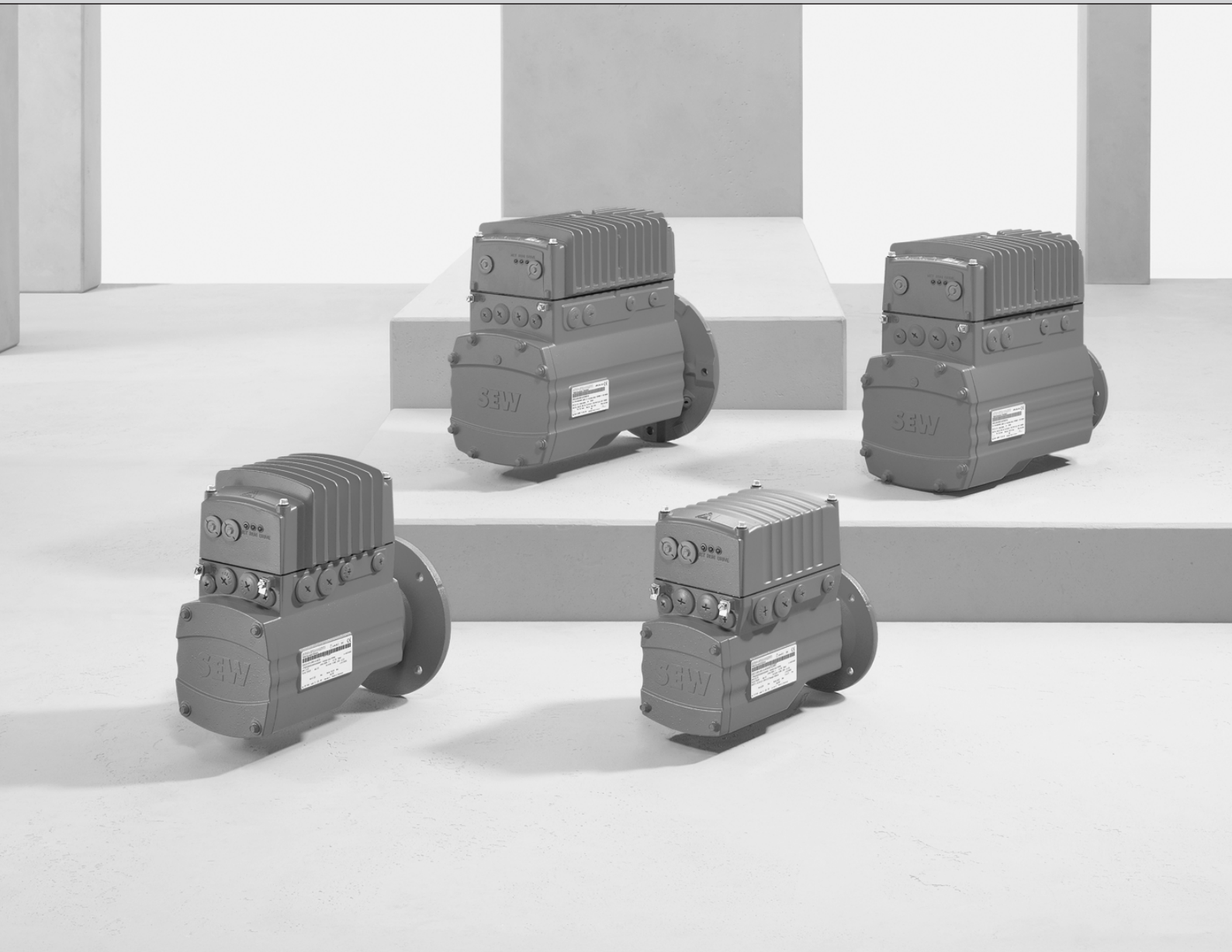
SEW EURODRIVE

Operating Instructions



Electronic Motor

DRC.-..-DBC

Direct Binary Communication

Edition 12/2019

23101326/EN

Contents

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1 General information

1.1 About this documentation

The documentation at hand is the original.

This documentation is an integral part of the product. The documentation is intended for all employees who perform work on the product.

Make sure this documentation is accessible and legible. Ensure that persons responsible for the systems and their operation as well as persons who work on the product independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or if you require further information, contact SEW-EURODRIVE.

1.2 Other applicable documentation

Observe the corresponding documentation for all further components.

1.3 Structure of the safety notes

1.3.1 Meaning of signal words

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

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

1.3.2 Structure of section-related safety notes

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

This is the formal structure of a safety note for a specific section:

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

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Meaning of the hazard symbols

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

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

1.3.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

⚠ **SIGNAL WORD!** Type and source of hazard. Possible consequence(s) if disregarded. Measure(s) to prevent the hazard.

1.4 Rights to claim under limited warranty

Read the information in this documentation. This is essential for fault-free operation and fulfillment of any rights to claim under limited warranty. Read the documentation before you start working with the product.

1.5 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

1.6 Copyright notice

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2 Safety notes DRC.. drive unit

2.1 Preliminary information

The following general safety notes serve the purpose of preventing injury to persons and damage to property. They primarily apply to the use of products described in this documentation. If you use additional components, also observe the relevant warning and safety notes.

2.2 Duties of the user

As the user, you must ensure that the basic safety notes are observed and complied with. Make sure that persons responsible for the machinery and its operation as well as persons who work on the device independently have read through the documentation carefully and understood it.

As the user, you must ensure that all of the work listed in the following is carried out only by qualified specialists:

- Setup and installation
- Installation and connection
- Startup
- Maintenance and repairs
- Shutdown
- Disassembly

Ensure that the persons who work on the product pay attention to the following regulations, conditions, documentation, and information:

- National and regional safety and accident prevention regulations
- Warning and safety signs on the product
- All other relevant project planning documents, installation and startup instructions, and wiring diagrams
- Do not assemble, install or operate damaged products
- All system-specific specifications and conditions

Ensure that systems in which the product is installed are equipped with additional monitoring and protection devices. Observe the applicable safety regulations and legislation governing technical work equipment and accident prevention regulations.

2.3 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 who possess the following qualifications:

- Qualification in the mechanical area in accordance with the national regulations
- Familiarity with this documentation

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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 who possess the following qualifications:

- Qualification in the electrotechnical area in accordance with the national regulations
- Familiarity with this documentation

Additional qualification

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 transportation, storage, operation and waste disposal must be carried out by persons who are trained appropriately. The purpose of the instruction is to give persons the ability to perform the required tasks and work steps in a safe and correct manner.

2.4 Designated use

The product is intended for installation in electrical plants 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 the 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.

2.4.1 Lifting applications

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

- Use mechanical protection devices.

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2.5 Functional safety technology

The product must not perform any safety functions without a higher-level safety system, unless explicitly allowed by the documentation.

2.6 Transportation

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product is damaged, it must not be assembled, installed or started up.

Observe the following notes when transporting the device:

- Ensure that the product is not subject to mechanical impact.

If necessary, use suitable, sufficiently dimensioned handling equipment.

Observe the information on climatic conditions in the chapter "Technical data" of the documentation.

The lifting eyebolts are designed to carry only the weight of the motor without gear unit. Tighten installed lifting eyebolts. 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.

2.7 Installation/assembly

Ensure that the product is installed and cooled according to the regulations in the documentation.

Protect the product from strong mechanical strain. The product and its mounting parts must never protrude into the path of persons or vehicles. Ensure that components are not deformed and insulation spaces are not changed, particularly during transportation and handling. Electric components must not be mechanically damaged or destroyed.

Observe the notes in chapter Mechanical installation in the documentation.

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2.7.1 Restrictions of use

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

- Use in potentially explosive atmospheres
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation
- Operation in applications with impermissibly high mechanical vibration and shock loads in excess of the regulations stipulated in EN 61800-5-1
- Use at an elevation of more than 4000 m above sea level

The product can be used at altitudes above 1000 m above sea level up to 4000 m above sea level under the following conditions:

- The reduction of the nominal output current and/or the line voltage is considered according to the data in chapter Technical data in the documentation.
- Above 2000 m above sea level, the air and creeping distances are only sufficient for overvoltage class II according to EN 60664. At altitudes above 2000 m above sea level, limiting measures must be taken which reduce the line side overvoltage from category III to category II for the entire system.
- If a protective electrical separation (in accordance with EN 61800-5-1 and EN 60204-1) is required, then implement this outside the product at altitudes of more than 2000 m above sea level.

2.8 Electrical installation

Ensure that all of the required covers are correctly attached after carrying out the electrical installation.

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

2.8.1 Stationary application

Necessary preventive measure for the product is:

Type of energy transfer	Preventive measure
Direct power supply	• Ground connection

2.9 Protective separation

The product meets all requirements for protective separation of power and electronics connections in accordance with EN 61800-5-1. To ensure protective separation, all connected circuits must also meet the requirements for protective separation.

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2.10 Startup/operation

Observe the safety notes in the chapters Startup and Operation in this documentation.

Make sure the connection boxes are closed and screwed before connecting the supply voltage.

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

When the device is switched on, dangerous voltages are present at all power connections as well as at any connected cables and terminals. This also applies even when the product is inhibited and the motor is at standstill.

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. Eliminating the cause of the problem or performing a reset may result in the drive restarting automatically. If, for safety reasons, this is not permitted for the drive-controlled machine, first disconnect the product from the supply system and then 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.

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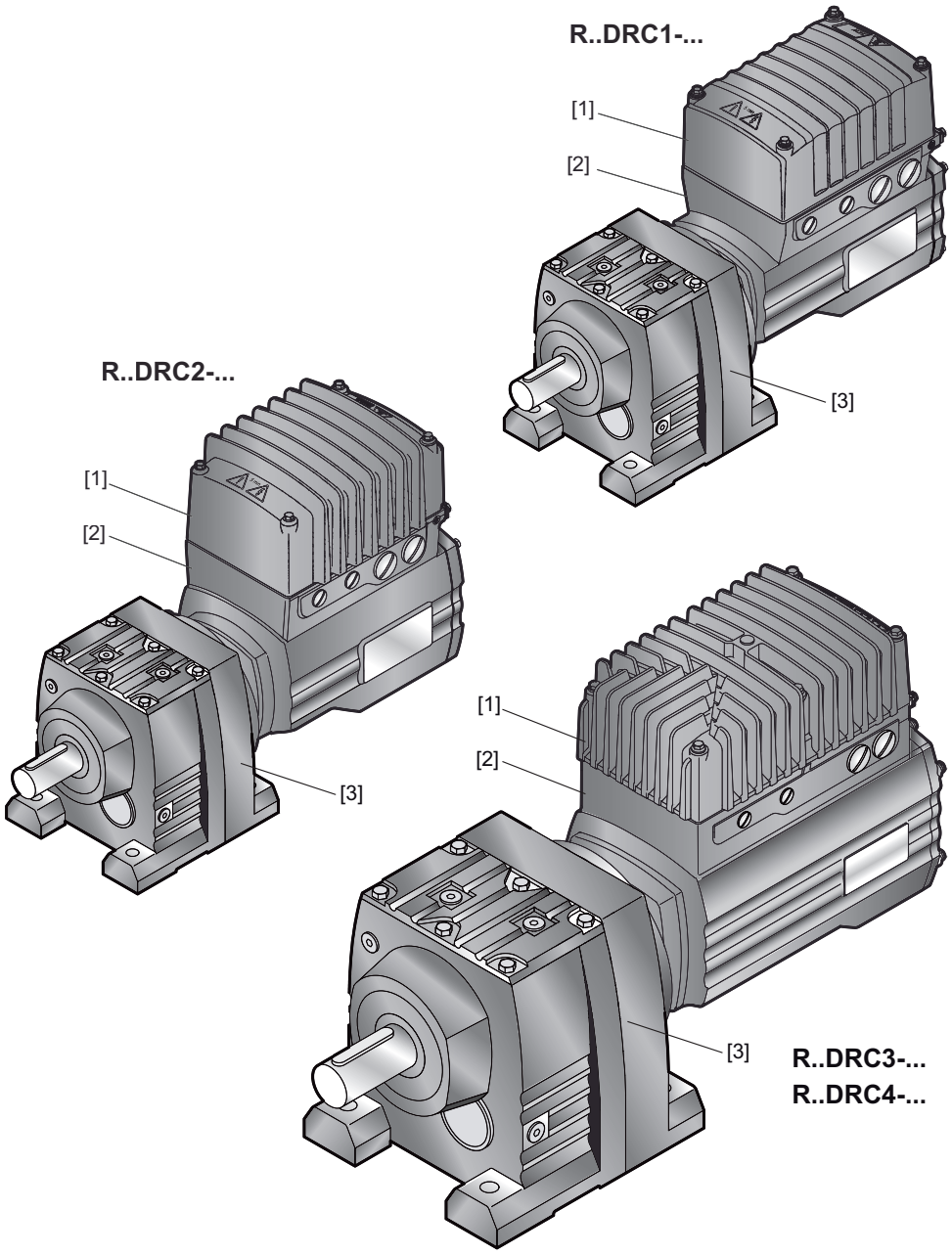
3 Unit structure

3.1 DRC.. drive unit

The following figure shows drive units consisting of DRC1/DRC2/DRC3/DRC4 electronic motor and R gear unit:



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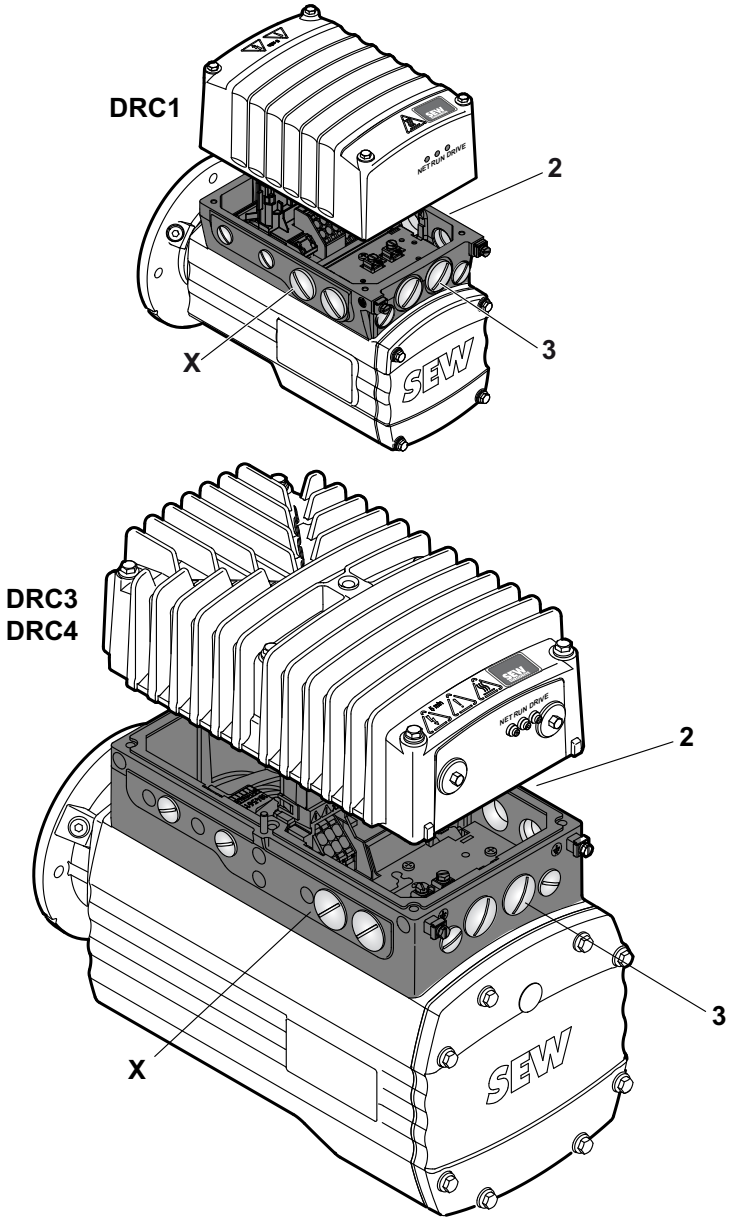
[1] Electronics cover
[2] DRC.. electronic motor with connection unit
[3] Gear unit (pictured here: R gear unit)

3.2 Cable entry position

The DRC.. electronic motor is equipped with the following cable entries as standard:

- Position X + 2 + 3
  - X: 2 × M25 × 1.5 + 2 × M16 × 1.5
  - 2: 2 × M25 × 1.5 + 2 × M16 × 1.5
  - 3: 2 × M25 × 1.5 + 2 × M16 × 1.5

The following figure shows examples with DRC1 and DRC3/4 electronic motors:



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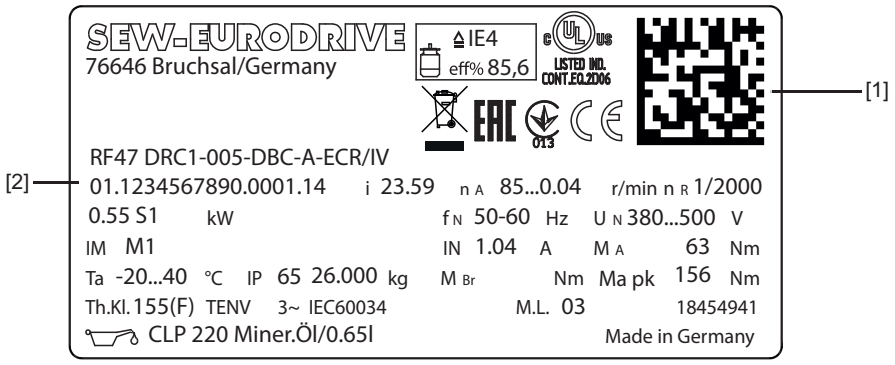
3.3 Example nameplate and type designation of the drive unit

3.3.1 Nameplate

The following figure shows an example of a drive unit nameplate. For the structure of the type designation, refer to the chapter "Type designation".



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[1] The 2D code on the nameplate represents the unique serial number (with period as separator).
[2] Unique serial number

3.3.2 Type designation

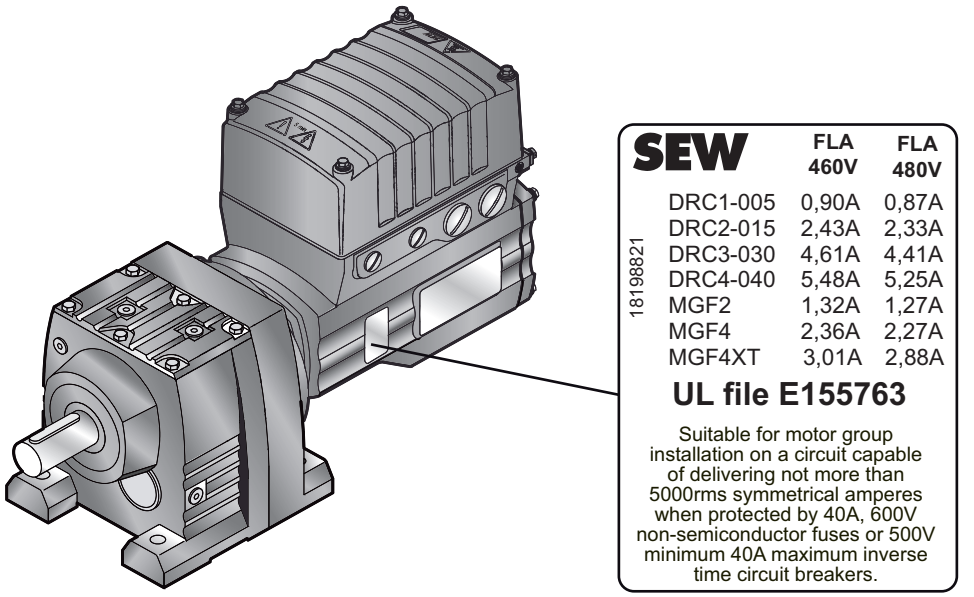
The following table shows the type designation of the drive unit:

RF	**Gear unit series**
47	**Gear unit size**
DRC..	**Product family** DRC.. = Electronic motor
1	**Electronic motor size** 1 = DRC1 2 = DRC2 3 = DRC3 4 = DRC4
–	
005	**Power** 005 = 0.55 kW 015 = 1.5 kW 030 = 3.0 kW 040 = 4.0 kW
–	
DBC	**DRC.. installation technology** DBC = **D**irect **B**inary **C**ommunication
–	
A	**Version**
–	

ECR	Extended control range (standard)
/	
IV	**DRC.. option**
	IV = Plug connector
	BY1C = DRC1 brake
	BY2C = DRC2 brake
	BY4C = DRC3/4 brake
	BW1 = Integrated braking resistor DRC1
	BW2 = Integrated braking resistor DRC2
	BW3 = Integrated braking resistor DRC3/4
	PE = Pressure compensation fitting electronics

3.4 Example of the optional nameplate "Electrical regulations UL/CE"

The following figure shows an example of the optional nameplate for drive units according to electrical regulation UL/CE:



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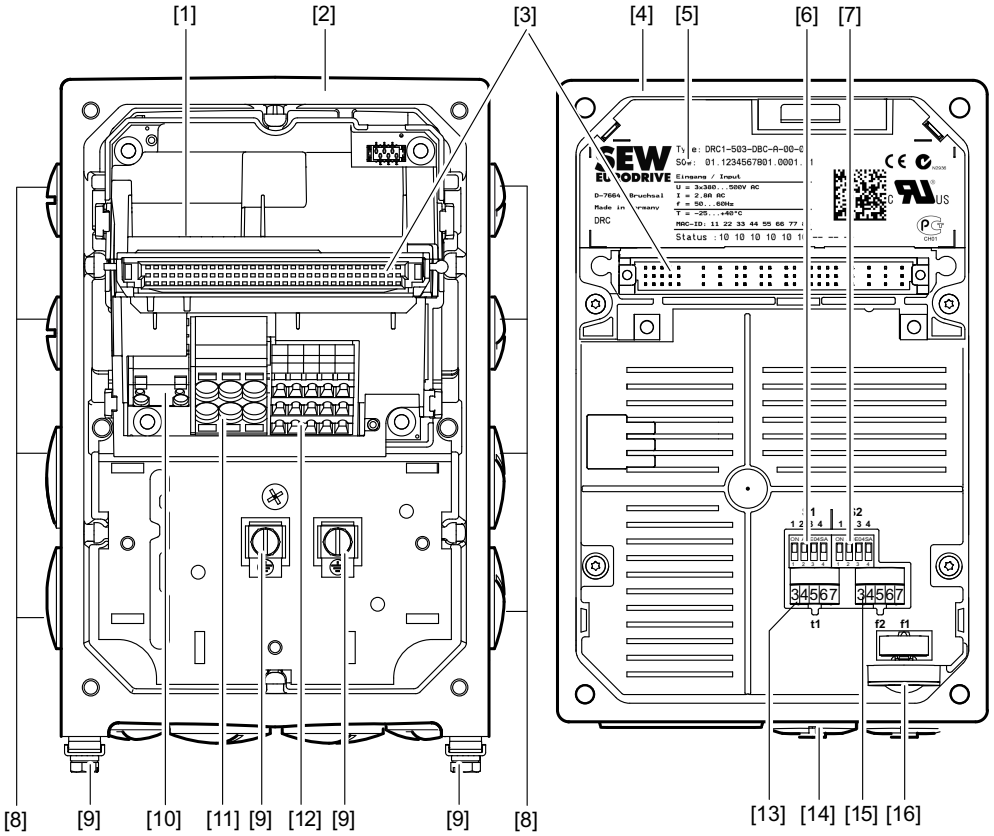
3.5 Electronics

3.5.1 DRC1/2 electronics cover (inside) and connection box

The following figure shows the connection box and the bottom side of the DRC1/2 electronics cover:



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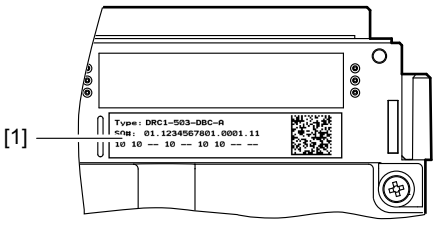
[1] Nameplate of connection unit, see following detailed view



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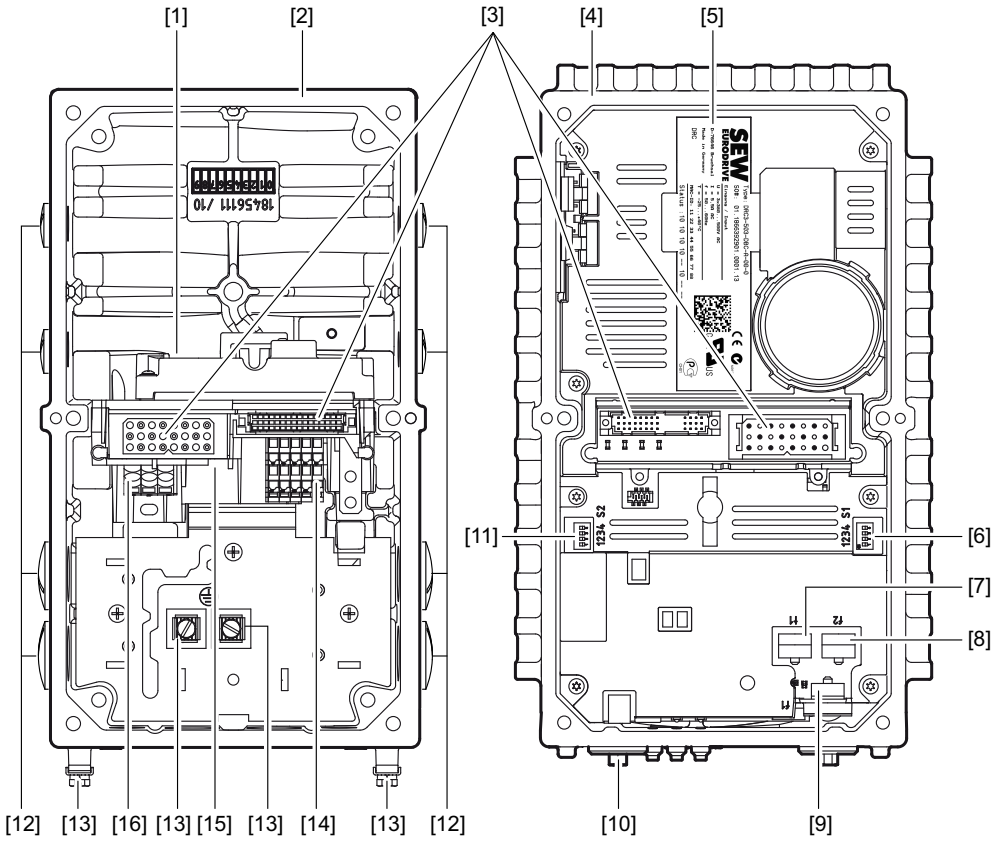
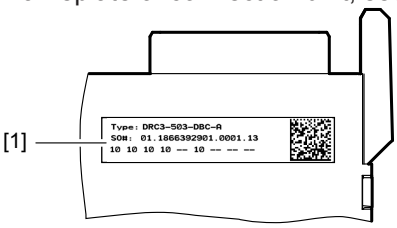
[2] Connection box
[3] Plug connector connection unit for DRC.. electronics cover
[4] Electronics cover DRC..
[5] Electronics cover nameplate
[6] DIP switches S1/1 – S1/4
[7] DIP switches S2/1 – S2/4
[8] Cable glands
[9] Screws for PE connection
[10] Braking resistor connection
[11] Line connection L1, L2, L3
[12] Electronics terminal strips
[13] Switch t1 for integrator ramp (green)
[14] Diagnostic interface (underneath the gland)
[15] Setpoint switch f2 (white)
[16] Setpoint potentiometer f1 with screw plug

3.5.2 DRC3/4 electronics cover (inside) and connection box

The following figure shows the connection box and the bottom side of the DRC3/4 electronics cover:



[1] Nameplate of connection unit, see following detailed view



[2] Connection box
[3] Plug connector connection unit for DRC.. electronics cover
[4] Electronics cover DRC..
[5] Electronics cover nameplate
[6] DIP switches S1/1 – S1/4
[7] Switch t1 for integrator ramp (green)
[8] Setpoint switch f2 (white)
[9] Setpoint potentiometer f1 with screw plug
[10] Diagnostic interface (underneath the gland)
[11] DIP switches S2/1 – S2/4
[12] Cable glands
[13] Screws for PE connection
[14] Electronics terminal strips
[15] Braking resistor connection, not visible in this illustration (terminals are below the connector). For details, see chapter "Electrical installation"
[16] Line connection L1, L2, L3

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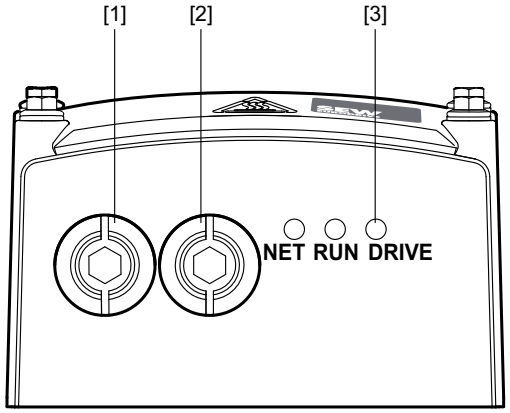
3.5.3 Electronics cover (outside)

DRC1/2

The following figure shows the outside of the electronics cover:



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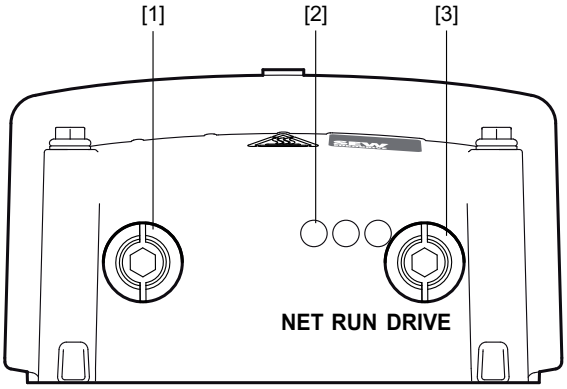
[1] Setpoint potentiometer f1 (underneath the gland)
[2] Diagnostic interface (underneath the gland)
[3] Status LEDs

DRC3/4

The following figure shows the outside of the electronics cover:



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[1] Setpoint potentiometer f1 (underneath the gland)
[2] Status LEDs
[3] Diagnostic interface (underneath the gland)

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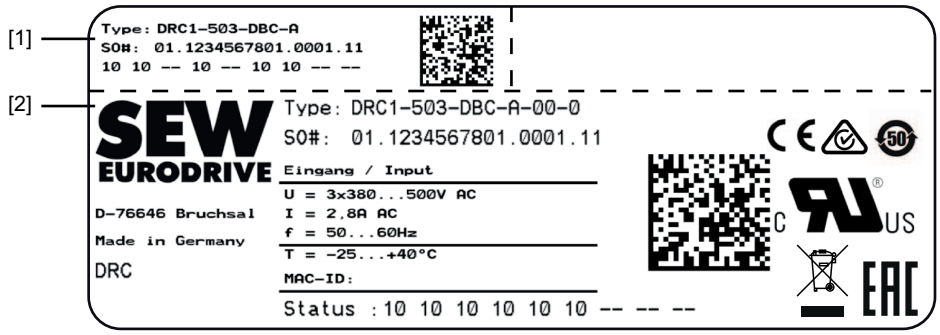
3.6 Example nameplate and type designation of the electronics

3.6.1 Nameplate

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



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[1] Connection unit nameplate
[2] Electronics cover nameplate

3.6.2 Type designation of the electronics cover

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

DRC..	**Product family** DRC.. = Electronic motor
1	**Size** 1 = DRC1 2 = DRC2 3 = DRC3 4 = DRC4
–	
50	**Connection voltage** 50 = AC 380 – 500 V
3	**Connection type** 3 = 3-phase
–	
DBC	**DRC.. installation technology** DBC = **D**irect **B**inary **C**ommunication
–	
A	**DRC.. version**
–	
00	**Design** 00 = Standard
–	

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0	**Electronics cover design** 0 = Without application slot

3.6.3 Type designation of the connection unit

The following table shows the type designation of the connection unit:

DRC..	**Product family** DRC.. = Electronic motor
1	**Size** 1 = DRC1 2 = DRC2 3 = DRC3 4 = DRC4
–	
50	**Connection voltage** 50 = AC 380 – 500 V
3	**Connection type** 3 = 3-phase (AC)
–	
DBC	**DRC.. installation technology** DBC = **D**irect **B**inary **C**ommunication
–	
A	**DRC.. version**

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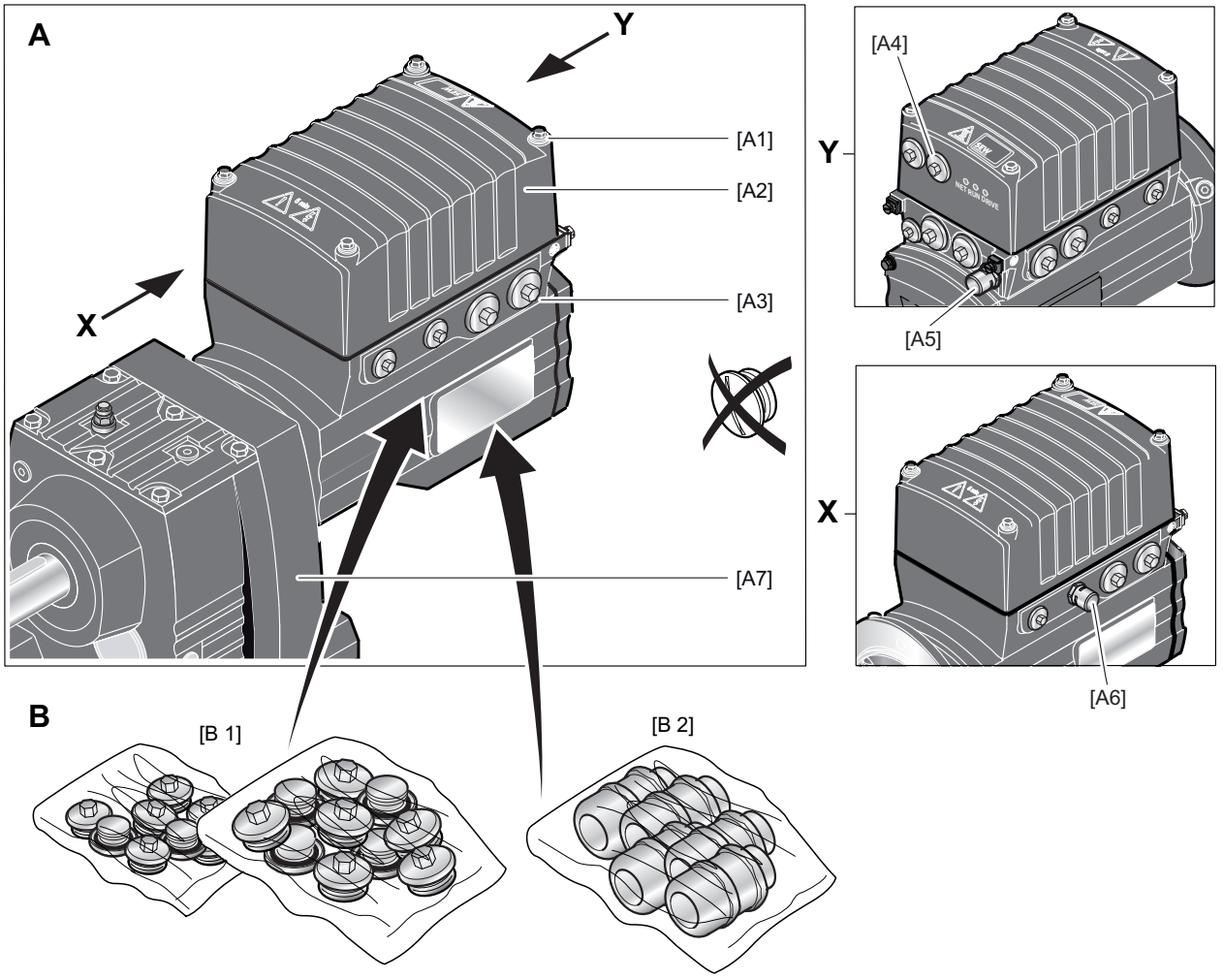
3.7 DRC.. drive units in ASEPTIC design

The following figure shows the additional features of DRC.. drive units in ASEPTIC design:

- The ASEPTIC design is delivered with screw plugs made of stainless steel as standard.
- Plastic screw plugs can be chosen instead. To achieve degree of protection IP66 and compatibility with cleaning agents, you have to replace the plastic screw plugs by suitable screw fittings made of stainless steel.



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All illustrations with ASEPTIC design are displayed with a shading (= surface protection) in this documentation

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3.7.1 Key

A	Scope of delivery	
[A1]	**DRC1/2:**	
	Mounting screws for cover made of stainless steel	
	DRC3/4:	
	Mounting screws cover galvanized	
[A2]	Surface protection OS2 to OS4 for ASEPTIC design, see chapter "Technical data and dimension sheets"	
[A3]	**Standard:**	**Optional:**
	Screw plugs made of stainless steel	Plastic screw plugs. To achieve degree of protection IP66 and compatibility with cleaning agents, you have to replace the plastic screw plugs by suitable screw fittings made of stainless steel.
[A4]	Screw plugs in the electronics cover made of stainless steel	
[A5]	Pre-installed pressure compensation fitting (M16) with mounting positions M5, M6	
[A6]	Pre-installed pressure compensation fitting (M16) with mounting position M1, M2, M4, M4	
Optional plug connectors (see chapter "Electrical installation") are available in connection with the ASEPTIC design.		
[A7]	Features of gear units in ASEPTIC design • Surface protection finish OS2 to OS4 Other possible gear unit options • Available for gear units with solid shaft, hollow shaft with key or TorqLOC for the following gear unit sizes: R27-87, F27-87, K37-87 and W37 • Gear unit output shaft including all fastening parts on the output shaft, such as screws, keys, shrink disk, etc., are made of stainless steel • If technically possible, the oil seals on the output are configured as double oil seals made from FKM (fluorocarbon rubber) • The breather valve of the gear units is made from stainless steel • All surface recesses are sprayed with elastic rubber compound • All gear unit options can be selected • All mounting positions M1 to M6 are available	
B	**Required screw fittings**	
[B1]	Screw plugs made of stainless steel[1)]	
[B2]	Cable glands made of stainless steel[1)]	
The required screw fittings can be ordered from SEW-EURODRIVE. For an overview, refer to chapter "Technical data/Optional metal screw fittings".		

1) Make sure to select plug seals that are compatible with the used cleaning agents

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4 Mechanical installation

4.1 Installation notes

INFORMATION

Adhere to the safety notes during installation.

⚠ WARNING

Improper installation/disassembly of DRC.. drive units and mount-on components.

Risk of injury.

- Adhere to the notes about installation and disassembly.
- Before releasing shaft connections, make sure that there are no active torsional moments present (tensions within the system).

⚠ WARNING

Risk of injury if the drive starts up unintentionally and danger of electrical voltage.

Dangerous voltages may still be present for up to 5 minutes after disconnection from the line voltage.

- Disconnect the DRC.. drive unit from the power supply using suitable external measures before you start working on the unit and secure it against unintentional reconnection to the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 5 minutes before removing the electronics cover.

⚠ WARNING

Risk of injury caused by rapidly moving output elements.

Serious injuries.

- Disconnect the DRC.. drive unit from the power supply and secure it against unintentional power up before you start working on it.
- Equip the input and output elements (e.g. customer shaft with contact shoulder or clamping ring, shrink disk) with a touch guard.

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4.2 Required tools and resources

- Set of wrenches
- Torque wrench
- Mounting device
- Compensation elements (washers and spacing rings), if necessary
- Fasteners for output elements
- Lubricant (e.g. NOCO® fluid)
- Standard parts are not included in the delivery

4.2.1 Installation tolerances for motor shaft ends

The following table shows the tolerances permitted for shaft ends and flanges of the DRC.. motor:

Shaft end	Flanges
Diameter tolerance according to EN 50347 • ISO j6 at Ø ≤ 26 mm • Center hole according to DIN 332, shape DR..	Centering shoulder tolerance according to EN 50347 • ISO j6 at Ø ≤ 250 mm

4.2.2 Tolerances for torque ratings

The specified torques must be adhered to with a tolerance of ± 10%.

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4.3 Installation requirements

Check that the following conditions have been met:

- The information on the nameplate of the DRC.. drive unit must match the voltage supply system.
- The drive is undamaged (no damage caused by transportation or storage).
- Ambient temperature according to the operating instructions, nameplate and lubricant table in chapter "Technical data/Lubricants".
- The drive must not be assembled in the following ambient conditions:
  - Potentially explosive atmosphere
  - Oils
  - Acids
  - Gases
  - Vapors
  - Radiation
- For special designs: The drive 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.

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4.4 Setting up the drive unit

4.4.1 Notes

- Only install the DRC.. 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 "DRC.. Gearmotors" catalog.
- Do not jolt or hammer the shaft end.
- Ensure that cooling air supply is unobstructed and that air discharged by other units does not influence 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).
- Seal the cable entry properly.
- 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.

Changing the mounting position

Make sure to read the following information when you operate the electronic motor in a mounting position other than the one indicated in the order:

- **Adjust the position of the pressure compensation fitting, if necessary.**

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4.4.2 Electronics cover

⚠ WARNING

Risk of burns due to hot surfaces.

Serious injuries.

- Let the devices cool down before touching them.

NOTICE

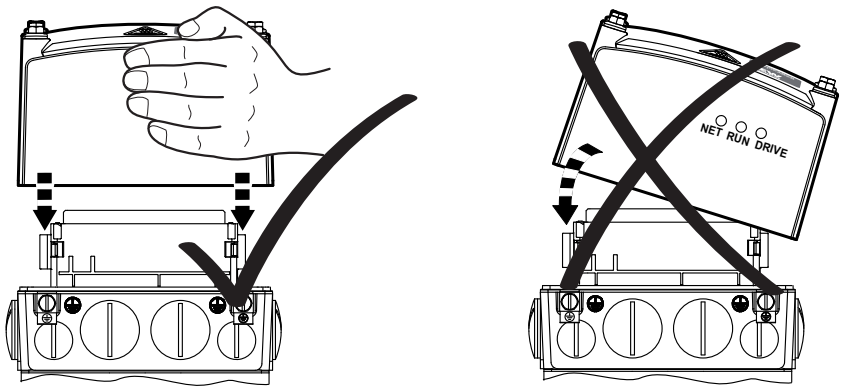
Loss of the guaranteed degree of protection.

Possible damage to property.

- When the electronics cover DRC.. is removed from the connection box, you have to protect it from humidity, dust or foreign particles.
- Make sure that the electronics cover DRC.. is mounted properly.

Installing the electronics cover

- Use only electronics covers that match the size.
- Be careful not to tilt the electronics cover when placing it on the connection box:



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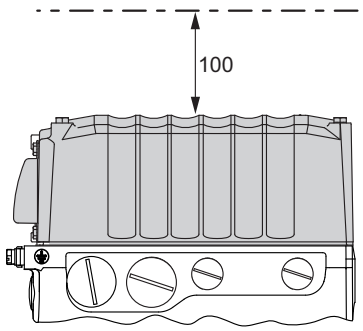
Minimum installation clearance

Note the minimum installation clearance (see following figure) required to remove the electronics cover DRC... For detailed dimension drawings, refer to chapter "Technical data".



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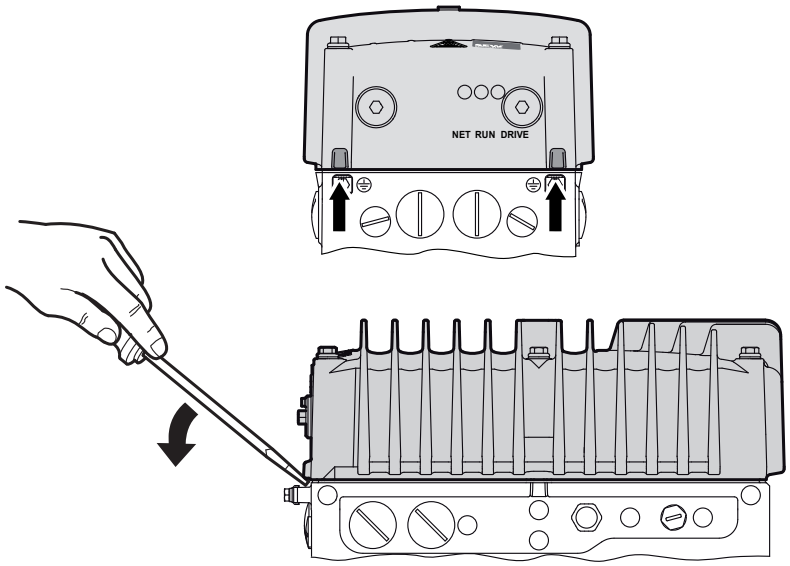
Removing the electronics cover

The following figure shows how you can lever off the electronics cover in the intended places:



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4.4.3 Installation in damp areas or in the open

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

Observe the notes in chapter "Drive units with optional ASEPTIC design".

4.4.4 Painting drive units

NOTICE

Breather valves and oil seals may be damaged during painting or repainting.

Potential damage to property.

- Clean the surface of the drive unit and make sure it is free from grease.
- Before painting, thoroughly cover the breather valves and sealing lip of the oil seals with strips.
- After painting, remove the adhesive strips.

4.5 Tightening torques

⚠ WARNING

Risk of burns due to hot surfaces.

Serious injuries.

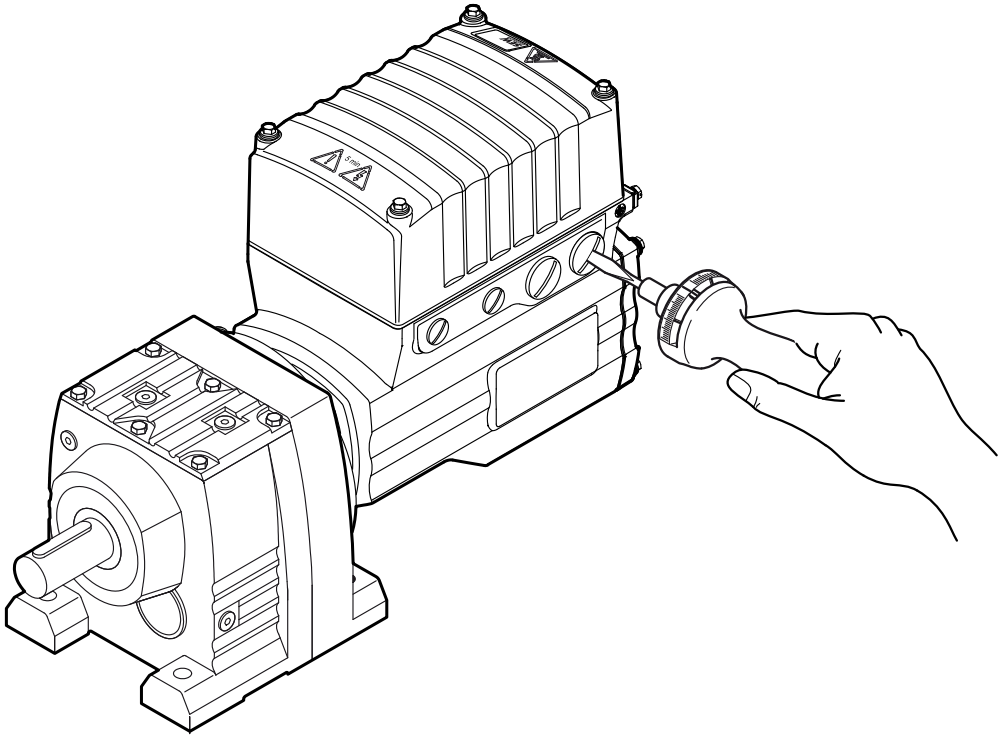
- Let the devices cool down before touching them.

4.5.1 Blanking plugs

Tighten the plastic blanking plugs **included in the delivery** by SEW-EURODRIVE with 2.5 Nm:

Example

The following figure shows an example.



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4.5.2 Cable glands

Tightening torques

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

Screw fitting	Part number	Content	Size	Outer cable diameter	Tightening torque
EMC cable glands (nickel-plated brass)	18204783	10 pieces	M16 x 1.5	5 to 9 mm	4.0 Nm
	18204805	10 pieces	M25 x 1.5	11 to 16 mm	7.0 Nm
EMC cable glands (stainless steel)	18216366	10 pieces	M16 x 1.5	5 to 9 mm	4.0 Nm
	18216382	10 pieces	M25 x 1.5	11 to 16 mm	7.0 Nm

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

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

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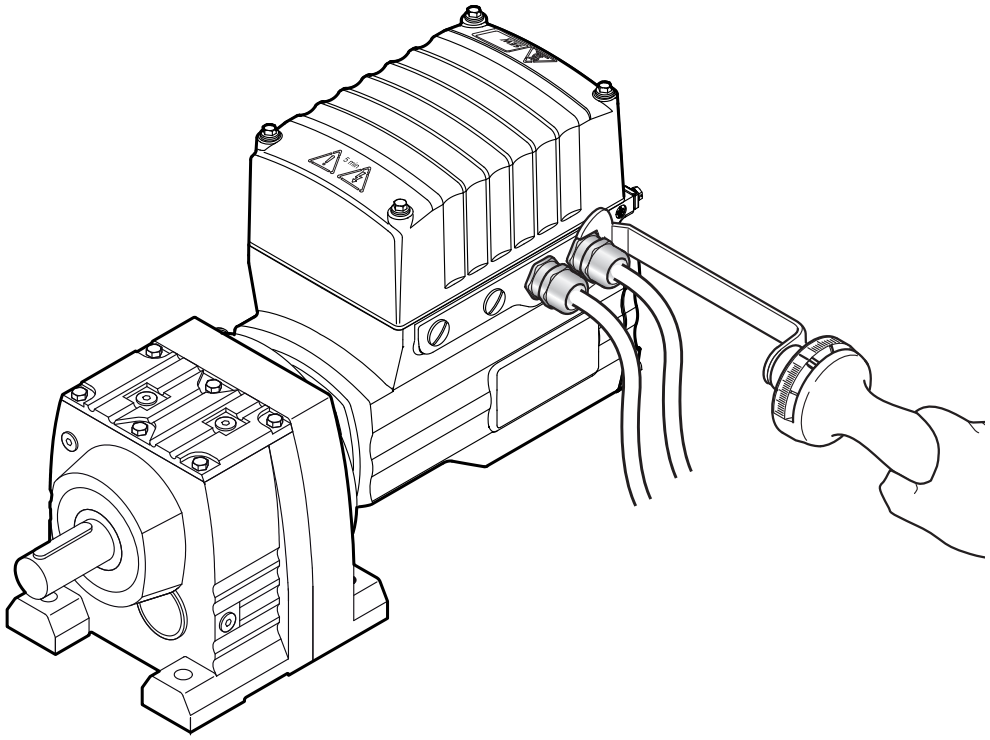
Example

The following figure shows an example.



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4.5.3 Electronics cover DRC..

Proceed as follows when installing the electronics cover DRC..: Insert the screws and tighten them with the tightening torque specified for that size according to the sequence shown in the figure below.

- DRC.. electronic motor size 1/2: 6.0 Nm
- DRC.. electronic motor size 3/4: 9.5 Nm

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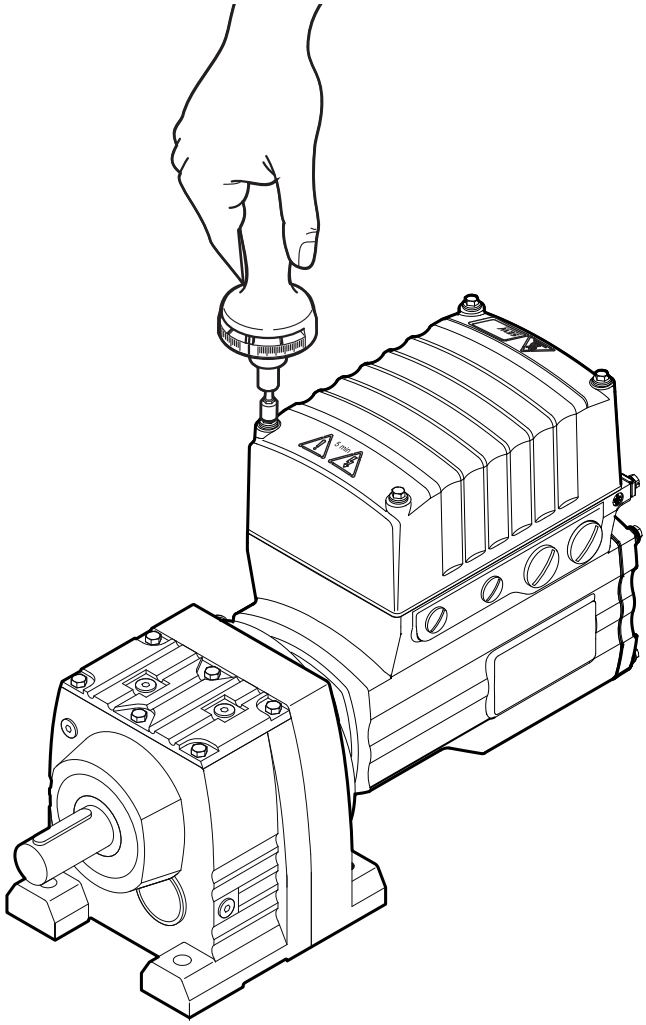

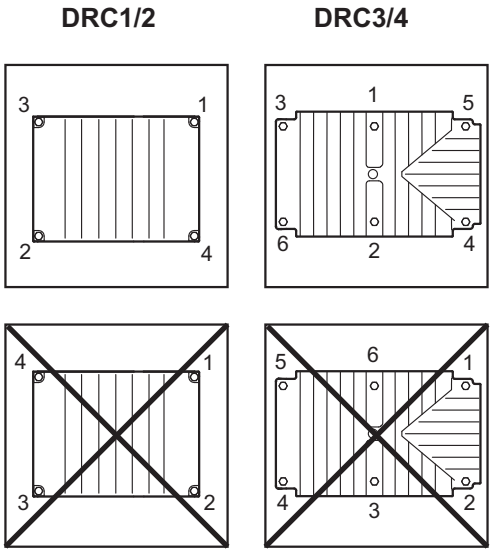

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4.6 Drive units with optional ASEPTIC design

4.6.1 Installation notes

NOTICE

Loss of degree of protection IP66 and incompatibility with cleaning agents.

Possible damage to property.

- Replace the optionally supplied plastic screw plugs with suitable stainless steel screw fittings.

Adhere to the following additional notes for DRC drive units in optional ASEPTIC design:

- Make sure to prevent moisture and dirt from entering the device during installation.
- After electrical installation, make sure that the sealing and sealing surfaces are clean during assembly.
- When performing maintenance work, check the condition of the gaskets as well as the tightening torques of the screw fittings. If damaged, contact SEW-EURODRIVE.
- 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. For this purpose it is essential that you observe the chapter "Inspection and maintenance".
- Make sure to install the cables with a drip loop. Observe the permitted bending radii of the installed cables for cable routing.
- Use only stainless steel cable glands and screw plugs offered by SEW-EURODRIVE, see chapter "Technical data and dimension sheets".
- You must seal unused cable bushings and plug connectors with suitable screw plugs, see chapter "Technical data and dimension sheets".

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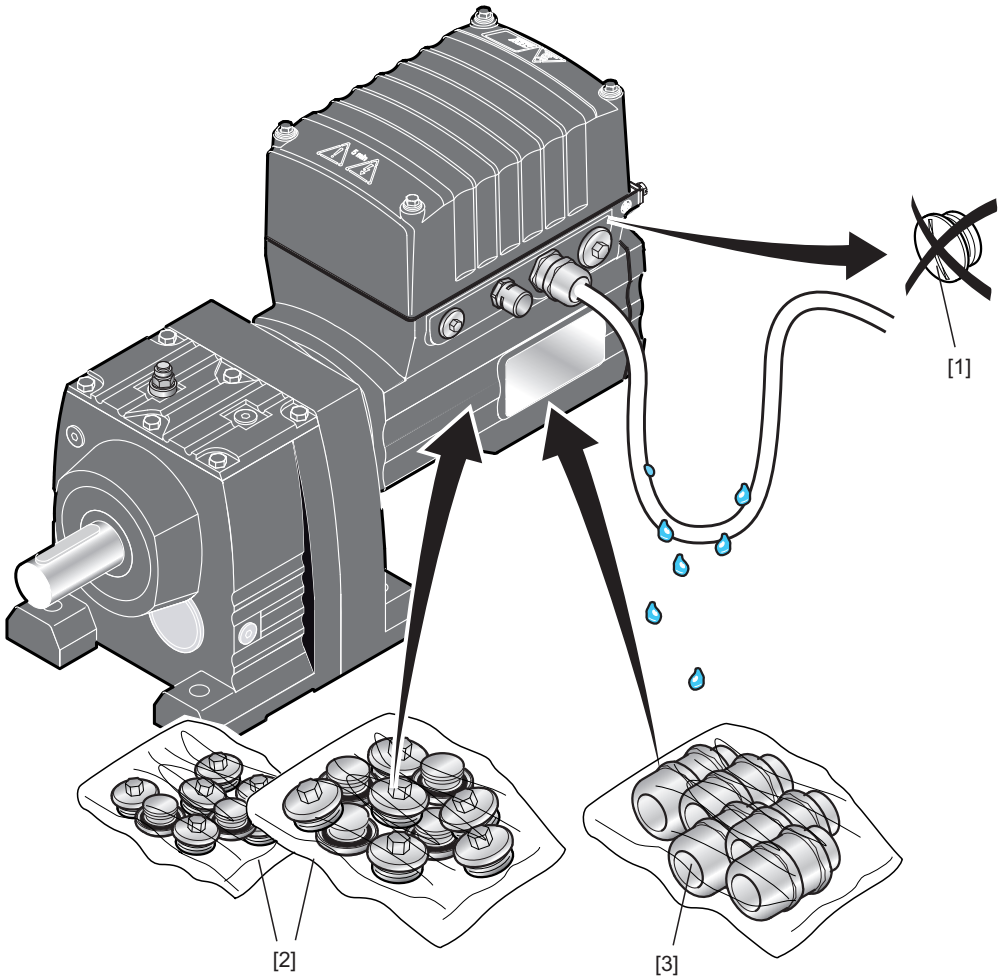
Example

The following figure gives an example of a cable entry with drip loop and replacement of plastic screw plugs supplied as an option with suitable stainless steel screw fittings.



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[1] The optionally delivered plastic screw plugs must be replaced by suitable screw plugs made of stainless steel.
[2] Stainless steel screw plugs, if necessary (see chapter "Technical data and dimension sheets")
[3] Required stainless steel cable glands (see chapter "Technical data and dimension sheets")

Use according to mounting position

DRC.. drive units in optional ASEPTIC design are delivered with pressure compensation and breather valve installed according to the mounting position.

This is why DRC drive units in optional ASEPTIC design must only be used in the mounting position specified in the order.

- Permitted cable routing

  The following cable entries are permitted for the ASEPTIC design depending on the mounting position and the position of the electronics cover:

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Permitted cable routing		Position of electronics cover			
		0° (R)	90° (B)	180° (L)	270° (T)
Mounting positions of gearmotors	**M1**	X/3	X/2/3	2/3	X/2/3
	M2	X/2/3			
	M3	2/3	X/2/3	X/3	X/2/3
	M4	X/2			
	M5	X/2/3	2/3	X/2/3	X/3
	M6	X/2/3	X/3	X/2/3	2/3
Mounting positions of stand-alone motors	**B5**	X/3	X/2/3	2/3	X/2/3
	V1	X/2			
	V3	X/2/3			

- Permitted mounting options for the DAC electronics variant

  Only the mounting positions marked in gray are permitted for the DAC electronics variant in connection with the ASEPTIC design depending on the position of the electronics cover:

- Restrictions in conjunction with GIO... application options

  Application options cannot be used together with the ASEPTIC design in mounting position M4 (V1).

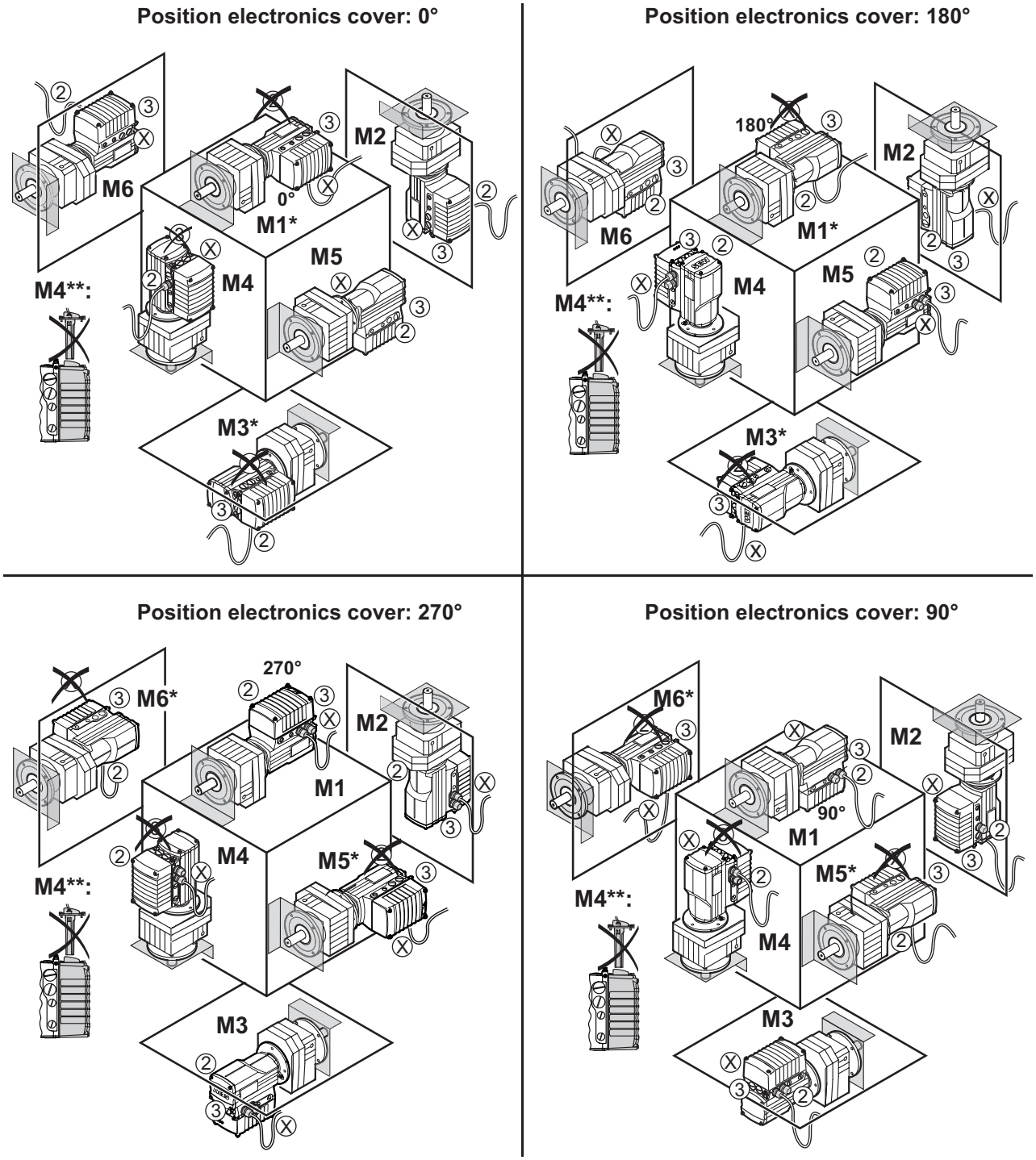
Permitted mounting options for the DAC electronics variant		Position of electronics cover			
		0° (R)	90° (B)	180° (L)	270° (T)
Mounting positions of gearmotors	**M1**				
	M2				
	M3				
	M4				
	M5				
	M6				
Mounting positions of stand-alone motors	**B5**				
	V1				
	V3				

- Restrictions in conjunction with GIO... application options

  Application options cannot be used together with the ASEPTIC design in mounting position M4 (V1).

Mounting positions of the ASEPTIC design

The following figure shows the position of the DRC.. drive unit when installed in mounting positions M1 to M6:



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* Mounting position is not possible in connection with the DAC electronics variant and design for use in wet areas.

** Application options in connection with the design for use in wet areas and mounting position M4 are not possible.

4.6.2 Tightening torques for optional ASEPTIC design

⚠ WARNING

Risk of burns due to hot surfaces.

Serious injuries.

- Let the devices cool down before touching them.

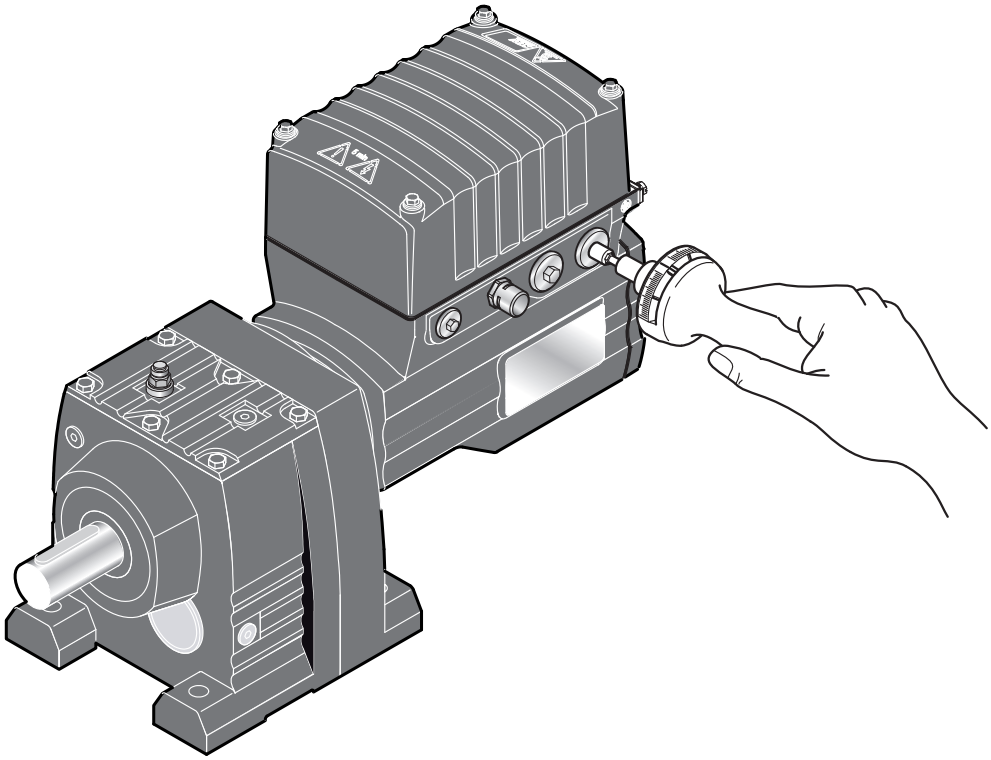
Blanking plugs

Tighten the blanking plugs **optionally** included in the delivery by SEW-EURODRIVE with 6.8 Nm:

Type of screw fitting	Content	Size	Part number	Tightening torque
Hexagon head screw plugs (made of stainless steel)	10 pieces	M16 x 1.5	18247342	6.8 Nm
	10 pieces	M25 x 1.5	18247350	6.8 Nm

Example

The following figure shows an example. The number and position of cable entries depend on the ordered variant.



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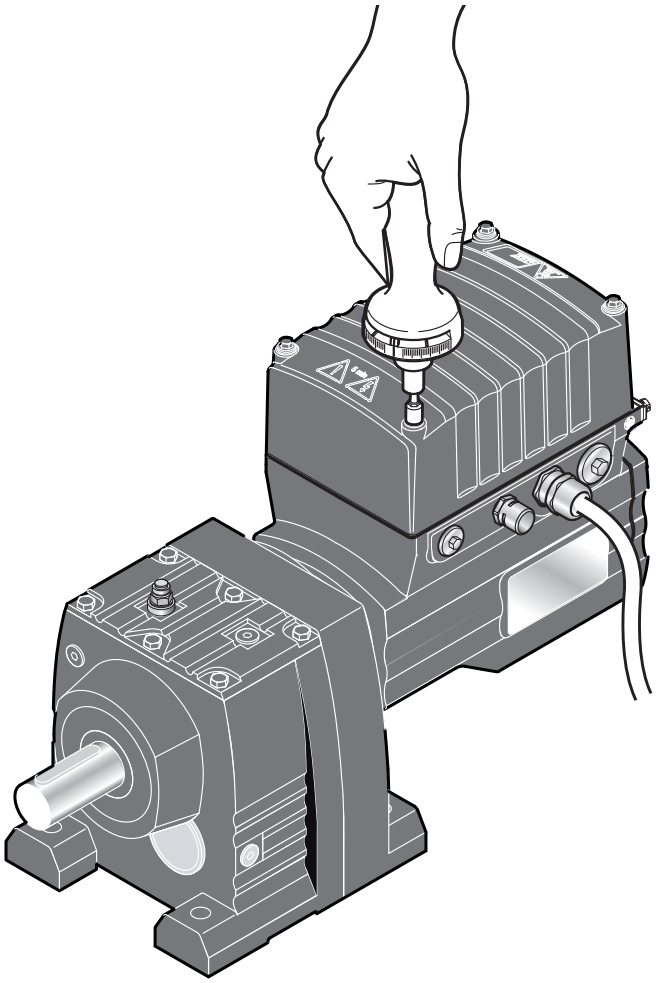
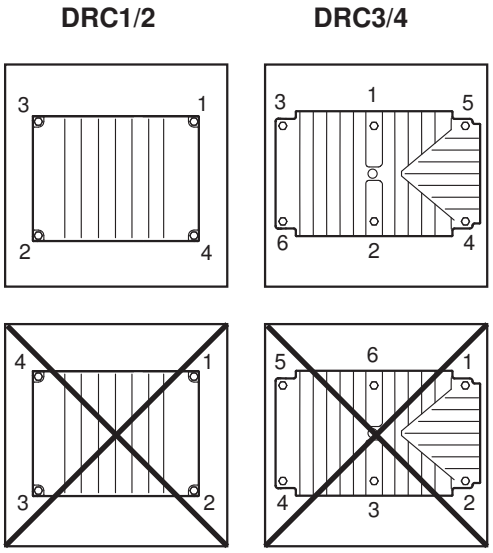
Electronics cover DRC..

Proceed as follows when installing the electronics cover DRC..: Insert the screws and tighten them with the tightening torque specified for that size according to the sequence shown in the figure below.

- DRC.. electronic motor size 1/2: 6.0 Nm
- DRC.. electronic motor size 3/4: 9.5 Nm





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EMC cable glands

Tighten the EMC cable glands **optionally included in the delivery** with the following tightening torques:

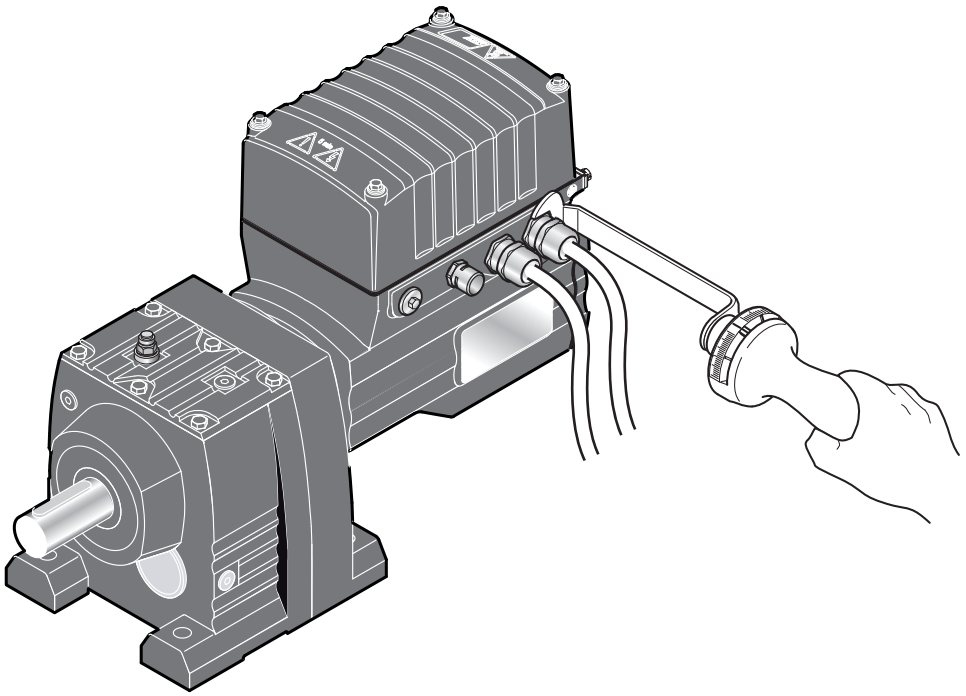
Screw fitting	Part number	Content	Size	Outer cable diameter	Tightening torque
EMC cable glands (nickel-plated brass)	18204783	10 pieces	M16 x 1.5	5 to 9 mm	4.0 Nm
	18204805	10 pieces	M25 x 1.5	11 to 16 mm	7.0 Nm
EMC cable glands (stainless steel)	18216366	10 pieces	M16 x 1.5	5 to 9 mm	4.0 Nm
	18216382	10 pieces	M25 x 1.5	11 to 16 mm	7.0 Nm

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

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

Example

The following figure shows an example. The number and position of cable entries depend on the ordered variant.



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5 Electrical installation

INFORMATION

Adhere to the safety notes during installation.

5.1 Installation planning taking EMC aspects into account

5.1.1 Information on arranging and routing installation components

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

Always adhere to the **relevant standards**.

Note the following:

5.1.2 EMC-compliant installation

INFORMATION

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

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

With respect to the EMC regulation, frequency inverters and compact drives cannot be seen as stand-alone units. They can only be evaluated in terms of EMC when they are integrated in a drive system. Conformity is declared for a described, CE-typical drive system. These operating instructions contain further information.

5.1.3 Cable selection, routing and shielding

⚠ WARNING

Electric shock caused by faulty installation.

Severe or fatal injuries.

- Take the utmost care when installing the units.
- Observe the connection examples.

For more information on cable selection, routing and shielding, refer to chapter "Cable routing and shielding".

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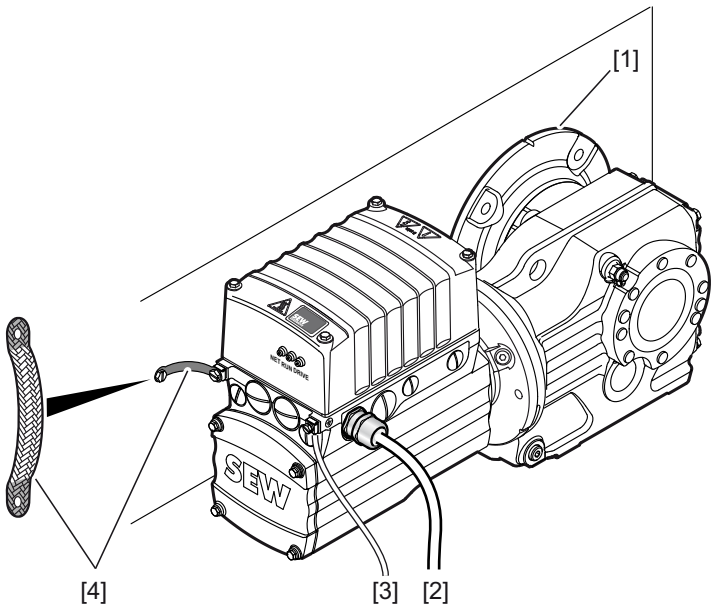
5.1.4 Equipotential bonding

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

- Establish a connection over a wide surface area between the drive unit and the mounting rail.
- To do so, use a ground strap (HF litz wire), for example, to connect the drive unit and the grounding point of the system.

Example



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[1] The mechanical installation of a DRC.. drive unit does **not** create a conductive connection of drive unit and mounting plate.
[2] PE conductor in the supply system cable
[3] Second PE conductor via separate terminals
[4] EMC-compliant equipotential bonding, for example using a ground strap (HF litz wire)
The contact surfaces must be free of paint.

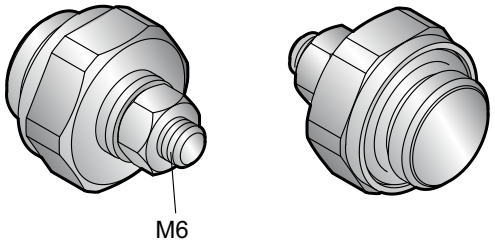
- Do not use the cable shields of data lines for equipotential bonding.

INFORMATION

For further information on equipotential bonding for decentralized inverters and drive units, refer to the publication "Equipotential Bonding of Decentralized Inverters" by SEW-EURODRIVE.

5.2 Equipotential bonding at the connection box

Another option for HF-capable equipotential bonding at a connection box is the following cable gland with M6 stud bolt:



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	Tightening torque of the cable gland	Tightening torque of the M6 nut for stud bolt	Part number
M16 cable gland with M6 stud bolt	4.0 Nm	3.0 Nm	08189234
M25 cable gland with M6 stud bolt	7.0 Nm	3.0 Nm	08192685

You can install this cable gland at a connection box that still has a free cable entry of size M16 or M25.

Screw the cable gland into the free cable entry and install the grounding cable (with ring cable lug) or the HF litz wire at the M6 stud bolt.

5.3 Installation instructions

5.3.1 Connecting supply system cables

- The nominal voltage and frequency of the DRC.. drive unit must correspond with the data of the supply system.
- Cable cross section: According to input current I_{supply} at rated power (see chapter "Technical data and dimension sheets").
- Install line fuses at the beginning of the power supply cable behind the supply bus junction. Select the fuse size according to the cable cross section.
- Use only copper cables with a minimum temperature range of 85 °C as the connection cable.
- DRC.. drive units are suitable for operation in voltage supply systems with grounded star point (TN and TT systems) and for operation in voltage supply systems with isolated star point (IT systems).

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5.3.2 Permitted cable cross sections of terminals

Line terminals

Observe the permitted cable cross sections for installation:

Line terminals X2	Without conductor end sleeve	With conductor end sleeves (with or without plastic collar)
Connection cross section (mm^2)	0.5 mm^2 – 10 mm^2	0.5 mm^2 – 6 mm^2
Connection cross section (AWG)	AWG20 – AWG8	AWG20 – AWG10
Stripping length	13 mm – 15 mm	
Current carrying capacity	24 A (max. loop-through current)	

External braking resistor terminals

Observe the permitted cable cross sections for installation:

External braking resistor terminals X5	Without conductor end sleeve	With conductor end sleeves (with or without plastic collar)
Connection cross section (mm^2)	0.08 mm^2 – 4.0 mm^2	0.25 mm^2 – 2.5 mm^2
Connection cross section (AWG)	AWG28 – AWG12	AWG 23 – AWG 14
Stripping length	8 mm – 9 mm	

Control terminals

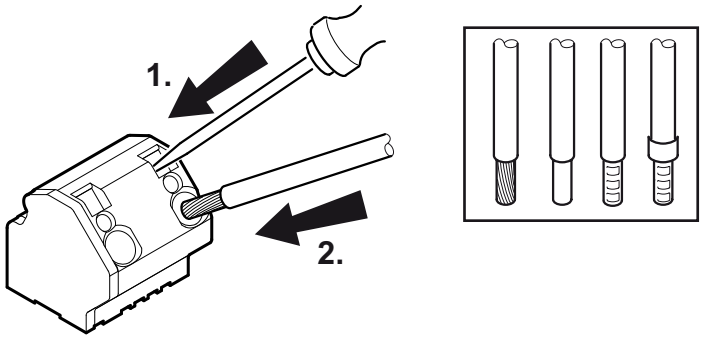
Observe the permitted cable cross sections for installation:

Control terminals X7	Without conductor end sleeve	With conductor end sleeve (without plastic collars)	With conductor end sleeves (with plastic collars)
Connection cross section (mm^2)	0.08 mm^2 – 2.5 mm^2		0.25 mm^2 – 1.5 mm^2
Connection cross section (AWG)	AWG 28 – AWG 14		AWG 23 – AWG 16
Stripping length	5 mm – 6 mm		
Current-carrying capacity	3.5 A (max. loop-through current)		

5.3.3 Terminal activation for the braking resistor

Adhere to the following sequence when activating the terminals for the braking resistor:

Terminals for the braking resistor (the following figure shows a schematic illustration)



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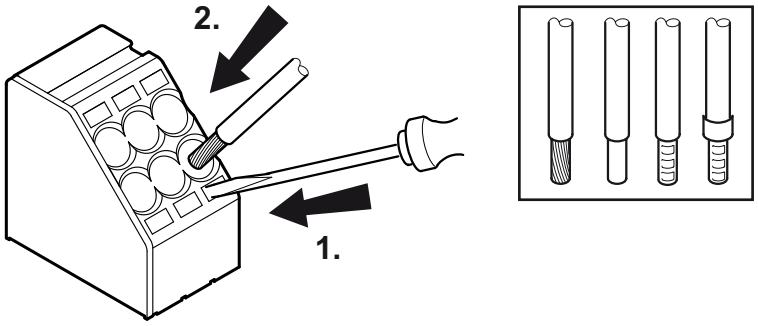
5.3.4 Line terminal actuation

Adhere to the following sequence when actuating the line terminals:

Line terminals (the following figure shows a schematic illustration)



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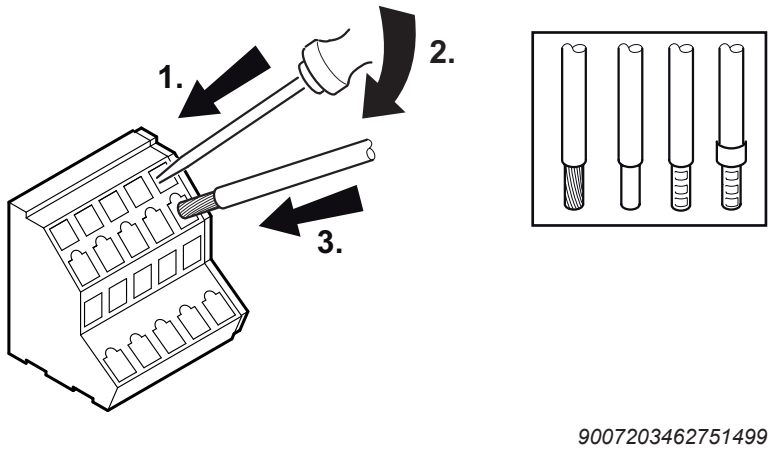
5.3.5 Control terminal actuation

Adhere to the following sequence when actuating the control terminals:

Control terminals (the following figure shows a schematic illustration)



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5.3.6 Residual current device

⚠ WARNING

No protection against electric shock if an incorrect type of residual current device is used.

Severe or fatal injuries.

- The product can cause direct current in the PE conductor. If a residual current device (RCD) or a residual current monitoring device (RCM) is used for protection in the event of a direct or indirect contact, only a type B RCD or RCM is permitted on the supply end of the product.

- If the use of a residual current device is not mandatory according to the standards, SEW-EURODRIVE recommends not to use a residual current device.

5.3.7 Line contactor

NOTICE

Damage to the DRC.. inverter when using the line contactor for jog mode.

Damage to the DRC.. inverter.

- Do not use the line contactor (see wiring diagram) for jog mode but only for switching on or off the inverter. Use the control commands for jog mode.
- Observe a minimum switch-off time of 2 s for the line contactor.

- Use only a contactor of utilization category AC-3 (EN 60947-4-1) as a line contactor.

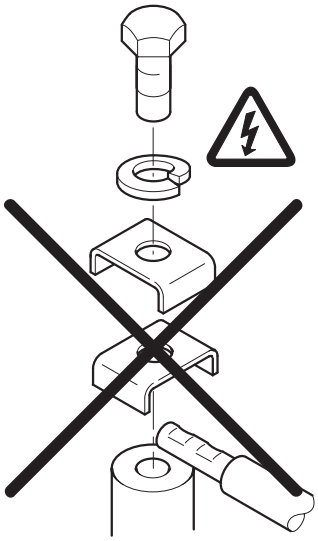
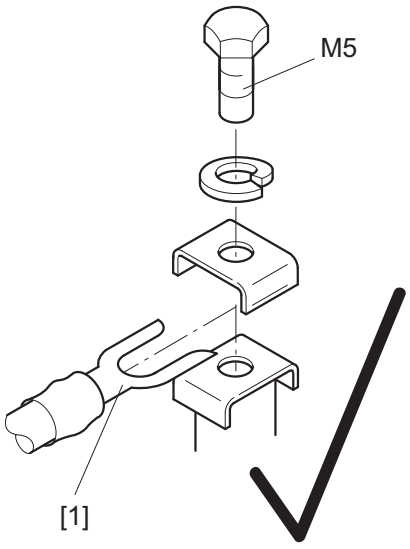
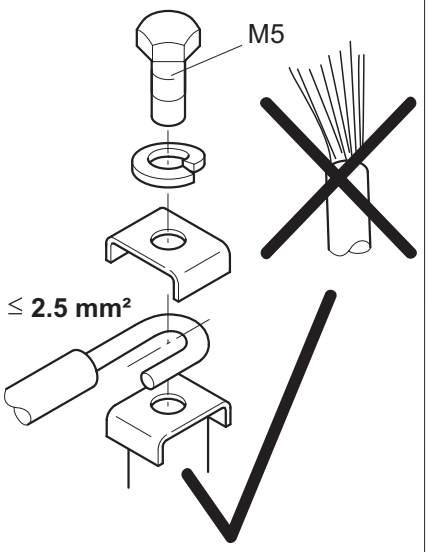
5.3.8 Notes on PE connection

⚠ WARNING

Electric shock due to incorrect connection of PE.

Severe or fatal injuries.

- The permitted tightening torque for the screw is 2.0 to 2.4 Nm (18 to 21 in-lbs).
- Observe the following notes regarding PE connection.

Impermissible assembly	Recommendation: Assembly with forked cable lug Permitted for all cross sections	Assembly with solid connecting wire Permitted for cross sections up to max. 2.5 mm²
	 9007201632429067	 9007201632413579

[1] Forked cable lug suitable for M5 PE screws

Leakage currents

Earth-leakage currents ≥ 3.5 mA can occur during normal operation. Observe the following notes to fulfill EN 61800-5-1:

- The protective earth (PE) connection must meet the requirements for systems with high earth-leakage currents.
- This usually means
  - installing a PE connection cable with a minimum cross section of 10 mm²
  - or installing a second PE connection cable in parallel with the original PE connection.

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5.3.9 Installation above 1000 m asl

Provided the following conditions are met, you can install DRC.. drive units at altitudes from 1000 m to a maximum of 4000 m above sea level.*)The maximum altitude is limited by the reduced electric strength due to the lower air density.

- The nominal continuous power is reduced due to the reduced cooling above 1000 m (see chapter "Technical data and dimension sheets").
- Above 2000 m above sea level, the air and creeping 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 unit for altitudes of 2000 m above sea level and higher (safe electrical disconnection in accordance with EN 61800-5-1).
- At installation altitudes between 2000 m and 4000 m above sea level, the permitted rated power supply voltages are reduced as follows:
  - By 6 V per 100 m

5.3.10 Protection devices

- DRC.. drive units are equipped with integrated protection devices against overload.
- Cable protection must be implemented using external overload devices.
- Observe the relevant standards concerning the cable cross section, voltage drop and installation type.

5.3.11 UL-compliant installation

INFORMATION

Due to UL requirements, the following chapter is always printed in English independent of the language of the publication.

Power terminals

Observe the following notes for UL-compliant installation:

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

Short circuit current rating

DRC1/2

Suitable for use on a circuit capable of delivering not more than 200,000 rms symmetrical amperes when protected by 600 V non-semiconductor fuses or 500 V minimum inverse time circuit breakers.

- DRC.., the max. voltage is limited to 500 V.

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DRC3/4

Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes when protected by 600 V non-semiconductor fuses or 500 V minimum inverse time circuit breakers.

- DRC.., the max. voltage is limited to 500 V.

DRC1/2/3/4

Suitable for motor group installation on a circuit capable of delivering not more than 5,000 rms symmetrical amperes when protected by maximum 40 A, 600 V non-semiconductor fuses or 500 V minimum 40 A maximum inverse time circuit breaker with an interrupting rating of 5 kA minimum.

- DRC.., 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.

The table below list the permitted maximum branch circuit protection:

Series	Non-semiconductor fuses	Inverse time circuit breakers
DRC..	40 A/600 V	500 V minimum/ 40 A maximum

Motor overload protection

DRC.. is 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.

Ambient temperature

DRC.. is suitable for an ambient temperature of 40 °C, max. 60 °C with derated output current. To determine the output current rating at temperatures above 40 °C, the output current should be derated by 3.0% per K between 40 °C and 60 °C.

An additional speed-dependent derating may be required. For details, refer to chapter "Technical data and dimension sheets".

Wiring diagrams

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

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5.4 Terminal assignment DRC1/2

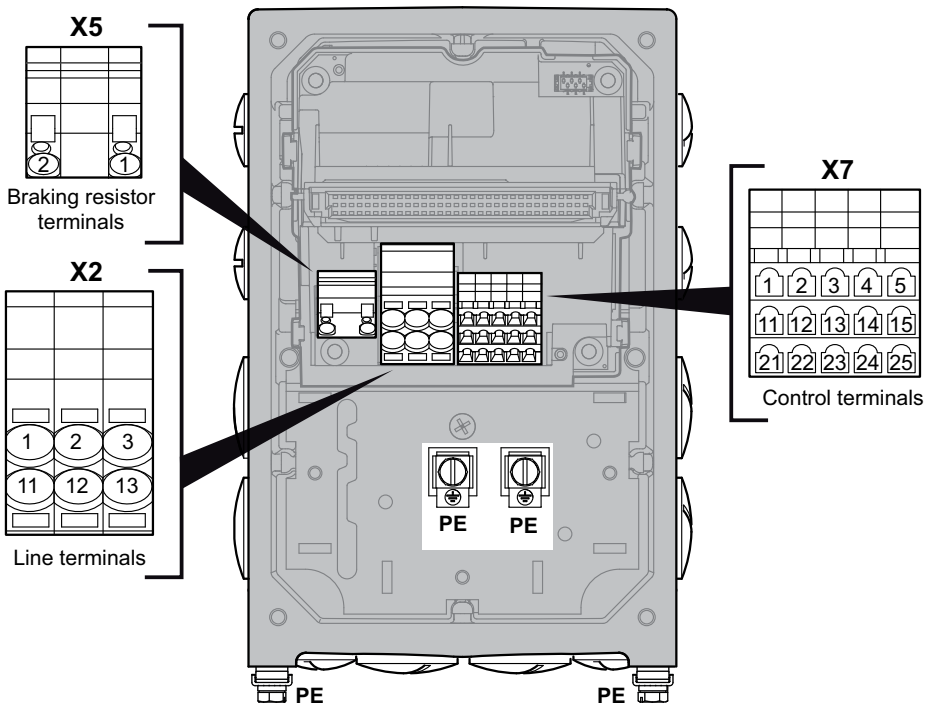
⚠ WARNING

Electric shock due to regenerative operation while the shaft is turning.

Severe or fatal injuries.

- Secure the output shaft against rotation when the electronics cover is removed.

The following figure shows the terminal assignment of DRC..-DBC:



9007203321401483

Assignment				
Terminal	**No.**	**Name**	**Marking**	**Function (permitted tightening torque)**
X2 line terminals	1	L1	Brown	Line connection phase L1 – IN
	2	L2	Black	Line connection phase L2 – IN
	3	L3	Gray	Line connection phase L3 – IN
	11	L1	Brown	Line connection phase L1 – OUT
	12	L2	Black	Line connection phase L2 – OUT
	13	L3	Gray	Line connection phase L3 – OUT
⏚	–	PE	–	Protective earth connection (2.0 to 3.3 Nm)
X5 braking resistor terminals	1	BR	–	Braking resistor connection
	2	BR	–	Braking resistor connection

Assignment				
Terminal	**No.**	**Name**	**Marking**	**Function (permitted tightening torque)**
X7 control terminals	1	STO+	Yellow	Input STO+
	2	STO-	Yellow	Input STO-
	3	K1a	–	Signal relay
	4	24V_O	–	DC 24 V output
	5	0V24_O	–	0 V 24 reference potential
	11	STO+	Yellow	Output STO+ (to loop through)
	12	STO-	Yellow	Output STO- (to loop through)
	13	K1b	–	Signal relay
	14	24V_O	–	DC 24 V output
	15	0V24_O	–	0 V 24 reference potential
	21	n.c.	–	Not assigned
	22	DI01	–	Digital input DI01
	23	DI02	–	Digital input DI02
	24	DI03	–	Digital input DI03
	25	DI04	–	Digital input DI04

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5.5 Terminal assignment DRC3/4

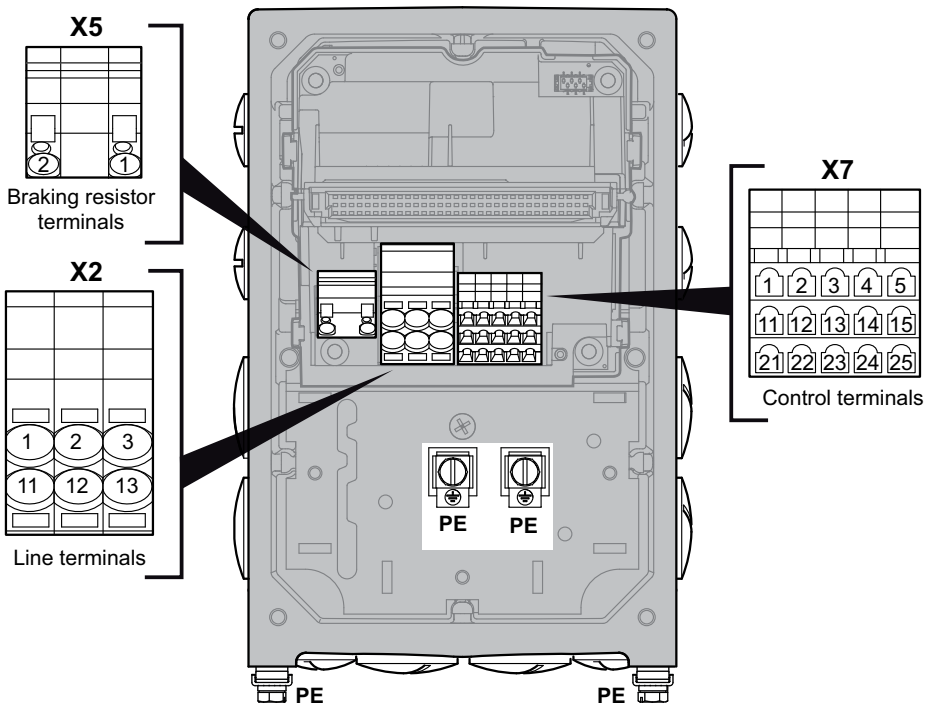
⚠ WARNING

Electric shock due to regenerative operation while the shaft is turning.

Severe or fatal injuries.

- Secure the output shaft against rotation when the electronics cover is removed.

The following figure shows the terminal assignment of DRC3-DBC:



8599749515

Assignment				
Terminal	**No.**	**Name**	**Marking**	**Function (permitted tightening torque)**
X2 line terminals	1	L1	Brown	Line connection phase L1 – IN
	2	L2	Black	Line connection phase L2 – IN
	3	L3	Gray	Line connection phase L3 – IN
	11	L1	Brown	Line connection phase L1 – OUT
	12	L2	Black	Line connection phase L2 – OUT
	13	L3	Gray	Line connection phase L3 – OUT
⏚	–	PE	–	Protective earth connection (2.0 to 3.3 Nm)
X5 braking resistor terminals	1	BR	–	Braking resistor connection
	2	BR	–	Braking resistor connection

Assignment				
Terminal	**No.**	**Name**	**Marking**	**Function (permitted tightening torque)**
X7 control terminals	1	STO+	Yellow	Input STO+
	2	STO-	Yellow	Input STO-
	3	K1a	–	Signal relay
	4	24V_O	–	DC 24 V output
	5	0V24_O	–	0 V 24 reference potential
	11	STO+	Yellow	Output STO+ (to loop through)
	12	STO-	Yellow	Output STO- (to loop through)
	13	K1b	–	Signal relay
	14	24V_O	–	DC 24 V output
	15	0V24_O	–	0 V 24 reference potential
	21	n.c.	–	Not assigned
	22	DI01	–	Digital input DI01
	23	DI02	–	Digital input DI02
	24	DI03	–	Digital input DI03
	25	DI04	–	Digital input DI04

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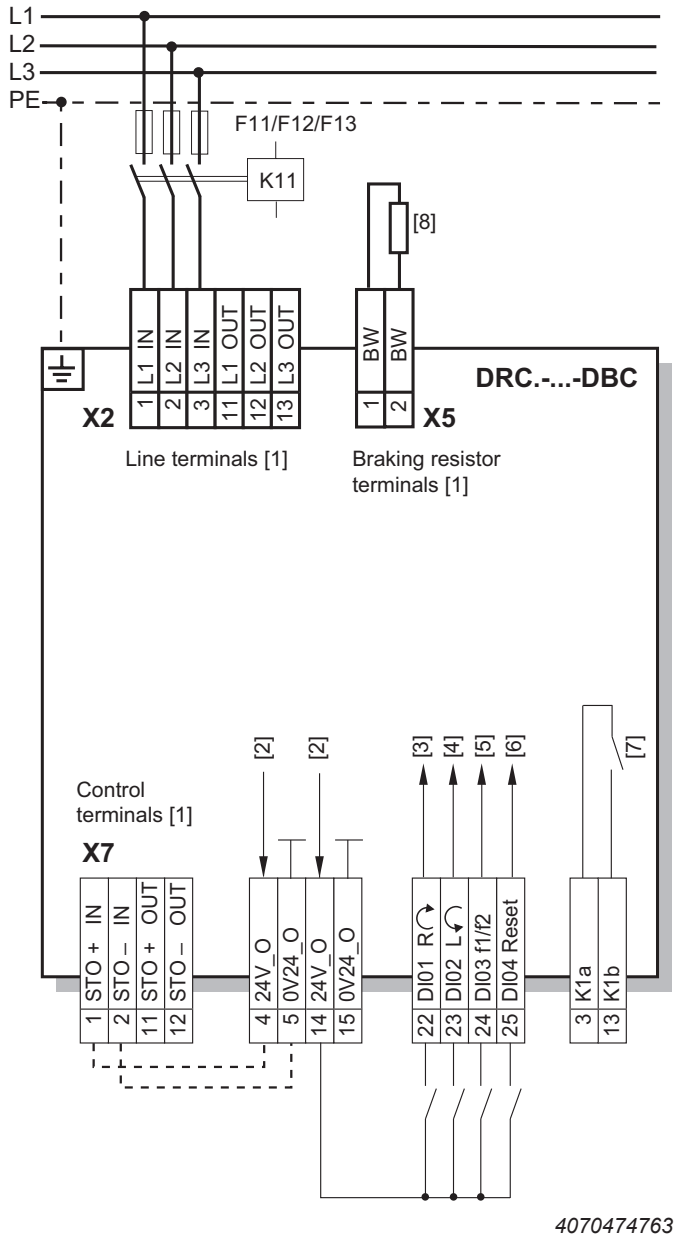
5.6 Connecting the DRC.. drive unit

⚠ WARNING

No safety-related disconnection of the DRC.. drive unit.

Severe or fatal injuries.

- Do not use the 24 V output (terminals 4, 5, 14, 15) for safety-related applications with DRC.. drive units.
- You may only jumper the STO input with 24 V when the DRC.. drive unit is not used to fulfill a safety function.



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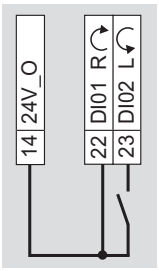
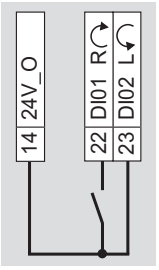
Functions of the terminals CW/stop and CCW/stop (with factory setting):

Direction of rotation **CW** active

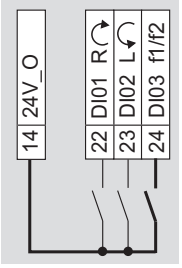


Direction of rotation **CCW** active

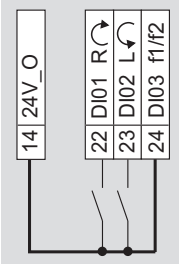


Functions of terminals f1/f2:

Setpoint **f1** active



Setpoint **f2** active



[1] See chapter "Terminal assignment"

[2] Integrated 24 V supply

[3] CW/stop

[4] CCW/stop

[5] Setpoint changeover f1/f2

[6] Fault reset

[7] Signal relay (contact closed = ready for operation)

[8] Braking resistor connection

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5.7 Cable routing and cable shielding

5.7.1 Accessory bag with installation equipment (part number 18248268)

INFORMATION

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

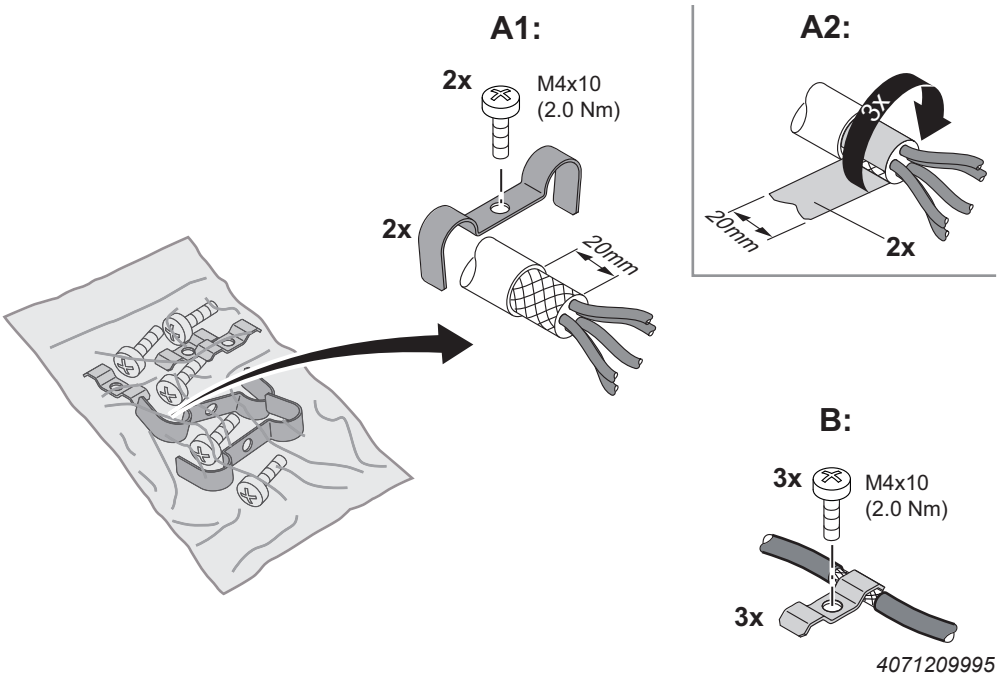
The delivery of each DRC.. drive unit includes the following accessory bag with installation materials for cable shielding (exception: Does not apply when all possible connections were ordered in plug connector design):

- **A1: Installation material for line cables and hybrid cables:**

  2 x shield clamps and screws (self cutting, which is why the holes in the connection box do not have a thread) to connect the shield of line cables or hybrid cables (outer shield).
- **A2: Conductive film:**

  2 x pieces of conductive film to wind around the braid shield. Use the conductive film if required.
- **B: Installation material for control cables and data cables:**

  3 x shield clamps with screws (self cutting, which is why the holes in the connection box do not have a thread) to connect the shield of control cables or data cables (STO, CAN, binary signals).



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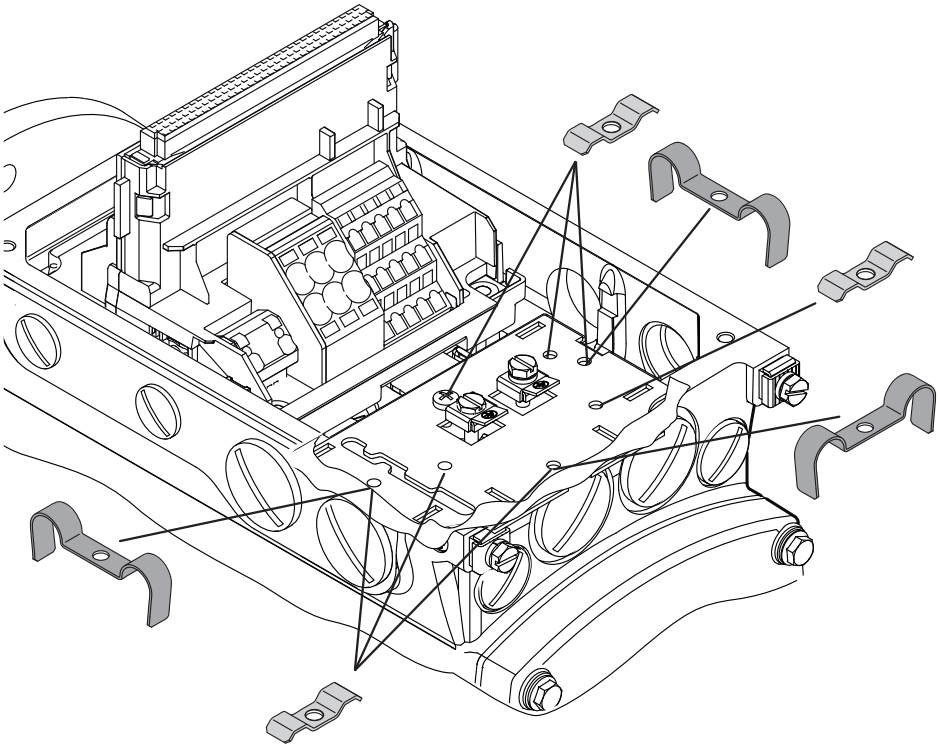
5.7.2 Basic mounting options for DRC1/2

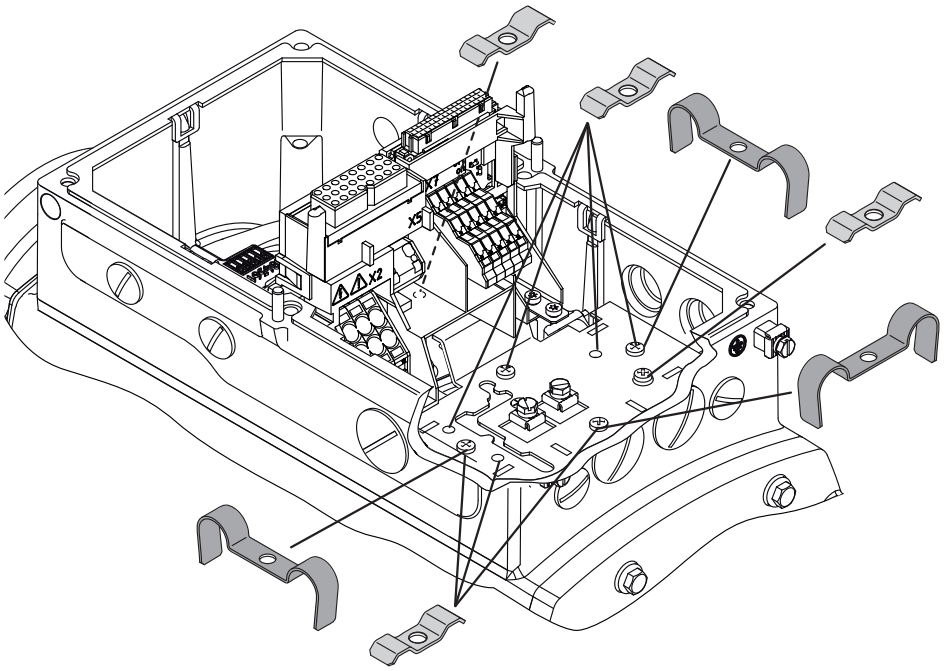
The following figure shows the possible mounting options for the DRC1/2 electronics motor. The following chapters show common examples and contain important notes on cable selection and routing.



18014402580944523

5.7.3 Basic mounting options for DRC3/4

The following figure shows the possible mounting options for the DRC3/4 electronics motor. The following chapters show common examples and contain important notes on cable selection and routing.



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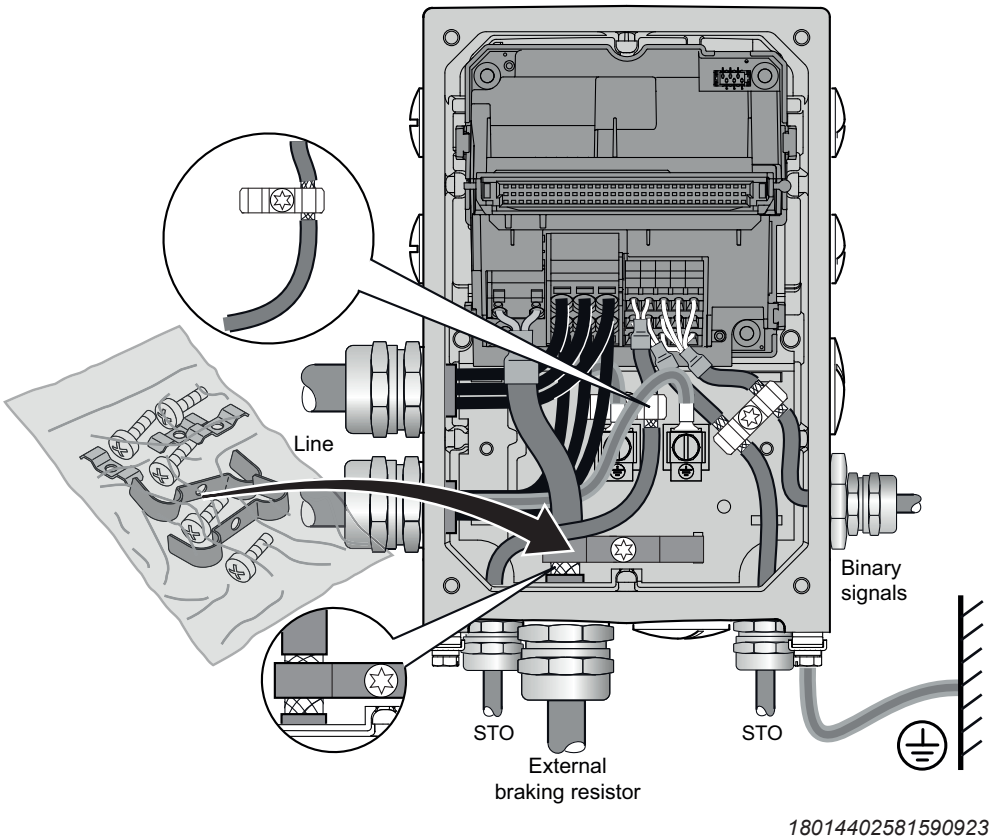
5.7.4 Notes on cable routing and shielding

Note the following when routing and shielding the cables:

- Cable selection
  - You can use unshielded cables for the supply system connection.
  - Control cables must be shielded. Route them separately from cables that emit interference (e.g. control cables of solenoid valves, motor leads).
  - Use shielded cables for the optional external braking resistor.
  - The shield must have good EMC properties (high shield attenuation) and must not be used for mechanical protection of the cable.
- Cable shield – External braking resistor
  - Connect the cable shield of the cable for an external braking resistor to the metal housing of the unit using the shield clamps of the installation material kit. To do so, strip off the cable sheath around the shield connection surface.
- Cable shielding – Control cables
  - Connect the shields of the control cables to the metal housing of the unit using the shield clamps of the installation material kit. To do so, strip off the cable sheath around the shield connection surface.
  - As an alternative, you can use optionally available EMC cable glands to connect the shield of control cables, see chapter "EMC cable glands".
- Observe the permitted bending radii of the installed cables for cable routing.

Recommended cable routing for DRC1/2

The following figure shows the recommended cable routing:



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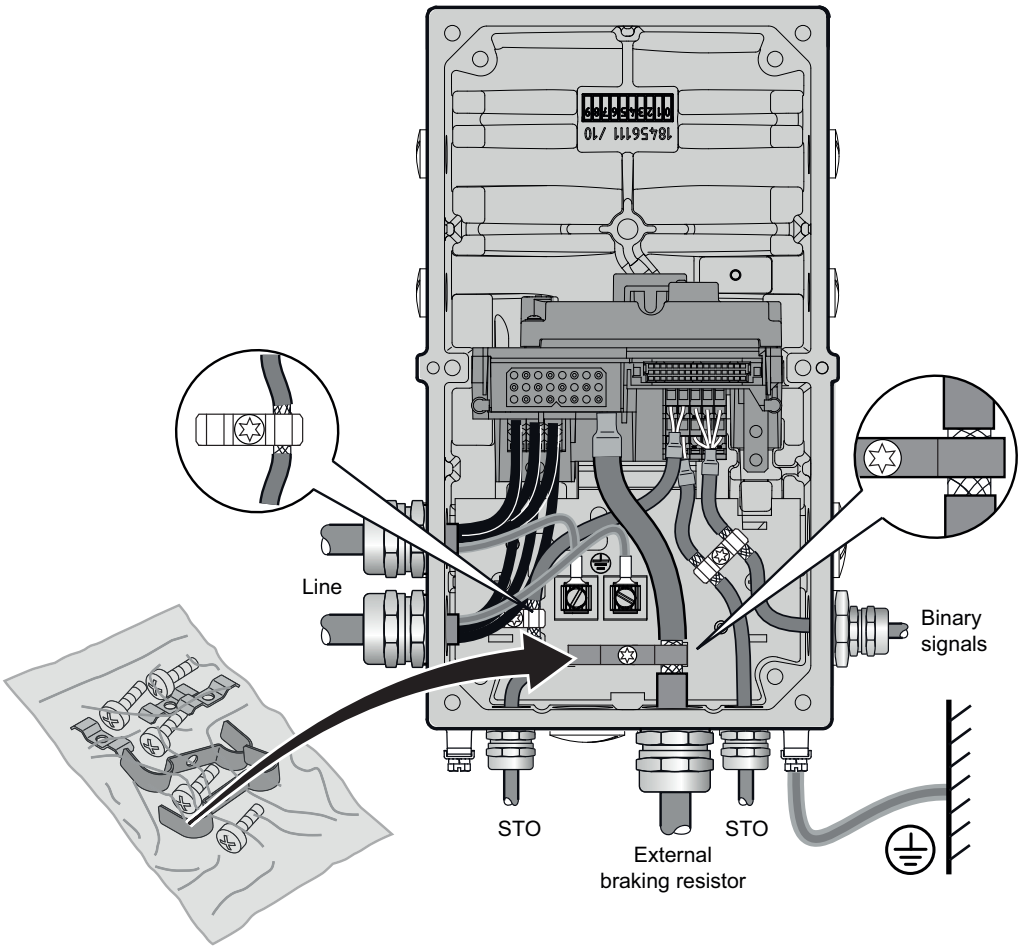
Recommended cable routing for DRC3/4

The following figure shows the recommended cable routing:



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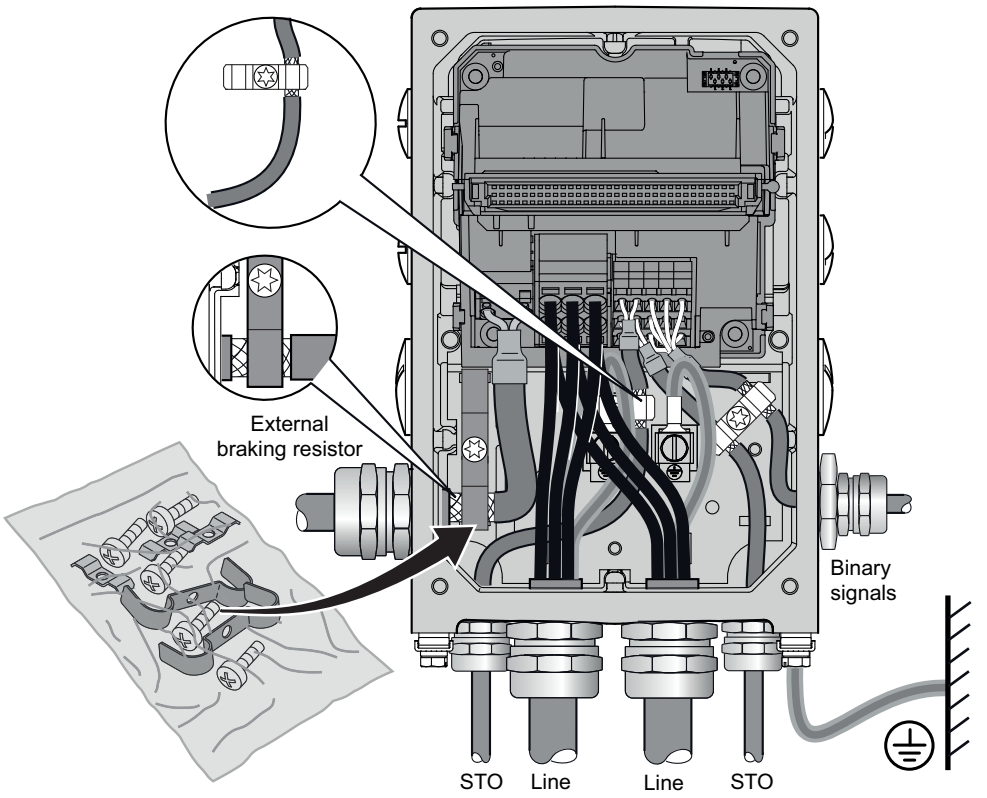
Alternative cable routing for DRC1/2

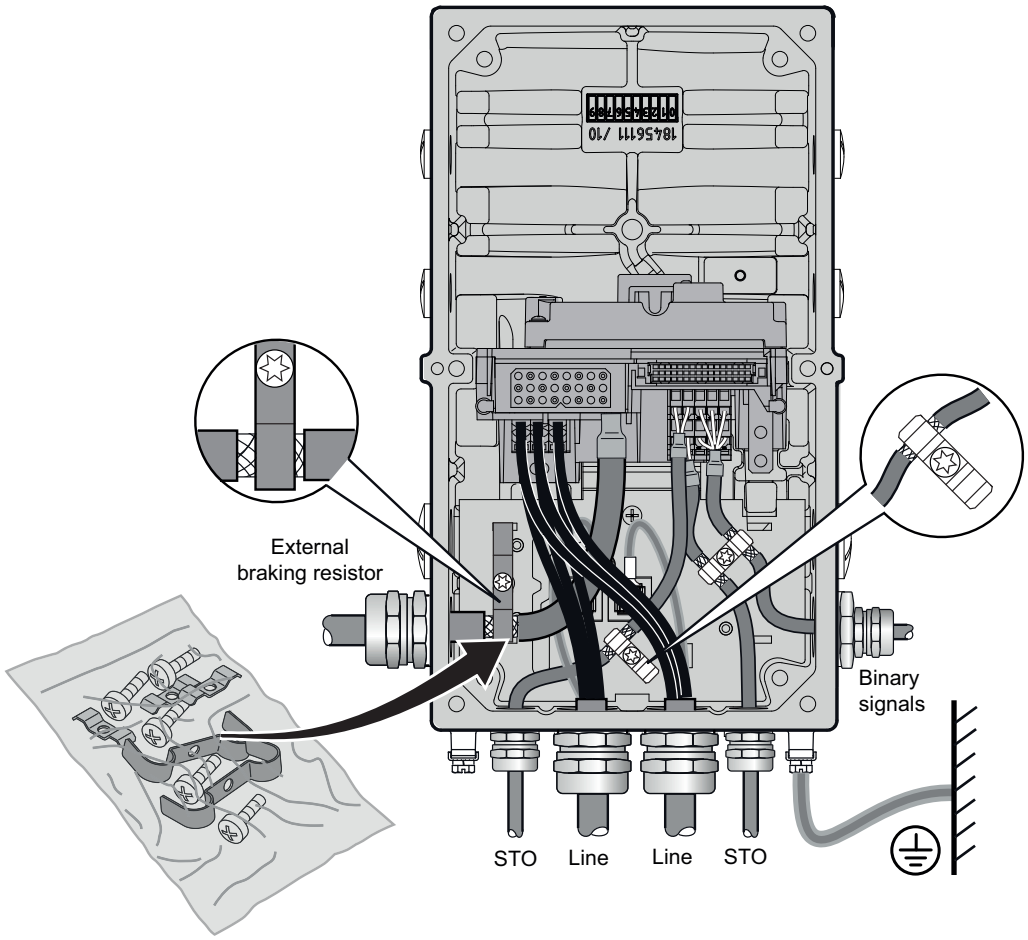
The following figure shows alternative cable routing:



18014402581671435

Alternative cable routing for DRC3/4

The following figure shows alternative cable routing:

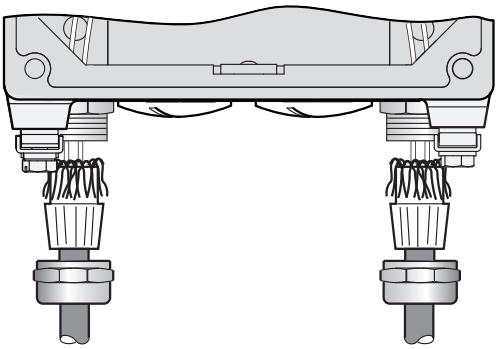


8921300619

5.8 EMC cable glands

5.8.1 Cable shielding (alternative) – Control cables

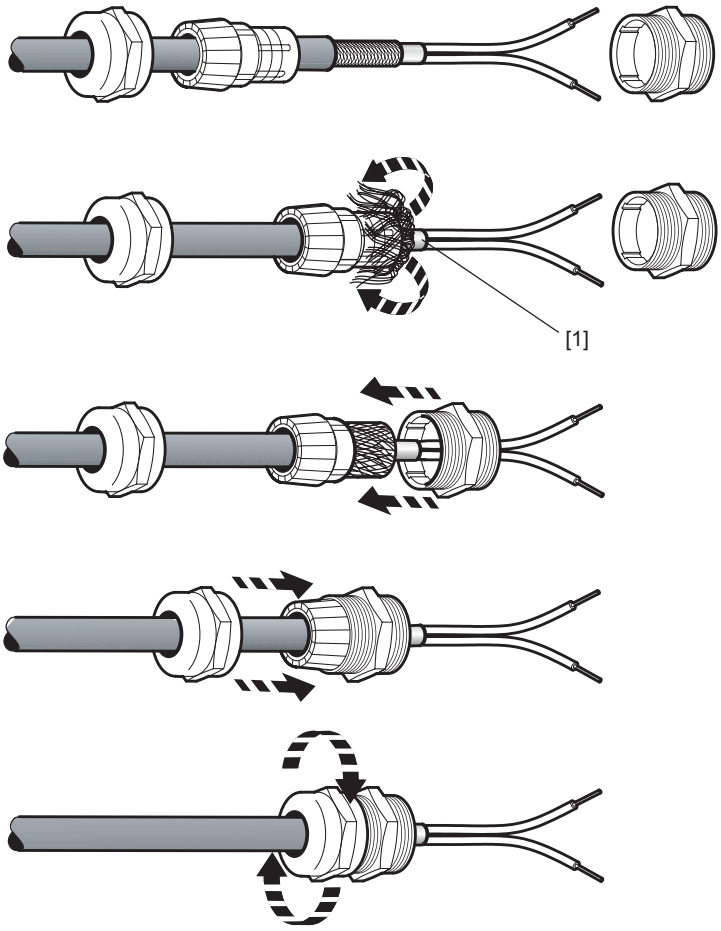
As an alternative to using shield clamps for control cables (STO, binary signals), you can use optionally available EMC cable glands to connect the shield.



3388566411

5.8.2 Assembly of EMC cable glands

Fit the EMC screw fittings supplied by SEW-EURODRIVE according to the following picture:



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

5.9 Plug connectors

The wiring diagrams of the plug connectors depict the contact end of the connection.

5.9.1 Designation key

The designation of plug connectors is specified according to the following key:

X	**Terminal**
2	**Group** 1 = Power input 2 = Power output 3 = Encoder 4 = Bus 5 = Inputs and outputs
01	**Function** Function of the plug connector within a group
2	**Type** Wiring diagram of the plug connector within a function
–	
	Group number (optional) For several plug connectors with the same function
	Sequence number (optional) For several plug connectors in a group

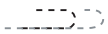
5.9.2 Connection cables

Connection cables are not included in the delivery.

You can order prefabricated cables from SEW-EURODRIVE. They are described in the following sections. Specify the part number and length of the required cable in your order.

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

The following figures show the various cable types:

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

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Cable routing

Observe the permitted bending radii of the installed cables for cable routing. For detailed information, refer to chapter "Technical data/Dimension sheets/Plug connectors including mating connectors".

Using prefabricated cables with plug connectors

SEW-EURODRIVE uses prefabricated cables for certifications, type tests and approval of the devices. The cables provided by SEW-EURODRIVE fulfill all requirements necessary to ensure that the device and all connected components function properly. The devices under consideration are always the basic devices including all connected components and corresponding connection cables.

This is why SEW-EURODRIVE recommends to use only the prefabricated cables specified in the documentation.

When using devices with integrated safety functions according to EN ISO 13849, you also have to adhere to all the conditions and requirements for the installation and routing of cables described in the documentation for the devices concerning functional safety.

Using third-party cables with plug connectors

If third-party cables are used – even if these cables are technically adequate – SEW-EURODRIVE does not accept any liability and cannot guarantee device properties or functions.

When using third-party cables to connect the device and/or device components, make sure to comply with all applicable national regulations. Note that the technical features of the device or system of devices might be affected inadvertently when using non-SEW cables. This concerns in particular the following properties:

- Mechanical properties (e.g. IP degree of protection, cable carrier suitability)
- Chemical properties (e.g. silicone and halogen free, resistance to substances)
- Thermal properties (e.g. thermal stability, increase in device temperature, flammability class)
- EMC behavior (such as interference emission limit values, compliance with interference immunity values stipulated in standards)
- Functional safety (approvals according to EN ISO 13849-1)

Third-party cables not explicitly recommended by SEW-EURODRIVE must meet at least the requirements of the following standards and have been permitted according to these plug connector standards:

- IEC 60309
- IEC 61984

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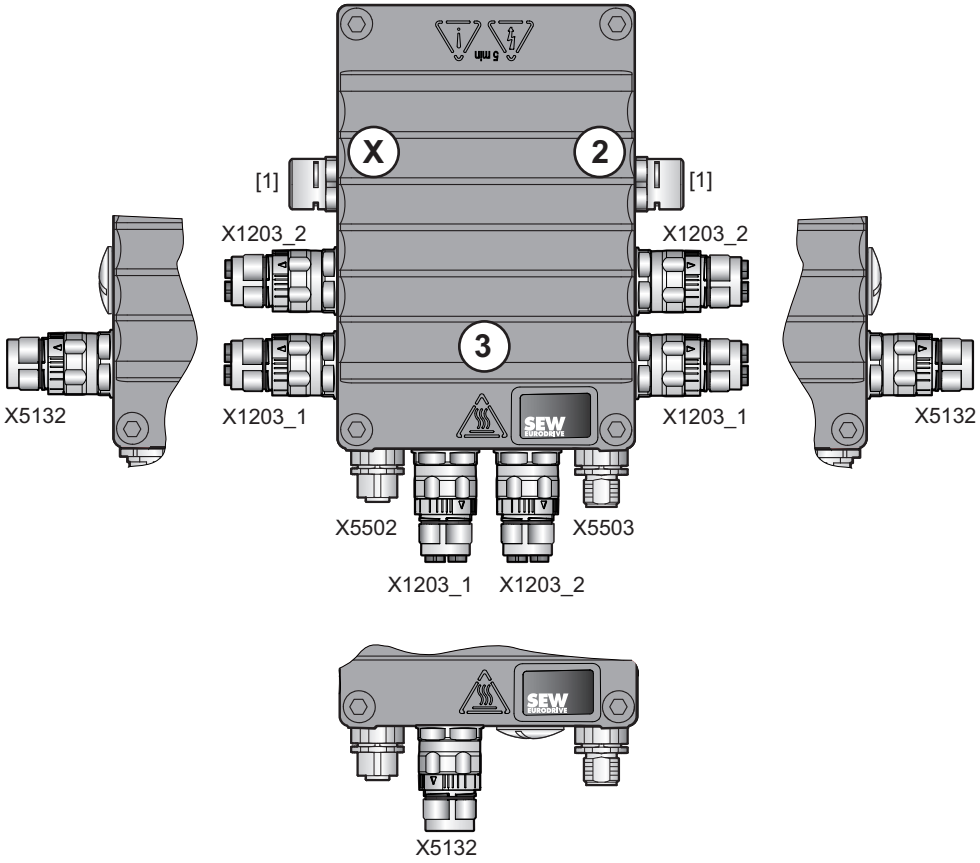
5.9.3 Plug connector positions

The following figure shows possible plug connector positions:



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Plug connector	Position
X5132: Digital inputs/outputs	X, 2 or 3 not together at a position with: X1203_1, X1203_2
X5502 (orange) STO[1)]	3 (left)
X5503 (orange) STO[1)]	3 (right)
X1203_1 (black) AC 400 V connection [2)]	X, 2 or 3 not together at a position with: 5132
X1203_2 (black) AC 400 V connection	Always corresponds to the selection of X1203_1
[1] Optional pressure compensation	Depending on mounting position

1) Plug connectors X5502 and X5503 can only be ordered together.

2) Plug connector X1203_1 is also available separately (i.e. without plug connector X1203_2).

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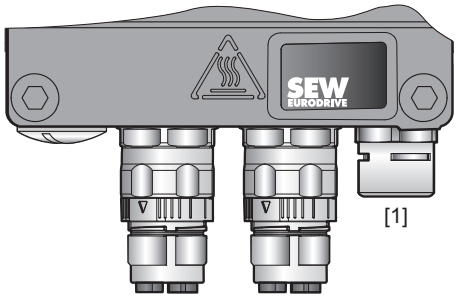
5.9.4 Restrictions in conjunction with pressure compensation

In connection with optional pressure compensation and mounting positions M5 and M6, the position for STO plug connectors is occupied by the pressure compensation fitting [1]. In this case, plug connectors for STO are not possible:



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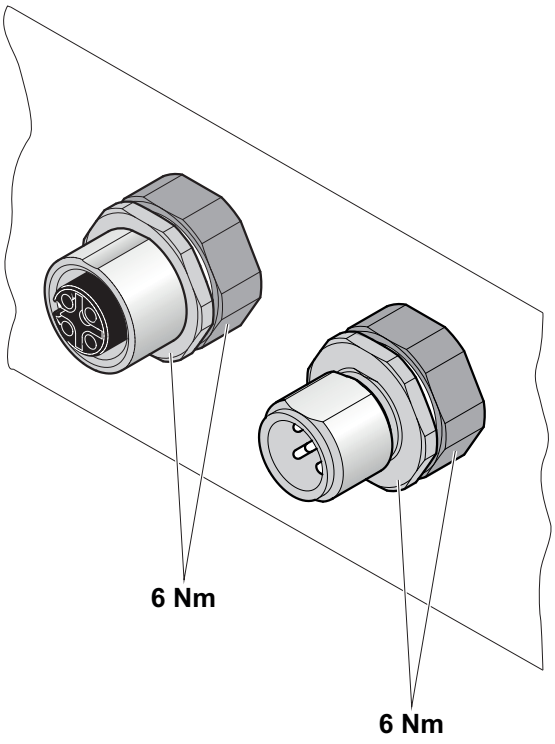
5.9.5 Plug connector variant

M12 plug connectors

M12 plug connectors are delivered so they match the connection cables provided by SEW-EURODRIVE. Customers can adjust the orientation of plug connectors if required.

The following figure shows a schematic illustration with the permitted tightening torques:



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M23 plug connectors

⚠ CAUTION

Possible damage of the right-angle connector when rotated without mating connector.

Irreparable damage to the thread, damage to the sealing surface.

- Do not use pliers to adjust the right-angle connector before connecting it.

⚠ CAUTION

Loss of the guaranteed degree of protection.

Potential damage to property.

- Remove the union nut from the M23 plug connector using 3 Nm.
- Between plug connector and bushing is a gap of 2 mm.

⚠ CAUTION

Adjusting the right-angle connector too often can damage it.

Potential damage to property.

- Adjust the plug connector only when installing and connecting the drive unit.
- Do not turn the plug connector regularly once it has been installed.

M23 plug connectors are available in the following variants:

- [1] "Straight" plug connector
- [2] "Right-angle" plug connector

Once the mating connector has been plugged in, the "right-angle" connector can be adjusted without using additional tools.

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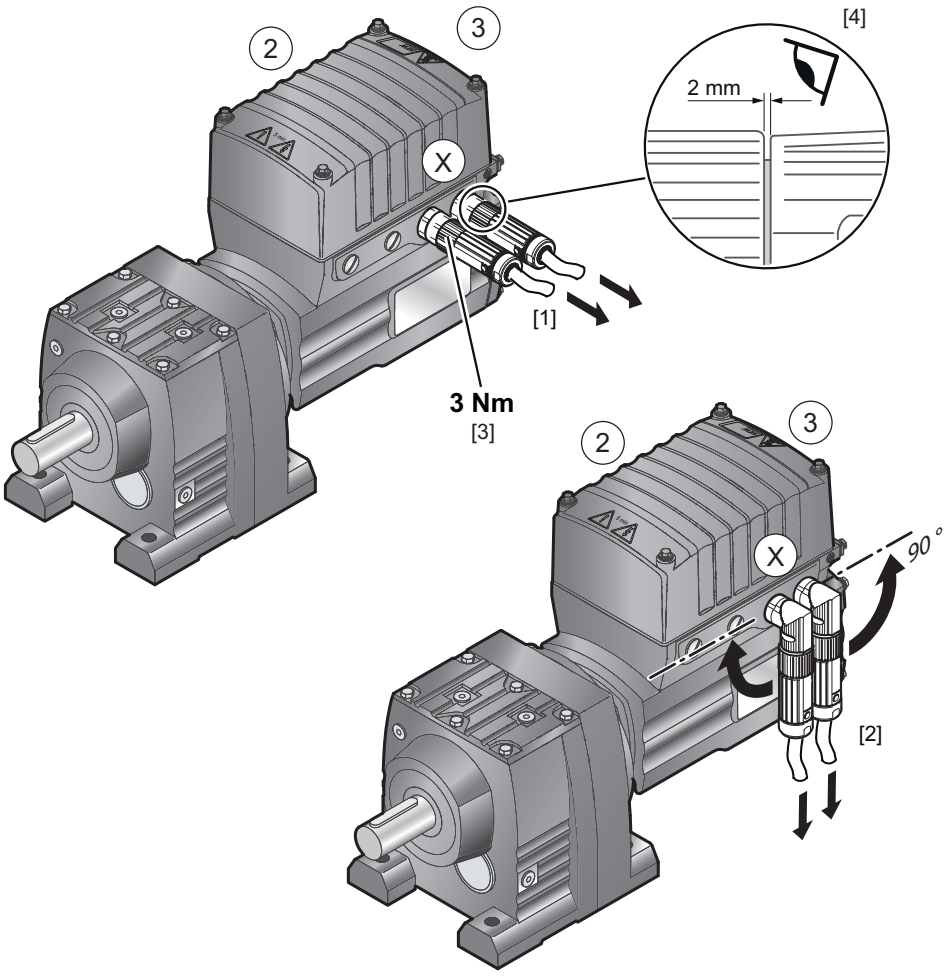
Example: DRC..

INFORMATION

The plug connector option "right-angle" cannot be used with DRC1 to DRC4 electronic motors in connection with plug connector position 3.



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[1] "Straight" design
[2] "Angled" design
[3] Tightening torque 3 Nm
You can order suitable tools from Intercontec using the following order number:
- Socket wrench 3 Nm, 1/4" external square driver: C1.020.00
- Hook wrench 1/4" square socket, suitable to the 923/723 series with SpeedTec equipment: C6.216.00

[4] There is a gap of 2 mm between plug connector and socket

5.9.6 Using plug connectors assembled by yourself

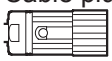
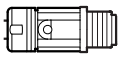
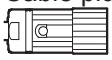
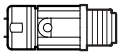
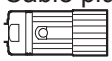
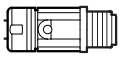
INFORMATION

The power and hybrid plug connectors for assembling connection cables yourself, and the corresponding assembly tool set is available for order from Intercontec.

Contact Intercontec if the order designation is not available in the online order system of Intercontec.

Order information

The table below shows the order designations for Intercontec connectors with the matching coding for assembly by the customer:

Connector type		Designation for ordering from supplier Intercontec
DBC/DAC/DSC **Coding ring: Black**	Cable plug (male) 	H 51 A 019 MR 02 59 0102 000
	Cable socket (female) 	H 52 A 013 FR 02 59 0102 000
SNI **Coding ring: Red**	Cable plug (male) 	H 51 A 031 MR 02 42 0103 000
	Cable socket (female) 	H 52 A 025 FR 02 59 0103 000
DSC hybrid **Coding ring: Violet**	–	Not intended for assembly by customer.
DSC/SNI hybrid+STO **Coding ring: Yellow**	Cable plug (male) 	H 51 A 613 MR 18 59 0110 007
	Cable socket (female) 	H 52 A 613 FR 18 59 0110 007

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5.10 Optional plug connector assignment

⚠ WARNING

Electric shock due to connecting or disconnecting plug connectors when voltage is applied.

Severe or fatal injuries.

- Switch off the line voltage.
- Never plug or unplug plug connectors while they are energized.

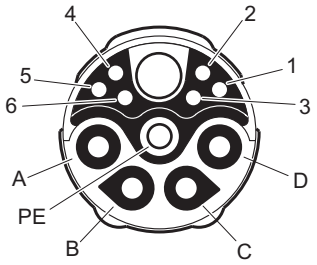
5.10.1 X1203_1 and X1203_2: AC 400 V connection

The following table shows information about this connection:

Function
AC 400 V connection for supplying the unit/for looping through

Connection type
M23, SEW insert, SpeedTec-capable, company Intercontec, female, coding ring: black, protected against contact

Wiring diagram



Assignment

No.	Name	Function
A	L1	Line connection phase L1
B	L2	Line connection phase L2
C	L3	Line connection phase L3
D	n.c.	Not connected
PE	PE	PE connection
1	Res.	Reserved
2	Res.	Reserved
3	Res.	Reserved
4	Res.	Reserved
5	Res.	Reserved
6	Res.	Reserved

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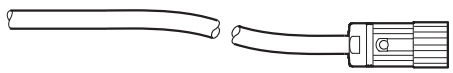
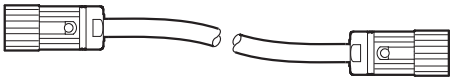
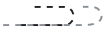
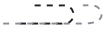
Connection cables

The following tables list the cables available for this connection:

Cable cross section 1.5 mm²

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 Open — M23, coding ring: black, male	CE: 18180094	HELUKABEL® JZ-600	Variable 	1.5 mm² / AC 500 V

Cable cross section 2.5 mm²

Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 M23, coding ring: black, male — M23, coding ring: black, male	CE: 18127460	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	2.5 mm² / AC 500 V
	CE: 18133959	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	
	UL: 18153267	HELUKABEL® – JZ-602	Variable 	
	UL: 18153275	HELUKABEL® MULTIFLEX® – 512	Variable 	

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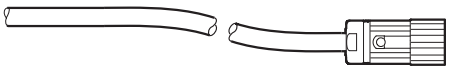
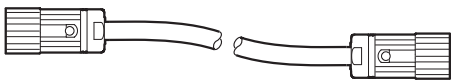
Connection cable		Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
		CE: 18127479	HELUKABEL® TOPFLEX® – 600-PVC	Variable	2.5 mm² / AC 500 V
Open	M23, coding ring: black, male	CE: 18133967	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable	
		UL: 18153283	HELUKABEL® – JZ-602	Variable	
		UL: 18153291	HELUKABEL® MULTIFLEX® – 512	Variable	

Cable cross section 4 mm²

Connection cable		Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
		CE: 18127487	HELUKABEL® TOPFLEX® – 600-PVC	Variable	4 mm² / AC 500 V
M23, coding ring: black, male	M23, coding ring: black, male	CE: 18133975	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable	
		UL: 18153305	HELUKABEL® – JZ-602	Variable	
		UL: 18153313	HELUKABEL® MULTIFLEX® – 512	Variable	

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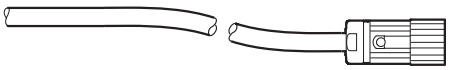
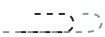
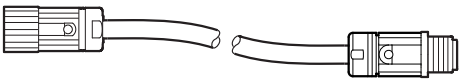
Connection cable	Conformity/ part number	Cable type	Length/installation type	Cable cross section/operating voltage
 Open — M23, coding ring: black, male	CE: 18127495	HELUKABEL® TOPFLEX® – 600-PVC	Variable 	4 mm² / AC 500 V
	CE: 18133983	HELUKABEL® TOPFLEX® – 611-PUR (halogen-free)	Variable 	
	UL: 18153321	HELUKABEL® – JZ-602	Variable 	
	UL: 18153348	HELUKABEL® MULTIFLEX® – 512	Variable 	
 M23, coding ring: black, male — M23, coding ring: black, female	UL: 18166318	HELUKABEL® MULTIFLEX® – 512	Variable	4 mm² / AC 500 V

Connection of cables with open end

The following table shows the conductor assignment of cables with the following part numbers:

Part number	Signal name	Color coding	Identification
18180094	L1	Black	1
18127479	L2	Black	2
18133967	L3	Black	3
18153283 18153291 18127495 18133983 18153321 18153348	PE	Green/yellow	–

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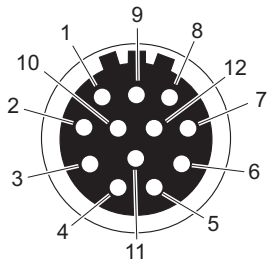
5.10.2 X5132: Digital inputs/outputs

The following table shows information about this connection:

Function
Digital inputs/outputs for DRC..

Connection type
M23, P insert, 12-pin, SpeedTec-capable, Intercontec, female, 0° coded

Wiring diagram



Assignment		
No.	**Name**	**Function**
1	DI01	Digital input DI01
2	DI02	Digital input DI02
3	DI03	Digital input DI03
4	DI04	Digital input DI04
5	Res.	Reserved
6	K1a	Signal relay K1a
7	K1b	Signal relay K1b
8	+24V_O	DC 24 V output
9	0V24_O	0V24 reference potential
10	Res.	Reserved
11	Res.	Reserved
12	FE	Equipotential bonding / functional earth

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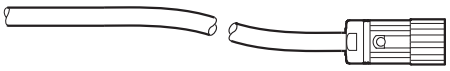
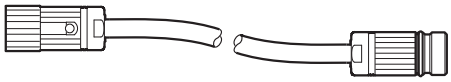
Connection cables

The following table provides an overview of the cables available for this connection:

Connection cable	Conformity/part number	Length/installation type	Operating voltage
 Open — M23, 12-pin, 0° coded, male	CE/UL: 11741457	Variable	DC 60 V
 M23, 12-pin, 0° coded, male — M23, 12-pin, 0° coded, female	CE/UL: 18123465	Variable (max. 30 m)	DC 60 V

Connection of cables with open end

The following table shows the conductor assignment of cables with the following part numbers:

Part number	Signal name	Color coding
11741457	DI01	Pink
	DI02	Gray
	DI03	Red
	DI04	Blue
	Reserved	Yellow
	K1a	Green
	K1b	Violet
	+24V_O	Black
	0V24_O	Brown
	Reserved	White
	Reserved	Gray/pink
	FE	Red/blue

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5.10.3 X5502: STO

⚠ WARNING

No safe disconnection of the DRC.. drive unit.

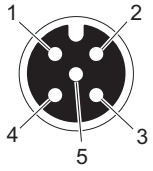
Severe or fatal injuries.

- Do not use the 24 V output (pins 1 and 3) for safety-related applications with DRC.. drive units.
- You may only jumper the STO connection with 24 V when the DRC.. drive unit is not used to fulfill any safety functions.

The following table shows information about this connection:

Function
Connection for safe disconnection (STO)

Connection type
M12, 5-pin, female, A-coded

Wiring diagram


Assignment		
No.	**Name**	**Function**
1	+24V_O	DC 24 V output
2	STO-	STO- connection
3	0V24_O	0V24 reference potential
4	STO+	STO+ connection
5	Res.	Reserved

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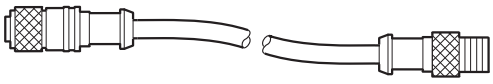
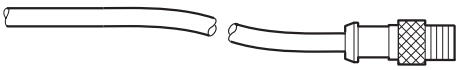
Connection cables

INFORMATION

Use only shielded cables for this connection and only appropriate plug connectors that connect the shield with the unit in an HF-compatible manner.

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/in-stallation type	Cable cross section/ operating voltage
 M12, 5-pin, A-coded, female — M12, 5-pin, A-coded, male	CE: 18124968	LEONI BETAflam® – 145C-flex	Variable	2 × 0.75 mm² / DC 60 V
	CE/UL: 18147402	HELU-KABEL® SUPER-PAAR-TRONIC 340-C-PUR	Variable	
 Open — M12, 5-pin, A-coded, male	CE: 18124976	LEONI BETAflam® – 145C-flex	Variable	2 × 0.75 mm² / DC 60 V
	CE/UL: 18147690	HELU-KABEL® SUPER-PAAR-TRONIC 340-C-PUR	Variable	
 M12, 5-pin, A-coded, female — Open	CE/UL: 18164390	HELU-KABEL® SUPER-PAAR-TRONIC 340-C-PUR	Variable	2 × 0.75 mm² / DC 60 V

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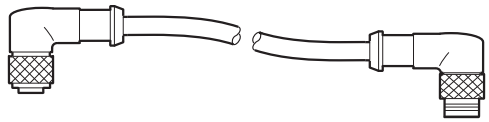
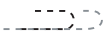
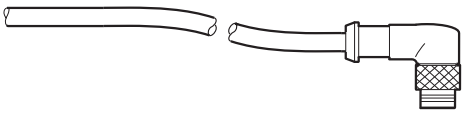
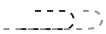
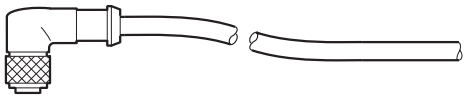
Connection cable	Conformity/ part number	Cable type	Length/in-stallation type	Cable cross section/ operating voltage
 M12, 5-pin, A-coded, female — M12, 5-pin, A-coded, male	CE: 18127401	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V
	CE/UL: 18147704	HELU-KABEL® SUPER-PAAR-TRONIC 340-C-PUR	Variable 	
 Open — M12, 5-pin, A-coded, male	CE: 18127398	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V
	CE/UL: 18153445	HELU-KABEL® SUPER-PAAR-TRONIC 340-C-PUR	Variable 	
 M12, 5-pin, A-coded, female — Open	CE: 18164315	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V

Connection of cables with open end

The following table shows the conductor assignment of the cables with the following part numbers:

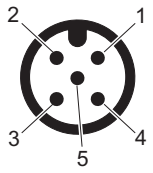
Part number	Signal name	Conductor color	Identification
18124976	STO-	Black	1
18147690 18164390 18127398 18153445 18164315	STO+	Black	2

5.10.4 X5503: STO

The following table shows information about this connection:

Function
Connection for safe disconnection (STO)

Connection type
M12, 5-pin, male, A-coded

Wiring diagram


Assignment		
No.	**Name**	**Function**
1	Res.	Reserved
2	STO-	STO- connection
3	Res.	Reserved
4	STO+	STO+ connection
5	Res.	Reserved

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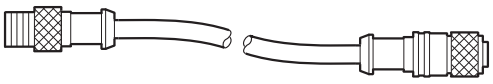
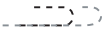
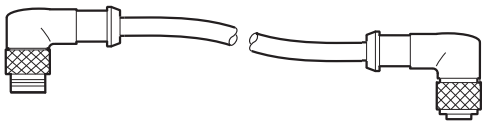
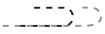
Connection cables

INFORMATION

Use only shielded cables for this connection and only appropriate plug connectors that connect the shield with the unit in an HF-compatible manner.

The following table shows the cables available for this connection:

Connection cable	Conformity/ part number	Cable type	Length/in-stallation type	Cable cross section/ operating voltage
 M12, 5-pin, A-coded, male — M12, 5-pin, A-coded, female	CE: 18124968	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V
	CE/UL: 18147402	HELU-KABEL® SUPER-PAAR-TRONIC 340-C-PUR	Variable 	
 M12, 5-pin, A-coded, male — M12, 5-pin, A-coded, female	CE: 18127401	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V
	CE/UL: 18147704	HELU-KABEL® SUPER-PAAR-TRONIC 340-C-PUR	Variable 	

5.10.5 STO jumper plug

⚠ WARNING

Safe disconnection of the DRC.. drive unit is not possible when the STO jumper plug is used.

Severe or fatal injuries.

- You may only use the STO jumper plug when the DRC.. drive unit does not fulfill any safety function.

⚠ WARNING

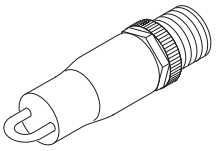
Deactivation of safety-related disconnection of other drive units due to parasitic voltages when using an STO jumper.

Severe or fatal injuries.

- You may only use the STO jumper when all incoming and outgoing STO connections have been removed from the drive unit.

The STO jumper plug can be connected to the STO plug connector X5502 of DRC... The STO jumper plug deactivates the safety functions of the DRC.. drive unit.

The following figure shows the STO jumper plug, part number 11747099:



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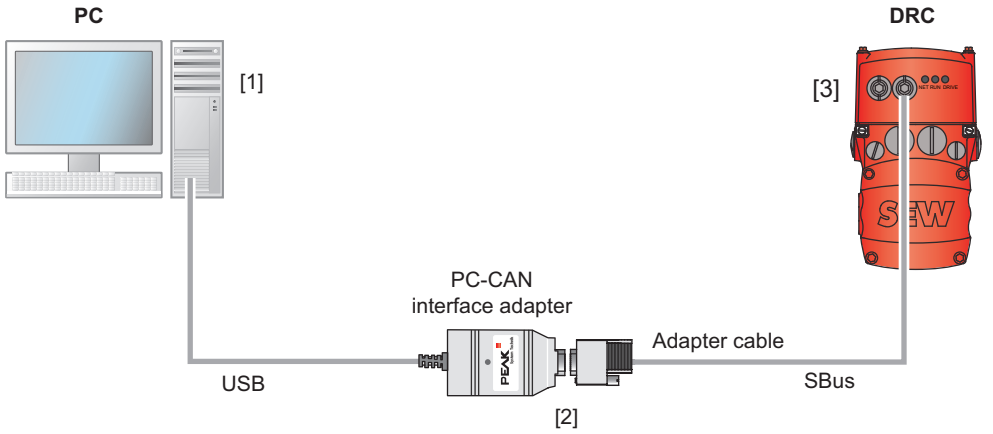
5.11 PC connection

The diagnostic interface [3] can be connected to a commercially available PC/ laptop [1] using one of the following options:

- [2] PC-CAN interface adapter with adapter cable
  - Part number of PC-CAN interface adapter + adapter cable: 2 821 449 8
  - Part number of PC-CAN interface adapter: 1 821 059 7
  - Part number of adapter cable: 1 812 386 4

5.11.1 Connection example



6 Startup

6.1 Startup notes

INFORMATION

It is essential to comply with the safety notes during startup.

⚠ WARNING

Risk of injury due to missing or defective protective covers.

Severe or fatal injuries.

- Install the protective covers of the system according to the instructions.
- Never start the DRC.. drive unit if the protective covers are not installed.

⚠ 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 DRC.. drive units with a suitable external disconnection device.
- Secure the drive unit against unintended reconnection of the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least the following time before removing the electronics cover: **5 minutes**

⚠ WARNING

Risk of burns due to hot surfaces.

Severe injuries.

- Let the devices cool down before touching them.

⚠ WARNING

Device malfunction due to incorrect device setting.

Severe or fatal injuries.

- Observe the startup instructions.
- Always have the installation carried out by trained specialists.
- Only use settings that are correct for the function.

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NOTICE

Device fault 45 or 94 due to power disconnection during the initialization phase.

Possible damage to property.

- After replacing the cover and switching on the power supply, wait at least for 30 s before disconnecting the drive from the supply system again.

INFORMATION

- Before startup, remove the paint protection cap from the LED displays.
- Before startup, remove the paint protection film from the nameplates.
- Observe a minimum switch-off time of 2 seconds for the line contactor.

INFORMATION

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

6.2 Lifting applications

⚠ WARNING

Danger of fatal injury if the hoist falls.

Severe or fatal injuries.

- The DRC.. drive unit is not designed for use as a safety device in lifting applications.
- Use monitoring systems and mechanical protection devices to ensure safety.
- In combination with lifting applications and "functional safety", the control must be carried out according to SS1(c) (Safe stop 1, function variant c according to EN 61800-5-2). Observe the "DRC.. Electronic Motor – Functional Safety" manual.

6.3 Requirements for startup

The following requirements apply to startup:

- Correct project planning of the DRC.. drive unit. For project planning notes, refer to the catalog.
- The DRC.. drive unit is installed correctly, both mechanically and electrically.
- Appropriate safety measures prevent the drives from starting up unintentionally.
- Appropriate safety measures are taken to prevent risk of injury or damage to the machine.

6.3.1 Torque limiting

NOTICE

Gear unit overloaded by the motor.

Possible damage to property.

- The maximum output torque might have to be limited to the torque specified on the nameplate.
- Observe the "DRC.. Gearmotors" catalog.

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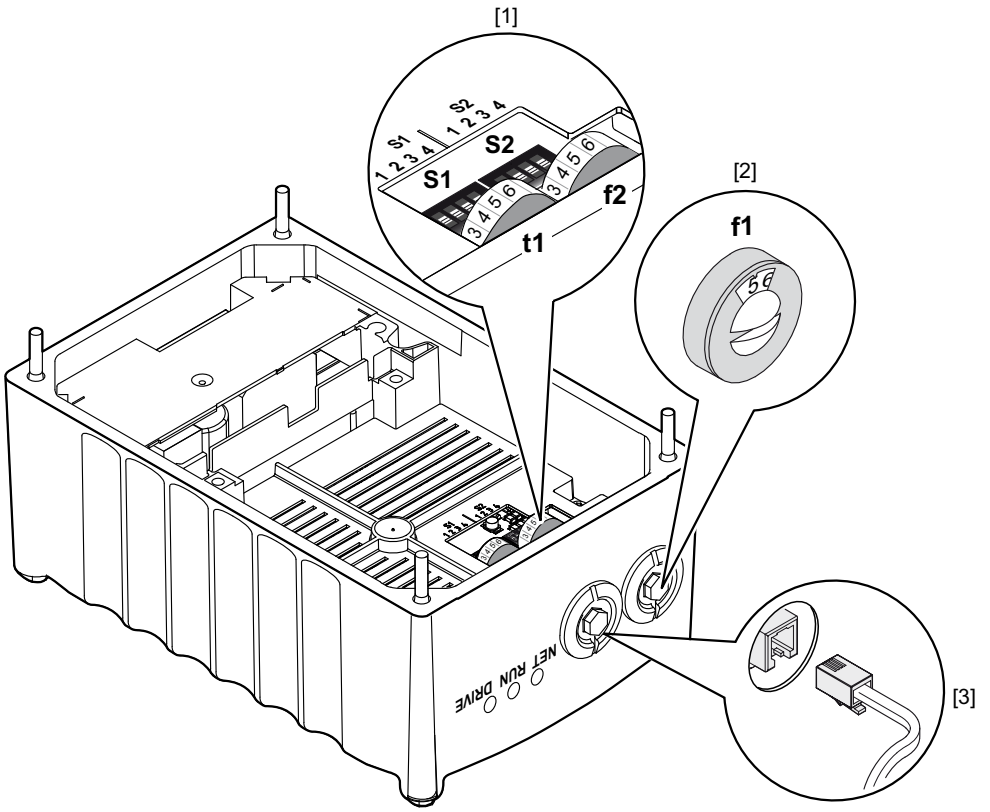
6.4 Description of control elements

6.4.1 Overview of control elements

DRC1/2 electronic motor

The following figure gives an overview of control elements in the DRC.. electronics cover:



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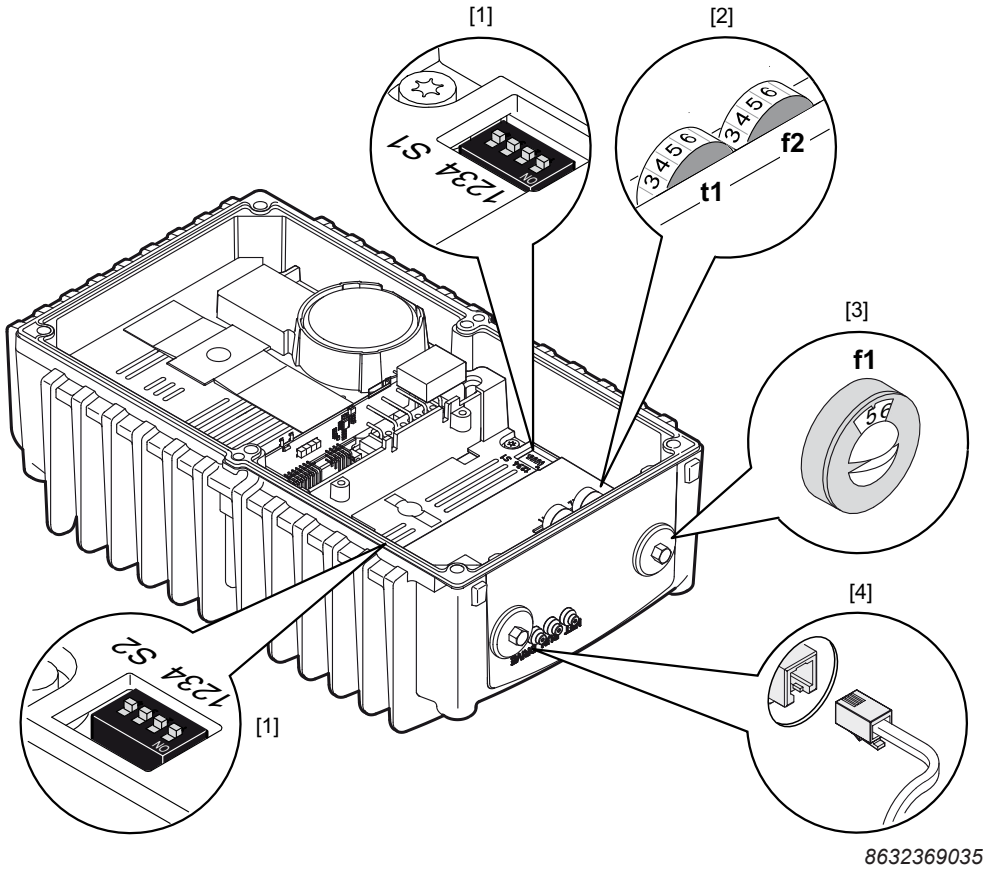
[1] DIP switches S1, S2
Switch t1
Switch f2
[2] Setpoint potentiometer f1 (underneath the gland)
[3] Diagnostic interface (underneath the gland)

DRC3/4 electronic motor

The following figure gives an overview of the control elements in the DRC.. electronics cover:



[1] DIP switches S1, S2
[2] Switch t1
Switch f2
[3] Setpoint potentiometer f1 (underneath the gland)
[4] Diagnostic interface (underneath the gland)

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6.4.2 Setpoint potentiometer f1

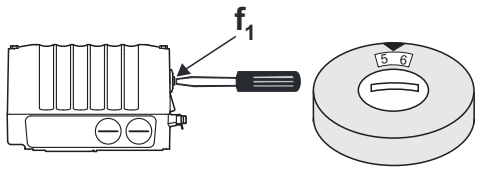
NOTICE

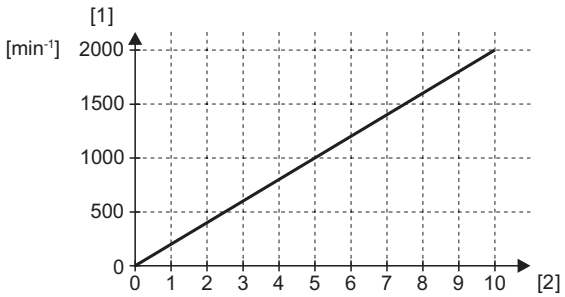
Loss of the ensured degree of protection if the screw plugs of the f1 setpoint potentiometer are not installed or are not installed correctly.

Damage to the DRC.. electronics cover.

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

The potentiometer f1 has the following function: Setting setpoint f1:





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[1] Motor speed
[2] Potentiometer setting

6.4.3 Switch f2

Switch f2 has the following function: Setting setpoint f2.

Switch f2											
Detent setting	**0**	1	2	3	4	5	6	7	8	9	10
Setpoint f2 [min^{-1}] (motor speed)	**200**	250	300	450	600	750	1000	1250	1500	1800	2000

6.4.4 Switch t1

Switch t1 is used to set the acceleration of the DRC.. drive unit. The ramp time t1 refers to a setpoint change in the motor speed of n = 3000 min^{-1}.

Switch t1											
Detent setting	0	1	2	3	4	**5**	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	**1**	2	3	5	7	10

6.5 Description of DIP switches

6.5.1 Overview of DRC1/2 electronic motor

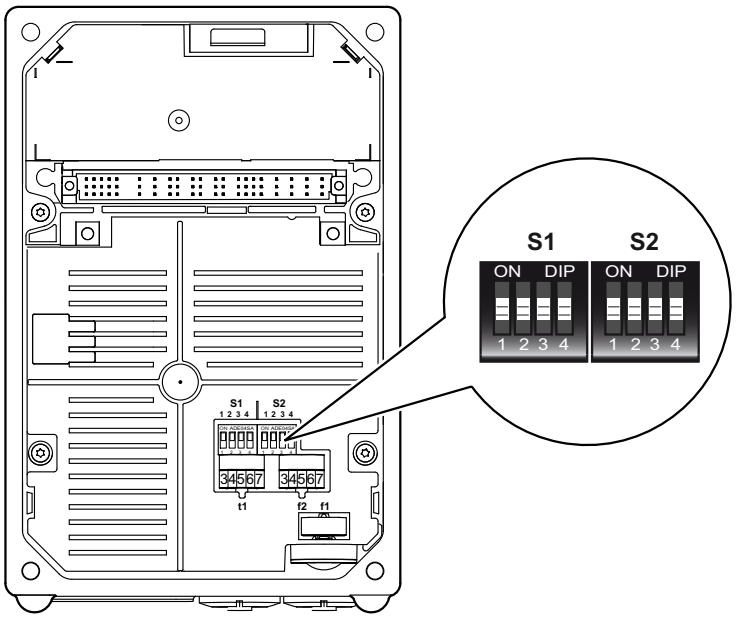
NOTICE

Damage to the DIP switches caused by unsuitable tools.

Possible damage to property.

- To set the DIP switches, use only suitable tools, such as a slotted screwdriver with a blade width of no more than 3 mm.
- The force used for setting the DIP switches must not exceed 5 N.

The following figure shows DIP switches S1 and S2:



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DIP switch S1

The following table shows the functions of DIP switch S1:

DIP switch	S1			
	1	2	3	4
	PWM cycle frequency[1)]	Release brake without enable	Binary coding Additional functions	
ON	8 kHz	On	1	1
OFF	4 kHz	**Off**	**0**	**0**

1) The DIP switch is only effective in "easy mode".

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DIP switch S2

The following table shows the functions of DIP switch S2:

DIP switch	S2			
	1	2	3	4
	Startup mode	**Reserved**	**Direction of rotation reversal**	**Speed monitoring** [1]
ON	Expert	Reserved	On	On
OFF	**Easy**	**Reserved**	**Off**	**Off**

[1] The DIP switch is only effective in "easy mode".

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6.5.2 Overview of DRC3/4 electronic motor

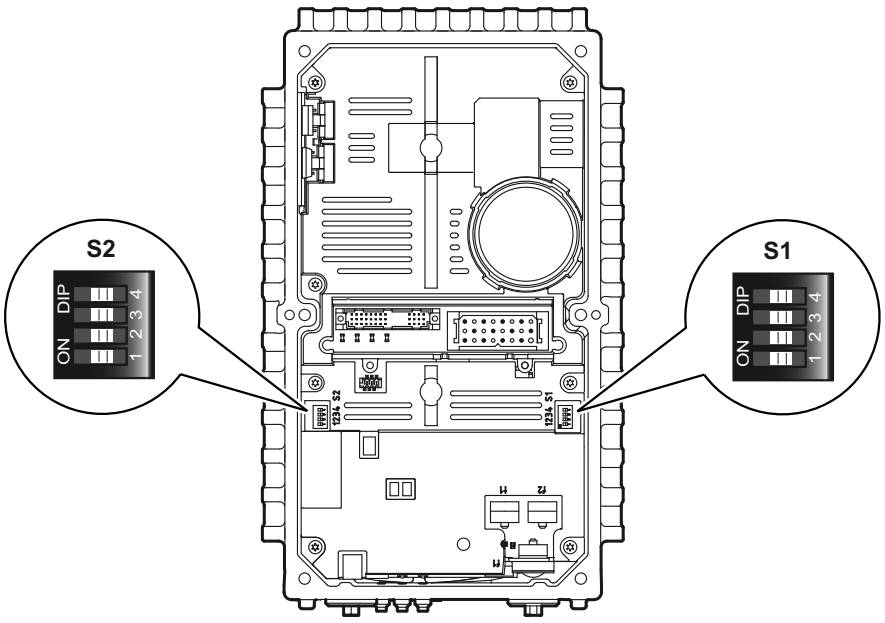
NOTICE

Damage to the DIP switches caused by unsuitable tools.

Possible damage to property.

- Set the DIP switches using only suitable tools, such as a slotted screwdriver with a blade width of no more than 3 mm.
- The force used for setting the DIP switches must not exceed 5 N.

The following figure shows DIP switches S1 and S2:



8643570315

DIP switch S1

The following table shows the functions of DIP switch S1:

DIP switch	S1			
	1	2	3	4
	PWM cycle frequency[1)]	Release brake without enable	Binary coding Additional functions	
ON	8 kHz	On	1	1
OFF	4 kHz	**Off**	**0**	**0**

1) The DIP switch is only effective in "easy mode".

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DIP switch S2

The following table shows the functions of DIP switch S2:

DIP switch	S2			
	1	2	3	4
	Startup mode	Reserved	Direction of rotation reversal	Speed monitoring [1]
ON	Expert	Reserved	On	On
OFF	**Easy**	**Reserved**	**Off**	**Off**

[1] The DIP switch is only effective in "easy mode".

6.5.3 Description of DIP switches

DIP switch S1/1

Setting of the maximum PWM frequency[1]

- When DIP switch S1/1 is set to "OFF", the DRC.. inverter operates with a PWM frequency of 4 kHz.
- When DIP switch S1/1 is set to "ON", the DRC.. inverter operates with a PWM frequency of 8 kHz and switches back to 4 kHz depending on the temperature and device utilization.

1) The DIP switch is only effective in "easy mode".

DIP switch S1/2

⚠ WARNING

Danger of fatal injury if the hoist falls.

Severe or fatal injuries.

- Do not use the function "Brake release without drive enable" for lifting applications.

INFORMATION

For more information about releasing the brake without drive enable, refer to chapter "Operation".

Release brake without enable

When switch S1/2 is set to "ON", it is possible to release the brake even without drive enable.

DIP switches S1/3 and S1/4

Additional functions

The binary coding of DIP switches S1/3 and S1/4 allows for activating additional functions. Proceed as follows to activate possible additional functions:

Decimal value	0	1	2	3
S1/3	OFF	**ON**	OFF	**ON**
S1/4	OFF	OFF	**ON**	**ON**

Overview of available additional functions

Decimal value	Brief description
0	Basic functionality, no additional function active
1	Setpoint $f2_{min}$ = 0 min^{-1} The function is available from the following firmware version of the command pcb: • MOVIGEAR® ≥ ".16" • DRC.. electronic motor ≥ ".14"
2	Enable signals by positive edge The function is available from the following firmware version of the command pcb: • MOVIGEAR® ≥ ".17" • DRC.. electronic motor ≥ ".15"
3	Reserved

DIP switch S2/1

Startup mode setting

You can select one of the following modes for starting up DRC.. drive units:

- When selecting "Easy" (DIP switch S2/1 = "OFF"), you can start up DRC.. drive units quickly and easily using DIP switches S1, S2 and switches f2, t1.
- In "Expert" mode (DIP switch S2/1 = "ON"), an extended range of parameters is available. You can use the MOVITOOLS® MotionStudio software to adjust the parameters to the application.

DIP switch S2/3

Direction of rotation reversal

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

- OFF (S2/3 = OFF): The motor turns CW for a positive setpoint and CCW for a negative setpoint.
- ON (S2/3 = ON): The motor turns CCW for a positive setpoint and CW for a negative setpoint.

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DIP switch S2/4

Speed monitoring (only active in "Easy" mode)

- Speed monitoring (S2/4 = "ON") protects the drive when it is blocked.
- If the drive is operated at the current limit for longer than 1 second when speed monitoring is active (S2/4 = "ON"), then speed monitoring is triggered. The DRC.. drive unit uses the status LED to indicate a fault. The current limit must be reached permanently for the duration of the delay time before the monitoring function trips.

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6.6 Additional functions

6.6.1 Additional function 1 "Setpoint $f2_{min}$ = 0 min^{-1}"

In detent position 0 of switch f2, the setpoint f2 with the activated additional function is 0 min^{-1}. All other values remain unchanged.

Switch f2											
Detent setting	**0**	1	2	3	4	5	6	7	8	9	10
Setpoint f2 [min^{-1}] (motor speed) with active additional function 1	**0**	250	300	450	600	750	1000	1250	1500	1800	2000
Setpoint f2 [min^{-1}] (motor speed) without additional function 1	**200**	250	300	450	600	750	1000	1250	1500	1800	2000

The function is available from the following firmware version of the command pcb:

- MOVIGEAR® ≥ ".16"
- DRC.. electronic motor ≥ ".14"

6.6.2 Additional function 2 "Enable signals by positive edge"

The drive is enabled after enabling or disabling STO state by a positive edge at the enable signals.

The function is available from the following firmware version of the command pcb:

- MOVIGEAR® ≥ ".17"
- DRC.. electronic motor ≥ ".15"

6.6.3 Additional function 3

Additional function 3 is reserved and may not be selected.

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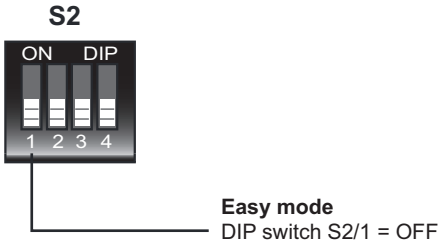
6.7 Startup in "easy mode"

6.7.1 Startup steps

1. It is essential that you observe the startup instructions.
2. Disconnect all components from the voltage supply and use an external disconnecting device to avoid an unintentional reconnection.
3. Check the correct connection of the DRC.. drive unit and of any installed options. Observe the chapter "Electrical installation".
4. **NOTICE!** Damage to the DIP switches caused by unsuitable tools. To set the DIP switches, use only suitable tools, such as a slotted screwdriver with a blade width of no more than 3 mm. The force used for setting the DIP switches must not exceed 5 N.
   Activate "easy mode" by setting DIP switch S2/1 to OFF.



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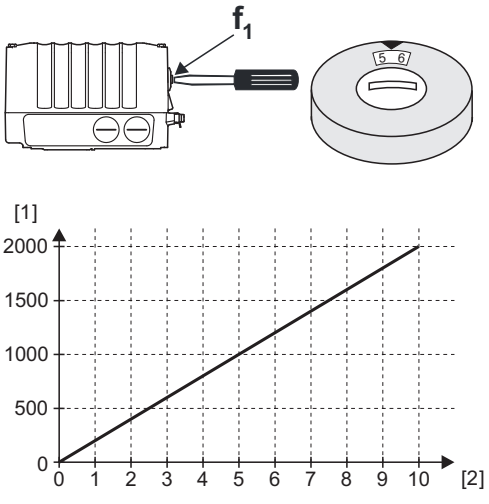
5. Set the first speed at setpoint potentiometer f1 (active when "DI03" (f1/f2) = "0") (factory setting: about position 5).



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[1] Motor speed
[2] Potentiometer setting

6. **NOTICE!** Loss of the ensured degree of protection if the screw plugs of the f1 setpoint potentiometer are not installed or are not installed correctly. Damage to the electronics cover.
   Reinsert the screw plug of the setpoint potentiometer f1 with the gasket.

7. Set the second speed at switch f2 (active if "DI03" (f1/f2) = "1"). When additional function 1 is active, observe the information in the chapter "Additional functions".

Switch f2											
Detent setting	**0**	1	2	3	4	5	6	7	8	9	10

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Switch f2											
Setpoint f2 [min^{-1}]	**200**	250	300	450	600	750	1000	1250	1500	1800	2000
(motor speed)											

INFORMATION

During operation, the first speed is infinitely variable using the setpoint potentiometer f1 which is accessible from outside. Speeds f1 and f2 can be set independently of each other.

8. Set the ramp time at switch t1 (ramp times in relation to a setpoint change in the motor speed of n = 3000 min^{-1}).

Switch t1											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10

9. Place the electronics cover DRC.. onto the connection box and screw it on.
10. Switch on the line voltage.

6.7.2 Inverter behavior depending on the terminal level

The following table shows the inverter behavior depending on the terminal level:

Inverter behavior	Supply system L1 to L3	CW/stop	CCW/stop	f1/f2	DRIVE LED
Inverter off	0	x	x	x	Off
Stop	1	0	0	x	Yellow
CW rotation with f1	1	1	0	0	Green
CCW rotation with f1	1	0	1	0	Green
CW rotation with f2	1	1	0	1	Green
CCW rotation with f2	1	0	1	1	Green
Stop	1	1	1	x	Flashing green

0 = No voltage

1 = Voltage

x = Any

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6.8 Startup in "expert mode"

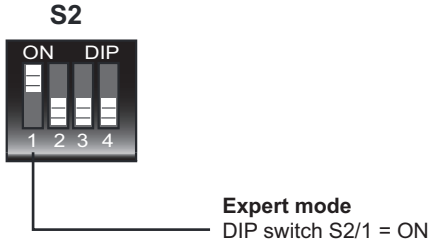
INFORMATION

- "Expert" startup is only necessary if parameters are to be set during startup.
- The following chapter describes the preparations made on DRC.. for activating expert mode and an example of how to fine-tune parameters.
- The chapter "Parameterization and diagnostics" describes how to integrate DRC.. in MOVITOOLS® MotionStudio and contains an overview of all parameters with a detailed description.

6.8.1 Startup steps

In expert mode, you can use parameters in addition to the basic functions of the DRC.. drive unit.

1. It is essential that you observe the startup instructions.
2. Disconnect all components from the voltage supply and use an external disconnecting device to avoid an unintentional reconnection.
3. Make sure that the DRC.. drive unit is connected properly. Observe chapter "Electrical installation".
4. Start up the unit in "easy mode".
5. **NOTICE!** Damage to the DIP switches caused by unsuitable tools. Possible damage to property. Set the DIP switches using only 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.
   Set DIP switch S1/1 to ON to activate "expert mode".



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6. Place the electronics cover DRC.. onto the connection box and screw it on.
7. Connect the PC to the DRC.. inverter.
8. Connect the DRC.. inverter to the voltage supply.
9. Start MOVITOOLS® MotionStudio and integrate the DRC.. inverter.
10. Specify the parameters you want to change.
11. Check whether these parameters depend on mechanical controls and disable them, if required, by adjusting the bit-coded selection box of parameter *index 10096.30*.

Mechanical control element	Affected parameter index (command pcb)	Bit index 10096.30	Effect of parameter index 10096.30 (deactivating mechanical control elements)
Setpoint potentiometer f1	10096.35 Setpoint n_f1	13	Bit not set: Setpoint f1 is set with setpoint potentiometer f1
			Bit set: Setpoint f1 is set using parameters
Switch f2	10096.36 Setpoint n_f2	14	Bit not set: Setpoint f2 is set with switch f2
			Bit set: Setpoint f2 is set using parameters
Switch t1	8807.0 Ramp t11 up 8808.0 Ramp t11 down	15	Bit not set: The ramps are set with switch t1 (ramp time up = ramp time down)
			Bit set: Setting the ramps via parameters

12. Change the selected parameters.
13. Check the functions of the DRC.. drive unit. Optimize the parameters, if required.
14. Disconnect the PC from the DRC.. inverter.
15. **NOTICE!** Loss of the ensured degree of protection if the screw plug of the diagnostic interface is not installed or is not installed correctly. Damage to the electronics cover.
    Make sure the screw plug of the diagnostic interface has a seal and screw it in.

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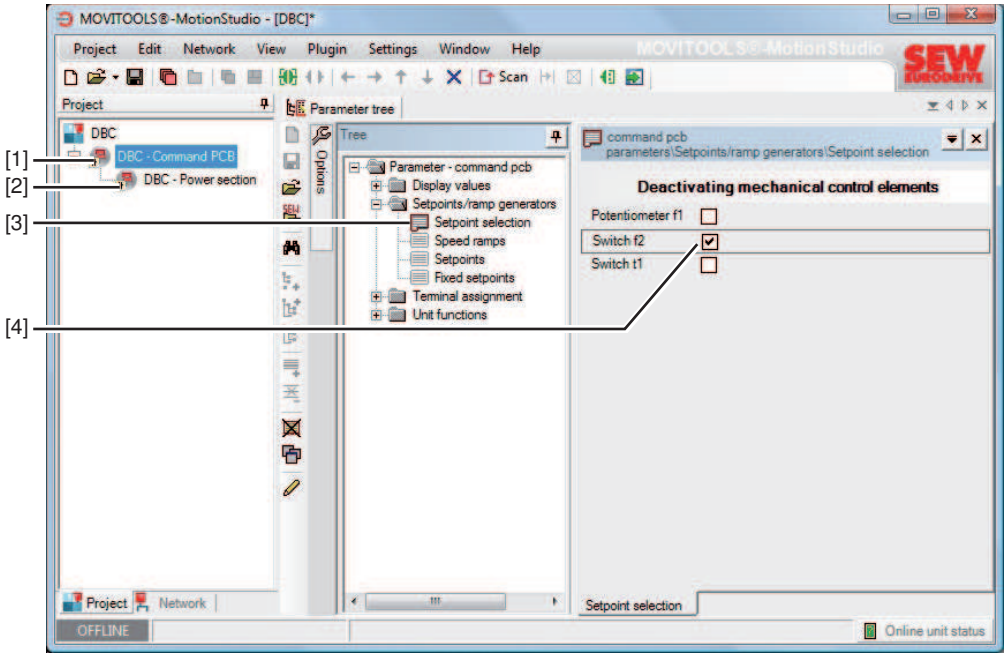
6.8.2 Example of "Fine adjustment of setpoint f2 using MOVITOOLS® MotionStudio"

1. It is essential that you observe the startup instructions.
2. Set DIP switch S1/1 to "ON" to activate expert mode as described in chapter "Startup in expert mode".
3. Connect the PC to the DRC.. inverter.
4. Connect the DRC.. inverter to the voltage supply.
5. Start MOVITOOLS® MotionStudio.
6. Create a project and a network.
7. Configure the communication channel at the PC.
8. Perform an online scan. You will get the following or a similar result:



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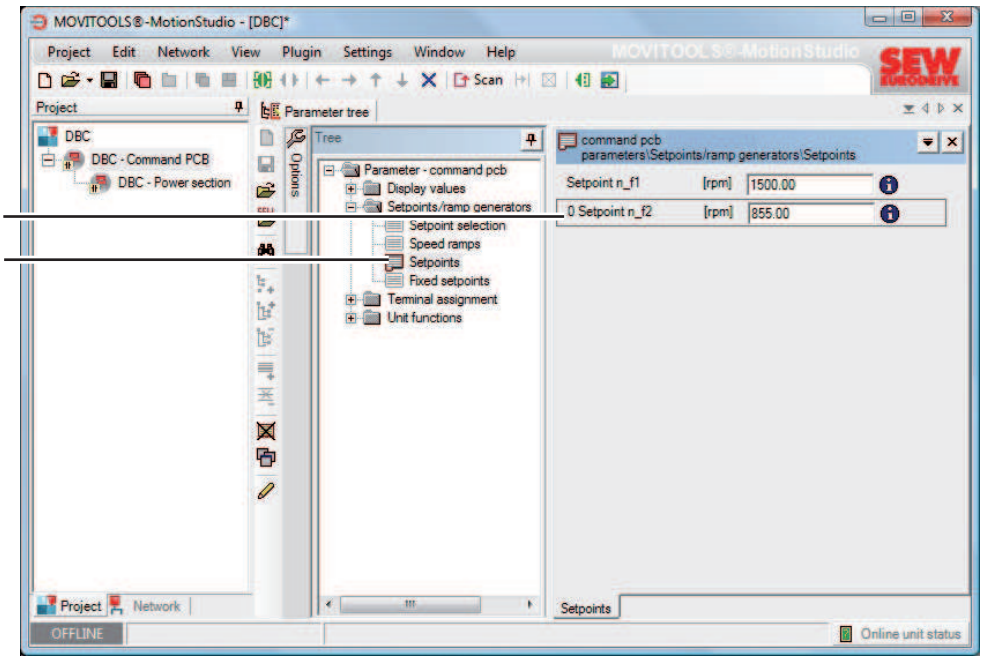
[1] Command pcb DRC..
[2] Power section DRC..
[3] Setpoint selection folder
[4] Check box for switch f2

9. Open the context menu of the DRC.. command pcb [1] by clicking the right mouse button and select the menu item "Startup"/"Parameter tree".

10. Open the folder "Setpoint selection" [3]. Deactivate switch f2 by ticking the check box "Switch f2" [4].
11. Open the "Setpoints" folder [2]. You will get the following or a similar result:



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12. Adjust the setpoint n_f2 [1] until the application runs optimally, e.g. parameter setpoint = 855 min^{-1}.
13. Disconnect the PC from the DRC.. inverter.
14. **NOTICE!** Loss of the ensured degree of protection if the screw plug of the diagnostic interface is not installed or is not installed correctly. Damage to the electronics cover.
    Make sure the screw plug of the diagnostic interface has a seal and screw it in.

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7 Operation of MOVITOOLS® MotionStudio

7.1 About MOVITOOLS® MotionStudio

7.1.1 Tasks

The software package enables you to perform the following tasks with consistency:

- Establishing communication with devices
- Executing functions of the devices

7.1.2 Establishing communication with the devices

The SEW Communication Server is integrated into the MOVITOOLS® MotionStudio software package for establishing communication with the devices.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the devices communicate via these communication channels using their communication options. You can operate up to four communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT®
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

The available channels can vary depending on the device and its communication options.

7.1.3 Executing functions with the devices

The software package offers uniformity in executing the following functions:

- Parameterization (e. g. in the parameter tree of the device)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are included in the MOVITOOLS® MotionStudio software package, allowing you to use the devices to execute functions:

- MotionStudio
- MOVITOOLS®

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7.2 First steps

7.2.1 Starting the software and creating a project

To start MOVITOOLS® MotionStudio and create a project, proceed as follows:

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

   [Start]/[Programs]/[SEW]/[MOVITOOLS MotionStudio]/[MOVITOOLS MotionStudio]

2. Create a project with a name and directory.

7.2.2 Establishing communication and scanning the network

To establish communication with MOVITOOLS® MotionStudio and to scan your network, proceed as follows:

1. Set up a communication channel to communicate with your devices.
2. Scan your network (device scan). To do so, click the [Start network scan] button [1] in the toolbar.

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7.2.3 Additional information

INFORMATION

For detailed information on how to configure a communication channel, see chapter "SBus (CAN) communication via interface adapter".

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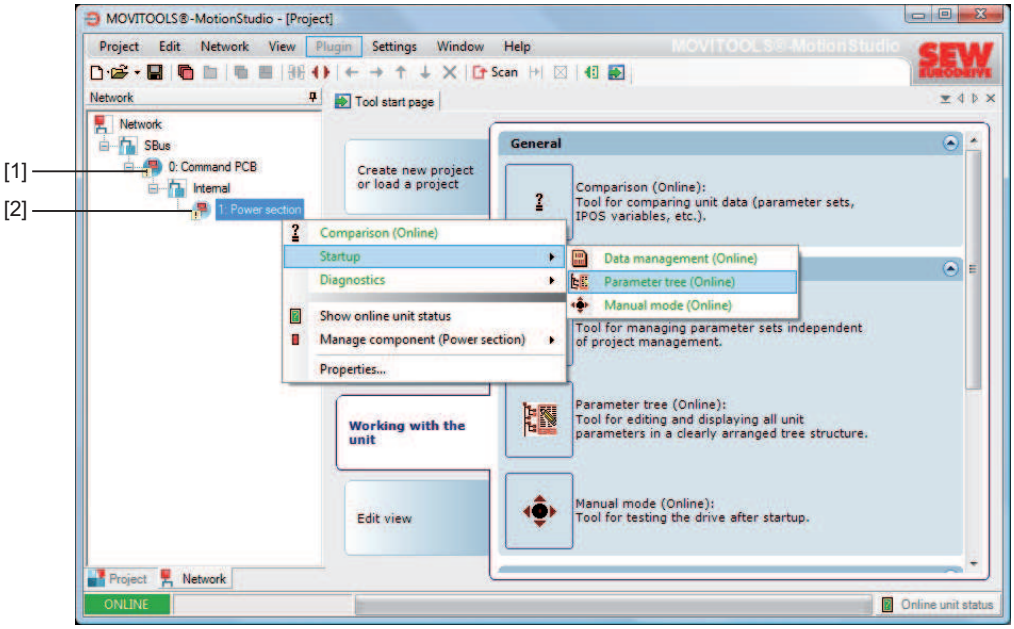
7.2.4 Configuring devices

Do the following to configure a device:

1. Select the device in the network view.
2. Right-click to open the context menu and display the tools for configuring the device.



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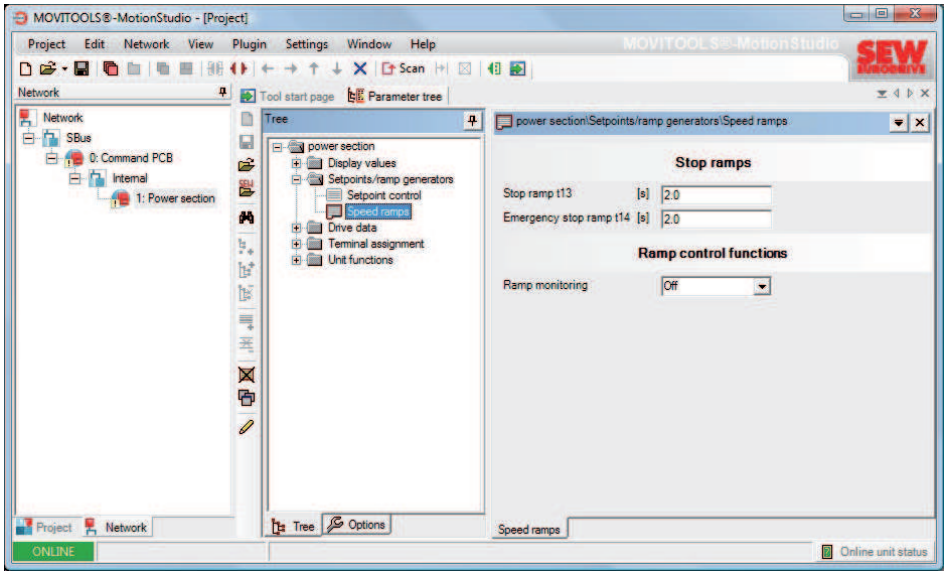
[1] Command pcb
[2] Power section

The example shows the context menu with the tools for a DRC.. power section [2]. The communication mode is set to "online" and the device was scanned in the network view.

3. Select a tool (e.g. "Parameter tree") to configure the device.



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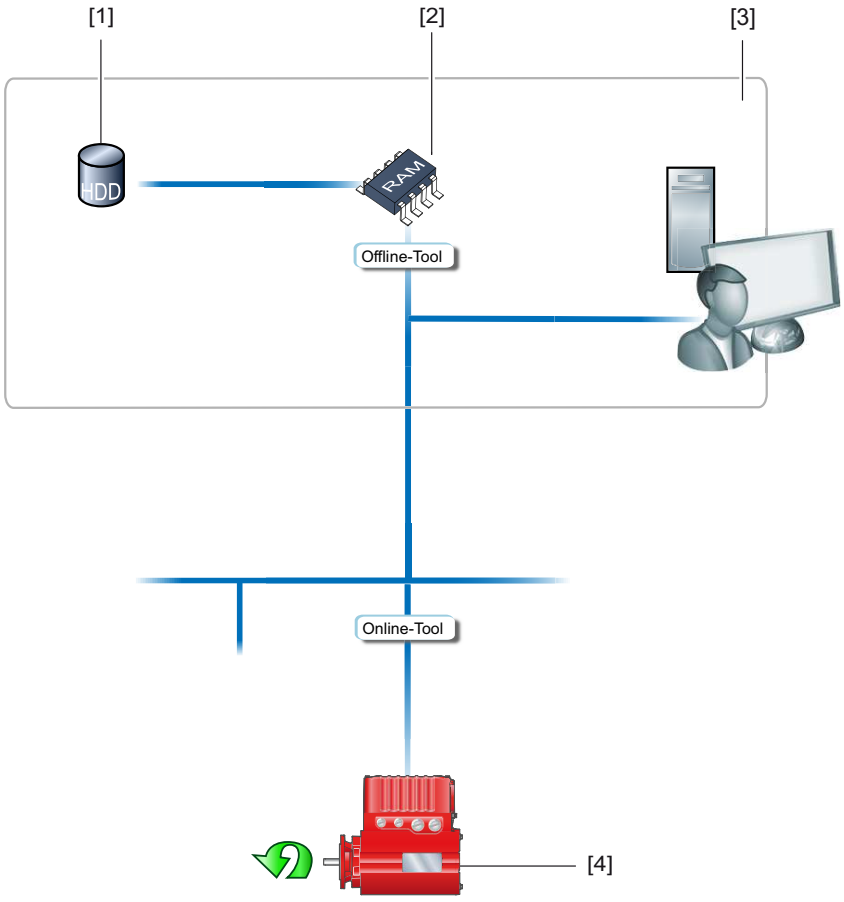
7.3 Connection mode

7.3.1 Overview

MOVITOOLS® MotionStudio differentiates between "online" and "offline" connection mode. You determine the connection mode yourself. Depending on the selected connection mode, you can choose offline or online tools specific to your device.

Overview of offline/online tools

The following figure illustrates the two types of tools:



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[1] Hard drive of the engineering PC
[2] RAM of the engineering PC
[3] Engineering PC
[4] Device

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Description of offline/online tools

INFORMATION

- The "online" connection status is **NOT** a response message which informs you that you are currently connected to the device or that your device is ready for communication. If you need this response message, refer to the chapter "Setting up the cyclic availability test" in the online help (or in the manual) of MOVITOOLS® MotionStudio.
- Project management commands (such as "download" and "upload"), the online device status, and the "device scan" work independently of the set connection mode.
- MOVITOOLS® MotionStudio starts up in the connection state that you set before you closed down.

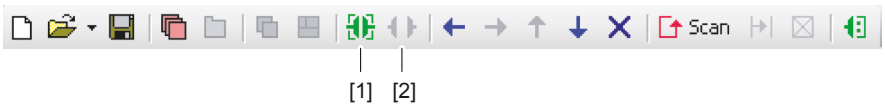
The following figure illustrates the two types of tools:

Tools	Description
Offline tools	Changes made using offline tools affect **"ONLY"** the RAM [2] at first. • Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3]. • Execute the "Download (PC -> device)" function if you want to transfer the changes to your device [4] as well.
Online tools	Changes made using online tools affect **"ONLY"** the device [4] at first. • Execute the "Upload (device -> PC)" function if you want to transfer the changes to your RAM [2]. • Save your project so that the changes can be stored on the hard disk [1] of your engineering PC [3].

7.3.2 Selecting the connection mode (online or offline)

Proceed as follows to set the connection mode:

1. Select the connection mode:
   - "Switch to online mode" [1] for functions (online tools) that should directly influence the device.
   - "Switch to offline mode" [2] for functions (offline tools) that should influence your project.



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[1] "Switch to online mode" icon
[2] "Switch to offline mode" icon

2. Select the device node.
3. Right-click to open the context menu and display the tools for configuring the device.

7.4 Communication SBus (CAN) via interface adapter

7.4.1 Engineering via interface adapter (SBus)

Since your device supports the "SBus" communication option, you can use a suitable interface adapter for engineering.

The interface adapter is additional hardware that you can obtain from SEW-EURODRIVE. You can use it to connect your engineering PC with the respective communication option of the device.

The following table shows the available types of interface adapters (option):

Type of interface adapter (option)	Order no.	Scope of delivery
PC-CAN package from SEW-EURODRIVE	28214498	PC-CAN interface adapter and adapter cable for connecting PC-CAN interface adapters and DRC.. inverters
PC-CAN interface adapter from SEW-EURODRIVE	18210597	The prefabricated cable included in the delivery **cannot** be used for the DRC.. drive unit
PC-CAN interface adapter PCAN-USB ISO from PEAK-System	IPEH 002022	Without connection cable
Adapter cable	18123864	Adapter cable for connecting PC-CAN interface adapters and DRC.. inverters

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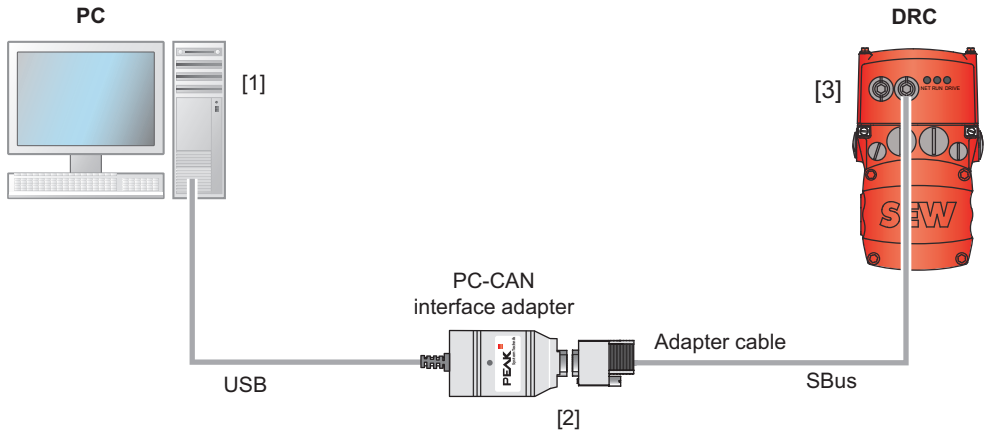
7.4.2 Starting up the USB-CAN interface

Overview

This section describes how to connect the PC-CAN interface from SEW-EURODRIVE to the SBus interface of your devices and what must be considered for this purpose.

Connecting the USB-CAN interface adapter to the device

The following figure shows how the PC-CAN interface adapter [2] is connected with the device [3] and with the PC [1] via the SBus interface [3]:



[1] PC
[2] USB-CAN interface with adapter cable
[3] Diagnostic interface DRC..

7.4.3 Configuring communication settings via SBus

You need an SBus connection between your PC and the devices you want to configure. You can use a USB-CAN interface for this purpose.

Proceed as follows to configure an SBus connection:

1. Click on "Configure communication plugs" [1] in the toolbar.

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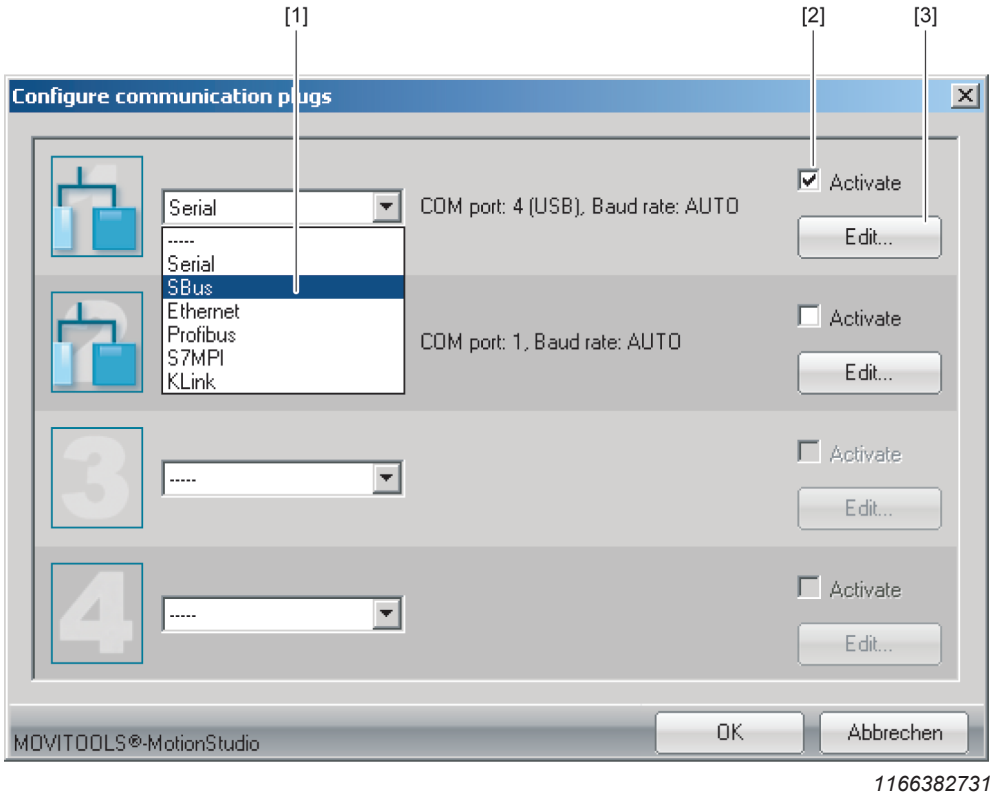
[1] "Configure communication plugs" icon

This will open the "Configure communication plugs" window.



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[1] "Type of communication" dropdown menu
[2] "Activate" check box
[3] [Edit] button

2. From the drop-down list [1], select "SBus" as the communication type. In this example, the first communication channel is activated with "SBus" communication type [2].

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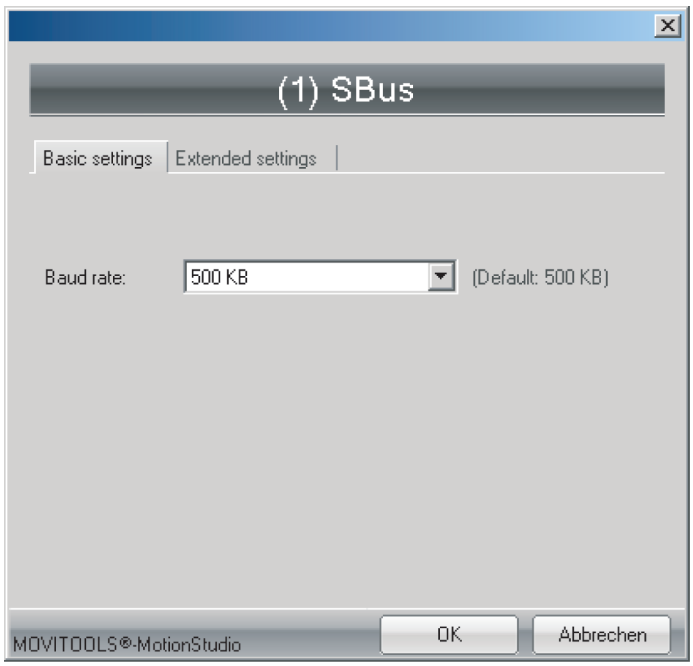
3. Click the [Edit] button [3] on the right side of the "Configure communication plugs" window.



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This will display the settings for the "SBus" communication type.

4. It might be necessary to change the preset communication parameters on the tab pages [Basic settings] and [Extended settings]. When doing so, refer to the detailed description of the communication parameters.

7.4.4 Communication parameters for SBus

The following table describes the [Basic setting] for the SBus communication channel:

Communication parameter	Description	Information
Baud rate	Transmission speed with which the connected PC communicates with the device in the network via the communication channel.	• Adjustable values (permitted total cable length): – 500 kBd (50 m) (default setting) – 1 MBd (25 m) • All connected devices must support the same baud rate.

The following table describes the [Extended setting] for the SBus communication channel:

Communication parameter	Description	Information
Parameter telegrams	Telegram with a single parameter.	Used to transfer a **single parameter** of a device.
Multi-byte telegrams	Telegram with several parameters.	Used to transfer the **complete** parameter set of a device.
Timeout	Waiting time in [ms] that the master waits for a response from the slave after it has sent a request.	• Default setting: – 100 ms (parameter telegram) – 350 ms (multi-byte telegram) • Increase the value if not all devices are detected during a network scan.
Repetitions	Number of request retries after the timeout is exceeded.	Default setting: 3

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7.5 Executing functions of the devices

7.5.1 Parameterizing a device

Devices are parameterized in the parameter tree. The parameter tree displays all device parameters, grouped into folders.

You can manage the device parameters using the context menu and the toolbar. The following steps illustrate how to read or edit device parameters.

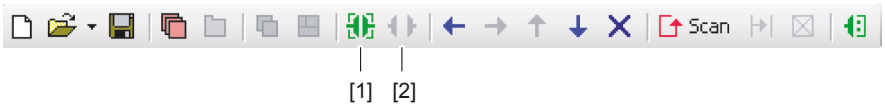
7.5.2 Reading or changing device parameters

INFORMATION

For detailed information about device parameters, refer to chapter "Parameter list".

Proceed as follows to read or change device parameters:

1. Switch to the required view (project view or network view).
2. Select the connection mode:
   - Click the "Switch to online mode" icon [1] if you want to read or change parameters directly in the **device**.
   - Click the "Switch to offline mode" icon [2] if you want to read or change parameters in the **project**.



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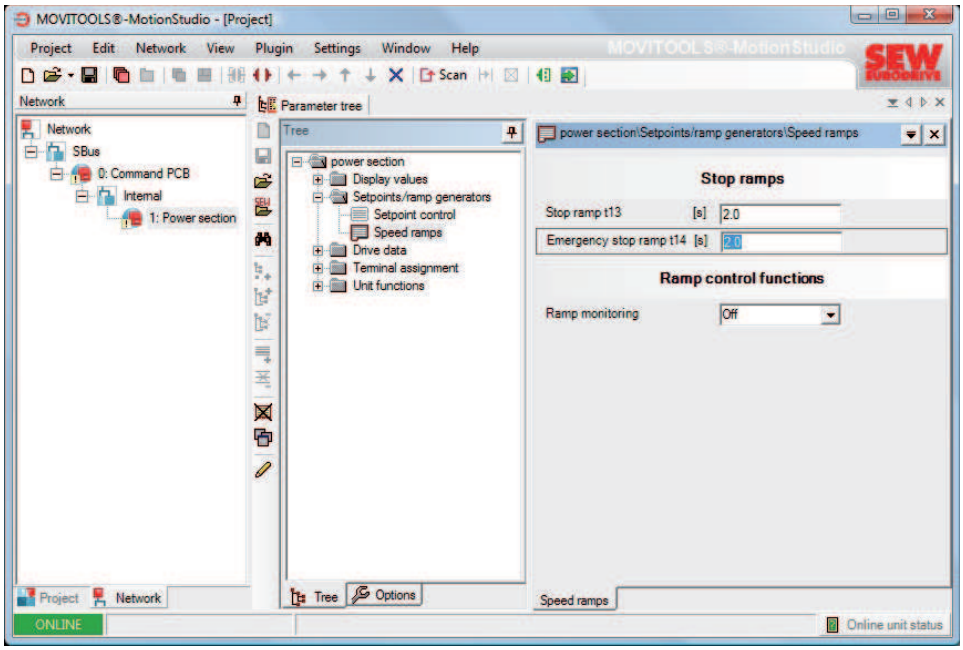
[1] "Switch to online mode" icon
[2] "Switch to offline mode" icon

3. Select the device you want to parameterize.
4. Open the context menu and select the [Parameter tree] command.

   The "Parameter tree" view opens to the right of the screen.

5. Expand the "Parameter tree" to the node you require.



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6. Double-click to display a particular group of device parameters.
7. Press the enter key to finalize any changes you make to numerical values in the input fields.

7.5.3 Starting up the devices (online)

Do the following to start up the devices (online):

1. Switch to network view.
2. In the toolbar, click on "Switch to online mode" [1].

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[1] "Switch to online mode" icon

3. Select the device you want to start up.
4. Open the context menu and select the [Startup]/[Startup] command.

   The Startup wizard opens.
5. Follow the instructions of the startup wizard and then load the startup data into your device.

8 Parameters

8.1 Overview of command pcb parameters

8.1.1 Display values

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Command pcb parameters\display values**device status**			
Device status			
8310.0	Operating state	[Text]	
10095.1	Startup mode	[Text]	
DIP switch			
9621.10, bit 0	Position of DIP switch S1/1	[Bit field]	
9621.10, bit 1	Position of DIP switch S1/2	[Bit field]	
9621.10, bit 2	Position of DIP switch S1/3	[Bit field]	
9621.10, bit 3	Position of DIP switch S1/4	[Bit field]	
9621.10, bit 4	Position of DIP switch S2/1	[Bit field]	
9621.10, bit 5	Position of DIP switch S2/2	[Bit field]	
9621.10, bit 6	Position of DIP switch S2/3	[Bit field]	
9621.10, bit 7	Position of DIP switch S2/4	[Bit field]	
Switch f2, t1			
10096.27	Setting of switch f2	0,1,2, – 10	
10096.29	Setting of switch t1	0,1,2, – 10	
Command pcb parameters\display values**analog setpoints**			
10096.28	Setting of setpoint potentiometer f1	0 – 10	1 digit = 0.001
Command pcb parameters\display values**digital inputs**			
Digital inputs			
10096.34	Terminal configuration	[Text]	
8334.0, bit 1	Digital input DI01 state	[Bit field]	
8334.0, bit 2	Digital input DI02 state	[Bit field]	
8334.0, bit 3	Digital input DI03 state	[Bit field]	

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Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
8334.0, bit 4	Digital input DI04 state	[Bit field]	
8335.0	Digital input DI01 function	[Text]	
8336.0	Digital input DI02 function	[Text]	
8337.0	Digital input DI03 function	[Text]	
8338.0	Digital input DI04 function	[Text]	
Command pcb parameters\display values**digital outputs**			
[Text]	For digital output, see power section		
Command pcb parameters\display values**device data**			
Command level			
–	Device family	[Text]	
9701.1, 9701.2, 9701.3, 9701.4, 9701.5	Device names	[Text]	
9823.1, 9823.2, 9823.3, 9823.4, 9823.5	Device signature	[Text]	
9701.30	Firmware command level	[Text]	
9701.31	Firmware status of command level	[Text]	
Deactivating mechanical control elements			
10096.30, bit 13	Potentiometer f1	[Bit field]	
10096.30, bit 14	Switch f2	[Bit field]	
10096.30, bit 15	Switch t1	[Bit field]	

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8.1.2 Parameters that can be changed

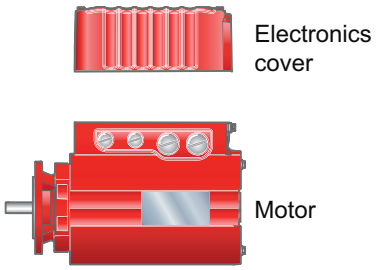
Storage location

INFORMATION

The following parameters are stored in the DRC.. motor.

If the motor is replaced, for example for service purposes, changes made to these parameters must be made again.

The changes remain active after changing the electronics cover.



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Setpoints/ramp generators

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Command pcb parameters\setpoints/ramp generators**setpoint selection**			
Deactivation of mechanical control elements			
10096.30, bit 13	Setpoint potentiometer f1	• **0 = Activated** • 1 = Deactivated	
10096.30, bit 14	Switch f2	• **0 = Activated** • 1 = Deactivated	
10096.30, bit 15	Switch t1	• **0 = Activated** • 1 = Deactivated	
Command pcb parameters\setpoints/ramp generators**speed ramps**			
8807.0	Ramp t11 up	0.00 – **1.00** – 60.00 [s]	1 digit = 0.001 s
8808.0	Ramp t11 down	0.00 – **1.00** – 60.00 [s]	1 digit = 0.001 s
Command pcb parameters\setpoints/ramp generators**setpoints**			
10096.35	Setpoint n_f1	0.00 – **1500.00** – 2000.00 [min^{-1}]	1 digit = 0.001 min^{-1}
10096.36	Setpoint n_f2	0.00 – **200.00** – 2000.00 [min^{-1}]	1 digit = 0.001 min^{-1}
Command pcb parameters\setpoints/ramp generators**fixed setpoints**			
8489.0	Fixed setpoint n0	– 2000.00 – **200.00** – 2000.00 [min^{-1}]	1 digit = 0.001 min^{-1}
8490.0	Fixed setpoint n1	– 2000.00 – **750.00** – 2000.00 [min^{-1}]	1 digit = 0.001 min^{-1}

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Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
8491.0	Fixed setpoint n2	– 2000.00 – **1500.00** – 2000.00 [min^{-1}]	1 digit = 0.001 min^{-1}
10096.31	Fixed setpoint n3	– 2000.00 – **2000.00** [min^{-1}]	1 digit = 0.001 min^{-1}

Terminal assignment

Index	Text	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Command pcb parameters\terminal assignment**digital inputs**			
10096.34	Terminal configuration	• **0 = Configuration of setpoint changeover, CCW/stop, CW/stop** • 1 = Configuration of fixed setpoint 2, fixed setpoint 1, enable/stop • 2 = Configuration of setpoint changeover, /Ext. terminal, enable/stop • 3 = Motor potentiometer CW • 4 = Motor potentiometer CCW	
8334.0, bit 1	Digital input DI01 state	[Bit field]	
8334.0, bit 2	Digital input DI02 state	[Bit field]	
8334.0, bit 3	Digital input DI03 state	[Bit field]	
8334.0, bit 4	Digital input DI04 state	[Bit field]	
8335.0	Digital input DI01 function	CW/stop (factory setting)	
8336.0	Digital input DI02 function	CCW/stop (factory setting)	
8337.0	Digital input DI03 function	Setpoint changeover (factory setting)	
8338.0	Digital input DI04 function	Reset (fixed assignment)	
Command pcb parameters\terminal assignment**digital outputs**			
[Text]	For digital output DO01, see power section		

Device functions

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Command pcb parameters\device functions**setup**			

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Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
8594.0	Factory setting	• **0 = No** • 1 = Default • 2 = Delivery state	

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8.2 Overview of power section parameters

8.2.1 Display values

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Power section parameters\display values**process values**			
Actual drive values			
8318.0	Actual speed	[min^{-1}]	1 digit = 0.001 min^{-1}
8501.0	User display	[Text]	
Output currents			
8321.0	Apparent output current	[% I_N]	1 digit = 0.001% I_N
8322.0	Active output current	[%]	1 digit = 0.001%
8326.0	Apparent output current	[A]	1 digit = 0.001 A
Actual device values			
8325.0	DC link voltage	[V]	1 digit = 0.001 V
8730.0	Device utilization	[%]	1 digit = 0.001%
8327.0	Heat sink temperature	[°C]	1 digit = 1 °C
Motor status			
8323.0	Motor utilization	[%]	1 digit = 0.001%
9872.255	Motor temperature	[°C]	1 digit = 10^{-6} °C
Power section parameters/display values/**device status**			
Device status			
9702.2	Power section status	[Text]	
9702.7	Drive status	[Text]	
9702.5	Fault code	[Text]	
10071.1	Subfault code	[Text]	
10404.5	Fault source	[Text]	
Statistical data			
8328.0	Power-applied hours	[h]	1 digit = 1 min = 1/60 h
8329.0	Drive running hours	[h]	1 digit = 1 min = 1/60 h
8330.0	Work	[kWh]	1 digit = 1Ws = 1/3600000
Power section parameters\display values**digital outputs**			
Digital outputs			
8349.0, bit 1	Digital output DO01 state (signal relay K1)	[Bit field]	
8350.0	Digital output DO01 function (signal relay K1)	[Text]	
Power section parameters\display values**device data**			

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Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Basic unit			
9701.10	Device family	[Text]	
9701.11	Variant ID	[Text]	
9701.1 – 9701.5	Device name	[Text]	
10204.2	Device variant	[Text]	
9823.1 – 9823.5	Device signature	[Text]	
9701.100 – 9701.105	Serial number	[Text]	
8361.0	Nominal device current (rms)	[A]	1 digit = 0.001 A
10079.9	Motor size	[Text]	
9610.1	Nominal motor torque	[Nm]	1 digit = 0.00001 Nm (10^{-5})
Basic device firmware			
9701.30, 9701.31	Basic device firmware	[Text]	
Power section parameters\display values**gear unit data**			
10079.3	Gear unit reduction ratio "numerator" (only in connection with MOVIGEAR® drive units	[Text]	
10079.4	Gear unit reduction ratio "denominator" (only in connection with MOVIGEAR® drive units	[Text]	
–	Gear unit ratio (only in connection with MOVIGEAR® drive units	[Text]	
10079.5	Number of gear unit stages (only in connection with MOVIGEAR® drive units	[Text]	
Power section parameters/display values/fault memory 0-4/**fault memory t-0**			
Fault status			
8366.0	Fault t-0 fault code	[Text]	
10072.1	Fault t-0 subfault code	[Text]	
8883.0	Fault t-0 internal	[Text]	
10404.6	Source of fault t-0	[Text]	
Actual drive values			
8401.0	Actual speed t-0	[min^{-1}]	1 digit = 0.001 min^{-1}

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Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
8406.0	Apparent output current t-0	[%]	1 digit = 0.001%
8411.0	Active output current t-0	[%]	1 digit = 0.001%
8416.0	Device utilization t-0	[%]	1 digit = 0.001%
8441.0	Motor utilization t-0	[%]	1 digit = 0.001%
8421.0	DC link voltage t-0	[V]	1 digit = 0.001 V
Device status			
8391.0	Power section status t-0	[Text]	
8426.0	Power-applied hours t-0	[h]	1 digit = 1 min = 1/60 h
8431.0	Drive running hours t-0	[h]	1 digit = 1 min = 1/60 h
10083.1	Work t-0	[kWh]	1 digit = 1Ws = 1/3600000
Temperatures			
8396.0	Heat sink temperature t-0	[°C]	1 digit = 1 °C
10070.1	Motor temperature t-0	[°C]	1 digit = 10^{-6} °C
Power section parameters/display values/fault memory 0-4/**fault memory t-1**			
Fault status			
8367.0	Fault t-1 fault code	[Text]	
10072.2	Fault t-1 subfault code	[Text]	
8884.0	Fault t-1 internal	[Text]	
10404.7	Source of fault t-1	[Text]	
Actual drive values			
8402.0	Actual speed t-1	[min^{-1}]	1 digit = 0.001 min^{-1}
8407.0	Apparent output current t-1	[%]	1 digit = 0.001%
8412.0	Active output current t-1	[%]	1 digit = 0.001%
8417.0	Device utilization t-1	[%]	1 digit = 0.001%
8442.0	Motor utilization t-1	[%]	1 digit = 0.001%
8422.0	DC link voltage t-1	[V]	1 digit = 0.001 V
Device status			
8392.0	Power section status t-1	[Text]	
8427.0	Power-applied hours t-1	[h]	1 digit = 1 min = 1/60 h
8432.0	Drive running hours t-1	[h]	1 digit = 1 min = 1/60 h
10083.2	Work t-1	[kWh]	1 digit = 1Ws = 1/3600000
Temperatures			
8397.0	Heat sink temperature t-1	[°C]	1 digit = 1 °C

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Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
10070.2	Motor temperature t-1	[°C]	1 digit = 10^{-6} °C
Power section parameters/display values/fault memory 0-4/**fault memory t-2**			
Fault status			
8368.0	Fault t-2 fault code	[Text]	
10072.3	Fault t-2 subfault code	[Text]	
8885.0	Fault t-2 internal	[Text]	
10404.8	Source of fault t-2	[Text]	
Input/output state			
Actual drive values			
8403.0	Actual speed t-2	[min^{-1}]	1 digit = 0.001 min^{-1}
8408.0	Apparent output current t-2	[%]	1 digit = 0.001%
8413.0	Active output current t-2	[%]	1 digit = 0.001%
8418.0	Device utilization t-2	[%]	1 digit = 0.001%
8443.0	Motor utilization t-2	[%]	1 digit = 0.001%
8423.0	DC link voltage t-2	[V]	1 digit = 0.001 V
Device status			
8393.0	Power section status t-2	[Text]	
8428.0	Power-applied hours t-2	[h]	1 digit = 1 min = 1/60 h
8433.0	Drive running hours t-2	[h]	1 digit = 1 min = 1/60 h
10083.3	Work t-2	[kWh]	1 digit = 1Ws = 1/3600000
Temperatures			
8398.0	Heat sink temperature t-2	[°C]	1 digit = 1 °C
10070.3	Motor temperature t-2	[°C]	1 digit = 10^{-6} °C
Power section parameters/display values/fault memory 0-4/**fault memory t-3**			
Fault status			
8369.0	Fault t-3 fault code	[Text]	
10072.4	Fault t-3 subfault code	[Text]	
8886.0	Fault t-3 internal	[Text]	
10404.9	Source of fault t-3	[Text]	
Actual drive values			
8404.0	Actual speed t-3	[min^{-1}]	1 digit = 0.001 min^{-1}
8409.0	Apparent output current t-3	[%]	1 digit = 0.001%
8414.0	Active output current t-3	[%]	1 digit = 0.001%
8419.0	Device utilization t-3	[%]	1 digit = 0.001%

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
8444.0	Motor utilization t-3	[%]	1 digit = 0.001%
8424.0	DC link voltage t-3	[V]	1 digit = 0.001 V
Device status			
8394.0	Power section status t-3	[Text]	
8429.0	Power-applied hours t-3	[h]	1 digit = 1 min = 1/60 h
8434.0	Drive running hours t-3	[h]	1 digit = 1 min = 1/60 h
10083.4	Work t-3	[kWh]	1 digit = 1Ws = 1/3600000
Temperatures			
8399.0	Heat sink temperature t-3	[°C]	1 digit = 1 °C
10070.4	Motor temperature t-3	[°C]	1 digit = 10^{-6} °C
Power section parameters/display values/fault memory 0-4/**fault memory t-4**			
Fault status			
8370.0	Fault t-4 fault code	[Text]	
10072.5	Fault t-4 subfault code	[Text]	
8887.0	Fault t-4 internal	[Text]	
10404.10	Source of fault t-4	[Text]	
Actual drive values			
8405.0	Actual speed t-4	[min^{-1}]	1 digit = 0.001 min^{-1}
8410.0	Apparent output current t-4	[%]	1 digit = 0.001%
8415.0	Active output current t-4	[%]	1 digit = 0.001%
8420.0	Device utilization t-4	[%]	1 digit = 0.001%
8445.0	Motor utilization t-4	[%]	1 digit = 0.001%
8425.0	DC link voltage t-4	[V]	1 digit = 0.001 V
Device status			
8395.0	Power section status t-4	[Text]	
8430.0	Power-applied hours t-4	[h]	1 digit = 1 min = 1/60 h
8435.0	Drive running hours t-4	[h]	1 digit = 1 min = 1/60 h
10083.5	Work t-4	[kWh]	1 digit = 1Ws = 1/3600000
Temperatures			
8400.0	Heat sink temperature t-4	[°C]	1 digit = 1 °C
10070.5	Motor temperature t-4	[°C]	1 digit = 10^{-6} °C

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8.2.2 Parameters that can be changed

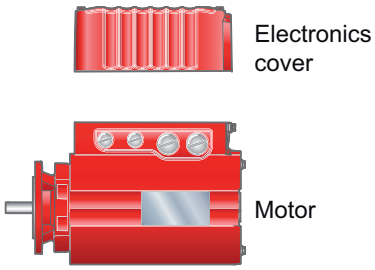
Storage location

INFORMATION

The following parameters are stored in the DRC.. motor.

If the motor is replaced, for example for service purposes, changes made to these parameters must be made again.

The changes remain active after changing the electronics cover.



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Setpoints/ramp generators

Index	Parameter name	MOVITOOLS® MotionStudio display (range/factory setting)	MOVILINK® scaling
Power section parameters\setpoints/ramp generators**setpoint monitoring**			
Stop by setpoint function			
8578.0	Stop by setpoint function	• **0 = Off** • 1 = On	
8579.0	Stop setpoint	**160** – 500 [min^{-1}]	1 digit = 0.001 min^{-1}
8580.0	Start offset	0 – **30** – 500 [min^{-1}]	1 digit = 0.001 min^{-1}
Power section parameters\setpoints/ramp generators**speed ramps**			
Stop ramps			
8476.0	Stop ramp t13	0.0 – **2.0** – 2000.0 [s]	1 digit = 0.001 s
8477.0	Emergency stop ramp t14	0.0 – **2.0** – 2000.0 [s]	1 digit = 0.001 s
Ramp monitoring functions			
8928.0	Ramp monitoring	• **0 = Off** • 1 = On	
Power section parameters\setpoints/integrators**motor potentiometer**			
8486.0	Ramp t3 up	0.2 – **20.0** – 2000.0 [s]	1 digit = 0.001 s
8487.0	Ramp t3 down	0.2 – **20.0** – 2000.0 [s]	1 digit = 0.001 s
8488.0	Save last setpoint	• **0 = No** • 1 = Yes	

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Drive data

NOTICE

Damage to the DRC.. drive unit.

Potential damage to property.

- Consult SEW-EURODRIVE before you change the torque limit.

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Power section parameters\drive data**motor parameters**			
Motor operating mode			
8574.0	Operating mode (display value)	• **16 = Servo** • 18 = Servo & IPOS	
Motor direction of rotation			
8537.0	Direction of rotation reversal (display value)	• **0 = Off** • 1 = On	
Modulation			
8827.0	PWM frequency (display value)	• 0 = 4 kHz • **1 = 8 kHz**	
Power section parameters\drive data**monitoring functions**			
Speed monitoring			
8557.0	Speed monitoring	• 0 = Off • 1 = Motor mode • 2 = Regenerative mode • **3 = Motor/regenerative**	
8558.0	Speed monitoring delay time	0.00 – **1.00** – 10.00 [s]	1 digit = 0.001 s
Power section parameters\drive data**limit values**			
Setpoint limits			
8516.0	Minimum speed	0.0 – **200.0** – 2000.0 [min^{-1}]	1 digit = 0.001 min^{-1}
8517.0	Maximum motor speed	0.0 – 200.0 – **2000.0** [min^{-1}]	1 digit = 0.001 min^{-1}
Drive limits			
8518.0	Current limit	**In connection with mechatronic MOVIGEAR® drive unit:** 0 – **250** – 400 [% I_N]	1 digit = 0.001% I_N
		In connection with DRC.. electronic motor: 0 – **250** – 300 [% I_N]	1 digit = 0.001% I_N

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Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
9951.3	Effective current limit	**Only in connection with mechatronic MOVIGEAR® drive unit:** 0 – 400 [% I_N]	1 digit = 0.001% I_N
8688.0	Torque limit	**In connection with mechatronic MOVIGEAR® drive unit:** 0 – **250** – 400 [% I_N]	1 digit = 0.001% I_N
		In connection with DRC.. electronic motor: 0 – **250** – 300 [% I_N]	1 digit = 0.001% I_N

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Terminal assignment

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Power section parameters\terminal assignment**digital outputs**			
8349.0, bit 1	Digital output DO01 state (signal relay K1)	[Bit field]	
8350.0	Digital output DO01 function (signal relay K1)	• **0 = No function** • 1 = /Fault • 2 = Ready • 3 = Output stage ON • 4 = Rotating field ON • 5 = Brake released • 6 = Brake applied • 7 = Motor standstill • 8 = Reserved • 9 = Speed reference signal • 10 = Speed reference signal • 11 = Setpoint-actual value comparison signal • 12 = Current reference signal • 13 = Imax signal • 14 = /Warning motor utilization 1 • 19 = IPOS in position • 20 = IPOS referenced • 21 = IPOS output • 22 = /IPOS fault • 27 = STO – safe torque off • 34 = Process data bit	

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Diagnostic functions

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Power section parameters\diagnostics functions**reference signals**			
Speed reference signal			
8539.0	Speed reference value	0.0 ... 1500.0 ... 2000.0 [min^{-1}]	1 digit = 0.001 min^{-1}
8540.0	Hysteresis	0.0 ... 100.0 ... 500.0 [min^{-1}]	1 digit = 0.001 min^{-1}
8541.0	Delay time	0.0 ... 1.0 ... 9.0 [s]	1 digit = 0.001 s
8542.0	Signal = "1" if:	• **0 = n < n ref** • 1 = n > n ref	
Speed window signal			
8543.0	Window center	0 ... 1500 ... 2000 [min^{-1}]	1 digit = 0.001 min^{-1}
8544.0	Range width	**0** ... 2000 [min^{-1}]	1 digit = 0.001 min^{-1}
8545.0	Delay time	0 ... 1 ... 9 [s]	1 digit = 0.001 s
8546.0	Signal = "1" if:	• **0 = internal** • 1 = external	
Speed setpoint/actual value comparison			
8547.0	Hysteresis	1 ... 100 ... 300 [min^{-1}]	1 digit = 0.001 min^{-1}
8548.0	Delay time	0 ... 1 ... 9 [s]	1 digit = 0.001 s
8549.0	Signal = "1" if:	• **0 = n <> nset** • 1 = n = nset	
Current reference signal			
8550.0	Current reference value	0 ... 100 ... 400 [%]	1 digit = 0.001%
8551.0	Hysteresis	0 ... 5 ... 30 [%]	1 digit = 0.001%
8552.0	Delay time	0 ... 1 ... 9 [s]	1 digit = 0.001 s
8553.0	Signal = "1" if:	• **0 = I < Iref** • 1 = I > Iref	
Imax signal			
8554.0	Hysteresis	**5** ... 50 [%]	1 digit = 0.001%
8555.0	Delay time	0 ... 1 ... 9 [s]	1 digit = 0.001 s
8556.0	Signal = "1" if:	• 0 = I = Imax • **1 = I < Imax**	

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Control functions

Index	Parameter name	MOVITOOLS® MotionStudio (range/ factory setting)	MOVILINK® scaling
Power section parameters\control functions**brake function**			
8584.0	Brake function	• 0 = Off • **1 = On**	
9833.20	Brake application for STO	• 0 = No • **1 = Yes**	

Device functions

Power section parameters\device functions**setup**			
8594.0	Factory setting	• **0 = No** • 1 = Default • 2 = Delivery state	
8595.0	Parameter lock	• **0 = No** • 1 = Yes	
Power section parameters\device functions**fault monitoring**			
Programmable responses			
9729.16	Response to ext. fault	• 0 = No response • 1 = Display only • 2 = Output stage inhibit/locked • 3 = Emergency stop/locked • 4 = Stop/locked • 5 = Output stage inhibit/waiting • **6 = Emergency stop/waiting** • 7 = Stop/waiting	
9729.4	Response to line phase failure	• 0 = No response • **1 = Display only** • 2 = Output stage inhibit/locked • 3 = Emergency stop/locked • 4 = Stop/locked • 5 = Output stage inhibit/waiting • 6 = Emergency stop/waiting • 7 = Stop/waiting	

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9729.9	TF signal response	• 0 = No response • 1 = Display only • 2 = Output stage inhibit/locked • 3 = Emergency stop/locked • 4 = Stop/locked • 5 = Output stage inhibit/waiting • **6 = Emergency stop/waiting** • 7 = Stop/waiting
Fault acknowledgment		
8617.0	Manual reset	• **0 = No** • 1 = Yes
Power section parameters\device functions**scaling of actual speed value**		
8747.0	Scaling factor for user display numerator	**1** – 65535
8748.0	Scaling factor for user display denominator	**1** – 65535
8772.0	User unit	[Text]
8773.0	User unit	[Text]

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8.3 Description of command pcb parameters

8.3.1 Display values

Command pcb parameters\display values\device status

Operating state index 8310.0

The parameter indicates the current operating state.

Startup mode index 10095.1

The parameter shows the startup mode set with DIP switch S2/1 in plain text:

- EASY
- EXPERT

Setting of DIP switch S1, S2 index 9621.10

The parameter indicates the setting of DIP switches S1 and S2:

DIP switch	Bit in index 9621.10	Functionality	
S1/1	0	PWM cycle frequency	0: 4 kHz 1: variable (8, 4 kHz)
S1/2	1	Release brake without drive enable	0: Off 1: On
S1/3	2	res.	Reserved
S1/4	3	res.	Reserved
S2/1	4	Startup mode	0: Easy 1: Expert
S2/2	5	res.	Reserved
S2/3	6	Direction of rotation reversal	0: Off 1: On
S2/4	7	Speed monitoring	0: Off 1: On

Display of the DIP switch setting is independent of whether the DIP switch function is activated or deactivated.

Setting of switch f2 index 10096.27

The parameter indicates the setting of switch f2.

The display of the switch setting is independent of whether the switch function is activated or deactivated.

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Parameter setting of switch t1 index 10096.29

The parameter indicates the setting of switch t1.

The display of the switch setting is independent of whether the switch function is activated or deactivated.

Command pcb parameters\display values\analog setpoints

Setting of setpoint potentiometer f1 index 10096.28

The parameter indicates the setting of setpoint potentiometer f1.

The display of the switch setting is independent of whether the potentiometer function is activated or deactivated.

Command pcb parameters\display values\digital inputs

Terminal configuration index 10096.34

The parameter indicates the set terminal configuration.

Digital input DI01 index 8334.0, bit 1

The parameter indicates the state of digital input DI01.

Digital input DI02 index 8334.0, bit 2

The parameter indicates the state of digital input DI02.

Digital input DI03 index 8334.0, bit 3

The parameter indicates the state of digital input DI03.

Digital input DI04 index 8334.0, bit 4

The parameter indicates the state of digital input DI04.

Digital input DI01 index 8335.0

The parameter indicates the function of digital input DI01.

Digital input DI02 index 8336.0

The parameter indicates the function of digital input DI02.

Digital input DI03 index 8337.0

The parameter indicates the function of digital input DI03.

Digital input DI04 index 8338.0

The parameter indicates the function of digital input DI04.

Command pcb parameters\display values\digital outputs

Digital output DO01

For digital output DO01, see power section.

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Command pcb parameters\display values\device data

Device series

The parameter indicates the device family, for example DRC..

Device name index 9701.1 – 9701.5

The parameter indicates the type designation of the command pcb.

Device signature index 9823.1 – 9823.5

The parameter is used to indicate and enter the device signature. This parameter is used to assign a name to the command pcb so you can identify it in the hardware tree or in other visualization elements.

Firmware command level index 9701.30, 9701.31

The parameter indicates the part number of the firmware used in the command pcb.

Deactivation of mechanical control elements index 10096.30 bits 13 – 15

The parameter indicates disabled/enabled mechanical control elements.

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8.3.2 Setpoints/ramp generators

Command pcb parameters\setpoints/ramp generators\setpoint selection

Deactivation of mechanical control elements index 10096.30, bits 13 – 15

Use this bit-coded selection box to disable the mechanical controls of the DRC.. inverter.

The parameter is set at the factory so that all mechanical control elements are effective.

Bit	Meaning	Information	
13	Deactivation of the setpoint potentiometer f1	Bit not set:	Setpoint potentiometer f1 active
		Bit set:	Setpoint potentiometer f1 not active Setting the setpoint and the maximum speed using parameters
14	Deactivation of switch f2	Bit not set:	Switch f2 active
		Bit set:	Switch f2 not active Setting the setpoint and the minimum speed using parameters
15	Deactivation of switch t1	Bit not set:	Switch t1 active
		Bit set:	Switch t1 not active Setting the ramp times using parameters

Command pcb parameters\setpoints/ramp generators\speed ramps

Ramp t11 up index 8807.0

Use this parameter to set acceleration ramp "t11 up".

- Unit: [s]
- Setting range: 0 – **1** – 60 s

The ramp times refer to a setpoint step change of Δn = 3000 min^{-1}.

Ramp t11 down index 8808.0

Use this parameter to set deceleration ramp "t11 down".

- Unit: [s]
- Setting range: 0 – **1** – 60 s

The ramp times refer to a setpoint step change of Δn = 3000 min^{-1}.

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Command pcb parameters\setpoints/ramp generators\setpoints

Setpoint n_f1 index 10096.35

Use this parameter to set setpoint "n_f1".

- Unit: [min^{-1}]
- Setting range: 0 – **1500** – 2000 min^{-1}

The setpoint "n_f1" is valid if

- setpoint potentiometer f1 is deactivated, i.e. when parameter 10096.30, bit 13 = "1"
- parameter 10096.34 terminal configuration = "0"
- and the signal "0" is present at terminal f1/f2.

Setpoint n_f2 index 10096.36

Use this parameter to set setpoint "n_f2".

- Unit: [min^{-1}]
- Setting range: 0 – **200** – 2000 min^{-1}

The setpoint n_f2 is valid if

- switch f2 is deactivated, i.e. when parameter 10096.30, bit 14 = "1"
- parameter 10096.34 terminal configuration = "0"
- and the signal "1" is present at terminal f1/f2.

Command pcb parameters\setpoints/ramp generators\fixed setpoints

Fixed setpoints n0 – n3 index 8489.0 – 8491.0, 10096.31

Use these parameters to set fixed setpoints n0 – n3.

The fixed setpoints n0 to n3 are valid if parameter 10096.34 Terminal assignment = "1".

You can then select fixed setpoints n0 – n3 using the programmed functionality of the input terminals.

The sign of the fixed setpoint determines the direction of rotation of the motor.

Index	Active setpoint	State DI02	State DI03
8489.0	n0	OFF	OFF
8490.0	n1	ON	OFF
8491.0	n2	OFF	ON
10096.31	n3	ON	ON

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8.3.3 Terminal assignment

Command pcb parameters\terminal assignment\digital inputs

Terminal configuration index 10096.34

Use this parameter to select the configuration of digital input terminals.

The following table shows the functions of the digital input terminals in relation to the control setpoint source and the terminal configuration:

INFORMATION

You can change parameter 10096.34 only when all digital inputs are set to "0".

Digital input DI04 is assigned the function "reset".

Terminal configuration		Digital input terminal		
		Digital input DI03	**Digital input DI02**	**Digital input DI01**
0:	**Terminal configuration 1**	Setpoint changeover "0" signal: Setpoint f1 "1" signal: Setpoint f2	CCW/stop "0" signal: Stop "1" signal: CCW rotation	CW/stop "0" signal: Stop "1" signal: CW rotation
1:	**Terminal configuration 2**	Selection of fixed setpoints Fixed setpoint n0: **Signal "0", "0"** parameter 8489.0 Fixed setpoint n1: **Signal "0", "1"** parameter 8490.0 Fixed setpoint n2: **Signal "1", "0"** parameter 8491.0 Fixed setpoint n3: **Signal "1", "1"** parameter 10096.31		Enable/stop "0" signal: Stop "1" signal: Enable
2:	**Terminal configuration 3**	Setpoint changeover "0" signal: Setpoint f1 "1" signal: Setpoint f2	/External fault "0" signal: Ext. fault "1" signal: No ext. fault	Enable/stop "0" signal: Stop "1" signal: Enable
3:	**Terminal configuration 4**	Motor pot. down	Motor pot. up	CW/stop "0" signal: Stop "1" signal: CW rotation
4:	**Terminal configuration 5**	Motor pot. down	Motor pot. up	CCW/stop "0" signal: Stop "1" signal: CCW rotation

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Digital input DI01 index 8334.0, bit 1

The parameter indicates the state of digital input DI01.

Digital input DI02 index 8334.0, bit 2

The parameter indicates the state of digital input DI02.

Digital input DI03 index 8334.0, bit 3

The parameter indicates the state of digital input DI03.

Digital input DI04 index 8334.0, bit 4

The parameter indicates the state of digital input DI04.

Digital input DI01 index 8335.0

The parameter indicates the function of digital input DI01.

Digital input DI02 index 8336.0

The parameter indicates the function of digital input DI02.

Digital input DI03 index 8337.0

The parameter indicates the function of digital input DI03.

Digital input DI04 index 8338.0

The parameter indicates the function of digital input DI04. The function is always set to "reset".

Command pcb parameters\terminal assignment\digital outputs

Digital output DO01

For digital output DO01, see power section.

8.3.4 Device functions

Command pcb parameters\device functions\setup

Factory setting index 8594.0

If you set this parameter to "Delivery state", all parameters that have a factory setting and can **not** be set using switches t1/f2 or setpoint potentiometer f1 are reset to their factory set values.

For those parameters that can be set using switches t1/f2 or setpoint potentiometer f1 during startup in "Easy mode", the setting of the mechanical setting element becomes active when the factory setting "Delivery state" is selected.

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8.4 Description of power section parameters

8.4.1 Display values

Power section parameters\display values\process values

Actual speed index 8318.0

The parameter indicates the motor speed:

- Unit: [min^{-1}]
- Resolution ±0.2 min^{-1}

User display index 8501.0

The user display is defined by the following parameters:

- 8747.0 Scaling factor for user display numerator
- 8748.0 Scaling factor for user display denominator
- 8772.0/8773.0 User-defined unit
- Unit: [Text]

Apparent output current index 8321.0

The parameter indicates the apparent current:

- Unit: [% I_N]

Active output current index 8322.0

The parameter indicates the active current. The display value is positive when torque is applied in the positive direction of rotation; negative when torque is applied in the negative direction of rotation.

- Unit: [% I_N]

Apparent output current index 8326.0

The parameter indicates the apparent output current:

- Unit: [A]

DC link voltage index 8325.0

The parameter indicates the voltage measured in the DC link circuit:

- Unit: [V]

Device utilization index 8730.0

The parameter indicates the device utilization Ixt:

- Unit: [%]

Heat sink temperature index 8327.0

The parameter indicates the heat sink temperature of the power section:

- Unit: [°C]

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Motor utilization index 8323.0

The parameter indicates the motor utilization calculated using motor model and current.

- Unit: [%]

Motor temperature index 9872.255

The parameter indicates the measured motor temperature.

- Unit: [°C]

Power section parameters/display values/device status

Status of power section index 9702.2

The parameter indicates the status of the power section:

- **0 = Not ready**
- 1 = Ready, output stage inhibited
- 2 = Ready, output stage enabled

Drive status index 9702.7

The parameter indicates the operating state of the power section:

- 0 = Inhibited
- 1 = Controller inhibit
- 2 = System error
- 3 = No enable
- 6 = Enabled
- 7 = Rapid stop
- 8 = Integrator stop
- 9 = Emergency stop
- 11 = Limit switch operation
- 12 = Pos. operation
- 15 = Reference travel
- 18 = Release brake
- 19 = Apply brake

Fault and fault code index 9702.5

The parameter indicates a pending fault with the fault number in plain text.

Fault and subfault code index 10071.1

The parameter provides detailed information on the fault of a fault group.

Fault source index 10404.5

The parameter indicates the fault source of a pending fault:

- **0 = No fault**
- 1 = Power section
- 2 = Command pcb

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Operating hours index 8328.0

The parameter indicates the total number of hours for which the inverter has been connected to the power grid or an external DC 24 V supply.

- Storage cycle every 15 min
- Unit: [h]

Enable hours index 8329.0

The parameter indicates the total number of hours for which the power section was in ENABLE operating state:

- Storage cycle every 15 min
- Unit: [h]

Energy index 8330.0

The parameter indicates the total of active electrical energy the motor has consumed:

- Storage cycle every 15 min
- Unit: [kWh]

Power section parameters\display values\digital outputs

Digital output DO01 index 8349.0, bit 1

The parameter indicates the present state of digital output DO01 (e.g. signal relay K1) of the basic unit.

Digital output DO01 index 8350.0

The parameter indicates the current function assignment of digital output DO01 (e.g. signal relay K1) of the basic unit.

Power section parameters\display values\device data

Device series index 9701.10

The parameter indicates the device family, for example "DRC..".

Variant ID index 9701.11

The parameter indicates the device generation, for example "B".

Device name index 9701.1, 9701.2, 9701.3, 9701.4, 9701.5

The parameter indicates the type designation of the power section.

Device variant index 10204.2

The parameter indicates the DRC.. installation technology, e.g.:

- DBC = **D**irect **B**inary **C**ommunication
- DAC = **D**irect **A**S-Interface **C**ommunication
- DSC = **D**irect **S**Bus **C**ommunication
- SNI = **S**ingle Line **N**etwork **I**nstallation

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Device signature index 9823.1, 9823.2, 9823.3, 9823.4, 9823.5

The parameter is used to indicate and enter the device signature. This parameter is used to assign a name to the power section so you can identify it in the hardware tree or in other visualization elements.

Manufacturing number index 9701.100, 9701.101, 9701.102, 9701.103, 9701.104, 9701.105

Displays the manufacturing number of the basic unit.

Value range: 6 parameters with 4 ASCII characters each.

Nominal device current (rms) index 8361.0

The parameter indicates the nominal device current (rms value).

- Unit: [A]

Motor size index 10079.9

The parameter indicates the size of the DRC.. drive unit.

Nominal motor torque index 9610.1

The parameter indicates the available continuous torque of the motor.

- Unit: [Nm × 10^{-5}]

Basic unit firmware index 9701.30

The parameter indicates the part number of the firmware used in the power section.

Status of basic unit firmware index 9701.31

The parameter indicates the status of the firmware used in the power section.

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Power section parameters\display values\fault memory 0-4\fault memory t-0 – 4

There are 5 fault memories (t-0 to t-4). The faults are stored in a chronological sequence with the most recent fault event being held in fault memory t-0. If there are more than 5 faults, the fault event of longest standing stored in t-4 is deleted.

Programmable fault responses: see chapter "Device functions/Fault monitoring".

The following information available at the time of the fault is stored and can be used for detailed diagnostics:

- State of digital inputs/digital outputs
- Actual speed
- Apparent output current
- Active current
- Device utilization
- Motor utilization
- DC link voltage
- Power section status
- Power-applied hours
- Drive running hours
- Work
- Heat sink temperature
- Motor temperature
- Electronics temperature

Fault t-0 – 4 fault code index 8366.0, 8367.0, 8368.0, 8369.0, 8370.0

The parameter indicates the fault group with the fault number in plain text.

Fault t-0 – 4 subfault code index 10072.1, 10072.2, 10072.3, 10072.4, 10072.5

The parameter provides detailed information on the fault of a fault group.

Fault t-0 – 4 internal index 8883.0, 8884.0, 8885.0, 8886.0, 8887.0

The parameter provides detailed information on the fault and can only be evaluated by SEW-EURODRIVE.

Source of fault t-0 – 4 index 10404.6, 10404.7, 10404.8, 10404.9, 10404.10

The parameter indicates the source of the fault:

- **0 = No fault**
- 1 = Power section
- 2 = Command pcb

Actual speed t-0 – 4 index 8401.0, 8402.0, 8403.0, 8404.0, 8405.0

The parameter indicates the actual motor speed at the time of the fault.

- Unit [min^{-1}]

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Apparent output current t-0 – 4 index 8406.0, 8407.0, 8408.0, 8409.0, 8410.0

The parameter indicates the apparent output current in percent of the nominal device current at the time of the fault.

- Unit [%]

Active output current t-0 – 4 index 8411.0, 8412.0, 8413.0, 8414.0, 8415.0

The parameter indicates the active output current in percent of the nominal device current at the time of the fault.

- Unit [%]

Device utilization t-0 – 4 index 8414.0, 8417.0, 8418.0, 8419.0, 8420.0

The parameter indicates the device utilization Ixt at the time of the fault.

- Unit: [%]

Motor utilization t-0 – 4 index 8441.0, 8442.0, 8443.0, 8444.0, 8445.0

The parameter indicates the motor utilization calculated using motor model and current at the time of the fault.

- Unit: [%]

DC link voltage t-0 – 4 index 8421.0, 8422.0, 8423.0, 8424.0, 8425.0

The parameter indicates the voltage measured in the DC link circuit at the time of the fault.

- Unit: [V]

Power section status t-0 – 4 index 8391.0, 8392.0, 8393.0, 8394.0, 8395.0

The parameter indicates the operating state of the power section at the time of the fault:

- 0 = Inhibited
- 1 = Controller inhibit
- 2 = System error
- 3 = No enable
- 6 = Enabled
- 7 = Rapid stop
- 8 = Integrator stop
- 9 = Emergency stop
- 11 = Limit switch operation
- 12 = Pos. operation
- 15 = Reference travel
- 18 = Release brake
- 19 = Apply brake

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Power-applied hours t-0 – 4 index 8426.0, 8427.0, 8428.0, 8429.0, 8430.0

The parameter indicates the total number of hours for which the inverter has been connected to the power supply at the time of the fault.

- Storage cycle every 15 min
- Unit: [h]

Drive running hours t-0 – 4 index 8431.0, 8432.0, 8433.0, 8434.0, 8435.0

The parameter indicates the total number of hours for which the power section was in ENABLE operating state at the time of the fault.

- Storage cycle every 15 min
- Unit: [h]

Work t-0 – 4 index 10083.1, 10083.2, 10083.3, 10083.4, 10083.5

The parameter indicates the total of active electrical energy the motor has consumed at the time of the fault.

- Storage cycle every 15 min

Heat sink temperature t-0 – 4 index 8396.0, 8397.0, 8398.0, 8399.0, 8400.0

The parameter indicates the heat sink temperature of the power section at the time of the fault.

- Unit: [°C]

Motor temperature t-0 – 4 index 10070.1, 10070.2, 10070.3, 10070.4, 10070.5

The parameter indicates the motor temperature measured at the time of the fault.

- Unit: [°C]

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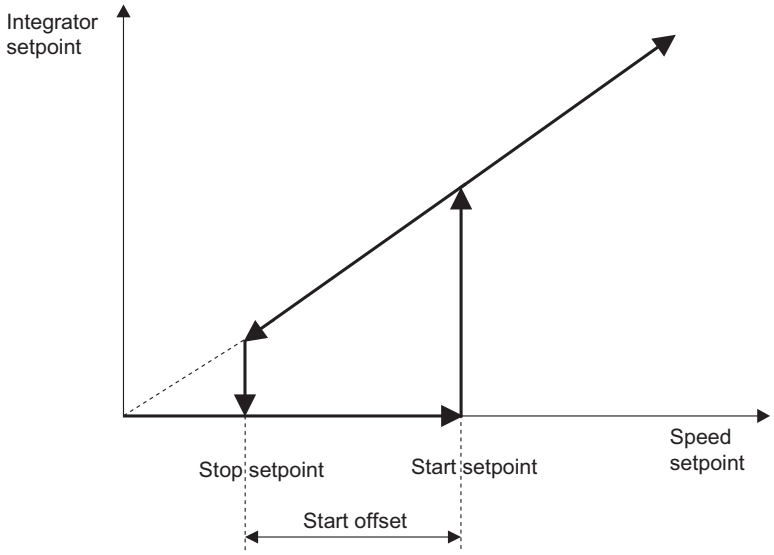
8.4.2 Setpoints/ramp generators

Power section parameters\setpoints/ramp generators\setpoint monitoring

Stop by setpoint function index 8578.0; stop setpoint index 8579.0; start offset index 8580.0

If the stop by setpoint function is activated, the inverter is enabled when the speed setpoint is larger than stop setpoint + start offset.

Inverter enable is revoked when the speed setpoint falls below the stop setpoint.



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Power section parameters\setpoints/ramp generators\speed ramps

Stop ramp t13 index 8476.0

This parameter is used to set stop ramp t13:

- Unit: [s]
- Setting range: 0 – **2** – 2000 s

The stop ramp is active in the event of a voltage drop or a fault (parameterizable fault responses).

Emergency stop ramp t14 index 8477.0

This parameter is used to set emergency stop ramp t14:

- Unit: [s]
- Setting range: 0 – **2** – 2000 s

The emergency stop ramp is activated in the event of a fault (parameterizable fault responses).

The system monitors whether the drive reaches zero speed within the set time. After expiry of the set time, the output stage is inhibited and the brake (if installed) is applied even if zero speed has not yet been reached.

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Ramp monitor index 8928.0

This parameter is used to activate ramp monitoring:

- Setting range: YES/NO

If you set the deceleration ramps to a value that is much shorter than can be physically achieved in the system, the rotating drive will be stopped once the monitoring time has expired.

The respective ramp time also has to be increased, if the ramp timeout is definitely triggered by a preset ramp that cannot be traveled. This parameter is an additional monitoring function for speed monitoring. However, it only applies to the deceleration ramp. This means the parameter can be used to monitor the deceleration ramp, stop ramp or emergency stop ramp if speed monitoring is not desired.

Power section parameters\setpoints/integrators\motor potentiometer

Ramp t3 up/down index 8486.0, 8467.0

These parameters are used to set ramp t3:

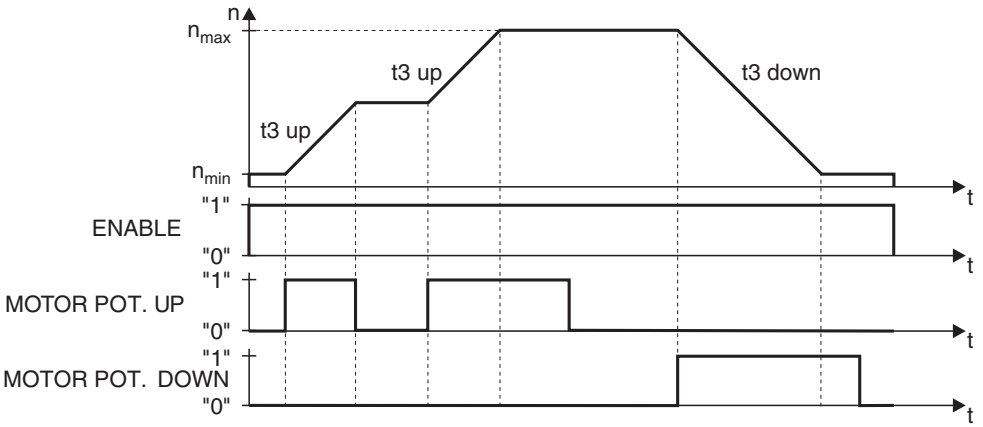
- Unit: [s]
- Setting range: 0.2 – **20** – 2000 s

The ramp is active when the terminal assignment in the command pcb was configured to motor potentiometer right or motor potentiometer left.

The ramp times refer to a setpoint change of $\triangle n = 3000\ min^{-1}$.

Save last setpoint index 8488.0

- ON: If MOTOR POT UP and MOTOR POT DOWN = "0," the last applicable motor potentiometer setpoint is stored in the non-volatile memory 2 s afterwards. The last motor potentiometer setpoint takes effect again after power off and power on.
- **OFF:** Following power off/power on or after withdrawal of the enable, the inverter starts with minimum speed index 8516.0.



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8.4.3 Drive data

Power section parameters\drive data\motor parameters

Operating mode index 8574.0

The parameter indicates the set operating mode:

- **16 = Servo**
- 18 = Servo & IPOS

Direction of rotation reversal index 8537.0

The parameter indicate whether direction of rotation reversal was activated via DIP switches.

- OFF: The motor turns CW for a positive setpoint and CCW for a negative setpoint.
- ON: The motor turns CCW for a positive setpoint and CW for a negative setpoint.

PWM frequency index 8827.0

The parameter shows the nominal cycle frequency at the inverter output that is set using DIP switches. The cycle frequency can change automatically depending on the device utilization:

- **0 = 4 kHz**
- 1 = 8 kHz

Power section parameters\drive data\monitoring functions

The following monitoring functions have been implemented to monitor what happens to drive-specific parameters in the specific application and to be able to react in case of impermissible deviations. You can set the response to triggered monitoring functions under "Device functions/Fault monitoring".

Speed monitoring index 8557.0

This parameter is used to activate speed monitoring.

Setting range:

- OFF
- MOTOR MODE
- GENERATOR MODE
- **MOTOR/GENERATOR**

The speed required by the setpoint can only be achieved if there is sufficient torque available to meet the load requirements. Once the current limit (index 8518.0) has been reached, the device assumes that the torque has reached its maximum and the desired speed cannot be reached. Speed monitoring is triggered if this situation persists for the duration specified in the delay time (index 8558.0).

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Delay time for speed monitoring index 8558.0

This parameter is used to set the delay time for speed monitoring:

- Setting range: 0 – **5** – 10 s

The set current limit can be reached briefly during acceleration, deceleration, or load peaks. You can prevent speed monitoring from responding too sensitively by setting the delay time accordingly. The current limit must be reached permanently for the duration of the delay time before the monitoring function trips.

Power section parameters\drive data\limit values

Minimum speed index 8576.0

This parameter is used to set the speed value, the lower limit of which must not be exceeded even when zero is selected as the setpoint:

- Setting range: 0 – 2000 min^{-1}

Maximum speed index 8517.0

This parameter is used to set the speed value, which cannot be exceeded by a specified setpoint:

- Setting range: 0 – 2000 min^{-1}

When $n_{min} > n_{max}$ is set, then n_{max} applies.

Current limit index 8518.0

This parameter is used to set the current limit:

- Setting range: 0 – **250** – 300% I_N

The current limit is given in % IN. It is based on the continuous apparent current of the power section. The actually effective current limit calculated by the device can be lower to protect the gear unit. It is shown in the parameter "effective current limit".

Torque limit index 8688.0

NOTICE

Damage to the DRC.. drive unit

Potential damage to property.

- Consult SEW-EURODRIVE before you change the torque limit.

This parameter is used to set the torque limit:

- Setting range: 0 – **250** – 300%

The parameter limits the maximum torque of the motor. The setting acts on the setpoint of the motor torque ($k_T \times I_{N\_inverter}$).

8.4.4 Terminal assignment

Power section parameters\terminal assignment\digital outputs

Digital output DO01 (signal relay K1) index 8349.0, bit 1

The parameter indicates the state of digital output DO01.

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Digital output DO01 (signal relay K1) index 8350.0

INFORMATION

The binary signals are only valid if the inverter has signaled "ready" after it has been switched on and if no error message has been issued. Binary signals have "0" state while the device is being initialized.

Several terminals can be assigned the same function.

This parameter is used to specify the assignment of digital output DO01 (signal relay K1). You can program the digital output to the following functions:

Function	Digital output has	
	"0" signal	**"1" signal**
0 = No function	Always "0" signal	–
1 = /Fault	Collective fault signal	–
2 = Ready	Not ready for operation	Ready
3 = Output stage ON	Device inhibited	Device enabled and motor energized
4 = Rotating field ON	No rotating field	Rotating field
5 = Brake released[1)]	**In connection with mechatronic MOVIGEAR® drive unit:** DynaStop® is active	**In connection with mechatronic MOVIGEAR® drive unit:** DynaStop® is deactivated
	In connection with DRC.. electronic motor: Brake applied	**In connection with DRC.. electronic motor:** Brake released
6 = Brake applied[1)]	**In connection with mechatronic MOVIGEAR® drive unit:** DynaStop® is deactivated	**In connection with mechatronic MOVIGEAR® drive unit:** DynaStop® is active
	In connection with DRC.. electronic motor: Brake released	**In connection with DRC.. electronic motor:** Brake applied
7 = Motor standstill	Motor running	Motor stopped
8 = Reserved	–	–
9 = Speed reference signal	$n > n_{ref}$ ($n < n_{ref}$)	$n < n_{ref}$ ($n > n_{ref}$)
10 = Speed reference signal	Speed is outside (within) speed window	Speed is within (outside) speed window
11 = Setpoint-actual value comparison signal	$n <> n_{setpoint}$ ($n = n_{setpoint}$)	$n = n_{setpoint}$ ($n <> n_{setpoint}$)
12 = Current reference signal	$I > I_{ref}$ ($I < I_{ref}$)	$I < I_{ref}$ ($I > I_{ref}$)
13 = Imax signal	$I < I_{max}$ ($I = I_{max}$)	$I = I_{max}$ ($I < I_{max}$)

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Function	Digital output has	
	"0" signal	"1" signal
14 = /Warning motor utilization 1	100% prewarning of motor protection in parameter set 1	–
19 = IPOS in position	Position not reached	Position reached
20 = IPOS referenced	No referencing	Referencing finished
21 = IPOS output	Depends on IPOS program	
22 = /IPOS fault	IPOS program error message	–
27 = STO – safe torque off	Not active	Active
34 = Process data bit	Bit not set	Bit set

1) Controlled by the inverter. The "Brake released" and "Brake applied" signals are intended to be passed on to a master controller.

8.4.5 Diagnostic functions

Power section parameters\diagnostics functions\reference signals

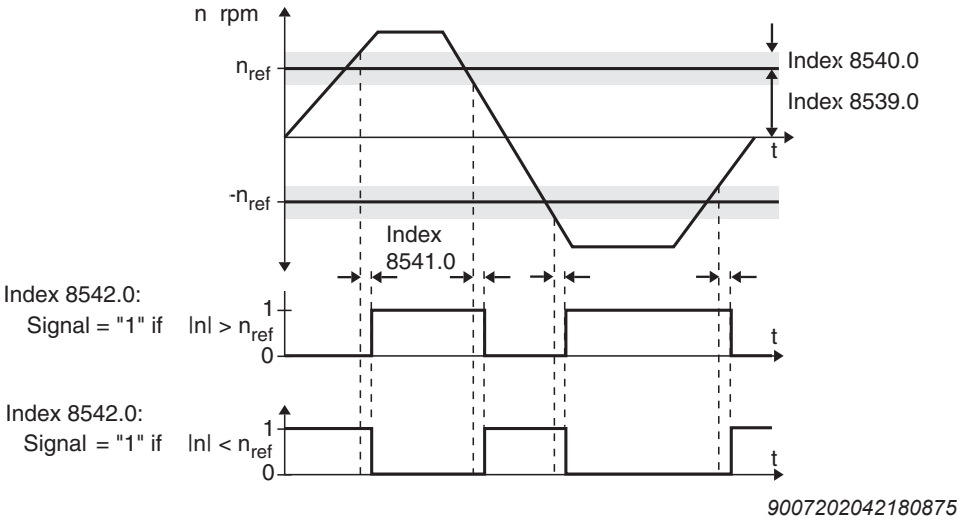
INFORMATION

The signals are only valid if the inverter has signaled "ready" after switch-on and no fault is indicated.

The following reference values are used for detecting and reporting certain operating states. All signals of this parameter group can be output via virtual digital outputs.

Speed reference signal

Signal if the speed is less than or greater than the set reference speed.



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Speed reference value index 8539.0

Setting range: 0 – **1500** – 6000 min^{-1}

Hysteresis index 8540.0

Setting range: 0 – **100** – 500 min^{-1}

Delay time index 8541.0

Setting range: 0 – **1** – 9 s

Signal = "1" if: Index 8542.0

n < n_{ref}/n > n_{ref}

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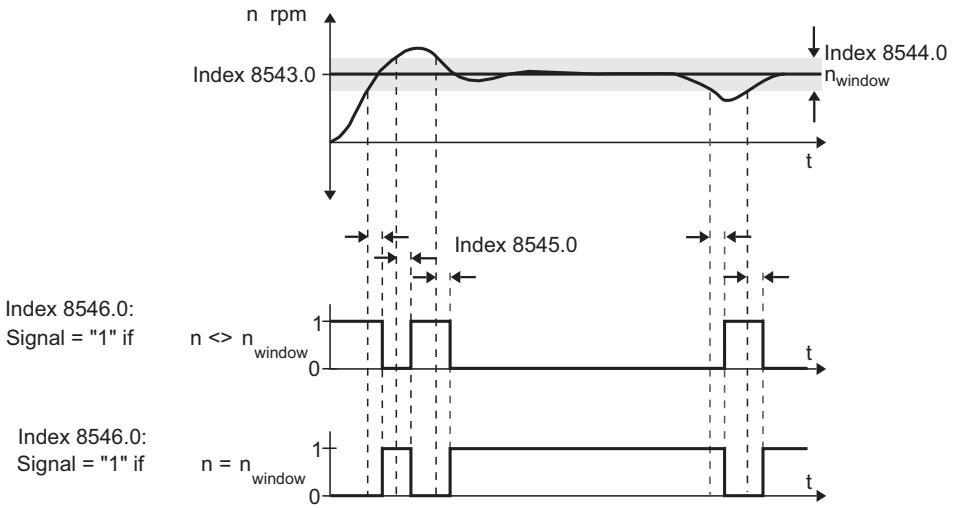
Speed window signal

Signals whether the speed is within or outside the set window range.



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Window center index 8543.0

Setting range: 0 – **1500** – 6000 min^{-1}

Range width index 8544.0

Setting range: **0** – 6000 min^{-1}

Delay time index 8545.0

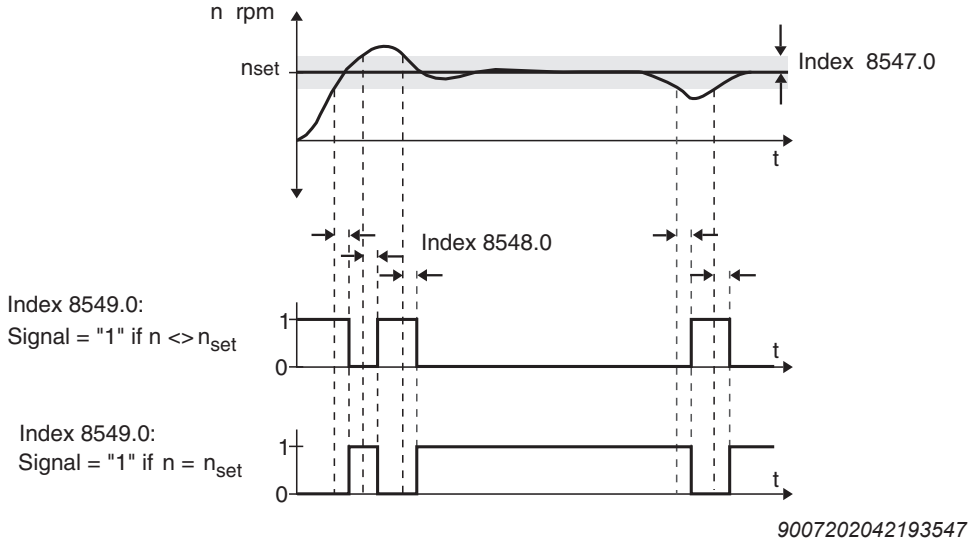
Setting range: 0 – **1** – 9 s

Signal = "1" if: Index 8546.0

Setting range: **WITHIN**/OUTSIDE

Speed setpoint actual value comparison

Signal if the speed is equal to or not equal to the setpoint speed.



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Hysteresis index 8547.0

Setting range: 1 – **100** – 300 min^{-1}

Delay time index 8548.0

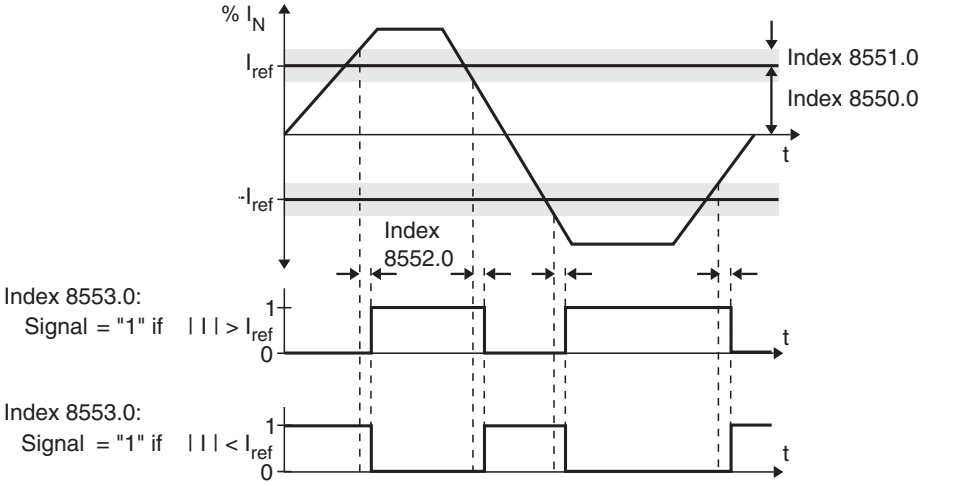
Setting range: 0 – **1** – 9 s

Signal = "1" if: Index 8549.0

Setting range: **n = n_{set}**/n <> n_{set}

Current reference signal

Signal if the output current is greater or less than the reference value.



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Current reference value index 8550.0

Setting range: 0 – **100** – 400% I_N

Hysteresis index 8551.0

Setting range: 0 – **5** – 30% I_N

Delay time index 8552.0

Setting range: 0 – **1** – 9 s

Signal = "1" with index 8553.0

I < I_{ref}/I > I_{ref}

Imax signal

Signal if the inverter has reached the current limiting.

Hysteresis index 8554.0

Setting range: **5** – 50% I_N

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Delay time index 8555.0

Setting range: 0 – **1** – 9 s

Signal = "1" with index 8556.0

I < I$_{max}$/I = I$_{max}$

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8.4.6 Control functions

Power section parameters\control functions\brake functions

Brake function index 8584.0

INFORMATION

- The brake is **always** applied when /CONTROLLER INHIBIT = 0.
- When "STO – safe torque off" is activated, the brake is applied (not safety-related) as set in parameter "Index 9833.20 – brake application for STO".

This function gives users the option to choose between electrically holding the load and mechanical brake application in hold status.

The parameter defines whether the brake is applied or not when the enable signal is withdrawn (enable = "0").

- 0 = OFF: The drive decelerates along the set ramp. When the speed is "0", the brake remains open and the drive generates a holding torque.
- **1 = ON**: The drive decelerates along the set ramp. When the speed is "0", the brake is applied.

Brake application for STO index 9833.20

INFORMATION

Note the information about permitted "emergency braking operations" in the "Technical data" chapter.

The parameter defines whether the brake is applied or not (not safety-related) when STO (safe torque off) is triggered.

- 0 = NO: The brake status remains unchanged when STO is triggered.
- **1 = YES**: The brake is applied when STO is triggered.

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8.4.7 Device functions

Power section parameters\device functions\setup

Factory setting index 8594.0

Parameter 8594.0 is used to reset the factory settings stored in EEPROM for almost all parameters.

Setting range:

- **0 = No**
- 1 = Default
- 2 = Delivery state

The following data is not reset when "default" is selected:

- IPOS program
- Speed control
- Limits
- Serial communication SBus 1
- Speed task 1/2
- Fault memory
- Statistical data

The "delivery state" setting also resets the data listed above.

Once the data has been reset, parameter 8594.0 automatically reverts to "NO".

Parameter lock index 8595.0

Setting range: ON/**OFF**

Setting parameter 8595.0 to "ON" prevents any change to the parameters (except for index 8617.0 manual reset and the parameter lock itself). This is useful, for example, after having optimized the drive settings. To enable changes to parameters again, index 8595.0 must be set to "OFF".

INFORMATION

The parameter lock also acts on the SBus interface and on IPOS$^{plus®}$.

Power section parameters\device functions\fault monitoring

⚠ WARNING

Risk of injury if the drive unit starts up automatically.

Severe or fatal injuries.

- Fault messages can reset automatically depending on the programmed fault response. This means the drive units receive the current process output data from the controller again as soon as the fault is no longer present. If this is not permitted for the driven machine for safety reasons, disconnect the device from the supply system before you start troubleshooting.

The following responses can be programmed:

Response	Description
[0] NO RESPONSE	The fault is not displayed, and there is no fault response. The indicated fault is ignored.
[1] DISPLAY ONLY	The fault is displayed and the fault output is set (if programmed). The device does not perform any other fault response. The fault can be reset (fieldbus, auto reset).
[2] OUTPUT STAGE INHIBIT/LOCKED	The inverter switches off immediately and issues a fault message. The output stage is inhibited and the brake (if installed) is applied. The ready signal is revoked and the fault output is set, if programmed. A restart is only possible after a fault reset during which the inverter is re-initialized.
[3] EMERGENCY STOP/ LOCKED	The drive is braked along the set emergency stop ramp t14. Once the stop speed is reached, the output stage is inhibited and the brake (if installed) is applied. The fault is signaled immediately. The ready signal is revoked and the fault output is set, if programmed. A restart is only possible after a fault reset during which the inverter is re-initialized.
[4] STOP/LOCKED	The drive is braked along the set stop ramp t13. Once the stop speed is reached, the output stage is inhibited and the brake (if installed) is applied. The fault is signaled immediately. The ready signal is revoked and the fault output is set, if programmed. A restart is only possible after a fault reset during which the inverter is re-initialized.
[5] OUTPUT STAGE INHIBIT/WAITING	The inverter switches off immediately and issues a fault message. The output stage is inhibited and the brake (if installed) is applied. The fault is signaled via the terminal, if programmed. The ready signal is revoked. The drive restarts without device re-initialization if the fault is rectified by an internal procedure or by a fault reset.

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Response	Description
[6] EMERGENCY STOP/ WAITING	The drive is braked along the set emergency stop ramp t14. Once the stop speed is reached, the output stage is inhibited and the brake (if installed) is applied. The fault is signaled immediately. The fault is signaled via the terminal, if programmed. The ready signal is revoked. The drive restarts without device re-initialization if the fault is rectified by an internal procedure or by a fault reset.
[7] STOP/WAITING	The drive is braked along the set stop ramp t13. Once the stop speed is reached, the output stage is inhibited and the brake (if installed) is applied. The fault is signaled immediately. The fault is signaled via the terminal, if programmed. The ready signal is revoked. The drive restarts without device re-initialization if the fault is rectified by an internal procedure or by a fault reset.

Response to ext. fault index 9729.16

Factory setting: EMERGENCY STOP/WAITING

The fault is only triggered in the ENABLED inverter status. Index 9729.16 programs the fault response that is triggered by a virtual input terminal programmed to "/EXT. FAULT".

Response to line phase failure index 9729.4

Factory setting: DISPLAY ONLY

The supply system input phases are monitored for failure of a single phase. If a phase failure is detected in two phases, then the DC link will be de-energized, which corresponds to a supply system disconnection.

Since the supply system input phases cannot be monitored directly, monitoring has to be done indirectly via the DC link ripple, which increases drastically in case one phase fails. The DC link voltage is monitored at a time interval D_t = 1 ms for dropping below a minimum voltage level that depends on the rated supply voltage of the device. A line phase failure can only be detected when the drive is enabled and under load.

The result is the following nominal guide value for detecting a phase failure:

- 50 Hz system: approx. t_{max} = 3.0 s
- 60 Hz system: approx. t_{max} = 2.5 s

The programmed response is activated when a line phase failure is detected.

Response to TF signal index 9729.9

Factory setting: EMERGENCY STOP/WAITING

Index 9729.9 is used to program the fault response that is triggered by the temperature sensor monitoring function of the TF or TH that might be installed in the motor winding.

Manual reset index 8617.0

Setting range: YES/NO

YES: The pending fault is reset. Index 8617.0 automatically reverts to NO after the reset. Activating the manual reset does not have any effect if there is no fault present.

NO: No reset.

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Power section parameters\device functions\scaling of actual speed value

Scaling factor for user display speed numerator index 8747.0

Setting range: 1 – 65535

Actual speed scaling defines a user-specific display parameter "index 8501.0 User display". For example, the user display is to be shown in 1/s.

This requires a scaling factor of 1/60. This means the numerator scaling factor has to be set to 1 and the denominator scaling factor to 60. The scaling unit 1/s is entered in "index 8772.0/8773.0 User-defined unit".

The scaling factor also acts on:

- PO1...3 Setpoint speed in user-defined units
- PI1...3 Actual speed in user-defined units

Scaling factor for user display speed denominator index 8748.0

Setting range: 1 – 65535

Actual speed scaling defines a user-specific display parameter "index 8501.0 User display". For example, the user display is to be shown in 1/s.

This requires a scaling factor of 1/60. This means the numerator scaling factor has to be set to 1 and the denominator scaling factor to 60. The scaling unit 1/s is entered in "index 8772.0/8773.0 User-defined unit".

The scaling factor also acts on:

- PO1...3 Setpoint speed in user-defined units
- PI1...3 Actual speed in user-defined units

User-defined unit index 8772.0, 8773.0

Factory setting: min^{-1}.

Max. 8 ASCII characters; displayed in index 8501.0 User display.

Scaling factor for actual position numerator index 9543.1

Permanently set to "1"

With the actual position scaling, a user-specific return value of the actual position is output to the process input data PI1..3 when selecting actual position user-defined units.

Resolution of the actual position: 4096 inc/motor revolution

Scaling factor for actual position denominator index 9544.1

Setting range: 1 – 65535

With the actual position scaling, a user-specific return value of the actual position is output to the process input data PI1..3 when selecting actual position user-defined units.

Resolution of the actual position: 4096 inc/motor revolution

$$Actual\ position\ UU(16\,Bit) = Actual position\ (32\,Bit) \times \frac{1}{Scaling\ factor\ denominator}$$

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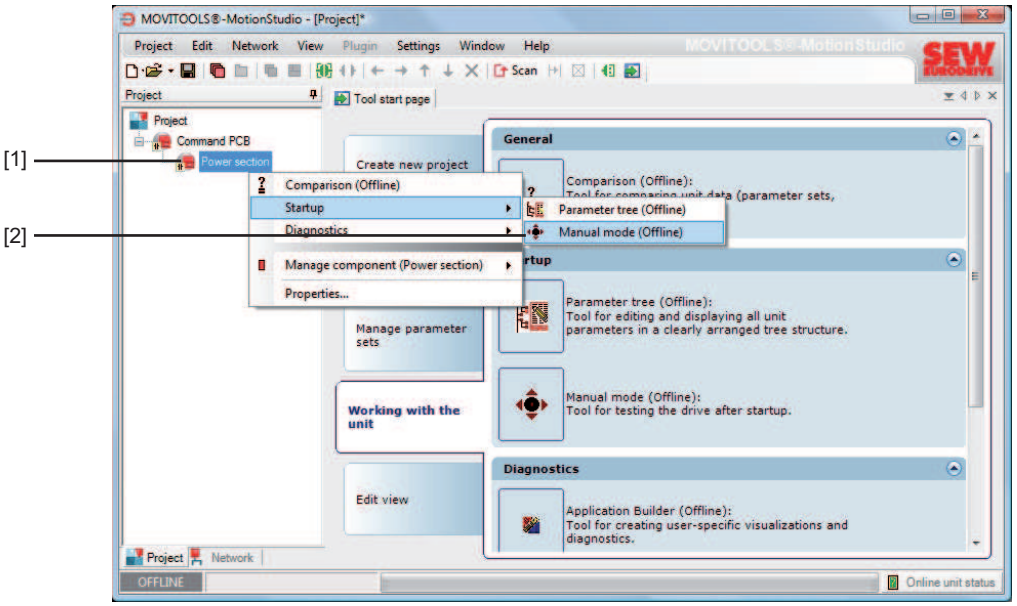
9 Operation

9.1 Manual mode with MOVITOOLS® MotionStudio

For manual operation of the DRC.. drive unit, you can use the manual mode function of the MOVITOOLS® MotionStudio software.

1. Connect the PC to the DRC.. inverter.
2. Start the MOVITOOLS® MotionStudio software and integrate the DRC.. inverter in MOVITOOLS® MotionStudio.

   Refer to the chapter "Operating MOVITOOLS® MotionStudio" for more information.
3. Once you have successfully integrated the DRC.. inverter, open the context menu in the DRC.. [1] by clicking on the right mouse button, and select the menu item "Startup"/"Manual mode" [2].



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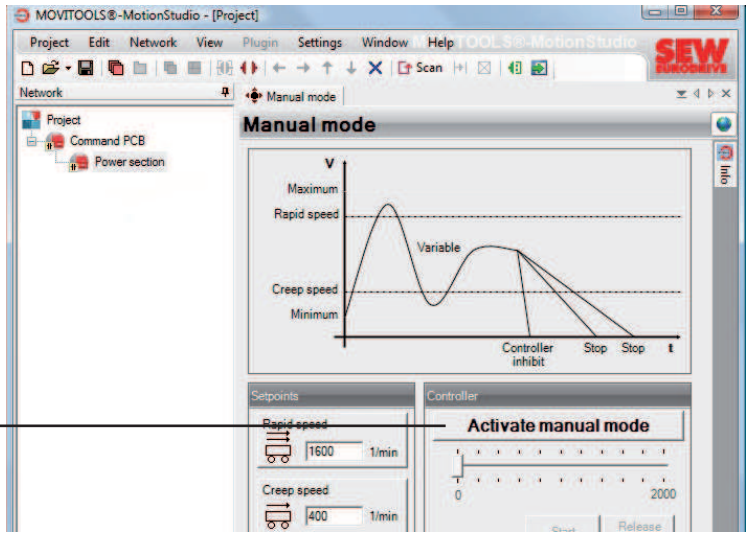
4. The "Manual mode" window opens.

9.1.1 Activating/deactivating manual mode

Activation

Manual mode can only be activated when the DRC.. drive unit is inhibited.



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To activate manual mode, click the [Activate manual mode] button [1].

Manual mode remains active even after a fault reset.

Deactivation

⚠ WARNING

Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries.

- Before deactivating manual mode, take measures to prevent the drive unit from starting up unintentionally, e.g. by activating "STO".
- Take additional safety precautions depending on the application to avoid injury to people and damage to machinery.

Manual mode is deactivated:

- When you click on the [Deactivate manual mode] button
- Or when you close the "Manual mode" window
- Or when you set parameter 8594.0 to "delivery state"

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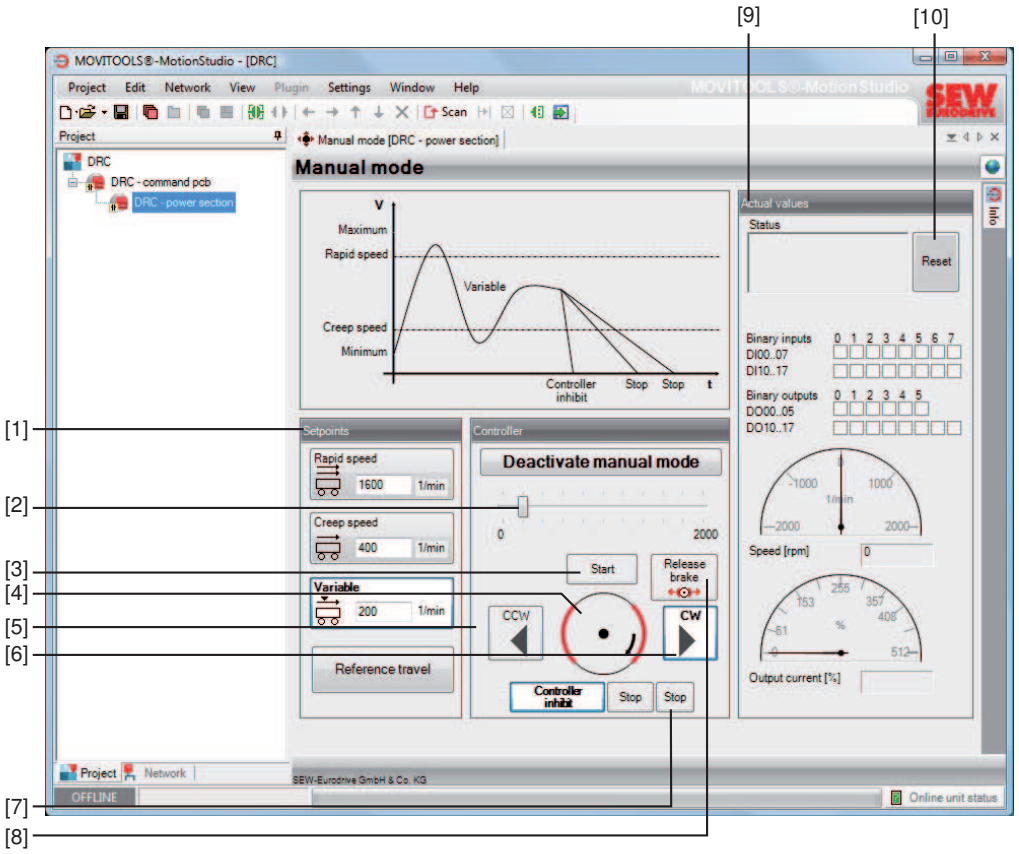
9.1.2 Control in manual mode

Manual mode window

Once manual mode has been successfully activated, you can control the DRC.. drive unit using the controls in the "Manual mode" window of MOVITOOLS® MotionStudio.



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Controller

1. Set the variable setpoint speed with the slide control [2] in the "Control" group.
2. Use the buttons [CW] [6] or [CCW] [5] to specify the direction of rotation.
3. Enable the DRC.. drive unit by clicking the [Start] button [3].

   The motor axis [4] displayed in the "Control" group symbolizes the direction of rotation and the speed of the motor.
4. Use the [Stop] button [7] to stop the drive.

As an alternative, you can enter the setpoints for rapid and creep speed or the variable speed setpoint directly in the "Setpoints" group [1].

The direction of rotation is determined by the sign (positive = CW operation, negative = CCW operation).

To enable the DRC.. drive unit, first enter the setpoint, then press the <ENTER> key and click on the button that contains the setpoint input field.

The "Actual values" group [9] displays the following actual values of the DRC.. drive unit:

- Status of the DRC.. inverter
- Motor speed in [min^{-1}]
- Output current of the DRC.. inverter in [%] of I_N

Brake

On DRC.. drive units with a brake, you can release the brake even without drive enable by ticking the "Release brake" check box [8]. The drive must be in "controller inhibit" or "safe stop" state for this purpose.

9.1.3 Reset in manual mode

If a fault occurs at the DRC.. inverter, you can reset the fault by clicking the [Reset] button [10].

9.1.4 Timeout monitoring in manual mode

Timeout monitoring is active during manual mode to prevent uncontrolled operation of the DRC.. drive unit in case of communication problems.

If communication between MOVITOOLS® MotionStudio and DRC.. inverter is interrupted longer than this timeout interval, then enable for the DRC.. drive unit is revoked. Manual mode remains active.

9.2 Releasing the brake without drive enable

9.2.1 Notes

⚠ WARNING

Danger of fatal injury if the hoist falls.

Severe or fatal injuries.

- Never use the function "Releasing the brake without drive enable" for hoist applications.

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⚠ 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 DRC.. drive units via a suitable external disconnection device.
- Secure the drive unit against unintended reconnection of the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 5 minutes before removing the electronics cover.

⚠ WARNING

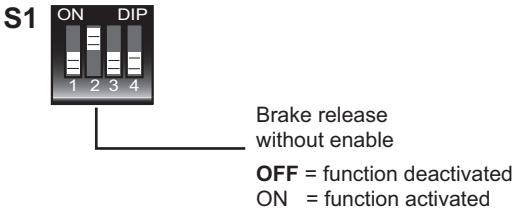
Risk of burns due to hot surfaces.

Severe injuries

- Let the devices cool down before touching them.

9.2.2 Activating the function

Set DIP switch S1/2 to "ON" (see also the "Startup" chapter). This makes it possible to release the brake even without drive enable and when the unit is in controller inhibit state.



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9.2.3 Functional description (with factory setting)

INFORMATION

Releasing the brake without drive enable is only possible with terminal configurations in which DI03 is parameterized to "f1/f2".

If DIP switch S1/2 is set to "ON", the brake can be released under the following conditions by setting the signal at DI03:

Terminal status			Device status	Fault status	Brake function
DI01	**DI02**	**DI03**			
R ↷	**L ↶**	**f1/f2**			
"1" "0"	"0" "1"	"0"	Enabled	No device fault	The brake is controlled by the DRC.. inverter, setpoint f1 is effective
"1" "0"	"0" "1"	"1"	Enabled	No device fault	The brake is controlled by the DRC.. inverter, setpoint f2 is effective
"1"	"1"	"0"	Not enabled	No device fault	The brake is controlled by the DRC.. inverter
"0"	"0"	"0"	Controller inhibit	No device fault	Brake applied
"1"	"1"	"1"	Not enabled	No device fault	The brake is controlled by the DRC.. inverter
"0"	"0"	**"1"**	**Controller inhibit or STO**	**No device fault**	**Brake is released for manual movement**
All states possible			Fault	Device fault	Brake applied

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Setpoint selection

Setpoint selection in binary control depending on the state of terminal f1/f2:

Enable state	Terminal f1/f2	Easy mode (see "Startup" chapter)	In conjunction with expert mode and deactivated controls f1/f2 (see the "Startup" chapter)
Enabled	Terminal f1/f2 = "0"	Setpoint potentiometer f1 active	Setpoint n_f1 active (parameter 10096.35, factory set to 1500 min^{-1})
Enabled	Terminal f1/f2 = "1"	Setpoint switch f2 active	Setpoint n_f2 active (parameter 10096.36, factory set to 200 min^{-1})

LED display

The DRIVE LED flashes periodically when the brake has been released for manual operation.

9.3 Brake in connection with STO

INFORMATION

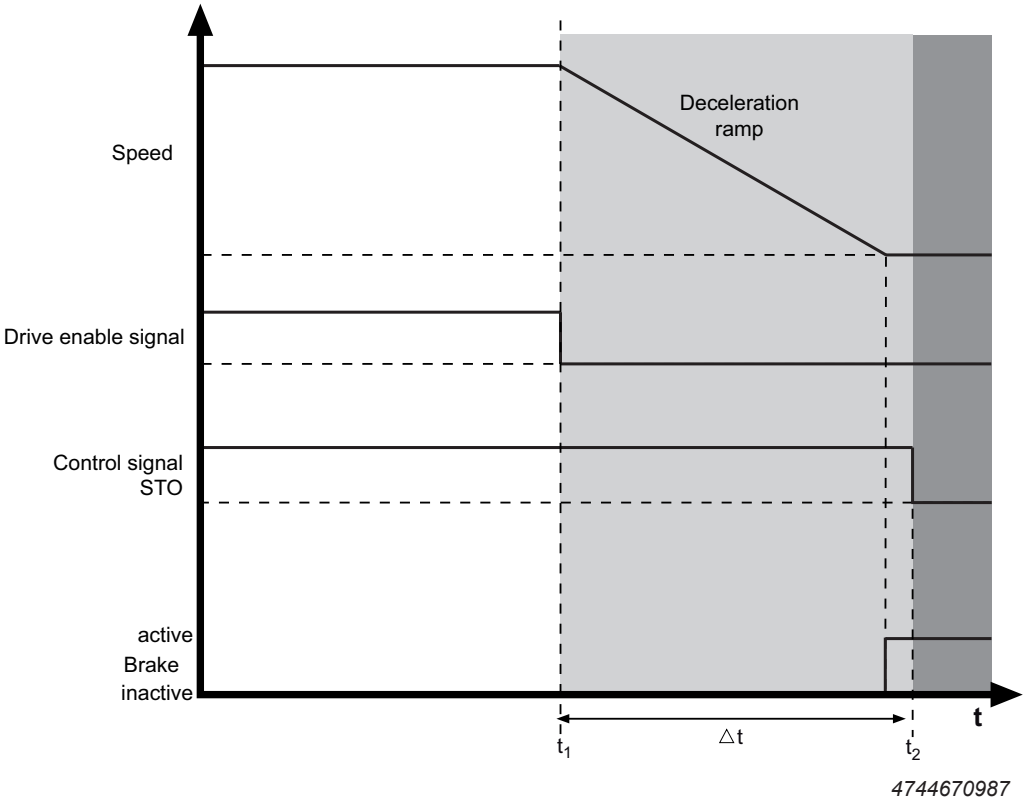
Observe the "Functional Safety – DRC.. Electronics Motor" documentation for using the STO function.

The standard brake, which is optionally integrated in DRC.. drive units, is not safety-related and is not part of the safety functions described in the "Functional Safety manual".

We recommend activation with SS1 (c); the standard brake is applied when the speed is 0.

For this purpose, the factory settings of the following parameters must not be changed:

Index	Parameter	Factory setting
8584.0	Brake function	**1 = ON**: The drive decelerates along the set ramp. When the speed is "0", the brake is applied.
9833.20	Brake application for STO	**1 = YES**: The brake is applied (not safety-related) when STO is activated.



t	Time
t_1	Point of time when brake ramp is initiated
t_2	Point of time when STO is triggered
Δt	Time between initiating the brake ramp and STO
	Safe time delay range
	Disconnection range

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9.3.1 Activation of STO before standstill

INFORMATION

Note the information about permitted "emergency braking operations" in the operating instructions in chapter "Technical data".

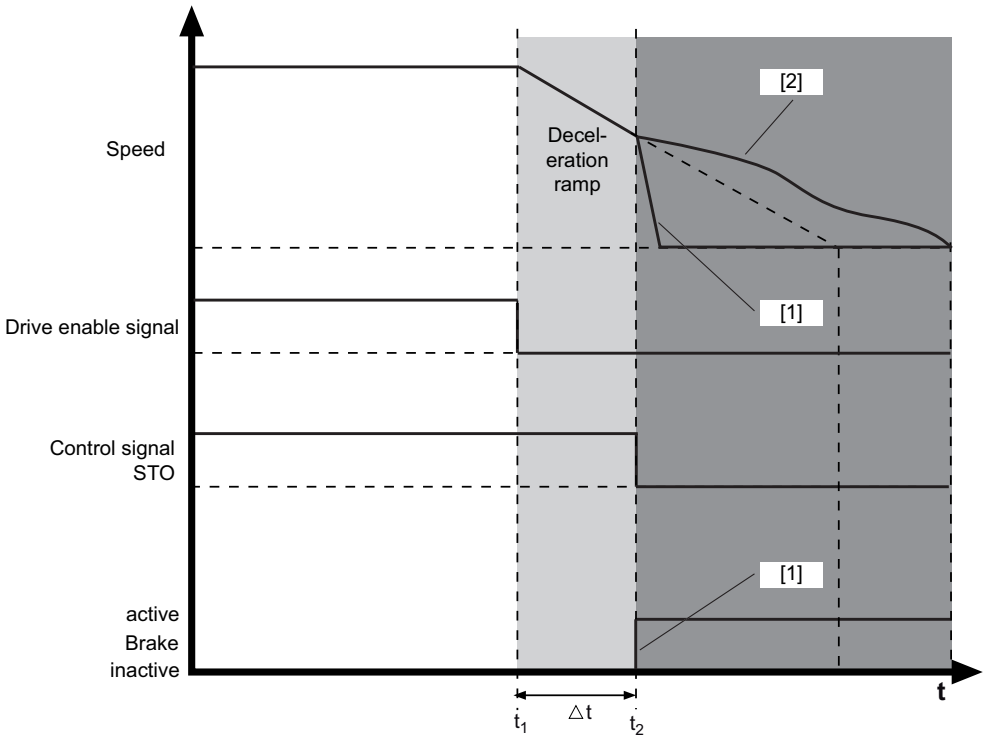
If STO is activated before the motor has come to a standstill, the brake behaves as set in parameter "9833.20 – Brake application with STO":

[1] Parameter "9833.20 – Brake application with STO" = 1 (factory setting)

- The brake is applied (not safety-related) when STO is activated

[2] Parameter "9833.20 – Brake application with STO" = 0

- The motor coasts to a halt
- The brake status remains the same
- The deceleration distance is not defined.



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Key

[1]	Parameter "9833.20 – Brake application with STO" = 1 (factory setting)
[2]	Parameter "9833.20 – Brake application with STO" = 0
t	Time
t_1	Point of time when brake ramp is initiated
t_2	Point of time when STO is triggered
Δt	Time between initiating the brake ramp and STO
	Safe time delay range
	Disconnection range

Activating the STO function during the deceleration ramp aborts controlled deceleration:

Possible reasons for premature activation of STO:

- Deceleration time Δt too short
- Extension of the deceleration ramp due to current limit, e.g. load too high

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10 Service

NOTICE

Improper work on DRC.. drive units can lead to damage.

Possible damage to property.

- Note that only qualified personnel is permitted to repair drives from SEW-EURODRIVE.
- Consult SEW-EURODRIVE Service.

10.1 Malfunctions of the mechanical DRC.. drive

10.1.1 Malfunctions of the DRC.. motor

Fault	Possible cause	Measure
Motor heats up excessively and trips with a fault	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 the motor
	Vibration of rotating parts	Rectify cause, possible imbalance
Oil leaks in the connection box or at the motor/flange gasket (only with gearmotors)	Internal seal defective	• Contact SEW-EURODRIVE • Have seal changed by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE

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10.1.2 Brake malfunctions

Fault	Possible cause	Measure
Brake does not release	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

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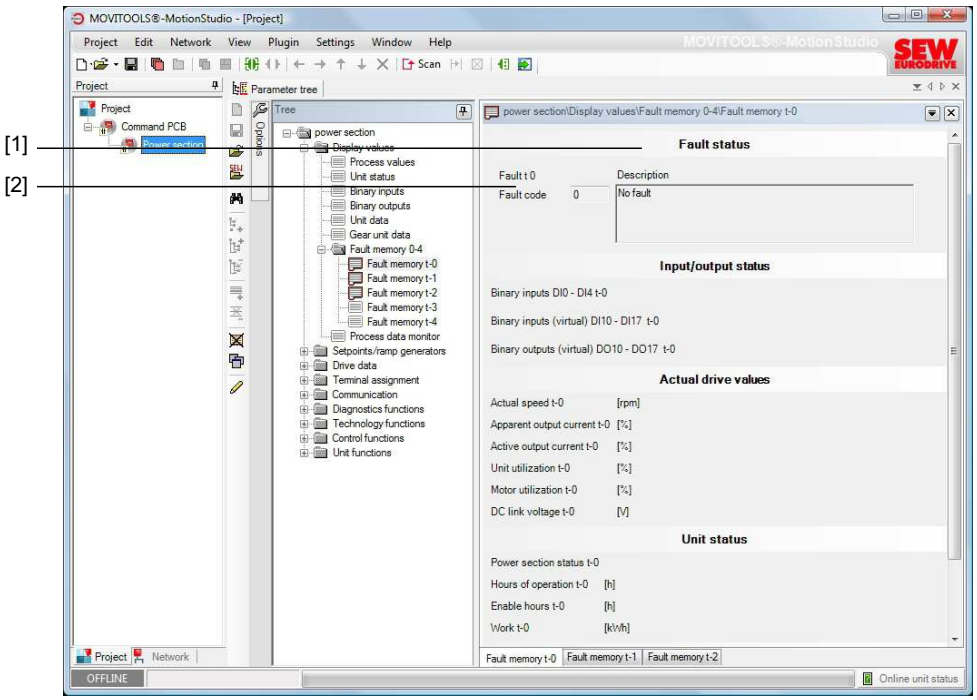
10.2 Evaluating fault messages

10.2.1 MOVITOOLS® MotionStudio

The following section shows a sample evaluation of a fault message in MOVITOOLS® MotionStudio:

1. In MOVITOOLS® MotionStudio, open the DRC.. parameter tree (power section). Observe the chapter "Operation of MOVITOOLS® MotionStudio".
2. In the parameter tree, select the following node (in the example for fault memory t-0):
   - **Power section** parameters/display values/fault memory 0-4/fault memory t-0 [2]
3. You can read out fault messages in the fault status group [1].



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[1] Fault messages group
[2] Power section parameters/display values/fault memory 0-4/fault memory t-0

10.3 Switch-off responses

There are 4 switch-off responses depending on the fault; the inverter remains locked during a failure:

10.3.1 Output stage inhibit (immediate switch-off)

The unit is no longer able to decelerate the drive, the output stage goes to high resistance in the event of a fault. The brake, if installed, is applied immediately.

10.3.2 Stop

The drive is decelerated along stop ramp t13. Once the stop speed is reached, the brake is applied immediately, if installed. The output stage then goes to high resistance.

10.3.3 Emergency stop

The drive is decelerated along emergency stop ramp t14. Once the stop speed is reached, the brake is applied immediately, if installed. The output stage then goes to high resistance.

10.3.4 Standard stop

The drive is decelerated along the set standard ramp. Once the stop speed is reached, the brake is applied immediately, if installed. The output stage then goes to high resistance.

10.4 Resetting fault messages

⚠ WARNING

Eliminating the cause of the problem or performing a reset may result in the drive restarting automatically.

Severe or fatal injuries.

- Prevent the drive from starting up inadvertently, for example by activating STO.

A fault message can be acknowledged by:

- Switching the power off and on again
- Controller/PLC: Send "reset command"
- Digital input "DI04/reset"

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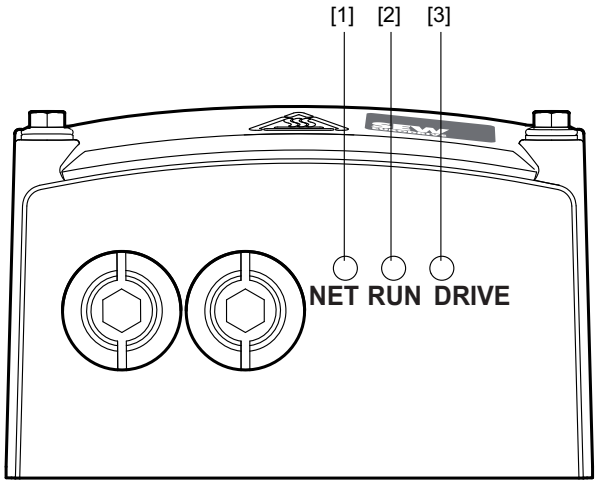
10.5 Description of status and operating indicators

10.5.1 LED indicators

The following figure shows the DRC.. LED indicators:



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[1] NET LED
[2] RUN LED
[3] "DRIVE" status LED

10.5.2 "NET" LED

LED
In this unit variant, the LED does not have any function.

10.5.3 "RUN" LED

LED	Operating status	Meaning
- **Off**	Not ready for operation	No line voltage → Check supply cable and line voltage for interruption.
Yellow **flashing steadily**	Not ready for operation	Initialization phase
Green **flashing steadily**	Not ready for operation	Power section parameters are being loaded or firmware is being updated
Green **steady light**	Ready	System ready
Yellow **steady light**	Ready but device inhibited	"STO" signal detected, safe disconnection → Check voltage at STO terminal. → See also status LED "DRIVE/yellow flashing steadily".

LED	Operating status	Meaning
Green/yellow **alternating colors**	Ready but timeout	Cyclical data exchange communication interrupted (fault 47 or 67). → No SBus/SNI connection between inverter and controller. Check and establish connection, especially terminating resistor. → EMC influence. Check shielding of data lines and improve, if necessary. → Protocol time between the individual telegrams is longer than the set time (timeout interval). Shorten telegram cycle.
Red **steady light**	Error	Possible errors: • CPU error (17, 37) • NV memory error (25) • Error transmitting parameters (97) • IPOS error (10) • Boot synchronization error (40, 41) • Safety error (119) → More detailed diagnostic information via Drive LED.

10.5.4 "DRIVE" status LED

LED	Operating status	Meaning
– **Off**	Not ready for operation	No line voltage
Yellow **flashing steadily**	Not ready for operation	Initialization phase, line voltage NOT OK or "STO" signal detected, safe disconnection. → See also "RUN/yellow steady light" LED.
Yellow **flashing briefly at regular intervals**	Ready	**In conjunction with mechatronic MOVIGEAR® drive unit:** Deactivating DynaStop® without drive enable active. **In conjunction with DRC.. electronic motor:** Brake release without drive enable active.
Yellow **steady light**	Ready but device inhibited	Line voltage OK, output stage inhibited
Yellow **2 x flashing, pause**	Ready but manual mode/local mode without device enable	Line voltage OK
Green/yellow **alternating colors**	Ready but timeout	Communication interrupted during cyclical data exchange (error 43, 46, or 47)
Green **steady light**	Device enabled	Motor running
Green **flashing evenly, fast**	Current limit active	Drive operating at current limit.

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LED	Operating status	Meaning
Green **flashing steadily**	Ready	Line voltage OK but no enable signal. Output stage is energized.
Green/red **alternating colors** **(2 × green, 2 × red)**	Ready	Displayed error is pending. Output stage is energized.
Green/red **flashing quickly with alternating colors**	Not ready for operation	Boot error on command pcb.
Yellow/red **alternating colors** **(2 x yellow, 2 x red)**	Ready	Displayed error is pending. Output stage inhibited.
Red **steady light**	Error 40	Boot synchronization error
	Error 41	Watchdog option error
	Error 116	MOVI-PLC® timeout
	Error 119	Safety error
Red **flashing slowly**	Error 08	Speed monitoring error
	Error 26	External terminal error
	Error 30	Emergency stop timeout error
	Error 15	Encoder fault
	Error 16	Incorrect startup
	Error 45	Initialization error Incorrect motor/inverter assignment
	Error 50	Internal voltage supply too low
	Errors 17, 18, 37, 53	CPU error
	Error 25	NV memory error
	Errors 27, 29	"Limit switch" error
	Error 39	"Reference travel" error
	Error 42	Positioning lag error
	Error 94	Checksum error
	Error 97	Parameter transmission error
	Errors 10, 32, 77	IPOS error
	Error 123	Positioning interruption error
Red **2 flashes, pause**	Error 07	DC link voltage too high
Red **3 flashes, pause**	Error 01	Overcurrent in output stage
	Error 11	Overtemperature of heat sink or electronics

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LED	Operating status	Meaning
Red **4 flashes, pause**	Error 31	TF trip
	Error 44	Ixt utilization/UL monitoring
	Error 52	Machine control error
Red **5 flashes, pause**	Error 89	**Only in conjunction with DRC.. electronic motor:** Brake overtemperature
Red **6 flashes, pause**	Error 06	Power supply system phase failure

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10.6 Fault/error table

Code	Meaning	Response	Possible cause	Measure
Error 01	Overcurrent in output stage	Output stage inhibit/locked	Short circuit on inverter output	• Check the connection between the inverter output and the motor as well as the motor winding for short circuits. • Reset the fault by switching off the device or by fault reset function
Error 06	Power supply system phase failure	Parameterizable	–	• Check the supply system cable for phase failure • Reset the fault by switching off the device or by fault reset function
Error 07	DC link voltage too high	Output stage inhibit/waiting	Ramp time too short	• Extend the ramp times • Reset the fault by switching off the device or by fault reset function
			Faulty braking resistor connection	• Check the braking resistor connection and correct it, if necessary • Reset the fault by switching off the device or by fault reset function
			Invalid voltage range of supply input voltage	• Check supply input voltage for permitted voltage range • Reset the fault by switching off the device or by fault reset function
Error 08	Speed monitoring error	Output stage inhibit/waiting	Speed monitoring has tripped, load on the drive too high	• Reduce the load on the drive • Increase the n-monitoring delay time • Check the current limit/ torque limit • Deactivate speed monitoring • Reset the fault by switching off the device or by fault reset function
Error 10	IPOS error	Output stage inhibit/locked	Faulty IPOS program (e.g. invalid command)	• Correct the program • Reset the fault by switching off the device or by fault reset function

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Code	Meaning	Response	Possible cause	Measure
Error 11	Overtemperature of heat sink or electronics	Emergency stop/waiting	–	• Clean the heat sink • Lower the ambient temperature • Prevent heat build-up • Reduce the load on the drive • Reset the fault by switching off the device or by fault reset function
Error 15	Encoder fault	Output stage inhibit/locked	Loose encoder plug-in connection	• Check encoder plug connector at connection board
			Encoder defective	• Contact SEW Service
Error 16	Incorrect startup	Output stage inhibit/locked	Encoder not calibrated	• Contact SEW Service
Error 17	CPU error	Output stage inhibit/locked	–	• Reset the error by switching off the device or by fault reset function • If the fault occurs again, contact SEW Service
Error 18	CPU error	Output stage inhibit/locked	–	• Reset the error by switching off the device or by fault reset function • If the fault occurs again, contact SEW Service
Error 25	NV memory error	Output stage inhibit/locked	Error accessing NV memory	• Set delivery state and reset device parameters • If the error occurs again, contact SEW Service.
Error 26	External terminal error	Parameterizable	External error signal read-in at programmable terminal	• Rectify external error • Reset the error by switching off the device or by fault reset function
Error 27	"Limit switch" error	Output stage inhibit/locked	A limit switch was reached in positioning mode	Check the travel range
			Wire break/both limit switches missing or inverted	Check the wiring
Error 29	"Limit switch" error	Emergency stop/waiting	A limit switch was reached in positioning mode	Check the travel range
			Wire break/both limit switches missing or inverted	Check the wiring

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Code	Meaning	Response	Possible cause	Measure
Error 30	Emergency stop timeout error	Output stage inhibit/waiting	Emergency stop ramp too short	Extend the emergency stop ramp
			Drive overloaded	Check the project planning
Error 31	TF trip	Parameterizable	Thermal overload of the motor or short circuit/wire break of the temperature sensor	• Lower the ambient temperature • Prevent heat build-up • Reduce the load on the drive • Leave the motor to cool for at least 1 minute before you reset the error by switching off the device or via fault reset function • If the error occurs again or occurs repeatedly, contact SEW Service.
Error 32	IPOS error	Output stage inhibit/locked	Faulty IPOS program (e.g. invalid command)	Correct the program Reset the error by switching off the device or by error fault function
Error 37	CPU error	Output stage inhibit/locked	–	• Reset the error by switching off the device or by fault reset function • If the error occurs again, contact SEW Service
Error 39	"Reference travel" error	Output stage inhibit/locked	The reference cam is missing or does not switch	• Check reference cam • Limit switches are connected incorrectly • Check limit switch connection • Reference travel type changed during reference travel • Check reference travel type setting and required parameters
Error 40	Boot synchronization error	Output stage inhibit/locked	Command pcb defective or connection to command pcb interrupted	Contact SEW Service
Error 41	Watchdog option error	Output stage inhibit/locked	Command pcb defective or connection to command pcb interrupted	Contact SEW Service
			Option defective or connection to option interrupted	• Check whether an option is installed • Replace the option

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Code	Meaning	Response	Possible cause	Measure
Error 42	Positioning lag error	Output stage inhibit/waiting	Acceleration ramps too short	Extend the ramps
			P component of positioning controller too small	Increase the P component
			Value of lag error tolerance too small	• Increase the lag error tolerance • Check whether mechanical components can move freely
Error 43	Manual mode timeout via any interface	Parameterizable	Connection between inverter and PC interrupted	Check/establish connection
Error 44	Ixt utilization/UL monitoring	Output stage inhibit/waiting	Output stage overload	• Reduce the load on the drive • Reset the error by switching off the device or by fault reset function
Error 45	Initialization error Incorrect motor/inverter assignment	Output stage inhibit/locked	Hardware fault	Contact SEW Service
			Incorrect motor/inverter assignment	Replace electronics
Error 46	Timeout internal system bus connection between command pcb and power section	Emergency stop/waiting	–	Contact SEW Service
Error 47	Communication interrupted during cyclical data exchange	Parameterizable	Power section fault: Missing system bus connection between inverter and controller.	Check and establish connection, especially terminating resistor.
			Power section fault: EMC influence	Check shielding of data lines and improve, if necessary.
			Power section fault: Protocol period between the individual telegrams is longer than the set time (timeout time).	Shorten telegram cycle
			Command pcb error: Connection to AS-Interface master interrupted.	Check/establish connection
			Command pcb error: Connection between AS-Interface option and command pcb interrupted.	Contact SEW Service
Error 50	Internal supply voltage too low	Output stage inhibit/locked	Hardware fault	Contact SEW Service

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Code	Meaning	Response	Possible cause	Measure
Error 52	Machine control error	Output stage inhibit/locked	Operation without encoder a speed that is too low	• Increase the speed • Reset the error by switching off the device or by fault reset function. • If the error occurs again or occurs repeatedly, contact SEW Service.
			Load too high in controlled operation	• Reduce the load on the drive • Reset the error by switching off the device or by fault reset function. • If the error occurs again or occurs repeatedly, contact SEW Service.
Error 53	CPU error	Output stage inhibit/locked	−	• Reset the error by switching off the device or by fault reset function. • Consult SEW Service if the error occurs repeatedly.
Error 77	IPOS error	Output stage inhibit/locked	Faulty IPOS program (e.g. invalid command)	• Correct the program • Reset the error by switching off the device or by fault reset function.
Error 89	**Only in conjunction with DRC.. electronic motor:** Brake overtemperature	Output stage inhibit/locked	Brake coil not sufficient to dissipate the regenerative energy.	Use a braking resistor
			Wrong size of braking resistor selected.	Use a larger braking resistor
Error 94	Checksum error	Output stage inhibit/locked	NV memory defective	Contact SEW Service
Error 97	Parameter transmission error	Output stage inhibit/locked	Error during data transmission	• Repeat copying process • Set delivery state and reset device parameters
Error 116	MOVI-PLC® timeout	Emergency stop/waiting	Timeout in communication with higher-level controller	−
Error 119	Safety error	Output stage inhibit/locked	Safety hardware defective	Contact SEW Service
Error 123	Positioning interruption error	Stop/waiting	Target monitoring when interrupted positioning process is resumed. Target would be overrun.	Perform positioning process without interruption until it is complete

10.7 Device replacement

⚠ 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 DRC.. drive units with a suitable external disconnection device.
- Secure the drive unit against unintended reconnection of the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least the following time before removing the electronics cover: **5 minutes**

INFORMATION

Device behavior in connection with multi-turn encoder und system referencing.

When using a multi-turn encoder, the referenced bit in parameter 8702.0, bit 0 is set permanently after successful reference travel. This bit can only be reset by starting reference travel again or by writing the value "0" to parameter 8702.0.

- The bit is cleared automatically when a multi-turn encoder is replaced by SEW-EURODRIVE Service.
- If a referenced drive is used as an overall unit at another location in the system, a reference travel must be performed again before positioning for the first time.
- When replacing the electronics cover, no reference travel is necessary. Downloading a saved parameter set into a device even sets the referenced bit permanently if the encoder has an identical serial number and the drive was referenced at the time of data backup.

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10.7.1 Replacing the electronics cover

NOTICE

Device fault 45 or 94 due to power disconnection during the initialization phase.

Possible damage to property.

- After replacing the cover and switching on the power supply, wait at least for 30 s before disconnecting the drive from the supply system again.

INFORMATION

When ordering a new electronics cover, always provide the complete type designation or manufacturing number of the entire drive or of the electronics cover.

Replacing an electronics cover that has been ordered by quoting only the part number can result in device fault 45 or 94.

1. Observe the safety notes.
2. Remove the screws and take off 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.
4. Set all the controls (e.g. DIP switches, see "Startup" chapter) on the new electronics cover in the same way as the controls of the previous electronics cover.
5. Place the new electronics cover onto the connection box and screw it on.
6. Supply voltage to the drive.
7. Check the new electronics cover for proper functioning.

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10.7.2 Replacing the motor

1. Observe the safety notes.
2. When you replace the motor including the electronics cover, you also have to carry out the steps described in chapter "Replacing the electronics cover".
3. Disassemble the motor. Also observe chapter "Mechanical Installation" and the operating instructions of the gear unit, if applicable.
4. Compare the data on the nameplate of the old motor with the nameplate data of the new motor.

INFORMATION

Always replace the motor with a motor that has the same properties.

5. Mount the motor. Also observe chapter "Mechanical Installation" and the operating instructions of the gear unit, if applicable.
6. Perform the installation according to the "Electrical installation" chapter.
7. Place the electronics cover onto the connection box and screw it on.
8. Supply voltage to the drive.
9. Parameters that can be changed are saved in the motor (see "Parameters" chapter). This means you have to change these parameters again when you replace the motor.

INFORMATION

If you only replace the electronics cover, the parameter changes are preserved.

10. Check the functions of the new motor.

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10.8 SEW-EURODRIVE Service

10.8.1 Sending in a unit for repair

If a fault cannot be rectified, contact the SEW-EURODRIVE Electronics Service (see chapter "Address list").

When you contact the SEW-EURODRIVE Electronics Service, always quote the digits on the status label so that our service personnel can assist you more effectively.

Provide the following information when sending the unit in for repair:

- Serial number (see nameplate)
- Type designation
- Unit variant
- Short description of the application (application, control mode, etc.)
- Nature of the fault
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

10.9 Shutdown

⚠ WARNING

Electric shock due to incompletely discharged capacitors.

Severe or fatal injuries.

- Before removing the electronics cover, de-energize the DRC.. drive units with a suitable external disconnection device.
- Secure the drive unit against unintended reconnection 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 DRC.. drive unit, disconnect the unit using appropriate measures.

10.10 Storage

Observe the following instructions when shutting down or storing the DRC.. drive unit:

- If you shut down and store the DRC.. drive unit for an extended period, close open cable bushings and cover ports with protective caps.
- Make sure that the unit is not subject to mechanical impact during storage.

Observe the notes on storage temperatures in the "Technical data" chapter.

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10.11 Extended storage

10.11.1 Electronics

If the device is in extended storage, connect it to the line voltage for at least 5 minutes every 2 years. Otherwise, the device's service life may be reduced.

Procedure in case maintenance has been neglected

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

The following graduations are recommended:

AC 400/500 V units:

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

10.12 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.

- 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.

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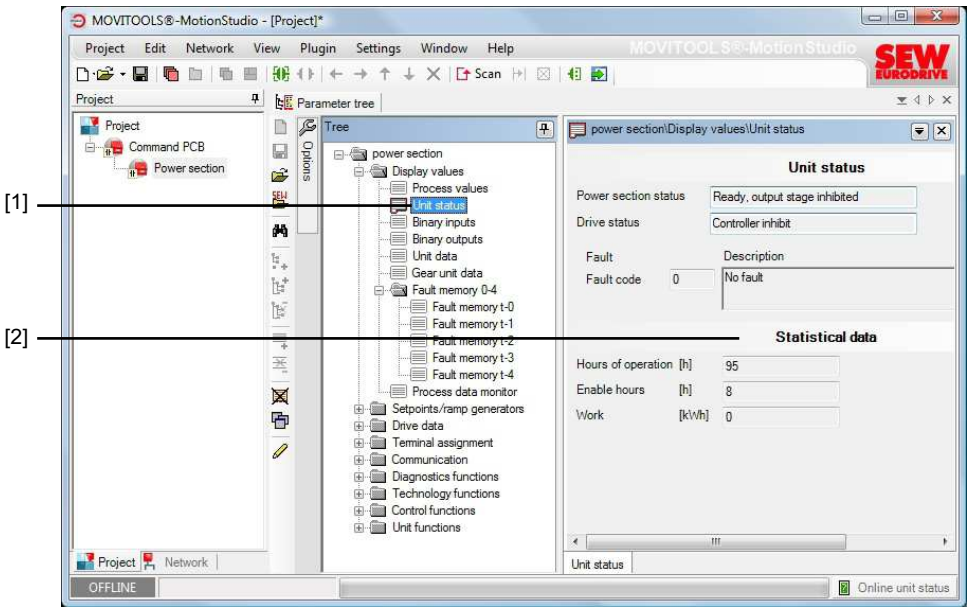
11 Inspection and maintenance

11.1 Determining the operating hours

11.1.1 About MOVITOOLS® MotionStudio

DRC.. drive units can read out the hours of operation so you can plan inspection and maintenance work more easily. Proceed as follows to determine the performed hours of operation:

1. In MOVITOOLS® MotionStudio, open the DRC.. parameter tree, see the chapter "Configuration and diagnostics".
2. In the parameter tree, select the node "Power section parameters/display values/ device status" DRC.. [1].
3. In the statistics data group [2], you can read out the performed hours of operation:



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[1] Power section parameters/display values/device status
[2] Statistics data group

11.2 Inspection and maintenance intervals

11.2.1 Motor

The following table shows the inspection intervals for DRC.. motors:

Time interval	What to do?	Who is permitted to perform the work?
Every 3000 operating hours, at least every 6 months	Check running noise for possible bearing damage	Specialists at customer site
	In the event of bearing damage: Have the bearing replaced by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.	SEW-EURODRIVE Service
		Qualified personnel trained by SEW-EURODRIVE
Recommendation: Every 10 000 operating hours[1)]	Have the motor inspected by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.	SEW-EURODRIVE Service
		Qualified personnel trained by SEW-EURODRIVE
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 fluctuations.	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

1) Wear times are influenced by many factors. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents.

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11.2.2 Brake

The following table shows the inspection intervals for DRC.. brakes:

If used as a holding brake:		
Time interval	**What to do?**	**Who is permitted to perform the work?**
Every 2 years[1)]	Have the brake inspected by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.	SEW-EURODRIVE Service
		Qualified personnel trained by SEW-EURODRIVE

1) Wear times are influenced by many factors. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents.

<table>
<tr><th colspan="5">If used as a holding brake with braking work done in case of emergency braking operations</th></tr>
<tr><th colspan="4">Time interval</th><th>What to do?</th><th>Who is permitted to perform the work?</th></tr>
<tr><td colspan="4">Every 3000 hours of operation, every 2 years at the latest[1)]</td><td rowspan="2">Have the brake inspected by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.</td><td>SEW-EURODRIVE Service</td></tr>
<tr><td colspan="4" rowspan="6">After this much braking work has been done [1)]
<table><tr><th>Brake</th><th>DRC..</th><th>Braking torque [Nm]</th><th>Braking work [MJ]</th></tr><tr><td>BY1C</td><td>DRC1</td><td>7/2.5</td><td>40</td></tr><tr><td>BY2C</td><td>DRC2</td><td>14/7</td><td>65</td></tr><tr><td>BY4C</td><td>DRC3</td><td>28/14</td><td>85</td></tr><tr><td>BY4C</td><td>DRC4</td><td>40</td><td>85</td></tr><tr><td>BY4C</td><td>DRC4</td><td>20</td><td>85</td></tr></table></td><td>Qualified personnel trained by SEW-EURODRIVE</td></tr>
<tr><td rowspan="4">Have wear parts replaced by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.</td><td>SEW-EURODRIVE Service</td></tr>
<tr><td rowspan="3">Qualified personnel trained by SEW-EURODRIVE</td></tr>
</table>

1) Wear times are influenced by many factors. The system manufacturer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents.

11.3 Inspection and maintenance work

11.3.1 Preliminary work regarding inspection and maintenance

Observe the following notes before you start with inspection/maintenance work on the DRC.. motor.

⚠ WARNING

Danger of falling hoist.

Severe or fatal injuries.

- Secure or lower the hoist before you carry out any work (risk of falling).

⚠ WARNING

Risk of injury if the drive starts up unintentionally.

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.

- Before removing the electronics cover, de-energize DRC.. drive units using a suitable external disconnection device.
- Secure the drive unit against unintended reconnection of the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least the following time before removing the electronics cover: **5 minutes**

⚠ WARNING

Risk of burns due to hot surfaces.

Serious injuries.

- Let the devices cool down before touching them.

NOTICE

Damage to the DRC.. drive unit.

Potential damage to property.

- Note that only the SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE is allowed to carry out maintenance work on the motor or the brake.

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11.3.2 Replacing the output oil seal

1. Observe the notes in chapter "Preliminary work for inspection and maintenance".
2. Remove the DRC.. drive unit from the system.
3. **NOTICE!** Oil seals with a temperature below 0 °C may get damaged during installation. Potential damage to property. Store oil seals at ambient temperatures over 0 °C. Warm up the oil seals before you install them, if necessary.
   When changing the oil seal, ensure that there is a sufficient grease reservoir between the dust lip and sealing lip, depending on the type of gear unit.
   - ⇨ If you use double oil seals, fill one-third of the gap with grease.
   - ⇨ Do not install the oil seal on the same track.
4. Touch up or renew the surface/anti-corrosion coating.

11.3.3 Painting the drive unit

1. Observe the notes in chapter "Preliminary work for inspection and maintenance".
2. **NOTICE!** Breather valves and oil seals may be damaged during painting or repainting. Potential damage to property. Thoroughly cover the breather valves and sealing lip of the oil seals with strips prior to painting.
   Clean the surface of the drive unit and make sure it is free from grease.
3. Remove the masking strips after painting.

11.3.4 Cleaning the drive unit

Observe the notes in chapter "Preliminary work for inspection and maintenance".

Excessive dirt, dust or shavings can have a negative impact on the function of synchronous motors; in extreme cases, these factors can cause the motor to break down.

For this reason, clean the drives at regular intervals (after one year at the latest) to ensure a sufficiently large area for heat dissipation.

Insufficient heat dissipation can have unwanted consequences. The bearing service life is reduced through operation at impermissibly high temperatures (bearing grease degrades).

11.3.5 Connection cables

Observe the notes in chapter "Preliminary work for inspection and maintenance".

Check the connection cables for damage at regular intervals and replace if necessary.

11.3.6 Replacing the gasket between connection box and electronics cover

Spare part kit

The gasket is available as spare part from SEW-EURODRIVE.

Content	Part number	
	Electronic motor DRC1-.../DRC2-...	Electronic motor DRC3-.../DRC4-...
1 piece	28211626	28211650
10 pieces	28211634	28211669
50 pieces	28211642	28211677

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Steps

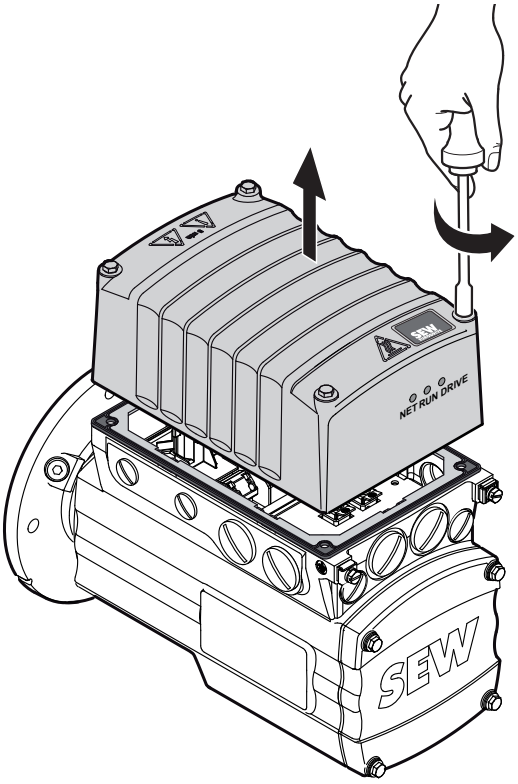
NOTICE

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 it from humidity, dust or foreign particles.
- Make sure that the electronics cover is mounted properly.

1. Observe the notes in chapter "Preliminary work for inspection and maintenance".
2. Loosen the screws of the electronics cover and remove it.



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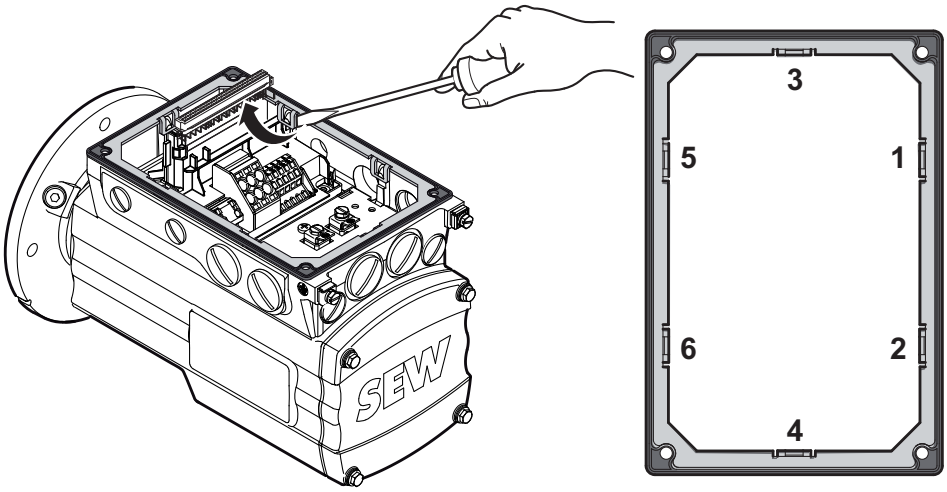
3. **NOTICE!** Loss of the guaranteed degree of protection. Possible damage to property. Make sure not to damage the sealing surfaces when removing the gasket. Loosen the used gasket by levering it off the retaining cams.

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



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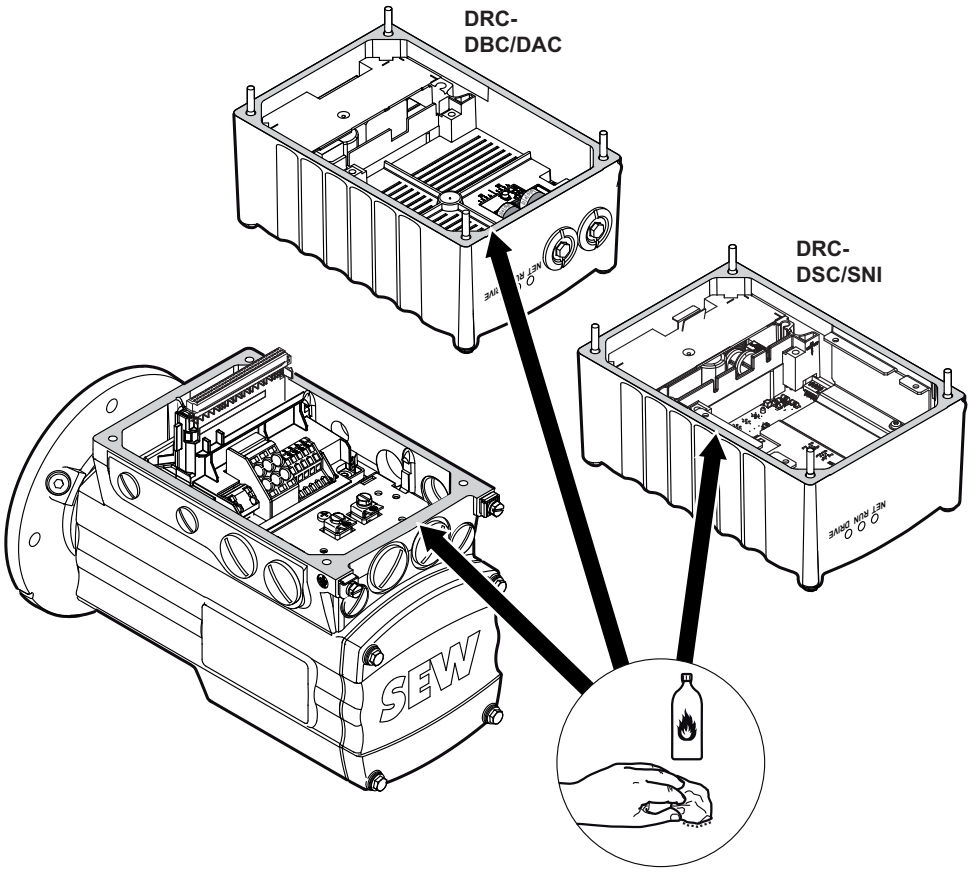
4. ⚠ **CAUTION!** Risk of injury due to sharp edges. Risk of cutting injuries. Use protective gloves for cleaning. Work may only be carried out by qualified personnel. Clean the sealing surfaces of the connection box and the electronics cover carefully.



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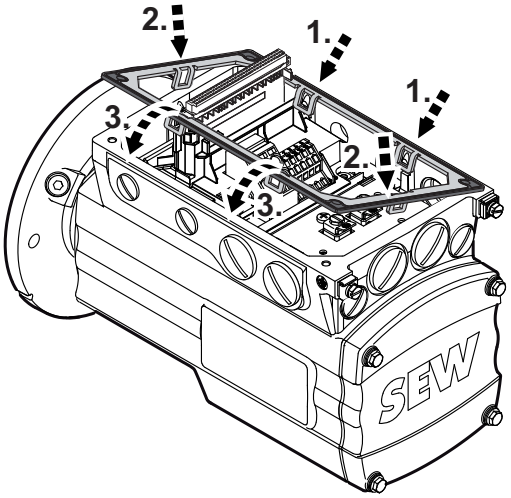
5. Place the new gasket on the connection box and fix it in position with the retaining cams. Doing so will be easier if you adhere to the sequence shown in the figure below.



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6. Check the installation and startup of the drive unit using the applicable operating instructions.
7. Place the electronics cover on the connection box again and fasten it. Proceed as follows when installing the electronics cover DRC..: Insert the screws and tighten them with the tightening torque specified for that size according to the sequence shown in the picture below.

   ⇨ DRC.. electronic motor size 1/2: 6.0 Nm

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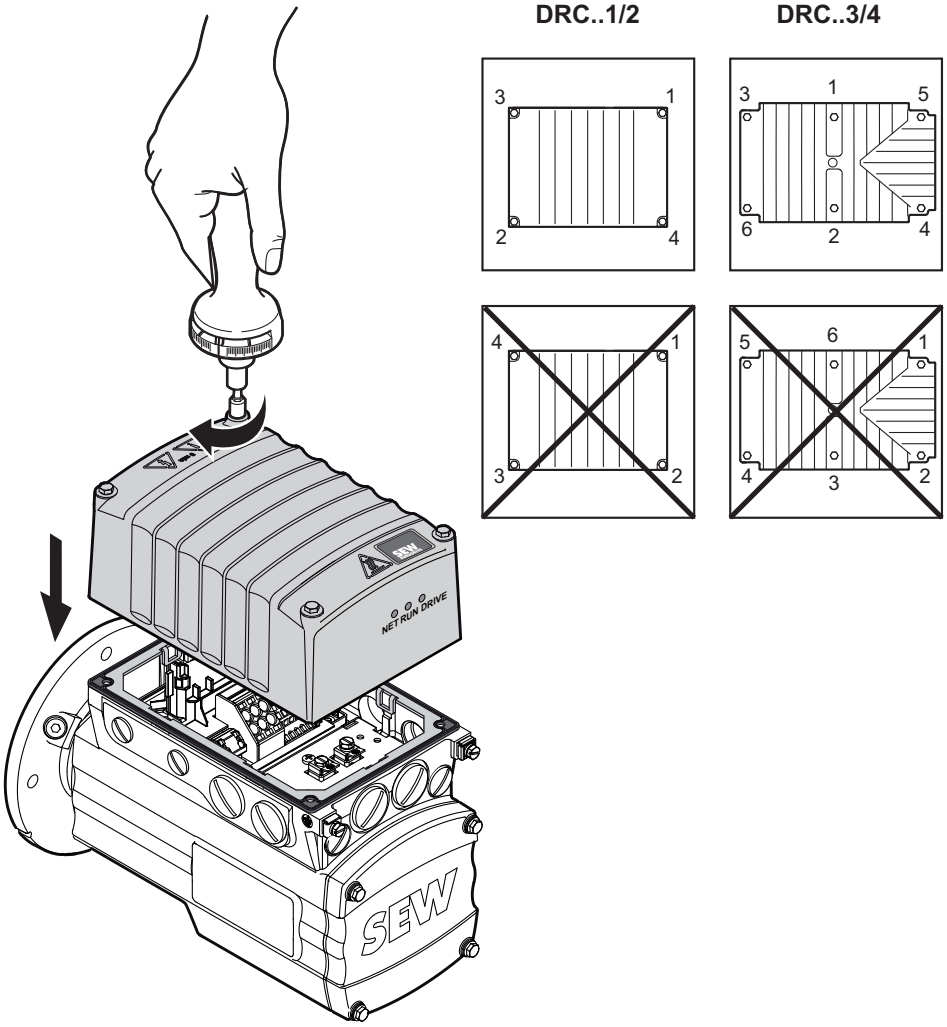
⇨ DRC.. electronic motor size 3/4: 9.5 Nm.



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12 Technical data and dimension sheets

12.1 Conformity

12.1.1 CE marking

- Low Voltage Directive:

  The DRC.. drive system fulfills the regulations of the Low Voltage Directive 2014/35/EU.

- Electromagnetic compatibility (EMC):

  The devices are designed for use as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided that the installation notes are followed, the requirements for CE marking of the entire machine/system equipped with these units on the basis of the EMC Directive 2014/30/EU are met. For detailed information on EMC-compliant installation, refer to the "Electromagnetic Compatibility in Drive Technology" publication from SEW-EURODRIVE.

CE

The CE mark on the nameplate represents conformity with the Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU.

12.1.2 UL approval

c UL us LISTED

UL and cUL approval (USA) has been granted for the DRC.. series.

cUL is equivalent to CSA approval.

12.1.3 EAC

EAC

The DRC.. drive unit series fulfills the requirements of the technical regulations of the Customs Union of Russia, Kazakhstan, and Belarus.

The EAC marking on the nameplate certifies the conformity with the safety requirements of the Custom Union.

12.1.4 UkrSEPRO (Ukrainian Certification of Products)

013

The UkrSEPRO marking on the nameplate certifies adherence to the technical regulations of Ukraine for the DRC.. series.

12.1.5 RCM approval

RCM approval has been granted for the DRC.. series.

RCM certifies conformity with ACMA (Australia Communication and Media Authority) standards.

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12.2 Technical data

12.2.1 General technical data of DRC..

DRC.. type		DRC1	DRC2	DRC3	DRC4
Connection voltages **Permitted range**	U_{line}	3 x AC 380 V -5% to AC 500 V +10%			
Line frequency	f_{line}	50 Hz ... 60 Hz			
Input current	I_N at U_{line} = 400 V	1.04 A	2.8 A	5.3 A	6.3 A
	I_N at U_{line} = 460 V	0.90 A	2.43 A	4.61 A	5.48 A
	I_N at U_{line} = 480 V	0.87 A	2.33 A	4.41 A	5.25 A
	I_{max}	2.6 A	7.0 A	13.25 A	11.8 A
Nominal output current	$I_{N\ motor}$	1.3 A	3.4 A	6.8 A	7.8 A
Current-carrying capacity of terminals		See operating instructions, chapter "Electrical Installation/Installation instructions/Permitted cable cross section of terminals"			
Motor power S1	P_{Mot}	**0.55 kW** 0.75 HP	**1.5 kW** 2.0 HP	**3.00 kW** 4.0 HP	**4.00 kW** 5.4 HP
Nominal motor speed	n_N	2000 min^{-1}	2000 min^{-1}	2000 min^{-1}	2000 min^{-1}
Nominal motor torque[1)]	M_N	2.65 Nm	7.20 Nm	14.3 Nm	19.1 Nm
Maximum motor torque	M_{max}	6.6 Nm to 2000 min^{-1}	18.0 Nm to 1500 min^{-1}	35.8 Nm to 1500 min^{-1}	36.2 Nm to 1800 min^{-1}
Motor mass moment of inertia	J_{mot} [2)]	1416 $kgm^2 \times 10^{-4}$	3.6226 $kgm^2 \times 10^{-4}$	16.85 $kgm^2 \times 10^{-4}$	23.23 $kgm^2 \times 10^{-4}$
	J_{mot} [3)]	2031 $kgm^2 \times 10^{-4}$	5.3266 $kgm^2 \times 10^{-4}$	20.55 $kgm^2 \times 10^{-4}$	26.93 $kgm^2 \times 10^{-4}$
PWM frequency		4/8 kHz			
External braking resistor	R_{min}	100 Ω	100 Ω	68 Ω	68 Ω
Interference immunity		EN 61800-3; 2. Environment (industrial environment)			
Interference emission		EN 61800-3 category C2 (class A group 2 of EN 55011)			
Proof of mechanical strength		According to EN 61800-5-1			
Degree of protection	IP	Standard: IP65 in accordance to EN 60529 (DRC.. housing closed and all cable entries sealed) With optional ASEPTIC design: IP66 in accordance to EN 60529 (DRC.. housing closed and all cable entries sealed)			
Duty type		S1, DB (EN 60034-1)			
Type of cooling		Natural cooling to DIN 41751 and EN 61800-5-1			
Signaling functions		Display elements on the housing to indicate the device state			

DRC.. type		DRC1	DRC2	DRC3	DRC4
Installation altitude	h	Up to h ≤ 1000 m without restrictions. The following restrictions apply to heights ≥ 1000 m: • From 1000 m to max. 4000 m: – I_N reduction by 1% per 100 m • From 2000 m to max. 4000 m: – V_N reduced by AC 6 V per 100 m Over 2000 m only overvoltage category II, external measures are required for overvoltage category III. Overvoltage categories according to EN 60664-1.			
Mass	m [1]	12.40 kg	17.20 kg	34.6 kg	38.6 kg
	m [2]	13.00 kg	18.23 kg	36.5 kg	40.5 kg
Required preventive measures		Grounding the device			

1) For motor speeds of ne < 5 min-1, you have to reduce the nominal motor torque MN to 90%
2) Without brake
3) With brake

12.2.2 Ambient conditions DRC..

DRC.. type		DRC1	DRC2	DRC3	DRC4
Climate class		EN 60721-3-3; class 3K3, non-condensing, no condensation			
Storage temperature	ϑ_L	-25 °C to +70 °C (different to class 3K3)			
Ambient temperature $I_{N\ Motor}$ reduction ambient temperature	ϑ_{amb}	-25 °C to +60 °C (different to class 3K3) 3% $I_{N\ motor}$ per K at 40 °C to 60 °C			

12.2.3 Current-carrying capacity of terminals

Current-carrying capacity of terminals		
Line terminals	X2	24 A (max. loop-through current)
Control terminals	X7	3.5 A (max. loop-through current)

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12.2.4 Digital inputs/signal relays

Digital inputs/signal relays			
Input type	DI01 to DI04	Isolated via optocoupler; PLC compatible to EN 61131-2 (digital inputs type 1) $R_i \approx 3.0$ kΩ, $I_E \approx 10$ mA, sampling cycle ≤ 5 ms	
Number of inputs		4	
Signal level		+15 to +30 V = "1" = Contact closed -3 to +5 V = "0" = Contact open	
Signal relays Contact details	K1a K1b	Response time ≤ 15 ms DC 24 V/50 mA/DC 12 according to IEC 60947-5-1 (only SELV or PELV circuits)	
Signaling function		N.O. contact for ready signal	Contact closed: – with voltage present – if no fault was detected – after completion of self-testing phase (when unit is turned on)

12.2.5 Internal voltage supply 24V_O

Internal voltage supply for non-safety-related enable signal via STO input		
Voltage supply	+24V_O 0V24_O	DC 24 V to EN 61131-2, interference-voltage-proof and short-circuit proof
Permitted total current		60 mA
Required current for STO-IN supply		30 mA

12.3 System characteristics of "/ECR" and "/ACR" options

System characteristics of /ECR and /ACR options in connection with MOVIGEAR®/DRC..	Single-turn resolution (position resolution per motor revolution)		Multi-turn resolution (max. counter for complete motor revolutions)	
/ECR Single-turn absolute encoders	12 bit	4096 inc	–	–
/ACR Multi-turn absolute encoders			20 bit	1048576 revolutions

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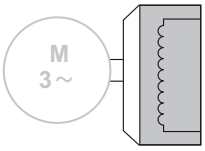
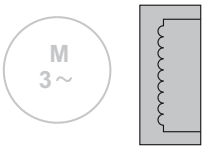
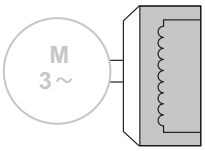
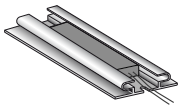
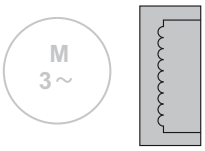
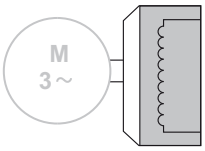
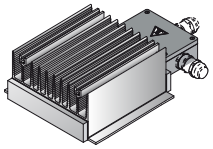
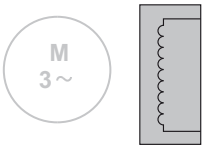
12.4 Braking resistors

12.4.1 Overview

The DRC.. electronics motor is equipped with 2 brake choppers. The following table shows their possible use in regenerative mode:

Application	Drive	Dissipation of regenerative energy		
		Brake chopper		Brake chopper
Very small amount of regenerative energy	DRC.. electronic motor **with** brake	Brake coil 	+	–
	DRC.. electronic motor **without** brake	Brake coil [1] 		
Small amount of regenerative energy	DRC.. electronic motor **with** brake	Brake coil 	+	Integrated braking resistor 
	DRC.. electronic motor **without** brake	Brake coil [1] 		
Medium/large amount of regenerative energy	DRC.. electronic motor **with** brake	Brake coil 	+	External braking resistor 
	DRC.. electronic motor **without** brake	Brake coil [1] 		

1) Motors without brake are also equipped with a brake coil (without brake disk) to dissipate the regenerative energy.

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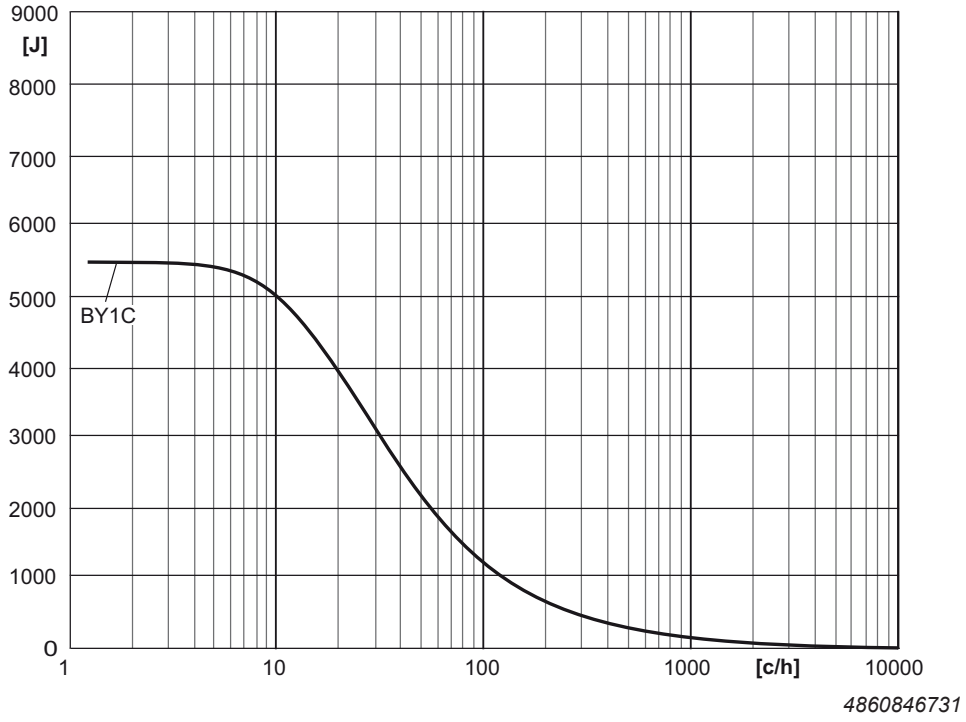
12.4.2 4Q operation with integrated brake coil

- In 4Q operation, the brake coil can be used as a braking resistor.
- The brake coil (without brake disk) is also integrated in motors without a brake.
- Brake voltage is generated internally within the unit, which means it is grid-independent.
- 4Q operation with only the integrated brake coil is recommended for applications with very small amounts of regenerative energy.
- If the amount of regenerated energy is too high for the application, you can use an additional internal or external braking resistor.

BY1C (DRC1)

The following figure shows the permitted regenerative load on the BY1C brake coil (DRC1):



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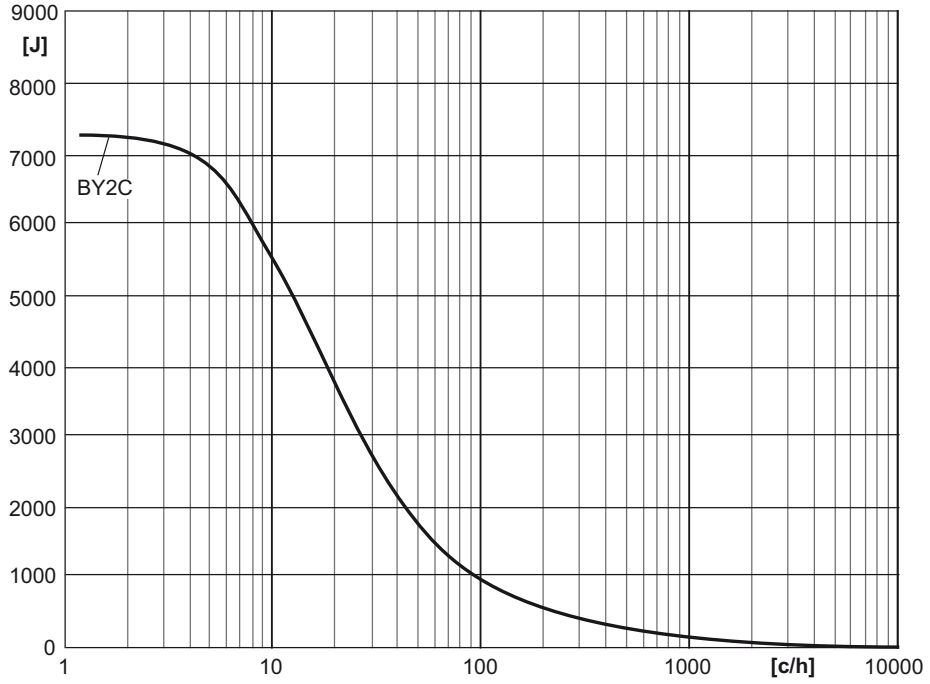
BY2C (DRC2)

The following figure shows the permitted regenerative load on the BY2C brake coil (DRC2):



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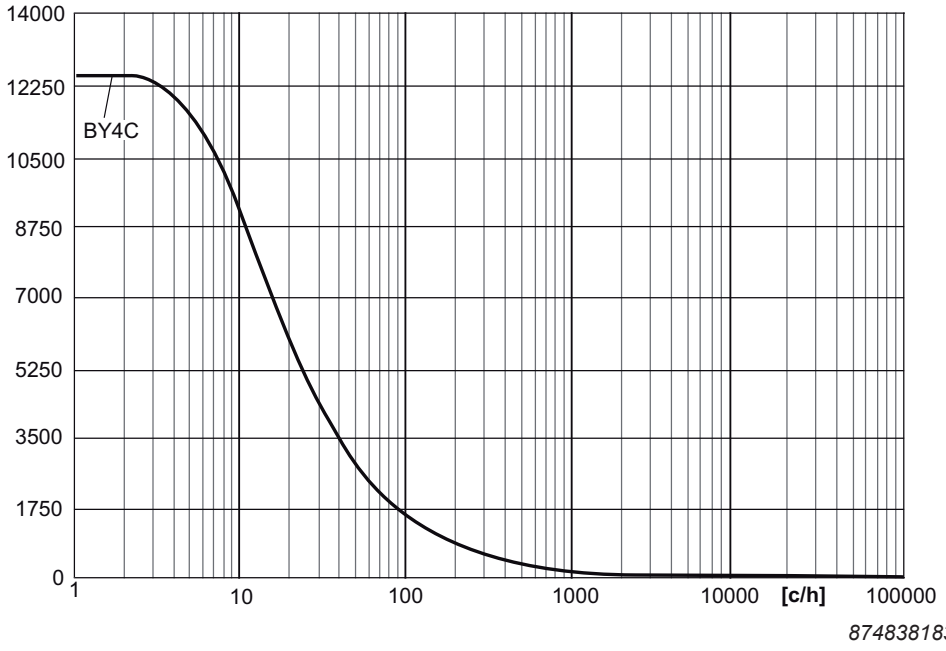
BY4C (DRC3/4)

The following figure shows the permitted regenerative load on the BY4C brake coil (DRC3/4):



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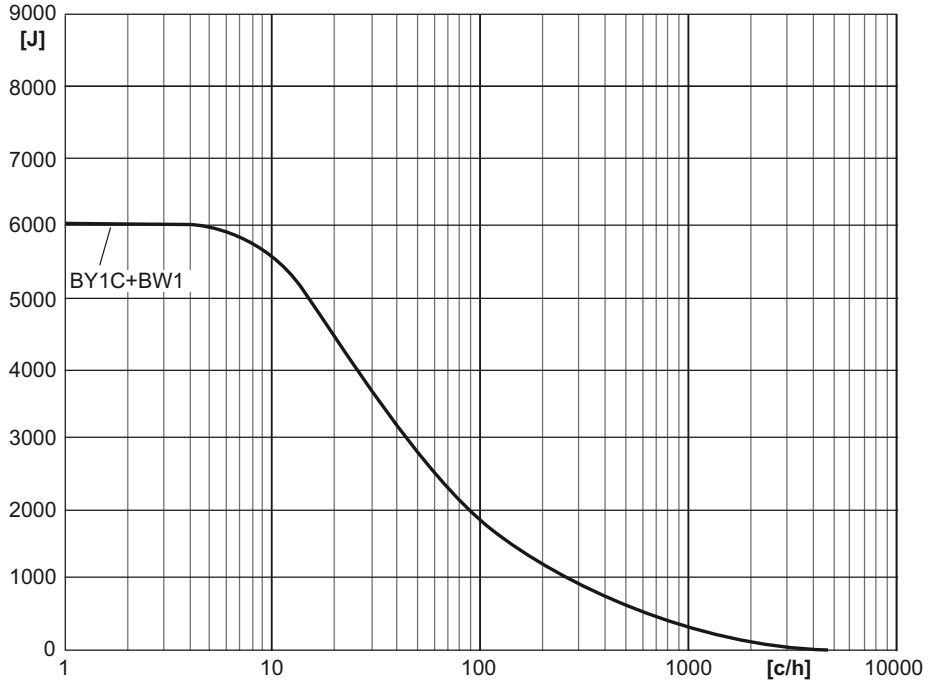
12.4.3 4Q operation with integrated brake coil and integrated braking resistor

- 4Q operation with integrated braking resistor is recommended for applications in which the level of regenerative energy is low.
- The resistor protects itself (reversible) against regenerative overload by changing abruptly to high resistance and no longer consuming any more energy. The inverter then trips with overvoltage error.
- If the amount of regenerated energy is too high for the application, you can use an external braking resistor as an alternative.

BY1C brake coil and integrated BW1 braking resistor (DRC1)

Regenerative load capacity for a brake ramp of 10 s

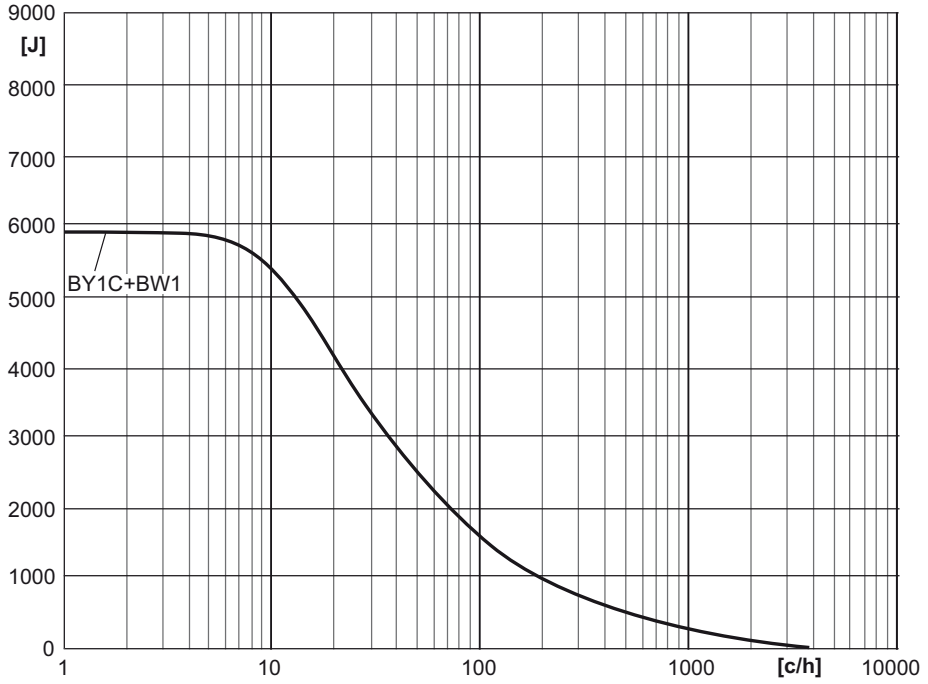
The following figure shows the permitted regenerative energy load of the BY1C brake coil in combination with the integrated BW1 braking resistor for a brake ramp of 10 s:



4860848651

Regenerative load capacity for a brake ramp of 4 s

The following figure shows the permitted regenerative energy load of the BY1C brake coil in combination with the integrated BW1 braking resistor for a brake ramp of 4 s:



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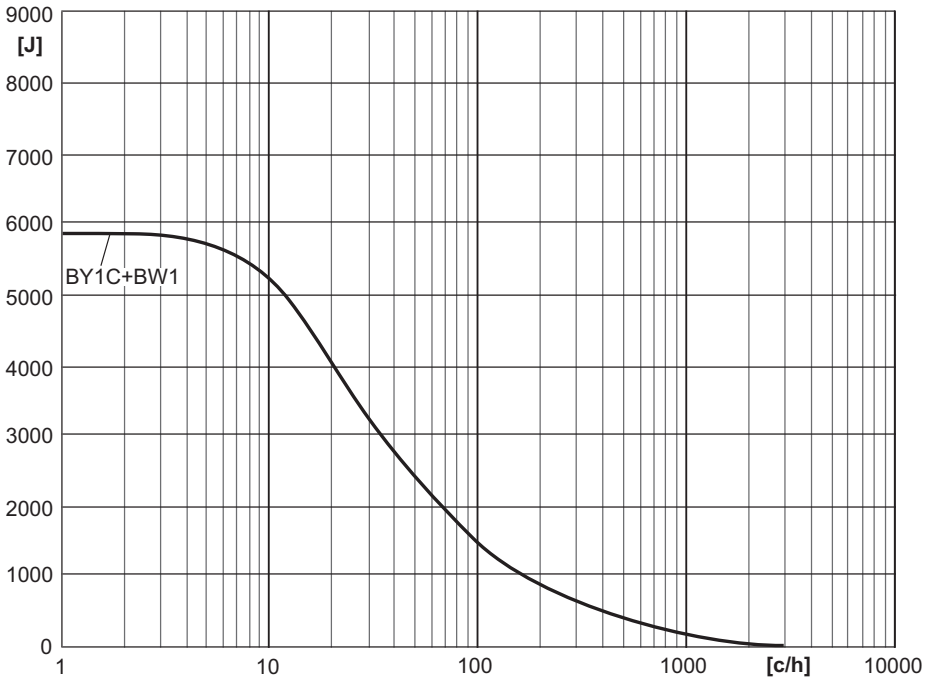
Regenerative load capacity for a brake ramp of 0.2 s

The following figure shows the permitted regenerative energy load of the BY1C brake coil in combination with the integrated BW1 braking resistor for a brake ramp of 0.2 s:



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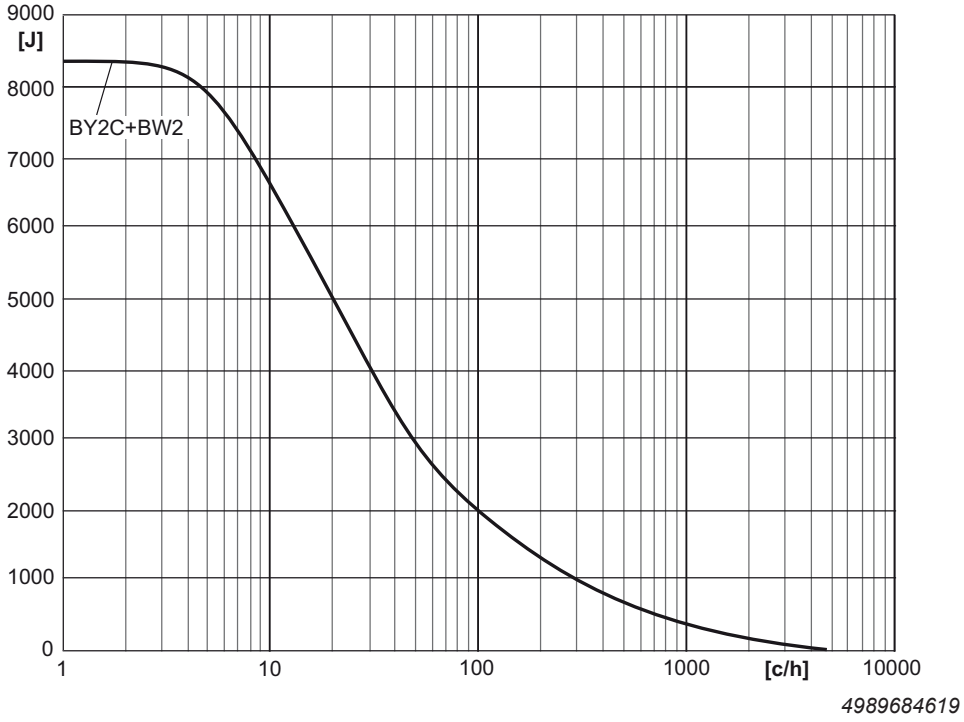
BY2C brake coil and integrated BW2 braking resistor (DRC2)

Regenerative load capacity for a brake ramp of 10 s

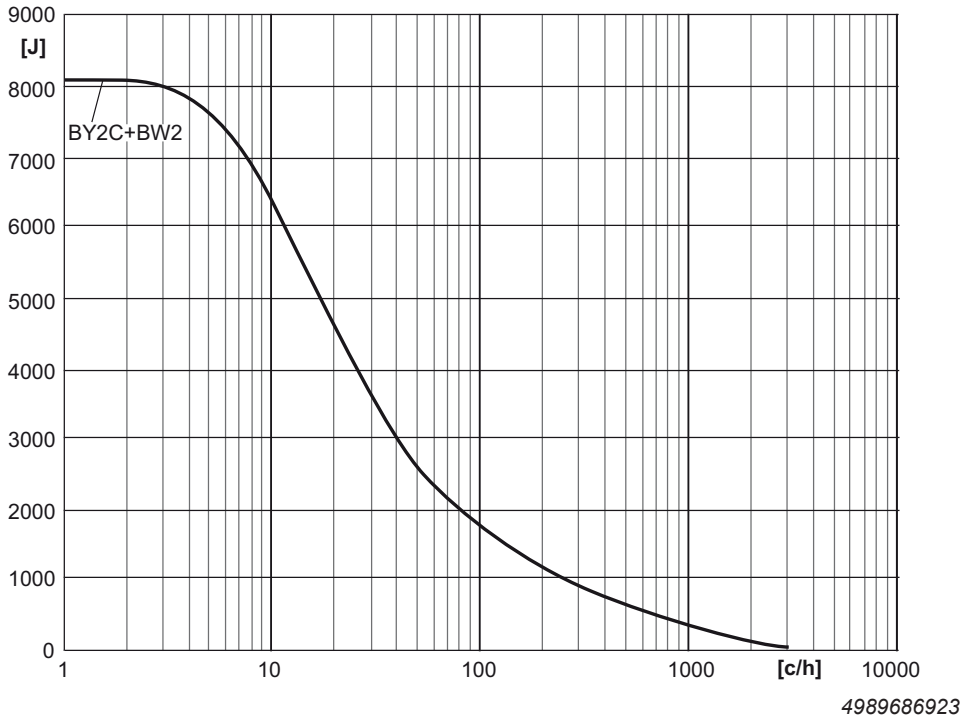
The following figure shows the permitted regenerative energy load of the BY2C brake coil in combination with the integrated BW2 braking resistor for a brake ramp of 10 s:



4989684619

Regenerative load capacity for a brake ramp of 4 s

The following figure shows the permitted regenerative energy load of the BY2C brake coil in combination with the integrated BW2 braking resistor for a brake ramp of 4 s:



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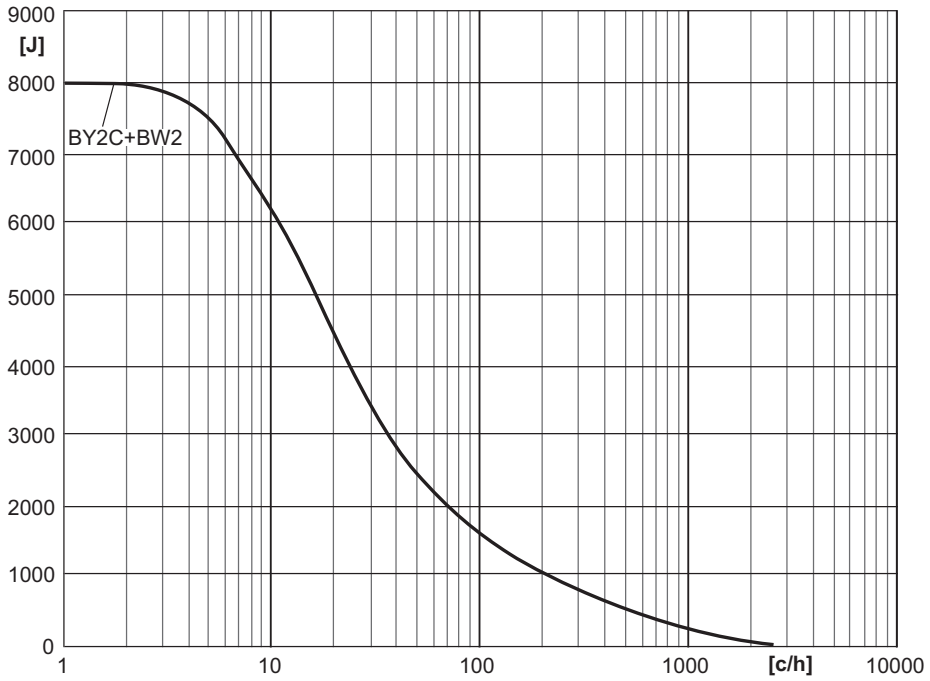
Regenerative load capacity for a brake ramp of 0.2 s

The following figure shows the permitted regenerative energy load of the BY2C brake coil in combination with the integrated BW2 braking resistor for a brake ramp of 0.2 s:



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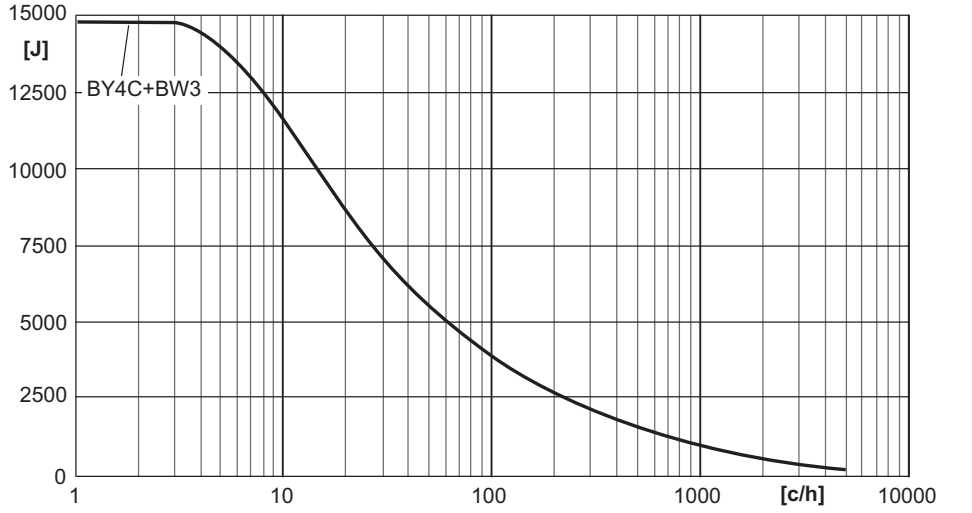
Brake coil BY4C and integrated braking resistor BW3 (DRC3/4)

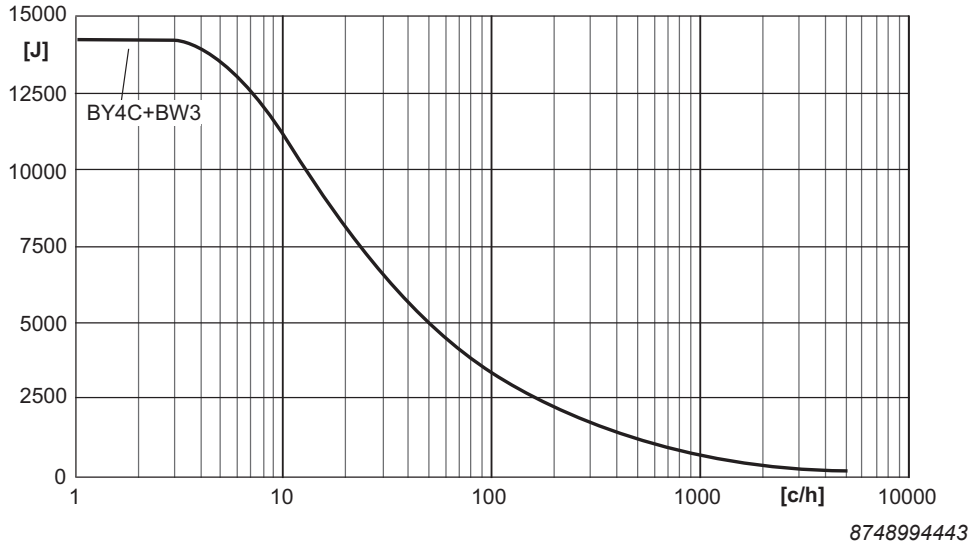
Regenerative load capacity for a brake ramp of 10 s

The following figure shows the permitted regenerative energy load of the BY4C brake coil in combination with the integrated BW3 braking resistor for a brake ramp of 10 s:



Regenerative load capacity for a brake ramp of 4 s

The following figure shows the permitted regenerative energy load of the BY4C brake coil in combination with the integrated BW3 braking resistor for a brake ramp of 4 s:



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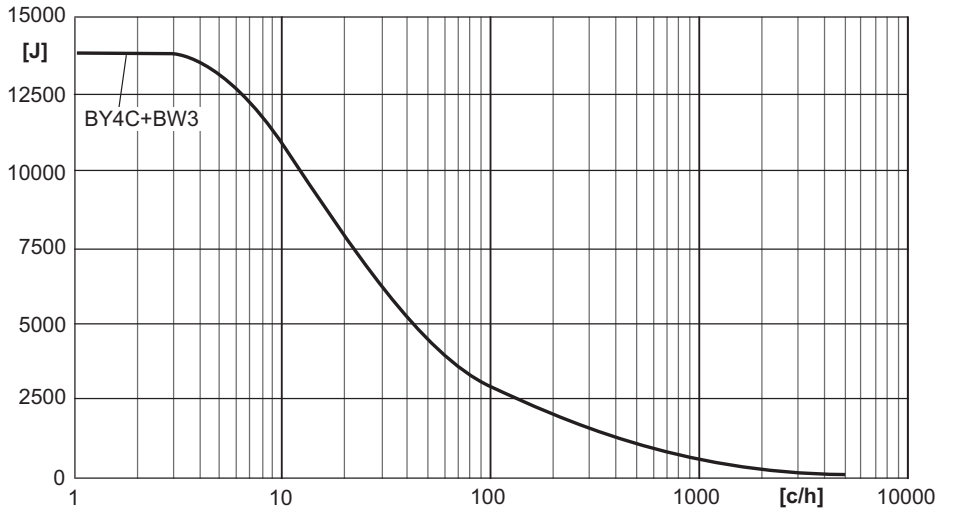
Regenerative load capacity for a brake ramp of 0.2 s

The following figure shows the permitted regenerative energy load of the BY4C brake coil in combination with the integrated BW3 braking resistor for a brake ramp of 0.2 s:



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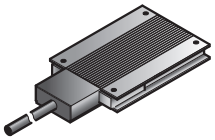
12.4.4 4Q operation with integrated brake coil and external braking resistor

4Q operation with external braking resistor is necessary for applications with a large amount of regenerative energy.

The following tables show the external braking resistors that are available for DRC.. electronic motors.

BW...-.../K-1.5



	BW100-005/K-1.5	BW150-003/K-1.5
Part number	08282862	08282927
Function	Dissipating the regenerative energy	
Degree of protection	IP65	IP65
Resistance	100 Ω	150 Ω
Power in S1, 100% cdf	200 W	100 W
Dimensions W x H x D	252 x 15 x 80 mm	146 x 15 x 80 mm
Cable length	1.5 m	1.5 m

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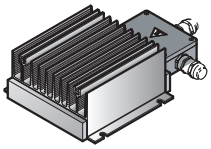
BW...-...-T



	BW150-006-T	BW100-009-T
Part number	17969565	17969573
Function	Dissipating the regenerative energy	
Degree of protection	IP66	IP66
Resistance	150 Ω	100 Ω
Power in S1, 100% cdf	600 W	900 W
Dimensions W x H x D	285 × 75 × 174 mm	435 × 75 × 174 mm
Prescribed connection cables	Shielded cables with a temperature resistance of T_{amb} ≥ 90 °C (194 °F)	
Maximum permitted cable length	15 m	15 m

	BW68-006-T	BW68-012-T
Part number	17970008	17970016
Function	Dissipating the regenerative energy	
Degree of protection	IP66	IP66
Resistance	68 Ω	68 Ω
Power in S1, 100% cdf	600 W	1200 W
Dimensions W x H x D	285 × 75 × 174 mm	635 × 75 × 174 mm
Prescribed connection cables	Shielded cables with a temperature resistance of T_{amb} ≥ 90 °C (194 °F)	
Maximum permitted cable length	15 m	15 m

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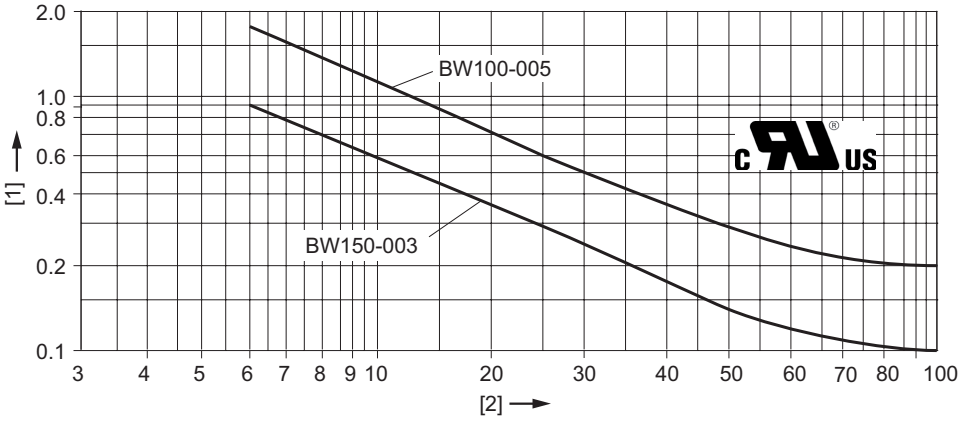
12.4.5 Technical data of BW100-005/K-1.5 and BW150-003/K-1.5

Power diagrams

The following figure shows the power diagrams of the braking resistors BW100-005/K-1.5, BW150-003/K-1.5:

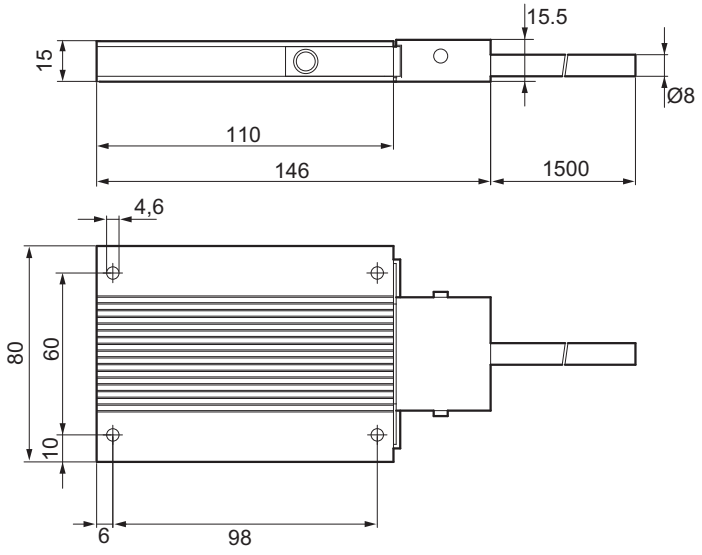


9007204104879499

[1] Power in KW
[2] Cyclic duration factor cdf in %

Dimension drawing of BW150-003/K-1.5

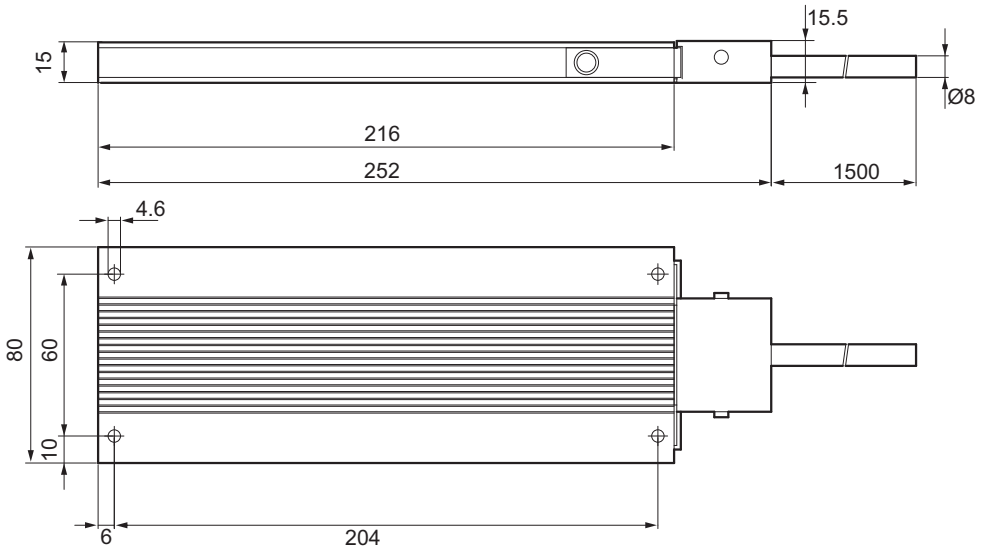
The following figure shows the dimensions of the external braking resistor BW150-003/K-1.5:



4850134027

Dimension drawing of BW100-005/K-1.5

The following figure shows the dimensions of the external braking resistor BW100-005/K-1.5:



4850166795

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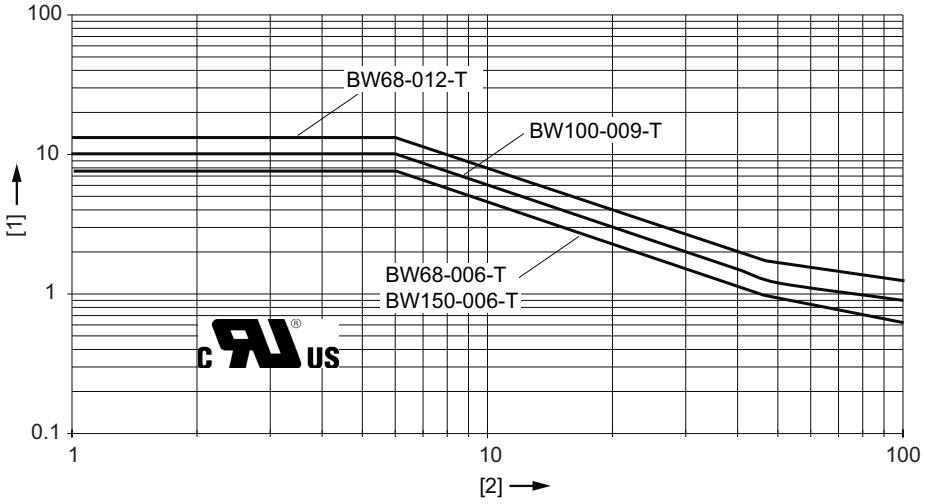
12.4.6 Technical data of BW150-006-T, BW100-009-T, BW068-006-T, and BW068-012-T

Power diagrams

The following figure shows the power diagrams of the braking resistors BW150-006-T, BW100-009-T, BW068-006-T, and BW068-012-T:

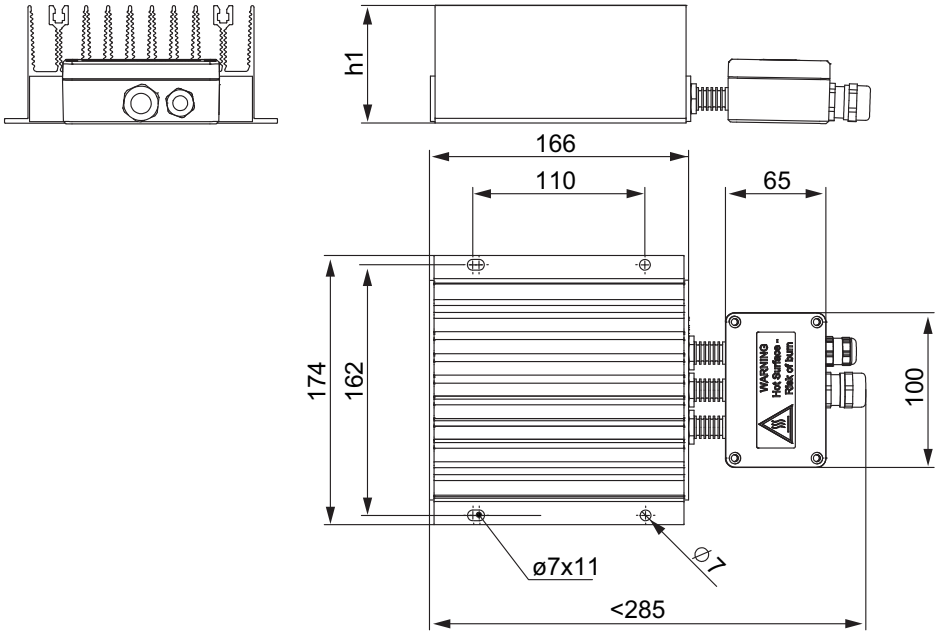


9007204104980491

[1] Power in KW
[2] Cyclic duration factor cdf in %
ED Cyclic duration factor of the braking resistor, based on a cycle duration of 120 s.

Dimension drawing of BW150-006-T/BW068-006-T

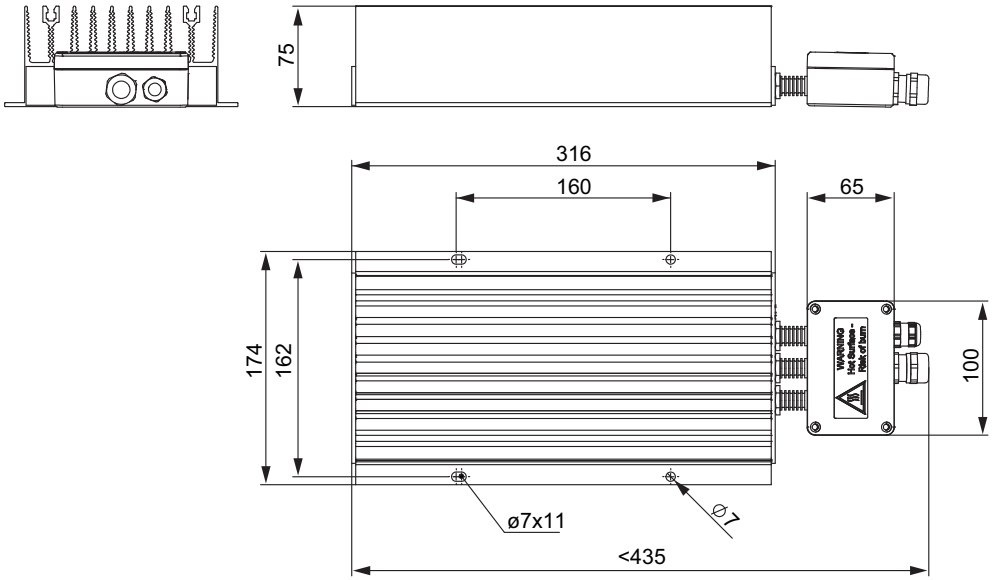
The following figure shows the dimensions of the external braking resistors BW150-006-T and BW068-006-T



4850243339

Dimension drawing of BW100-009-T

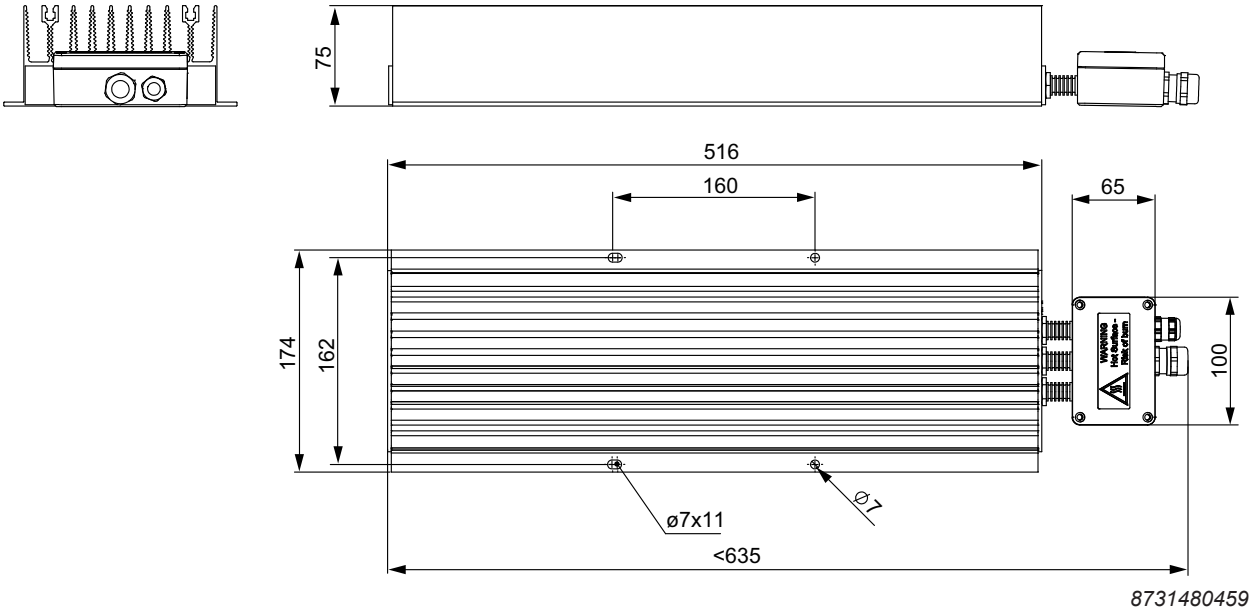
The following figure shows the dimensions of the external braking resistor BW100-009-T:



4850322059

Dimension drawing of BW068-012-T

The following figure shows the dimensions of the external braking resistor BW068-012-T:



8731480459

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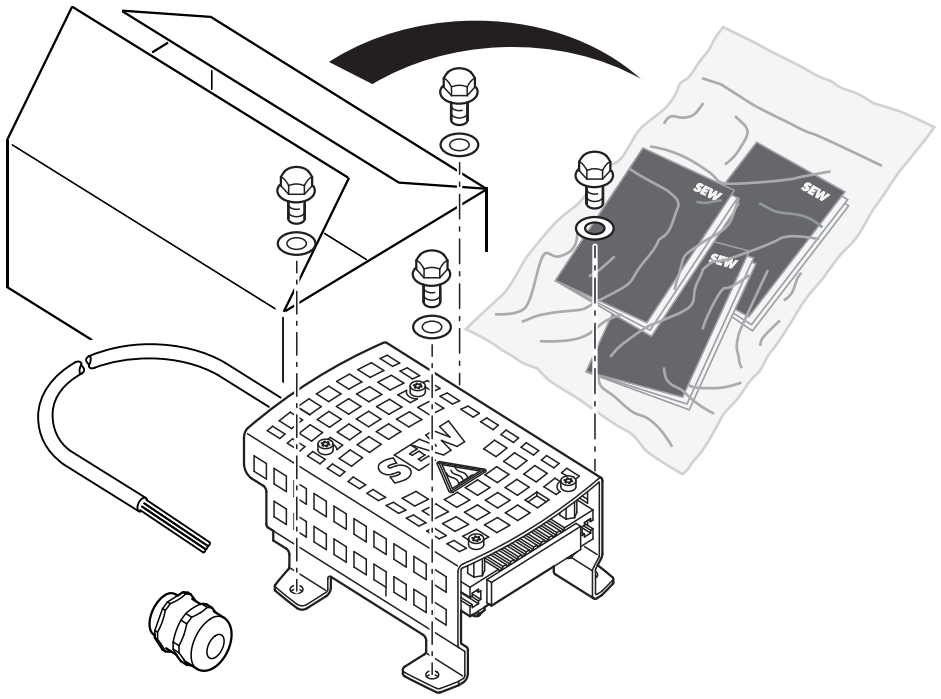
12.5 Mounting kit for braking resistor BW...-.../..A

INFORMATION

- The BW...-.../..A braking resistor must always be mounted and installed by the customer.
- Observe the installation instructions "Braking resistor BW...-.../..A".

The following figure shows the mounting kit for braking resistor BW...-.../..A:



20930754315

12.5.1 Assignment

Drive unit	Mounting kit	
	Part number	Type
DRC1	18259103	BW100-001/K-1.5/D1A
	18259154	BW100-002/K-1.5/D1A
DRC2	18259111	BW100-001/K-1.5/D2A
	18259162	BW100-002/K-1.5/D2A
DRC3 **DRC4**	18262910	BW100-002/K-1.5/D4A

12.5.2 Technical data

Technical data	Type	
	BW100-001/.../...	**BW100-002/.../...**
Nominal continuous power at T_{amb}~40 °C	100 W	200 W
Resistance value R_{BW}	100 Ω ±10%	100 Ω ±10%
Design	Flat design	
Connections	3 x AWG 20; l = 150 cm	
Degree of protection (EN 60529)	IP66	
Operating temperature range	-25 °C to +40 °C	
Type of cooling	Natural convection	
Housing temperature at nominal continuous power at T_{amb}~40 °C	< 300 °C	
Conformity	CE/UL/CSA	
Derating at T_{amb}> 40 °C	5% per 10 K to 60 °C	

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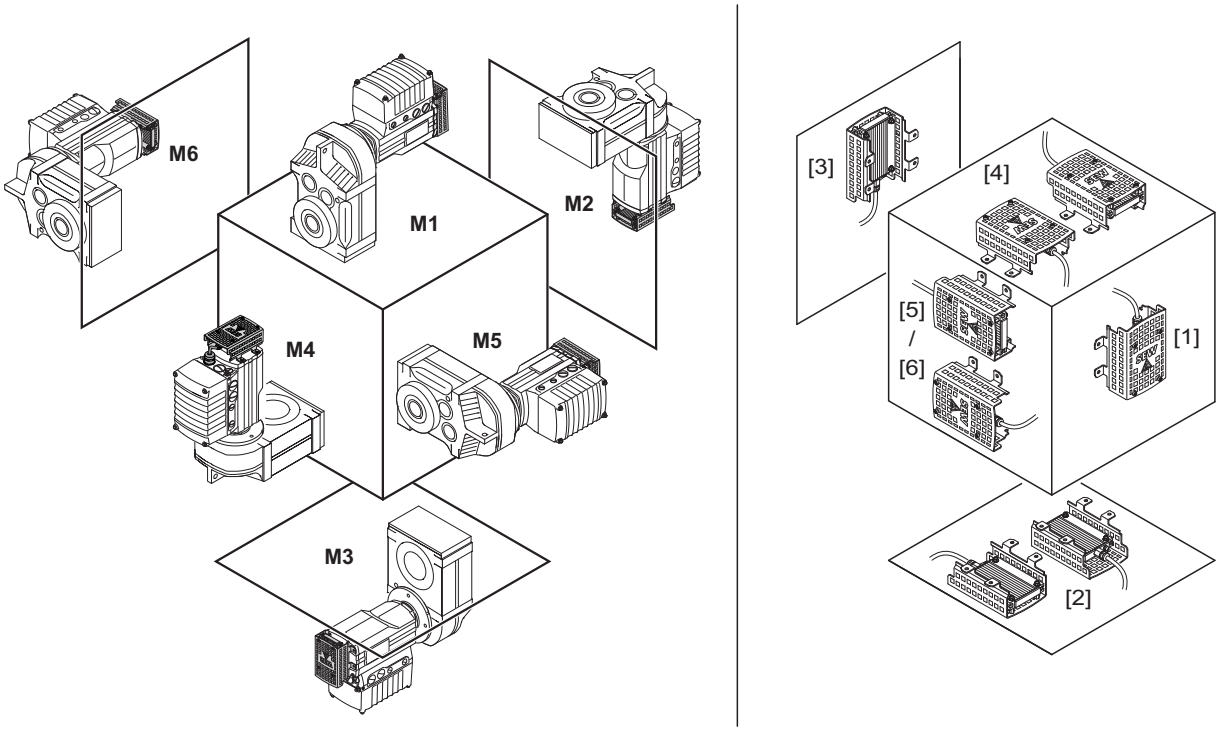
12.5.3 Load capacity

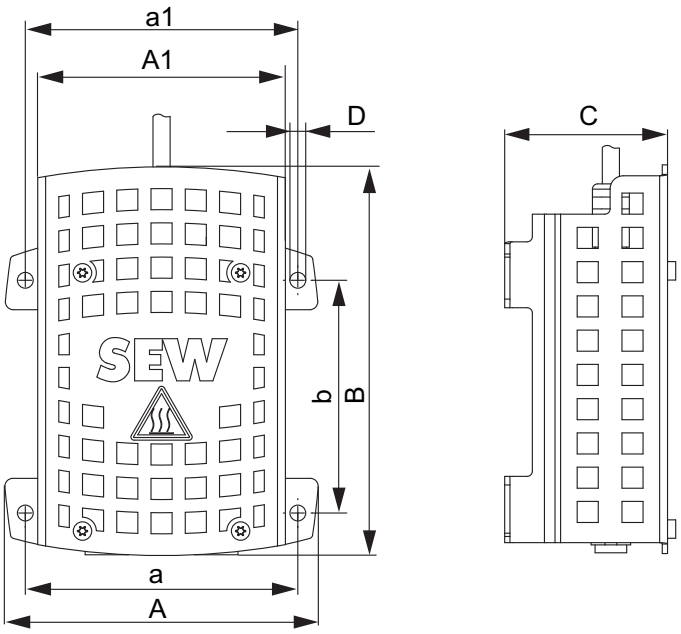


20908269067

BW100-001/.../..	Load capacity at % cdf in [W]				
cdf	**M1 [1]**	**M2 [2]**	**M3 [3]**	**M4 [4]**	**M5/M6 [5] / [6]**
100%	100	100	100	100	100
50%	150	150	150	150	150
25%	250	250	250	250	250
12%	300	300	300	300	300
6%	500	500	500	500	500
cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration TD ≤ 120 s					

BW100-002/.../..	Load capacity at % cdf in [W]				
cdf	**M1 [1]**	**M2 [2]**	**M3 [3]**	**M4 [4]**	**M5/M6 [5] / [6]**
100%	200	200	200	160	160
50%	300	300	300	240	240
25%	500	500	500	400	400
12%	600	600	600	480	480
6%	1000	1000	1000	800	800
cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration TD ≤ 120 s					

12.5.4 Dimension drawing



20907654411

	A	A1	B	C	D	a	a1	b
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
18259103 (BW100-001/K-1.5/D1A)	118.50	94.00	147.50	61.80	6	103.40	103.40	88.30
18259154 (BW100-002/K-1.5/D1A)								
18259111 (BW100-001/K-1.5/D2A)	133.00	94.00	147.50	61.80	6	111.80	111.80	111.80
18259162 (BW100-002/K-1.5/D2A)								
18262910 (BW100-002/K-1.5/D4A)	190.40	94.00	147.50	61.80	7	172.20	172.20	107.60

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12.6 Technical data of the brake

12.6.1 Braking work, braking torque

NOTICE

Damage to the DRC.. drive unit.

Potential damage to property.

- Note that only the SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE is permitted to carry out maintenance/inspection work on the brake or to change the braking torque.

Type	Braking torque	Braking work per emergency braking operation	Max. number of emergency braking operations[1]	Braking work until maintenance
	[Nm]	[kJ]		[MJ]
BY1C (DRC1)	7	5	10/h	40
	2.5	5	10/h	40
BY2C (DRC2)	14	15	10/h	65
	7	15	10/h	65
BY4C (DRC3)	28	17	10/h	85
	14	17	10/h	85
BY4C (DRC4)	40	10.5	10/h	55
	20	10.5	10/h	85

1) Emergency braking means that the brake is applied at high speed instead of decelerating the drive along a ramp and applying the brake after reaching the stop speed. This can occur in case of a controller inhibit, a drive fault (depending on the set fault response), or STO (depending on the parameter settings).

12.6.2 Response and application times

Type	Braking torque	Response time t_1	Application time t_2
	[Nm]	[ms]	[ms]
BY1C (DRC1)	7	100	200
	2.5		400
BY2C (DRC2)	14	100	200
	7		250
BY4C (DRC3)	28	100	200
	14		200
BY4C (DRC4)	40	100	200
	20		200

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12.6.3 Characteristic values of functional safety

Definition of the characteristic safety value B_{10D}

The value B_{10D} specifies the number of cycles at which 10% of components have failed dangerously (definition according to standard EN ISO 13849-1). Failed dangerously means in this context that the brake is not applied when required. This means the brake does not deliver the necessary braking torque.

Size DRC	Size Brake	B_{10D} Switching cycles
DRC1	BY1C	12 000 000
DRC2	BY2C	8 000 000
DRC3/DRC4	BY4C	6000000

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12.7 ASEPTIC design

12.7.1 Surface protection

For the properties of OS2 – OS4 in connection with ASEPTIC designs, refer to the chapter "Surface protection".

12.7.2 Cleaning

Do not mix cleaning and disinfecting agents under any circumstances.

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

Strictly observe the safety instructions of the cleaning agent manufacturer.

12.7.3 Sealing material

Resistance to cleaning agents

The sealing material used for DRC.. motors has been tested for resistance to cleaning agents.

Resistance to the following cleaning agents was proven in the tests performed by the company ECOLAB®:

Alkaline and chlorinated alkaline foam cleaning agents		
Designation	**Application concentration**	**Application temperature**
P3-topax 12	5%	40 °C

Acid foam cleaning agents		
Designation	**Application concentration**	**Application temperature**
P3-topax 56	5%	40 °C
P3-topax 58	5%	40 °C

TFC cleaner		
Designation	**Application concentration**	**Application temperature**
P3-topactive 200	4%	40 °C
P3-topactive 500	4%	40 °C

Disinfectant		
Designation	**Application concentration**	**Application temperature**
P3-topax 990	5%	23 °C

DI water	–	40 °C

Product specifications

P3-topax 19 Alkaline foam cleaning agent

P3-topax 56	Acid foam cleaning agent based on phosphoric acid
P3-topax 58	Acid foam cleaning agent based on organic acids
P3-topactive 200	Alkaline cleaning agent for operational cleaning as TFC application
P3-topactive 500	Acid cleaning agent for operational cleaning as TFC application
P3-topax 990	Alkaline foam disinfectant based on alkylamine acetate
DI water	Demineralized water

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12.8 Surface protection

12.8.1 General information

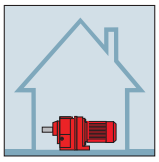
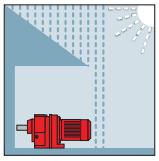
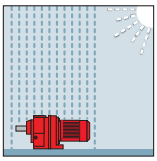
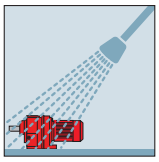
SEW-EURODRIVE offers the following optional protective measure for operating DRC.. drive units under special environmental conditions.

- OS surface protection

Special optional protective measures are also available for the gear unit/motor, see "DRC.. Gearmotors" catalog.

12.8.2 Surface protection

Instead of standard surface protection, DRC.. drive units can be equipped with OS1 to OS4 surface protection as an option. The special procedure Z can also be performed in addition. Special measure Z means that large contour recesses are filled with rubber before painting.

Surface protection		Ambient conditions	Sample applications
Standard		For machines and systems in buildings and enclosed rooms with neutral atmospheres. Similar to corrosivity category[1]: • C1 (negligible)	• Machines and systems in the automotive industry • Conveyor systems in logistics areas • Conveyor systems at airports
OS1		For environments prone to condensation and atmospheres with low humidity or contamination, such as applications outdoors under roof or with protection. Similar to corrosivity category[1]: • C2 (low)	• Systems in saw mills • Hall gates • Agitators and mixers
OS2		For environments with high humidity or mean atmospheric contamination, such as applications outdoors subject to direct weathering. Similar to corrosivity category[1]: • C3 (moderate)	• Cable cars and chairlifts • Applications in gravel plants
OS3		For environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. Similar to corrosivity category[1]: • C4 (high)	• Sewage treatment works • Port cranes • Mining applications

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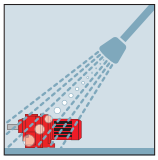
Surface protection		Ambient conditions	Sample applications
OS4		For environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning, also with chemical cleaning agents. Based on corrosivity category[2]: • C5-1 (very high)	• Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry

1) According to DIN EN ISO 12 944-2

2) According to DIN EN ISO 12944-2, classification of ambient conditions

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12.8.3 Resistance of OS4 surface treatment to cleaning agents

SEW-EURODRIVE has had the resistance of the base coat and top coat of the OS4 surface coating independently tested and certified for cleaning agents and disinfectants from leading manufacturers.

If the recommended cleaning agents and disinfectants are used and the specified cleaning intervals, temperatures and cleaning schedules are complied with, the best possible results can be achieved with ASEPTIC gearmotors in terms of service life and performance.

The following prerequisites were applied to the testing cycle:

- The testing cycle (1500 cycles) simulated daily cleaning according to product-specific instructions for a time period of five years.
- Evaluation took place approximately 7 days after regeneration.
- Evaluation of visual changes (color, degree of lustre) and changes in protective properties according to DIN EN ISO 4628-1.
- OS4 coating system on steel or aluminum base.
- Cleaning agents supplied by Henkel-ECOLAB®.

Cleaning agent	Product specification	Major ingredients	Concentration	Load cycle	Test temperature	Decorative changes[1)]	Changes in protective properties[1)]
P3-topax 19	Alkaline foam cleaning agent	Alkalis, surfactants, complexing agents	3%	20 min	60 °C	1	0
P3-topax 56	Acid foam cleansing agent	Acids, surfactants, inhibitors	3%	20 min	60 °C	4	0
P3-topax 58	Acid foam cleaning agent based on organic acids	Surfactants, organic acids	5%	20 min	60 °C	0	0
P3-topax 66	Alkaline foam cleansing agent and disinfectant based on active chlorine	Alkalis, active chlorine, surfactants	5%	20 min	60 °C	2	0
P3-topax 68	Alkaline foam cleansing agent with active chlorine (suitable for aluminum)	Alkalis, active chlorine, surfactants	5%	20 min	60 °C	1	0
P3-topax 99	Alkaline foam disinfectant	Basis: Salts, organic acids	2%	20 min	60 °C	3	0
P3-topactive 200	Alkaline cleaning agent for operational cleaning as TFC application	Alkalis, surfactants, complexing agents	4%	20 min	60 °C	1	0
P3-topactive 500	Acid cleaning agent for operational cleaning as TFC application	Inorganic acids, surfactants	3%	20 min	60 °C	4	0
P3-oxonia	Disinfectant for closed systems	Basis: Hydrogen peroxide	1%	30 min	60 °C	1	0

Cleaning agent	Product specification	Major ingredients	Concentration	Load cycle	Test temperature	Decorative changes[1]	Changes in protective properties[1]
P3-oxonia active	Disinfectant for closed systems	Basis: Hydrogen peroxide, peracetic acid	3%	10 min	20 °C	0	0
P3-topactive DES	Foam and TFC-capable disinfectant	Basis: Peracetic acid, surfactants	3%	30 min	20 °C	0	0
P3-oxysan ZS	Disinfectant for closed systems	Basis: Peroxide compounds	1%	30 min	20 °C	0	0

1) Assessment: 0 = No change, up to 5 = Very severe changes

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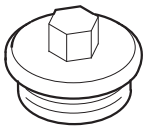
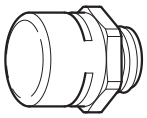
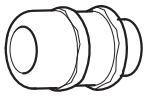
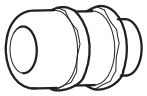
12.9 Screw fittings

The following tables show the screw fittings available from SEW-EURODRIVE:

12.9.1 Cable glands/screw plugs/pressure compensation

Type of screw fitting	Image	Content	Size	Tightening torque[1)]	Outer cable diameter	Part number
Screw plugs external hexagon (made of stainless steel)		10 pieces	M16 x 1.5	6.8 Nm	–	18247342
		10 pieces	M25 x 1.5	6.8 Nm	–	18247350
Pressure compensation screw fittings (made of stainless steel)		1 piece	M16 x 1.5	4 Nm	–	28214617
EMC cable gland (brass, nickel-plated)		10 pieces	M16 x 1.5	4 Nm	5 to 9 mm	18204783
		10 pieces	M25 x 1.5	7 Nm	11 to 16 mm	18204805
EMC cable gland (made of stainless steel)		10 pieces	M16 x 1.5	4 Nm	5 to 9 mm	18216366
		10 pieces	M25 x 1.5	7 Nm	11 to 16 mm	18216382

1) The specified torques must be adhered to with a tolerance of ± 10%.

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

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

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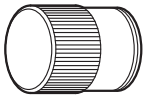
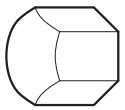
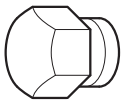
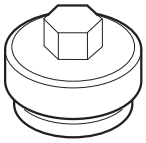
12.9.2 Screw fittings: plug connectors

Type of screw fitting	Image	Content	Size	Tightening torque[1)]	Part number
M23 plug (made of stainless steel)		1 piece	M23 x 1.5	Tighten fully	19094558
M12 plug for plug connector with male thread (made of stainless steel)		10 pieces	M12 x 1.0	2.3 Nm	18202799
M12 plug for plug connector with female thread (made of stainless steel)		10 pieces	M12 x 1.0	2.3 Nm	18202276

1) The specified torques must be adhered to with a tolerance of ± 10%.

12.9.3 Screw fitting for the diagnostic interface/potentiometer

Type of screw fitting	Image	Content	Size	Tightening torque[1)]	Part number
Hexagon head screw plug for f1 potentiometer and diagnostic interface (stainless steel)		10 pieces	M24 x 1.5	6.8 Nm	18241077

1) The specified torques must be adhered to with a tolerance of ± 10%.

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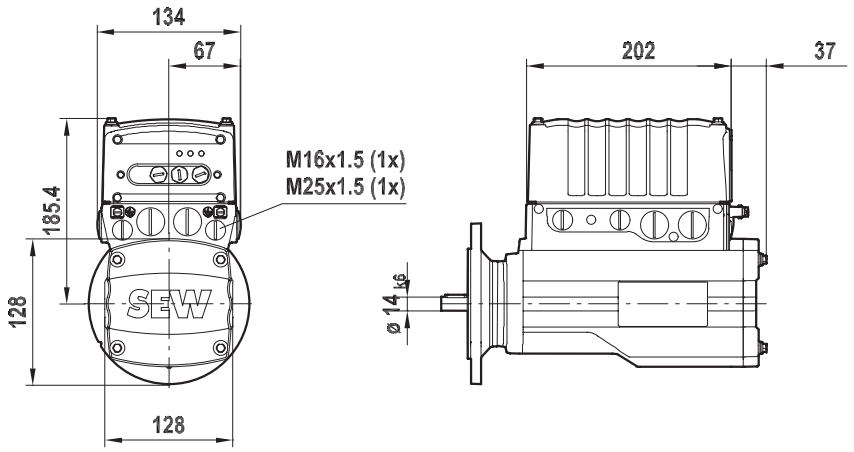
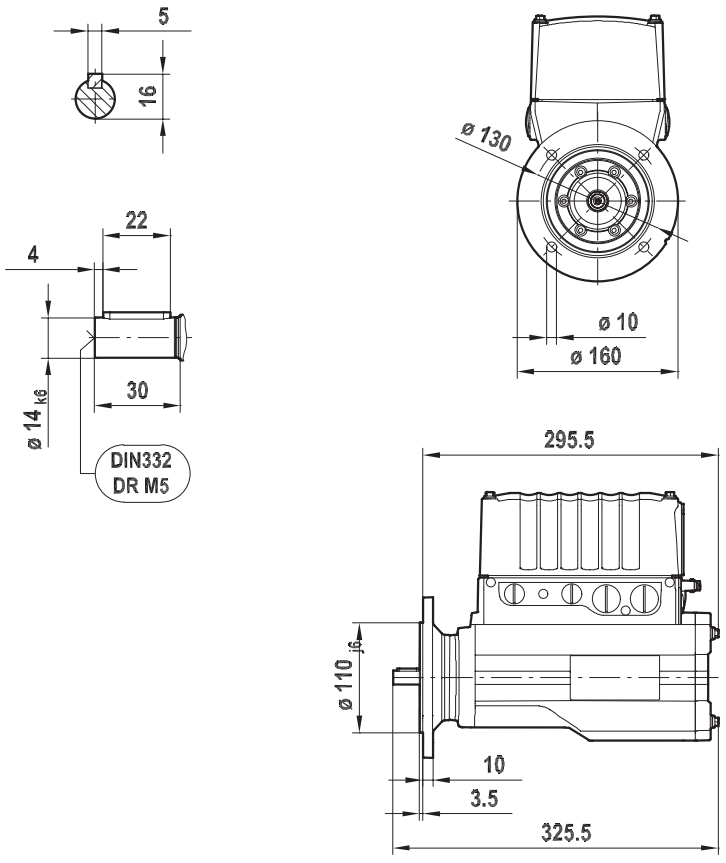
12.10 Dimension drawings

12.10.1 DRC1 with IEC flange[1)]

DRC1 08 104 01 12

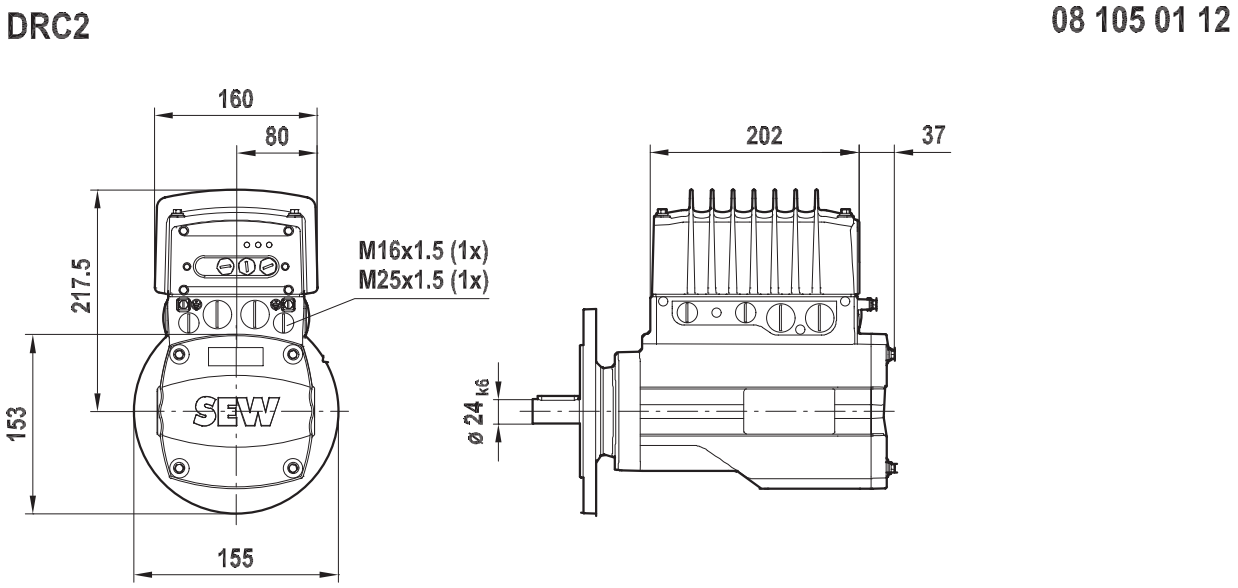


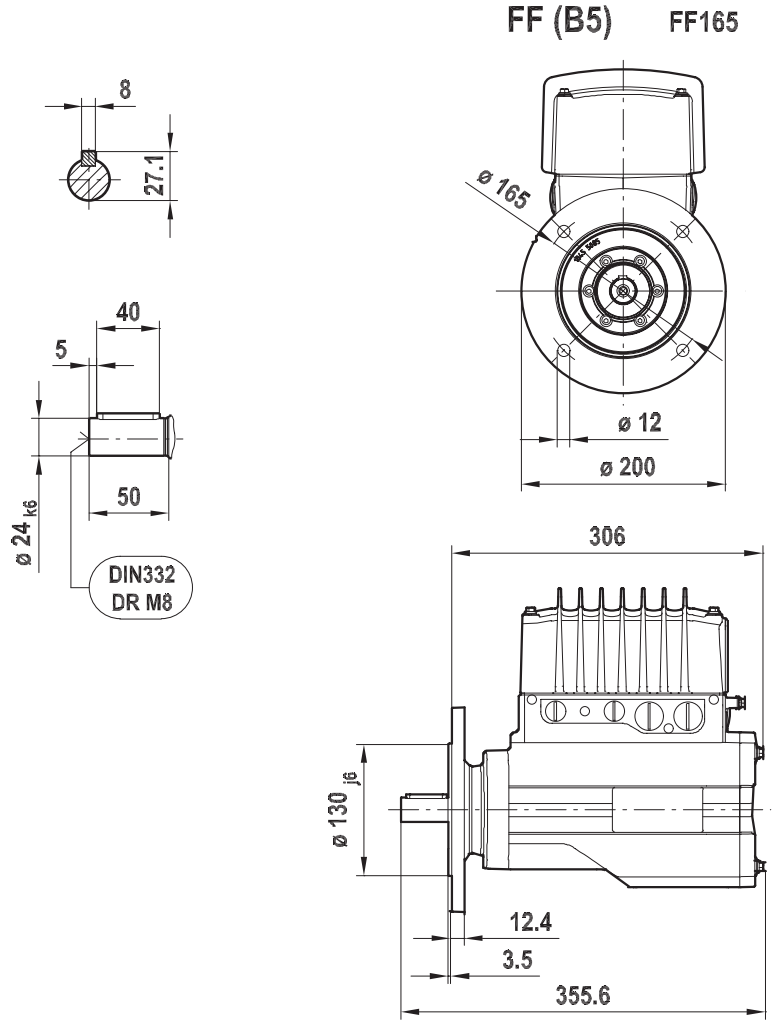
FF (B5) FF130



1) For gearmotor dimension sheets, refer to the "DRC.. Gearmotors" catalog

12.10.2 DRC2 with IEC flange[1)]





1) For gearmotor dimension sheets, refer to the "DRC.. Gearmotors" catalog.

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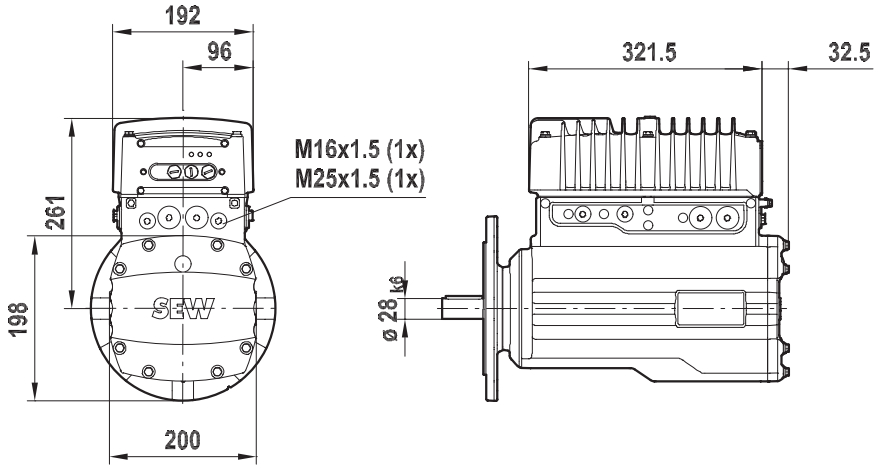
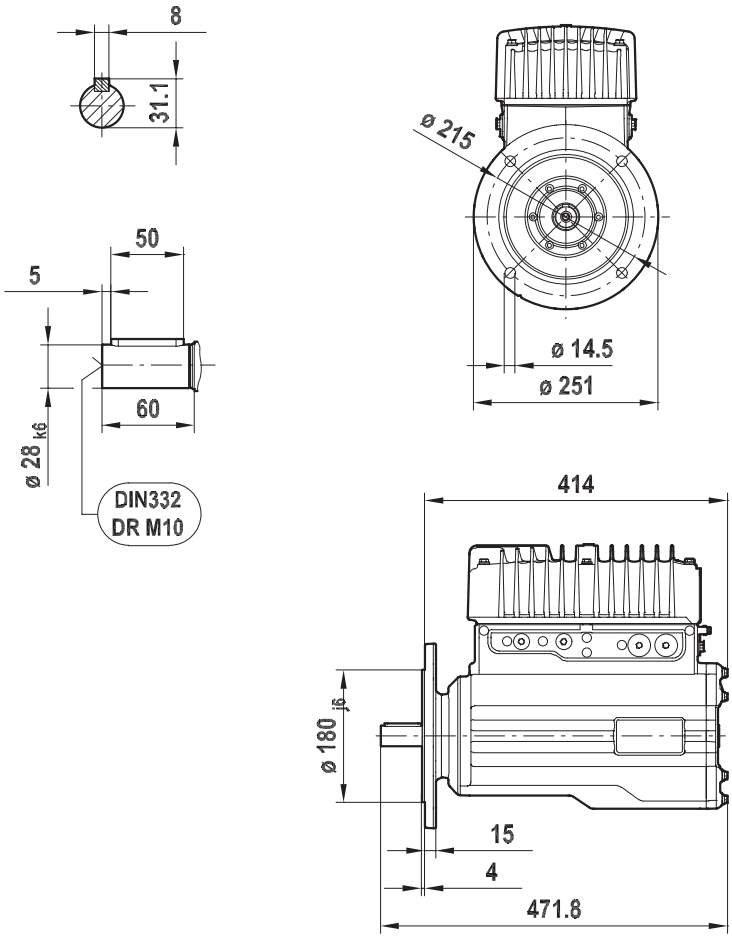
12.10.3 DRC3/4 with IEC flange[1)]

DRC3/DRC4

08 309 01 13



FF (B5) FF215

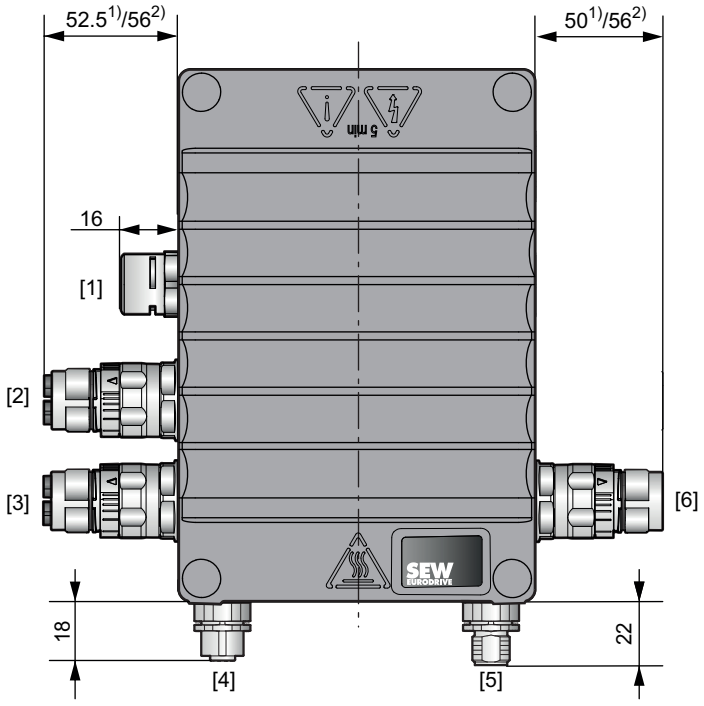


1) For gearmotor dimension sheets, refer to the "DRC.. Gearmotors" catalog.

12.10.4 Plug connectors

INFORMATION

- The following figure shows an example of the additional dimensions of the optional plug connectors for a possible plug connector configuration.
- For further information, refer to the chapter "Plug connector positions".



36028799691057035

1) "Straight" plug connector variant
2) "Right-angle" plug connector variant
[1] Pressure compensation fitting in connection with the optional design for use in wet areas (MOVIGEAR®)/ASEPTIC variant (DRC..).
[2] X1203_2: AC 400 V connection
[3] X1203_1: AC 400 V connection
[4] X5502: STO – IN
[5] X5503: STO – OUT
[6] X5132: Digital inputs/outputs

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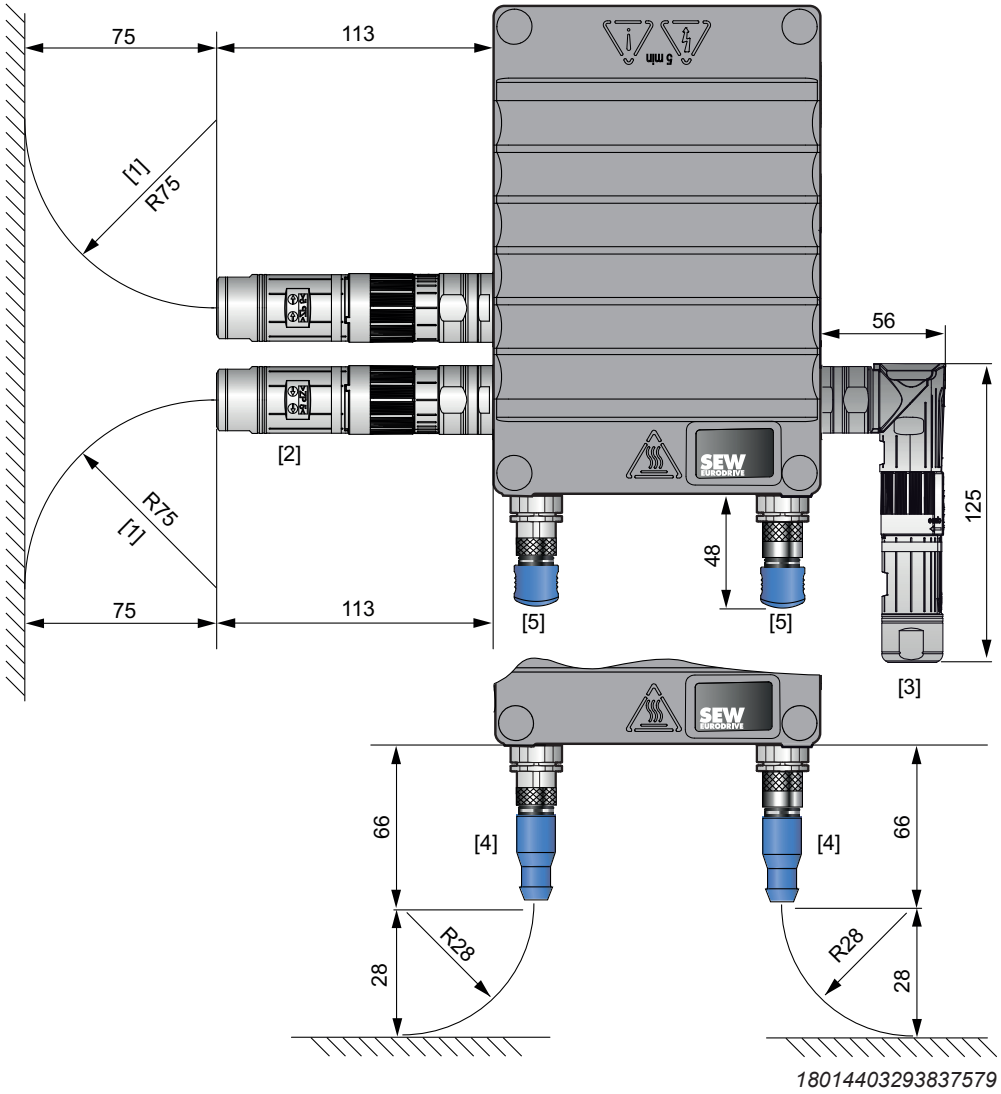
12.10.5 Plug connectors with mating connector

INFORMATION

- The following figure shows the additional dimensions/bending radii of the optional plug connectors including mating connector in connection with prefabricated cables from SEW-EURODRIVE.
- For more information, refer to the chapter "Plug connector positions".



[1] Bending radius
[2] "Straight" plug connector variant M23
[3] "Right-angle" plug connector variant M23
[4] "Straight" plug connector variant M12
[5] "Right-angle" plug connector variant M12

13 Address list

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	Joinville	SEW-EURODRIVE Brasil Ltda. Jvl / Ind Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
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	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2001 Ch. de l'Aviation Dorval Quebec H9P 2X6	Tel. +1 514 367-1124 Fax +1 514 367-3677 n.paradis@sew-eurodrive.ca
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	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 85551 Kirchheim (München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 dtc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 40764 Langenfeld (Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 dtc-west@sew-eurodrive.de
Drive Center	Berlin	SEW-EURODRIVE GmbH & Co KG Alexander-Meißner-Straße 44 12526 Berlin	Tel. +49 306331131-30 Fax +49 306331131-36 dc-berlin@sew-eurodrive.de
	Hamburg	SEW-EURODRIVE GmbH & Co KG Hasselbinnen 11 22869 Schenefeld	Tel. +49 40 298109-60 Fax +49 40 298109-70 tb-hamburg@sew-eurodrive.de
	Ludwigshafen	SEW-EURODRIVE GmbH & Co KG c/o BASF SE Gebäude W130 Raum 101 67056 Ludwigshafen	Tel. +49 7251 75 3759 Fax +49 7251 75 503759 dc-ludwigshafen@sew-eurodrive.de
	Saarland	SEW-EURODRIVE GmbH & Co KG Gottlieb-Daimler-Straße 4 66773 Schwalbach Saar – Hülzweiler	Tel. +49 6831 48946 10 Fax +49 6831 48946 13 dc-saarland@sew-eurodrive.de

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	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 18 89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 dc-ulm@sew-eurodrive.de
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	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911
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Iceland			
Sales	Reykjavik	Varma & Vélaverk ehf. Knarrarvogi 4 104 Reykjavík	Tel. +354 585 1070 Fax +354 585)1071 http://www.varmaverk.is vov@vov.is
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	Pune	SEW-EURODRIVE India Private Limited Plant: Plot No. D236/1, Chakan Industrial Area Phase- II, Warale, Tal- Khed, Pune-410501, Maharashtra	Tel. +91 21 35 628700 Fax +91 21 35 628715 salespune@seweurodriveindia.com
Sales Service	Gurgaon	SEW-EURODRIVE India Private Limited Drive Center Gurugram Plot no 395, Phase-IV, UdyogVihar Gurugram , 122016 Haryana	Tel. +91 99588 78855 salesgurgaon@seweurodriveindia.com
Indonesia			
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	Jakarta	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id

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	Surabaya	CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 Fax +62 31 5317220 sianhwa@sby.centrin.net.id http://www.cvmultimas.com
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Sales	Tel Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
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Assembly Sales Service	Milan	SEW-EURODRIVE S.a.s. di SEW S.r.l. & Co. Via Bernini,12 20020 Solaro (Milano)	Tel. +39 02 96 980229 Fax +39 02 96 980 999 http://www.sew-eurodrive.it milano@sew-eurodrive.it
Ivory Coast			
Sales	Abidjan	SEW-EURODRIVE SARL Ivory Coast Rue des Pêcheurs, Zone 3 26 BP 916 Abidjan 26	Tel. +225 21 21 81 05 Fax +225 21 25 30 47 info@sew-eurodrive.ci http://www.sew-eurodrive.ci
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Kazakhstan			
Sales Service	Almaty	SEW-EURODRIVE LLP 291-291A, Tole bi street 050031, Almaty	Tel. +7 (727) 350 5156 Fax +7 (727) 350 5156 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
	Tashkent	SEW-EURODRIVE LLP Representative office in Uzbekistan 96A, Sharaf Rashidov street, Tashkent, 100084	Tel. +998 71 2359411 Fax +998 71 2359412 http://www.sew-eurodrive.uz sew@sew-eurodrive.uz
	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Fax +976-77109997 imt@imt.mn
Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C 1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.lv info@alas-kuul.com
Lebanon			
Sales (Lebanon)	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb

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Lebanon			
Sales (Jordan, Kuwait , Saudi Arabia, Syria)	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 http://www.medrives.com info@medrives.com
Lithuania			
Sales	Alytus	UAB Irseva Statybininku 106C 63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 http://www.irseva.lt irmantas@irseva.lt
Luxembourg			
Representation: Belgium			
Macedonia			
Sales	Skopje	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Malaysia			
Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Mexico			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO S.A. de C.V. SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Querétaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Sales Service	Puebla	SEW-EURODRIVE MEXICO S.A. de C.V. Calzada Zavaleta No. 3922 Piso 2 Local 6 Col. Santa Cruz Buenavista C.P. 72154 Puebla, México	Tel. +52 (222) 221 248 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Technical Office	Ulaanbaatar	IM Trading LLC Olympic street 28B/3 Sukhbaatar district, Ulaanbaatar 14230, MN	Tel. +976-77109997 Tel. +976-99070395 Fax +976-77109997 http://imt.mn/ imt@imt.mn
Morocco			
Sales Service Assembly	Bouskoura	SEW-EURODRIVE Morocco SARL Parc Industriel CFCIM, Lot. 55/59 27182 Bouskoura Grand Casablanca	Tel. +212 522 88 85 00 Fax +212 522 88 84 50 http://www.sew-eurodrive.ma sew@sew-eurodrive.ma
Namibia			
Sales	Swakopmund	DB MINING & INDUSTRIAL SUPPLIES CC Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 anton@dbminingnam.com
Netherlands			
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam Postbus 10085 3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

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New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 30 Lodestar Avenue, Wigram Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Nigeria			
Sales	Lagos	Greenpeg Nig. Ltd Plot 296A, Adeyemo Akapo Str. Omole GRA Ikeja Lagos-Nigeria	Tel. +234-701-821-9200-1 http://www.greenpegltd.com bolaji.adekunle@greenpegltd.com
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no
Pakistan			
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk
Paraguay			
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sewpy@sew-eurodrive.com.py
Peru			
Assembly Sales Service	Lima	SEW EURODRIVE DEL PERU S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
Sales	Makati	P.T. Cerna Corporation 4137 Ponte St., Brgy. Sta. Cruz Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com http://www.ptcerna.com
Poland			
Assembly Sales Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź	Tel. +48 42 293 00 00 Fax +48 42 293 00 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 293 0030 Fax +48 42 293 0043	24 Hour Service Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Av. da Fonte Nova, n.º 86 3050-379 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

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Russia			
Assembly Sales Service	St. Petersburg	ЗАО «СЕВ-ЕВРОДРАЙФ» 188660, Russia, Leningrad Region, Vsevolozhsky District, Korabselki, Aleksandra Nevskogo str. building 4, block 1 P.O. Box 36 195220 St. Petersburg	Tel. +7 812 3332522 / +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 http://www.senemeca.com senemeca@senemeca.sn
Serbia			
Sales	Belgrade	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor 11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bernolákovo	SEW-Eurodrive SK s.r.o. Priemyselná ulica 6267/7 900 27 Bernolákovo	Tel.+421 2 33595 202, 217, 201 Fax +421 2 33595 200 http://www.sew-eurodrive.sk sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 248-7289 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 bgriffiths@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PROPRIETARY) LIMITED 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
South Korea			
Assembly Sales Service	Ansan	SEW-EURODRIVE KOREA CO., LTD. 7, Dangjaengi-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Zip 425-839	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-eurodrive.kr master.korea@sew-eurodrive.com

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South Korea			
	Busan	SEW-EURODRIVE KOREA CO., LTD. 28, Noksansandan 262-ro 50beon-gil, Gangseo-gu, Busan, Zip 618-820	Tel. +82 51 832-0204 Fax +82 51 832-0230
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Sri Lanka			
Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Swaziland			
Sales	Manzini	C G Trading Co. (Pty) Ltd Simunye street Matsapha, Manzini	Tel. +268 7602 0790 Fax +268 2 518 5033 charles@cgtrading.co.sz www.cgtradingswaziland.com
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 553 03 Jönköping Box 3100 S-550 03 Jönköping	Tel. +46 36 34 42 00 Fax +46 36 34 42 80 http://www.sew-eurodrive.se jonkoping@sew.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Taiwan			
Sales	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Huw S. Road Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878 sewtwn@ms63.hinet.net http://www.tingshou.com.tw
Tanzania			
Sales	Daressalam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam	Tel. +255 0 22 277 5780 Fax +255 0 22 277 5788 http://www.sew-eurodrive.co.tz info@sew.co.tz
Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn
Turkey			
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRIVE Ana Merkez Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli	Tel. +90 262 9991000 04 Fax +90 262 9991009 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

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Ukraine			
Assembly Sales Service	Dnipropetrovsk	SEW-EURODRIVE, LLC Robochya str., bld. 23-B, office 409 49008 Dnipro	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
United Arab Emirates			
Drive Technology Center	Dubai	SEW-EURODRIVE FZE PO Box 263835 Jebel Ali Free Zone – South, P.O. Box Dubai, United Arab Emirates	Tel. +971 (0)4 8806461 Fax +971 (0)4 8806464 info@sew-eurodrive.ae
Uruguay			
Assembly Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esqina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-90 sewuy@sew-eurodrive.com.uy
USA			
Production Assembly Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Production +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Wellford	SEW-EURODRIVE INC. 148/150 Finch Rd. Wellford, S.C. 29385	Tel. +1 864 439-7537 Fax +1 864 661 1167 IGOrders@seweurodrive.com
	Additional addresses for service provided on request!		
Vietnam			
Sales	Ho Chi Minh City	SEW-EURODRIVE PTE. LTD. RO at Hochiminh City Floor 8, KV I, Loyal building, 151-151 Bis Vo Thi Sau street, ward 6, District 3, Ho Chi Minh City, Vietnam	Tel. +84 937 299 700 huytam.phan@sew-eurodrive.com
	Hanoi	MICO LTD Quảng Trị - North Vietnam / All sectors except Construction Materials 8th Floor, Ocean Park Building, 01 Dao Duy Anh St, Ha Noi, Viet Nam	Tel. +84 4 39386666 Fax +84 4 3938 6888 nam_ph@micogroup.com.vn http://www.micogroup.com.vn
Zambia			
Representation: South Africa			

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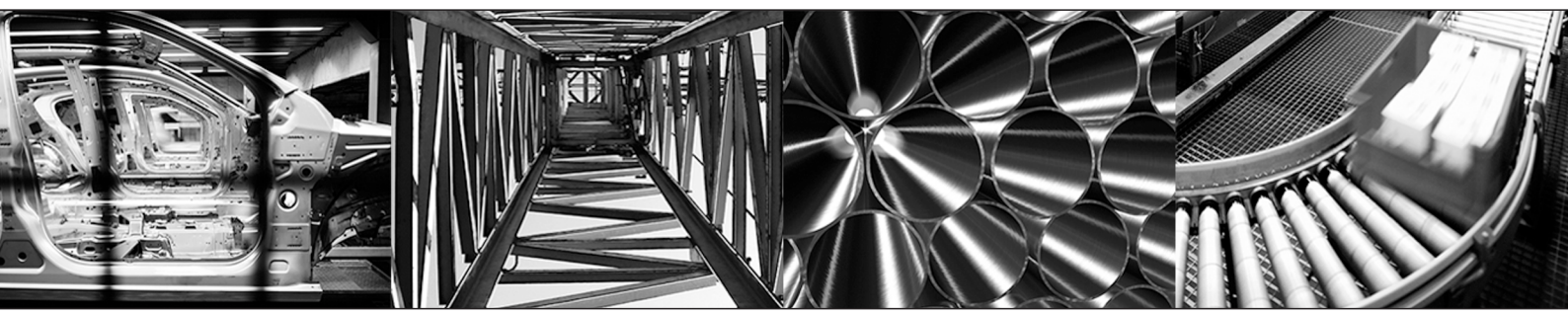

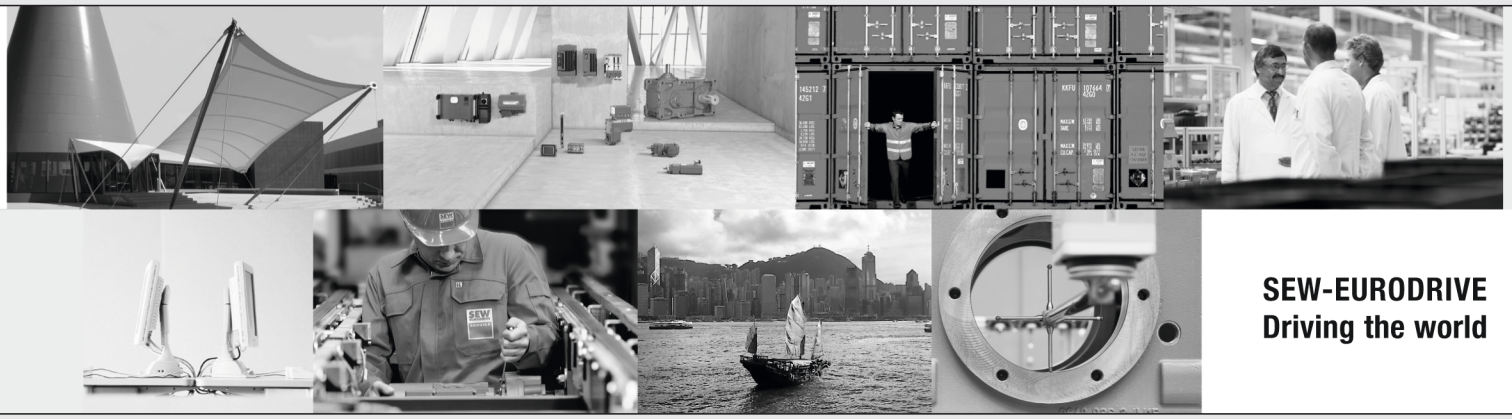

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