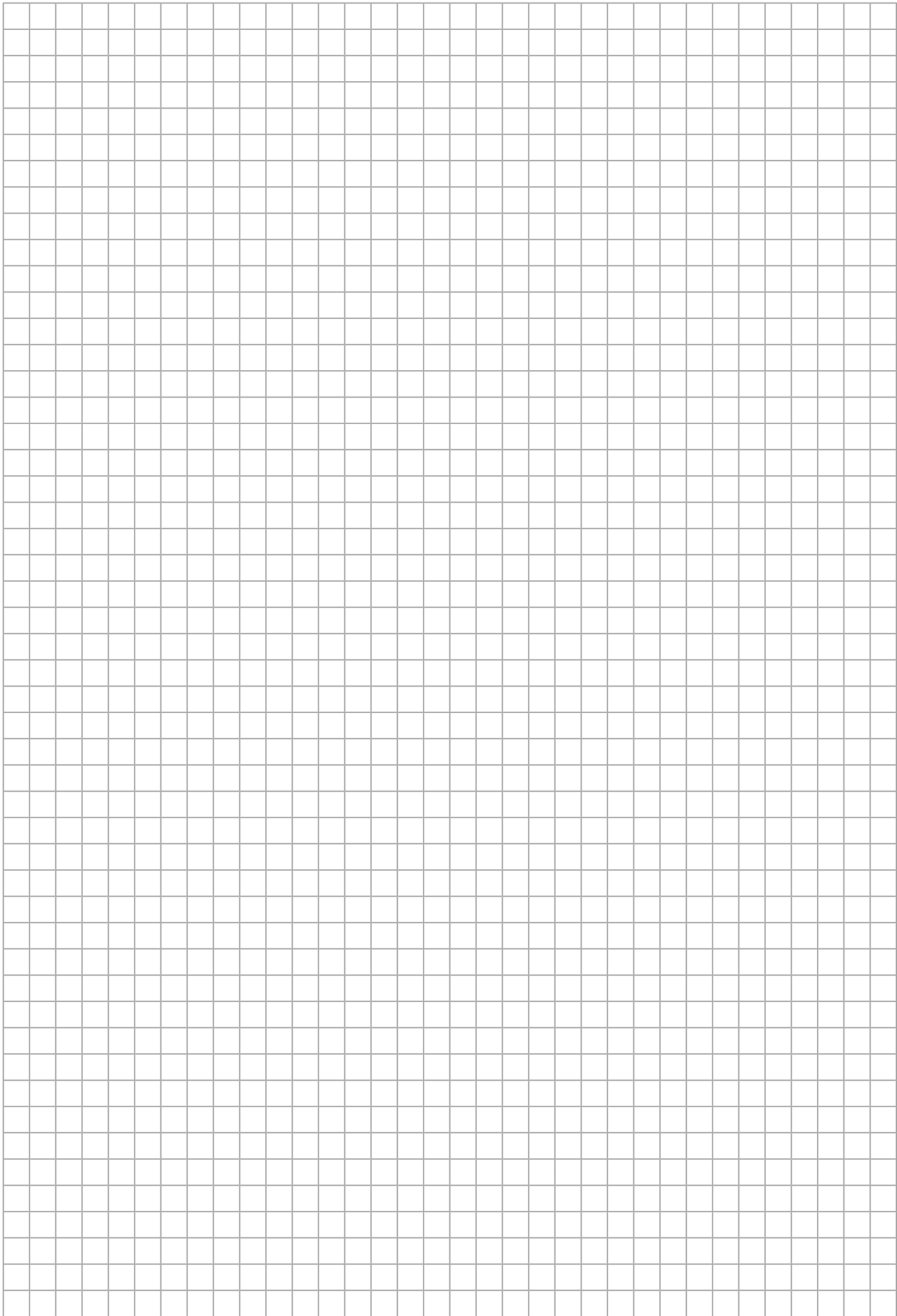
<https://www.sew-eurodrive.de/contacts-worldwide>

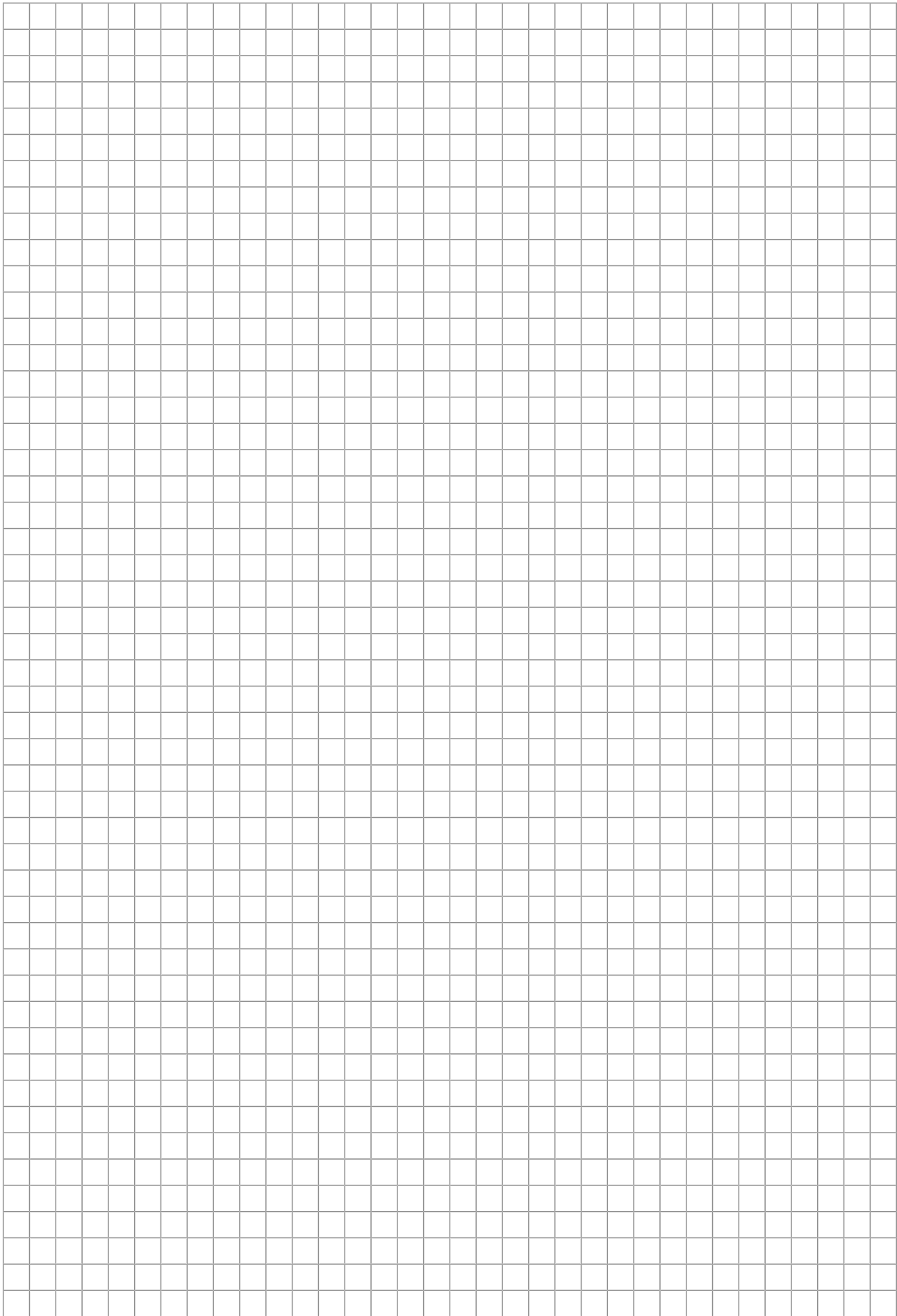


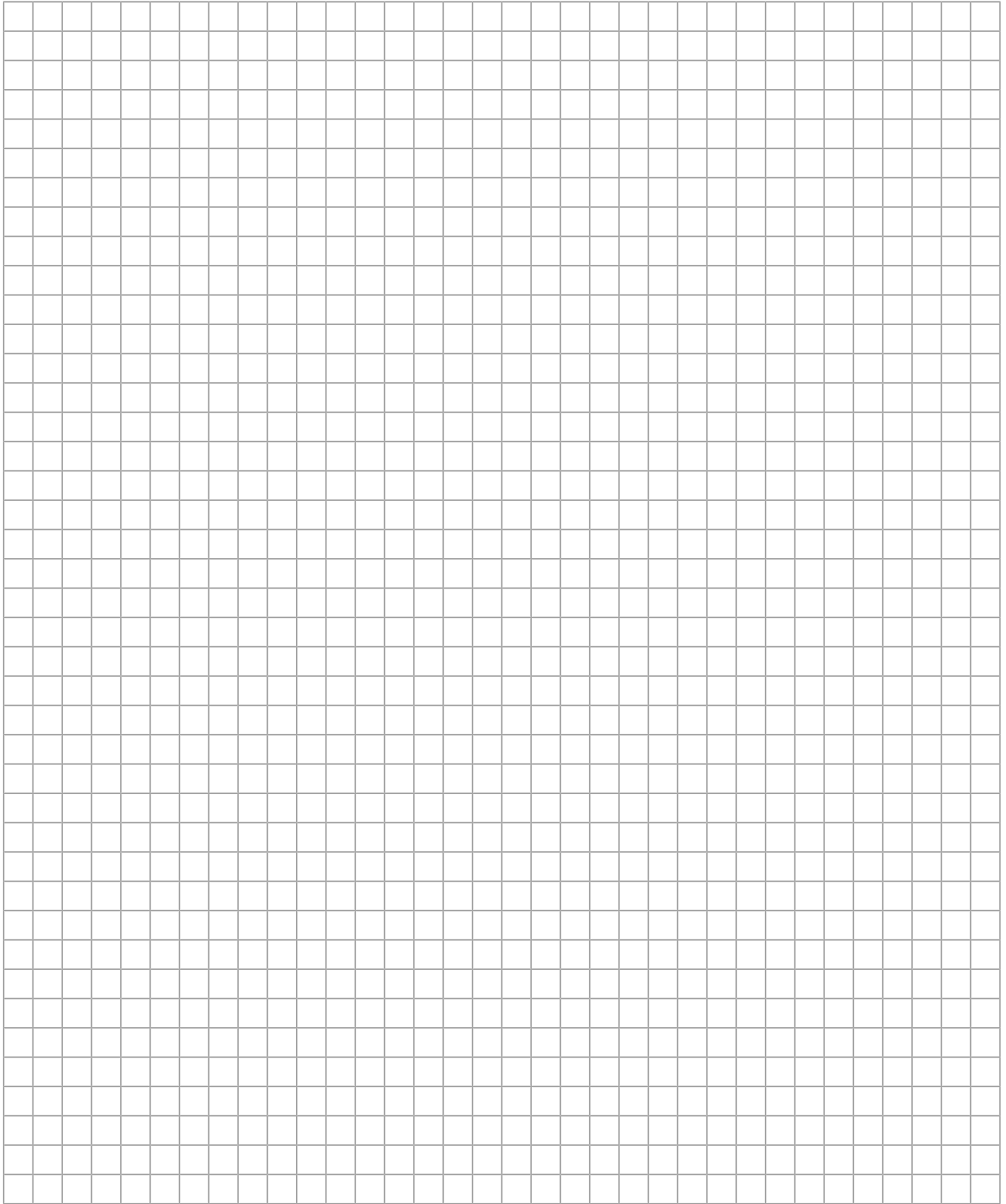
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