SEW EURODRIVE

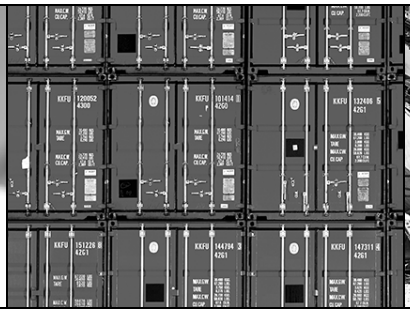
Operating Instructions

Electronic Motor
DRC.-...-DAC
Direct AS-Interface Communication

Edition 10/2013

20219342 / EN



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1 General information

1.1 How to use this documentation

The documentation is an integral part of the product and contains important information on operation and service. The documentation is written for all employees who assemble, install, start up, and service this product.

The documentation must be accessible and legible. Make sure that persons responsible for the system and its operation, as well as persons who work independently on the unit, have read through the 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 Structure of the safety notes

1.2.1 Meaning of signal words

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

Signal word	Meaning	Consequences if disregarded
⚠ **DANGER!**	Imminent 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 drive system or its environment
INFORMATION	Useful information or tip: Simplifies handling of the drive system.	

1.2.2 Design of the section-related safety notes

Section-related safety notes do not apply to a specific action, but to several actions pertaining to one subject. The 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 danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Design of the 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.

1.3 Rights to claim under warranty

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

1.4 Exclusion of liability

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

1.5 Copyright

1.6 Product names and trademarks

All product names in this documentation are trademarks or registered trademarks of their respective titleholders.

2 Safety notes

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

2.1 General information

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

During operation, DRC drive units can have live, bare and movable or rotating parts as well as hot surfaces, depending on their degree of protection.

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

Refer to the documentation for additional information.

2.2 Target group

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

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

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

2.3 Designated use

DRC drive units are components intended for installation in electrical systems or machines.

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

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

DRC drive units comply with the regulations of the Low Voltage Directive 2006/95/EC. The standards given in the declaration of conformity are applied to the DRC drive units.

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

2.3.1 Safety functions

DRC drive units may not perform safety functions unless these functions are described and expressly permitted.

2.3.2 Lifting applications

DRC drive units are not designed for use as safety devices in lifting applications.

2.4 Other applicable documentation

Note also the following documentation:

- "DRC Gearmotors" catalog
- Operating instructions for the gear unit (only for DRC gearmotors)

You can download or order these publications on the Internet (**http://www.sew-eurodrive.com** under the heading "Documentation").

2.5 Transportation, storage

Observe the notes on transportation, storage and proper handling. Comply with the requirements for climatic conditions stated in chapter "Technical Data". Tighten installed eyebolts securely. They are only designed for the weight of the DRC motor without gear unit. Mounted gear units have separate suspension attachments, which must be used according to the gear unit operating instructions when lifting the DRC gearmotor. Do not attach any additional loads. Use suitable, sufficiently rated handling equipment (e.g. rope guides) if required.

2.6 Installation

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

Protect the DRC drive units from improper strain.

The following applications are prohibited unless explicitly permitted:

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications that are subject to mechanical vibration and shock loads as stated in the documentation for DRC drive units.

Important: DRC drive units and corresponding mount-on parts must not protrude into footways.

2.7 Electrical connection

Working on live parts of DRC drive units is not permitted.

The drive is operated as a generator due to the kinetic energy of the system/machine. Secure the output shaft against rotation before opening the wiring compartment.

Electrical installation must be carried out in compliance with pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

You find notes on EMC-compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the documentation of the DRC drive units. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

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

2.8 Safe disconnection

DRC drive units meet all requirements for safe disconnection of power and electronics connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection to ensure reliable isolation.

2.9 Operation

Systems with integrated DRC drive units must be equipped with additional monitoring and protection devices according to the applicable safety guidelines, such as the law governing technical equipment, accident prevention regulations, etc. Additional protective measures may be necessary for applications with increased potential risk. Changes to DRC drive units using the operating software are permitted.

⚠ WARNING

Do not touch live components and power connections immediately after separation of the DRC drive units from the supply voltage because some capacitors might still be charged.

Severe or fatal injuries.

- Wait at least for 5 minutes after the supply voltage has been switched off.

The connection boxes must be closed and screwed on before the supply voltages are connected to DRC drive units.

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

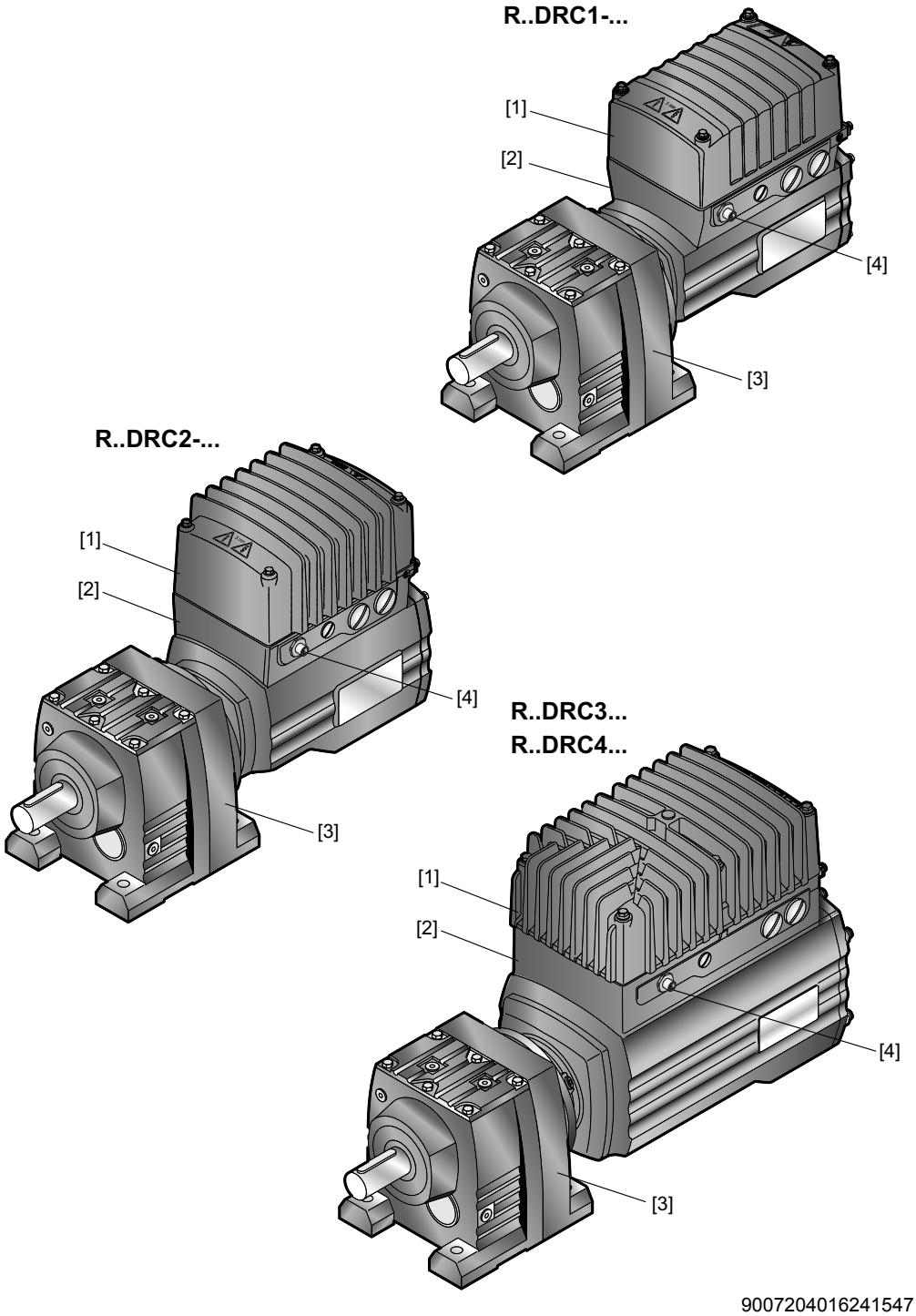
Mechanical blocking or internal safety functions of the unit can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive restarting automatically. If this is not permitted for the driven machine for safety reasons, disconnect the unit from the supply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

Caution: Danger of burns: The surface temperatures of DRC drive units can be more than 60 °C during operation.

3 Unit structure

3.1 DRC drive unit

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



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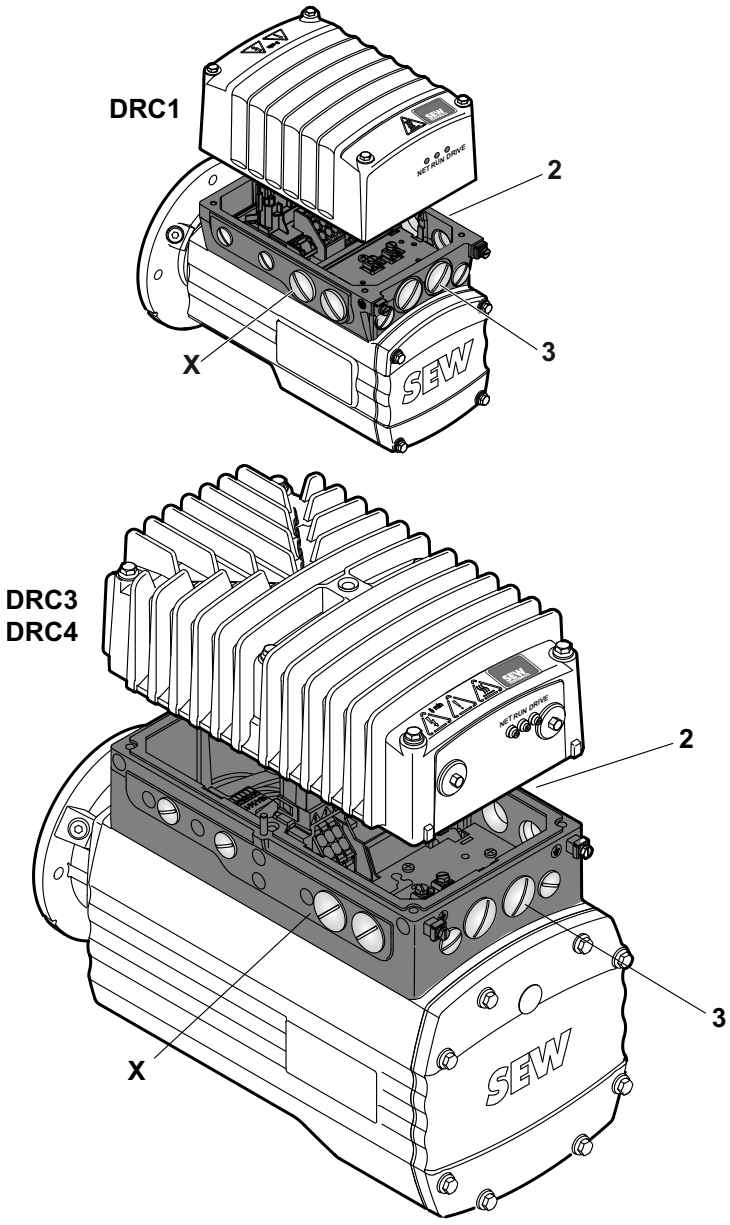
[1] Electronics cover
[2] DRC electronic motor with connection unit
[3] Gear unit (here: R gear unit)
[4] AS-Interface connection

3.2 Cable entry positions

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

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

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



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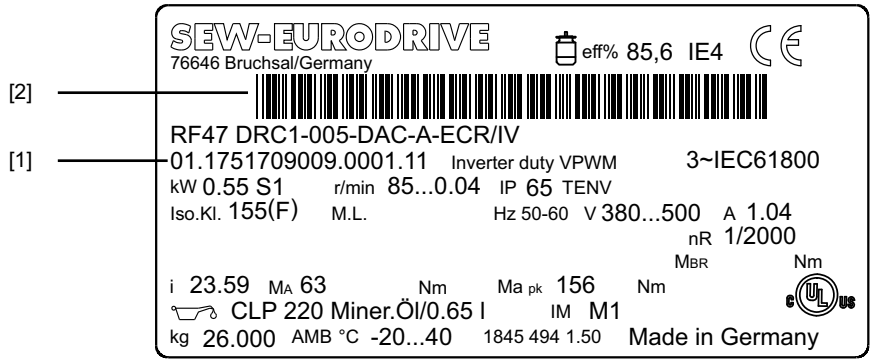
3.3 Example nameplate and type designation of the drive unit

3.3.1 Nameplate

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



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[1] Unique serial number

[2] The bar code on the nameplate (code 39) according to ISO/IEC 16388 represents the unique serial number (with a period as separator).

3.3.2 Type designation

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

RF 47 DRC 1 - 005 - DAC - A - ECR / IV

DRC option
IV = Plug connector
BY1C = Brake DRC1
BY2C = Brake DRC2
BY4C = Brake DRC3/4
BW1 = Integrated braking resistor DRC1
BW2 = Integrated braking resistor DRC2
BW3 = Integrated braking resistor DRC3/4

Extended control range (standard)

Version

DRC installation technology
DAC = Direct AS-Interface Communication

Power
005 = 0.55 kW
015 = 1.5 kW
030 = 3.0 kW
040 = 4.0 kW

Electronic motor size
1 = DRC1
2 = DRC2
3 = DRC3
4 = DRC4

Product line
DRC = Electronic motor

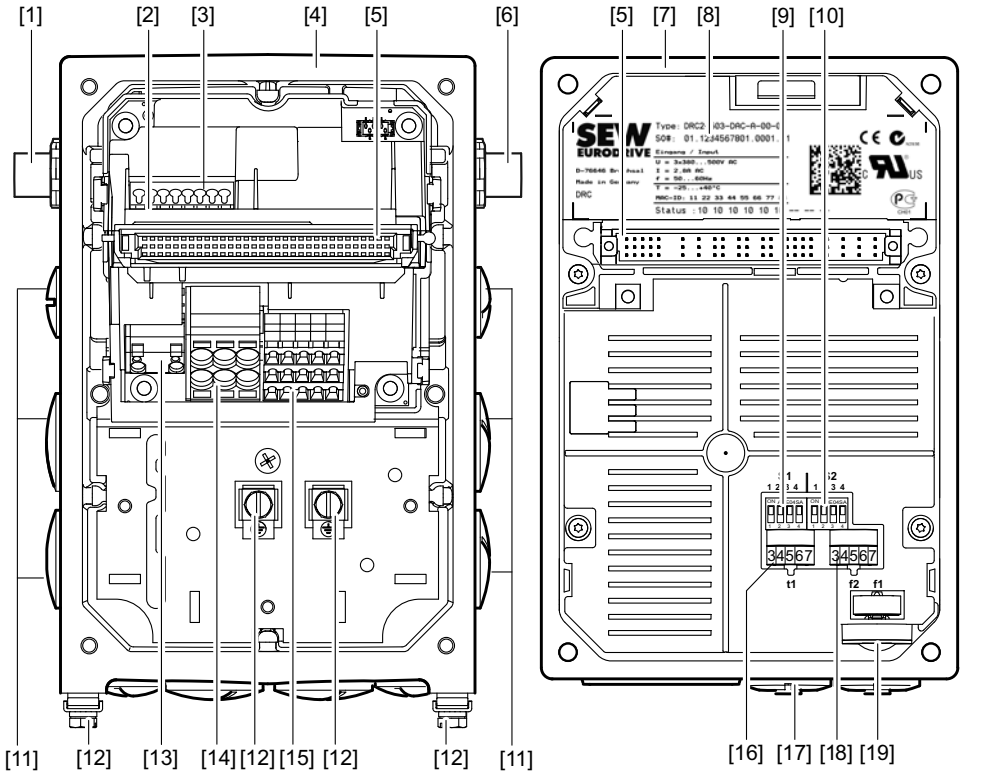
Gear unit size

Gear unit series

3.4 Electronics

3.4.1 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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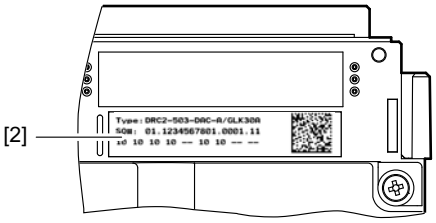
[1] AS-Interface connection
[2] Nameplate of drive unit, see following detailed view



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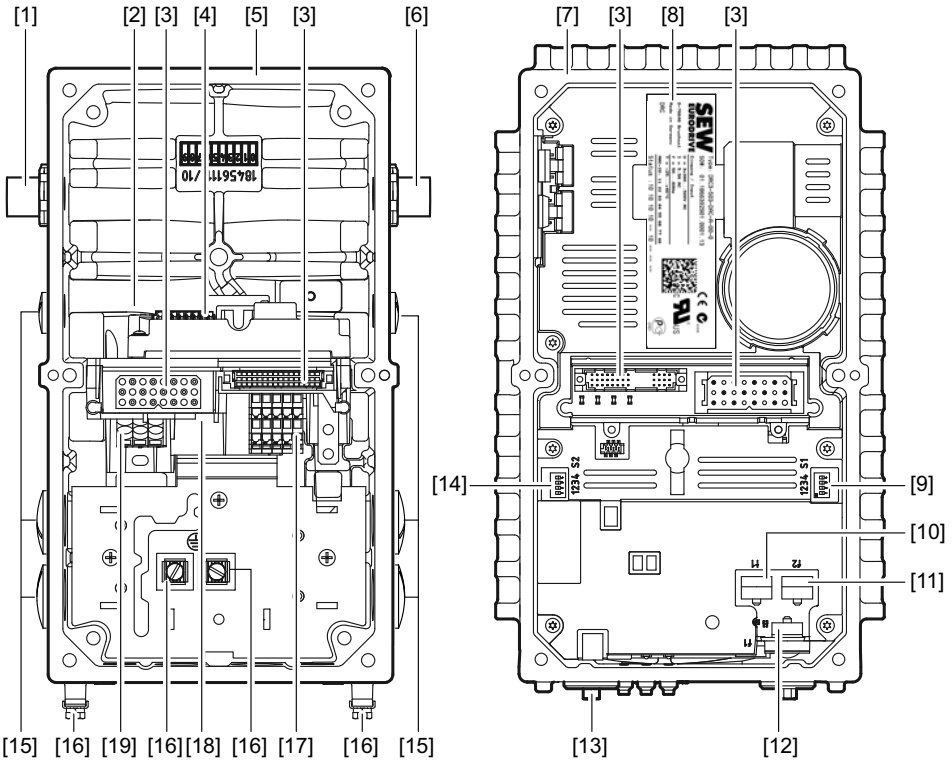
[3] AS-Interface terminals (wired to plug connector)
[4] Connection box
[5] Plug connector connection unit for DRC electronics cover
[6] AS-Interface sensors
[7] DRC electronics cover
[8] Electronics cover nameplate
[9] DIP switches S1/1 – S1/4
[10] DIP switches S2/1 – S2/4
[11] Cable glands
[12] Screws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

3.4.2 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:



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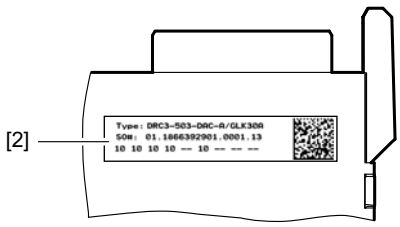
[1] AS-Interface connection
[2] Nameplate of drive unit, see following detailed view



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

3.4.3 AS-Interface option

The AS-Interface option is located on the connection board in the connection box.

DRC-DAC is available with the following AS-Interface variants:

- GLK30A binary slave
- GLK31A double slave for drive with several speed setpoints and ramps

GLK30A binary slave

The GLK30A option, when connected as a slave to AS-Interface, works like a module with 4 inputs and 4 outputs.

The cyclic output bits control the DRC-DAC drive units.

The input bits transmit the status of the drive and 2 additional sensor signals to the AS-Interface master.

The acyclic parameter bits are used to select speed scaling factors.

GLK31A double slave

The GLK31A option works as a double slave on the AS-Interface according to AS-Interface specification 3.0.

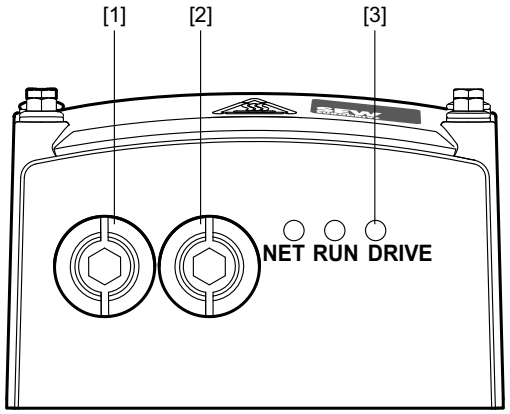
Serial AS-Interface data transmission (analog profile) allows for writing and reading DRC-DAC parameters and display values.

The DRC-DAC inverter is controlled via the cyclic output bits. The coding of the data bits is specified in different function modules. The DRC-DAC inverter interprets these bits as different control and status codes. You can switch between the function modules using the acyclic parameter bits.

The input bits transmit the status of the drive and 2 additional sensor signals to the AS-Interface master.

3.4.4 Electronics cover (outside)

DRC1/2 The following figure shows the outside of the electronics cover:



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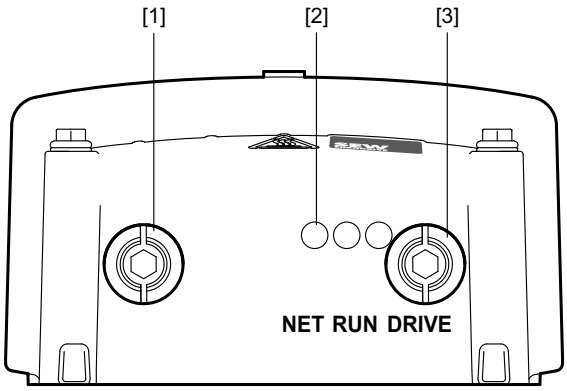
[1] Setpoint potentiometer f1 (underneath the gland)
[2] Diagnostic interface (underneath the gland)
[3] Status LEDs

DRC3/4 The following figure shows the outside of the electronics cover:



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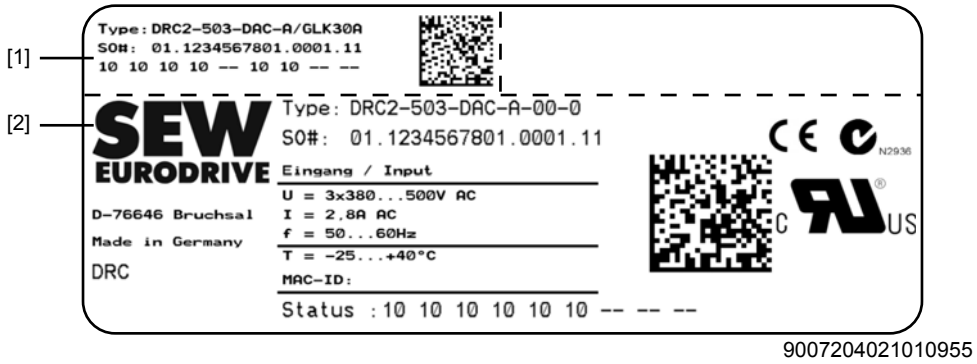
[1] Setpoint potentiometer f1 (underneath the gland)
[2] Status LEDs
[3] Diagnostic interface (underneath the gland)

3.5 Example nameplate and type designation of electronics

3.5.1 Nameplate

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



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[1] Nameplate of connection unit
[2] Electronics cover nameplate

3.5.2 Type designation of electronics cover

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

D R C 1 – 5 0 3 – DAC – A – 00 – 0

Electronics cover variant
0 = Without application slot

Design
00 = Standard

DRC version

DRC installation technology
DAC = Direct AS-Interface Communication

Connection type
3 = 3-phase (AC)

Supply voltage
50 = AC 380 – 500 V

Frame size
1 = DRC 1
2 = DRC 2
3 = DRC 3
4 = DRC 4

Product line
DRC = Electronic motor

3.5.3 Type designation of connection unit

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

D R C 1 – 5 0 3 – DAC – A – / GLK30A

Connection unit option
GLK30A = GLK30A binary slave
GLK31A = GLK31A double slave

DRC version

DRC installation technology
DAC = Direct AS-Interface Communication

Connection type
3 = 3-phase (AC)

Supply voltage
50 = AC 380 – 500 V

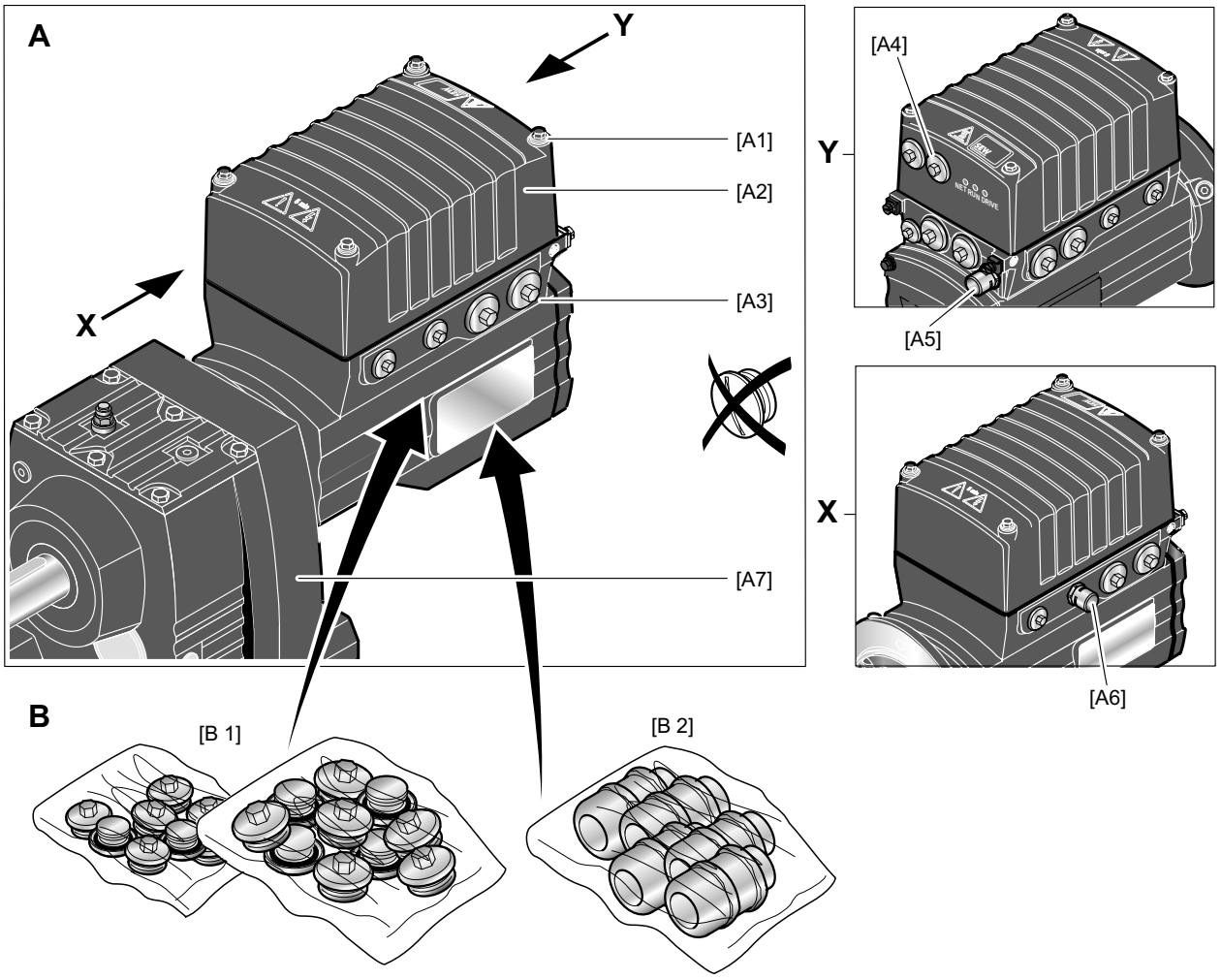
Frame size
1 = DRC 1
2 = DRC 2
3 = DRC 3
4 = DRC 4

Product line
DRC = Electronic motor

3.6 DRC drive units in ASEPTIC / ASEPTIC^{plus} design

The following figure shows the additional characteristics of DRC drive units in ASEPTIC / ASEPTIC^{plus} design:

- The ASEPTIC / ASEPTIC^{plus} variant 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 / ASEPTIC^{plus} design are displayed with a shading (= HP200 surface protection) in this publication

A Scope of delivery

[A1] DRC1/2:
Mounting screws for cover made of stainless steel
DRC3/4:
Mounting screws for cover are zinc-plated

[A2] Surface protection OS2 to OS4 for ASEPTIC design / OS4 for ASEPTIC^{plus} 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] Factory-installed pressure compensation fitting (M16) with mounting positions M5, M6

[A6] Factory-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 / ASEPTIC^{plus} version.

[A7] Features of gear units in ASEPTIC design

- Surface protection finish OS2 to OS4

Features of gear units in ASEPTIC^{plus} design

- 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 retaining 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 (Viton®)
- The breather valve of the gear units is made from stainless steel
- Surface protection finish OS4 for compatibility with common cleaning agents and disinfectants
- All surface recesses 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

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 power supply.

Severe or fatal injuries.

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

4.2 Required tools and resources

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

4.2.1 Installation tolerances for shaft ends

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

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

4.2.2 Tolerances for torque ratings

The specified torques must be adhered to with a tolerance of +/− 10% .

4.3 Installation requirements

Check that the following conditions have been met:

- The entries on the nameplate of the DRC unit 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 they are free of anti-corrosion agents, contamination or similar. Use a commercially available solvent. Do not expose the sealing lips of the oil seals to the solvent – damage to the material.
- When the drive is installed in abrasive ambient conditions, protect the output end oil seals against wear.

4.4 Setting up the drive unit

4.4.1 Information

- 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 shaft seals – 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 Gear-motors" 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 DRC cover before re-assembly.
- 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.

Change in 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.**

4.4.2 Electronics cover

⚠ WARNING

Burns caused by hot surfaces.

Severe injuries.

- Let the units cool down before touching them.

NOTICE

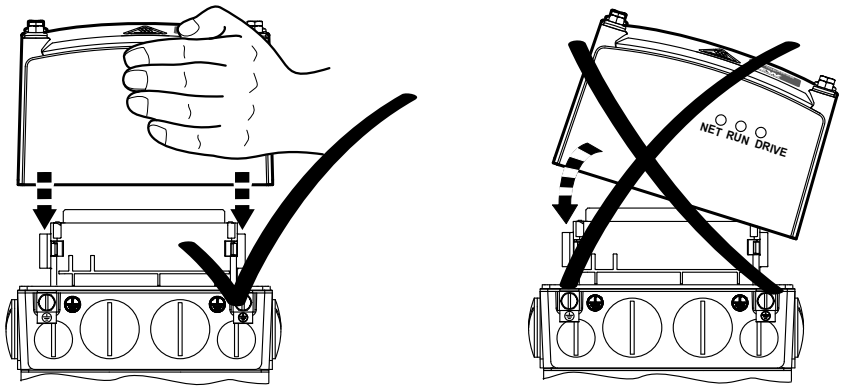
Loss of the guaranteed degree of protection.

Possible damage to property.

- When the DRC electronics cover is removed from the connection box, you have to protect it from humidity, dust or foreign particles.
- Check to see that the DRC electronics cover was 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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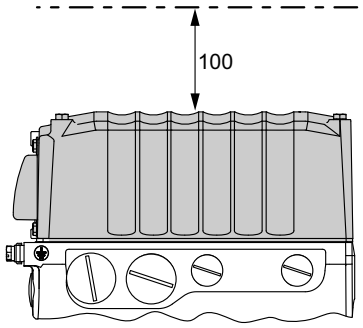
Minimum installation clearance

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



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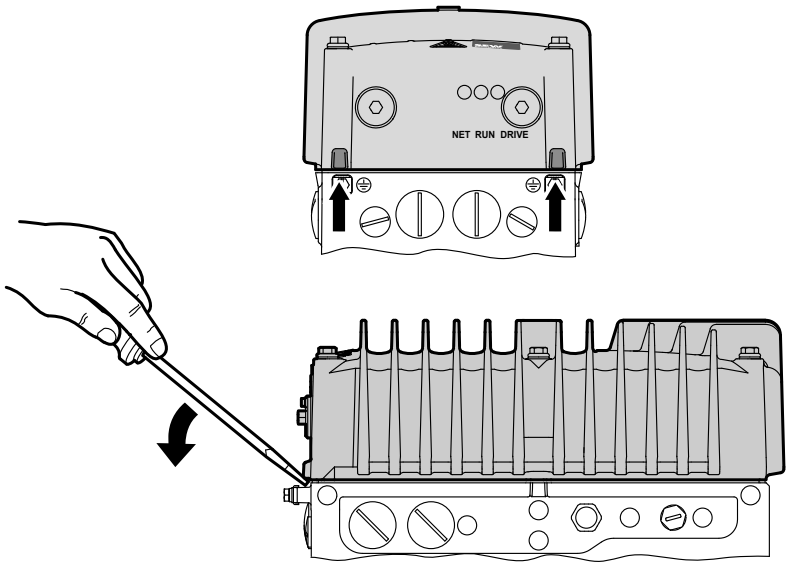
Removing the electronics cover

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 locations or in the open

Drives are supplied in corrosion-resistant versions 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 / ASEPTIC^{plus} design".

4.4.4 Painting drive units

NOTICE

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

Potential damage to property.

- Clean the surface of the drive unit and make sure it is free from grease.
- Thoroughly cover the breather valves and sealing lip of the oil seals with strips prior to painting.
- Remove the strips after painting.

4.5 Tightening torques

⚠ WARNING

Burns caused by hot surfaces.

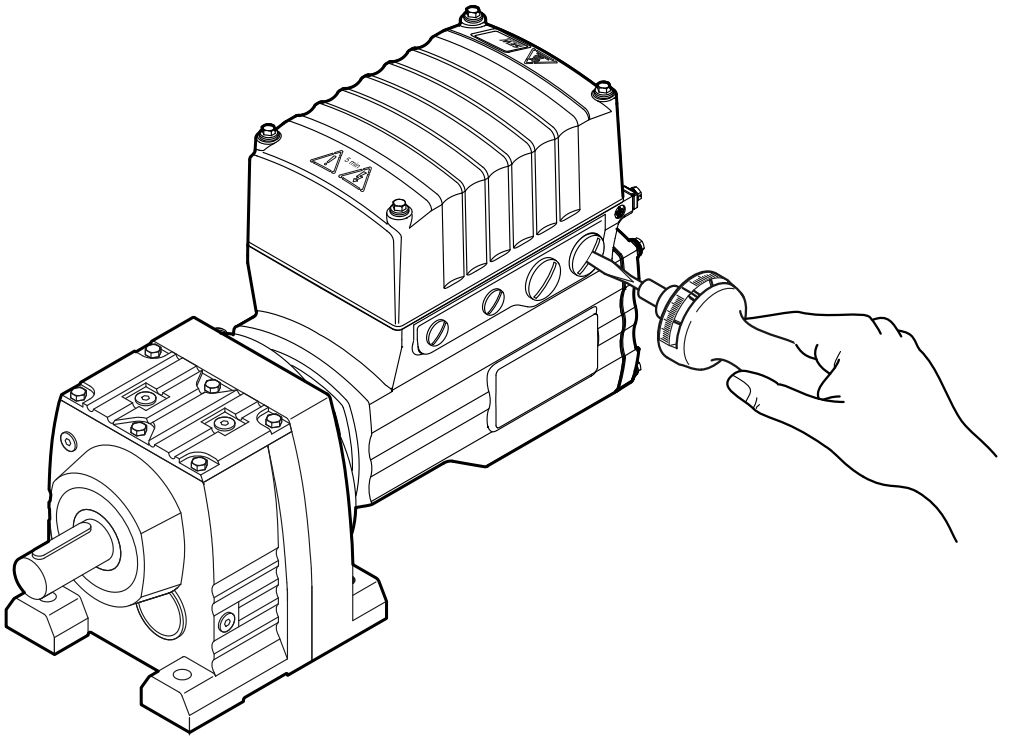
Severe injuries.

- Let the units cool down before touching them.

4.5.1 Blanking plugs

Tighten the plastic blanking plugs included in the delivery 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:

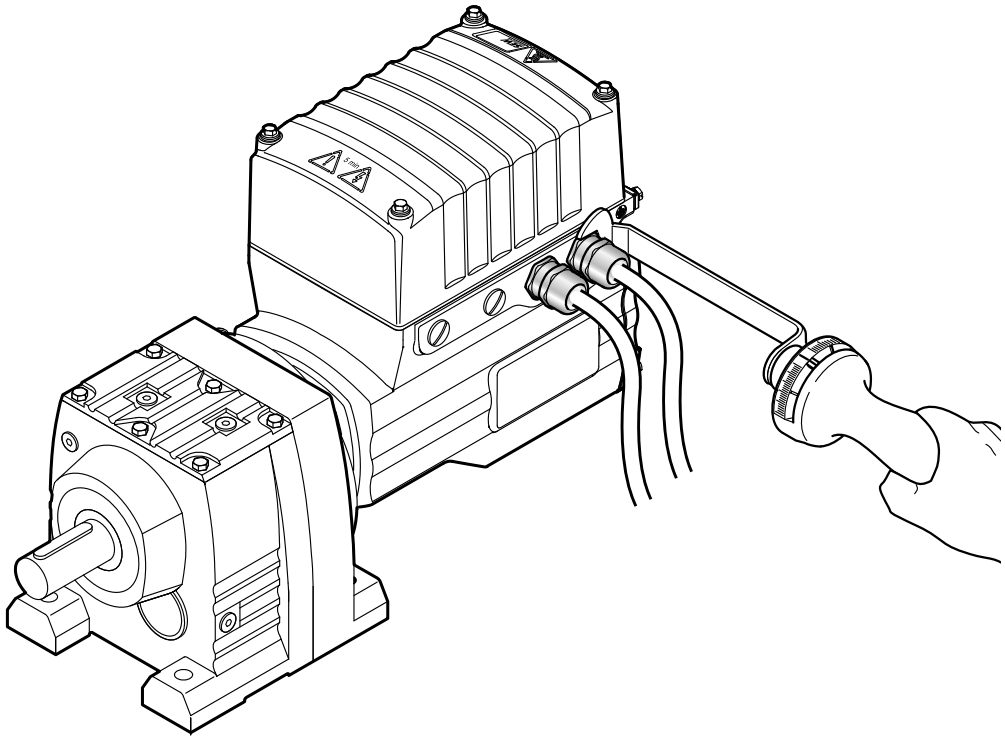
Screw fitting	Part number	Contents	Size	Outer diameter of cable	Tightening torque
EMC cable glands (nickel-plated brass)	1820 478 3	10 pc	M16 x 1.5	5 to 9 mm	4.0 Nm
	1820 480 5	10 pc	M25 x 1.5	11 to 16 mm	7.0 Nm
EMC cable glands (stainless steel)	1821 636 6	10 pc	M16 x 1.5	5 to 9 mm	4.0 Nm
	1821 638 2	10 pc	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.



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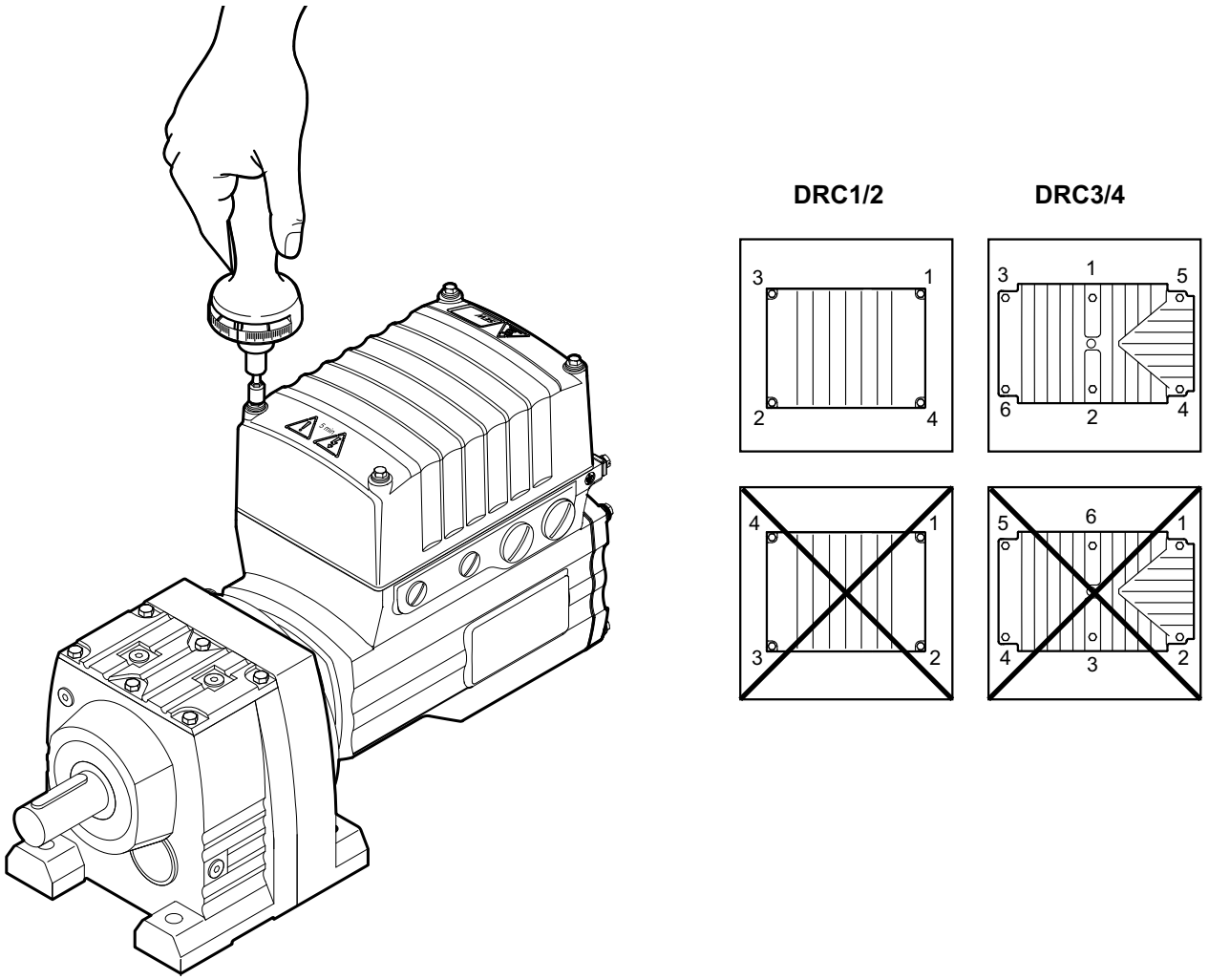
4.5.3 DRC electronics cover

Proceed as follows when installing the DRC electronics cover: 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
- DRC electronic motor size 3/4: 9.5 Nm



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4.6 Drive units with optional ASEPTIC / ASEPTIC^{plus} design

4.6.1 Installation notes

NOTICE

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

Possible damage to property.

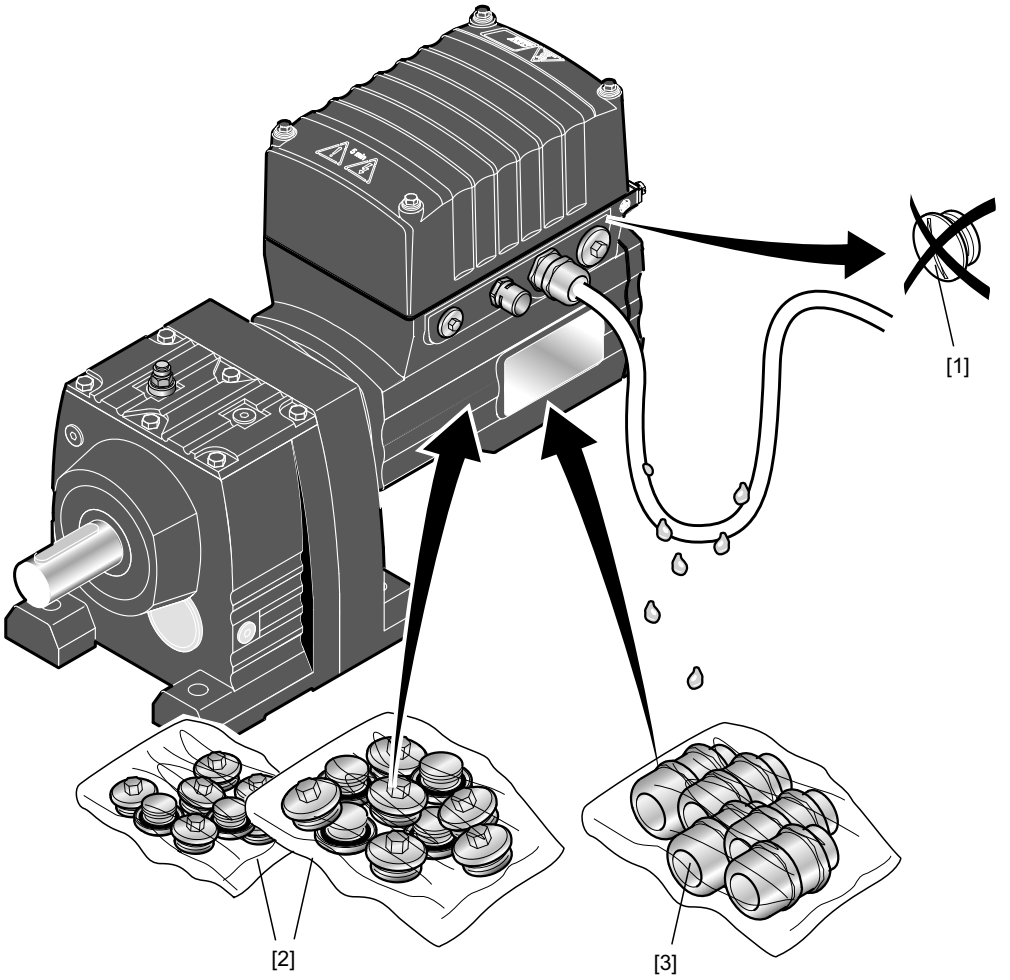
- Replace the optionally supplied plastic screw plugs with suitable stainless steel screw fittings.

Adhere to the following additional notes for DRC drive units in optional ASEPTIC / ASEPTIC^{plus} design:

- Make sure to prevent moisture and dirt from entering the unit 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: Consult 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 connection glands 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".

Example

The following figure gives an example of a cable entry with drip loop and the replacement of the 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 required
(see chapter "Technical data and dimension sheets")

[3] Required stainless steel cable glands
(see chapter "Technical data and dimension sheets")

Mounting positions

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

This is why DRC drive units in optional ASEPTIC / ASEPTIC^{plus} 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 / ASEPTIC^{plus} design depending on the mounting position and the position of the electronics cover:

Permitted cable routing		Position of electronics cover			
		0° (R)	90° (B)	180° (L)	270° (T)
Gearmotor mounting positions	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
Stand-alone motor mounting positions	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 / ASEPTIC^{plus} design depending on the position of the electronics cover.

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

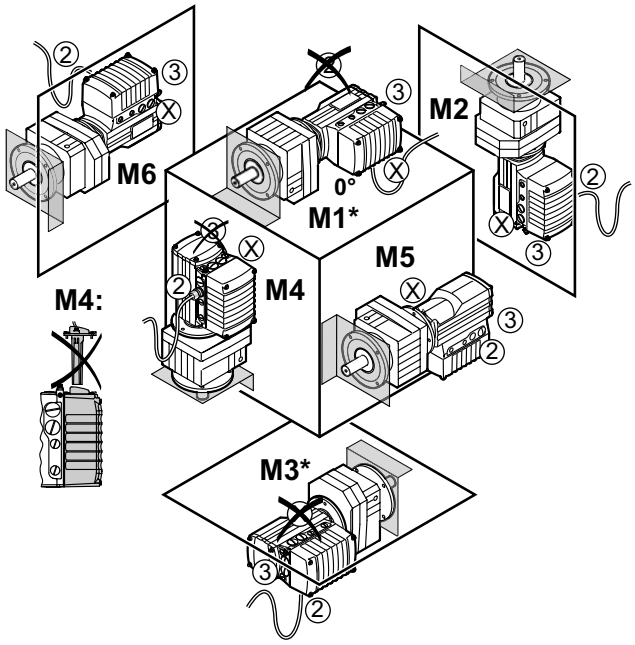
- Restrictions in conjunction with GIO... application options

  Application options cannot be used together with the ASEPTIC / ASEPTIC^{plus} design in mounting position M4 (V1).

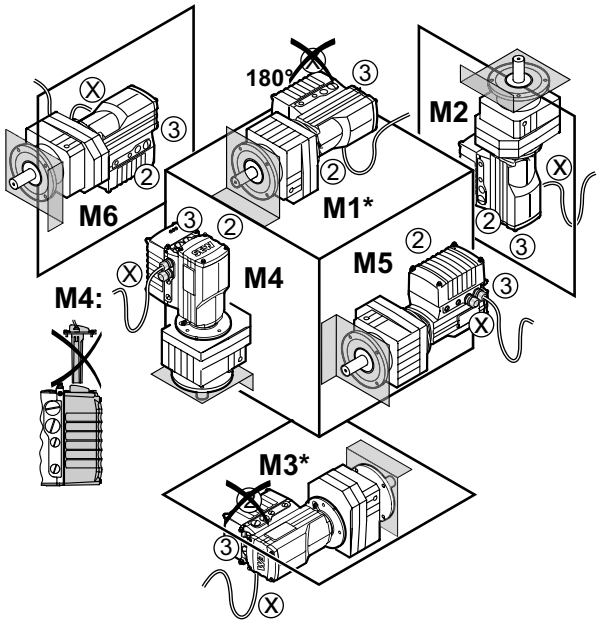
Mounting positions of the ASEPTIC / ASEPTIC^{plus} design

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

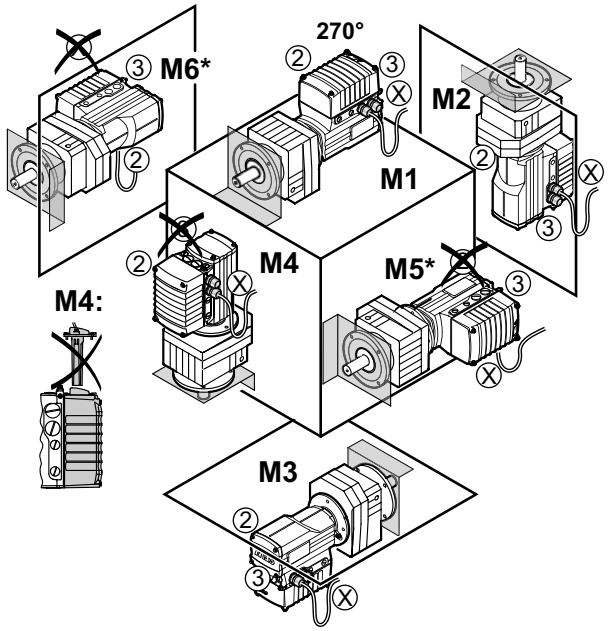
Position of electronics cover: 0°



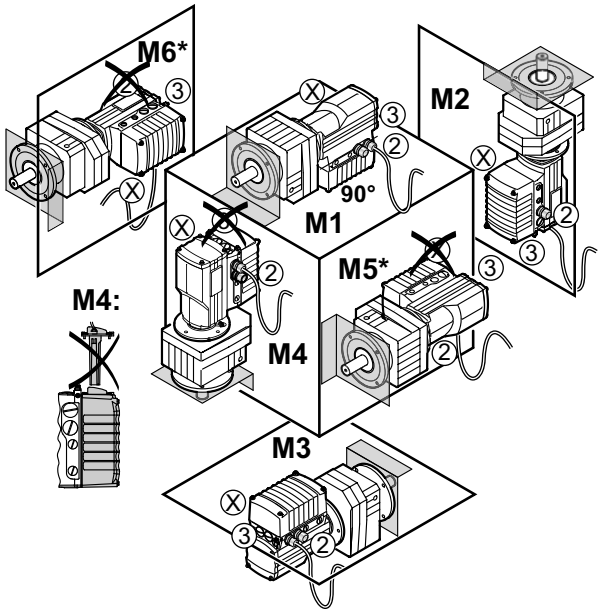
Position of electronics cover: 180°



Position of electronics cover: 270°



Position of electronics cover: 90°



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***** Mounting positions M5 and M6 in connection with the DAC electronics variant Design for wet areas not possible.

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

4.6.2 Tightening torques for optional ASEPTIC / ASEPTIC^{plus} design

⚠ WARNING

Burns caused by hot surfaces.

Severe injuries.

- Let the units cool down before touching them.

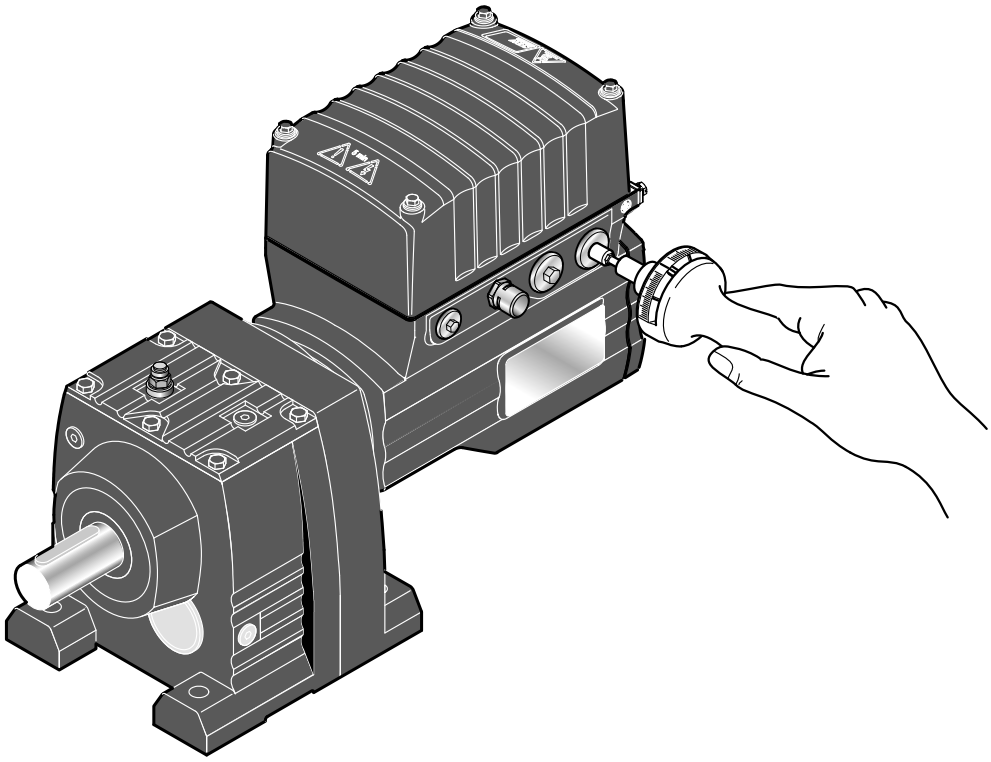
Blanking plugs

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

Type of screw fitting	Contents	Size	Part number	Tightening torque
Screw plugs Hexagon (made of stainless steel)	10 pc	M16 x 1.5	1 824 734 2	6.8 Nm
	10 pcs	M25 x 1.5	1 824 735 0	6.8 Nm

Example

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



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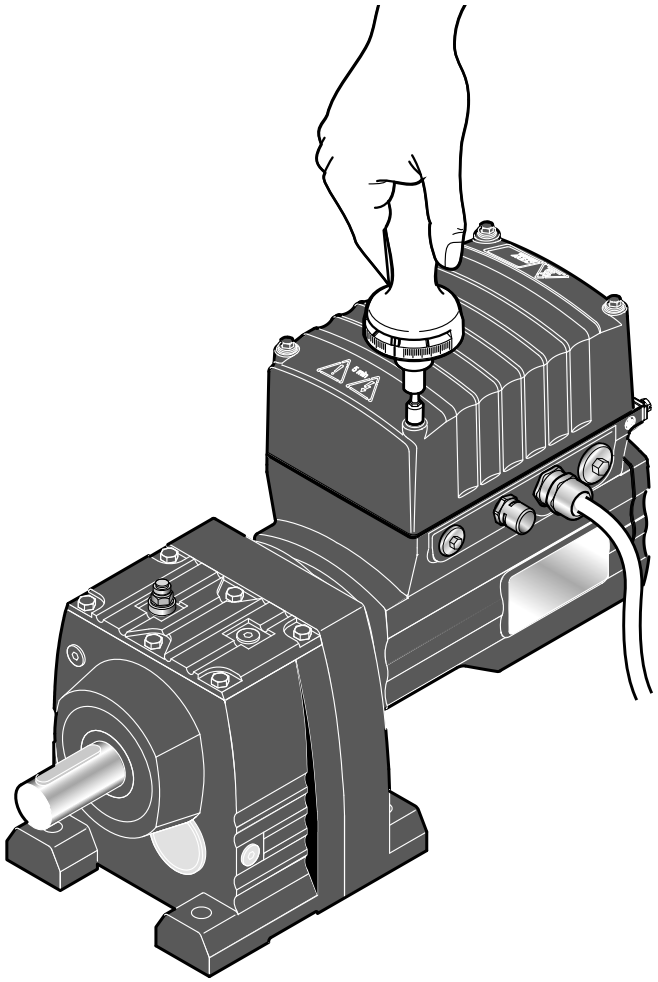
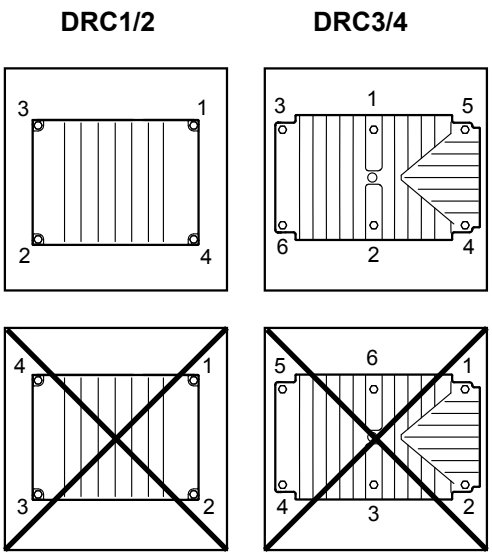
DRC electronics cover

Proceed as follows when installing the DRC electronics cover: 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
- 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 by SEW-EURODRIVE with the following tightening torques:

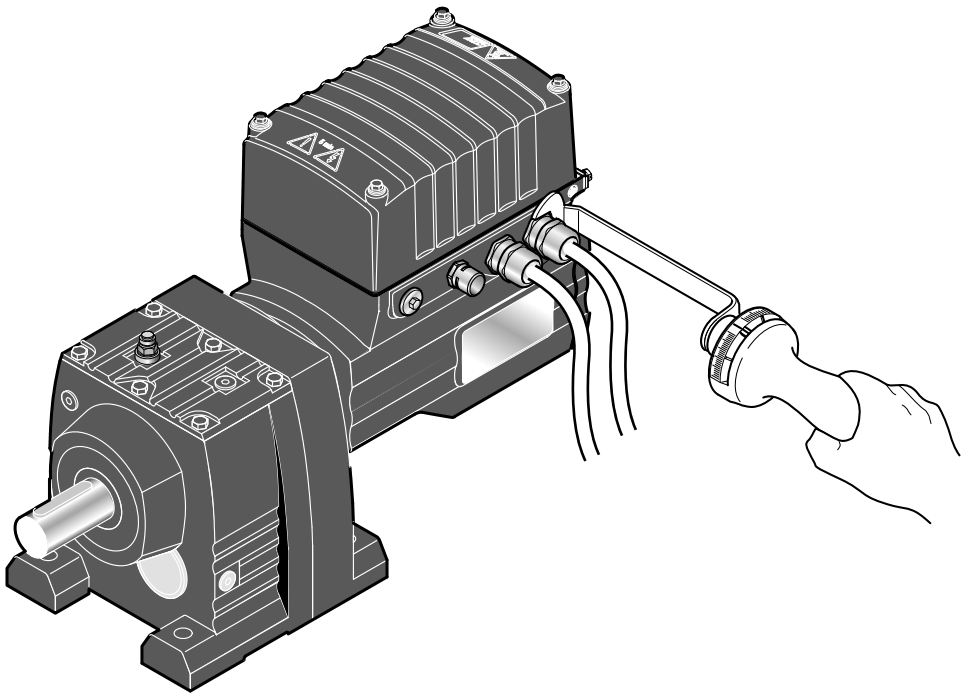
Screw fitting	Part number	Contents	Size	Outer diameter of cable	Tightening torque
EMC cable glands (nickel-plated brass)	1820 478 3	10 pcs	M16 x 1.5	5 to 9 mm	4.0 Nm
	1820 480 5	10 pcs	M25 x 1.5	11 to 16 mm	7.0 Nm
EMC cable glands (stainless steel)	1821 636 6	10 pcs	M16 x 1.5	5 to 9 mm	4.0 Nm
	1821 638 2	10 pcs	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 depends on the variant you have ordered.



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5 Electrical installation

INFORMATION

Adhere to the safety notes during installation.

5.1 Installation planning considering EMC aspects

5.1.1 Notes on arranging and routing installation components

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

Always apply 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 operator to take suitable measures.

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

With respect to the EMC regulation, frequency inverters 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 about this topic.

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".

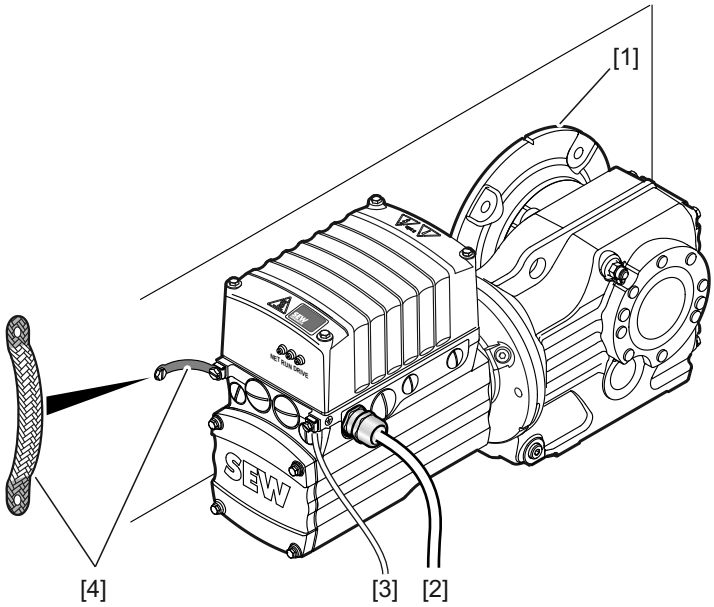
5.1.4 Equipotential bonding

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

- Establish a connection over a wide surface area between the DRC drive unit and the mounting rail.

- To do so, use a ground strap (HF litz wire), for example, to connect the DRC drive unit and the plant's grounding point.

Example



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

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

5.2 Installation instructions

5.2.1 Connecting power supply cables

- The rated voltage and rated frequency of the DRC drive unit must correspond with the data of the power supply system.
- Cable cross section: According to input current I_{line} 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 connection cable.
- DRC drive units are intended to be operated on voltage supply systems with grounded star point (TN and TT systems).

5.2.2 Permitted cable cross section of terminals

Line terminals

Adhere to the permitted cable cross sections for installation:

Line terminals X2	without conductor end sleeve	with conductor end sleeve (with or without insulating shroud)
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

Adhere to the permitted cable cross sections for installation:

External braking resistor terminals X5	without conductor end sleeve	with conductor end sleeve (with or without insulating shroud)
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

Adhere to the permitted cable cross sections for installation:

Control terminals X7	without conductor end sleeve	with conductor end sleeve (without insulating shroud)	with conductor end sleeve (with insulating shroud)
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)		

Communication terminals

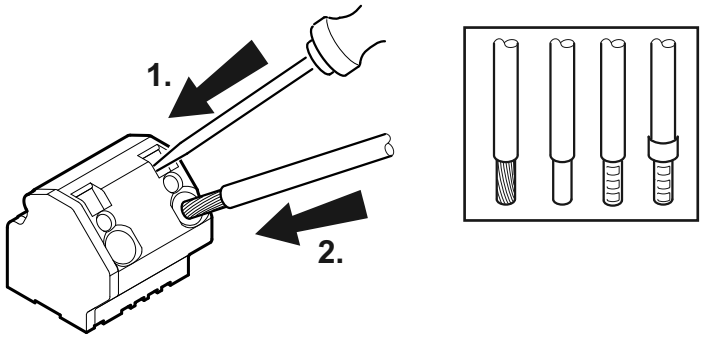
Adhere to the permitted cable cross sections for installation:

Communication terminals X1	Single-wire conductor (bare wire) Flexible conductor (bare litz wire)	Conductor with Conductor end sleeve without insulating shroud	Conductor with Conductor end sleeve With insulating shroud
Connection cross section (mm^2)	0.5 – 1.5 mm^2	0.5 mm^2 – 1.0 mm^2	0.5 mm^2
Connection cross section (AWG)	AWG20 – AWG16	AWG20 – AWG17	AWG20
Stripping length	9 mm		
Connection	Connect only single-wire conductors or flexible conductors with or without conductor end sleeve (DIN 46228 part 1, material E-CU)		

5.2.3 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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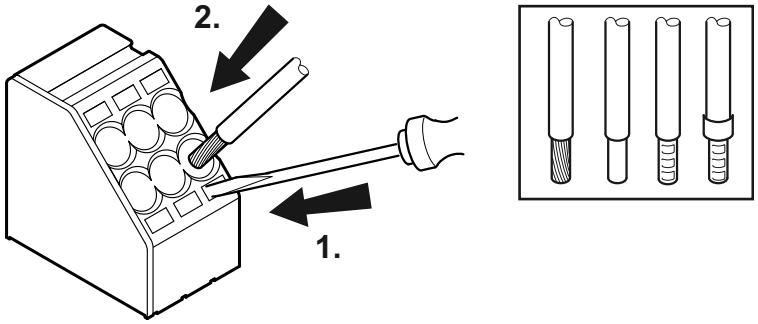
5.2.4 Line terminal actuation

Adhere to the following sequence when activating the line terminals:

Line terminals (the following figure shows a schematic illustration)



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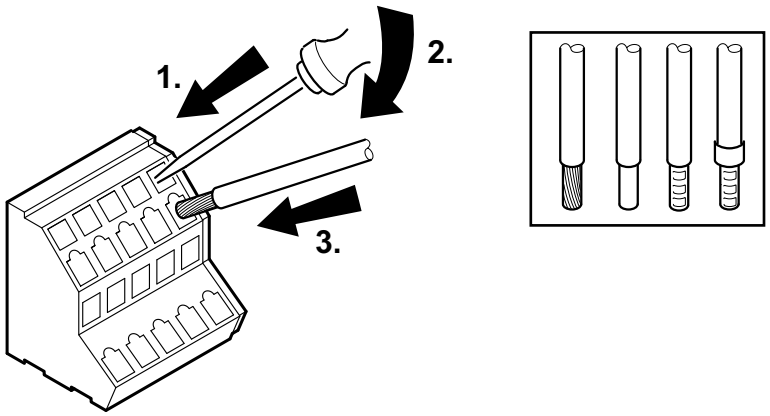
5.2.5 Control terminal actuation

Adhere to the following sequence when activating the control terminals:

Control terminals (the following figure shows a schematic illustration)



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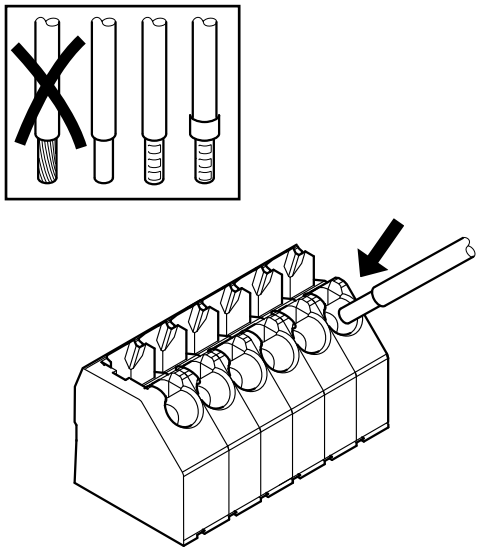
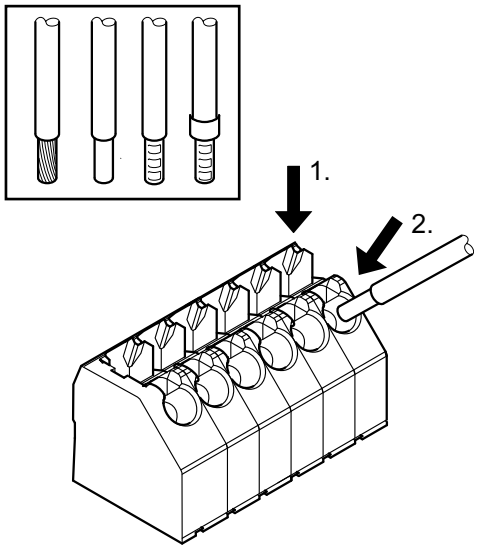
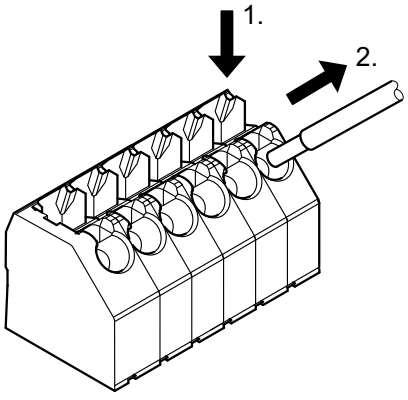
5.2.6 Actuating the communication terminals

Note the following information and sequence for actuating the communication terminal clamps:

Connect the conductor without pressing the actuation button	Connect the conductor after pressing the actuation button
 9007201633209867	 9007201633229835
Single-wire conductors and flexible conductors with conductor end sleeves can be installed directly (without tool) up to two cross section sizes below the nominal cross section.	You will need to press the actuation button on top to open the clamping spring for installing untreated, flexible conductors or those with a small cross section that cannot be installed directly.

Remove the conductor after pressing the actuation button
 9007201633261451

Before removing the conductor, first press the actuation button on top.

5.2.7 Line protection and residual current device (RCD or RCM)

⚠ WARNING

Electric shock due to incorrect RCD type

Severe or fatal injuries.

- The connected DRC drive units can cause direct current in the protective earth conductor. In cases where an earth-leakage circuit breaker is used for protection against direct or indirect contact, only a type B earth-leakage circuit breaker is permitted on the power supply side of DRC drive units.

- Install the fuses at the beginning of the power supply cables behind the supply bus junction.
- A conventional residual current device is not permitted. RCDs sensitive to universal current are permitted. During normal operation of DRC, earth-leakage currents of > 3.5 mA can occur.
- SEW-EURODRIVE recommends to not use residual current devices. However, if a residual current device is stipulated for direct or indirect protection against contact, observe the above note.

5.2.8 Line contactor

NOTICE

Damage to the DRC inverter due to jogging of the line contactor.

Damage to the DRC inverter.

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

- Use only a contactor of utilization category AC3 (EN 60947-4-1) as a line contactor.

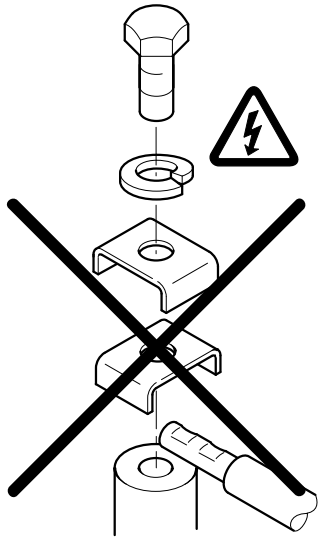
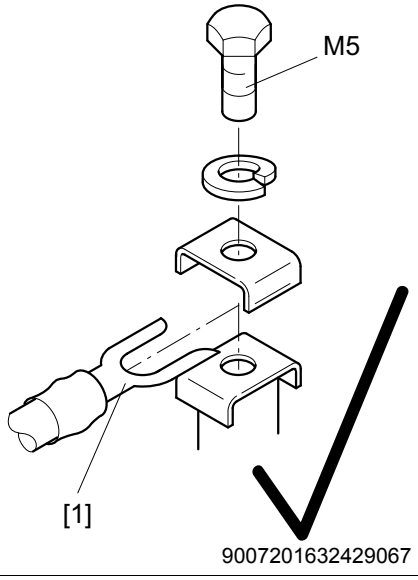
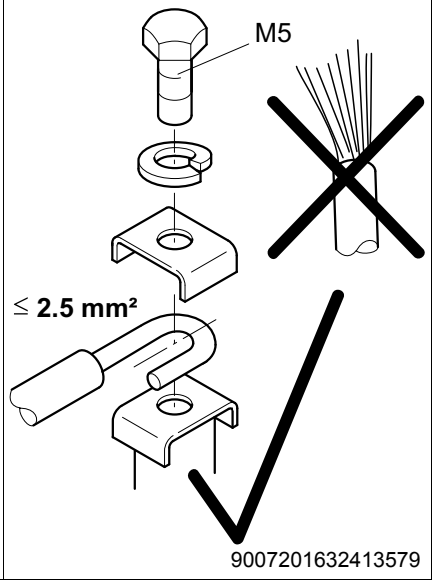
5.2.9 Notes on PE connection

⚠ WARNING

Electric shock due to incorrect connection of PE.

Severe or fatal injuries.

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

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

[1] Forked cable lug suitable for M5 PE screws

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

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

5.2.10 Installation above 1000 m asl

You can install DRC drive units at altitudes from 1000 m to a maximum of 4000 m above sea level[1)] provided the following conditions are met:

- 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

5.2.11 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 cable cross section, voltage drop and installation type.

1) The maximum altitude is limited by the reduced electric strength due to the lower air density.

5.2.12 UL-compliant installation

INFORMATION

Due to UL requirements, the following chapters are 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

Suitable for use on a circuit capable of delivering not more than 200,000 rms symmetrical amperes when protected by 40 A, 600 V non-semiconductor fuses or 500 V minimum 40 A maximum inverse time circuit breakers.

- 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 lists 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

The DRC motor 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

The DRC motor 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.

Wiring diagrams

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

5.3 Terminal assignment of DRC1/2

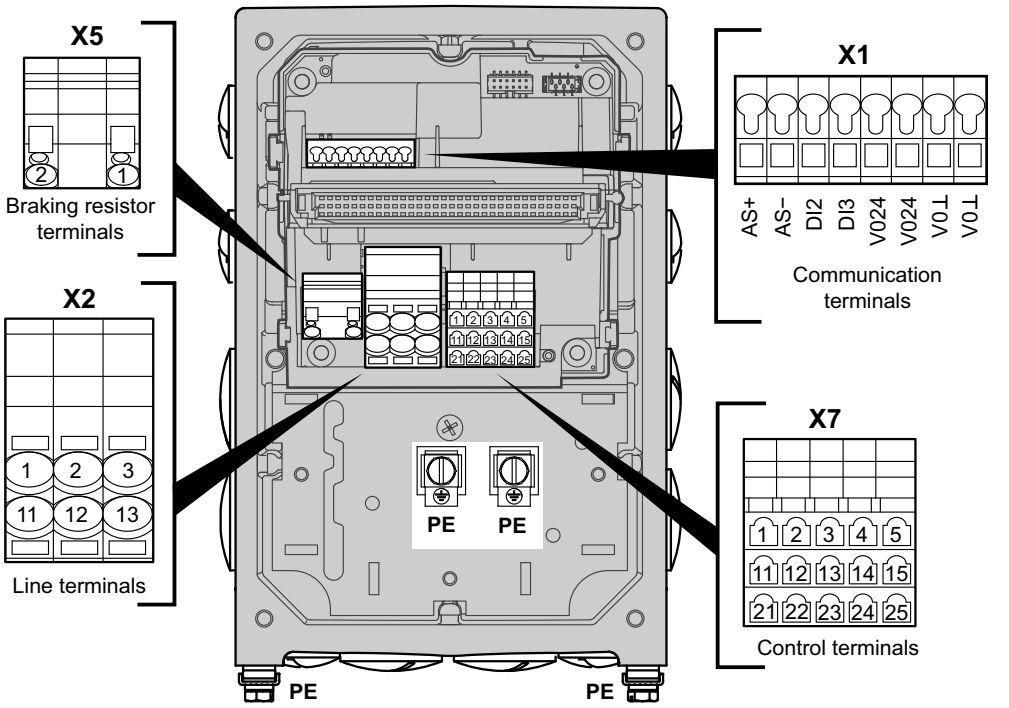
⚠ WARNING

Electric shock due to regenerative operation while turning the shaft.

Severe or fatal injuries.

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

The following figure shows the terminal assignment of DRC1/2-DAC:



4727525899

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**	**BW**	–	Braking resistor connection
	2	**BW**	–	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 relays
	4	**24V_O**	–	DC 24 V output
	5	**0V24_O**	–	0V24 reference potential output
	11	**STO +**	Yellow	Output STO + (to loop through)
	12	**STO −**	Yellow	Output STO – (to loop through)
	13	**K1b**	–	Signal relays
	14	**24V_O**	–	DC 24 V output
	15	**0V24_O**	–	0V24 reference potential output
	21	**n.c.**	–	Not connected
	22	**DI01**	–	Digital input DI01
	23	**DI02**	–	Digital input DI02
	24	**DI03**	–	Digital input DI03
	25	**DI04**	–	Digital input DI04
X1 communi-cation terminals	**–**	**AS+**	–	AS-Interface data cable +
	–	**AS−**	–	AS-Interface data cable –
	–	**DI2**	–	DI2 sensor input
	–	**DI3**	–	DI3 sensor input
	–	**VO24**	–	DC 24 V voltage supply for sensors
	–	**VO24**	–	DC 24 V voltage supply for sensors
	–	**VO⊥**	–	0V24 reference potential for sensors
	–	**VO⊥**	–	0V24 reference potential for sensors

5.4 Terminal assignment of DRC3/4

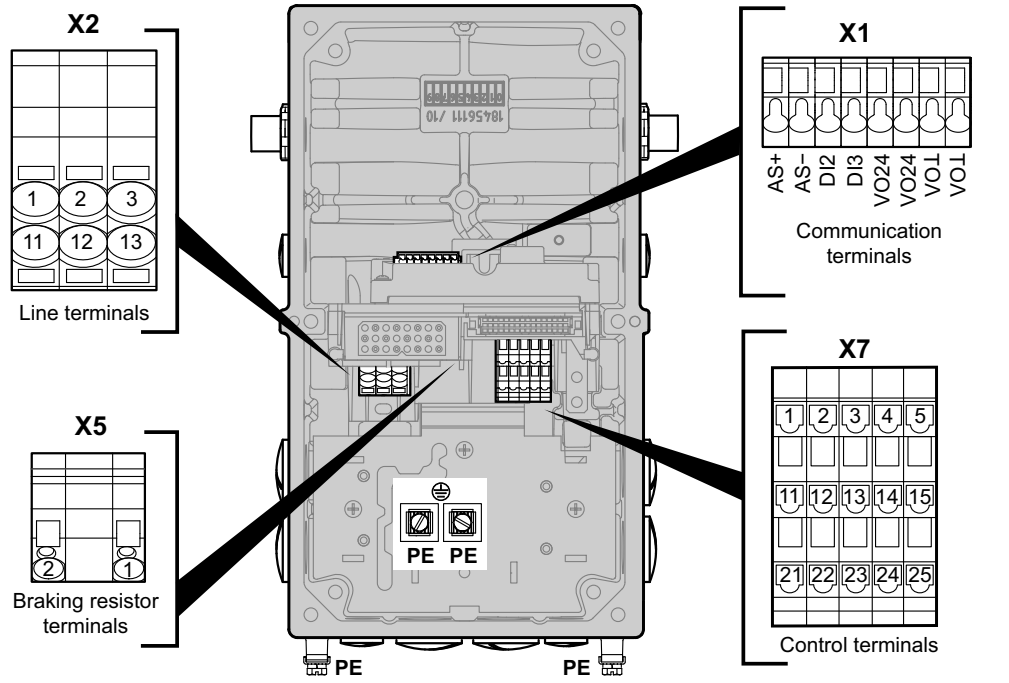
⚠ WARNING

Electric shock due to regenerative operation while turning the shaft.

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-DAC:



8603627787

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**	**BW**	–	Braking resistor connection
	2	**BW**	–	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 relays
	4	**24V_O**	–	DC 24 V output
	5	**0V24_O**	–	0V24 reference potential output
	11	**STO +**	Yellow	Output STO + (to loop through)
	12	**STO −**	Yellow	Output STO – (to loop through)
	13	**K1b**	–	Signal relays
	14	**24V_O**	–	DC 24 V output
	15	**0V24_O**	–	0V24 reference potential output
	21	**n.c.**	–	Not connected
	22	**DI01**	–	Digital input DI01
	23	**DI02**	–	Digital input DI02
	24	**DI03**	–	Digital input DI03
	25	**DI04**	–	Digital input DI04
X1 communi-cation terminals	**–**	**AS+**	–	AS-Interface data cable +
	–	**AS−**	–	AS-Interface data cable –
	–	**DI2**	–	DI2 sensor input
	–	**DI3**	–	DI3 sensor input
	–	**VO24**	–	DC 24 V voltage supply for sensors
	–	**VO24**	–	DC 24 V voltage supply for sensors
	–	**VO⊥**	–	0V24 reference potential for sensors
	–	**VO⊥**	–	0V24 reference potential for sensors

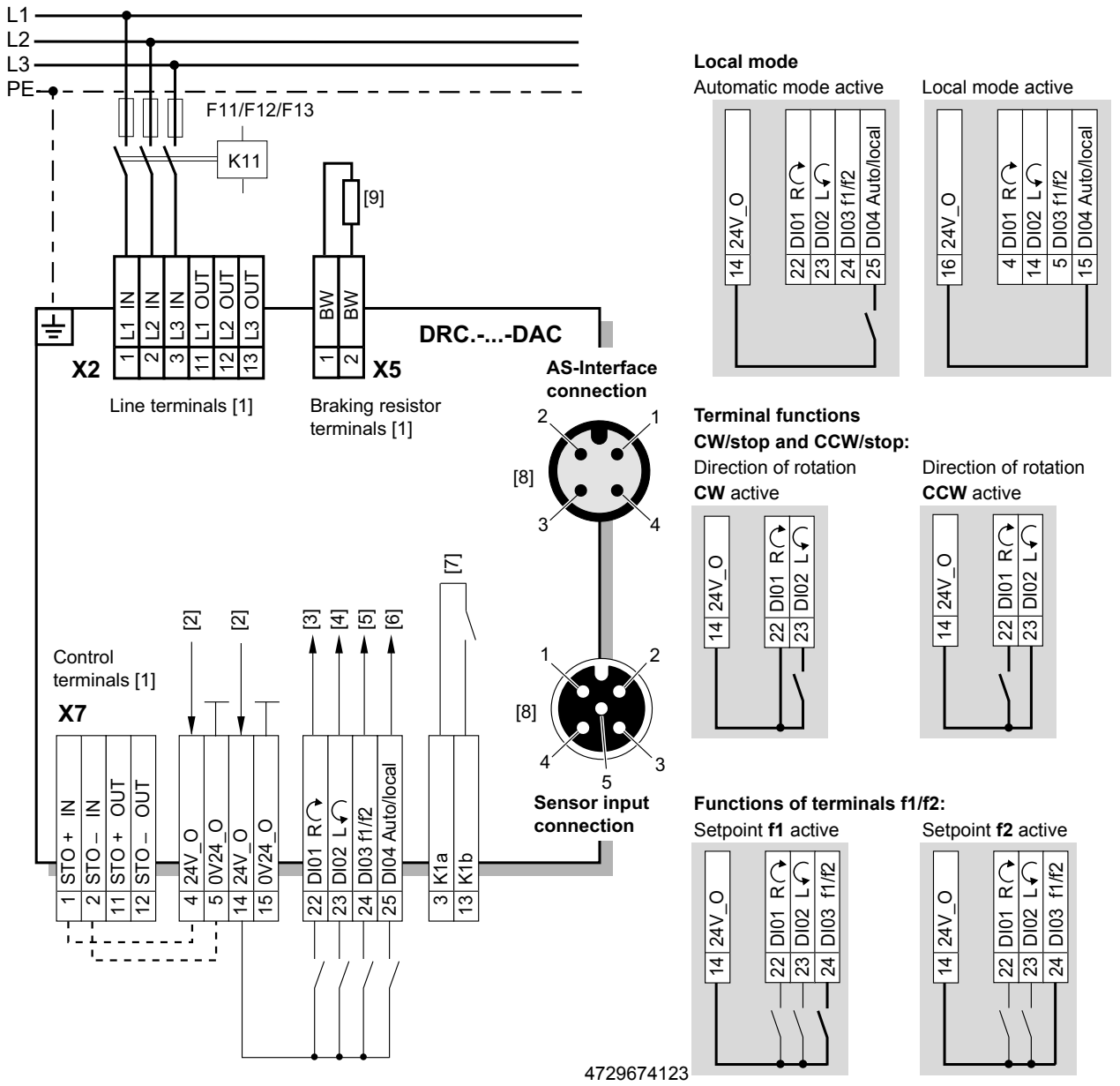
5.5 Connecting DRC drive units

⚠ WARNING

No safe 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 need not fulfill any safety function.



[1] See chapter "Terminal assignment"
[2] Integrated 24 V supply
[3] CW/stop
[4] CCW/stop
[5] Setpoint changeover f1/f2
[6] Automatic mode/local mode
[7] Signal relay
(contact closed = ready for operation)
[8] Assignment see chapter "Plug connector assignment"
[9] Braking resistor connection

5.6 Cable routing and shielding

5.6.1 Installation material kit (part no. 1 824 826 8)

Each DRC drive unit[1] is delivered with an accessory bag that contains installation material for cable shielding:

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

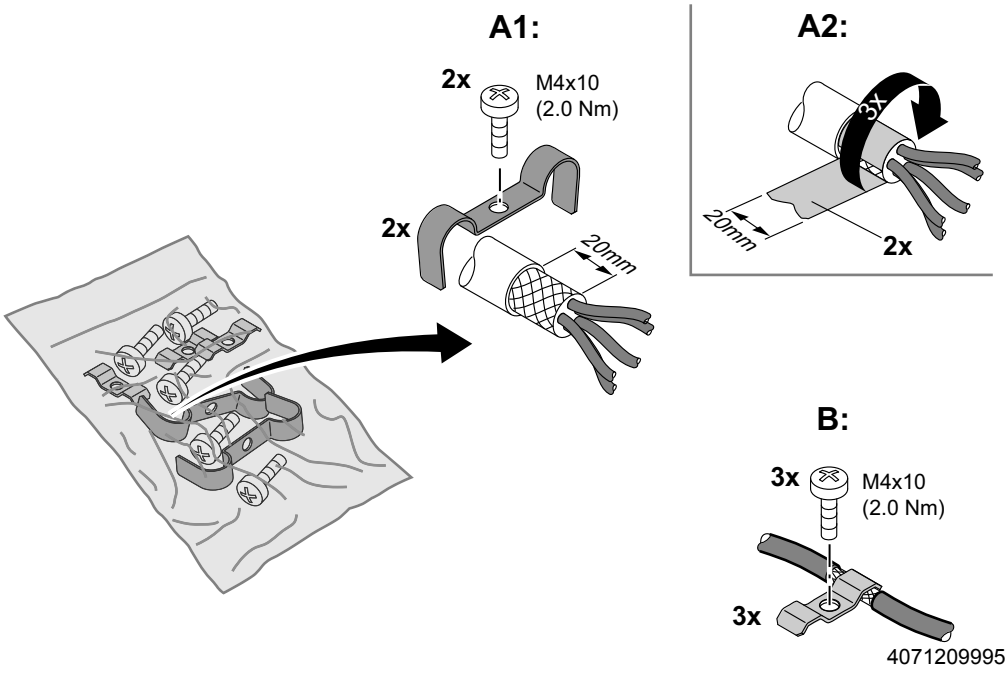
  2 x shield clamps and screws[2] to connect the shield of line cables or hybrid cables (outer shield).

- **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 clamp with screw[2] to connect the shield of control cables or data cables (STO, CAN, binary signals).



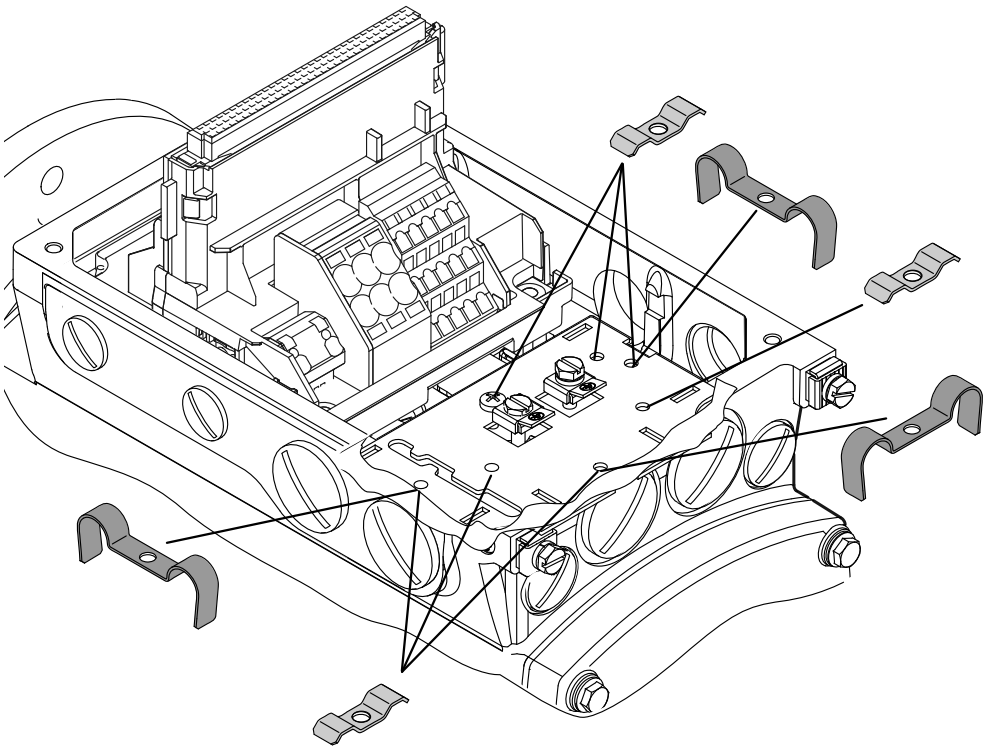
INFORMATION

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

1) Exception: Not when all possible connections have been ordered as plug connectors.
2) Self cutting, which is why the holes in the connection box do not have a thread.

5.6.2 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.



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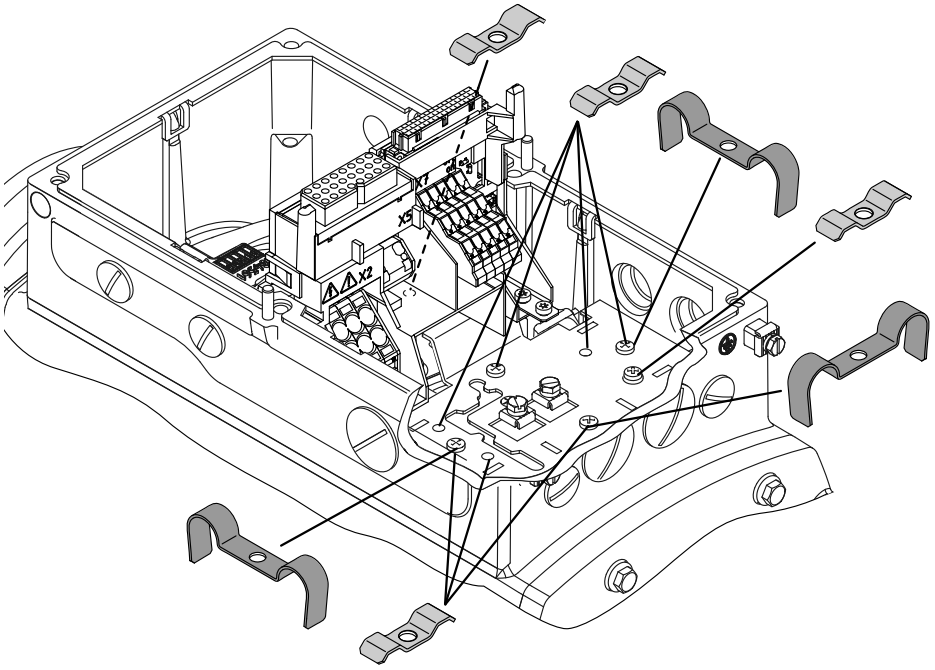
5.6.3 Basic mounting options for DRC3/4

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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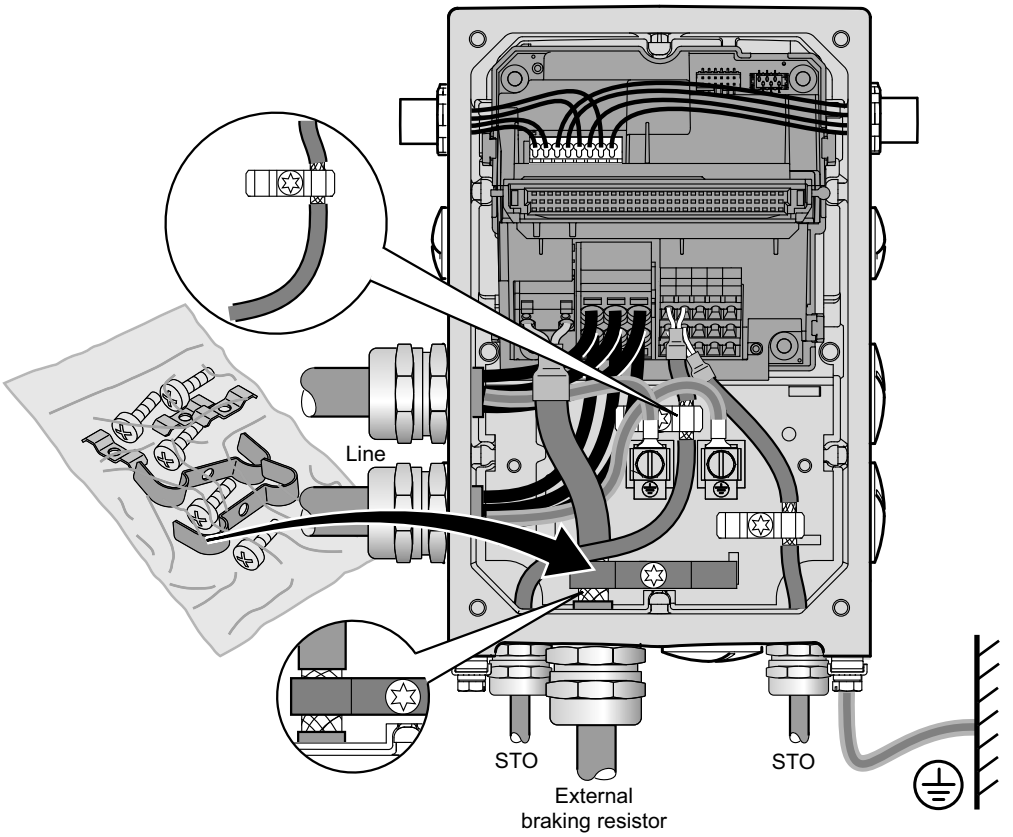
5.6.4 Notes on cable routing and shielding

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.
- The AS-Interface data cable and sensors are generally connected using plug connectors.
- 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.

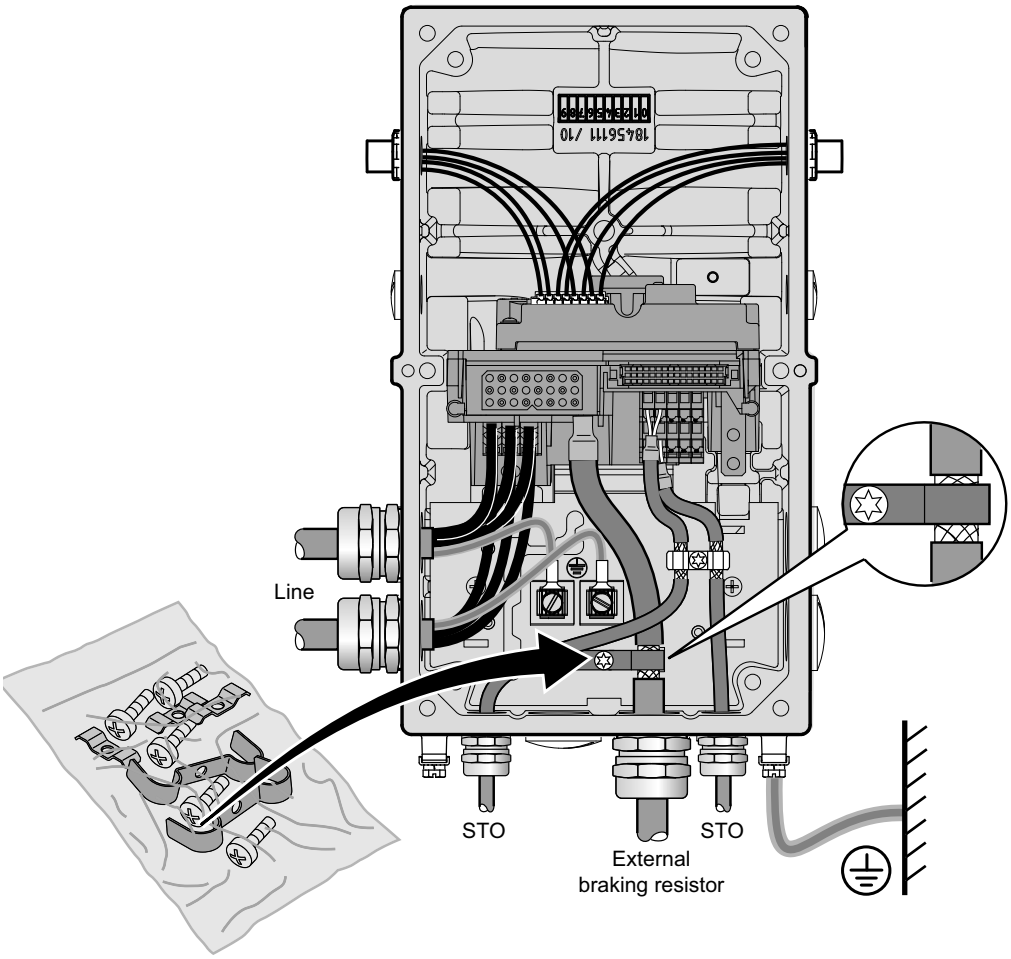
Recommended cable routing for DRC1/2

The following figure shows the recommended cable routing:



Recommended cable routing for DRC3/4

The following figure shows the recommended cable routing:



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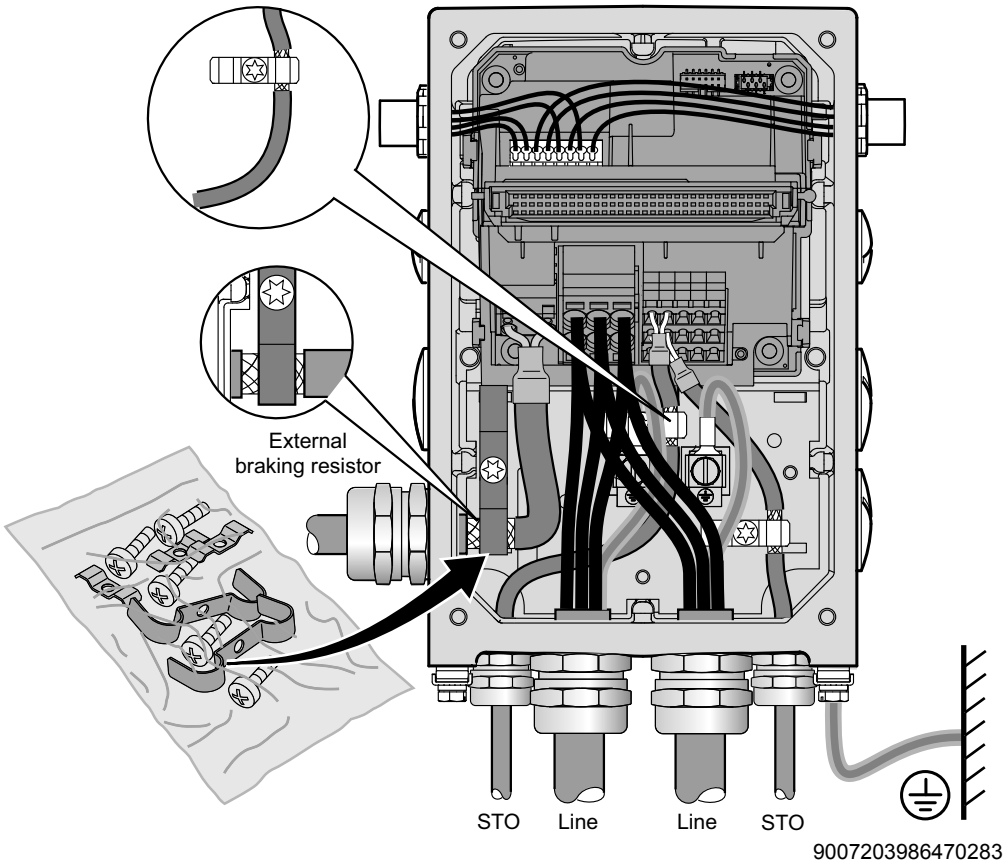
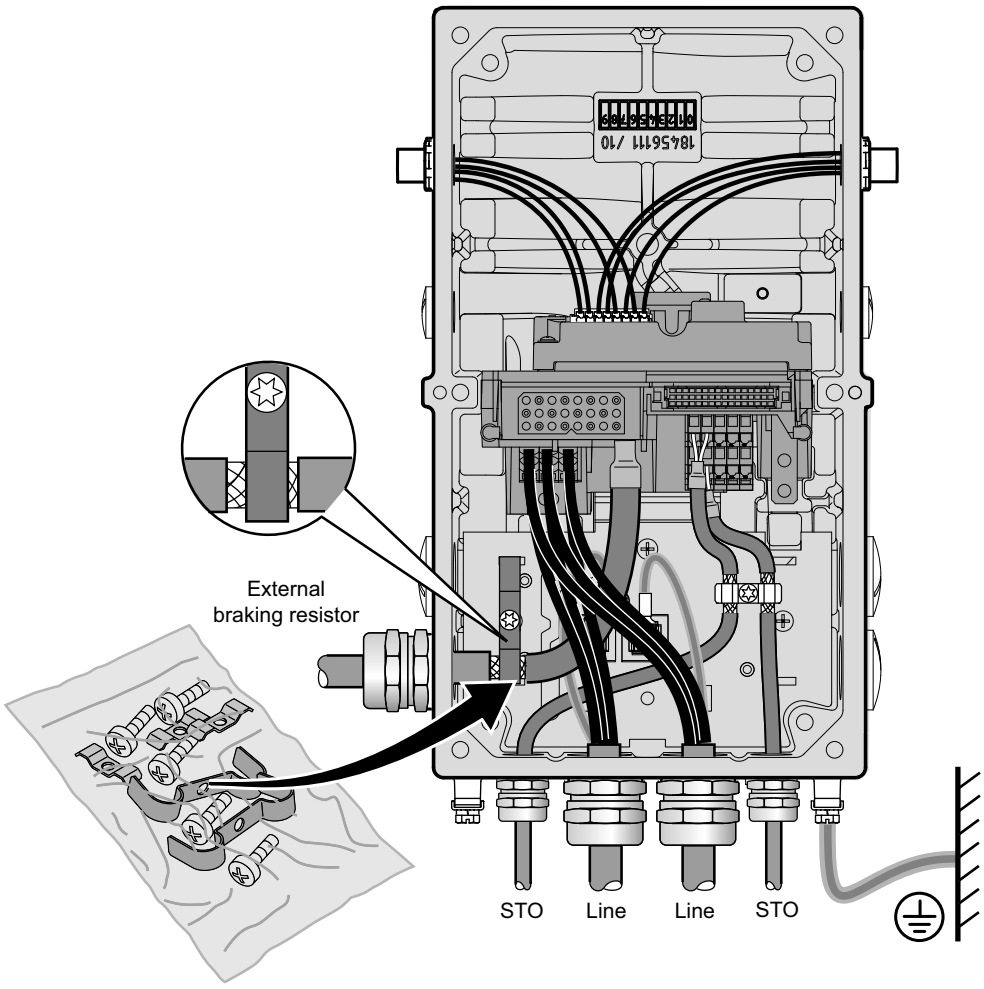
Alternative cable routing for DRC1/2

The following figure shows the alternative cable routing:



Alternative cable routing for DRC3/4

The following figure shows the alternative cable routing:



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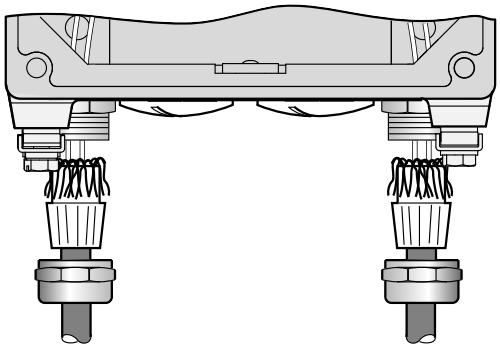
5.7 EMC cable glands

5.7.1 Cable shielding (alternative) – Control cables

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



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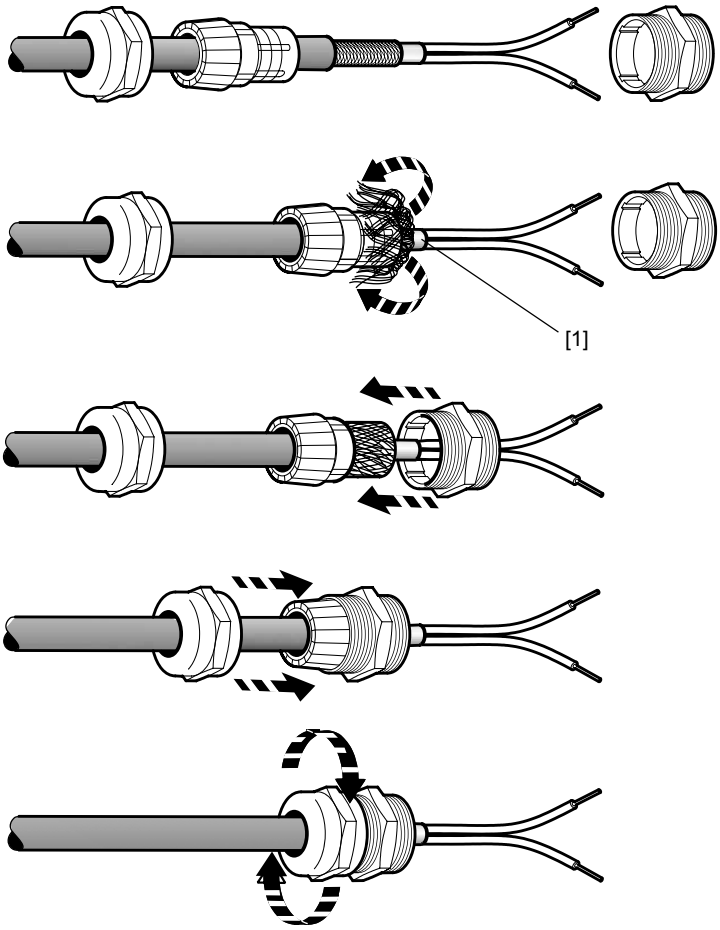
5.7.2 Assembly of EMC cable glands

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



2661188747

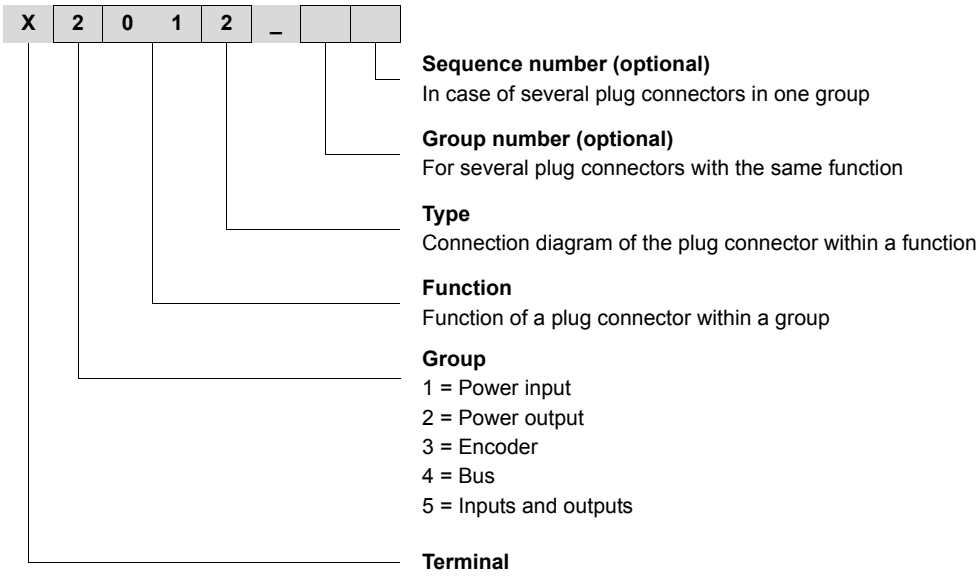
[1] Important: Cut off the insulating foil, do not just fold it back.

5.8 Plug connectors

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

5.8.1 Designation key

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



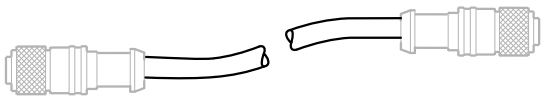
5.8.2 Connection cable

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

The following figures show the various cable types:

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

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".

Use of prefabricated cables with plug connectors

SEW-EURODRIVE uses prefabricated cables for certifications, type tests and approval of the units. The cables available from SEW-EURODRIVE meet all the requirements necessary for the functions of the unit and the connected components. The units under consideration are always the basic units 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 units 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 units concerning functional safety.

Use of 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 unit properties or functions.

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

- Mechanical properties (such as IP degree of protection, cable carrier suitability)
- Chemical properties (such as the absence of silicone and halogen, resistance against substances)
- Thermal properties (e.g. temperature stability, heating of the unit, 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

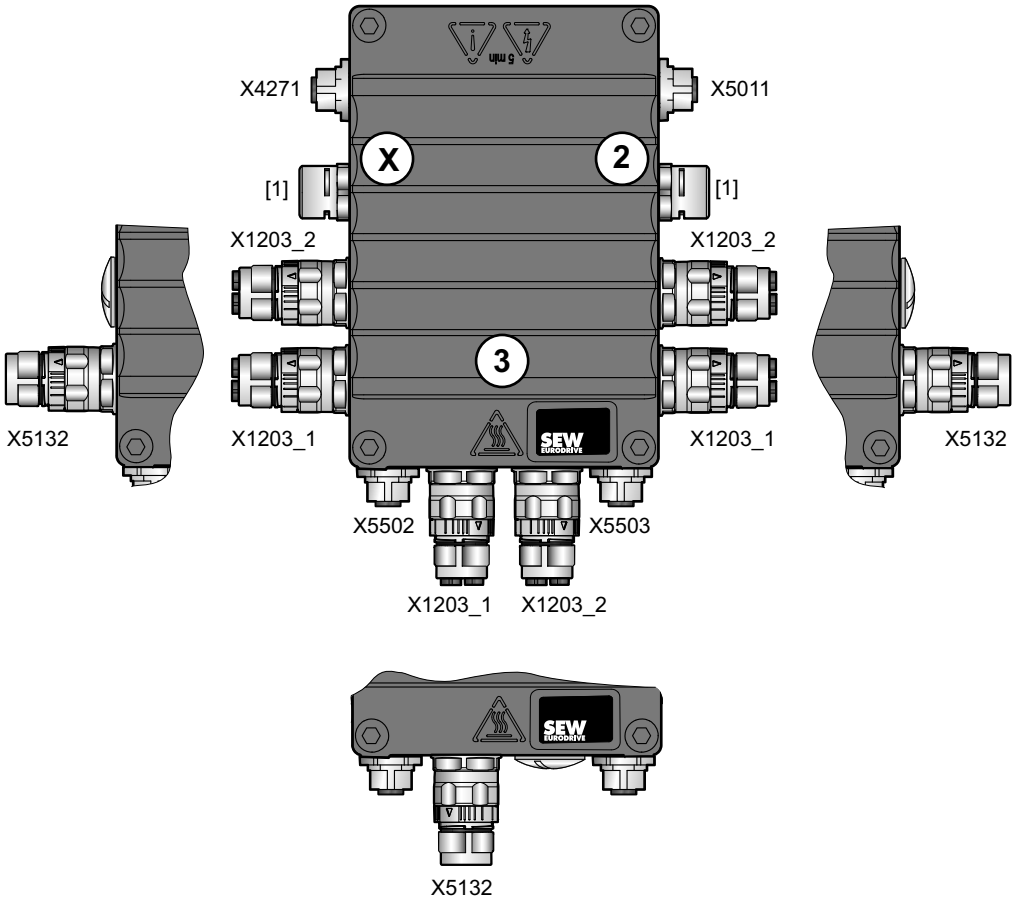
5.8.3 Plug connector positions

The following figure shows possible plug connector positions. A difference is made between plug connectors with selectable position and plug connectors with fixed position:

Plug connector	Color	Position	Position
X5132: Digital inputs/outputs	–	As required	X, 2 or 3, not together with X1203_1, X1203_2
X5502: STO	Orange	Fixed	3 (left)
X5503: STO	Orange	Fixed	3 (right)
X4271: AS-Interface communication interface[1)]	Yellow	Fixed	X
X5011: AS-Interface sensors [1)]	Black	Fixed	2
X1203_1: AC 400 V connection [2)]	Black	As required	X, 2 or 3, not together with X5132
X1203_2: AC 400 V connection	Black	As required	X, 2 or 3, not together with X5132
[1] Optional pressure compensation	–	Fixed	Depends on mounting position

1) Standard scope of delivery

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



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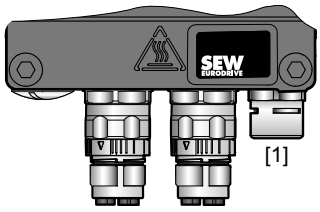
5.8.4 Restrictions in conjunction with pressure compensation

In connection with optional pressure compensation and mounting positions M5 and M6, the position for the 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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5.8.5 Plug connector variant

⚠ CAUTION

Possible damage of the right-angle connector in case of rotation 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

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

Potential damage to property

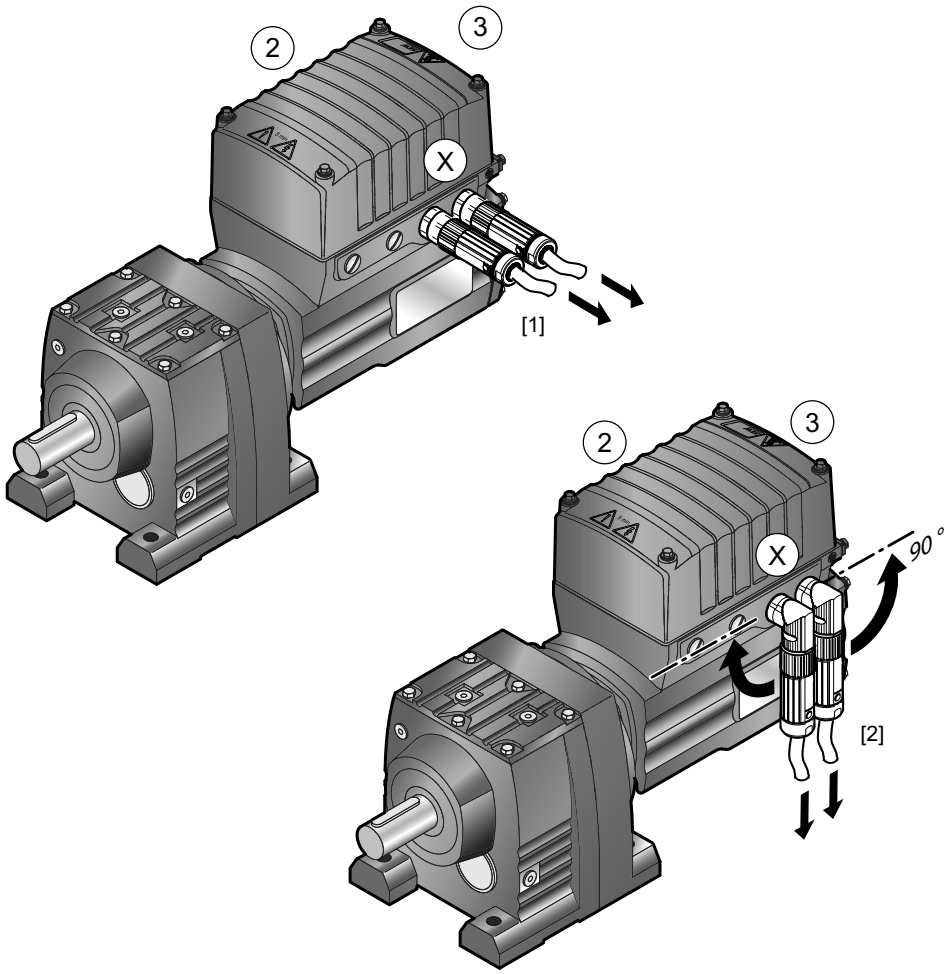
- Adjust the plug connector only when installing and connecting the drive unit.
- Do not turn the plug connector regularly once it has been installed.

The following M23 plug connectors are available:

- [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.

Example



18014402582291211

INFORMATION

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

5.8.6 Using plug connectors assembled by yourself

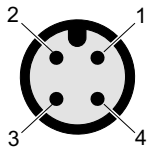
INFORMATION

Power and hybrid plug connectors as well as the associated assembly tools are also available from Intercontec.

5.9 Plug connector assignment

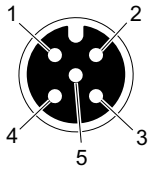
5.9.1 X4271: AS-Interface communication interface

The following table shows information about this connection:

Function		
Connection of AS-Interface data cable		
Connection type		
M12, 4-pole, male, A-coded		
Wiring diagram		
 2384154763		
Assignment		
No.	**Name**	**Function**
1	AS+	AS-Interface data cable (+)
2	res.	Reserviert
3	AS−	AS-Interface data cable (−)
4	res.	Reserved

5.9.2 X5011: AS-Interface sensor connection

The following table shows information about this connection:

Function		
Connection of AS-Interface sensors		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
 2264816267		
Assignment		
No.	**Name**	**Function**
1	+24V_SEN	DC 24 V voltage supply for sensors
2	DI3	DI3 sensor input
3	0V24_SEN	0V24 reference potential for sensors
4	DI2	DI2 sensor input
5	res.	Reserved

5.10 Assignment of optional plug connectors

⚠ WARNING

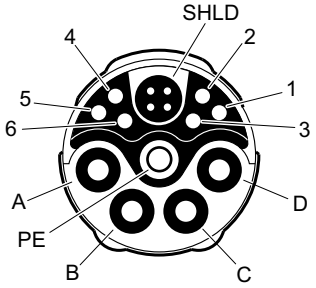
Electric shock when disconnecting or connecting voltage-carrying plug connectors.

Severe or fatal injuries

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

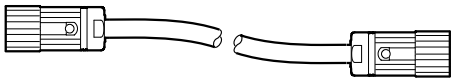
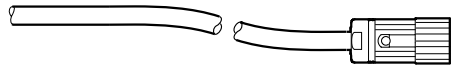
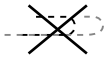
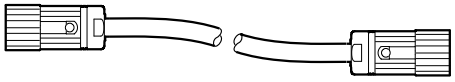
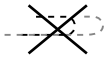
5.10.1 X1203_1 and X1203_2: AC 400 V connection

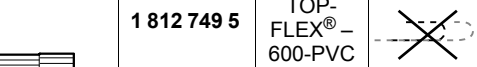
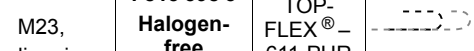
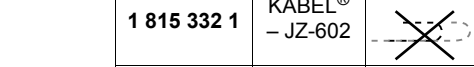
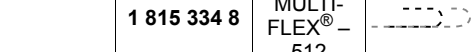
The following table shows information about this connection:

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		
 2497125387		
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	n.c.	Not connected
2	n.c.	Not connected
3	n.c.	Not connected
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	n.c.	Not connected
8	n.c.	Not connected
9	n.c.	Not connected
10	n.c.	Not connected
SHLD	n.c.	Not connected

Connection cable

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

Connection cable	Conformity / part number	Cable type	Length/ Installation type	Cable cross-section / operating voltage
 M23, Coding ring: black M23, Coding ring: black	**CE: 1 812 746 0**	HELUKABEL® TOP-FLEX® – 600-PVC	Variable 	2.5 mm² / AC 500 V
	CE: 1 813 395 9 Halogen-free	HELUKABEL® TOP-FLEX® – 611-PUR	Variable	
	UL: 1 815 326 7	HELUKABEL® – JZ-602	Variable 	
	UL: 18153275	HELUKABEL® MULTI-FLEX® – 512	Variable	
 Open M23, Coding ring: black	**CE: 1 812 747 9**	HELUKABEL® TOP-FLEX® – 600-PVC	Variable 	2.5 mm² / AC 500 V
	CE: 1 813 396 7 Halogen-free	HELUKABEL® TOP-FLEX® – 611-PUR	Variable	
	UL: 1 815 328 3	HELUKABEL® – JZ-602	Variable 	
	UL: 1 815 329 1	HELUKABEL® MULTI-FLEX® – 512	Variable	
 M23, Coding ring: black M23, Coding ring: black	**CE: 1 812 748 7**	HELUKABEL® TOP-FLEX® – 600-PVC	Variable 	4 mm² / AC 500 V
	CE: 1 813 397 5 Halogen-free	HELUKABEL® TOP-FLEX® – 611-PUR	Variable	
	UL: 1 815 330 5	HELUKABEL® – JZ-602	Variable 	
	UL: 1 815 331 3	HELUKABEL® MULTI-FLEX® – 512	Variable	

Connection cable	Conformity / part number	Cable type	Length/ Installation type	Cable cross-section / operating voltage
 Open M23, Coding ring: black	**CE:** **1 812 749 5**	HELUKABEL® TOP-FLEX® – 600-PVC	Variable 	4 mm² / AC 500 V
	CE: **1 813 398 3** **Halogen-free**	HELUKABEL® TOP-FLEX® – 611-PUR	Variable 	
	UL: **1 815 332 1**	HELUKABEL® – JZ-602	Variable 	
	UL: **1 815 334 8**	HELUKABEL® MULTI-FLEX® – 512	Variable 	

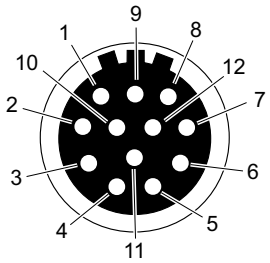
Connection of cables with open end

The following table shows the conductor assignment of the cable with the following part number: 1 812 747 9, 1 813 396 7, 1 815 328 3, 1 815 329 1 , 1 812 749 5, 1 813 398 3, 1 815 332 1, and 1 815 334 8

Signal name	Core color/designation
L1	Black / 1
L2	Black / 2
L3	Black / 3
PE	Green/yellow

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-pole, SpeedTec-capable, Intercontec, female, 0°-coded		
Wiring diagram		
 2264820107		
Assignment		
No.	**Name**	**Function**
1	DI01	Digital input DI01 (CW/stop)
2	DI02	Digital input DI02 (CCW/stop)
3	DI03	Digital input DI03 (setpoint f1/f2)
4	DI04	Digital input DI04 (changeover automatic/local mode)
5	n.c.	Not connected
6	K1a	Signal relay K1a
7	K1b	Signal relay K1b
8	+24V_O	DC 24 V output
9	0V24_O	0V24 reference potential
10	n.c.	Not connected
11	n.c.	Not connected
12	FE	Equipotential bonding/functional ground

Connection cable

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-pole, 0°-coded	**CE/UL: 1 174 145 7**	Variable 	DC 60 V

Connection of cables with open end

The following table shows the conductor assignment of the cable with the following part number:

1 174 145 7

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

5.10.3 X5502: STO

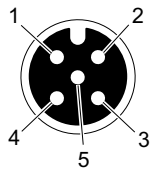
⚠ WARNING

No safety-related 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 need not fulfill any safety function.

The following table shows information about this connection:

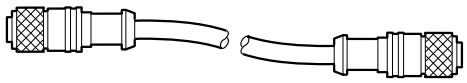
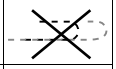
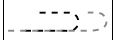
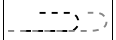
Function		
Connection for safe torque off (STO)		
Connection type		
M12, 5-pole, female, A-coded		
Wiring diagram		
 2264816267		
Assignment		
No.	**Name**	**Function**
1	+24V_O	DC 24 V output
2	STO −	STO − connection
3	0V24_O	0V24 reference potential
4	STO +	STO + connection
5	res.	Reserved

Connection cable

INFORMATION

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

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

Connection cable	Conformity / part number	Cable type	Length/ Installation type	Cable cross-section / operating voltage
 M12, 5-pole, A-coded — M12, 5-pole, A-coded	CE: 1 812 496 8	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V
	CE / UL: 1 814 740 2	HELU-KABEL® MULTI-SPEED® – 500-C-PUR UL/CSA	Variable 	
 Open — M12, 5-pole, A-coded	CE: 1 812 497 6	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V
	CE / UL: 1 814 769 0	HELU-KABEL® MULTI-SPEED® – 500-C-PUR UL/CSA	Variable 	

Connection of cables with open end

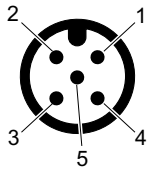
The following table shows the conductor assignment of the cable with the following part number:

1 812 497 6, 1 814 769 0, 1 812 739 8 and 1 815 344 5

Signal name	Core color/designation
STO −	Black / 1
STO +	Black / 2

5.10.4 X5503: STO

The following table shows information about this connection:

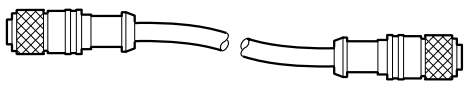
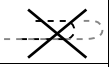
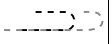
Function		
Connection for safe torque off (STO)		
Connection type		
M12, 5-pole, male, A-coded		
Wiring diagram		
 2264818187		
Assignment		
No.	**Name**	**Function**
1	res.	Reserved
2	STO −	STO − connection
3	res.	Reserved
4	STO +	STO + connection
5	res.	Reserved

Connection cable

INFORMATION

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

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

Connection cable	Conformity / part number	Cable type	Length/ Installation type	Cable cross-section / operating voltage
 M12, 5-pole, A-coded — M12, 5-pole, A-coded	CE: 1 812 496 8	LEONI BETAflam® – 145C-flex	Variable 	2 × 0.75 mm² / DC 60 V
	CE / UL: 1 814 740 2	HELU-KABEL® MULTI-SPEED® – 500-C-PUR UL/CSA	Variable 	

5.10.5 STO jumper plug

⚠ WARNING

Safety-related disconnection of the DRC drive unit is not possible when using the STO jumper plug.

Severe or fatal injuries.

- You may only jumper the STO input with 24 V when the DRC drive unit need not fulfill any safety function.

⚠ WARNING

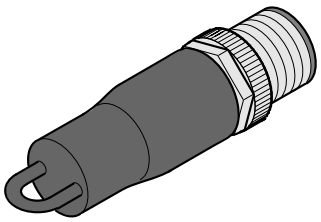
Disablement of safety-related disconnection of other drive units due to parasitic voltages when using an STO jumper.

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 the DRC drive unit. The STO jumper plug deactivates the safety functions of the DRC drive unit.

The following figure shows the STO jumper plug, part number 1 174 709 9:



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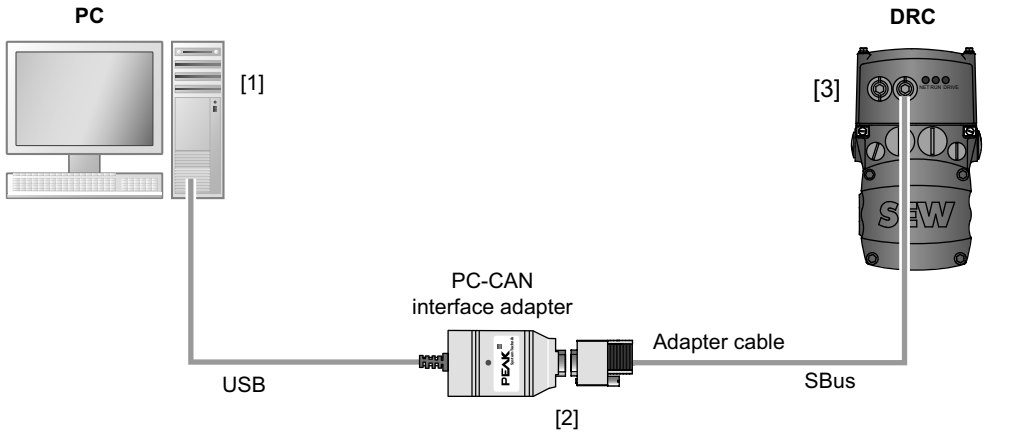
5.11 PC connection

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



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6 Startup

6.1 Startup notes

INFORMATION

It is essential to adhere to the safety notes during startup.

⚠ WARNING

Risk of injury due to missing or defective protection covers.

Severe or fatal injuries.

- Install the protective covers of the system according to the instructions.
- Never start up the DRC drive unit without protective covers.

⚠ WARNING

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

Severe or fatal injuries.

- Before removing the electronics cover, switch off the power to the DRC drive units using a suitable external disconnecting device.
- Secure the drive unit against unintended re-connection to the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 5 minutes before removing the electronics cover.

5 minutes

⚠ WARNING

Burns caused by hot surfaces.

Severe injuries

- Let the units cool down before touching them.

⚠ WARNING

Unit malfunction due to incorrect unit setting.

Severe or fatal injuries.

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

NOTICE

Unit error 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 15 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 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

Risk 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.

6.3 Prerequisties for startup

The following conditions apply to startup:

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

6.3.1 Torque limiting

NOTICE

Gear unit overloaded by the motor.

Possible damage to property.

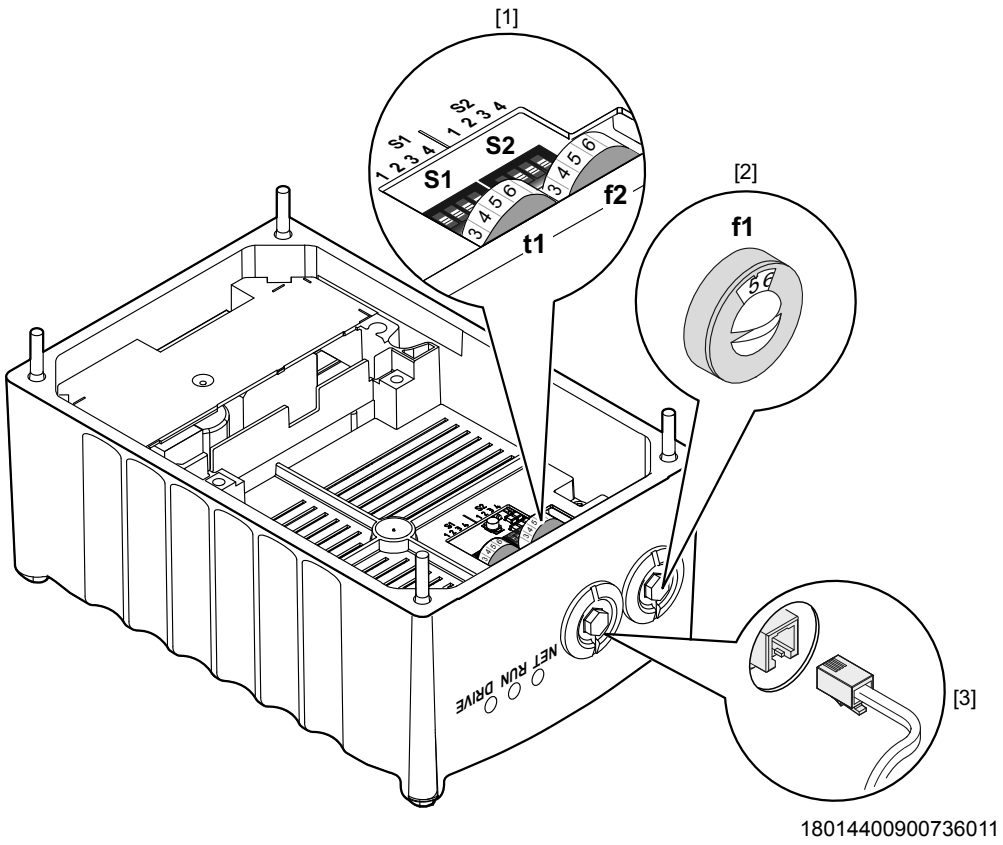
- The maximum output torque might have to be limited to the torque specified on the nameplate.
- Observe the DRC gearmotor catalog.

6.4 Description of control elements

6.4.1 Overview of control elements

DRC1/2 electronic motor

The following figure gives an overview of the controls in the DRC electronics cover:



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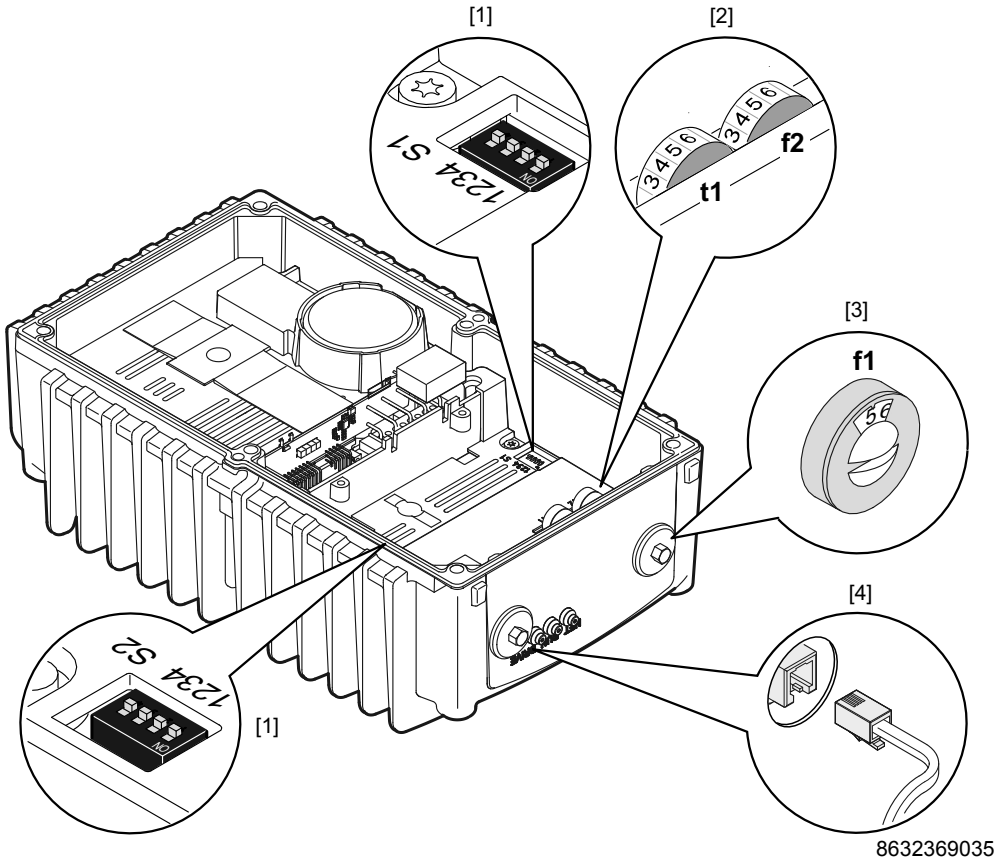
[1] DIP switches S1, S2
Switch t1
Switch f2
[2] Setpoint potentiometer f1 (underneath the gland)
[3] Diagnostic interface (underneath the gland)

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)

6.4.2 Setpoint potentiometer f1

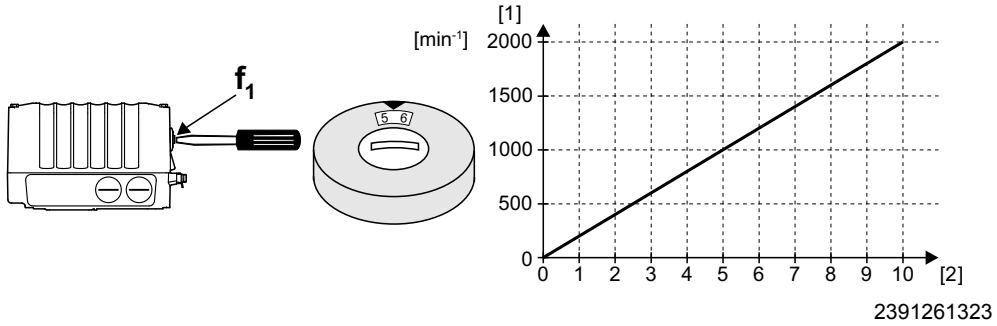
NOTICE

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

Damage to the DRC electronics cover.

- Once you have set 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:



[1] Motor speed
[2] Potentiometer setting

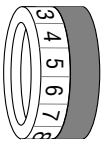
6.4.3 Switch f2

The 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 [rpm] (Motor speed)	**200**	250	300	450	600	750	1000	1250	1500	1800	2000

6.4.4 Switch t1

Use switch t1 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 rpm.



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

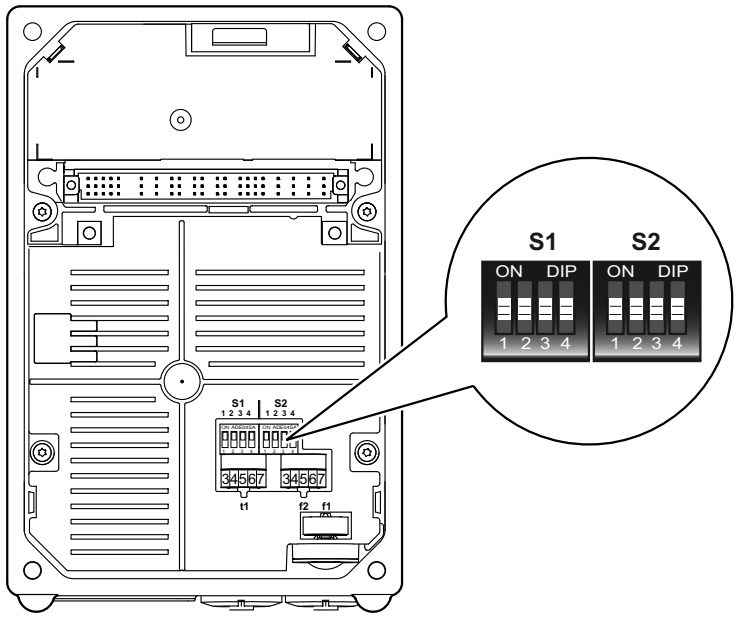
NOTICE

Damage to the DIP switches caused by using 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 the 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 PWM cycle frequency	2 Brake release without enable	3 Reserved	4 Reserved
ON	8 kHz	On	Reserved	Reserved
OFF	**4 kHz**	**Off**	**Reserved**	**Reserved**

DIP switch S2

The following table shows the functions of DIP switch S2:

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

[1)] The DIP switch is effective only in "Easy" mode

6.5.2 Overview of DRC3/4 electronic motor

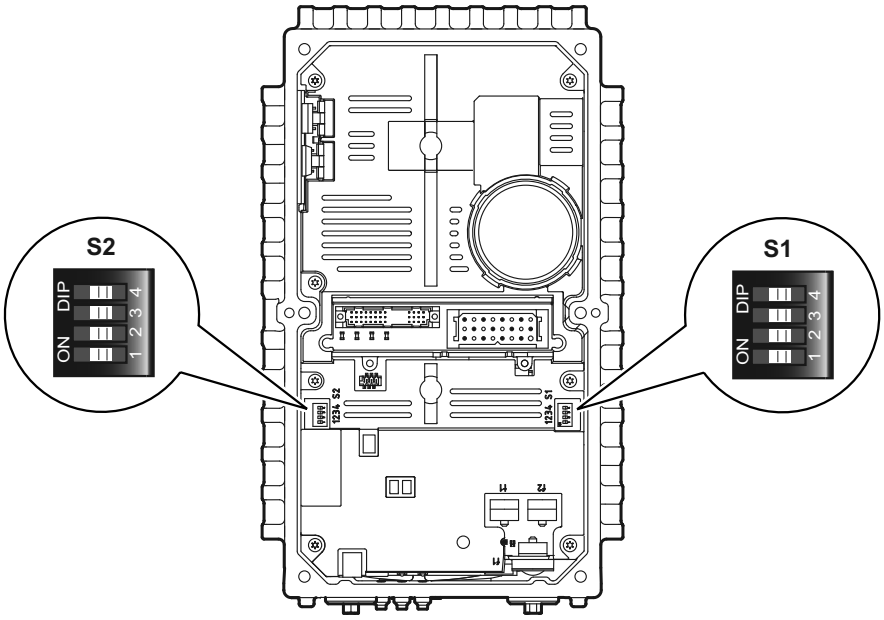
NOTICE

Damage to the DIP switches caused by using 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 the 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 PWM cycle frequency	2 Brake release without enable	3 Reserved	4 Reserved
ON	8 kHz	On	Reserved	Reserved
OFF	**4 kHz**	**Off**	**Reserved**	**Reserved**

DIP switch S2 The following table shows the functions of DIP switch S2:

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

[1)] The DIP switch is effective only in "Easy" mode

6.5.3 Description of the DIP switches

DIP switch S1/1 **Setting the maximum PWM frequency**

- 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 an PWM frequency of 8 kHz and switches back to 4 kHz depending on the temperature and unit utilization.

DIP switch S1/2

⚠ WARNING

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

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

Brake release without enable

When switch S1/2 is set to "ON", it is possible to release the brake even if there is no drive enable signal.

INFORMATION

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

DIP switch S2/1 **Startup mode setting**

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

- Selecting "Easy" (DIP switch S2/1 = "OFF") lets you quickly and easily start up DRC drive units 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 via this DIP switch.

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

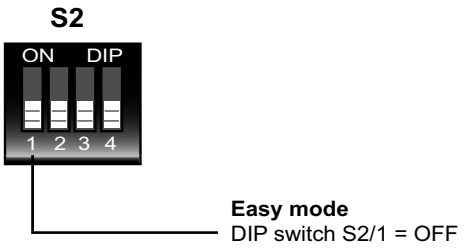
DIP switch S2/4 **Speed monitoring (only active in "Easy" mode)**

- 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 indicates an error on the status LED. The current limit must be reached permanently for the duration of the delay time before the monitoring function trips.

6.6 Startup with binary slave GLK30A in "Easy mode"

6.6.1 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 unintentional re-connection.
3. Make sure that the DRC drive unit is connected properly. Observe chapter "Electrical Installation".
4. Activate "Easy" mode by setting DIP switch S2/1 to OFF.



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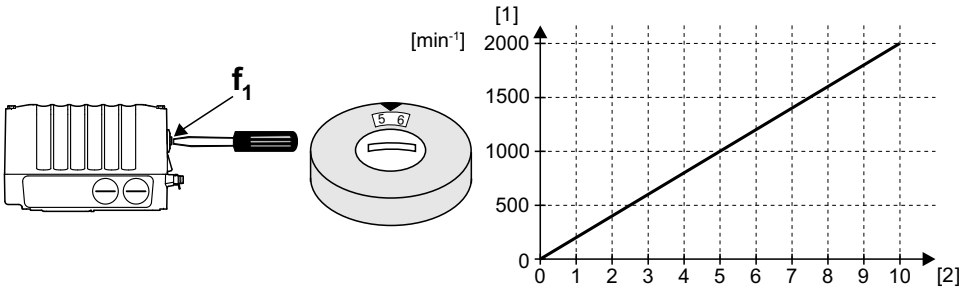
NOTICE Damage to the DIP switches caused by using unsuitable tools.

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.

5. Set the 1st speed at the setpoint potentiometer f1 (active if AS-Interface bit DO2 = "0") (factory setting: about position 5).



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[1] Motor speed
[2] Potentiometer setting

6. Make sure the screw plug of the setpoint potentiometer f1 has a seal and screw it in.

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

Damage to the DRC electronics cover.

- Make sure the screw plug of the setpoint potentiometer has a seal and screw it in.

7. Set the 2nd speed at switch f2 (active if AS-Interface bit DO2 = "1").

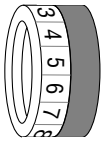
Switch f2											
Detent setting	**0**	1	2	3	4	5	6	7	8	9	10
Setpoint f2 [rpm] (Motor speed)	**200**	250	300	450	600	750	1000	1250	1500	1800	2000

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 rpm).



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 DRC electronics cover onto the connection box and screw it on.
10. Switch on the following voltages.
    - AS-Interface voltage
    - Line voltage
11. Set the required AS-Interface address.
    - With a hand-held programming device
    - With an AS-Interface master (see description of master)

6.6.2 Assigning the slave address

DRC drive units with AS-Interface are assigned address 0 at the factory.

You have the following options for assigning the AS-Interface address of the DRC drive unit with AS-Interface (address 1 - 31):

- Addresses are assigned automatically within a configured AS-Interface system when replacing a DRC drive unit with AS-Interface.

  The following requirements must be met:

  – The new DRC drive unit with AS-Interface must have the address 0.

  – If you replace several DRC drive units with AS-Interface, you must replace them individually (one after the other).

- Manual address assignment via the plant master

  The drive units must be connected to the AS-Interface cable one after the other. Doing so prevents several DRC drive units with AS-Interface from having assigned the same address.

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

  When connecting the DRC drive unit with AS-Interface to the AS-Interface cable, observe the notes in chapter "Assigning the slave address using a hand-held programming device (GLK30A)".

6.6.3 Data AS-Interface master → inverter

The following table shows the 4 data bits that the AS-Interface master sends to the DRC inverter via the AS-Interface:

AS-Interface bit	Function
DO0	CW/stop
DO1	CCW/stop
DO2	Speed f2/speed f1
DO3	Reset[1] / controller enable

1) In the event of an edge change "0" → "1" (only effective in case of an error)

INFORMATION

To enable the drive, AS-Interface bit DO3 "Reset/controller enable" must be set.

6.6.4 Inverter data → AS-Interface master

The following table shows the 4 data bits that the DRC inverter sends back to the AS-Interface master via the AS-Interface:

Bit	Function
DI0	Ready signal 0: The DRC drive is not ready for operation 1: The DRC drive is ready for operation
DI1	Manual mode/local mode 0: DRC control via AS-Interface 1: DRC control via manual mode
DI2	Sensor input 1 0: The signal of sensor 1 = "0" 1: The signal of sensor 1 = "1"
DI3	Sensor input 2 0: The signal of sensor 2 = "0" 1: The signal of sensor 2 = "1"

6.6.5 Setpoint scaling via parameter bits

The following table lists the parameter bits for setpoint scaling.

Setpoint f2 and the minimum frequency are not affected by the scaling.

The following table lists the possible setpoint frequencies for setpoint potentiometer settings f1 = 2000 rpm and f1 = 1000 rpm:

Parameter bits				Factor	Setpoints (motor speeds)	
P3	P2	P1	P0		Setting f1 = 2000 rpm	Setting f1 = 1000 rpm
1	1	1	1	1.00	2000	1000
1	1	1	0	1.11	1800	900
1	1	0	1	1.25	1600	800
1	1	0	0	1.43	1400	700
1	0	1	1	1.67	1200	600
1	0	1	0	2.00	1000	500
1	0	0	1	2.22	900	450
1	0	0	0	2.50	800	400
0	1	1	1	2.86	700	350
0	1	1	0	3.33	600	300
0	1	0	1	4.00	500	250
0	1	0	0	5.00	400	200
0	0	1	1	6.67	300	150
0	0	1	0	10.00	200	100
0	0	0	1	14.30	140	70
0	0	0	0	20.00	100	50

6.6.6 Inverter behavior depending on the AS-Interface bits

The following table shows the inverter behavior depending on the AS-Interface bits:

Inverter behavior	Supply system L1-L3	AS-Interface bit				DRIVE LED
		DO0 CW/stop	DO1 CCW/stop	DO2 Speed f2/speed f1	DO3 Reset/controller enable	
Controller inhibit	1	x	x	x	0	Yellow
No supply system	0	x	x	x	x	Off
Stop	1	0	0	x	1	Yellow
CW operation with f1	1	1	0	0	1	Green
CCW operation with f1	1	0	1	0	1	Green
CW operation with f2	1	1	0	1	1	Green
CCW operation with f2	1	0	1	1	1	Green
Stop	1	1	1	x	1	Flashing green

Key
0 = No voltage
1 = Voltage
x = Any

6.7 Startup with binary slave GLK30A in "Expert mode"

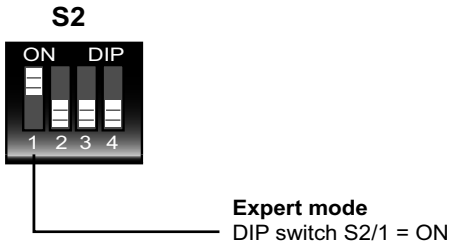
INFORMATION

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

6.7.1 Startup steps

In Expert mode, individual parameters can be used in addition to the basic functionality 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 unintentional re-connection.
3. Make sure that the DRC drive unit is connected properly. Observe chapter "Electrical Installation".
4. Start up the unit in "Easy" mode.
5. Set DIP switch S2/1 to ON to activate "Expert" mode.



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NOTICE Damage to the DIP switches caused by using 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.

6. Connect the PC to the DRC inverter.
7. Connect the DRC inverter to the voltage supply.
8. Start MOVITOOLS® MotionStudio and integrate the DRC inverter.
9. Specify the parameters you want to change.

10. 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 of index 10096.30	Effect of parameter index 10096.30 (deactivation of 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 (acceleration ramp time = deceleration ramp time)
			Bit set: The ramps are set using parameters

11. Change the selected parameters.
12. Check the functions of the DRC drive unit.

    Optimize the parameters, if required.
13. Disconnect the PC from the DRC inverter.
14. Make sure the screw plug of the diagnostic interface has a seal and screw it in.

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

    Damage to the DRC electronics cover.

    - Make sure the screw plug of the diagnostic interface has a seal and screw it in.
15. Switch on the following voltages.
    - AS-Interface voltage
    - Line voltage
16. Set the required AS-Interface address.
    - With a hand-held programming device
    - With an AS-Interface master (see description of master)

6.7.2 Assigning the slave address

DRC drive units with AS-Interface are assigned address 0 at the factory.

You have the following options for assigning the AS-Interface address of the DRC drive unit with AS-Interface (address 1 - 31):

- Addresses are assigned automatically within a configured AS-Interface system when replacing a DRC drive unit with AS-Interface.

  The following requirements must be met:

  – The new DRC drive unit with AS-Interface must have the address 0.

  – If you replace several DRC drive units with AS-Interface, you must replace them individually (one after the other).

- Manual address assignment via the plant master

  The drive units must be connected to the AS-Interface cable one after the other. Doing so prevents several DRC drive units with AS-Interface from having assigned the same address.

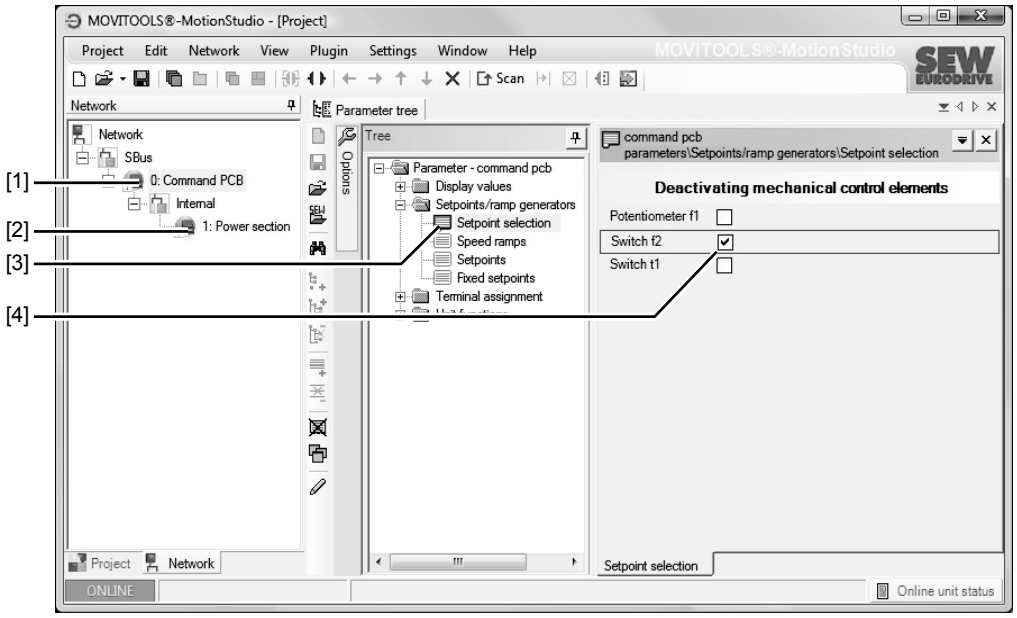
- Manual address assignment using a hand-held AS-Interface programming device.

  When connecting the DRC drive unit with AS-Interface to the AS-Interface cable, observe the notes in chapter "Assigning the slave address using a hand-held programming device (GLK30A)".

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

1. It is essential that you observe the startup instructions.
2. Activate Expert mode as described in chapter "Startup with binary slave GLK30A 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 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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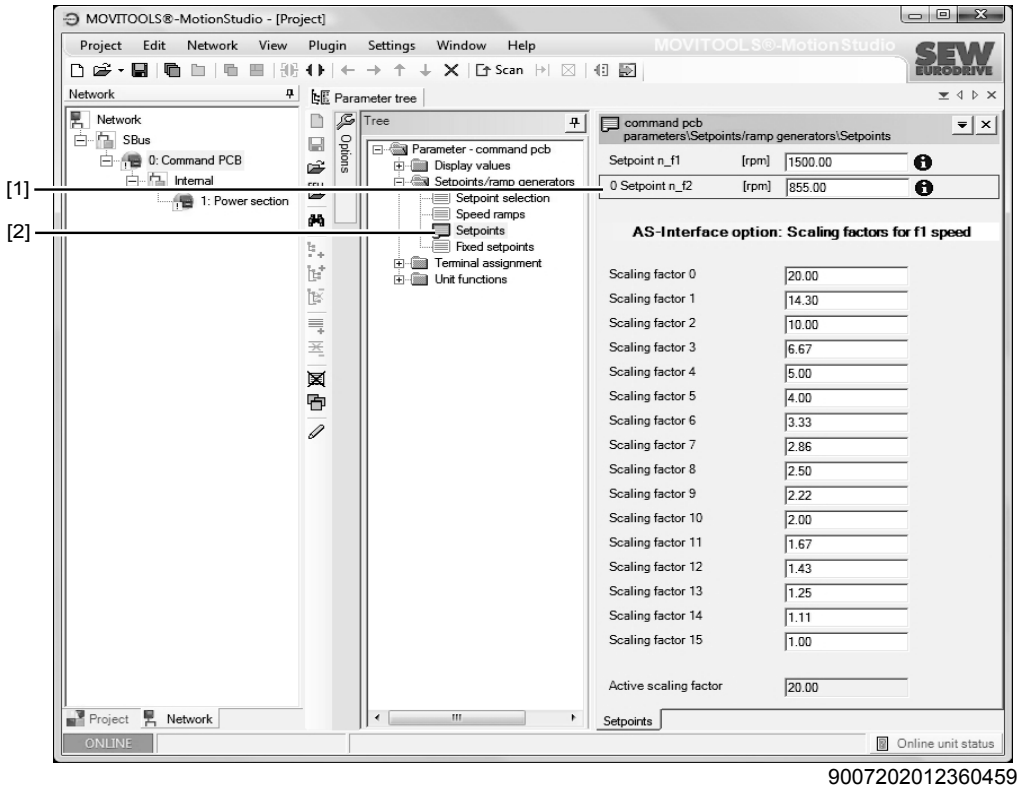
[1] DRC Command pcb
[2] DRC Power section
[3] Setpoint selection folder
[4] Check box for switch f2

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 folder "Setpoints" [2].

You will get the following or a similar result:



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Adjust the setpoint n_f2 [1] until the application runs optimally, e.g. parameter setpoint = 855 rpm.

12. Disconnect the PC from the DRC inverter.
13. Make sure the screw plug of the diagnostic interface has a seal and screw it in.

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

Damage to the DRC electronics cover.

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

6.8 Assigning slave address with hand-held programming device (GLK30A)

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

- Reading out and changing an AS-Interface slave address
- Reading out the AS-Interface profile
- Reading out and changing the data and parameter bits
- Function check and test run.

When using a hand-held programming device, you need a **2-core** connection cable that fits onto the AS-interface plug connector of the DRC drive unit (see the following figure).

6.8.1 X4271: AS-Interface communication interface

NOTICE

Damage to the units caused by faulty installation

Possible damage to property

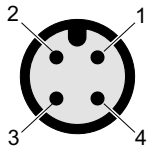
- The hand-held programming device may **only** be connected with the AS-Interface plug connector via pins 1 "AS-Interface +" and 3 "AS-Interface –". The hand-held programming device can be damaged if not connected properly.

The following table informs about this connection:

Function
Connection of AS-Interface data cable

Connection type
M12, 4-pole, male, A-coded

Wiring diagram



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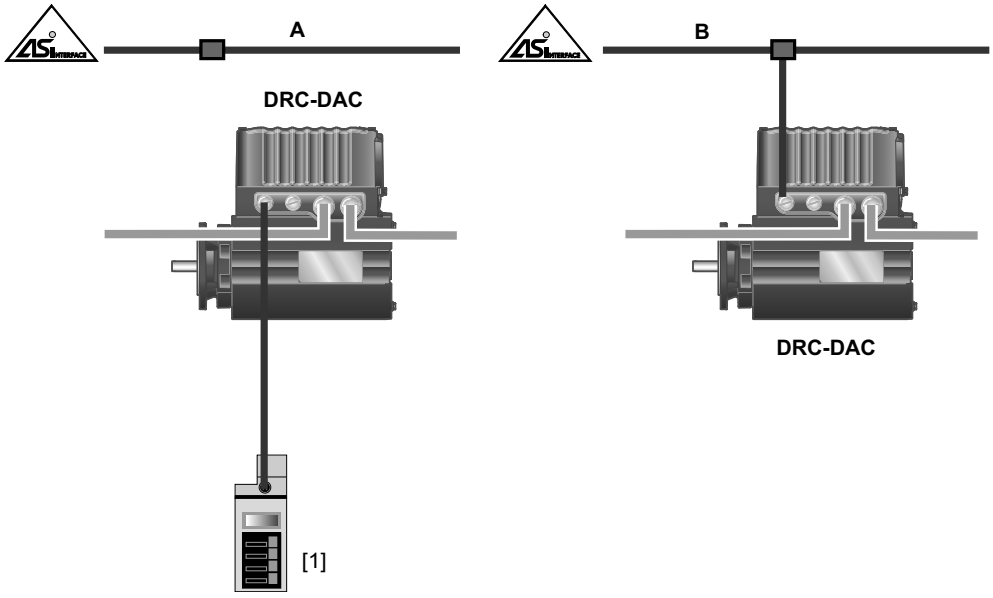
Assignment		
No.	**Name**	**Function**
1	AS+	AS-Interface data cable (+)
2	n.c.	Not connected
3	AS−	AS-Interface data cable (−)
4	n.c.	Not connected

6.8.2 Example

Disconnect the AS-Interface nodes from the AS-Interface network **one at a time** and assign addresses via the hand-held programming device [A].

Then reconnect the respective AS-Interface node to the AS-Interface network [B].



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[1] AS-Interface hand-held programming device

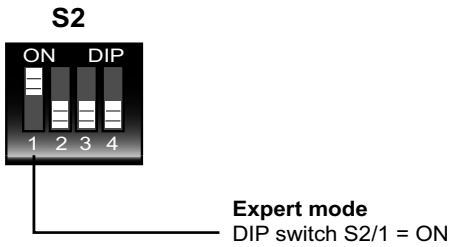
6.9 Startup with double slave GLK31A

INFORMATION

- Startup with the GLK31A double slave only makes sense in "Expert" mode.
- The following chapter describes the preparations made on the DRC inverter for activating Expert mode and an example for fine-tuning parameters.
- The chapter "Parameterization and diagnostics" describes how to integrate the DRC inverter in MotionStudio and provides an overview of all parameters with a detailed description.
- For detailed information about the function of the double slave, refer to chapter "Communication with AS-Interface double slave GLK31A".

6.9.1 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 unintentional re-connection.
3. Set DIP switch S2/1 to ON to activate "Expert" mode.



NOTICE Damage to the DIP switches caused by using 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.

4. Make sure that the DRC drive unit is connected properly. Observe chapter "Electrical Installation".
5. Place the DRC electronics cover onto the connection box and screw it on.
6. Switch on the following voltages.
   - AS-Interface voltage
   - Line voltage
7. Set the required AS-Interface address.
   - With a hand-held programming device
   - With an AS-Interface master (see description master)

Assigning the slave address

An AS-Interface master according to the AS-Interface specification 3.0, rev. 2 in conjunction with the M4 master profile is required for controlling the GLK31A double slave.

DRC drive units with GLK31A AS-Interface option are delivered with address 0 and profile S-7.A.7.7. If you set an address > 0, the GLK31A option turns into a double slave with profiles S-7.A.7.7 (A slave) and S-7.A.F.5 (B slave). After the address assignment, the B slave automatically assumes the base address of the A slave.

You have the following options for assigning the AS-Interface address of the DRC drive unit with AS-Interface option GLK31A (address 1 - 31):

- Addresses are assigned automatically[1)] within a configured AS-Interface system when replacing a DRC drive unit with AS-Interface option GLK31A.

  The following requirements must be met:

  – The new DRC drive unit with AS-Interface option GLK31A must have the address 0.

  – If you replace several DRC drive units with AS-Interface option GLK31A, you must replace them individually (one after the other).

- Manual address assignment via the plant master.

  The drives must be connected to the AS-Interface cable one after the other. Doing so prevents several DRC drive units with AS-Interface option GLK31A from having assigned the same address.

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

  Observe the notes in the next chapter when connecting the DRC drive unit with AS-Interface option GLK31A to the AS-Interface cable.

INFORMATION

Observe the following notes if you change the AS-Interface address of the GLK31A AS-Interface option after it has already been assigned an address (address > 0):

- The new address must not be used by another projected slave.
- The B slave must always have the same base address as the A slave.
- Only the address of the A slave must be set for the address assignment.
- After having assigned the address, the B slave automatically assumes the base address of the A slave.

1) AS-Interface master must support this function.

Assigning the slave address using a hand-held programming device

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

- Reading out and changing an AS-Interface slave address
- Reading out the AS-Interface profile
- Reading out and changing the data and parameter bits
- Function check and test run.

When using a hand-held programming device, you need a **2-core** connection cable that fits onto the AS-interface plug connector of the DRC drive unit (see the following figure).

X4271: AS-Interface communication interface

NOTICE

Damage to the units caused by faulty installation

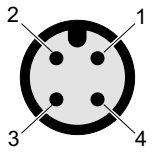
Possible damage to property

- The hand-held programming device may **only** be connected via pins 1 "AS-Interface +" and 3 "AS-Interface –" with the AS-Interface plug connector. The hand-held programming device can be damaged if not connected properly.

The following table informs about this connection:

Function
Connection of AS-Interface data cable

Connection type
M12, 4-pole, male, A-coded

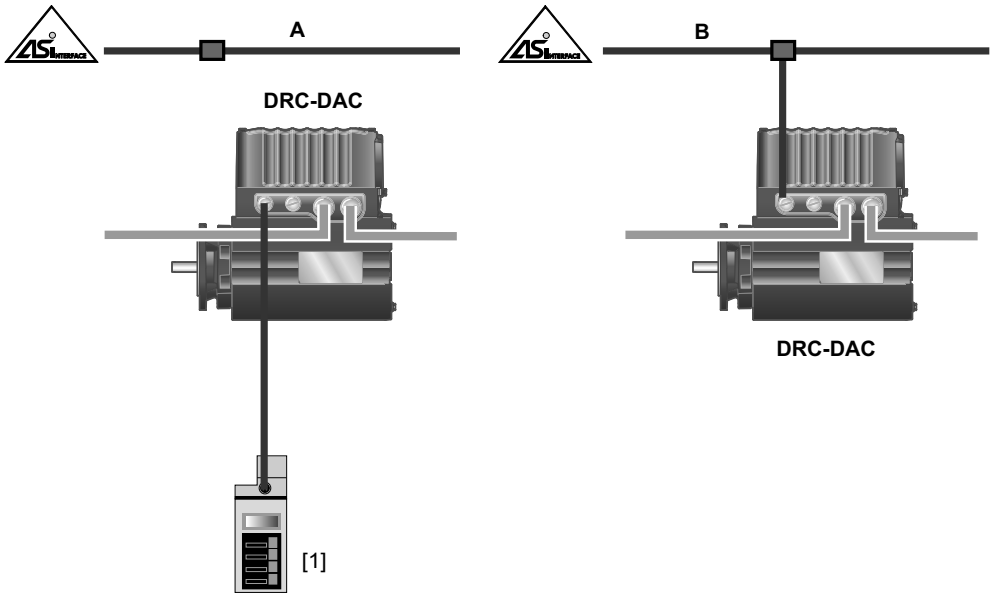
Wiring diagram
 2384154763

Assignment		
No.	**Name**	**Function**
1	AS+	AS-Interface data cable +
2	n.c.	Not connected
3	AS−	AS-Interface data cable –
4	n.c.	Not connected

Example

Disconnect the AS-Interface nodes from the AS-Interface network **one at a time** and assign addresses via the hand-held programming device [A].

Then reconnect the respective AS-Interface node to the AS-Interface network [B].



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[1] AS-Interface hand-held programming device

6.9.2 Startup and function expansion through parameterization

You can expand the basic functionality of the DRC drive unit by using parameters.

Proceed as follows:

1. It is essential that you observe the startup instructions.
2. Connect the PC to the DRC inverter.
3. Connect the DRC inverter to the voltage supply.
4. Start MOVITOOLS® MotionStudio and integrate the DRC inverter, see chapter "Operation of MOVITOOLS® MotionStudio".
5. Specify the parameters you want to change.
6. 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 of index 10096.30	Effect of parameter index 10096.30 (deactivation of mechanical control elements)
Setpoint potentiometer f1	10096.35 setpoint n_f1	13	Bit not set: Setpoint f1 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 (acceleration ramp time = deceleration ramp time)
			Bit set: The ramps are set using parameters

7. Change the selected parameters.
8. Check the functions of the DRC drive unit.

   Optimize the parameters, if required.
9. Disconnect the PC from the DRC inverter.
10. Make sure the screw plug of the diagnostic interface has a seal and screw it in.

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

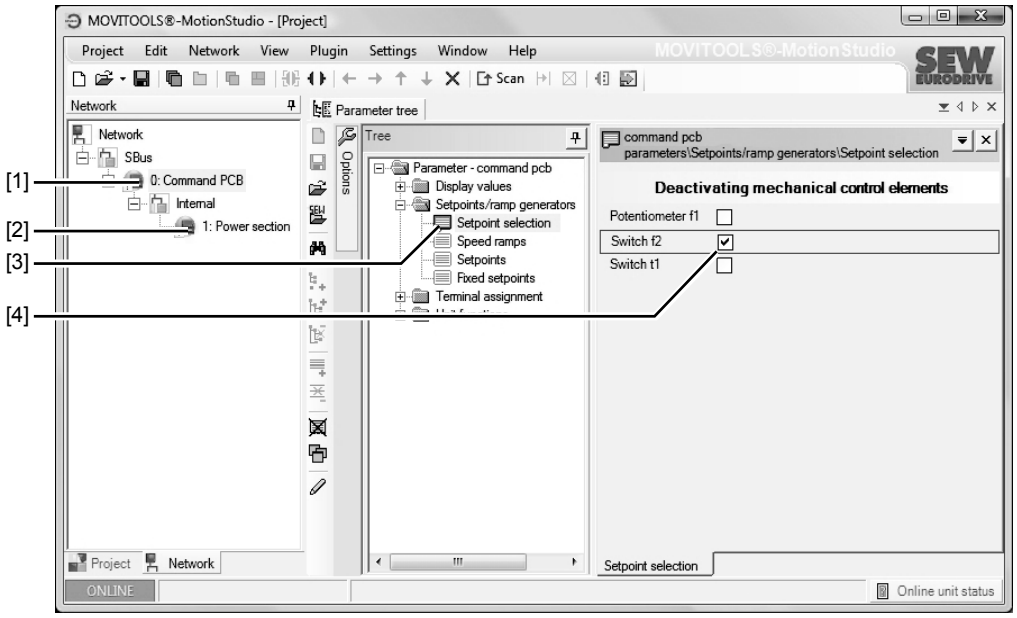
    Damage to the DRC electronics cover.

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

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

1. It is essential that you observe the startup instructions.
2. Connect the PC to the DRC inverter.
3. Connect the DRC inverter to the voltage supply.
4. Start MOVITOOLS® MotionStudio.
5. Create a project and network.
6. Configure the communication channel at the PC.
7. Perform an online scan.

   You will get the following or a similar result:



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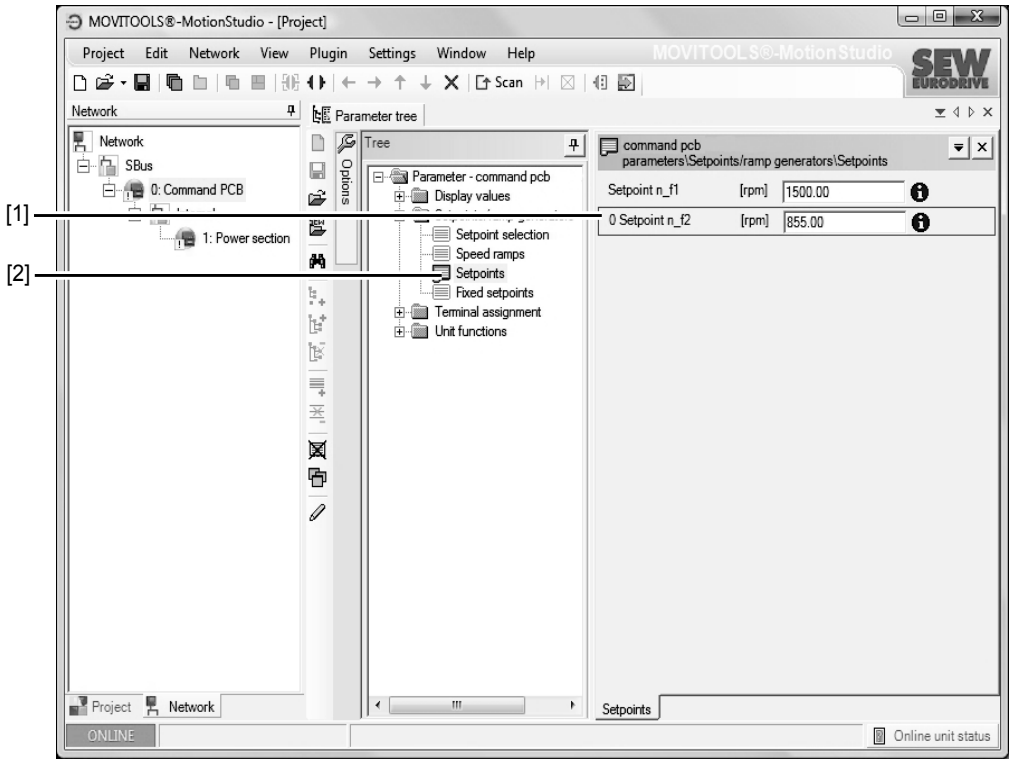
[1] DRC Command pcb
[2] DRC Power section
[3] Setpoint selection folder
[4] Check box for switch f2

8. Open the context menu of the DRC command pcb [1] by clicking the right mouse button and select the menu item "Startup" / "Parameter tree".
9. Open the folder "Setpoint selection" [3].

   Deactivate switch f2 by ticking the check box "Switch f2" [4].
10. Open the folder "Setpoints" [2].

You will get the following or a similar result:



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Adjust the setpoint n_f2 [1] until the application runs optimally, e.g. setpoint = 855 rpm.

11. Disconnect the PC from the DRC inverter.
12. Make sure the screw plug of the diagnostic interface has a seal and screw it in.

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

Damage to the DRC electronics cover.

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

7 Operation of MOVITOOLS® MotionStudio

7.1 About MOVITOOLS® MotionStudio

7.1.1 Tasks

The software package enables you to perform the following tasks:

- Establish communication with units
- Execute functions of the units

7.1.2 Establishing communication with the units

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

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units 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 (RS-485) 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 units and its communication options.

7.1.3 Executing functions of the units

The software package offers uniformity in executing the following functions:

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

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

- MotionStudio
- MOVITOOLS®

7.2 First steps

7.2.1 Starting the software and creating a project

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

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

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

1. Set up a communication channel to communicate with your units.
2. Scan your network (unit scan). Press the [Start network scan] button [1] in the toolbar.

[1]

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7.2.3 Additional information

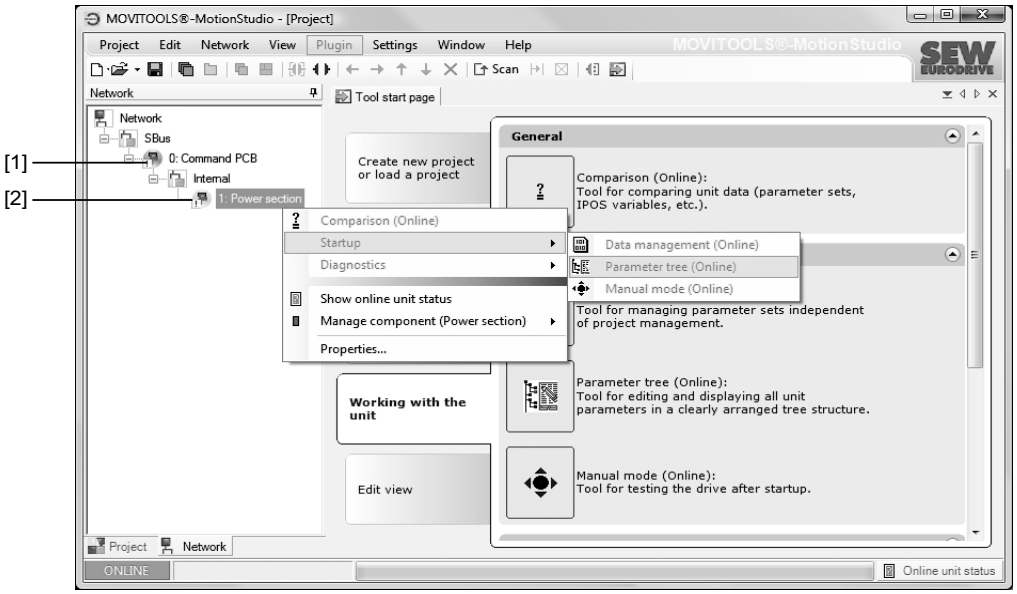
INFORMATION

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

7.2.4 Configuring units

Proceed as follows to configure a unit:

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



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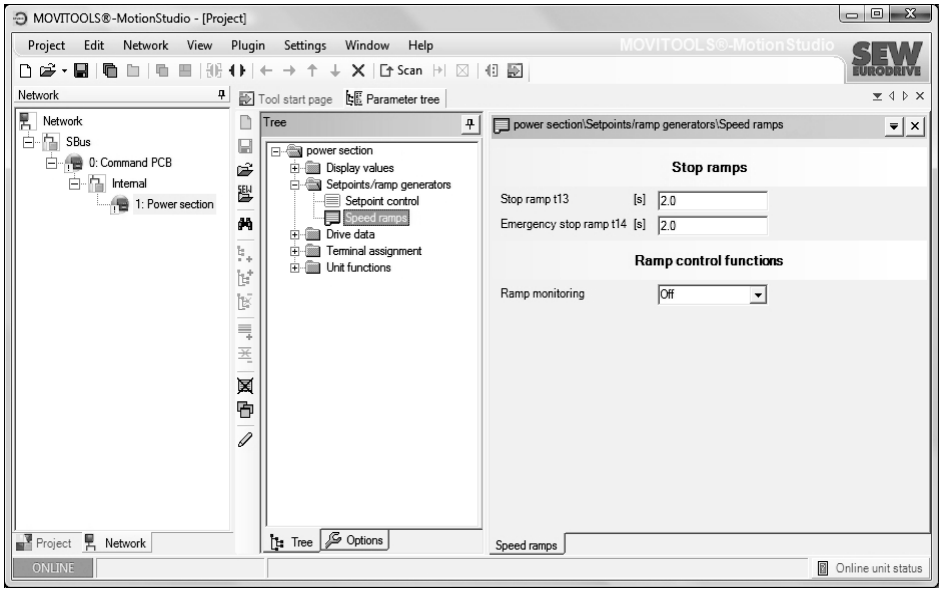
[1] Command PCB
[2] Power section

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

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



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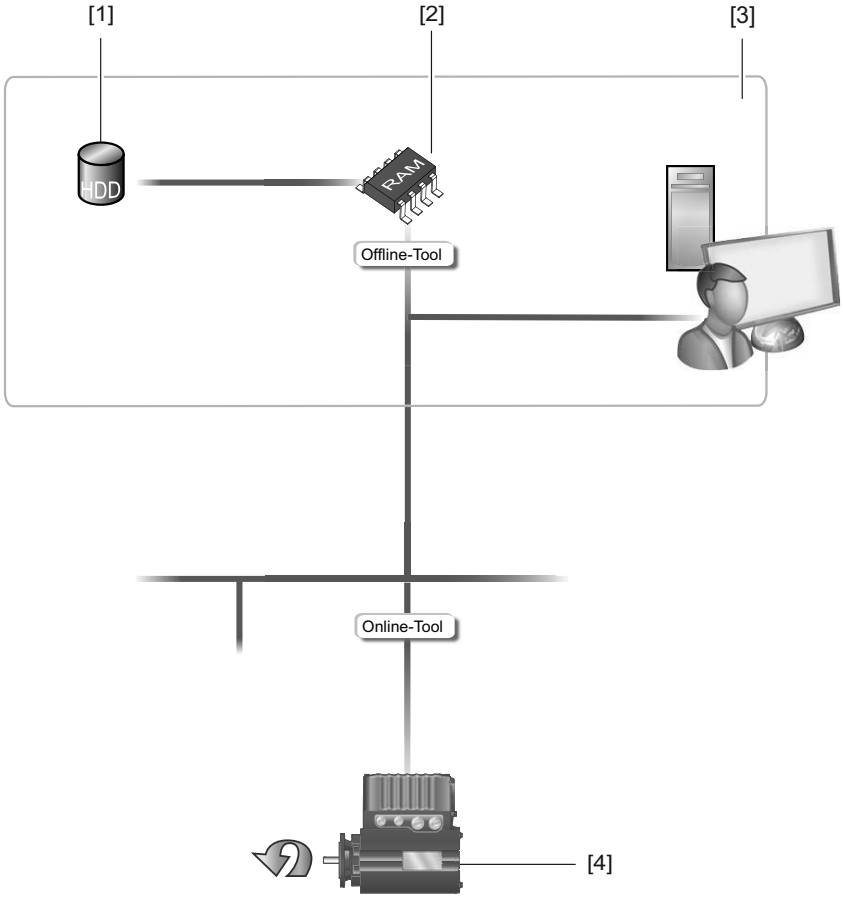
7.3 Connection mode

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 unit.

Offline tools / online tools overview

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] Unit

Offline tools / online tools description

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->unit)" function if you want to transfer the changes to your unit [4] as well.
Online tools	Changes made using online tools affect **"ONLY"** the unit [4] at first. • Execute the "Upload (unit->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].

INFORMATION

- The "online" connection status is **NOT** a response message which informs you that you are currently connected to the unit or that your unit is ready for communication. Should you require this feedback, observe chapter "Setting the cyclical accessibility test" in the online help (or the manual) of MOVITOOLS® MotionStudio.
- Project management commands (such as "download" and "upload"), the online unit status, and the "unit scan" work independently of the set connection mode.
- MOVITOOLS® MotionStudio starts up in the connection mode that was set before the program was closed.

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 unit.
   - "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 unit node.
3. Right-click to open the context menu and display the tools for configuring the unit.

7.4 SBus (CAN) communication via interface adapter

7.4.1 Engineering via interface adapter (SBus)

Since your unit 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 unit.

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

Interface adapter type (option)	Order No.	Scope of delivery
PC-CAN package from SEW-EURODRIVE	2 821 449 8	PC-CAN interface adapter and adapter cable for connecting PC-CAN interface adapters and DRC inverters
PC-CAN interface adapter from SEW-EURODRIVE	1 821 059 7	The prefabricated cable included in the scope of delivery can not be used for DRC drive units.
PC-CAN interface adapter PCAN-USB ISO from PEAK-System	IPEH 002022	Without connection cable
Adapter cable	1 812 386 4	Adapter cable for connecting a PC-CAN interface adapter with an DRC inverter

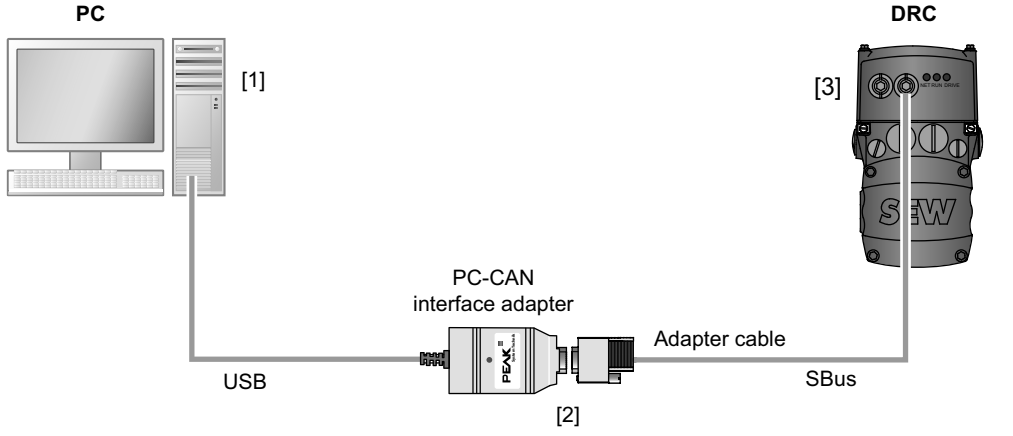
7.4.2 Starting up the USB-CAN interface

Overview

This section describes how to connect the PC-CAN interface from SEW to the SBus interface or your units and what must be considered for this.

Connecting the USB-CAN interface adapter to the unit

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



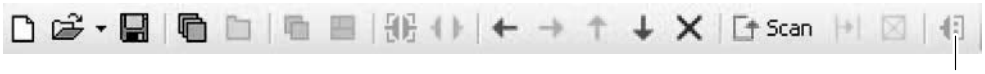
[1] PC
[2] USB-CAN interface with adapter cable
[3] DRC diagnostics interface

7.4.3 Configuring communication settings via SBus

You need an SBus connection between your PC and the units 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 connections" [1] in the toolbar.



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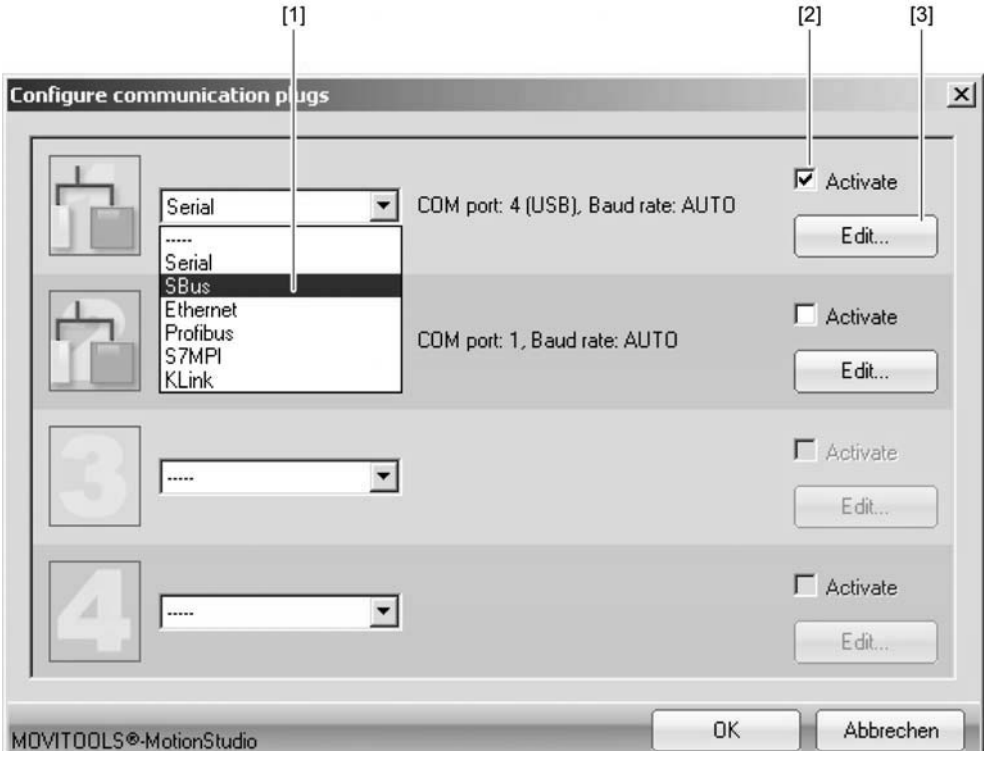
[1] "Configure communication connections" icon

This will open the "Configure communication connections" window.



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

2. From the list [1], select "SBus" as the communication type.

   In this example, the 1st communication channel is activated with "SBus" communication type [2].

3. Press the [Edit] button [3] on the right side of the "Configure communication connections" 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 [Advanced 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 parameters	Description	Information

Baud rate	Transmission speed with which the connected PC communicates with the unit in the network via the communication channel.	• Adjustable values (permitted total cable length):
		  • 500 kBd (50 m) (Default)
		  • 1 MBd (25 m)
		• All connected units must support the same baud rate.

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

Communication parameters	Description	Information
Parameter telegrams	Telegram with a single parameter	Used to transfer a **single parameter** of a unit.
Multi-byte telegrams	Telegram with several parameters	Used to transfer the **complete** parameter set of a unit.

Timeout	Waiting time in [ms] that the master waits for a response from the slave after it has made a request.	• Default setting:
		  • 100 ms (parameter telegram)
		  • 350 ms (multi-byte telegram)
		• Increase the value if not all units are detected during a network scan.

Retries	Number of request retries after the timeout is exceeded	Default setting: 3

7.5 Executing functions of the units

7.5.1 Parameterizing a unit

Units are parameterized in the parameter tree. The parameter tree displays all unit parameters, grouped into folders.

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

7.5.2 Reading or changing unit parameters

Proceed as follows to read or change unit parameters:

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

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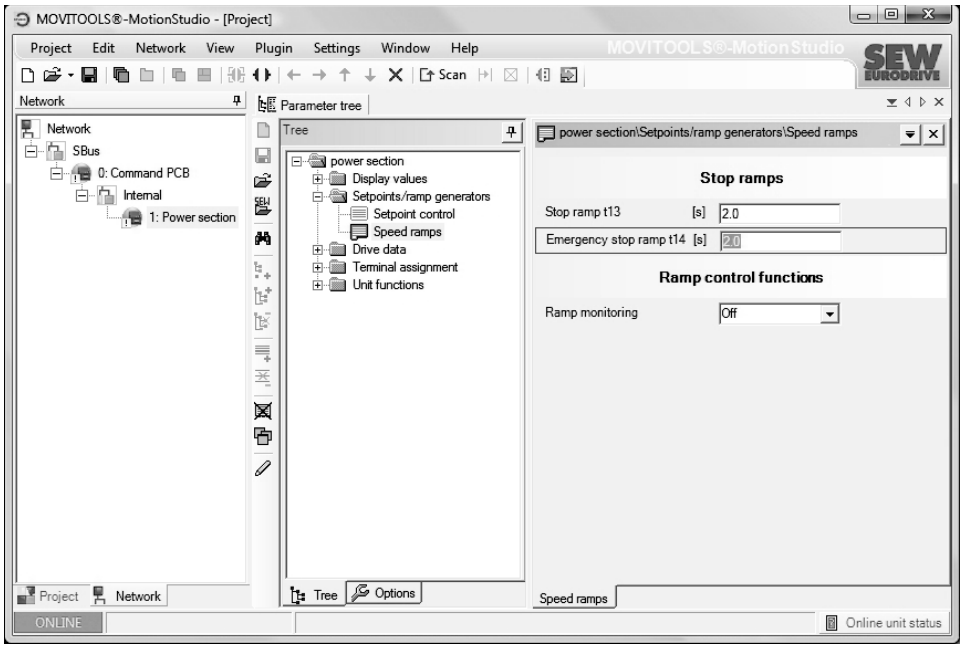
[1] "Switch to online mode" icon
[2] "Switch to offline mode" icon

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

   This opens the "Parameter tree" view on the right.
5. Expand the "Parameter tree" to the node you require.



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

INFORMATION

For detailed information about the unit parameters, refer to chapter "Parameters".

7.5.3 Starting up the units (online)

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

1. Switch to the 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 unit 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. Then load the startup data into your unit.

8 Parameters

8.1 Overview of parameters of the command PCB

8.1.1 Display values

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Command PCB parameters \ display values \ unit status			
Unit status			
8310.0	Operating state	[Text]	
10095.1	Startup mode	[Text]	
DIP switch			
9621.10, bit 0	Setting of DIP switch S1/1	[Bit field]	
9621.10, bit 1	Setting of DIP switch S1/2	[Bit field]	
9621.10, bit 2	Setting of DIP switch S1/3	[Bit field]	
9621.10, bit 3	Setting of DIP switch S1/4	[Bit field]	
9621.10, bit 4	Setting of DIP switch S2/1	[Bit field]	
9621.10, bit 5	Setting of DIP switch S2/2	[Bit field]	
9621.10, bit 6	Setting of DIP switch S2/3	[Bit field]	
9621.10, bit 7	Setting 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			
8334.0, bit 1	Digital input DI01 status	[Bit field]	
8334.0, bit 2	Digital input DI02 status	[Bit field]	
8334.0, bit 3	Digital input DI03 status	[Bit field]	
8334.0, bit 4	Digital input DI04 status	[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 \ unit data			
Command level			
–	Unit series	[Text]	
9701.1, 9701.2, 9701.3, 9701.4, 9701.5	Unit names	[Text]	
9823.1, 9823.2, 9823.3, 9823.4, 9823.5	Unit signature	[Text]	
9701.53, 9701.54	AS-Interface option firmware	[Text]	
10095.39	AS-Interface option	[Text]	
9701.30	Command level firmware	[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]	

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
10096.30, bit 15	Switch t1	[Bit field]	
Command PCB parameters \ display values \ bus diagnostics			
AS-Interface option monitor			
In conjunction with AS-Interface binary slave GLK30A:			
10095.39	AS-Interface option	[Text]	
9756.1, bit 0	AS-Interface output bit DO0	[Bit field] CW/stop	
9756.1, bit 1	AS-Interface output bit DO1	[Bit field] CCW/stop	
9756.1, bit 2	AS-Interface output bit DO2	[Bit field] Speed f2/speed f1	
9756.1, bit 3	AS-Interface output bit DO3	[Bit field] Reset/controller enable	
9756.1, bit 8	AS-Interface output bit PO0	[Bit field] Parameter bit 1	
9756.1, bit 9	AS-Interface output bit PO1	[Bit field] Parameter bit 2	
9756.1, bit 10	AS-Interface output bit PO2	[Bit field] Parameter bit 3	
9756.1, bit 11	AS-Interface output bit PO3	[Bit field] Parameter bit 4	
9866.1, bit 0	AS-Interface input bit DI0	[Bit field] Ready message	
9866.1, bit 1	AS-Interface input bit DI1	[Bit field] Automatic/manual mode	
9756.1, bit 6	AS-Interface output bit DI2	[Bit field] Sensor output 1	
9756.1, bit 7	AS-Interface input bit DI3	[Bit field] Sensor output 2	
In conjunction with AS-Interface double slave GLK31A:			
10095.39	AS-Interface option	[Text]	
9756.1, bit 0	AS-Interface output bit DO0	[Bit field]	Depending on the selected function module
9756.1, bit 1	AS-Interface output bit DO1	[Bit field]	
9756.1, bit 2	AS-Interface output bit DO2	[Bit field]	
9756.1, bit 3	AS-Interface output bit DO3	[Bit field]	
9756.1, bit 8	AS-Interface output bit PO0	[Bit field]	
9756.1, bit 9	AS-Interface output bit PO1	[Bit field]	
9756.1, bit 10	AS-Interface output bit PO2	[Bit field]	
9756.1, bit 11	AS-Interface output bit PO3	[Bit field]	
9866.1, bit 0	AS-Interface input bit DI0	[Bit field]	
9866.1, bit 1	AS-Interface input bit DI1	[Bit field]	
9866.1, bit 2	AS-Interface output bit DI2	[Bit field]	
9866.1, bit 3	AS-Interface input bit DI3	[Bit field]	

8.1.2 Parameters that can be changed

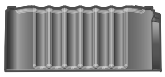
Storage location

INFORMATION

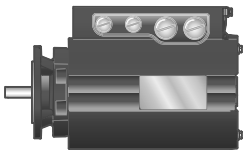
The following parameters are stored in the DRC motor.

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.



Electronics cover



Motor

Setpoints/ramp generators

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Command PCB parameters \ setpoints/ramp generators \ setpoint selection			
Deactivating 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
Only in conjunction with AS-Interface binary slave GLK31A:			
10504.1	Ramp t15 up	0.00 – 1.00 – 60.00 [s]	1 digit = 0.001 s
10504.11	Ramp t15 down	0.00 – 1.00 – 60.00 [s]	1 digit = 0.001 s
10475.2	Ramp t16 up	0.00 – 1.00 – 60.00 [s]	1 digit = 0.001 s
10475.1	Ramp t16 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 [rpm]	1 digit = 0.001 rpm
10096.36	Setpoint n_f2	0.00 – 200.00 – 2000.00 [rpm]	1 digit = 0.001 rpm
Only in conjunction with AS-Interface binary slave GLK30A:			
15500.0	Scaling factor 0	1.0 – 20.0 – 50.0	
15501.0	Scaling factor 1	1.0 – 14.3 – 50.0	
15502.0	Scaling factor 2	1.0 – 10.0 – 50.0	
15503.0	Scaling factor 3	1.0 – 6.67 – 50.0	
15504.0	Scaling factor 4	1.0 – 5.00 – 50.0	
15505.0	Scaling factor 5	1.0 – 4.00 – 50.0	
15506.0	Scaling factor 6	1.0 – 3.33 – 50.0	
15507.0	Scaling factor 7	1.0 – 2.86 – 50.0	
15508.0	Scaling factor 8	1.0 – 2.25 – 50.0	
15509.0	Scaling factor 9	1.0 – 2.22 – 50.0	
15510.0	Scaling factor 10	1.0 – 2.00 – 50.0	
15511.0	Scaling factor 11	1.0 – 1.67 – 50.0	

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
15512.0	Scaling factor 12	1.0 – 1.43 – 50.0	
15513.0	Scaling factor 13	1.0 – 1.25 – 50.0	
15514.0	Scaling factor 14	1.0 – 1.11 – 50.0	
15515.0	Scaling factor 15	1.0 – 1.00 – 50.0	
8967.0	Active scaling factor (display value)	[Text]	
Command PCB parameters \ setpoints/ramp generators \ fixed setpoints			
Only in conjunction with AS-Interface double slave GLK31A:			
8489.0	Fixed setpoint n0	– 2000.00 – 200.00 – 2000.00 [rpm]	1 digit = 0.001 rpm
8490.0	Fixed setpoint n1	– 2000.00 – 750.00 – 2000.00 [rpm]	1 digit = 0.001 rpm
8491.0	Fixed setpoint n2	– 2000.00 – 1500.00 – 2000.00 [rpm]	1 digit = 0.001 rpm
10096.31	Fixed setpoint n3	– 2000.00 – 2000.00 [rpm]	1 digit = 0.001 rpm
10096.38	Fixed setpoint n4	– 2000.00 – 2000.00 [rpm]	1 digit = 0.001 rpm
10096.39	Fixed setpoint n5	– 2000.00 – 2000.00 [rpm]	1 digit = 0.001 rpm
Command PCB parameters \ terminal assignment \ digital outputs			
[Text]	For digital output DO01, see power section		

Unit functions

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Command PCB parameters \ unit functions \ setup			
8594.0	Factory setting	• 0 = No • 1 = Standard • 2 = Delivery state	

8.2 Overview of power section parameters

8.2.1 Display values

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Power section parameters \ display values \ process values			
Actual drive values			
8318.0	Actual speed	[rpm]	1 digit = 0.001 rpm
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 %
Actual unit values			
8325.0	DC link voltage	[V]	1 digit = 0.001 %
8730.0	Unit 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 \ unit status			
Device status			
9702.2	Power section status	[Text]	
9702.7	Drive status	[Text]	
9702.5	Error code	[Text]	
10071.1	Suberror code	[Text]	
10404.5	Error source	[Text]	
Statistical data			
8328.0	Operating hours	[h]	1 digit = 1 min = 1/60 h
8329.0	Enable 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 status (signal relay K1)	[Bit field]	
8350.0	Digital output DO01 function (signal relay K1)	[Text]	
Power section parameters \ display values \ unit data			
Basic unit			
9701.10	Unit series	[Text]	
9701.11	Variant identification	[Text]	
9701.1 – 9701.5	Unit name	[Text]	
10204.2	Unit variant	[Text]	
9823.1 – 9823.5	Device signature	[Text]	
8361.0	Nominal unit current (rms)	[A]	1 digit = 0.001 %
10079.9	Motor size	[Text]	
9610.1	Nominal motor torque	[Nm]	1 digit = 0.00001 Nm (10^{-5})

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Basic unit firmware			
9701.30, 9701.31	Basic unit 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 reduction 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	Error t-0 error code	[Text]	
10072.1	Error t-0 suberror code	[Text]	
8883.0	Error t-0 internal	[Text]	
10404.6	Source of error t-0	[Text]	
Actual drive values			
8401.0	Actual speed t-0	[rpm]	1 digit = 0.001 rpm
8406.0	Apparent output current t-0	[%]	1 digit = 0.001 %
8411.0	Active output current t-0	[%]	1 digit = 0.001 %
8416.0	Unit 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 %
Device status			
8391.0	Power section status t-0	[Text]	
8426.0	Operating hours t-0	[h]	1 digit = 1 min = 1/60 h
8431.0	Enable 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 \ Error memory 0-4 \ Error memory t-1			
Fault status			
8367.0	Error t-1 error code	[Text]	
10072.2	Error t-1 suberror code	[Text]	
8884.0	Error t-1 internal	[Text]	
10404.7	Source of error t-1	[Text]	
Actual drive values			
8402.0	Actual speed t-1	[rpm]	1 digit = 0.001 rpm
8407.0	Apparent output current t-1	[%]	1 digit = 0.001 %
8412.0	Active output current t-1	[%]	1 digit = 0.001 %
8417.0	Unit utilization t-1	[%]	1 digit = 0.001 %
8442.0	Motor utilization t-1	[%]	1 digit = 0.001 %

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
8422.0	DC link voltage t-1	[V]	1 digit = 0.001 %
Device status			
8392.0	Power section status t-1	[Text]	
8427.0	Operating hours t-1	[h]	1 digit = 1 min = 1/60 h
8432.0	Enable 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
10070.2	Motor temperature t-1	[°C]	1 digit = 10^{-6} °C
Power section parameters \ Display values \ Error memory 0-4 \ Error memory t-2			
Fault status			
8368.0	Error t-2 error code	[Text]	
10072.3	Error t-2 suberror code	[Text]	
8885.0	Error t-2 internal	[Text]	
10404.8	Source of error t-2	[Text]	
Input/output status			
Actual drive values			
8403.0	Actual speed t-2	[rpm]	1 digit = 0.001 rpm
8408.0	Apparent output current t-2	[%]	1 digit = 0.001 %
8413.0	Active output current t-2	[%]	1 digit = 0.001 %
8418.0	Unit 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 %
Device status			
8393.0	Power section status t-2	[Text]	
8428.0	Operating hours t-2	[h]	1 digit = 1 min = 1/60 h
8433.0	Enable 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 \ Error memory 0-4 \ Error memory t-3			
Fault status			
8369.0	Error t-3 error code	[Text]	
10072.4	Error t-3 suberror code	[Text]	
8886.0	Error t-3 internal	[Text]	
10404.9	Source of error t-3	[Text]	
Actual drive values			
8404.0	Actual speed t-3	[rpm]	1 digit = 0.001 rpm
8409.0	Apparent output current t-3	[%]	1 digit = 0.001 %
8414.0	Active output current t-3	[%]	1 digit = 0.001 %
8419.0	Unit utilization t-3	[%]	1 digit = 0.001 %
8444.0	Motor utilization t-3	[%]	1 digit = 0.001 %
8424.0	DC link voltage t-3	[V]	1 digit = 0.001 %
Device status			
8394.0	Power section status t-3	[Text]	

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
8429.0	Operating hours t-3	[h]	1 digit = 1 min = 1/60 h
8434.0	Enable 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 \ Error memory 0-4 \ Error memory t-4			
Fault status			
8370.0	Error t-4 error code	[Text]	
10072.5	Error t-4 suberror code	[Text]	
8887.0	Error t-4 internal	[Text]	
10404.10	Source of error t-4	[Text]	
Actual drive values			
8405.0	Actual speed t-4	[rpm]	1 digit = 0.001 rpm
8410.0	Apparent output current t-4	[%]	1 digit = 0.001 %
8415.0	Active output current t-4	[%]	1 digit = 0.001 %
8420.0	Unit 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 %
Device status			
8395.0	Power section status t-4	[Text]	
8430.0	Operating hours t-4	[h]	1 digit = 1 min = 1/60 h
8435.0	Enable 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

8.2.2 Parameters that can be changed

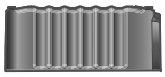
Storage location

INFORMATION

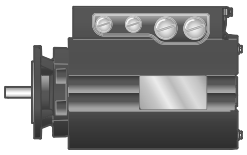
The following parameters are stored in the DRC motor.

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.



Electronics cover



Motor

Setpoints/ramp generators

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Power section parameters \ setpoints/ramp generators \ setpoint monitoring			
Setpoint stop function			
8578.0	Setpoint stop function	• 0 = Off • 1 = On	
8579.0	Stop setpoint	160 – 500 [rpm]	1 digit = 0.001 rpm
8580.0	Start offset	– 0 – 30 – 500 [rpm]	1 digit = 0.001 rpm
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/ramp generators \ 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	

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 Display (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 [rpm]	1 digit = 0.001 rpm
8517.0	Maximum speed	0.0 – 200.0 – 2000.0 [rpm]	1 digit = 0.001 rpm
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 conjunction with DRC electronic motor: 0 – 250 – 300 [%I_N]	1 digit = 0.001 %I_N
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 conjunction with DRC electronic motor: 0 – 250 – 300 [%I_N]	1 digit = 0.001 %I_N

Terminal assignment

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Power section parameters \ terminal assignment \ digital outputs			
8349.0, bit 1	Digital output DO01 status (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	

Diagnostic functions

Index	Parameter name	MOVITOOLS® MotionStudio Display (Range / factory setting)	MOVILINK® scaling
Power section parameters \ diagnostics functions \ reference signals			
Speed reference message			
8539.0	Speed reference value	0.0 ... 1500.0 ... 2000.0 [rpm]	1 digit = 0.001 rpm
8540.0	Hysteresis	0.0 ... 100.0 ... 500.0 [rpm]	1 digit = 0.001 rpm
8541.0	Deceleration 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 [rpm]	1 digit = 0.001 rpm
8544.0	Range width	0 ... 2000 [rpm]	1 digit = 0.001 rpm
8545.0	Deceleration 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 [rpm]	1 digit = 0.001 rpm
8548.0	Deceleration 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	Deceleration 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	Deceleration time	0 ... 1 ... 9 [s]	1 digit = 0.001 s
8556.0	Signal = "1" if:	• 0 = I = Imax • 1 = I < Imax	

Control functions

Index	Parameter name	MOVITOOLS® MotionStudio Display (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	

Unit functions

Power section parameters \ unit functions \ setup		
8594.0	Factory setting	• 0 = No • 1 = Standard • 2 = Delivery state
8595.0	Parameter lock	• 0 = No • 1 = Yes
Power section parameters \ unit functions \ error monitoring		
Programmable responses		
9729.16	Response ext. Error	• 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	Line phase failure 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
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
Error acknowledgement		
8617.0	Manual reset	• 0 = No • 1 = Yes
Power section parameters \ unit 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]

8.3 Description of command PCB parameters

8.3.1 Display values

Command pcb parameters \ display values \ unit status

Operating status index 8310.0

The parameter indicates the current operating state.

Startup mode index 10095.1

This 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 switches	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.

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

Parameter setting of switch t1 index 10096.29

The parameter indicates the setting of switch t1.

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

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 parameters.

Command pcb parameters \ *display values* \ *unit data*

Unit series
The parameter indicates the unit series, for example DRC.

Unit name
index 9701.1 – 9701.5
The parameter indicates the type designation of the command PCB.

Unit 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 AS-Interface option
index 9701.53, 9701.54
The parameter indicates the part number and version of the firmware used in the AS-Interface option.

ASInterface option
index 10095.39
The parameter indicates the type of AS-Interface option:

Parameter value	Type of AS-Interface option
0	AS-Interface is not available
3	GLK30A binary slave
4	GLK31A double slave

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 bit 13 – 15

The parameter indicates disabled/enabled mechanical control elements.

Command PCB parameters \ display values \ bus diagnostics

AS-Interface option index 10095.39

The parameter indicates the type of AS-Interface option:

Parameter value	Type of AS-Interface option
0	AS-Interface is not available
3	GLK30A binary slave
4	GLK31A double slave

ASInterface output bit index 9756.1, bits 0 – 3 and bits 8 – 11

In conjunction with AS-Interface binary slave GLK30A:

The parameters are used as AS-Interface bus monitor. They indicate the transmission of AS-Interface bits from and to the DRC inverter.

The following table shows the assignment of AS-Interface output bits:

Index	AS-Interface bit	Meaning
9756.1, bit 0	AS-Interface output bit DO0	CW operation/stop
9756.1, bit 1	AS-Interface output bit DO1	CCW operation/stop
9756.1, bit 2	AS-Interface output bit DO2	Speed f2/speed f1
9756.1, bit 3	AS-Interface output bit DO3	Reset/controller enable
9756.1, bit 8	AS-Interface output bit PO0	Parameter bit 1
9756.1, bit 9	AS-Interface output bit PO1	Parameter bit 2
9756.1, bit 10	AS-Interface output bit PO2	Parameter bit 3
9756.1, bit 11	AS-Interface output bit PO3	Parameter bit 4

In conjunction with AS-Interface double slave GLK31A:

The parameters are used as AS-Interface bus monitor. They indicate the transmission of AS-Interface bits from and to the DRC inverter. The meaning of the AS-Interface data bits depends on the selected function module (see chapter "Function modules").

Index	AS-Interface bit	Meaning
9756.1, bit 0	AS-Interface output bit DO0	Depending on the selected function module
9756.1, bit 1	AS-Interface output bit DO1	
9756.1, bit 2	AS-Interface output bit DO2	
9756.1, bit 3	AS-Interface output bit DO3	
9756.1, bit 8	AS-Interface output bit PO0	
9756.1, bit 9	AS-Interface output bit PO1	
9756.1, bit 10	AS-Interface output bit PO2	
9756.1, bit 11	AS-Interface output bit PO3	

AS-Interface input bit index 9866.1, bits 0 – 3 and index 9756.1, bits 6 – 7

In conjunction with AS-Interface binary slave GLK30A:

The parameters are used as AS-Interface bus monitor. They indicate the transmission of AS-Interface bits from and to the DRC inverter.

The following table shows the assignment of the AS-Interface input bits:

Index	AS-Interface bit	Meaning
9866.1, bit 0	AS-Interface input bit DI0	Ready signal
9866.1, bit 1	AS-Interface input bit DI1	Automatic/manual mode
9756.1, bit 6	AS-Interface input bit DI2	Sensor output 1
9756.1, bit 7	AS-Interface input bit DI3	Sensor output 2

In conjunction with AS-Interface double slave GLK31A:

The parameters are used as AS-Interface bus monitor. They indicate the transmission of AS-Interface bits from and to the DRC inverter. The meaning of the AS-Interface data bits depends on the selected function module (see chapter "Function modules").

Index	AS-Interface bit	Meaning
9866.1, bit 0	AS-Interface input bit DI0	Depending on the selected function module
9866.1, bit 1	AS-Interface input bit DI1	
9866.1, bit 2	AS-Interface input bit DI2	
9866.1, bit 3	AS-Interface input bit DI3	

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 deactivate the mechanical control elements 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	Deactivating switch f2	Bit not set:	Switch f2 active
		Bit set:	Switch f2 not active Setting the setpoint and the minimum speed using parameters
15	Deactivating 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 rpm.

In conjunction with AS-Interface double slave GLK31A, the parameter is used to set the acceleration ramp for function modules 1, 5, 7 of the double slave.

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 rpm.

In conjunction with AS-Interface double slave GLK31A, the parameter is used to set the deceleration ramp for function modules 1, 5, 7 of the double slave.

Ramp t15 up index 10504.1

Only in conjunction with AS-Interface double slave GLK31A:

Use this parameter to set acceleration ramp "t15 up" (depending on which function module is active).

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

The ramp times refer to a setpoint step change of Δn = 3000 rpm.

Ramp t15 down index 10504.11

Only in conjunction with AS-Interface double slave GLK31A:

Use this parameter to set deceleration ramp "t15 down" (depending on which function module is active).

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

The ramp times refer to a setpoint step change of Δn = 3000 rpm.

Ramp t16 up index 10475.2

Only in conjunction with AS-Interface double slave GLK31A:

Use this parameter to set acceleration ramp "t16 up" (depending on which function module is active).

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

The ramp times refer to a setpoint step change of Δn = 3000 rpm.

Ramp t16 down index 10475.1

Only in conjunction with AS-Interface double slave GLK31A:

Use this parameter to set deceleration ramp "t16 down" (depending on which function module is active).

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

The ramp times refer to a setpoint step change of Δn = 3000 rpm.

Command PCB parameters \ setpoints/ramp generators \ setpoints

Setpoint n_f1 index 10096.35

Use this parameter to set setpoint "n_f1".

- Unit: [rpm]
- Setting range: 0 – 1500 – 2000 rpm

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"
- the signal "0" is present at terminal f1 / f2.

Setpoint n_f2 index 10096.36

Use this parameter to set setpoint "n_f2".

- Unit: [rpm]
- Setting range: 0 – 200 – 2000 rpm

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"
- the signal "1" is present at terminal f1 / f2.

Scaling factor 0 – 15 index 15500.0 – 15515.0

Only in conjunction with AS-Interface binary slave GLK30A:

Use these parameters to set the scaling factors.

The scaling factors are factors of the setpoint speed. The setpoint scaling affects only the setpoint set using setpoint potentiometer f1.

The current scaling factor is determined by the parameter bits, see chapter "Setpoint scaling via parameter bits".

Active scaling factor index 8967.0

Only in conjunction with AS-Interface binary slave GLK30A:

The parameter indicates the current scaling factor for the setpoint speed.

Command PCB parameters \ setpoints/ramp generators \ fixed setpoints

Fixed setpoint n0 – n5 index 8489.0 – 8491.0, 10096.31, 10096.38, 10096.39

Only in conjunction with AS-Interface double slave GLK31A:

Use these parameters to set fixed setpoints n0 – n5 (depending on which function module is active).

The sign of the fixed setpoint and the function selected at outputs DO0 – DO3 determine the direction of rotation of the motor.

Sign of the fixed setpoint (n0 – n5)	Selected function (DO0 – DO3)	Direction of rotation Drive
Positive (n > 0)	Clockwise rotation	Clockwise rotation
Positive (n > 0)	Counterclockwise rotation	Counterclockwise rotation
Negative (n < 0)	Clockwise rotation	Counterclockwise rotation
Negative (n < 0)	Counterclockwise rotation	Clockwise rotation

8.3.3 Terminal assignment

Command PCB parameters \ terminal assignment \ digital outputs

Digital output DO01

For digital output DO01, see power section parameters.

8.3.4 Unit functions

Command pcb parameters \ unit 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 DIP switches t1 / f2 or setpoint potentiometer f1 are reset to their factory setting 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.

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: [rpm]
- Resolution +/– 0.2 rpm

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 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]

Unit utilization
index 8730.0

The parameter indicates the unit utilization Ixt:

- Unit: [%]

Heat sink temperature index 8327.0

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

- Unit: [°C]

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 \ unit 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

Error and error code index 9702.5

The parameter indicates a pending error with error number in plain text.

Error and suberror code index 10071.1

The parameter provides detailed information on the error of an error group.

Error source index 10404.5

The parameter indicates the error source of a pending error:

- 0 = No error
- 1 = Power section
- 2 = Command PCB

Operating hours index 8328.0

The parameter indicates the total number of hours for which the inverter has been connected to the supply system 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 \ unit data

Unit series index
9701.10

The parameter indicates the unit series, for example "DRC".

Variant ID index
9701.11

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

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

The parameter indicates the type designation of the power section.

Unit variant index
10204.2

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

- DBC = Direct Binary Communication
- DAC = Direct AS-Interface Communication
- DSC = Direct SBus Communication
- SNI = Single Line Network Installation

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

The parameter is used to indicate and enter the unit 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.

Nominal unit current (rms)
index 8361.0

The parameter indicates the nominal unit 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.

Power section parameters \ Display values \ Error memory 0-4 \ Error memory t-0–4

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

Programmable error responses: see chapter "Unit functions/error monitoring".

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

- State of digital inputs / digital outputs
- Actual speed
- Apparent output current
- Active current
- Unit utilization
- Motor utilization
- DC link voltage
- Power section status
- Operating hours
- Enable hours
- Work
- Heat sink temperature
- Motor temperature
- Electronics temperature

Error t-0 – 4 error code index 8366.0, 8367.0, 8368.0, 8369.0, 8370.0

The parameter shows the error group with error number and in plain text.

Error t-0 – 4 sub-error code index 10072.1, 10072.2, 10072.3, 10072.4, 10072.5

The parameter provides detailed information on the error of an error group.

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

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

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

The parameter indicates the error source:

- 0 = No error
- 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 error.

- Unit [rpm]

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 unit current at the time of the error.

- 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 unit current at the time of the error.

- Unit [%]

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

The parameter indicates the unit utilization Ixt at the time of the error.

- 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 the motor model and the current at the time of the error.

- 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 at the time of the error.

- 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 error:

- 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

Operating 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 supply system at the time of the error.

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

Enable 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 error.

- 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 error.

- 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 error.

- 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 error.

- Unit: [°C]

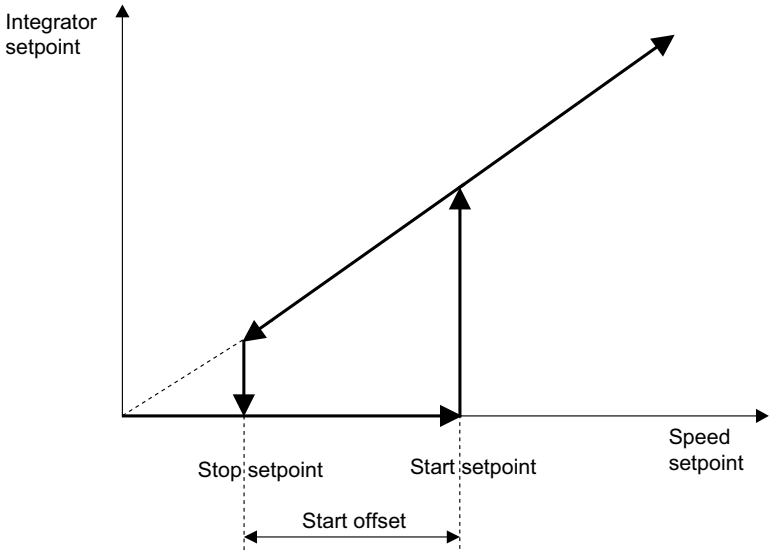
8.4.2 setpoints/ramp generators

Power section parameters \ setpoints/ramp generators \ setpoint monitoring

Setpoint stop function index 8578.0; stop setpoint index 8579.0; start offset index 8580.0

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

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



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 power failure or an error (parameterizable error 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 an error (parameterizable error responses).

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

Ramp monitoring 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/ramp generators \ motor potentiometer

Ramp t3 up/down index 8486.0, 8467.0

These parameters are used to set ramp t3:

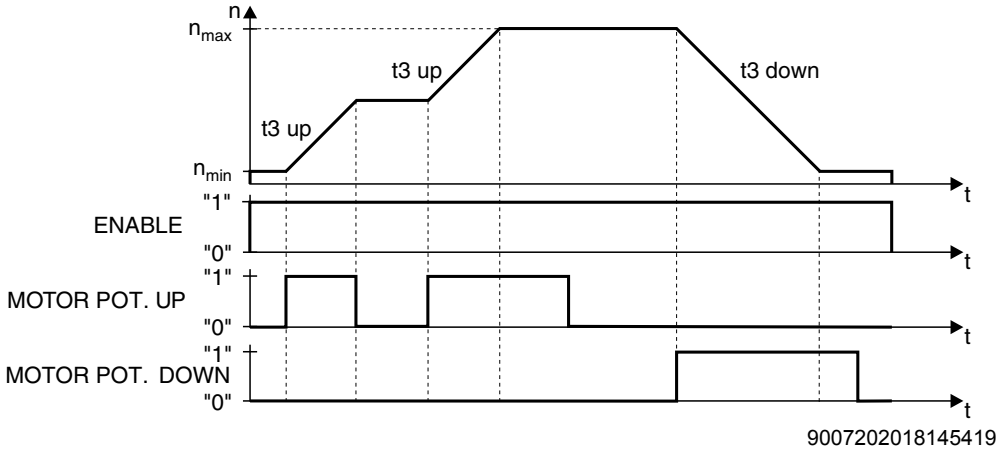
- Unit: [s]
- Setting range: 0.2 – <u>20</u> – 2000 s

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 step change of △n = 3000 rpm.

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.
- <u>OFF:</u> Following power off/power on or after withdrawal of the enable signal, the inverter starts with minimum speed index 8516.0.



8.4.3 Drive data

Power section parameters \ drive data \ <u>motor parameters</u>

Operating mode index 8574.0

The parameter indicates the set operating mode:

- <u>16 = Servo</u>
- 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 via DIP switches. The cycle frequency can change automatically depending on the unit utilization:

- <u>0 = 4 kHz</u>
- 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 "Unit functions/error monitoring".

Speed monitoring index 8557.0

This parameter is used to activate speed monitoring.

Setting range:

- OFF
- MOTOR MODE
- REGENERAT. MODE
- MOTOR / REGENERATIVE

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 unit assumes that the torque has reached its maximum and the desired speed cannot be reached. The speed monitoring function trips if this state persists for the specified delay time (index 8558.0).

Delay time for speed monitoring index 8558.0

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

- Setting range: 0 – 1 – 10 s

The set current limit can be reached briefly during acceleration, deceleration, or load peaks. You can prevent the 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 rpm

Minimum speed index 8517.0

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

- Setting range: 0 – 2000 rpm

If $n_{min} > n_{max}$ 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 user specifies the current limit in % IN based on the continuous apparent current of the power section. The actually effective current limit calculated by the unit 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. It 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 status of digital output DO01.

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" status while the unit 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	Ready for operation
3 = Output stage ON	Unit inhibited	Unit enabled and motor energized
4 = Rotating field ON	No rotating field	Rotating field
5 = Brake released[1)]	**In conjunction with mechatronic MOVIGEAR® drive unit:** DynaStop® is activated	**In conjunction with mechatronic MOVIGEAR® drive unit:** DynaStop® is deactivated
	In conjunction with DRC electronic motor: Brake applied	**In conjunction with DRC electronic motor:** Brake released

Function	Digital output has	
	"0" signal	"1" signal
6 = Brake applied[1]	**In conjunction with mechatronic MOVIGEAR® drive unit:** DynaStop® is deactivated	**In conjunction with mechatronic MOVIGEAR® drive unit:** DynaStop® is activated
	In conjunction with DRC electronic motor: Brake released	**In conjunction with DRC electronic motor:** Brake applied
7 = Motor standstill	Motor is running	Motor is at standstill
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	$n <> n_{set}$ ($n = n_{set}$)	$n = n_{set}$ ($n <> n_{set}$)
12 = Current reference signal	$I > I_{ref}$ ($I < I_{ref}$)	$I < I_{ref}$ ($I > I_{ref}$)
13 = Imax signal	$I < I_{max}$ ($I = I_{max}$)	$I = I_{max}$ ($I < I_{max}$)
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

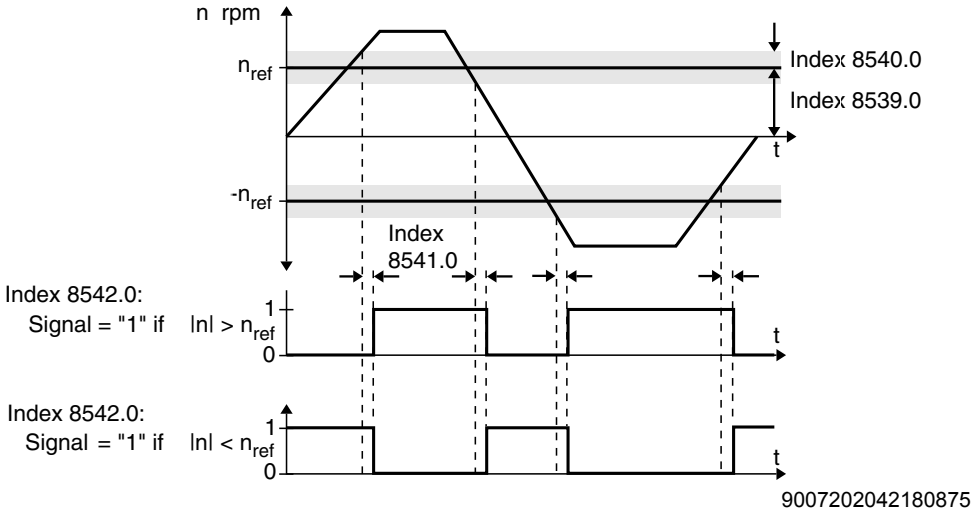
The following reference values are used for detecting and reporting certain operating states. All signals of this parameter group can be output via virtual digital outputs.

INFORMATION

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

Speed reference signal

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



Speed reference value index 8539.0

Setting range: 0 – <u>1500</u> – 6000 rpm

Hysteresis index 8540.0

Setting range: 0 – <u>100</u> – 500 rpm

Delay time index 8541.0

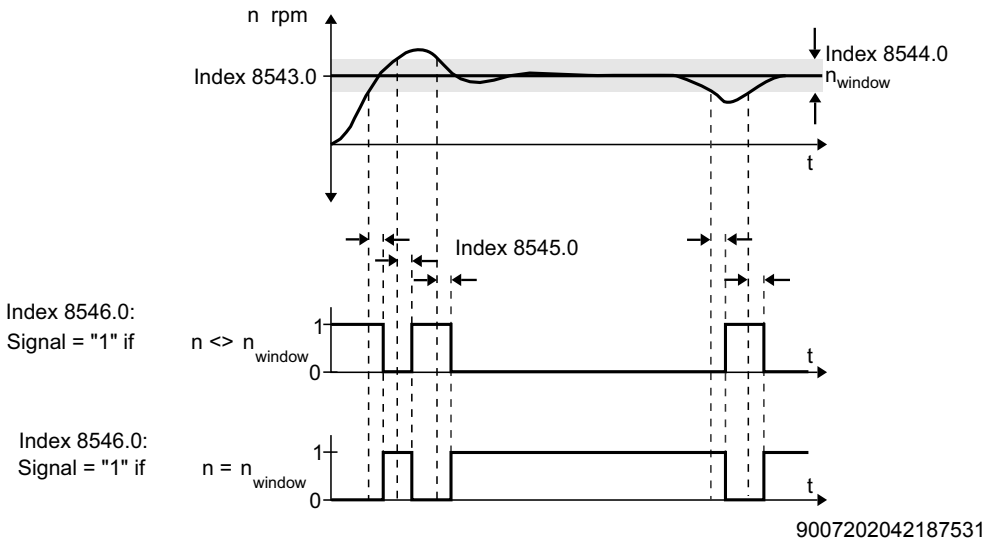
Setting range: 0 – <u>1</u> – 9 s

Signal = "1" if: Index 8542.0

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

Speed window signal

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



Window center index 8543.0

Setting range: 0 – <u>1500</u> – 6000 rpm

Range width index 8544.0

Setting range: <u>0</u> – 6000 rpm

Delay time index 8545.0

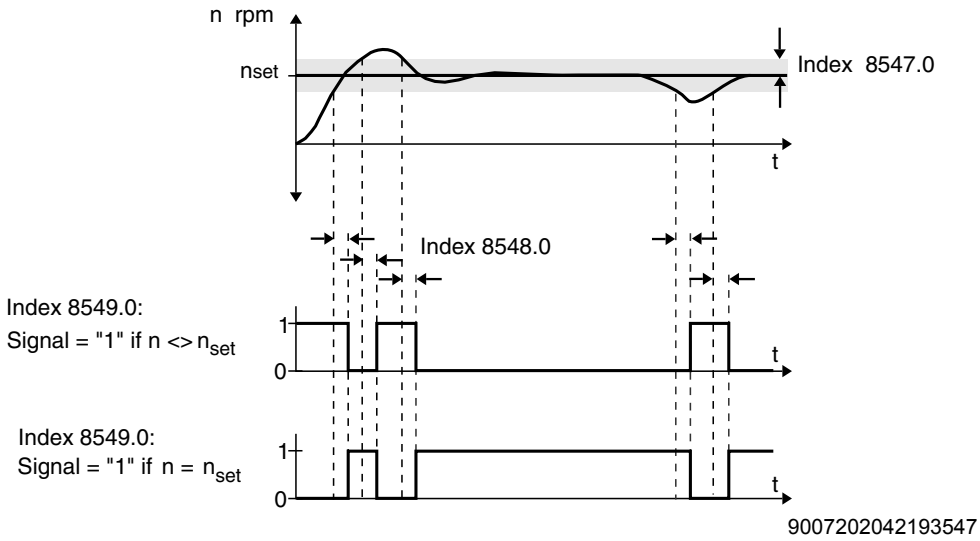
Setting range: 0 – <u>1</u> – 9 s

Signal = "1" if: Index 8546.0

Setting range:<u>WITHIN</u> / OUTSIDE

Speed setpoint / actual value comparison

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



Hysteresis index 8547.0

Setting range: 1 – <u>100</u> – 300 rpm

Delay time index 8548.0

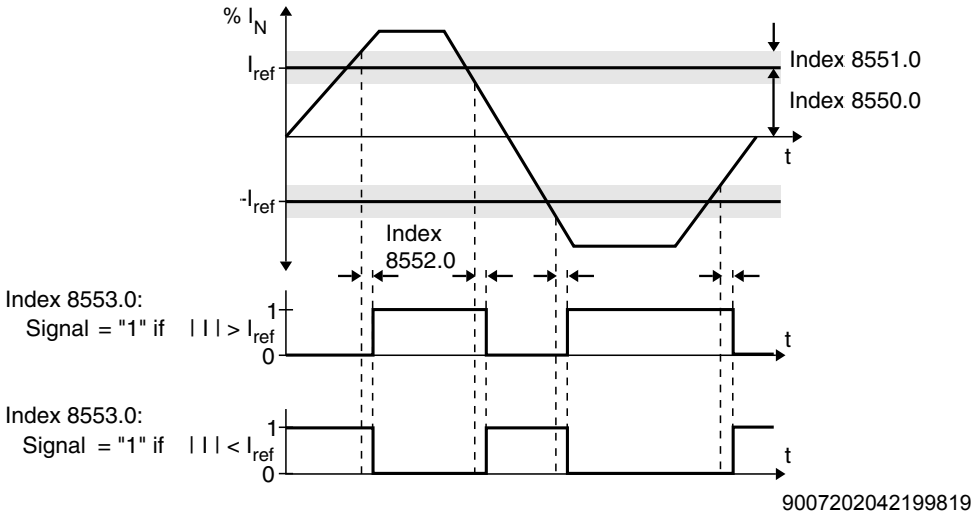
Setting range: 0 – <u>1</u> – 9 s

Signal = "1" if: Index 8549.0

Setting range: <u>n = n_{setpt}</u> / n <> n_{setpt}

Current reference signal

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



Current reference value index 8550.0

Setting range: 0 – <u>100</u> – 400 % I_N

Hysteresis index 8551.0

Setting range: 0 – <u>5</u> – 30 % I_N

Delay time index 8552.0

Setting range: 0 – <u>1</u> – 9 s

Signal = "1" with index 8553.0

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

Imax signal

Signal if the inverter has reached the current limitation.

Hysteresis index 8554.0

Setting range: <u>5</u> – 50 % I_N

Delay time index 8555.0

Setting range: 0 – <u>1</u> – 9 s

Signal = "1" with index 8556.0

<u>I < I_{max}</u> / I = I_{max}

8.4.6 Control functions

Power section parameters \ control functions \ brake functions

Brake function index 8584.0

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

INFORMATION

- The brake is **always** applied when /CONTROL.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".

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

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.

INFORMATION

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

8.4.7 Unit functions

Power section parameters \ unit functions \ setup

Factory setting index 8594.0

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

Setting range:

- 0 = No
- 1 = Standard
- 2 = Delivery status

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

- IPOS program
- Speed control
- Limits
- Serial communication SBus 1
- Speed task 1 / 2
- Error 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 makes sense, for example, after the drive settings have been optimized. Index 8595.0 must be set to "OFF" to enable changes to parameters again.

INFORMATION

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

Power section parameters \ unit functions \ error monitoring

WARNING

Risk of injury if the drive unit starts up automatically.

Severe or fatal injuries.

- Error messages can be automatically reset depending on the programmed error response, i.e. the drive units receive the current process output data from the controller again as soon as the error is corrected.
  If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the supply system before correcting the error.

The following responses can be programmed:

Response	Description
[0] NO RESPONSE	The error is not displayed, and there is no error response. The signaled error is ignored.

Response	Description
[1] DISPLAY ONLY	The error is displayed and the error output is set (if programmed). The unit performs no other error responses. The error can be reset (fieldbus, auto reset).
[2] OUTPUT STAGE INHIBIT / LOCKED	The inverter switches off immediately and issues an error message. The output stage is inhibited and the brake (if installed) is applied. The ready signal is revoked and the error output is set, if programmed. A restart is only possible after an error reset during which the inverter is reinitialized.
[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 error is signaled immediately. The ready signal is revoked and the error output is set, if programmed. A restart is only possible after an error reset during which the inverter is reinitialized.
[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 error is signaled immediately. The ready signal is revoked and the error output is set, if programmed. A restart is only possible after an error reset during which the inverter is reinitialized.
[5] OUTPUT STAGE INHIBIT / WAITING	The inverter switches off immediately and issues an error message. The output stage is inhibited and the brake (if installed) is applied. The error is signaled via the terminal, if programmed. The ready signal is removed. The drive restarts without unit re-initialization if the error is rectified by an internal procedure or by an error reset.
[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 error is signaled immediately. The error is signaled via the terminal, if programmed. The ready signal is removed. The drive restarts without unit re-initialization if the error is rectified by an internal procedure or by an error 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 error is signaled immediately. The error is signaled via the terminal, if programmed. The ready signal is removed. The drive restarts without unit re-initialization if the error is rectified by an internal procedure or by an error reset.

Response ext. error index 9729.16

Factory setting: EMERGENCY STOP / WAITING

The error is only triggered in the ENABLED inverter status. Index 9729.16 is used to program the error response that is triggered by an input terminal that is programmed to "/EXT. ERROR".

Line phase failure response 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 if 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 unit.

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.

Temperature sensor trip response index 9729.9

Factory setting: EMERGENCY STOP / WAITING

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

Manual reset index 8617.0

Setting range: YES / NO

YES: The pending error 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 error present.

NO: No reset.

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

Scaling factor for user display 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".

Scaling factor for user display 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".

User-defined unit index 8772.0, 8773.0

Factory setting: rpm.

Max. 8 ASCII characters; displayed in "index 8501.0 user display".

9 Communication with AS-Interface double slave GLK31A

9.1 Functional description

9.1.1 Operating principle

An AS-Interface master according to AS-Interface specification 3.0, rev. 2 in conjunction with the M4 master profile is required for controlling the GLK31A double slave.

On delivery, the GLK31A option has address 0 and profile S-7.A.7.7. If you set an address > 0, the GLK31A option turns into a double slave with profiles S-7.A.7.7 (A-slave) and S-7.A.7.5 (B-slave).

You must not connect more than 31 of those slaves to one AS-Interface branch.

9.1.2 A-slave, meaning of the AS-Interface data and parameter bits

The AS-Interface master transmits data bits and parameter bits to the GLK31A option (A-slave). The GLK31A option forwards 4 data bits and 3 parameter bits via SBus communication to the DRC inverter without interpretation.

The DRC inverter contains several function modules (assignment tables) that assign specific drive functions to the data bits. For information on the assignment of functions, refer to chapter "Function modules".

Parameter bits

- 3 of the acyclic parameter bits (P2 – P0) are used for switching between the individual function modules. These parameter bits determine the meaning of the data bits.
- In the extended address mode, the fourth parameter bit is not available for the user.
- Parameter selection between the function modules is also possible during operation and with enabled DRC inverter. The meaning of the data bits might change in this case.
- The parameter input bits are not used.

Data bits

The following table show the assignment of the digital input data bits of the A-slave (cycle time: max 10 ms):

Parameter bits (A-slave)		**Function of the input data bits (A-slave)**			
(P2 P1 $P0_{bin}$)	**Function module**	**Bit 4 (DI3)**	**Bit 3 (DI2)**	**Bit 2 (DI1)**	**Bit 1 (DI0)**
010_{bin} – 111_{bin}	2_{hex} – 7_{hex} (2hex + 6hex = reserved)	Status Sensor 2	Status Sensor 1	DRC status according to chapter "Description of data bits, function modules"	
000_{bin} – 001_{bin}	0_{hex} – 1_{hex} (0hex = reserved)	DRC status according to chapter "Description of data bits, function modules"			

Parameter bits P2 – P0 are used for selecting the function modules.

- When function modules 2_{hex} – 7_{hex} are selected, data bits DI0 and DI1 are transmitted from the slave to the master according to the DRC status word. Data bits DI2 and DI3 contain the state of sensor inputs DI2 and DI3.
- When function modules 0_{hex} – 1_{hex} are selected, all 4 data bits DI0 – DI3 are transmitted from the slave to the master according to the DRC status word. The state of the sensor inputs is not transmitted.

9.1.3 Function of the B-slave

The B-slave is used to transmit various status and control words between the AS-Interface master and the DRC inverter.

The use of serial AS-Interface data transmission (analog profile) makes it possible to write and read DRC parameters and display values.

- According to profile S-7.A.F.5, the AS-Interface master acyclically transmits several data bytes to the GLK31A option (B-slave).
- The microcontroller of the GLK31A option processes these signals and transmits them according to the MOVILINK® protocol (parameter telegram) via the SBus interface of the inverter.
- The DRC inverter transmits the response telegram to the GLK31A option via the SBus interface.
- The GLK31A option converts the response telegram and transmits it to the AS-Interface master via serial AS-Interface data transmission (analog profile).

For communication via the SBus interface, the acyclical parameter transmission of the B-slave has a higher priority than the cyclical control word of the A-slave. Due to the cycle time on the AS-Interface, at least one process data protocol is performed between the parameter transmissions.

Communication via the B-slave is always performed acyclically. Transmission of parameters via the internal SBus interface requires a corresponding parameter call of the AS-Interface master in conjunction with a higher-level controller.

9.2 Function modules

The drive-specific functions of the cyclic data bits are assigned in the DRC inverter. This chapter describes this function assignment.

The AS-Interface parameter bits P2 – P0 are used for switching between the drive functions. They determine the meaning of the data bits. Switching between the function modules is also possible during operation and with enabled DRC inverter. The meaning of the data bits might change in this case.

9.2.1 Description of parameter bits

The following table shows the function assignment of the data bits to the selected function module (AS-Interface parameter bits).

AS-Interface parameter bits (A-slave)		Function of the data bits
(P2 P1 $P0_{bin}$)	Function module	
111_{bin}	7_{hex}	Binary mode (default), control compatible with SEW binary slave
110_{bin}	6_{hex}	Reserved
101_{bin}	5_{hex}	6 fixed setpoints with the ramps t11 up and t11 down Status reports Ramp switchover between the function modules 4_{hex} and 5_{hex}
100_{bin}	4_{hex}	6 fixed setpoints with the ramps t15 up and t15 down Status reports Ramp switchover between the function modules 5_{hex} and 4_{hex}
011_{bin}	3_{hex}	3 fixed setpoints with the ramps t16 up and t16 down 3 fixed setpoints with the ramps t15 up and t15 down
010_{bin}	2_{hex}	Reserved
001_{bin}	1_{hex}	6 fixed setpoints with the ramps t11 up and t11 down Extended diagnostics No sensor inputs
000_{bin}	0_{hex}	Reserved

- When function modules 2_{hex} – 7_{hex} are selected, data bits DI0 and DI1 are transmitted from the slave to the master according to the DRC status word. Data bits DI2 and DI3 contain the state of sensor inputs DI2 and DI3.
- When function modules 0_{hex} – 1_{hex} are selected, all 4 data bits DI0 – DI3 are transmitted from the slave to the master according to the DRC status word. The state of the sensor inputs is not transmitted.

INFORMATION

If the AS-Interface master selects the parameter bits with a reserved function, the DRC drive changes to "Stop".

There is no feedback in this case. This is why all the input data in the DRC status word is set to "0" (not ready).

9.2.2 Description of the data bits, function modules

Function module 7_{hex}

The cyclic operation with the function module 7_{hex} represents a function compatible with the SEW binary slave (without scaling function).

The GLK31A option is like an I/O module with 4 input and 4 output data bits.

The DRC drive is controlled via output data bits.

The output and input data bits of the A-slave are assigned the following functions:

Output data AS-Interface master → GLK31A option **Function module 7_{hex} (AS interface parameter bits = 111_{bin})**	
Data bit (A-slave)	**Function**
DO0	CW / stop
DO1	CCW / stop
DO2	Setpoint changeover f1/f2
DO3	Reset[1] / controller enable

1) In the event of an edge change "0" → "1" (only effective in case of an error)

Input data GLK31A option → AS-Interface master **Function module 7_{hex} (AS interface parameter bits = 111_{bin})**	
Data bit (A-slave)	**Function**
DI0	Ready signal 0: Drive is not ready for operation 1: Drive is ready for operation
DI1	Manual mode, local mode / automatic mode 0: Drive controlled via AS-Interface 1: Drive controlled manually / via local mode
DI2	Sensor input 1 0: Signal of sensor 1 = "0" 1: Signal of sensor 1 = "1"
DI3	Sensor input 2 0: Signal of sensor 2 = "0" 1: Signal of sensor 2 = "1"

Function module 5_{hex}

The cyclic operation with function module 5_{hex} allows for selecting 6 fixed setpoints with ramps t11 up and t11 down.

The output data bits are binary coded and interpreted as 16 different control codes.

The output and input data bits of the A-slave are assigned the following functions:

Output data AS-Interface master → GLK31A option

Function module 5_{hex} (AS interface parameter bits = 101_{bin})

Data bit (A-slave)		Function		
0000_{bin}	0_{dec}	Stop		Stop ramp t13 (*8476.0*)
0001_{bin}	1_{dec}	Stop/inhibit		Ramp t11 down (*8808.0)*
0010_{bin}	2_{dec}	CW operation,	fixed setpoint n0 (*8489.0*)	Ramps t11 up (8807.0), t11 down (*8808.0)*
0011_{bin}	3_{dec}	CCW operation,	fixed setpoint n0 (*8489.0*)	Ramps t11 up (8807.0), t11 down (8808.0)
0100_{bin}	4_{dec}	CW operation,	fixed setpoint n1 (*8490.0*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
0101_{bin}	5_{dec}	CCW operation,	fixed setpoint n1 (*8490.0*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
0110_{bin}	6_{dec}	CW operation,	fixed setpoint n2 (*8491.0*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
0111_{bin}	7_{dec}	CCW operation,	fixed setpoint n2 (*8491.0*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
1000_{bin}	8_{dec}	CW operation,	fixed setpoint n3 (*1096.31*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
1001_{bin}	9_{dec}	CCW operation,	fixed setpoint n3 (*1096.31*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
1010_{bin}	10_{dec}	CW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
1011_{bin}	11_{dec}	CCW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
1100_{bin}	12_{dec}	CW operation,	fixed setpoint n5 (*10096.39*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
1101_{bin}	13_{dec}	CCW operation,	fixed setpoint n5 (*10096.39*)	Ramps t11 up (*8807.0*), t11 down (*8808.0)*
1110_{bin}	14_{dec}	**In conjunction with mechatronic MOVIGEAR® drive unit:** Deactivating DynaStop® without drive enable (only if DIP switch S1/2 = "ON")		
		In conjunction with DRC electronic motor: Brake release without drive enable (only if DIP switch S1/2 = "ON")		
1111_{bin}	15_{dec}	Stop Reset (only effective in case of an error)		Stop ramp t13 (*8476.0*)

Input data GLK31A option → AS-Interface master

Function module 5_{hex} (AS interface parameter bits = 101_{bin})

Data bit (A-slave)	Function
DI0	Ready signal 0: Drive is not ready for operation 1: Drive is ready for operation
DI1	Enable 0: Motor not running 1: Motor is running
DI2	Sensor input 1 0: Signal of sensor 1 = "0" 1: Signal of sensor 1 = "1"
DI3	Sensor input 2 0: Signal of sensor 2 = "0" 1: Signal of sensor 2 = "1"

Function module 4_{hex}

The cyclic operation with function module 4_{hex} allows for selecting 6 fixed setpoints with ramps t15 up and t15 down.

This operation is identical to the operation with function module 5_{hex}, however, ramps t15 up and t15 down are used.

This means switching between function modules 4_{hex} and 5_{hex} realizes a switching between the ramps during operation. This ramp switchover can be used for a load-dependent optimization of the application.

The output and input data bits of the A-slave are assigned the following functions:

Output data AS-Interface master → GLK31A option

Function module 4_{hex} (AS interface parameter bits = 100_{bin})

Data bit (A-slave)		Function		
0000_{bin}	0_{dec}	Stop		Stop ramp t13 (*8476.0*)
0001_{bin}	1_{dec}	Stop/inhibit		Ramp t15 down (*10504.11*)
0010_{bin}	2_{dec}	CW operation,	fixed setpoint n0 (*8489.0*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
0011_{bin}	3_{dec}	CCW operation,	fixed setpoint n0 (*8489.0*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
0100_{bin}	4_{dec}	CW operation,	fixed setpoint n1 (*8490.0*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
0101_{bin}	5_{dec}	CCW operation,	fixed setpoint n1 (*8490.0*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
0110_{bin}	6_{dec}	CW operation,	fixed setpoint n2 (*8491.0*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
0111_{bin}	7_{dec}	CCW operation,	fixed setpoint n2 (*8491.0*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1000_{bin}	8_{dec}	CW operation,	fixed setpoint n3 (*1096.31*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1001_{bin}	9_{dec}	CCW operation,	fixed setpoint n3 (*1096.31*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1010_{bin}	10_{dec}	CW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1011_{bin}	11_{dec}	CCW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1100_{bin}	12_{dec}	CW operation,	fixed setpoint n5 (*10096.39*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1101_{bin}	13_{dec}	CCW operation,	fixed setpoint n5 (*10096.39*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1110_{bin}	14_{dec}	**In conjunction with mechatronic MOVIGEAR® drive unit:** Deactivating DynaStop® without drive enable (only if DIP switch S1/2 = "ON")		
		In conjunction with DRC electronic motor: Brake release without drive enable (only if DIP switch S1/2 = "ON")		
1111_{bin}	15_{dec}	Stop Reset (only effective in case of an error)		Stop ramp t13 (*8476.0*)

Input data GLK31A option → AS-Interface master

Function module 4_{hex} (AS interface parameter bits = 100_{bin})

Data bit (A-slave)	Function
DI0	Ready signal 0: Drive is not ready for operation 1: Drive is ready for operation
DI1	Enable 0: Motor not running 1: Motor is running
DI2	Sensor input 1 0: Signal of sensor 1 = "0" 1: Signal of sensor 1 = "1"
DI3	Sensor input 2 0: Signal of sensor 2 = "0" 1: Signal of sensor 2 = "1"

Function module 3_{hex}

The cyclic operation with function module 3_{hex} allows for selecting 3 fixed setpoints with ramps t16 up and t16 down as well as 3 fixed setpoints with ramps t15 up and t15 down.

The output data bits are binary coded and interpreted as 16 different control codes.

The output and input data bits of the A-slave are assigned the following functions:

Output data AS-Interface master → GLK31A option **Function module 3_{hex} (AS interface parameter bits = 011_{bin})**				
Data bit (A-slave)		**Function**		
0000_{bin}	0_{dec}	Stop		Stop ramp t13 (*8476.0*)
0001_{bin}	1_{dec}	Stop/inhibit		Ramp t16 down (*10475.1*)
0010_{bin}	2_{dec}	CW operation,	fixed setpoint n0 (*8489.0*)	Ramps t16 up (*10475.2*), t16 down (*10475.1*)
0011_{bin}	3_{dec}	CCW operation,	fixed setpoint n0 (*8489.0*)	Ramps t16 up (*10475.2*), t16 down (*10475.1*)
0100_{bin}	4_{dec}	CW operation,	fixed setpoint n1 (*8490.0*)	Ramps t16 up (*10475.2*), t16 down (*10475.1*)
0101_{bin}	5_{dec}	CCW operation,	fixed setpoint n1 (*8490.0*)	Ramps t16 up (*10475.2*), t16 down (*10475.1*)
0110_{bin}	6_{dec}	CW operation,	fixed setpoint n2 (*8491.0*)	Ramps t16 up (*10475.2*), t16 down (*10475.1*)
0111_{bin}	7_{dec}	CCW operation,	fixed setpoint n2 (*8491.0*)	Ramps t16 up (*10475.2*), t16 down (*10475.1*)
1000_{bin}	8_{dec}	CW operation,	fixed setpoint n3 (*1096.31*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1001_{bin}	9_{dec}	CCW operation,	fixed setpoint n3 (*1096.31*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1010_{bin}	10_{dec}	CW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1011_{bin}	11_{dec}	CCW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1100_{bin}	12_{dec}	CW operation,	fixed setpoint n5 (*10096.39*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1101_{bin}	13_{dec}	CCW operation,	fixed setpoint n5 (*10096.39*)	Ramps t15 up (*10504.1*), t15 down (*10504.11*)
1110_{bin}	14_{dec}	Stop/inhibit		Ramp t15 down (*10504.11*)
1111_{bin}	15_{dec}	Stop Reset (only effective in case of an error)		Stop ramp t13 (*8476.0*)

Input data GLK31A option → AS-Interface master **Function module 3_{hex} (AS interface parameter bits = 011_{bin})**	
Data bit (A-slave)	**Function**
DI0	Ready signal 0: Drive is not ready for operation 1: Drive is ready for operation
DI1	Enable 0: Motor not running 1: Motor is running
DI2	Sensor input 1 0: Signal of sensor 1 = "0" 1: Signal of sensor 1 = "1"
DI3	Sensor input 2 0: Signal of sensor 2 = "0" 1: Signal of sensor 2 = "1"

Function module 1_{hex}

Cyclic operation with function module 1_{hex} allows for selecting 6 fixed setpoints and for extended error diagnostics.

The output data during the operation with function module 1_{hex} correspond to the output data during operation with function module 5_{hex}. The input data during operation with function module 1_{hex} are interpreted as different status codes.

Output data AS-Interface master → GLK31A option

Function module 1_{hex} (AS interface parameter bits = 001_{bin})

Data bit (A-slave)		Function		
0000_{bin}	0_{dec}	Stop		Stop ramp t13 (*8476.0*)
0001_{bin}	1_{dec}	Stop/inhibit		Ramp t11 down (*8808.0)*
0010_{bin}	2_{dec}	CW operation,	fixed setpoint n0 (*8489.0*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
0011_{bin}	3_{dec}	CCW operation,	fixed setpoint n0 (*8489.0*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
0100_{bin}	4_{dec}	CW operation,	fixed setpoint n1 (*8490.0*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
0101_{bin}	5_{dec}	CCW operation,	fixed setpoint n1 (*8490.0*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
0110_{bin}	6_{dec}	CW operation,	fixed setpoint n2 (*8491.0*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
0111_{bin}	7_{dec}	CCW operation,	fixed setpoint n2 (*8491.0*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
1000_{bin}	8_{dec}	CW operation,	fixed setpoint n3 (*1096.31*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
1001_{bin}	9_{dec}	CCW operation,	fixed setpoint n3 (*1096.31*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
1010_{bin}	10_{dec}	CW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
1011_{bin}	11_{dec}	CCW operation,	Fixed setpoint n4 (*10096.38*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
1100_{bin}	12_{dec}	CW operation,	fixed setpoint n5 (*10096.39*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
1101_{bin}	13_{dec}	CCW operation,	fixed setpoint n5 (*10096.39*)	Ramps t11 up (*8807.0)*, t11 down (*8808.0)*
1110_{bin}	14_{dec}	**In conjunction with mechatronic MOVIGEAR® drive unit:** Deactivating DynaStop® without drive enable signal (only when DIP switch S1/2 = "ON")		
		In conjunction with DRC electronic motor: Releasing the brake without drive enable signal (only when DIP switch S1/2 = "ON")		
1111_{bin}	15_{dec}	Stop Reset (only effective in case of an error)		Stop ramp t13 (*8476.0*)

Input data GLK31A option → AS-Interface master

Function module 1_{hex} (AS interface parameter bits = 001_{bin})

Data bit (A-slave)		Function	
0000_{bin}	0_{dec}	Not ready	
0001_{bin}	1_{dec}	Ready for operation – automatic mode	
0010_{bin}	2_{dec}	Ready – manual mode / local mode	
0011_{bin}	3_{dec}	Enable/motor running – automatic mode	
0100_{bin}	4_{dec}	Enable/motor running – manual mode / local mode	
0101_{bin}	5_{dec}	Reserved	
0110_{bin}	6_{dec}	Reserved	
0111_{bin}	7_{dec}	Reserved	
1000_{bin}	8_{dec}	Error, DC link voltage too high	Error code 07
1001_{bin}	9_{dec}	Phase failure error	Error code 06
1010_{bin}	10_{dec}	Error, overcurrent output stage	Error code 01
1011_{bin}	11_{dec}	Error, thermal overload output stage	Error code 11
1100_{bin}	12_{dec}	Error, thermal overload motor	Error code 84
1101_{bin}	13_{dec}	Error, thermal overload brake coil	Error code 89
1110_{bin}	14_{dec}	Speed monitoring error	Error code 08
1111_{bin}	15_{dec}	Other error	

9.3 Transmitting individual parameters via AS-Interface

9.3.1 MOVILINK® parameter channel

The MOVILINK® parameter channel enables access to all drive parameters of the DRC inverter regardless of the bus in use. It is also used for parameter access of the AS-Interface master to the DRC inverter via the GLK31A AS-Interface slave. The following figure shows the structure of the MOVILINK® parameter channel:

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The request and response frames of the MOVILINK® parameter channel have the same structure.

Addressing byte

The addressing byte specifies the MOVILINK® telegram destination, see also the "Parameters" chapter:

- 0: Command PCB
- 1: Power section

Management byte

Management byte 1 coordinates the parameterization process. It provides important service parameters of the executed service.

Management byte 1		
Bit	**Meaning**	**Value**
0 – 3	Service executed	0000_{bin} No service 0001_{bin} Read parameter 0010_{bin} Write parameter 0011_{bin} Write parameter volatile 0110_{bin} Read default
4 – 5	Length of data/error bytes	11_{bin} 4 bytes
6	Handshake bit	0: Not used for unit variants with GLK31A option
7	Status bit	0: No error while executing service 1: Error while executing service, see bytes 4 – 7

- Bits 0 – 3 specify the service to be executed.
- Bits 4 and 5 specify the data length of the write service.
- Handshake bit 6 is used as an acknowledgement bit for cyclic transmission. This bit is not used for the parameter transmission with the GLK31A option.
- Status bit 7 indicates whether the service was carried out properly or whether errors occurred.

Index addressing

Byte 2 / subindex, byte 3 / high index, and byte 4 / low index specify the parameter to be read or written via the parameter channel. The parameters of the inverter are addressed using the same index in all communication interfaces.

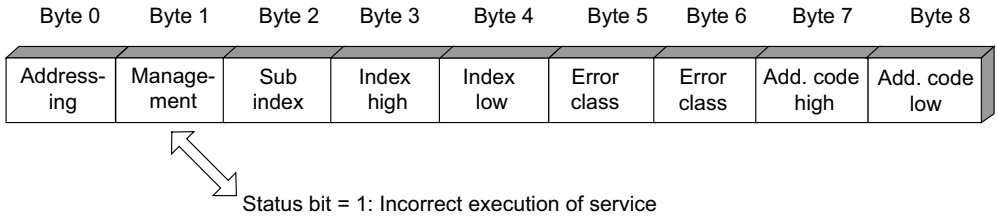
Data range

The data is located in bytes 5 – 8 of the MOVILINK® parameter channel. This means a maximum of 4 bytes per service can be transmitted across the parameter channel. The data is always right-justified. This means byte 8 contains the least significant data byte (LSB data) whereas byte 5 is the most significant data byte (MSB data).

Incorrect service execution

If an error occurs during service execution, status bit 7 in the management byte will be set to "1".

If status bit 7 signals an error, the error code is send back in structured form in the data range (bytes 5 – 8) of the response telegram.



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The following table shows the values and their meaning for the elements "Error Class", "Error Code", "Additional Code High" and "Additional Code Low":

Element	Value	Meaning/note
Error class	0x08	Error type according to EN 50170 For unit variants with GLK31A, the error class is = 0x08.
Error code	0x0	Error code For unit variants with GLK31A, the error code is = 0x00.
Additional code High:	0x0	For unit variants with GLK31A, the addition code low is = 0x00.
Additional code low:	0x00 / 0	No error
	0x10 / 16	Illegal index
	0x11 / 17	Function/parameter not implemented
	0x12 / 18	Read-only access
	0x13 / 19	Parameter lock activated
	0x15 / 21	Parameter value too high
	0x16 / 22	Parameter value too small
	0x1B / 27	Parameter protected against access
	0x1C / 28	Controller inhibit required to change the parameter.
	0x1D / 29	Invalid parameter value

9.3.2 CTT2 protocol via AS-Interface

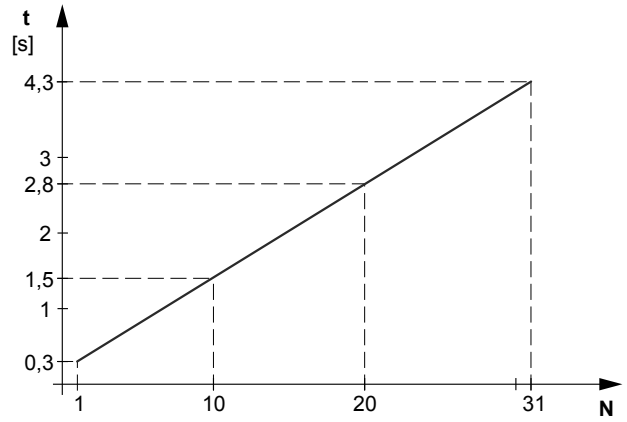
You can use the GLK31A double slave to exchange MOVILINK® parameters between an AS-Interface master and a DRC inverter.

The B-slave with slave profile S-7.A.F.5 uses the CTT2 protocol. For a description of the profile, refer to the appendix of the "Complete AS-Interface Specification Version 3.0, Revision 2, July 9, 2008".

Transmission time for a parameter

System-related transmission times occur during data exchange between the DRC B-slave and the AS-Interface master using the CTT2 protocol. These transmission times mainly depend on the number of slaves in the AS-Interface network.

The following diagram shows the connection between the transmission time for a MOVILINK® parameter and the number of AS-Interface slave addresses:



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t Transmission time for a parameter
N Number of AS-Interface slave addresses

SEW-EURODRIVE recommends to add a safety factor to those values.

Controlling the DRC inverter via the cyclical data bits of the A-slave continues even during the transmission of parameters of the B-slave.

CTT2 services

The GLK31A double slave supports the following acyclical services and the corresponding response telegrams of the CTT2 protocol:

Code		Service/ response telegram	Followed by	Recommended use
$0x10_{hex}$	16_{dec}	Read request	Index, length	Reading out: • Index "$0x00_{hex}$" = "ID object" • Index "$0x01_{hex}$" = "diagnosis"
$0x50_{hex}$	80_{dec}	Read response OK	Data	
$0x90_{hex}$	144_{dec}	Read response not OK	Standard error code	
$0x11_{hex}$	17_{dec}	Write request	Index, length, data	
$0x51_{hex}$	81_{dec}	Write response OK	–	
$0x91_{hex}$	145_{dec}	Write response not OK	Standard error code	
$0x1D_{hex}$	29_{dec}	Exchange request	Index Length when reading Length when writing Read data Written data	Parameterization DRC inverter • Index "$0x02_{hex}$" = "MOVILINK parameter channel"
$0x5D_{hex}$	93_{dec}	Exchange response OK	Read data	
$0x9D_{hex}$	157_{dec}	Exchange response not OK	Error object	

To check the communication between the AS-Interface master and the AS-Interface slave, SEW-EURODRIVE recommends to read out the "ID object" with the "Read request" service.

The indexes $0x00_{hex}$ "ID object" and $0x01_{hex}$ "Diagnosis" are only permitted in conjunction with the CTT2 service "Read request" $0x10_{hex}$.

For parameterization of the DRC inverter, use the "Exchange request" service.

Alternatively, you can use the "Write request" and "Read request" services for parameterization. However, you have to program fixed wait times when programming the higher-level controller to compensate for transmission times for parameters.

The following chapters describe the individual CTT2 services.

A prerequisite for the transmission of DRC parameters using CTT2 services is a basic knowledge of the CTT2 and MOVILINK® protocols.

Reading out an ID object

To check whether the communication between AS-Interface master and GLK31A option is error-free, read out the ID object using the "read request" service.

Select index $0x00_{hex}$ and length $0x06_{hex}$.

- If this service is properly transmitted to the double slave, the GLK31A double slave replies with the response telegram $0x50_{hex}$ "Read response OK" and the data.
- If errors occur, the GLK31A double slave sends the response telegram $0x90_{hex}$ "Read response not OK" (for error codes, refer to the AS-Interface specification).

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x00	0x06

Code 0x10 = Read request
Index 0x00 = ID object
Length 0X06 = Length of the ID object

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service						
Code	**Vendor ID High**	**Vendor ID Low**	**Device ID High**	**Device ID Low**	**Output/input**	**Firmware version**
0x50	0x00	0x0A	0x00	0x0A	0x00	0x01

Code 0x50 = Read response OK
Vendor ID high 0x00 = High value of the vendor ID
Vendor ID low 0x0A = Low value of the vendor ID
=> Vendor ID = $0x000A_{hex} = 10_{dec}$
Device ID high 0x00 = High value of the device ID
Device ID low 0x0A = Low value of the device ID
=> Device ID = $0x000A_{hex} = 10_{dec}$
Output/input 0x00 = No inputs and outputs
Firmware version 0x01

MOVILINK® parameter exchange with "Exchange request"

Executing the CTT2 service "Exchange request" 0x1D, the AS-Interface master sends a telegram with the DRC parameter data to the double slave and receives the response data immediately with the response telegram.

Select index $0x02_{hex}$ and length $0x09_{hex}$.

- If this service has been executed correctly, the GLK31A double slave sends the response telegram $0x5D_{hex}$ "Exchange response OK" and the read data.
- If errors occur, the GLK31A double slave sends the response telegram $0x9D_{hex}$ "Exchange response not OK" (for the error code, refer to the AS-Interface specification).
- If the response data of the DRC inverter are not available yet, the GLK31A double slave sends a response with error code "Busy" = "4" after the read access.

Example:

Changing the fixed setpoint value n4 (parameter *10096.38*) to 1000 rpm:

"Exchange request" service:

CTT2 service				MOVILINK® protocol								
Code	**Index**	**Read length**	**Write length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x1D	0x02	0x09	0x09	0x00	0x32	0x26	0x27	0x70	0x00	0x0F	0x42	0x40

Code 0x1D =	Exchange request
Index 0x02 =	MOVILINK® parameter service
Read length 0x09 =	Length of the MOVILINK® response
Write length 0x09 =	Length of the MOVILINK® request
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x26 =	Subindex of parameter fixed setpoint n4 (10096.38) 38_{dec} = 0x26
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written on the high index and low index bytes.
Data MSB 0x00 Data 0x0F Data 0x42 Data LSB 0x40	The internal scaling of the DRC inverter is 1000 times higher than the real scaling. The scaling factor then is 1 000 000_{dec} = 0xF4240. This value is written to the 4 data bytes.

The slave replies after the system-related transmission times for parameters.

"Exchange response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x5D	0x00	0x32	0x26	0x27	0x70	0x00	0x00	0x00	0x00

Code 0x5D =	Exchange request OK
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x26 =	Subindex of parameter fixed setpoint n4 (10096.38) 38_{hex} = 0x26
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written on the high index and low index bytes.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data value is 0_{dec} = 0x0

MOVILINK® parameter exchange with "Write request" and "Read request"

For the MOVILINK® parameter exchange, you can also use the "Write request" and "Read request" service instead of the recommended "Exchange request".

"Write request"

Execute the CTT2 service $0x11_{hex}$ "Write request" to read and write a DRC parameter.

Select index $0x02_{hex}$.

Select length $0x09_{hex}$. This is the length of a MOVILINK® frame in bytes.

- If this service is transmitted to the double slave correctly, the GLK31A double slave replies with the response telegram $0x51_{hex}$ "Read response OK".
- If an error occurs or if an incorrect index or length have been selected, the GLK31A double slave sends the response telegram $0x91_{hex}$ "Write response not OK" instead (for the error code, refer to the AS-Interface specification).

Example:

Changing the fixed setpoint value n4 (parameter *10096.38*) to 1000 rpm:

"Write request" service:

CTT2 service			MOVILINK® protocol								
Code	**Index**	**Length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x11	0x02	0x09	0x00	0x32	0x26	0x27	0x70	0x00	0x0F	0x42	0x40

Code 0x11 =	Write request
Index 0x02 =	MOVILINK® parameter service
Length 0x09 =	Length of the MOVILINK® protocol
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x26 =	Subindex of parameter fixed setpoint n4 (10096.38) 38_{dec} = 0x26
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written on the high index and low index bytes.
Data MSB 0x00 Data 0x0F Data 0x42 Data LSB 0x40	The internal scaling of the DRC inverter is 1000 times higher than the real scaling. The scaling factor then is 1 000 000_{dec} = 0xF4240. This value is written to the 4 data bytes.

The slave replies after the system-related transmission times for parameters.

"Write response OK" response telegram:

CTT2 service
Code
0x51

Code 0x51 =	Write response OK

"Read request"

Once the CTT2 service "Write request" has been executed correctly, you can use the service $0x10_{hex}$ "Read request" to call the response telegram of the CTT2 service previously executed.

Select index $0x02_{hex}$ and length $0x09_{hex}$.

- If this service is properly transmitted to the double slave, the GLK31A double slave replies with the response telegram $0x50_{hex}$ "Read response OK" and the data.
- If errors occur, the GLK31A double slave sends the response telegram $0x90_{hex}$ "Read response not OK" (for error codes, refer to the AS-Interface specification).
- If the response data of the DRC inverter are not available yet, the GLK31A double slave sends a response with error code "Busy" = "4" after the read access. The AS-Interface master must read the data again.

Example:

Request and OK response of the DRC inverter concerning the previous change of the fixed setpoint value n4 (parameter *10096.38*)

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x02	0x09

Code 0x10 =	Read request
Index 0x02 =	MOVILINK® parameter service
Length 0X09 =	Length of the MOVILINK® protocol

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x50	0x00	0x32	0x26	0x27	0x70	0x00	0x00	0x00	0x00

Code 0x50 =	Read response OK
Management 0x32 =	Write parameter => no MOVILINK® error
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Subindex 0x26 =	Subindex of parameter fixed setpoint n4 (10096.38) 38_{dec} = 0x26
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written on the high index and low index bytes.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data byte value is 0x0 = 0_{dec}

9.3.3 Using the "Exchange request" service (example)

This example illustrates how to change individual parameters of the DRC inverter using the CTT2 service "Exchange request" 0x1D. You can use this service as an alternative to the "Read request" and "Write request" services to read or write DRC parameters.

First, check the communication by reading out the "ID object" using the "Read request" service.

Next, all you have to do is execute a "Request" service. The AS-Interface response telegram 0x5D already includes the MOVILINK® response of the DRC inverter.

The following parameters of the DRC inverter are to be changed:

- Ramp t11 up and t11 down to 0.5 s
- Fixed setpoint value n0 to 1000 rpm

In addition, the heat sink temperature is to be read.

Checking the communication

Read out the ID object correctly to check proper communication between AS-Interface master and GLK31A.

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x00	0x06

Code 0x10 = Read request
Index 0x00 = ID object
Length 0X06 = Length of the ID object

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service						
Code	**Vendor ID High**	**Vendor ID Low**	**Device ID High**	**Device ID Low**	**Output/input**	**Firmware version**
0x50	0x00	0x0A	0x00	0x0A	0x00	0x01

Code 0x50 = Read response OK
Vendor ID high 0x00 = High value of the vendor ID
Vendor ID low 0x0A = Low value of the vendor ID
=> Vendor ID = $0x000A_{hex} = 10_{dec}$
Device ID high 0x00 = High value of the device ID
Device ID low 0x0A = Low value of the device ID
=> Device ID = $0x000A_{hex} = 10_{dec}$
Output/input 0x00 = No inputs and outputs
Firmware version 0x01

Deactivating mechanical control elements

You have to deactivate the mechanical control elements because the parameters of the DRC inverter are to be set via AS-Interface. To do so, write the value 65535_{dec} = 0xFFFF to parameter *10096.30*.

"Exchange request" service:

CTT2 service				MOVILINK® protocol								
Code	**Index**	**Read length**	**Write length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x1D	0x02	0x09	0x09	0x00	0x32	0x1E	0x27	0x70	0x00	0x00	0xFF	0xFF

Code 0x1D =	Exchange request
Index 0x02 =	MOVILINK® parameter service
Read length 0x09 =	Length of the MOVILINK® response
Write length 0x09 =	Length of the MOVILINK® request
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x1E =	Subindex of the parameter
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0xFF Data LSB 0xFF	The parameter must be set to 65535_{dec} = 0xFFFF to deactivate the mechanical control elements. This value is written to the 4 data bytes.

When the GLK31A double slave receives the service "Exchange request" 0x1D, it sends the MOVILINK® protocol to the DRC inverter. Once the DRC inverter receives the MOVILINK® response, the GLK31A double slave sends the response "Exchange response OK" to the AS-Interface master. This means another "Read request" service of the AS-Interface master is not required.

The slave replies after the system-related transmission times for parameters.

"Exchange response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x5D	0x00	0x32	0x1E	0x27	0x70	0x00	0x00	0x00	0x00

Code 0x5D =	Exchange request OK
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x1E =	Subindex of the parameter
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data value is 0_{dec} = 0x0

Setting ramp t11 up

Set the ramp time of ramp t11 up (parameter *8807.0*) to 0.5 s.

"Exchange request" service:

CTT2 service				MOVILINK® protocol								
Code	**Index**	**Read length**	**Write length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x1D	0x02	0x09	0x09	0x00	0x32	0x00	0x22	0x67	0x00	0x00	0x01	0xF4

Code 0x1D =	Exchange request
Index 0x02 =	MOVILINK® parameter service
Read length 0x09 =	Length of the MOVILINK® response
Write length 0x09 =	Length of the MOVILINK® request
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x22 =	High value of the index
Low index 0x67 =	Low value of the index => Index of parameter = = 8807_{dec} = $0x2267_{hex}$ The value $0x2267_{hex}$ is written to the high index and low index.
Data MSB 0x00 Data 0x00 Data 0x01 Data LSB 0xF4	Specify the ramp time of the DRC inverter in ms in order to set the ramp time to 0.5 s = 500 ms (500 ms $\triangleq$ 500_{dec} = 0x1F4). This value is written to the 4 data bytes.

When the GLK31A double slave receives the service "Exchange request" 0x1D, it sends the MOVILINK® protocol to the DRC inverter. Once the DRC inverter receives the MOVILINK® response, the GLK31A double slave sends the response "Exchange response OK" to the AS-Interface master. This means another "Read request" service of the AS-Interface master is not required.

The slave replies after the system-related transmission times for parameters.

"Exchange response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x5D	0x00	0x32	0x00	0x22	0x67	0x00	0x00	0x00	0x00

Code 0x5D =	Exchange request OK
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x22 =	High value of the index
Low index 0x67 =	Low value of the index => Index of parameter = 8807_{dec} = $0x2267_{hex}$ The value $0x2267_{hex}$ is written to the high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data value is 0_{dec} = 0x0

Setting ramp t11 down

Set the ramp time of ramp t11 down *(8808.0)* to 0.5 s. The ramp time for ramp t11 down is set in the same way as the ramp time for ramp t11 up.

Ramp t11 down has index 8808_{dec} = 0x2268 and subindex 0.

Setting the fixed setpoint n0

Set the fixed setpoint n0 (parameter *8489.0*) to 1000 rpm.

"Exchange request" service:

CTT2 service				MOVILINK® protocol								
Code	**Index**	**Read length**	**Write length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x1D	0x02	0x09	0x09	0x00	0x32	0x00	0x21	0x29	0x00	0x0F	0x42	0x40

Code 0x1D =	Exchange request
Index 0x02 =	MOVILINK® parameter service
Read length 0x09 =	Length of the MOVILINK® response
Write length 0x09 =	Length of the MOVILINK® request
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x21 =	High value of the index
Low index 0x29 =	Low value of the index => Index of parameter = 8489_{dec} = $0x2129_{hex}$ The value $0x2129_{hex}$ is written to bytes high index and low index.
Data MSB 0x00 Data 0x0F	The internal scaling of the DRC inverter is 1000 times higher than the real scaling.
Data 0x42	The scaling factor then is 1 000 000_{dec} = 0xF4240.
Data LSB 0x40	This value is written to the 4 data bytes.

When the GLK31A double slave receives the service "Exchange request" 0x1D, it sends the MOVILINK® protocol to the DRC inverter. Once the DRC inverter receives the MOVILINK® response, the GLK31A double slave sends the response "Exchange response OK" to the AS-Interface master. This means another "Read request" service of the AS-Interface master is not required.

The slave replies after the system-related transmission times for parameters.

"Exchange response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x5D	0x00	0x32	0x00	0x21	0x29	0x00	0x00	0x00	0x00

Code 0x5D =	Exchange request OK
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x21 =	High value of the index
Low index 0x29 =	Low value of the index => Index of parameter = 8489_{dec} = $0x2129_{hex}$ The value $0x2129_{hex}$ is written to bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data value is 0_{dec} = 0x0

Reading out the heat sink temperature

Read the heat sink temperature from parameter *8327.0* as follows:

"Exchange request" service:

CTT2 service				MOVILINK® protocol								
Code	**Index**	**Read length**	**Write length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x1D	0x02	0x09	0x09	0x01	0x31	0x00	0x20	0x87	0x00	0x00	0x00	0x00

Code 0x1D =	Exchange request
Index 0x02 =	MOVILINK® parameter service
Read length 0x09 =	Length of the MOVILINK® response
Write length 0x09 =	Length of the MOVILINK® request
Addressing 0x01 =	Addressing the power section because this is where the parameter is stored.
Management 0x31 =	Read parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x20 =	High value of the index
Low index 0x87 =	Low value of the index => Index of the parameter = 8327_{dec} = $0x2087_{hex}$ The value $0x2087_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	The value 0x00 is written to the data when the DRC parameters are read.

When the GLK31A double slave receives the service "Exchange request" 0x1D, it sends the MOVILINK® protocol to the DRC inverter. Once the DRC inverter receives the MOVILINK® response, the GLK31A double slave sends the response "Exchange response OK" to the AS-Interface master. This means another "Read request" service of the AS-Interface master is not required.

The slave replies after the system-related transmission times for parameters.

"Exchange response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x5D	0x01	0x31	0x00	0x20	0x87	0x00	0x00	0x00	0x14

Code 0x5D =	Exchange request OK
Addressing 0x01 =	Addressing the power section because this is where the parameter is stored.
Management 0x31 =	Read parameter, no MOVILINK® error
Subindex 0x00 =	Subindex of the parameter
High index 0x20 =	High value of the index
Low index 0x87 =	Low value of the index => Index = 8893_{dec} = $0x2087_{hex}$ The value $0x2087_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x14	When the MOVILINK® service has been executed correctly, the data bytes transmit the heat sink temperature, e.g. 20 °C ≙ 0x14. The unscaled heat sink temperature is stored in the DRC inverter. The value 0x14 corresponds to a temperature of 20 °C.

9.3.4 Using "Read request" and "Write request" services (example)

INFORMATION

- Make sure that "Expert mode" is active.
- Refer to the "Startup" chapter.

This example illustrates how to change individual parameters of the DRC inverter using the CTT2 services "Write request" 0x11 and "Read request" 0x10.

The following parameters of the DRC inverter are to be changed:

- Ramp t11 up and t11 down to 0.5 s
- Fixed setpoint value n0 to 1000 rpm

In addition, the heat sink temperature is to be read.

Checking the communication

Read out the ID object correctly to check proper communication between AS-Interface master and GLK31A.

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x00	0x06

Code 0x10 = Read request
Index 0x00 = ID object
Length 0X06 = Length of the ID object

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service						
Code	**Vendor ID High**	**Vendor ID Low**	**Device ID High**	**Device ID Low**	**Output/input**	**Firmware version**
0x50	0x00	0x0A	0x00	0x0A	0x00	0x01

Code 0x50 = Read response OK
Vendor ID high 0x00 = High value of the vendor ID
Vendor ID low 0x0A = Low value of the vendor ID
=> Vendor ID = $0x000A_{hex} = 10_{dec}$
Device ID high 0x00 = High value of the device ID
Device ID low 0x0A = Low value of the device ID
=> Device ID = $0x000A_{hex} = 10_{dec}$
Output/input 0x00 = No inputs and outputs
Firmware version 0x01

Deactivating the mechanical control elements

You have to deactivate the mechanical control elements because the parameters of the DRC inverter are to be set via AS-Interface. To do so, write the value 65535_{dec} = 0xFFFF to parameter *10096.0*.

"Write request" service:

CTT2 service			MOVILINK® protocol								
Code	**Index**	**Length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x11	0x02	0x09	0x00	0x32	0x1E	0x27	0x70	0x00	0x00	0xFF	0xFF

Code 0x11 =	Write request
Index 0x02 =	MOVILINK® parameter service
Length 0x09 =	Length of the MOVILINK® protocol
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x1E =	Subindex of the parameter
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0xFF Data LSB 0xFF	The parameter must be set to 65535_{dec} = 0xFFFF to deactivate the mechanical control elements. This value is written to the 4 data bytes.

The slave replies after the system-related transmission times for parameters.

"Write response OK" response telegram:

CTT2 service
Code
0x51

Code 0x51 =	Write response OK

Once the GLK31A double slave has correctly received the data, it immediately sends the response 0x51 "Write response OK" to the master. At the same time, the MOVILINK® protocol is sent to the DRC inverter.

The response of the DRC protocol is evaluated with the "Read request" service as follows to make sure that the [MOVIGEAR® / DRC]® inverter has changed parameter *10096.0*.

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x02	0x09

Code 0x10 =	Read request
Index 0x02 =	MOVILINK® parameter service
Length 0X09 =	Length of the MOVILINK® protocol

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x50	0x00	0x32	0x1E	0x27	0x70	0x00	0x00	0x00	0x00

Code 0x50 =	Read response OK
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter => no MOVILINK® error
Subindex 0x1E =	Subindex of the parameter
High index 0x27 =	High value of the index
Low index 0x70 =	Low value of the index => Index of the parameter = 10096_{dec} = $0x2770_{hex}$ The value $0x2770_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data byte value is $0x0 = 0_{dec}$

Setting ramp t11 up

Set the ramp time of ramp t11 up (*parameter 8807.0*) to 0.5 s.

"Write request" service:

CTT2 service			MOVILINK® protocol								
Code	**Index**	**Length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x11	0x02	0x09	0x00	0x32	0x00	0x22	0x67	0x00	0x00	0x01	0xF4

Code 0x11 =	Write request
Index 0x02 =	MOVILINK® parameter service
Length 0x09 =	Length of the MOVILINK® protocol
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x22 =	High value of the index
Low index 0x67 =	Low value of the index => Index of parameter = 8807_{dec} = $0x2267_{hex}$ The value $0x2267_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x01 Data LSB 0xF4	Specify the ramp time of the DRC inverter in ms in order to set the ramp time to 0.5 s = 500 ms (500 ms $\triangleq$ 500_{dec} = 0x1F4). This value is written to the 4 data bytes.

The slave replies after the system-related transmission times for parameters.

"Write response OK" response telegram:

CTT2 service
Code
0x51

Code 0x51 =	Write response OK

Once the GLK31A double slave has correctly received the data, it immediately sends the response 0x51 "Write response OK" to the master. At the same time, the MOVILINK® protocol is sent to the DRC inverter.

The response of the DRC protocol is evaluated with the "Read request" service as follows to make sure that the [MOVIGEAR® / DRC]® inverter has changed parameter *8807.0*.

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x02	0x09

Code 0x10 =	Read request
Index 0x02 =	MOVILINK® parameter service
Length 0X09 =	Length of the MOVILINK® protocol

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	Addressing	Management	Subindex	High index	Low index	MSB data	Data	Data	LSB data
0x50	0x00	0x32	0x00	0x22	0x67	0x00	0x00	0x00	0x00

Code 0x50 =	Read response OK
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter => no MOVILINK® error
Subindex 0x00 =	Subindex of the parameter
High index 0x22 =	High value of the index
Low index 0x67 =	Low value of the index => Index of parameter = 8807_{dec} = $0x2267_{hex}$ The value $0x2267_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data byte value is $0x0 = 0_{dec}$

Setting ramp t11 down

Set ramp t11 down (parameter *8808.0*) to 0.5 s. The ramp time for ramp t11 down is set in the same way as the ramp time for ramp t11 up.

Ramp t11 down has index 8808_{dec} = 0x2268 and subindex 0.

Setting the fixed setpoint n0

Set the fixed setpoint n0 (parameter *8489.0*) to 1000 rpm.

"Write request" service:

CTT2 service			MOVILINK® protocol								
Code	**Index**	**Length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x11	0x02	0x09	0x00	0x32	0x00	0x21	0x29	0x00	0x0F	0x42	0x40

Code 0x11 =	Write request
Index 0x02 =	MOVILINK® parameter service
Length 0x09 =	Length of the MOVILINK® protocol
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x21 =	High value of the index
Low index 0x29 =	Low value of the index => Index of parameter = 8489_{dec} = $0x2129_{hex}$ The value $0x2129_{hex}$ is written to bytes high index and low index.
Data MSB 0x00 Data 0x0F Data 0x42 Data LSB 0x40	The internal scaling of the DRC inverter is 1000 times higher than the real scaling. The scaling factor then is 1 000 000_{dec} = 0xF4240. This value is written to the 4 data bytes.

The slave replies after the system-related transmission times for parameters.

"Write response OK" response telegram:

CTT2 service
Code
0x51

Code 0x51 =	Write response OK

Once the GLK31A double slave has correctly received the data, it immediately sends the response 0x51 "Write response OK" to the master. At the same time, the MOVILINK® protocol is sent to the DRC inverter.

The response of the DRC protocol is evaluated with the "Read request" service as follows to make sure that the [MOVIGEAR® / DRC]® inverter has changed parameter *8489.0*.

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x02	0x09

Code 0x10 =	Read request
Index 0x02 =	MOVILINK® parameter service
Length 0X09 =	Length of the MOVILINK® protocol

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x50	0x00	0x32	0x00	0x21	0x29	0x00	0x00	0x00	0x00

Code 0x50 =	Read response OK
Addressing 0x00 =	Addressing the command PCB because this is where the parameter is stored
Management 0x32 =	Write parameter => no MOVILINK® error
Subindex 0x00 =	Subindex of the parameter
High index 0x21 =	High value of the index
Low index 0x29 =	Low value of the index => Index of parameter = 8489_{dec} = $0x2129_{hex}$ The value $0x2129_{hex}$ is written to bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x00	If the MOVILINK® service has been executed correctly, the data byte value is $0x0 = 0_{dec}$

Reading out the heat sink temperature

Read the heat sink temperature from parameter *8327.0* as follows:

"Write request" service:

CTT2 service			MOVILINK® protocol								
Code	**Index**	**Length**	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x11	0x02	0x09	0x01	0x31	0x00	0x20	0x87	0x00	0x00	0x00	0x00

Code 0x11 =	Write request
Index 0x02 =	MOVILINK® parameter service
Length 0x09 =	Length of the MOVILINK® protocol
Addressing 0x01 =	Addressing the power section because this is where the parameter is stored.
Management 0x31 =	Read parameter
Subindex 0x00 =	Subindex of the parameter
High index 0x20 =	High value of the index
Low index 0x87 =	Low value of the index => Index of the parameter = 8327_{dec} = $0x2087_{hex}$ The value $0x2087_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00	The value 0x00 is written to the data when the DRC parameters are read.
Data 0x00	
Data 0x00	
Data LSB 0x00	

The slave replies after the system-related transmission times for parameters.

"Write response OK" response telegram:

CTT2 service
Code
0x51

Code 0x51 =	Write response OK

Once the GLK31A double slave has correctly received the data, it immediately sends the response 0x51 "Write response OK" to the master. At the same time, the MOVILINK® protocol is sent to the DRC inverter.

The "Read request" service must be executed to obtain the value of the parameter read out by the DRC inverter.

"Read request" service:

CTT2 service		
Code	**Index**	**Length**
0x10	0x02	0x09

Code 0x10 =	Read request
Index 0x02 =	MOVILINK® parameter service
Length 0X09 =	Length of the MOVILINK® protocol

The slave replies after the system-related transmission times for parameters.

"Read response OK" response telegram:

CTT2 service	MOVILINK® protocol								
Code	**Addressing**	**Management**	**Subindex**	**High index**	**Low index**	**MSB data**	**Data**	**Data**	**LSB data**
0x50	0x01	0x31	0x00	0x20	0x87	0x00	0x00	0x00	0x14

Code 0x50 =	Read response OK
Addressing 0x01 =	Addressing the power section because this is where the parameter is stored.
Management 0x31 =	Read parameter => no MOVILINK® error
Subindex 0x00 =	Subindex of the parameter
High index 0x20 =	High value of the index
Low index 0x87 =	Low value of the index => Index of the parameter = 8893_{dec} = $0x2087_{hex}$ The value $0x2087_{hex}$ is written to the bytes high index and low index.
Data MSB 0x00 Data 0x00 Data 0x00 Data LSB 0x14	When the MOVILINK® service has been executed correctly, the data bytes transmit the heat sink temperature, e.g. 20 °C ≙ 0x14. The unscaled heat sink temperature is stored in the DRC inverter. The value 0x14 corresponds to a temperature of 20 °C.

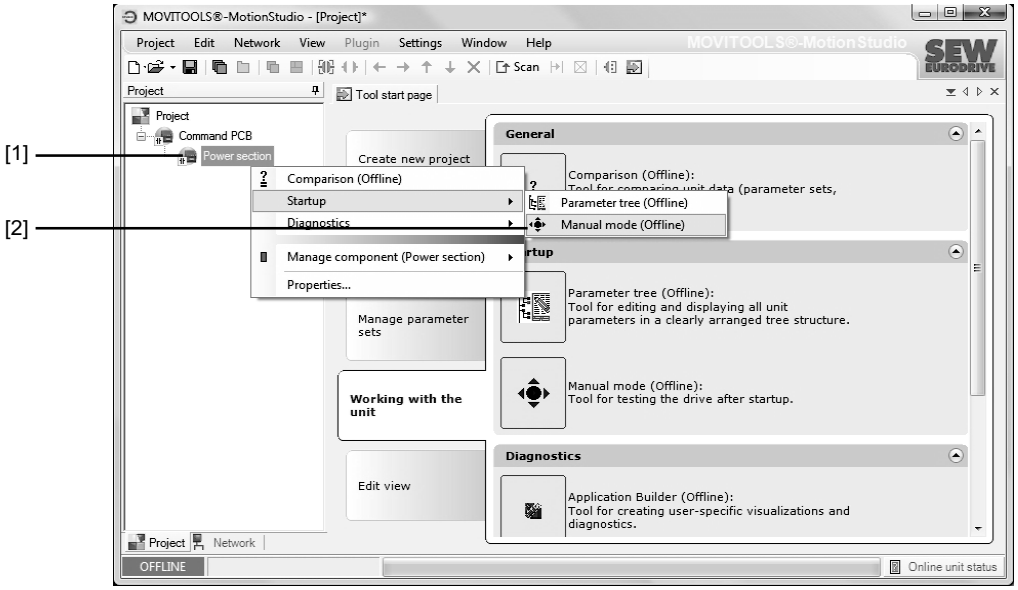
10 Operation

10.1 Manual operation with MOVITOOLS® MotionStudio

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

1. First, connect the PC to the DRC inverter.
2. Start MOVITOOLS® MotionStudio and integrate the DRC inverter in MOVITOOLS® MotionStudio.

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



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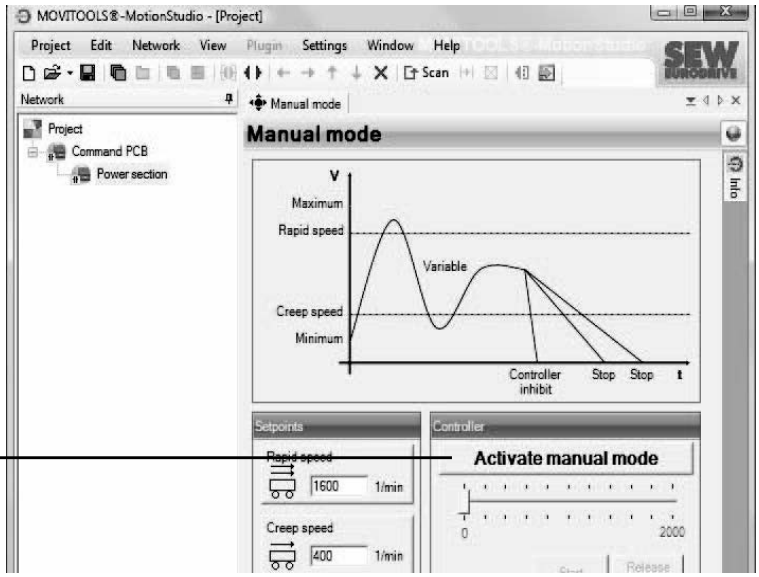
The "Manual mode" window opens.

10.1.1 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 an error 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. activating "STO".
- Take additional safety precautions depending on the application to avoid injury to people and damage to machinery.

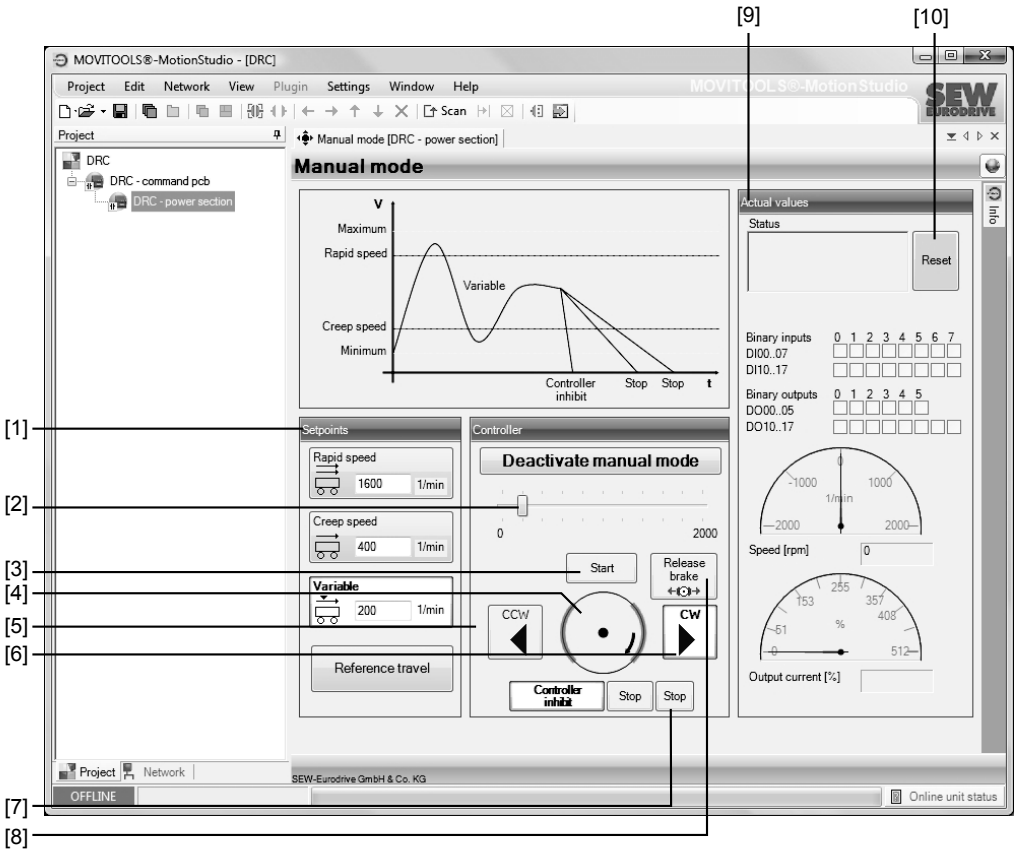
Manual mode is deactivated:

- 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 condition"

10.1.2 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. Click on the [Start] button [3] to enable the DRC drive unit.

   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).

First enter the setpoint, then press <ENTER> and click on the button that contains the setpoint input field in order to enable the DRC drive unit.

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

- Status of the DRC inverter
- Motor speed in [rpm]
- 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 signal by enabling the "Brake release" checkbox [8].

10.1.3 Reset in manual mode

If an error occurs at the DRC inverter, you can reset the error by clicking on the [Reset] button [10].

10.1.4 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 the DRC inverter is interrupted longer than this timeout interval, the enable signal for the DRC drive unit is withdrawn. Manual mode remains active.

10.2 Local mode

10.2.1 Activating local mode

INFORMATION

Local mode can only be activated when the drive is not enabled.

When setting the signal at digital input DI04 to "1", digital inputs DI01 to DI03 are used for local mode with the following functions:

Digital input	Functionality	
	Easy mode (see chapter "Startup")	**In conjunction with expert mode and deactivated controls f1/f2 (see chapter "Startup")**
DI01	CW/stop	
DI02	CCW/stop	
DI03	Setpoint selection "0" = Setpoint potentiometer f1 active "1" = Setpoint switch f2 active	Setpoint selection "0" = Setpoint n_f1 active (parameter 10096.35, factory set to 1500 rpm) "1" = Setpoint n_f2 active (parameter 10096.36, factory set to 200 rpm)
DI04	Switching between local mode / automatic mode	

10.2.2 Deactivating local mode

⚠ WARNING

Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries.

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

10.2.3 Error reset in local mode

An error can be reset in local mode as follows:

An error is reset when you have set digital inputs DI01 and DI02 to "1" and a rising edge occurs at digital input DI03 = "0" → "1".

10.3 Releasing the brake without drive enable signal

10.3.1 Notes

⚠ WARNING

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

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

⚠ WARNING

Electric shock caused by dangerous voltages in the connection box. Dangerous voltages may 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 via a suitable external disconnection device.
- Secure the drive unit against unintended re-connection of the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 5 minutes before removing the electronics cover.

5 minutes

⚠ WARNING

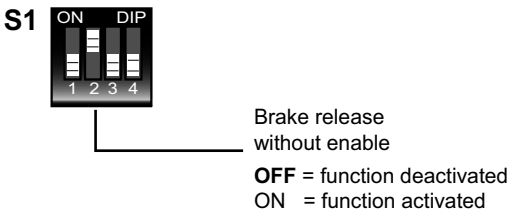
Burns caused by hot surfaces.

Severe injuries

- Let the units cool down before touching them.

10.3.2 Activating the function

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



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10.3.3 Functional description of automatic mode (bus mode) with binary slave GLK30A

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

The brake can be released under the following conditions by setting the AS-Interface bit DO2 "speed f2/speed f1":

Status of AS-Interface bits				Enable status	Error status	Brake function
DO0 (R)	DO1 (L)	DO2 (f2/f1)	DO3 (Reset/enable)			
"1" "0"	"0" "1"	"0"	"1"	Enabled	No unit error	The brake is controlled by the DRC inverter, setpoint f1 effective
"1" "0"	"0" "1"	"1"	"1"	Enabled	No unit error	The brake is controlled by the DRC inverter, setpoint f2 effective
"1"	"1"	"0"	"1"	No enable signal	No unit error	The brake is controlled by the DRC inverter
"0"	"0"	"0"	"1"	No enable signal	No unit error	Brake applied
"1"	"1"	"1"	"1"	No enable signal	No unit error	Brake applied
"0"	**"0"**	**"1"**	**"0"**	**Controller inhibit or STO**	**No unit error**	**Brake is released for manual operation**
All states possible				Error	Unit error	Brake applied

Setpoint selection

Setpoints are selected depending on the AS-Interface bit DO2 "Speed f2/Speed f1".

Enable status	AS-Interface bit	Easy mode (see chapter "Startup")	In conjunction with expert mode and deactivated controls f1/f2 (see chapter "Startup")
Enabled	DO2 = "0"	Setpoint potentiometer f1 active	Setpoint n_f1 active (parameter 10096.35, factory set to 1500 rpm)
Enabled	DO2 = "1"	Setpoint switch f2 active	Setpoint n_f2 active (parameter 10096.36, factory set to 200 rpm)

LED display

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

10.3.4 Functional description automatic mode (bus mode) with GLK31A double slave

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

INFORMATION

Brake release is controlled via the data bits of the A-slave, see chapter "Communication with AS-Interface double slave/function modules".

10.3.5 Functional description of local mode

If DIP switch S1/2 is set to "ON" and local mode is activated with DI04, the brake can be released under the following conditions by setting the signal at DI03:

Terminal status				Unit status	Error status	Brake function
DI01 R	DI02 L	DI03 f1/f2	DI04 automatic/local mode			
"1" "0"	"0" "1"	"0"	"1"	Enabled	No unit error	The brake is controlled by the DRC inverter, setpoint f1
"1" "0"	"0" "1"	"1"	"1"	Enabled	No unit error	The brake is controlled by the DRC inverter, setpoint f2
"1"	"1"	"0"	"1"	No enable signal	No unit error	The brake is controlled by the DRC inverter
"0"	"0"	"0"	"1"	No enable signal	No unit error	Brake applied
"1"	"1"	"1"	"1"	No enable signal	No unit error	The brake is controlled by the DRC inverter
"0"	"0"	**"1"**	"1"	**Controller inhibit or STO**	**No unit error**	**Brake is released for manual operation**
All states possible			"1"	Error	Unit error	Brake applied

Setpoint selection

Setpoints are selected depending on the AS-Interface bit DO2 "Speed f2/Speed f1".

Enable status	AS-Interface bit	Easy mode (see chapter "Startup")	In conjunction with expert mode and deactivated controls f1/f2 (see chapter "Startup")
Enabled	DO2 = "0"	Setpoint potentiometer f1 active	Setpoint n_f1 active (parameter 10096.35, factory set to 1500 rpm)
Enabled	DO2 = "1"	Setpoint switch f2 active	Setpoint n_f2 active (parameter 10096.36, factory set to 200 rpm)

LED display

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

⚠ WARNING

Risk of injury if the drive starts up unintentionally.

Severe or fatal injuries.

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

11 Service

NOTICE

Improper handling of DRC drive units may lead to damage.

Possible damage to property

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

11.1 Malfunctions of the mechanical DRC drive

11.1.1 Malfunctions of the DRC motor

Malfunctions	Possible cause	Remedy
Motor heats up excessively and trips an error	Overload	Measure power, use larger motor or reduce load, if necessary, check travel profile
	Ambient temperature too high	Observe permitted temperature range
	Insufficient cooling	Clean the drive
Running noise on motor	Bearing damage	• Consult SEW-EURODRIVE Service • Replace 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	• Consult SEW-EURODRIVE • Have seal changed by SEW-EURODRIVE Service or a qualified technician trained by SEW-EURODRIVE.

11.1.2 Brake malfunctions

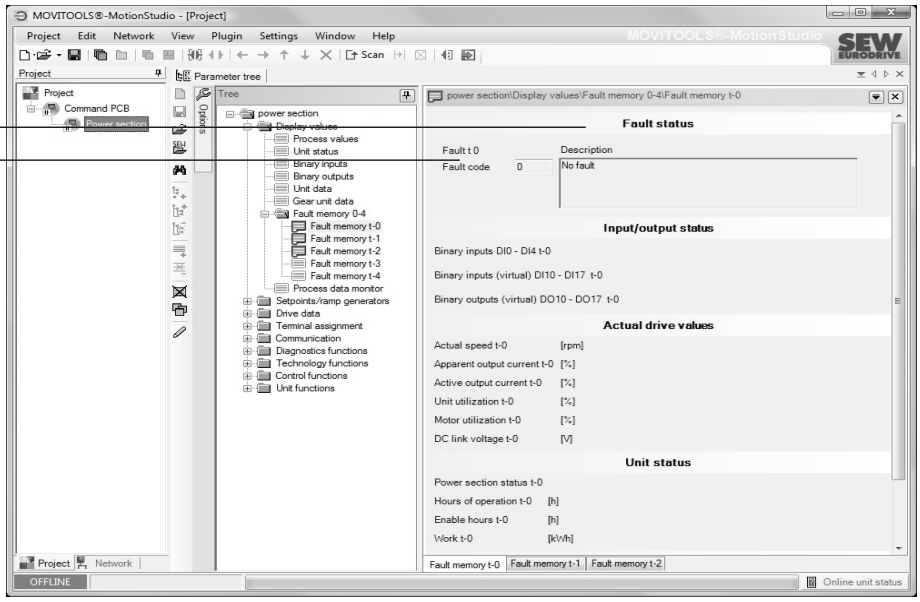
Malfunctions	Possible cause	Remedy
Brake does not release	Electronics cover faulty	• Consult SEW-EURODRIVE Service • Replace electronics cover
	Max. permitted working air gap exceeded because brake lining worn down	• Consult SEW-EURODRIVE • Have brake lining replaced by SEW-EURODRIVE Service or a qualified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

11.2 Evaluating error messages

11.2.1 MOVITOOLS® MotionStudio

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

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



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

11.3 Switch-off responses

There are 4 switch-off responses depending on the error; the inverter remains blocked in error status:

11.3.1 Output stage inhibit (immediate switch-off)

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

11.3.2 Stop

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

11.3.3 Emergency stop

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

11.3.4 Standard stop

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

11.4 Reset of error messages

An error message can be acknowledged:

- By switching the power off and on again
- Via the controller/PLC: Send "reset command"

⚠ WARNING

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

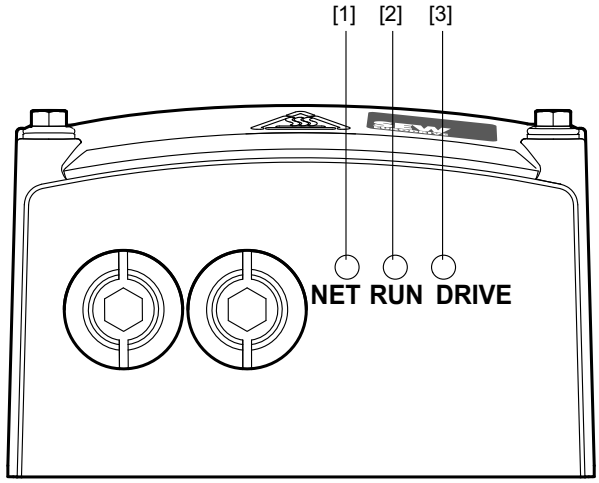
Severe or fatal injuries.

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

11.5 Description of status and operating displays

11.5.1 LEDs

The following figure shows the DRC LEDs:



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

11.5.2 "NET" LED

"NET" LED in conjunction with binary slave GLK30A			
LED color	**LED status**	**Operating state**	**Description**
-	**Off**	Not ready	No 24 V supply at AS-Interface connection
Green	**On**	Ready for operation	• Normal operation • 24 V supply at AS-Interface connection OK • Communication established
Red	**On**	Not ready	Communication interrupted or slave address set to 0
Red/ green	**Flashing regularly**	Not ready	Communication interrupted or peripheral error
Yellow	**On**	Ready for operation	Manual mode/local mode active

"NET" LED in conjunction with double slave GLK31A			
LED color	**LED status**	**Operating state**	**Description**
-	**Off**	Not ready	No 24 V supply at AS-Interface connection
Green	**On**	Ready for operation	• Normal operation • 24 V supply at AS-Interface connection OK • Communication established
Red	**On**	Not ready	Communication error at A- or B-slave
Red	**Flashing regularly**	Not ready	Protocol error, no CTT3 communication with A-slave or no CTT2 communication with B-slave
Yellow/ red	**Flashing regularly**	Not ready	Slave address = 0
Red/ green	**Flashing regularly**	Not ready	Peripheral error at A- or B-slave. There is no communication between GLK31A and the DRC inverter.
Yellow	**On**	Ready for operation	Manual mode/local mode active

11.5.3 "RUN" LED

RUN LED			
LED color	**LED status**	**Operating state**	**Description**
-	**Off**	Not ready	No line voltage → Check supply cable and line voltage for interruption.
Yellow	**Flashing steadily**	Not ready	Initialization phase
Green	**Flashing steadily**	Not ready	Power section parameters are being loaded or firmware is being updated
Green	**Steady light**	Ready for operation	System ready
Yellow	**Steady light**	Ready but unit inhibited	"STO" signal detected, safe stop → Check voltage at STO terminal
Green/yellow	**With alternating colors**	Ready but timeout	Cyclical data exchange – communication interrupted (error 47 or 67). → No SBus/SNI connection between DRC 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 while transmitting parameters (97) • IPOS error (10) • Boot synchronization error (40, 41) • Safety error (119) → More detailed diagnostic information via Drive LED.

11.5.4 "DRIVE" status LED

DRIVE LED			
LED color	**LED status**	**Operating state**	**Description**
–	**Off**	Not ready	No line voltage
Yellow	**Flashing steadily**	Not ready	Initialization phase or line voltage not OK.
Yellow	**Flashing briefly at regular intervals**	Ready for operation	**In conjunction with mechatronic MOVIGEAR® drive unit:** Deactivating DynaStop® without drive enable active
			In conjunction with DRC electronic motor: Brake release without drive enable signal active
Yellow	**Steady light**	Ready but unit inhibited	Line voltage OK, output stage inhibited
Yellow	**2 x flashing, pause**	Ready but manual mode/local mode without unit enable signal	Line voltage OK
Green/yellow	**With alternating colors**	Ready but timeout	Communication interrupted during cyclical data exchange (error 43, 46, or 47)
Green	**Steady light**	Unit enabled	Motor in operation
Green	**Flashing evenly, fast**	Current limit active	Drive operating at current limit
Green	**Flashing steadily**	Ready for operation	Line voltage OK but no enable signal. Output stage is energized.
Green/red	**With alternating colors (2 x green, 2 x red)**	Ready for operation	Displayed error is pending. Output stage is energized.
Yellow/red	**With alternating colors (2 x green, 2 x red)**	Ready for operation	Displayed error is pending. Output stage inhibited.

DRIVE LED			
LED color	**LED status**	**Operating state**	**Description**
Red	**Steady light**	Fault 40	Boot synchronization error
		Fault 41	Watchdog option error
		Fault 116	MOVI-PLC® timeout
		Fault 119	Safety error
Red	**Flashing slowly**	Fault 08	Speed monitoring error
		Fault 26	External terminal error
		Fault 30	Emergency stop timeout error
		Fault 15	Encoder error
		Fault 16	Incorrect startup
		Fault 45	Initialization error Incorrect motor/inverter assignment
		Fault 50	Internal voltage supply too low
		Errors 17, 18, 37, 53	CPU error
		Fault 25	NV memory error
		Error 27, 29	"Limit switch" error
		Fault 39	"Reference travel" error
		Fault 42	Positioning lag error
		Fault 94	Checksum error
		Fault 97	Parameter transmission error
		Errors 10, 32, 77	IPOS error
		Fault 123	Positioning interruption error
Red	**2x flashing, break**	Fault 07	DC link voltage too high
Red	**3x flashing, break**	Fault 01	Overcurrent in output stage
		Fault 11	Overtemperature of heat sink or electronics
Red	**4x flashing, break**	Fault 31	TF trip
		Fault 44	Ixt utilization/UL monitoring
		Fault 52	Machine control error
Red	**5x flashing, break**	Fault 89	**Only in conjunction with DRC electronic motor:** Brake overtemperature
Red	**6x flashing, break**	Fault 06	Line phase failure

11.6 Error table

Error code	Description	Switch-off response	Cause/solution
Fault 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 error by switching the unit off or via error reset function.
Fault 06	Line phase failure	Parameterizable	Check the supply system cable for phase failure. Reset error by switching the unit off or via error reset function
Fault 07	DC link voltage too high	Output stage inhibit/waiting	• Ramp time too short → Extend ramp time • Faulty braking resistor connection → Check braking resistor connection and correct it, if necessary • Invalid voltage range of the supply input voltage → Check supply input voltage for permitted voltage range Reset error by switching the unit off or via error reset function.
Fault 08	Speed monitoring error	Output stage inhibit/waiting	Speed monitoring has tripped, load on the drive too high → Reduce the load on the drive → Extend the n-monitoring delay time → Check current and torque limits → Deactivate speed monitoring Reset error by switching the unit off or via error reset function.
Fault 10	IPOS error	Output stage inhibit / locked	Faulty IPOS program (e.g. invalid command) → Correct program Reset error by switching the unit off or via error reset function.
Fault 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 error by switching the unit off or via error reset function.
Fault 15	Encoder error	Output stage inhibit / locked	• Loose encoder plug connection → check encoder plug connector on connection board • Encoder defective → contact SEW Service
Fault 16	Incorrect startup	Output stage inhibit / locked	Encoder not calibrated → Contact SEW Service
Fault 17	CPU error	Output stage inhibit / locked	Reset error by switching the unit off or via error reset function. Consult SEW Service if the error recurs.
Fault 18	CPU error	Output stage inhibit / locked	Reset error by switching the unit off or via error reset function. Consult SEW Service if the error recurs.
Fault 25	NV memory error	Output stage inhibit / locked	Error while accessing NV memory Set the delivery status and re-parameterize the unit. Consult SEW Service if the error re-occurs.
Fault 26	External terminal error	Parameterizable	External error signal read-in at programmable terminal → Rectify external error → Reset error by switching the unit off or via error reset function.
Fault 27	"Limit switch" error	Output stage inhibit / locked	• A limit switch was reached in positioning mode → Check travel range • Wire breakage / both limit switches missing or inverted → Check wiring
Fault 29	"Limit switch" error	Emergency stop/waiting	• A limit switch was reached in positioning mode → Check travel range • Wire breakage / both limit switches missing or inverted → Check wiring
Fault 30	Emergency stop timeout error	Output stage inhibit/waiting	• Emergency stop ramp too short → Extend emergency stop ramp • Drive overloaded → Check project planning

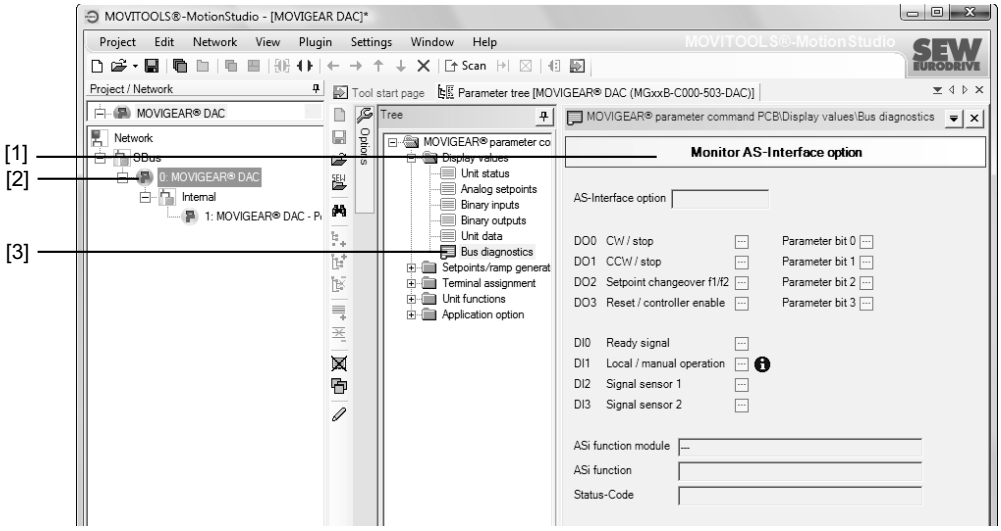
Error code	Description	Switch-off response	Cause/solution
Fault 31	TF trip	Parameterizable	Thermal overload of the motor or short circuit/wire breakage of the temperature sensor. → Lower the ambient temperature → Prevent heat build-up → Reduce the load on the drive Leave the motor to cool for at least one minute before you reset the error by switching off the unit or via error reset function. Consult SEW Service if the error recurs.
Fault 32	IPOS error	Output stage inhibit / locked	Faulty IPOS program (e.g. invalid command) → Correct program Reset error by switching the unit off or via error reset function.
Fault 37	CPU error	Output stage inhibit / locked	Reset error by switching the unit off or via error reset function. Consult SEW Service if the error recurs.
Fault 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 was changed during reference travel → Check reference travel type setting and required parameters.
Fault 40	Boot synchronization error	Output stage inhibit / locked	Command PCB defective or connection to command PCB interrupted. → Contact SEW Service
Fault 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
Fault 42	Lag error positioning	Output stage inhibit/waiting	• Emergency stop ramp too short → Extend emergency stop ramp • P-component of positioning controller too small → Increase P-component • Value of lag error tolerance too small → Increase lag error tolerance → Check whether mechanical components can move freely
Fault 43	Timeout – manual operation via any interface	Parameterizable	• Connection between unit and PC interrupted → Check and re-establish connection.
Fault 44	Ixt utilization / UL monitoring	Output stage inhibit/waiting	Output stage overload → Reduce the load on the drive Reset error by switching the unit off or via error reset function.
Fault 45	Initialization error Motor-inverter assignment incorrect	Output stage inhibit / locked	• Hardware defective → Contact SEW Service. • Incorrect motor/inverter assignment → Replace electronics.
Fault 46	Timeout – internal SBus connection between command PCB and power section	Emergency stop/waiting	• Contact SEW Service.
Fault 47	Communication interrupted during cyclical data exchange.	Parameterizable	**Power section error** • No SBus connection between DRC inverter and controller. Check and establish connection, especially terminating resistor. • EMC influence Check shielding of data lines and improve, if necessary. • 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 and re-establish connection. • Connection between AS-Interface option and command PCB interrupted → Contact SEW Service.
Fault 50	Internal voltage supply too low	Output stage inhibit / locked	• Hardware defective → Contact SEW Service.

Error code	Description	Switch-off response	Cause/solution
Fault 52	Machine control error	Output stage inhibit / locked	• Operation without encoder a speed that is too low → Increase speed • Load too high in controlled operation → Reduce load on the drive Reset error by switching the unit off or via error reset function. Consult SEW Service if the error recurs.
Fault 53	CPU error	Output stage inhibit / locked	Reset error by switching the unit off or via error reset function. Consult SEW Service if the error recurs.
Fault 77	IPOS error	Output stage inhibit / locked	Faulty IPOS program (e.g. invalid command) → Correct program Reset error by switching the unit off or via error reset function.
Fault 89	**Only in conjunction with DRC electronic motor:** Brake overtemperature	Output stage inhibit / locked	Brake coil not sufficient to dissipate the regenerative energy. → Use braking resistor
			Wrong size of braking resistor selected. → Use larger braking resistor
Fault 94	Checksum error	Output stage inhibit / locked	NV memory defective. → Contact SEW Service
Fault 97	Parameter transmission error	Output stage inhibit / locked	Error during data transmission → Repeat copying process Set the delivery status and re-parameterize the unit.
Fault 116	MOVI-PLC® timeout	Emergency stop/waiting	Timeout in communication with higher-level controller
Fault 119	Safety error	Output stage inhibit / locked	Safety hardware faulty → Contact SEW Service
Fault 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.

11.7 AS-Interface bus monitor

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

1. In MOVITOOLS® MotionStudio, open the DRC parameter tree of the command BCB [1]. Observe chapter "Operation of MOVITOOLS® MotionStudio".
2. Select the following node in the parameter tree
   - Command PCB parameters / display values / bus diagnostics [3]



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The "Monitor AS-Interface Option" group [1] serves as bus monitor of the AS-Interface and shows the transmission of AS-Interface bits from and to the DRC inverter.

AS-Interface option monitor				
Index		**Parameter name**	**GLK30A meaning**	**GLK31A meaning**
10095.39		AS-Interface option	GLK30A	GLK31A
AS-Interface output bits				
9756.1, bit 0		AS-Interface output bit DO0	CW operation/stop	Depending on the selected function module
9756.1, bit 1		AS-Interface output bit DO1	CCW operation/stop	
9756.1, bit 2		AS-Interface output bit DO2	Speed f2/speed f1	
9756.1, bit 3		AS-Interface output bit DO3	Reset/controller enable	
9756.1, bit 8		AS-Interface output bit PO0	Parameter bit 1	
9756.1, bit 9		AS-Interface output bit PO1	Parameter bit 2	
9756.1, bit 10		AS-Interface output bit PO2	Parameter bit 3	
9756.1, bit 11		AS-Interface output bit PO3	Parameter bit 4	
AS-Interface input bits				
9866.1, bit 0		AS-Interface input bit DI0	Ready signal	Depending on the selected function module
9866.1, bit 1		AS-Interface input bit DI1	Automatic/manual mode	
9756.1, Bit 6 [1]	9866.1, Bit 2 [2]	AS-Interface input bit DI2	Sensor output 1	
9756.1, Bit 7 [1]	9866.1, Bit 3 [2]	AS-Interface input bit DI3	Sensor output 2	

1) GLK30A

2) GLK31A

11.8 Unit replacement

⚠ WARNING

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

Severe or fatal injuries.

- Before removing the electronics cover, switch off the power to the DRC drive units using a suitable external disconnecting device.
- Secure the drive unit against unintended re-connection to the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 5 minutes before removing the electronics cover.

11.8.1 Replacing the electronics cover

NOTICE

Unit error 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 15 s before disconnecting the drive from the supply system again.

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.

INFORMATION

Always replace the electronics cover with an electronics cover with the same part number.

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 functions of the new electronics cover.

11.8.2 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.

11.9 SEW-EURODRIVE Service

11.9.1 Sending in a unit for repair

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

When you contact the SEW 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.

11.10 Shutdown

To shut down the DRC drive unit, de-energize it using appropriate measures.

⚠ WARNING

Electric shock due to charged capacitors.

Severe or fatal injuries.

- Before removing the electronics cover, switch off the power to the DRC drive units using a suitable external disconnecting device.
- Secure the drive unit against unintended re-connection to the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 5 minutes before removing the electronics cover.

11.11 Storage

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

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

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

11.12 Extended storage

11.12.1 Electronics

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

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

The following stages are recommended:

AC 400/500 V units:

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

11.13 Disposal

Observe the applicable regulations: Dispose of the following materials in accordance with the regulations in force:

- Aluminum scrap
  - Housing parts
- Steel scrap:
  - Shafts
  - Rolling bearing
  - Flange rings
- Electronics scrap (circuit boards)
- Plastic (housing), sheet metal, copper, etc.

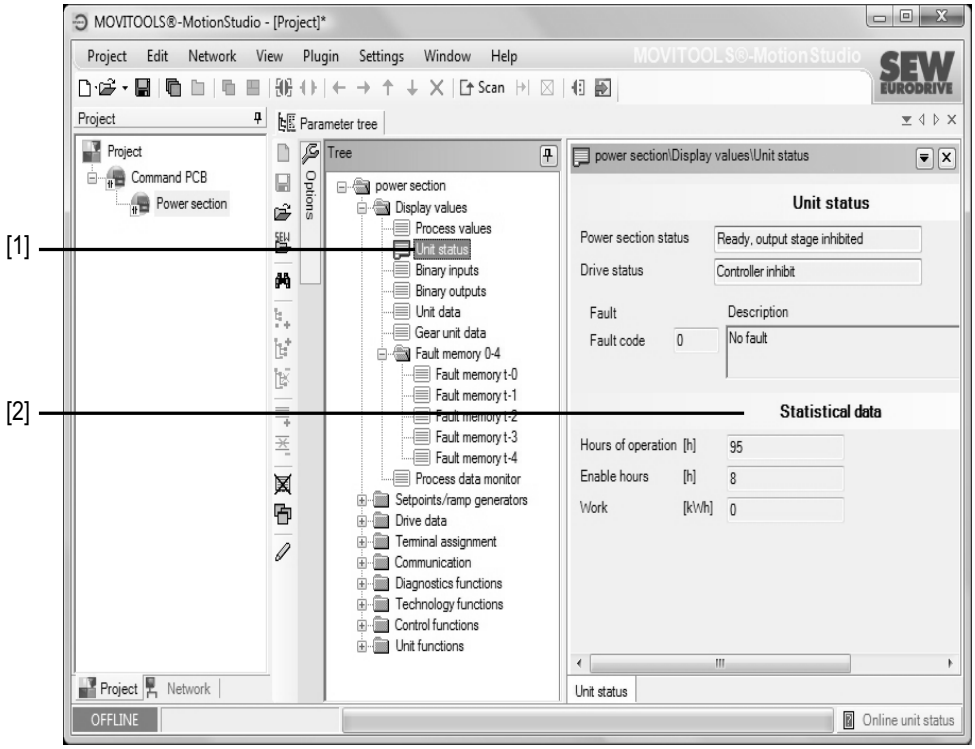
12 Inspection and maintenance

12.1 Determining the operating hours

12.1.1 About MOVITOOLS® MotionStudio

To facilitate inspection and maintenance planning, you can read out the performed operating hours of DRC drive units. Proceed as follows to determine the performed hours of operation:

1. In MOVITOOLS® MotionStudio, open the DRC parameter tree. See chapter "Configuration and diagnostics".
2. In the parameter tree, select the node "DRC power section parameters / display values / unit status" [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 / unit status
[2] Statistics data group

12.2 Inspection and maintenance intervals

12.2.1 Motor

The following table shows the inspection intervals for DRC motors:

Time interval	What to do?	Who is permitted to perform the work?
Every 3,000 hours of operation, at least every 6 months	Check running noise for possible bearing damage	Qualified personnel at customer site
	In the event of a 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 hours of operation[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 removed 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.	Qualified personnel at customer site
Each time the electronics cover is removed	Visual inspection of the gasket between connection box and electronics cover Replace the gasket if it is damaged or separating from the connection box.	Qualified personnel at customer site
Varying (depending on external factors)	Touch up or renew the surface protection/anticorrosion coating.	Qualified personnel 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.

12.2.2 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.

If used as a holding brake with braking work done in case of emergency braking operations					
Time interval				**What to do?**	**Who is permitted to perform the work?**
Every 3,000 hours of operation, every 2 years at the latest[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
After this much braking work has been done:[1)]				Have wear parts replaced by SEW-EURODRIVE Service or qualified personnel trained by SEW-EURODRIVE.	SEW-EURODRIVE Service
Brake	DRC	Braking torque [Nm]	Braking work [MJ]		
BY1C	DRC1	7 / 2.5	40		
BY2C	DRC2	14 / 7	65		Qualified personnel trained by SEW-EURODRIVE
BY4C	DRC3	28 / 14	85		
BY4C	DRC4	40	55		
BY4C	DRC4	20	85		

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.

12.3 Inspection and maintenance work

12.3.1 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 may 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 via a suitable external disconnection device.
- Secure the drive unit against unintended re-connection of the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 5 minutes before removing the electronics cover.

5 minutes

⚠ WARNING

Burns caused by hot surfaces.

Severe injuries.

- Let the units 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.

12.3.2 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. **IMPORTANT:** 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.
4. When changing the oil seal, ensure that there is a sufficient grease reservoir between the dust lip and protective lip, depending on the type of gear unit.
5. If you use double oil seals, fill one-third of the gap with grease.
6. Do not install the oil seal on the same track.
7. Touch up or renew the surface protection/anticorrosion coating.

12.3.3 Painting the drive unit

1. Observe the notes in chapter "Preliminary work for inspection and maintenance".
2. **IMPORTANT:** Breather valves and oil seals may be damaged during painting or re-painting.

   Potential damage to property.

   - Clean the surface of the drive unit and make sure it is free from grease.
   - Thoroughly cover the breather valves and sealing lip of the oil seals with strips prior to painting.
   - Remove the strips after painting.

12.3.4 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, you must 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).

12.3.5 Connection cables

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

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

12.3.6 Replacing the gasket between connection box and electronics cover

Spare part kit

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

Contents	Part number	
	DRC1-... electronic motor DRC2-... electronic motor	DRC3-... electronic motor DRC4-... electronic motor
1 pcs	2 821 162 6	2 821 165 0
10 pcs	2 821 163 4	2 821 166 9
50 pcs	2 821 164 2	2 821 167 7

Steps

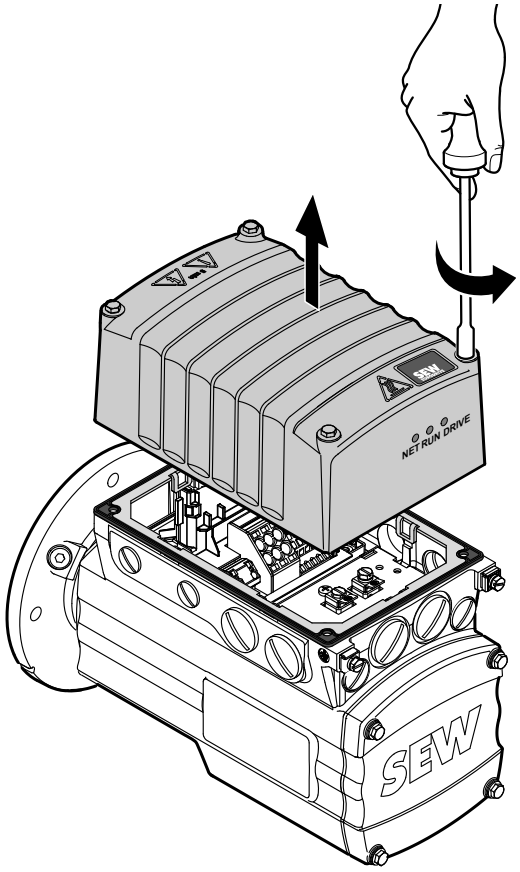
NOTICE

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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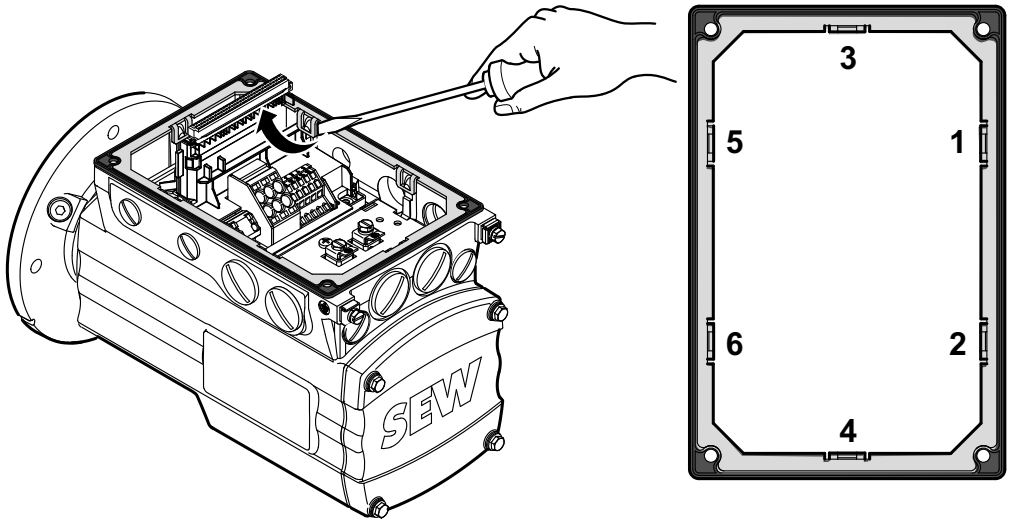
3. **NOTICE** Loss of the guaranteed degree of protection.

   Possible damage to property.

   - Make sure not to damage the sealing surfaces when removing the gasket.

4. Loosen the used gasket by levering it off the retaining cams. This becomes easier when you keep to the sequence shown in the figure below.



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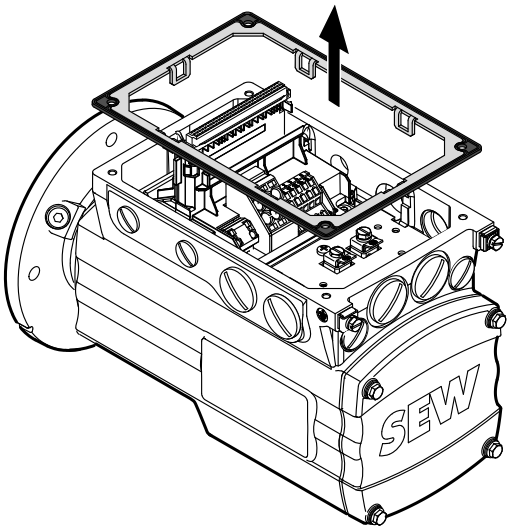
5. Remove the used gasket completely from the connection box.



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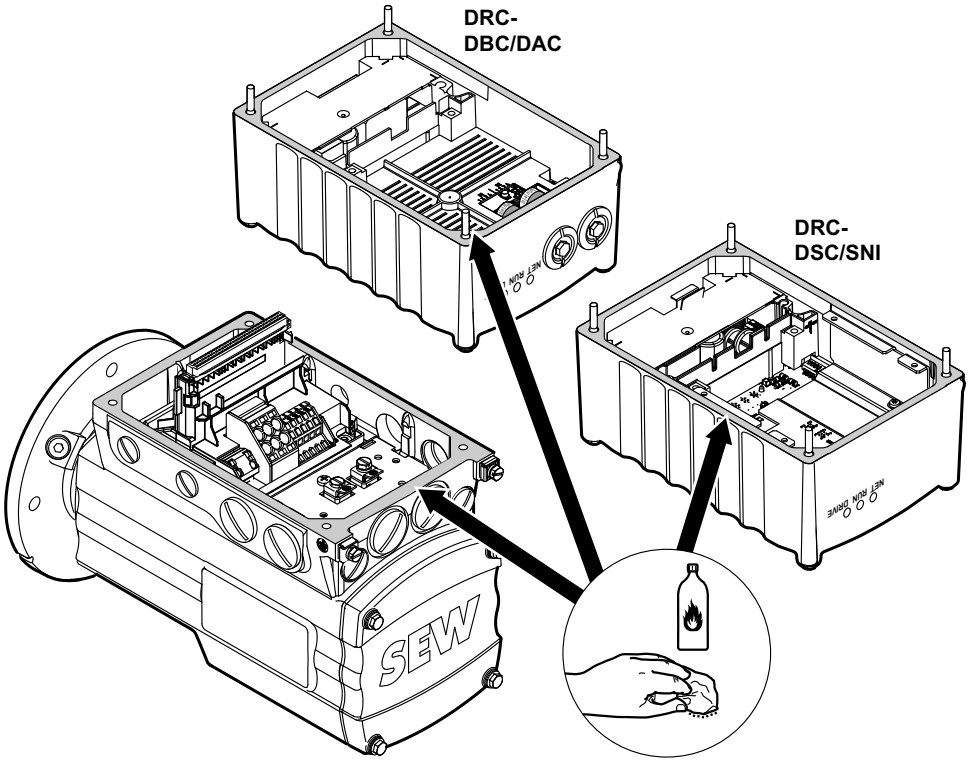
6. ⚠ **CAUTION:** Risk of injury due to sharp edges.

   Cuts.

   - 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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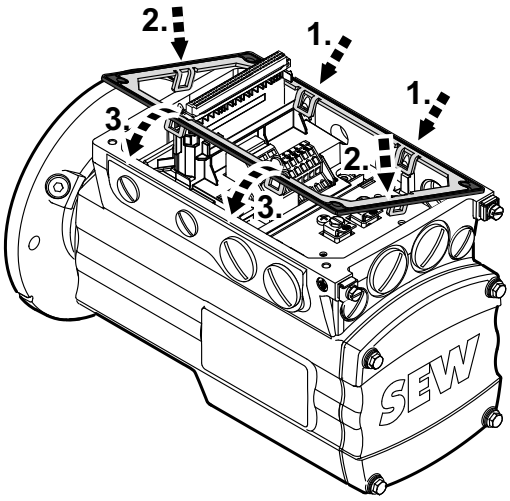
7. Place the new gasket on the connection box and fix it in position with the retaining cams. This becomes easier when you keep to the sequence shown in the figure below.



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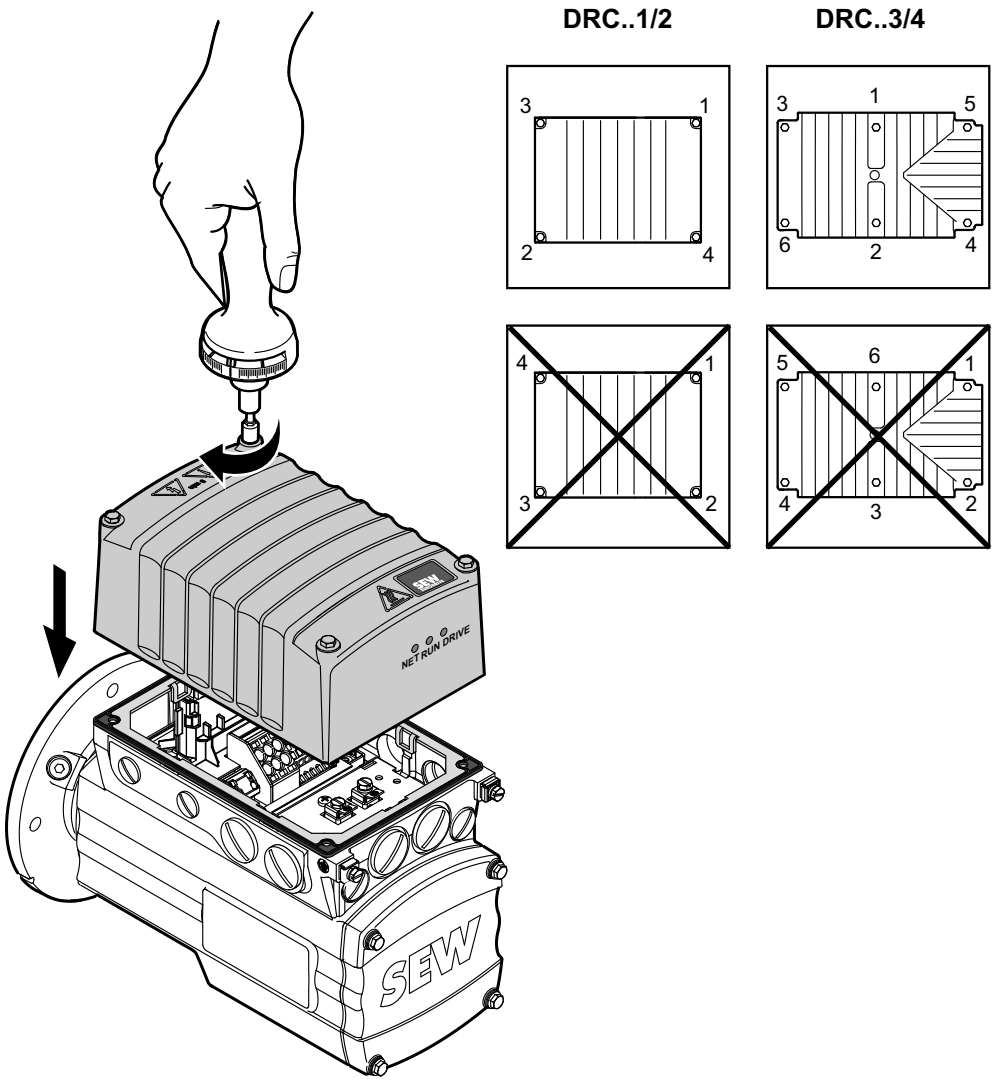
8. Check the installation and startup of the drive unit using the applicable operating instructions.

9. Place the electronics cover on the connection box again and fasten it.

   Proceed as follows when installing the DRC electronics cover: 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
   - DRC electronic motor size 3/4: 9.5 Nm.



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13 Technical data and dimension sheets

13.1 Technical data

13.1.1 General technical data of DRC

DRC type		DRC1	DRC2	DRC3	DRC4
Supply voltages Permitted range	V_{line}	3 x AC 380 V −5 % to AC 500 V +10 %			
Line frequency	f_{line}	50 Hz ... 60 Hz			
Input current	I_N	1.04 A	2.8 A	5.3 A	6.3 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 rpm	2000 rpm	2000 rpm	2000 rpm
Nominal motor torque	M_N	2.65 Nm	7.20 Nm	14.3 Nm	19.1 Nm
Maximum motor torque	M_{max}	6.6 Nm to 2000 rpm	18.0 Nm to 1500 rpm	35.8 Nm to 1500 rpm	36.2 Nm to 1800 rpm
Mass moment of inertia of the motor	J_{mot} [1]	1.416 $kgm^2 \times 10^{-4}$	3.6226 $kgm^2 \times 10^{-4}$	16.85 $kgm^2 \times 10^{-4}$	23.23 $kgm^2 \times 10^{-4}$
	J_{mot} [2]	2.031 $kgm^2 \times 10^{-4}$	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)			
Climate class		EN 60721-3-3, class 3K3			
Storage temperature	ϑ_S	−25 °C to +70 °C (EN 60721-3-3)			
Proof of mechanical strength		According to EN 61800-5-1			
Degree of protection	IP	Standard: IP 65 according to EN 60529 (DRC housing closed and all cable glands sealed) With optional ASEPTIC / ASEPTIC^{plus} design: IP 66 according to EN 60529 (DRC housing closed and all cable glands sealed)			
Operating mode		S1, DB (EN 60034-1)			
Type of cooling		Self-cooling to DIN 41751 and EN 61800-5-1			
Signaling functions		Display elements on housing to indicate the unit state			
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 unit			

1) Without brake

2) With brake

13.1.2 Ambient temperature of DRC

DRC type		DRC1	DRC2	DRC3	DRC4
Ambient temperature	ϑ_A	-25 °C to +60 °C			
$I_{N\ motor}$ reduction Ambient temperature		3 % $I_{N\ motor}$ per K at 40 °C to 60 °C			

13.1.3 Current carrying capacity of terminals and plug connectors

Current carrying capacity of terminals and plug connectors		
Supply system terminals	X2	24 A (max. loop-through current)
Control terminals	X7	3.5 A (max. loop-through current)

13.1.4 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) $R_i \approx 3.0\ k\Omega$, $I_E \approx 10$ 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 data	K1a K1b	Response time ≤ 15 ms DC 24 V / 50 mA / DC 12 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)

13.1.5 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

13.1.6 Derating factors

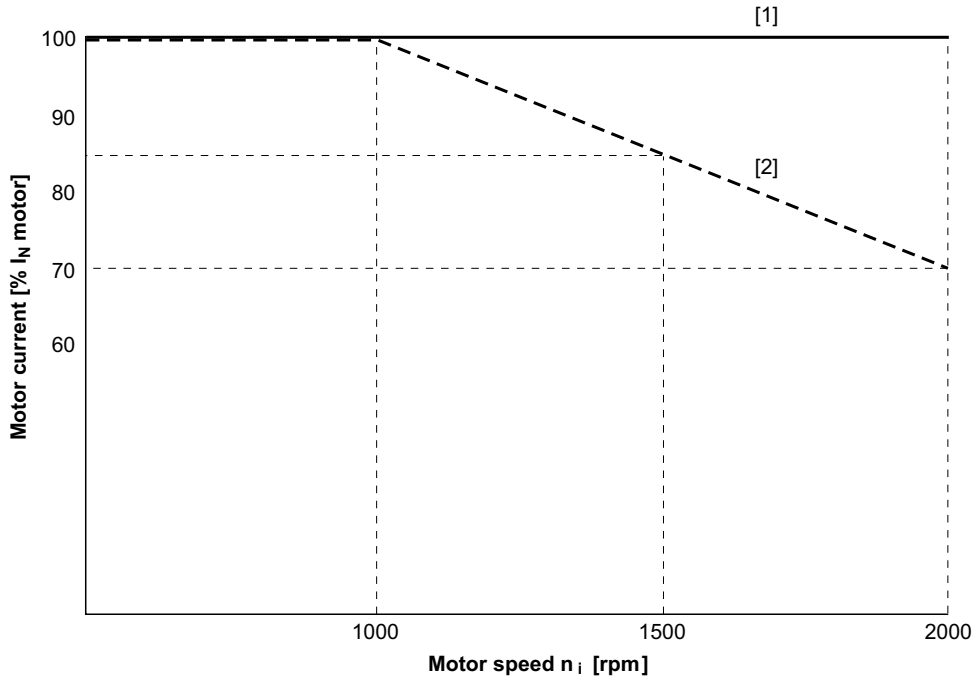
Affected unit variants

The table shows the unit variants for which you have to/do not have to use the additional $I_{N\ motor}$ reduction in the following chapter:

$I_{N\ motor}$ reduction	
not required	**Required**
DRC1 (all variants)	–
DRC2..DSC without application option DRC2..SNIwithout application option DRC2..DBC	DRC2..DSC with application option DRC2..SNI with application option DRC2..DAC
DRC3 (all variants)	–
DRC4..DSC without application option DRC4..SNI without application option DRC4..DBC	DRC4..DSC with application option DRC4..SNI with application option DRC4..DAC

$I_{N\ motor}$ reduction

The following figure shows the $I_{N\ Motor}$ reduction depending on the motor speed:



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[1] Ambient temperature ≤ 35 °C
[2] Ambient temperature = 40 °C

INFORMATION

Derating is based on typical operating conditions with a supply voltage of 24 V (AS-Interface electronics supply, signal level of digital inputs, input voltage of STO input).

13.1.7 Technical data of AS-Interface

AS-Interface		
AS-Interface electronics supply	Tl. AS + Tl. AS - I_E only AS-Interface:	29.5 V – 31.6 V (AS-Interface power supply to EN 50295) ≤ 50 mA[1)]
Control input	Tl. AS + Tl. AS -	Connection of the AS-interface data line Connection of the AS-interface data line
Sensor connection	Tl. DI2 Tl. DI3 Tl. V024 Tl. V0⊥	External sensor input External sensor input 24 V for sensor supply Reference potential for sensor supply
Sensor inputs	PLC-compatible in accordance with EN 61131-2 R_i about 3.0 kΩ I_E about 10 mA	
Signal level	+15 V to +30 V –3 V to +5 V	"1" "0"
Maximum sensor cable length	15 m	

1) The current increases by the demand of the connected sensors (max. sensor current 75 mA).

AS-Interface GLK30A binary slave

AS-Interface GLK30A	
Protocol variant	AS-Interface binary slave with a S-7.F profile "four bit I/O mode slave"
AS-Interface profile	S-7.F
I/O configuration	7_{hex}
ID code	F_{hex}
ext. ID code 2	E_{hex}
ext. ID code1	F_{hex}
Address	1 to 31 (factory setting: 0), can be changed as often as required

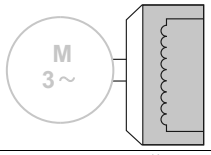
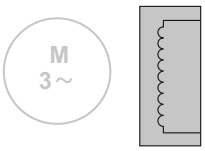
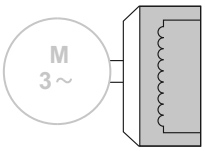
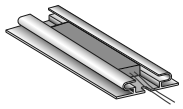
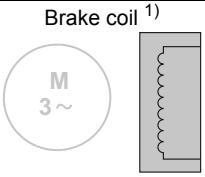
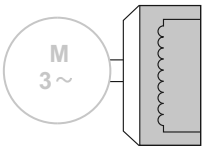
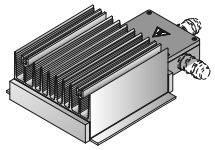
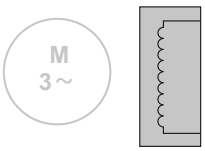
AS-Interface GLK31A double slave

AS-Interface GLK31A	Slave A	Slave B
Protocol variant	AS-Interface double slave in extended address mode AS-Interface specification V3.0, rev.02 in conjunction with M4 master profile	
AS-Interface profile	S-7.A.7.7	S-7.A.5.F
I/O configuration	7_{hex}	7_{hex}
ID code	A_{hex}	A_{hex}
ext. ID code 2	7_{hex}	5_{hex}
ext. ID code1	7_{hex}	7_{hex}
Function	4DI/4DO cyclical 4PDI/3PDO	Serial acyclic
Address	1 to 31 (factory setting: 0), can be changed as often as required	

13.2 Braking resistors

13.2.1 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 1		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 
	DRC1 electronic motor without brake	Brake coil [1] 		

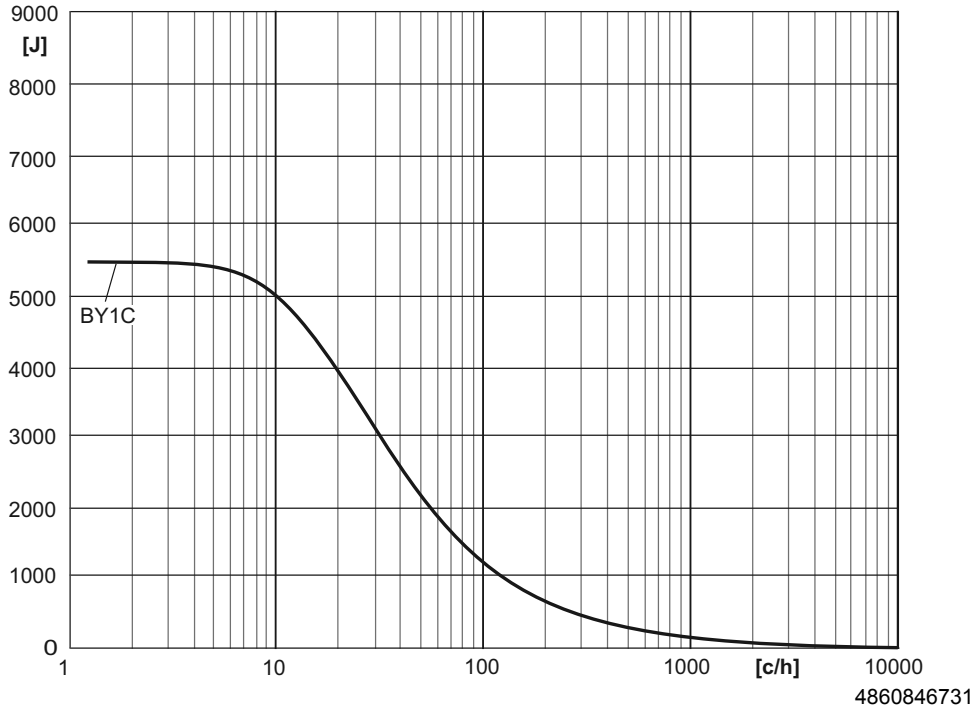
1) Also for motors without brake, a brake coil (without brake disk) is always integrated to dissipate regenerative energy.

13.2.2 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)

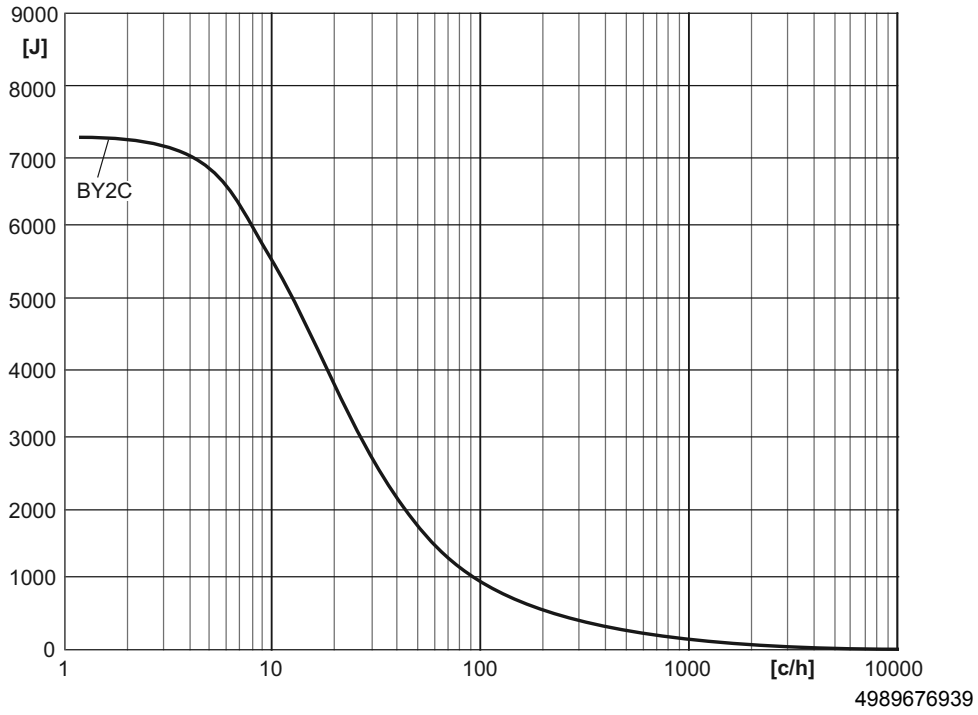
The following figure shows the permitted regenerative load on the BY1C brake coil (DRC1):



c/h = cycles per hour

BY2C (DRC2)

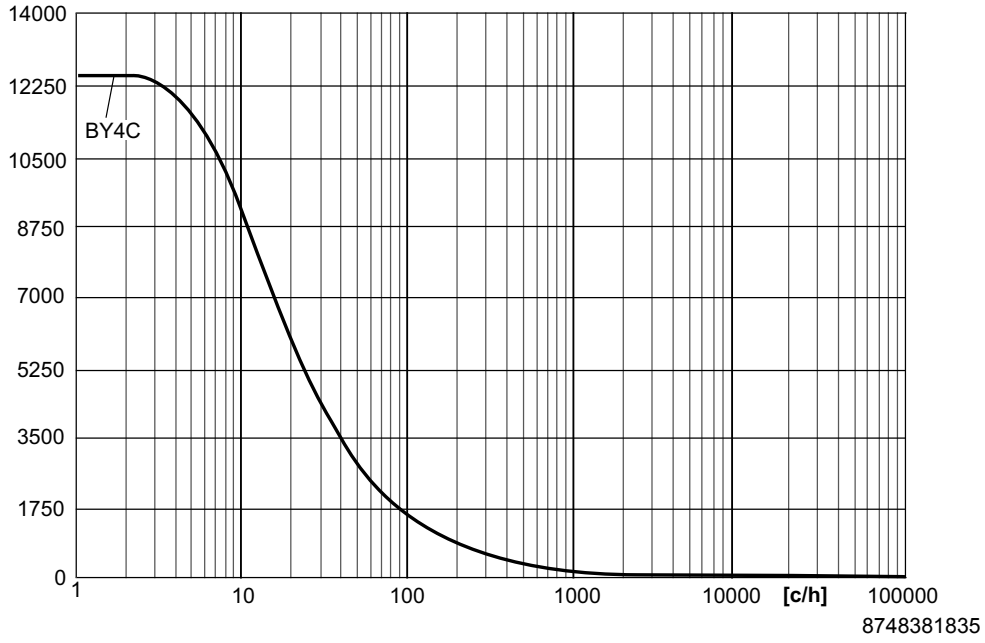
The following figure shows the permitted regenerative load on the BY2C brake coil (DRC2):



c/h = cycles per hour

BY4C (DRC3/4)

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



c/h = cycles per hour

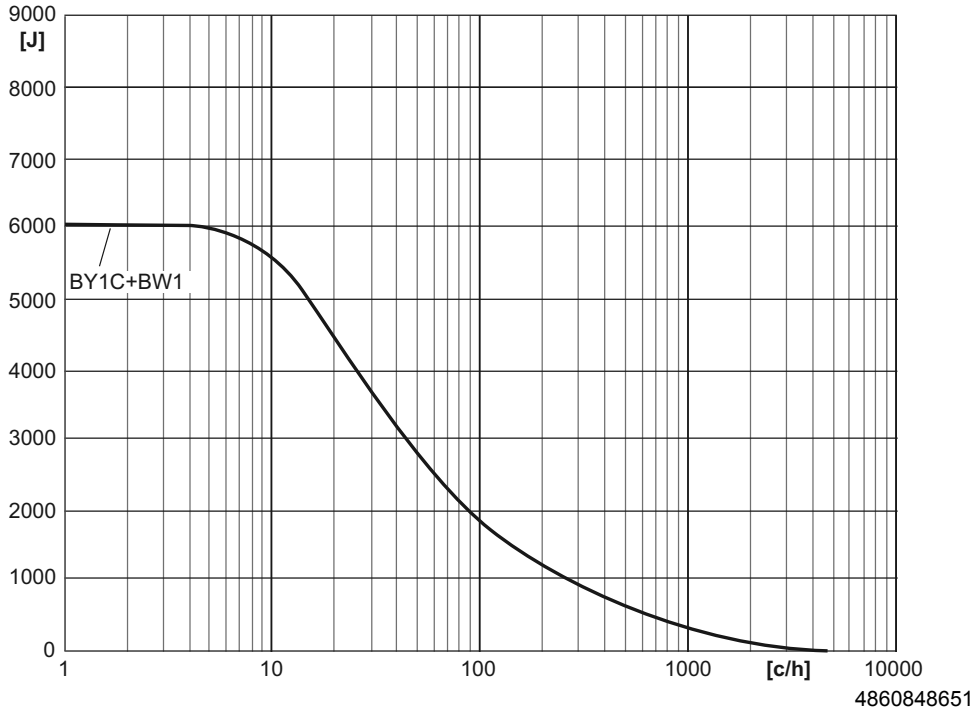
13.2.3 4Q operation with integrated brake coil and integrated braking resistor

- 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

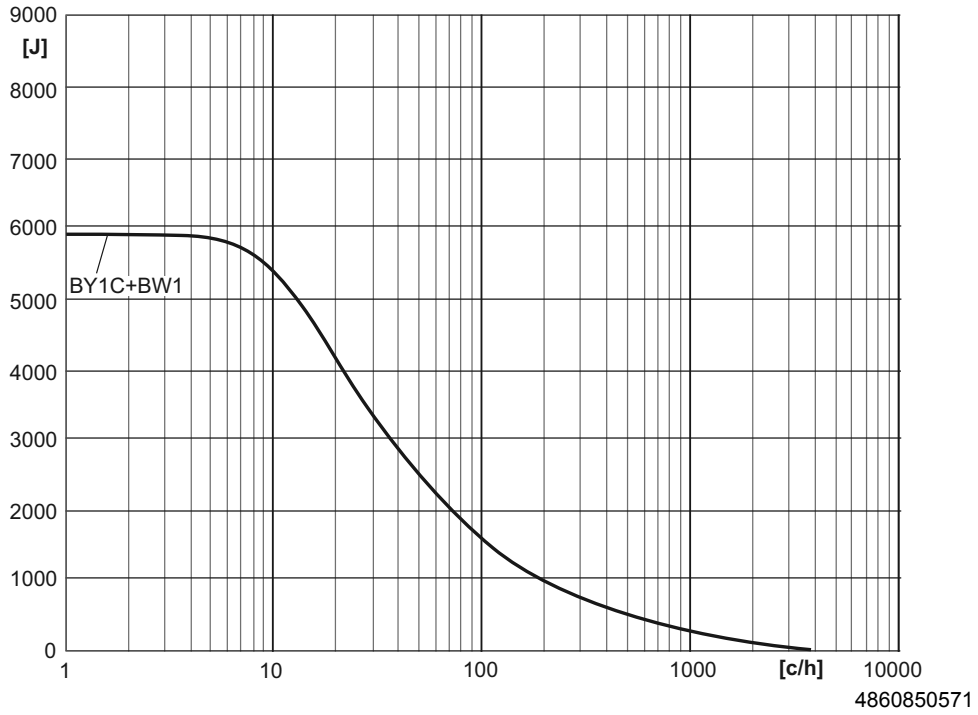
The following figure shows the permitted regenerative energy load of the BY1C brake coil in combination with the integrated BW1 braking resistor for a brake ramp of 10 s:



c/h = cycles per hour

Regenerative load capacity for a brake ramp of 4 s

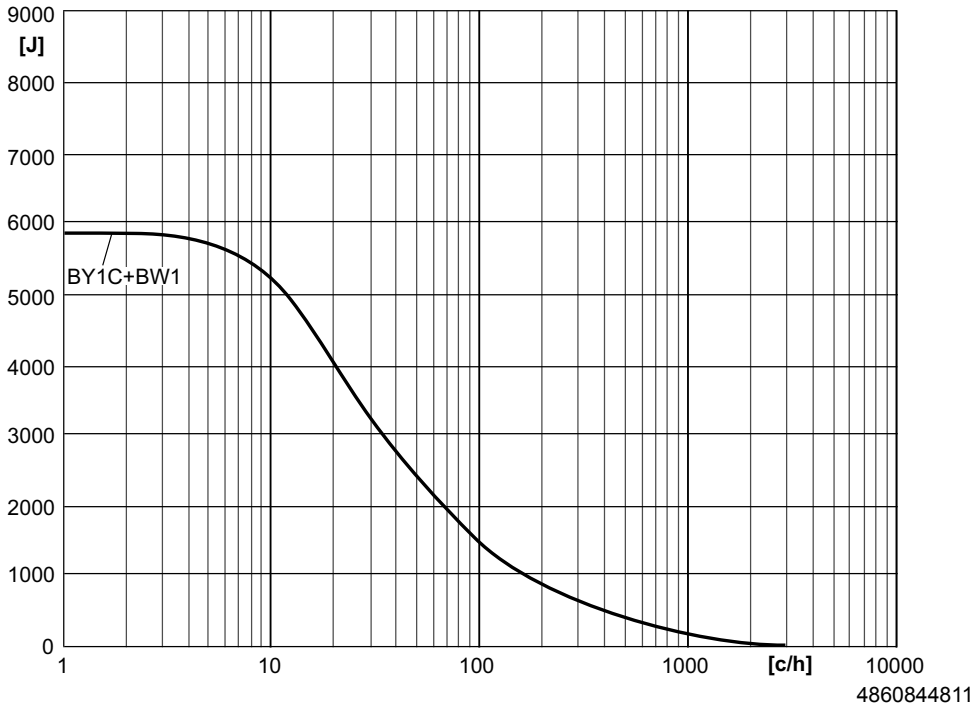
The following figure shows the permitted regenerative energy load of the BY1C brake coil in combination with the integrated BW1 braking resistor for a brake ramp of 4 s:



c/h = cycles per hour

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:

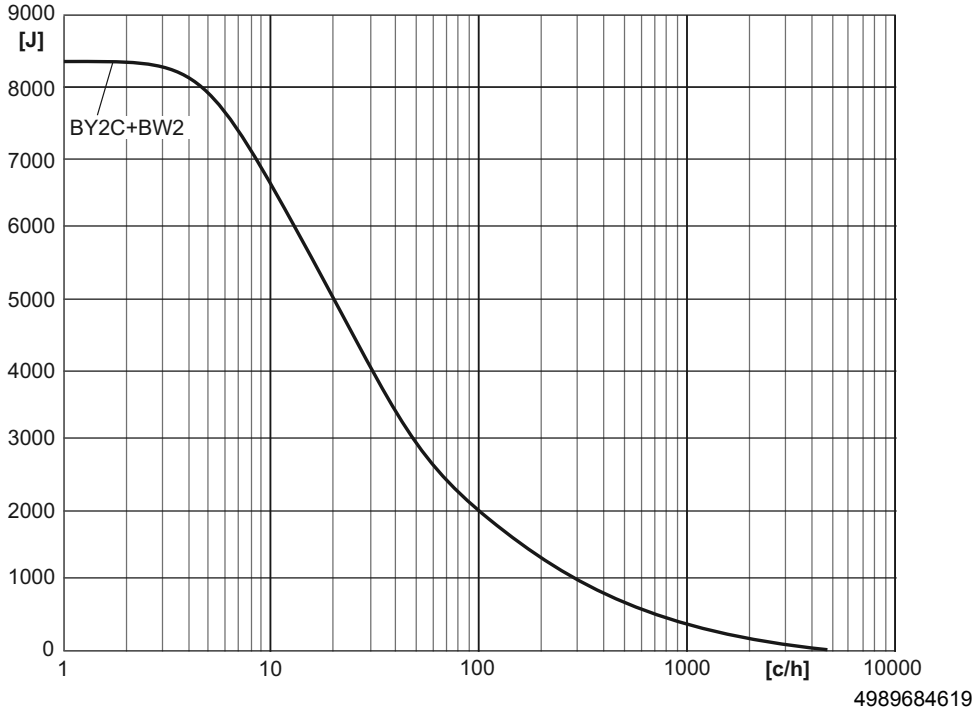


c/h = cycles per hour

BY2C brake coil and integrated BW2 braking resistor (DRC2)

Regenerative load capacity for a brake ramp of 10 s

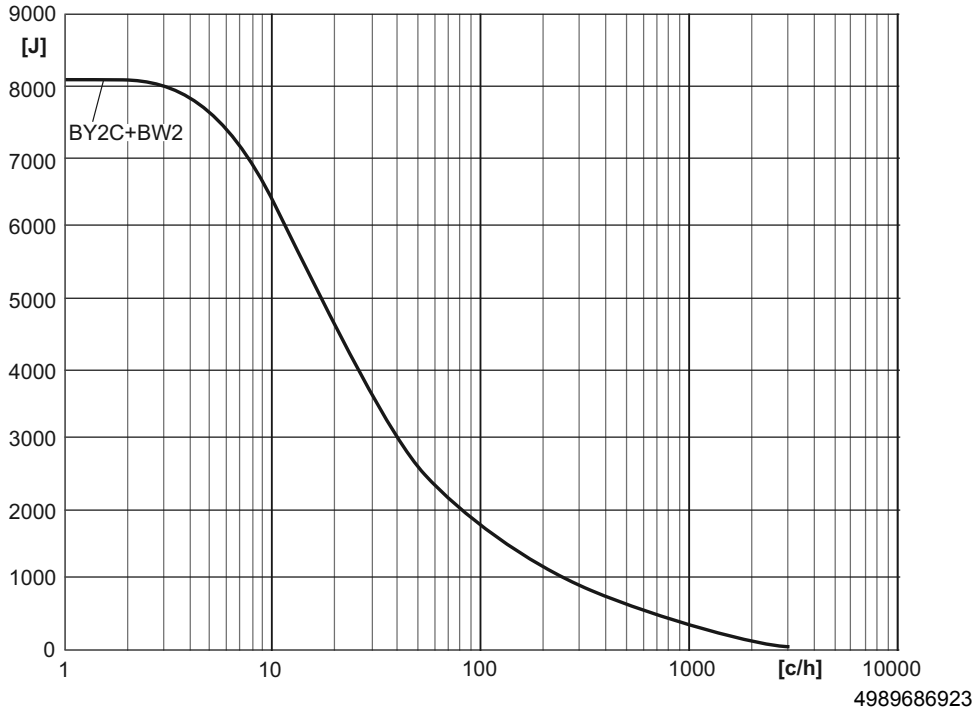
The following figure shows the permitted regenerative energy load of the BY2C brake coil in combination with the integrated BW2 braking resistor for a brake ramp of 10 s:



c/h = cycles per hour

Regenerative load capacity for a brake ramp of 4 s

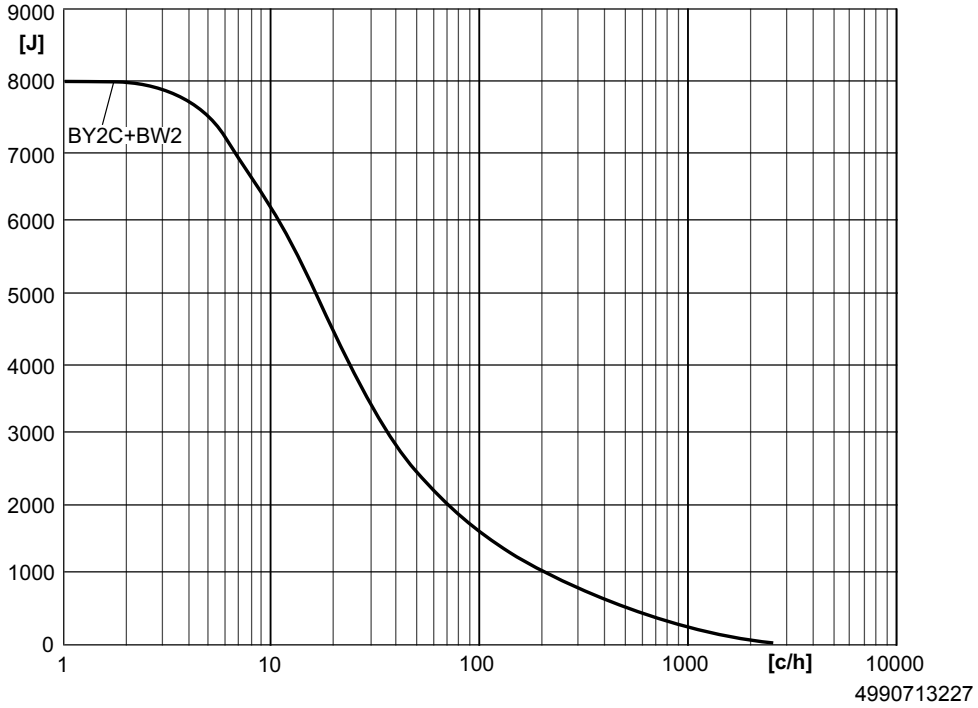
The following figure shows the permitted regenerative energy load of the BY2C brake coil in combination with the integrated BW2 braking resistor for a brake ramp of 4 s:



c/h = cycles per hour

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:

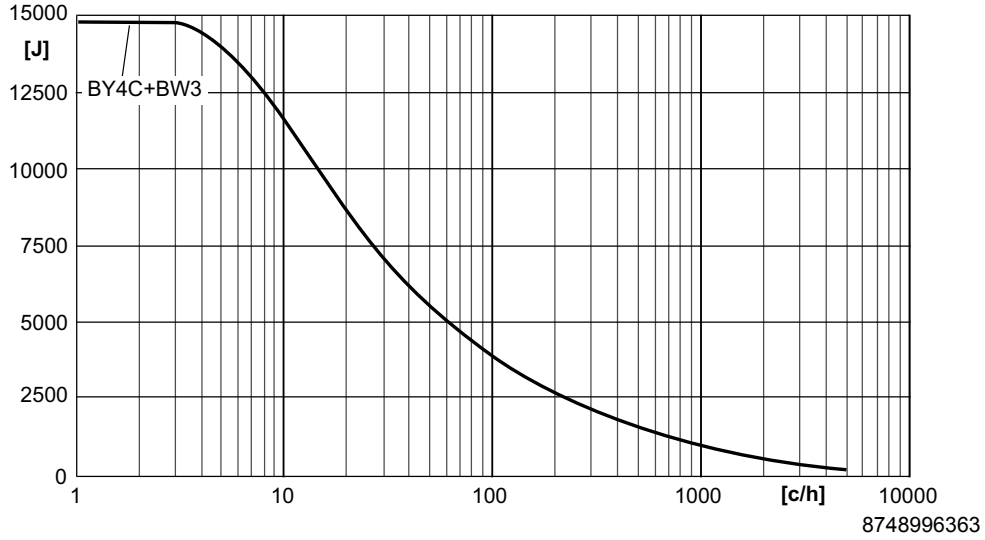


c/h = cycles per hour

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

Regenerative load capacity for a brake ramp of 10 s

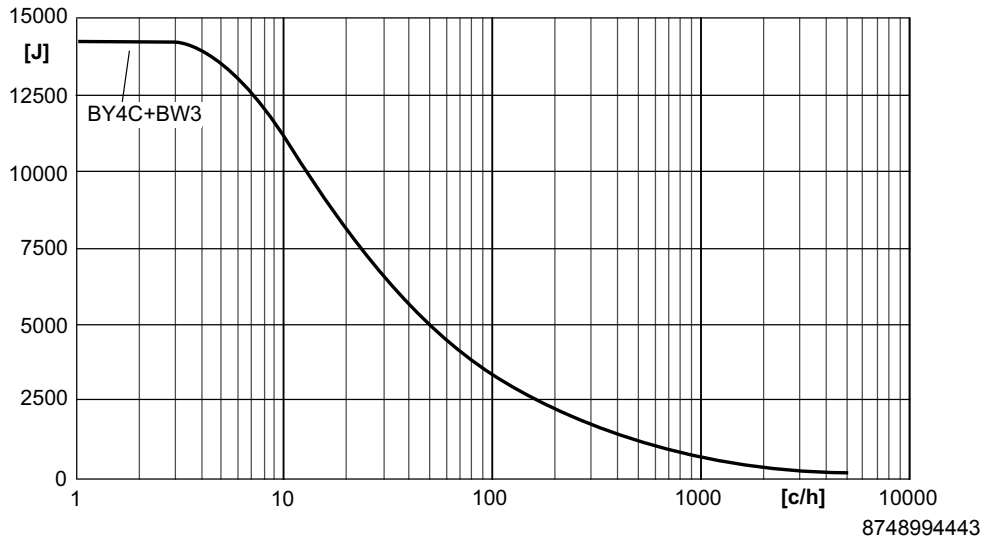
The following figure shows the permitted regenerative energy load of the BY4C brake coil in combination with the integrated BW3 braking resistor for a brake ramp of 10 s:



c/h = cycles per hour

Regenerative load capacity for a brake ramp of 4 s

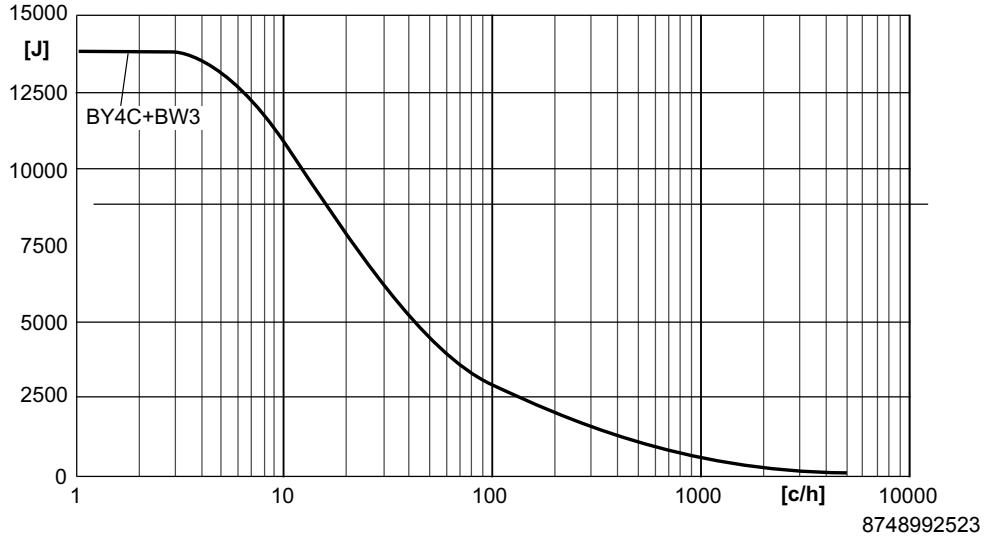
The following figure shows the permitted regenerative energy load of the BY4C brake coil in combination with the integrated BW3 braking resistor for a brake ramp of 4 s:



c/h = cycles per hour

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:



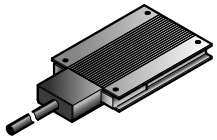
c/h = cycles per hour

13.2.4 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.

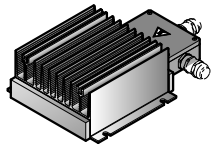
The following tables show the external braking resistors that are available for DRC electronic motors.

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



	BW100-005/K-1.5	BW150-003/K-1.5
Part number	0 828 286 2	0 828 2927
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

BW...-...-T

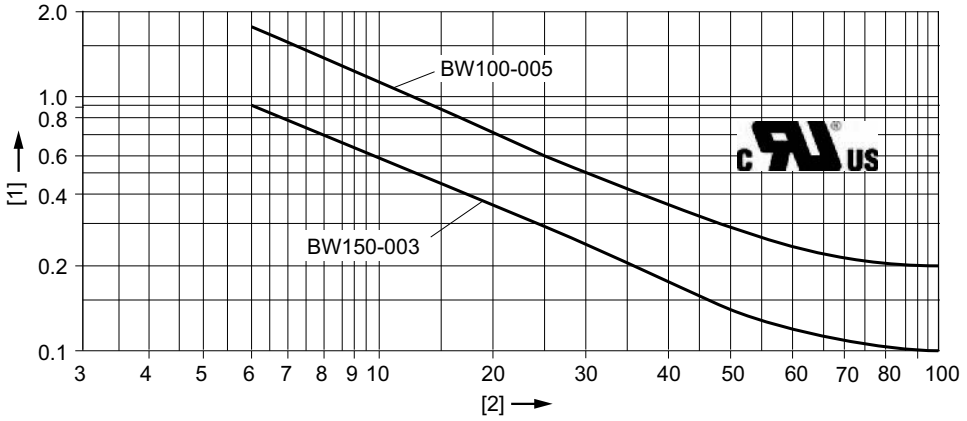


	BW150-006-T	BW100-009-T	BW68-006-T	BW68-012-T
Part number	1 796 956 5	1 796 957 3	1 797 000 8	1 797 001 6
Function	Dissipating the regenerative energy			
Degree of protection	IP66	IP66	IP66	IP66
Resistance	150 Ω	100 Ω	68 Ω	68 Ω
Power in S1, 100% cdf	600 W	900 W	600 W	1200 W
Dimensions W x H x D	285 x 75 x 174 mm	435 x 75 x 174 mm	285 x 75 x 174 mm	635 x 75 x 174 mm
Prescribed connection cables	Shielded cables with a thermal resistance of $T_{amb} \geq 90$ °C (194 °F)			
Maximum permitted cable length	15 m	15 m	15 m	15 m

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

Power diagrams

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



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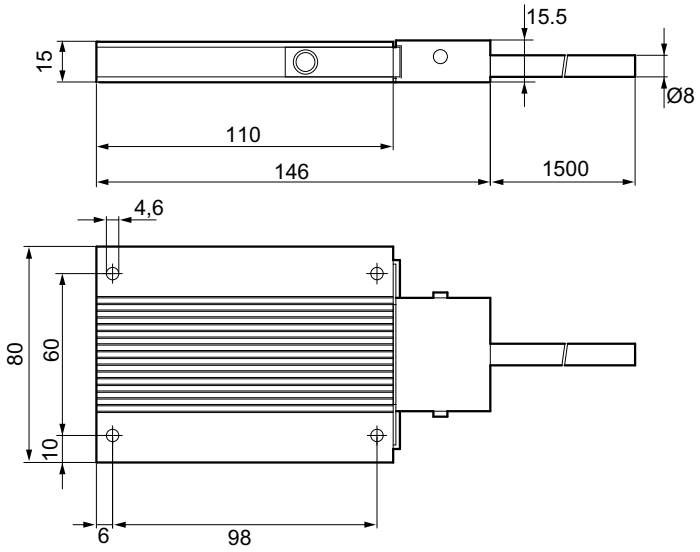
[1] Power in kW
[2] Cyclic duration factor cdf in %

Dimension drawing of BW150-003/K-1.5

The following figure shows the dimensions of the external braking resistor BW150-003/K-1.5:



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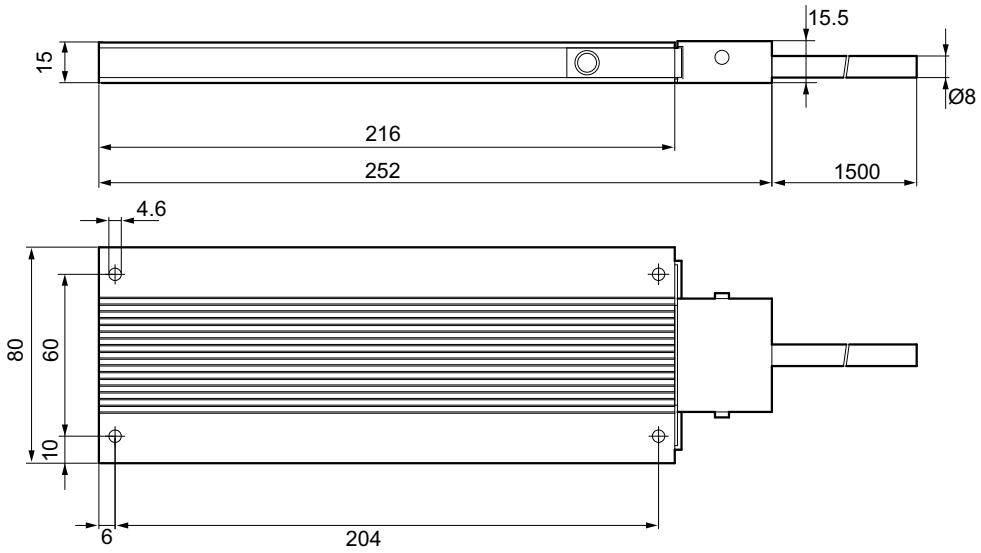
Dimension drawing of BW100-005/K-1.5

The following figure shows the dimensions of the external braking resistor BW100-005/K-1.5:



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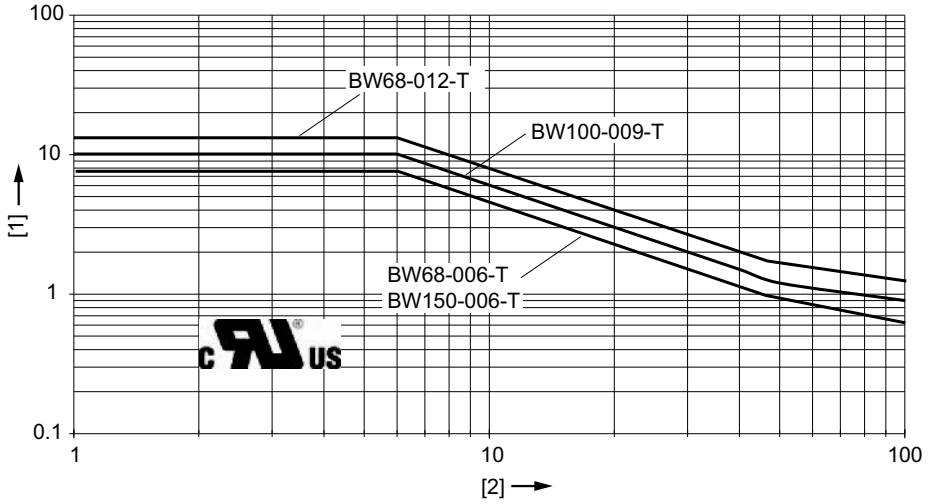
13.2.6 Technical data of BW150-006-T, BW100-009-T, BW068-006-T, and BW068-012-T

Power diagrams

The following figure shows the rating diagrams of the braking resistors BW150-006-T, BW100-009-T, BW068-006-T, and BW068-012-T:



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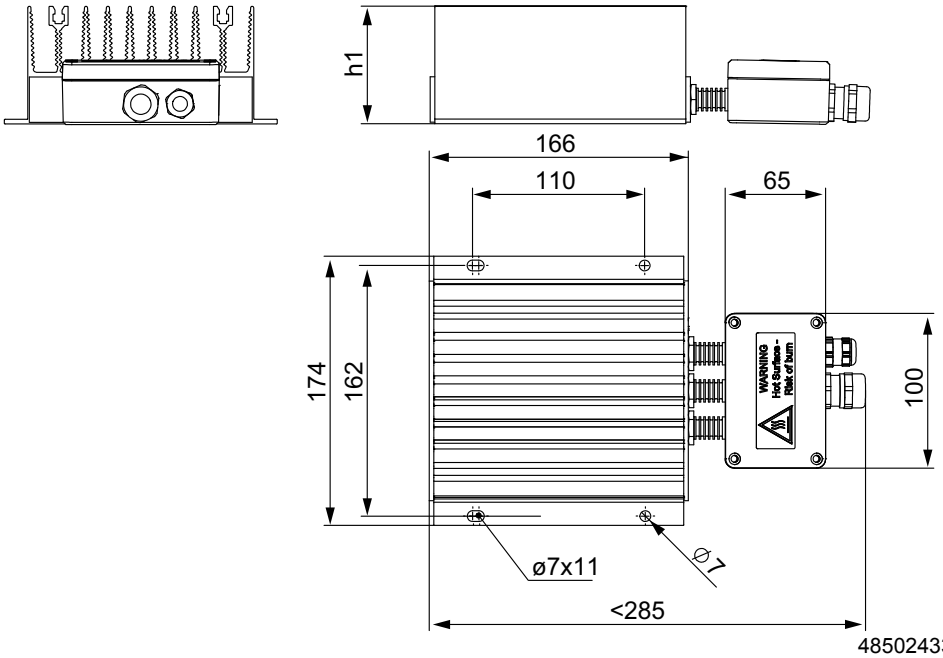
[1] Power in kW
[2] Cyclic duration factor cdf in %
cdf = cyclic duration factor of the braking resistor, based on a cycle time of 120 s.

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



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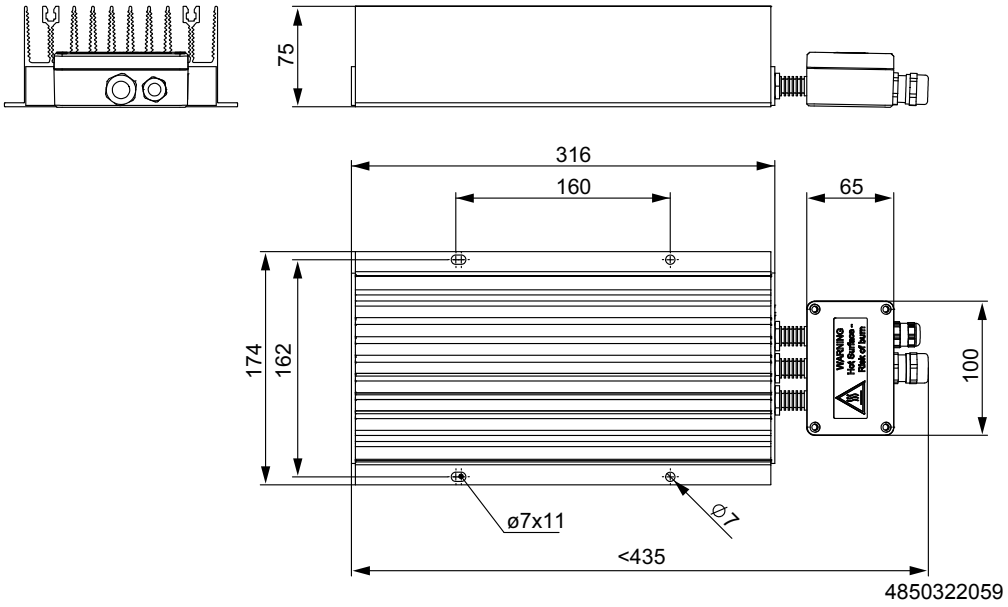
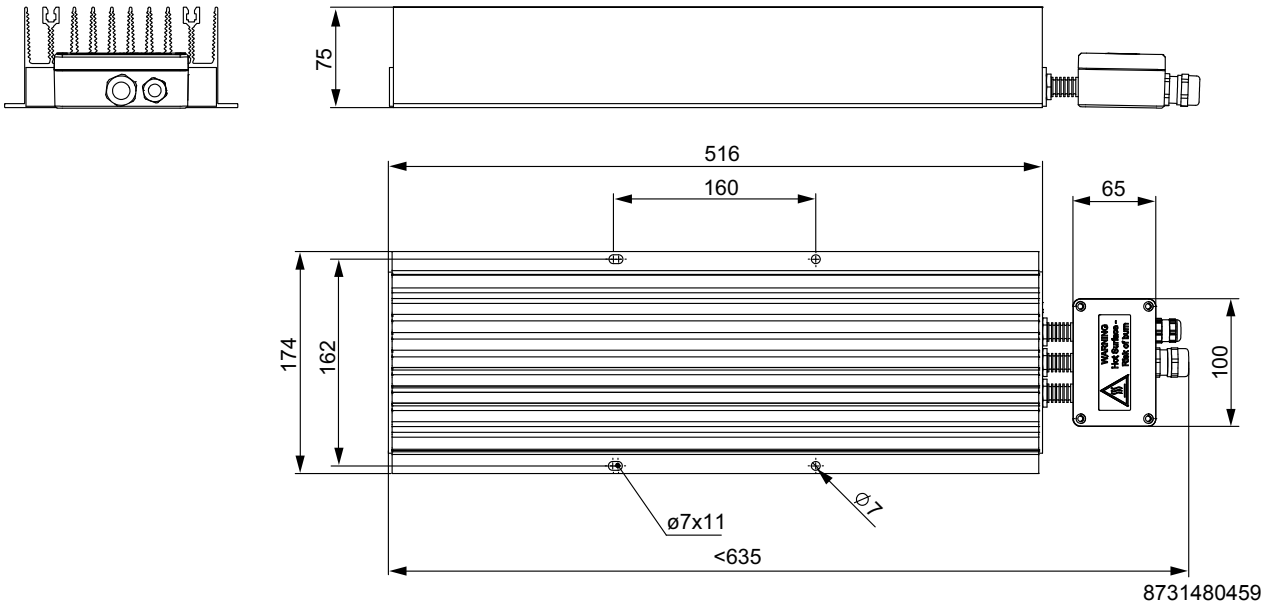
Dimension drawing of BW100-009-T

The following figure shows the dimensions of the external braking resistor BW100-009-T:



Dimension drawing of BW068-012-T

The following figure shows the dimensions of the external braking resistor BW068-012-T:



13.3 Technical data of the brake

13.3.1 Braking work, braking torque

Type	Braking torque [Nm]	Braking work per emergency braking operation [kJ]	Max. number of emergency braking operations[1)]	Braking work until maintenance [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 only after reaching the stop speed. This can occur in case of a controller inhibit signal, a drive fault (depending on the set fault response), or STO (depending on the parameter settings).

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.

13.3.2 Response and application times

Type	Braking torque [Nm]	Response time t_1 [ms]	Application time t_2 [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

13.4 ASEPTIC / ASEPTIC^{plus} variants

13.4.1 Surface protection

The properties of OS2 – OS4 in connection with ASEPTIC variants or OS4 in connection with ASEPTIC^{plus} variants are listed in chapter "Surface protection".

13.4.2 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.

13.4.3 Sealing material

Resistance to cleaning agents

The sealing material used in 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

13.5 Surface protection

13.5.1 General information

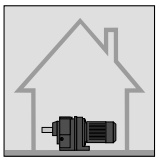
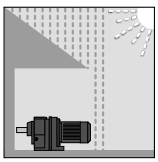
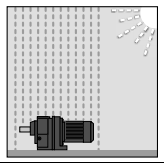
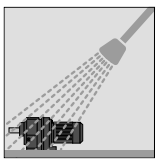
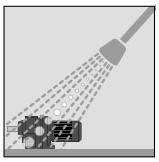
SEW-EURODRIVE offers the following optional protective measures for DRC motors that are operated under special ambient conditions.

- OS surface protection

Special optional protective measures are also available for the gear unit / motor, see "DRC Gearmotors" catalog.

13.5.2 Surface protection

Instead of standard surface protection, DRC motors 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	Application examples
Standard		Suitable for machines and systems in buildings and rooms indoors with neutral atmospheres. Similar to corrosivity category[1]: • C1 (negligible)	• Machines and systems in the automobile industry • Conveyor systems in logistics areas • Conveyor systems at airports
OS1		Suited 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: • C2 (low)	• Systems in saw mills • Hall gates • Agitators and mixers
OS2		Suited for environments with high humidity or mean atmospheric contamination, such as applications outdoors subject to direct weathering. Similar to corrosivity category: • C3 (moderate)	• Funiculars and chair-lifts • Applications in gravel plants
OS3		Suited 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: • C4 (high)	• Sewage treatment works • Port cranes • Mining applications
OS4		Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning, also with chemical cleaning agents. Similar to 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

13.5.3 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.

Providing these recommended cleaning agents and disinfectants are used and that 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®

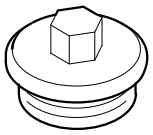
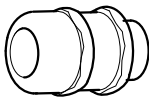
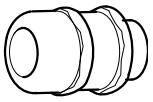
Cleaning agents	Product specification	Major ingredients	Concentration	Load cycle	Test temperature	Decorative changes[1)]	Changes in protective properties[1)]
P3-topax 19	Alkaline foam cleaning agent	Alkalis, surfactants, complexing agents	3%	20 min	60 °C	1	0
P3-topax 56	Acid foam cleansing agent	Acids, 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 cleansing agent for operational cleansing as TFC application	Alkalis, surfactants, complexing agents	4%	20 min	60 °C	1	0
P3-topactive 500	Acid cleansing agent for operational cleansing 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
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, to 5 = Very severe changes

13.6 Screw fittings

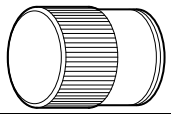
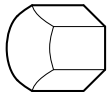
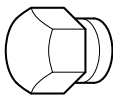
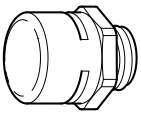
The following tables show the screw connections available from SEW-EURODRIVE:

13.6.1 Cable glands / screw plugs

Type of screw fitting	Figure	Contents	Size	Tightening torque[1)]	Part number
Screw plugs Hexagon (made of stainless steel)		10 pcs	M16 x 1.5	6.8 Nm	1 824 734 2
		10 pcs	M25 x 1.5	6.8 Nm	1 824 735 0
EMC cable gland (nickel-plated brass)		10 pcs	M16 x 1.5	4 Nm	1 820 478 3
		10 pcs	M25 x 1.5	7 Nm	1 820 480 5
EMC cable gland (made of stainless steel)		10 pcs	M16 x 1.5	4 Nm	1 821 636 6
		10 pcs	M25 x 1.5	7 Nm	1 821 638 2

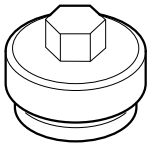
1) The specified torques must be adhered to with a tolerance of +/− 10%.

13.6.2 Screw fittings: plug connectors/pressure compensation

Type of screw fitting	Figure	Contents	Size	Tightening torque[1)]	Part number
M23 plug (made of stainless steel)		1 pcs	M23 x 1.5	Tighten fully	1 909 455 8
M12 plug for plug connectors with male thread (made of stainless steel)		10 pcs	M12 x 1.0	2.3 Nm	1 820 279 9
M12 plug for plug connectors with female thread (made of stainless steel)		10 pcs	M12 x 1.0	2.3 Nm	1 820 227 6
Pressure compensation fitting (made of stainless steel)		1 pcs	M16 x 1.5	4 Nm	1 820 409 0

1) The specified torques must be adhered to with a tolerance of +/− 10%.

13.6.3 Screw fittings: diagnostic interface / potentiometer

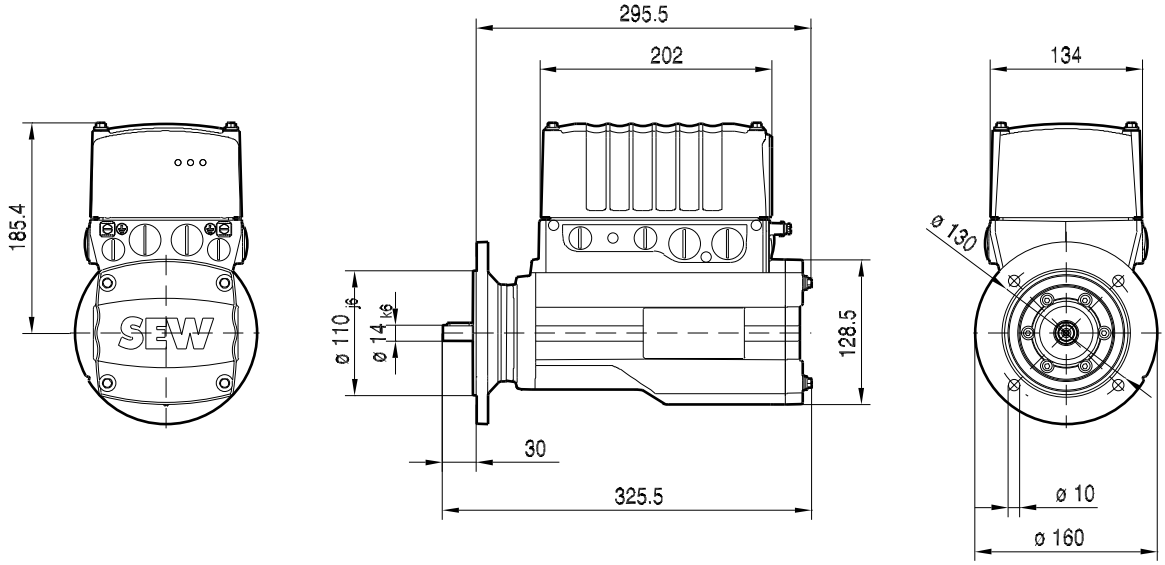
Type of screw fitting	Figure	Contents	Size	Tightening torque[1)]	Part number
Screw plug Hexagon For f1 potentiometer And diagnostic interface (made of stainless steel)		10 pcs	M24 x 1.5	6.8 Nm	1 824 107 7

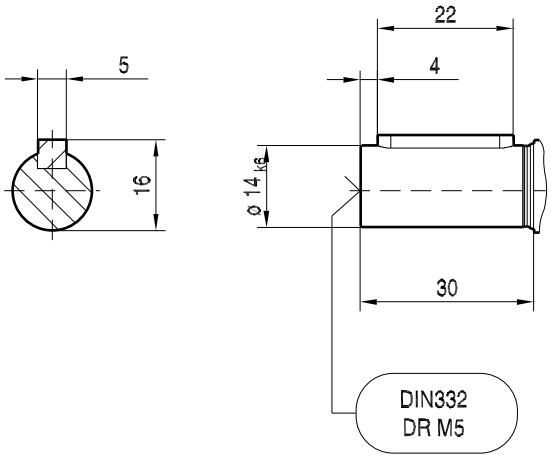
1) The specified torques must be adhered to with a tolerance of +/− 10%.

13.7 Dimension drawings

13.7.1 DRC1 with IEC flange[1)]

DRC1 08 104 00 12



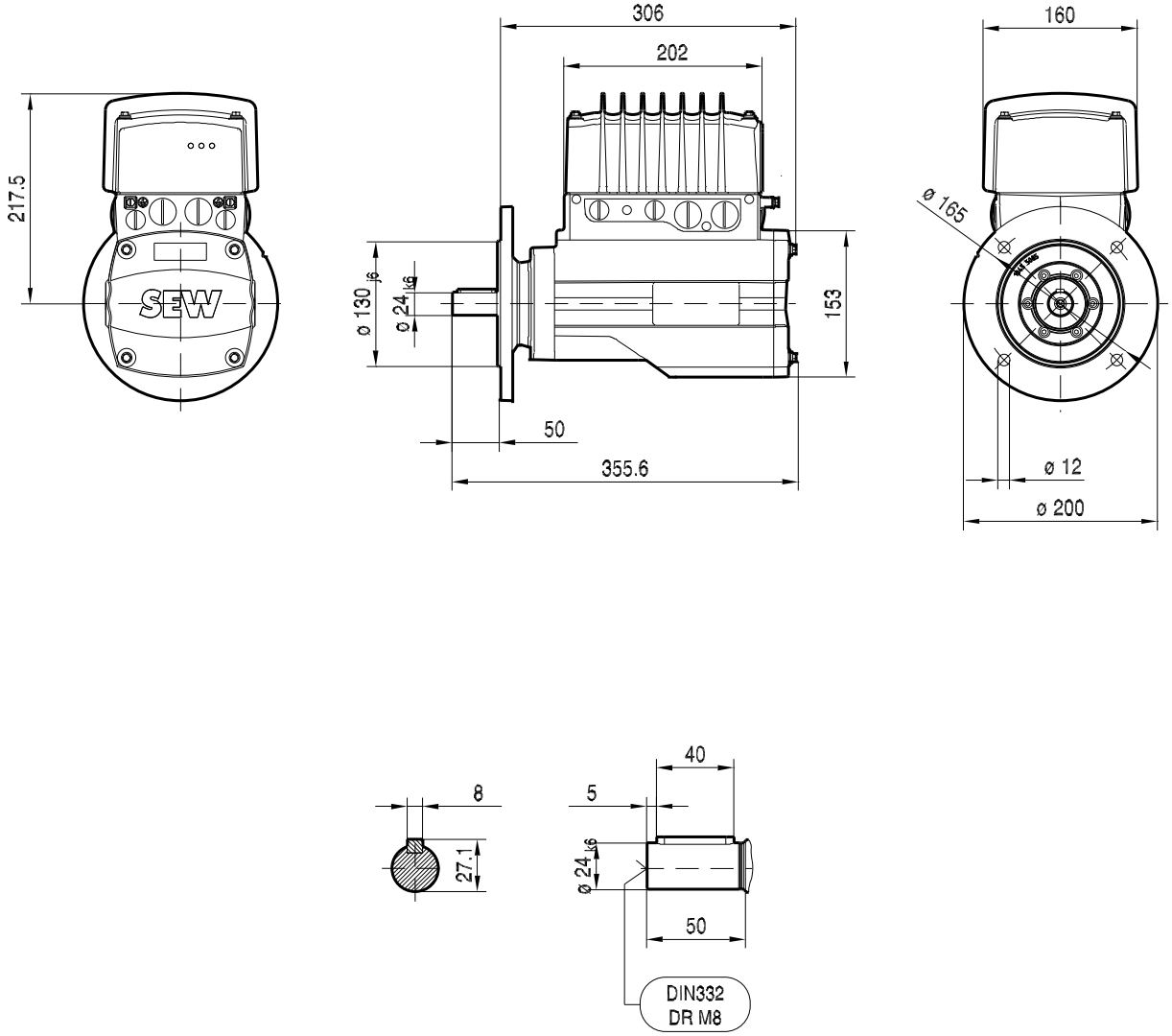


8733045515

1) For gearmotor dimension sheets, refer to the "DRC Gearmotors" catalog

13.7.2 DRC2 with IEC flange[1)]

DRC2 08 105 00 12

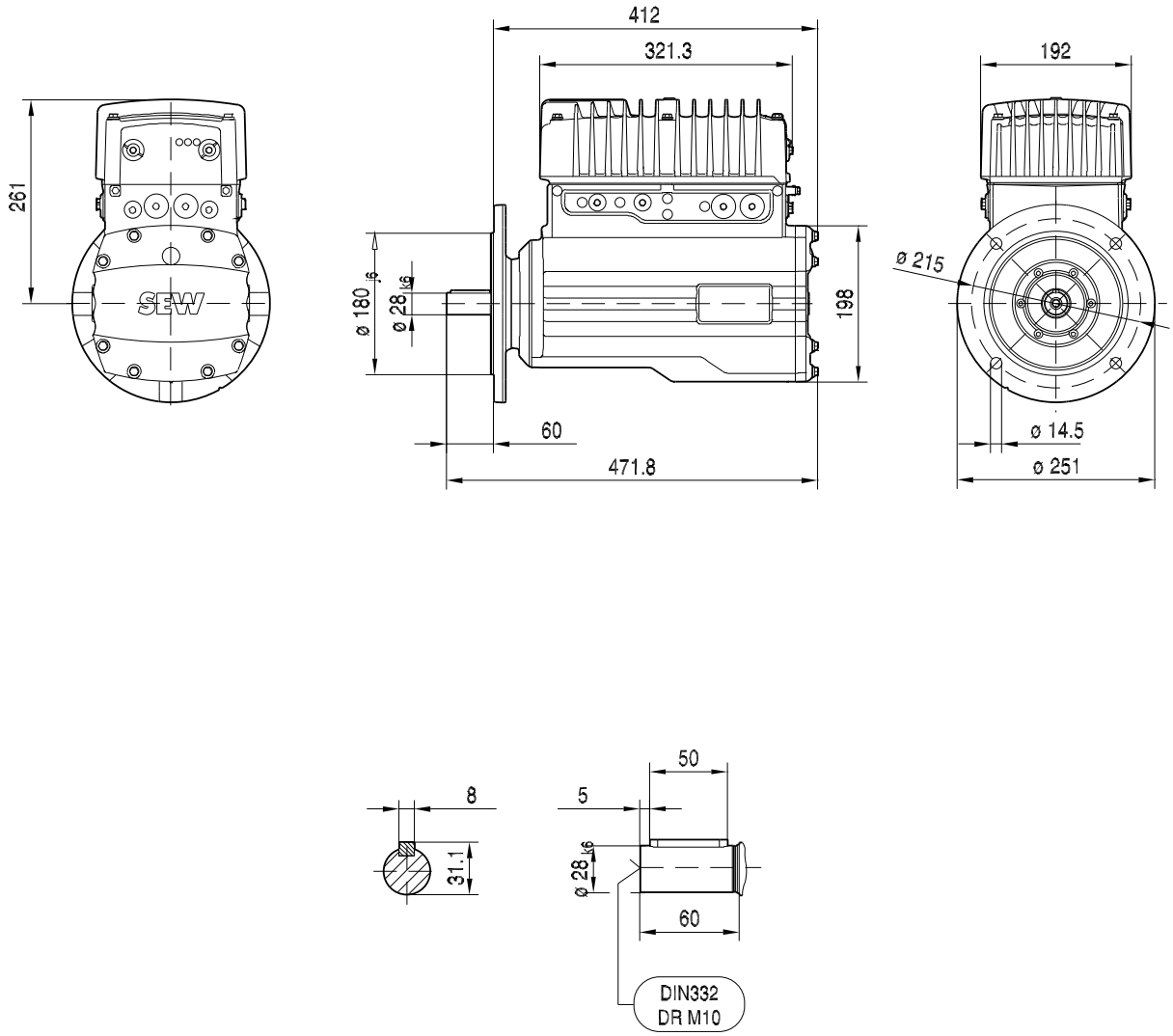


8733039755

1) For gearmotor dimension sheets, refer to the "DRC Gearmotors" catalog

13.7.3 DRC3/4 with IEC flange[1)]

DRC3/DRC4 08 309 00 13



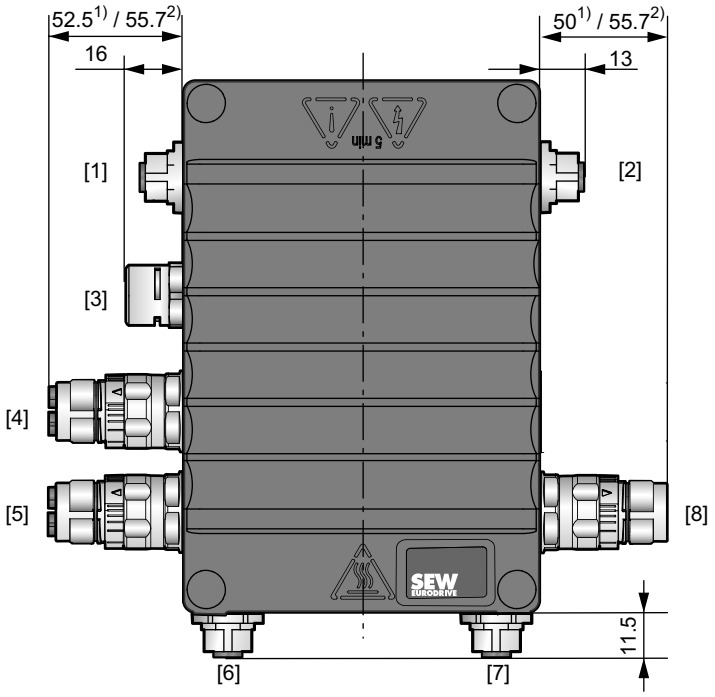
8733041675

1) For gearmotor dimension sheets, refer to the "DRC Gearmotors" catalog

13.7.4 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 more information, refer to chapter "Electrical Installation / Plug connector positions".



27021600405170827

1) "Straight" plug connector variant
2) "Right-angle" plug connector variant

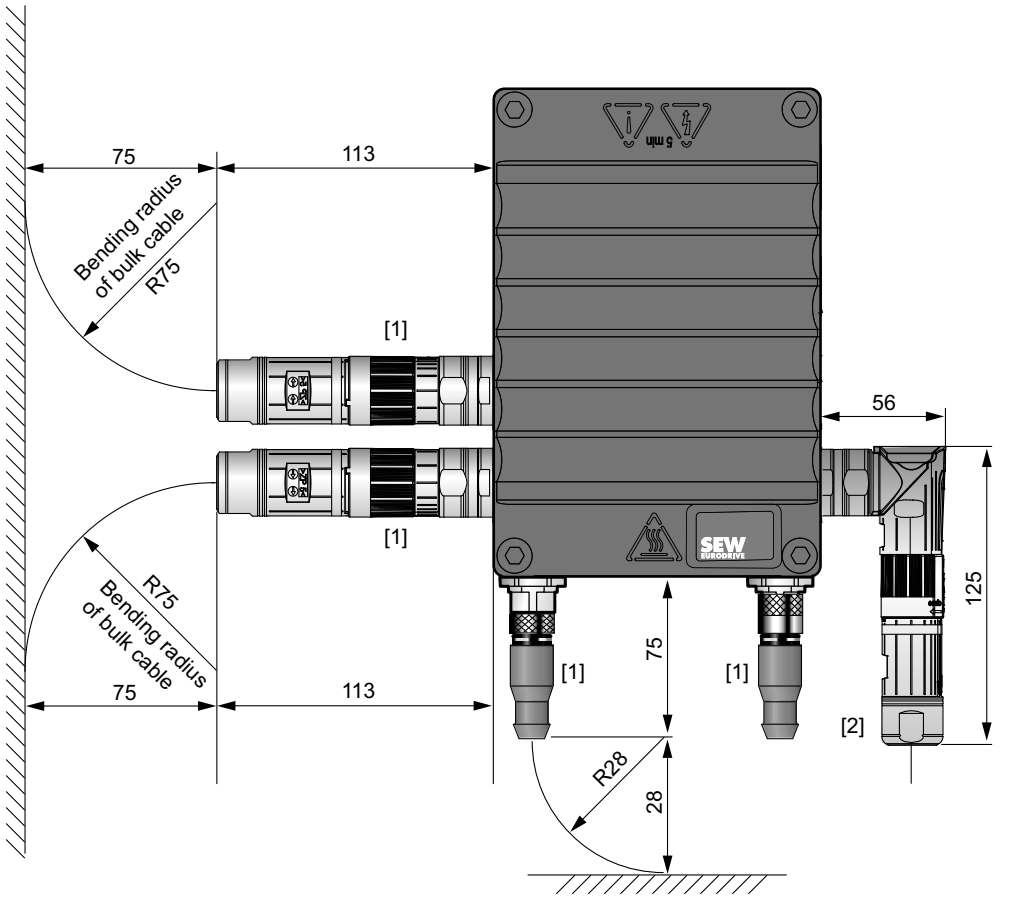
Key

[1]	X4271: AS-Interface communication interface
[2]	X5011: AS-Interface sensors
[3]	Pressure compensation fitting in connection with the optional package for wet areas (MOVIGEAR®) / ASEPTIC variant (DRC).
[4]	X1203_2: AC 400 V connection
[5]	X1203_1: AC 400 V connection
[6]	X5502: STO – IN
[7]	X5503: STO – OUT
[8]	X5132: Digital inputs/outputs

13.7.5 Plug connectors including mating connectors

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 chapter "Electrical Installation / Plug connector positions".



9007204039096587

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

14 EC declaration of conformity

EC Declaration of Conformity

SEW EURODRIVE

901340111

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

declares under sole responsibility that the

electronic motors of the series	**DRC1** **DRC2** **DRC3** **DRC4**	
possibly in connection with gear units of the series	**R..; RES** **F..** **K..; KES** **W..** **S..** **H..**	
are in conformity with		
Machinery Directive	**2006/42/EC**	**1)**
Low Voltage Directive	**2006/95/EC**	
EMC Directive	**2004/108/EC**	**4)**
Applied harmonized standards:	**EN ISO 13849-1:2008** **EN 61800-5-1:2007** **EN 61800-3:2004**	**5)**

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

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

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

Bruchsal	15.10.13	Johann Soder	
Place	Date	Managing Director Technology	a) b)

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

9347856907

15 Address list

Germany			
Headquarters **Production** **Sales**	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
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	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20

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Argentina			
Assembly **Sales**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australia			
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	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
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Belarus			
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Belgium			
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Service Competence Center	**Industrial Gears**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brazil			
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Brazil			
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	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 - Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br

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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. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn

China			
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
	Additional addresses for service in China provided on request!		

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Czech Republic			
Sales **Assembly** **Service**	**Hostivice**	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline / 24 Hour Service	HOT-LINE +420 800 739 739 (800 SEW SEW)	**Servis:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz

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

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

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Hollola**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	**Hollola**	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Production **Assembly**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

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

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline / 24 Hour Service		Tel. 01924 896911

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

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

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

India			
Registered Office **Assembly** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodrivein-dia.com

India			
Assembly **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

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

Italy			
Assembly **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 980 999 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

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

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

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

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

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

Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com

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

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

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

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

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

Mongolia			
Sales	**Ulan Bator**	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253	Tel. +976-70009997 Fax +976-70009997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn

Morocco			
Sales **Service**	**Mohammedia**	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

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

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

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

Nigeria			
Sales	**Lagos**	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria	Tel. +234 (0)1 217 4332 team.sew@eisnl.com http://www.eisnl.com

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

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

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 sew-py@sew-eurodrive.com.py

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Poland			
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa Hotline 24H Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro
Russia			
Assembly **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com
Serbia			
Sales	**Beograd**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	**Bratislava**	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 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 (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

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

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

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

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

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

Tanzania			
Sales	**Dar es Salaam**	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 uroos@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-EURODRİVE Sistemleri San. Ve TIC. Ltd. Sti 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

Ukraine			
Assembly **Sales** **Service**	**Dnipropetrovsk**	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск	Тел. +380 56 370 3211 Факс. +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

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

USA			
Production **Assembly** **Sales** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com

USA			
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

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

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

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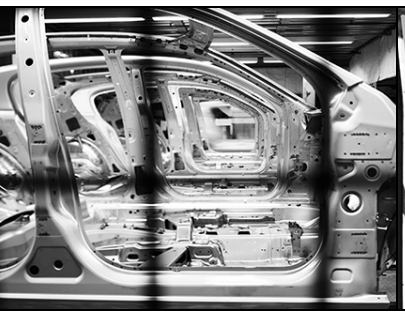

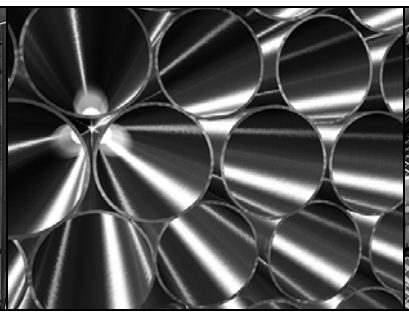


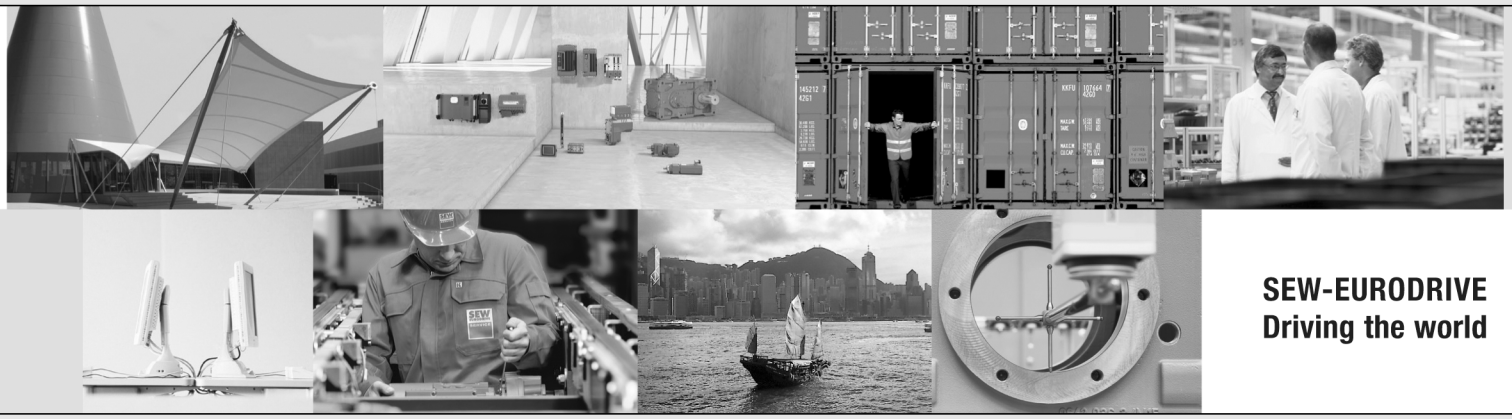

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Driving the world

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