



SEW
EURODRIVE

Operating Instructions



Decentralized Drive Systems
MOVIMOT® MM..D

Edition 10/2014

21214190/EN



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1

General information

How to use this documentation

1 General information

1.1 How to use this documentation

This documentation is an integral part of the product. The documentation is intended for all employees who perform assembly, installation, startup, and service work on the product.

The documentation must be provided in a legible format. Ensure that persons responsible for the machinery and its operation as well as persons who work on the unit independently have read through the documentation carefully and understood it. If you are unclear about any of the information in this documentation or require further information, please contact SEW-EURODRIVE.

1.2 Structure of the warning notes

1.2.1 Meaning of signal words

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

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

1.2.2 Structure of section-specific warning instructions

Section-specific warning instructions do not apply to a specific action, but to several actions pertaining to the one area. The hazard symbols used either indicate a general hazard or a specific hazard.

Section-specific warning messages are structured as follows:



SIGNAL WORD







Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent hazard.

Meaning of the hazard symbols

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

Hazard symbol	Meaning
	General hazard
	Warning of dangerous electrical voltage
	DANGER! HOT SURFACES
	Warning of risk of crushing
	Warning of suspended load
	Warning of automatic restart

1.2.3 Structure of embedded warning instructions

Embedded warning notes are included in the instructions directly just before the description of the dangerous action.

Embedded warning instructions are structured as follows:

- **▲ SIGNAL WORD** Type and source of hazard.
Possible consequence(s) if disregarded.
 - Measure(s) to prevent hazard.

1.3 Rights to claim under limited warranty

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

1.4 Exclusion of liability

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

1.5 Other applicable documentation

You must also observe the following publications.

- "MOVIMOT® gearmotors" catalog
- "DR.71 – 315 AC Motors" operating instructions
- Operating instructions for the gear unit (only for MOVIMOT® gearmotors)

You can download or order these publications on the Internet (under the heading "Documentation").

1.6 Product names and trademarks

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

1.7 Copyright notice

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Unauthorized reproduction, modification, distribution or any other use of the whole or any part of this documentation is strictly prohibited.

2 Safety notes

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

2.1 Preliminary information

The following safety notes are primarily concerned with the use of MOVIMOT® drives. If you use other SEW components, also refer to the safety notes for these particular components in the corresponding documentation.

Please also observe the supplementary safety notes in the individual chapters of this documentation.

2.2 General information

Never install or start up damaged products. In the event of damage, submit a complaint to the shipping company immediately.

During operation, MOVIMOT® drives can have movable or rotating parts or hot surfaces.

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to machinery. Documentation must be referred to for further information.

2.3 Target group

Only skilled persons are authorized to install, startup or maintain the units or correct unit errors (observing IEC 60364 and/or CENELEC HD 384 or DIN VDE 0100 and IEC 60664 or DIN VDE 0110 as well as national accident prevention regulations).

In the context of these basic safety notes, qualified electricians are persons familiar with the installation, assembly, startup, and operation of the product and who possess the qualifications to perform the tasks required of them.

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

2.4 Designated use

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

In case of installation in machines, startup of MOVIMOT® inverters (i.e. start of designated operation) is prohibited until it is determined that the machine meets the requirements stipulated in the Machinery Directive 2006/42/EC.

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

MOVIMOT® inverters meet the requirements stipulated in the low voltage directive 2006/95/EC. The standards contained in the declaration of conformity are used for the MOVIMOT® inverter.

Observe the technical data and information on the connection requirements as provided on the nameplate and in the documentation.

2.4.1 Safety functions

MOVIMOT® inverters may not perform any safety functions unless they are described and explicitly approved. Safety-related components are marked with the FS logo for functional safety.

2.4.2 Hoist applications

MOVIMOT® inverters are suitable for lifting applications to a limited degree only, see operating instructions, chapter "Additional function 9" (→ 88).

Do not use MOVIMOT® inverters as safety devices in lifting applications.

2.5 Transportation, storage

Observe the notes on transportation, storage and proper handling. Comply with the requirements for climatic conditions stated in chapter "Technical data" of the operating instructions. Tighten attached lifting eyes securely. They are designed to handle the mass of the MOVIMOT® drive. Do not mount or apply 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 contained in the corresponding documentation.

Protect the MOVIMOT® inverters from excessive strain.

The following applications are prohibited unless explicitly permitted:

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

2.7 Electrical connection

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

Perform electrical installation according to the relevant regulations (e.g. cable cross sections, fusing, PE connection). For any additional information, refer to the applicable documentation.

For notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, refer to chapter "Installation instructions". The manufacturer of the system or machine is responsible for maintaining the limit values established by EMC legislation.

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

To ensure insulation, you must perform voltage checks on MOVIMOT® drives before startup, in accordance with EN 61800-5-1:2007, chapter 5.2.3.2.

2.8 Safe isolation

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 to ensure reliable isolation.

2.9 Operation

Systems with integrated MOVIMOT® inverters must be equipped with additional monitoring and protection devices, if necessary, according to the applicable safety guidelines, such as the law governing technical equipment, accident prevention regulations, etc. Additional preventive measures may be required for applications with increased hazard potential.

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 for at least 1 minute after having switched off the supply voltage.

As soon as supply voltages are present at the MOVIMOT® inverter, the connection box must be closed, i.e. the MOVIMOT® inverter and, if applicable, the connector of the hybrid cable must be installed and connected with all four screws. The MOVIMOT® drive only achieves the guaranteed IP degree of protection and resistance against vibrations and impacts when the MOVIMOT® inverter is securely screwed onto the connection box with 4 screws. Operation with inverter installed but not fully screwed on may significantly reduce the service life of the drive.

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

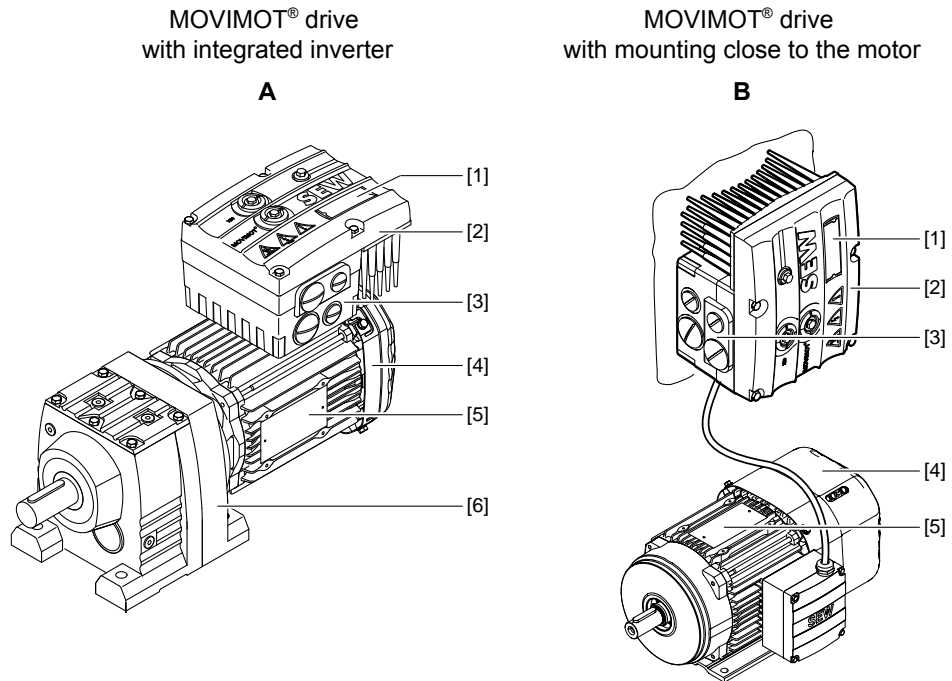
Mechanical blocking or internal safety functions within the unit can cause the motor to stop. Eliminating the cause of the problem or performing a reset may help to restart the drive automatically. If this is not permitted for the driven machine for safety reasons, disconnect the unit from the grid before correcting the error.

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

3 Unit design

3.1 MOVIMOT® drive

The following figure shows the MOVIMOT® drive in different versions:



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- [1] Unit identification MOVIMOT® inverter
- [2] MOVIMOT® inverter
- [3] Connection box
- [4] Motor
- [5] Drive nameplate
- [6] Helical gear units

A MOVIMOT® drive is a combination of:

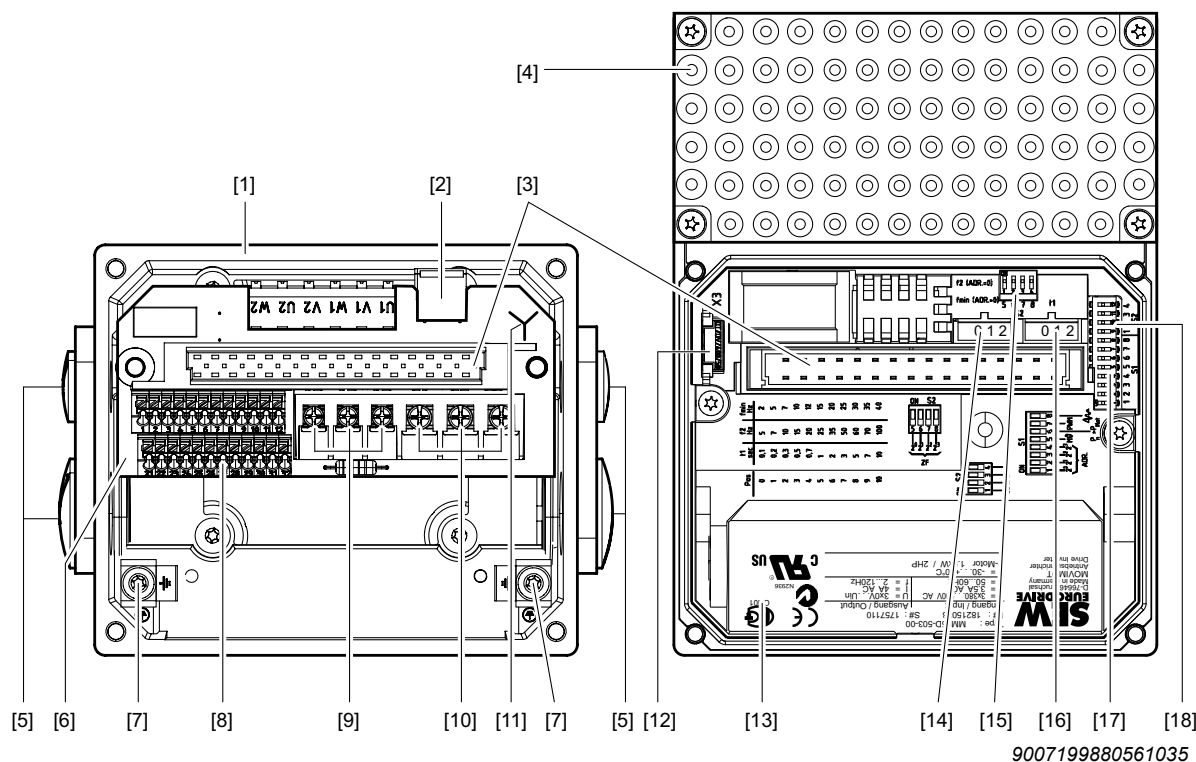
- MOVIMOT® inverter
 - mounted on the motor (**A**)
 - or mounting close to the motor (**B**)
- Motor (see the motor operating instructions)
- Gear unit (optional, see gear unit operating instructions)

3 Unit design

MOVIMOT® inverter

3.2 MOVIMOT® inverter

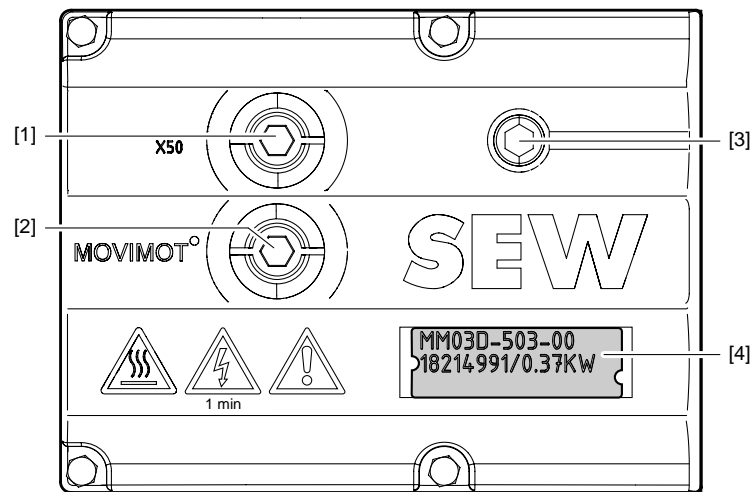
The following figure shows the connection box and the MOVIMOT® inverter:



- [1] Connection box
- [2] X10: Plug connector for the BEM/BES options
- [3] Connection plug for the MOVIMOT® inverter
- [4] MOVIMOT® inverter with heat sink
- [5] Cable glands
- [6] Connection unit with terminals
- [7] Screw for PE connection ⊥
- [8] X5, X6: Electronics terminal strip
- [9] X1: Connection for brake coil (motors with brake) or braking resistor (motors without brake)
- [10] X1: Line connection L1, L2, L3
- [11] Connection type identification
- [12] Drive ID module
- [13] MOVIMOT® 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

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



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

3.2.1 MOVIMOT® unit features

- Frequency inverter with vector-oriented motor control
- Power range: 0.37 – 4.0 kW (0.37 – 2.2 kW)
- Voltage range: 3 x 380 – 500 V (3 x 200 – 240 V)
- Application-specific parameterization is possible
- Pluggable parameter memory for data backup (drive ID module)
- Comprehensive protection and monitoring functions
- Low-noise thanks to PWM switching frequency 16 kHz
- Status LED for fast diagnostics
- Diagnostic interface with plug connector as a standard feature
- Diagnostics and manual operation using MOVITOOLS® MotionStudio
- 4-quadrant operation as standard
- Integrated brake management:
 - For motors with mechanical brake, the brake coil is used as braking resistor.
 - For motors without brake, MOVIMOT® is supplied with internal braking resistor as standard.
- The units are controlled either via binary signals, via the serial interface RS485, or optionally with AS-Interface or one of the common fieldbus interfaces (PROFIBUS, PROFINET IO, INTERBUS, DeviceNet, EtherCAT®).
- MOVIMOT® can be supplied with UL approval (UL listed) on request.

3

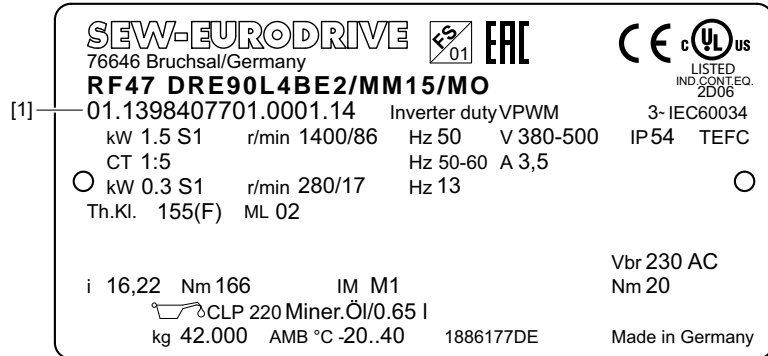
Unit design

MOVIMOT® drive type designation

3.3 MOVIMOT® drive type designation

3.3.1 Nameplate

The following figure gives an example of a MOVIMOT® drive nameplate. The nameplate is on the motor.



18014399029659147

[1] Part number

FS logo



The markings on the top edge of the nameplate are only shown if

- the motor has been manufactured accordingly
- and contains one or more safety-rated components.

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

3.3.2 Type designation

The following table shows an example of the type designation of the MOVIMOT® drive **RF47 DRE90L4BE2/MM15/MO**

RF	Gear unit series
47	Gear unit size
DRE	Motor series (DRS, DRE, DRP, DRN)
90L	Motor size
J	Rotor C = copper rotor J = LSPM rotor
4	Motor pole count
BE2	Additional feature: motor (brake)
/	
MM15	MOVIMOT® inverter
/	
MO	Additional feature: inverter¹⁾

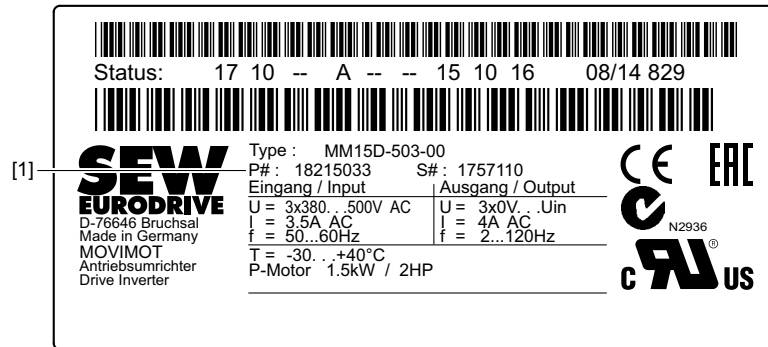
1) The nameplate only displays options installed at the factory.

The available designs can be found in the "MOVIMOT® gearmotors" catalog.

3.4 MOVIMOT® inverter type designation

3.4.1 Nameplate

The following figure gives an example of a MOVIMOT® inverter nameplate:



18014400467409291

[1] Part number

3.4.2 Type designation

The following table shows an example of the type designation of the MOVIMOT® inverter **MM15D-503-00**:

MM	Unit series	MM = MOVIMOT®
15	Motor power	15 = 1.5 kW
D	Version D	
-		
50	Connection voltage	50 = AC 380 – 500 V 23 = AC 200 – 240 V
3	Connection type	3 = 3-phase
-		
00	Design	00 = Standard

The available designs can be found in the "MOVIMOT® gearmotors" catalog.

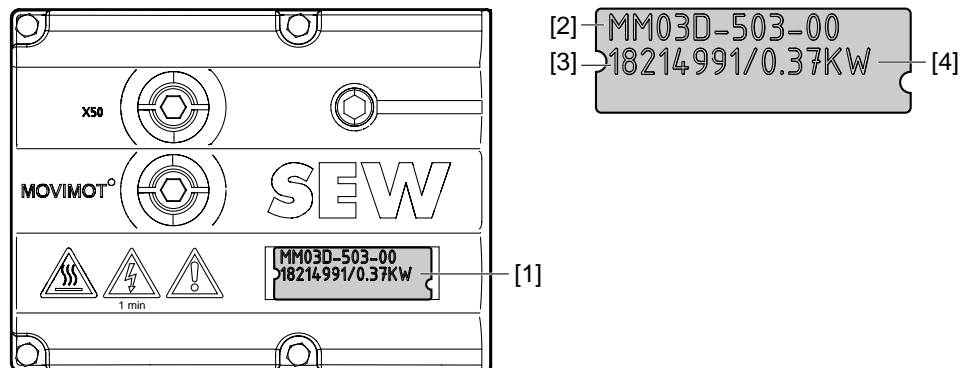
3

Unit design

MOVIMOT® inverter type designation

3.4.3 Device 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].

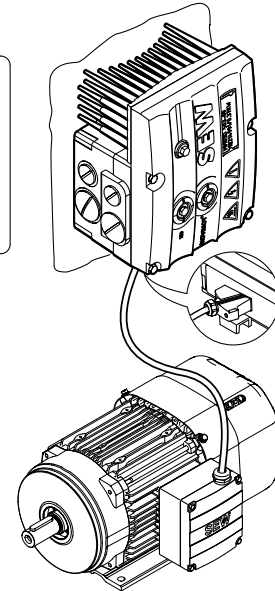


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3.5 Type designation of the variant "mounted close to the motor"

3.5.1 Nameplate

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



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3.5.2 Type designation

The following table shows the type designation for the MOVIMOT® inverter **MM15D-503-00/0/P21/RO1A/APG4** with mounting close to the motor:

MM15D-503-00	MOVIMOT® inverter
/	
0	Connection type 0 = λ 1 = Δ
/	
P21A	Adapter for mounting close to the motor
/	
RO1A	Connection box design
/	
APG4	Plug connector for connection to motor

4 Mechanical installation

4.1 General information

- Observe the general safety notes.
- Comply with all instructions referring to the technical data and the permissible conditions where the unit is operated.
- Only use the provided attachment options when mounting the MOVIMOT® drive.
- Use only mounting and safety elements that fit into the bores, threads and counter-sinks provided.

4.2 Tools required

- Set of wrenches
- Socket wrench, SW8 mm
- Torque wrench
- Screwdriver set
- Compensation elements (washers and spacing rings), if necessary

4.3 Installation requirements

Check that the following requirements are met before you start installing the unit:

- The data on the nameplate of the drive matches the voltage supply system.
- The drive is undamaged (no damage caused by transportation or storage)
- The ambient temperature corresponds to the specifications in chapter "Technical data" of the operating instructions. Note that the temperature range of the gear unit may also be restricted, see gear unit operating instructions.
- The MOVIMOT® drive must **not** be installed under the following harmful ambient conditions:
 - In potentially explosive atmospheres
 - Oils
 - Acids
 - Gases
 - Vapors
 - Radiation
 - etc.
- When the drive is installed in abrasive ambient conditions, protect the output end oil seals against wear.

4.4 Installation of MOVIMOT® gearmotor

4.4.1 Installation tolerances

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

Shaft end	Flange
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 at $\varnothing > 55$ mm • Centering 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 with $\varnothing > 300$ mm

4.4.2 Installing MOVIMOT®



NOTICE

Loss of guaranteed degree of protection if the MOVIMOT® inverter is installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

- When removing the MOVIMOT® inverter from the connection box, it must be protected from dust and moisture.

Observe the following notes and regulations for mounting the MOVIMOT® drive:

- Only install the MOVIMOT® drive on a level, low-vibration, and torsionally rigid support structure.
- Observe the permitted mounting position on the drive nameplate.
- Thoroughly remove any anti-corrosion agent from the shaft end. Use a commercially available solvent. Do not allow the solvent to penetrate the bearings and sealing rings (damage to the material).
- Align the motor carefully to avoid placing any unacceptable strain on the motor shafts. Observe the permitted overhung and axial loads specified in the "MOVIMOT® gearmotors".
- Do not jolt or hammer the shaft end.
- Use an appropriate cover to prevent objects or fluids from entering motors in vertical mounting positions.
- Ensure sufficient clearance around the unit to allow for adequate cooling air supply. Ensure that exhaust air warmed by other devices cannot be drawn in.
- Balance components that were subsequently mounted to the shaft with a half key (output shafts are balanced with a half key).
- The condensation drain holes are sealed with plastic plugs. Unplug them only if necessary.

Open condensation drain holes are not permitted. If condensation drain holes are open, higher degrees of protection no longer apply.

4.4.3 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 incoming cables. Use reducing adapters if necessary.
- Coat the threads of the cable glands and screw plugs with sealing compound and tighten them properly. Then coat the cable glands again.
- Seal the cable entry properly.
- Thoroughly clean the sealing surfaces of the MOVIMOT® inverter before re-assembly.
- If the corrosion protection coating is damaged, restore the coating.
- Check whether the degree of protection specified on the nameplate is permitted in the ambient conditions on site.

4.5 Installation of MOVIMOT® options

4.5.1 Installing options MLU11A/MLU12A/MLG..A

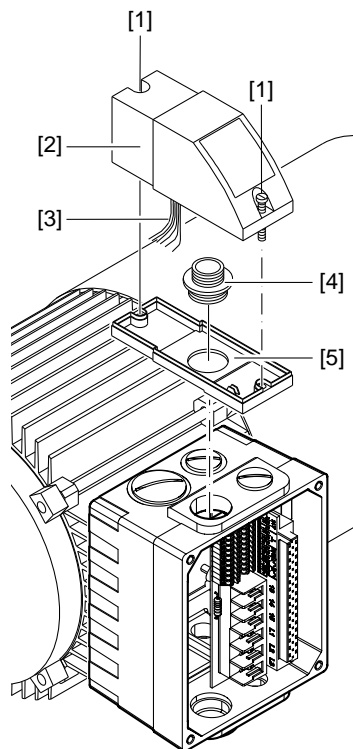
Scope of delivery

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

Assembly

1. Remove a screw plug on the MOVIMOT® connection box.
2. Fix the lower part [5] on the MOVIMOT® connection box. Secure 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® connection box.
4. Fit the upper part [2] onto the lower part [5] and secure it with two screws [1] (tightening torque 0.9 – 1.1 Nm/8 – 10 lb.in).

Only install the option in the following position:



9007199713026827

For more information about connecting the MLU11A/MLU21A option, refer to sec. "Connection of option MLU11A/MLU21A" (→ 47).

For more information about connecting the MLG..A option, refer to sec. "Connection of option MLG..A" (→ 48).

4

Mechanical installation

Installation of MOVIMOT® options

4.5.2 Installation of MLU13A option

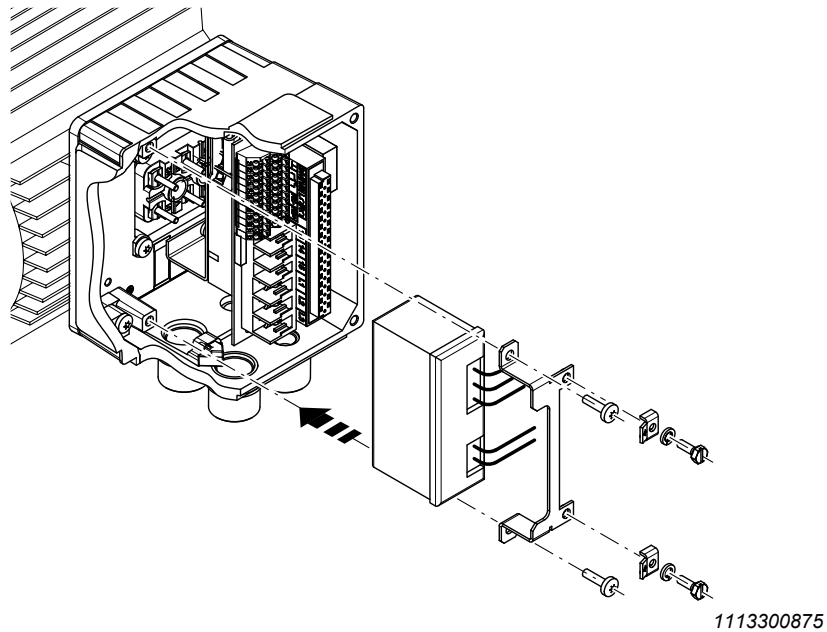
The MLU13A option is installed in the modular connection box at the factory. If you have any questions about retrofitting the option, do not hesitate to contact the SEW-EURODRIVE service.

INFORMATION



Installation is only permitted in combination with the modular connection box of MOVIMOT® MM03D-503-00 – MM40D-503-00.

The following figure depicts an installation example. The installation depends on the connection box used and on other installed options, if there are any.



For more information about connecting the MLU13A option, refer to section "Connection of MLU13A option" (→ 47).

4.5.3 Installation of MNF21A option

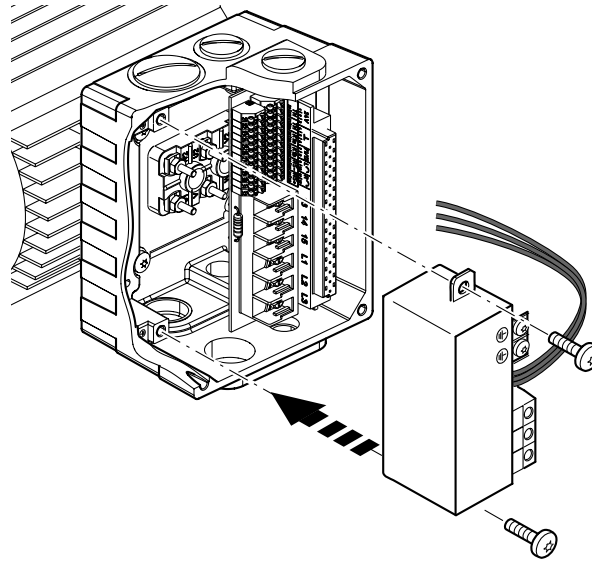
The MNF21A option is installed in the modular connection box at the factory. If you have any questions about retrofitting the option, do not hesitate to contact the SEW-EURODRIVE service.

INFORMATION



Installation is only permitted in combination with the modular connection box of MOVIMOT® MM03D-503-00 – MM15D-503-00.

The following figure depicts an installation example. The installation depends on the connection box used and on other installed options, if there are any.



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For more information about connecting the MNF21A option, refer to section "Connection of option MNF21A" (→ 49).

4

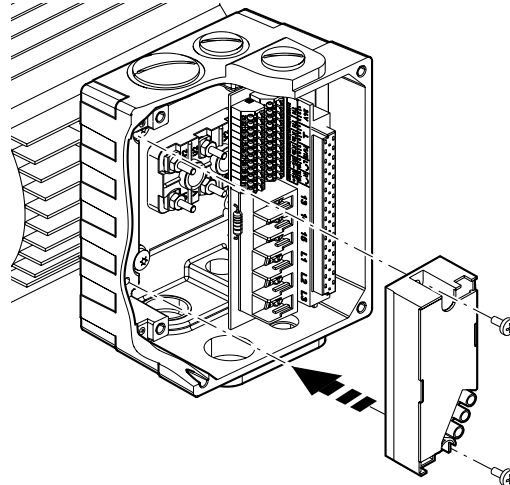
Mechanical installation

Installation of MOVIMOT® options

4.5.4 Installation of URM / BEM / BES options

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

The following figure depicts an installation example. The installation depends on the connection box used and on other installed options, if there are any.



458307467

For more information about connecting the URM option, refer to section "Connection of URM option" (→ 50).

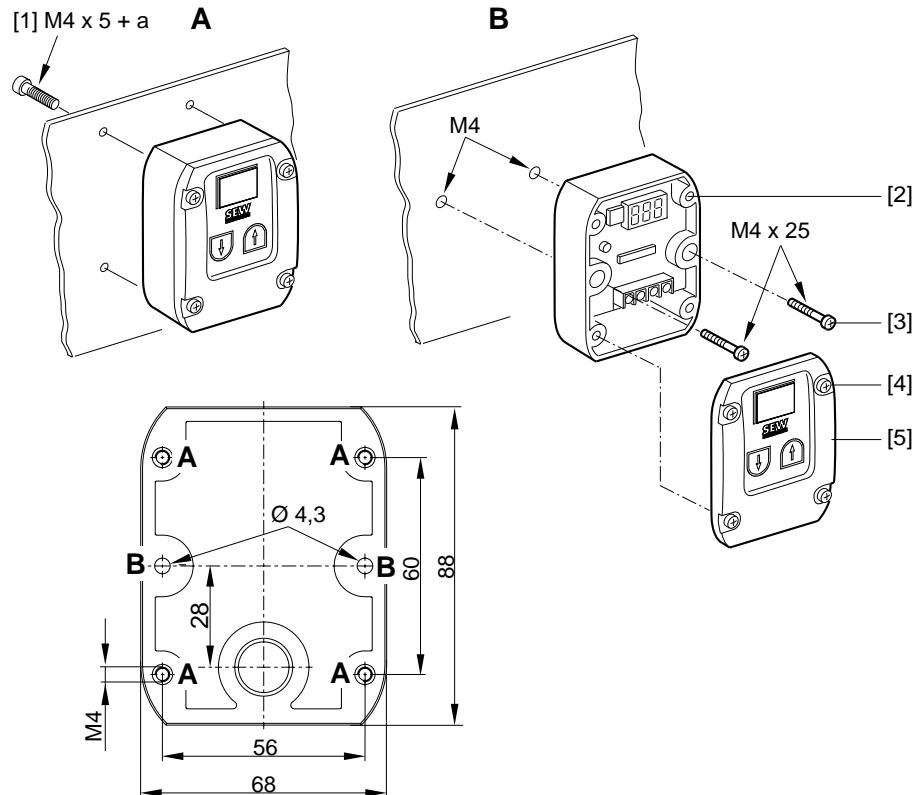
For more information about connecting the BEM option, refer to section "Connection of BEN option" (→ 51).

For more information about connecting the BES option, refer to section "Connection of BES option" (→ 52).

4.5.5 Installation of MBG11A option

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

- A:** Mounting from the rear using 4 tapped holes.
(tightening torque for retaining screw [1]: 1.6 – 2.0 Nm/14 – 18 lb.in)
- B:** Mounting from the front using 2 retaining holes
(tightening torque for retaining screw [3]: 1.6 – 2.0 Nm/14 – 18 lb.in)



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- [1] a = Wall thickness
Screws are **not** included in the scope of delivery!

Fit the upper part [5] onto the lower part [2] and secure 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 MBG11A option" (→ 53).

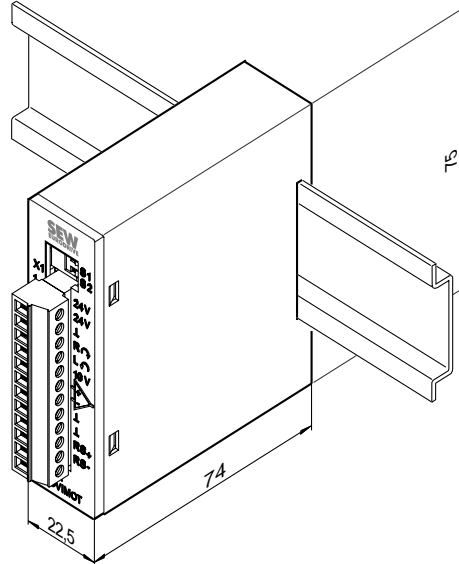
4

Mechanical installation

Installation of MOVIMOT® options

4.5.6 Installation of MWA21A option

Install MWA21A option in the control cabinet on a mounting rail according to EN 50022:

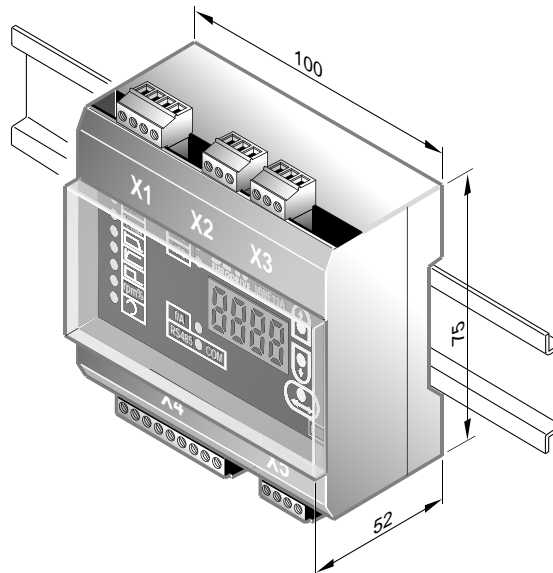


9007199577152907

For more information about connecting the MWA21A option, refer to sec. "Connection of MWA21A option" (→ 54).

4.5.7 Installation of MWF11A option

Install MWF11A option in the control cabinet on a mounting rail according to EN 50022:

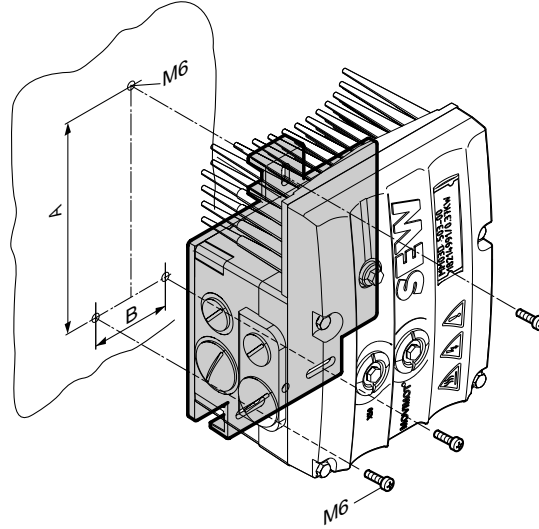


3180221579

For more information about connecting the MWF11A option, refer to section "Connection of MWF11A option" (→ 55).

4.6 Mounting MOVIMOT® inverter close to the motor

The following figure shows the mounting dimensions for mounting the MOVIMOT® inverter close to the motor:



9007199713018763

Size	Type	A	B
1	MM03D503-00 – MM15D-503-00 MM03D233-00 – MM07D-233-00	140 mm	65 mm
2/2L	MM22D503-00 – MM40D-503-00 MM11D233-00 – MM22D-233-00	170 mm	65 mm

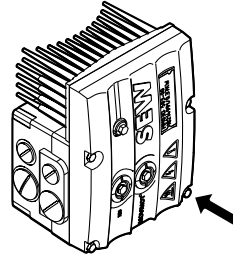
4 Mechanical installation

Tightening torques

4.7 Tightening torques

4.7.1 MOVIMOT® inverter

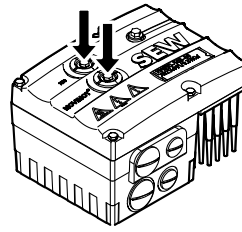
Tighten the screws on the MOVIMOT® inverter using 3.0 Nm (27 lb.in) in diametrically opposite sequence.



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4.7.2 Screw plugs

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

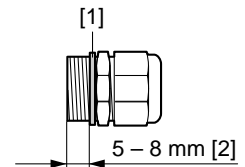


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4.7.3 Cable glands

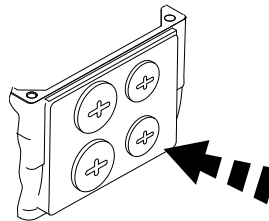
Observe the manufacturer's specifications and the following information for cable glands.

- Pay attention to the O-ring on the thread [1].
- The thread must be 5 – 8 mm long [2].



4.7.4 Screw plugs for cable entries

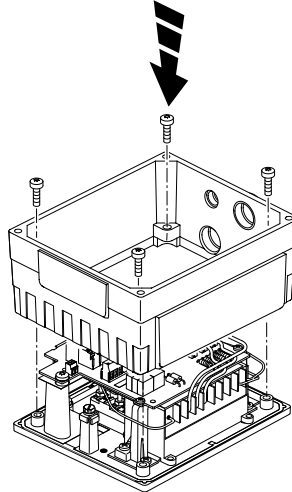
Tighten screw plugs with 2.5 Nm (22 lb.in).



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4.7.5 Modular connection box

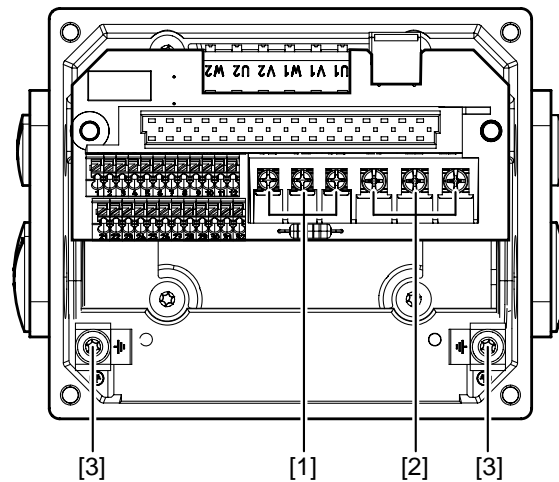
For fastening the connection box on the mounting plate, tighten screws using 3.3 Nm (29 lb.in).



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4.7.6 Tightening torques for terminals

Use the following tightening torques for terminals during installation:



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- [1] 0.8 – 1.5 Nm (7 – 13 lb.in)
- [2] 1.2 – 1.6 Nm (11 – 14 lb.in)
- [3] 2.0 – 2.4 Nm (18 – 21 lb.in)

5 Electrical installation

5.1 General information

Observe the following information on electrical installation:

- Observe the general safety notes.
- Comply with all instructions referring to the technical data and the permissible conditions where the unit is operated.
- Use suitable screw fittings for the cables (use reducing adapters if necessary). With connector plug variants, you must use a suitable mating connector.
- Seal open cable entries with screw plugs.
- Use protective caps to seal plug connectors not in use.

5.2 Installation instructions

5.2.1 Connecting power supply cables

- The nominal voltage and frequency of the MOVIMOT® inverter must correspond to the data for the power supply system.
- Install safety features F11/F12/F13 for line fuses at the beginning of the power supply cable behind the supply bus junction, see chapter "Connecting MOVIMOT® drive".

The following safety features are permitted for F11/F12/F13:

- Fuses in utilization category gG
- Miniature circuit breakers with characteristic B or C
- Motor overload circuit breaker

Size the safety features according to the cable cross section.

- SEW-EURODRIVE recommends using insulation monitors with pulse-code measurement in voltage supply systems with a non-earthed star point (IT systems). Use of such devices prevents the insulation monitor false tripping due to the earth capacitance of the inverter.
- Size the cable cross section according to the input current I_{line} for rated power (see operating instructions, "Technical data" chapter).

5.2.2 Permitted cable cross section of the MOVIMOT® terminals

Power terminals

Observe the permitted cable cross sections for installation:

Power terminals	
Cable cross section	1.0 mm ² – 4.0 mm ² (2 x 4.0 mm ²) AWG17 – AWG12 (2 x AWG12)
Conductor end sleeves	<ul style="list-style-type: none"> • For single assignment: Connect only single-wire conductors or flexible conductors with conductor end sleeves (DIN 46228, material E-CU) with or without plastic collars. • For double assignment: Connect only flexible conductors with conductor end sleeve (DIN 46228 - 1, material E-CU) without plastic collar. • Permitted length of the conductor end sleeve: at least 8 mm

Control terminals

Observe the permitted cable cross sections for installation:

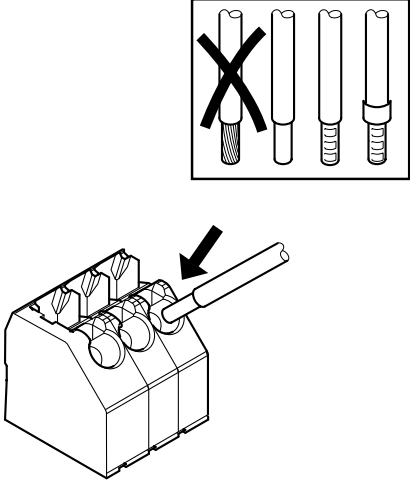
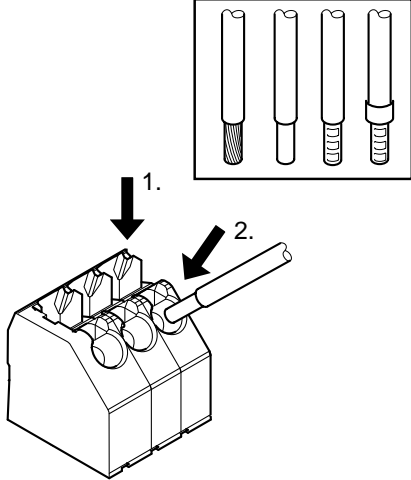
Control terminals	
Cable cross section <ul style="list-style-type: none"> • Single-wire conductor (bare wire) • Flexible conductor (bare litz wire) • Conductor end sleeve without plastic collar 	0.5 mm ² – 1.0 mm ² AWG20 – AWG17
<ul style="list-style-type: none"> • Conductor end sleeve with plastic collar 	0.5 mm ² – 0.75 mm ² AWG20 – AWG19
Conductor end sleeves	<ul style="list-style-type: none"> • Connect only single-wire conductors or flexible wire conductors with or without conductor end sleeve (DIN 46228, material E-CU). • Permitted length of the conductor end sleeve: at least 8 mm

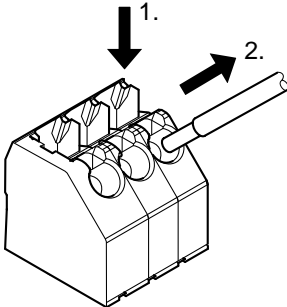
5 Electrical installation

Installation instructions

5.2.3 Using the control terminals X5 – X6

Note the following information for actuating the control terminal clamps:

Connect conductor without pushing the activation button.	Connect conductor after pressing the activation button.
 <p style="text-align: right;">9007199919965835</p>	 <p style="text-align: right;">9007200623153931</p>
<p>The following conductors can be installed directly (without tools) up to two cross section sizes below the nominal cross section:</p> <ul style="list-style-type: none"> • Single-wire conductors • Flexible conductors with end sleeves 	<p>When connecting the following conductors, you must press the activation button on top to open the clamping spring:</p> <ul style="list-style-type: none"> • Untreated, flexible conductors • Conductors with small cross sections that cannot be plugged in directly

Removing the conductor. First press the activation button.
 <p style="text-align: right;">18014398990528139</p>

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

5.2.4 Residual current device



▲ WARNING

Electric shock due to incorrect RCD type.
Severe or fatal injuries.

- The unit can cause direct current in the protective earth. In cases where an residual current device (RCD) is used for protection against direct or indirect contact, only an RCD of type B on the power supply side of the frequency inverter is permitted.
- Do not use a conventional RCD as a protective device. Universal current-sensitive RCDs are permitted as a protective device. During normal operation of the unit, earth-leakage currents of > 3.5 mA may occur.
- SEW-EURODRIVE recommends that you do not use residual current devices. However, if a residual current device (RCD) is stipulated for direct or indirect protection against contact, observe the above note.

5.2.5 Line contactor



NOTICE

Damage to the MOVIMOT® inverter due when using the line contractor K11 for jog mode.

Damage to the MOVIMOT® inverter.

- Do not use the K11 line contactor (see wiring diagram (→ 41)) 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 input contactor K11.
- Only use a contactor of utilization category AC3 (EN 60947-4-1) as a line contactor.

5 Electrical installation

Installation instructions

5.2.6 Information on PE connection

▲ WARNING



Electric shock due to incorrect connection of PE.
Severe or fatal injuries.

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

Prohibited assembly procedure	Recommendation: Assembly with forked cable lug Permitted for all cross sections	Assembly with solid connecting wire Permitted for cross sections of up to max. 2.5 mm ²
<p style="text-align: center;">9007199577783435</p>	<p style="text-align: center;">900719957775243</p>	<p style="text-align: center;">900719957779339</p>

[1] Forked cable lug suitable for M5 PE screws

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

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

5.2.7 EMC-compliant installation

INFORMATION



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

This is a product with restricted availability (categories C1 to C4 according to EN 61800-3). This product may cause EMC interference. In this case, it is recommended that the user take suitable measures.

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

5.2.8 Installation above 1000 m amsl

MOVIMOT® drives with mains voltages of 200 – 240 V or 380 – 500 V can also be operated at an altitude of 1000 – 4000 m amsl. To do so, you must observe the following basic conditions.

- At heights above 1000 m amsl, the nominal continuous power is reduced due to reduced cooling: I_N reduction by 1% per 100 m.
- At altitudes of 2000 – 4000 m amsl you must take limiting measures which reduce the line side overvoltage from category III to category II for the entire system.

5.2.9 Connecting the 24 V supply

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

5.2.10 Binary control

Connect the required control cables

Always use shielded cables as control cables. Route the control cables separately from the power supply cables.

5.2.11 Control via RS485 interface

The MOVIMOT® drive is controlled via the RS485 interface by one of the following controllers:

- MOVIFIT® MC
- MF..or MQ.. fieldbus interfaces
- PLC bus master
- MLG..A option
- MBG11A option
- MWA21A option
- MWF11A option

INFORMATION



- Only connect a bus master to the MOVIMOT® drive.
- Use twisted pair shielded cables as control cables.
- Route the control cables separately from power supply cables.

5.2.12 Protection devices

MOVIMOT® drives have integrated protection devices against overloads. External overload devices are not necessary.

5.2.13 UL-compliant installation

INFORMATION



The English text for this chapter is available in the "Annex".

Routing power terminals in the field

Note the following points for UL-compliant installation:

- Use only 60°/75°C copper conductors.
- The terminals' permitted tightening torque is 1.5 Nm (13.3 lb.in)

Short circuit current rating

Suitable for use in current circuits with a maximum short circuit current of AC 200,000 A_{eff} for the following fuses:

For 240 V systems:

250 V min., 25 A max., fuse
or 250 V min., 25 A max., circuit breaker

For 500 V systems:

500 V min., 25 A max., fuse
or 500 V min., 25 A max., circuit breaker

The maximum voltage is limited to 500 V.

Branch circuit protection

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

The following table shows the maximum values for the circuit protection of branch circuits.

Series	Fuse	Circuit breaker
MOVIMOT® MM..D	250 V/500 V minimum, 25 A maximum	250 V/500 V minimum, 25 A maximum

Motor overload protection

MOVIMOT® MM..D is fitted with a load- and speed-dependent overload protection with thermal memory in the event of disconnection and power loss.

The trigger threshold is 140% of the rated motor current.

Ambient temperature

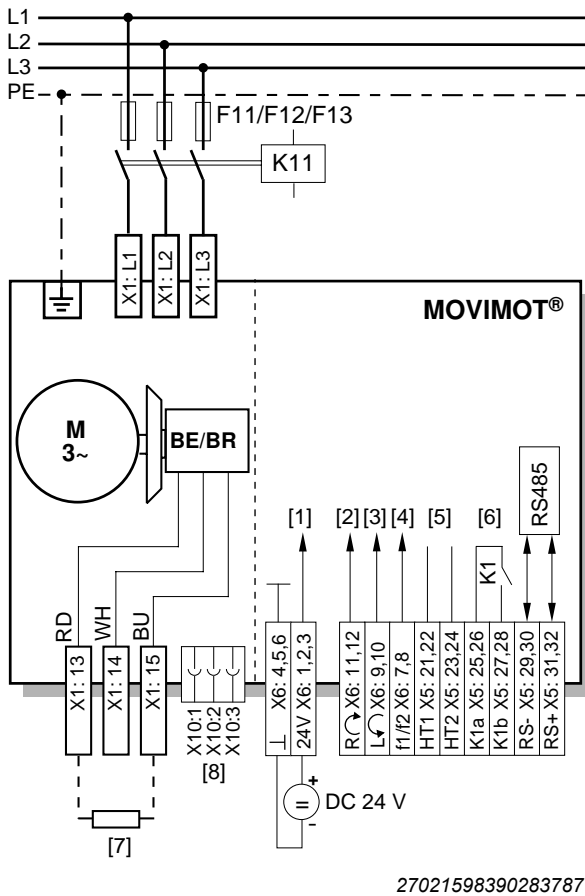
MOVIMOT® MM..D is suitable for an ambient temperature of 40°C, max. 60°C with derated output current. To determine the output current rating at higher than 40°C, the output current should be derated 3.0% per °C between 40°C and 60°C.

INFORMATION



- Only use certified units with a limited output voltage ($U_{max} = DC 30 V$) and limited output current ($I \leq 8 A$) as an external DC 24 V voltage source
- The UL certification only applies to operation on voltage supply systems with voltages to ground of max. 300 V. The UL-certification does not apply to operation on voltage supply systems with a non-grounded star point (IT systems).

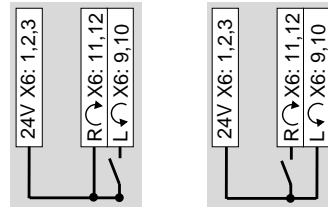
5.4 Connection of MOVIMOT® drive



27021598390283787

- [1] DC 24 V supply
(external or MLU..A/MLG..A options)
- [2] CW/stop (binary input)
- [3] CCW/stop (binary input)
- [4] Setpoint changeover f1 / f2 (binary input)
- [5] HT1/HT2: Intermediate terminal for specific wiring diagrams
- [6] Ready signal
(contact closed = ready for operation)
- [7] BW.. braking resistor (only for MOVIMOT® drives without mechanical brake)
- [8] Plug connector for connecting the BEM or BES option

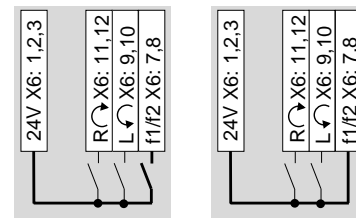
Functions of the CW/stop and CCW/stop terminals in binary control mode:



Direction of rotation
CW active

Direction of rotation
CCW active

Functions of terminals f1/f2:



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39

9007199578382091

Functions of the CW/stop and CCW/stop terminals with control via RS485 interface/fieldbus:

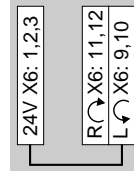


Both directions of rotation are enabled.



Only **CW** direction of rotation is enabled.

Setpoint specifications for CCW direction of rotation cause the drive to stop.



Only **CCW** direction of rotation is enabled.

Setpoint specifications for CW direction of rotation cause the drive to stop.



Drive is blocked or brought to a stop.

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5 Electrical installation

MOVIMOT® plug connector

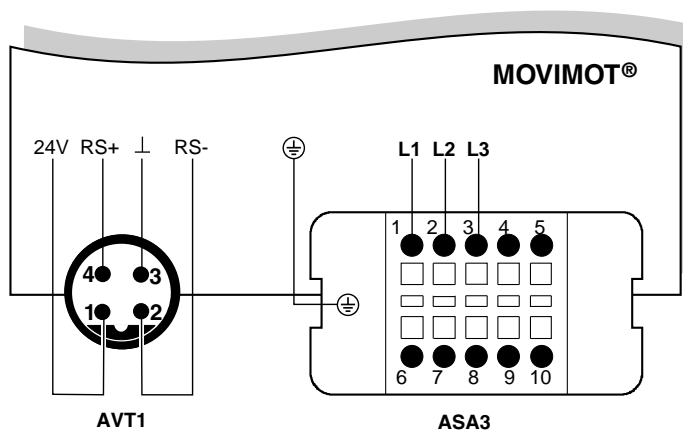
5.5 MOVIMOT® plug connector

5.5.1 AVT1, ASA3 plug connectors

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

Available variants:

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



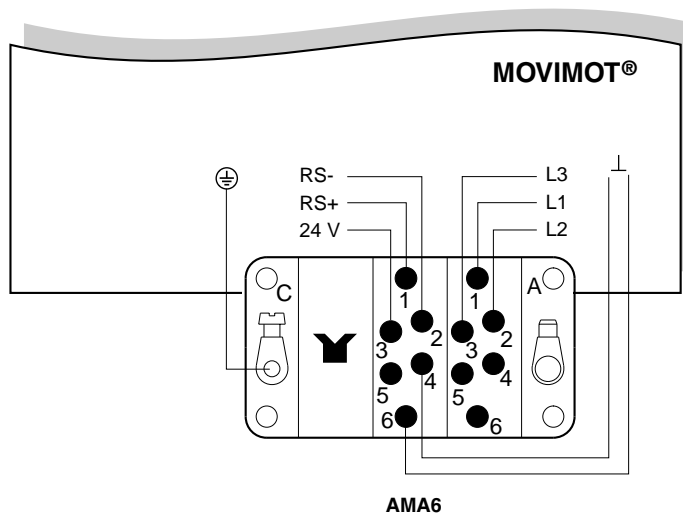
9007199578571147

5.5.2 AMA6 plug connector

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

Possible design:

- MM../AMA6



18014398833361547

For designs with plug connectors, both directions of rotation are enabled as standard. If only one direction of rotation is required, please note chapter "Connecting MOVIMOT® drive".

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

If the MOVIMOT® inverter is mounted close to the motor, the connection to the motor is realized with a pre-fabricated hybrid cable.

Only use hybrid cable from SEW-EURODRIVE for the connection between the MOVIMOT® inverter and the motor.

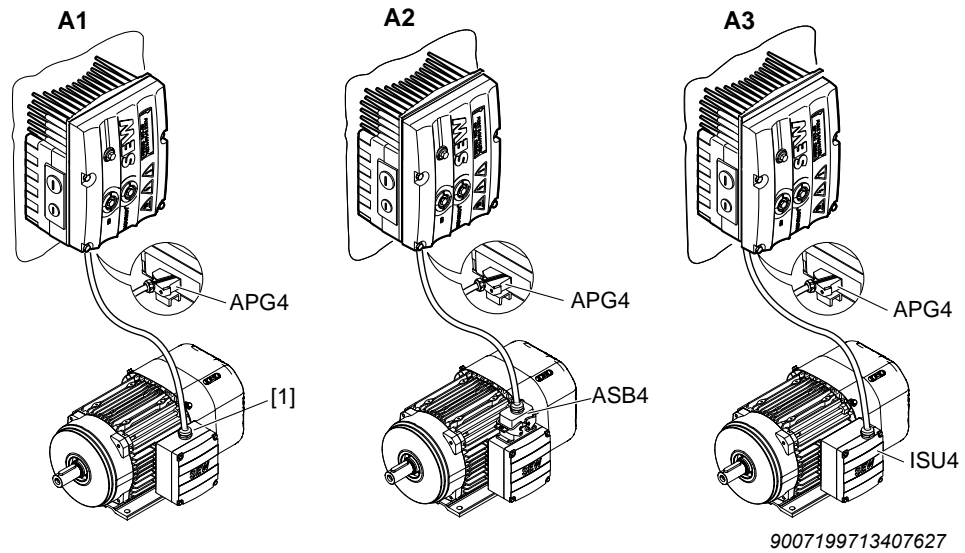
The following designs are possible on the MOVIMOT® side:

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

5.6.1 MOVIMOT® with APG4 plug connector

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

Design	A1	A2	A3
MOVIMOT®	APG4	APG4	APG4
Motor	Cable gland/ terminals	ASB4	ISU4
Hybrid cable	01867423	05930766	08163251 Δ for DR.63 0816326X Δ for DR.71 – DR.132 05932785 ∟ for DR.63 05937558 ∟ for DR.71 – DR.132



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[1] Connection via terminals

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5

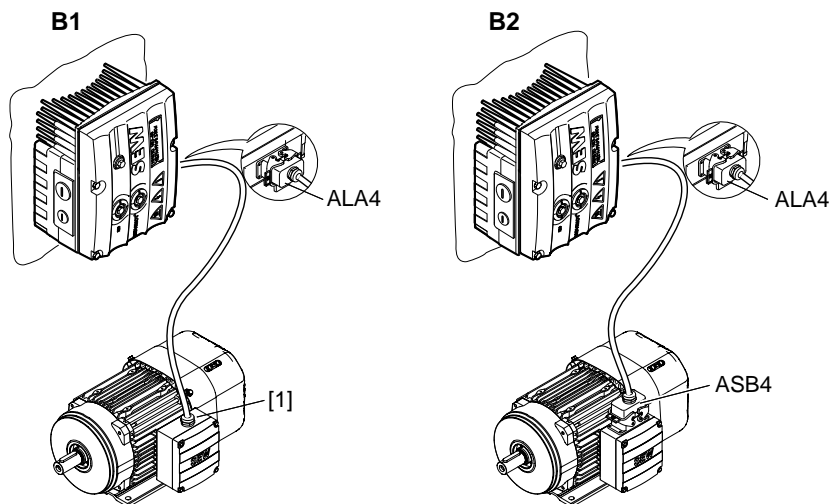
Electrical installation

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

5.6.2 MOVIMOT® with ALA4 plug connector

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

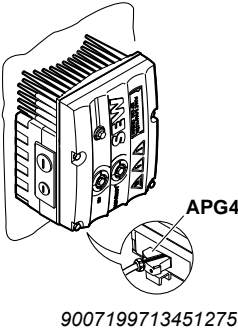
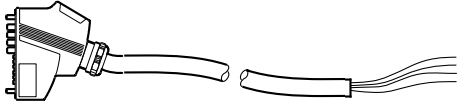
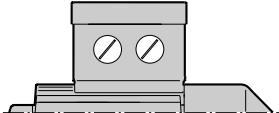
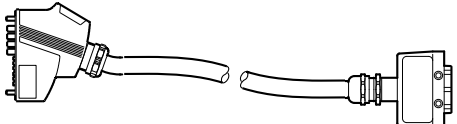
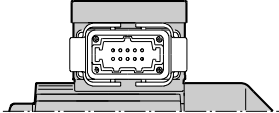
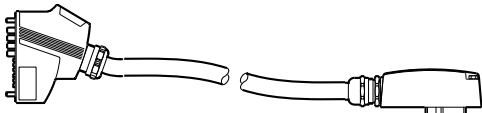
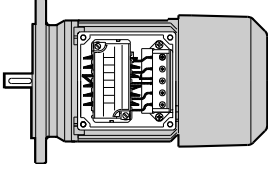
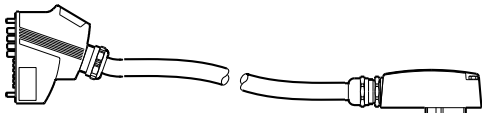
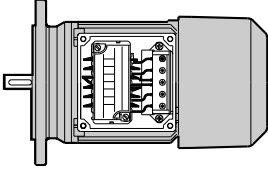
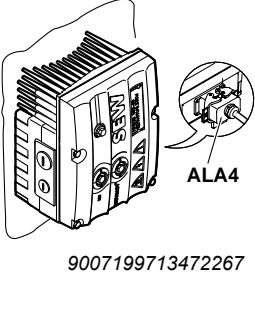
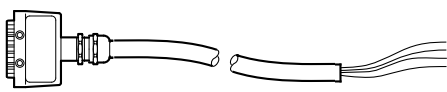
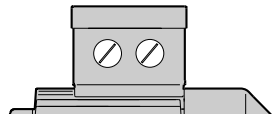
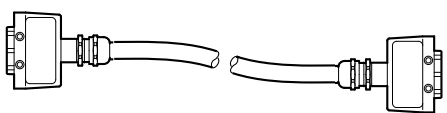
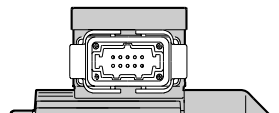
Design	B1	B2
MOVIMOT®	ALA4	ALA4
Motor	Cable gland/terminals	ASB4
Hybrid cable	08179484	08162085



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[1] Connection via terminals

5.6.3 Overview of connection between MOVIMOT® and motor with mounting close to the motor

MOVIMOT® inverter		Connection cables	Drive
MM../P2.A/RO.A/ APG4 	A1	Part number DR.71 – DR.100 01867423 Part number DR.112 – DR.132 18116620 	AC motors with cable gland 
	A2	Part number: 05930766 	AC motors with ASB4 plug connector 
	A3	Part number: 05932785 (∧) Part number: 08163251 (Δ) 	AC motors with ISU4 plug connectors size DR 63 
		Part number: 05937558 (∧) Part number: 0816326X (Δ) 	AC motors with ISU4 plug connectors size DR.71 – 132 
MM../P2.A/RE.A/ALA4 	B1	Part number: 08179484 	AC motors with cable gland 
	B2	Part number: 08162085 	AC motors with ASB4 plug connector 

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5

Electrical installation

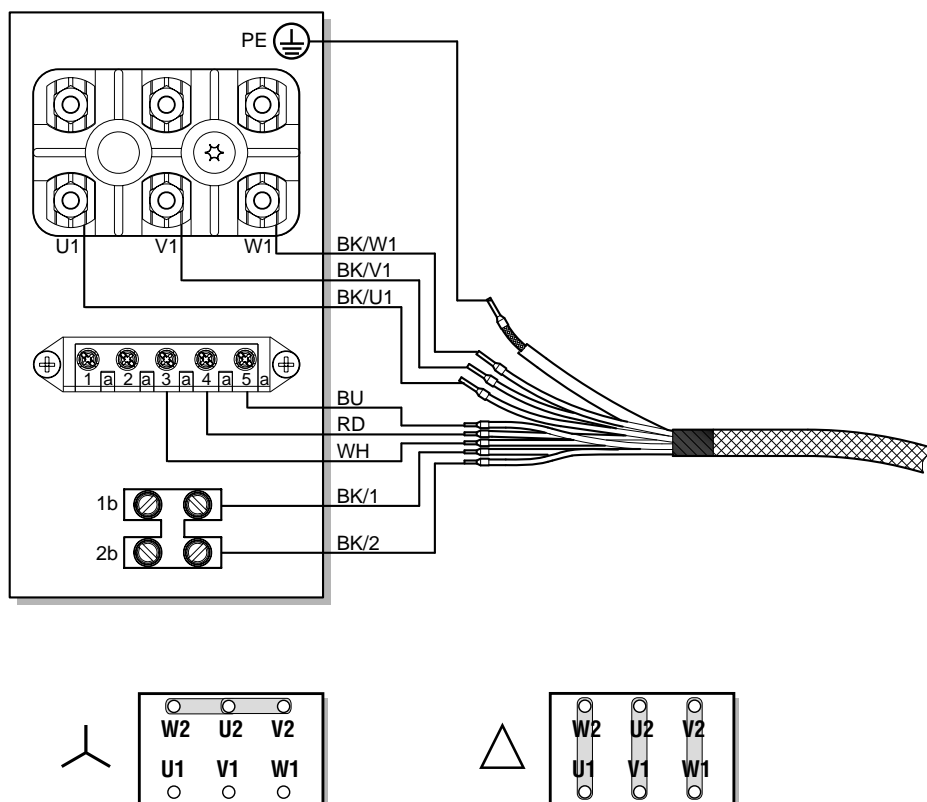
Connection between MOVIMOT® and motor when mounted close to the motor

5.6.4 Hybrid cable connection

The following table shows the conductor assignment of the hybrid cables with part numbers 01867423 and 08179484 and the corresponding motor terminals of the motor DR..:

Motor terminal motor DR..	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 (inner shield)

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



9007200445548683

INFORMATION



Do not install an external brake rectifier with brakemotors
 With brakemotors, the MOVIMOT® inverter controls the brake directly

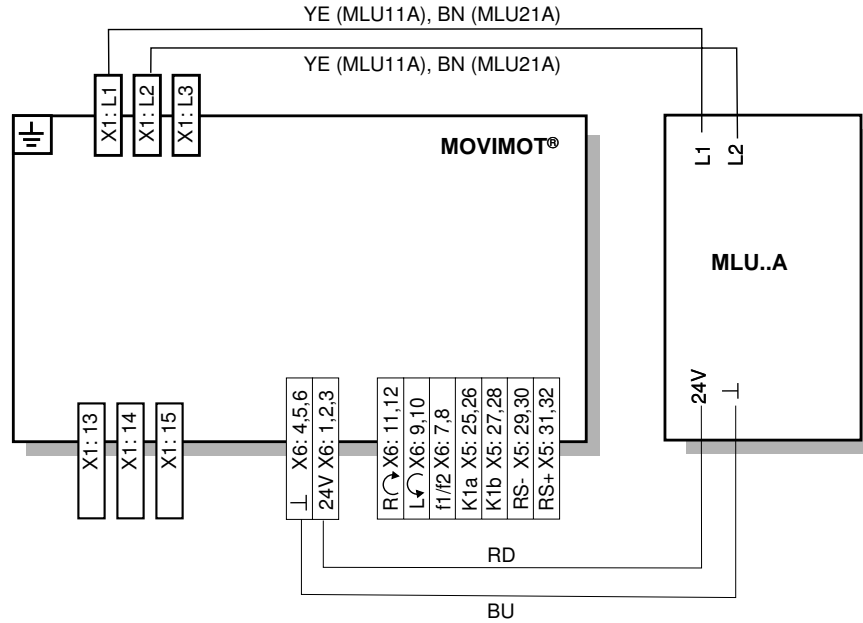
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5.7 Connection of MOVIMOT® options

5.7.1 Connection of MLU11A/MLU21A option

For more information about connecting the MLU11A and MLU21A options, refer to chapter "Installation of MLU11A / MLU21A / MLG..A option" (→ 23).

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

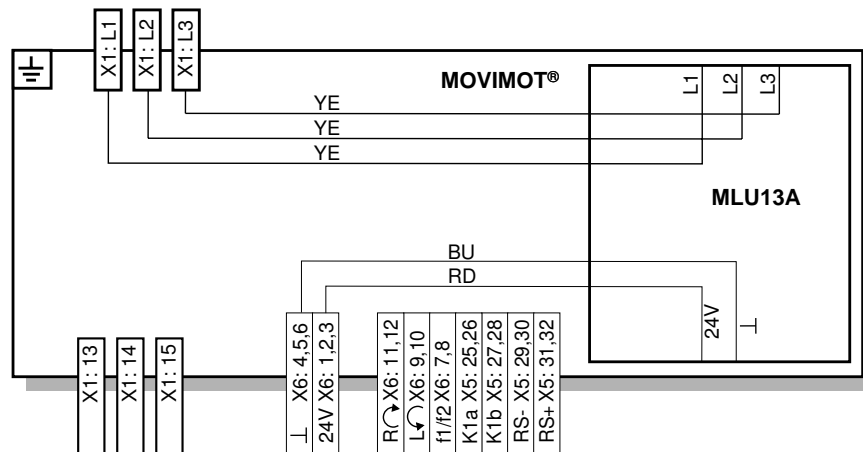


640436235

5.7.2 Connection of MLU13A option

For more information about mounting the MLU13A option, refer to chapter "Installation of MLU13A option" (→ 23).

The following figure shows how to connect the MLU13A option:



323967371

5

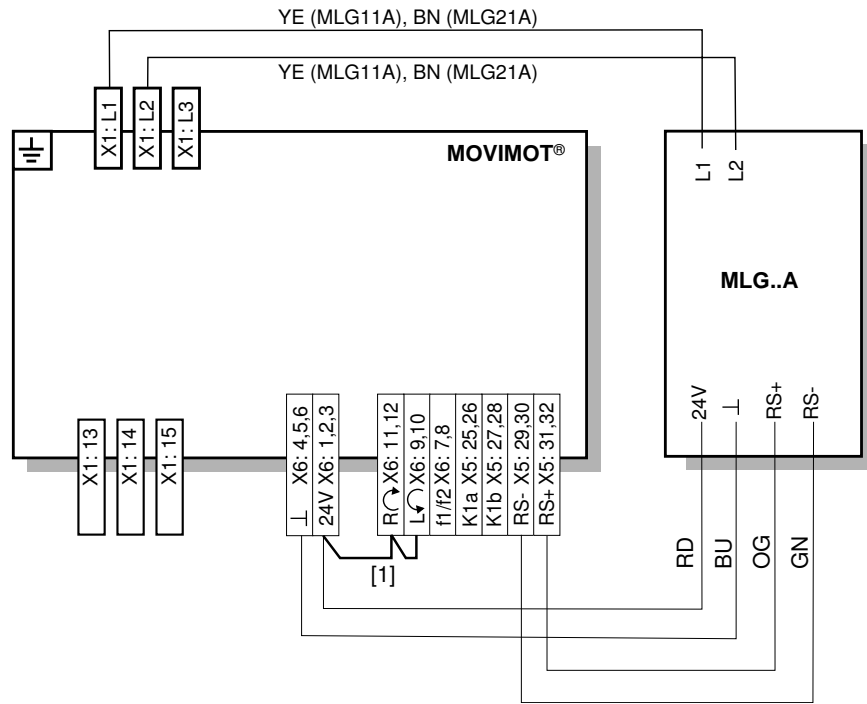
Electrical installation

Connection of MOVIMOT® options

5.7.3 Connection of MLG..A option

For more information about mounting the MLG..A option, refer to chapter "Installation of MLU11A / MLU21A / MLG..A option" (→ 23).

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



641925899

[1] Note the enabled direction of rotation.

See chapter "Connection of the MOVIMOT® drive" (→ 41),
Functions of the CW/Stop and CCW/Stop terminals with control via RS485 inter-
face

5.7.4 Connection of MNF21A option

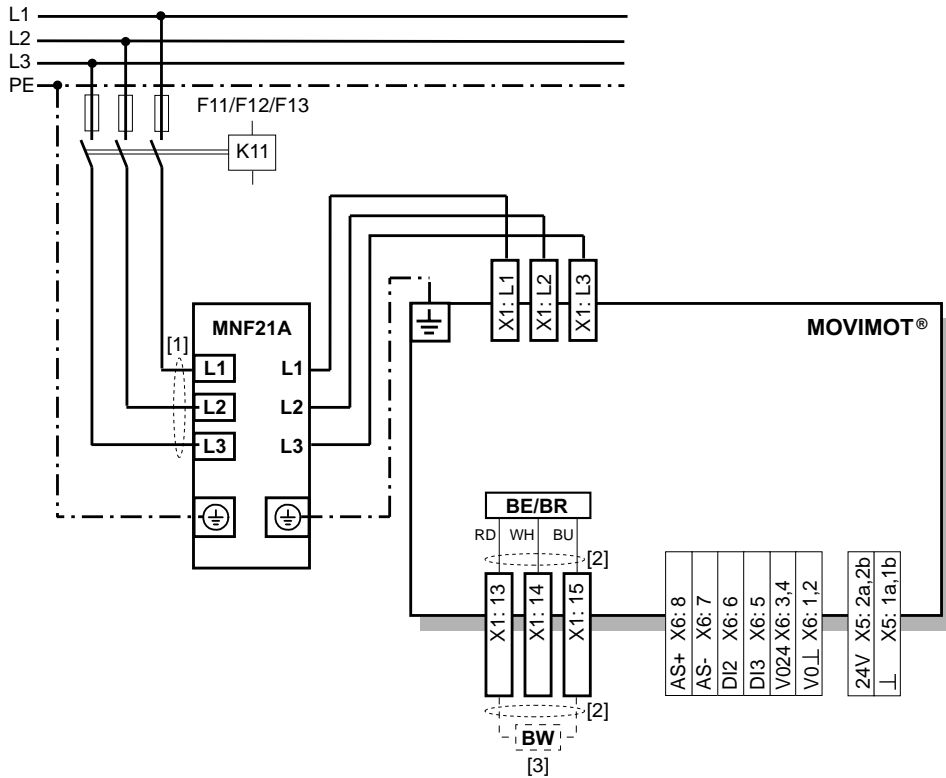
INFORMATION



Installation is only permitted in combination with the modular connection box of MOVIMOT® MM03D-503-00 – MM15D-503-00.

For more information about mounting the MNF21A option, refer to chapter "Installation of MNF21A option" (→ 25).

The following figure shows how to connect the MNF21A option:



1754451723

- [1] Keep the cable length for the power supply as short as possible!
- [2] Keep the length of 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] BW braking resistor (only in MOVIMOT® without mechanical brake)

5

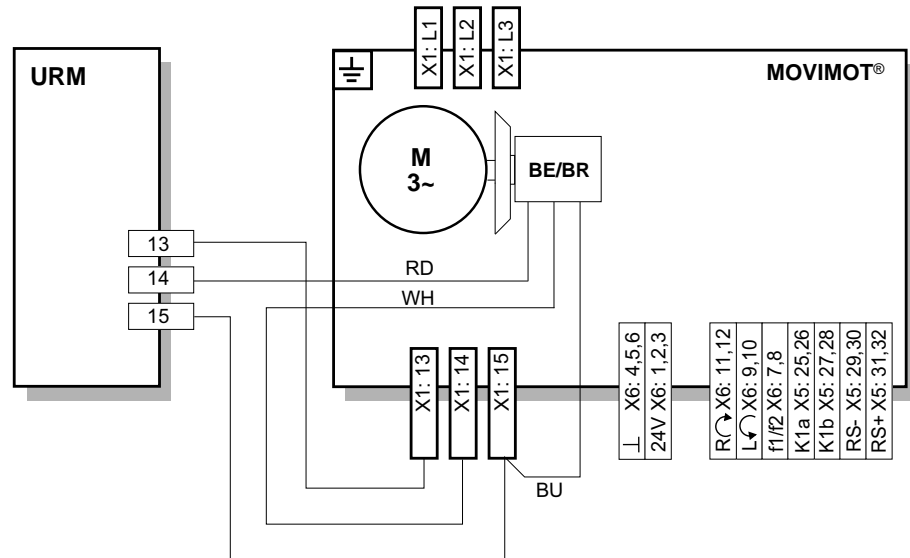
Electrical installation

Connection of MOVIMOT® options

5.7.5 Connection of URM option

For more information about mounting the URM option, refer to chapter "Installation of URM/BEM option" (→ 26).

The following figure shows how to connect the URM option:



324118411

5

Electrical installation

Connection of MOVIMOT® options

5.7.7 Connection of BES option

NOTICE



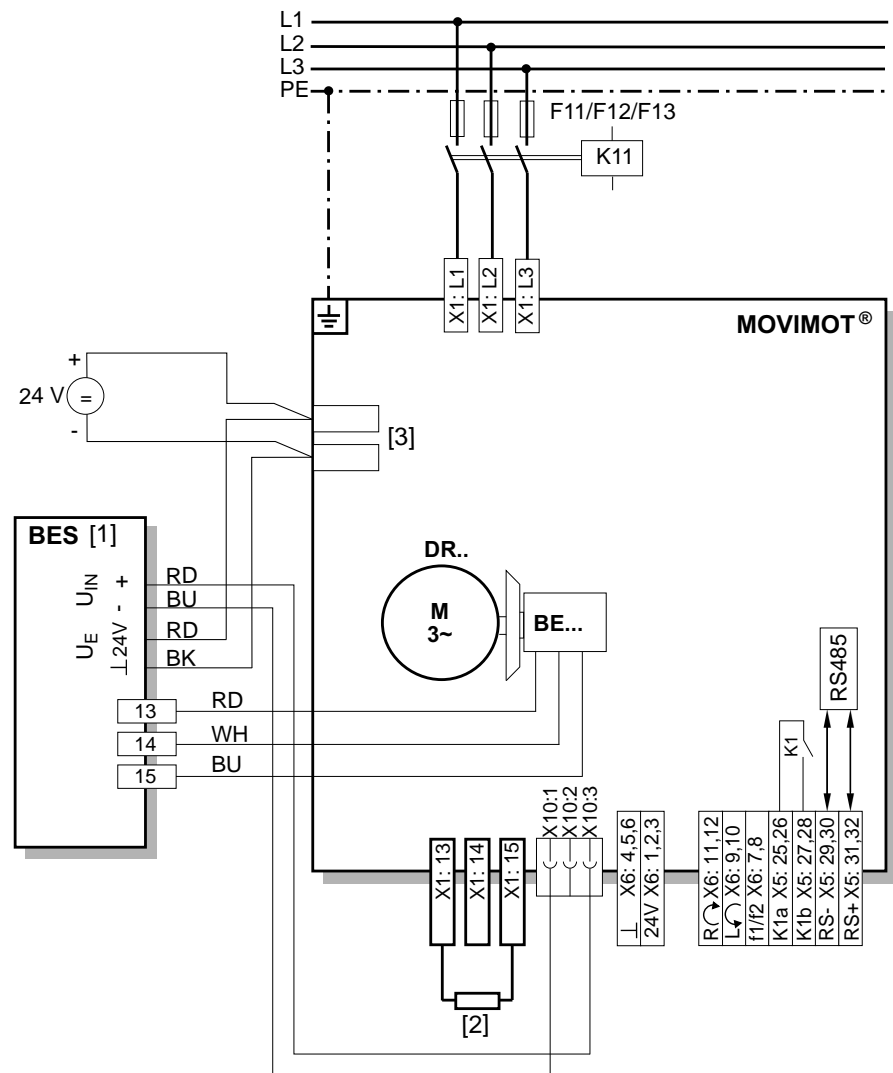
If the connection voltage is too high, the BES option or the brake coil connected to it can be damaged.

Damage to the BES option of the brake coil.

- Select a brake with a DC 24 V brake coil.

For more information about mounting the BES option, refer to chapter "Installation of URM / BEM / BES option" (→ 26).

The following figure shows how to connect the BES option:



9007200966343307

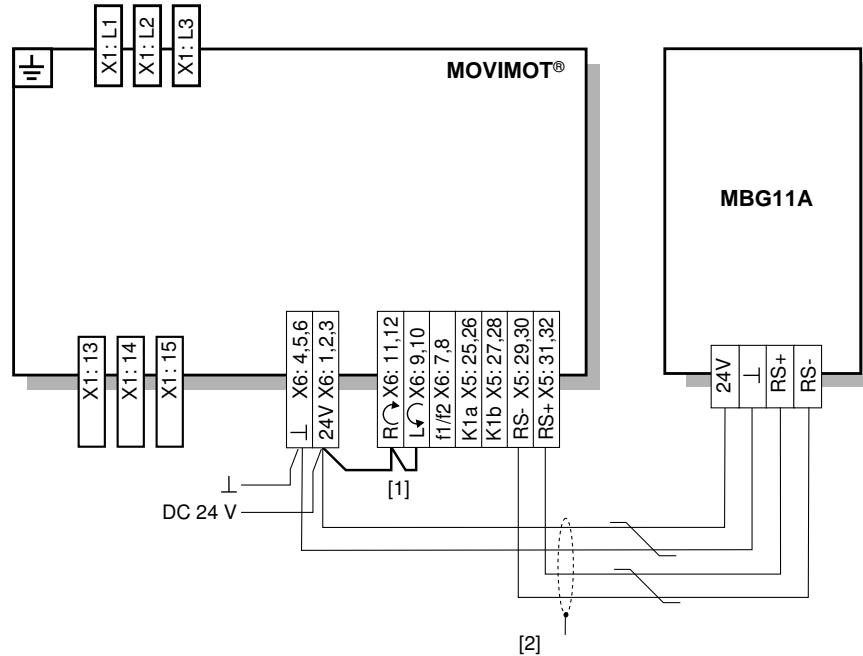
- [1] BES brake control mounted in the connection box
- [2] External braking resistor BW
- [3] Brake supply auxiliary terminals DC 24 V

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5.7.8 Connection of MBG11A option

For more information about mounting the MBG11A option, refer to chapter "Installation of MBG11A option" (→ 27).

The following figure shows how to connect the MBG11A option:



9007199578787723

- [1] Note the enabled direction of rotation.
 See chapter "Connection of the MOVIMOT® drive" (→ 41),
 Functions of the CW/Stop and CCW/Stop terminals with control via RS485 inter-
 face
- [2] EMC metal cable gland

5

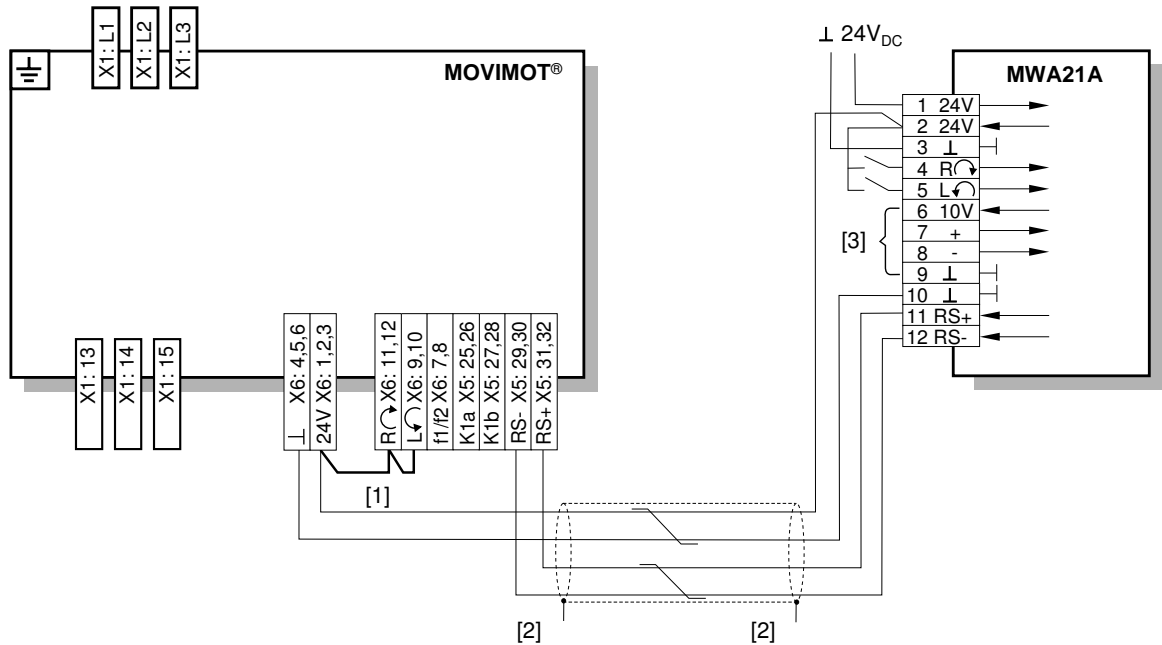
Electrical installation

Connection of MOVIMOT® options

5.7.9 Connection of MWA21A option

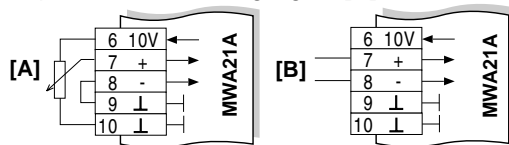
For more information about mounting the MWA21A option, refer to chapter "Installation of MWA21A option" (→ 28).

The following figure shows how to connect the MWA21A option:



324061323

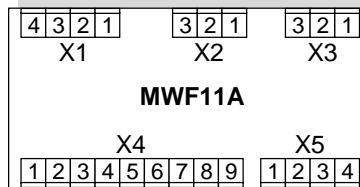
- [1] Note the enabled direction of rotation.
See chapter "Connection of the MOVIMOT® drive" (→ 41),
Functions of the CW/Stop and CCW/Stop terminals with control via RS485 interface
- [2] EMC metal cable gland
- [3] Potentiometer using the 10 V reference voltage **[A]**
or potential-free analog signal **[B]**



5.7.10 Connection of MWF11A option

For more information about mounting the MWF11A option, refer to chapter "Installation of MWF11A option" (→ 28).

The following figure shows how to connect the MWF11A option:



9007202439315339

RS485 interface		
X1	1	RS485 + (connection to MOVIMOT®)
	2	RS485 - (connection to MOVIMOT®)
	3	RS485 GND (connection to MOVIMOT®)
	4	Shielding
Frequency input		
X2	1	A
	2	No function
	3	GND
Voltage supply		
X3	1	+24 V (IN)
	2	+24 V (OUT)
	3	GND
Control terminals		
X4	1	Enable CW
	2	Enable CCW
	3	Enable/Rapid stop
	4	n11
	5	n12
	6	Error reset
	7	/error output
	8	/error output (short-circuit-proof)
	9	GND
Analog input (differential)		
X5	1	10 V off (for 47 kΩ potentiometer)
	2	AI11
	3	AI12 (reference)
	4	GND

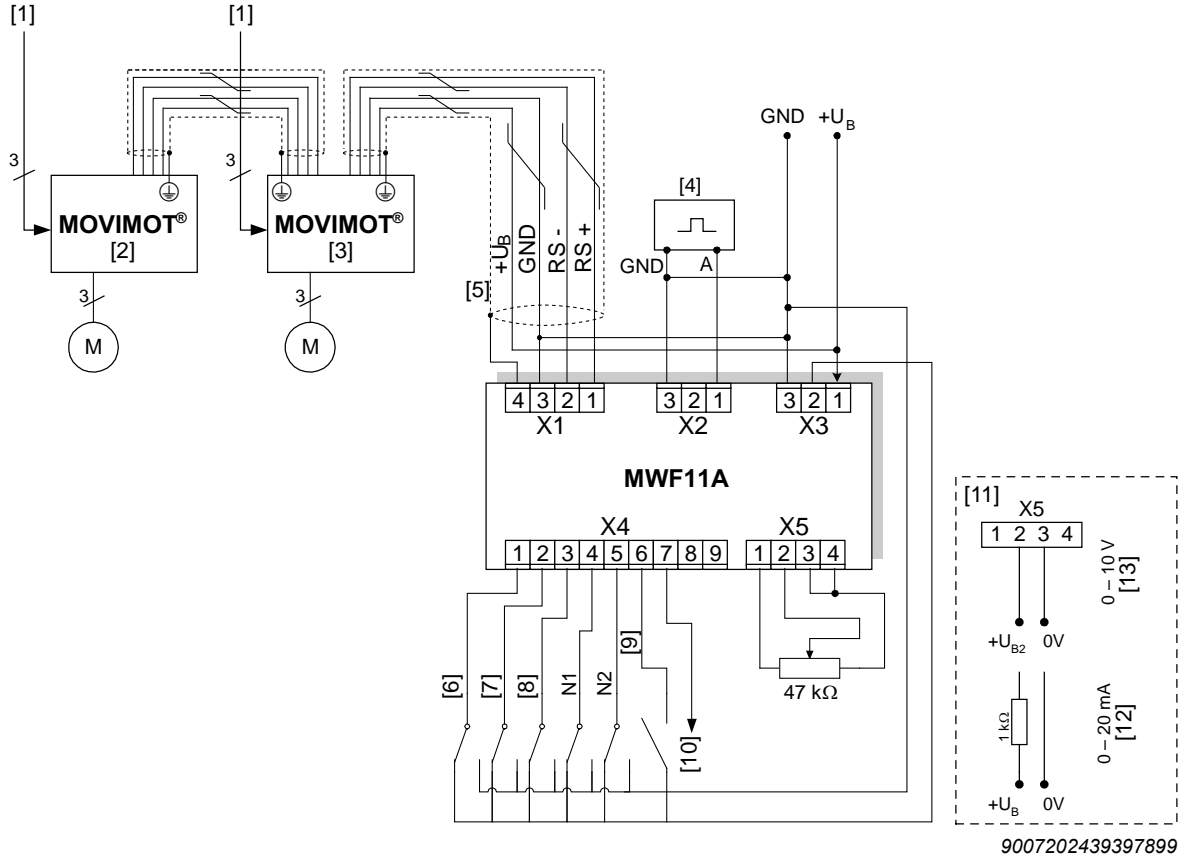
5

Electrical installation

Connection of MOVIMOT® options

Connection of MWF11A option in broadcast mode

The following figure shows an installation example of the MWF11A option in broadcast mode:



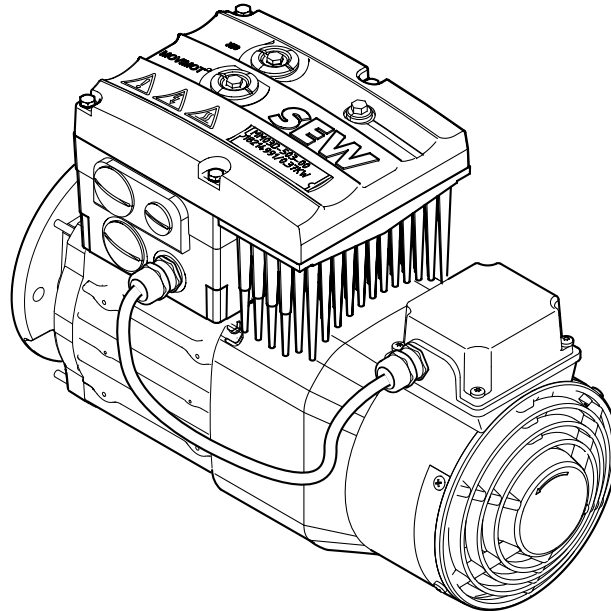
9007202439397899

- [1] Supply system
- [2] MOVIMOT® with address 1
- [3] MOVIMOT® with address 2
- [4] Function generator
- [5] For ambient conditions with a high interference level, the RS485 line shield must be earthed in the mounting panel of the control cabinet.
- [6] Enable CW / stop
- [7] Enable CCW / stop
- [8] Enable/rapid stop
- [9] Error reset
- [10] /error
- [11] Alternative setpoint selection
- [12] I-input
- [13] U-input

5.7.11 Connection of forced cooling fan V

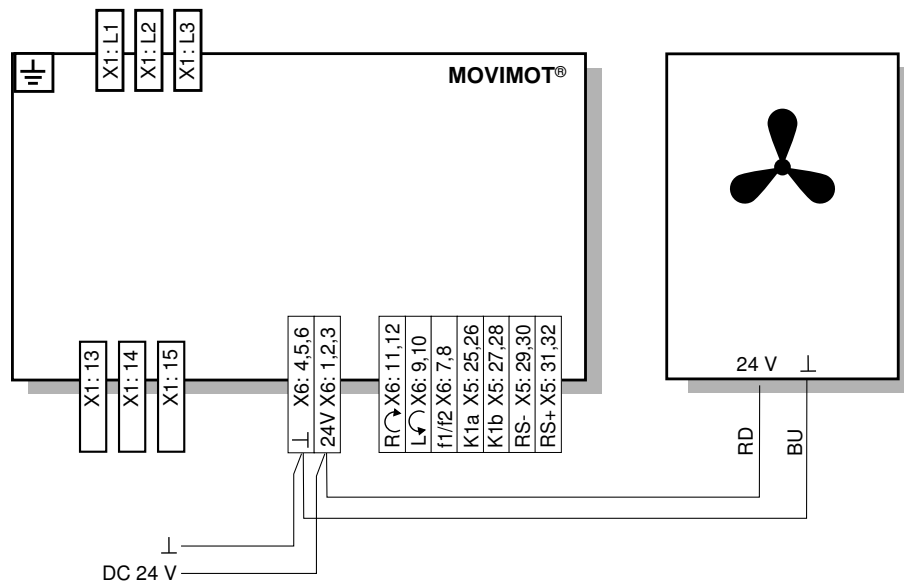
The AC motors in the DR.. series are also available with the forced cooling fan. Use of the V forced cooling fan extends the setting range of the setpoint speed. Speeds from 150 rpm (5 Hz) can then be consistently achieved.

The following figure shows the cable entry of the forced cooling fan cable:



9007202424404491

The following figure shows an example connection for the V forced cooling fan:



318211115

INFORMATION



For motors with V forced cooling fans, the *P341 type of cooling* parameter must be set to "forced air cooling".

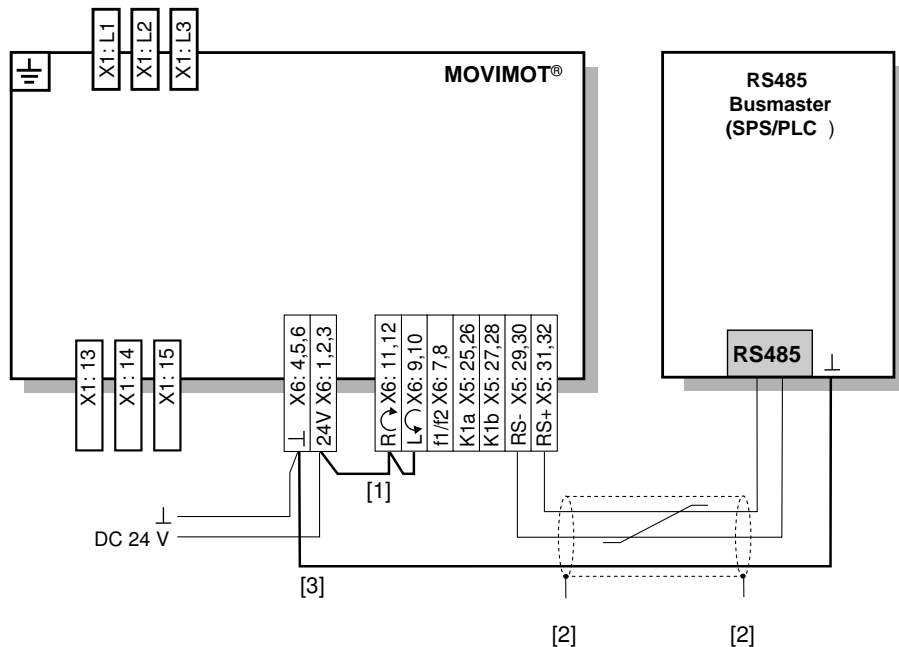
5

Electrical installation

Connection of the RS485 bus master

5.8 Connection of the RS485 bus master

The following figure shows how to connect an RS485 bus master:



18014398833771531

- [1] Note the enabled direction of rotation.
See chapter "Connection of MOVIMOT® drive" (→ 41),
Functions of the CW/Stop and CCW/Stop terminals with control via RS485 interface
- [2] EMC metal cable gland
- [3] MOVIMOT®/RS485 master equipotential bonding

5.9 Connection of DBG keypad

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

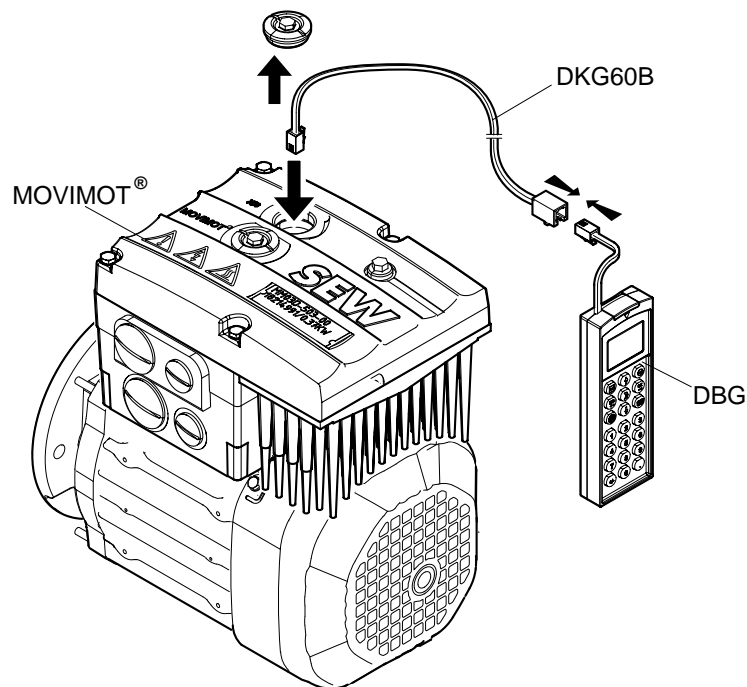
The X50 diagnostics interface is located underneath the screw plug on top of the MOVIMOT® inverter.

You must remove the screw plug before plugging the connector into the diagnostic interface.

▲ WARNING! Danger of burns from the MOVIMOT® drive's hot surfaces (in particular the heat sink).

Serious injuries.

- Wait for the MOVIMOT® drive to cool down sufficiently before touching it.



18014399653617291

You can also connect the DBG operator terminal 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 • 4-core, shielded cable (AWG26) 	08175837

5 Electrical installation

PC/laptop connection

5.10 PC/laptop connection

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

The diagnostic interface [1] is located underneath the screw plug on top of the MOVIMOT® inverter.

You must remove the screw plug before plugging the connector into the diagnostic interface.

▲ WARNING! Danger of burns from the MOVIMOT® drive's hot surfaces (in particular the heat sink).

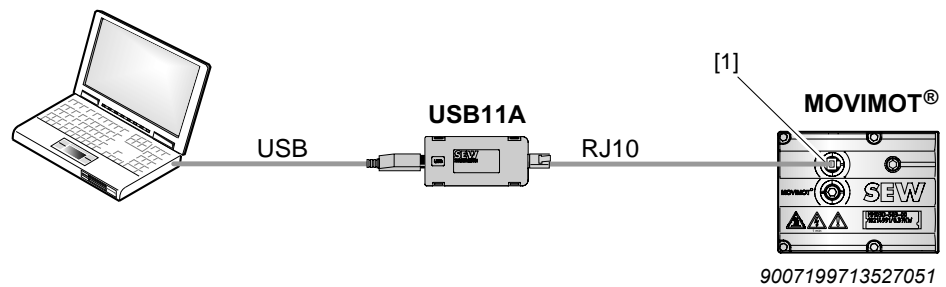
Serious injuries.

- Wait for the MOVIMOT® drive to cool down sufficiently before touching it.

The diagnostic interface can be connected to a commercially available PC/laptop via the USB11A interface adapter (part number 08248311).

Scope of delivery:

- USB11A interface adapter
- Cable with RJ10 plug connector
- USB interface cable



6 "Easy" startup

6.1 Overview

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

- When you select **Easy mode**, MOVIMOT® is started up quickly and easily using DIP switches S1, S2 and switches f2, t1.
- An extended scope of parameters is available for startup in **Expert mode**. You can use the MOVITOOLS® MotionStudio software or the DGB hand-held terminal to adjust the parameters to the application.

For more information on startup in expert mode, refer to chapter "Expert" startup with parameter function" (→ 130).

6.2 General information concerning startup

INFORMATION



You must comply with the general safety notes in the chapter "Safety notes" during startup.

▲ WARNING



Risk of crushing due to missing or defective protective covers.

Severe or fatal injuries.

- Install the protective covers of the plant according to the instructions, see the operating instructions of the gear unit.
- Never start the unit if the protective covers are not installed.

▲ WARNING



Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**

▲ WARNING



Device malfunction due to incorrect device setting.

Severe or fatal injuries.

- Comply with the startup instructions.
- The installation must be carried out by qualified personnel only.
- Always use the appropriate functional settings.

6 "Easy" startup Requirements



▲ WARNING

Danger of burns due to hot surfaces of the unit (e.g. the heat sink).
Serious injuries.

- Do not touch the unit until it has cooled down sufficiently.



INFORMATION

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



INFORMATION

- Remove status LED paint protection cap before startup. Remove paint protection film from the nameplates before startup.
- Observe a minimum switch-off time of 2 seconds for the K11 line contactor.

6.3 Requirements

The following conditions apply to the startup:

- The MOVIMOT® drive must be installed correctly both mechanically and electrically.
- Appropriate safety measures prevent the drives from starting up unintentionally.
- Appropriate safety measures must be taken to prevent risk of injury or damage to the machine.

6.4 Description of the control elements

6.4.1 Setpoint potentiometer f1



NOTICE

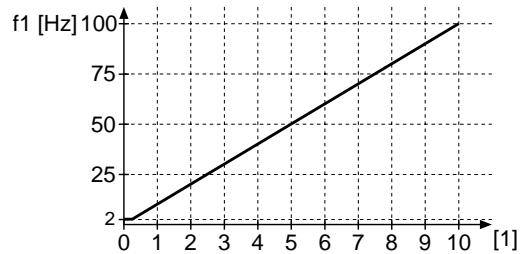
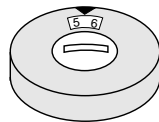
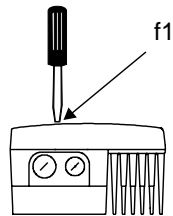
Loss of guaranteed degree of protection if the screw plugs on the f1 setpoint potentiometer and diagnostic interface are not installed or not installed correctly.

Damage to the MOVIMOT® inverter.

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

The potentiometer f1 has different functions depending on the operating mode:

- Binary control: Setting setpoint f1
(f1 selected via terminal f1/f2 X6:7,8 = "0")
- Control via RS485: Setting maximum frequency f_{max}



18014398838894987

[1] Potentiometer setting

6

"Easy" startup

Description of the control elements

6.4.2 Switch f2

The switch f2 has different functions depending on the operating mode:

- Binary control: Setting setpoint f2
(f2 selected via terminal f1/f2 X6:7,8 = "1")
- Control via RS485: Minimum frequency setting f_{min}



Switch f2											
Detent position	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
Minimum frequency [Hz]	2	5	7	10	12	15	20	25	30	35	40

6.4.3 Switch t1

Use switch t1 to set the acceleration of the MOVIMOT® drive. The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).



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

6.4.4 DIP switches S1 and S2

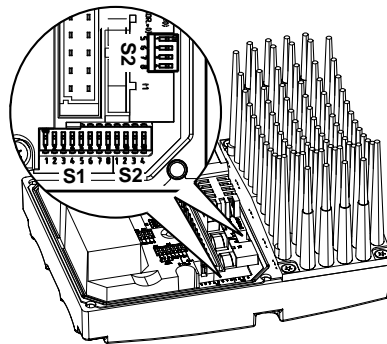
NOTICE



Damage to the DIP switches caused by unsuitable tools.

Damage to the DIP switches.

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



9007199881389579

DIP switch S1:

S1 Meaning	1	2	3	4	5 Motor protection	6 Motor performance level	7 PWM frequency	8 No load damping
	Binary coding RS485 unit address							
	2 ⁰	2 ¹	2 ²	2 ³				
ON	1	1	1	1	Off	Motor one stage 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 released without enable	3 Operating mode	4 Speed monitoring	5 6 7 8 Binary encoding additional functions			
					2 ⁰	2 ¹	2 ²	2 ³
ON	Optional brake	On	V/f	On	1	1	1	1
OFF	Standard brake	Off	VFC	Off	0	0	0	0

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6.5 Description of the DIP switches S1**6.5.1 DIP switches S1/1 – S1/4**

Selecting the RS485 address of the MOVIMOT® drive 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

= ON

= OFF

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

Control	RS485 address
Binary control	0
Via operator terminal (MLG..A, MBG..A)	1
Via fieldbus interface (MF..)	1
Via MOVIFIT® MC (MTM..)	1
Via fieldbus interface with integrated minicontroller (MQ..)	1 – 15
Via RS485 master	1 – 15
Via MWF11A setpoint converter	1 – 15

6.5.2 DIP switch S1/5**Motor protection switched on / switched off**

When the MOVIMOT® inverter is installed (close to) the motor, the motor protection must be deactivated.

To ensure motor protection, a TH (bimetallic thermostat) must be installed. The TH opens the sensor circuit when the nominal response temperature is reached (see field distributor manual).

6.5.3 DIP switch S1/6

Lower motor power rating

- When activated, the DIP switch S1/6 allows the MOVIMOT® inverter to be assigned to a motor with a lower motor power rating. The rated unit power is not affected.
- When using a motor with a lower power rating, the MOVIMOT® inverter is a power level higher from the motor's perspective. The overload capacity of the drive may be increased as a result. A higher current can be provided briefly, leading to higher torque ratings.
- The aim of the DIP 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").
- The necessary setting for the DIP switch S1/6 depends on the motor type and therefore also on the drive ID module in the MOVIMOT® inverter.

First check the drive ID module type in the MOVIMOT® inverter. Set the DIP switch S1/6 according to the following table.

6

"Easy" startup

Description of the DIP switches S1

Motor with operating point 400 V/50 Hz

Applies to MOVIMOT® with the following drive ID modules:

Identification	Drive ID module		Motor	
	ID color	Part number	Line voltage [V]	Line frequency [Hz]
DRS/400/50	White	18214371	230/400	50
DRE/400/50	Orange	18214398	230/400	50
DRP/230/400	Brown	18217907	230/400	50
DRN/400/50	Light blue	28222040	230/400	50

Setting DIP switch S1/6:

Power [kW]	Motor type	MOVIMOT® MM..D-503-00 inverter			
		Motor in Δ connection		Motor in Δ connection	
		S1/6 = OFF	S1/6 = ON	S1/6 = OFF	S1/6 = ON
0.25	DR63L4/.. DRE80S4/..	–	MM03D..	MM03D..	MM05D..
0.37	DRS71S4/.. DRE80S4/..	MM03D..	MM05D..	MM05D..	MM07D..
0.55	DRS71M4/.. DRE80M4/..	MM05D..	MM07D..	MM07D..	MM11D..
0.75	DRS80S4/.. DRE80M4/.. DRP90M4/.. DRN80M4/..	MM07D..	MM11D..	MM11D..	MM15D..
1.1	DRS80M4/.. DRE90M4/.. DRP90L4/.. DRN90S4/..	MM11D..	MM15D..	MM15D..	MM22D..
1.5	DRS90M4/.. DRE90L4/.. DRP100M4/.. DRN90L4/..	MM15D..	MM22D..	MM22D..	MM30D..
2.2	DRS90L4/.. DRE100M4/.. DRP100L4/.. DRN100LS4/..	MM22D..	MM30D..	MM30D..	MM40D..
3.0	DRS100M4/.. DRE100LC4/.. DRP112M4/.. DRN100L4/..	MM30D..	MM40D..	MM40D..	–
4.0	DRS100LC4/.. DRE132S4/.. DRN112M4/..	MM40D..	–	–	–

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Motor with operating point 460 V/60 Hz

Applies to MOVIMOT® with the following drive ID modules:

Marking	Drive ID module		Motor	
	ID color	Part number	Line voltage [V]	Line frequency [Hz]
DRS/460/60	Yellow	18214401	266/460	60
DRE/460/60	Green	18214428	266/460	60
DRP/266/460	Beige	18217915	266/460	60
DRN/460/60	Pale green	28222059	266/460	60

Setting DIP switch S1/6:

Power [kW]	Motor type	MOVIMOT® MM..D-503-00 inverter			
		Motor in λ connection		Motor in Δ connection	
		S1/6 = OFF	S1/6 = ON	S1/6 = OFF	S1/6 = ON
0.37	DRS71S4/..	MM03D..	MM05D..	MM05D..	MM07D..
0.55	DRS71M4/..	MM05D..	MM07D..	MM07D..	MM11D..
0.75	DRS80S4/.. DRE80M4/.. DRP90M4/.. DRN80M4/..	MM07D..	MM11D..	MM11D..	MM15D..
1.1	DRS80M4/.. DRE90M4/.. DRP90L4/.. DRN90S4/..	MM11D..	MM15D..	MM15D..	MM22D..
1.5	DRS90M4/.. DRE90L4/.. DRP90L4/.. DRN90L4/..	MM15D..	MM22D..	MM22D..	MM30D..
2.2	DRS90L4/.. DRE100L4/.. DRP112M4/.. DRN100L4/..	MM22D..	MM30D..	MM30D..	MM40D..
3.7	DRS100M4/.. DRE100LC4/.. DRP132S4/.. DRN100L4/..	MM30D..	MM40D..	–	–
4.0	DRS100LC4/.. DRE132S4/.. DRN112M4/..	MM40D..	–	–	–

6

"Easy" startup

Description of the DIP switches S1

Motor with 50 / 60 Hz voltage range

Applies to MOVIMOT® with the following drive ID modules:

Marking	Drive ID module		Motor	
	ID color	Part number	Line voltage [V]	Line frequency [Hz]
DRS/DRE/50/60	Violet	18214444	220 – 240/380 – 415 254 – 277/440 – 480	50 60
DRS/DRN/50/60	Pastel green	28222067	220 – 230 / 380 – 400 266/460	50 60

Setting DIP switch S1/6:

Power [kW]	Motor type	MOVIMOT® MM..D-503-00 inverter			
		Motor in Δ connection		Motor in Δ connection	
		S1/6 = OFF	S1/6 = ON	S1/6 = OFF	S1/6 = ON
0.25	DR63L4/..	–	MM03D..	MM03D..	MM05D..
0.37	DRS71S4/..	MM03D..	MM05D..	MM05D..	MM07D..
0.55	DRS71M4/..	MM05D..	MM07D..	MM07D..	MM11D..
0.75	DRE80M4/.. DRN80M4/..	MM07D..	MM11D..	MM11D..	MM15D..
1.1	DRE90M4/.. DRN90S4/..	MM11D..	MM15D..	MM15D..	MM22D..
1.5	DRE90L4/.. DRN90L4/..	MM15D..	MM22D..	MM22D..	MM30D..
2.2	DRE100L4/.. DRN100L4/..	MM22D..	MM30D..	MM30D..	MM40D..
3.0	DRE100LC4/.. DRN100L4/..	MM30D..	MM40D..	MM40D..	–
4.0	DRE132S4/.. DRN112M4/..	MM40D..	–	–	–

Motor with operating point 380 V/60 Hz (ABNT regulation for Brazil)

Applies to MOVIMOT® with the following drive ID modules:

Identification	Drive ID module		Motor	
	ID color	Part number	Line voltage [V]	Line frequency [Hz]
DRS/DRE/380/60	Red	18234933	220/380	60

Setting DIP switch S1/6:

Power [kW]	Motor type	MOVIMOT® MM..D-503-00 inverter			
		Motor in Δ connection		Motor in Δ connection	
		S1/6 = OFF	S1/6 = ON	S1/6 = OFF	S1/6 = ON
0.37	DRS71S4/..	MM03D..	MM05D..	MM05D..	MM07D..
0.55	DRS71M4/..	MM05D..	MM07D..	MM07D..	MM11D..
0.75	DRE80S4/..	MM07D..	MM11D..	MM11D..	MM15D..
1.1	DRE80M4/..	MM11D..	MM15D..	MM15D..	MM22D..
1.5	DRE90M4/..	MM15D..	MM22D..	MM22D..	MM30D..
2.2	DRE90L4/..	MM22D..	MM30D..	MM30D..	MM40D..
3.0	DRE100M4/..	MM30D..	MM40D..	MM40D..	–
4.0	DRE100L4/..	MM40D..	–	–	–

Motor with operating point 400 V/50 Hz and LSPM technology

Applies to MOVIMOT® with the following drive ID modules:

Identification	Drive ID module		Motor	
	ID color	Part number	Line voltage [V]	Mains frequency [Hz]
DRE...J/400/50	Orange	28203816	230/400	50
DRU...J/400/50	Gray	28203194	230/400	50

Setting DIP switch S1/6:

Power [kW]	Motor type	MOVIMOT® MM..D-503-00 inverter			
		Motor in Δ connection		Motor in Δ connection	
		S1/6 = OFF	S1/6 = ON	S1/6 = OFF	S1/6 = ON
0.25	DRU71SJ/..	–	–	MM03D..	–
0.37	DRE71SJ4/..	MM03D..	–	MM05D..	–
	DRU71MJ4/..	–	–	–	–
0.55	DRE71MJ4/..	MM05D..	–	MM07D..	–
	DRU80SJ4/..	–	–	–	–
0.75	DRE71MJ4/..	MM07D..	–	MM11D..	–
	DRU80MJ4/..	–	–	–	–
1.1	DRE80SJ4/..	MM11D..	–	MM15D..	–
	DRU90MJ4/..	–	–	–	–
1.5	DRE80MJ4/..	MM15D..	–	MM22D..	–
	DRU90LJ4/..	–	–	–	–
2.2	DRE90MJ4/..	MM22D..	–	MM30D..	–
	DRU100MJ4/..	–	–	–	–
3.0	DRE90LJ4/..	MM30D..	–	MM40D..	–
	DRU100LJ4/..	–	–	–	–
4.0	DRE100MJ4/..	MM40D..	–	–	–

6.5.4 DIP switch S1/7

Setting the maximum PWM frequency

- When DIP switch S1/7 is set to "OFF", the MOVIMOT® works with the PWM frequency of 4 kHz.
- When DIP switch S1/7 is set to "ON", the MOVIMOT® works with the PWM frequency of 16 kHz (low-noise). MOVIMOT® incrementally switches back to lower clock frequencies depending on the heat sink temperature and the load on the inverter.

6.5.5 DIP switch S1/8

No-load vibration damping

When setting DIP switch S1/8 to "ON", this function reduces resonance vibrations when in no-load operation.

6.6 Description of DIP switches S2**6.6.1 DIP switch S2/1****Brake type**

- When using the standard brake, the DIP switch S2/1 must be set to "OFF".
- When using the optional brake, the DIP switch S2/1 must be set to "ON".

Motor				Standard brake [type] S2/1 = OFF	Optional brake [type] S2/1 = ON
400 V/50 HZ 460 V/60 Hz 50 / 60 Hz voltage range		380 V/60 Hz ABNT Brazil	400 V/50 HZ LSPM technology		
DR.63L4				BR03	–
DRS71S4 DRE80S4		DRS71S4	DRE71SJ4 DRU71MJ4	BE05	BE1
DRS71M4 DRS80S4 DRE80M4	DRN80M4	DRS71M4 DRE80S4	DRE71SJ4 DRU80SJ4 DRU80MJ4	BE1	BE05
DRP90M4				BE1	BE2
DRS80M4 DRE90M4 DRP90L4	DRN90S4	DRE80M4	DRE80SJ4 DRU90MJ4	BE2	BE1
DRS90M4 DRE90L4	DRN90L4	DRE90M4	DRE90MJ4	BE2	BE1
DRP100M4			DRU90LJ4	BE2	BE5
DRS90L4 DRE100M4 DRE100L4 DRP100L4	DRN100LS4	DRE90L4	DRE90MJ4 DRU100MJ4	BE5	BE2
DRS100M4 DRS100L4 DRS100LC4 DRE100LC4	DRN100L4	DRE100M4 DRE100L4	DRE90LJ4 DRE100MJ4 DRU100LJ4	BE5	BE2
DRP112M4 DRE132S4 DRP112S4	DRN112M4			BE5	BE11

Preferred brake voltage

MOVIMOT® type (inverter)	Preferred brake voltage
MOVIMOT® MM..D-503, size 1 (MM03.. – MM15..)	230 V
MOVIMOT® MM..D-503, size 2 (MM22.. – MM40..)	120 V
MOVIMOT® MM..D-233, sizes 1 and 2 (MM03.. – MM40..)	

6.6.2 DIP switch S2/2

Brake release without enable

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

Binary control functions

In binary control, you are able to release the brake by setting the signal at terminal f1/f2 X6:7,8 subject to the following preconditions:

Terminal status			Enable status	Error status	Brake function
R ↻ X6:11,12	L ↻ X6:9,10	f1/f2 X6:7,8			
"1" "0"	"0" "1"	"0"	Unit enabled	No unit error	The MOVIMOT® inverter controls the brake. Setpoint f1
"1" "0"	"0" "1"	"1"	Unit enabled	No unit error	The MOVIMOT® inverter controls the brake. Setpoint f2
"1" "0"	"1" "0"	"0"	Unit not enabled	No unit error	Brake is applied.
"1"	"1"	"1"	Unit not enabled	No unit error	Brake is applied.
"0"	"0"	"1"	Unit not enabled	No unit error	Brake is released for manual movement.¹⁾
All states possible			Unit not enabled	Unit errors	Brake is applied.

1) In "Expert" mode the parameter P600 (terminal configuration) must be set to "0" (default) => "setpoint changeover, CCW/stop, CW/stop".

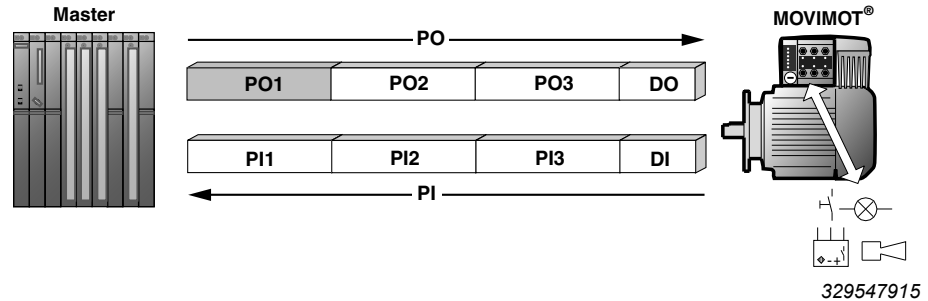
6

"Easy" startup

Description of DIP switches S2

Functions with control via RS485

With control via RS485, 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:

								Basic control block								
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Control word							Bit "9"	Bit "8"	Not assigned ¹⁾	"1" = Reset	Not assigned ¹⁾			"1 1 0" = Enable, otherwise stop		

Virtual terminals for releasing the brake without drive enable

Virtual terminal for applying brake and inhibiting output stage "Stop" control command

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

Enable status	Error status	Status of bit 8 in control word	Brake function
Unit enabled	No unit error/ no communication timeout	"0"	The MOVIMOT® inverter controls the brake.
Unit enabled	No unit error/ no communication timeout	"1"	The MOVIMOT® inverter controls the brake.
Unit not enabled	No unit error/ no communication timeout	"0"	Brake is applied.
Unit not enabled	No unit error/ no communication timeout	"1"	Brake is released for manual movement.
Unit not enabled	Unit error/ communication timeout	"1" or "0"	Brake is applied.

Setpoint selection for binary control

Setpoint selection for binary control depending on the status of terminal f1/f2 X6: 7,8:

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 status 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 RS485.

6.6.3 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

6.6.4 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"), the MOVIMOT® inverter trips the speed monitoring fault. The status LED of the MOVIMOT® inverter signals the error by slowly flashing red (error code 08). This error only occurs when the current limit has been reached for the duration of the deceleration time.

6.6.5 DIP switches S2/5 – S2/8

Additional functions

The binary coding of the DIP switches S2/5 – 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

6

"Easy" startup

Selectable additional functions MM..D-503-00

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

6.7.1 Overview of the available additional functions

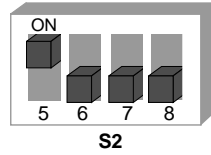
You can activate the following additional functions at the DIP switches S2/5 – S2/8:

Decimal value	Brief description	Operating mode		Description
		Control via RS485	Binary control	
0	Basic functionality, no additional function active	X	X	–
1	MOVIMOT® with increased ramp times	X	X	(→ 77)
2	MOVIMOT® with adjustable current limitation (error if exceeded)	X	X	(→ 78)
3	MOVIMOT® with adjustable current limitation (can be changed using the terminal f1/f2 X6:7,8)	X	X	(→ 78)
4	MOVIMOT® with bus parameterization	X	–	(→ 81)
5	MOVIMOT® with motor protection via TH	X	–	(→ 83)
6	MOVIMOT® with maximum 8 kHz PWM frequency	X	X	(→ 84)
7	MOVIMOT® with rapid start/stop	X	X	(→ 85)
8	MOVIMOT® with minimum frequency 0 Hz	X	X	(→ 87)
9	MOVIMOT® for lifting applications	X	X	(→ 88)
10	MOVIMOT® with minimum frequency 0 Hz and reduced torque at low frequencies	X	X	(→ 91)
11	Monitoring of supply-phase error deactivated	X	X	(→ 92)
12	MOVIMOT® with rapid start/stop and motor protection via TH	X	X	(→ 93)
13	MOVIMOT® with extended speed monitoring	X	X	(→ 96)
14	MOVIMOT® with deactivated slip compensation	X	X	(→ 100)
15	Not assigned	–	–	–

21214190/EN – 10/2014

6.7.2 Additional function 1

MOVIMOT® with increased ramp times



329690891

Functional description

It is possible to set ramp times of up to 40 s.

With control via RS485, a ramp time of max. 40 s can be transmitted when using 3 process data units.

Changed ramp times



Switch t1											
Detent position	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

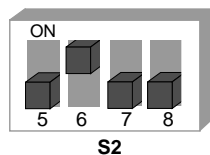
6

"Easy" startup

Selectable additional functions MM..D-503-00

6.7.3 Additional function 2

MOVIMOT® with adjustable current limitation (error if exceeded)



329877131

Functional description

The current limit can be set on switch f2.

The setpoint f2 (for binary control) and the minimum frequency (with 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.

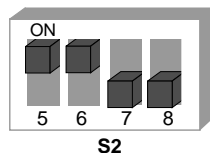
Adjustable current limits



Switch f2											
Detent position	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

6.7.4 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

Functional description

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

Response upon reaching the current limit

When the current limit is reached, the unit reduces the frequency and stops the ramp. This prevents 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

The following functions are no longer possible:

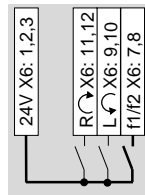
- In binary control mode, it is no longer possible to switch between setpoint f1 and setpoint f2 via terminal f1/f2.
- With control via RS485 it is not possible to set the minimum frequency. The minimum frequency is set to 2 Hz.

Adjustable current limits



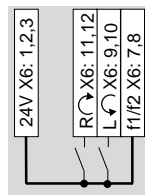
Switch f2											
Detent position	0	1	2	3	4	5	6	7	8	9	10
I_{max} [%] of I_N	60	70	80	90	100	110	120	130	140	150	160

Selecting the current limits via binary input terminal f1 / f2



90071995783
55339

f1/f2 = "0" The default current limit is active.



90071995783
82091

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

6

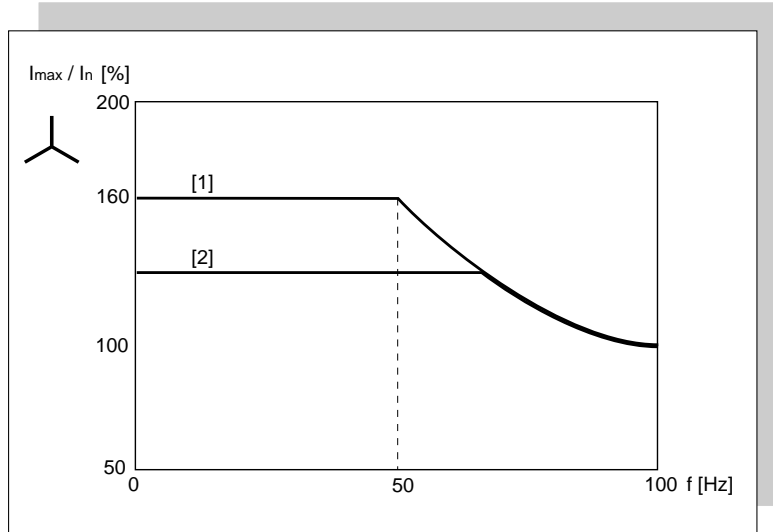
"Easy" startup

Selectable additional functions MM..D-503-00

Influencing the current characteristic curve

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

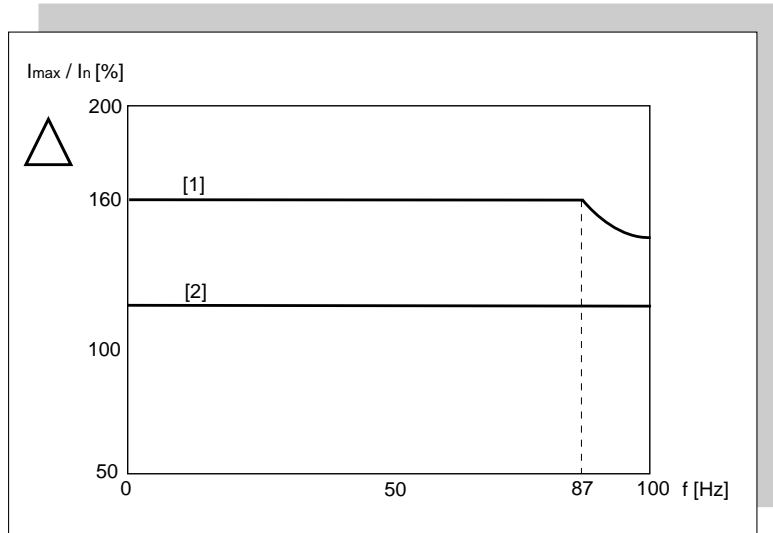
Motor with star connection



331979659

- [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"

Changing parameters in MOVITOOLS® MotionStudio

After opening MOVITOOLS® "MotionStudio" > "startup" > "parameter tree", the following parameters are accessible. These parameters can be changed and saved in the unit.

Name	Section	Index	Parameter	Step width
Ramp up	0.1 – 1 – 2000 [s]	8807	<i>P130</i>	0.1 s – 1 s: 0.01
Ramp down	0.1 – 1 – 2000 [s]	8808	<i>P131</i>	1 s – 10 s: 0.1 10 s – 100 s: 1 10 s – 2000 s: 10
Minimum frequency	2 – 100 [Hz]	8899	<i>P305</i>	0.1 Hz
Maximum frequency¹⁾	2 – 100 [Hz]	8900	<i>P306</i>	0.1 Hz
Current limit	60 – 160 [%]	8518	<i>P303</i>	1%
Pre-magnetization time	0 – 0.4 – 2 [s]	8526	<i>P323</i>	0.001 s
Post-magnetization time	0 – 0.2 – 2 [s]	8585	<i>P732</i>	0.001 s
Parameter lock	0: Off 1: On	8595	<i>P803</i>	–
Factory setting	0: No 2: Delivery state	8594	<i>P802</i>	–
Speed monitoring delay time	0.1 – 1 – 10.0 [s]	8558	<i>P501</i>	0.1 s
Brake release time	0 – 2 [s]	8749	<i>P731</i>	0.001 s
Slip compensation²⁾	0 – 500 [rpm]	8527	<i>P324</i>	0.2 rpm

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.

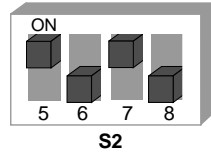
The start frequency is set to 0.5 Hz.

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.

6.7.6 Additional function 5

MOVIMOT® motor protection via TH



329992459

INFORMATION



The additional function is only designed for RS485 control when the MOVIMOT® inverter is installed close to the motor.

Functional description

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

- When the MOVIMOT® inverter is mounted close to the motor, the TH sets the terminals "R" and "L" to "0" if the maximum motor temperature is exceeded.
- Additional function 5 generates error 84 (motor over temperature) when terminals "L" and "R" are opened.
- Error 84 is indicated by the flashing status LED of the MOVIMOT® inverter.
- The generated error 84 is also transmitted via fieldbus.

Functions in combination with fieldbus interface MQ..:

- MOVIMOT® bus configuration according to additional function 4 (→ 81).

Functions in combination with fieldbus interface MF..:

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

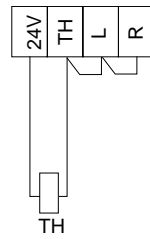
Name	Value
Ramp up	1 s
Ramp down	1 s
Minimum frequency	2 Hz
Maximum frequency	100 Hz
Current limit	Default current limit
Pre-magnetization time	0.4 s
Post-magnetization time	0.2 s
Speed monitoring delay time	1 s
Brake release time	0 s
Slip compensation	Rated motor slip

Tripping conditions for error 84

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

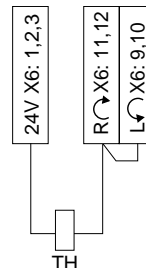
- The standard MOVIMOT® motor protection function is deactivated when DIP switch S1/5 is set to "ON".
- The terminals for direction of rotation are connected to 24 V via a TH as in the following figure.

For field distributors:



9007199586919307

For mounting close to the motor with option P2.A:



9007199881486475

- The TH tripped due to motor overtemperature. The enable signal for the two direction of rotation terminals is canceled.
- Supply voltage is connected.

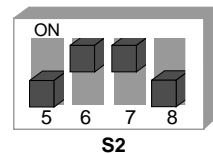
INFORMATION



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

6.7.7 Additional function 6

MOVIMOT® with maximum 8 kHz PWM frequency



330028171

Functional description

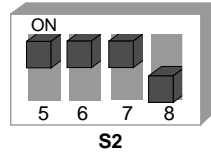
The additional function reduces the PWM frequency of 16 kHz to 8 kHz.

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 without additional function 6	S1/7 with 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

6.7.8 Additional function 7

MOVIMOT® with rapid start/stop



330064651

Functional description

"Rapid start" sub-function (with control via RS485 + binary control)

- 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 additional function 7 is activated, the calibration function and the thermal memory of the UL protective function is inactive. When using according to UL approval, please note that the start temperature of the motor protection function is not the same as the motor temperature.

"Rapid stop" sub-function (only with control via RS485)

- The "rapid stop" function (apply brake during downward ramp) is introduced for control via RS485. This function is assigned to bit 9 in the control word as virtual terminal in line with the MOVILINK® profile.

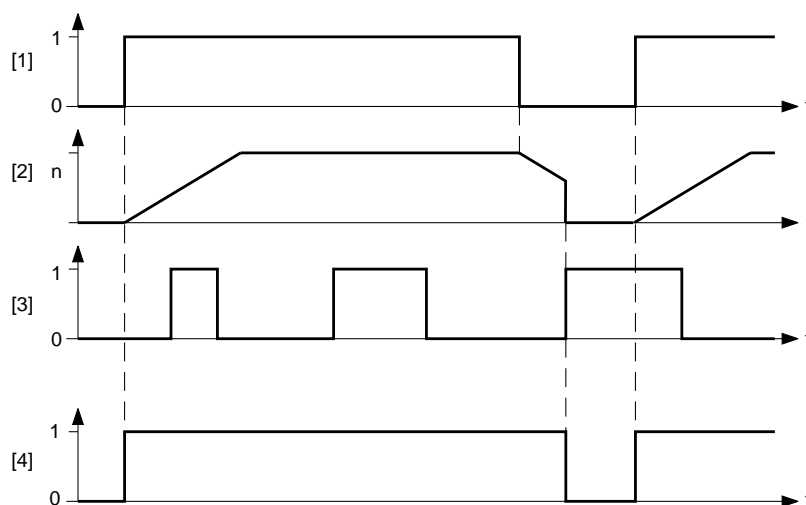
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Not assigned ¹⁾						Bit "9"	Bit "8"	Not assigned ¹⁾	"1" = Reset	Not assigned ¹⁾			"1 1 0" = Enable, otherwise stop		

Release brake without enable.

Virtual terminal for "Applying brake when downward ramp is activated"

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

- When bit 9 is set during the downward ramp, the MOVIMOT® inverter applies the brake (directly via the brake output or via the MOVIMOT® signal relay output) and blocks the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied regardless of the state of bit 9.
- After activation of the rapid stop, the enable must only be granted again once the drive has reached a standstill.

Flow diagram for brake control with "rapid stop" sub-function (control via RS485):

333149963

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

Brake control (control via RS485 + binary control)**Mechanical brake controlled by MOVIMOT® inverter:**

- The terminals X1:13, X1:14 and X1:15 in the MOVIMOT® connection box are assigned to the brake coil of the mechanical brake. You must not connect an additional braking resistor to terminals X1:13 and X1:15.
- The relay is switched as a ready relay (standard function).

Mechanical brake controlled by the relay output or the BEM/BES option:**▲ WARNING**

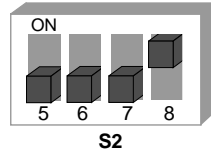
Risk of crushing due to unintentional startup of the drive caused by incorrect settings of the DIP switches S2/5 – S2/8. Failure to comply with chapter "Use of the relay output for additional functions 7, 9, 12 and 13" (→ 101) can result in the brakes releasing.

Severe or fatal injuries.

- Observe the information in chapter "Use of the relay output for additional functions 7, 9, 12 and 13" (→ 101).
- A braking resistor (BW..) must be connected to terminals X1:13 and X1:15 in the MOVIMOT® connection box. Terminal X1:14 is not assigned.
- The K1 relay works as a brake control relay. This means that the ready signal function is no longer available.

6.7.9 Additional function 8

MOVIMOT® with minimum frequency 0 Hz



330101899

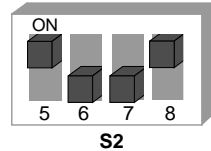
Functional description

Control via RS485: 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 position	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency [Hz] with activated additional function	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 position	0	1	2	3	4	5	6	7	8	9	10
Setpoint f2 [Hz] with activated additional function	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

6.7.10 Additional function 9**MOVIMOT® for lifting applications**

330140427

**▲ WARNING**

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

- The MOVIMOT® drive may not be used as a safety device in hoist applications.
- Use monitoring systems or mechanical protection devices to ensure safety.

**NOTICE**

System overload due to operation of the MOVIMOT® drive at the current limit.

Inverter damage.

- Activate speed monitoring. If the MOVIMOT® drive is operated at the current limit for longer than 1 s, it will trigger the error message F08 "speed monitoring".

Requirements

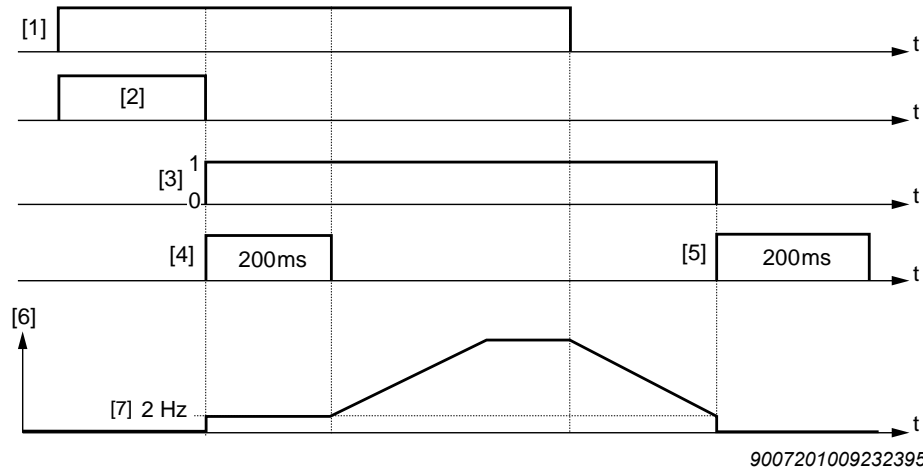
The MOVIMOT® can only be used in hoist applications if the following prerequisites are met:

- Additional function 9 is only possible in conjunction with brake motors.
- Make sure that the DIP switch S2/3 is set to "OFF" (VFC operation).
- It is mandatory to use a brake controller in connection with an external braking resistor.
- Activate the "speed monitoring" function (→ 75) (DIP switch S2/4 = "ON").

Functional description

- The start frequency for binary control mode and RS485 control mode is 2 Hz. If the function is not activated, the start frequency is 0.5 Hz.
- The brake release time is set to 200 ms (standard = 0 ms). This setting prevents the motor from working against the brake.
- The brake application time (post-magnetization time) is set to 200 ms. This setting ensures that the brake is applied as soon as the motor stops generating torque.
- 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 (control via RS485 + binary control):



- [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 = start / minimum frequency

Mechanical brake is controlled by the relay output or the BEM/BES option.

▲ WARNING



Risk of crushing due to unintentional startup of the drive caused by incorrect settings of the DIP switches S2/5 – S2/8. Failure to comply with chapter "Use of the relay output for additional functions 7, 9, 12 and 13" (→ 101) can result in the brakes releasing.

Severe or fatal injuries.

- Observe the information in chapter "Use of the relay output for additional functions 7, 9, 12 and 13" (→ 101).
- A braking resistor (BW..) must be connected to terminals X1:13 and X1:15 in the MOVIMOT® connection box. Terminal X1:14 is not assigned.
- The K1 relay works as a brake control relay. This means that the ready signal function is no longer available.

INFORMATION



"Brake release without enable" is not available in hoist operation.

6

"Easy" startup

Selectable additional functions MM..D-503-00

"Rapid stop" sub-function (only with control via RS485)

- The "rapid stop" function (apply brake during downward ramp) is introduced for control via RS485. This function is assigned to bit 9 in the control word as virtual terminal in line with MOVILINK® profile.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
not assigned ¹⁾						Bit "9"	Bit "8"	Not assigned ¹⁾	"1" = Reset	Not assigned ¹⁾			"1 1 0" = Enable otherwise stop		

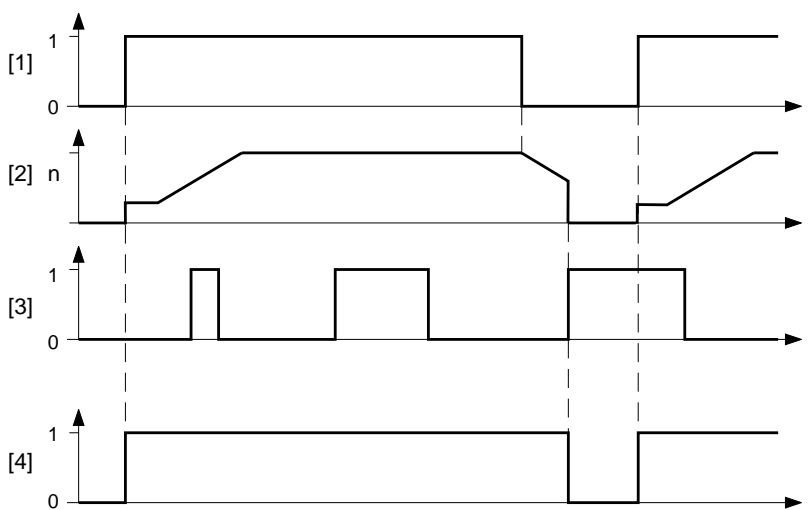
Release brake without enable.

Virtual terminal for "Applying brake when downward ramp is activated"

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

- When bit 9 is set during the downward ramp, the MOVIMOT® inverter applies the brake (directly via the brake output or via the MOVIMOT® signal relay output) and blocks the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied regardless of the state of bit 9.
- After activation of the rapid stop, the enable must only be granted again once the drive has reached a standstill.

Flow diagram for brake control with "rapid stop" sub-function (control via RS485):



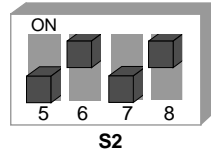
9007199589234187

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

21214190/EN – 10/2014

6.7.11 Additional function 10

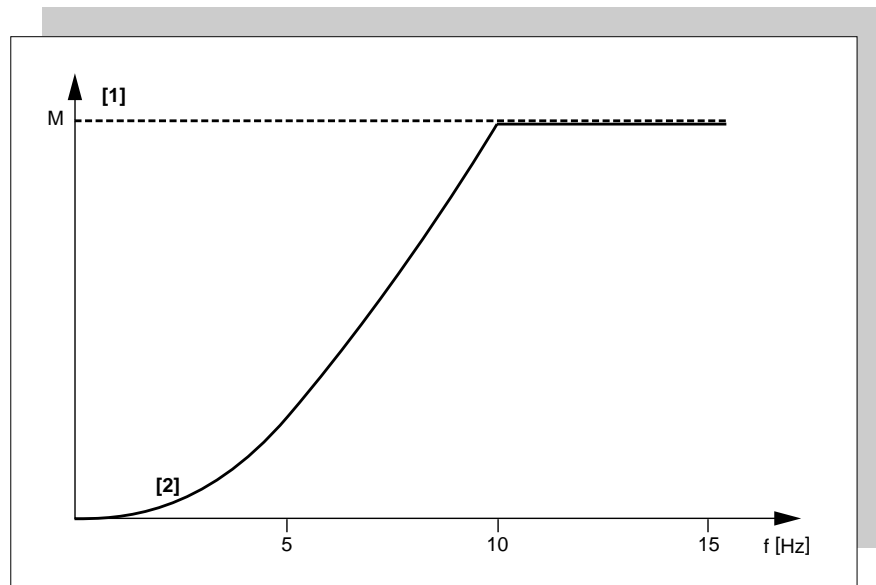
MOVIMOT® with reduced torque at low frequencies



330179211

Functional description

- Through reducing the slip compensation and active current at low speeds, the drive only develops a reduced torque (see the figure which follows):
- Minimum frequency = 0 Hz, see additional function 8 (→ 87).



334866315

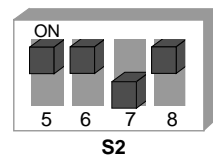
- [1] Maximum torque in VFC mode
- [2] Maximum torque when additional function 10 is activated

6.7.12 Additional function 11**Deactivating the line phase failure monitoring****NOTICE**

Deactivating the line phase failure monitoring can damage the unit if conditions are unfavorable.

Inverter damage.

- Deactivate the line phase failure check with short-term asymmetries of the line voltage.
- Make sure that the MOVIMOT® drive is always supplied with all 3 phases of the line voltage.



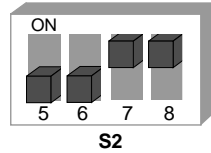
330218763

Functional description

- 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.

6.7.13 Additional function 12

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



330259595

Functional description

- The additional function includes the following functions when the MOVIMOT® inverter is mounted close to the motor:
 - Motor protection via indirect TH evaluation via direction of rotation terminals
 - Rapid start and stop function

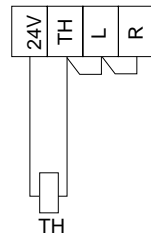
Sub-function "Motor protection via TH evaluation"

This function is only active with control via RS485. This additional function causes a tripping of error 84 "Motor overtemperature".

The error is triggered when **all** the following conditions are fulfilled:

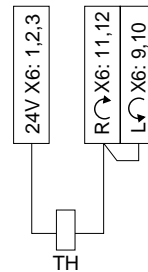
- The standard MOVIMOT® motor protection function is deactivated when the DIP switch S1/5 is set to "ON".
- The terminals for direction of rotation are connected to 24 V via a TH as in the following figure.

For field distributors:



9007199586919307

For mounting close to the motor with option P2.A:



9007199881486475

- The TH tripped due to motor overtemperature. The enable signal for the two direction of rotation terminals is canceled.
- Supply voltage is connected.

INFORMATION



You can deactivate the "motor protection function using TH evaluation" 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.

6

"Easy" startup

Selectable additional functions MM..D-503-00

"Rapid start" sub-function (control via RS485 + binary control)

- 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.

"Rapid stop" sub-function (only with control via RS485)

- With control via RS485, the "apply brake during downward ramp" function is introduced. This functionality is assigned to bit 9 in the control word as virtual terminal in line with MOVILINK® profile.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Not assigned ¹⁾						Bit "9"	Bit "8"	Not assigned ¹⁾	"1" = Reset	Not assigned ¹⁾			"1 1 0" = Enable otherwise stop		

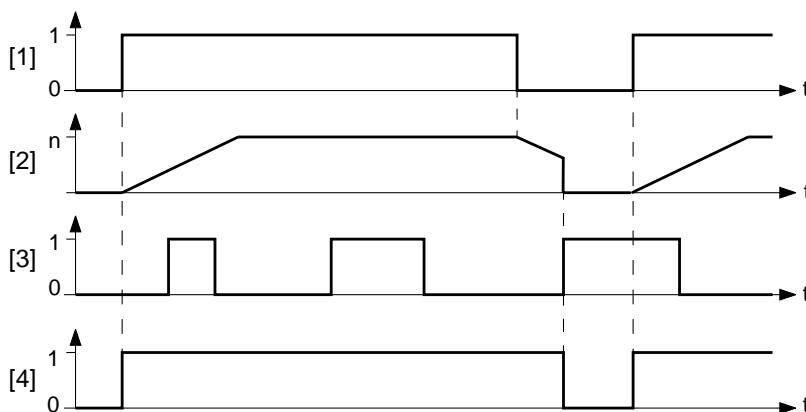
Release brake without enable.

Virtual terminal for "Applying brake when downward ramp is activated"

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

- When bit 9 is set during the downward ramp, the MOVIMOT® inverter applies the brake (directly via the brake output or via the MOVIMOT® signal relay output) and blocks 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.
- After activation of the rapid stop, the enable must only be granted again once the drive has reached a standstill.

Brake control flow diagram with the sub-function "rapid stop" (control via RS485):



9007199589659275

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

21214190/EN – 10/2014

Brake control (control via RS485 + binary control)

Mechanical brake controlled by MOVIMOT® inverter:

- The terminals X1:13, X1:14 and X1:15 in the MOVIMOT® connection box are assigned to the brake coil of the mechanical brake. You must not connect an additional braking resistor to terminals X1:13 and X1:15.
- The relay is switched as a ready relay (standard function).

Mechanical brake controlled by the relay output or the BEM/BES option:**▲ WARNING**

Risk of crushing due to unintentional startup of the drive caused by incorrect settings of the DIP switches S2/5 – S2/8. Failure to comply with chapter "Use of the relay output for additional functions 7, 9, 12 and 13" (→ 101) can result in the brakes releasing.

Severe or fatal injuries.

- Observe the information in chapter "Use of the relay output for additional functions 7, 9, 12 and 13" (→ 101).
-
- A braking resistor (BW..) must be connected to terminals X1:13 and X1:15 in the MOVIMOT® connection box. Terminal X1:14 is not assigned.
 - The K1 relay works as a brake control relay. This means that the ready signal function is no longer available.

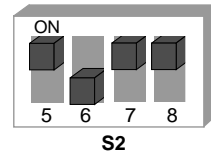
6

"Easy" startup

Selectable additional functions MM..D-503-00

6.7.14 Additional function 13

MOVIMOT® with extended speed monitoring



330300683



▲ WARNING

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

- The MOVIMOT® drive may not be used as a safety device in hoist applications.
- Use monitoring systems or mechanical protection devices to ensure safety.

Requirements

The MOVIMOT® can only be used in hoist applications if the following prerequisites are met:

- Additional function 13 is only possible in conjunction with brake motors.
- Make sure that the DIP switch S2/3 is set to "OFF" (VFC operation).
- It is mandatory to use a brake controller in connection with an external braking resistor.
- Please note the descriptions and information for additional function 9 (→ 88).

Functional description

Additional function 13 includes the following functions:

- Additional function 9, MOVIMOT® for lifting applications (→ 88)
- Speed monitoring with adjustable monitoring time

Once the 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 has the following functions depending on the set RS485 address:

Binary control**The RS485 address set at DIP switches S1/1 – 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 set 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 set to 5 Hz.
 - The ramp time is set at switch t1.

Control via RS485**The RS485 address set at DIP switches S1/1 – S1/4 is not 0.**

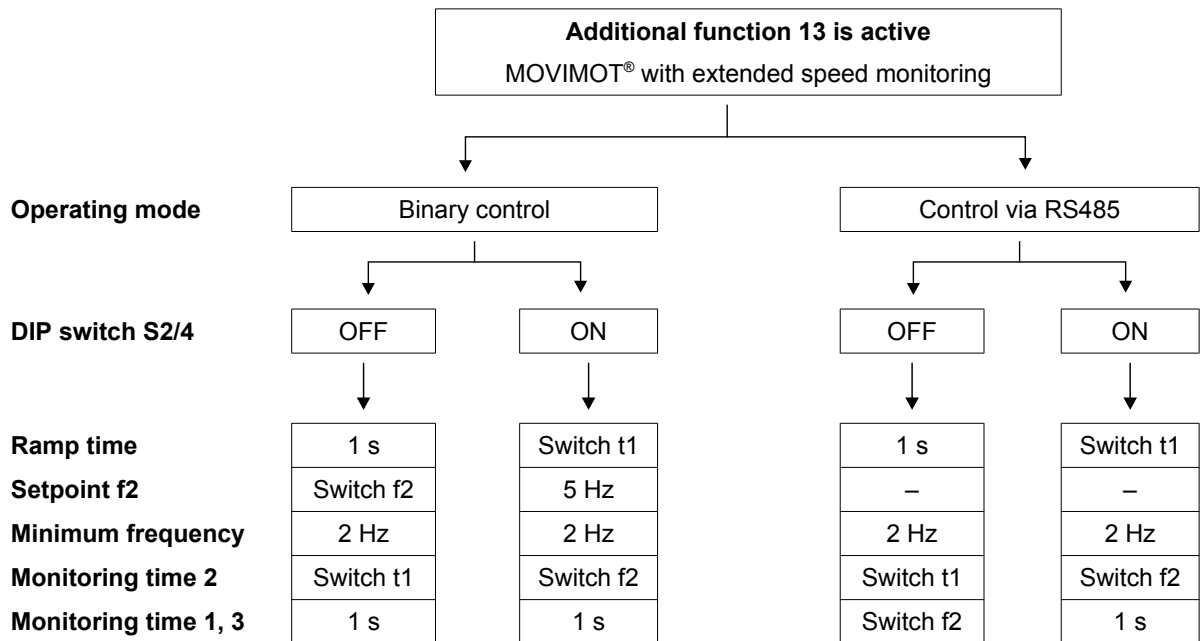
- S2/4 = "OFF"
 - The speed monitoring time 2 is set at switch t1.
 - The speed monitoring times 1 and 3 are set at switch f2.
 - The ramp time is set to 1 s.
 - The minimum frequency is set to 2 Hz.
- S2/4 = "ON"
 - The speed monitoring time 2 is set at switch f2.
 - The speed monitoring times 1 and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

6

"Easy" startup

Selectable additional functions MM..D-503-00

Setting options for additional function 13



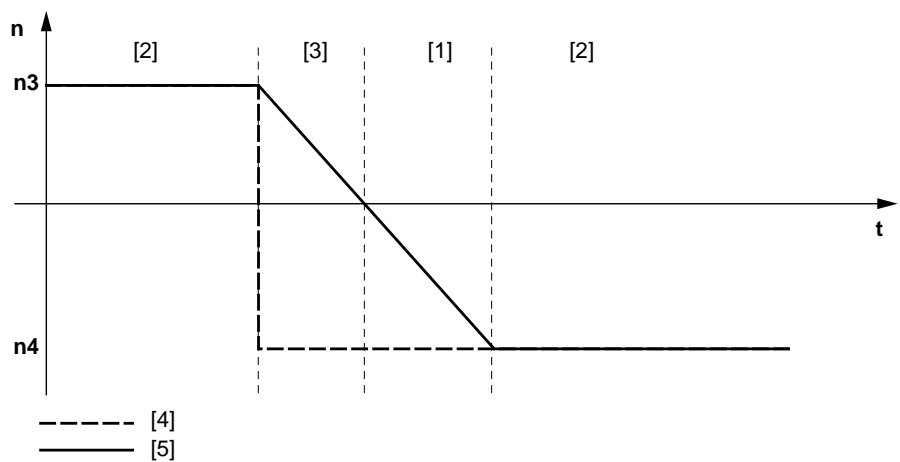
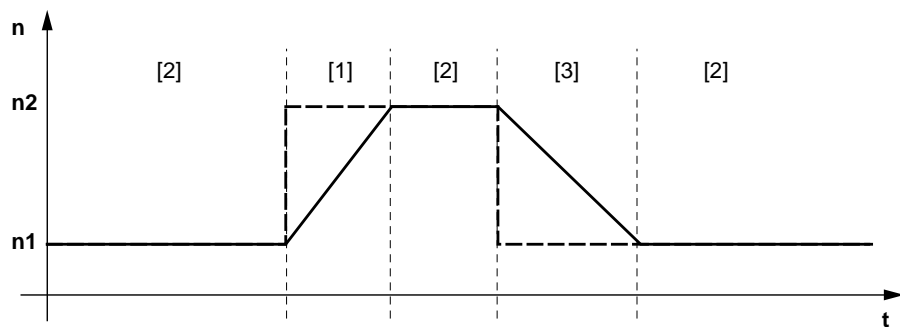
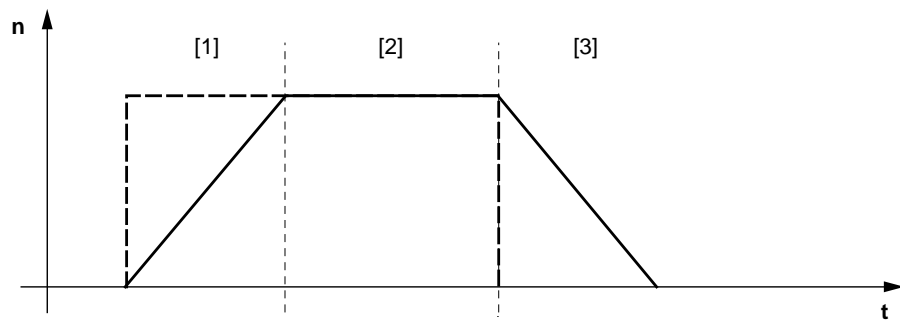
Setting the speed monitoring times

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 position	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



- [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)

9007199591797259

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.

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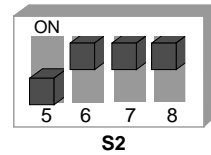
6

"Easy" startup

Selectable additional functions MM..D-503-00

6.7.15 Additional function 14

MOVIMOT® with deactivated slip compensation



330342539

Functional description

Slip compensation is deactivated.

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

6.7.16 Using the relay output for additional functions 7, 9, 12 and 13

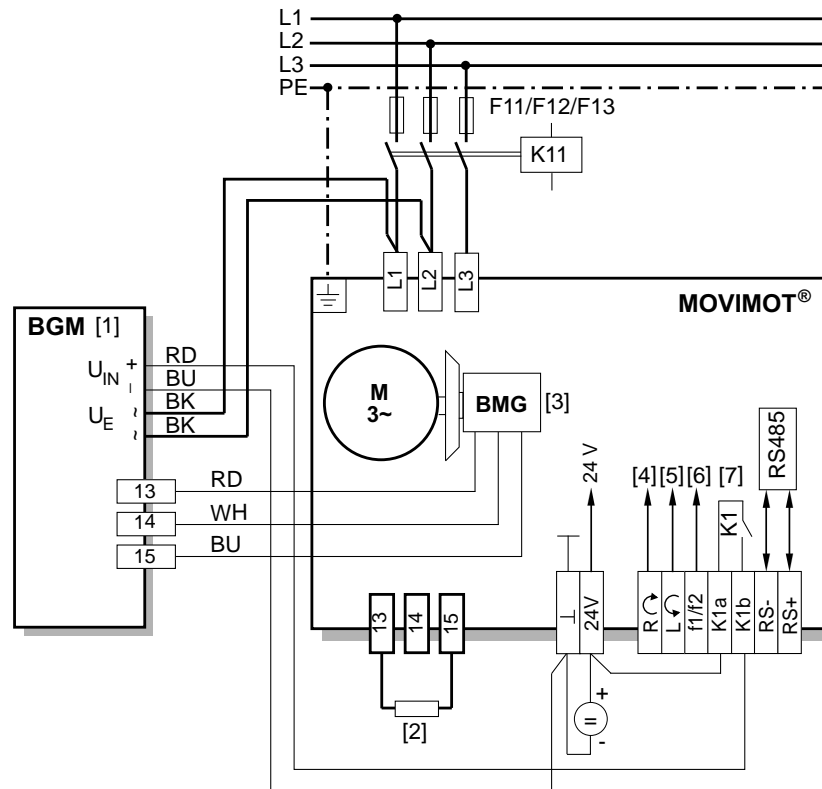
▲ WARNING



Risk of crushing if the drive starts up unintentionally.
Severe or fatal injuries.

- The brake coil must correspond to the line voltage (e.g. 400 V).
- Do not assign port X1:14.
- The additional functions 7, 9 or 13 must be activated as otherwise the brake is released permanently. Please ensure this is the case with replacing the MOVIMOT® inverter. If none of the functions referred to are activated, the K1 relay contact acts as a ready contact. This means that the brake is released even without enable when using the BGM option.

The following figure shows the use of the K1 relay contact for controlling the mechanical brake with the BGM brake rectifier.



9007201255929483

- [1] BGM brake control mounted in the connection box
- [2] External braking resistor BW (for assignment see "Technical data" chapter)
- [3] DC 24 V supply
- [4] CW/Stop
- [5] Observe enabled CCW/Stop direction of rotation, see chapter "Connection of MOVIMOT® drive" (→ 41)
- [6] Setpoint changeover f1 / f2
- [7] Brake relay

6 "Easy" startup

Startup with binary control

6.8 Startup with binary control

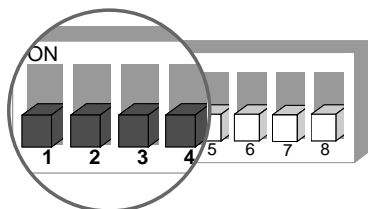


▲ WARNING

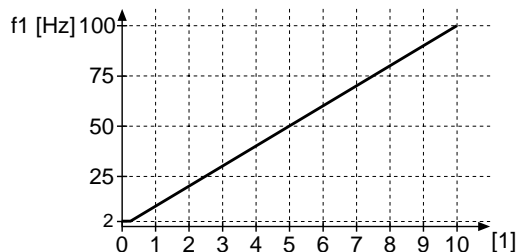
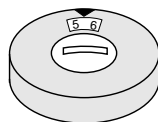
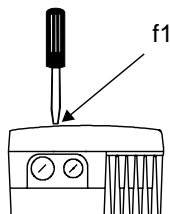
Electric shock from capacitors that have not been fully discharged.
Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**

1. Remove the MOVIMOT® inverter from the connection box.
2. Check whether the MOVIMOT® drive is installed correctly both mechanically and electrically.
Refer to chapters "Mechanical installation" and "Electrical installation".
3. Make sure that the DIP switches S1/1 – S1/4 are set to "OFF" (address = 0). This means MOVIMOT® is controlled binary via terminals.



4. Set the first speed at the setpoint potentiometer f1 (active when terminals f1/f2 X6:7,8 = "0") factory setting: about 50 Hz (1500 rpm).



18014398838894987

[1] Potentiometer setting

5. **NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostic interface are installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

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

6. Set the second speed at switch f2 (active when terminals f1/f2 X6,7,8 = "1").



Switch f2											
Detent position	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

INFORMATION



The first speed is 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.

7. Set the ramp time at the switch t1.

The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).



Switch t1											
Detent position	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

8. Place the MOVIMOT® inverter onto the connection box and screw it on tightly.

9. Switch on the DC 24 V control voltage and the line voltage.

6.8.1 Inverter behavior depending on terminal signal level

The following table shows the behavior of the MOVIMOT® inverter depending on the level at the control terminals:

Inverter behavior	Terminal signal level					Status LED
	Supply system	24 V	f1/f2	CW/Stop	CCW/Stop	
	X1:L1 – L3	X6:1,2,3	X6:7,8	X6:11,12	X6:9,10	
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 rotation with f1	1	1	0	1	0	Green
CCW rotation with f1	1	1	0	0	1	Green
CW rotation with f2	1	1	1	1	0	Green
CCW rotation with f2	1	1	1	0	1	Green
Stop	1	1	x	1	1	Yellow

Key:

0 = No voltage

1 = Voltage

X = Any

6

"Easy" startup

Startup with options MBG11A or MLG..A

6.9 Startup with options MBG11A or MLG..A



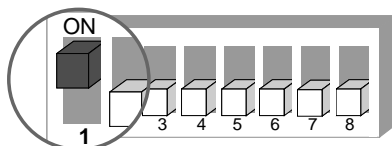
▲ WARNING

Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**

1. Remove the MOVIMOT® inverter from the connection box.
2. Check whether the MOVIMOT® drive is installed correctly both mechanically and electrically.
Refer to chapters "Mechanical installation" and "Electrical installation".
3. Set the MOVIMOT® DIP switch S1/1 to ON (= address 1).



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



Switch f2											
Detent position	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

5. Set the ramp time at the switch t1.

The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).



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

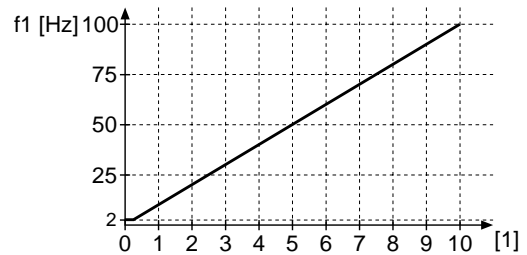
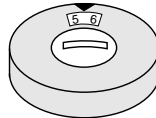
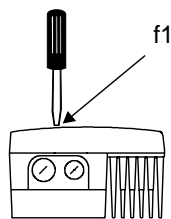
6. Check to see if the requested direction of rotation has been enabled.

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 rotation is enabled. • Setpoint selections for CCW direction of rotation cause the drive to stop.

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CW/Stop	CCW/Stop	Meaning
Not activated	Activated	<ul style="list-style-type: none"> Only CCW rotation is enabled Setpoint selections for CW direction of rotation cause the drive to stop.
Not activated	Not activated	Unit is inhibited or drive brought to a stop

- Place the MOVIMOT® inverter onto the connection box and screw it on tightly.
- Set the required maximum speed using setpoint potentiometer f1.



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[1] Potentiometer setting

- NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostics interface are installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

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

- Switch on the DC 24 V control voltage and the supply voltage.

INFORMATION



For notes on operation with the MBG11A or MLG..A options, refer to sec. "MBG11A and MLG..A operator terminals" (→ 175).

6

"Easy" startup

Startup with MWA21A option

6.10 Startup with MWA21A option

▲ WARNING



Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

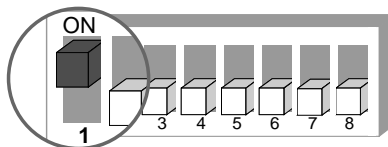
- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:

– **1 minute**

1. Remove the MOVIMOT® inverter from the connection box.
2. Check whether the MOVIMOT® drive is installed correctly both mechanically and electrically.

Refer to chapters "Mechanical installation" and "Electrical installation".

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



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



Switch f2											
Detent position	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

5. Set the ramp time at the switch t1.

The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).



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

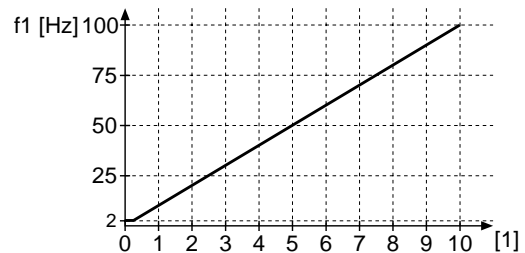
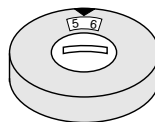
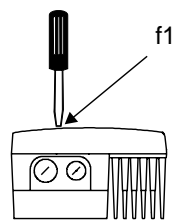
6. Check to see if the requested direction of rotation has been enabled.

CW/Stop	CCW/Stop	Meaning
Activated	Activated	• Both directions of rotation are enabled.
Activated	Not activated	• Only CW rotation is enabled. • Setpoint selections for CCW direction of rotation cause the drive to stop.

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CW/Stop	CCW/Stop	Meaning
Not activated	Activated	<ul style="list-style-type: none"> Only CCW rotation is enabled Setpoint selections for CW direction of rotation cause the drive to stop.
Not activated	Not activated	Unit is inhibited or drive brought to a stop

- Place the MOVIMOT® inverter onto the connection box and screw it on tightly.
- Set the maximum speed required using setpoint potentiometer f1 of the MOVIMOT® inverter.



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[1] Potentiometer setting

- NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostics interface are installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

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

- 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
U signal = 0 – 10 V	OFF	OFF	No
I signal = 0 – 20 mA	ON	OFF	
I signal = 4 – 20 mA	ON	ON	yes
U signal = 2 – 10 V	OFF	ON	

- Switch on the DC 24 V control voltage and the supply voltage.
- Enable the MOVIMOT® drive. This means applying 24 V to terminal 4 (CW rotation) or terminal 5 of the MWA21A option.


6

"Easy" startup

Startup with MWA21A option



INFORMATION

For notes on operation with the MWA21A option, refer to chapter "MWA21A setpoint converter" (→  176).

6.11 Startup with MWF11A option

▲ WARNING



Electric shock from capacitors that have not been fully discharged.
Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - 1 minute

1. Remove the MOVIMOT® inverter from the connection box.
2. Check whether the MOVIMOT® drive is installed correctly both mechanically and electrically. See chapt. "Mechanical installation" and "Electrical installation".
3. Set the RS485 address of the drive at DIP switches S1/1 – S1/4.

Always set address "1" for the "point to point" mode or "point to point with alternating 2PD/3PD".

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

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



Switch f2											
Detent position	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

5. If the ramp time is not specified via the option, set the ramp time at switch t1. The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).



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

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

CW/Stop	CCW/Stop	Meaning
Activated	Activated	• Both directions of rotation are enabled.

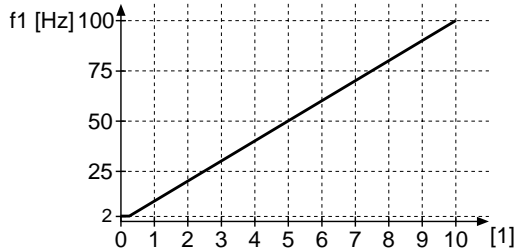
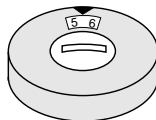
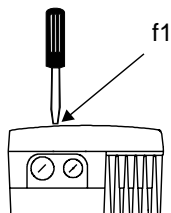
6

"Easy" startup

Startup with MWF11A option

CW/Stop	CCW/Stop	Meaning
Activated	Not activated	<ul style="list-style-type: none"> Only CW rotation is enabled. Setpoint selections for CCW direction of rotation cause the drive to stop.
Not activated	Activated	<ul style="list-style-type: none"> Only CCW rotation is enabled Setpoint selections for CW direction of rotation cause the drive to stop.
Not activated	Not activated	Unit is inhibited or drive brought to a stop

- Place the MOVIMOT® inverter onto the connection box and screw it on tightly.
- Set the required maximum speed using setpoint potentiometer f1.



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[1] Potentiometer setting

- NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostics interface are installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

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

- Switch on the DC 24 V control voltage and the supply voltage.

INFORMATION



For notes on operation with the MWF11A option, refer to chapter "MWF11A setpoint converter" (→ 177).

6.12 Supplementary notes for installation close to the motor

When the MOVIMOT® inverter is installed close to the motor, observe the following notes:

6.12.1 Checking the connection type for the connected motor

Make sure that the selected connection type of MOVIMOT® inverter corresponds to that of the connected motor according to the figure below.



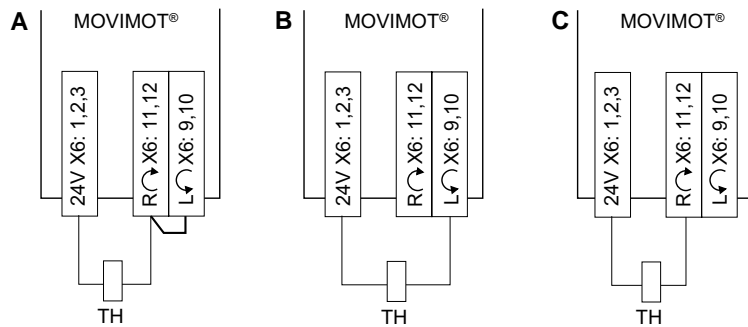
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For brakemotors: Do not install brake rectifiers inside the terminal box of the motor!

6.12.2 Motor protection and direction of rotation enable

The connected motor must be equipped with a TH.

- For control via RS485, 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.

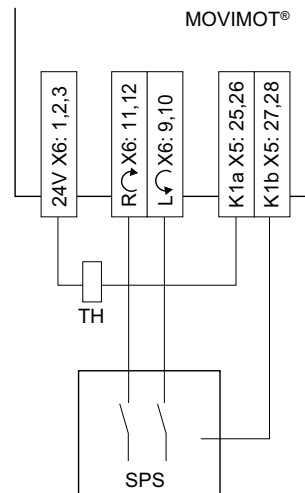
- For control via binary signals, SEW-EURODRIVE recommends that you connect the TH in series with the "Ready signal" relay (see the following figure).
 - The ready signal must be monitored by an external controller.

6

"Easy" startup

Supplementary notes for installation close to the motor

- As soon as the ready signal is no longer present, the drive must be switched off (terminals R ↻ X6:11,12 and L ↻ X6:9,10 = "0").



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6.12.3 DIP switch

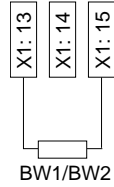
When the MOVIMOT® inverter is installed close to the motor, the DIP switch S1/5 must be changed from the factory setting to "ON":

S1 Meaning	Binary coding RS485 unit address				5 Motor pro- tection	6 Motor performance lev- el	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 stage smaller	Variable (16, 8, 4 kHz)	On
OFF	0	0	0	0	On	Adjusted	4 kHz	Off

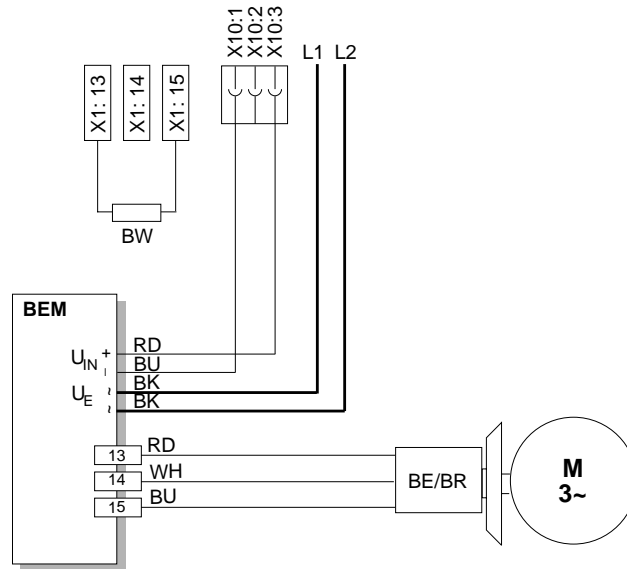
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6.12.4 Braking resistor

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



- 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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6.12.5 Mounting the MOVIMOT® inverter in the field distributor

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

7 "Easy" startup with RS485 interface/fieldbus

General information concerning startup

7 "Easy" startup with RS485 interface/fieldbus

7.1 General information concerning startup

INFORMATION



You must comply with the general safety notes in the chapter "Safety notes" during startup.



▲ WARNING

Risk of crushing due to missing or defective protective covers.

Severe or fatal injuries.

- Install the protective covers of the plant according to the instructions, see the operating instructions of the gear unit.
- Never start the unit if the protective covers are not installed.



▲ WARNING

Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**



▲ WARNING

Device malfunction due to incorrect device setting.

Severe or fatal injuries.

- Comply with the startup instructions.
- The installation must be carried out by qualified personnel only.
- Always use the appropriate functional settings.



▲ WARNING

Danger of burns due to hot surfaces of the unit (e.g. the heat sink).

Serious injuries.

- Do not touch the unit until it has cooled down sufficiently.

INFORMATION



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

INFORMATION



- Remove status LED paint protection cap before startup. Remove paint protection film from the nameplates before startup.
- Observe a minimum switch-off time of 2 seconds for the K11 line contactor.

7.2 Requirements

The following conditions apply to the startup:

- The MOVIMOT® drive must be installed correctly both mechanically and electrically.
- Appropriate safety measures prevent the drives from starting up unintentionally.
- Appropriate safety measures must be taken to prevent risk of injury or damage to the machine.

7 "Easy" startup with RS485 interface/fieldbus

Startup procedure

7.3 Startup procedure



▲ WARNING

Electric shock from capacitors that have not been fully discharged.
Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**

1. Remove the MOVIMOT® inverter from the connection box.
2. Check whether the MOVIMOT® drive is installed correctly both mechanically and electrically. Refer to chapters "Mechanical installation" and "Electrical installation".
3. Set the correct RS485 address of the drive at DIP switches S1/1 – S1/4.

In conjunction with SEW fieldbus interfaces (MF../MQ..) or with MOVIFIT®, always set address "1".

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

= ON

= OFF

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



Switch f2	
Detent position	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

5. If the ramp time is not specified via the fieldbus, set the ramp time at switch t1.
The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).

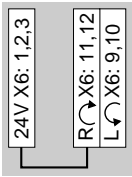
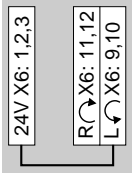
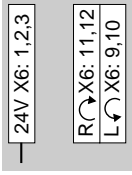


Switch t1	
Detent position	0 1 2 3 4 5 6 7 8 9 10
Ramp time t1 [s]	0.1 0.2 0.3 0.5 0.7 1 2 3 5 7 10

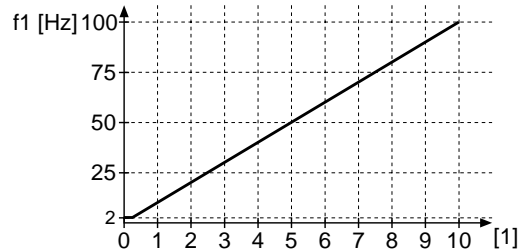
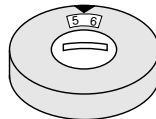
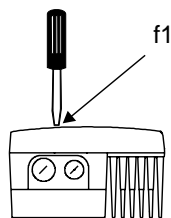
6. Check to see if the requested direction of rotation has been enabled.

CW/Stop	CCW/Stop	Meaning
Activated	Activated	• Both directions of rotation are enabled.

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CW/Stop	CCW/Stop	Meaning
Activated	Not activated	<ul style="list-style-type: none"> Only CW rotation is enabled. Setpoint selections for CCW direction of rotation cause the drive to stop.
		
Not activated	Activated	<ul style="list-style-type: none"> Only CCW rotation is enabled Setpoint selections for CW direction of rotation cause the drive to stop.
		
Not activated	Not activated	<ul style="list-style-type: none"> Unit is inhibited or drive brought to a stop.
		

- Place the MOVIMOT® inverter onto the connection box and screw it on tightly.
- Set the required maximum speed using setpoint potentiometer f1.



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[1] Potentiometer setting

- NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostic interface are installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

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

- Switch on the DC 24 V control voltage and the line voltage.

For further information on the function in conjunction with the RS485 master, refer to chapter "Function with RS485 master" (→ 125) of the operating instructions.

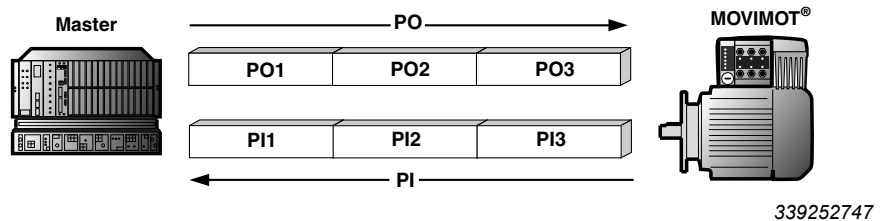
For further information on the function in connection with fieldbus interfaces, refer to the relevant fieldbus manuals.

7.4 Coding of process data

The same process data information is used for control and setpoint selection in all fieldbus systems. The coding of the process data takes place according to the uniform MOVILINK® profile for SEW drive inverters.

MOVIMOT® is available in the following variants:

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



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

7.4.1 2 process data words

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

7.4.2 3 process data words

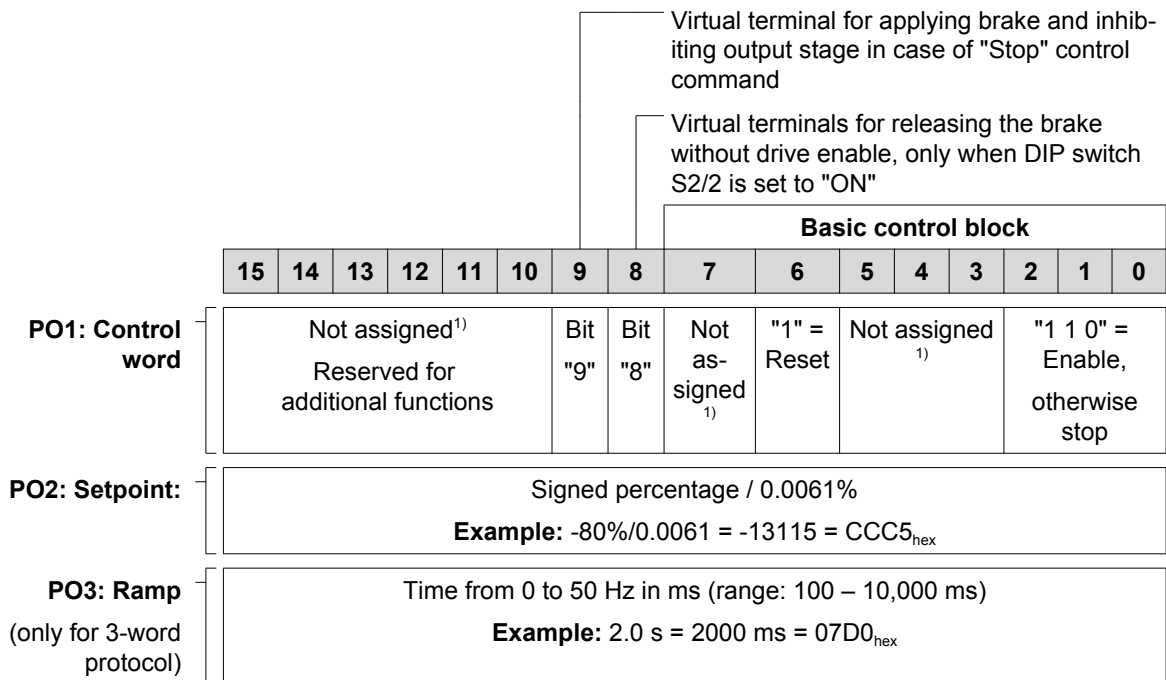
For control with 3 process data words, the "ramp" is sent as an additional process data output word and "Status word 2" is sent as the third process data input word.

7.4.3 Process output data

Process output data is sent from the higher-level controller to the MOVIMOT® inverter (control information and setpoints). However, they only become effective in the MOVIMOT® inverter if the RS485 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® drive using the following process output data:

- PO1: Control word
- PO2: Speed [%] (setpoint)
- PO3: Ramp (only for 3-word protocol)



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}. To enable the MOVIMOT® inverter, you must also switch terminal R ↻ X6:11,12 and/or L ↻ X6:9,10 to +24 V (jumper 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 ensure compatibility with other SEW inverter series. If bit 2 = "0", the MOVIMOT® inverter stops the drive with the current ramp.

Control word, bit 6 = reset

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

Control word, bit 8 = release brake without drive enable

If DIP switch S2/2 is set to "ON", you are able to release the brake without drive enable by setting bit 8.

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7 "Easy" startup with RS485 interface/fieldbus

Coding of process data

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

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

Speed [%]

The speed setpoint is given as a percentage and refers to the maximum speed which you set on the setpoint potentiometer f1.

Coding: $C000_{hex}$ = -100% (CCW rotation)
 4000_{hex} = +100% (CW rotation)
 → 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 MOVIMOT® is controlled by two process data items.

Coding: → 1 digit = 1 ms
Range: 100 – 10000 ms
Example: 2.0 s = 2000 ms = $2000_{dec} = 07D0_{hex}$

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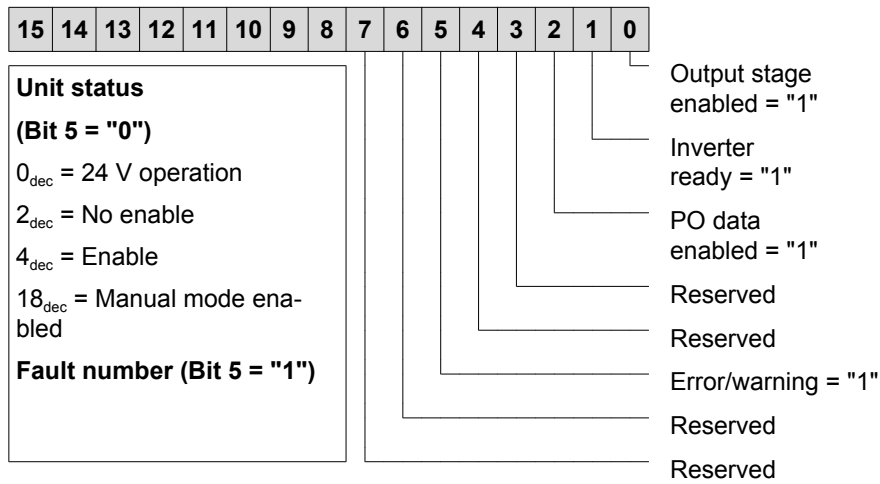
7.4.4 Process input data

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 (only for 3-word protocol)

PI1: Status word 1



PI2: Current actual value

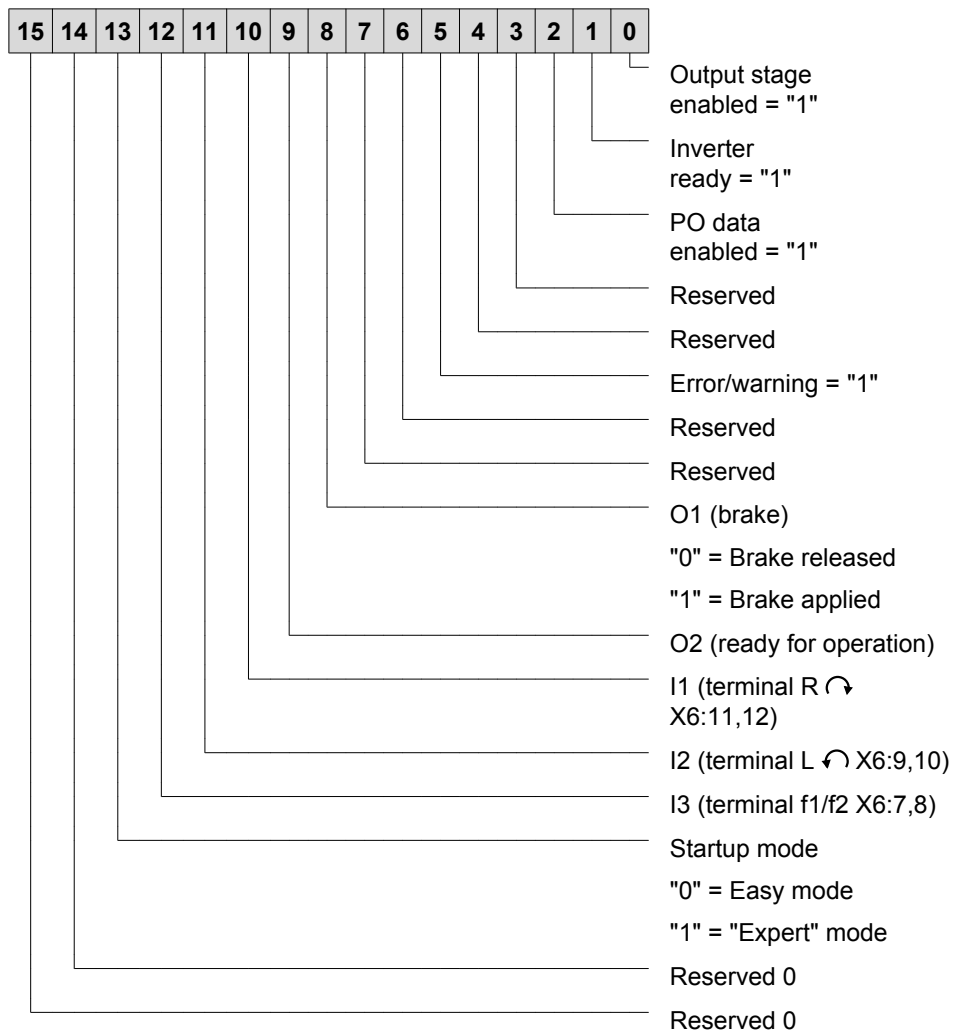
16 bit integer with sign x 0.1% I_N

Example: 0320_{hex} = 800 x 0.1% I_N = 80% I_N

7 "Easy" startup with RS485 interface/fieldbus

Coding of process data

PI3: Status word 2 (only for 3-word protocol)



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Assignment status word 1

Bit	Meaning	Explanation
0	Output stage enabled	1: MOVIMOT® drive is enabled.
		0: MOVIMOT® drive is not enabled.
1	Inverter ready	1: MOVIMOT® drive is ready for operation.
		0: MOVIMOT® drive is not ready for operation.
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	Error/warning	1: Error/warning present.
		0: No error/warning present.
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: Fault number	If there is no error/warning (bit 5 = 0), the operating/enable status of the inverter power section is displayed in this byte. If there is an error/warning (bit 5 = 1), the fault number is displayed in this byte.

7 "Easy" startup with RS485 interface/fieldbus

Coding of process data

Assignment of status word 2

Bit	Meaning	Explanation
0	Output stage enabled	1: MOVIMOT® drive is enabled.
		0: MOVIMOT® drive is not enabled.
1	Inverter ready	1: MOVIMOT® drive is ready for operation.
		0: MOVIMOT® drive is not ready for operation.
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	Error/warning	1: Error/warning present.
		0: No error/warning present.
6	Reserved	Reserved = 0
7	Reserved	Reserved = 0
8	O1 brake	1: Brake applied
		0: Brake released
9	O2 ready for operation	1: MOVIMOT® drive is ready for operation.
		0: MOVIMOT® drive is not ready for operation.
10	I1 (R X6:11,12)	1: Digital input is set. 0: Digital input is not set
11	I2 (L X6:9,10)	
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

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7.5 Function with RS485 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 chapter "Coding of process data") with a fixed transfer rate of 9600 baud.

7.5.1 Telegram structure

▲ WARNING

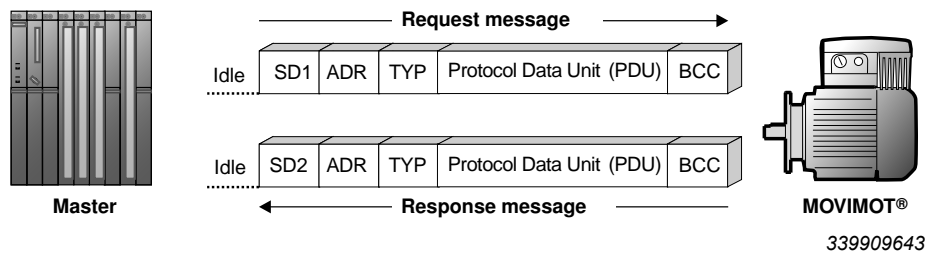


Danger of fatal injury due to uncontrolled operation.

There is no timeout monitoring when "acyclical" messages (type = "acyclical") are sent. The drive can continue to operate uncontrolled when the bus connection is interrupted.

- Run the bus connection between master and MOVIMOT® inverter only with "cyclical" transmission.

The following figure shows the message structure between the RS485 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

INFORMATION



When "cyclic" messages (type = "cyclic") are sent, the MOVIMOT® inverter expects the next bus activity after a maximum time of one second (master protocol). If the MOVIMOT® inverter does not detect this bus activity, the MOVIMOT® inverter automatically stops the drive (timeout monitoring).

7 "Easy" startup with RS485 interface/fieldbus

Function with RS485 master

7.5.2 Idle and start delimiter

The MOVIMOT® inverter 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.

7.5.3 Address (ADR)

The MOVIMOT® inverter 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.

7.5.4 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 RS485 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!

7.5.5 User data type (TYPE)

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

Type	Transfer 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	

7.5.6 Timeout monitoring

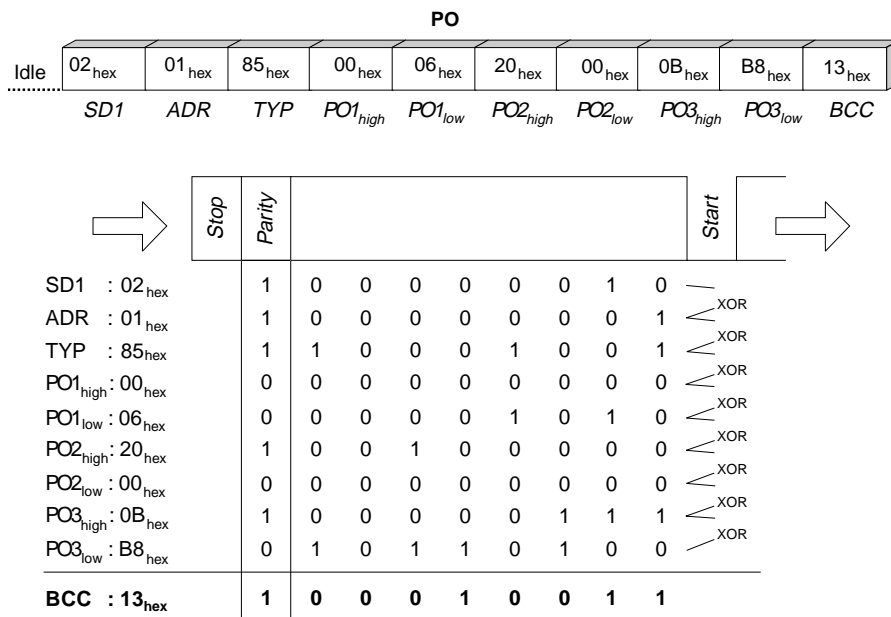
In the "cyclical" transmission variant, the MOVIMOT® inverter expects the next bus activity (request message of types named above) after a maximum of one second. If this bus activity is not detected, the drive automatically decelerates with the most recently valid ramp (timeout monitoring). The "ready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

7.5.7 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 transmitted at the end of the telegram in the BCC.

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. Otherwise, a transmission error has occurred. The message may have to be repeated.



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7.5.8 Message processing in the MOVILINK® master

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

a) Sending a request message

Example: Sending setpoints to the 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) Receive response message

(Acknowledgment 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).

7.5.9 Sample message

This example deals with the control of a MOVIMOT® drive using three process data words of PDU type 85_{hex} (3 PD acyclical). The RS485 master sends three process output data words (PO) to the MOVIMOT® inverter. The MOVIMOT® inverter replies by sending three process input data words (PI).

Request message from RS485 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

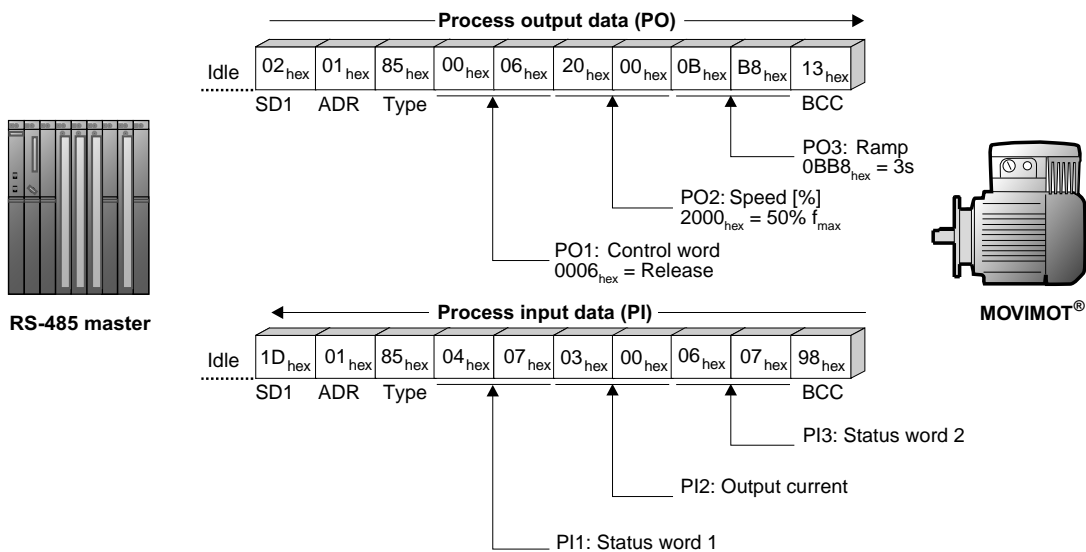
1) f_{max} is specified on setpoint potentiometer f1.

Response message from MOVIMOT® to RS485 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 chapter "Coding process data" (→ 118).

Sample message "3 PD acyclical"



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This example shows the acyclical transmission variant. The timeout monitoring in the MOVIMOT® inverter is deactivated. 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 types named above) after a maximum of 1 second. Otherwise, the MOVIMOT® inverter automatically stops the drive (timeout monitoring).

8 "Expert" startup with parameter function**INFORMATION**

Startup in "Expert" mode is only required if you want to set parameters during startup. Startup in "Expert" mode is only possible if:

- No additional function is activated (DIP switch S2/5 - S2/8 is set to "OFF")
- The Drive ID module is plugged in
- Parameter *P805 Startup mode* is set to "Expert" mode.

8.1 General information concerning startup**INFORMATION**

You must comply with the general safety notes in the chapter "Safety notes" during startup.

▲ WARNING

Risk of crushing due to missing or defective protective covers.
Severe or fatal injuries.

- Install the protective covers of the plant according to the instructions, see the operating instructions of the gear unit.
- Never start the unit if the protective covers are not installed.

▲ WARNING

Electric shock from capacitors that have not been fully discharged.
Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**

▲ WARNING

Device malfunction due to incorrect device setting.
Severe or fatal injuries.

- Comply with the startup instructions.
- The installation must be carried out by qualified personnel only.
- Always use the appropriate functional settings.

▲ WARNING

Danger of burns due to hot surfaces of the unit (e.g. the heat sink).
Serious injuries.

- Do not touch the unit until it has cooled down sufficiently.

INFORMATION



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

INFORMATION



- Remove status LED paint protection cap before startup. Remove paint protection film from the nameplates before startup.
- Observe a minimum switch-off time of 2 seconds for the K11 line contactor.

8.2 Requirements

The following conditions apply to the startup:

- The MOVIMOT® drive must be installed correctly both mechanically and electricaly.
- Appropriate safety measures prevent the drives from starting up unintentionally.
- Appropriate safety measures must be taken to prevent risk of injury or damage to the machine.

The following hardware is required for startup:

- PC or laptop, see chapter "PC/laptop connection" (→ 60)

The following software is required on the PC or laptop:

- MOVITOOLS® MotionStudio

8.3 MOVITOOLS® MotionStudio

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

Install the latest software version of MOVITOOLS® MotionStudio on your PC/laptop. MOVITOOLS® MotionStudio can communicate with the drive units via a wide range of communication 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).

8.3.1 Integrating MOVIMOT® into the MOVITOOLS® MotionStudio

INFORMATION



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.

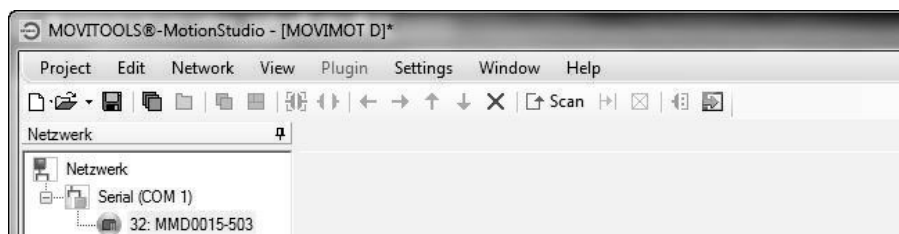
3. Configure the communication channel on the PC/laptop.
4. Make sure that the 24 V supply of the MOVIMOT® inverter is connected.
5. Perform an online scan.
 - Check the set scanning range in MOVITOOLS® MotionStudio.

INFORMATION



- The diagnostic interface is always assigned **address 32**. Adapt the scanning range in MOVITOOLS® MotionStudio so that address 32 is also scanned.
- The baud rate is 9.6 kBaud.
- The online scan can take some time.

6. MOVIMOT® is displayed in the MOVITOOLS® MotionStudio as shown in the example below:



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

8.4 Startup and function expansion with individual parameters

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

INFORMATION



Startup in "Expert" mode is only possible if:

- No additional function is activated (DIP switch S2/5 - S2/8 is set to "OFF")
- The Drive ID module is plugged in
- Parameter *P805 Startup mode* is set to "Expert" mode.

1. Perform "Easy" startup according to section 6.
2. Connect the PC/laptop or the DBG operator terminal to the MOVIMOT® inverter.
See chapter "PC connection" (→ 60) or chapter "DBG operator terminal connection" (→ 59).
3. Connect the 24 V supply of the MOVIMOT® inverter.
4. When using a PC/laptop, start MOVITOOLS® MotionStudio and integrate the MOVIMOT® inverter.
See chapter "Integrating MOVIMOT® in MOVITOOLS® MotionStudio". (→ 131)
5. Set parameter *P805 Startup mode* to "Expert".
6. Specify the parameters which you want to change.
7. Check whether these parameters depend on mechanical controls.
See section "Parameters that depend on mechanical controls" (→ 170).
8. Deactivate the respective controls by adjusting the bit-coded selection box of parameter *P102*.
See chapter "Parameter 102" (→ 153).
9. Change the selected parameters.
For information on parameter setting with the DBG operator terminal, refer to chapter "Parameter mode" (→ 193).
10. Check the functionality of the MOVIMOT® drive.
Optimize the parameters, if required.
11. Disconnect the PC/laptop or the DBG operator terminal from the MOVIMOT® inverter.
12. **NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostics interface are installed incorrectly or not at all.
Damage to the MOVIMOT® inverter.
 - Make sure the screw plug of the setpoint potentiometer has a seal and screw it in.

8.4.1 Example

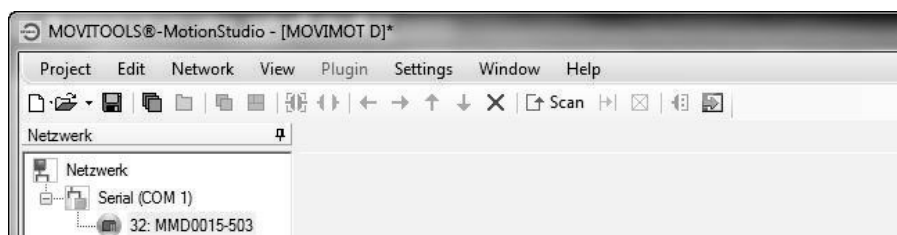
Fine adjustment of setpoint f2 using MOVITOOLS® MotionStudio

1. Perform "Easy" startup using switch f2 for rough adjustment, e.g. setting 5 (25 Hz = 750 rpm).

8 "Expert" startup with parameter function

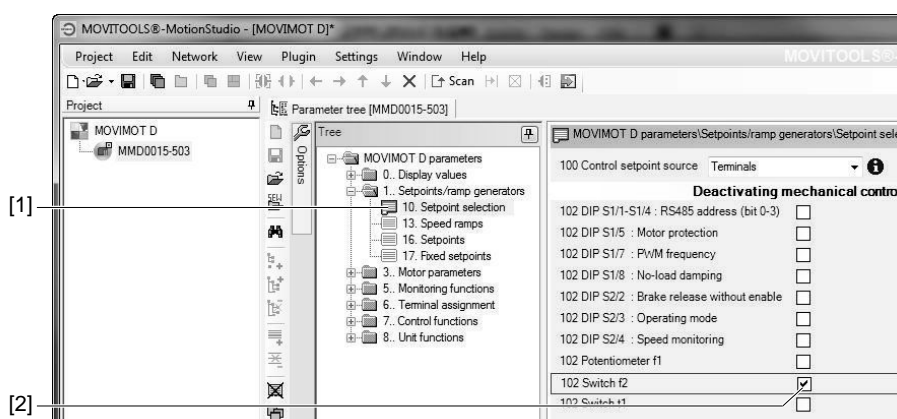
Startup and function expansion with individual parameters

2. Connect the PC/laptop to the MOVIMOT® inverter.
3. Connect the 24 V supply of the MOVIMOT® inverter.
4. Start MOVITOOLS® MotionStudio.
5. Create a project and network.
6. Configure the communication channel on the PC/laptop.
7. Perform an online scan.



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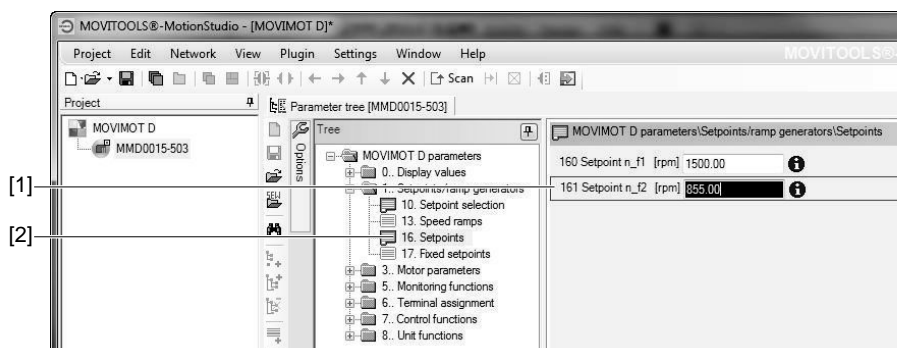
8. Open the context menu by clicking the right mouse button and select the menu item "Startup" > "Parameter tree".
9. Set parameter *P805 Startup mode* to "Expert".



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

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



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

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

E.g. parameter *P161* = 855 rpm (= 28.5 Hz)

12. Disconnect the PC/laptop from the MOVIMOT® inverter.

13. **NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostics interface are installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

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

8.5 Startup and configuration with a central controller and MQP/MFE

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

INFORMATION



Startup in "Expert" mode is only possible if:

- No additional function is activated (DIP switch S2/5 - S2/8 is set to "OFF")
- The Drive ID module is plugged in
- Parameter *P805 Startup mode* is set to "Expert" mode.

1. Check the MOVIMOT® inverter.

See section "Electrical installation".

2. Connect the 24 V supply of the MOVIMOT® inverter.
3. Establish communication between the higher-level controller and the MOVIMOT® inverter.

Connection and communication with the higher-level controller depends on the type of the higher-level controller.

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

4. Set parameter *P805 Startup mode* to "Expert".
5. Deactivate all mechanical controls by overwriting the bit-coded selection box of parameter *P102* with "FFFFhex" (*P102* = "1111 1111 1111 1111").
6. Set the control setpoint source to RS485 by setting the parameter *P100 Control setpoint source* to "1".
7. Set the required parameters.
8. Check the functionality of the MOVIMOT® drive.
Optimize the parameters, if required.

8.6 Startup by transferring the set of parameters

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

Parameters can only be transferred between two identical MOVIMOT® drives (same inverter and same motor).

INFORMATION



The parameter set can only be transferred if:

- No additional function is activated (DIP switch S2/5 – S2/8 is set to "OFF")
- The Drive ID module is plugged in
- A parameter set from one MOVIMOT® reference unit already exists

8.6.1 Transferring the parameter set using MOVITOOLS® or the DBG operator terminal

1. Remove the MOVIMOT® inverter from the connection box.
2. Check the connection of the MOVIMOT® inverter.
See section "Electrical Installation".
3. Set all controls identical with those of the reference unit.
4. Place the MOVIMOT® inverter onto the connection box and screw it on tightly.
5. Connect the PC/laptop or the DBG operator terminal to the MOVIMOT® inverter.
See chapter "PC connection" (→ 60) or chapter "DBG operator terminal connection" (→ 59).
6. Connect the 24 V supply of the MOVIMOT® inverter.
7. When using a PC/laptop, start MOVITOOLS® MotionStudio and integrate the MOVIMOT® inverter in MOVIMOT®.
See chapter "Integrating MOVIMOT® in MOVITOOLS® MotionStudio". (→ 131)
8. Transfer the entire parameter set of the MOVIMOT® reference unit to the MOVIMOT® inverter.
For information on transferring the parameter set with the DBG operator terminal, refer to section "Copying function of the DBG operator terminal" (→ 197).
9. Check the functionality of the MOVIMOT® drive.
10. Disconnect the PC/laptop or the DBG operator terminal from the MOVIMOT® inverter.
11. **NOTICE!** Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostics interface are installed incorrectly or not at all.
Damage to the MOVIMOT® inverter.
 - Make sure the screw plug of the setpoint potentiometer has a seal and screw it in.

8.6.2 Transferring parameters using a central controller and MQP

Parameters can only be transferred between two identical MOVIMOT® drives (same inverter and same motor).

1. Remove the MOVIMOT® inverter from the connection box.
2. Check the MOVIMOT® inverter.
See section "Electrical Installation".
3. Set all controls identical with those of the reference unit.
4. Place the MOVIMOT® inverter onto the connection box and screw it on tightly.
5. Connect the 24 V supply of the MOVIMOT® inverter.
6. Establish communication between the higher-level controller and the MOVIMOT® inverter.

Connection and communication with the higher-level controller depends on the type of the higher-level controller.

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

7. Transfer all MOVIMOT® reference unit parameters to the MOVIMOT® inverter.

INFORMATION

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

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

8. Check the functionality of the MOVIMOT® drive.

8.7 Parameter list

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
0__ Display values					
00_ Process values					
000	8318	0	Speed (signed)	[rpm]	1 digit = 0.001 rpm
002	8319	0	Frequency (signed)	[Hz]	1 digit = 0.001 Hz
004	8321	0	Output current (amount)	[% I _N]	1 digit = 0.001% I _N
005	8322	0	Active current (signed)	[% I _N]	1 digit = 0.001% I _N
006	8323	0	Motor utilization	[%]	1 digit = 0.001%
008	8325	0	DC link voltage	[V]	1 digit = 0.001 V
009	8326	0	Output current	[A]	1 digit = 0.001 A
01_ Status displays					
010	8310	0	Inverter status	[Text]	
011	8310	0	Operating status	[Text]	
012	8310	0	Error status	[Text]	
013	10095	1	Startup mode	[Text]	
014	8327	0	Heat sink temperature	[°C]	1 digit = 1 °C
015	8328	0	Hours of operation	[h]	1 digit = 1 min
016	8329	0	Enable hours	[h]	1 digit = 1 min
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 of setpoint potentiometer f1	0 – 10	1 digit = 0.001
03_ Digital inputs					
031	8334 bit 1	0	Setting digital input X6:11,12	[Bit field]	
	8335	0	Assignment of digital input X6:11,12	CW/Stop (factory setting)	
032	8334 bit 2	0	Setting digital input X6:9,10	[Bit field]	
	8336	0	Assignment of digital input X6:9,10	CCW/Stop (factory setting)	
033	8334 bit 3	0	Setting digital input X6:7,8	[Bit field]	
	8337	0	Assignment of digital input X6:7,8	Setpoint switch mode (factory setting)	

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"Expert" startup with parameter function

Parameter list

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
05_ Digital outputs					
050	8349 bit 0	0	Setting signal relay K1	[Bit field]	
	8350	0	Assignment of signal relay K1	Readiness for operation (factory setting)	
051	8349 bit 1	0	Setting output X10	[Bit field]	
	8351	0	Assignment output X10	Brake released	
07_ Device data					
070	8301	0	Device type	[Text]	
071	8361	0	Nominal output current	[A]	1 digit = 0.001 A
072	10461	3	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	Operating mode	[Text]	
08_ Fault memory					
080	Error t-0		Background information for errors that occurred at t-0		
	8366	0	Error code	Error code	
	9304	0	Error subcode		
	8883	0	Internal error		
	8371	0	Digital input status	[Bit field bit 0, bit 1, bit 2]	
	8381	0	Digital output status K1, X10	[Bit field bit 0, bit 1]	
	8391	0	Inverter status	[Text]	
	8396	0	Heat sink temperature	[°C]	1 digit = 1°C
	8401	0	Speed	[rpm]	1 digit = 0.001 rpm
	8406	0	Output current	[% I _N]	1 digit = 0.001% I _N
	8411	0	Active current	[% I _N]	1 digit = 0.001% I _N
	8416	0	Unit utilization	[% I _N]	1 digit = 0.001% I _N
	8421	0	DC link voltage	[V]	1 digit = 0.001 V
	8426	0	Hours of operation	[h]	1 digit = 1 min.
	8431	0	Enable hours	[h]	1 digit = 1 min.
081	Error t-1		Background information for errors that occurred at t-1		
	8367	0	Error code	Error code	
	9305	0	Error subcode		
	8884	0	Internal error		
	8372	0	Digital input status	[Bit field bit 0, bit 1, bit 2]	

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No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
	8382	0	Digital output status K1, X10	[Bit field bit 0, bit 1]	
	8392	0	Inverter status	[Text]	
	8397	0	Heat sink temperature	[°C]	1 digit = 1°C
	8402	0	Speed	[rpm]	1 digit = 0.001 rpm
	8407	0	Output current	[% I _N]	1 digit = 0.001% I _N
	8412	0	Active current	[% I _N]	1 digit = 0.001% I _N
	8417	0	Unit utilization	[%]	1 digit = 0.001% I _N
	8422	0	DC link voltage	[V]	1 digit = 0.001 V
	8427	0	Hours of operation	[h]	1 digit = 1 min.
	8432	0	Enable hours	[h]	1 digit = 1 min.
082	Error t-2		Background information for errors that occurred at t-2		
	8368	0	Error code	Error code	
	9306	0	Error subcode		
	8885	0	Internal error		
	8373	0	Digital input status	[Bit field bit 0, bit 1, bit 2]	
	8383	0	Digital output status K1, X10	[Bit field bit 0, bit 1]	
	8393	0	Inverter status	[Text]	
	8398	0	Heat sink temperature	[°C]	1 digit = 1°C
	8403	0	Speed	[rpm]	1 digit = 0.001 rpm
	8408	0	Output current	[% I _N]	1 digit = 0.001% I _N
	8413	0	Active current	[% I _N]	1 digit = 0.001% I _N
	8418	0	Unit utilization	[%]	1 digit = 0.001% I _N
	8423	0	DC link voltage	[V]	1 digit = 0.001 V
	8428	0	Hours of operation	[h]	1 digit = 1 min.
	8433	0	Enable hours	[h]	1 digit = 1 min.
083	Error t-3		Background information for errors that occurred at t-3		
	8369	0	Error code	Error code	
	9307	0	Error subcode		
	8886	0	Internal error		
	8374	0	Digital input status	[Bit field bit 0, bit 1, bit 2]	
	8384	0	Digital output status K1, X10	[Bit field bit 0, bit 1]	
	8394	0	Inverter status	[Text]	
	8399	0	Heat sink temperature	[°C]	1 digit = 1°C
	8404	0	Speed	[rpm]	1 digit = 0.001 rpm
	8409	0	Output current	[% I _N]	1 digit = 0.001% I _N
	8414	0	Active current	[% I _N]	1 digit = 0.001% I _N

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"Expert" startup with parameter function

Parameter list

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
	8419	0	Unit utilization	[%]	1 digit = 0.001% I _N
	8424	0	DC link voltage	[V]	1 digit = 0.001 V
	8429	0	Hours of operation	[h]	1 digit = 1 min.
	8434	0	Enable hours	[h]	1 digit = 1 min.
084	Fault t-4		Background information for errors that occurred at t-4		
	8370	0	Error code	Error code	
	9308	0	Error subcode		
	8887	0	Internal error		
	8375	0	Digital input status	[Bit field bit 0, bit 1, bit 2]	
	8385	0	Digital output status K1, X10	[Bit field bit 0, bit 1]	
	8395	0	Inverter status		
	8400	0	Heat sink temperature	[°C]	1 digit = 1°C
	8405	0	Speed	[rpm]	1 digit = 0.001 rpm
	8410	0	Output current	[% I _N]	1 digit = 0.001% I _N
	8415	0	Active current	[% I _N]	1 digit = 0.001% I _N
	8420	0	Unit utilization	[%]	1 digit = 0.001% I _N
	8425	0	DC link voltage	[V]	1 digit = 0.001 V
	8430	0	Hours of operation	[h]	1 digit = 1 min.
	8435	0	Enable hours	[h]	1 digit = 1 min.
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: RS485 (DIP switches S1/1 – S1/4) 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 – 1 – 2000 [s] (Switch t1) ¹⁾	1 digit = 0.001 s

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No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
131	8808	0	Ramp t11 down	0.1 – 1 – 2000 [s] (Switch t1) ¹⁾	1 digit = 0.001 s
134	8474	0	Ramp t12 up = down	0.1 – 10 – 2000 [s]	1 digit = 0.001 s
135	8475	0	S pattern t12	0: OFF 1: Class 1 2: Class 2 3: Class 3	
136	8476	0	Stop ramp t13	0.1 – 0.2 – 2000 [s]	1 digit = 0.001 s
16_ Setpoints					
160	10096	35	Setpoint n_f1	0 – 1500 – 3600 [rpm]	1 digit = 0.001 rpm
161	10096	36	Setpoint n_f2	0 – 150 – 3600 [rpm]	1 digit = 0.001 rpm
17_ Fixed setpoints					
170	8489	0	Fixed setpoint n0	-3600 – 150 – 3600 [rpm]	1 digit = 0.001 rpm
171	8490	0	Fixed setpoint n1	-3600 – 750 – 3600 [rpm]	1 digit = 0.001 rpm
172	8491	0	Fixed setpoint n2	-3600 – 1500 – 3600 [rpm]	1 digit = 0.001 rpm
173	10096	31	Fixed setpoint n3	-3600 – 2500 – 3600 [rpm]	1 digit = 0.001 rpm
3_ Motor parameters					
30_ Limits					
300	8515	0	Start/stop speed	0 – 15 – 150 [rpm]	1 digit = 0.001 rpm
301	8516	0	Minimum speed	0 – 60 – 3600 [rpm]	1 digit = 0.001 rpm
302	8517	0	Maximum speed	0 – 3000 – 3600 [rpm]	1 digit = 0.001 rpm
303	8518	0	Current limit	0 – 160 [% I _N]	1 digit = 0.001% I _N
32_ Motor adjustment					
320	8523	0	Automatic adjustment	0: OFF 1: ON	
321	8524	0	Boost	0 – 100 [%]	1 digit = 0.001%
322	8525	0	IxR compensation	0 – 100 [%]	1 digit = 0.001%
323	8526	0	Pre-magnetization	0 – 2 [s]	1 digit = 0.001 s
324	8527	0	Slip compensation	0 – 500 [rpm]	1 digit = 0.001 rpm
325	8834	0	No-load vibration damping	0: OFF 1: ON (DIP switch S1/8) ¹⁾	
34_ Motor protection					
340	8533	0	Motor protection	0: OFF 1: ON (DIP switch S1/5) ¹⁾	
341	8534	0	Type of cooling	0: Fan cooled 1: Forced cooling	

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Parameter list

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
347	10096	32	Motor cable length	0 – 15 [m]	1 digit = 1 m
5__ Monitoring functions					
50_ Speed monitoring					
500	8557	0	Speed monitoring	0: OFF 3: Motor/regenerative (DIP switch S2/4) ¹⁾	
501	8558	0	Deceleration time	0.1 – 1 – 10 [s]	1 digit = 0.001 s
52_ Power supply-off check					
522	8927	0	Line phase failure monitoring Deactivating the line phase failure monitoring in unfavorable operating conditions can damage the unit.	0: OFF 1: ON	
523	10096	26	Power off monitoring	0: Operation on three-phase line supply 1: Operation with MOVITRANS®	
590	10537	1	Localization	0: OFF 1: ON	
6__ Terminal assignment					
60_ Digital 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_ Digital 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	Operating mode	0: VFC 2: VFC hoist 3: VFC DC braking 21: V/f characteristic 22: V/f + DC braking (DIP switch S2/3) ¹⁾	
71_ Standstill current					

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No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
710	8576	0	Standstill current	0 – 50% I _{Mot}	1 digit = 0.001% I _{Mot}
72_ Setpoint stop function					
720	8578	0	Setpoint stop function	0: OFF 1: ON	
721	8579	0	Stop setpoint	0 – 30 – 500 [rpm]	1 digit = 0.001 rpm
722	8580	0	Start offset	0 – 30 – 500 [rpm]	1 digit = 0.001 rpm
73_ Brake function					
731	8749	0	Brake release time	0 – 2 [s]	1 digit = 0.001 s
732	8585	0	Brake application time	0 – 0.2 – 2 [s]	1 digit = 0.001 s
738	8893	0	Activation of brake release without drive enable	0: OFF 1: ON (DIP switch S2/2) ¹⁾	
77_ Energy saving function					
770	8925	0	Energy saving function	0: OFF 1: ON	
8_ Unit functions					
80_ Setup					
802	8594	0	Factory setting	0: No factory setting 2: Delivery state	
803	8595	0	Parameter lock	0: OFF 1: ON	
805	10095	1	Startup mode	0: Easy 1: Expert	
81_ Serial communication					
810	8597	0	RS485 address	0 – 31 (DIP switches S1/1 S1/4) ¹⁾	
811	8598	0	RS485 group address	100 – 131 (DIP switches S1/1 – S1/4) ¹⁾	
812	8599	0	RS485 timeout delay	0 – 1 – 650 [s]	1 digit = 0.001 s
83_ Fault responses					

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"Expert" startup with parameter function

Parameter list

No.	Index dec.	Sub-index dec.	Name	MOVITOOLS® MotionStudio (Range / factory setting)	MOVILINK® scaling
830	8609	0	External error	0: No response 1: Display error 2: Immediate stop/error 4: Rapid stop/error 5: Immediate stop/warning 7: Rapid stop/warning 11: Normal stop/warning 12: Normal stop/error	
832	8611	0	Motor overload error	0: No response 1: Display error 2: Immediate stop/error 4: Rapid stop/error 12: Normal stop/error	
84_	Reset behavior				
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 PO 1	Control word (only display)	
871	8305	0	Setpoint description PO 2	1: Setpoint speed 11: Setpoint speed [%]	
872	8306	0	Setpoint description PO 3	Ramp (only display)	
873	8307	0	Actual value description PI 1	Status word 1 = (display only)	
874	8308	0	Actual value description PI 2	1: Actual speed 2: Output current 3: Active current 8: Actual speed [%]	
875	8309	0	Actual value description PI 3	Status word 2 = (display only)	
876	8622	0	PO data enable	0: YES 1: NO	

1) When deactivating the control element (e.g. switch) using parameter P102, the initialization value of the parameter is the same as the most recent value set.

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8.8 Parameter description

8.8.1 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 the range 0 – 200% of the rated unit current.

Parameter 005

Active current (signed)

Active current in the range -200% – +200% of the nominal unit current

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

Direction of rotation	load	Speed	Active current
Clockwise rotation	Motor	Positive ($n > 0$)	Positive ($I_w > 0$)
Counterclockwise rotation	Motor	Negative ($n < 0$)	Negative ($I_w < 0$)
Clockwise rotation	Regenerative	Positive ($n > 0$)	Negative ($I_w < 0$)
Counterclockwise 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 (amount)

Apparent current in [A]

Parameter 010**Inverter status**

Inverter statuses

- INHIBITED
- ENABLED

Parameter 011**Operating status**

The following operating statuses are available:

- 24 V OPERATION
- CONTROLLER INHIBIT
- NO ENABLE
- STANDSTILL CURRENT
- ENABLE
- FACTORY SETTING
- ERROR
- TIMEOUT

Parameter 012**Error status**

Error status in text form

Parameter 013**Startup mode**

Startup mode "Easy" or "Expert"

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

Parameter 016**Enable hours**

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

Parameter 017

DIP switch setting S1 and S2

Display of DIP switch settings for S1 and S2:

DIP switches	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 modes	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.

Parameter 018

Setting switch f2

Display of switch f2 setting

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

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Parameter 019**Setting switch t1**

Displays switch t1 setting

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

Parameter 020**Setting of 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 digital input, terminal X6:11,12**

Displays the status of the digital input at terminal CW ↻ X6:11,12

Parameter 032**Setting/assignment of digital input, terminal X6:9,10**

Displays the status of the digital input at terminal CCW ↻ X6:9,10

Parameter 033**Setting/assignment of digital input, terminal X6:7,8**

Displays the status of the digital 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 output X10**

Displays the status of the output for controlling the BEM option

Parameter 070**Device type**

The unit type is displayed

Parameter 071**Nominal 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	Drive ID module special design
12	DRS/400/50
13	DRE400/50
14	DRS/460/60
15	DRE/460/60
16	DRS/DRE/380/60 (ABNT)
17	DRS/DRE/400/50/60 (50/60 Hz voltage range)
18	Reserved
19	DRP/230/400/50
20	DRP/266/460/50
21	EDRE/3D/400/50
22	DT56L4/BMG02
23	DRE..J/400/50
24	DRU..J/400/50
25	DRN/400/50
26	DRN/460/60
27	DRS/DRN/50/60
28 – 31	Reserved

Display of the part number and the data set version on the drive ID module

Parameter 076

Firmware basic unit

Displays the part number and version of the unit firmware

Parameter 700

Operating mode

The selected operating mode is displayed

Parameter 080 – 084

Error t-0 – t-4

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

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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

8.8.2 Setpoints/ramp generators**Parameter 100****INFORMATION**Parameter *P100* can only be changed if

- All digital inputs are set to "0"
- and DIP switches S1/1 – S1/4 are deactivated by parameter *P102*

Control setpoint source

- When selecting "Binary", the drive is controlled via the digital 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 "RS485", the drive is controlled via the digital 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	Deactivation of the DIP switch S1/1 – S1/4 (RS485 address)	Bit not set:	DIP switches S1/1 – S1/4 active
		Bit set:	DIP switches S1/1 – S1/4 not active Setting the RS485 address, RS485 group address and control / setpoint source using parameters <i>P810</i> , <i>P811</i> and <i>P100</i>
2 – 4	Reserved		
5	Deactivation of DIP switch S1/5 (motor protection)	Bit not set:	DIP switch S1/5 active
		Bit set:	DIP switch S1/5 not active: Switching the motor protection function on / off using the parameter <i>P340</i> .
6	Reserved		
7	Deactivation of DIP switch S1/7 (PWM cycle frequency)	Bit not set:	DIP switch S1/7 active
		Bit set:	DIP switch S1/7 not active Setting the PWM cycle frequency using parameter <i>P860</i>
8	Deactivation of DIP switch S1/8 (no-load damping)	Bit not set:	DIP switch S1/8 active
		Bit set:	DIP switch S1/8 not active Activation / deactivation of no-load damping using parameter <i>P325</i>
9	Reserved		
10	Deactivation of DIP switch S2/2 (brake release)	Bit not set:	DIP switch S2/2 active
		Bit set:	DIP switch S2/2 not active Activation / deactivation of brake release without drive enable using parameter <i>P738</i>
11	Deactivation of DIP switch S2/3 (operating mode)	Bit not set:	DIP switch S2/3 active
		Bit set:	DIP switch S2/3 not active Selection of operating mode using parameter <i>P700</i>

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Parameter description

Bit	Meaning	NOTE	
12	Deactivation of 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 parameter <i>P500</i>
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 parameter <i>P160</i> and <i>P302</i>
14	Deactivating switch f2	Bit not set:	Switch f2 active
		Bit set:	Switch f2 not active Setting the setpoint and the maximum speed using parameter <i>P161</i> and <i>P301</i>
15	Deactivating switch t1	Bit not set:	Switch t1 active Acceleration ramp time = deceleration ramp time
		Bit set:	Switch t1 not active Setting the ramp times using parame- ter <i>P130</i> and <i>P131</i>

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Parameter 130**Ramp t11 up**

- When using MOVIMOT® with binary control, the acceleration ramp t11 up only applies if
 - switch t1 is deactivated, i.e. if $P102:15 = "1"$.
- When using MOVIMOT® with RS485 control, the acceleration ramp t11 up only applies if
 - switch t1 is deactivated, i.e. if $P102:15 = "1"$
 - and the drive is running in 2 PD mode.

The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).

Parameter 131**Ramp t11 down**

- When using MOVIMOT® with binary control, the acceleration ramp t11 down only applies if
 - switch t1 is deactivated, i.e. if $P102:15 = "1"$.
- When using MOVIMOT® with RS485 control, the acceleration ramp t11 down only applies if
 - switch t1 is deactivated, i.e. if $P102:15 = "1"$
 - and the drive is running in 2 PD mode.

The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).

Parameter 134**Ramp t12 up = down**

Acceleration and deceleration ramp at S pattern

The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).

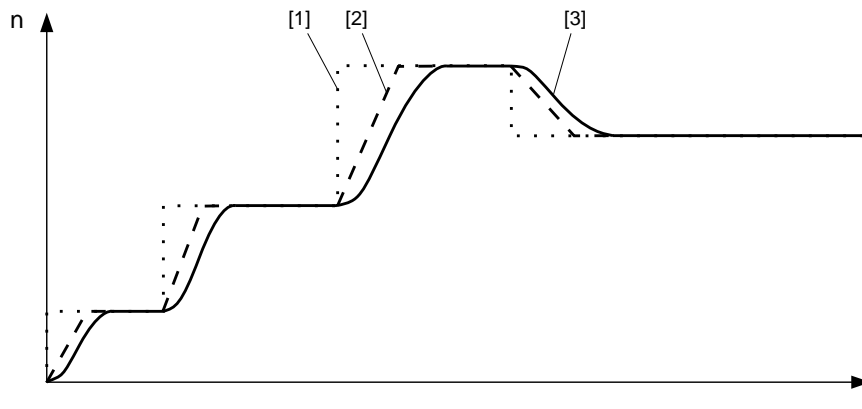
The ramp time sets the acceleration and deceleration if parameter $P135S$ *pattern t12* has been set to grade 1, grade 2 or grade 3.

INFORMATION

It is not possible to determine a setpoint via process data when parameter $P135$ *S pattern t12* is activated.

Parameter 135**S pattern t12**

This parameter determines the pattern grade (1 = low, 2 = medium, 3 = high) of the ramp. The S pattern is used for rounding off the ramp and allows for a soft acceleration of the drive in the event of a setpoint change. The following figure shows the effect of the S pattern:



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- [1] Setpoint selection
- [2] Speed profile without S pattern
- [3] Speed profile with S pattern

INFORMATION

Once started, an S pattern phase is interrupted if an error occurs with the stop ramp. If the setpoint is reduced or the enable signal is revoked, the started S pattern phase is completed. Thus the drive can accelerate until the end of the S pattern phase despite the setpoint reduction.

Parameter 136**Stop ramp t13**

The stop ramp is the deceleration ramp when an internal error occurs.

The ramp time is based on a setpoint step change of 1500 rpm (50 Hz).

Parameter 160**Setpoint n_f1**

The setpoint n_f1 is valid if

- The setpoint potentiometer f1 is deactivated, i.e. when parameter *P102:13* is set to "1".
- Parameter *P600 Digital inputs* is set to "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. when parameter *P102:14* is set to "1",
- Parameter *P600 Digital inputs* is set to "0".
- The signal "1" is present at terminal f1/f2 X6: 7,8.

Parameter 170 – 173

Fixed setpoint n0 – n3

The fixed setpoints n0 – n3 are valid if parameter *P600 terminal configuration* at "1" = terminal configuration 2 (selection of fixed setpoints).

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

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

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

8.8.3 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. Upon revoking the enable function, the parameter will be set as to the frequency at which the MOVIMOT® inverter will detect a motor standstill and start to apply the brakes.

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 (exception: direction of rotation reversal or drive stop).

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 output current. In order to implement stall protection for the connected motor, the inverter automatically decreases the current limit internally in the field weakening range.

Parameter 320**Automatic adjustment**

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

If adjustment is deactivated, the calibration function and the thermal memory of the UL protective function is inactive.

When using according to UL approval, you must leave the parameter *P320* set to "ON".

Parameter 321**Boost**

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

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

Parameter 322**IxR compensation**

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 a magnetic field to be built up in the motor after the inverter is enabled.

Parameter 324**Slip compensation**

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

The slip compensation is designed for a ratio of load mass moment of inertia to motor moment of inertia of smaller than 10. 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.

Parameter 347**Motor cable length**

This parameter is used for defining the motor cable length (= length of hybrid cable from SEW-EURODRIVE between MOVIMOT® 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.

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Parameter description

8.8.4 Monitoring functions

Parameter 500

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

MOVIMOT® performs speed monitoring by evaluating operations at the current limit. Speed monitoring is triggered when the current limit is maintained for the duration of the set deceleration time (parameter *P501*).

Parameter 501

Deceleration 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

Line phase failure check



NOTICE

Deactivating the line phase failure monitoring can damage the inverter if conditions are unfavorable.

Inverter damage.

- Deactivate the line phase failure check with short-term asymmetries of the line voltage.
- Make sure that the MOVIMOT® drive is always supplied with all 3 phases of the line voltage.

This monitoring system must be deactivated in order to prevent the line phase failure check from triggering with asymmetrical supply systems.

Parameter 523

Power off monitoring

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

Parameter 590

Localization

This parameter can be used to activate the localization function in order to localize the MOVIMOT® drive in the system. If the localization function is active, the status LED on the MOVIMOT® inverter flashes green/red/green. After 5 min, the MOVIMOT® inverter automatically deactivates the localization function again.

8.8.5 Terminal assignment

Parameter 600

Terminal configuration

Parameter *P600* can only be changed if all digital inputs are set to "0".

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

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

Control / setpoint source "Binary"				
Terminal configuration		Digital 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: Counter-clockwise rotation	CW/Stop "0" signal: Stop "1" signal: Clockwise rotation
1:	Terminal configuration 2	Selection of fixed setpoints Fixed setpoint n0: signal "0" , "0" param. <i>P170</i> Fixed setpoint n1: signal "0" , "1" param. <i>P171</i> Fixed setpoint n2: signal "1" , "0" param. <i>P172</i> Fixed setpoint n3: signal "1" , "1" param. <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 "RS485"				
Terminal-configuration		Digital 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 operation
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 operation

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8 "Expert" startup with parameter function

Parameter description

Parameter 620

Function of the signal relay K1



▲ WARNING

Risk of injury if the drive starts up unexpectedly when the signal relay K1 is used for controlling the brake.

Severe or fatal injuries

- If you are using the signal relay K1 to control the brake, the parameter *P620* must be set to 5 "Brake released".
- Before using the signal relay K1 for controlling the brake, check the parameter setting.

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

Effect at	"0" signal	"1" signal
0: No function	–	–
2: Ready	Not ready	Ready
3: Output stage on	Device inhibited	Unit is enabled. Motor is energized.
4: Rotating field on	No rotating field ▲ WARNING! There may still be dangerous voltages present on the MOVIMOT® inverter output side.	Rotating field
5: Brake released	Brake applied	Brake released
6: Brake applied	Brake released	Brake applied

8.8.6 Control functions

Parameter 700

VFC /
V/f characteristic
curve

VFC hoist

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

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

Default setting for asynchronous motors.

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

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

▲ WARNING



Risk of injury if the drive starts up unexpectedly when the signal relay K1 is used for controlling the brake.

Severe or fatal injuries

- If the signal relay K1 is used to control the brake, do not change the parameters that define the function of the signal relay.
- Before changing parameter *P700*, check whether the signal relay is used for controlling the brake.

For the hoisting function to be performed correctly, the motor brake must be controlled using the inverter.

The VFC hoist operating mode affects the following parameters:

No.	Index dec.	Subindex dec.	Name	Value
<i>P300</i>	8515	0	Start/stop speed	= 60 rpm If the start/stop speed is set to less than 60 rpm.
<i>P301</i>	8516	0	Minimum speed	= 60 rpm If the minimum speed is set to less than 60 rpm.
<i>P303</i>	8518	0	Current limit	= Rated motor current If the current limit is set to a lower value than the rated motor current
<i>P323</i>	8526	0	Pre-magnetization	= 20 ms If pre-magnetization is set to a lower value than 20 ms
<i>P500</i>	8557	0	Speed monitoring	= 3: Motor/regenerative
<i>P620</i>	8350	0	Signal output K1	= 5: Brake released
<i>P731</i>	8749	0	Brake release time	= 200 ms If the brake release time is set to a lower value than 200 ms
<i>P732</i>	8585	0	Brake application time	= 200 ms If the brake application time is set to a lower value than 200 ms

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8 "Expert" startup with parameter function

Parameter description

No.	Index dec.	Subindex dec.	Name	Value
P738	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 activated in VFC hoist operating mode.

The function of the signal relay output can be parameterized.

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

VFC / V/f DC braking



▲ WARNING

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

Severe or fatal injuries

- Use a different operating mode if required.

Parameter 710



Standstill current

▲ WARNING

Electric shock caused by voltages in the connection box. A communication timeout does not interrupt the standstill current.

Severe or fatal injuries

- Disconnect the inverter from the supply system and wait at least for the specified amount of time:
 - **1 minute**

When the standstill current function is activated, the inverter injects a current into 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 current level 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 the event of an error, the current supply of the motor is interrupted depending on the respective error response.

Parameter 720 – 722

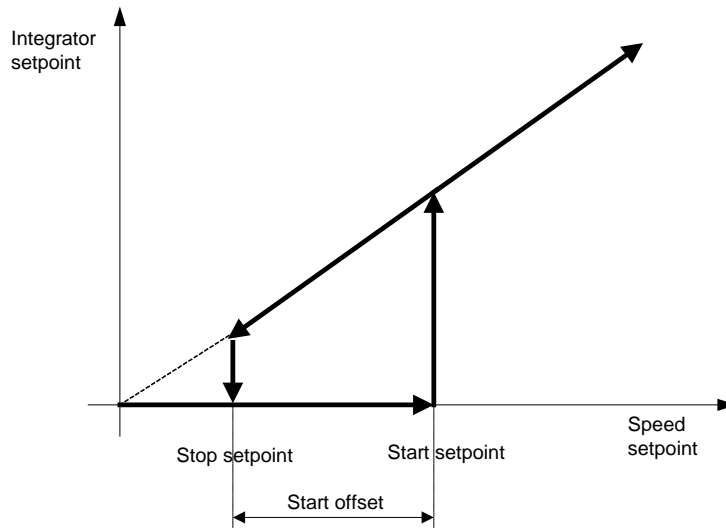
Setpoint stop function

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.

The brake cannot be released when the drive is not enabled in conjunction with the hoisting function.

Parameter 770**Energy saving function**

If this parameter is set to "ON", the inverter reduces the no-load current.

8.8.7 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 set to this factory setting value.

For those parameters that are set at the DIP switches S1/S2 or at switches t1/f1, 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 use 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**

The MOVIMOT® is started up quickly and easily in Easy mode using DIP switches S1, S2 and switches f2, t1.

- **"Expert" mode**

In "Expert" mode additional parameters are available.

Parameter 810**RS485 address** (when DIP switches S1/1 – S1/4 are deactivated)

Use this parameter to set the RS485 address of the MOVIMOT® inverter.

Parameter 811**RS485 group address** (when DIP switches S1/1 – S1/4 are deactivated)

Use this parameter to set the RS485 group address of the MOVIMOT® inverter.

Parameter 812**RS485 timeout delay**

Use this parameter to set the timeout monitoring interval of the RS485 interface.

Parameter 830**Error response for an external error**

This parameter is used to define the error response that is revoked when the signal at terminal X6: 9, 10 (error code 26) is triggered, see parameter *P600* "terminal configuration 3".

Parameter 832**Motor overload error response**

Use this parameter to determine the error response that is performed in the event of a motor overload (error code 84).

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.

Parameters 860**PWM frequency** (when DIP switch S1/7 is deactivated)

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

Parameter 870**Setpoint description PO 1**

Displays the assignment of the process data output word PO 1

Parameter 871**Setpoint description PO 2**

Displays the assignment of the process data output word PO 2

The following assignments are available:

Setpoint speed:	The setpoint speed is set absolutely.
Coding:	1 digit = 0.2 rpm
Example 1:	CW rotation with 400 rpm
Calculation:	$400/0.2 = 2000_{\text{dec}} = 07D0_{\text{hex}}$
Example 2:	CCW rotation with 750 rpm
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:	$C000_{\text{hex}} = -100\%$ (CCW rotation) $4000_{\text{hex}} = +100\%$ (CW rotation) 1 digit = 0.0061%
Example:	80% f_{max} , CCW rotation
Calculation:	$-80\%/0.0061\% = -13115_{\text{dec}} = CCC5_{\text{hex}}$

Parameter 872**Setpoint description PO 3**

Displays the assignment of the process data output word PO 3

Parameter 873**Actual value description PI 1**

Displays the assignment of the process data input word PI 1

Parameter 874

Actual value description PI 2

Displays the assignment of the process data input word PI 2

The following assignments are available:

Actual speed:	Current speed actual value of the drive in 1/min
	Coding: 1 digit = 0.2 rpm
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 potentiometer f1 or of n_{max}
	Coding: 1 digit = 0.0061%
	-100% – +100% = 0xC000 – 0x4000

Parameter 875

Actual value description PI 3

(see chapter "Process output data" (→ 121))

Displays the assignment of the process data input word PI 3

Parameter 876

PO data enable

YES: The process output data that was sent from the fieldbus control become effective immediately.

NO: The last valid process output data remain in effect.

INFORMATION



If the assignment of the process data output word PO2 is changed, the PO data is inhibited. It must be re-enabled in parameter P876.

8.8.8 Parameters that depend on mechanical controls

The following mechanical control elements influence the user parameters:

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

INFORMATION

Parameter *P100* can only be changed if

- All digital inputs are set to "0"
- and DIP switches S1/1 – S1/4 are deactivated by parameter *P102*

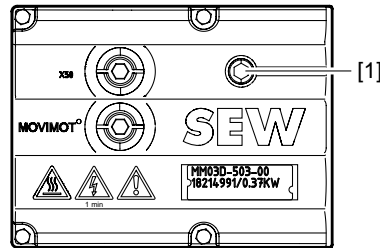
Control element	Influenced parameter	Effect of parameter <i>P102</i>	
		Bit	
DIP switches S1/1 – S1/4	<i>P810</i> <i>RS485 address</i> <i>P811</i> <i>RS485 group address</i> <i>P100</i> <i>Control setpoint source</i>	1	Bit not set: Setting RS485 address, RS485 group address and setpoint source at DIP switch S1/1 – S1/4
			Bit set: Setting RS485 address, RS485 group address and control setpoint source using parameters
DIP switch S1/5	<i>P340</i> <i>Motor protection</i>	5	Bit not set: Activation/deactivation of the motor protection function at DIP switch S1/5
			Bit set: Activation/deactivation of motor protection function using parameters
DIP switch S1/7	<i>P860</i> <i>PWM frequency</i>	7	Bit not set: Selection of the PWM frequency at DIP switch S1/7
			Bit set: Selection of the PWM frequency using parameters
DIP switch S1/8	<i>P325</i> <i>No-load vibration damping</i>	8	Bit not set: Activation/deactivation of the no-load vibration damping function at DIP switch S1/8
			Bit set: Activation/deactivation of no-load vibration damping using parameters

Control element	Influenced parameter	Effect of parameter P102	
		Bit	
DIP switch S2/2	P738 <i>Brake release without drive enable</i>	10	Bit not set: Activation/deactivation of 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	P700 <i>Operating mode</i>	11	Bit not set: Selection of the operating mode at DIP switch S2/3
			Bit set: Selection of the operating mode using parameters
DIP switch S2/4	P500 <i>Speed monitoring</i>	12	Bit not set: Activation/deactivation of the speed monitoring function at DIP switch S2/4
			Bit set: Activation/deactivation of no-load vibration damping using parameters
Setpoint potentiometer f1	P302 <i>Maximum speed</i>	13	Bit not set: Setting maximum speed at setpoint potentiometer f1
			Bit set: Setting maximum speed using parameters
Switch f2	P301 <i>Minimum speed</i>	14	Bit not set: Setting minimum speed at switch f2
			Bit set: Setting minimum speed using parameters
Switch t1	P130 <i>Acceleration ramp</i> P131 <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.



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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 status	Meaning of operating state	Possible cause
Off	Not ready	No 24 V power supply.
Yellow flashing evenly	Not ready	Self-test phase is active or 24 V supply is present but the line voltage is not OK.
Yellow flashing evenly, fast	Ready	Brake release active without drive enable (only with S2/2 = "ON")
Yellow constantly lit	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!
Yellow 2 x flashing, break	Ready, manual operation without unit enable	24 V power supply and supply voltage OK. Stop manual mode to activate automatic mode.
Green/yellow Flashing evenly with alternating colors	Ready for operation, but timeout	Faulty communication with cyclical data exchange.
Green Constantly lit	Unit enabled	Motor is in operation.
Green flashing evenly, fast	Current limit active	Drive operating at current limit.
Green flashing evenly	Ready	Standstill current function is active.
Green/red/green Flashing evenly with alternating colors, break	Localization function active	Localization function has been activated. See parameter 590.

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LED color status	Meaning of operating state	Possible cause
Red Constantly lit	Not ready	Check 24 V supply. A smoothed DC voltage with maximum residual ripple of 13% must be present.

Status LED flash codes

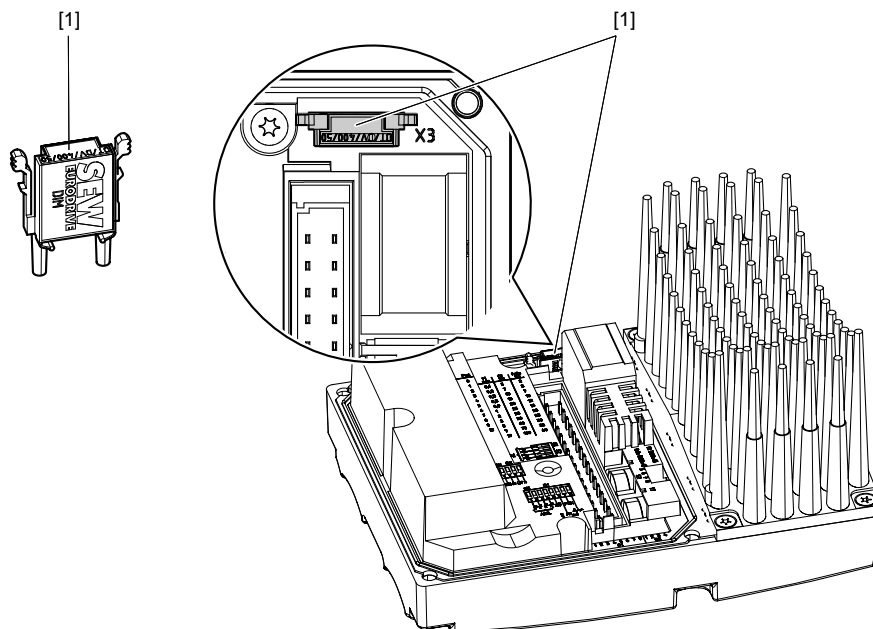
Flashing evenly:	LED 600 ms on, 600 ms off
Flashing evenly, fast:	LED 100 ms on, 300 ms off
Flashing with alternating colors:	LED 600 ms green, 600 ms yellow
Flashing with alternating colors, break:	LED 100 ms green, 100 ms red, 100 ms green, 300 ms break

For a description of the error statuses, refer to sec. "Meaning of the status LED states" (→ 198).

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/laptop or data backup.

If, during a unit replacement

- the DIP switch setting is not transmitted correctly,
- or a MOVIMOT® inverter with a different part number is used (e.g. with a different power level),

the MOVIMOT® inverter detects a change in configuration. This may reinitialize certain startup parameters.

This is why the MOVIMOT® inverter must only be replaced with a MOVIMOT® inverter with the same part number.

For information regarding unit replacements, refer to chapter "Unit replacement" (→ 206).





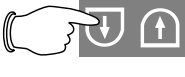










9.3 MBG11A and MLG..A operator terminals

INFORMATION



For notes on startup with the MBG11A or MLG..A options, refer to sec. "Startup with the MBG11A or MLG..A options" (→ 104).

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

Function	Explanation
Display	<p>Negative display value, for example  = CCW rotation</p> <p>Positive display value; e.g.,  = CW operation</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>NOTICE! If the display is "0," the drive is rotating at f_{min}.</p>
Increase speed	<p>For CW rotation:  For CCW rotation: </p>
Reducing the speed	<p>For CW rotation:  For CCW rotation: </p>
Stop MOVIMOT® drive	<p>Pressing both keys at the same time:  Display = </p>
Start MOVIMOT® drive	<p></p> <p>NOTICE! 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. Press  again to change the direction of rotation from CW to CCW.</p>
Change direction of rotation from CCW to CW	<p>1.  until display = </p> <p>2. Press  again to change the direction of rotation from CCW to CW.</p>
Memory function	<p>When the line voltage 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>

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9.4 MWA21A setpoint converter

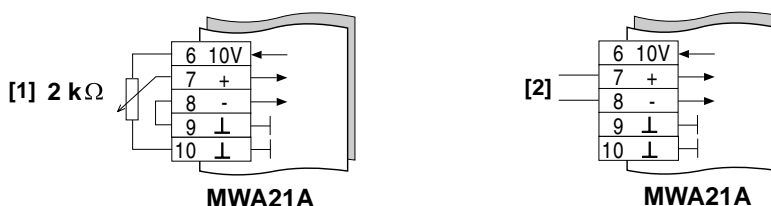
INFORMATION



- For notes on connecting the MWA21A option, refer to sec. "Connection of option MWA21A" (→ 54).
- For notes on startup of the MWA21A option, refer to sec. "Startup with option MWA21A" (→ 106).

9.4.1 Control

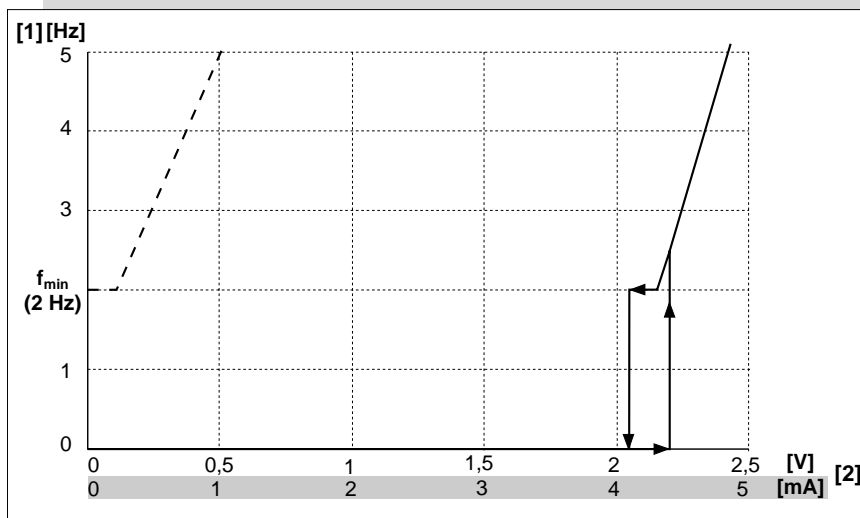
The analog signal at terminals 7 and 8 of the MWA21A option is used for controlling the speed of the MOVIMOT® drive from f_{min} to f_{max} .



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

9.4.2 Setpoint stop function



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- Setting:
 - - - - 0...10 V / 0...20 mA [1] Output frequency
 ———— 2...10 V / 4...20 mA [2] Setpoint

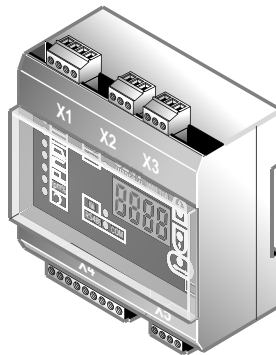
9.5 MWF11A setpoint converter

INFORMATION



- For information about connecting the MWF11A option, refer to chapter "Connection of option MWF11A" (→ 55).
- For notes on startup of the MWF11A option, refer to chapter "Startup with MWF11A option " (→ 109).

The following figure shows setpoint converter MWF11A:



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9.5.1 Functional description

The MWF11A setpoint converter converts a setpoint (frequency or analog input) and control signal into an RS485 protocol.

This allows you to control of the MOVIMOT® drive from the control cabinet remotely. You are able to control up to 31 MOVIMOT® drives at the same time (broadcasting).

The setpoint converter MWF11A can be operated in the following modes:

- Broadcast mode (B mode)
- Point to point (P mode)
- Point to point with alternating 2PD/3PD

Run mode	Description
Broadcast mode (B mode)	<ul style="list-style-type: none"> • In broadcast mode you are able to control a maximum of 31 MOVIMOT® drives via RS485 with 1 MWF11A setpoint converter. • The MOVIMOT® inverter sends no status messages (via RS485) back to the MWF11A setpoint converter.
Point to point (P mode)	<ul style="list-style-type: none"> • In point to point mode you are able to control 1 MOVIMOT® drive with 1 MWF11A setpoint converter. • The setpoint converter evaluates the error messages and the actual speed of the MOVIMOT® drive. • If a error occurs in the MWF11A setpoint converter or in the MOVIMOT® drive, then the "/error" terminal is reset.

9

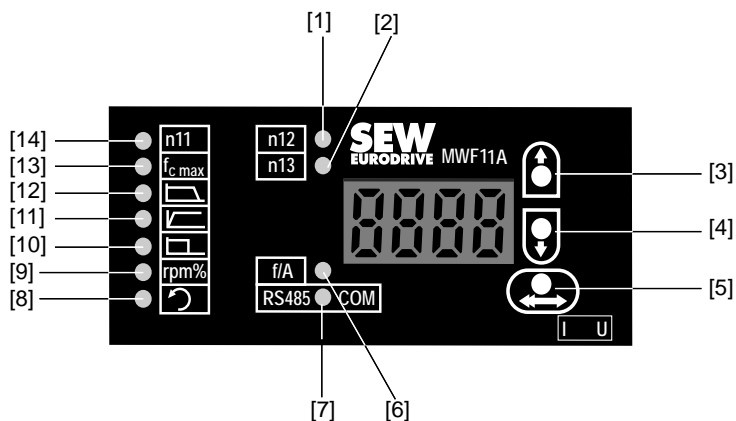
Operation

MWF11A setpoint converter

Run mode	Description
Point to point with alternating 2PD/3PD (2 PD mode)	<ul style="list-style-type: none"> • See line point to point (P mode) • Differences: <ul style="list-style-type: none"> – The "/error" terminal is also active if the MWF11A setpoint converter signals "StbY" (24 V operation). – During initialization, the ramp parameters are written to the MOVIMOT® parameter "t11 up"/"t11 down". During the braking, the MWF11A setpoint converter only communicates via the rapid stop ramp using 3PD.

9.5.2 Operating and display elements

The following figure shows the operating and display elements of the MWF11A option:



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- [1] Fixed setpoint n12 icon
- [2] Fixed setpoint n13 icon
- [3] "Up" button for selecting icons / changing values
- [4] "Down" button for selecting icons / changing values
- [5] "Confirm" button
- [6] Frequency or analog input icon
- [7] Communication mode icon
- [8] CCW rotation icon
- [9] Status display icon
- [10] Rapid stop ramp icon
- [11] Ramp up icon
- [12] Ramp down icon
- [13] Icon for frequency at 100% setpoint
- [14] Fixed setpoint n11 icon


9.5.3 Operation

The table below shows the basic operation of the MWF11A option:






Selecting icons	Select an icon with the "up" button [3] and the "down" button [4].
Changing values.	<ol style="list-style-type: none"> 1. Select an icon (see above). 2. Switch to the setting mode using button [5]. 3. Change the value by pressing the buttons "up" [3] and "down" button [4]. 4. The value will flash when being set. Confirm the selection of the value by double clicking button [5]. The value is then stored and protected from loss in case of a power failure.
Scaling the step width when changing values.	<p>Press button [5] at the same time as the "up" [3] and "down" [4] button when changing values.</p> <p>For information about the step width, see the following pages.</p>





9.5.4 Meaning of display icons

The table below shows the meaning of the display icons:

Icon	Function
<p>Status display</p> 	<p>In broadcast mode (B mode):</p> <ul style="list-style-type: none"> • Display: <ul style="list-style-type: none"> – If no enable is present at the terminals, the display shows "StoP". – If the enable signal is present, the display shows the setpoint speed as a %. • Unit: Percentage • Range: 0.0 – 200.0 • Step width: 0.1 <hr/> <p>In point to point mode and 2 PD mode:</p> <ul style="list-style-type: none"> • Display: Inverter status <ul style="list-style-type: none"> – "StbY" for 24 V operation – "StoP" for no enable/controller inhibit – "F XX" if error XX is present in the MOVIMOT® inverter. – "E XX" if error XX is present in MWF11A, see chapter "Diagnostics with MWF11A option" (→ 205). – "----" if communication between the MOVIMOT® inverter and the MWF11A option is interrupted. • Unit: Percentage • Range: 0.0% – 200.0% • Step width: 0.1



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Icon	Function
Rapid stop ramp 	<ul style="list-style-type: none"> • Display: Rapid stop ramp based on 1500 rpm (50 Hz) • Unit: Seconds • Range: 0.1 – 65 s • Step width: 0.01 s • Rapid step width: 0.2 s • Factory setting: 1 s
Ramp up 	<ul style="list-style-type: none"> • Display: Ramp up (CW + CCW) based on 1500 rpm (50 Hz) • Unit: Seconds • Range: 0.1 – 65 s • Step width: 0.01 s • Rapid step width: 0.2 s • Factory setting: 5 s
Ramp down 	<ul style="list-style-type: none"> • Display: Ramp down (CW + CCW) based on 1500 rpm (50 Hz) • Unit: Seconds • Range: 0.1 – 65 s • Step width: 0.01 s • Rapid step width: 0.2 s • Factory setting: 5 s
Frequency for 100% setpoint 	<ul style="list-style-type: none"> • Display: Input frequency at which the MWF11A option specifies a setpoint speed of 100% to the MOVIMOT® inverter. <p>Example:</p> <p>12 kHz are set. 6 kHz are supplied via the frequency input. The speed setpoint = 6 kHz/12 kHz × 100% = 50%.</p> <p>All results > 200% are limited to 200.0%.</p> <p>When the MOVIMOT® inverter is given a speed setpoint > 100%, the MWF11A option will limit the setpoint speed to 100%.</p> <ul style="list-style-type: none"> • Unit: kHz • Range: 0.1 – 70.00 kHz • Step width: 0.01 kHz • Rapid step width: 0.5 kHz • Factory setting: 10 kHz
Fixed setpoint n11 	<ul style="list-style-type: none"> • Display: Fixed setpoint n11 • Unit: Percentage • Range: 0 – 100.0% • Step width: 0.5% • Rapid step width: 5% • Factory setting: ± 10%

Icon	Function
Fixed setpoint n12 	<ul style="list-style-type: none"> • Display: Fixed setpoint n12 • Unit: Percentage • Range: 0 – 100.0% • Step width: 0.5% • Rapid step width: 5% • Factory setting: +50%
Fixed setpoint n13 	<ul style="list-style-type: none"> • Display: Fixed setpoint n13 • Unit: Percentage • Range: 0 – 100.0% • Step width: 0.5% • Rapid step width: 5% • Factory setting: +100%
Frequency and analog input 	<ul style="list-style-type: none"> • Display: <ul style="list-style-type: none"> – "F" for frequency input – "A" for analog input (current or voltage) • Factory setting: "F"
Communication mode 	<ul style="list-style-type: none"> • Display: <ul style="list-style-type: none"> – "b" for broadcast mode – "P" for point to point mode – "P2" for P2 mode • Factory setting: "B"

9.5.5 Control functions of X4

The following table shows the control function of terminals X4:

X4:1 CW	X4:2 CWW	X4:3 Enable/ Rapid stop	X4:4 n11	X4:5 n12	Resulting function
–	–	"1"→"0"	–	–	Motor brakes with "rapid stop ramp" and stops.
"1"→"0"	"0"	"1"	–	–	Motor brakes with "ramp down" and stops.
"0"	"1"→"0"	"1"	–	–	
"0"→"1"	"1"	"1"	–	–	Motor brakes with "ramp down" and stops.
"1"	"0"→"1"	"1"	–	–	
"0"→"1"	"0"	"1"	"0"	"0"	CW rotation with frequency or analog setpoint Depending on icon:  Motor accelerates with "ramp up".
"0"	"0"→"1"	"1"	"0"	"0"	CCW rotation with frequency or analog setpoint Depending on icon:  Motor accelerates with "ramp up".
"0"→"1"	"0"	"1"	"1"	"0"	CW rotation with fixed setpoint n11 Motor accelerates with "ramp up".
"0"	"0"→"1"	"1"	"1"	"0"	CCW rotation with fixed setpoint n11 Motor accelerates with "ramp up".
"0"→"1"	"0"	"1"	"0"	"1"	CW rotation with fixed setpoint n12 Motor accelerates with "ramp up".
"0"	"0"→"1"	"1"	"0"	"1"	CCW rotation with fixed setpoint n12 Motor accelerates with "ramp up".
"0"→"1"	"0"	"1"	"1"	"1"	CW rotation with fixed setpoint n13 Motor accelerates with "ramp up".
"0"	"0"→"1"	"1"	"1"	"1"	CCW rotation with fixed setpoint n13 Motor accelerates with "ramp up"

Terminal X4:6 (error reset)

Faults shown on the display can be reset by connecting 24 V to terminal X4:6 (error reset). For the response, refer to chapter "Diagnostics with the MWF11A setpoint converter".

Terminal X4:7 (/error output)

- In B mode, 24 V is always present at terminal X4:7.
- In P mode, GND is only present at terminal X4:7 in the event of an error message, otherwise 24 V are present.
- In 2 PD mode GDD is present at terminal X4:7 in the event of an error message or in 24 V operation, otherwise 24 V is present.

Terminal X4:8 (/error output, short-circuit-proof)

Terminal X4:8 has an internal fixed connection terminal X4:7 (output, short-circuit-proof).

Notes regarding ramps

B and P mode

- The MWF11A setpoint converter always sends the ramp via the third process data words.
- If enable CW or CCW rotation is enabled, the ramp is specified even when switching from a large setpoint to a smaller setpoint. A ramp integrator cannot be implemented for relative setpoints.
- "Ramp down" is sent if there is no rapid stop and no enable signal.
- The rapid stop ramp is sent, if "rapid stop" 0 V is present at the terminal X4:3.

2 PD mode:

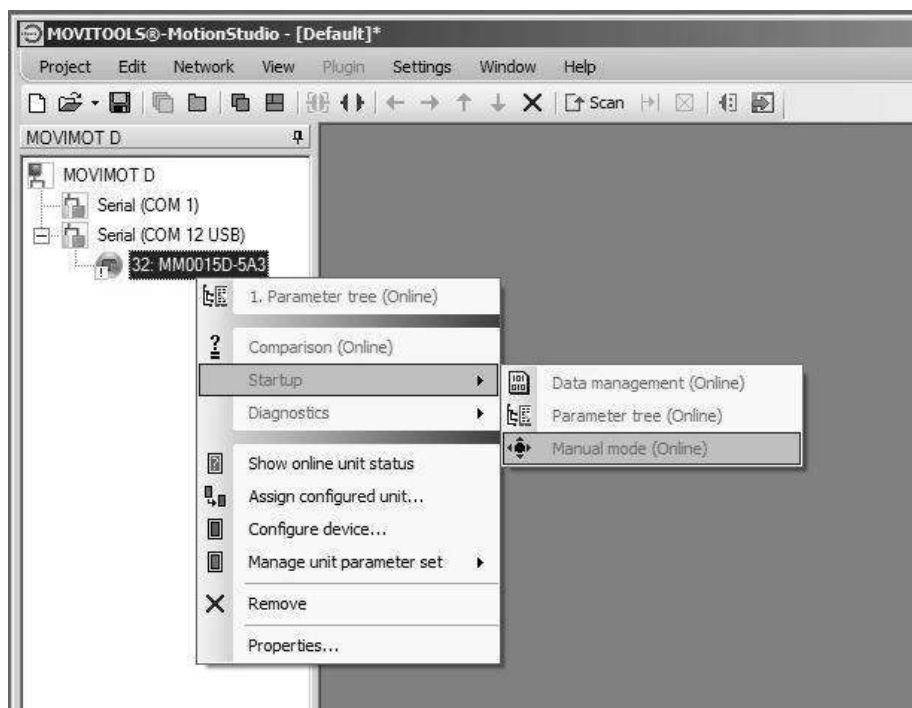
- Ramp up and ramp down are initialized in the MOVIMOT® inverter. The MOVIMOT® inverter independently selects the correct ramp during operation (depending on the setpoint/actual speed). This is why the MWF11A option only sends 2 PD. When you connect terminals X4:1 (CW) and/or X4:2 (left) of the MWF11A option with terminals (CW) and/or (CCW) of the MOVIMOT® inverter, then the MOVIMOT® drive runs immediately (without communication delay) with the correct ramp.
- The rapid stop ramp can only be triggered with 3 PD which is likely to result in a delay of 30 – 70 ms.

9.6 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. Firstly connect the PC/laptop to the MOVIMOT® inverter.
See chapter "PC connection" (→ 60).
2. Start MOVITOOLS® MotionStudio and integrate the MOVIMOT® inverter in MOVITOOLS® MotionStudio.
See section "MOVITOOLS® MotionStudio" (→ 131).
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 mode".



18014399048546059

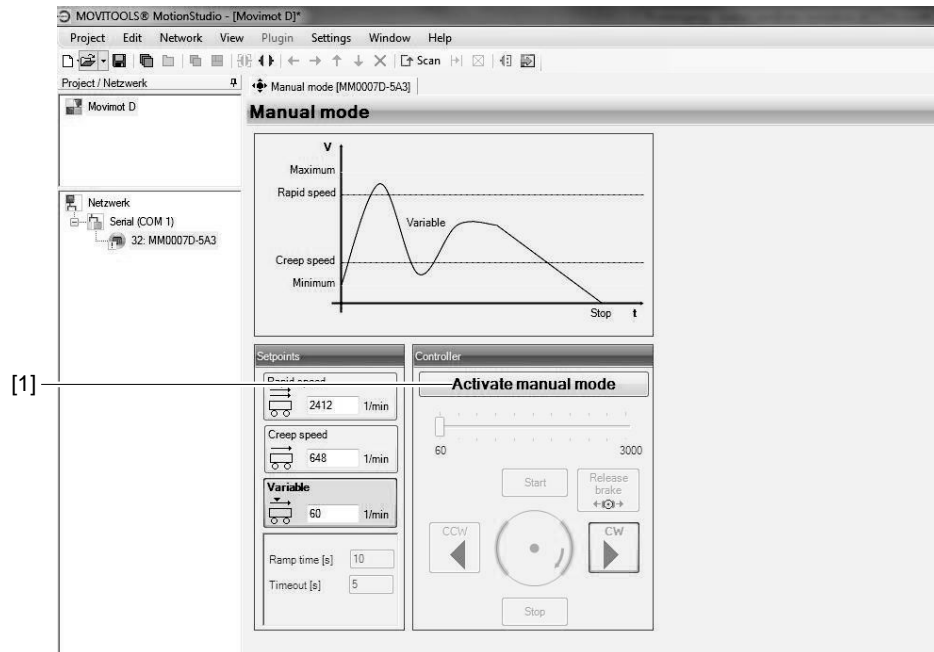
9.6.1 Activating / deactivating manual mode

Activation

Manual mode 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.



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

Deactivate manual operation before you disconnect the PC/laptop from the MOVIMOT® inverter.

Deactivation

▲ WARNING

Risk of crushing if the drive starts up unintentionally.

Severe or fatal injuries.

- Before deactivating manual mode, reset the signals at the digital inputs and revoke drive enable via process data.
- Take additional safety precautions depending on the application to avoid injury to people and damage to machinery.



Manual operation is deactivated:

- When you click on the [Deactivate manual operation] button
- Or when you close the "Manual operation" window



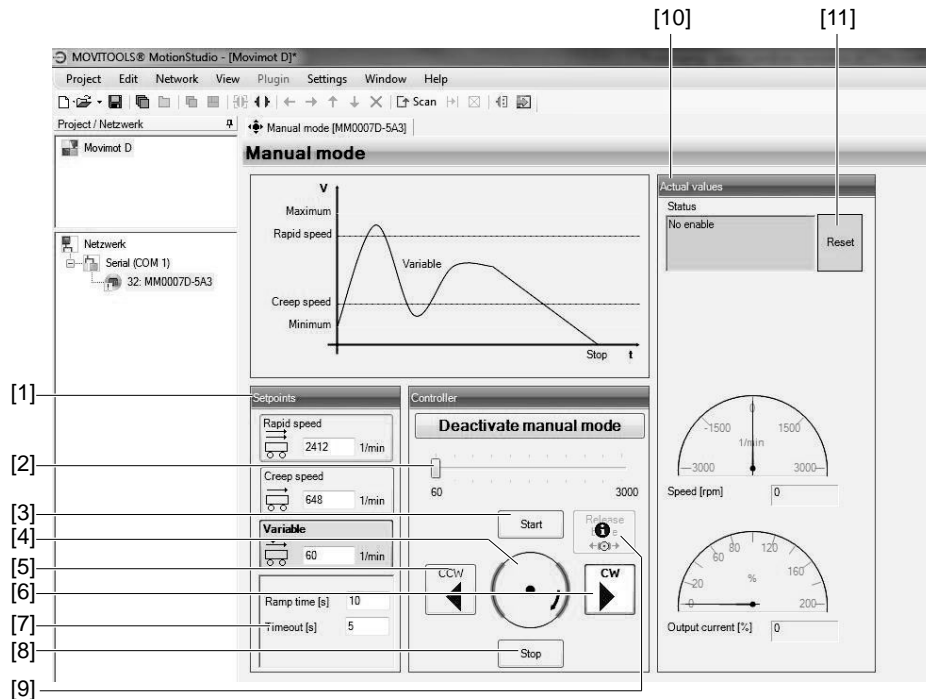
INFORMATION

If you deactivate manual operation,

- The signals at the digital inputs become effective in binary control mode.
 - The signals at the digital inputs and the process data become effective in RS485 control mode.
-

9.6.2 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.



9007199789314827

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 [8] 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).

Enter the respective setpoints. Press <ENTER> and click on the button that contains the setpoint input field to enable the MOVIMOT® drive.

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

- MOVIMOT® inverter status
- Motor speed in [rpm]
- 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 [9].

INFORMATION



The brake can only be released without drive enable if:

- DIP switch S2/2 = "ON"
 - or this function is enabled via parameter *P738*
-

9.6.3 Reset in manual mode

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

9.6.4 Timeout monitoring in manual 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 MOVIMOT® inverter is interrupted longer than this timeout interval,

- The enable signal for the MOVIMOT® drive unit is withdrawn
- And the brake is applied.

Manual operation remains active.

9.7 DBG keypad

9.7.1 Description


Function

You can use the DBG keypad for parameterization and manual operation of MOVIMOT® drives. In addition to that, the keypad1 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

Operator terminal	Language
 <p>9007199896273291</p>	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)

For notes on connecting the DBG operator terminal, refer to section "Connection of the DBG operator terminal" (→ 59).

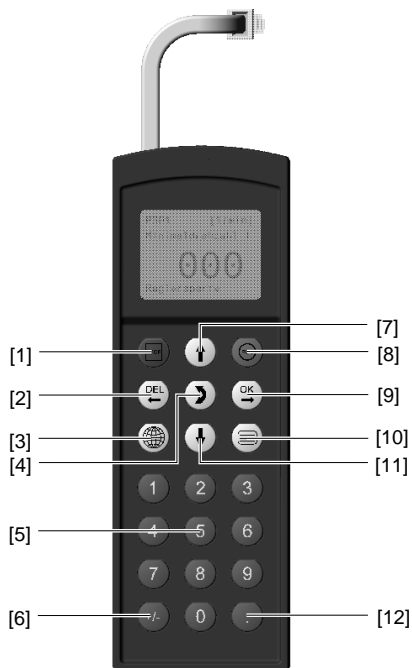
NOTICE! Loss of warranted degree of protection if the screw plugs of the f1 setpoint potentiometer or the X50 diagnostics interface are installed incorrectly or not at all.

Damage to the MOVIMOT® inverter.

- Screw the screw plug back on with the seal after parameter setting, diagnostics or manual operation.

Key assignment DBG

The following figure shows the key assignment of the DBG operator terminal:



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

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9.7.2 Operation


Selecting a language


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

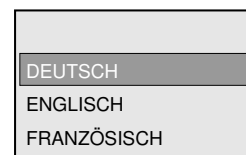


The symbol for language selection then appears on the display.




2. Press the  key until the desired language appears.

Press the  key to confirm your selection.



The DBG operator terminal searches for the connected units and displays them in the unit selection list.

Context menu

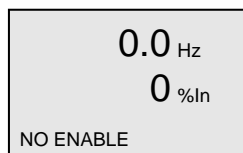
Use the  key to go to the context menu.

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

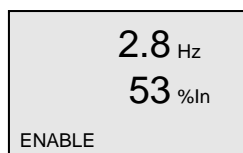
- "BASIC VIEW"
- "PARAMETER MODE"
- "MANUAL MODE"
- "COPY TO DBG"
- "COPY IN MM"
- "DBG DELIVERY ST."
- "UNIT SETTINGS"
- "SIGNATURE"
- "EXIT"

Basic display

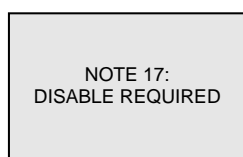
The menu "BASIC DISPLAY" represents important characteristic values.



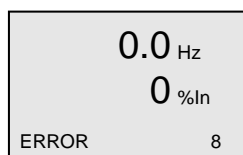
Display for inhibited MOVIMOT® inverter



Display for enabled MOVIMOT® inverter



Information message



Error display

Parameter mode

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

INFORMATION

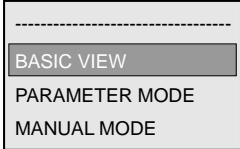


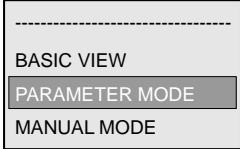
Parameters can only be changed if

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

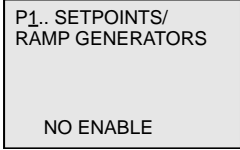
To change parameters in the parameter mode, proceed as follows:

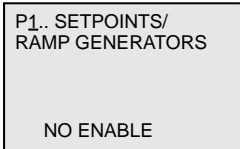
1. Use the key to call up the context menu. The second menu item is "PARAMETER MODE".

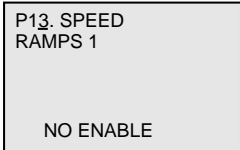

2. Press the key to select "PARAMETER MODE".

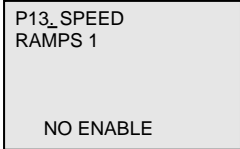

3. Press the key to select "PARAMETER MODE". The first display parameter P000 "SPEED" appears.

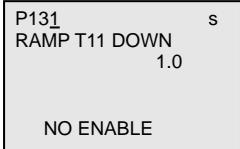
Use the or key to select main parameter groups 0 – 9.


4. Press the key to activate the parameter subgroup selection in the required main parameter group. The flashing cursor moves one position to the right.


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














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


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



9 Operation

DBG keypad

8. Use the  key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.
9. Use the  or  key to set the required parameter value.
10. Press the  key to confirm the setting. To exit the setting mode, press the  key. The flashing cursor is positioned again under the third digit of the parameter number.
11. Use the  or  key to select another parameter, or press the  key to switch to the menu of the parameter subgroups.
12. Use the  or  key to select another parameter subgroup or press the  key to switch to the menu of the main parameter groups.
13. Use the  key to return to the context menu.

```
P131      s
RAMP T11 DOWN
      1.0_
NO ENABLE
```

```
P131      s
RAMP T11 DOWN
      1.3_
NO ENABLE
```

```
P131      s
RAMP T11 DOWN
      1.3
NO ENABLE
```


Manual mode

Activation






▲ WARNING


Risk of crushing if the drive starts up unintentionally.

When deactivating the manual mode, the binary signals (binary control) or the process data of the master (control via RS485) become active. If the enable signal is present via the binary signals or process data, the MOVIMOT® drive can start up unintentionally when deactivating manual operation.

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

Proceed as follows to change to manual mode:

1. Use the  key to switch to the context menu.
2. Use the  or  key to select "MANUAL MODE".

Press the  key to confirm your selection.

The operator terminal is now in manual mode.

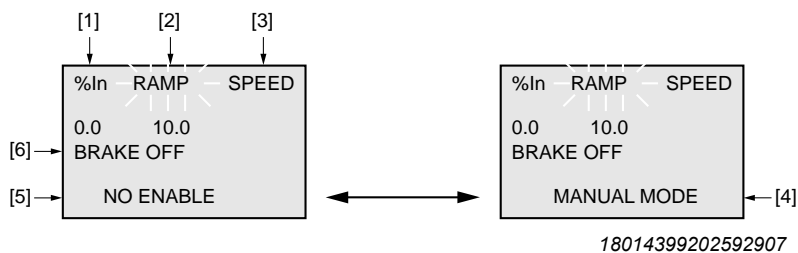
INFORMATION



If the drive is enabled or the brake is released, you cannot change to manual mode.

The message "NOTE 17: INV. ENABLED" is displayed for 2 seconds. The operator terminal switches to the context menu.

Display in manual mode




Display alternates every 2 s



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


Operation

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


Setting the ramp time

Press the  key.

Use the  or  key to set the required ramp time.

Press the  key to confirm your entry.

Changing parameters.

Use the  key to switch between parameters "RAMP", "SPEED" and "BRAKE".


Go to the "SPEED" parameter.

The operator terminal 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.


Press the  key to confirm your entry.

Starting the drive.


Use the  key to start the MOVIMOT® drive.

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


Stop drive.

Use the  key to stop the MOVIMOT® drive.

Release brake without drive enable.

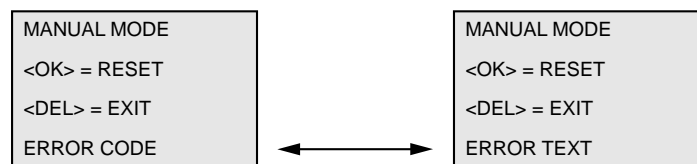
Press the  key to switch to the "BRAKE" menu item.

Use the  key or the  key to release or engage the brake without drive enable.


Press the  key to confirm your selection.

Reset error.

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



Display alternates every 2 s

Press the  key to have the DBG operator terminal reset 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.

Deactivation



▲ WARNING

Risk of crushing if the drive starts up unintentionally.

When deactivating the manual mode, the binary signals (binary control) or process data of the master (control via RS485) become active. If the enable signal is present via the binary signals or the process data, the drive can start up unintentionally when deactivating manual operation.

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



Deactivating manual operation

Use the  or  key to deactivate the manual mode.

The following query appears:

ACTIVATE
AUTOMATIC MODE ?



DEL=NO OK=YES

- Press the  key to return to manual mode.
- Press the  key to deactivate manual mode. The context menu appears.

Copy function of the DBG keypad

You can use the DBG keypad to copy the complete parameter set from one MOVIMOT® inverter to other MOVIMOT® inverters as follows:

Parameters can only be transferred between two identical MOVIMOT® drives (same inverter and same motor).

1. In the context menu, select the menu item "COPY TO DBG". Press the  key to confirm your selection.
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". Press the  key to confirm your selection.

10 Service

10.1 Status and error display

10.1.1 Meaning of the status LED

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

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

LED Color status	Meaning Operating status Error code	Possible cause
Off	Not ready	No 24 V power supply.
Yellow flashing steadily	Not ready	Self-test phase is active or 24 V supply is present but the line voltage is not OK.
Yellow flashing evenly, fast	Ready	Brake release active without drive enable (only with S2/2 = "ON")
Yellow constantly lit	Ready but unit inhibited	24 V power supply and line voltage is OK, but no enable signal. If drive does not run when enable is present - check startup!
Yellow 2 x flashing, break	Ready for operation, but manual mode without unit enable	24 V power supply and line voltage OK. Stop manual mode to activate automatic mode.
Green/yellow Flashing evenly with alternating colors	Ready for operation, but timeout	Faulty communication with cyclical data exchange.
Green Constantly lit	Unit enabled	Motor is in operation.
Green flashing evenly, fast	Current limit active	Drive operating at current limit.
Green flashing evenly	Ready	Standstill current function is active.
Green/red/green Flashing evenly with alternating colors, break	Localization function active	Localization function has been activated. See parameter 590.
Red 2 x flashing, break	Error 07	DC link voltage too high.

LED Color status	Meaning Operating status Error code	Possible cause
Red flashes slowly	Error 08	Speed monitoring error (only when S2/4 = "ON") or additional function 13 is active.
	Error 09	Startup error Additional functions 4, 5, 12 (DIP switches S2/5 – S2/8) are not permitted.
	Error 15	Error 24 V supply
	Errors 17 – 24, 37	CPU errors
	Errors 25, 94	EEPROM error
	Errors 38, 45	Unit/motor data error
	Error 44	Current limit exceeded for longer than 500 ms (only for additional function 2)
	Fault 90	Motor – inverter assignment is incorrect.
	Error 97	Error during transmission of the parameter set
	Error 99	Firmware does not support MLK31A option (only for MOVIMOT® with AS-interface).
Red 3 x flashing, break	Error 01	Overcurrent in output stage
	Error 11	Overtemperature in output stage
Red 4 x flashing, break	Error 84	Overload in motor
Red 5 x flashing, break	Error 4	Error brake chopper
	Error 89	Overtemperature in brake Motor – frequency inverter assignment is incorrect. The brake and braking resistor are connected to terminals X1:13 – X1:15 at the same time. This is not permitted.
Red 6 x flashing, break	Error 06	Line phase failure
	Error 81	Start condition ¹⁾
	Error 82	Output phases interrupted. ¹⁾
Red Constantly lit	Not ready	Check 24 V supply. A smoothed DC voltage with maximum residual ripple of 13% must be present.

1) for lifting applications only

Status LED flash codes

Flashing evenly:	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
Flashing with alternating colors, break:	LED 100 ms green, 100 ms red, 100 ms green, 300 ms break
N x flashing, break:	LED N x (600 ms red, 300 ms off), then LED off for 1 s

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10.2 Error list

The following table helps you with troubleshooting:

Code	Error	Possible cause	Measure
–	Communication timeout (motor stops, without error code)	No connection ⊥, RS+, RS- between MOVIMOT® and RS485 master	Check and establish connection, especially earth.
		EMC influence	Check shielding of data lines and improve, if necessary.
		Incorrect type (cyclical) for acyclical data traffic, protocol period between the individual telegrams is longer than the timeout set.	Check number of MOVIMOT® drives connected to the master. If a timeout period of 1 s, for example, a maximum of 8 MOVIMOT® drives may be connected as slaves with cyclical communication. Reduce telegram cycle, increase timeout period or select telegram type "acyclic".
–	Supply voltage not present (motor stops, without error code)	DC link voltage too high, supply system off has been recognized	Check power cables and line voltage for interruption.
–	24 V supply not available (motor stops, without error code)	24 V supply voltage not available	Check 24 V supply voltage for interruption Check value of 24 V supply voltage. Permitted voltage: DC 24 V ± 25%, EN 61131-2, residual ripple max. 13%) Motor restarts automatically as soon as the voltage reaches normal values.
		AUX power supply voltage not available. (only for MOVIMOT® with AS-interface)	AUX power supply voltage not available Check value of AUX power supply voltage. Permitted voltage: DC 24 V ± 25%, EN 61131-2, residual ripple max. 13%) Motor restarts automatically as soon as the voltage reaches normal values.
01	Overcurrent in output stage	Short circuit on inverter output	Check the connection between the inverter output and the motor as well as the motor winding for short circuits. Reset error. ¹⁾
04	Brake chopper	Overcurrent in brake output, resistor damaged, resistance too low.	Check the connection of the resistor/replace it.
		Short circuit, brake coil	Replace brake.
06	Phase failure (error can only be detected when drive is under load)	Phase failure	Check the supply system cables for phase failure. Reset error ¹⁾ .

Code	Error	Possible cause	Measure
07	DC link voltage too high	Ramp time too short.	Extend the ramp time. Reset error ¹⁾ .
		Faulty connection between brake coil/braking resistor	Check the braking resistor/brake coil connection. Correct, if necessary. Reset error ¹⁾ .
		Incorrect internal resistance of brake coil/braking resistor	Check internal resistance of brake coil/braking resistor (see operating instructions, chapter "Technical data"). Reset error ¹⁾ .
		Thermal overload of the braking resistor, size of braking resistor incorrectly selected	Dimension the braking resistor correctly. Reset error ¹⁾ .
		Invalid voltage range of supply input voltage	Check supply input voltage for permitted voltage range. Reset error ¹⁾ .
08	Speed monitoring	Speed deviation due to operation at the current limit	Reduce the load on the drive. Reset error ¹⁾ .
09	Startup	Non-permitted drive ID module with MOVIMOT [®] with 230 V supply	Not all drive ID modules are permitted for MOVIMOT [®] with 230 V supply (see operating instructions, chapter "Drive ID module assignment"). Check/remedy drive ID module.
		For MOVIMOT [®] MM..D with AS-interface, the additional function 4, 5, 12 are not permitted.	Correct the settings of DIP switches S2/5 – S2/8.
11	Thermal overload of the output stage or internal unit error	Heat sink is dirty.	Clean the heat sink. Reset error ¹⁾ .
		Ambient temperature too high.	Lower ambient temperature. Reset error ¹⁾ .
		Heat build-up on MOVIMOT [®] drive.	Prevent heat build-up. Reset error ¹⁾ .
		Drive load too high.	Reduce the load on the drive. Reset error ¹⁾ .
15	24 V monitoring	24 V supply voltage dip	Check 24 V supply. Reset error ¹⁾ .
17 - 24 37	CPU errors	CPU errors	Reset error ¹⁾ .

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Code	Error	Possible cause	Measure
25	EEPROM error	Error when accessing EEPROM	Set parameter <i>P802</i> to "Delivery state". Reset error ¹⁾ . Re-parameterize MOVIMOT® inverter. Consult the SEW Service if the error reoccurs.
26	External terminal	External signal at terminal X6: 9,10 is not present	Remove/reset external error
38	Error code 38	Internal error	Contact SEW Service.
43	communication timeout	Communication timeout during cyclical communication via RS485. If this error occurs, the drive is decelerated and stopped along the set ramp.	Check/establish communication link between RS485 master and MOVIMOT® inverter. NOTICE! The drive is enabled again after communication has been re-established.
		Internal communication error (for MOVIMOT® MM..D with AS-interface)	Check the number of slaves connected to the RS485 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 RS485 master for cyclical communication. Contact SEW Service.
44	Current limit exceeded	Current limit set exceeded for longer than 500 ms. Error only active with additional function 2. Status LED flashes red.	Reduce load or increase the current limit at switch f2 (only for additional function 2).
81	Start condition error	The inverter could not be supplied with the correct amount of current during the pre-magnetization time. Rated motor power too small in relation to rated inverter power.	Check connection between MOVIFIT® inverter and motor.
82	Output open error	2 or all output phases interrupted.	Check connection between MOVIFIT® inverter and motor.
		Rated motor power too small in relation to rated inverter power.	Check connection between MOVIFIT® inverter and motor.

Code	Error	Possible cause	Measure
84	Thermal overload of motor	Motor protection is active when the MOVIMOT® inverter is mounted close to the motor.	Set DIP switch S1/5 to "ON". Reset error ¹⁾ .
		Incorrectly set performance level when MOVIMOT® inverter and motor are combined.	Check DIP switch setting S1/6. Reset error ¹⁾ .
		Ambient temperature too high.	Lower ambient temperature. Reset error ¹⁾ .
		Heat build-up on MOVIMOT® drive.	Prevent heat build-up. Reset error ¹⁾ .
		Motor load too high.	Reduce the load on the motor. Reset error ¹⁾ .
		Speed too low.	Increase speed. Reset error ¹⁾ .
		Should the error occur shortly after the initial enable.	Check the combination of motor and MOVIMOT® inverter. Reset error ¹⁾ .
		The temperature monitoring in the motor (TH winding thermostat) has tripped when using MOVIMOT® inverter with the selected additional function 5.	Reduce the load on the motor. Reset error ¹⁾ .
89	Overtemperature in brake	Thermal overload brake coil	Extend the ramp time. Reset error ¹⁾ .
		Brake coil defective.	Contact SEW Service.
		Brake coil and braking resistor connected.	Connect either brake or braking resistor on the drive.
		Inverter is not suitable for the motor. (only if the error occurs after the initial enable)	Check the combination of motor (brake coil) and MOVIMOT® inverter. Check/correct settings of DIP switch S1/6 and S2/1. Reset error ¹⁾ .
90	Output stage detection	Assignment of inverter to motor is not permitted.	Check/correct settings of DIP switch S1/6 and S2/1.
			Check/correct motor connection type.
			Check whether the drive ID module is suitable for the motor and is correctly connected.
			Use MOVIMOT® inverter or motor with a different power rating.

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Code	Error	Possible cause	Measure
91	Bus module communication timeout – MOVIMOT®	Timeout between fieldbus interface and MOVIMOT® inverter.	Check/establish communication link between fieldbus interface and MOVIMOT® inverter. The fieldbus interface only reports the error to the higher-level controller.
94	EEPROM checksum error	EEPROM is defective.	Contact SEW Service.
97	Copy error	DBG operator terminal or PC/laptop disconnected during the copy process	Before acknowledging the error, load the factory setting or the complete data record from the DGB operator terminal or the MOVITOOLS® MotionStudio software.
		Switching the 24 V voltage supply off and on during the copying process.	Before acknowledging the error, load the factory setting or the complete data record from the DGB operator terminal or the MOVITOOLS® MotionStudio software.
99	MOVIMOT® firmware is not compatible with the MLK3.A option (only for MOVIMOT® with AS-interface)	MOVIMOT® firmware is not compatible with the MLK3.A option.	Contact SEW Service.

1) For standard MOVIMOT®, reset the error by switching off the 24 V supply voltage or via error reset. For MOVIMOT® with AS-interface, reset the error via the AS interface signals or through error reset via the diagnostics socket.

10.3 Inspection and maintenance

10.3.1 MOVIMOT® inverter

The MOVIMOT® inverter is maintenance-free. SEW-EURODRIVE does not prescribe any inspection or maintenance work for the MOVIMOT® inverter.

Exception: For extended storage, refer to the instructions in the "Service" > "Extended storage" chapter.

10.3.2 Motor

The motor requires regular inspection and maintenance work.

Observe the notes and instructions in chapter "Inspection/Maintenance" of the motor operating instructions.

10.3.3 Gear units (only for MOVIMOT® gearmotors)

The gear unit requires regular inspection and maintenance work.

Observe the notes and instructions in chapter "Inspection/Maintenance" of the gear unit operating instructions.

10.4 Diagnostics with MWF11A option

The table below shows the meaning of the error codes for the MWF11A option:

Error code on the display	Meaning	Response at terminal X4/6 = "1"
–	Communication between MWF11A and inverter is disrupted.	No response. The error disappears automatically as soon as communication reestablished.
E-02	An error occurred while reading the EEPROM.	The EEPROM will be read again.
E-03	The data record in the EEPROM is invalid, or the EEPROM is still empty.	Factory settings are restored
E-04	The error only occurs in 2PD mode, if the ramps were not able to be initialized in the MOVIMOT® inverter (e.g. incorrect MOVIMOT® firmware).	The ramps are initialized again.
F-XX	MOVIMOT® error XX. The meaning of the error can be found in the previous pages.	The MOVIMOT® inverter is reset.

10.5 Unit replacement

**▲ WARNING**

Electric shock from capacitors that have not been fully discharged.
Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**

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

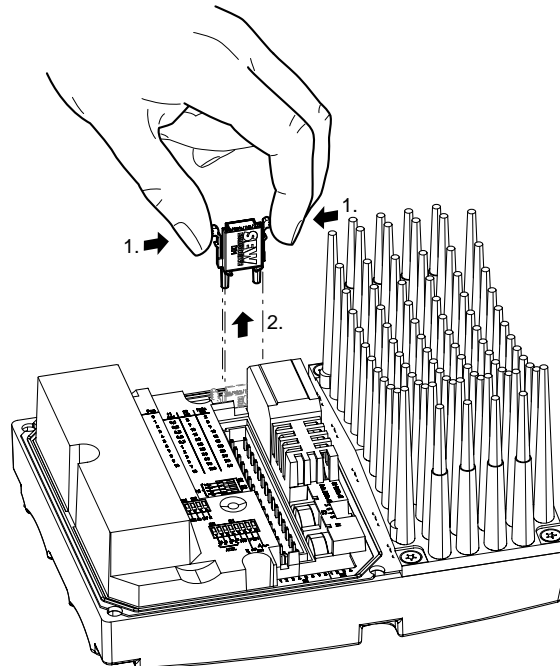
INFORMATION

The MOVIMOT® inverter must only be replaced with a MOVIMOT® inverter with the same part number.

3. Set all control elements
 - DIP switch S1
 - DIP switch S2
 - Setpoint potentiometer f1
 - Switch f2
 - Switch t1

on the new MOVIMOT® inverter analogously to the control elements 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 connection box and screw it on.
7. Supply voltage to the MOVIMOT® inverter.

INFORMATION



When switching on the new inverter the first time after a unit replacement, the 24 V supply must be connected for at least 10 seconds without interruptions.

After the unit replacement, it can take up to 6 s before the MOVIMOT® inverter signals the ready signal.

8. Check whether the new MOVIMOT® inverter is functioning properly.

10.6 Rotating the connection box

SEW-EURODRIVE always recommends purchasing the pre-fabricated MOVIMOT® drive 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 connection box).

▲ WARNING



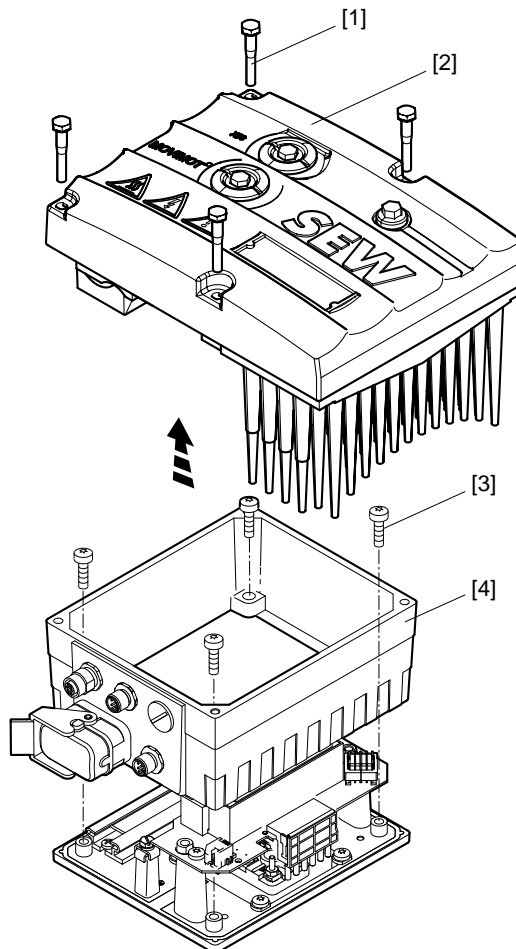
Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:

– **1 minute**

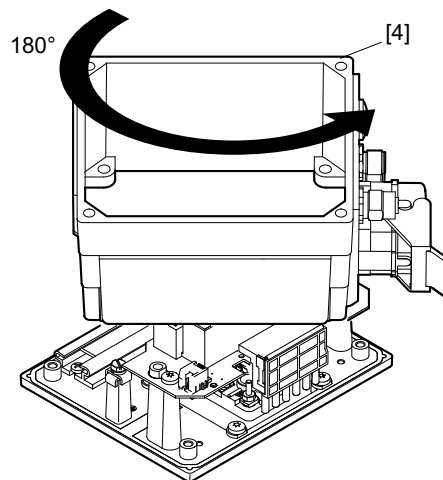
1. Label the connections of the MOVIMOT® inverter before disconnecting them for later re-installation.
2. Disconnect the supply system, control and sensor connections.
3. Remove the screws [1] and take off the MOVIMOT® inverter [2] from the terminal box.
4. Loosen the screws [3] and remove the connection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



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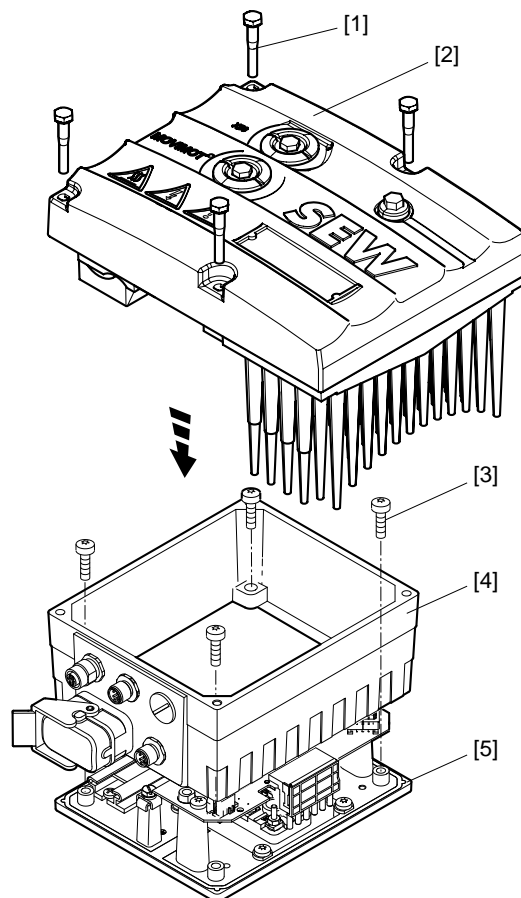
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5. Rotate the connection box [4] by 180°.



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

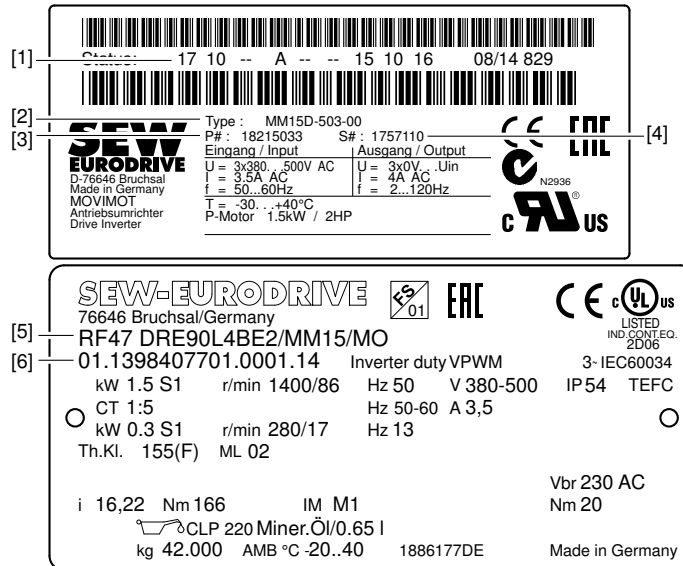


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10.7 SEW-EURODRIVE Service

If an error cannot be solved, please contact SEW-EURODRIVE Service (see "Address list"). When contacting SEW-EURODRIVE Service, always provide the following information:

- 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, binary control or via RS485)
- Type of error
- Accompanying circumstances (e.g. initial startup)
- Your own presumptions, any unusual events preceding the problem, etc.



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10.8 Shutdown

To shut down the MOVIMOT® drive, de-energize the drive using appropriate measures.



▲ WARNING

Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

- Disconnect the inverter from the power. Observe the minimum switch-off time after disconnection from the supply system:
 - **1 minute**

10.9 Storage

Observe the following instructions when shutting down or storing MOVIMOT® drive:

- If you shut down and store the MOVIMOT® drive for a longer period, you must close open cable bushings and cover ports with protective caps.
- Ensure that the unit is not subject to mechanical impact during storage.

Observe the guidelines on storage temperature in the "Technical data" section.

10.10 Extended storage

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

10.10.1 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 directly to the nominal voltage after a longer period of storage.

If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. After you have completed the regeneration process, the 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

10.11 Waste disposal

This product consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic components

Dispose of all components in accordance with applicable regulations.

11

Technical data

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

11 Technical data

11.1 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		1821 4991	1821 5009	1821 5017	1821 5025	1821 5033	1821 5041	1821 5068	1821 5076
Size		1					2		2L
Apparent output power at $V_{line} =$ AC 380 – 500 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
Connection voltages	V_{line}	AC 3 x 380 V/400 V/415 V/460 V/500 V							
Permitted range		$V_{line} = AC 380 V -10\% - AC 500 V +10\%$							
Line frequency	f_{line}	50 – 60 Hz \pm 10%							
Nominal line current at $V_{line} = AC 400 V$	I_{line}	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 – V_{line}							
Output frequency	f_A	2 – 120 Hz							
Resolution		0.01 Hz							
Operating point		400 V at 50/100 Hz							
Nominal 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 W 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)/8/16kHz ¹⁾							
Current limit	I_{max}	Motor: 160% at λ and Δ Regenerative: 160% at λ and Δ							
Maximum motor cable length		15 m when MOVIMOT® inverter is mounted close to the motor (with SEW-EURODRIVE hybrid cable)							

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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	1821 4991	1821 5009	1821 5017	1821 5025	1821 5033	1821 5041	1821 5068	1821 5076
Size	1					2		2L
External braking resistor	R _{min}	150 Ω				68 Ω		
Interference immunity	Complies with EN 61800-3							
Interference emission	Complies with category C2 according to EN 61800-3 (limit class A to EN 55011 and EN 55014)							
Ambient temperature	θ _U	-25 (-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	Complies with EN 50178							
Degree of protection (depending on the motor)	IP54, IP55, IP65, IP66 (options, specify when ordering) (Connection box closed and all cable entries sealed, the degree of protection of the MOVIMOT® drive decreases with a lower degree of protection of the motor)							
Operating mode	S1, S3 max. cycle duration 10 minutes (EN 60034-1)							
Type of cooling	Natural cooling (DIN 41751)							
Installation altitude	h ≤ 1000 m: No reduction h > 1000 m: I _N reduction by 1% per 100 m h > 2000 m: V _{line} reduction by AC 6 V per 100 m, overvoltage class 2 according to DIN 0110-1 h _{max} = 4000 m See section "Installation altitudes above 1000 m amsl" (→ 37)							
Weight	See "MOVIMOT® gearmotors" catalog							
Dimensions, dimension drawings								
Output torque values								
Required preventive measures	Ground the unit							

1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 is set to ON, the units operate at a PWM frequency of 16 kHz (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature and the load.

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

11.2 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		1821 4991	1821 5009	1821 5017	1821 5025	1821 5033	1821 5041	1821 5068	1821 5076
Size		1					2		2L
Apparent output power at $V_{line} =$ AC 380 – 500 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
Connection voltages	V_{line}	AC 3 x 380 V/400 V/415 V/460 V/500 V							
Permitted range		$V_{line} = AC 380 V - 10\% - AC 500 V + 10\%$							
Line frequency	f_{line}	50 – 60 Hz \pm 10%							
Nominal line current at $V_{line} = AC 460 V$	I_{line}	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 6.9 A
Output voltage	V_O	0 – V_{line}							
Output frequency	f_A	2 – 120 Hz							
Resolution		0.01 Hz							
Operating point		460 V at 60 Hz							
Nominal 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 2.0 HP	2.2 kW 3.0 HP	3.7 kW 5.0 HP	4 kW 5.4 HP
PWM frequency		4 (factory setting)/8/16 kHz ¹⁾							
Current limit	I_{max}	Motor: 160% at λ and Δ Regenerative: 160% at λ and Δ							
Maximum motor cable length		15 m when MOVIMOT® inverter is mounted close to the motor (with SEW-EURODRIVE hybrid cable)							

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		1821 4991	1821 5009	1821 5017	1821 5025	1821 5033	1821 5041	1821 5068	1821 5076
Size		1					2		2L
External braking resistor	R _{min}	150 Ω					68 Ω		
Interference immunity		Complies with EN 61800-3							
Interference emission		Complies with category C2 according to EN 61800-3 (limit class A to EN 55011 and EN 55014)							
Ambient temperature	ϑ _U	-25 (-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		Complies with EN 50178							
Degree of protection (depending on the motor)		IP54, IP55, IP65, IP66 (options, specify when ordering) (Connection box closed and all cable entries sealed, the degree of protection of the MOVIMOT® drive decreases with a lower degree of protection of the motor)							
Operating mode		S1, S3 max. cycle duration 10 minutes (EN 60034-1)							
Type of cooling		Natural cooling (DIN 41751)							
Installation altitude		h ≤ 1000 m: No reduction h > 1000 m: I _N reduction by 1% per 100 m h > 2000 m: V _{line} reduction by AC 6 V per 100 m, overvoltage class 2 according to DIN 0110-1 h _{max} = 4000 m See section "Installation altitudes above 1000 m amsl" (→ 37)							
Weight		See "MOVIMOT® gearmotors" catalog							
Dimensions, dimension drawings									
Output torque values									
Required preventive measures		Ground the unit							

1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 is set to ON, the units operate at a PWM frequency of 16 kHz (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature and the load.

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

11.3 Motor with operating point 230 V/60 Hz

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
Size		1			2		
Apparent output power at $V_{line} = AC 200-240 V$	S_N	1.0 kVA	1.3 kVA	1.7 kVA	2.0 kVA	2.9 kVA	3.4 kVA
Connection voltages	V_{line}	AC 3 x 200 V/230 V/240 V					
Permitted range		$V_{supply} = AC 200 V - 10\% - AC 240 V + 10\%$					
Line frequency	f_{line}	50 – 60 Hz ± 10%					
Nominal line current at $V_{line} = AC 230 V$	I_{line}	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 – V_{line}					
Output frequency	f_A	2 – 120 Hz					
Resolution		0.01 Hz					
Operating point		230 V at 60 Hz					
Nominal output current	I_N	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
PWM frequency		4 (factory setting)/8/16 kHz ¹⁾					
Current limit	I_{max}	Motor:			160% at λ and Δ		
		Regenerative:			160% at λ and Δ		
Maximum motor cable length		15 m when mounting close to the motor of the MOVIMOT® frequency inverter (with SEW-EURODRIVE hybrid cable)					

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
Size		1			2		
External braking resistor	R_{\min}	150 Ω			68 Ω		
Interference immunity		Complies with EN 61800-3					
Interference emission		Complies with category C2 according to EN 61800-3 (limit value class A to EN 55011 and EN 55014)					
Ambient temperature	ϑ_U	-25 (-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		Complies with EN 50178					
Degree of protection (depending on the motor)		IP54, IP55, IP65, IP66 (options, specify when ordering) (Connection box closed and all cable entries sealed, the degree of protection of the MOVIMOT® drive decreases with a lower degree of protection of the motor)					
Operating mode		S1, S3 max. cycle duration 10 minutes (EN 60034-1)					
Type of cooling		Natural cooling (DIN 41751)					
Installation altitude		h ≤ 1000 m: No reduction h > 1000 m: I_N reduction by 1% per 100 m h > 2000 m: V_{line} reduction by AC 3 V per 100 m, overvoltage class 2 according to DIN 0110-1 $h_{\max} = 4000$ m See section "Installation altitudes above 1000 m amsl" (→ 37)					
Weight		See "MOVIMOT® gearmotors" catalog					
Dimensions, dimension drawings							
Output torque values							
Required preventive measures		Ground the unit					

1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 is set to ON, the units operate at a PWM frequency of 16 kHz (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature and the load.

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

11.4 Electronics data

Electronics data	Terminal	
External electronics supply	24 V X6:1, 2, 3	V = +24 V ± 25%, EN 61131-2, residual ripple max. 13% I _E ≤ 250 mA (typically 120 mA at 24 V) Input capacitance 120 µF
Three digital inputs		Isolated via optocoupler; PLC compatible (EN 61131-2) R _i ≈ 3.0 kΩ, I _E ≈ 10 mA, sampling cycle ≤ 5 ms
Signal level		+13 – +30 V = "1" = Contact closed -3 – +5 V = "0" = Contact open
Control functions	R ↻ X6:11, 12	CW/Stop
	L ↻ X6:9, 10	CCW/Stop
	f1/f2 X6:7, 8	"0" = setpoint 1 "1" = setpoint 2
Output relay Contact information	K1a X5:25, 26 K1b X5:27, 28	Response time ≤ 15 ms DC 24 V/0.6 A/DC 12 according to IEC 60947-5-1 (only SELV or PELV circuits)
Signaling function		NO contact for ready signal Contact closed: <ul style="list-style-type: none"> • with voltage present (24 V + power supply) • if no error was detected • at the end of self-testing phase (after power on)
Serial interface	RS+ X5:29, 30 RS- X5:31, 32	RS485

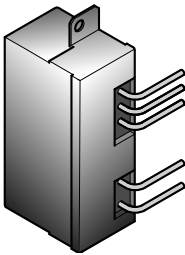
11.5 Technical data of options and accessories

11.5.1 MLU11A/MLU21A



Option	MLU11A	MLU21A
Part number	08233837	0823387X
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	

11.5.2 MLU13A



Option	MLU13A
Part number	18205968
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

11.5.3 MLG11A/MLG21A



Option	MLG11A	MLG21A
Part number	08233845	08233888
Function	Setpoint adjuster 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 interface ¹⁾	RS485 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

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Technical data

Technical data of options and accessories

11.5.8 MBG11A



Option	MBG11A
Part number	08225478
Function	Setpoint adjuster
Input voltage	DC 24 V ± 25%
Current consumption	approx. 70 mA
Setpoint resolution	1%
Serial interface ¹⁾	RS485 for connecting a maximum of 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 terminating resistor

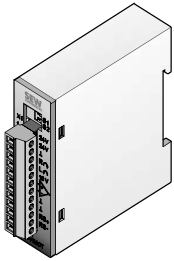
11.5.9 DBG



Option	DBG60B-01	DBG60B-02	DBG60B-03
Function	Operator terminal		
Connection	RJ10 connector For connection to the X50 diagnostics interface		
Degree of protection	IP40 (EN 60529)		
Ambient temperature	0 – +40 °C		
Storage temperature	-20 – +80 °C		

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11.5.10 MWA21A



Option	MWA21A
Part number	08230064
Function	Setpoint converter
Input voltage	DC 24 V ± 25%
Current consumption	approx. 70 mA
Serial interface¹⁾	RS485 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 ≈ 12 kΩ 0 – 20 mA/4 – 20 mA, R _i ≈ 22 Ω
Setpoint resolution analog input	8 Bit (± 1 Bit)
Signal level digital inputs	+13 – +30 V = "1" -3 – +5 V = "0"
Degree of protection	IP20
Ambient temperature	-15 – +60°C
Storage temperature	-25 – +85°C

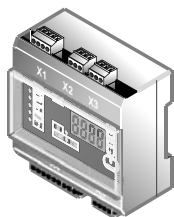
1) with integrated terminating resistor

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Technical data

Technical data of options and accessories

11.5.11 MWF11A



Option	MWF11A
Part number	08238278
Function	Setpoint converter
Input voltage	DC 24 V ± 25%
Current consumption	approx. 55 mA
Serial interface	RS485 to EIA standard, max 32 stations (with integrated terminating resistor)
Frequency input	100 Hz bis 100 kHz Voltage 5.5 – 30 V Rectangular, sine or saw tooth voltage can be used
Analog input	
Voltage controlled	0 – 10 V, $R_i > 200 \text{ k}\Omega$
Current controlled	0 – 20 mA, $R_i = 250 \text{ }\Omega$
Digital inputs	$R_i = 3 \text{ k}\Omega$, $I_E = 10 \text{ mA}$
Signal level	13 – 30 V = "1"
(according to EN 61131-2 type 1)	0 – 5 V = "0"
Digital output	PLC-compatible, $I_{\text{max}} = 150 \text{ mA}$
Degree of protection	IP20
Ambient temperature	-10 – +50°C

11.5.12 Forced cooling fan V

Option for motor size DR..	V forced cooling fan				
	71	80	90	100	112/132
Input voltage	DC 24 V				
Current consumption	0.35 A	0.5 A	0.75 A	0.75/ 1.1 A	1.64 A
Power demand	10 W	12 W	14 W	14/19 W	29 W
Air discharge rate	60 m ³ /h		170 m ³ /h	210 m ³ /h	295 m ³ /h
Connection	Terminal strip				
Max. cable cross section	3 x 1.5 mm ²				
Cable gland	M16 x 1.5				
Degree of protection	IP66				
Ambient temperature	-20 – +60°C				

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11.6 Integrated RS485 interface

RS485 interface	
Standard	RS485 to EIA standard (with integrated dynamic terminating resistor)
Baud rate	9.6 kbaud 31.25 kBaud (in connection with MF..., MQ..., MOVIFIT® MC)
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	Bidirectional
Operating mode	Aynchronous, semi-duplex
Timeout time	1 s
Line length	max. 200 m in RS485 operation with 9600 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 Bd will be detected automatically in case of operation with MF.. fieldbus interface.

2) ext. control or option MBG11A, MWA21A or MLG..A

11.7 Diagnostic interface

Diagnostic interface X50	
Standard	RS485 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	Bidirectional
Operating mode	Aynchronous, semi-duplex
Connection	RJ10 socket

11

Technical data

Work done, working air gap, braking torque of brake

11.8 Work done, working air gap, braking torque of brake

Brake type	Work done until maintenance [10 ⁶ J]	Working air gap [mm]		Brake disk [mm] min.	Braking torque settings				
		min. ¹⁾	max.		Braking torque [Nm]	Type and number of brake springs		Order numbers for brake springs	
						Normal	Blue	Normal	Blue
BE05	120	0.25	0.6	9.0	5.0	2	4	0135017X	13741373
					3.5	2	2		
					2.5	-	6		
					1.8	-	3		
BE1	120	0.25	0.6	9.0	10	6	-	0135017X	13741373
					7.0	4	2		
					5.0	2	4		
BE2	165	0.25	0.6	9.0	20	6	-	13740245	13740520
					14	2	4		
					10	2	2		
					7.0	-	4		
BE5	260	0.25	0.9	9.0	55	6	-	13740709	13740717
					40	2	4		
					28	2	2		
					20	-	4		
BE11	640	0.3	1.2	10.0	110	6	-	13741837	13741847
					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.

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11.9 Braking torque assignment

Motor type	Brake type	Braking torque steps [Nm]												
		1.8	2.5	3.5	5.0									
DR.71	BE05	1.8	2.5	3.5	5.0									
	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

Preferred brake voltage

MOVIMOT® type	Preferred brake voltage
MOVIMOT® MM..D-503, size 1 (MM03.. to MM15..)	230 V
MOVIMOT® MM..D-503, size 2 (MM22.. to MM40..)	120 V
MOVIMOT® MM..D-223 ¹⁾ , size 1 and 2 (MM03.. to MM40..)	

1) In connection with MOVIMOT MM..D-233, only the brakes with a nominal voltage of 120 V are permitted.

11.10 Assignment of internal braking resistors

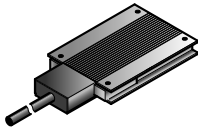
MOVIMOT® type	Braking resistor	Part number
MM03D-503-00 – MM15D-503-00 MM03D-233-00 – MM07D-233-00	BW1	08228973 ¹⁾
MM22D-503-00 – MM40D-503-00 MM11D-233-00 – MM22D-233-00	BW2	08231362 ¹⁾

1) 2 screws M4 x 8, included in scope of delivery.

11.11 Assignment of external braking resistors

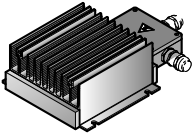
MOVIMOT® type	Braking resistor	Part no.	Protective grid
MM03D-503-00 – MM15D-503-00	BW200-003/K-1.5	08282919	0813152X
MM03D-233-00 – MM07D-233-00	BW200-005/K-1.5	08282838	–
	BW150-010	08022852	–
MM22D-503-00 – MM40D-503-00	BW100-003/K-1.5	08282935	0813152X
MM11D-233-00 – MM22D-233-00	BW100-005/K-1.5	08282862	–
	BW068-010	08022879	–
	BW068-020	08022860	–

11.11.1 BW100.. BW200..



	BW100-003/ K-1.5	BW100-005/ K-1.5	BW200-003/ K-1.5	BW200-005/ K-1.5
Part number	08282935	08282862	08282919	08282838
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
Line length	1.5 m			

11.11.2 BW150.. BW068..



	BW150-006-T	BW68-006-T	BW68-012-T
Part number	17969565	17970008	17970016
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	285 x 75 x 174 mm	285 x 75 x 174 mm	635 x 75 x 174 mm
Maximum permitted cable length	15 m		

INFORMATION



Generally speaking, the application does not need the temperature sensor of the braking resistor. The higher-level controller can evaluate the temperature sensor's signal and switch off the supply voltage of the drive when necessary.

11.12 Resistance and assignment of the brake coil

Brake	Resistance of the brake coil ¹⁾		
	120 V	230 V	400 V
BE03	76 Ω	378 Ω	1197 Ω
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) Nominal 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.

11.13 Assignment of the drive ID module

Type	Motor		Drive ID module		
	Line voltage [V]	Line frequency [Hz]	Identification	ID color	Part number
DRS	230/400	50	DRS/400/50	White	18214371
DRE	230/400	50	DRE/400/50	Orange	18214398
DRS	266/460	60	DRS/460/60 ¹⁾	Yellow	18214401
DRE	266/460	60	DRE/460/60 ¹⁾	Green	18214428
DRS/DRE	220/380	60	DRS/DRE/380/60 ¹⁾	Red	18234933
DRS/DRE	220 – 240/380 – 415 254 – 277/440 – 480	50 60	DRS/DRE/50/60	Purple	18214444
DRP	230/400	50	DRP/230/400	Brown	18217907
DRP	266/460	60	DRP/266/460 ¹⁾	Beige	18217915
DRE...J	230/400	50	DRE...J/400/50	Orange	28203816
DRU...J	230/400	50	DRU...J/400/50	Gray	28203194
DRN.	230/400	50	DRN/400/50	Light blue	28222040
DRN.	266/460	60	DRN/460/60	Pale green	28222059
DRS/DRN	220 – 230 / 380 – 400 266/460	50 60	DRS/DRN/50/60	Pastel green	28222067

1) This drive ID module can also be combined with MOVIMOT® MM..D-233.

12 Appendix

INFORMATION



Due to UL requirements, the following chapters are always printed in English independent of the language of the publication:

12.1 UL-compliant installation

12.1.1 Field wiring power terminals

Observe the following notes for UL-compliant installation:

- Use 60/75 °C copper wire only.
- Tighten terminals to 1.5 Nm (13.3 lb.in)

12.1.2 Short circuit current rating

Suitable for use on a circuit capable of delivering not more than 200,000 rms symmetrical amperes when protected as follows

For 240 V systems:

250 V minimum, 25 A maximum, non-semiconductor fuses
or 250 V minimum, 25 A maximum, inverse time circuit breakers

For 500 V systems:

500 V minimum, 25 A maximum, non-semiconductor fuses
or 500 V minimum, 25 A maximum, inverse time circuit breakers

The max. voltage is limited to 500 V.

12.1.3 Branch circuit protection

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

For maximum branch circuit protection see table below.

Series	Non-semiconductor fuses	Inverse time circuit breakers
MOVIMOT® MM..D	250 V/500 V minimum, 25 A maximum	250 V/500 V minimum, 25 A maximum

12.1.4 Motor overload protection

MOVIMOT® MM..D is provided with load and speed-sensitive overload protection and thermal memory retention upon shutdown or power loss.

The trip current is adjusted to 140% of the rated motor current.

12.1.5 Ambient temperature

MOVIMOT® MM..D is suitable for an ambient temperature of 40 °C, max. 60 °C with derated output current. To determine the output current rating at higher than 40 °C, the output current should be derated 3.0% per °C between 40 °C and 60 °C.

INFORMATION

- Only use certified units with a limited output voltage ($V_{\max} = \text{DC } 30 \text{ V}$) and limited output current ($I \leq 8 \text{ A}$) as an external DC 24 V voltage source.
 - The UL certification only applies for the operation on voltage supply systems with voltages to ground of max. 300 V. The UL certification does not apply to operation on voltage supply systems with a non-grounded star point (IT systems).
-

13 Declaration of conformity

EC Declaration of Conformity

SEW
EURODRIVE

900030110

**SEW EURODRIVE GmbH & Co KG**
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the following products

frequency inverters of the series	MOVIMOT® D	
possibly in connection with	AC motor	
are in conformity with		
Machinery Directive	2006/42/EC	1)
Low Voltage Directive	2006/95/EC	
EMC directive	2004/108/EC	4)
Applied harmonized standards:	EN 13849-1:2008	5)
	EN 61800-5-2: 2007	5)
	EN 60034-1:2004	
	EN 61800-5-1:2007	
	EN 60664-1:2008	
	EN 61800-3:2007	

- 1) The products are intended for installation in machines Startup is prohibited until it has been determined that the machines in which these products are to be installed comply with the requirements of the aforementioned Machinery Directive.
- 4) According to the EMC directive, the products listed cannot be operated independently. Only if these products are integrated in a overall system can they be evaluated with reference to EMC guidelines. The evaluation only accounts for a typical system configuration and not for the individual product.
- 5) Compliance with all safety guidelines included in the product-specific documentation (operating instructions, manual, etc.) must be ensured for the entire product life.

Bruchsal 12.08.10

Location	Date	Johann Soder Managing Director Technology	a) b)
----------	------	--	-------

- a) Authorized representative for issuing this declaration on behalf of the manufacturer
b) Authorized representative for compiling the technical documents

14 Address list

Germany		
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal
Production / Industrial Gears	Bruchsal	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 D-76646 Bruchsal
Service Competence Center	Mechanics / Mechatronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal
Drive Technology Center	North	SEW-EURODRIVE GmbH & Co KG Alte Rickinger Straße 40-42 D-30823 Garbsen (near Hannover)
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)
	Drive Service Hotline / 24 Hour Service	
Additional addresses for service in Germany provided on request.		
France		
Production Sales Service	Haguenau	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex
Production	Forbach	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Étang
Additional addresses for service in France provided on request.		
Algeria		
Sales	Algiers	REDUCOM Sarl 16, rue des Frères Zaghroune Bellevue 16200 El Harrach Alger

Argentina		
Assembly Sales	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires
Australia		
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164
Austria		
Assembly Sales Service	Wien	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien
Belarus		
Sales	Minsk	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk
Belgium		
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven
Service Competence Center	Industrial Gears	SEW-EURODRIVE n.v./s.a. Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne
Brazil		
Production Sales Service	São Paulo	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496
Assembly Sales Service	Rio Claro	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 - Indaiatuba / SP
Bulgaria		
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia
Cameroon		
Sales	Douala	Electro-Services Rue Drouot Akwa B.P. 2024 Douala

14 Address list

Canada		
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9
Additional addresses for service in Canada provided on request.		
Chile		
Assembly Sales Service	Santiago	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile
China		
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065
Additional addresses for service in China provided on request.		
Colombia		
Assembly Sales Service	Bogotá	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá
Croatia		
Sales Service	Zagreb	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb
Czech Republic		
Sales Assembly Service	Hostovice	SEW-EURODRIVE CZ s.r.o. Floriánova 2459 253 01 Hostovice

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Czech Republic		
		Drive Service Hot-line / 24 Hour Service - HOT-LINE +420 800 739 739 (800 SEW SEW) Servis:
Denmark		
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Estonia		
Sales	Tallin	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa
Finland		
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Service	Hollola	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola
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Gabon		
Sales	Libreville	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun
Great Britain		
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		Drive Service Hotline / 24 Hour Service
Greece		
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India		
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu
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Israel		
Sales	Tel-Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon
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Japan		
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818
Kazakhstan		
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Kenya		
Sales	Nairobi	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi
Latvia		
Sales	Riga	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga
Lebanon		
Sales Lebanon	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut After Sales Service

Lebanon		
Sales Jordan / Kuwait / Saudi Arabia / Syria	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut After Sales Service
Lithuania		
Sales	Alytus	UAB Irseva Statybininku 106C LT-63431 Alytus
Luxembourg		
Assembly Sales Service	Brussels	SEW-EURODRIVE n.v./s.a. Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven
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Sales	Antananarivo	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar
Malaysia		
Assembly Sales Service	Johor	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia
Mexico		
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México
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Sales	Ulan Bator	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253
Morocco		
Sales Service	Mohammedia	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia
Namibia		
Sales	Swakopmund	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund
Netherlands		
Assembly Sales Service	Rotterdam	SEW-EURODRIVE B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam

New Zealand		
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch
Nigeria		
Sales	Lagos	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria
Norway		
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss
Pakistan		
Sales	Karachi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi
Paraguay		
Sales	Fernando de la Mora	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino
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Assembly Sales Service	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima
Poland		
Assembly Sales Service	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346
Portugal		
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada
Romania		
Sales Service	Bucharest	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti
Russia		
Assembly Sales Service	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg

Senegal		
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar
Serbia		
Sales	Beograd	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd
Singapore		
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644
Slovakia		
Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice
Slovenia		
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje
South Africa		
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban P.O. Box 10433, Ashwood 3605
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200

South Korea		
Assembly Sales Service	Ansan	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate #1048-4, Shingil-Dong, Danwon-Gu, Ansan-City, Kyunggi-Do Zip 425-839
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270
Spain		
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)
Swaziland		
Sales	Manzini	C G Trading Co. (Pty) Ltd PO Box 2960 Manzini M200
Sweden		
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping
Switzerland		
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel
Tanzania		
Sales	Dar es Salaam	SEW-EURODRIVE PTY LIMITED TANZANIA Plot 52, Regent Estate PO Box 106274 Dar Es Salaam
Thailand		
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000
Tunisia		
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana
Turkey		
Assembly Sales Service	Kocaeli-Gebze	SEW-EURODRIVE Sistemleri San. Ve TIC. Ltd. Sti Gebze Organize Sanayi Böl. 400 Sok No. 401 41480 Gebze Kocaeli
Ukraine		
Assembly Sales Service	Dnipropetrovsk	ООО «СЕВ-Евродрайв» ул.Рабочая, 23-В, офис 409 49008 Днепропетровск
United Arab Emirates		
Sales Service	Sharjah	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah

USA		
Production Assembly Sales Service	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544
Additional addresses for service in the USA provided on request.		
Venezuela		
Assembly Sales Service	Valencia	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo
Vietnam		
Sales	Ho Chi Minh City	All sectors except harbor and offshore: Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City
		Harbor and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City
Zambia		
Sales	Kitwe	EC Mining Limited Plots No. 5293 & 5294, Tangaanyika Road, Off Mutentemuko Road, Heavy Industrial Park, P.O.BOX 2337 Kitwe

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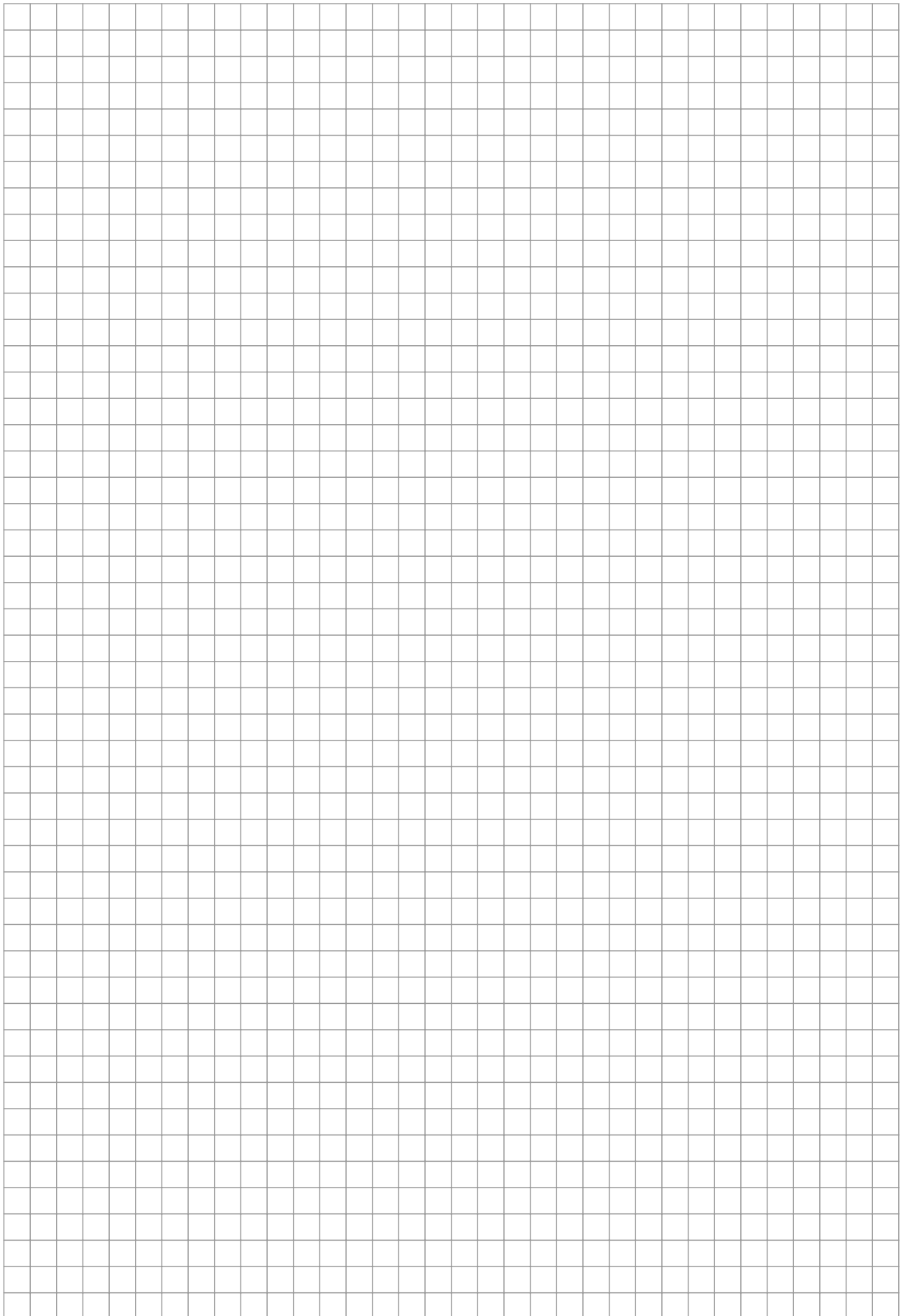
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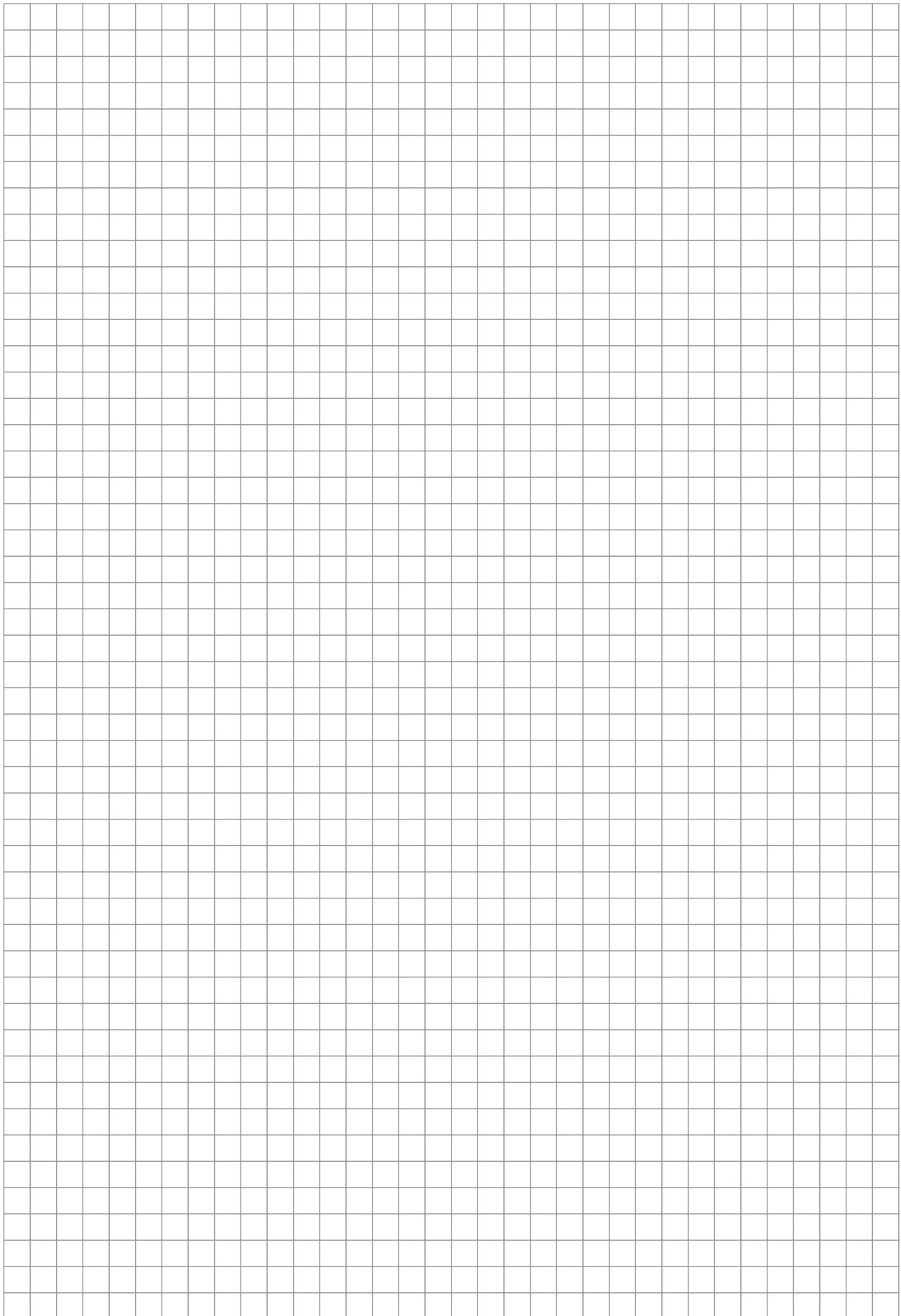
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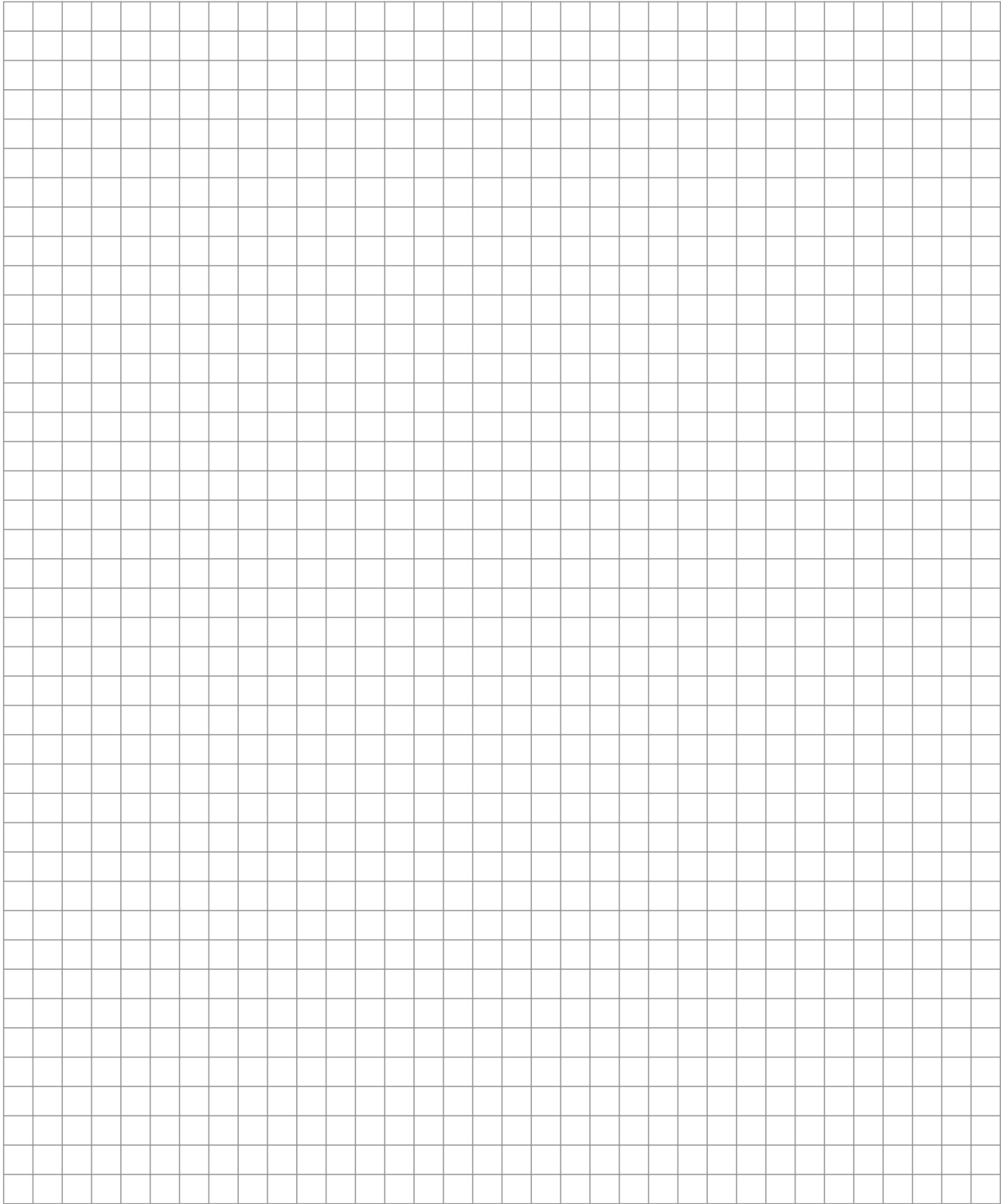
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