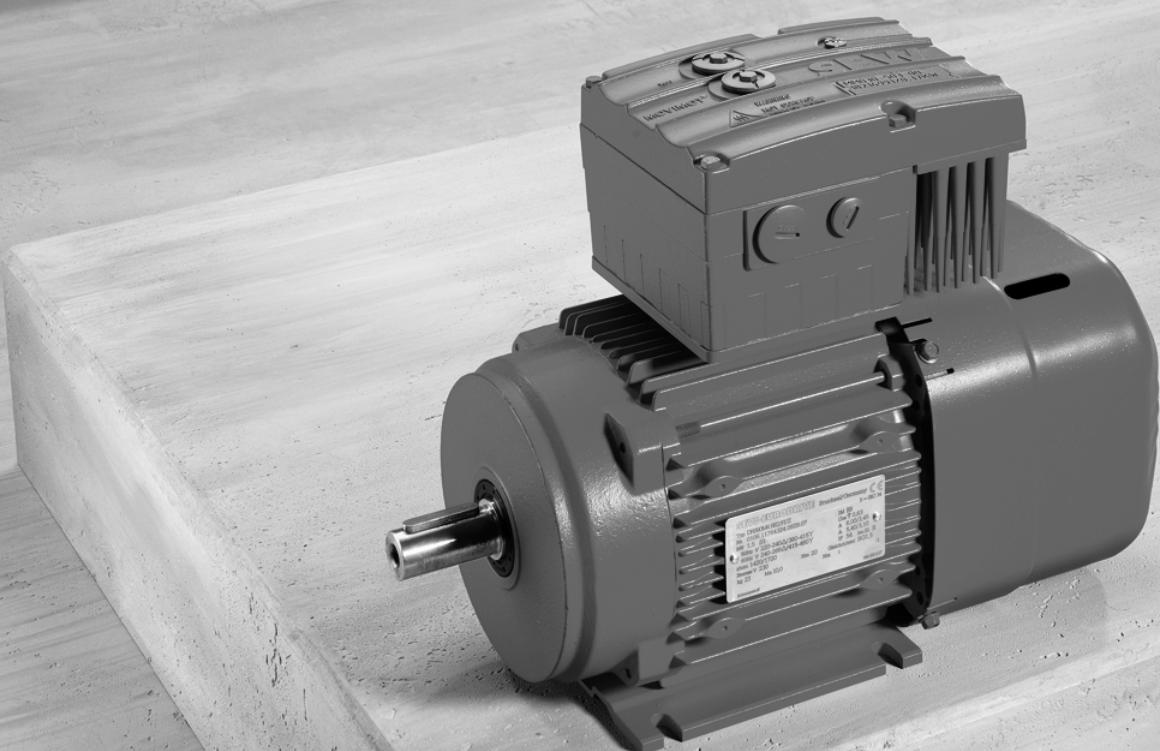


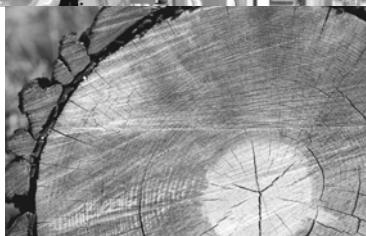
**SEW
EURODRIVE**



MOVIMOT® MM..D With AC Motor DRS/DRE/DRP

Edition 12/2007
11675012 / EN

Operating Instructions



SEW
EURODRIVE



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1 General Information

1.1 Structure of the safety notes

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

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

1.2 Rights to claim under limited warranty

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

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

1.3 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the MOVIMOT® MM..D inverter and to achieve the specified product characteristics and performance requirements. 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.



2 Safety Notes

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

2.1 General

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

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

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

2.2 Target group

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

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

All activity in the other areas of transportation, storage, operation, and disposal must be carried out by persons who are appropriately trained.

2.3 Designated use

MOVIMOT® inverters are components intended for installation in electrical systems or machines.

In case of installation in machines, startup of the MOVIMOT® inverters (i.e. start of designated operation) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 98/37/EC (machine guideline).

Startup (i.e. the start of designated use) is only permitted under observance of the EMC (89/336/EEC) directive.

MOVIMOT® inverters comply with the regulations of the Low Voltage Directive 2006/95/EC. The standards given in the declaration of conformity are used for the MOVIMOT® inverter.

Technical data and information on the connection requirements are provided on the nameplate and in the documentation; these must be observed under all circumstances.

2.3.1 Safety functions

The MOVIMOT® inverter may not perform safety functions unless these functions are described and expressly permitted.



2.3.2 Hoist applications

MOVIMOT® inverters are suitable for hoist applications to a limited degree only, see sec. "Additional function 9" (siehe page 67).

MOVIMOT® inverters are not designed for use as a safety device in hoist applications.

2.4 Other applicable documentation

Note also the following documentation:

- "AC Motors DRS/DRE/DRP" operating instructions

2.5 Transportation, storage

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

2.6 Installation

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

Protect the MOVIMOT® inverters from improper strain.

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

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



2.7 Electrical connection

Observe the applicable national accident prevention guidelines when working on live MOVIMOT® drive inverters (e.g. BGV A3).

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

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

Preventive measures and protection devices must correspond to the regulations in force (e.g. EN 60204 or EN 61800-5-1).

2.8 Safe disconnection

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

2.9 Operation

Systems with integrated MOVIMOT® inverters 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 might be necessary for applications with increased risk potential. Changes to the MOVIMOT® inverter using the operating software are permitted.

Do not touch live components and power connections immediately after separation of the MOVIMOT® inverter from the supply voltage because there may still be some charged capacitors. Wait at least for 1 minute after having switched off the supply voltage.

As soon as supply voltages are present at the MOVIMOT® inverter, the terminal box must be closed (i.e. the MOVIMOT® inverter must be bolted on).

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

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

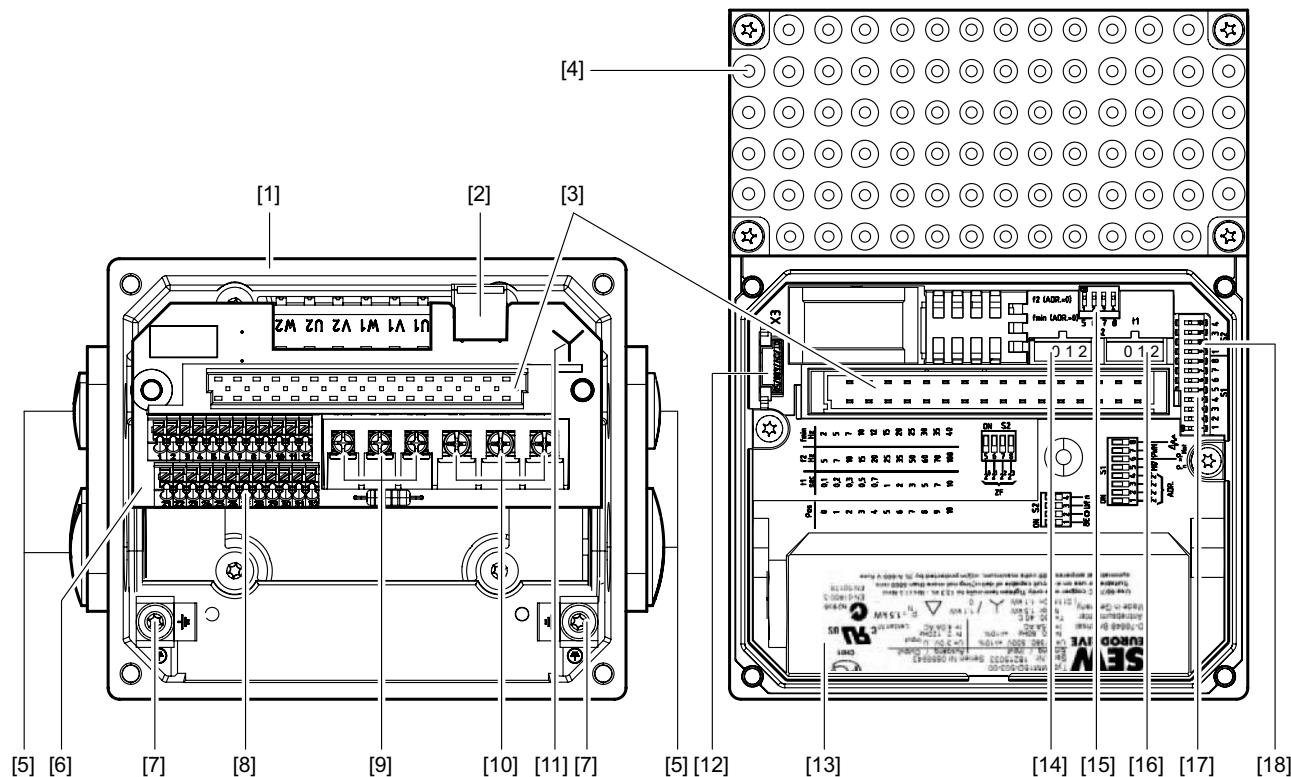
Danger of burns: The surface temperature of the MOVIMOT® drive and of external options, e.g. the heat sink of the braking resistor, can exceed 60 °C during operation!



3 Unit Design

3.1 MOVIMOT® inverter

The following figure shows the terminal box and the bottom of the MOVIMOT® inverter:

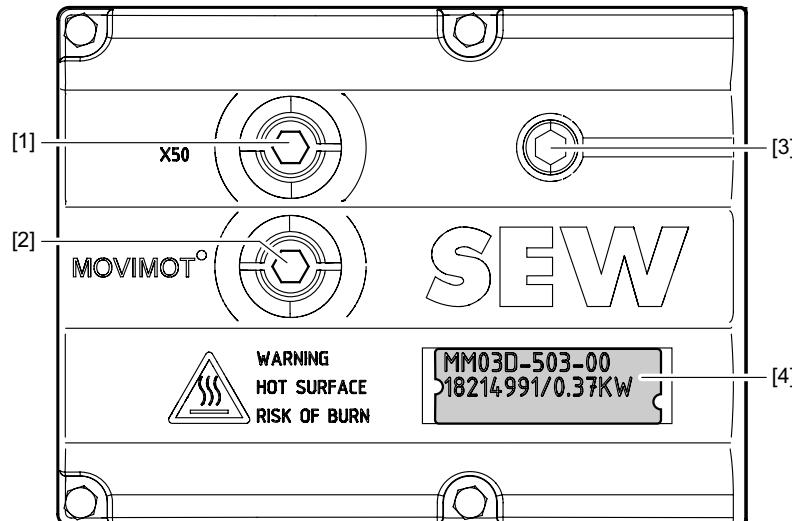


615683595

- [1] Terminal box
- [2] X10: Plug connectors for option BEM
- [3] Plug connector connection unit - MOVIMOT® inverter
- [4] MOVIMOT® inverter with heat sink
- [5] Cable glands
- [6] Connection unit with terminals
- [7] Screw for PE connection \oplus
- [8] X5, X6: Electronics terminal strips
- [9] X1: Connection for brake coil (motors with brake) or braking resistor (motors without brake)
- [10] X1: Mains connection L1, L2, L3
- [11] Connection type identification
- [12] Drive-ID module
- [13] Inverter nameplate
- [14] Setpoint switch f2 (green)
- [15] DIP switches S2/5 ... S2/8
- [16] switch t1 for integrator ramp (white)
- [17] DIP switches S1/1...S1/8
- [18] DIP switches S2/1...S2/4



The following figure shows the top of the MOVIMOT® inverter:



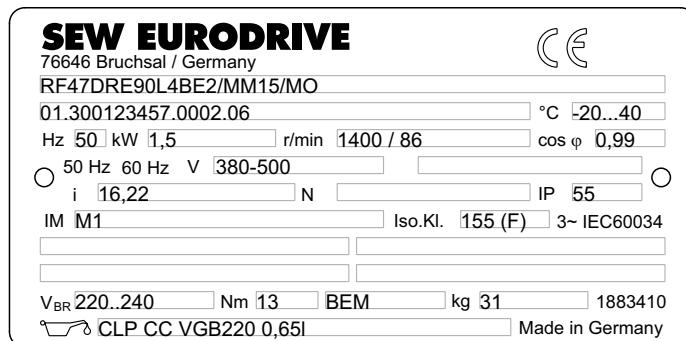
514402955

- [1] X50: Diagnostics interface with screw plug
- [2] Setpoint potentiometer f1 with screw plug
- [3] Status LED
- [4] Unit identification



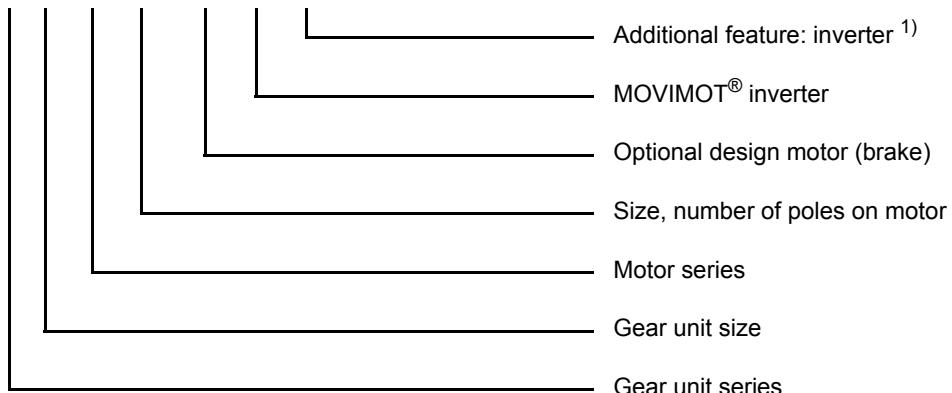
3.2 Unit designations

3.2.1 Sample motor nameplate



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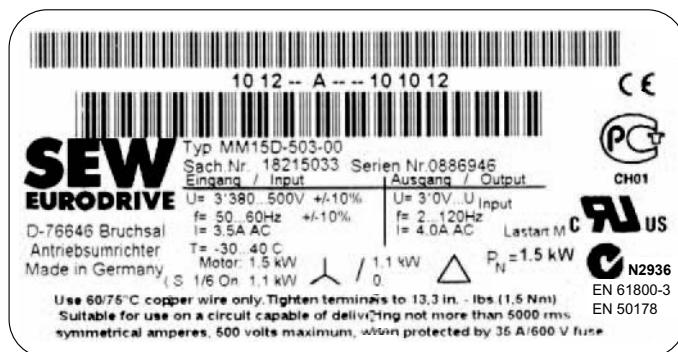
RF 47 DRE 90L4 BE/MM15/MO



1) The nameplate only displays options installed at the factory.

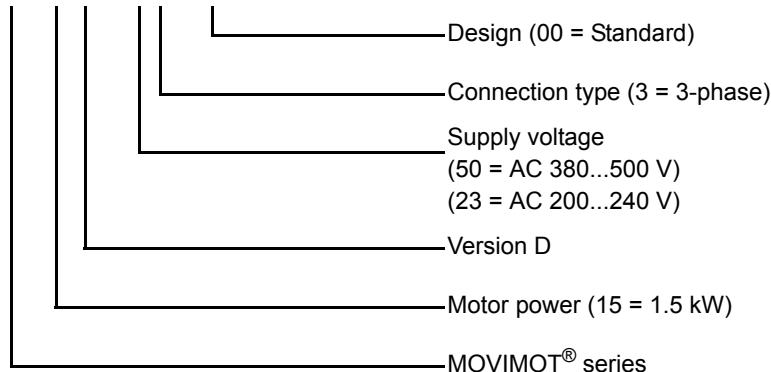


3.2.2 Sample inverter nameplate



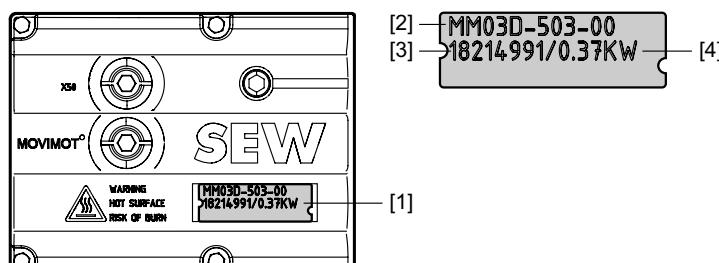
373932683

MM 15 D – 503 – 00



3.2.3 Unit identification

The unit identification [1] on the top of the MOVIMOT® inverter provides information about the inverter type [2], inverter part number [3], unit power [4].

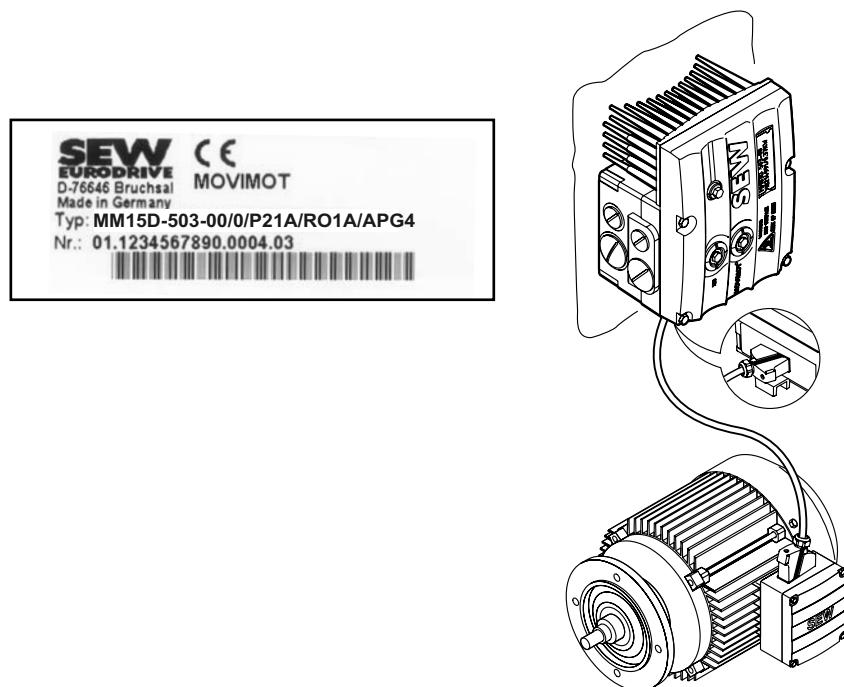


457916555



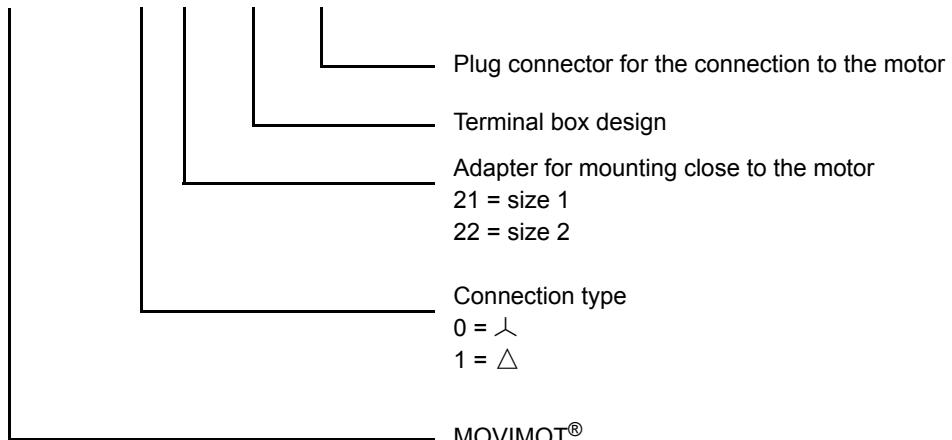
3.2.4 "Mounting close to the motor" design with option P2.A

The following illustration shows an example of the MOVIMOT® inverter mounted close to the motor with corresponding nameplate and unit designation:



457921547

MM15D-503-00/0/P21A/RO1A/APG4





4 Mechanical Installation

4.1 MOVIMOT® gearmotor

4.1.1 Before you start

Only install the MOVIMOT® drive if:

- the entries on the nameplate of the drive match the voltage supply system.
- The drive is undamaged (no damage caused by transportation or storage).
- It is certain that the following requirements have been met:
 - Ambient temperature corresponds to the specifications in sec. "Technical Data". Note that the temperature range of the gear unit may also be restricted (see gear unit operating instructions).
 - No oil, acid, gas, vapors, radiation, etc.

*Installation
tolerances*

The following tables shows the permitted tolerances of the shaft ends and flanges of the MOVIMOT® drive.

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



4.1.2 Installing MOVIMOT®

Observe the following notes for mounting the MOVIMOT® drive:

- Install/mount the MOVIMOT® drive only in the mounting position specified on the motor nameplate on a level, vibration-free, and torsionally rigid support structure.
- Clean the output shafts thoroughly to ensure they are free of anti-corrosion agents (use a commercially available solvent). Do not allow the solvent to penetrate the bearings and shaft seals – this could damage the material.
- Carefully align the MOVIMOT® inverter and the motor, to avoid placing any unacceptable strain on the motor shafts (observe permissible overhung load and axial load data!).
- Do not butt or hammer the shaft end.
- Use an appropriate cover to prevent objects or fluids from entering motors in vertical mounting positions.
- Ensure an unobstructed cooling air supply and that air heated by other apparatus cannot be drawn in or reused.
- Balance components for subsequent mounting on the shaft with a half key (output shafts are balanced with a half key).
- Existing condensation drain holes must be sealed with plastic plugs. They must not be opened unless needed.
- Open condensation drain holes are not permitted. If condensation drain holes are open, higher enclosures are no longer possible.

	<p>STOP!</p> <p>The degree of protection specified in the technical data only applies if the MOVIMOT® inverter is properly installed.</p> <p>When the MOVIMOT® inverter is removed from the connection box, it might be damaged by humidity or dust.</p> <ul style="list-style-type: none"> • Protect the MOVIMOT® inverter when it is removed from the connection box.
--	---

4.1.3 Installation in damp locations or in the open

Observe the following notes for mounting the MOVIMOT® drive in damp areas or in the open:

- Use suitable cable glands for the supply leads (use reducing adapters if necessary).
- Coat the threads of cable glands and filler plugs with sealing compound and tighten them well; then coat them again.
- Seal the cable entries well.
- Clean the sealing faces of the MOVIMOT® inverter well before re-assembly.
- If the corrosion protection coating is damaged, restore the coating.
- Check enclosure according to nameplate.



4.2 MLU11A/MLG..A option

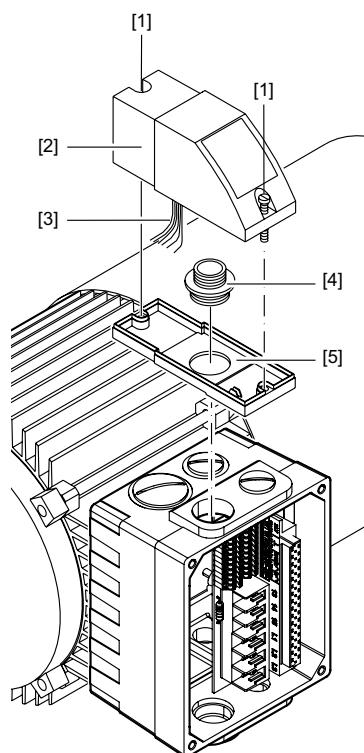
4.2.1 Scope of delivery

- MLU11A / MLU21A / MLG..A upper part [2]
- 2 screws [1]
- Transit bolt [4]
- MLU11A / MLU21A / MLG..A lower part [5]

4.2.2 Assembly

1. Remove a screw plug on the MOVIMOT® terminal box.
2. Fix the lower part [5] on the MOVIMOT® terminal box and fasten it with a transit bolt [4] (tightening torque 2.5 Nm / 22 lb.in).
3. Route the connection cable [3] through the transit bolt [4] into the inside of the MOVIMOT® terminal box.
4. Fit the upper part [2] onto the lower part [5] and fasten it with two screws [1] (tightening torque 0.9 Nm / 8 lb.in).

	STOP!
Install the option only in the position shown in the following figure!	



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For more information about connecting the MLU11A/MLU21A option, refer to sec. "Connection of option MLU11A/MLU21A" (siehe page 38).

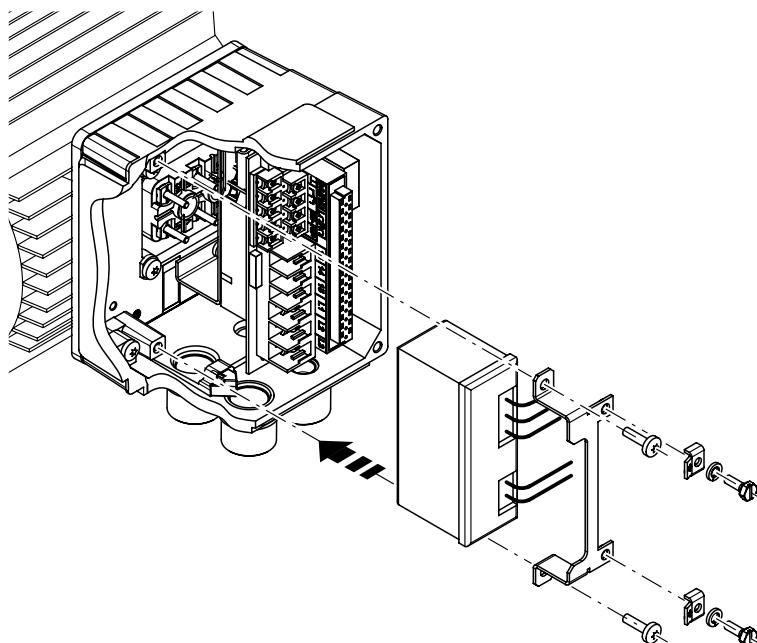
For more information about connecting the MLG..A option, refer to sec. "Connection of option MLG..A" (siehe page 39).



4.3 MLU13A option

Option MLU13A is generally installed in the modular terminal box at the factory. If you have any questions about retrofitting the option, do not hesitate to contact the SEW-EURODRIVE service.

	STOP!
	<p>Installation is only permitted in combination with the modular terminal box of MOVIMOT® MM03D-503-00...MM15D-503-00 or MM03D-233-00...MM07-233-00.</p> <p>The following figure depicts an installation example. In general, the installation depends on the used terminal box and on other installed options, if there are any.</p>



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For more information about connecting the MLU13A option, refer to sec. "Connection of option MLU13A" (siehe page 38).

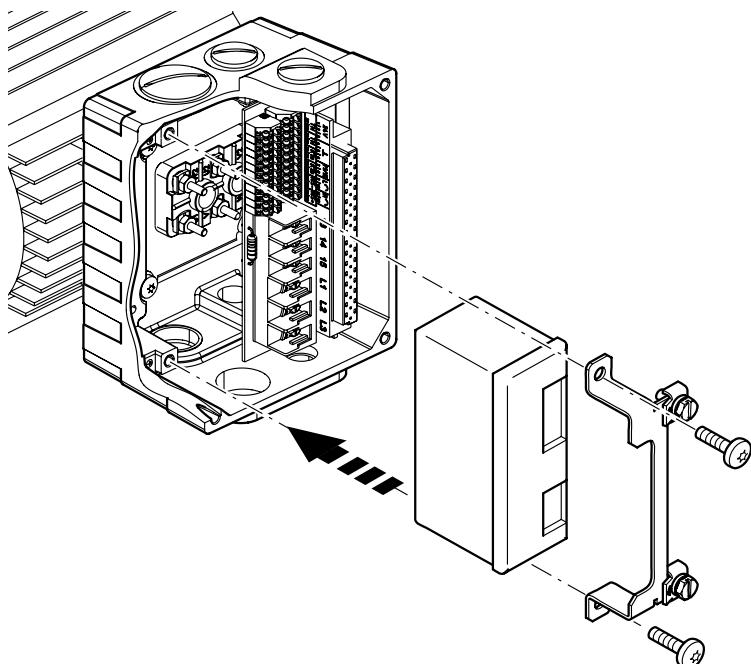


4.4 MNF11A option

Option MNF11A is generally installed in the modular terminal box at the factory. If you have any questions about retrofitting the option, do not hesitate to contact the SEW-EURODRIVE service.

	STOP!
	<p>Installation is only permitted in combination with the modular terminal box of MOVIMOT® MM03D-503-00...MM15D-503-00 or MM03D-233-00...MM07D-233-00.</p> <p>The following figure depicts an installation example. In general, the installation depends on the used terminal box and on other installed options, if there are any.</p>

Install option MNF11A using 2 screws and a retaining plate according to the following figure.



458316555

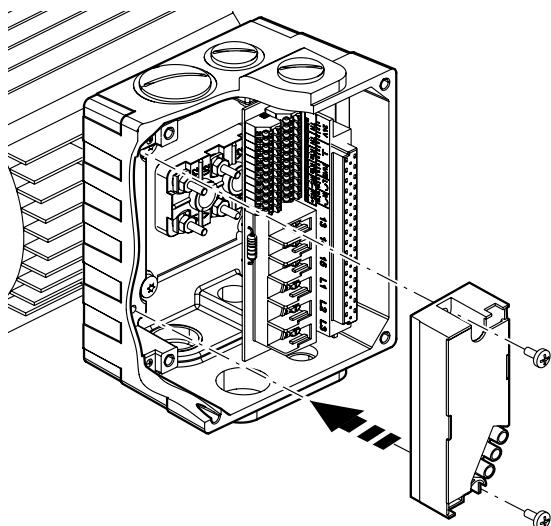
For more information about connecting the MNF11A option, refer to sec. "Connection of option MNF11A" (siehe page 40).



4.5 URM/BEM option

The URM and BEM options are generally installed in the terminal box at the factory. If you have any questions about retrofitting options URM or BEM, do not hesitate to contact the SEW-EURODRIVE service.

Install the URM/BEM option using two screws according to the following figure:



458307467

For more information about connecting the URM option, refer to sec. "Connection of option URM" (siehe page 41).

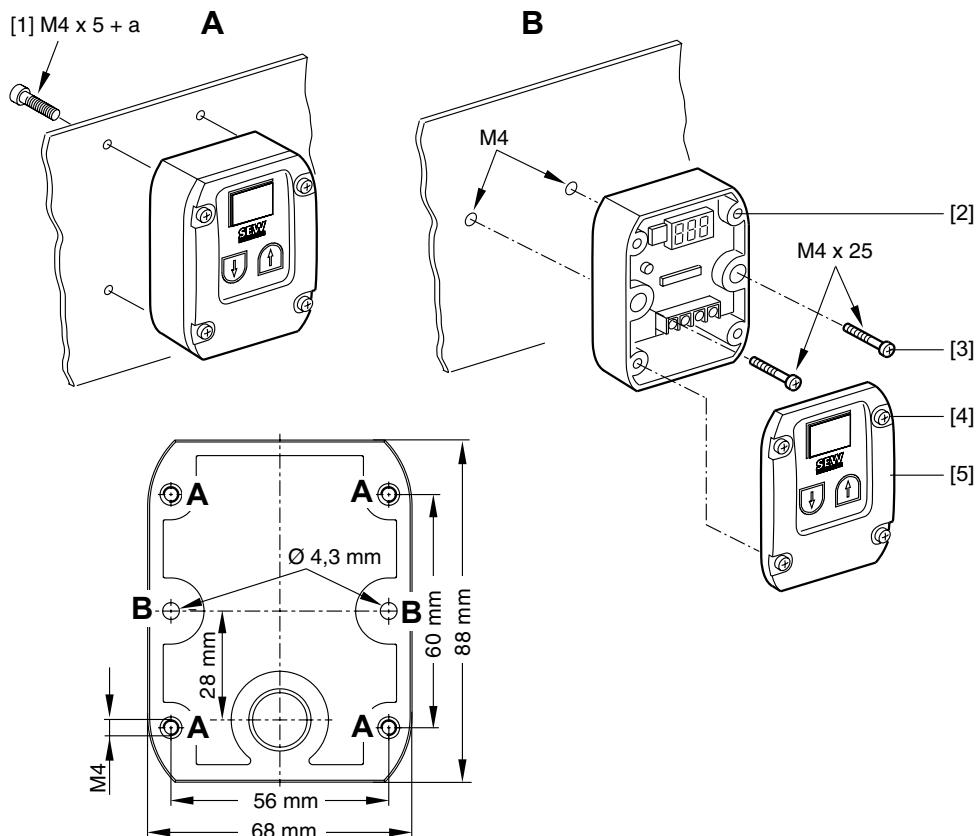
For more information about connecting the BEM option, refer to sec. "Connection of option BEM" (siehe page 42).



4.6 Installing MBG11A

There are two ways to mount option MBG11A to a wall:

- **A:** Installation from behind using 4 threaded holes
(Tightening torque for retaining screw [1] 1.6...2.0 Nm / 14...18 lb.in)
- **B:** Installation from the front using 2 retaining holes
(Tightening torque for retaining screw [3] 1.6...2.0 Nm / 14...18 lb.in)



322404747

a = Wall thickness

Screws are not included in the scope of delivery!

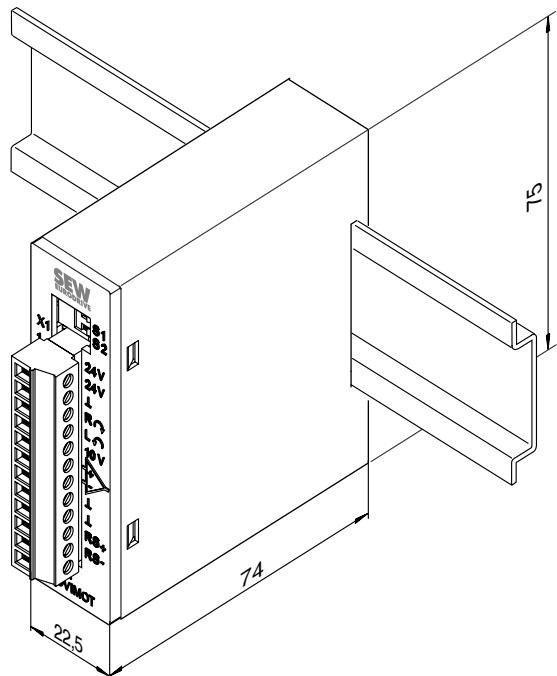
Fit the upper part [5] onto the lower part [2] and fasten it with two screws [4] (tightening torque 0.3 Nm / 2.6 lb.in).

For more information about connecting the MBG11A option, refer to sec. "Connection of option MBG11A" (siehe page 43).



4.7 MWA21A option

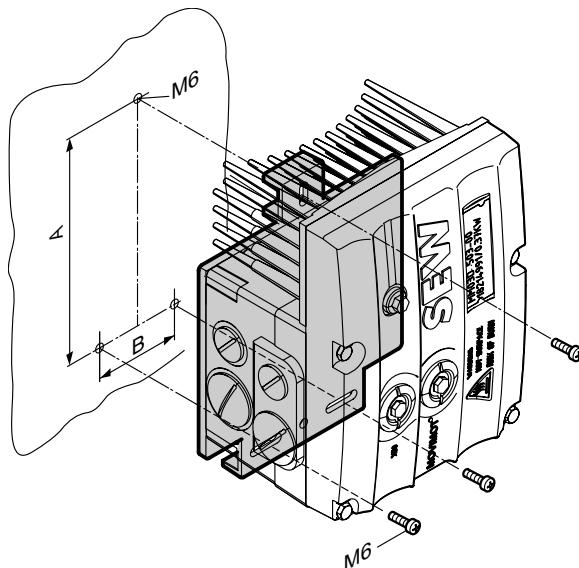
Install option MWA21A in the control cabinet on a mounting rail (EN 50022):





4.8 *Installing the MOVIMOT® inverter close to the motor with option P2.A*

The following illustration shows the mounting dimensions for installing the MOVIMOT® inverter with option P2A close to the motor:



458277771

	A	B
MM03D503-00...MM15D-503-00 MM03D233-00...MM07D-233-00	140 mm	65 mm
MM22D503-00...MM40D-503-00 MM11D233-00...MM22D-233-00	170 mm	65 mm



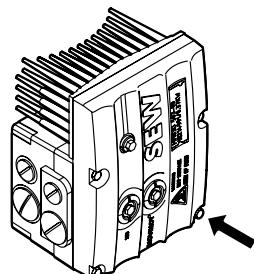
Mechanical Installation

Tightening torques

4.9 Tightening torques

4.9.1 MOVIMOT® inverter

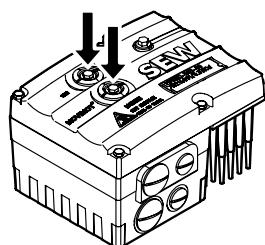
Tighten the screws on the MOVIMOT® inverter using 3.0 Nm (27 lb.in) working diagonally across.



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4.9.2 Screw plugs

Tighten screw plugs of potentiometer f1 and connection X50 using 2.5 Nm (22 lb.in).



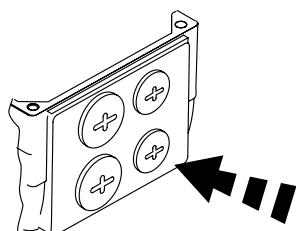
458570379

4.9.3 Cable glands

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

4.9.4 Blanking plug cable entries

Tighten blanking plug screws with 2.5 Nm (22 lb.in).

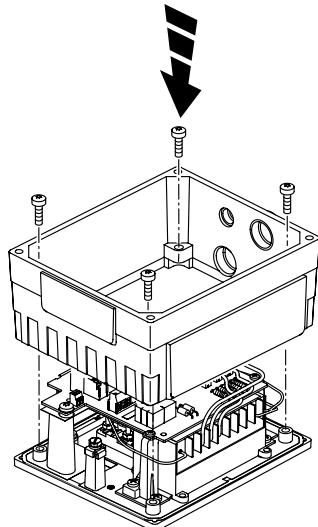


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4.9.5 Modular terminal box

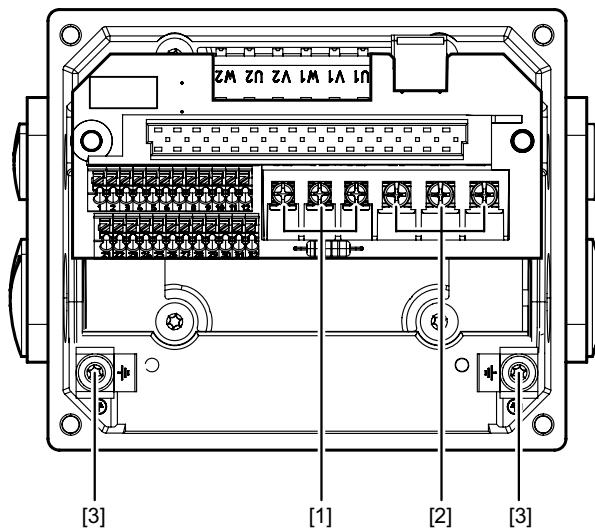
For fastening the terminal box on the mounting plate, tighten screws using 3.3 Nm (29 lb.in).



322786187

4.9.6 Tightening torques for terminals

Use the following tightening torques for terminals during installation:



458605067

- [1] 0.8 - 1.1 Nm (7 ... 10 lb.in)
- [2] 1.2 - 1.6 Nm (11 ... 14 lb.in)
- [3] 2.0 - 2.4 Nm (18 ... 21 lb.in)

4.9.7 URM/BEM/MNF11A option

For installing options URM, BEM and MNF11A in the terminal box, tighten screws using 2.0 (18 lb.in).



5 Electrical Installation

5.1 Installation instructions

5.1.1 Connecting supply system leads

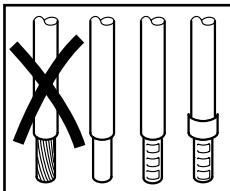
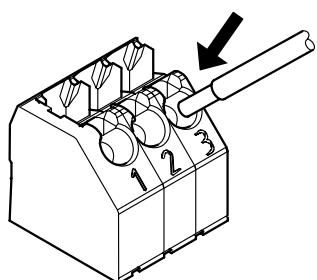
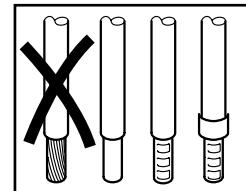
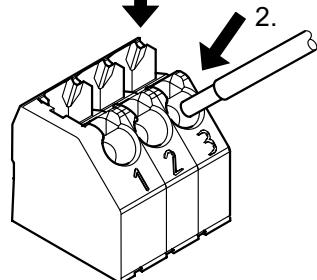
- The rated voltage and frequency of the MOVIMOT® inverter must correspond to the data for the power supply system.
- Cable cross section: according to input current I_{mains} for rated power (see sec. "Technical Data").
- Permitted cable cross section of MOVIMOT® terminals (does not apply to field distributors).

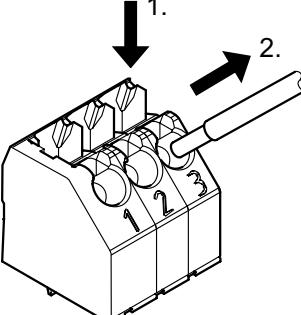
Power terminals	Control terminals
1.0 mm ² - 4.0 mm ² (2 x 4.0 mm ²)	0.5 mm ² - 1.0 mm ²
AWG17 – AWG12 (2 x AWG12)	AWG20 – AWG17
<ul style="list-style-type: none"> • For single assignment: Only connect single-wire conductors or flexible conductors with conductor end sleeve (DIN 46228 part 1, material E-CU) <u>with or without insulating shrouds</u> • For double assignment: Only connect flexible conductors with conductor end sleeve (DIN 46228 part 1, material E-CU) <u>without insulating shrouds</u> 	Only connect single-wire conductors or flexible conductors with or without conductor end sleeve (DIN 46228 part 1, material E-CU)

- Install line fuses at the beginning of the power supply cable behind supply bus junction (see the section "Connection of MOVIMOT® basic unit", F11/F12/F13). Use D, DO, NH fuses or circuit breakers. Select the fuse size according to the cable cross section.
- SEW recommends using earth-leakage monitors with pulse code measuring in voltage supply systems with a non-earthed star point (IT systems). Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter.



5.1.2 Using the tension spring terminals X5/X6

Connecting the conductor without pushing the activation button	Connecting the conductor, first pressing the activation button
  665224843	  665262475
Single-wire conductors and flexible conductors with conductor end sleeves can be installed directly (without tool) up to two cross-section sizes below the rated cross-section.	You will need to press the activation 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.

Removing the conductor, first pressing the activation button
 481046155

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



5.1.3 Earth-leakage circuit breakers

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

	WARNING! Wrong type of earth-leakage circuit breaker installed. Severe or fatal injuries. MOVIMOT® can cause direct current in the protective earth. In cases where an earth-leakage circuit breaker is used for protection against direct or indirect contact, only install a type B earth-leakage circuit breaker on the power supply end of the MOVIMOT® inverter.
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5.1.4 Input contactor

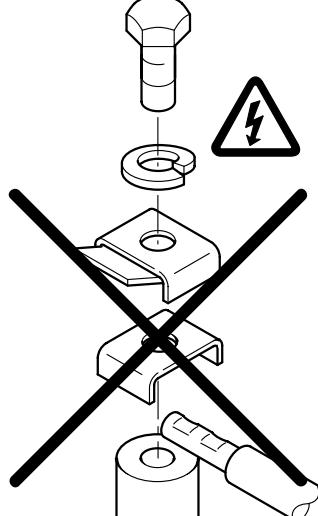
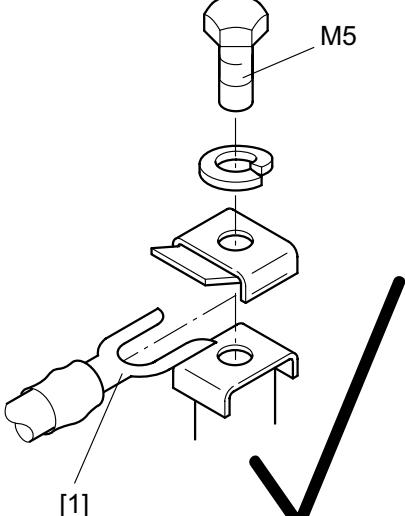
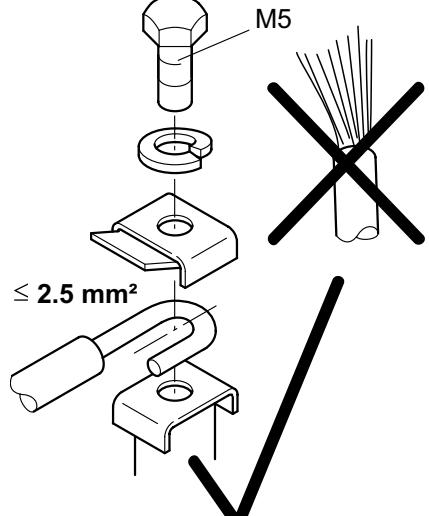
- Only use a contactor of utilization category AC3 (EN 60947-4-1) as a mains contactor.

	STOP! <ul style="list-style-type: none"> • Do not use the K11 input contactor (see wiring diagram (siehe page 32)) for jog mode, but only for switching the inverter on and off. For jog mode, use the commands "CW/Stop" or "CCW/Stop". • Observe a minimum switch-off time of 2 s for the supply system contactor K11.
---	--



5.1.5 Notes on PE connection

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

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

[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 note:

- Route a second PE conductor with the cross section of the supply system lead in parallel to the protective earth via separate terminals or use a copper protective earth conductor with a cross section of 10 mm².



5.1.6 EMC-compliant installation

Frequency inverters cannot be operated by themselves as defined by the law dealing with electromagnetic compatibility. Only when integrated in a drive system, they can be evaluated with respect to EMC. Conformity is declared for a described, CE-typical drive system. More detailed information can be found in these operating instructions.

	NOTES
	<ul style="list-style-type: none"> • This is a product with restricted availability in accordance with IEC 61800-3. It may cause EMC interference. In this case, the operator may need to implement appropriate measures. • For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

5.1.7 Installation altitude above 1000 m above sea level

MOVIMOT® drives with supply voltages of 200 to 240 V or 380 to 500 V can be used at altitudes above 1,000 msl up to 4,000 msl under the following conditions¹⁾.

- The rated continuous power is reduced based on the reduced cooling above 1000 m (see sec."Technical Data").
- Above 2,000 msl, the air and creeping distances are only sufficient for overvoltage class 2. If the installation calls for overvoltage class 3, you will have to install additional external overvoltage protection to limit overvoltage peaks to 2.5 kV phase-to-phase and phase-to-ground.
- If safe electrical disconnection is required, it must be implemented outside the device at altitudes above 2,000 msl (safe electrical disconnection in accordance with EN 61800-5-1).
- In installation altitudes between 2,000 m to 4,000 msl, the permitted rated power supply voltages are reduced as follows:
 - By 6 V per 100 m for MM..D-503-00
 - By 3 V per 100 m for MM..D-233-00

5.1.8 Connecting 24 V supply

- Power the MOVIMOT® inverter either via an external 24 V supply or the MLU..A or MLG..A options.

5.1.9 Binary control

- Connect the required control leads.
- Use shielded cables as control cables and route them separately from supply system cables.

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



5.1.10 Control via RS-485 interface

The MOVIMOT® drive is controlled via the RS-485 interface by one of the following controllers:

- MOVIFIT® MC
- Fieldbus interfaces MF../MQ..
- PLC bus master
- MLG..A option
- MBG11A option
- MWA21A option

	<p>NOTE</p> <p>Only ever connect one bus master.</p>
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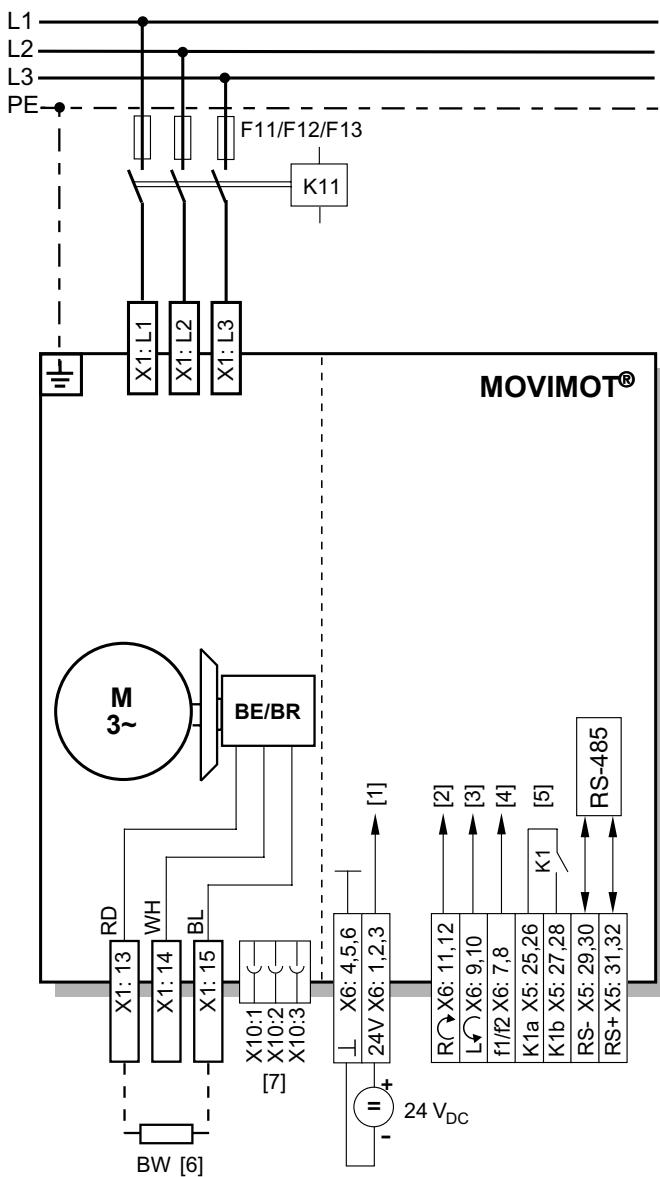
- Use twisted pair shielded cables as control leads and route them separately from supply system leads.

5.1.11 Protection devices

- MOVIMOT® drives are equipped with integrated protection devices against overload. External overload devices are not necessary.



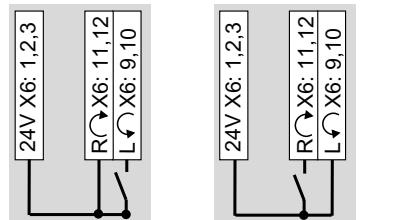
5.2 Connection of MOVIMOT®



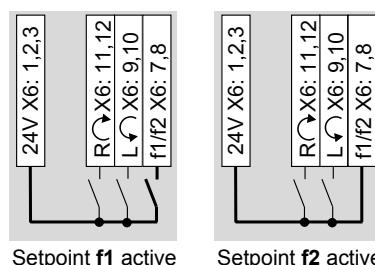
323271819

- [1] DC 24 V supply (external or MLU..A/MLG..A options)
- [2] CW/Stop
- [3] CCW/Stop
- [4] Setpoint changeover f1/f2
- [5] Ready signal (contact closed = ready for operation)
- [6] Braking resistor BW..
(only for MOVIMOT® drives without mechanical brake)
- [7] Plug connector for connecting option BEM

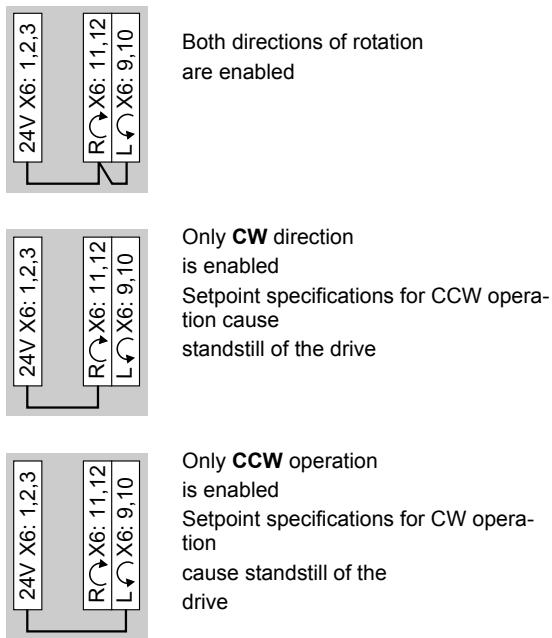
Functions of the CW / Stop and CCW / Stop terminals for binary control:



Functions of terminals f1/f2:



Functions of the CW / Stop and CCW / Stop terminals for control via RS-485 interface / fieldbus:



Only **CW** operation is enabled
Setpoint specifications for CCW operation cause standstill of the drive

Only **CCW** operation is enabled
Setpoint specifications for CW operation cause standstill of the drive

Drive is inhibited or is being brought to a stop



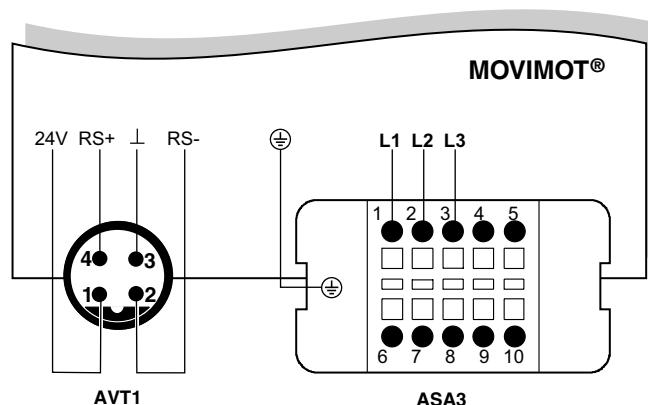
5.3 MOVIMOT® plug connectors

5.3.1 Plug connectors AVT1, ASA3

The following figure shows the assignment of optional AVT1 and ASA3 plug connectors.

Available versions

- MM.../ASA3
- MM.../AVT1
- MM.../ASA3/AVT1



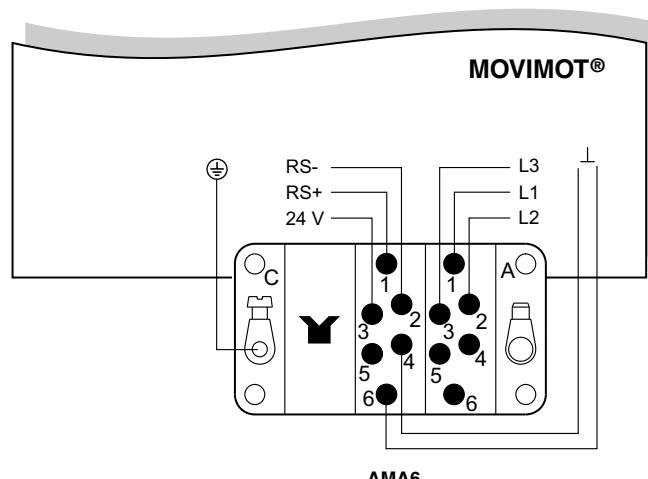
323830155

5.3.2 AMA6 plug connector

The following illustration shows the assignment of the optional AMA6 plug connector.

Possible design:

- MM.../AMA6



323879563

	NOTE
	For designs with plug connectors, both directions of rotation are enabled as standard. If only one direction of rotation is required, please observe sec. "Connection of MOVIMOT® basic unit, functions of the terminals CW/Stop, CCW/Stop for connection via RS-485 interface".



Electrical Installation

Connection between MOVIMOT® and motor when mounted close to the

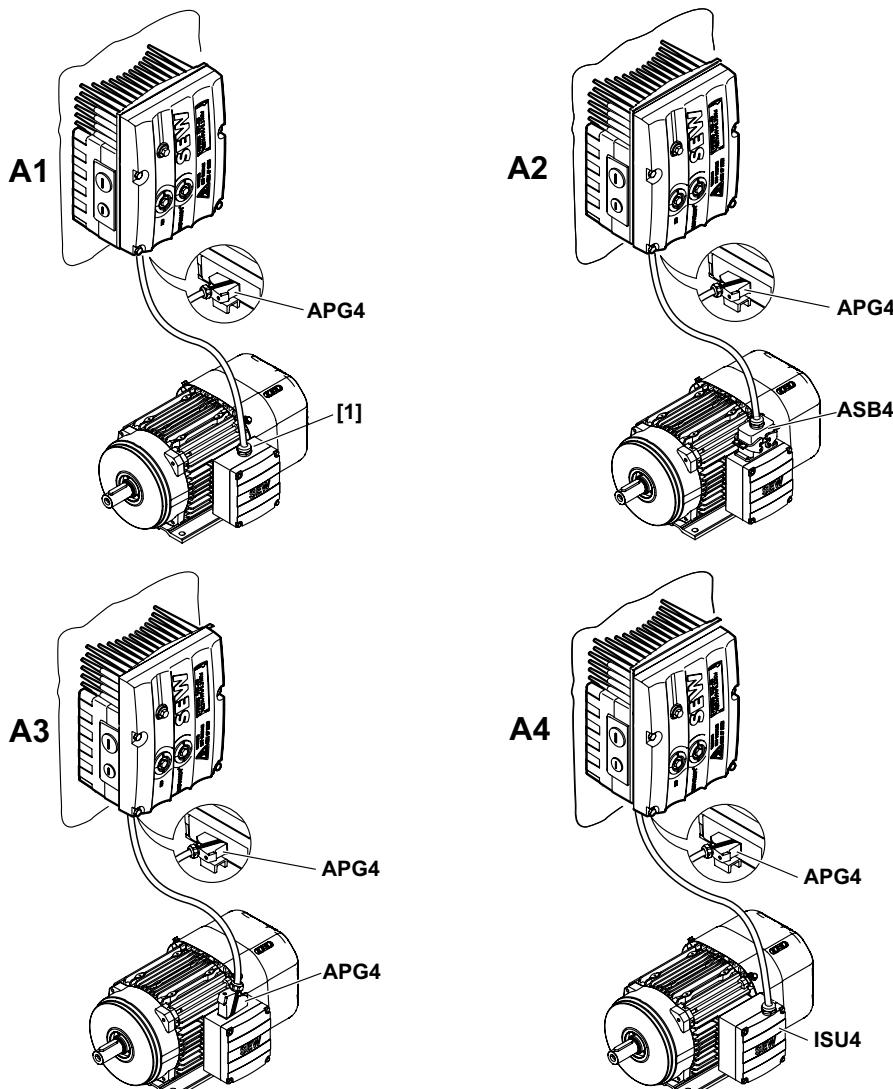
5.4 Connection between MOVIMOT® and motor when mounted close to the motor

If the MOVIMOT® inverter with option P2.A is mounted close to the motor, the connection to the motor is realized with a pre-fabricated cable (hybrid cable). The following designs are possible on the MOVIMOT® side:

- A: MM..P2.A/RO.A/**APG4**
- B: MM..P2.A/RE.A/**ALA4**

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

Design	A1	A2	A3	A4
MOVIMOT®	APG4	APG4	APG4	APG4
Motor	Cable gland / terminals	ASB4	APG4	ISU4
Hybrid cable	0 186 742 3	0 593 076 6	0 186 741 5	0 816 325 1 △ For DR.63 0 816 326 X △ f. DR.71-DR.132 0 593 278 5 ↘ For DR.63 0 593 755 8 ↘ For DR.71-DR.132



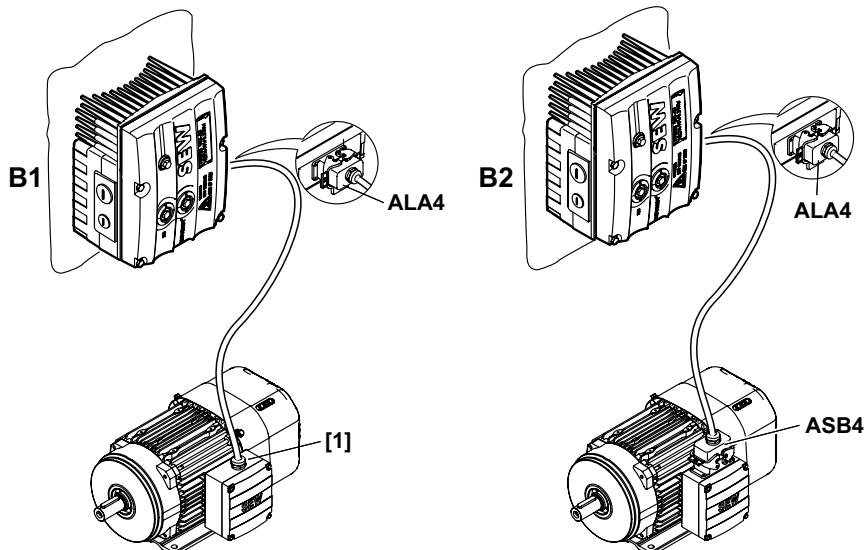
458666635

[1] Connection via terminals



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

Design	B1	B2
MOVIMOT®	ALA4	ALA4
Motor	Cable gland / terminals	ASB4
Hybrid cable	0 817 948 4	0 816 208 5



458688139

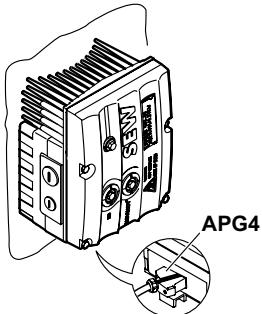
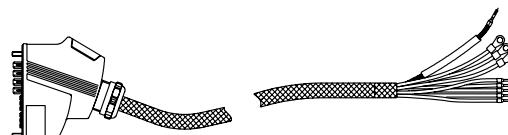
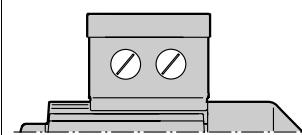
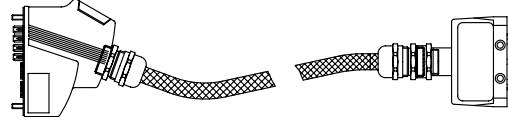
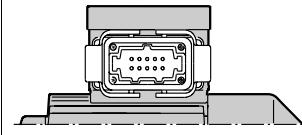
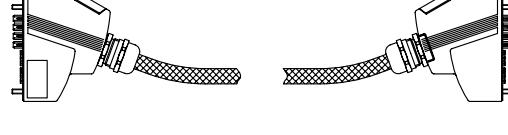
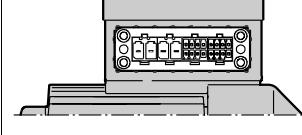
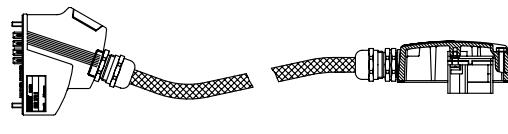
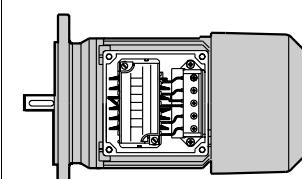
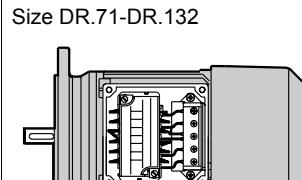
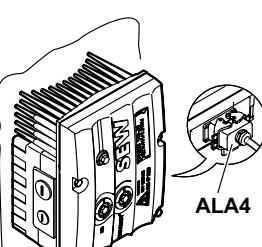
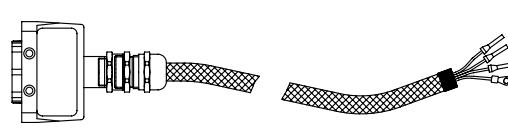
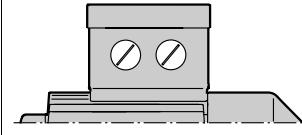
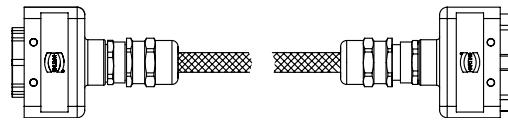
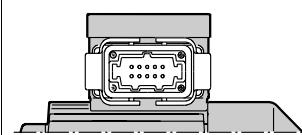
[1] Connection via terminals



Electrical Installation

Connection between MOVIMOT® and motor when mounted close to the

5.4.1 Overview of connections between MOVIMOT® and motor when mounted close to the motor

MOVIMOT® inverter	Design	Hybrid cable	Drive
 MM..P2.A/RO.A/APG4	A1	Part number: 0 186 742 3 	AC motors with cable gland 
	A2	Part number: 0 593 076 6 	AC motors with ASB4 plug connector 
	A3	Part number: 0 186 741 5 	AC motors with APG4 plug connector 
	A4	Part number: 0 593 278 5 (L) Part number: 0 816 325 1 (Δ) 	AC motors with plug connector ISU4 Size DR.63 
	A4	Part number: 0 593 755 8 (L) Part number: 0 816 326 X (Δ) 	AC motors with plug connector ISU4 Size DR.71-DR.132 
 MM..P2.A/RE.A/ALA4	B1	Part number: 0 817 948 4 	AC motors with cable gland 
	B2	Part number: 0 816 208 5 	AC motors with ASB4 plug connector 

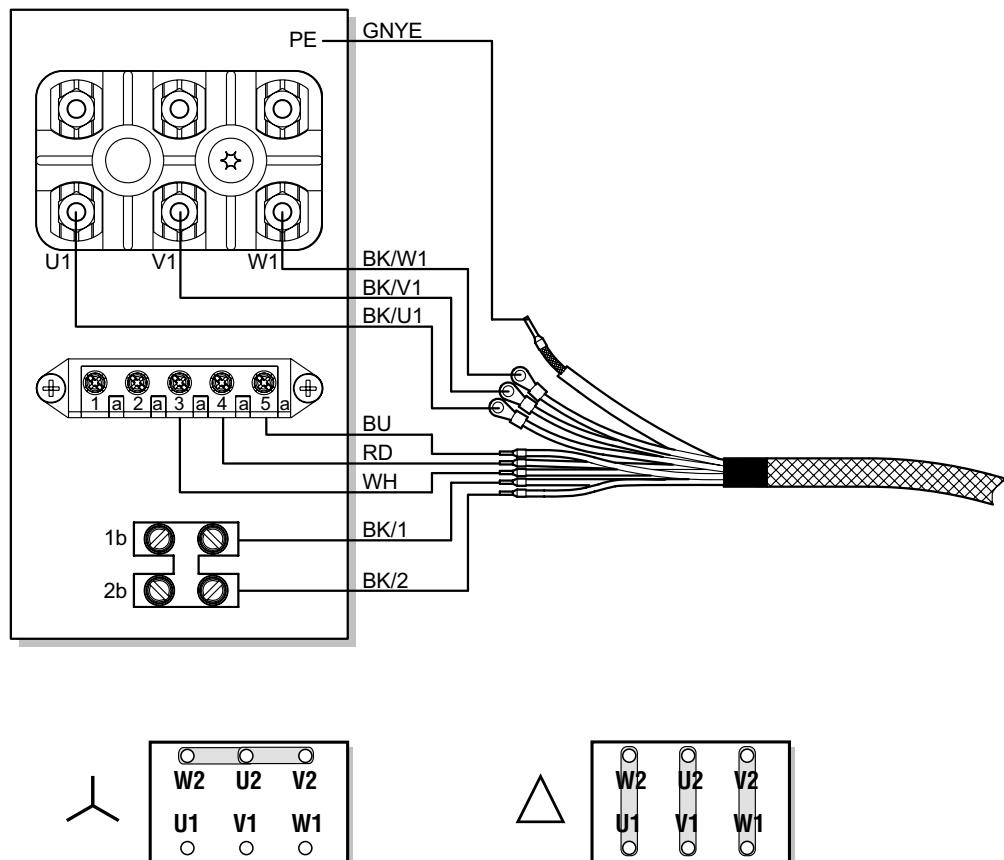


5.4.2 Hybrid cable connection

The following tables shows the conductor assignment in hybrid cables with part no. 0 186 742 3 and 0 817 948 4 and the corresponding motor terminals of the DR motor:

DR motor terminal	Wire color/hybrid cable designation
U1	Black / U1
V1	Black / V1
W1	Black / W1
4a	Red / 13
3a	White / 14
5a	Blue / 15
1b	Black / 1
2b	Black / 2
PE connection	Green/yellow + shield end (internal shield)

The following figure shows the connection of the hybrid cable to the terminal box of the DR motor.



640489867

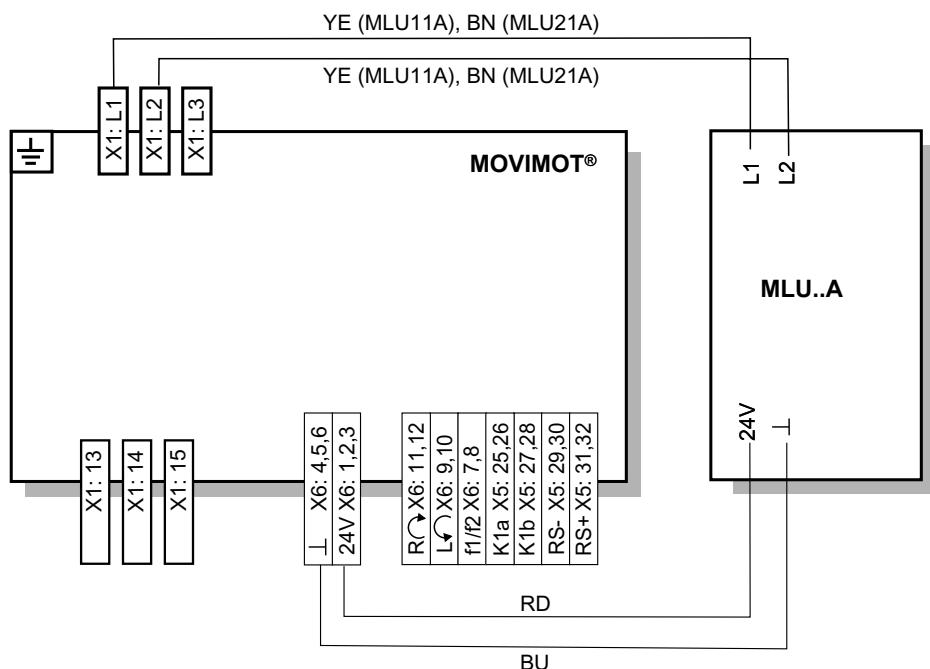


5.5 Connection of MOVIMOT® options

5.5.1 Connection of MLU11A/MLU21A option

For more information about connecting the MLU11A and MLU21A options, refer to sec. "Connection of option MLU11A/MLU21A/MLG..A" (siehe page 17).

The following figure shows how to connect the MLU11A and MLU21A options:

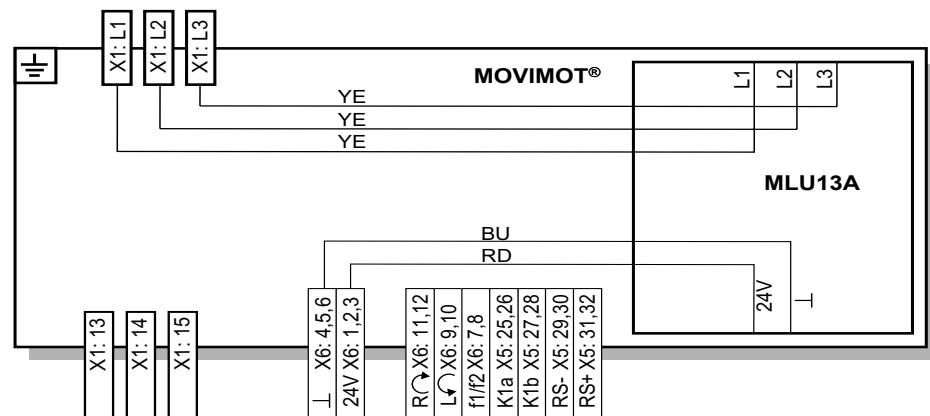


640436235

5.5.2 Connection of MLU13A option

For more information about mounting the MLU13A option, refer to sec. "MLU13A option" (siehe page 18).

The following figure shows how to connect the MLU13A option:



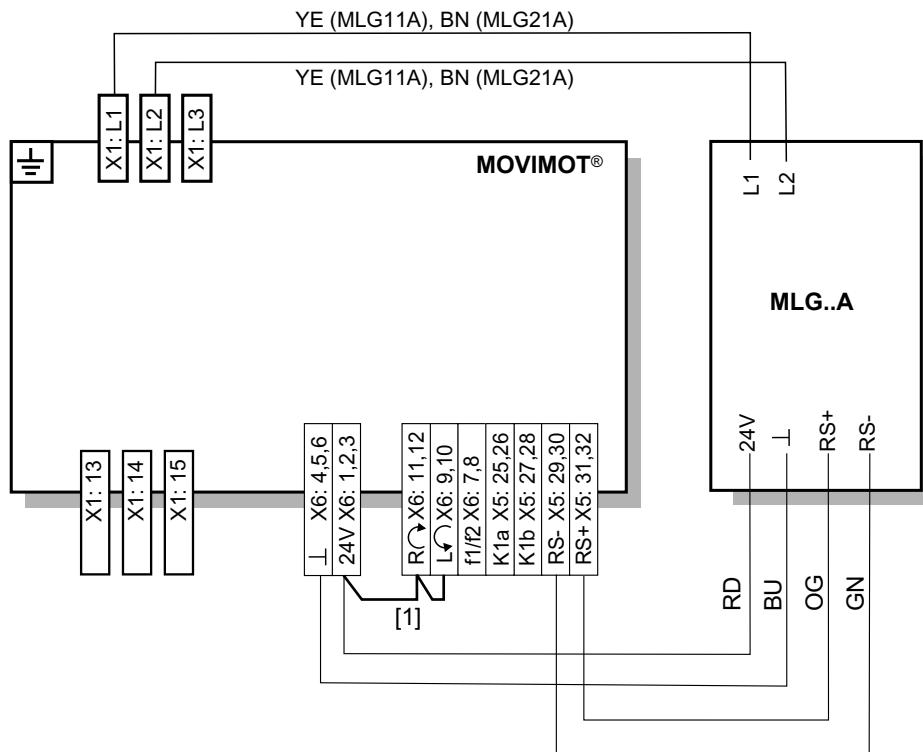
323967371



5.5.3 Connection of option MLG..A

For more information about mounting the MLG..A option, refer to sec. "MLU11A/MLU21A/MLG..A option" (siehe page 17).

The following figure shows how to connect the MLG..A option:



641925899

[1] Note the enabled direction of rotation.

See sec. "Connection of MOVIMOT® basic unit" (siehe page 32),
Functions of the CW/Stop and CCW/Stop terminals using control via RS-485 interface

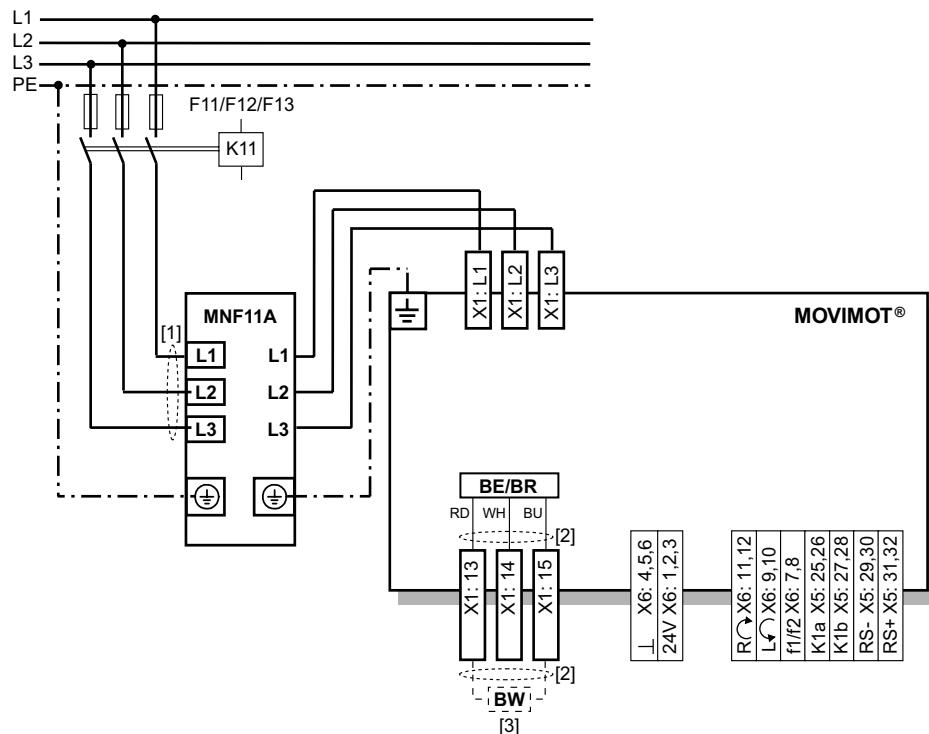


5.5.4 Connection of MNF11A option

STOP	<p>STOP</p> <p>Installation is only permitted in combination with the modular terminal box of MOVIMOT® MM03D-503-00...MM15D-503-00 or MM03D-233-00...MM07D-233-00.</p> <p>Only install the MNF11A option in the terminal box of MOVIMOT® MM05 ... MM15.</p>
-------------	--

For more information about mounting the MNF11A option, refer to sec. "MNF11A option" (siehe page 19).

The following figure shows how to connect the MNF11A option:



324151435

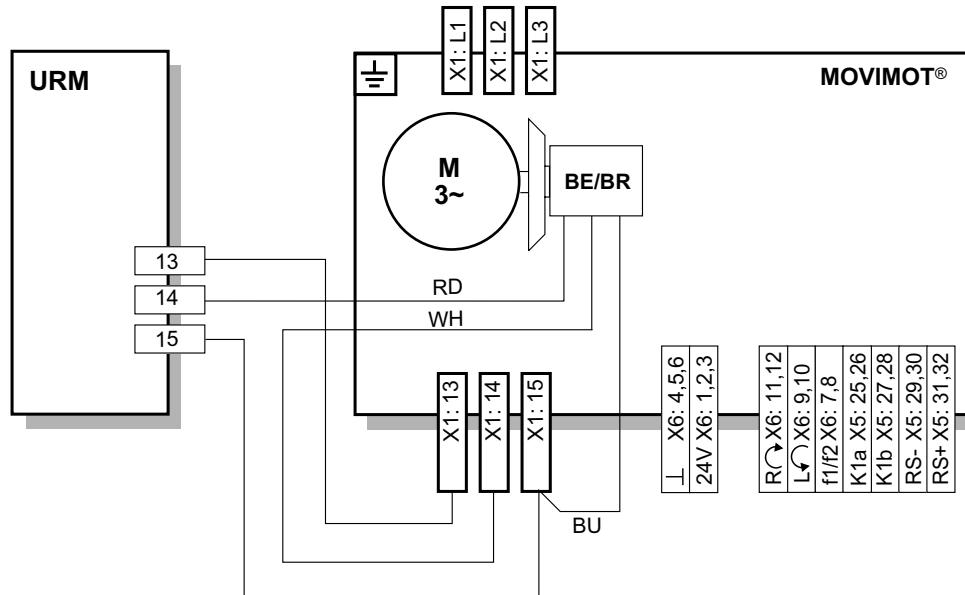
- [1] Keep the cable length for the power supply as short as possible!
- [2] Keep the cable length for the brake cables as short as possible!
Do not route the brake cables in parallel, but as far away from the power supply cables as possible!
- [3] Only for MOVIMOT® without mechanical brake.



5.5.5 Connection of URM option

For more information about mounting the URM option, refer to sec. "URM/BEM option" (siehe page 20).

The following figure shows how to connect the URM option:



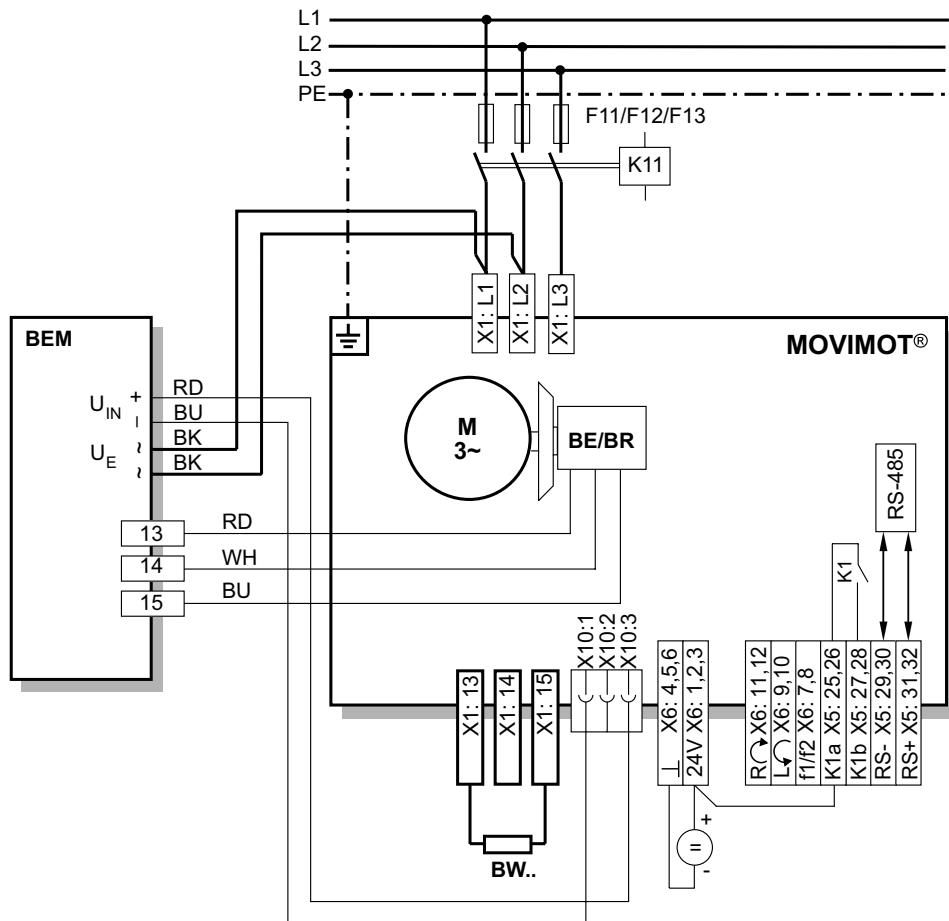
324118411



5.5.6 Connection of BEM option

For more information about mounting the BEM option, refer to sec. "URM/BEM option" (siehe page 20).

The following figure shows how to connect the BEM option:



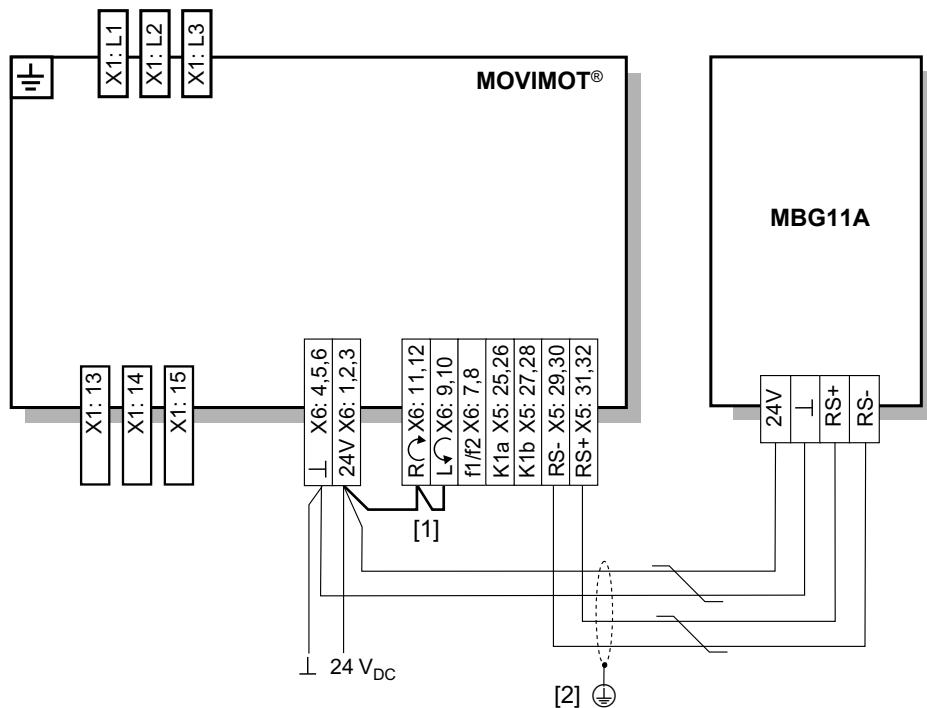
324134539



5.5.7 Connection of MBG11A option

For more information about mounting the MBG11A option, refer to sec. "MBG11A option" (siehe page 21).

The following figure shows how to connect the MBG11A option:



324046731

[1] Note the enabled direction of rotation.

See sec. "Connection of MOVIMOT® basic unit" (siehe page 32),

Functions of the CW/Stop and CCW/Stop terminals using control via RS-485 interface

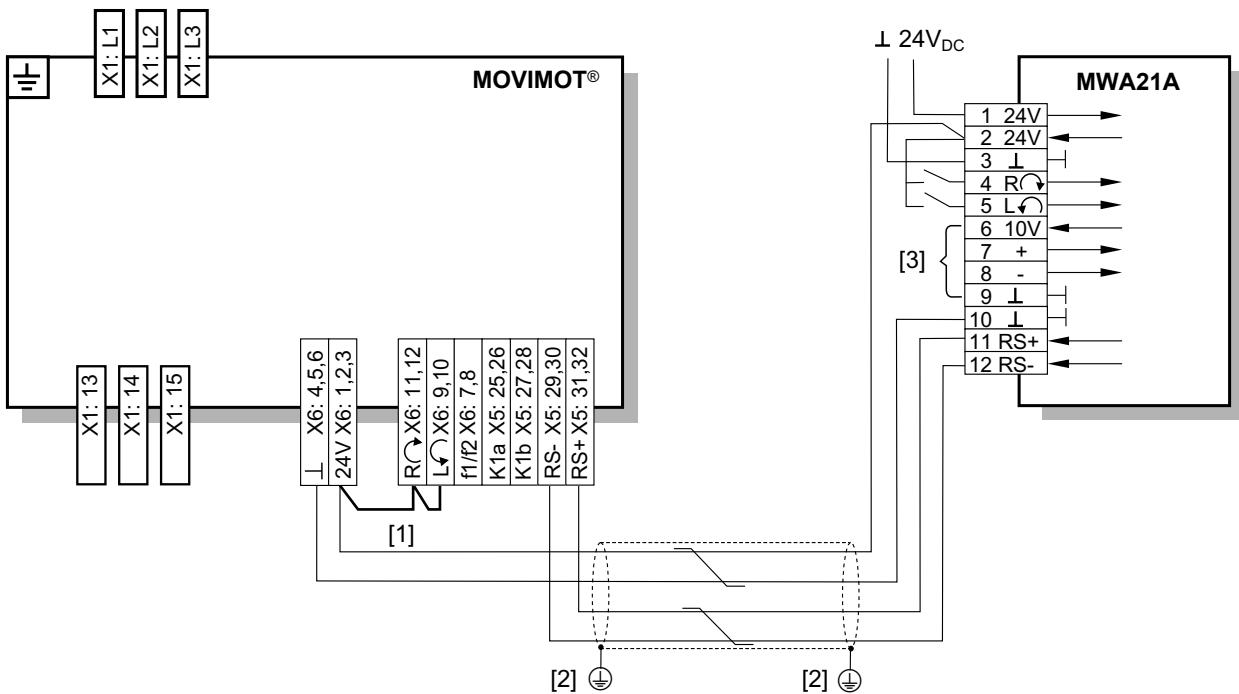
[2] EMC metal cable gland



5.5.8 Connection of MWA21A option

For more information about mounting the MWA21A option, refer to sec. "MWA21A option" (siehe page 22).

The following figure shows how to connect the MWA21A option:



324061323

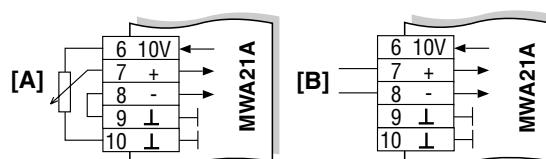
[1] Note the enabled direction of rotation.

See sec. "Connection of MOVIMOT® basic unit" (siehe page 32),

Functions of the CW/Stop and CCW/Stop terminals using control via RS-485 interface

[2] EMC metal cable gland

[3] Potentiometer using the 10 V reference voltage [A]
or potential-free analog signal [B]

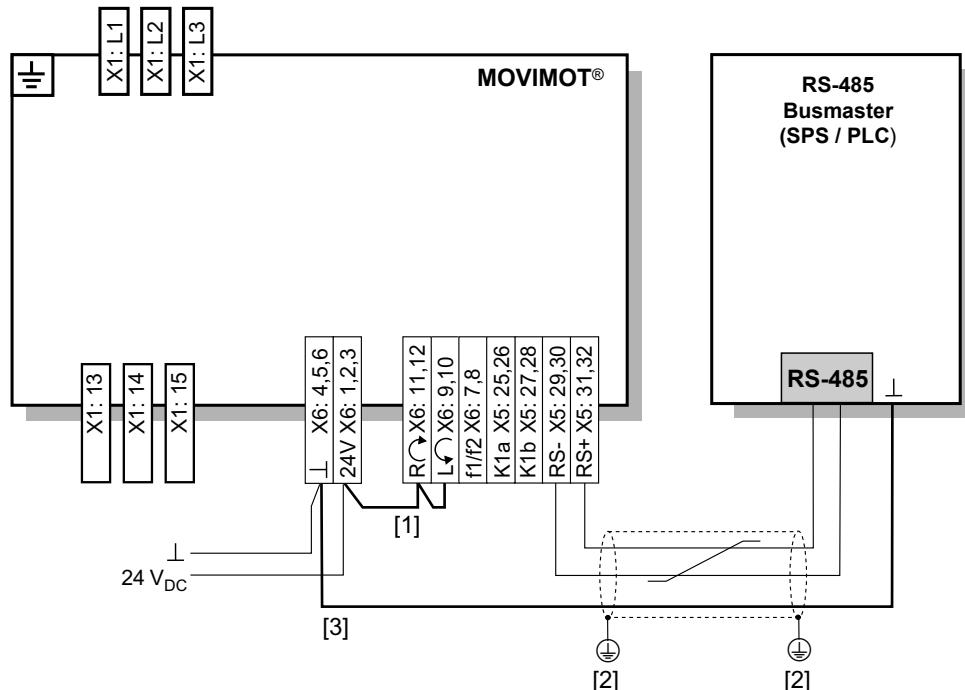


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5.6 Connection of RS-485 bus master

The following illustration shows how to connect an RS-485 bus master:



324289547

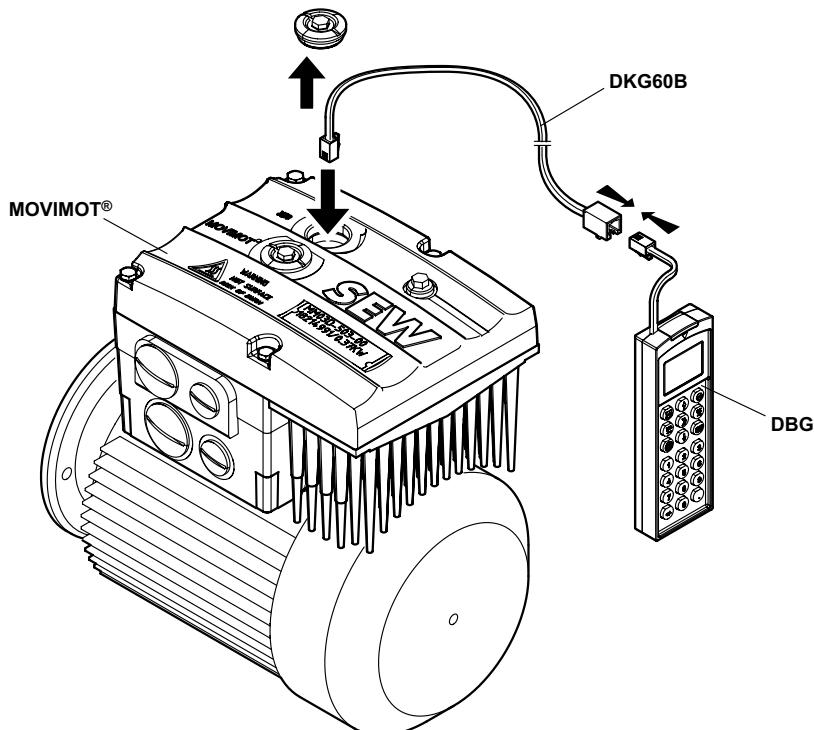
- [1] Note the enabled direction of rotation.
See sec. "Connection of MOVIMOT® basic unit" (siehe page 32),
Functions of the CW/Stop and CCW/Stop terminals using control via RS-485 interface
- [2] EMC metal cable gland
- [3] Equipotential bonding MOVIMOT® / RS-485 master



5.7 Connection of DBG keypad (in preparation)

MOVIMOT® drives are equipped with an X50 diagnostics interface (RJ10 plug connector) for startup, configuration and service.

The X50 diagnostics interface is located on top of the MOVIMOT® inverter.



458756491

	WARNING!
	<p>The surfaces of MOVIMOT® and external options, e.g. braking resistor (especially the heat sink), can become very hot during operation.</p> <p>Danger of burns.</p> <ul style="list-style-type: none"> Do not touch the MOVIMOT® drive and external options until they have cooled down sufficiently.

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

Extension cable	Description (= scope of delivery)	Part number
DKG60B	<ul style="list-style-type: none"> Length 5 m (16.4 ft) 4-core, shielded cable (AWG26) 	0 817 583 7



5.8 PC connection

MOVIMOT® drives are equipped with an X50 diagnostics interface (RJ10 plug connector) for startup, configuration and service.

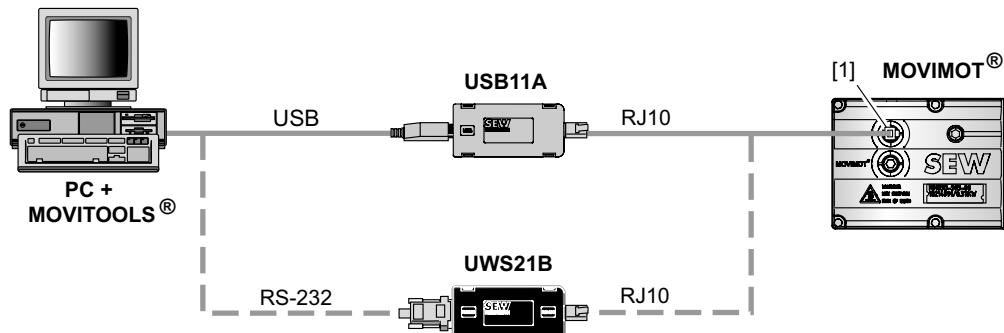
The diagnostics interface [1] is located on top of the MOVIMOT® inverter.

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

- USB11A with USB interface, part number 0 824 831 1
- UWS21B with serial interface RS-232, part number 1 820 456 2

Scope of delivery:

- Interface adapter
- Cable with RJ10 plug connector
- Interface cable USB (USB11A) or RS-232 (UWS21B)



458786059

	WARNING!
	<p>The surfaces of MOVIMOT® and external options, e.g. braking resistor (especially the heat sink), can become very hot during operation.</p> <p>Danger of burns.</p> <ul style="list-style-type: none"> • Do not touch the MOVIMOT® drive and external options until they have cooled down sufficiently.



6 "Easy" Startup

6.1 Overview

You can select one of the following modes for starting up MOVIMOT®:

- When selecting "Easy", you start up MOVIMOT® using DIP switches S1, S2 and switches f2, t1, quick and easy.
- In "Expert" mode, an extended scope of parameters is available. You can use the MOVITOOLS® MotionStudio software or the DGB keypad to adjust the parameters to the application.

For more information on "Expert" startup, refer to sec. " 'Expert' Startup with Parameter Function " (siehe page 102).

6.2 Important notes on startup

	<p>HAZARD!</p> <p>Before removing / fitting the MOVIMOT® inverter, you must disconnect it from the supply system. Dangerous voltages may still be present for up to one minute after disconnection from the power supply.</p> <p>Severe or fatal injuries from electric shock.</p> <ul style="list-style-type: none"> • Disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection. • Then wait for at least 1 minute.
	<p>WARNING!</p> <p>The surfaces of MOVIMOT® and external options, e.g. braking resistor (especially the heat sink), can become very hot during operation.</p> <p>Danger of burns.</p> <ul style="list-style-type: none"> • Do not touch the MOVIMOT® drive and external options until they have cooled down sufficiently.
	<p>NOTES</p> <ul style="list-style-type: none"> • Remove paint protection cap from the status LED before startup. • Remove paint protection film from the nameplates before startup. • Check that all protective covers are installed correctly. • Observe a minimum switch-off time of 2 seconds for the mains contactor K11.

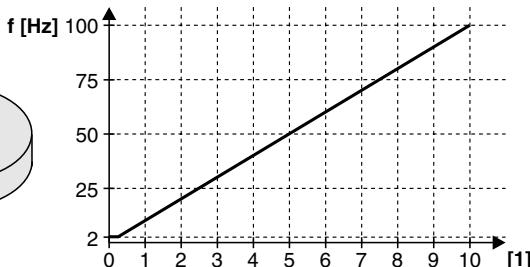
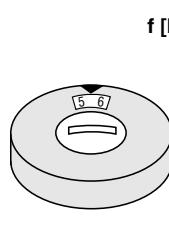
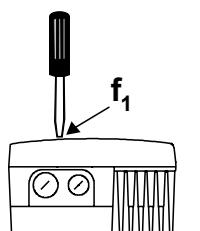


6.3 Description of the controls

6.3.1 Setpoint potentiometer f1

Depending on the operating mode of the MOVIMOT® inverter, the potentiometer f1 has different functions:

- Binary control: Setting setpoint f1
(selected via terminal f1/f2 X6:7,8 = "0")
- Control via RS-485: Setting maximum frequency f_{\max}



[1] Potentiometer setting

329413003



STOP!

The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly.

Missing or incorrectly installed screw plugs can cause damage to the MOVIMOT® inverter.

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

6.3.2 Switch f2

Depending on the operating mode of the MOVIMOT® inverter, switch f2 has different functions:

- Binary control: Setting setpoint f2
(selected via terminal f1/f2 X6:7,8 = "1")
- Control via RS-485: Setting minimum frequency f_{\min}



Switch f2	0	1	2	3	4	5	6	7	8	9	10
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Setpoint f2 [Hz]	5	7	10	15	20	25	35	50	60	70	100

Switch f2	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency [Hz]	2	5	7	10	12	15	20	25	30	35	40

6.3.3 Switch t1

Switch t1 is used for setting the acceleration of the MOVIMOT® drive (Setting the ramp times in relation to a setpoint step change of 50 Hz).

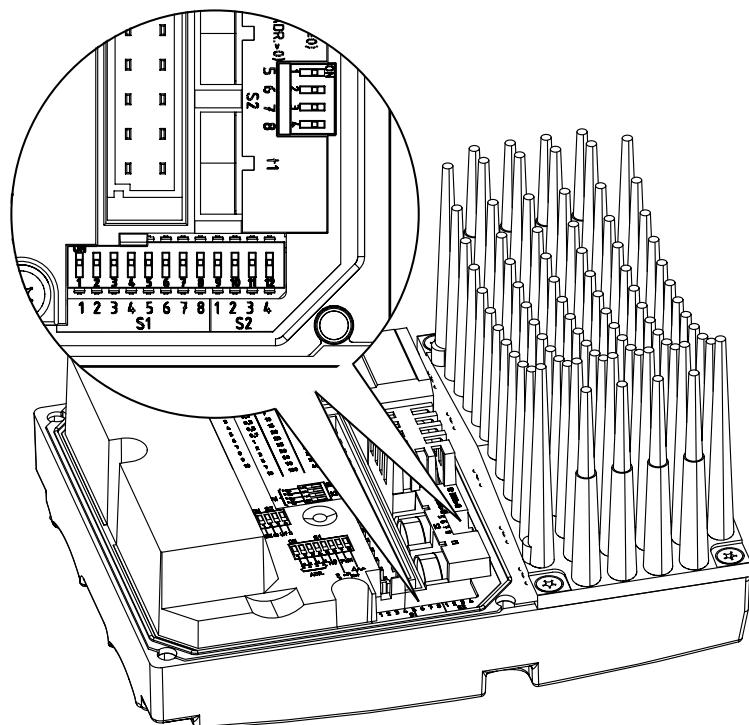


Switch t1	0	1	2	3	4	5	6	7	8	9	10
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10



"Easy" Startup Description of the controls

6.3.4 DIP switches S1 and S2



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DIP switch S1:

S1 Meaning	Binary coding RS-485 unit address				5 Motor protection	6 Motor power rating	7 PWM Frequency	8 No-load damping
	1 2^0	2 2^1	3 2^2	4 2^3				
ON	1	1	1	1	Off	Motor one size smaller	Variable (16,8,4 kHz)	On
OFF	0	0	0	0	On	Motor adjusted	4 kHz	Off

DIP switch S2:

S2 Meaning	1 Brake type		2 Brake release Without Enable		3 Duty type		4 Speed monitoring		5 Binary coding addi- tional functions			
	2^0	2^1	2^2	2^3	2^0	2^1	2^2	2^3	1	1	1	1
ON	Optional brake		On		V/f		On		0	0	0	0
OFF	Standard brake		Off		VFC		Off		1	1	1	1

	STOP!
	Set the DIP switches using suitable tools, e.g. a flat tip screwdriver with a blade width ≤ 3 mm. The force used for setting the DIP switches must not exceed 5 N.



6.4 Description of the S1 DIP switches

6.4.1 DIP switches S1/1 – S1/4

Selecting the RS-485 address of MOVIMOT® via binary coding

Decimal Address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S1/1	–	X	–	X	–	X	–	X	–	X	–	X	–	X	–	X
S1/2	–	–	X	X	–	–	X	X	–	–	X	X	–	–	X	X
S1/3	–	–	–	–	X	X	X	X	–	–	–	–	X	X	X	X
S1/4	–	–	–	–	–	–	–	–	X	X	X	X	X	X	X	X

X = ON

– = OFF

Set the following addresses depending on how the MOVIMOT® inverter is controlled:

Control	RS485 address
Binary control	0
Via keypad (MLG..A, MBG..A)	1
Via fieldbus interface (MF..)	1
Via MOVIFIT® MC (MTM..)	1
Via intelligent fieldbus interface (MQ..)	1 to 15
Via RS-485 master	1 to 15

6.4.2 DIP switch S1/5

Motor protection switched on / off

When MOVIMOT® is installed close to the motor (with option P2.A or in field distributor), the motor protection must be deactivated.

To protect the motor, a TH (bimetallic thermostat) must be installed. The TH opens the sensor circuit when the rated response temperature is reached (see "Drive System for Decentralized Installation" system manual, sec. "Startup with field distributor").



"Easy" Startup Description of the S1 DIP switches

6.4.3 DIP switch S1/6

Lower motor power rating

- When activated, this DIP switch enables MOVIMOT® to be assigned to a motor with a lower power rating. The rated unit power is not affected.
- When a motor with a lower power rating is used, the overload capacity of the drive can be increased because, from the perspective of the motor, MOVIMOT® is one power rating too big. A higher current can be provided briefly, leading to higher torque ratings.
- The aim of this switch S1/6 is to achieve short-term utilization of the motor's peak torque. The unit's current limit remains the same regardless of the switch setting. The motor protection function is adjusted depending on the switch setting.
- Stall protection for the motor is not possible in this operating mode (S1/6 = "ON").

6.4.4 DIP switch S1/7

Setting the maximum PWM- frequency

- When DIP switch S1/7 is set to "OFF", the MOVIMOT® unit operates with 4 kHz PWM frequency.
- When DIP switch S1/7 is set to "ON", the MOVIMOT® unit operates with a 16 kHz PWM frequency (low noise) and switches back in steps to lower switching frequencies depending on the heat sink temperature.

6.4.5 DIP switch S1/8

No load vibration damping (S1/8 = "ON")

This function, when activated, prevents resonance vibrations in no load operation.



6.5 Description of the S2 DIP switches

6.5.1 DIP switch S2/1

Brake type

- When using the standard brake, the DIP switch 2/1 must be set to "OFF".
- When using the optional brake, the DIP switch 2/1 must be set to "ON".

Motor	Standard brake S2/1 = "OFF"	Optional brake S2/1 = "ON"
DR.63L4	BR03	--
DR.71S4	BE05	BE1
DR.71M4	BE1	BE05
DR.80S4	BE1	BE05
DRE80M4	BE1	BE05
DRS80M4	BE2	BE1
DR.90M4	BE2	BE1
DRE90L4	BE2	BE1
DRS90L4	BE5	BE2
DR.100M4	BE5	BE2
DR.100LC4	BE5	BE2
DR.100L4	BE5	BE2
DRP112M4	BE5	BE11
DR.132S4	BE5	BE11

6.5.2 DIP switch S2/2

Brake release without enable

When switch S2/2 is set to "ON", it is possible to release the brake even if there is no drive enable.

Binary control functions

In binary control, the brake can be released by setting the signal at terminal f1/f2 X6:7,8 subject to the following preconditions:

Terminal status	f1 / f2 X6:7,8	Enable sta- tus	Fault status	Brake function
R ↗ X6:11,12	L ↗ X6:9,10	"0"	Unit enabled	No Unit error
"1" "0"	"0" "1"			Brake is controlled by MOVIMOT®, Setpoint f1
"1" "0"	"0" "1"	"1"	Unit enabled	No Unit error
"1" "0"	"1" "0"			Brake is controlled by MOVIMOT®, setpoint f2
"1" "0"	"1" "0"	"0"	Unit not released	No Unit error
"1"	"1"	"1"	Unit not released	No Unit error
"0"	"0"	"1"	Unit not released	No Unit error
All statuses possible		Unit not released	Unit error	Brake is released for manual movement
				Brake applied

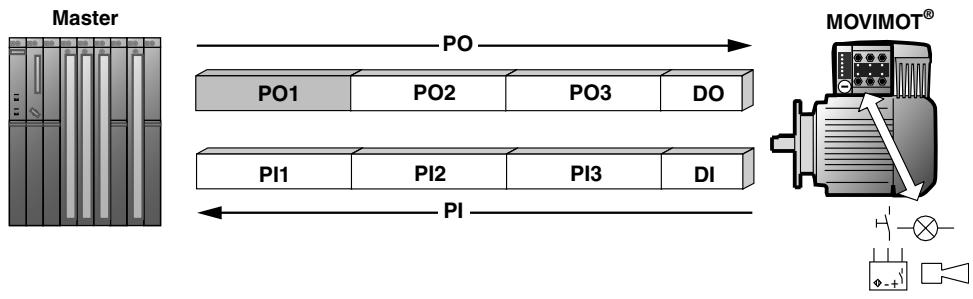


"Easy" Startup

Description of the S2 DIP switches

RS-485 control functions

In RS-485 control, the brake is released via the control word:



PO = Process output data

PI = Process input data

PO1 = Control word

PI1 = Status word 1

PO2 = Speed [%]

PI2 = Output current

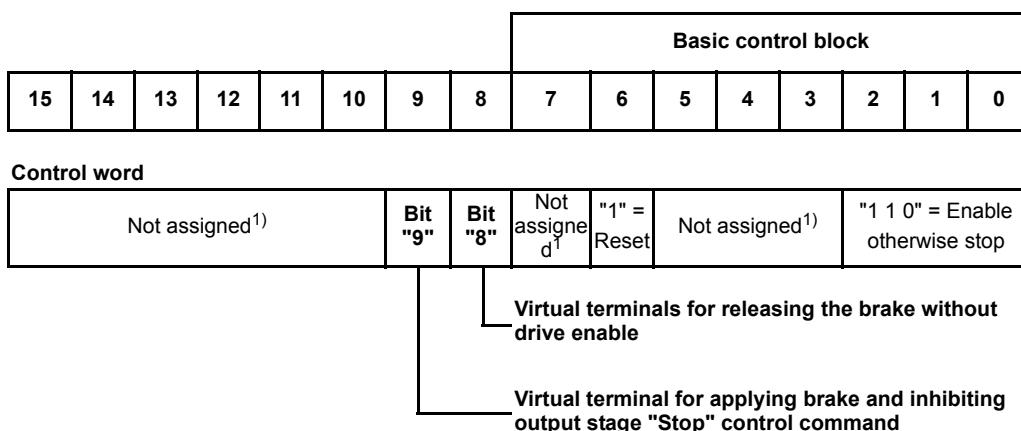
PO3 = Ramp

PI3 = Status word 2

DO = Digital outputs

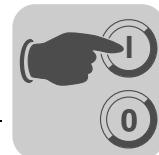
DI = Digital inputs

By setting bit 8 in the control word, the brake can be released if the following conditions are met:



1) Recommendation for all bits that are not assigned = "0"

Enable status	Fault status	Status of bit 8 in control word	Brake function
Unit released	No unit fault / no communication timeout	"0"	Brake is controlled by MOVIMOT®
Unit released	No unit fault / no communication timeout	"1"	Brake is controlled by MOVIMOT®
Unit not released	No unit fault / no communication timeout	"0"	Brake applied
Unit not released	No unit fault / no communication timeout	"1"	Brake is released for manual movement
Unit not released	Unit fault / communication timeout	"1" or "0"	Brake applied



*Setpoint selection
for binary control*

Setpoint selection in binary control depending on the status of terminal f1/f2 X7,8:

Enable status	Terminal f1/f2 X6:7,8	Active setpoint
Unit enabled	Terminal f1/f2 X6:7,8 = "0"	Setpoint potentiometer f1 active
Unit enabled	Terminal f1/f2 X6:7,8 = "1"	Setpoint potentiometer f2 active

Behavior if unit not ready

If the unit is not ready, the brake is always applied irrespective of the setting of terminal f1/f2 X6:7,8 or bit 8 in the control word.

LED display

The status LED flashes periodically at a fast rate ($t_{on} : t_{off} = 100 \text{ ms} : 300 \text{ ms}$) if the brake has been released for manual movement. This applies both for binary control and for control via RS-485.

6.5.3 DIP switch S2/3

Operating mode

- DIP switch S2/3 = "OFF": VFC operation for 4-pole motors
- DIP switch S2/3 = "ON": V/f operation reserved for special cases

6.5.4 DIP switch S2/4

Speed monitoring

- 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 tripped. The MOVIMOT® unit signals a fault using the status LED (red, slow flashing, error code 08). The current limit must be reached permanently for the duration of the delay time before monitoring responds.

6.5.5 DIP switches S2/5 to S2/8

Additional functions

- The binary coding of the DIP switches S2/5 to S2/8 allows for the activation of additional functions.
- Proceed as follows to activate possible additional functions:

Decimal Value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S2/5	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X
S2/6	-	-	X	X	-	-	X	X	-	-	X	X	-	-	X	X
S2/7	-	-	-	-	X	X	X	X	-	-	-	-	X	X	X	X
S2/8	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X

X = ON

- = OFF

- For an overview of additional functions, refer to sec. "Selectable additional functions" (siehe page 56).



6.6 Selectable additional functions MM..D-503-00

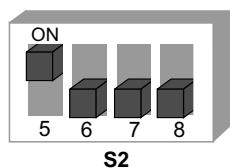
6.6.1 Overview of the selectable additional functions

Decimal Value	Brief description	Operating mode		See
		Control via RS-485	Binary control	
0	Basic functions, no additional function selected	X	X	–
1	MOVIMOT® with increased ramp times	X	X	(siehe page 57)
2	MOVIMOT® with adjustable current limitation (error when value is exceeded)	X	X	(siehe page 57)
3	MOVIMOT® with adjustable current limitation (can be changed using terminal f1/f2 X6:7,8)	X	X	(siehe page 58)
4	MOVIMOT® with bus configuration	X	–	(siehe page 60)
5	MOVIMOT® with motor protection via TH	X	–	(siehe page 62)
6	MOVIMOT® with maximum 8 kHz PWM frequency	X	X	(siehe page 63)
7	MOVIMOT® with rapid start / stop	X	X	(siehe page 64)
8	MOVIMOT® with minimum frequency 0 Hz	X	X	(siehe page 66)
9	MOVIMOT® for hoist applications	X	X	(siehe page 67)
10	MOVIMOT® with minimum frequency 0 Hz and reduced torque at low frequencies	X	X	(siehe page 70)
11	Monitoring of supply-phase fault deactivated	X	X	(siehe page 71)
12	MOVIMOT® with rapid start/stop and motor protection via TH	X	X	(siehe page 71)
13	MOVIMOT® with extended speed monitoring function	X	X	(siehe page 74)
14	MOVIMOT® with deactivated slip compensation	X	X	(siehe page 78)
15	Not assigned	–	–	–



6.6.2 Additional function 1

MOVIMOT® with increased ramp times



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Description of functions

- It is possible to set ramp times of up to 40 s.
- In RS-485 control mode, a ramp time of max. 40 s can be transmitted when using 3 process data units.

Changed ramp times

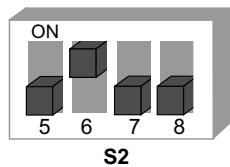


Switch t1											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	20	25	30	35	40

= Corresponds to standard setting
 = Changed ramp times

6.6.3 Additional function 2

MOVIMOT® with adjustable current limitation (fault if exceeded)

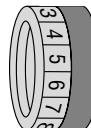


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Description of functions

- The current limit can be set using switch f2.
- The setpoint f2 (for binary control) and the minimum frequency (for control via RS485) are permanently set to the following values:
 - Setpoint f2: 5 Hz
 - Minimum frequency: 2 Hz
- The monitoring function comes into effect above 15 Hz. If the drive operates at the current limit for longer than 500 ms, the unit generates an error (error 44). This is indicated by the status LED flashing red quickly.

Adjustable current limits



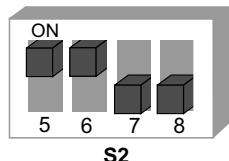
Switch f2											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
I _{max} [%] of I _N	90	95	100	105	110	115	120	130	140	150	160



"Easy" Startup Selectable additional functions MM..D-503-00

6.6.4 Additional function 3

MOVIMOT® with adjustable current limitation (can be changed using terminal f1/f2 X6:7,8), the frequency is reduced when exceeded



329910539

Description of functions

The current limitation can be set using switch f2. Binary input terminal f1/f2 can be used to switch between the maximum current limit and the current limit set for switch f2.

Response upon reaching the current limit

- When the current limit is reached, the unit reduces the frequency via the current limitation function. If necessary, the ramp is stopped to prevent the current from increasing.
- If the unit is operating at the current limit, the status LED indicates this status by flashing green quickly.

System internal values for setpoint f2 / minimum frequency

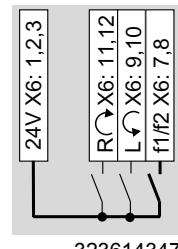
- It is no longer possible to switch via terminals between setpoint f1 and setpoint f2 in binary control mode or to set the minimum frequency in RS-485 control mode.
- The minimum frequency in RS-485 control mode has a fixed minimum frequency of 2 Hz.

Adjustable current limits

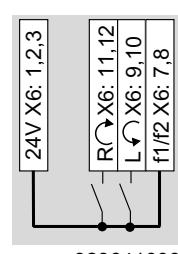


Switch f2	0	1	2	3	4	5	6	7	8	9	10
Detent setting	0	1	2	3	4	5	6	7	8	9	10
I_{max} [%] of I_N	60	70	80	90	100	110	120	130	140	150	160

Selecting the current limits via binary input terminal f1 / f2



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f1/f2 = "0" Current limit 160 % is active

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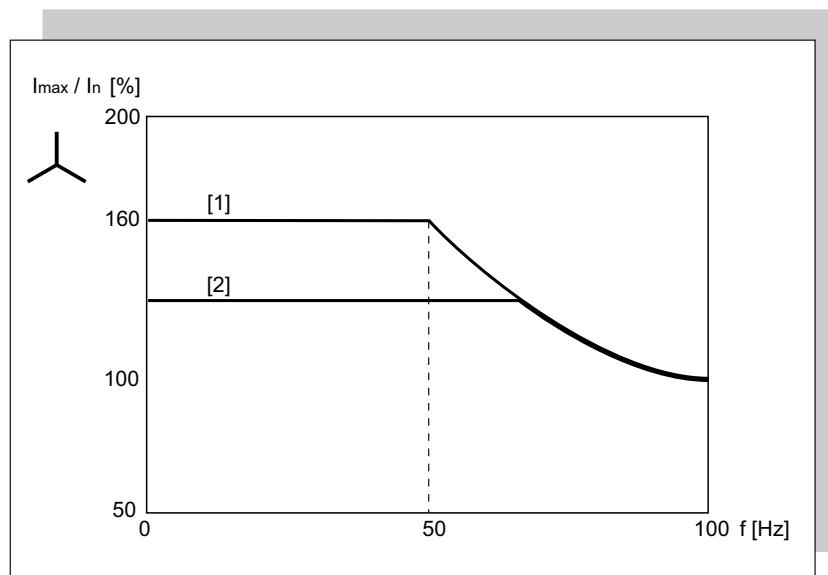
f1/f2 = "1" The current limitation set via switch f2 is active.
The selection can also be made when the unit is enabled.



*Influencing the
current character-
istic curve*

The current limit curve is calculated with a constant factor by selecting a lower current limit.

Motor with star connection

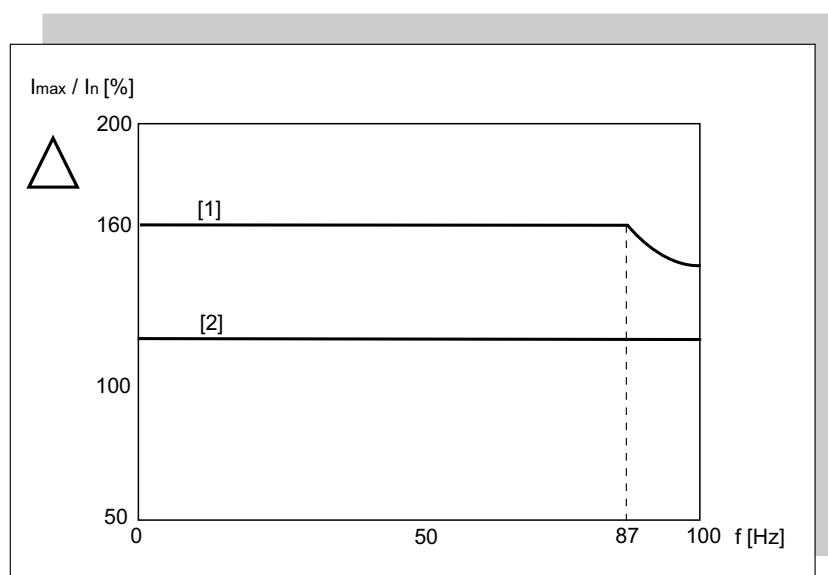


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[1] Current limit characteristic curve of standard function

[2] Reduced current limit for additional function 3 and terminals f1/f2 X6;7,8 = "1"

Motor with delta connection



332087051

[1] Current limit characteristic curve of standard function

[2] Reduced current limit for additional function 3 and terminals f1/f2 X6;7,8 = "1"



6.6.5 Additional function 4

MOVIMOT® with bus configuration



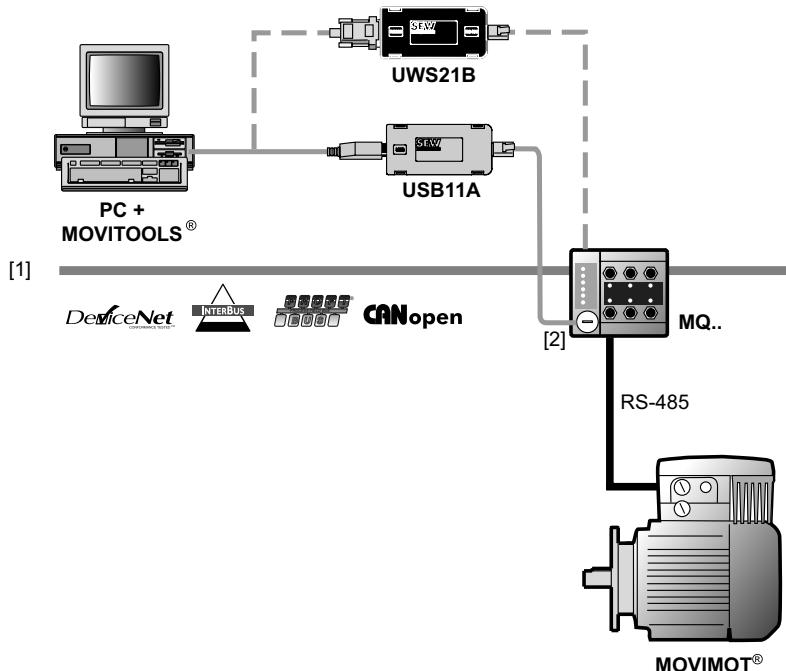
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NOTES	
	<p>When activating additional function 4, only a limited number of parameters is available. If you want to set more parameters, SEW-EURODRIVE recommends "Expert" startup with parameter function (siehe page 104).</p> <p>Additional function 4 is only designed for RS-485 control in combination with the MQ.. fieldbus interfaces with integrated minicontroller.</p> <p>For more information, refer to the following SEW-EURODRIVE manuals:</p> <ul style="list-style-type: none"> • PROFIBUS Interfaces, Field Distributors • Interbus Interfaces, Field Distributors • DeviceNet/CANopen Interfaces, Field Distributors

Description of functions

The potentiometer f1 and switches f2 and t1 are deactivated. MOVIMOT® ignores the settings of the potentiometers and the switches. MOVIMOT® continues to read the setting of the DIP switch. Functions selected using the DIP switch cannot be changed via bus.

Block diagram



332132107

- [1] Fieldbus
- [2] Diagnostic interface



Changing parameters in MOVITOOLS® MotionStudio

After opening MOVITOOLS®/Shell, the following parameters are accessible. They can be changed and saved in the unit.

Name	Range	Index	Parameter number	Step width
Ramp up	0.1...1...2000 [s]	8807	130	0.1 s – 1 s: 0,01 1 s – 10 s: 0,1 10 s – 100 s: 1 100 s – 2000 s: 10
Ramp down	0.1...1...2000 [s]	8808	131	
Minimum frequency	2...100 [Hz]	8899	305	0.1
Maximum frequency¹⁾	2...100 [Hz]	8900	306	0.1
Current limit	60...160 [%]	8518	303	1
Pre-magnetization time	0...0.4...2 [s]	8526	323	0.001
Post-magnetization time	0...0.1...2 [s]	8585	732	0.001
Parameter lock	On / Off	8595	803	–
Factory setting	Yes / No	8594	802	–
Delay time Speed monitoring	0.1...1...10.0 [s]	8558	501	0.1
Brake release time	0..2 [s]	8749	731	0.001
Slip compensation²⁾	0...500 [min ⁻¹]	8527	324	0.2

Factory setting = bold

1) Example: Maximum frequency = 60 Hz

Bus setpoint = 10 %

Frequency setpoint = 6 Hz

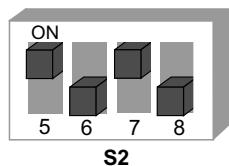
2) The value will be set to the rated motor slip when there is a change in the additional function setting.

- The factory setting is activated as soon as additional function 4 is activated via DIP switches. If the additional function which was selected via DIP switches remains unchanged after the 24 V operating voltage is switched off, the last valid values from EEPROM will be used after reactivation.
- The start frequency is fixed at 0.5 Hz, the stop frequency at 3 Hz.
- If the set setpoint or maximum frequency is lower than the set minimum frequency, the minimum frequency becomes active.
- The parameters are only evaluated with this additional function.



6.6.6 Additional function 5

MOVIMOT® motor protection via TH



329992459

	NOTE The additional function is only designed for RS-485 control when the MOVIMOT® inverter is installed close to the motor (with option P2.A or in field distributor).
---	---

Description of functions

Functions in connection with fieldbus interfaces MF.. and MQ..:

- Additional function 5 generates error 84 (motor over temperature) when both terminals for the direction of rotation are open.
- When the MOVIMOT® inverter (with P2.A option or in a field distributor) is mounted close to the motor, the direction terminals are set to "0" by the TH during over temperatures in the motor.
- Error 84 is indicated by the flashing status LED of the MOVIMOT®.
- The generated error 84 is also transmitted via fieldbus.

Functions in combination with fieldbus interface MQ..:

- MOVIMOT® bus configuration according to additional function 4 (siehe page 60).

Functions in combination with fieldbus interface MF..:

- The potentiometer f1 and switches f2 and t1 are deactivated. The following values apply:

Name	Value
Ramp up	1 [s]
Ramp down	1 [s]
Minimum frequency	2 [Hz]
Maximum frequency	100 [Hz]
Current limit	160 [%]
Pre-magnetization time	0,4 [s]
Post-magnetization time	0,1 [s]
Speed monitoring delay time	1 [s]
Brake release time	0 [s]
Slip compensation	Rated motor slip

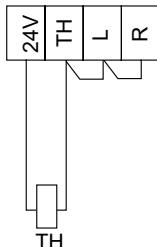


Tripping conditions for error 84

Error 84 "Motor overtemperature" is triggered when **all** the following conditions are fulfilled:

- The standard MOVIMOT® motor protection function via DIP switch S1/5 = "ON" is deactivated.
- The terminals for direction of rotation are connected to 24 V via a TH as in the following figure.

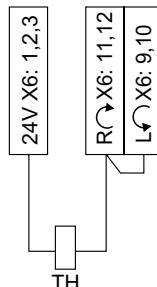
For field distributors:



332178315

For mounting close to the motor

With option P2.A:



626745483

- The TH has triggered due to excessive heat in the motor (The enable for both terminals for the direction of rotation is revoked).
- Supply voltage is connected.

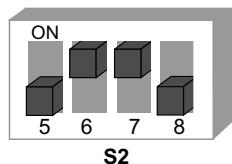
NOTE

If only the DC 24 V supply voltage is present at the MOVIMOT®, the error is not tripped.



6.6.7 Additional function 6

MOVIMOT® with maximum 8 kHz PWM frequency



330028171

Description of functions

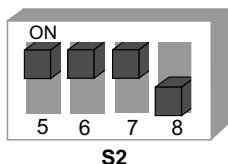
- The additional function reduces the maximum PWM frequency that can be set using DIP switch S1/7 from 16 kHz to 8 kHz.
- When DIP switch S1/7 is set to "ON", the unit operates with an 8 kHz PWM frequency and switches back to 4 kHz depending on the heat sink temperature.

	S1/7 <u>without</u> additional function 6	S1/7 <u>with</u> additional function 6
ON	PWM frequency variable 16, 8, 4 kHz	PWM frequency variable 8, 4 kHz
OFF	PWM frequency 4 kHz	PWM frequency 4 kHz



6.6.8 Additional function 7

MOVIMOT® with rapid start / stop



330064651

Description of functions

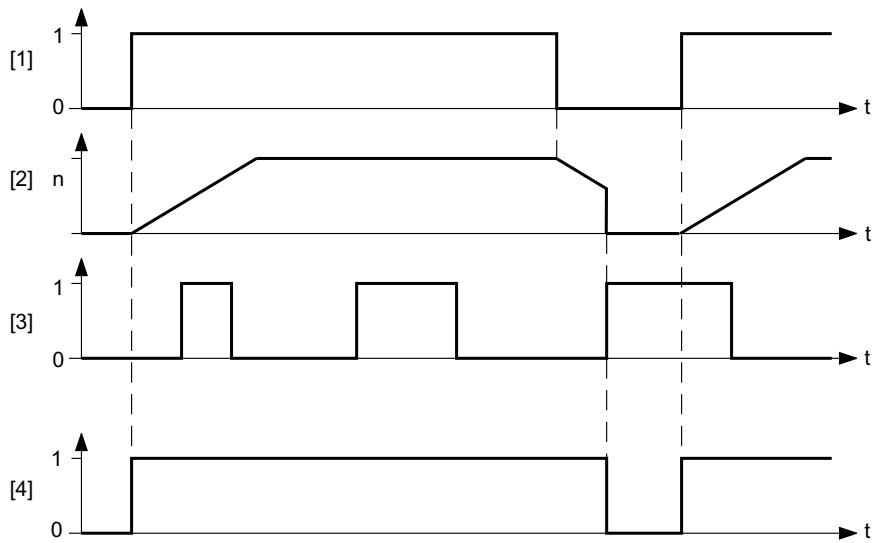
- The pre-magnetization time is set to 0 s.
- Pre-magnetization is not performed after the drive is enabled. This is necessary to start acceleration along the setpoint ramp as quickly as possible.
- If a brake is connected to terminals X1:13, X1:14, X1:15, the brake is controlled by MOVIMOT®.
- If a brake resistor is connected to terminals X1:13, X1:15, the SEW brake is controlled via output X10 and option BEM.
- The K1 relay has no function and cannot be used for this additional function.

Control via RS-485

- The new function "Applying brake and inhibiting output stage when control command 'Stop' is issued" is introduced. This function is assigned to bit 9 in the control word as virtual terminal in line with the MOVILINK® profile.
- When bit 9 is set after activating the control command "Stop", MOVIMOT® applies the brake and inhibits the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied regardless of the state of bit 9.



Flow diagram "Brake control in RS-485 control mode":



333149963

- [1] Enable terminals / control word
- [2] Speed
- [3] Bit 9
- [4] Brake control signal: 1 = released, 0 = applied

Binary control

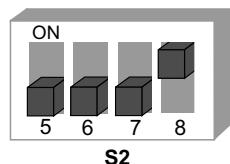
- The brake coil of the mechanical brake is connected to terminals X1:13, X1:14 and X1:15 of the MOVIMOT® inverter.
- The mechanical brake cannot be influenced by the terminals. The brake works like a unit without additional function.
- The relay is switched as a ready relay (standard function).

	NOTE
	The rapid stop function cannot be used in binary control mode!



6.6.9 Additional function 8

MOVIMOT® with minimum frequency 0 Hz



330101899

*Description of
functions*

Control via RS-485:

In detent position 0 of switch f2, the minimum frequency with the activated additional function is 0 Hz. All other values that can be set remain unchanged.

Switch f2											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency [Hz] with additional function acti- vated	0	5	7	10	12	15	20	25	30	35	40
Minimum frequency [Hz] without additional function	2	5	7	10	12	15	20	25	30	35	40

Binary control:

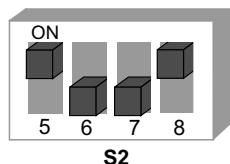
In detent position 0 of switch f2, the setpoint f2 with the activated additional function is 0 Hz. All other values that can be set remain unchanged.

Switch f2											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Setpoint f2 [Hz] with additional function acti- vated	0	7	10	15	20	25	35	50	60	70	100
Setpoint f2 [Hz] without additional function	5	7	10	15	20	25	35	50	60	70	100



6.6.10 Additional function 9

MOVIMOT® for hoist applications



330140427

	HAZARD! Risk of fatal injury if the hoist falls. Severe or fatal injuries or damage to property. <ul style="list-style-type: none"> • MOVIMOT® may not be used as a safety device in hoist applications. • Use monitoring systems or mechanical protection devices as safety equipment.
	STOP! In order to avoid a system overload, the MOVIMOT® drive may not be operated at the current limit. <ul style="list-style-type: none"> • Activate speed monitoring. In this way, you ensure that the MOVIMOT® drive is not operated for a longer time (> 1 s) at the current limit.

Prerequisites

	STOP! MOVIMOT® can only be used in hoist applications if the following prerequisites are met: <ul style="list-style-type: none"> • Additional function 9 can only be used with brake motors. • Make sure that the DIP switch S2/3 is set to "OFF" (VFC operation). • The BEM brake controller must be used with an external braking resistor. • We recommend that you activate the "speed monitoring" (siehe page 55) function.
---	---



"Easy" Startup Selectable additional functions MM..D-503-00

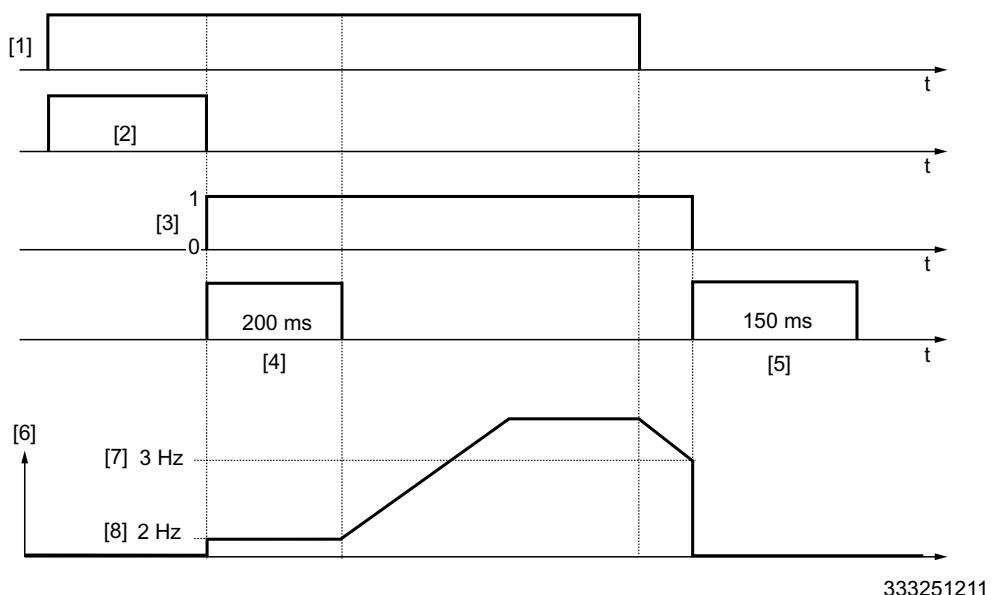
Description of functions

- The start frequency for binary control mode and RS-485 control mode is 2 Hz. If the function is not activated, the start frequency is 0.5 Hz.
- The brake release time is fixed at 200 ms (standard = 0 ms), which prevents the motor from working against the applied brake.
- The brake application time (post-magnetization time) is 150 ms (standard = 100 ms), which ensures that the brake is applied as soon as the motor stops generating torque.
- If a brake resistor is connected to terminals X1:13, X1:15, the SEW brake is controlled via output X10 and option BEM.
- The K1 relay is assigned the "Brake released" function.

When the K1 relay is open, the brake stops the motor.

When the K1 relay is closed, the brake is released.

Overview of brake control with additional function 9:



[1] Enable
[2] Pre-magnetization time
[3] Brake control signal
"1" = released,
"0" = applied

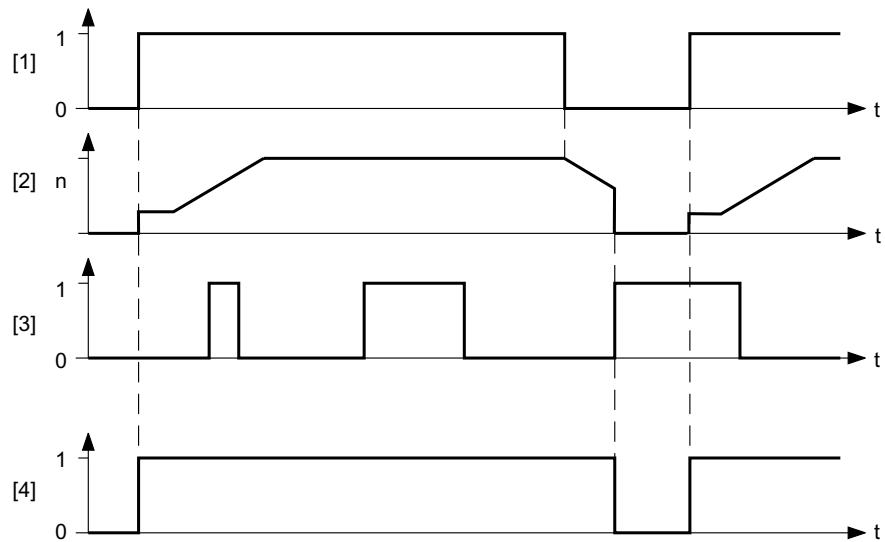
[4] Brake release time
[5] Brake application time
(Post-magnetization time)

[6] Frequency
[7] Stop frequency
[8] Start/minimum frequency



Control via RS-485

- The new function "Applying brake and inhibiting output stage when control command 'Stop' is issued" is introduced. This function is assigned to bit 9 in the control word as virtual terminal in line with the MOVILINK® profile.
- When bit 9 is set after activating the control command "Stop", MOVIMOT® applies the brake and inhibits the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied regardless of the state of bit 9.



[1] Enable terminals/control word

[2] Speed

[3] Bit 9

[4] Brake control signal: "1" = released, "0" = applied

334493195

Binary control

- A braking resistor (BW..) must be connected to terminals X1:13 and X1:15 of MOVIMOT®; terminal X1:14 is not assigned.

	NOTE In binary control mode, the brake cannot be applied using bit 9.
--	---



6.6.11 Additional function 10

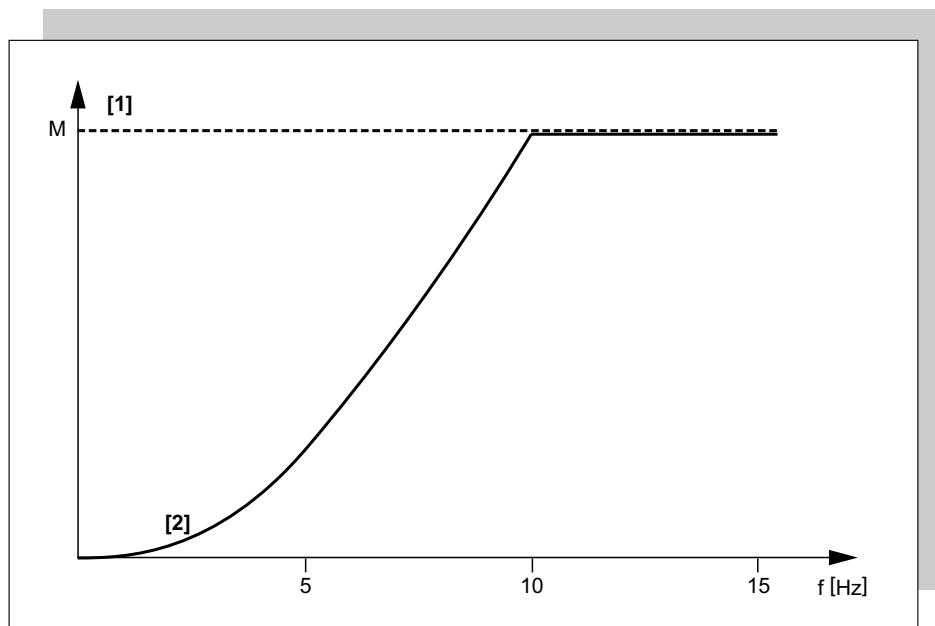
MOVIMOT® with reduced torque at low frequencies



330179211

Description of functions

- Through reducing the slip compensation and active current at low speeds, the drive only develops a reduced torque (see the illustration which follows):
- Minimum frequency = 0 Hz, see additional function 8 (siehe page 66).



334866315

[1] Maximum torque in VFC mode

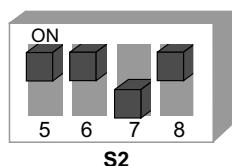
[2] Maximum torque when additional function 10 is activated



6.6.12 Additional function 11

Deactivating the mains phase failure monitoring

 STOP!	<p>Deactivating the mains phase failure monitoring can damage the unit if conditions are unfavorable.</p>
------------------	---



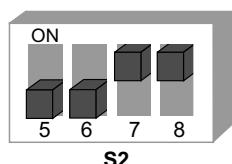
330218763

Description of functions

- When the additional function is activated, the phases are not monitored.
- It is a good idea to deactivate this function for power supplies with short-term asymmetries, for example.

6.6.13 Additional function 12

MOVIMOT® with rapid start / stop and motor protection via TH



330259595

Description of functions

- The additional function is active in binary and RS-485 control mode, but there are differences with respect to the usable functional scope.
- When the MOVIMOT® inverter is installed close to the motor (with option P2.A or in field distributor), the additional function includes the following functions:
 - Motor protection via indirect TH evaluation via direction of rotation terminals
 - Rapid start and stop function



"Easy" Startup

Selectable additional functions MM..D-503-00

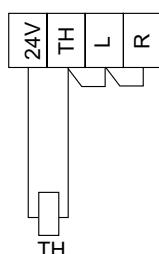
*Sub-function
"Motor protection
via TH evaluation"*

This function is only active in RS-485 control mode. This additional function causes a tripping of error 84 "Motor overtemperature".

Error 84 "Motor overtemperature" is triggered when all the following conditions are fulfilled:

- The standard MOVIMOT® motor protection function via DIP switch S1/5 = "ON" is deactivated.
- The terminals for direction of rotation are connected to 24 V via a TH as in the following figure.

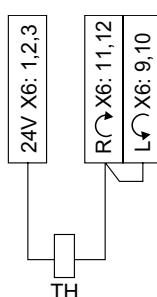
For field distributors:



332178315

**For mounting close to the
motor**

With option P2.A:



626745483

- The TH has triggered due to excessive heat in the motor (The enable for both terminals for the direction of rotation is revoked).
- Supply voltage is connected.



NOTE

The "motor protection function using TH evaluation" can be deactivated by setting the DIP switch S1/5 to "OFF". In this case, the motor protection in the MOVIMOT® unit realized via a motor model is in effect.

*Sub-function
"Rapid start/stop"*

- The pre-magnetization time is set to 0 s.
- Pre-magnetization is not performed after the drive is enabled. This is necessary to start acceleration along the setpoint ramp as quickly as possible.
- If a brake is connected to terminals X1:13, X1:14, X1:15, the brake is controlled by MOVIMOT®.
- If a brake resistor is connected to terminals X1:13, X1:15, the SEW brake is controlled via output X10 and option BEM.
- The K1 relay has no function and cannot be used for this additional function.

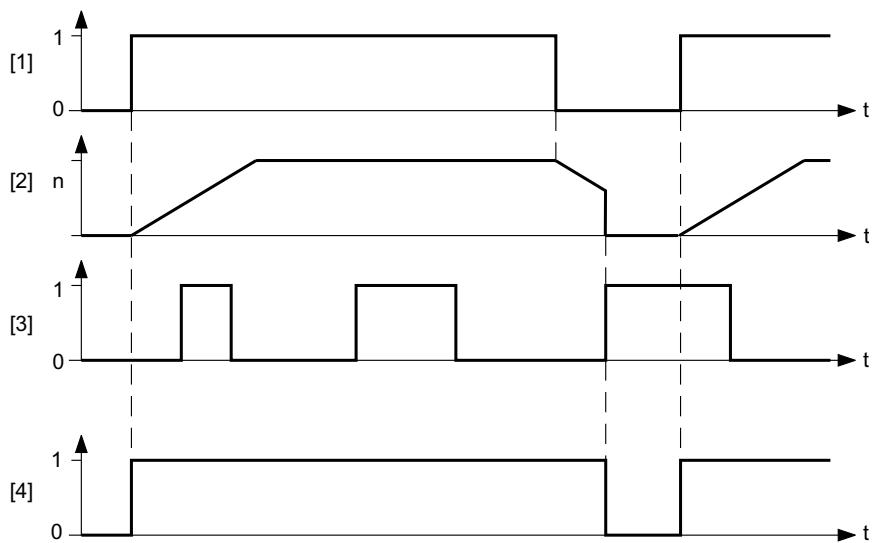


Control via RS-485

- The new function "Applying brake and inhibiting output stage when control command 'Stop' is issued" is introduced. This function is assigned to bit 9 in the control word as virtual terminal in line with the MOVILINK® profile.
- When bit 9 is set after activating the control command "Stop", MOVIMOT® applies the brake and inhibits the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied regardless of the state of bit 9 during the downward ramp.

	NOTE The rapid stop function cannot be used in binary control mode.
---	---

Flow diagram "Brake control in RS-485 control mode":



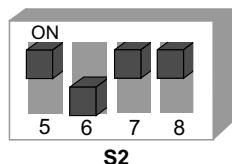
334918283

- [1] Enable terminals / control word
- [2] Speed
- [3] Bit 9
- [4] Brake control signal: "1" = released, "0" = applied



6.6.14 Additional function 13

MOVIMOT® with extended speed monitoring function



330300683

	HAZARD! Risk of fatal injury if the hoist falls. Severe or fatal injuries or damage to property. <ul style="list-style-type: none"> • MOVIMOT® may not be used as a safety device in hoist applications. • Use monitoring systems or mechanical protection devices as safety equipment.
---	---

Prerequisites

	STOP! MOVIMOT® can only be used in hoist applications if the following prerequisites are met: <ul style="list-style-type: none"> • Additional function 13 can only be used with brake motors. • Make sure that the DIP switch S2/3 is set to "OFF" (VFC operation). • The BEM brake controller must be used with an external braking resistor.
---	---

**Description of functions**

Additional function 13 includes the following functions:

- Additional function 9, MOVIMOT® for hoist applications
- Speed monitoring with adjustable monitoring time

Once additional function 13 is activated, speed monitoring is always on, regardless of the setting of DIP switch S2/4.

After activating additional function 13, the DIP switch S2/4 had the following functions depending on the set RS-485 address:

Binary control**The RS-485 address set at DIP switches S1/1 to S1/4 is 0.**

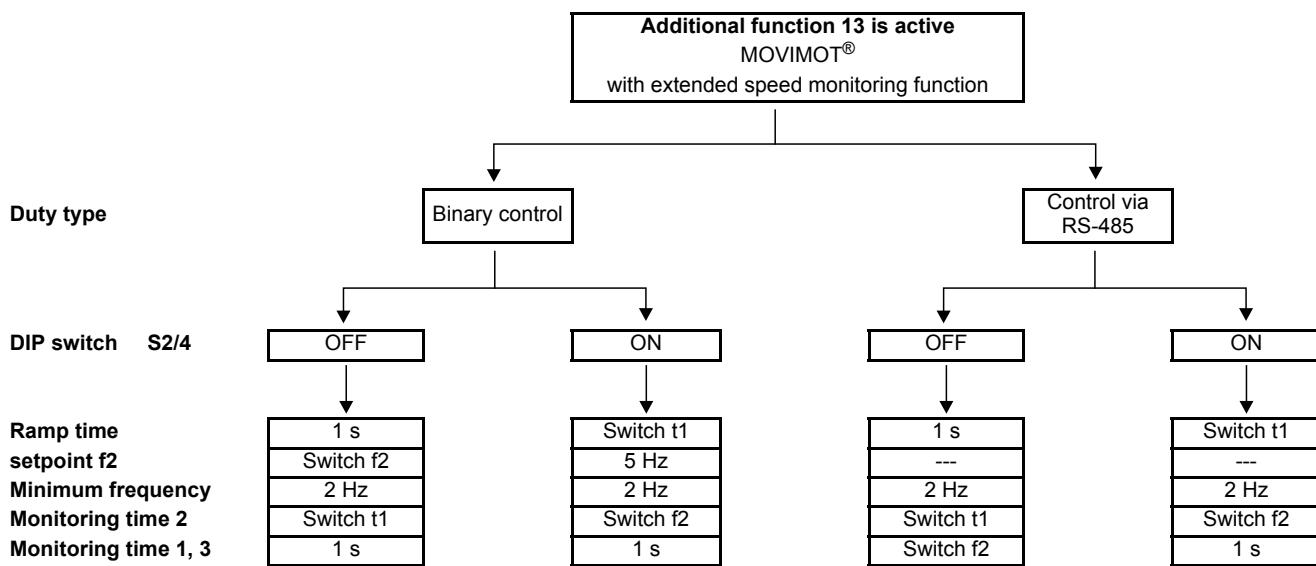
- S2/4 = "OFF"
 - The speed monitoring time 2 is set at switch t1.
 - The speed monitoring times 1 and 3 are fixed to 1 s.
 - The ramp time is fixed to 1 s.
 - Setpoint f2 is set as switch f2.
- S2/4 = "ON"
 - The speed monitoring time 2 is set at switch f2.
 - The speed monitoring times 1 and 3 are fixed to 1 s.
 - The setpoint is fixed at 5 Hz.
 - The ramp time is set at switch t1.

Control via RS-485**The RS-485 address set at DIP switches S1/1 to S1/4 is not 0.**

- S2/4 = "OFF"
 - The speed monitoring time 2 is set at switch t1.
 - The speed monitoring times 1 and 3 are set at switch f2.
 - The ramp time is fixed to 1 s.
 - The minimum frequency is fixed at 2 Hz.
- S2/4 = "ON"
 - The speed monitoring time 2 is set at switch f2.
 - The speed monitoring times 1 and 3 are fixed to 1 s.
 - The ramp time is set at switch t1.
 - The minimum frequency is fixed at 2 Hz.



Setting options for additional function 13



Setting the speed monitoring times

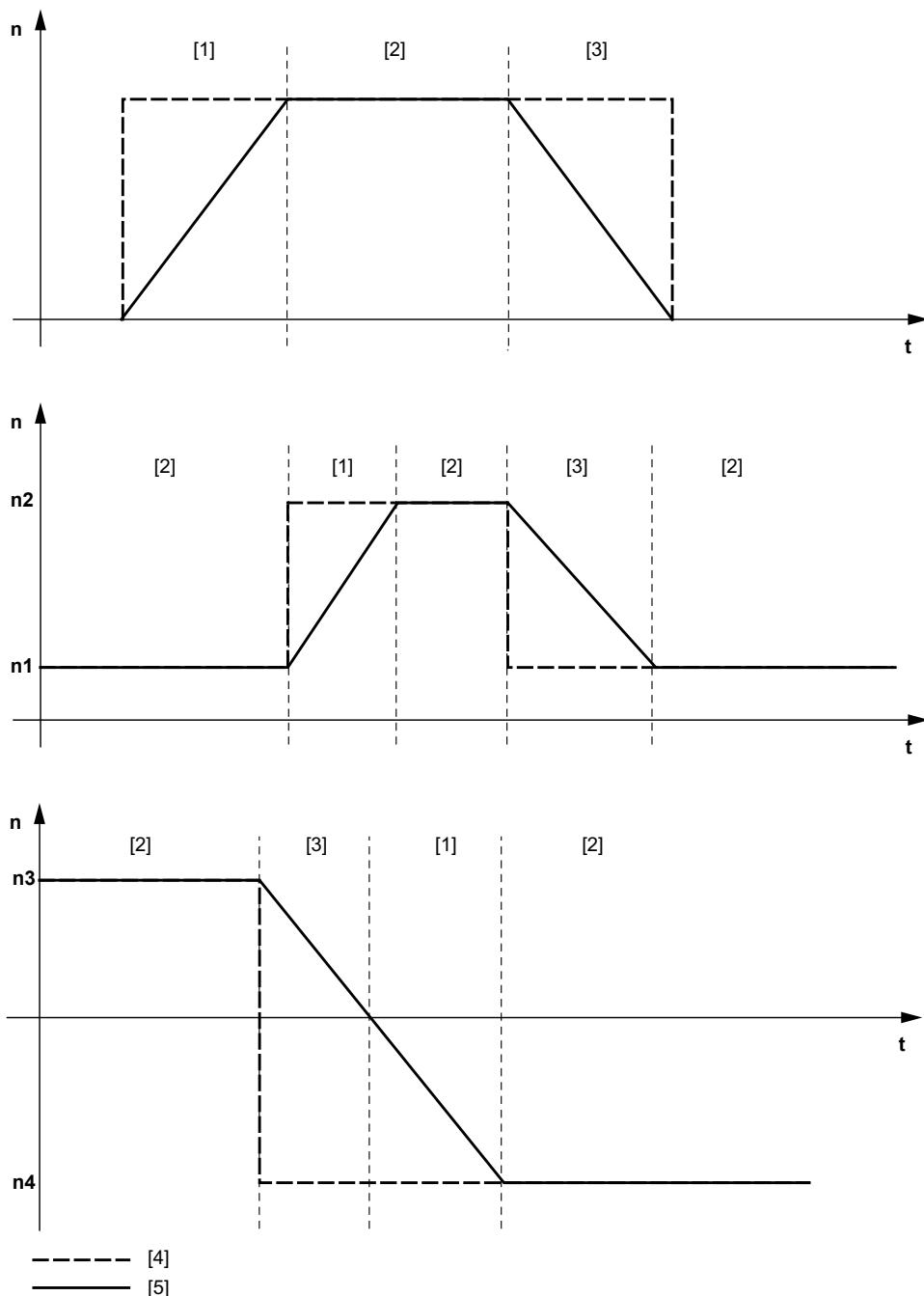
When additional function 13 is active, the following values may be set as monitoring times on switches t1 and f2:



Switch t1 or f2 (see above)											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Monitoring time 2 [s]	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5
Monitoring times 1 and 3 [s]	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.5



Validity of the speed monitoring times



337056267

- [1] Validity of monitoring time 1
- [2] Validity of monitoring time 2
- [3] Validity of monitoring time 3

- [4] Speed setpoint
- [5] Speed output (actual value)

Monitoring time 1 is valid when the actual speed increases after a setpoint change.

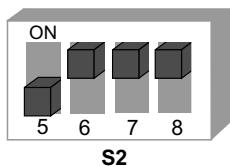
The validity range of monitoring time 2 begins when the setpoint is reached.

The validity range of monitoring time 3 applies when the actual speed decreases after a setpoint change.



6.6.15 Additional function 14

MOVIMOT® with deactivated slip compensation



330342539

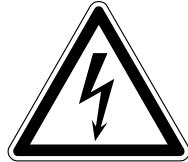
*Description of
functions*

Slip compensation is deactivated.

Deactivating slip compensation can reduce the speed accuracy of the motor.



6.7 Startup with binary control



HAZARD!

When working on the unit, dangerous voltage levels may still be present up to one minute after the mains is disconnected.

Severe or fatal injuries from electric shock.

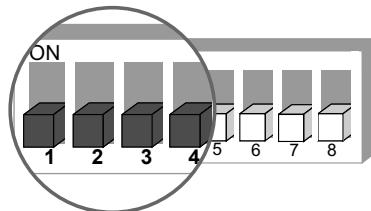
- Disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection.
- Then wait for at least 1 minute.

1. Check the connection of the MOVIMOT® inverter.

See sec. "Electrical Installation".

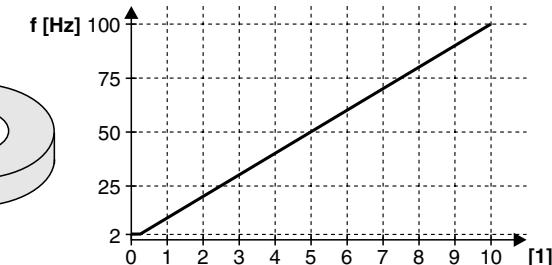
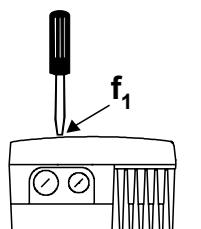
2. Make sure that the DIP switches S1/1 – S1/4 are set to "OFF" (address = 0).

This means MOVIMOT® is controlled binary via terminals.



337484811

3. Set the first speed at the setpoint potentiometer f1 (active when terminals f1/f2 X6:7,8 = "0") (factory setting: ca. 50 Hz).



329413003

[1] Potentiometer setting

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



STOP!

The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly.

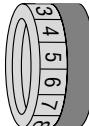
A missing or incorrectly installed screw plug can cause damage to the MOVIMOT® inverter.



"Easy" Startup

Startup with binary control

5. Set the 2nd speed at switch f2 (active when terminals f1/f2 X6:7,8 = "1").



Switch f2											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Setpoint f2 [Hz]	5	7	10	15	20	25	35	50	60	70	100

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

6. Set the ramp time with switch t1 (ramp times in relation to a setpoint step change of 50 Hz).



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

7. Place the MOVIMOT® inverter onto the terminal box and screw it on.

8. Switch on the DC 24 V and the supply voltage.

6.7.1 Inverter behavior depending on terminal level

Inverter behavior	Power supply X1: L1-L3	24 V X6:1,2,3	f1 / f2 X6:7,8	CW / Stop X6:11,12	CCW / Stop X6:9,10	Status LED
Inverter off	0	0	x	x	x	Off
Inverter off	1	0	x	x	x	Off
Stop, no supply system	0	1	x	x	x	Flashing yellow
Stop	1	1	x	0	0	Yellow
CW operation with f1	1	1	0	1	0	Green
CCW operation with f1	1	1	0	0	1	Green
CW operation with f2	1	1	1	1	0	Green
CCW operation with f2	1	1	1	0	1	Green
Stop	1	1	x	1	1	Yellow

Key

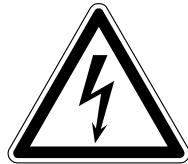
0 = No voltage

1 = Voltage

x = Any



6.8 Startup with options MBG11A or MLG..A



HAZARD!

When working on the unit, dangerous voltage levels may still be present up to one minute after the mains is disconnected.

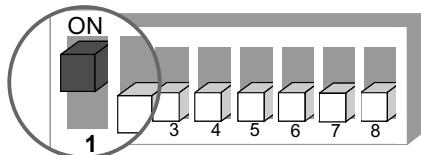
Severe or fatal injuries from electric shock.

- Disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection.
- Then wait for at least 1 minute.

1. Check the connection of the MOVIMOT® inverter.

See sec. "Electrical Installation".

2. Set DIP switch S1/1 of the MOVIMOT® to "ON" (= address 1).



337783947

3. Set minimum frequency f_{min} with switch f2.



Switch f2

Detent setting	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency f_{min} [Hz]	2	5	7	10	12	15	20	25	30	35	40

4. Set ramp time with switch t1 (ramp times based on a setpoint step change of 50 Hz).



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

5. Check to see if requested direction of rotation has been enabled.

CW / Stop	CCW / Stop	Meaning
Activated	Activated	<ul style="list-style-type: none"> Both directions of rotation are enabled
Activated	Not activated	<ul style="list-style-type: none"> Only CW operation enabled Preselected setpoints for CCW rotation result in standstill of drive



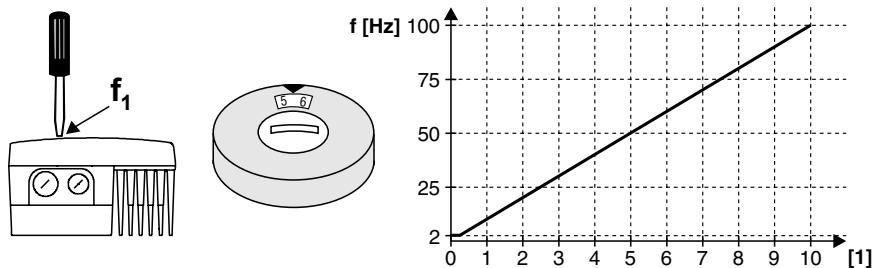
"Easy" Startup

Startup with options MBG11A or MLG..A

CW / Stop	CCW / Stop	Meaning
Not activated	Activated	<ul style="list-style-type: none"> Only CCW operation enabled Preselected setpoints for CW rotation result in standstill of drive
Not activated	Not activated	<ul style="list-style-type: none"> Unit is blocked or drive brought to a stop

6. Place the MOVIMOT® inverter onto the terminal box and screw it on.

7. Set the required maximum speed using setpoint potentiometer f1.



329413003

[1] Potentiometer setting

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

	STOP! The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly. A missing or incorrectly installed screw plug can cause damage to the MOVIMOT® inverter.
--	--

9. Switch on the voltage.

	NOTE For notes on operation with the MBG11A or MLG..A options, refer to sec. "Keypads MBG11A and MLG..A" (siehe page 136).
--	--



6.9 Startup with option MWA21A (speed control module)



HAZARD!

When working on the unit, dangerous voltage levels may still be present up to one minute after the mains is disconnected.

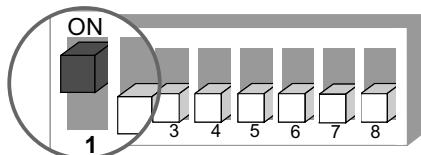
Severe or fatal injuries from electric shock.

- Disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection.
- Then wait for at least 1 minute.

1. Check the connection of the MOVIMOT® inverter.

See sec. "Electrical Installation".

2. Set DIP switch S1/1 of the MOVIMOT® to "ON" (= address 1).



337783947

3. Set minimum frequency f_{min} with switch f2.



Switch f2

Detent setting	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency f_{min} [Hz]	2	5	7	10	12	15	20	25	30	35	40

4. Set the ramp time with switch t1 (ramp times in relation to a setpoint step change of 50 Hz).



Switch t1

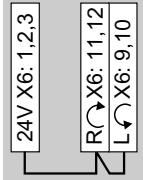
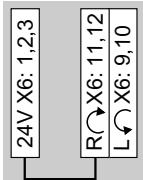
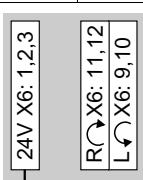
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10



"Easy" Startup

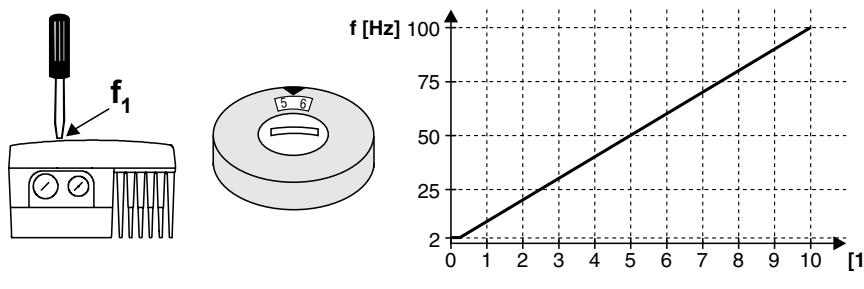
Startup with option MWA21A (speed control module)

5. Check to see if requested direction of rotation has been enabled.

CW / Stop	CCW / Stop	Meaning
Activated	Activated	<ul style="list-style-type: none"> Both directions of rotation are enabled 
Activated	Not activated	<ul style="list-style-type: none"> Only CW operation enabled Preselected setpoints for CCW rotation result in standstill of drive 
Not activated	Activated	<ul style="list-style-type: none"> Only CCW operation enabled Preselected setpoints for CW rotation result in standstill of drive 
Not activated	Not activated	<ul style="list-style-type: none"> Unit is blocked or drive brought to a stop 

6. Place the MOVIMOT® inverter onto the terminal box and screw it on.

7. Set the required maximum speed using setpoint potentiometer f1.



[1] Potentiometer setting



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

 STOP!	<p>The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly. A missing or incorrectly installed screw plug can cause damage to the MOVIMOT® inverter.</p>
------------------	--

9. Select the signal type for the analog input (terminals 7 and 8) of the MWA21A option using switches S1 and S2.

	S1	S2	Setpoint stop function
V signal = 0...10 V	OFF	OFF	No
I signal 0...20 mA	ON	OFF	
I signal 4...20 mA	ON	ON	Yes
V signal = 2...10 V	OFF	ON	

10. Switch on the voltage.

11. Enable MOVIMOT®

by applying 24 V to terminal 4 (CW rotation) or terminal 5 (CCW rotation) of the MWA21A option.

	NOTE <p>For notes on operating the MWA21A option, refer to sec. "Speed control module MWA21A" (siehe page 137).</p>
--	--



6.10 Supplementary notes for installation close to the motor

When the MOVIMOT® inverter with option P2.A is installed close to the motor, observe the following notes:

6.10.1 Checking the connection type of the connected motor

Use the following figure to check that the selected connection type is identical for the MOVIMOT® and the connected motor.



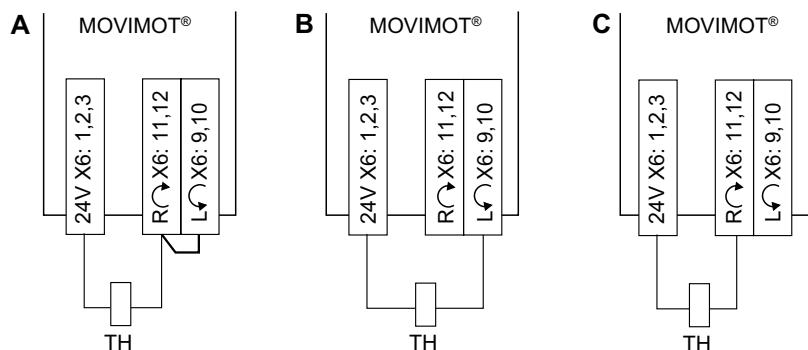
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Important: For brake motors: Do not install brake rectifiers inside the terminal box of the motor!

6.10.2 Motor protection and direction of rotation enable

The connected motor must be equipped with a TH.

- For control via RS-485, the TH must be wired as follows:

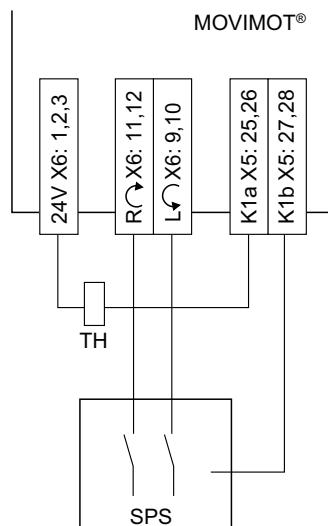


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- [A] Both directions of rotation are enabled
- [B] Only **CCW** direction of rotation is enabled
- [C] Only **CW** direction of rotation is enabled



- For control via binary signals, SEW-EURODRIVE recommends that you connect the TH in series with the "Ready signal" relay (see the following illustration).
 - The ready signal must be monitored by an external controller.
 - As soon as the ready signal is no longer applied, the drive must be switched off (terminals R ↗ X6:11,12 and L ↘ X6:9,10 = "0").



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6.10.3 DIP switch

When the MOVIMOT® inverter is installed close to the motor, the DIP switch S1/5 must be changed from the factory setting to "ON":

S1 Meaning	Binary coding RS-485 unit address				Motor protection	Motor power rating	PWM Frequency	No-load damping
	2^0	2^1	2^2	2^3				
ON	1	1	1	1	Off	Motor one size smaller	Variable (16,8,4 kHz)	On
OFF	0	0	0	0	On	Adjusted	4 kHz	Off

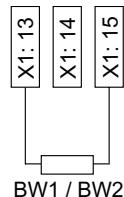


"Easy" Startup

Supplementary notes for installation close to the motor

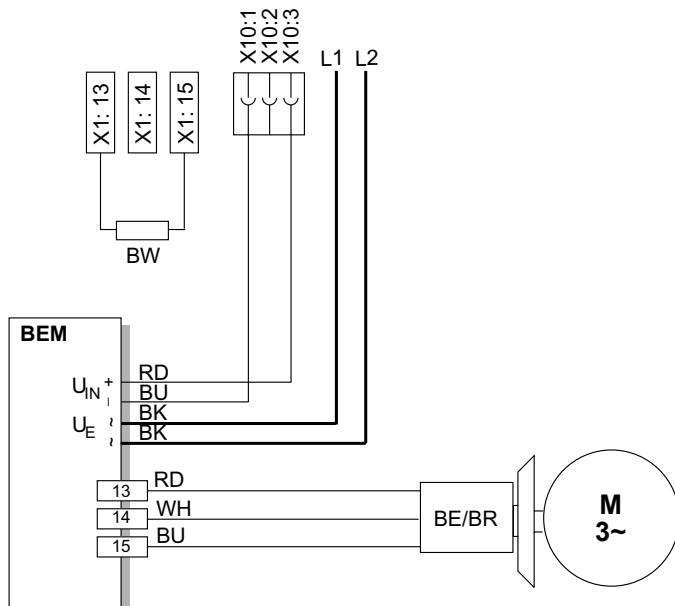
6.10.4 Braking resistor

- For **motors without brake**, a braking resistor must be connected to the MOVIMOT®.



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- For **brakemotors without BEM option**, no braking resistor may be connected to the MOVIMOT®.
- For **brakemotors with BEM option** and external braking resistor, the external braking resistor and the brake must be connected as follows.



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6.10.5 Mounting the MOVIMOT® inverter in the field distributor

Follow the instructions in the corresponding manuals when mounting the MOVIMOT® inverter close to the motor in the field distributor.

- PROFIBUS Interfaces, Field Distributors
- Interbus Interfaces, Field Distributors
- DeviceNet/CANopen Interfaces, Field Distributors
- AS-Interface Interfaces, AS-Interface Field Distributors



7 "Easy" Startup with RS-485 Interface/Fieldbus

7.1 Important notes on startup

	HAZARD! <p>Before removing / fitting the MOVIMOT® inverter, you must disconnect it from the supply system. Dangerous voltages may still be present for up to one minute after disconnection from the power supply.</p> <p>Severe or fatal injuries from electric shock.</p> <ul style="list-style-type: none"> • Disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection. • Then wait for at least 1 minute.
	WARNING! <p>The surfaces of MOVIMOT® and external options, e.g. braking resistor (especially the heat sink), can become very hot during operation.</p> <p>Danger of burns.</p> <ul style="list-style-type: none"> • Do not touch the MOVIMOT® drive and external options until they have cooled down sufficiently.
	NOTES <ul style="list-style-type: none"> • Remove paint protection cap from the status LED before startup. • Remove paint protection film from the nameplates before startup. • Check that all protective covers are installed correctly. • Observe a minimum switch-off time of 2 seconds for the mains contactor K11.

7.2 Startup procedure

1. Check the connection of the MOVIMOT® inverter.

See sec. "Electrical Installation".

2. Set the correct RS-485 address on DIP switches S1/1...S1/4.

Always set address "1" in conjunction with SEW fieldbus interfaces (MF..) or with MOVIFIT®.

Decimal address	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
S1/1	-	X	-	X	-	X	-	X	-	X	-	X	-	X	-	X
S1/2	-	-	X	X	-	-	X	X	-	-	X	X	-	-	X	X
S1/3	-	-	-	-	X	X	X	X	-	-	-	-	X	X	X	X
S1/4	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X	X

X = ON

- = OFF



"Easy" Startup with RS-485 Interface/Fieldbus

Startup procedure

3. Set minimum frequency f_{\min} with switch f2.



Switch f2	0	1	2	3	4	5	6	7	8	9	10
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency f_{\min} [Hz]	2	5	7	10	12	15	20	25	30	35	40

4. Set the ramp time with switch t1 (ramp times in relation to a setpoint step change of 50 Hz) if not specified via fieldbus.



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

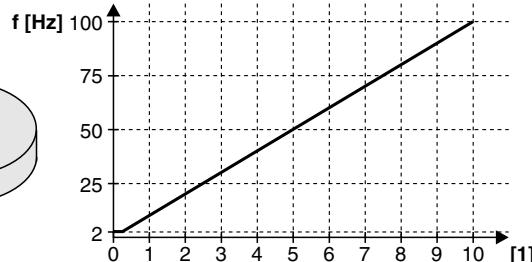
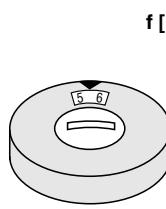
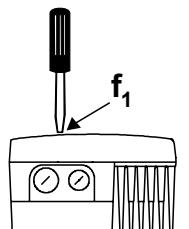
5. Check to see if requested direction of rotation has been enabled.

CW / Stop	CCW / Stop	Meaning
Activated	Activated	<ul style="list-style-type: none"> Both directions of rotation are enabled
Activated	Not activated	<ul style="list-style-type: none"> Only CW operation enabled Preselected setpoints for CCW rotation result in standstill of drive
Not activated	Activated	<ul style="list-style-type: none"> Only CCW operation enabled Preselected setpoints for CW rotation result in standstill of drive
Not activated	Not activated	<ul style="list-style-type: none"> Unit is blocked or drive brought to a stop

6. Place the MOVIMOT® inverter onto the terminal box and screw it on.



- Set the required maximum speed using setpoint potentiometer f1.



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[1] Potentiometer setting

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



STOP!

The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly. A missing or incorrectly installed screw plug can cause damage to the MOVIMOT® inverter.

- Switch on the voltage.



NOTES

For further information on the function in connection to the RS-485 master, refer to sec. "Function with RS-485 master" (siehe page 97).

For further information on the function in connection to the fieldbus interfaces, refer to relevant manuals:

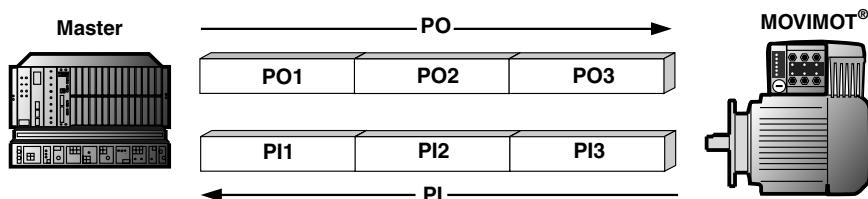
- PROFIBUS Interfaces, Field Distributors
- Interbus Interfaces, Field Distributors
- DeviceNet/CANopen Interfaces, Field Distributors
- AS-Interface Interfaces, AS-Interface Field Distributors



7.3 Coding of process data

The same process data information is used for control and setpoint selection in all fieldbus systems. The process data is coded according to the standard MOVILINK® profile for SEW drive inverters. The following variants are available for MOVIMOT® inverters:

- 2 process data words (2 PD)
- 3 process data words (3 PD)



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PO = Process output data
 PO1 = Control word
 PO2 = Speed [%]
 PO3 = Ramp

PI = Process input data
 PI1 = Status word 1
 PI2 = Output current
 PI3 = Status word 2

7.3.1 2 process data words

For controlling MOVIMOT® via 2 process data words, the higher-level controller sends the process output data "Control word" and "Speed [%]" to the MOVIMOT®. MOVIMOT® sends the process input data "Status word 1" and "Output current" to the higher-level controller.

7.3.2 3 process data words

When control is with 3 process data words, the "ramp" is sent as an additional process output data word and "Status word 2" is sent as the third process input data word.

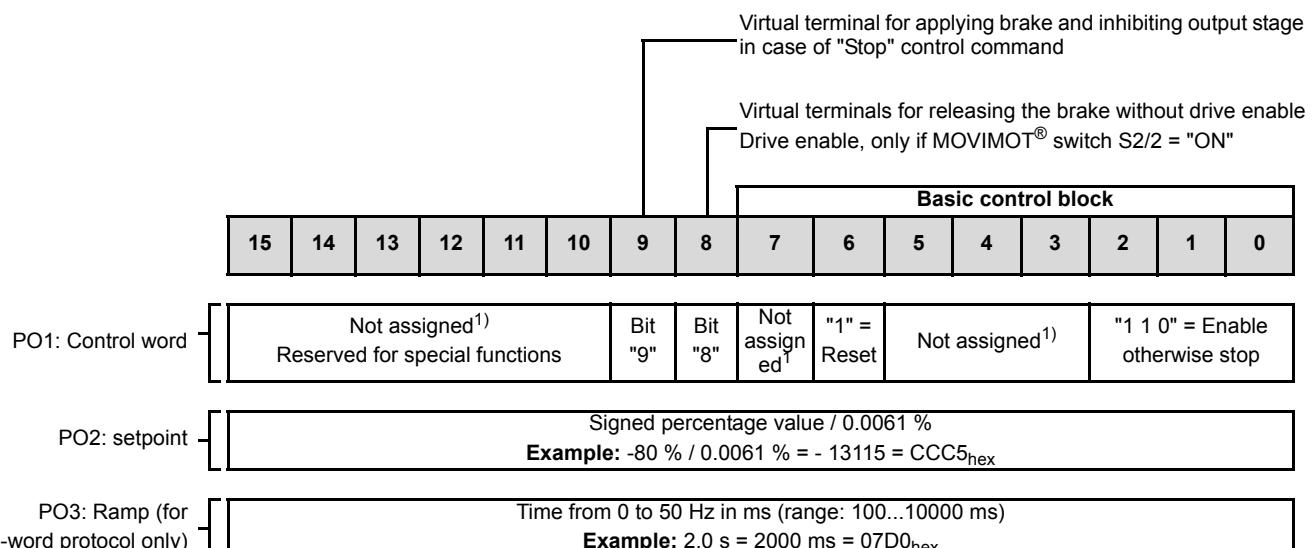


7.3.3 Process output data

Process output data is sent from the higher-level controller to the MOVIMOT® inverter (control information and setpoints). However, they only come into effect in MOVIMOT® if the RS-485 address in MOVIMOT® (DIP switches S1/1 to S1/4) is set to a value other than 0.

The higher-level controller controls the MOVIMOT® inverter using the following process output data:

- PO1: Control word
- PO2: Speed [%] (setpoint)
- PO3: Ramp



1) Recommendation for all bits that are not assigned = "0"

*Control word,
bit 0...2*

The "Enable" control command is specified with bits 0...2 by entering the control word = 0006_{hex}. For enabling the MOVIMOT® inverter, input terminal R ↗ X6:11,12 and/or L ↘ X6:9,10 must be connected to +24 V (jumpered with terminal 24V X6:1,2,3).

The "Stop" control command is issued by resetting bit 2 = "0". Use the stop command 0002_{hex} to enable compatibility with other SEW inverter series. MOVIMOT® always triggers a stop at the current ramp whenever bit 2 = "0" regardless of the status of bit 0 and bit 1.

*Control word,
bit 6 = Reset*

In the event of a malfunction, the fault can be acknowledged by setting bit 6 = "1" (Reset). For reasons of compatibility, any control bits not assigned must be set to the value 0.

*Control word,
bit 8 = Release
brake without drive
enable*

If DIP switch S2/2 = "ON", the brake can be released without drive enable by setting bit 8.

*Control word,
bit 9 = Apply brake
when control
command "Stop" is
issued*

When bit 9 is set after activating the control command "Stop", MOVIMOT® applies the brake and inhibits the output stage.



Speed [%] The speed setpoint is given as a relative value in percentage and refers to maximum speed set using the setpoint potentiometer f1.

Coding: $C000_{hex} = -100\% \text{ (CCW direction)}$

$4000_{hex} = +100\% \text{ (CW operation)}$

-> 1 digit = 0.0061 %

Example: 80 % f_{max} , CCW rotation:

Calculation: $-80\% / 0.0061 = -13115_{dec} = CCC5_{hex}$

Ramp The current integrator in the process output data word PO3 is transferred if the process data exchange takes place using three process data words. The integrator ramp set with switch t1 is used if the MOVIMOT® inverter is controlled using two process data items.

Coding: 1 digit = 1 ms

Range: 100 ... 10000 ms

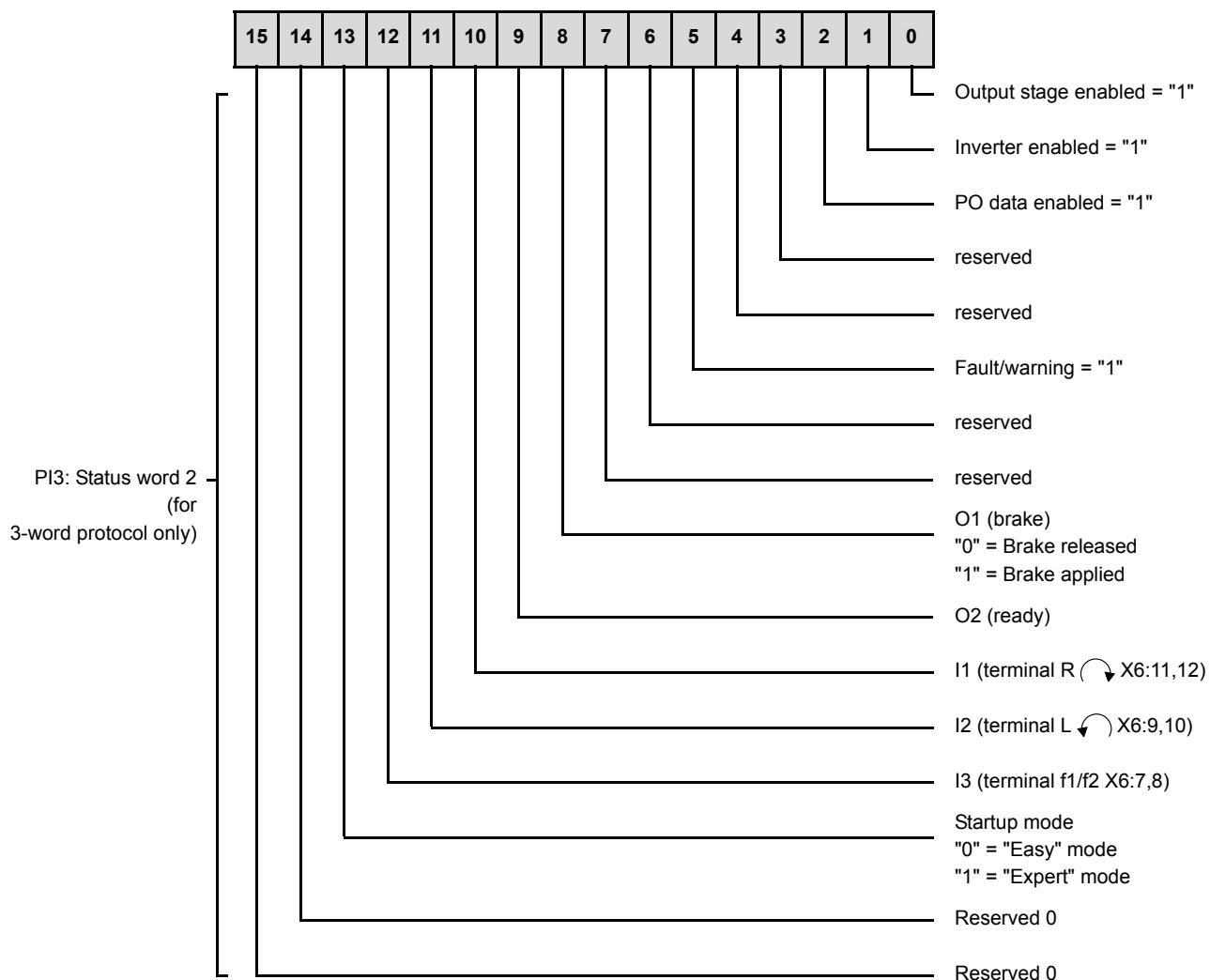
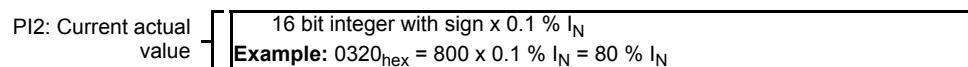
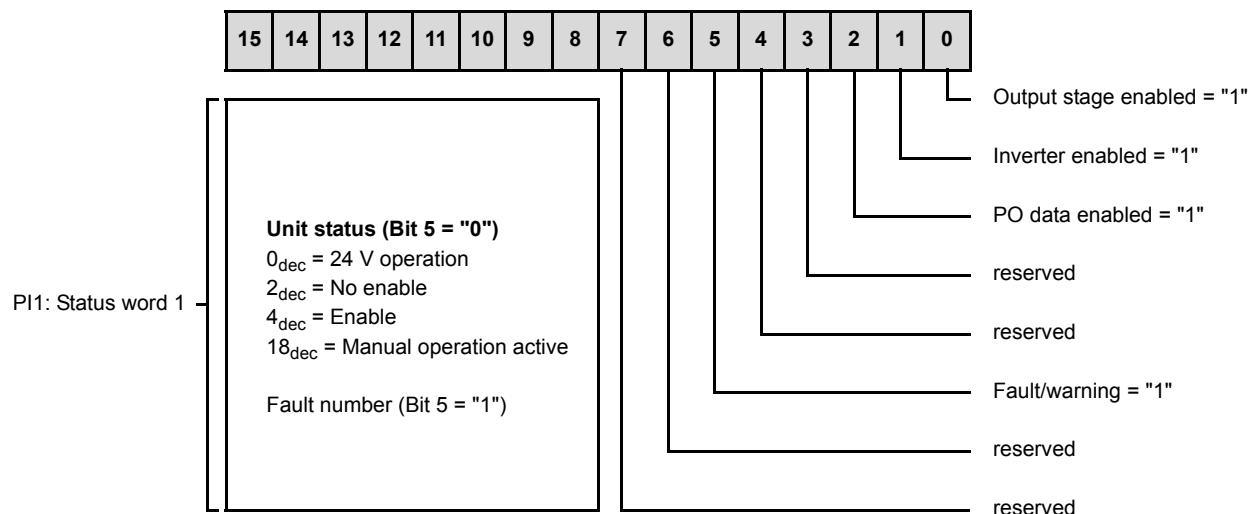
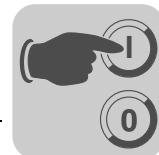
Example: 2.0 s = 2000 ms = $2000_{dec} = 07D0_{hex}$

7.3.4 Process input data

The MOVIMOT® inverter sends back process input data to the higher-level controller. The process input data consists of status and actual value information.

The MOVIMOT® inverter supports the following process input data:

- PI1: Status word 1
- PI2: Output current
- PI3: Status word 2





"Easy" Startup with RS-485 Interface/Fieldbus

Coding of process data

The following table shows the assignment of status word 1:

Bit	Meaning	Explanation
0	Output stage enabled	1: MOVIMOT® is enabled 0: MOVIMOT® is not enabled
1	Inverter ready	1: MOVIMOT® is ready 0: MOVIMOT® is not ready
2	PO data enabled	1: Process data is enabled; Drive can be controlled via fieldbus 0: Process data is inhibited; Drive cannot be controlled via fieldbus
3	reserved	Reserved = 0
4	reserved	Reserved = 0
5	Fault/warning	1: Fault/warning present 0: No fault/warning
6	reserved	Reserved = 0
7	reserved	Reserved = 0
8..15	Bit 5 = 0: Unit status 0 _{dec} : 24 V operation 2 _{dec} : No enable 4 _{dec} : Enable 18 _{dec} : Manual operation active Bit 5 = 1: Error number	If there is no fault/warning (bit 5 = 0), the operating/enable status of the inverter power section is displayed in this byte. If there is a fault/warning (bit 5 = 1), the fault number is displayed in this byte.

The following table shows the assignment of status word 2:

Bit	Meaning	Explanation
0	Output stage enabled	1: MOVIMOT® is enabled 0: MOVIMOT® is not enabled
1	Inverter ready	1: MOVIMOT® is ready 0: MOVIMOT® is not ready
2	PO data enabled	1: Process data is enabled; Drive can be controlled via fieldbus 0: Process data is inhibited; Drive cannot be controlled via fieldbus
3	reserved	Reserved = 0
4	reserved	Reserved = 0
5	Fault/warning	1: Fault/warning present 0: No fault/warning
6	reserved	Reserved = 0
7	reserved	Reserved = 0
8	O1 brake	1: Brake applied 0: Brake released
9	O2 ready	1: MOVIMOT® is ready 0: MOVIMOT® is not ready
10	I1 (R X6:11,12)	1: Binary input is set
11	I2 (L X6:9,10)	0: Binary input is not set
12	I3 (f1/f2 X6:7,8)	
13	Startup mode	1: "Expert" startup mode 0: "Easy" startup mode
14	reserved	Reserved = 0
15	reserved	Reserved = 0

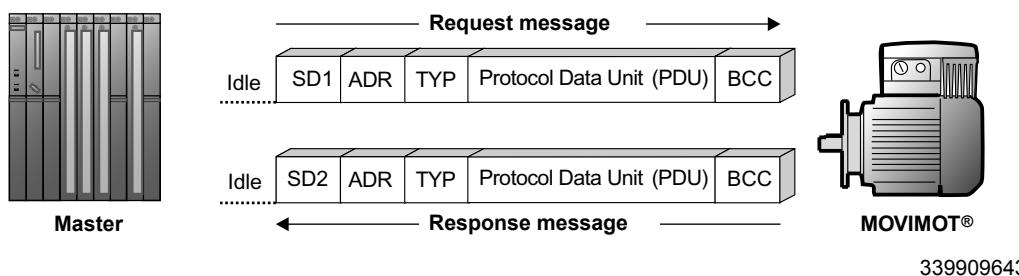


7.4 Function with RS-485 master

- The higher-level controller (e.g. PLC) is the master, the MOVIMOT® inverter is the slave.
- 1 start bit, 1 stop bit and 1 parity bit (even parity) will be used.
- Transmission complies with the SEW MOVILINK® protocol (see section "Coding of process data") with a fixed transfer rate of 9600 baud.

7.4.1 Message structure

The following figure shows the message structure between the RS-485 master and the MOVIMOT® inverter:



Idle = Idle period of at least 3.44 ms

SD1 = Start delimiter (start character) 1: Master -> MOVIMOT®: 02_{hex}

SD2 = Start delimiter (start character) 2: MOVIMOT® -> master: 1D_{hex}

ADR = Address 1-15

Group address 101–115

254 = Point-to-point

255 = Broadcast

Type = User data type

PDU = User data

BCC = Block check character: XOR all bytes

	NOTE If the type "cyclic" is selected, MOVIMOT® expects the next bus activity after a maximum wait of one second (master protocol). If this bus activity is not detected, MOVIMOT® rests automatically (timeout monitoring).
--	--

	WARNING! There is no timeout monitoring if the type "acyclical" is selected. The drive can continue to operate uncontrolled when the bus connection is interrupted. Death or severe injuries from uncontrolled operation. • Run the bus connection between master and MOVIMOT® inverter only with "cyclic" transmission.
--	---



7.4.2 Idle and start delimiter

MOVIMOT® detects the start of a request message by means of an idle period lasting at least 3.44 ms, followed by the character 02_{hex} (start delimiter 1). In the event that the transmission of a valid request message is canceled by the master, a new request message may not be sent until at least twice the idle period (approx. 6.88 ms) has elapsed.

7.4.3 Address (ADR)

MOVIMOT® supports the address range from 0 to 15 as well as access via the point-to-point address (254) or via the broadcast address (255). It is only possible to read the current process input data (status word, output current) via address 0. The process output data sent by the master does not come into effect because PO data processing is not active when the address setting is 0.

7.4.4 Group address

Furthermore, ADR = 101...115 makes it possible to group several MOVIMOT® inverters. When this is done, all MOVIMOT® inverters in one group are set to the same RS-485 address (e.g. group 1: ADR = 1, group 2: ADR = 2).

The master can now assign new setpoints to these groups by using ADR = 101 (setpoints to inverters in group 1) and ADR = 102 (setpoints for group 2). The inverters will not send a reply in this addressing version. The master must observe a min. rest time of 25 ms between two broadcast or group messages!

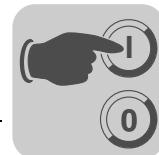
7.4.5 User data type (TYP)

As a rule, MOVIMOT® supports four different PDU (Protocol Data Unit) types. These types are principally determined by the process data length and transmission variant.

Type	Transmission variant	Process data length	User data
03 _{hex}	Cyclical	2 words	Control word / speed [%] / status word 1 / output current
83 _{hex}	Acyclical	2 words	
05 _{hex}	Cyclical	3 words	Control word / speed [%] / ramp / status word 1 / output current / status word 2
85 _{hex}	Acyclical	3 words	

7.4.6 Timeout monitoring

In the "cyclical" transmission variant, the MOVIMOT® inverter expects the next bus activity (request message of types named above) after a maximum of one second. If this bus activity is not detected the drive automatically decelerates with the most recently valid ramp (timeout monitoring). The "ready signal" relay drops out. There is no timeout monitoring if the "acyclical" transmission variant is selected.

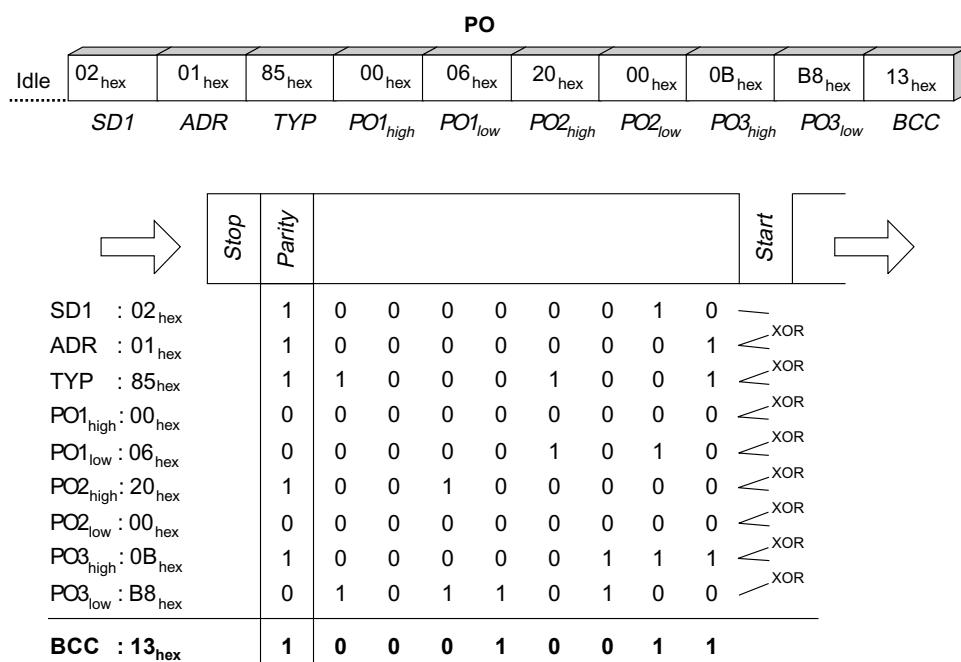


7.4.7 Block check character BCC

The block check character (BCC) is used in conjunction with even parity formation to ensure reliable data transfer. The block check character is formed by means of an XOR logic operation of all message characters. The result is entered in the BCC at the end of the message.

Example

The following figure gives an example of how a block check character is created for an acyclical message of type PDU 85_{hex} with 3 process data items. The XOR logic operation on the characters SD1...PO3_{low} results in the value 13_{hex} as the block check character BCC. This BCC will be sent as the last character of the message. The recipient checks the character parity after having received the individual characters. Following this, the block check character is created from the received characters SD1...PO3_{low} in accordance with the procedure below. The message has been correctly transmitted if the calculated and received BCCs are identical and there is no character parity error. Any other result will be displayed as a transmission error. The message may have to be repeated.



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7.4.8 Message processing in the MOVILINK® master

The following algorithm must be observed for sending and receiving MOVILINK® messages in any programmable controllers, in order to ensure correct data transmission.

a) Sending a request message

(E.g. sending setpoints to MOVIMOT® inverter)

1. Wait for expiration of idle period (at least 3.44 ms, at least 25 ms with group or broadcast messages).
2. Send request message to inverter.

b) Receiving a response message

(Acknowledgement signal + actual values from MOVIMOT® inverter)

1. The response message must be received within approx. 100 ms, otherwise, for example, it is sent again.
2. Calculated block check character (BCC) of the response message = received BCC?
3. Start delimiter of response message = $1D_{hex}$?
4. Response address = Request address?
5. Response PDU type = Request PDU type?
6. All criteria satisfied: => transfer OK! Process data valid.
7. The next request message can now be sent (continue from point a).

All criteria satisfied: => transfer OK! Process data valid. The next request message can now be sent (continue from point a).



7.4.9 Sample message

This example deals with the control of a MOVIMOT® AC motor using three process data words of PDU type 85_{hex} (3 PD acyclical). The RS-485 master sends three process output data words (PO) to the MOVIMOT® AC motor. The MOVIMOT® inverter replies by sending three process input data words (PI).

*Request message
from the RS-485
master to
MOVIMOT®*

PO1: 0006_{hex} Control word 1 = Enable
PO2: 2000_{hex} Speed [%] setpoint = 50 % (of f_{max}¹⁾)
PO3: 0BB8_{hex} Ramp = 3 s

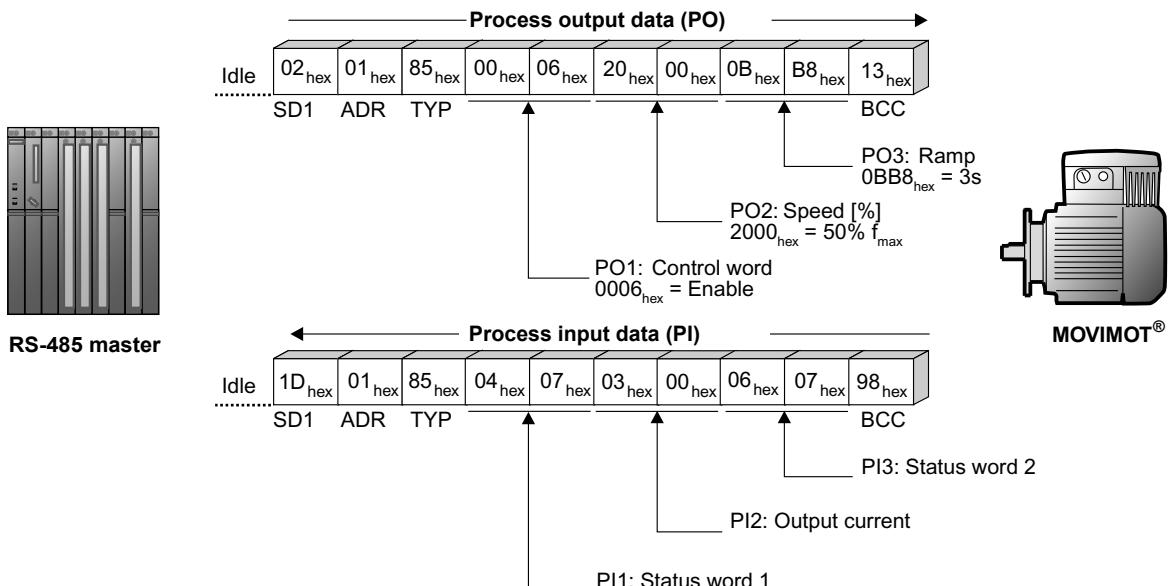
1) f_{max} is specified on setpoint potentiometer f1

*Response mes-
sage from
MOVIMOT® to RS-
485 master*

PI1: 0406_{hex} Status word 1
PI2: 0300_{hex} Output current [% I_N]
PI3: 0607_{hex} Status word 2

For more information on the coding of the process data, refer to sec. "Coding process data" (siehe page 92).

Sample message "3 PD acyclical"



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This example shows the acyclical transmission variant, i.e. no timeout monitoring is active in the MOVIMOT® inverter. The cyclical transmission variant can be implemented with the entry TYPE = 05_{hex}. In this case, the MOVIMOT® inverter expects the next bus activity (request message of the aforementioned types) within one second at the latest, otherwise the MOVIMOT® inverter stops automatically (timeout monitoring).



"Expert" Startup with Parameter Function

Important notes on startup

8 "Expert" Startup with Parameter Function

	NOTES
	<p>"Expert" startup is only necessary if parameters are to be set during startup.</p> <p>"Expert" startup is only possible if:</p> <ul style="list-style-type: none"> • No additional function is activated (DIP switch S2/5 - S2/8 = "OFF") • The Drive ID module is plugged in • and parameter <i>P805 Startup mode</i> is set to "Expert mode"

8.1 Important notes on startup

	HAZARD!
	<p>Before removing / fitting the MOVIMOT® inverter, you must disconnect it from the supply system. Dangerous voltages may still be present for up to one minute after disconnection from the power supply.</p> <p>Severe or fatal injuries from electric shock.</p> <ul style="list-style-type: none"> • Disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection. • Then wait for at least 1 minute.
	WARNING! <p>The surfaces of MOVIMOT® and external options, e.g. braking resistor (especially the heat sink), can become very hot during operation.</p> <p>Danger of burns.</p> <ul style="list-style-type: none"> • Do not touch the MOVIMOT® drive and external options until they have cooled down sufficiently.
	NOTES <ul style="list-style-type: none"> • Remove paint protection cap from the status LED before startup. • Remove paint protection film from the nameplates before startup. • Check that all protective covers are installed correctly. • Observe a minimum switch-off time of 2 seconds for the mains contactor K11.

8.2 MOVITOOLS® MotionStudio

The "MOVITOOLS® MotionStudio" software package is the SEW engineering tool that you can use to access all SEW drive units. With simple applications, you can use the MOVITOOLS® MotionStudio to perform diagnostics for the MOVIMOT® inverter. For more demanding applications, you can use the wizards available in MOVITOOLS® MotionStudio to startup and configure MOVIMOT® inverters. The scope function in MOVITOOLS® MotionStudio can be used for visualizing process values.

Install the latest software version of MOVITOOLS® MotionStudio on your PC.



MOVITOOLS® MotionStudio can communicate with the drive units using different communication links and fieldbus systems.

The following section describes the most straightforward application, a connection between a PC / laptop and a MOVIMOT® inverter via the diagnostics interface X50 (point-to-point connection).

8.2.1 Integrating MOVIMOT® into MOVITOOLS® MotionStudio

	NOTE
	For a detailed description of the following steps, please refer to the comprehensive online help in MOVITOOLS® MotionStudio.

1. Start MOVITOOLS® MotionStudio.
2. Create a project and network.
3. Configure the communication channel at the PC.
4. Make sure that the 24 V supply of the MOVIMOT® inverter is connected.
5. Perform an online scan.

Check the set scanning range in MOVITOOLS® MotionStudio.

	NOTE
	<p>The diagnostic interface is always assigned address 32.</p> <p>The online scan can take some time.</p>

6. MOVIMOT®, for example, is displayed in MOVITOOLS® MotionStudio as follows:



7. Right-click on "32: MMD0015-5A3" to make the tools for startup and diagnostics for MOVIMOT® available in the context menu.



"Expert" Startup with Parameter Function

Startup and adding functions by setting individual parameters

8.3 Startup and adding functions by setting individual parameters

The basic functionality of the MOVIMOT® drive can be expanded by using individual parameters.

NOTE	
	<p>This "Expert" startup is only possible if:</p> <ul style="list-style-type: none"> • No additional function is activated (DIP switch S2/5 - S2/8 = "OFF") • The Drive ID module is plugged in • and parameter <i>P805 Startup mode</i> is set to "Expert mode"

Proceed as follows:

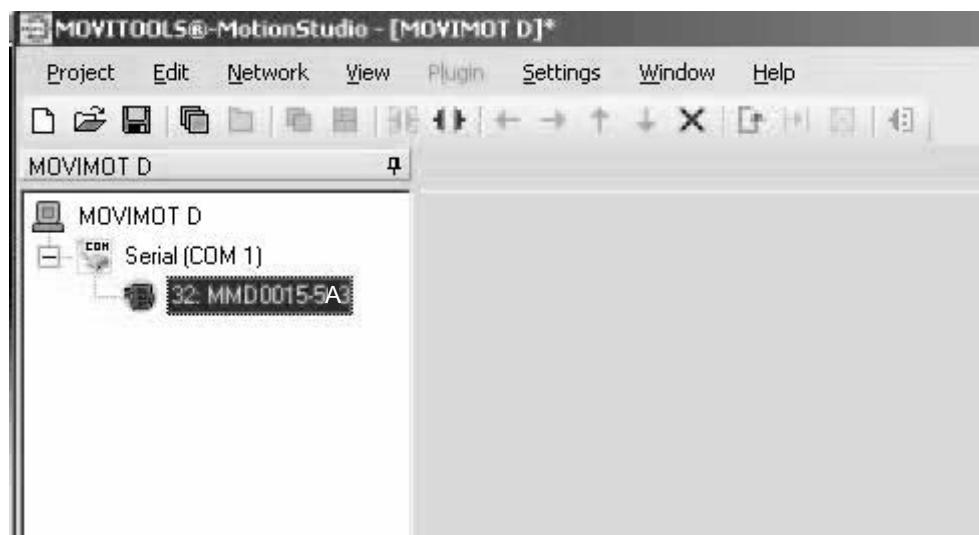
1. It is essential to observe the safety and warning instructions of section "Important notes on startup" (siehe page 102) when working on the MOVIMOT® inverter.
2. Perform "Easy" startup according to sec. 6.
3. Connect the PC or the DBG keypad to the MOVIMOT® inverter.
See sec. "PC connection" (siehe page 47) or sec. "Connection of DBG keypad" (siehe page 46).
4. Connect the 24 V supply of the MOVIMOT® inverter.
5. When using a PC, start MOVITOOLS® MotionStudio and integrate the MOVIMOT® inverter.
See sec. "Integrating MOVIMOT in MOVITOOLS MotionStudio". (siehe page 103)
6. Set parameter *P805 Startup mode* to "Expert".
7. Specify the parameters you want to change.
8. Check whether these parameters depend on mechanical controls.
See sec. "Parameters that depend on mechanical controls". (siehe page 132)
9. Deactivate the respective controls by adjusting the bit-coded selection box of parameter *P102*.
See sec. "Parameter 102" (siehe page 120).
10. Change the selected parameters.
For information on parameter setting with the DBG keypad, refer to sec. "Parameter mode" (siehe page 145).
11. Test the functionality of the MOVIMOT® drive.
Optimize the parameters, if required.
12. Disconnect the PC or the DBG keypad from the MOVIMOT® inverter.
13. Make sure the screw plug of the diagnostics interface X50 has a seal and screw it in.

STOP!	
	<p>The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly. Missing or incorrectly installed screw plugs can cause damage to the MOVIMOT® inverter.</p>



Example: Fine adjustment of setpoint f2 using MOVITOOLS® MotionStudio

1. It is essential to observe the safety and warning instructions of section "Important notes on startup" (siehe page 102) when working on the MOVIMOT® inverter.
2. Perform "Easy" startup using switch f2 for rough adjustment, e.g. setting 5 (25 Hz = 750 rpm).
3. Connect the PC to the MOVIMOT® inverter.
4. Connect the 24 V supply of the MOVIMOT® inverter.
5. Start MOVITOOLS® MotionStudio.
6. Create a project and network.
7. Configure the communication channel at the PC.
8. Perform an online scan.



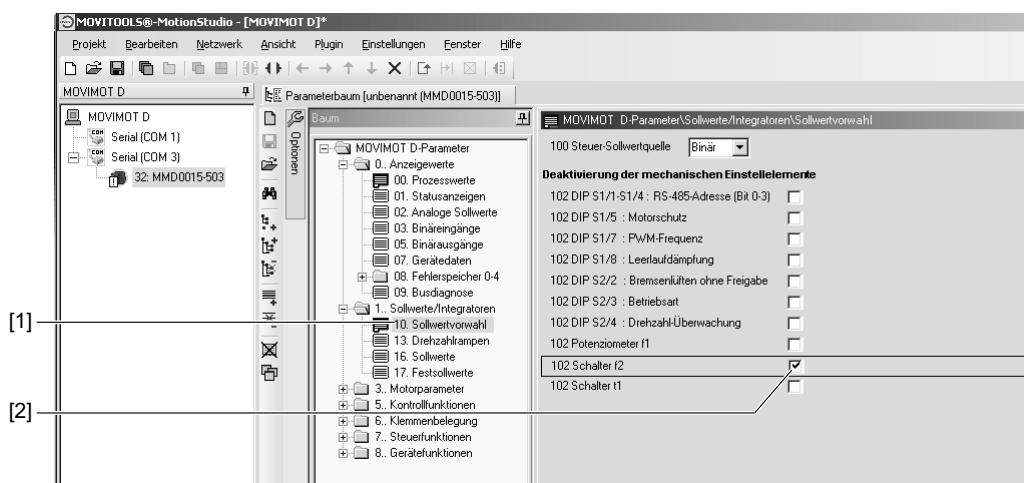
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9. Open the context menu by clicking the right mouse button and select the menu item "Startup" / "Parameter tree".
10. Set parameter *P805 Startup mode* to "Expert".



"Expert" Startup with Parameter Function

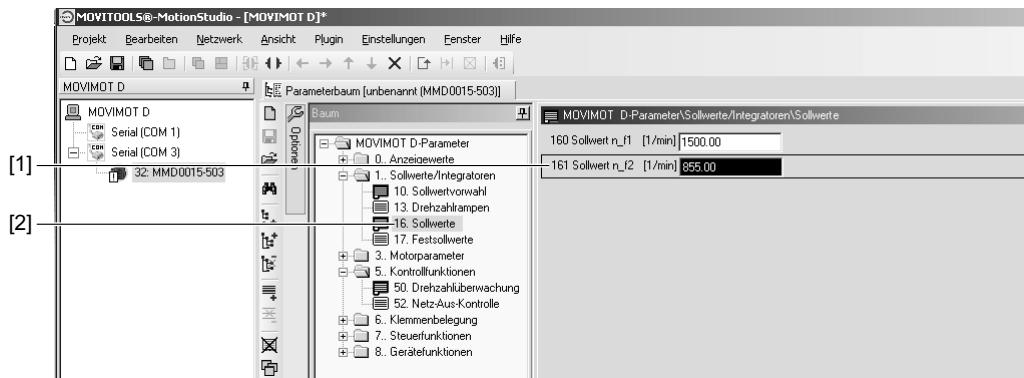
Startup and adding functions by setting individual parameters



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11. Open the folder "Setpoint selection" [1].

Deactivate switch f2 [2] by setting the check box of parameter *P102 Deactivating mechanical controls* [2] (*P102:14 = "1" => P102 = "0100 0000 0000 0000"*).



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12. Open the folder "Setpoints" [2].

Adjust parameter *P161 Setpoint n_f2* [1] until the application is working optimally.

E.g. $P161 = 855 \text{ min}^{-1}$ (= 28.5 Hz)

13. Disconnect the PC from the MOVIMOT® inverter.

14. Make sure the screw plug of the diagnostics interface X50 has a seal and screw it in.

 STOP!	<p>The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly.</p> <p>A missing or incorrectly installed screw plug can cause damage to the MOVIMOT® inverter.</p>
------------------	---



8.4 Startup and configuration with a central controller and MQP..

You can use a central controller to startup and configure the MOVIMOT® drive via the fieldbus interface MQP.. (PROFIBUS-DPV1).

NOTE	
	This "Expert" startup is only possible if: <ul style="list-style-type: none">• No additional function is activated (DIP switch S2/5 - S2/8 = "OFF")• The Drive ID module is plugged in• and parameter <i>P805 Startup mode</i> is set to "Expert mode"

Proceed as follows:

1. It is essential to observe the safety and warning instructions of section "Important notes on startup" (siehe page 102) when working on the MOVIMOT® inverter.

2. Check the connection of the MOVIMOT® inverter.

See sec. "Electrical Installation".

3. Connect the 24 V supply of the MOVIMOT® inverter.

4. Establish communication between the higher-level controller and the MOVIMOT® inverter.

The connection of the higher-level controller to the MOVIMOT® inverter and the communication link depend on the type of higher-level controller.

For information about connecting the higher-level controller to the MOVIMOT® inverter, refer to the "PROFIBUS Interfaces, Field Distributors" manual.

5. Set parameter *P805 Startup mode* to "Expert".

6. Deactivate all mechanical controls by overwriting the bit-coded selection box of parameter *P102* with "FFFFhex" (*P102* = "1111 1111 1111 1111").

7. Set the control setpoint source to RS-485 by setting *P100 Control setpoint source* to "1".

8. Set the required parameters.

9. Test the functionality of the MOVIMOT® drive.

Optimize the parameters, if required.



"Expert" Startup with Parameter Function

Startup by transferring the set of parameters

8.5 Startup by transferring the set of parameters

You can startup several MOVIMOT® drives with the same parameter set.

	NOTE
	<p>The parameter set can only be transferred if:</p> <ul style="list-style-type: none"> • No additional function is activated (DIP switch S2/5 - S2/8 = "OFF") • The Drive ID module is plugged in • and a parameter set from one MOVIMOT® reference unit already exists

8.5.1 Transferring the parameter set using MOVITOOLS® of the DBG keypad

1. It is essential to observe the safety and warning instructions of section "Important notes on startup" (siehe page 102) when working on the MOVIMOT® inverter.
2. Check the connection of the MOVIMOT® inverter.
See sec. "Electrical Installation".
3. Set all controls identical with those of the reference unit.
4. Connect the PC or the DBG keypad to the MOVIMOT® inverter.
See sec. "PC connection" (siehe page 47) or sec. "DBG keypad connection" (siehe page 46).
5. Connect the 24 V supply of the MOVIMOT® inverter.
6. When using a PC, start MOVITOOLS® MotionStudio and integrate the MOVIMOT® inverter into MOVITOOLS®.
See sec. "Integrating MOVIMOT in MOVITOOLS MotionStudio". (siehe page 103)
7. Transfer the entire parameter set of the MOVIMOT® reference unit to the MOVIMOT® inverter.
For information on transferring the parameter set with the DBG keypad, refer to sec. "Copying function of the DBG keypad" (siehe page 149).
8. Test the functionality of the MOVIMOT® drive.
9. Disconnect the PC or the DBG keypad from the MOVIMOT® inverter.
10. Make sure the screw plug of the diagnostics interface X50 has a seal and screw it in.

	STOP!
	<p>The enclosure specified in sec. Technical Data only applies if the screw plugs of the setpoint potentiometer and the X50 diagnostic interface are installed correctly. A missing or incorrectly installed screw plug can cause damage to the MOVIMOT® inverter.</p>



8.5.2 Transferring the parameter set using a central controller and MQP..

1. It is essential to observe the safety and warning instructions of section "Important notes on startup" (siehe page 102) when working on the MOVIMOT® inverter.

2. Check the connection of the MOVIMOT® inverter.

See sec. "Electrical Installation".

3. Set all controls identical with those of the reference unit.

4. Connect the 24 V supply of the MOVIMOT® inverter.

5. Establish communication between the higher-level controller and the MOVIMOT® inverter.

The connection of the higher-level controller to the MOVIMOT® inverter and the communication link depend on the type of higher-level controller.

For information about connecting the higher-level controller to the MOVIMOT® inverter, refer to the "PROFIBUS Interfaces, Field Distributors" manual.

6. Transfer the entire parameter set of the MOVIMOT® reference unit to the MOVIMOT® inverter.

NOTE

Parameter *P805 Startup mode* must be the first value to be transferred.



The transfer procedure depends on the type of higher-level controller.

7. Test the functionality of the MOVIMOT® drive.

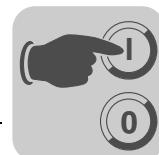


"Expert" Startup with Parameter Function

Parameter list

8.6 Parameter list

No.	Index dec.	Subindex dec.	Name	Range / factory setting	MOVITOOLS® MotionStudio
0_	Display values				
00_	Process values				
000	8318	0	Speed (signed)	[min ⁻¹]	
002	8319	0	Frequency (signed)	[Hz]	
004	8321	0	Output current (amount)	[% I _N]	
005	8322	0	Active current (signed)	[% I _N]	
006	8323	0	Motor utilization	[%]	
008	8325	0	DC link voltage	[V]	
009	8326	0	Output current	[A]	
01_	Status displays				
010	8310	0	Inverter status	[Text]	
011	8310	0	Operating state	[Text]	
012	8310	0	Error status	[Text]	
014	8327	0	Heat sink temperature	[°C]	
015	8328	0	Hours of operation	[h]	
016	8329	0	Enable hours	[h]	
017	10087	135	DIP switch setting S1, S2	[Bit field]	
018	10096	27	Setting switch f2	[0,1,2,...10]	
019	10096	29	Setting switch t1	[0,1,2,...10]	
02_	Analog setpoints				
020	10096	28	Setting setpoint potentiometer f1	[0...10]	
03_	Binary inputs				
031	8334 Bit 1	0	Setting binary input X6: 11,12	[Bit field]	
	8335	0	Assignment binary input X6: 11,12	CW / Stop (factory setting)	
032	8334 Bit 2	0	Setting binary input X6: 9,10	[Bit field]	
	8336	0	Assignment binary input X6: 9,10	CCW / Stop (factory setting)	
033	8334 Bit 3	0	Setting binary input X6: 7,8	[Bit field]	
	8337	0	Assignment binary input X6: 7,8	Setpoint switch mode (factory setting)	
05_	Binary outputs				
050	8349 Bit 0	0	Setting signal relay K1	[Bit field]	
	8350	0	Assignment signal relay K1	Ready for operation (factory setting)	
051	8349 Bit 1	0	Setting output X10	[Bit field]	
	8351	0	Assignment output X10	Brake released	



No.	Index dec.	Subindex dec.	Name	Range / factory setting	MOVITOOLS® MotionStudio
07_	Unit data				
070	8301	0	Unit type	[Text]	
071	8361	0	Rated output current	[A]	
072	8930	0	DIM slot option	[Text]	
076	8300	0	Firmware basic unit	[Part number and version]	
100	10096	33	Control / setpoint source	(Display value)	
102	10096	30	Deactivating mechanical controls	(Display value)	
700	8574	0	Duty type	[Text]	
08_	Error memory				
080	Error t-0				Background information for faults that occurred in the past when t-0
	8366	0	Error code	Error code	
	9304	0	Error subcode		
	8883	0	Internal error		
	8371	0	Status of binary inputs	[Bit field bit 0, bit 1, bit 2]	
	8381	0	Status of binary outputs K1, X10	[Bit field bit 0, bit 1]	
	8391	0	Inverter status		
	8396	0	Heat sink temperature	[°C]	
	8401	0	Speed	[min ⁻¹]	
	8406	0	Output current	[% I _N]	
	8411	0	Active current	[% I _N]	
	8416	0	Unit utilization	[%]	
	8421	0	DC link voltage	[V]	
	8426	0	Hours of operation	[h]	
	8431	0	Enable hours	[h]	
081	Error t-1				Background information for faults that occurred in the past when t-1
	8367	0	Error code	Error code	
	9305	0	Error subcode		
	8884	0	Internal error		
	8372	0	Status of binary inputs	[Bit field bit 0, bit 1, bit 2]	
	8382	0	Status of binary outputs K1, X10	[Bit field bit 0, bit 1]	
	8392	0	Inverter status		
	8397	0	Heat sink temperature	[°C]	
	8402	0	Speed	[min ⁻¹]	
	8407	0	Output current	[% I _N]	
	8412	0	Active current	[% I _N]	
	8417	0	Unit utilization	[%]	
	8422	0	DC link voltage	[V]	
	8427	0	Hours of operation	[h]	
	8432	0	Enable hours	[h]	



"Expert" Startup with Parameter Function

Parameter list

No.	Index dec.	Subindex dec.	Name	Range / factory setting	MOVITOOLS® MotionStudio
082	Error t-2				Background information for faults that occurred in the past when t-2
	8368	0	Error code	Error code	
	9306	0	Error subcode		
	8885	0	Internal error		
	8373	0	Status of binary inputs	[Bit field bit 0, bit 1, bit 2]	
	8383	0	Status of binary outputs K1, X10	[Bit field bit 0, bit 1]	
	8393	0	Inverter status		
	8398	0	Heat sink temperature	[°C]	
	8403	0	Speed	[min ⁻¹]	
	8408	0	Output current	[% I _N]	
	8413	0	Active current	[% I _N]	
	8418	0	Unit utilization	[%]	
	8423	0	DC link voltage	[V]	
	8428	0	Hours of operation	[h]	
	8433	0	Enable hours	[h]	
083	Error t-3				Background information for faults that occurred in the past when t-3
	8369	0	Error code	Error code	
	9307	0	Error subcode		
	8886	0	Internal error		
	8374	0	Status of binary inputs	[Bit field bit 0, bit 1, bit 2]	
	8384	0	Status of binary outputs K1, X10	[Bit field bit 0, bit 1]	
	8394	0	Inverter status		
	8399	0	Heat sink temperature	[°C]	
	8404	0	Speed	[min ⁻¹]	
	8409	0	Output current	[% I _N]	
	8414	0	Active current	[% I _N]	
	8419	0	Unit utilization	[%]	
	8424	0	DC link voltage	[V]	
	8429	0	Hours of operation	[h]	
	8434	0	Enable hours	[h]	
084	Error t-4				Background information for faults that occurred in the past when t-4
	8370	0	Error code	Error code	
	9308	0	Error subcode		
	8887	0	Internal error		
	8375	0	Status of binary inputs	[Bit field bit 0, bit 1, bit 2]	
	8385	0	Status of binary outputs K1, X10	[Bit field bit 0, bit 1]	
	8395	0	Inverter status		
	8400	0	Heat sink temperature	[°C]	
	8405	0	Speed	[min ⁻¹]	
	8410	0	Output current	[% I _N]	
	8415	0	Active current	[% I _N]	
	8420	0	Unit utilization	[%]	
	8425	0	DC link voltage	[V]	
	8430	0	Hours of operation	[h]	
	8435	0	Enable hours	[h]	



No.	Index dec.	Subindex dec.	Name	Range / factory setting	MOVITOOLS® MotionStudio
09_ Bus diagnostics					
094	8455	0	PO 1 setpoint	[hex]	
095	8456	0	PO 2 setpoint	[hex]	
096	8457	0	PO 3 setpoint	[hex]	
097	8458	0	PI 1 actual value	[hex]	
098	8459	0	PI 2 actual value	[hex]	
099	8460	0	PI 3 actual value	[hex]	
1_ Setpoints / ramp generators					
10_ Setpoint selection					
100	10096	33	Control / setpoint source	0: Binary 1: RS-485 (DIP switch S1/1-4) ¹⁾	
102	10096	30	Deactivating mechanical controls	[Bit field] Default: 0000 0000 0000 0000	
13_ Speed ramps					
130	8807	0	Ramp t11 up	0.1...2000 [s] (Switch t1) ¹⁾	
131	8808	0	Ramp t11 down	0.1...2000 [s] (Switch t1) ¹⁾	
136	8476	0	Stop ramp t13	0.1... 0.2 ...1 [s]	
16_ Setpoints					
160	10096	35	Setpoint n_f1	0.1... 1500 ...3600 [min ⁻¹]	
161	10096	36	Setpoint n_f2	0.1... 150 ...3600 [min ⁻¹]	
17_ Fixed setpoints					
170	8489	0	Fixed setpoint n0	-3600... 150 ...3600 [min ⁻¹]	
171	8490	0	Fixed setpoint n1	-3600... 750 ...3600 [min ⁻¹]	
172	8491	0	Fixed setpoint n2	-3600... 1500 ...3600 [min ⁻¹]	
173	10096	31	Fixed setpoint n3	-3600... 2500 ...3600 [min ⁻¹]	
3_ Motor parameters					
30_ Limits					
300	8515	0	Start/stop speed	0... 150 [min ⁻¹]	
301	8516	0	Minimum speed	0... 60 ...3600 [min ⁻¹]	
302	8517	0	Maximum speed	0... 3000 ...3600 [min ⁻¹]	
303	8518	0	Current limit	0... 160 [% I _N]	
32_ Motor adjustment					
320	8523	0	Automatic adjustment	0: OFF 1: ON	OFF ON
321	8524	0	Boost	0...100 [%]	
322	8525	0	IxR adjustment	0...100 [%]	
323	8526	0	Pre-magnetization	0... 200 ...2,000 [ms]	
324	8527	0	Slip compensation	0...500 [min ⁻¹]	
325	8834	0	No-load vibration damping	0: OFF 1: ON (DIP switch S1/8) ¹	OFF ON



"Expert" Startup with Parameter Function

Parameter list

No.	Index dec.	Subindex dec.	Name	Range / factory setting	MOVITOOLS® MotionStudio
34_	Motor protection				
340	8533	0	Motor protection	0: OFF 1: ON (DIP switch S1/5) ¹⁾	OFF ON
341	8534	0	Type of cooling	0: Fan cooled 1: Forced cooling	FAN COOLED FORCED COOLING
347	10096	32	Motor cable length	0...15 [m]	
5_	Monitoring functions				
50_	Speed monitoring				
500	8557	0	Speed monitoring	0: OFF 3: Motor/regenerative (DIP switch S2/4) ¹⁾	OFF Motor/regenerative
501	8558	0	Delay time	0.1...1...10 [s]	
52_	Mains OFF monitoring				
522	8927	0	Mains phase failure monitoring Deactivating the mains phase failure check in unfavorable operating conditions can damage the unit.	0: OFF 1: ON	OFF ON
523	10096	26	Mains off monitoring	0: Operation on three-phase mains supply 1: Operation with MOVITRANS®	
6_	Terminal assignment				
60_	Binary inputs				
600	10096	34	Terminal configuration	0: Setpoint changeover CCW / Stop - CW / Stop 1: Fixed setpoint 2 - Fixed setpoint 1- Enable / Stop 2: Setpoint changeover - /Ext. error - Enable/stop	
62_	Binary outputs				
620	8350	0	Signal output K1	0: No function 2: Ready 3: Output stage on 4: Rotating field on 5: Brake released 6: Brake applied	
7_	Control functions				
70_	Operating modes				
700	8574	0	Duty type	0: VFC 2: VFC Hoist 3: VFC DC braking 21: V/f characteristics 22: V/f + DC braking (DIP switch S2/3) ¹⁾	
71_	Standstill current				
710	8576	0	Standstill current	0...50% I _{mot}	
72_	Setpoint stop function				
720	8578	0	Setpoint stop function	0: OFF 1: ON	OFF ON
721	8579	0	Stop setpoint	0...30...500 [min ⁻¹]	
722	8580	0	Start offset	0...30...500 [min ⁻¹]	
73_	Brake function				
731	8749	0	Brake release time	0...2,000 [ms]	
732	8585	0	Brake application time	0...100...2,000 [ms]	



No.	Index dec.	Subindex dec.	Name	Range / factory setting	MOVITOOLS® MotionStudio
738	8893	0	Activation of brake release without drive enable	0: OFF 1: ON (DIP switch S2/2) ¹⁾	OFF ON
8_ Unit functions					
80_ Setup					
802	8594	0	Factory setting	0: No factory setting 2: Delivery condition	
803	8595	0	Parameter lock	0: OFF 1: ON	OFF ON
805	10095	1	Startup mode	0: Easy mode 1: Expert mode	
81_ Serial communication					
810	8597	0	RS-485 address	0...31 (DIP switch S1/1-4) ¹⁾	
811	8598	0	RS-485 group address	100...131 (DIP switch S1/1-4) ¹⁾	
812	8599	0	RS485 timeout delay	0...1...650 [s]	
84_ Reset response					
840	8617	0	Manual reset	0: No 1: Yes	
86_ Modulation					
860	8620	0	PWM frequency	0: 4 kHz 1: 8 kHz 3: 16 kHz (DIP switch S1/7) ¹⁾	
87_ Process data assignment					
870	8304	0	Setpoint description PO1	Control word	Only display value
871	8305	0	Setpoint description PO2	1: Set speed 11: Setpoint speed [%]	
872	8306	0	Setpoint description PO3	Ramp	Only display value
873	8307	0	Actual value description PI1	Status word 1	Only display value
874	8308	0	Actual value description PI2	1: Actual speed 2: Output current 3: Active current 8: Actual speed [%]	Only display value
875	8309	0	Actual value description PI3	Status word 2	Only display value
876	8622	0	PO data enable	0: YES 1: NO	

1) The parameter value depends on the setting of the controls.



8.7 Parameter description

8.7.1 Display values

Parameter 000 **Speed (signed)**

The displayed speed is the calculated actual speed.

Parameter 002 **Frequency (signed)**

Output frequency of the inverter

Parameter 004 **Output current (amount)**

Apparent current in range 0...200% of the rated unit current

Parameter 005 **Active current (signed)**

Active current in range -200 % ... +200% of the rated unit current

The sign of the active current depends on the direction of rotation and the type of load:

Direction rotation	of Load	Speed	Active current
CW rotation	motor	Positive ($n > 0$)	Positive ($I_W > 0$)
CCW rotation	motor	Negative ($n < 0$)	Negative ($I_W < 0$)
CW rotation	regenerative	Positive ($n > 0$)	Negative ($I_W < 0$)
CCW rotation	regenerative	Negative ($n < 0$)	Positive ($I_W > 0$)

Parameter 006 **Motor utilization**

Motor utilization in [%], calculated using a motor temperature model

Parameter 008 **DC link voltage**

Voltage in [V] measure in the DC link

Parameter 009 **Output current**

Apparent current in [A]

Parameter 010 **Inverter status**

Inverter statuses

- INHIBITED
- ENABLED

Parameter 011 **Operating state**

The following operating states are available:

- 24 V OPERATION
- CONTROLLER INHIBIT
- NO ENABLE
- CURRENT AT STANDSTILL
- ENABLE
- FACTORY SETTING
- FAULT



Parameter 012

Error status

Error status in text form

Parameter 014

Heat sink temperature

Heat sink temperature of the inverter

Parameter 015

Hours of operation

The total of hours in which the inverter was connected to the external DC 24 V supply

Storage cycle: 15 min

Parameter 016

Enable hours

Sum of hours in which the output stage of the inverter was enabled

Storage cycle: 15 min

Parameter 017

DIP switch setting S1/S2

Display of DIP switch settings for S1 and S2:

DIP switch	Bit in index 10087.135	Functionality	
S1/1	Bit 0	Unit address	Unit address bit 2^0
S1/2	Bit 1		Unit address bit 2^1
S1/3	Bit 2		Unit address bit 2^2
S1/4	Bit 3		Unit address bit 2^3
S1/5	Bit 11	Motor protection	0: Motor protection ON 1: Motor protection OFF
S1/6	Bit 9	Increased short-time torque	0: Motor adjusted 1: Motor power rating one stage smaller
S1/7	Bit 12	PWM cycle frequency	0: 4 kHz 1: Variable (16, 8, 4 kHz)
S1/8	Bit 13	No-load damping	0: Off 1: On
S2/1	Bit 7	Brake type	0: Standard brake 1: Optional brake
S2/2	Bit 15	Brake release without drive enable	0: Off 1: On
S2/3	Bit 6	Control mode	0: VFC control 1: V/f control
S2/4	Bit 16	Speed monitoring	0: Off 1: On
S2/5	Bit 17	Additional function	Additional function setting bit 2^0
S2/6	Bit 18		Additional function setting bit 2^1
S2/7	Bit 19		Additional function setting bit 2^2
S2/8	Bit 20		Additional function setting bit 2^3

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



"Expert" Startup with Parameter Function

Parameter description

- Parameter 018 Setting switch f2**
 Displays the setting of switch f2
 The display of the DIP switch setting is independent of whether the DIP switch function is activated or deactivated.
- Parameter 019 Setting switch t1**
 Displays the setting of switch t1
 The display of the DIP switch setting is independent of whether the DIP switch function is activated or deactivated.
- Parameter 020 Setting setpoint potentiometer f1**
 Displays the setting of setpoint potentiometer f1
 The display of the DIP switch setting is independent of whether the DIP switch function is activated or deactivated.
- Parameter 031 Setting/assignment of binary input, terminal X6:11,12**
 Displays the status of the binary input at terminal R ↗ X6:11,12
- Parameter 032 Setting/assignment of binary input, terminal X6:9,10**
 Displays the status of the binary input at terminal L ↘ X6:9,10
- Parameter 033 Status/assignment of binary input, terminal X6:7,8**
 Displays the status of the binary input at terminal f1/f2 X6:7,8
- Parameter 050 Setting/assignment of signal relay K1**
 Displays the status of the signal relay K1
- Parameter 051 Setting/assignment of output X10**
 Displays the status of the output for controlling the BEM option
- Parameter 070 Unit type**
 The unit type is displayed
- Parameter 071 Rated output current**
 The rated unit current is displayed in [A]



Parameter 072

DIM slot option

Displays the Drive ID module type which is used in the Drive ID module slot X3

Parameter value	Type of the Drive ID module
0	No Drive-ID module
1...9	reserved
10	DT/DV/400/50
11	DZ/380/60
12	DRS/400/50
13	DRE400/50
14	DRS/460/60
15	DRE/460/60
16	DRS/DRE/380/60
17	DRS/DRE/400/50
18	reserved
19	DRP/400/50
20	DRP/460/50
21...31	reserved

Parameter 076

Firmware basic unit

Displays the part number and version of the unit firmware

Parameter 700

Duty type

The selected operating mode is displayed

Parameters
080...084

Error code

The unit saves diagnostic data when a fault occurs. The last five errors are displayed in the error memory.

Parameter 094

PO 1 Setpoint (display value)

Process data output word 1

Parameter 095

PO 2 Setpoint (display value)

Process data output word 2

Parameter 096

PO 3 Setpoint (display value)

Process data output word 3

Parameter 097

PI 1 Actual value (display value)

Process data input word 1

Parameter 098

PI 2 Actual value (display value)

Process data input word 2

Parameter 099

PI 3 Actual value (display value)

Process data input word 3



"Expert" Startup with Parameter Function

Parameter description

8.7.2 Setpoints/ramp generators

Parameter 100

	NOTE
	<p>Parameter <i>P100</i> can only be changed if</p> <ul style="list-style-type: none"> • All binary inputs are set to "0" • And DIP switches S1/1 to S1/4 are deactivated by parameter <i>P102</i>

Control / setpoint source

- When selecting "Binary", the drive is controlled via the binary input terminals.
 - If the mechanical controls f1 and f2 are not deactivated (see parameter *P102*), the setpoints are specified with setpoint potentiometer f1 and switch f2.
 - If the mechanical controls f1 and f2 are deactivated (see parameter *P102*), the setpoints are specified by selecting setpoints n_f1 or n_f2 (conditions see parameters *P160/P161*).
- When selecting "RS-485", the drive is controlled via the binary input terminals and the bus control word. The setpoint is selected via the system bus.

Parameter 102

Deactivating mechanical controls

Use this bit-coded selection box to deactivate the mechanical controls of the MOVIMOT® inverter.

The value of the parameter set at the factory enables all mechanical controls.

Bit	Meaning	Note	
0	reserved		
1	Deactivating the DIP switches S1/1-S1/4 (RS485 address)	Bit not set: Bit set:	DIP switches S1/1 – S1/4 active DIP switches S1/1 – S1/4 not active Setting the RS-485 address, RS-485 group address and control setpoint source using parameters
2-4	reserved		
5	Deactivating the DIP switch S1/5 (motor protection)	Bit not set: Bit set:	DIP switch S1/5 active DIP switch S1/5 not active: Switching the motor protection function on / off using parameters
6	reserved		
7	Deactivating the DIP switch S1/7 (PWM cycle frequency)	Bit not set: Bit set:	DIP switch S1/7 active DIP switch S1/7 not active Setting the PWM cycle frequency using parameters
8	Deactivating the DIP switch S1/8 (no-load damping)	Bit not set: Bit set:	DIP switch S1/8 active DIP switch S1/8 not active Activation / deactivation of no-load damping using parameters
9	reserved		
10	Deactivating the DIP switch S2/2 (releasing the brake)	Bit not set: Bit set:	DIP switch S2/2 active DIP switch S2/2 not active Activation / deactivation of brake release without drive enable using parameters



Bit	Meaning	Note	
11	Deactivating the DIP switch S2/3 (operating mode)	Bit not set:	DIP switch S2/3 active
		Bit set:	DIP switch S2/3 not active Selecting the operating mode using parameters
12	Deactivating the DIP switch S2/4 (Speed monitoring)	Bit not set:	DIP switch S2/4 active
		Bit set:	DIP switch S2/4 not active Activation / deactivation of speed monitoring using parameters
13	Deactivating 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

Parameter 130

Ramp t11 up

Acceleration ramp

(The ramp times are based on a setpoint step change of 50 Hz)

Parameter 131

Ramp t11 down

Deceleration ramp

(The ramp times are based on a setpoint step change of 50 Hz)

Parameter 136

Stop ramp t13

The stop ramp time is effective for a stop along the stop ramp.

(The ramp times are based on a setpoint step change of 50 Hz)



"Expert" Startup with Parameter Function

Parameter description

Parameter 160

Setpoint n_f1

The setpoint n_f1 is valid if

- the setpoint potentiometer f1 is deactivated, i.e. if $P102:13 = "1"$
- Parameter $P600\ Binary\ inputs = "0"$
- The signal "0" is present at terminal f1/f2 X6: 7,8

Parameter 161

Setpoint n_f2

The setpoint n_f2 is valid if

- The switch f2 is deactivated, i.e. if $P102:14 = "1"$
- Parameter $P600\ Binary\ inputs = "0"$
- The signal "1" is present at terminal f1/f2 X6: 7,8

Parameters
170...173

Fixed setpoint n0...n3

The fixed setpoints n0...n3 are valid if parameter $P600\ Binary\ inputs = "1"$.

The fixed setpoints n0...n3 can then be selected via the programmed functionality of the input terminals.

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

Parameter	Active setpoint	Status Terminal L ↗ X6:9,10	Status Terminal f1/f2 X6:7,8
$P170$	n0	OFF	OFF
$P171$	n1	ON	OFF
$P172$	n2	OFF	ON
$P173$	n3	ON	ON

8.7.3 Motor parameters

Parameter 300

Start/stop speed

This parameter defines the smallest speed request which the inverter sends to the motor when enabled. The transition to the speed determined in the setpoint selection is made using the active acceleration ramp.

Parameter 301

Minimal speed (when switch f2 is deactivated)

This parameter defines the minimum speed n_{min} of the drive.

The drive does not fall below this speed value even when the setpoint specification is slower than the minimum speed.

Parameter 302

Maximum speed (when switch f1 is deactivated)

This parameter defines the maximum speed n_{max} of the drive.

The drive does not exceed this speed value even when the setpoint specification is higher than the maximum speed.

If you set $n_{min} > n_{max}$, then the value set in n_{min} applies to the minimum speed and the maximum speed.



Parameter 303

Current limit

The internal current limitation is based on the apparent current. The inverter automatically decreases the current limit internally in the field weakening range to implement stall protection for the connected motor.

Parameter 320

Automatic adjustment

When the parameter is activated, the motor is calibrated each time the operating status changes to ENABLE.

Parameter 321

Boost

If parameter *P320 Automatic adjustment* = "On", the inverter sets parameter *P321 BOOST* automatically. This parameter does not usually have to be set manually.

In exceptional cases, manual setting may be necessary to increase the breakaway torque.

Parameter 322

IxR adjustment

If parameter *P320 Automatic adjustment* = "On", the inverter sets parameter *P322 IxR adjustment* automatically. Only specialists are permitted to change this parameter manually to optimize the settings.

Parameter 323

Pre-magnetization

The pre-magnetization time allows for a magnetic field to be built up in the motor when the inverter is enabled.

Parameter 324

Slip compensation

Slip compensation increases the speed accuracy of the motor. Enter the rated slip of the connected motor as a manual entry.

The slip compensation is designed for a ratio smaller than 10 for load moment of inertia to motor moment of inertia. If control starts oscillating, you must reduce the slip compensation or set it to 0, if required.

Parameter 325

No-load vibration damping (when DIP switch S1/8 is deactivated)

No-load vibration damping can be activated when the motor tends to be unstable under no load conditions.

Parameter 340

Motor protection (when DIP switch S1/5 is deactivated)

Activation / deactivation of the thermal protection model for MOVIMOT®

When this function is activated, MOVIMOT® takes over the thermal protection of the drive by electronic means.

Parameter 341

Type of cooling

This parameter is used for defining the cooling type (fan cooled or forced cooling) that is the basis for calculating the motor temperature.



"Expert" Startup with Parameter Function

Parameter description

Parameter 347

Motor cable length

This parameter is used for defining the motor cable length (= cable length between MOVIMOT® inverter and motor) that is the basis for calculating the motor temperature. This parameter must only be changed if the unit is installed close to the motor.

8.7.4 Monitoring functions

Parameter 500

Speed monitoring (when DIP switch S2/4 is deactivated)

With MOVIMOT®, speed monitoring is performed by evaluating operation at the current limit. Speed monitoring is triggered when the current limit is maintained for the duration of the set deceleration time.

Parameter 501

Delay time

The set current limit can be reached during acceleration, deceleration, or load peaks.

The deceleration time prevents speed monitoring from responding too sensitively. The current limit must be maintained for the duration of the set deceleration time before monitoring responds.

Parameter 522

Mains phase failure check

Deactivate this monitoring function to prevent the mains phase failure check from triggering with unsymmetrical supply systems.

	STOP! Deactivating the mains phase failure check in unfavorable operating conditions can damage the unit.
--	---

Parameter 523

Mains off monitoring

Use this parameter to adjust the mains off monitoring function of the inverter for operation with MOVITRANS®.



8.7.5 Terminal assignment

Parameter 600 Terminal configuration

	NOTE
	Parameter <i>P600</i> can only be changed if all binary inputs are set to "0".

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

The following tables show the functions of the binary input terminals in relation to the control setpoint source and the terminal configuration:

Control / setpoint source "Binary"				
Terminal configura-tion		Binary input terminals f1/f2 X6:7,8	L ↘ X6:9,10	R ↘ X6:11,12
0:	Terminal configuration 1	Setpoint switch mode "0" signal: Setpoint f1 "1" signal: setpoint f2	CCW / Stop "0" signal: Stop "1" signal: CCW rotation	CW / Stop "0" signal: Stop "1" signal: CW rotation
1:	Terminal configuration 2	Selection of fixed setpoints Fixed setpoint n0: Signal "0", "0" parameter <i>P170</i> Fixed setpoint n1: Signal "0", "1" parameter <i>P171</i> Fixed setpoint n2: Signal "1", "0" parameter <i>P172</i> Fixed setpoint n3: Signal "1", "1" parameter <i>P173</i>		Enable/stop "0" signal: Stop "1" signal: Enable
2:	Terminal configuration 3	Setpoint switch mode "0" signal: Setpoint f1 "1" signal: setpoint f2	/External error "0" signal: Ext. Error "1" signal: No ext. error	Enable/stop "0" signal: Stop "1" signal: Enable

Control / setpoint source "RS-485"				
Terminal configura-tion		Binary input terminals f1 / f2 X6:7,8	L ↘ X6:9,10	R ↘ X6:11,12
0:	Terminal configuration 1	No function	CCW / Stop "0" signal: Stop "1" signal: Enable CCW	CW / Stop "0" signal: Stop "1" signal: Enable CW
1:	Terminal configuration 2	No function	no function	Enable/stop "0" signal: Stop "1" signal: Enable CW and CCW oper.
2:	Terminal configuration 3	No function	/External error "0" signal: Ext. Error "1" signal: No ext. error	Enable/stop "0" signal: Stop "1" signal: Enable CW and CCW oper.



"Expert" Startup with Parameter Function

Parameter description

Parameter 620

Function of the signal relay K1

Use this parameter to select the function of the signal relay K1.

In effect at	"0" signal	"1" signal
0: No function	–	–
2: Ready for operation	Not ready for operation	Ready for operation
3: Output stage on	Unit inhibited	Unit enabled, motor energized
4: Rotating field on	No rotating field Important: The mains voltage can still be present at the MOVIMOT® drive.	Rotating field
5: Brake released	Brake applied	Brake released
6: Brake applied	Brake released	Brake applied

 HAZARD!	<p>When the signal relay K1 is used for controlling the brake, assignment 5 "Brake released" must be selected.</p> <p>Severe or fatal injuries</p> <ul style="list-style-type: none"> Before using the signal relay K1 for controlling the brake, check the parameter setting.
--	---

8.7.6 Control functions

Parameter 700

Operating mode (when DIP switch S2/3 is deactivated)

This parameter is used to set the basic operating mode of the inverter.

VFC / V/f characteristic curve:

Default setting for asynchronous motors. This setting is suitable for general applications such as conveyor belts, trolleys, etc.

VFC hoist:

The hoisting function automatically provides all functions necessary for operating a simple hoist application.

The VFC hoist operating mode affects the following parameters:

No.	Index dec.	Subindex dec.	Name	Value
300	8515	0	Start/stop speed	= 60 min ⁻¹ If the start/stop speed is set to less than 60 min ⁻¹
301	8516	0	Minimum speed	= 60 min ⁻¹ If the minimum speed is set to less than 60 min ⁻¹
303	8518	0	Current limit	= Rated motor current If the current limit is set to a lower value than the rated motor current
323	8526	0	Pre-magnetization	= 20 ms If pre-magnetization is set to a lower value than 20 ms
500	8557	0	Speed monitoring	= 3: Motor/regenerative
620	8350	0	Signal output K1	= 5: Brake released



No.	Index dec.	Subindex dec.	Name	Value
731	8749	0	Brake release time	= 200 ms If the brake release time is set to a lower value than 200 ms
732	8585	0	Brake application time	= 200 ms If the brake application time is set to a lower value than 200 ms
738	8893	0	Activation of brake release without drive enable	= 0: OFF

In VFC hoist operating mode, the MOVIMOT® inverter checks whether the values of these parameters are permitted.

The speed monitoring function cannot be deactivated in VFC hoist operating mode.

The function "Brake release without drive enable" cannot be deactivated in VFC hoist operating mode.

The function of the signal relay output can be parameterized.


HAZARD!

If the K1 signal relay is used to control the brake, do not change the parameters of the signal relay function.

Severe or fatal injuries.

- Before changing parameter P700, check whether the signal relay is used for controlling the brake.

VFC DC braking / V/f DC braking:

This setting means the asynchronous motor brakes by using current injection. The motor brakes without braking resistor on the inverter.


HAZARD!

With DC braking, guided stops are not possible and certain ramp values cannot be observed.

Severe or fatal injuries.

- Use a different operating mode.



"Expert" Startup with Parameter Function

Parameter description

Parameter 710

Standstill current

When the standstill function is activated, the inverter injects a current in the motor at standstill.

The standstill current fulfills the following functions:

- When the ambient temperature of the motor is low, the standstill current prevents the risk of condensation and freezing of the brake. Set the amount of current in such a way that the motor will not overheat.
- If you have activated the standstill current, you can enable the motor without pre-magnetization.

When the standstill function is activated, the output stage remains enabled even in the "NO ENABLE" status to inject the motor standstill current.

In case of error, the motor is no longer energized.

Parameter
720...722

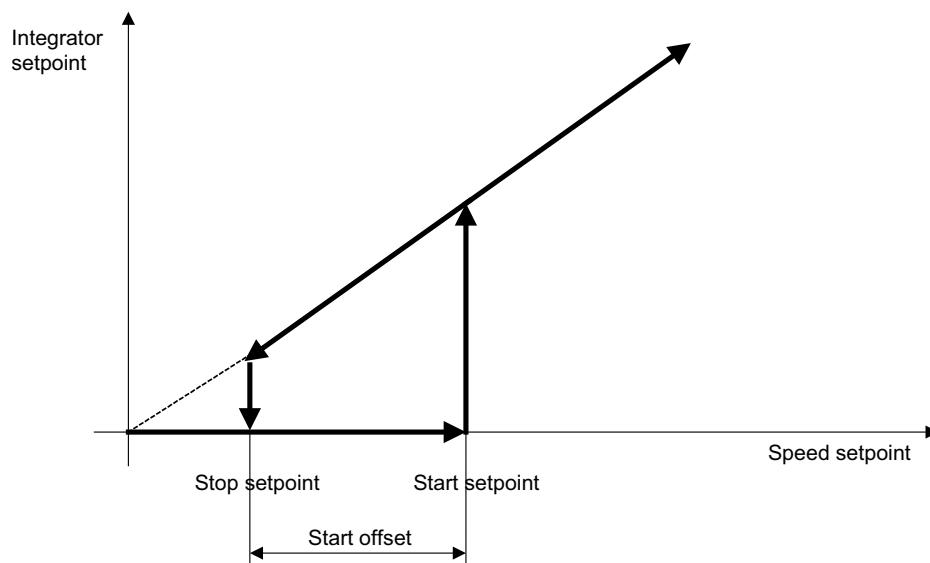
Setpoint stop function

Stop setpoint

Start offset

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.



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Parameter 731

Brake release time

This parameter is used for defining how long the motor is to run at minimum speed after pre-magnetization ends. This time is necessary for opening the brake completely.

Parameter 732

Brake application time

You can use this parameter to set the time required for the mechanical brake to apply.

Parameter 738

Activation of brake release without drive enable

(when DIP switch S2/2 is deactivated)



If this parameter is set to the value "ON", the brake can be released even if the drive is not enabled.

This functionality is only available when the motor brake is being controlled by the inverter.

The brake is always applied when the unit is not ready.

8.7.7 Unit functions

Parameter 802

Factory setting

If you set this parameter to "Delivery state", all parameters that have a factory setting and can not be set using DIP switches S1/S2 or switches t1/f2 are reset to their factory setting value.

For those parameters that can be set at the DIP switches S1/S2 or at switches t1/f1 during "Easy" startup, the setting of the mechanical setting element becomes active when the factory setting "Delivery state" is selected.

Parameter 803

Parameter lock

If this parameter is set to "ON", you cannot change any of the parameters except the parameter lock. It is a good idea to make this setting once you have finished starting up the unit and optimizing the parameters. You can only change the parameters again when this parameter is set to "OFF".

Parameter 805

Startup mode

Parameterization of the startup mode

- **"Easy" mode**

When selecting "Easy" mode, DIP switches S1, S2 and switches f2, t1 are used for starting up MOVIMOT® quickly and easily.

- **"Expert" mode**

"Expert" mode includes additional parameters.

Parameter 810

RS-485 address (when DIP switches S1/1 to S1/4 are deactivated)

Use this parameter to set the RS-485 address of the MOVIMOT® inverter.

Parameter 811

RS-485 group address (when DIP switches S1/1 to S1/4 are deactivated)

Use this parameter to set the RS-485 group address of the MOVIMOT® inverter.

Parameter 812

RS485 timeout delay

Use this parameter to set the timeout monitoring interval of the RS-485 interface.



"Expert" Startup with Parameter Function

Parameter description

Parameter 840

Manual reset

If an error is present at the MOVIMOT® inverter, you can acknowledge the error by setting this parameter to "ON". Once the error has been reset, the parameter is set automatically to "OFF" again. If the power section does not indicate an error, setting the parameter to "ON" has no effect.

Parameter 860

PWM frequency (when DIP switch S1/7 is deactivated)

You can use this parameter to set the nominal cycle frequency at the inverter output. The cycle frequency can change automatically depending on the unit utilization.

Parameter 870

Setpoint description PO1

(see sec. "Process output data" (siehe page 93))

Displays the assignment of the output data word PO1

Parameter 871

Setpoint description PO2

Configuration and assignment of output data word PO2

The following assignments are available:

Setpoint speed: The setpoint speed is set absolutely.

Coding: 1 digit = 0.2 min^{-1}

Example 1: CW operation with 400 min^{-1} :

Calculation: $400/0.2 = 2000_{\text{dec}} = 07D0_{\text{hex}}$

Example 2: CCW operation with 750 min^{-1} :

Calculation: $-750/0.2 = -3750_{\text{dec}} = F15A_{\text{hex}}$

Setpoint speed [%]

The speed setpoint is given as a relative value in percentage and refers to maximum speed set using the setpoint potentiometer f1.

Coding: $C000_{\text{hex}} = -100 \text{ \%}$ (counterclockwise direction)

$4000_{\text{hex}} = +100 \text{ \%}$ (clockwise rotation)

$\rightarrow 1 \text{ digit} = 0.0061 \text{ \%}$

Example: $80 \text{ \% } f_{\text{max}}$, CCW rotation:

Calculation: $-80 \text{ \% } / 0.0061 = -13115_{\text{dec}} = CCC5_{\text{hex}}$

Parameter 872

Setpoint description PO3

(see sec. "Process output data" (siehe page 93))

Displays the assignment of the output data word PO3



Parameter 873

Actual value description PI1

(see (siehe sec. "Process input data"7.3.4:Process input data))

Displays the assignment of the process input data word PI1

Parameter 874

Actual value description PI2

Configuring the assignment of the process input data word PI2

The following assignments are available:

Actual speed: Current speed actual value of the drive in min^{-1}
Coding: Coding: 1 digit = 0.2 min^{-1}

Output current: Instantaneous output current of the unit in % of I_N
Coding: 1 digit = $0.1 \% I_N$

Active current: Current active current of the unit in % of I_N
Coding: 1 digit = $0.1 \% I_N$

Actual speed [%]: Current speed actual value of the drive in % of setpoint poten-
tiometer f1 or of n_{\max}
Coding: 1 digit = 0.0061%
 $-100 \% \dots +100 \% = 0xC000 \dots 0x4000$

Parameter 875

Actual value description PI3

(see sec. "Process input data" (siehe page 94))

Displays the assignment of the process input data word PI3

Parameter 876

PO data enable

YES: The process output data that was sent from the fieldbus control become ef-
fective immediately.
NO: The last valid process output data remain in effect.

NOTE
If the assignment of the process output data word PO2 is changed, the PO data is blocked and must be released by parameter 876.



"Expert" Startup with Parameter Function

Parameter description

8.7.8 Parameters that depend on mechanical controls

The following mechanical controls influence the user parameters:

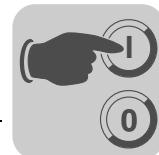
- DIP switch S1
- DIP switch S2
- Setpoint potentiometer f1
- Switch f2
- Switch t1

NOTE	
	<p>Parameter <i>P100</i> can only be changed if</p> <ul style="list-style-type: none"> • All binary inputs are set to "0" • And DIP switches S1/1 to S1/4 are deactivated by parameter <i>P102</i>

Mechanical control	Influenced parameter	Effect of parameter <i>P102</i>	
DIP switches S1/1 – S1/4	<i>P810</i> <i>RS-485 address</i>	1	Bit not set: Setting RS-485 address, RS-485 group address and control / setpoint source at DIP switch S1/1-S1/4
	<i>P811</i> <i>RS-485 group address</i>		Bit set: Setting the RS-485 address, RS-485 group address and control / setpoint source using parameters
DIP switch S1/5	<i>P340</i> <i>Motor protection</i>	5	Bit not set: Activating / deactivating the motor protection function at DIP switch S1/5
			Bit not set: Activation / deactivation of motor protection function using parameters
DIP switch S1/7	<i>P860</i> <i>PWM frequency</i>	7	Bit not set: Selecting the PWM frequency at DIP switch S1/7
			Bit set: Selecting the PWM frequency using parameters
DIP switch S1/8	<i>P325</i> <i>No-load vibration damping</i>	8	Bit not set: Activating / deactivating the no-load vibration damping function at DIP switch S1/8
			Bit set: Activation / deactivation of no-load vibration damping using parameters
DIP switch S2/2	<i>P738</i> <i>Brake release without drive enable</i>	10	Bit not set: Activating / deactivating the function "Brake release without drive enable" at DIP switch S2/2
			Bit set: Activation / deactivation of the function "Brake release without drive enable" using parameters
DIP switch S2/3	<i>P700</i> <i>Duty type</i>	11	Bit not set: Selecting the operating mode at DIP switch S2/3
			Bit set: Selecting the operating mode using parameters

"Expert" Startup with Parameter Function

Parameter description



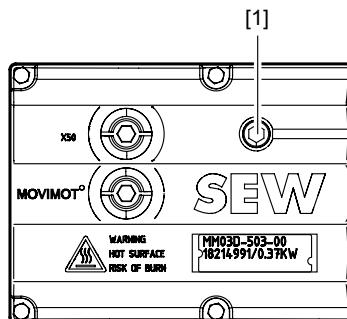
Mechanical control	Influenced parameter	Effect of parameter <i>P102</i> Bit	
DIP switch S2/4	<i>P500</i> <i>Speed monitoring</i>	12	Bit not set: Activating / deactivating the speed monitoring function at DIP switch S2/4
			Bit set: Activation / deactivation of speed monitoring using parameters
Setpoint potentiometer f1	<i>P302</i> <i>Maximum speed</i>	13	Bit not set: Setting the maximum speed at setpoint potentiometer f1
			Bit set: Setting the maximum speed using parameters
Switch f2	<i>P301</i> <i>Minimum speed</i>	14	Bit not set: Setting the minimum speed at switch f2
			Bit set: Setting the minimum speed using parameters
Switch t1	<i>P130</i> <i>Acceleration ramp</i> <i>P131</i> <i>Deceleration ramp</i>	15	Bit not set: Setting the ramps at switch t1
			Bit set: Setting the ramps using parameters



9 Operation

9.1 Operating display

The status LED is located on the top of the MOVIMOT® inverter (see following figure).



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[1] MOVIMOT® status LED

9.1.1 Meaning of the status LED states

The three-color status LED indicates the operating and error statuses of the MOVIMOT® inverter.

LED color	LED status	Operating state	Description
-	Off	Not ready for operation	No 24 V power supply
Yellow	Flashes steadily	Not ready for operation	Self-test phase active or 24 V power supply present but supply voltage not OK
Yellow	Flashing evenly, fast	Ready for operation	Brake release without drive enable active (only with S2/2 = "ON")
Yellow	Steady light	Ready, but unit inhibited	24 V power supply and supply voltage OK, but no enable signal If drive does not run when enable signal is present - check startup!
Green/Yellow	Flashing with alternating colors	Ready, but timeout	Faulty communication with cyclical data exchange
Green	Steady light	Unit enabled	Motor in operation
Green	Flashing evenly, fast	Current limit active	Drive operating at current limit
Green	Flashes steadily	Ready for operation	Standstill current function active
Red	Steady light	Not ready for operation	Check the 24 V supply. Make sure that there is a smoothed DC voltage with low ripple (residual ripple max. 13 %) present

Status LED flash codes

Flashing steadily: LED 600 ms on, 600 ms off

Flashing evenly, fast: LED 100 ms on, 300 ms off

Flashing with alternating colors: LED 600 ms green, 600 ms yellow

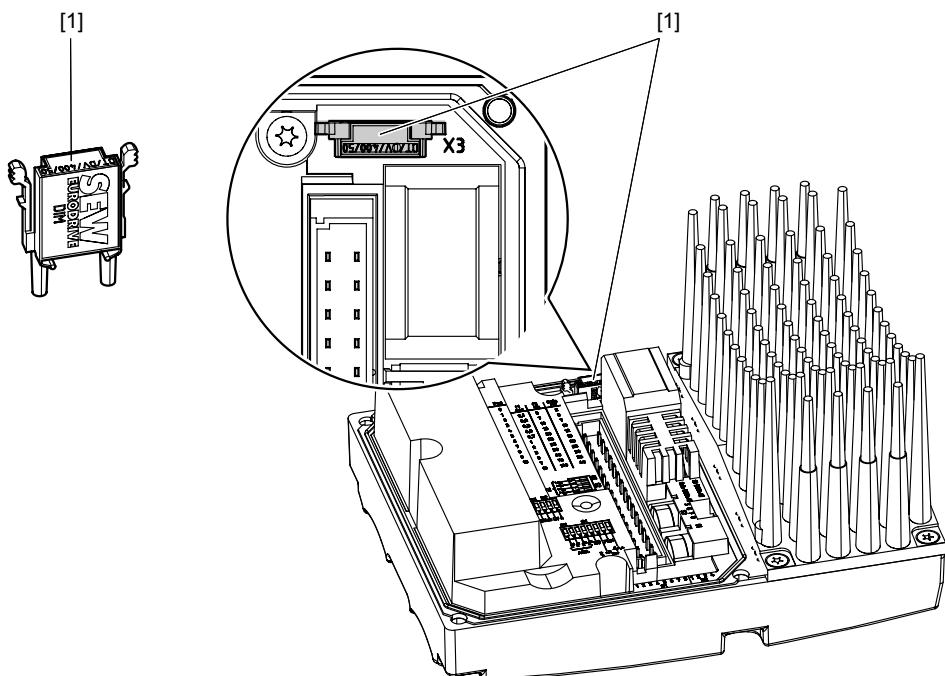
For a description of the error statuses, refer to sec. "Meaning of the status LED states" (siehe page 150).



9.2 Drive ID module

The pluggable Drive ID module is installed in the basic unit.

The following figure shows the Drive ID module and its position in the MOVIMOT® inverter.



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[1] Drive-ID module

The Drive ID module receives a memory module on which the following information is stored:

- Motor data
- Brake data
- User parameters

If a MOVIMOT® inverter has to be replaced, you can re-startup the system by simply re-plugging the Drive ID module without a PC or data backup, see sec. "Unit replacement" (siehe page 153).



9.3 Keypads

	NOTE
For notes on startup with the MBG11A or MLG..A options, refer to sec. "Startup with the MBG11A or MLG..A options" (siehe page 81).	

The following MOVIMOT® functions can be executed with the MBG11A and MBG..A keypads:

Function	Explanation
Display	<p>Negative display value, e.g. = counterclockwise</p> <p>Positive display value, e.g. = clockwise</p> <p>The display value is based on the speed set using the setpoint potentiometer f1. Example: Display "50" = 50 % of the speed set with the setpoint potentiometer.</p> <p>Important: If the display is "0," the drive is rotating at f_{min}.</p>
Increase the speed	<p>For CW direction: </p> <p>For CCW direction: </p>
Reducing the speed	<p>For CW direction: </p> <p>For CCW direction: </p>
Stopping the MOVIMOT® drive	<p>Pressing both keys at the same time: Display = </p>
Starting the MOVIMOT® drive	<p> or </p> <p>Important: After enable, the MOVIMOT® drive accelerates to the value and direction of rotation saved last.</p>
Change direction of rotation from CW to CCW	<p>1. Until display = </p> <p>2. Pressing again changes direction of rotation from CW to CCW.</p>
Change direction of rotation from CCW to CW	<p>1. Until display = </p> <p>2. Pressing again changes direction of rotation from CCW to CW.</p>
Memory function	<p>When the mains is switched off and then on again, the value set last is saved if the 24 V supply has been present for at least 4 seconds after the last setpoint change.</p>



9.4 MWA21A setpoint generator

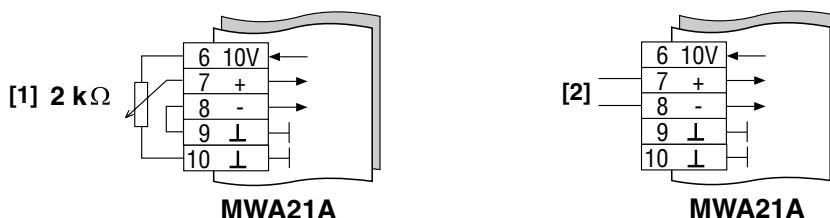


NOTES

- For notes on connecting the MWA21A option, refer to sec. "Connection of option MWA21A" (siehe page 44).
- For notes on startup of the MWA21A option, refer to sec. "Startup with option MWA21A" (siehe page 83).

9.4.1 Control

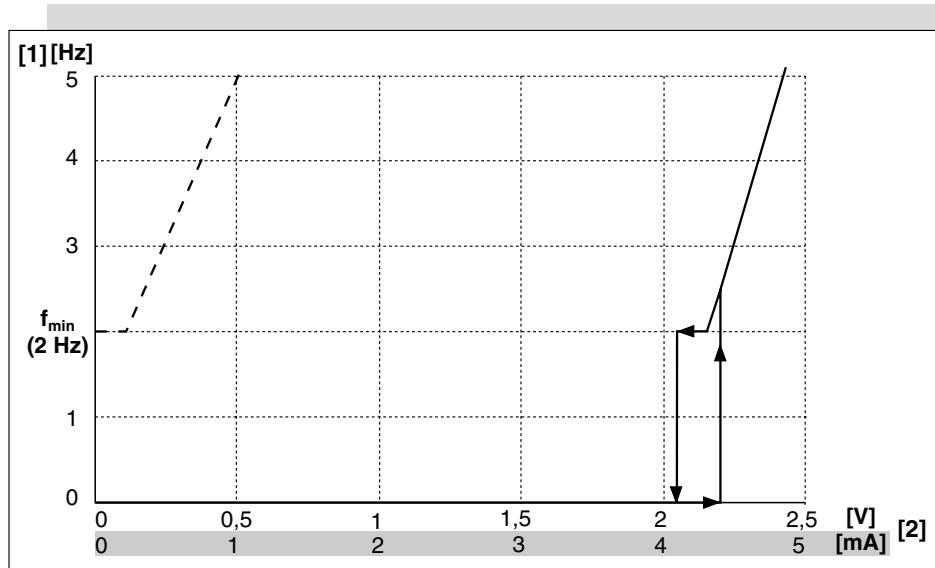
The analog signal at terminals 7 and 8 of the MWA21A option is used for controlling the speed of the MOVIMOT® drive from f_{\min} to f_{\max} .



341225355

- [1] Potentiometer using the 10 V reference voltage (alternative 5 kΩ)
[2] Potential-free analog signal

9.4.2 Setpoint stop function:



341098123

Setting:

- - - - 0...10 V / 0...20 mA
— — — — 2...10 V / 4...20 mA

[1] Output frequency

[2] setpoint

341167755



Operation

MOVIMOT® manual operation with MOVITOOLS® MotionStudio

9.5 MOVIMOT® manual operation with MOVITOOLS® MotionStudio

MOVIMOT® drives are equipped with an X50 diagnostics interface for startup and service. It can be used for diagnostics, manual operation and parameter setting.

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

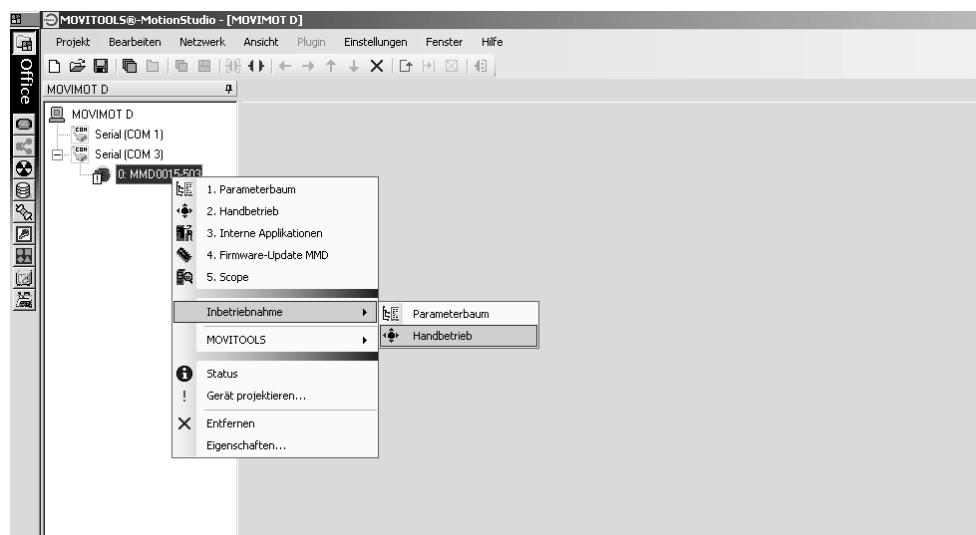
1. Connect the PC to the MOVIMOT® inverter.

See sec. "PC connection" (siehe page 47).

2. Start MOVITOOLS® MotionStudio and integrate the MOVIMOT® inverter in MOVITOOLS® MotionStudio.

See sec. "MOVITOOLS® MotionStudio" (siehe page 102).

3. Once the MOVIMOT® inverter is successfully integrated, open the context menu by clicking on the right mouse button and select the menu item "Startup"/"Manual operation".



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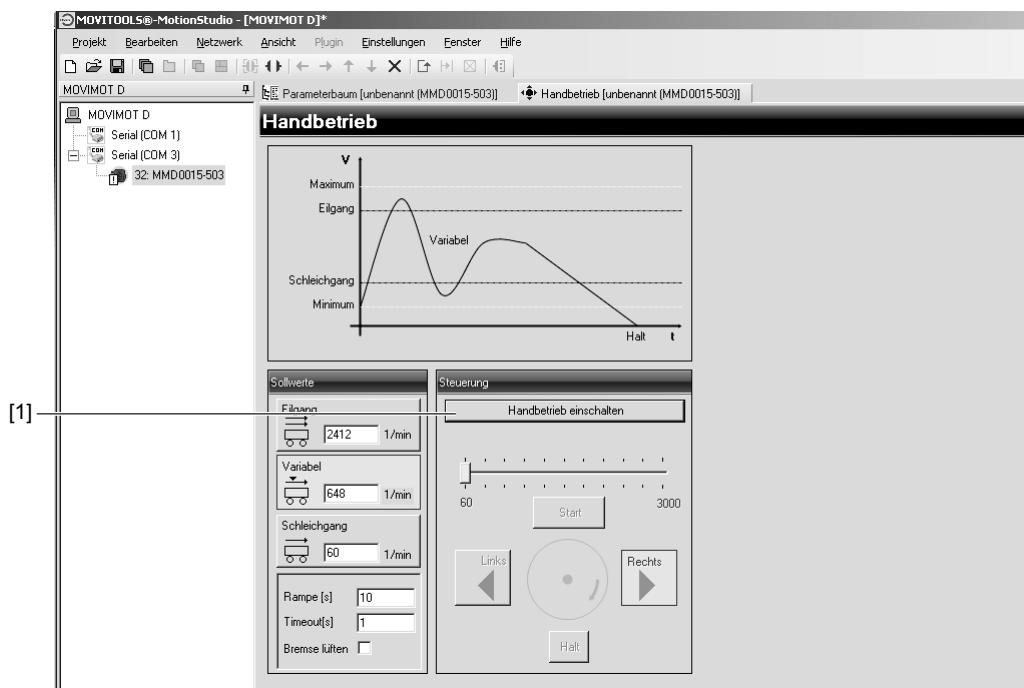
The "Manual operation" window opens.

9.5.1 Activating/deactivating manual operation

Manual operation can only be activated if the MOVIMOT® drive is inhibited.

It can not be activated if

- The brake is released without drive enable
- Or if the inverter output stage is enabled to supply a standstill current.



534358795

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

The parameter *P097 PI 1 Actual value (display value)* signals to the higher-level controller that manual operation has been activated.

Manual operation remains active even after an error reset or after the 24 V supply has been switched off.

Manual operation is deactivated

- When you click on the button [Deactivate manual operation]
- Or when you close the "Manual operation" window
- Or set parameter *P802 Factory setting* to "Delivery state".

	NOTE
	<p>If you deactivate manual operation,</p> <ul style="list-style-type: none"> • The signals at the binary inputs become effective in binary control mode. • The signals at the binary inputs and the process data become effective in RS-485 control mode.

!	HAZARD!
	<p>Risk of crushing if the drive starts up unintentionally. Severe or fatal injuries.</p> <ul style="list-style-type: none"> • Before deactivating manual operation, reset the signals at the binary inputs and revoke drive enable via process data. • Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.

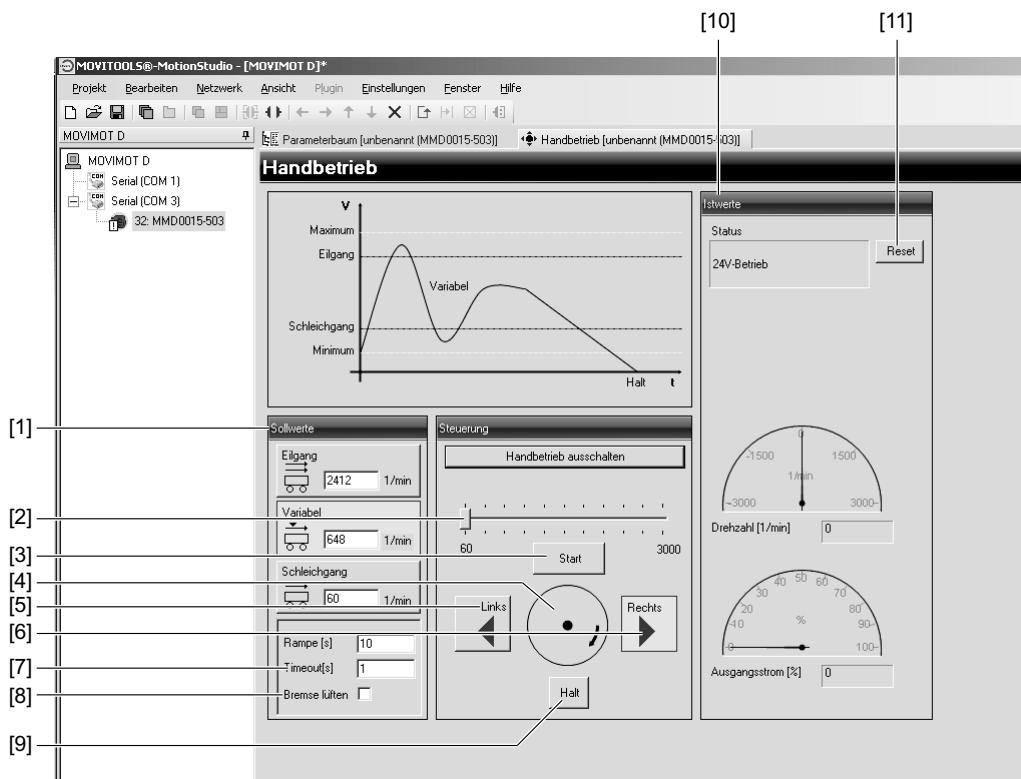


Operation

MOVIMOT® manual operation with MOVITOOLS® MotionStudio

9.5.2 Control in manual mode

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



534573835

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 determine the direction of rotation.
3. Click on the [Start] button [3] to enable the MOVIMOT® drive.

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 [9] 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 MOVIMOT® drive.

The group "Actual values" [10] displays the following actual values of the MOVIMOT® drive:

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



On MOVIMOT® drives with a brake, you can release the brake even without drive enable by activating the "Brake release" checkbox [8].

NOTE	
	<p>The brake can only be released without drive enable if</p> <ul style="list-style-type: none">• DIP switch S2/2 = "ON"• or this function is enabled via parameter P738

9.5.3 Reset in manual operation mode

If an error occurs at the MOVIMOT® inverter, you can reset the error by clicking on the [Reset] button [11].

9.5.4 Timeout monitoring in manual operation mode

Timeout monitoring is active during manual operation to prevent uncontrolled operation of the MOVIMOT® drive in case of communication problems.

The timeout interval can be specified in the "Timeout" input field [7].

If communication between MOVITOOLS® MotionStudio and the MOVIMOT® inverter is interrupted longer than this timeout interval, the enable for the MOVIMOT® drive is revoked and the brake is applied. Manual operation remains active.



9.6 DBG keypad (in preparation)

9.6.1 Description

Function You can use the DBG keypad for parameterization and manual operation of MOVIMOT® drives. In addition to that, the keypad displays important information about the state of the MOVIMOT® drive.

Features

- Illuminated plain text display, up to 7 languages can be set
- Keypad with 21 keys
- Can be connected via extension cable DKG60B (5 m)

Overview

Keypad	Language
	DBG60B-01 DE / EN / FR / IT / ES / PT / NL (German / English / French / Italian / Spanish / Portuguese / Dutch)
	DBG60B-02 DE / EN / FR / FI / SV / DA / TR (German / English / French / Finnish / Swedish / Danish / Turkish)
	DBG60B-03 DE / EN / FR / RU / PL / CS (German / English / French / Russian / Polish / Czech)

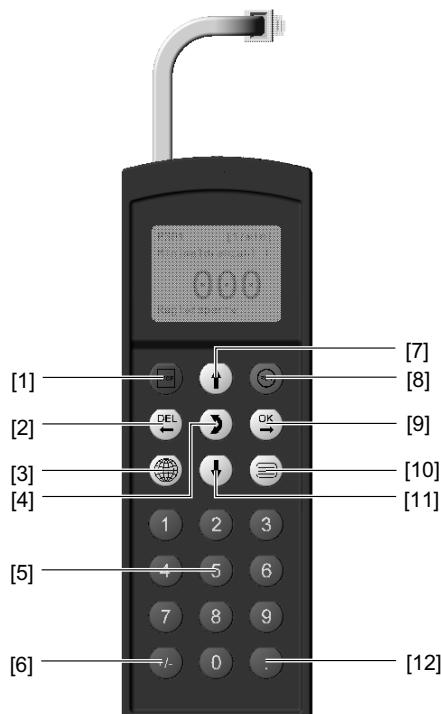
	NOTE For notes on connecting the DBG keypad, refer to sec. "Connection of the DBG keypad" (siehe page 46).
--	--

	STOP The degree of protection specified in sec. Technical Data only applies if the screw plug of the diagnostic interface is mounted correctly. A missing or incorrectly installed screw plug can cause damage to the MOVIMOT® inverter. <ul style="list-style-type: none"> • Screw the screw plug back on with the seal after performing parameter setting, diagnostics or manual operation.
--	---



**Key assignment
DBG**

The following figure shows the key assignment of the DBG keypad:



341827339

- | | | |
|------|---------------|--|
| [1] | Key | Stop |
| [2] | Key | Delete previous entry |
| [3] | Key | Select language |
| [4] | Key | Change menu |
| [5] | Key <0>...<9> | Digits 0...9 |
| [6] | Key | Sign reversal |
| [7] | Key | Up arrow, moves up to the next menu item |
| [8] | Key | Start |
| [9] | Key | OK, confirms the entry |
| [10] | Key | Activate the context menu |
| [11] | Key | Down arrow, moves down to the next menu item |
| [12] | Key | Decimal point |



9.6.2 Operation

Selecting a language

The following text appears on the display for a few sections when the DBG keypad is switched on for the first time or after activating the delivery status:

**SEW
EURODRIVE**

The symbol for language selection then appears on the display.



341888523

To select the required language, press the  key until the basic display is shown in your chosen language.

Context menu

You can use the  key to go to the context menu.

For the MOVIMOT® MM..D inverter, the following menu items are available in the context menu of the DBG keypad:

- "BASIC VIEW"
- "PARAMETER MODE"
- "MANUAL MODE"
- "COPY TO DBG"
- "COPY IN MM"
- "UNIT SETTINGS"
- "SIGNATURE"
- "EXIT"

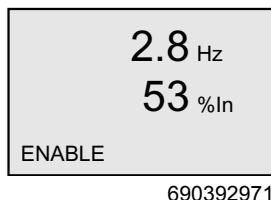


Basic display

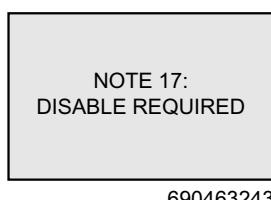
The menu "BASIC VIEW" represents important characteristic values.



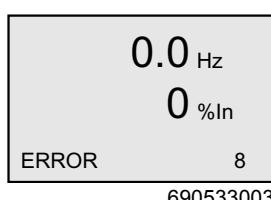
Display for inhibited MOVIMOT® inverter



Display for enabled MOVIMOT® inverter



Information message



Error display

Parameter mode

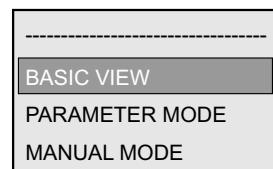
In the menu "PARAMETER MODE", you can check and change parameter settings .

Parameters can only be changed if

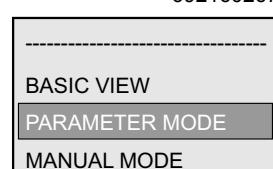
- a Drive ID module is plugged into the MOVIMOT® inverter
- and no additional function is activated.

To change parameters in the parameter mode, proceed as follows:

1. Activate the context menu with the key. The second menu item is "PARAMETER MODE".

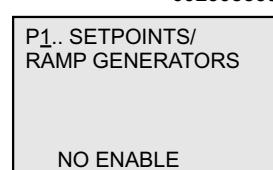


2. Use the key to select the "PARAMETER MODE" menu item.



3. Start the "PARAMETER MODE" using the key. The first display parameter P000 "SPEED" appears.

Use the key or the key to select the main parameter groups 0 to 9.





Operation DBG keypad (in preparation)

4. Activate the selection of the parameter subgroup in the required parameter main group with the key. The flashing cursor moves one position to the right.

P1_.. SETPOINTS/
RAMP GENERATORS

NO ENABLE

692557963

5. Use the key or the key to select the required parameter subgroup. The flashing cursor is positioned under the number of the parameter subgroup.

P13.. SPEED-
RAMPS 1

NO ENABLE

692632203

6. Activate the parameter selection in the required parameter subgroup with the key. The flashing cursor moves one position to the right.

P13.. SPEED
RAMPS 1

NO ENABLE

692708875

7. Use the key or the key to select the desired parameter. The flashing cursor is positioned under the third digit of the parameter number.

P131 RAMP T11 DOWN s
1.0

NO ENABLE

692797707

8. Use the key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.

P131 RAMP T11 DOWN s
1.0_

NO ENABLE

692873867

9. Use the key or the key to select the desired parameter value.

P131 RAMP T11 DOWN s
1.3_

NO ENABLE

692950795

10. Confirm the setting using the key. Exit the setting mode by pressing the key. The flashing cursor is positioned under the third digit of the parameter number again.

P131 RAMP T11 DOWN s
1.3

NO ENABLE

693028491

11. Use the key or the to select another parameter or go back to the parameter subgroup menu using the key.

12. Use the key or the to select another parameter subgroup or go back to the main parameter group menu using the key.

13. Use the key to return to the context menu.



Manual mode

Activation

	<p>HAZARD!</p> <p>When deactivating the manual mode, the binary signals (binary control) or the process data of the master (control via RS-485) become active. If the enable signal is present via the binary signals or the process data, the MOVIMOT® drive can start up unintentionally when deactivating manual operation.</p> <p>Severe or fatal injuries from crushing.</p> <ul style="list-style-type: none"> • Before deactivating the manual mode, set the binary signals or the process data in such way that the MOVIMOT® drive is not enabled. • Change the binary signals or process data only after deactivating manual operation.
---	---

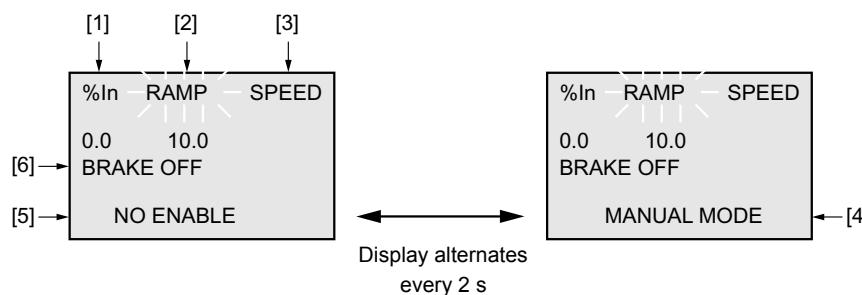
Proceed as follows to change to manual mode:

1. Use the  key to go to the context menu.
2. Use the  key or the  key to select the "MANUAL MODE" menu item.
Confirm your entry using the .

The keypad is now in manual operation mode.

	<p>NOTE</p> <p>If the drive is enabled or the brake is released, you cannot change to manual mode. In this case, the message "NOTE 17: DISABLE REQUIRED" appears for 2 seconds and the DBG keypad returns to the context menu.</p>
---	---

Display in manual mode



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- [1] Output current in [%] of I_N
- [2] Acceleration (speed ramps in [s] in relation to a setpoint step change of 50 Hz)
- [3] Speed in [min^{-1}]
- [4] Manual operation display
- [5] Inverter status
- [6] Brake status



Operation

The following MOVIMOT® functions can be executed in the menu "MANUAL MODE":

Setting the ramp time Press the key.

Use the key or the key to set the desired ramp time.

Confirm the entry with key.

Change parameters You can use the key to switch between parameters "RAMP", "SPEED" and "BRAKE".

Go to the "SPEED" parameter.

The keypad shows the currently set "SPEED" parameter as flashing.

Enter speed

Enter the desired speed for manual operation using the digit keys <0>...<9>.

The sign determines the direction of rotation of the drive.

Confirm the entry with key.

Starting the drive

You can use the key to start the MOVIMOT® drive.

During operation, the keypad displays the current motor current in [%] of the rated motor current I_N .

Stop drive

You can use the key to stop the MOVIMOT® drive.

Brake release without Use the key to go to the "BRAKE" menu item.

drive enable Use the key or the key to release or apply the brake without drive enable

Confirm your selection using the key.

Reset error

If an error occurs during manual operation, the display shows the following message:

MANUAL MODE
<OK> = RESET
 = EXIT
ERROR CODE

MANUAL MODE
<OK> = RESET
 = EXIT
ERROR TEXT

Display alternates
every 2 s

Pressing the key, the DBG keypad resets the error.

During the error reset, the following message is displayed:

MANUAL MODE
PLEASE WAIT...

After the error reset, manual operation remains active. The display shows the manual mode display again.



Deactivating manual operation

Use the key or the key to deactivate the manual mode. The following query appears:

ACTIVATE AUTOMATIC MODE ?	
DEL=NO	OK=YES

- If you press the key, you will return to manual mode.
- If you press the key, you will deactivate manual mode. The context menu appears.



HAZARD!

When deactivating the manual mode, the binary signals (binary control) or the process data of the master (control via RS-485) become active. If the enable signal is present via the binary signals or the process data, the MOVIMOT® drive can start up unintentionally.

Severe or fatal injuries from crushing.

- Before deactivating the manual mode, set the binary signals or the process data in such way that the MOVIMOT® drive is not enabled.
- Change the binary signals or process data only after deactivating manual operation.

Copy function of the DBG keypad

The DBG keypad can be used to copy the complete parameter set of the DBG keypad from one MOVIMOT® inverter to other MOVIMOT® inverters as follows.

1. In the context menu, select the menu item "COPY TO DBG". Confirm your selection using the key.
2. After the copying process, connect the DBG keypad to another MOVIMOT® inverter.
3. In the context menu, select the menu item "COPY TO MM". Confirm your selection using the key.



10 Service

10.1 Status and error display

10.1.1 Status LED

The status LED is located on the top of the MOVIMOT® inverter.

Meaning of the status LED states

The three-color status LED indicates the operating and error statuses of the MOVIMOT® inverter.

LED color	LED status	Error code	Description
-	Off	Not ready for operation	No 24 V power supply
Yellow	Flashes steadily	Not ready for operation	Self-test phase active or 24 V power supply present but supply voltage not OK
Yellow	Flashing evenly, fast	Ready for operation	Brake release without drive enable active (only with S2/2 = "ON")
Yellow	Steady light	Ready, but unit inhibited	24 V power supply and supply voltage OK, but no enable signal If drive does not run when enable signal is present - check startup!
Green/yellow	Flashing with alternating colors	Ready, but timeout	Faulty communication with cyclical data exchange
Green	Steady light	Unit enabled	Motor in operation
Green	Flashing evenly, fast	Current limit active	Drive operating at current limit
Green	Flashes steadily	Ready for operation	Standstill current function active
Red	Steady light	Not ready for operation	Check the 24 V supply. Make sure that there is a smoothed DC voltage with low ripple (residual ripple max. 13 %) present
Red	2x flashing, break	Error 07	DC link voltage too high
Red	Flashing slowly	Error 08	Speed monitoring error (only with S2/4 = "ON") or additional function 13 is active
		Error 90	Assignment of motor to inverter incorrect
		Errors 17 to 24, 37	CPU error
		Errors 25, 94	EEPROM error
		Error 97	Parameter transmission error
Red	3x flashing, break	Error 01	Overcurrent in output stage
		Error 11	Overtemperature in output stage
Red	4x flashing, break	Error 84	Overload in motor
Red	5x flashing, break	Error 89	Overtemperature in brake Assignment of motor to frequency inverter incorrect
Red	6x flashing, break	Error 06	Mains phase failure
		Error 81	Start condition ¹⁾
		Error 82	Output phases interrupted ¹⁾

1) Only for hoist applications

Status LED flash codes

Flashing steadily: LED 600 ms on, 600 ms off

Flashing evenly, fast: LED 100 ms on, 300 ms off

Flashing with alternating colors: LED 600 ms green, 600 ms yellow

N x flashing, break: LED N x (600 ms red, 300 ms off), then LED off for 1 s

The errors are described on the next page.



10.1.2 List of errors

Error	Cause / solution
Communication timeout (motor stops, without error code)	<ul style="list-style-type: none"> Missing connection \perp, RS+, RS- between MOVIMOT® and RS-485 master. Check and establish connection, especially earth. EMC influence Check shielding of data lines and improve, if necessary. Incorrect type (cyclical) in acyclical data transfer, protocol time between the individual telegrams is longer than 1 s (timeout interval). Check the number of MOVIMOT® units connected to the master (a maximum of 8 MOVIMOT® units can be connected as slaves for cyclic communication). Reduce telegram cycle or select telegram type "acyclic".
DC link voltage too low, supply system off was detected (motor stops, without error code)	<p>Check supply system leads, supply voltage and 24 V electronics supply voltage for interruption. Check the value of the 24 V electronics supply voltage (permitted voltage range $24V \pm 25\%$, EN 61131-2 residual ripple max. 13 %)</p> <p>Motor restarts automatically as soon as the voltage reaches normal values.</p>
Error code 01 Overcurrent in output stage	<p>Short circuit on inverter output.</p> <p>Check the connection between the inverter output and the motor as well as the motor winding for short circuits.</p> <p>Reset the error by switching off the DC 24 V supply voltage or resetting the error.</p>
Error code 06 Phase failure (The error can only be detected when the drive is at load)	<p>Check the supply system cable for phase failure.</p> <p>Reset the error by switching off the DC 24 V supply voltage or resetting the error.</p>
Error code 07 DC link voltage too high	<ul style="list-style-type: none"> Ramp time too short → Increase ramp time. Faulty connection between brake coil/braking resistor → Check the connection between braking resistor and brake coil. Correct, if necessary. Incorrect internal resistance of brake coil/braking resistor → Check internal resistance of brake coil/braking resistor (see sec. "Technical Data"). Thermal overload in braking resistor → Wrong size of braking resistor selected. Invalid voltage range of the supply input voltage → Check supply input voltage for valid voltage range <p>Reset the error by switching off the DC 24 V supply voltage or resetting the error.</p>
Error code 08 Speed monitoring	<p>Speed monitoring has triggered, load on the drive is too high</p> <p>Reduce the load on the drive</p> <p>Reset the error by switching off the DC 24 V supply voltage or resetting the error.</p>
Error code 11 Thermal overload of the output stage or internal unit error	<ul style="list-style-type: none"> Clean the heat sink Lower ambient temperature Prevent heat build-up Reduce the load on the drive <p>Reset the error by switching off the DC 24 V supply voltage or resetting the error.</p>
Error codes 17 to 24, 37 CPU error	Reset the error by switching off the DC 24 V supply voltage or resetting the error.
Error codes 25, 94 EEPROM error	Reset the error by switching off the DC 24 V supply voltage or resetting the error.
Error code 43 communication timeout	<p>Communication timeout during cyclical communication via RS-485</p> <p>If this error occurs, the drive is decelerated and stopped along the set ramp.</p> <ul style="list-style-type: none"> Check/establish communication link between RS-485 master and MOVIMOT®. Check the number of slaves connected to the RS-485 master. If the timeout interval of the MOVIMOT® inverter is set to 1 s, you can connect a maximum of 8 MOVIMOT® inverters (slaves) to the RS-485 master for cyclical communication. <p>Important: The drive is enabled again after communication has been re-established.</p>
Error code 81 Start condition error	<p>The motor could not be supplied with the correct amount of current during the pre-magnetizing time.</p> <ul style="list-style-type: none"> Rated motor power too small in relation to rated inverter power Motor cable cross section too small <p>Check connection between MOVIMOT® inverter and motor.</p>
Error code 82 Error output open	<ul style="list-style-type: none"> 2 or all output phases interrupted Rated motor power too small in relation to rated inverter power <p>Check connection between MOVIMOT® inverter and motor.</p>



Error	Cause / solution
Error code 84 Thermal overload of motor	<ul style="list-style-type: none"> When the MOVIMOT® inverter is installed close to the motor, set DIP switch S1/5 to "ON". For combinations of "MOVIMOT® and motor with one lower power rating", check the setting of DIP switch S1/6. Lower ambient temperature Prevent heat build-up Reduce the load on the motor Increase the speed Check the combination of the drive and MOVIMOT® frequency inverter if the error is signaled shortly after the first enable. The temperature monitoring in the motor (TH winding thermostat) has tripped when using MOVIMOT® with the selected extra function 5 → Reduce load on the motor. <p>Reset the error by switching off the DC 24 V supply voltage or resetting the error.</p>
Error code 89 Thermal overload of brake coil or brake coil defective, brake coil connected incorrectly	<ul style="list-style-type: none"> Increase the set ramp time Brake inspection (see section "Inspection and maintenance of the brake") Check brake coil connection Contact SEW Service Check the combination of the drive (brake coil) and MOVIMOT® frequency inverter if the error is signaled shortly after the first enable. For combinations of "MOVIMOT® and motor with one lower power rating", check the setting of DIP switch S1/6. <p>Reset the error by switching off the DC 24 V supply voltage or resetting the error.</p>
Error code 94 EEPROM checksum error	<ul style="list-style-type: none"> Defective EEPROM <p>Contact SEW Service.</p>
Error code 97 Copy error	<ul style="list-style-type: none"> Disconnecting the DBG keypad or the PC during the copying process Switching the 24 V supply voltage off and on during the copying process <p>Before acknowledging the error, load the factory setting or the complete data record from the keypad or the MOVITOOLS® MotionStudio software.</p>



10.2 Replacing units

	HAZARD!
	<p>When working on the unit, dangerous voltage levels may still be present up to one minute after the mains is disconnected.</p> <p>Severe or fatal injuries from electric shock.</p> <ul style="list-style-type: none">• Switch off the MOVIMOT® inverter and wait for at least 1 minute.

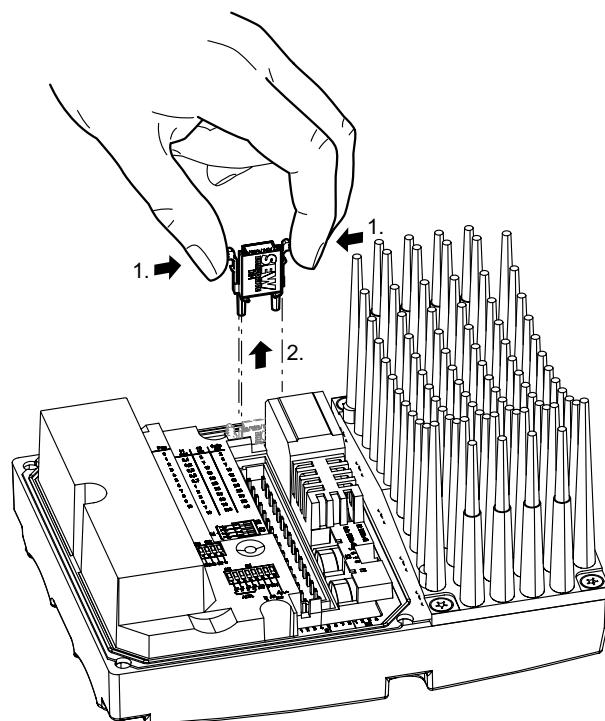
1. Remove the screws and take off the MOVIMOT® inverter from the terminal box.
2. Compare the data on the nameplate of the previous MOVIMOT® inverter with the data on the nameplate of the newMOVIMOT® inverter.

	STOP!
	<p>The previous MOVIMOT® inverter can only be replaced by a MOVIMOT® inverter with the same part number.</p>

3. Set all controls
 - DIP switch S1
 - DIP switch S2
 - Setpoint potentiometer f1
 - Switch f2
 - Switch t1on the new MOVIMOT® inverter analogously to the controls of the previous MOVIMOT® inverter.



4. Unlock the Drive ID module of the new MOVIMOT® inverter and pull it out carefully.



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5. Unlock the Drive ID module of the previous MOVIMOT® inverter as well and pull it out carefully.

Insert this Drive ID module into the new MOVIMOT® inverter.

Make sure that the Drive ID module locks in place.

6. Place the new MOVIMOT® inverter onto the terminal box and screw it on.

7. Supply voltage to the MOVIMOT® inverter.

Check whether the new MOVIMOT® inverter is functioning properly.



10.3 Turning the modular terminal box

We recommend purchasing pre-fabricated MOVIMOT® units with the correct position of cable entries. In exceptional cases, the position of the cable entries can be rotated to the opposite side (only for units with a modular terminal box).



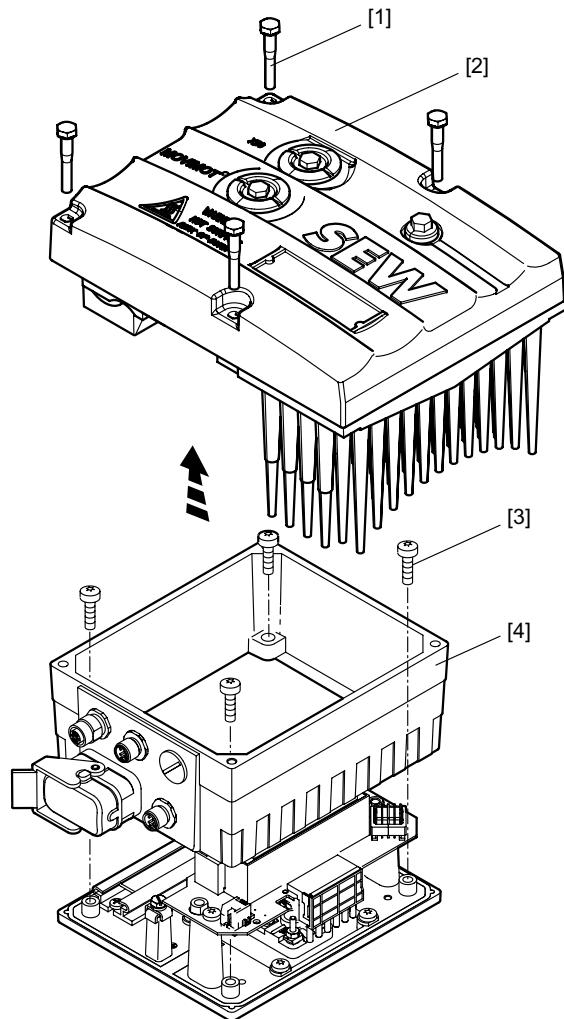
HAZARD!

When working on the unit, dangerous voltage levels may still be present up to one minute after the mains is disconnected.

Severe or fatal injuries from electric shock.

- Switch off the MOVIMOT® inverter and wait for at least 1 minute.

1. Label the connections of the MOVIMOT® inverter before disconnecting them for later re-installation.
2. Disconnect the supply system, control and sensor connections.
3. Remove the screws [1] and take off the MOVIMOT® inverter [2] from the terminal box.
4. Loosen the screws [3] and remove the terminal box [4].



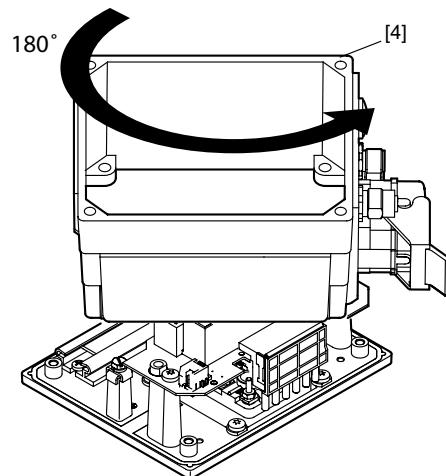
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Service

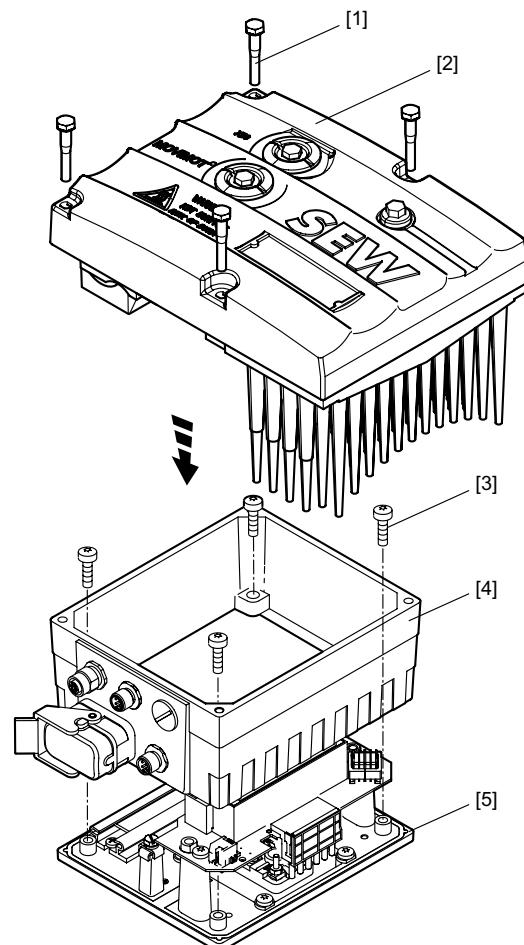
Turning the modular terminal box

5. Rotate the terminal box [4] by 180°.



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6. Place the terminal box [4] on the mounting plate [5] and fasten it with screws [3].
7. Re-install the connections.
8. Place the MOVIMOT® inverter [2] onto the terminal box and fasten it with 4 screws [1].



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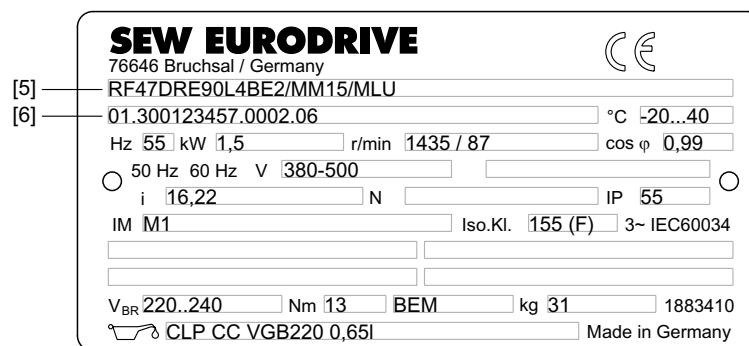
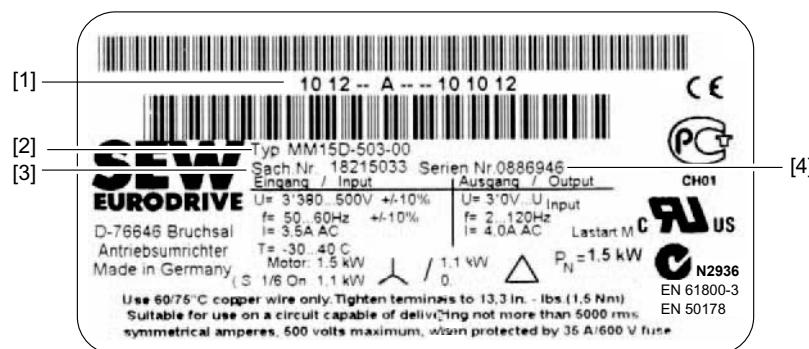


10.4 SEW Service

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

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

- Service code [1]
- Unit designation on inverter nameplate [2]
- Part number [3]
- Serial number [4]
- Type designation on motor nameplate [5]
- Serial number [6]
- Short description of application (application, control via terminals or serial)
- Nature of the error
- Accompanying circumstances (e.g. initial startup)
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.



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10.5 Extended storage

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

10.5.1 Procedure when maintenance has been neglected

Electrolytic capacitors are used in the inverters. They are subject to aging effects when deenergized. This effect can damage the capacitors if the unit is connected using the rated voltage after a longer period of storage.

If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the supply 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

10.6 Disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastics
- Electronic components

Dispose of all components in accordance with applicable regulations!



11 Inspection/Maintenance

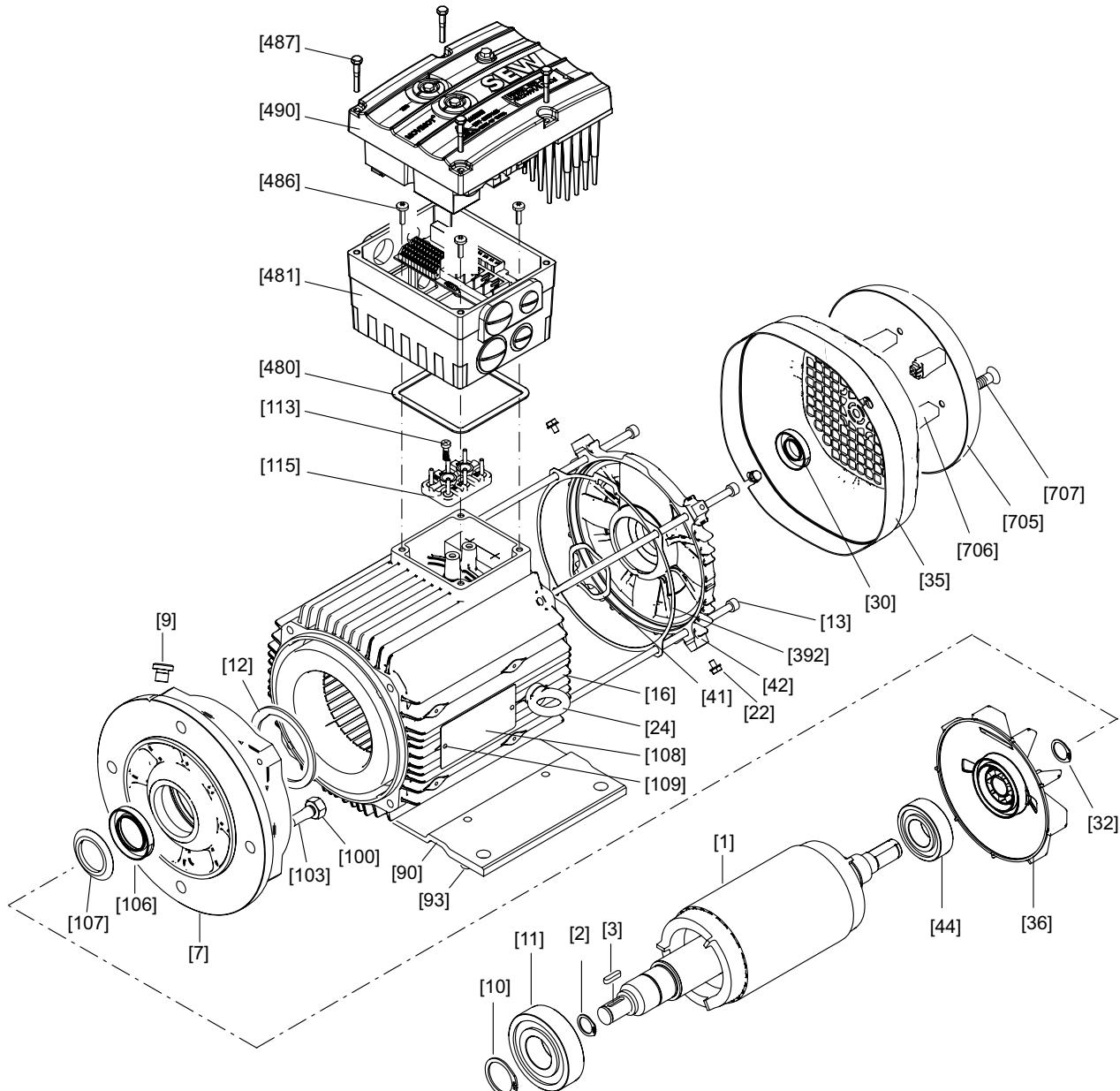
11.1 Inspection and maintenance intervals

	HAZARD! <p>When working on the unit, dangerous voltage levels may still be present up to one minute after the mains is disconnected.</p> <p>Severe or fatal injuries from electric shock.</p> <ul style="list-style-type: none"> • Disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection. • Then wait for at least 1 minute.
	WARNING! <p>The surfaces of MOVIMOT® and external options, e.g. braking resistor (especially the heat sink), can become very hot during operation.</p> <p>Danger of burns.</p> <ul style="list-style-type: none"> • Do not touch the MOVIMOT® drive and external options until they have cooled down sufficiently.
	HAZARD! <p>Risk of fatal injury if the hoist falls.</p> <p>Severe or fatal injuries.</p> <ul style="list-style-type: none"> • MOVIMOT® may <u>not</u> be used as a safety device in hoist applications. • Use monitoring systems or mechanical protection devices as safety equipment.

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

Unit / unit part	Time interval	What to do?
Brake	<ul style="list-style-type: none"> • If used as a working brake: At least every 3000 hours of operation¹⁾ 	Inspect the brake: <ul style="list-style-type: none"> • Measure brake disk thickness • Brake disk, lining • measure and set working air gap • Pressure plate • Carrier / gearing • Pressure rings
	<ul style="list-style-type: none"> • If used as a holding brake: Every 2 to 4 years, depending on operating conditions ¹⁾ 	<ul style="list-style-type: none"> • Vacuum up the abraded matter • Inspect the switch elements and change if necessary (e.g. in case of burn-out).
Motor	<ul style="list-style-type: none"> • Every 10,000 hours of operation 	Inspect the motor: <ul style="list-style-type: none"> • Inspect anti-friction bearings and replace them, if necessary. • Replace the oil seal • Clean cooling air passages
Drive	<ul style="list-style-type: none"> • Varies (depending on external factors) 	<ul style="list-style-type: none"> • Touch up or renew the surfaces / anticorrosion coating

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


11.2 Inspection / maintenance for DR.71-DR.100 motors
11.2.1 Basic design of DR.71-DR.132


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[1] Rotor	[32] Circlip	[109] Grooved pin
[2] Circlip	[35] Fan guard	[113] Pan head screw
[3] Key	[36] Fan	[115] Terminal board
[7] Flanged end shield	[41] Equalizing ring	[392] Gasket
[9] Screw plug	[42] Non drive-end bearing shield	[480] Gasket
[10] Circlip	[44] Grooved ball bearing	[481] Terminal box
[11] Deep groove ball bearing	[90] Base plate	[486] Pan head screw
[12] Circlip	[93] Pan head screw	[487] Hex head bolt
[13] Machine screw	[100] Hex nut	[490] MOVIMOT® inverter
[16] Stator	[103] Stud	[705] Protective canopy
[22] Hex head bolt	[106] Oil seal	[706] Spacer
[24] Lifting eyebolt	[107] Oil flinger	[707] Pan head screw
[30] Oil seal	[108] Nameplate	



11.2.2 Inspection steps for DR.71-DR.132 motors

⚠ HAZARD!	
	<p>Risk of crushing if the drive starts up unintentionally and danger of electrical voltages. Dangerous voltages may still be present for up to one minute after disconnection from the power supply.</p> <p>Severe or fatal injuries.</p> <ul style="list-style-type: none">• Before starting to work on it, disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection.• Then wait for at least 1 minute.• Strictly observe the following instructions. <ol style="list-style-type: none">1. Remove forced cooling fan and encoder, if installed.2. Remove fan guard [35] and fan [36].3. Remove machine screws [13] from the flanged endshield [7] and take the B-side endshield [42] and stator [16] off the flanged endshield.4. Visual inspection: Is there any moisture or gear unit oil inside the stator?<ul style="list-style-type: none">– If not, continue with 7– If there is condensation, continue with 5– If there is gear oil, have the motor repaired by a specialist workshop5. If there is moisture inside the stator:<ul style="list-style-type: none">– With gearmotors: Remove the motor from the gear unit– With motors without a gear unit: Remove the A-flange– Remove the rotor [1]6. Clean the winding, dry it and check it electrically.7. Replace the deep groove ball bearings [11] [44] with permitted ball bearings. See sec. "Permitted anti-friction bearing types" (siehe page 180).8. Reseal the shaft:<ul style="list-style-type: none">– A-side: Replace oil seal [106]– B-side: Replace oil seal [30] Coat the sealing lip with grease (Klüber Petamo GHY 133).9. Reseal the stator seat:<ul style="list-style-type: none">– Seal the sealing surface with duroplastic sealing compound (operating temperature -40...180 °C), such as "Hylomar L Spezial".– Replace gasket [392]10. Install the motor and accessory equipment.

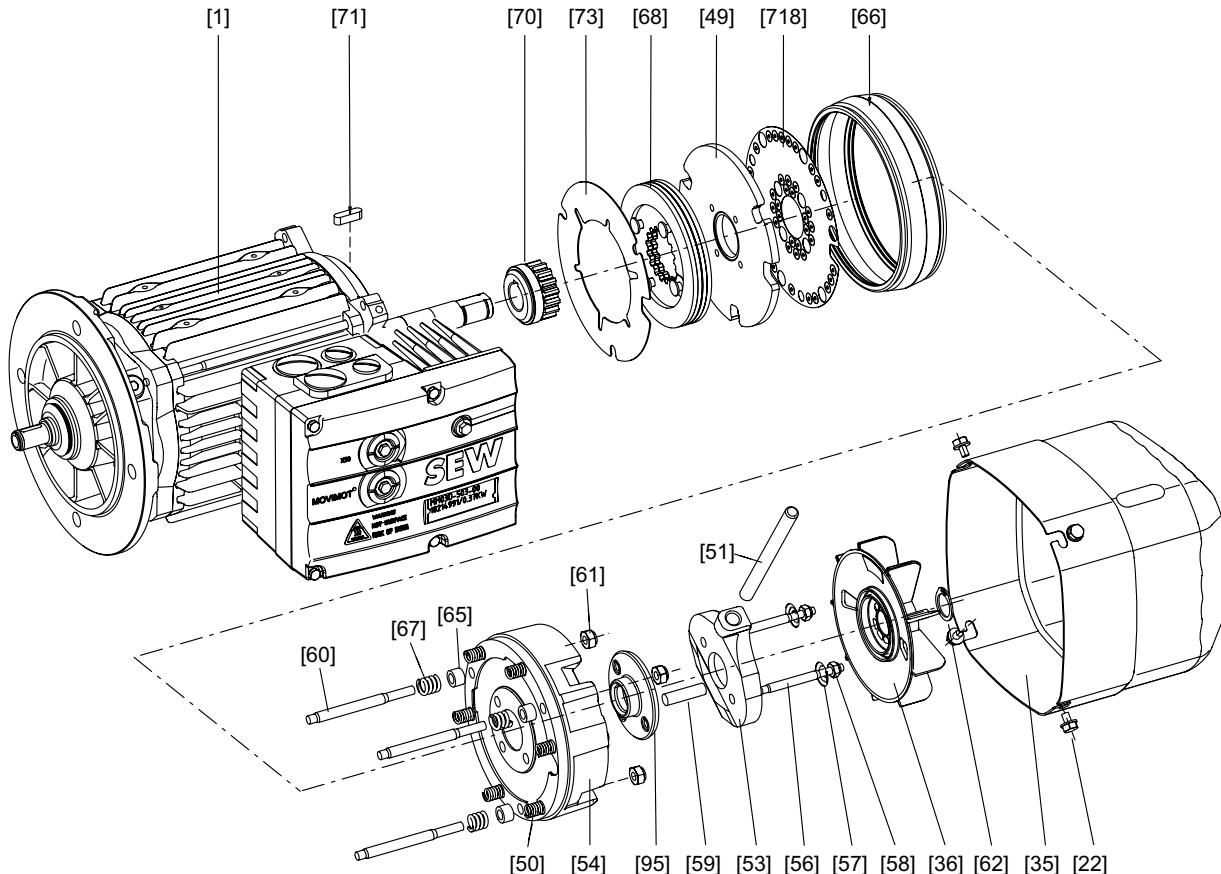


Inspection/Maintenance

Inspection/maintenance of the brake

11.3 Inspection/maintenance of the brake

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

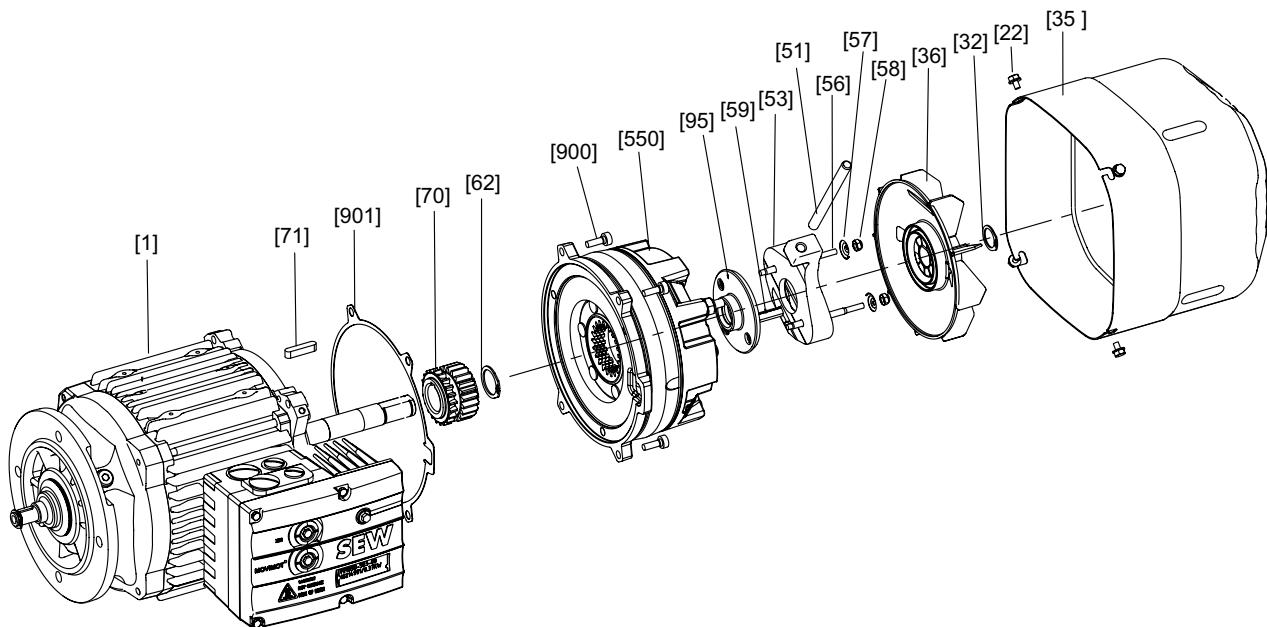


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- | | | |
|---|----------------------------|---------------------|
| [1] Motor with brake bearing end shield | [56] Stud | [62] Circlip |
| [22] Hex head bolt | [57] Conical spring | [70] Driver |
| [35] Fan guard | [58] Setting nut | [71] Key |
|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



11.3.2 Basic design of DR.90-DR.100 brakemotors



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[1] Motor with brake bearing end shield

[22] Hex head bolt

[32] Circlip

[35] Fan guard

[36] Fan

[51] Hand lever

[53] Releasing lever

[56] Stud

[57] Conical coil spring

[58] Setting nut

[59] Parallel pin

[62] Circlip

[70] Carrier

[95] Sealing ring

[550] Pre-assembled brake

[900] Screw

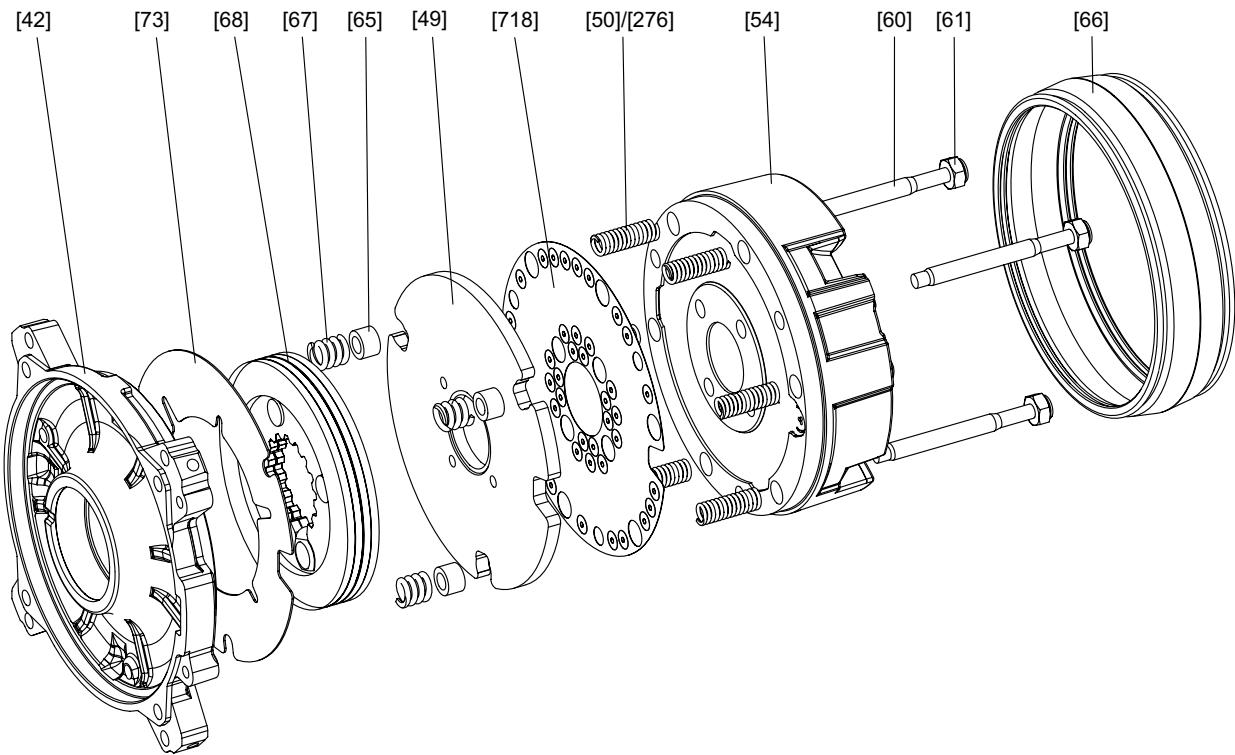
[901] Gasket



Inspection/Maintenance

Inspection/maintenance of the brake

11.3.3 Basic design of BE05-BE2 brake (for DR.71-DR.80 brakemotors)



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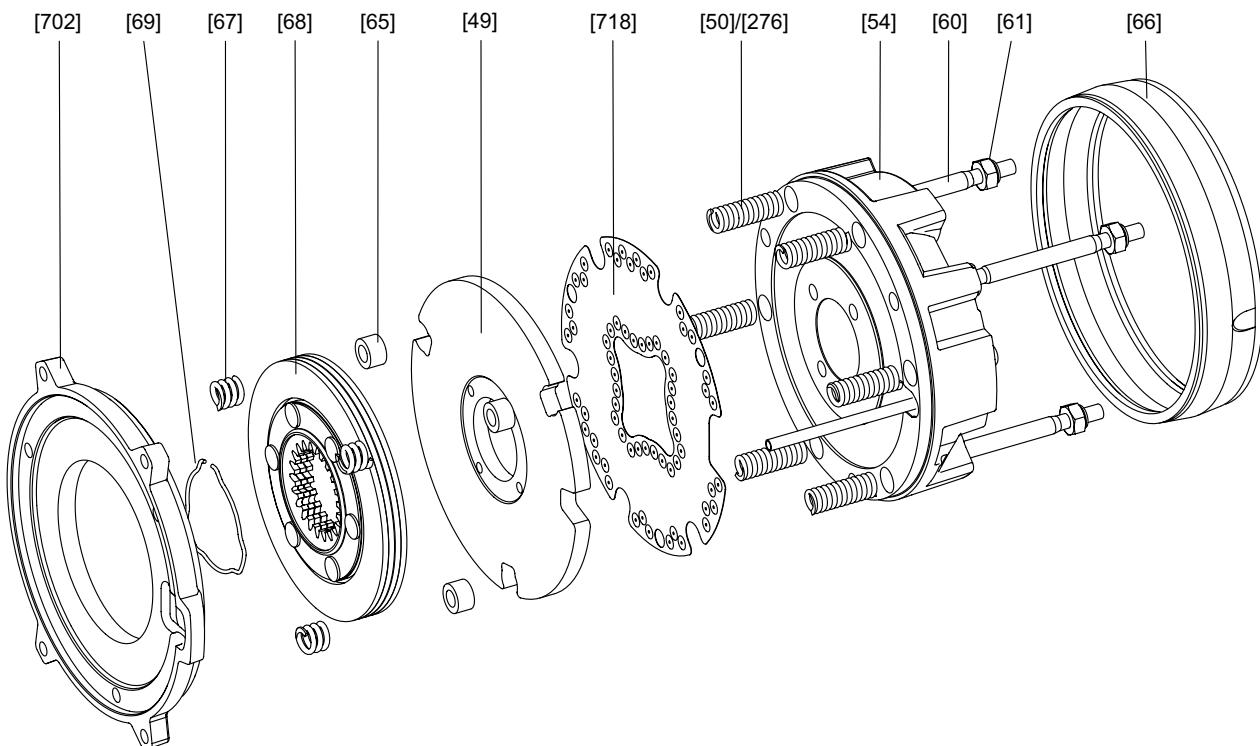
[42] Brake endshield
 [49] Pressure plate
 [50] Brake spring (standard)
 [54] Magnet, complete
 [60] Stud 3x

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

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



11.3.4 Basic design of BE1-BE11 brake (for DR.90-DR.132 brakemotors)



488358283

[49] Pressure plate
[50] Brake spring (standard)
[54] Magnet, complete
[60] Stud 3x
[61] Hexagonal nut

[65] Pressure ring
[66] Rubber sealing collar
[67] Counter spring
[68] Brake disk
[69] Circular spring

[276] Brake spring (blue)
[702] Friction disk
[718] Dampening plate



Inspection/Maintenance

Inspection/maintenance of the brake

11.3.5 Inspection steps for DR.71-DR.132 brakemotors

	HAZARD! <p>Risk of crushing if the drive starts up unintentionally and danger of electrical voltages. Dangerous voltages may still be present for up to one minute after disconnection from the power supply.</p> <p>Severe or fatal injuries.</p> <ul style="list-style-type: none"> • Before starting to work on it, disconnect the MOVIMOT® inverter from the power supply and prevent it from unintentional re-connection. • Then wait for at least 1 minute. • Strictly observe the following instructions.
---	---

1. Remove forced cooling fan and encoder, if installed.
2. Remove fan guard [35] and fan [36].
3. Remove machine screws [13] from the flanged endshield [7] and take the B-side endshield [42] and stator [16] off the flanged endshield.
4. Remove MOVIMOT® inverter from the terminal box. Disconnect brake cable from the rectifier.
5. Push the brake off the stator and carefully lift it off.
6. Pull the stator back by approx. 3 to 4 cm.
7. Visual inspection: Is there any moisture or gear unit oil inside the stator?
 - If not, continue with 10
 - If there is condensation, continue with 8
 - If there is gear oil, have the motor repaired by a specialist workshop
8. If there is moisture inside the stator:
 - With gearmotors: Remove the motor from the gear unit
 - With motors without a gear unit: Remove the A-flange
 - Remove the rotor [1]
9. Clean the winding, dry it and check it electrically.
10. Replace the deep groove ball bearings [11] [44] with permitted ball bearings.
See sec. "Permitted anti-friction bearing types" (siehe page 180).
11. Reseal the shaft:
 - A-side: Replace oil seal [106]
 - B-side: Replace oil seal [30]

Coat the sealing lip with grease (Klüber Petamo GHY 133).
12. Reseal the stator seat:
 - Seal the sealing surface with duroplastic sealing compound (operating temperature -40...180 °C), such as "Hylomar L Spezial".
 - Replace gasket [392].
13. Install the motor, brake and accessory equipment.



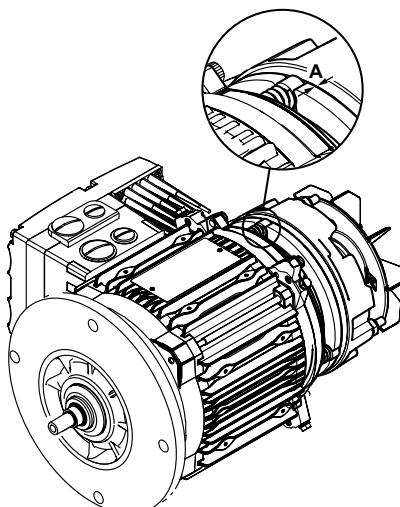
11.3.6 Setting the working air gap of brakes BE05-BE11

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

1. Remove the following:
 - Forced cooling fan and encoder (if installed)
 - flange cover or fan guard [21]
2. Push the rubber sealing collar [66] aside,
 - loosen the clamp, if necessary
 - Vacuum up the abraded matter
3. Measure the brake disk [68]:
 - Minimum brake disk thickness see sec. "Work done, working air gap and braking torque of the brake" (siehe page 179).
 - Replace the brake disk, if necessary.

See sec. "Replacing the brake disk of brakes BE05-BE11" (siehe page 168).
4. Measure the working air gap A (see following figure)
 (use a feeler gauge and measure at three points offset by 120°):
 - between the pressure plate [49] and damping plate [718]
5. Tighten the hex nuts [61]:
6. Tighten the setting sleeves
 - until working air gap is set correctly.

See sec. "Work done, working air gap and braking torque of the brake" (siehe page 179).
7. Put the rubber sealing collar back in place and re-install the dismantled parts.



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Inspection/Maintenance

Inspection/maintenance of the brake

11.3.7 Replacing the brake disk of brakes BE05-BE11

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

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

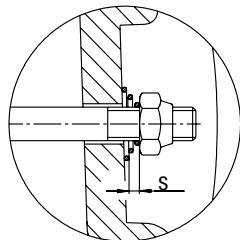
	NOTES <ul style="list-style-type: none"> • The brake of DR.71-DR.80 motor sizes cannot be removed from the motor because the BE brake is directly installed on the brake endshield of the motor. • The brake of DR.90-DR.132 motor sizes cannot be removed from the motor for replacing the brake disk because the BE brake is pre-installed on the brake endshield of the motor with a friction disk .
---	--

1. Remove the following:
 - Forced cooling fan and encoder (if installed)
 - Flange cover or fan guard [35], circlip [32]/[62] and fan [36]
2. Remove MOVIMOT® inverter from the terminal box. Disconnect brake cable from the rectifier.
3. Remove the rubber sealing collar [66].
4. Loosen hex nuts [61], carefully pull off the magnet [54] (brake cable!) and take out the brake springs [50].
5. Remove the damping plate [718], pressure plate [49] and brake disk [68], and clean the brake components.
6. Install a new brake disk.
7. Re-install the brake components,
 - Except for the fan and the fan guard, because the working air gap has to be set first, see section "Setting the working air gap of the brakes BE05-BE11" (siehe page 167).



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

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



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

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



NOTES

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



NOTE

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



Technical Data

Motor with operating point 400 V/50 Hz or 400 V/100 Hz

12 Technical Data

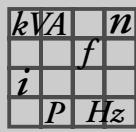
12.1 Motor with operating point 400 V/50 Hz or 400 V/100 Hz

MOVIMOT® type		MM 03D-503-00	MM 05D-503-00	MM 07D-503-00	MM 11D-503-00	MM 15D-503-00	MM 22D-503-00	MM 30D-503-00	MM 40D-503-00				
Part number		18214991	18215009	18215017	18215025	18215033	18215041	18215068	18215076				
Apparent output power at $V_{\text{mains}} = \text{AC } 380\ldots 500 \text{ V}$	S_N	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA	6.7 kVA				
Supply voltages Permitted range	V_{mains}	AC 3 x 380 V / 400 V / 415 V / 460 V / 500 V $V_{\text{mains}} = \text{AC } 380 \text{ V} -10\% \ldots \text{AC } 500 \text{ V} +10\%$											
Supply frequency	f_{mains}	50...60 Hz $\pm 10\%$											
Rated mains current (at $V_{\text{mains}} = \text{AC } 400 \text{ V}$)	I_{mains}	AC 1.3 A	AC 1.6 A	AC 1.9 A	AC 2.4 A	AC 3.5 A	AC 5.0 A	AC 6.7 A	AC 7.3 A				
Output voltage	V_O	$0\ldots V_{\text{mains}}$											
Output frequency Resolution Operating point	f_O	2...120 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz											
Rated output current	I_N	AC 1.6 A	AC 2.0 A	AC 2.5 A	AC 3.2 A	AC 4.0 A	AC 5.5 A	AC 7.3 A	AC 8.7 A				
Motor power S1	P_{Mot}	0.37 kW 0.5 HP	0.55 kW 0.75 HP	0.75 kW 1.0 HP	1.1 kW 1.5 HP	1.5 kW 2.0 HP	2.2 kW 3.0 HP	3.0 kW 4.0 HP	4.0 kW 5.4 HP				
PWM frequency		4 (factory setting) / 8 / 16 ¹⁾ kHz											
Current limitation	I_{max}	motor: 160 % at \perp and \triangle Regenerative: 160 % at \perp and \triangle											
Maximum motor cable length		15 m when MOVIMOT® frequency inverter is installed close to the motor (with SEW hybrid cable and P2.A option)											
External braking resistor	R_{min}	150 Ω				68 Ω							
Interference resistance		Conforms to EN 61800-3											
Interference emission		Conforms to category C2 according to EN 61800-3 (limit class A to EN 55011 and EN 55014)											
Ambient temperature	ϑ_A	-25 °C (-30°)...+40 °C depending on the motor P_N reduction: 3 % I_N per K to max. 60 °C											
Climate class		EN 60721-3-3, class 3K3											
Storage temperature²⁾		-30...+85 °C (EN 60721-3-3, class 3K3)											
Maximum permitted vibration and shock load		Meets EN 50178											
Degree of protection (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering) IP67 (only possible for inverter with terminal box)											
Duty type		S1 (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes											
Cooling type (DIN 41751)		Self-cooling											
Installation altitude		$h \leq 1,000 \text{ m}$: No reduction $h > 1,000 \text{ m}$: I_N reduction by 1% per 100 m (330 ft) $h > 2000 \text{ m}$: V_{mains} reduction by AC 6 V per 100 m, overvoltage class 2 according to DIN 0110-1 $h_{\text{max}} = 4,000 \text{ m}$ See also sec. "Installation altitudes above 1,000m msl" (siehe page 30)											
Required preventive measures		Grounding of the unit											



MOVIMOT® type	MM 03D-503-00	MM 05D-503-00	MM 07D-503-00	MM 11D-503-00	MM 15D-503-00	MM 22D-503-00	MM 30D-503-00	MM 40D-503-00		
Part number	18214991	18215009	18215017	18215025	18215033	18215041	18215068	18215076		
			Size 1				Size 2			
External electronics supply	Tl. 24 V X6:1,2,3	V = +24 V ± 25 %, EN 61131-2, residual ripple max. 13 % $I_E \leq 250 \text{ mA}$ (typ. 150 mA at 24 V) Input capacitance 120 μF								
3 binary inputs		Isolated via optocoupler; PLC compatible (EN 61131-2) $R_i \approx 3.0 \text{ k}\Omega$, $I_E \approx 10 \text{ mA}$, sampling interval $\leq 5 \text{ ms}$								
Signal level		$+13 \dots +30 \text{ V} = "1"$ = Contact closed $-3 \dots +5 \text{ V} = "0"$ = Contact open								
Control functions	Tl. R ↗ X6:11,12	CW / Stop								
	Tl. L ↘ X6:9,10	CCW / Stop								
	Tl. f1/f2 X6:7,8	$"0"$ = setpoint 1 / $"1"$ = setpoint 2								
Output relay Contact information	Tl. K1a X5:25,26	Response time $\leq 15 \text{ ms}$ DC 24 V / 0.6 A / DC 12 to IEC 60947-5-1 (only SELV or PELV circuits)								
	Tl. K1b X5:27,28									
Signaling function		NO contact for ready signal		Contact closed: - with voltage present (24 V mains) - in case no error was detected - at end of self-testing phase (when unit is turned on)						
Serial interface	Tl. RS+ X5:29,30	RS-485								
	Tl. RS- X5:31,32									

- 1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 = ON, the units operate with a 16 kHz PWM frequency (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature.
- 2) If the unit is being stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.



Technical Data

Motor with operating point 460 V/60 Hz

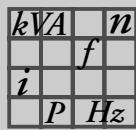
12.2 Motor with operating point 460 V/60 Hz

MOVIMOT® type		MM 03D-503-00	MM 05D-503-00	MM 07D-503-00	MM 11D-503-00	MM 15D-503-00	MM 22D-503-00	MM 30D-503-00	MM 40D-503-00				
Part number		18214991	18215009	18215017	18215025	18215033	18215041	18215068	18215076				
Apparent output power at $V_{\text{mains}} = \text{AC } 380\ldots 500 \text{ V}$	S_N	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA	6.7 kVA				
Supply voltages Permitted range	V_{mains}	AC 3 x 380 V / 400 V / 415 V / 460 V / 500 V $V_{\text{mains}} = \text{AC } 380 \text{ V} -10 \% \ldots \text{AC } 500 \text{ V} +10 \%$											
Supply frequency	f_{mains}	50...60 Hz $\pm 10 \%$											
Rated mains current (at $V_{\text{mains}} = \text{AC } 460 \text{ V}$)	I_{mains}	AC 1.1 A	AC 1.4 A	AC 1.7 A	AC 2.1 A	AC 3.0 A	AC 4.3 A	AC 5.8 A	AC 7.3 A				
Output voltage	V_o	$0\ldots V_{\text{mains}}$											
Output frequency Resolution Operating point	f_o	2...120 Hz 0.01 Hz 460 V at 60 Hz											
Rated output current	I_N	AC 1.6 A	AC 2.0 A	AC 2.5 A	AC 3.2 A	AC 4.0 A	AC 5.5 A	AC 7.3 A	AC 8.7 A				
Motor power	P_{Mot}	0.37 kW 0.5 HP	0.55 kW 0.75 HP	0.75 kW 1.0 HP	1.1 kW 1.5 HP	1.5 kW 2 HP	2.2 kW 3.0 HP	3.7 kW 5 HP	4 kW 5.4 HP				
PWM frequency		4 (factory setting) / 8 / 16 ¹⁾ kHz											
Current limitation	I_{max}	motor: 160 % at λ Regenerative: 160 % at λ											
Maximum motor cable length		15 m when MOVIMOT® frequency inverter is installed close to the motor (with SEW hybrid cable and P2.A option)											
External braking resistor	R_{min}	150 Ω				68 Ω							
Interference resistance		Conforms to EN 61800-3											
Interference emission		Conforms to category C2 according to EN 61800-3 (limit class A to EN 55011 and EN 55014)											
Ambient temperature	ϑ_A	$-25^{\circ}\text{C} (-30^{\circ})\ldots+40^{\circ}\text{C}$ depending on the motor P_N reduction: 3 % I_N per K to max. 60 °C											
Climate class		EN 60721-3-3, class 3K3											
Storage temperature²⁾		$-30\ldots+85^{\circ}\text{C}$ (EN 60721-3-3, class 3K3)											
Maximum permitted vibration and shock load		Meets EN 50178											
Degree of protection (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering) IP67 (only possible for inverter with terminal box)											
Duty type		S1 (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes											
Cooling type (DIN 41751)		Self-cooling											
Installation altitude		$h \leq 1,000 \text{ m}$: No reduction $h > 1,000 \text{ m}$: I_N reduction by 1% per 100 m (330 ft) $h > 2000 \text{ m}$: V_{mains} reduction by AC 6 V per 100 m, overvoltage class 2 according to DIN 0110-1 $h_{\text{max}} = 4,000 \text{ m}$ See also sec. "Installation altitudes above 1,000m msl" (siehe page 30)											
Required preventive measures		Grounding of the unit											

<i>kVA</i>	<i>n</i>
<i>i</i>	<i>f</i>
<i>P</i>	<i>Hz</i>

MOVIMOT® type	MM 03D-503-00	MM 05D-503-00	MM 07D-503-00	MM 11D-503-00	MM 15D-503-00	MM 22D-503-00	MM 30D-503-00	MM 40D-503-00								
Part number	18214991	18215009	18215017	18215025	18215033	18215041	18215068	18215076								
			Size 1				Size 2	Size 2L								
External electronics supply	TI. 24 V X6:1,2,3	V = +24 V ± 25 %, EN 61131-2, residual ripple max. 13 % I _E ≤ 250 mA (typ. 150 mA at 24 V) Input capacitance 120 µF														
3 binary inputs		Isolated via optocoupler; PLC compatible (EN 61131-2) R _i ≈ 3.0 kΩ , I _E ≈ 10 mA, sampling interval ≤ 5 ms														
Signal level		+13 ... +30 V = "1" = Contact closed -3...+5 V = "0" = Contact open														
Control functions	TI. R ↗ X6:11,12	CW / Stop														
	TI. L ↘ X6:9,10	CCW / Stop														
	TI. f1/f2 X6:7,8	"0" = setpoint 1 / "1" = setpoint 2														
Output relay Contact information	TI. K1a X5:25,26	Response time ≤ 15 ms DC 24 V / 0.6 A / DC 12 to IEC 60947-5-1 (only SELV or PELV circuits)														
	TI. K1b X5:27,28															
Signaling function		NO contact for ready signal	Contact closed: – with voltage present (24 V mains) – in case no error was detected – at end of self-testing phase (when unit is turned on)													
Serial interface	TI. RS+ X5:29,30	RS-485														
	TI. RS- X5:31,32															

- 1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 = ON, the units operate with a 16 kHz PWM frequency (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature.
- 2) If the unit is being stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.



Technical Data

Motor with operating point 230 V / 50 Hz (in preparation)

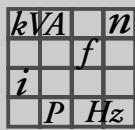
12.3 Motor with operating point 230 V / 50 Hz (in preparation)

MOVIMOT® type		MM 03D-233-00	MM 05D-233-00	MM 07D-233-00	MM 11D-233-00	MM 15D-233-00	MM 22D-233-00
Part number		18215084	18215092	18215106	18215114	18215122	18215130
Apparent output power at $V_{\text{mains}} = \text{AC } 200..240 \text{ V}$	S_N	1.0 kVA	1.3 kVA	1.7 kVA	2.0 kVA	2.9 kVA	3.4 kVA
Supply voltages Permitted range	V_{mains}	AC 3 x 200 V / 230 V / 240 V $V_{\text{mains}} = \text{AC } 200 \text{ V} -10 \% \dots \text{AC } 240 \text{ V} +10 \%$					
Supply frequency	f_{mains}	50...60 Hz $\pm 10 \%$					
Rated mains current (at $V_{\text{mains}} = \text{AC } 230 \text{ V}$)	I_{mains}	AC 2.2 A	AC 2.9 A	AC 3.5 A	AC 4.7 A	AC 6.2 A	AC 8.2 A
Output voltage	V_o	0... V_{mains}					
Output frequency Resolution Operating point	f_o	2...120 Hz 0.01 Hz 230 V at 60 Hz					
Rated output current	I_N	AC 2.5 A	AC 3.3 A	AC 4.2 A	AC 5.7 A	AC 6.9 A	AC 9.0 A
Motor power S1	P_{Mot}	0.37 kW 0.5 HP	0.55 kW 0.75 HP	0.75 kW 1.0 HP	1.1 kW 1.5 HP	1.5 kW 2.0 HP	2.2 kW 3.0 HP
PWM frequency		4 (factory setting) / 8 / 16 ¹⁾ kHz					
Current limitation	I_{max}	motor: 160 % at $\lambda\lambda$ Regenerative: 160 % at $\lambda\lambda$					
Maximum motor cable length		15 m when MOVIMOT® frequency inverter is installed close to the motor (with SEW hybrid cable and P2.A option)					
External braking resistor	R_{min}	27 Ω					
Interference resistance		Conforms to EN 61800-3					
Interference emission		Conforms to category C2 according to EN 61800-3 (limit class A to EN 55011 and EN 55014)					
Ambient temperature	ϑ_A	-25 °C (-30°)...+40 °C depending on the motor P_N reduction: 3 % I_N per K to max. 60 °C					
Climate class		EN 60721-3-3, class 3K3					
Storage temperature ²⁾		-30...+85 °C (EN 60721-3-3, class 3K3)					
Maximum permitted vibration and shock load		Meets EN 50178					
Degree of protection (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering) IP67 (only possible for inverter with terminal box)					
Duty type		S1 (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes					
Cooling type (DIN 41751)		Self-cooling					
Installation altitude		$h \leq 1,000 \text{ m}$: No reduction $h > 1,000 \text{ m}$: I_N reduction by 1% per 100 m (330 ft) $h > 2000 \text{ m}$: V_{mains} reduction by AC 3 V per 100 m, overvoltage class 2 according to DIN 0110-1 $h_{\text{max}} = 4,000 \text{ m}$ See also sec. "Installation altitudes above 1,000m msl" (siehe page 30)					
Required preventive measures		Grounding of the unit					

<i>kVA</i>	<i>n</i>
<i>i</i>	<i>f</i>
<i>P</i>	<i>Hz</i>

MOVIMOT® type	MM 03D-233-00 18215084	MM 05D-233-00 18215092	MM 07D-233-00 18215106	Size 1	MM 11D-233-00 18215114	MM 15D-233-00 18215122	MM 22D-233-00 18215130	Size 2
External electronics supply	TI. 24 V X6:1,2,3	V = +24 V ± 25 %, EN 61131-2, residual ripple max. 13 % I _E ≤ 250 mA (typ. 150 mA at 24 V) Input capacitance 120 µF						
3 binary inputs		Isolated via optocoupler; PLC compatible (EN 61131-2) R _i ≈ 3.0 kΩ , I _E ≈ 10 mA, sampling interval ≤ 5 ms						
Signal level		+13 ... +30 V = "1" = Contact closed -3...+5 V = "0" = Contact open						
Control functions	TI. R ↗ X6:11,12	CW / Stop						
	TI. L ↘ X6:9,10	CCW / Stop						
	TI. f1/f2 X6:7,8	"0" = setpoint 1 / "1" = setpoint 2						
Output relay Contact information	TI. K1a X5:25,26	Response time ≤ 15 ms DC 24 V / 0.6 A / DC 12 to IEC 60947-5-1 (only SELV or PELV circuits)						
	TI. K1b X5:27,28							
Signaling function		NO contact for ready signal	Contact closed: – with voltage present (24 V + mains) – in case no error was detected – at end of self-testing phase (when unit is turned on)					
Serial interface	TI. RS+ X5:29,30	RS-485						
	TI. RS- X5:31,32							

- 1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 = ON, the units operate with a 16 kHz PWM frequency (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature.
- 2) If the unit is being stored for a long time, connect it to the mains voltage for at least 5 minutes every 2 years. Otherwise, the unit's service life may be reduced.



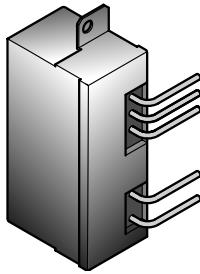
12.4 Technical data of options

12.4.1 MLU11A/MLU21A



Option	MLU11A	MLU21A
Part number	0 823 383 7	0 823 387 X
Function	24 V voltage supply	
Input voltage	AC 380...500 V ± 10 % (50/60 Hz)	AC 200...240 V ± 10 % (50/60 Hz)
Output voltage	DC 24 V ± 25 %	
Output power	Max. 6 W	
Degree of protection	IP65	
Ambient temperature	-25...+60 °C	
Storage temperature	-25...+85 °C	

12.4.2 MLU13A



Option	MLU13A
Part number	1 820 596 8
Function	24 V voltage supply
Input voltage	AC 380...500 V ± 10 % (50/60 Hz)
Output voltage	DC 24 V ± 25 %
Output power	Max. 8 W
Degree of protection	IP20
Ambient temperature	-25...+85 °C
Storage temperature	-25...+85 °C

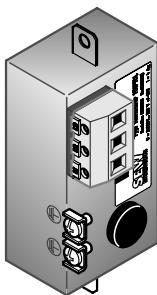
12.4.3 MLG11A/MLG21A



Option	MLG11A	MLG21A
Part number	0 823 384 5	0 823 388 8
Function	Setpoint generator and 24 V voltage supply	
Input voltage	AC 380...500 V ± 10 % (50/60 Hz)	AC 200...240 V ± 10 % (50/60 Hz)
Output voltage	DC 24 V ± 25 %	
Output power	Max. 6 W	
Setpoint resolution	1 %	
Serial interface¹⁾	RS-485 for connecting a MOVIMOT® inverter	
Degree of protection	IP65	
Ambient temperature	-15...+60 °C	
Storage temperature	-25...+85 °C	

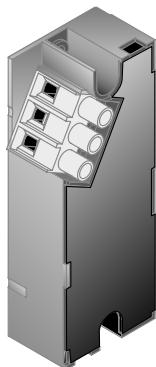
1) With integrated dynamic terminating resistor

12.4.4 MNF11A



Option	MNF11A (only for MM03D-503-00...MM15D-503-00 or MM03D-233-00...MM07D-233-00)
Part number	0 828 316 8
Function	3-phase line filter (allows for category C1 to EN 61800-3)
Input voltage	3 x 380 V ±10 % / 50...60 Hz
Input current	4 A
Degree of protection	IP00
Ambient temperature	-25...+60 °C
Storage temperature	-25...+85 °C

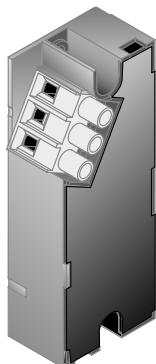
12.4.5 URM



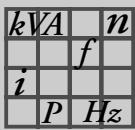
Option	URM
Part number	0 827 601 3
Function	Voltage relay, ensures quick application of the mechanical brake
Rated voltage U_N	DC 36...167 V (Brake coil AC 88...167 V)
Braking current I_N	0.75 A
Degree of protection	IP20
Ambient temperature	-25...+60 °C
Storage temperature	-25...+85 °C
Disconnection time t_{off}	approx. 40 ms (cut-off in the DC circuit)

12.4.6 BEM

	STOP!
	If the connection voltage is too high, the BEM brake rectifier or the braking resistor connected to it can be damaged. The brake coil must correspond to the connection voltage!



Option	BEM
Part number	0 829 611 1
Function	Brake rectifier
Rated supply voltage	AC 230 V...AC 500 V +10 % / -15 % 50...60 Hz ± 5 % Black connection wires
Control voltage	DC 0...5 V Red/blue connecting wires
Braking current	max. DC 0.8 A Brake connection 13, 14, 15
Degree of protection	IP20
Ambient temperature	-25...+60 °C
Storage temperature	-25...+85 °C



Technical Data

Technical data of options

12.4.7 MBG11A



Option	MBG11A
Part number	0 822 547 8
Function	Keypad
Input voltage	DC 24 V ± 25 %
Current consumption	approx. 70 mA
Setpoint resolution	1 %
Serial interface¹⁾	RS-485 for connecting max. 31 MOVIMOT® inverters (max. 200 m, 9600 Baud)
Degree of protection	IP65
Ambient temperature	-15...+60 °C
Storage temperature	-25...+85 °C

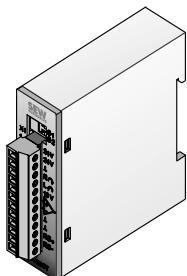
1) With integrated dynamic terminating resistor

12.4.8 DBG (in preparation)



Option	DBG60B-01	DBG60B-02	DBG60B-03
Function	Keypad		
Connection	RJ-10 plug For connection to diagnostic interface X50		
Degree of protection	IP40 (EN 60529)		
Ambient temperature	0 ... +40 °C		
Storage temperature	-20...+80 °C		

12.4.9 MWA21A



Option	MWA21A
Part number	0 823 006 4
Function	Setpoint generator
Input voltage	DC 24 V ± 25 %
Current consumption	approx. 70 mA
Serial interface¹⁾	RS-485 for connecting max. 31 MOVIMOT® inverters (max. 200 m) max. 9600 Baud Unidirectional communication Cycle time: 100 ms
Analog input	0...10 V / 2...10 V, $R_i \approx 12 \text{ k}\Omega$ 0...20 mA / 4...20 mA, $R_i \approx 22 \text{ k}\Omega$
Setpoint resolution of the analog input	8 bits (± 1 bit)
Signal level binary inputs	+13...+30 V = "1" - 3...+5 V = "0"
Degree of protection	IP20
Ambient temperature	-15...+60 °C
Storage temperature	-25...+85 °C

1) With integrated dynamic terminating resistor

<i>kVA</i>	<i>n</i>
<i>i</i>	<i>f</i>
<i>P</i>	<i>Hz</i>

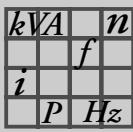
12.5 Work done, working air gap and braking torque of the brake

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

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

12.6 Braking torque assignment

Motor type	Brake type	Braking torque steps [Nm]											
		1.8	2.5	3.5	5.0								
DR.71	BE05												
	BE1				5.0	7.0	10						
DR.80	BE05	1.8	2.5	3.5	5.0								
	BE1				5.0	7.0	10						
	BE2					7.0	10	14	20				
DR.90	BE1				5.0	7.0	10						
	BE2					7.0	10	14	20				
	BE5							20	28	40	55		
DR.100	BE2					7.0	10	14	20				
	BE5							20	28	40	55		
DR.112	BE5								28	40	55		
	BE11									40	55		
DR.132	BE5								28	40	55		
	BE11									40	55	80	110



Technical Data

Permitted anti-friction bearing types

12.7 Permitted anti-friction bearing types

Motor type	A-side bearing		B-side bearing	
	IEC motor	Gearmotor	AC motor	Brakemotor
DR.71	6204-2Z-J-C3	6303-2Z-J-C3	6203-2Z-J-C3	6203-2RS-J-C3
DR.80	6205-2Z-J-C3	6304-2Z-J-C3	6304-2Z-J-C3	6304-2RS-J-C3
DR.90-DR.100		6306-2Z-J-C3	6205-2Z-J-C3	6205-2RS-J-C3
DR.112-DR.132		6308-2Z-J-C3	6207-2Z-J-C3	6207-2RS-J-C3

12.8 Integrated RS-485 interface

RS-485 interface	
Standard	RS-485 to EIA standard (with integrated dynamic terminating resistor)
Baud rate	9.6 kBaud 31.25 kBaud (in connection with MF.., MQ.., MOVIFIT® MC fieldbus interfaces)
Start bits	1 start bit
Stop bits	1 stop bit
Data bits	8 data bits
Parity	1 parity bit, completing for even parity (even parity)
Data direction	unidirectional
Duty type	asynchronous, semi-duplex
Timeout time	1 s
Cable length	max. 200 m in RS-485 operation with 9,600 Baud max. 30 m at transmission rate: 31250 Baud ¹⁾
Number of participants	<ul style="list-style-type: none"> • Max. 32 stations (1 bus master²⁾ + 31 MOVIMOT®) broadcast and group addresses possible • 15 MOVIMOT® can be addressed individually

- 1) Transmission rate of 31,250 Baud will be detected automatically in case of operation with MF.. fieldbus interface.
 2) Ext. control or options MBG11A, MWA21A or MLG..A

12.9 Diagnostics interface

Diagnostic interface X50	
Standard	RS-485 to EIA standard (with integrated dynamic terminating resistor)
Baud rate	9.6 kBaud
Start bits	1 start bit
Stop bits	1 stop bit
Data bits	8 data bits
Parity	1 parity bit, completing for even parity (even parity)
Data direction	unidirectional
Duty type	asynchronous, semi-duplex
Connection	RJ10 socket

<i>kVA</i>	<i>n</i>
<i>i</i>	<i>f</i>
<i>P</i>	<i>Hz</i>

12.10 Assignment of internal braking resistors

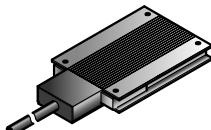
MOVIMOT® type	Braking resistor	Part number
MM03D-503-00...MM15D-503-00 MM03D-233-00...MM07D-233-00	BW1	0 822 897 3 ¹⁾
MM22D-503-00...MM40D-503-00 MM11D-233-00...MM22D-233-00	BW2	0 823 136 2 ¹⁾

1) Two screws M4 x 8, included in scope of delivery

12.11 Assignment of external braking resistors

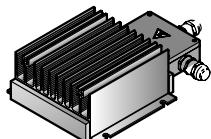
MOVIMOT® type	Braking resistor	Part number	Protective grid
MM03D-503-00...MM15D-503-00 MM03D-233-00...MM07D-233-00	BW200-003/K-1.5	0 828 291 9	0 813 152 X
	BW200-005/K-1.5	0 828 283 8	–
	BW150-010	0 802 285 2	–
MM22D-503-00...MM40D-503-00 MM11D-233-00...MM22D-233-00	BW100-003/K-1.5	0 828 293 5	0 813 152 X
	BW100-005/K-1.5	0 828 286 2	–
	BW068-010	0 802 287 9	–
	BW068-020	0 802 286 0	–

12.11.1 BW100... BW200...

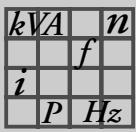


	BW100-003/ K-1.5	BW100-005/ K-1.5	BW200-003/ K-1.5	BW200-005/ K-1.5
Part number	0 828 293 5	0 828 286 2	0 828 291 9	0 828 283 8
Function	Dissipating the regenerative energy			
Degree of protection	IP65			
Resistance	100 Ω	100 Ω	200 Ω	200 Ω
Power in S1, 100 % cdf	100 W	200 W	100 W	200 W
Dimensions W x H x D	146 x 15 x 80 mm	252 x 15 x 80 mm	146 x 15 x 80 mm	252 x 15 x 80 mm
Cable length	1.5 m			

12.11.2 BW150... BW068...



	BW150-010	BW068-010	BW068-020
Part number	0 802 285 2	0 802 287 9	0 802 286 0
Function	Dissipating the regenerative energy		
Degree of protection	IP66		
Resistance	150 Ω	68 Ω	68 Ω
Power according to UL in S1, 100 % cdf	600 W	600 W	1200 W
Power according to CE in S1, 100 % cdf	900 W	900 W	1800 W
Dimensions W x H x D	260 x 75 x 174 mm	260 x 75 x 174 mm	610 x 75 x 174 mm
Maximum permitted cable length	15 m		


12.12 Resistance and assignment of the brake coil

Brake	Resistance of the brake coil ¹⁾		
	120 V	230 V	400 V
BE05	78 Ω	312 Ω	985 Ω
BE1	78 Ω	312 Ω	985 Ω
BE2	58 Ω	232 Ω	732 Ω
BE5	51 Ω	200 Ω	640 Ω
BE11	33 Ω	130 Ω	412 Ω

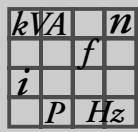
1) Rated value measured between the red connection (terminal 13) and the blue connection (terminal 15) at 20°C, temperature-dependent fluctuations in the range –25 % / +40 % are possible.

12.13 Assignment of the Drive-ID module

Type	Motor		Drive-ID module		
	Rated voltage [V]	Supply frequency [Hz]	Designation	ID color	Part number
DRS	230/400	50	DRS/400/50	White	1 821 437 1
DRE	230/400	50	DRE/400/50	Orange	1 821 439 8
DRS	266/460	60	DRS/460/60	Yellow	1 821 440 1
DRE	266/460	60	DRE/460/60	Green	1 821 442 8
DRS/DRE	220/380	60	DRS/DRE/380/60	Red	1 821 443 6
DRP	230/400	50	DRP/230/400	Brown	1 821 790 7
DRP	266/460	60	DRP/266/460	Beige	1 821 791 5

13 Address List

Germany					
Headquarters	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Bickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de		
Production					
Sales					
Service Competence Center	Central	SEW-EURODRIVE GmbH & Co KG Ernst-Bickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de		
	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de		
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de		
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de		
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de		
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Bickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de		
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357		
Additional addresses for service in Germany provided on request!					
France					
Production	Haguenau	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com		
Sales					
Service					
Production	Forbach	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00		
Assembly	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09		
Sales					
Service					
	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		
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88		
Additional addresses for service in France provided on request!					



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Argentina			
Assembly Sales Service	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Australia			
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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
	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au
Austria			
Assembly Sales Service	Wien	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at
Belarus			
Sales	Minsk	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by
Belgium			
Assembly Sales Service	Brüssel	SEW Caron-Vector S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be
	Industrial Gears	SEW Caron-Vector S.A. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
Brazil			
Production Sales Service	Sao Paulo	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 – Rodovia Presidente Dutra Km 208 Guarulhos – 07251-250 - SP SAT – SEW ATENDE – 0800 7700496	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net

Cameroon			
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Canada			
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	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta, B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@sew-eurodrive.ca
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	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
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Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies 33 El 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			
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Gabon			
Sales	Libreville	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
Greece			
Sales Service	Athen	Christ. Bozinos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.bozinos.gr info@bozinos.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 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk



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Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@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			
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Ivory Coast			
Sales	Abidjan	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Korea			
Assembly Sales Service	Ansan-City	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	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
Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com



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Lithuania			
Sales	Alytus	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
Assembly Sales Service	Brüssel	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be
Malaysia			
Assembly Sales Service	Johore	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	Queretaro	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Morocco			
Sales	Casablanca	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 22618372 Fax +212 22618351 ali.alami@premium.net.ma
Netherlands			
Assembly Sales Service	Rotterdam	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

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 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl	
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) 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	
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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	
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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	
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Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-83554 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk	
	Žilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk	



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South Africa			
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	Capetown	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 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za
Spain			
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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 info@sew-eurodrive.se
Switzerland			
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Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaro Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn



Turkey			
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Ukraine			
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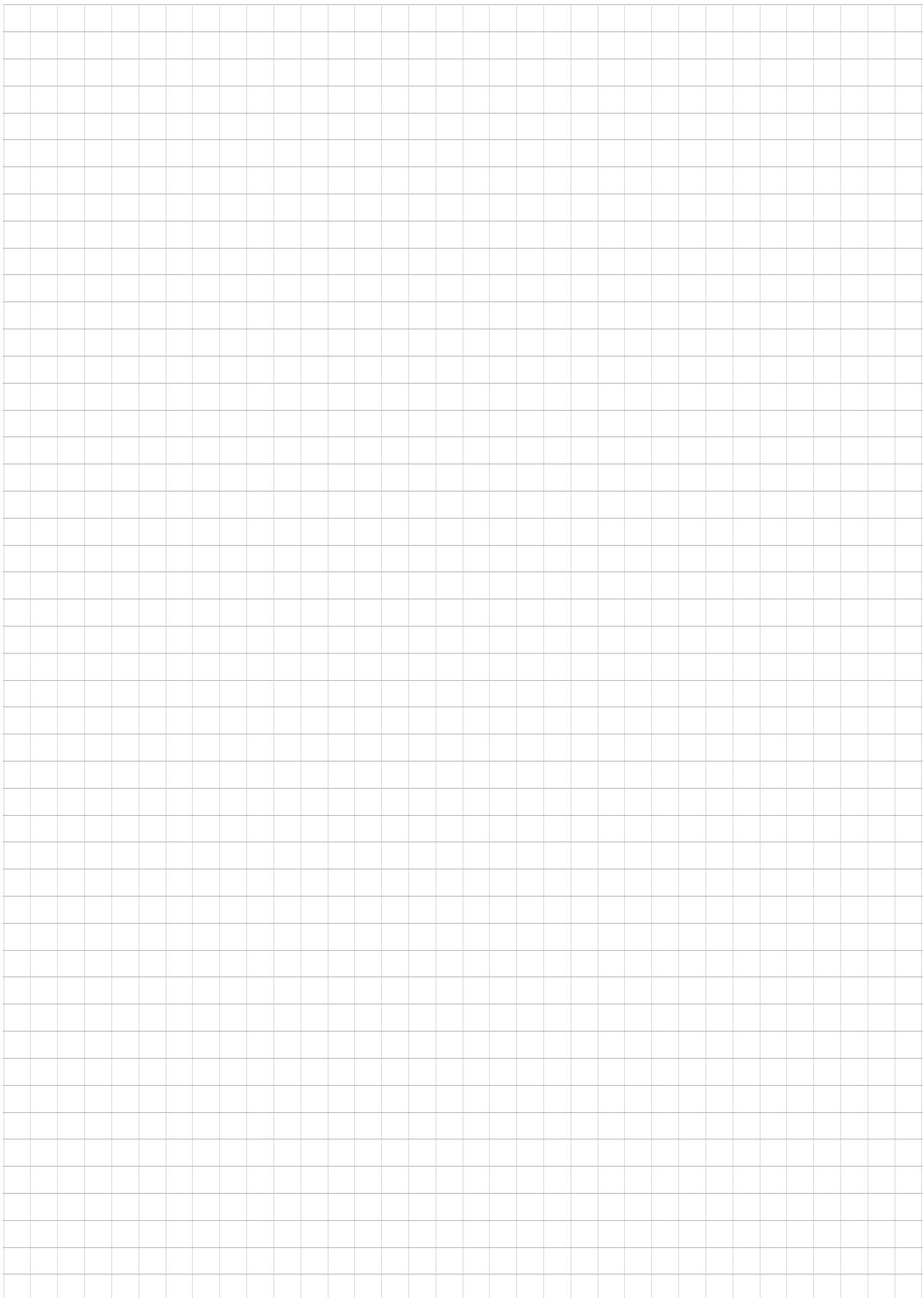


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