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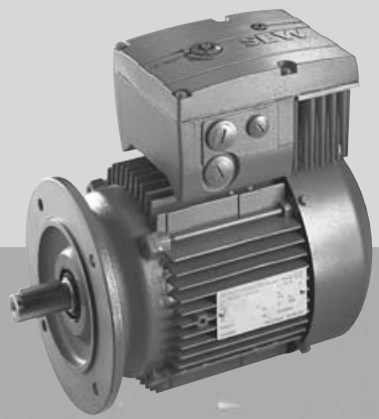
SEW EURODRIVE

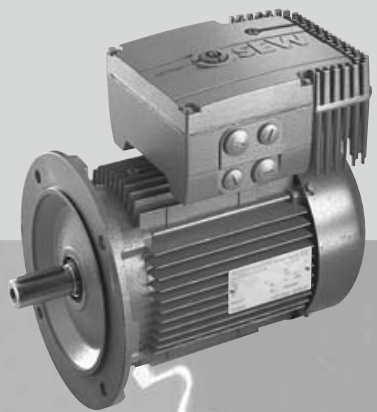
MOVIMOT®

MM03**C** to MM3X**C**

Edition

06/2002

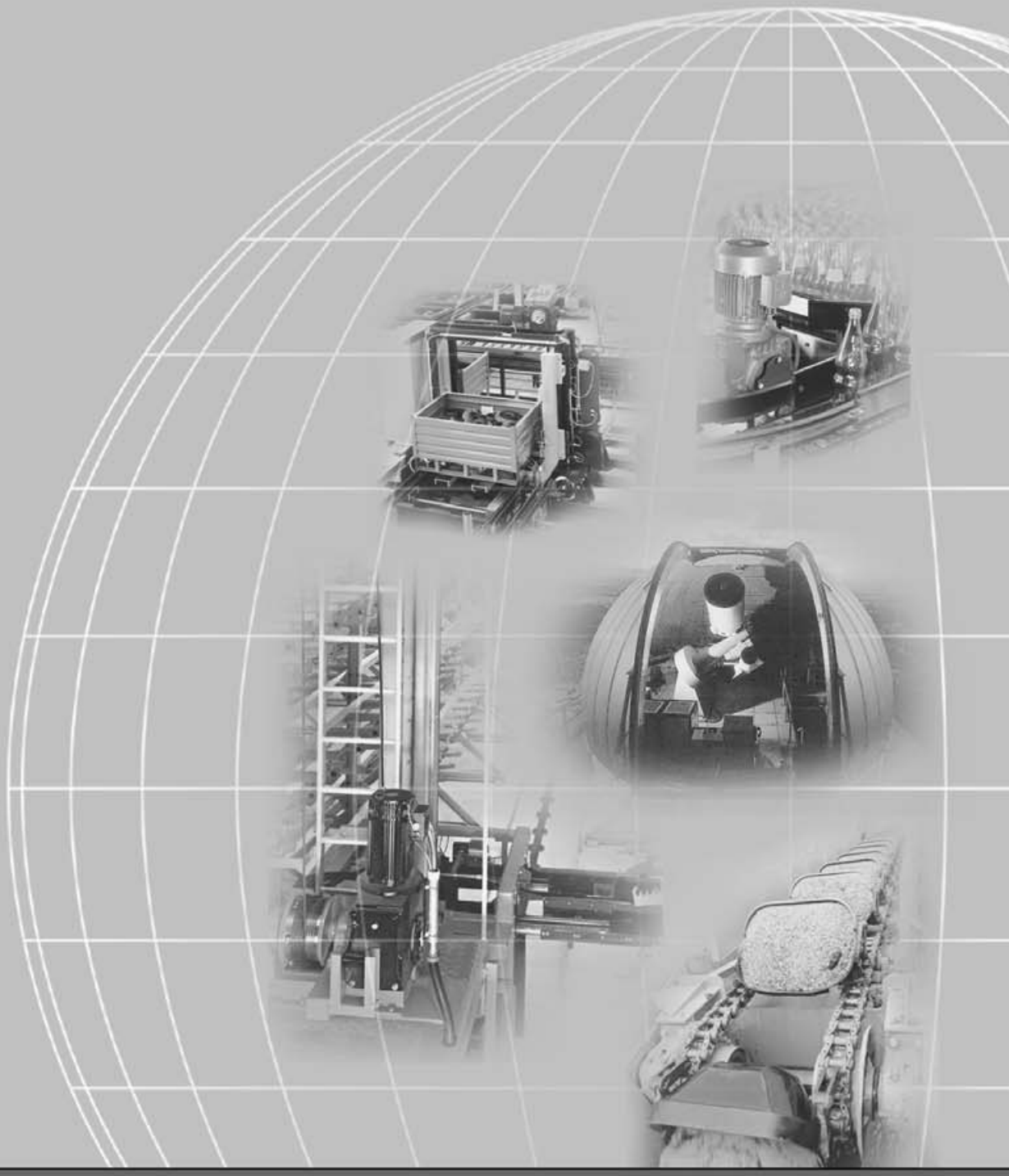




Operating Instructions

1052 701X / EN

SEW
EURODRIVE



SEW-EURODRIVE





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1 Important Notes

Safety and warning instructions

Always follow the safety and warning instructions contained in this publication!



Electrical hazard
Possible consequences: Severe or fatal injuries.



Hazard
Possible consequences: Severe or fatal injuries.



Hazardous situation
Possible consequences: Slight or minor injuries.



Harmful situation
Possible consequences: Damage to the unit and the environment.



Tips and useful information.

A requirement of fault-free operation and fulfillment of any rights to claim under guarantee is that you adhere to the information in the operating instructions. Consequently, read the operating instructions before you start operating the drive!

These operating instructions contain vital servicing information and should be kept in close proximity to the drive.

Other applicable documents

- 'Drive System for Decentralized Installation' system manual
- 'MOVIMOT® Geared Motors' catalog



Waste disposal



This product consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronics components

All components should be disposed of in accordance with applicable regulations!

2 Safety Notes

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

- Only **trained specialists** with the relevant accident prevention training are allowed to perform **installation, startup, and service work** on MOVIMOT® in compliance with the regulations in force (e.g. EN 60204, VBG 4, DIN-VDE 0100/0113/0160).

- Make sure that **preventive measures** and **protection devices** correspond to the **applicable regulations** (e.g. EN 60204 or EN 50178).
  - **Necessary protective measures: Grounding of MOVIMOT®**.



- **Disconnect the Movimot® from the power supply system** prior to **removing the connection box cover**. **Dangerous voltages** may still be present for up to **1 minute after disconnection**.

- **As soon as supply voltage is present at the MOVIMOT®, the terminal box must be closed and the terminal box cover must be bolted.**

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



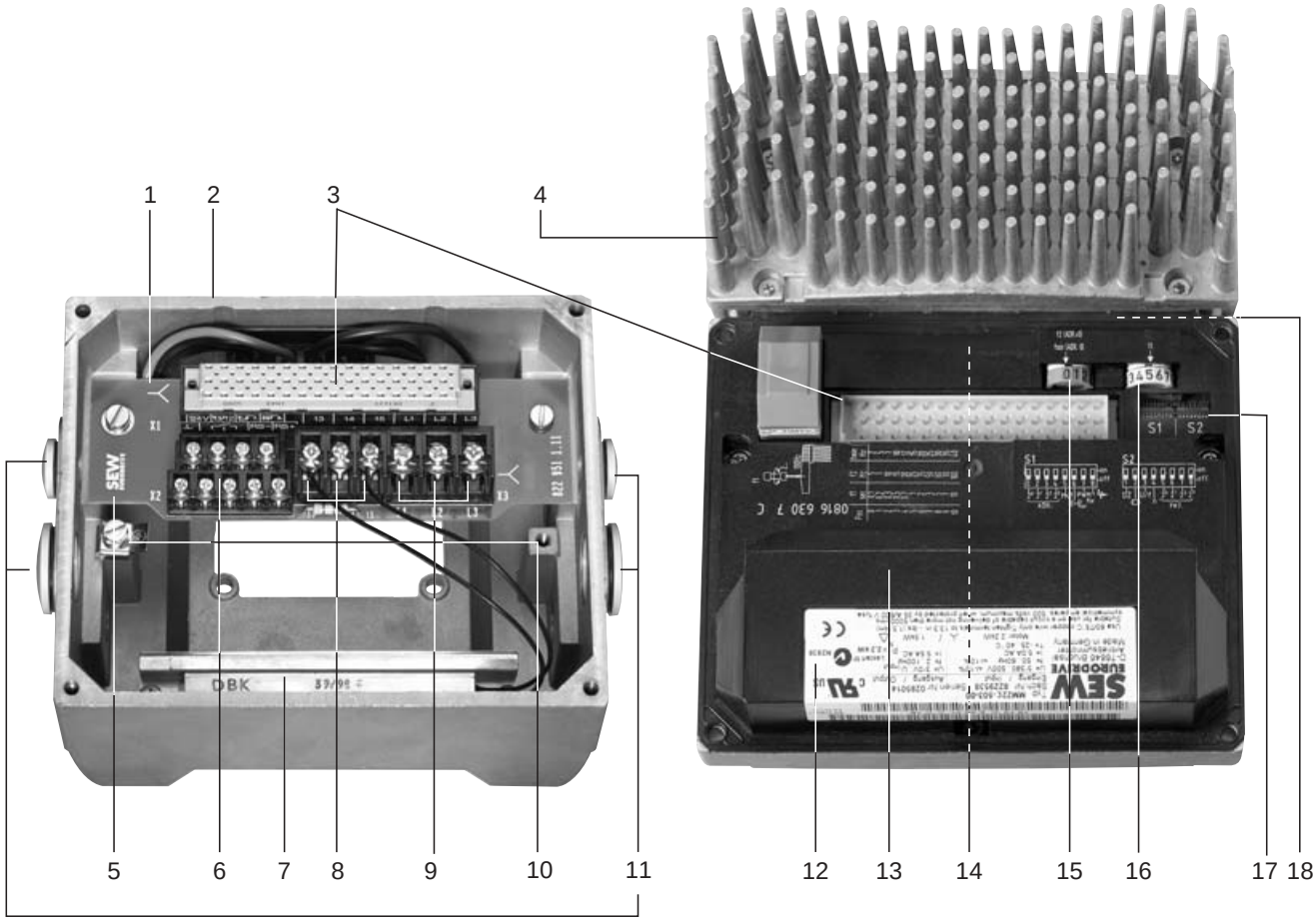
- **Mechanical blocking** or unit-internal **safety functions** can cause a **motor stand-still**. Removing the cause of this problem or performing a reset can result in the **motor re-starting on its own.** If, for safety reasons, this is not permitted for the driven machine, **MOVIMOT® must be disconnected from the power supply.**

- **Important Danger of burns:** The MOVIMOT® surface temperature (especially of the heat sink) **can exceed 60 °C** during operation!

- **Designated use**
  - These MOVIMOT® (geared) motors are intended for industrial equipment. They comply with the applicable standards and regulations and meet the requirements of the Low Voltage Directive 73/23/EEC.
  - The use of MOVIMOT® for hoist applications is limited!
  - Technical data and information about the permitted conditions where the unit is used can be found on the nameplate and in these operating instructions.
  - **It is essential to observe these instructions!**

3 Unit Structure

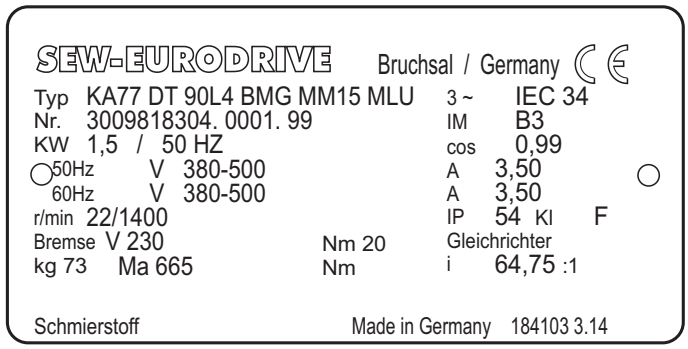
3.1 *MOVIMOT® inverter*



1. Identification of the circuit type
2. Terminal box (size 2 used as example)
3. Connection plug between connection unit and inverter
4. Terminal box cover with inverter and heat sink (size 2 used as example)
5. Connection unit with terminals
6. Electronics terminal strip X2
7. Internal braking resistor BW. (standard for motors without brake)
8. Connection of brake coil (X3). For motors without brake: Connection of internal braking resistor BW. (standard)
9. Mains connection L1, L2, L3 (X3) (suitable for 2 x 4 mm^2)
10. Bolts for PE connection ⏚
11. Cable screw fittings
12. Electronics nameplate
13. Protective cover for inverter electronics
14. Setpoint potentiometer f1 (not visible), accessible from top of terminal box cover via fitting
15. Setpoint switch f2 (green)
16. Switch t1 for integrator (white)
17. DIP switches S1 and S2 (see section 'Startup' for settings)
18. Status LED (visible from the top of the terminal box box cover, see section 'Diagnostics')

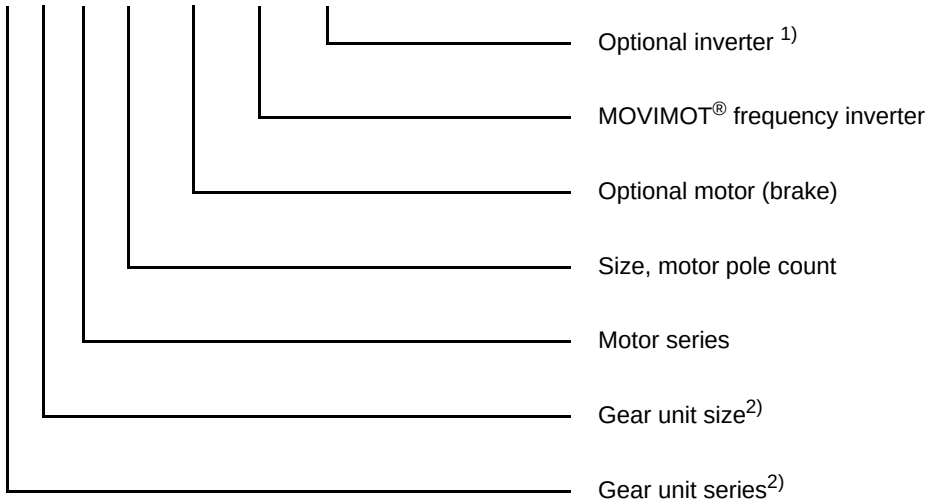
3.2 Nameplates, MOVIMOT® type designations

Sample motor nameplate



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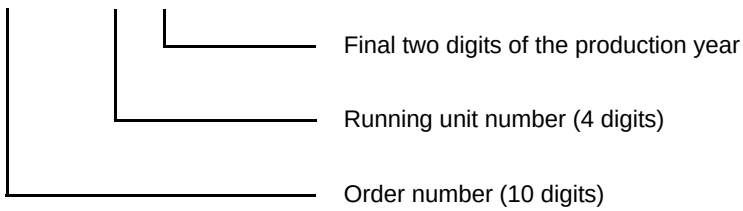
KA 77 DT 90L4 BMG/MM15/MLU



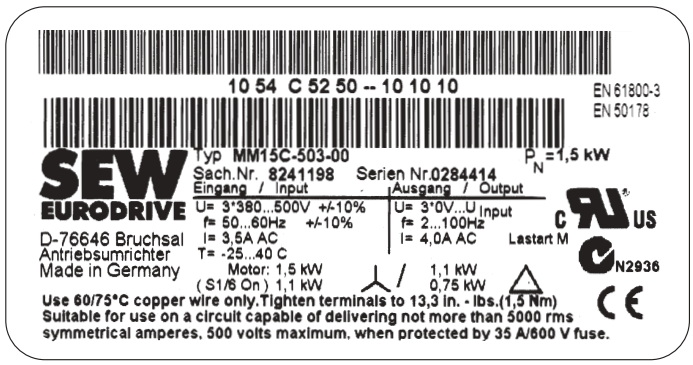
1) Only factory-installed options are listed on the nameplate.
2) Detailed information on geared motor combinations are listed in the 'MOVIMOT Geared Motors' catalog.

Structure of sample production number:

3009818304. 0001. 99



Inverter nameplate (example)



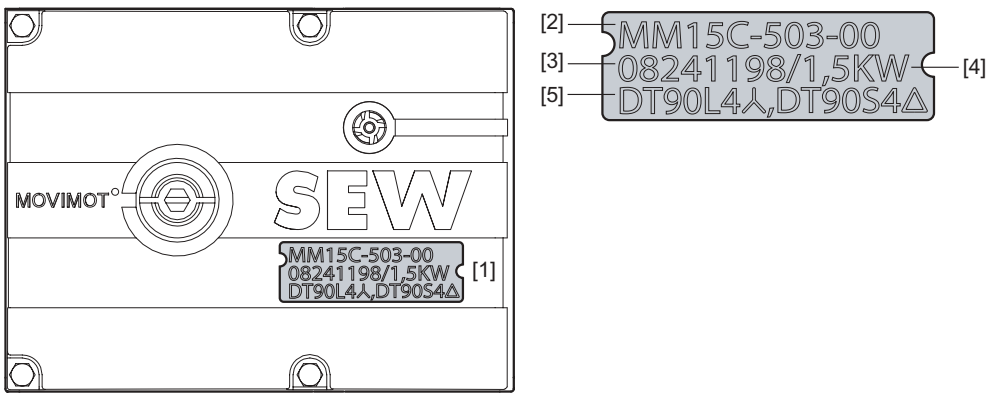
05605AXX

MM 15 C – 503 – 00

- Design (00 = Standard)
- Connection type (3 = three phase)
- Supply voltage (50 = 380...500 V_{AC}) (23 = 200...240 V_{AC})
- Version C
- Motor power (15 = 1.5 kW)
- MOVIMOT® series

Device identification

The device identification [1] at the top of the terminal box cover contains information about inverter type [2], inverter part number [3], equipment power [4] and adapted (associated) motor [5].



50862AXX

4 Mechanical Installation

4.1 MOVIMOT® geared motor

Before you begin

Install MOVIMOT® only if

- the entries on the nameplate of the drive match the voltage supply system,
- the drive is undamaged (no damage caused by transportation or storage) and
- it is certain that the following requirements have been met:
  - Ambient temperature between –25 °C and +40 °C (remember that the temperature range of the gear unit may be restricted → operating instructions for the gear unit)
  - No oil, acid, gas, vapors, radiation, etc.

Installation tolerances

Shaft end	Flanges
Diametric tolerance in accordance with DIN 748 • ISO k6 at ∅ ≤ 50 mm • ISO m6 at ∅ > 50 mm (Center bore in accordance with DIN 332, shape DR)	Centering shoulder tolerance in accordance with DIN 42948 • ISO j6 at ∅ ≤ 230 mm • ISO h6 at ∅ > 230 mm

Mounting MOVIMOT®

- The MOVIMOT® may only be mounted or installed in the specified mounting position on a level, vibration-proof and torsionally rigid support structure.
- Thoroughly remove anti-corrosion agents from the shaft extensions (use a commercially available solvent). Do not allow the solvent to penetrate the bearings and shaft seals – this could cause material damage!
- Carefully align MOVIMOT® and the driven machine to avoid placing any unacceptable strain on the motor shafts (observe permitted overhung load and axial thrust forces!).
- Do not butt or hammer the shaft end.
- Use an appropriate cover to protect motors in vertical mounting positions from objects or fluids entering!
- Ensure an unobstructed cooling air supply and that air heated by other apparatus cannot be drawn in or reused.
- Balance components for subsequent mounting on the shaft with a half key (output shafts are balanced with a half key).
- Any condensation drain holes are closed with plastic plugs and must not be opened unless needed.
- Do not leave any condensation drain holes open, since this defeats higher enclosure ratings.

Installation in damp areas or in the open

- Use suitable screwed cable glands for the supply leads (use reducing adapters if necessary).
- Coat the threads of cable screw fittings and pocket caps with sealant and tighten them well – then coat them again.
- Seal the cable entry well.
- Clean the sealing faces of the connection box cover well before re-assembly.
- Restore the anticorrosive coating if necessary.
- Check to see if enclosure is permitted (refer to the nameplate).

4.2 Option MLU..A / MLG..A / MLK11A

Scope of delivery

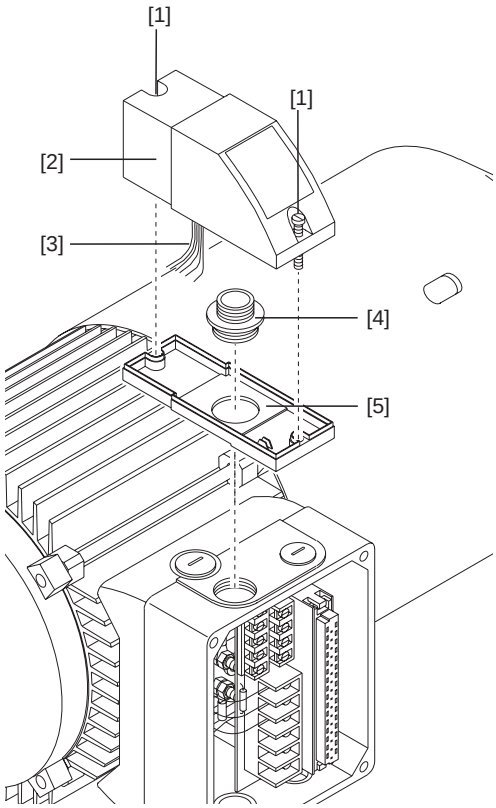
- MLU..A / MLG..A / MLK11A top [2]
- 2 screws [1]
- Cable entry screw [4]
- MLU..A / MLG..A / MLK11A lower section [5]

Mounting

1. Remove a filler plug from the MOVIMOT® terminal box.
2. Attach lower section [E] to MOVIMOT® terminal box and fasten it with cable entry screw [4].
3. Guide connection cable [3] through cable entry screw [4] into the MOVIMOT® terminal box.
4. Place top [2] on bottom [5] and fasten it with 2 screws [1].



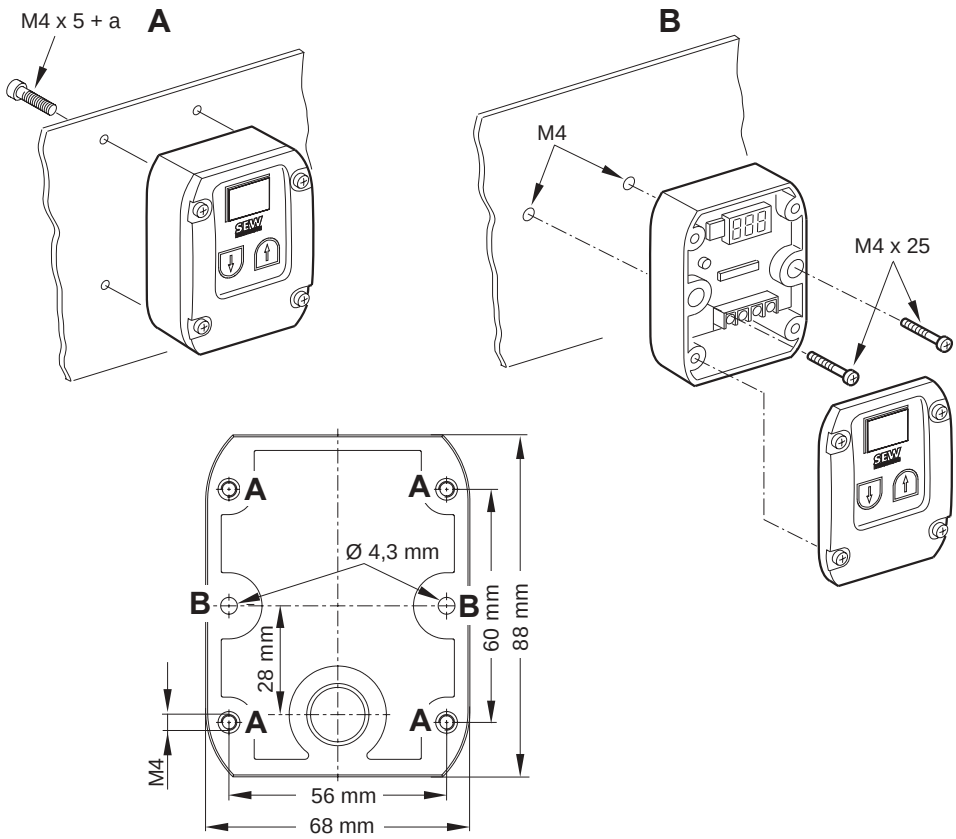
Important: Option may be assembled only in the position shown in the following illustration!



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4.3 MBG11A option

- A: Assembly from the rear via 4 tapped holes
- B: Assembly from the front via 2 mounting holes

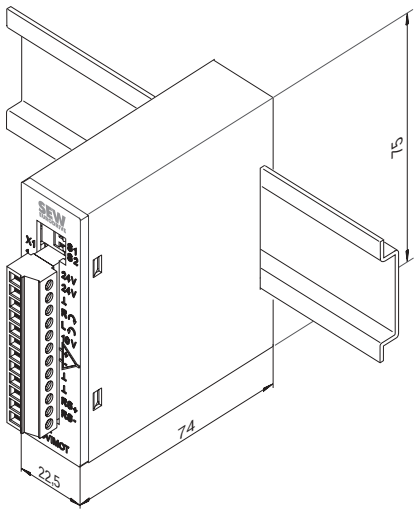


50520AXX

a = wall thickness
Screws are not included!

4.4 MWA21A option

- MWA21A is installed in the switch cabinet on the support rail (DIN EN 50022):



50519AXX

5 Electrical Installation

5.1 Installation guidelines

Connecting power cables

- The rated voltage and frequency of MOVIMOT® must correspond to the data for the power supply system (mains).
- Line cross section: according to input current I_{in} at rated power (see Technical Data).
- Permitted line cross-section of MOVIMOT® terminals (does not apply to field distributor)

Power terminals	Control terminals
1.0 mm² – 4.0 mm² (2 x 4.0 mm²)	0.25 mm² – 1.0 mm² (2 x 0.75 mm²)
AWG17 – AWG10 (2 x AWG10)	AWG22 – AWG17 (2 x AWG18)

- Use conductor end sleeves without insulating shrouds (DIN 46228 part 1, material E-CU).
- Install line safety at the beginning of the power cable behind the supply bus junction (see Section 'Connection of MOVIMOT® Basic Unit,' F11/F12/F13). Use D, DO, NH or circuit breakers. The fusible rating should be selected in accordance with the line cross section.
- It is not permitted to use a conventional residual-current-operated circuit breaker as a protection device. Universal current-sensitive earth leakage circuit-breakers (tripping current 300 mA) are permitted as a protective device. During normal operation of MOVIMOT®, earth-leakage currents of > 3.5 mA can occur.
- Use contactor switch contacts to switch MOVIMOT® from utilization category AC-3 according to IEC 158.
- SEW recommends using earth-leakage monitors with pulse-code measurement for power supply systems with non-grounded star point (IT nets). This avoids mis-tripping of the earth-leakage monitor due to the earth capacitance of the inverter.

Altitude above 1000 meters above sea level

MOVIMOT® drives with supply voltages of 380 to 500 V can be used at altitudes above 2000 m above sea level to 4000 m above sea level[1] under the following peripheral conditions.

- The rated continuous power is reduced based on the reduced cooling above 1000 m (see the section Technical Data and Dimension Drawings).
- Above 2000 m above sea level, the air and creeping distances are only sufficient for overvoltage class 2. If the installation requires overvoltage class 3, an additional external overvoltage protection must be used to ensure that overvoltage surges are limited to 2.5 kV phase-to-phase and phase-to-ground.
- If safe electrical separation is required, it must be implemented outside the device at altitudes above 2000 m above sea level (Safe Electrical Separation in accordance with EN 50178).
- The permitted rated supply voltage of 3 x 500 V up to 2000 m above sea level is reduced by 6 V for every 100 m to a maximum of 3 x 380 V at 4000 m above sea level.

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

Connecting 24 V_{DC} supply

- Supply MOVIMOT® either via external 24 V_{DC} or via the MLU..A or MLG..A options.

Conventional control (via binary commands)

- Connect the required control leads (e.g. CW/Stop, CCW/Stop, f1/f2 setpoint change)
- Use shielded cables as control leads and route them separately from power supply cables.

Control via RS-485 interface

With bus master PLC, MLG..A, MBG11A, MWA21A option or MF../MQ.. fieldbus interfaces

- Important: Connect one bus master only.
- Use twisted pair shielded cables as control leads and route them separately from power supply cables.

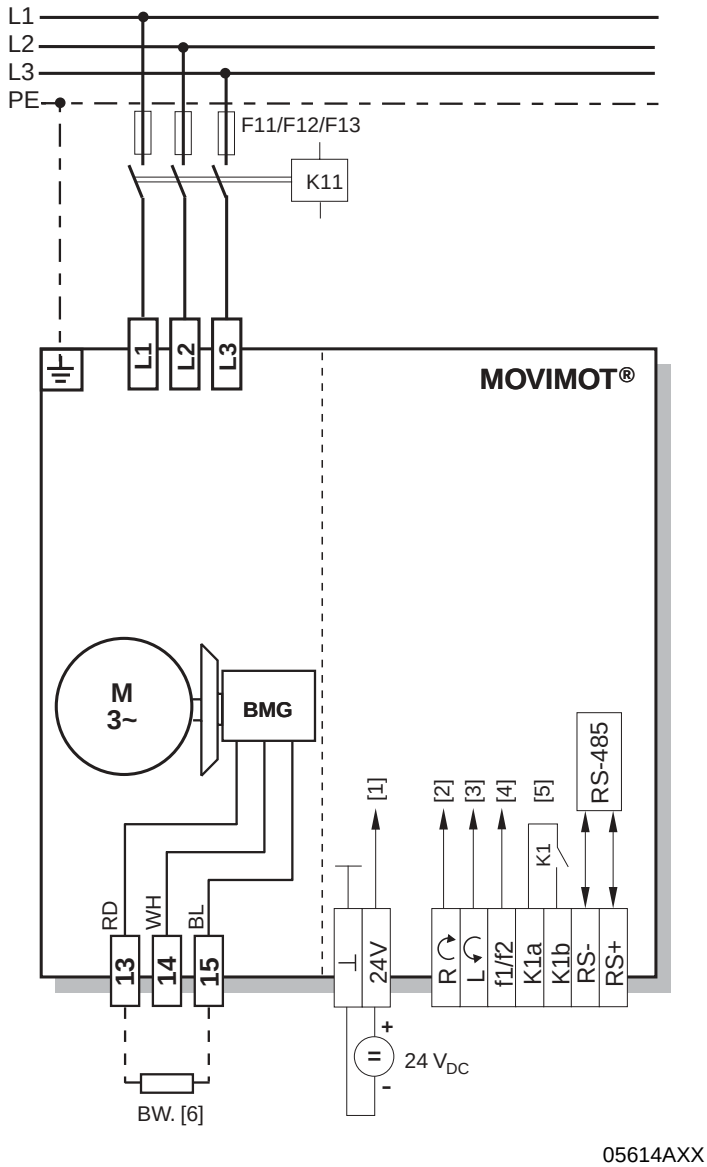
Protection devices

- MOVIMOT® drives are equipped with integrated overload protective devices, so there is no need for external devices.

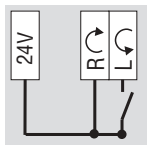
UL compliant installation

- Use copper cables with the following temperature ranges as connection leads only: Temperature range: 60 / 75 °C
- The permitted tightening torques for MOVIMOT® power terminals are:
  - 1.5 Nm (13.3 lb.in)
- MOVIMOT® units are suited for operation on voltage supply systems with grounded star (TN and TT systems) supplying a maximum supply current of 5000 A_{AC} and having a maximum rated voltage of 500 V_{AC} (MM03C-503 to MM3XC-503). The performance data of the fuses must not exceed 35 A/600 V.
- Use tested units with a limited output voltage (V_{max} = 30 V_{DC}) and limited output current ($I \leq 8$ A) only as an external 24 V_{DC} voltage source.
- UL certification applies only to operation in voltage supply systems with voltages to ground up to 300 V.

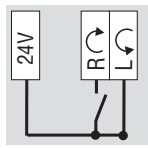
5.2 Connection MOVIMOT® basic unit



Function of terminals CW/Stop and CCW/Stop with binary control:

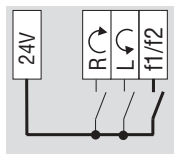


Rotation **CW** active

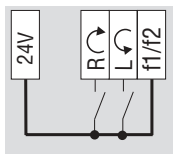


Rotation **CCW** active

Functions of terminals f1/f2:

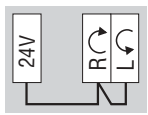


Setpoint **f1** active

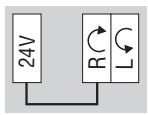


Setpoint **f2** active

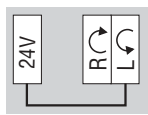
Function of terminals CW/Stop and CCW/Stop with control via RS-485 interface/fieldbus:



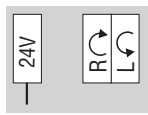
Both directions of rotation are enabled



Only CW rotation
is enabled
Setpoint selections for CCW rotation result in standstill of drive



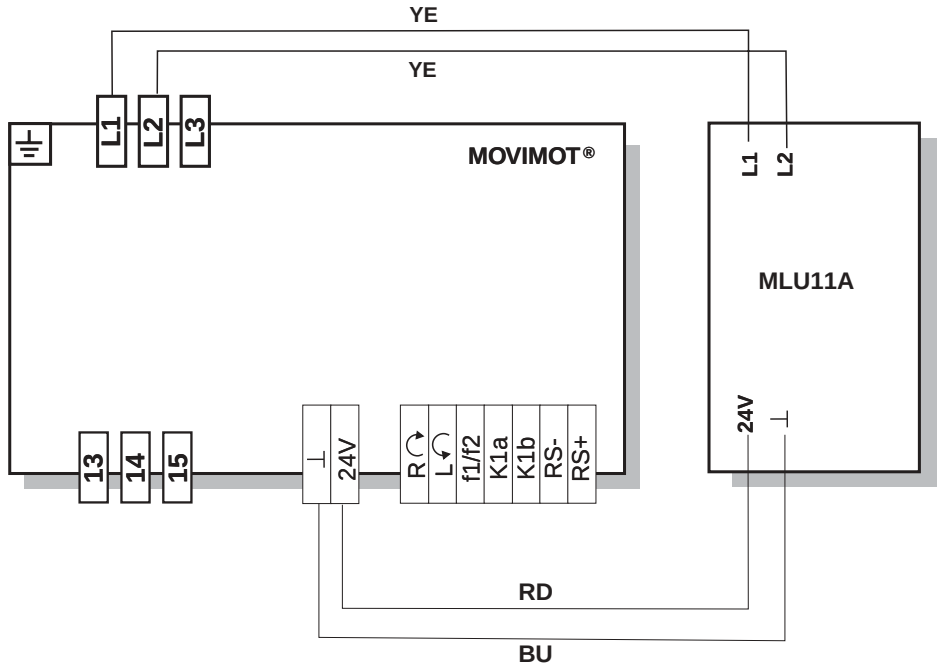
Only CCW rotation
is enabled
Setpoint selections for CW rotation result in standstill of drive



Drive is blocked or brought to standstill

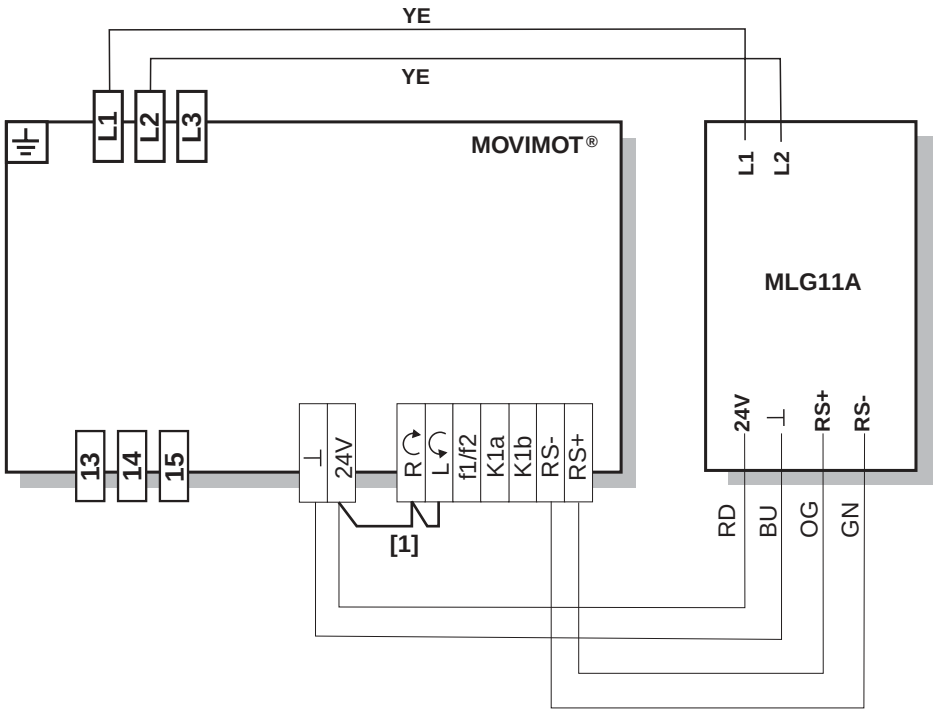
[1] 24 V_{DC} supply (external or MLU../MLG.. option)
[2] CW/Stop
[3] CCW/Stop
[4] Setpoint selection f1/f2
[5] Ready message (contact closed = ready for operation)
[6] BW.. braking resistor (in MOVIMOT® without mechanical brake only)

5.3 Connection of MLU11A option



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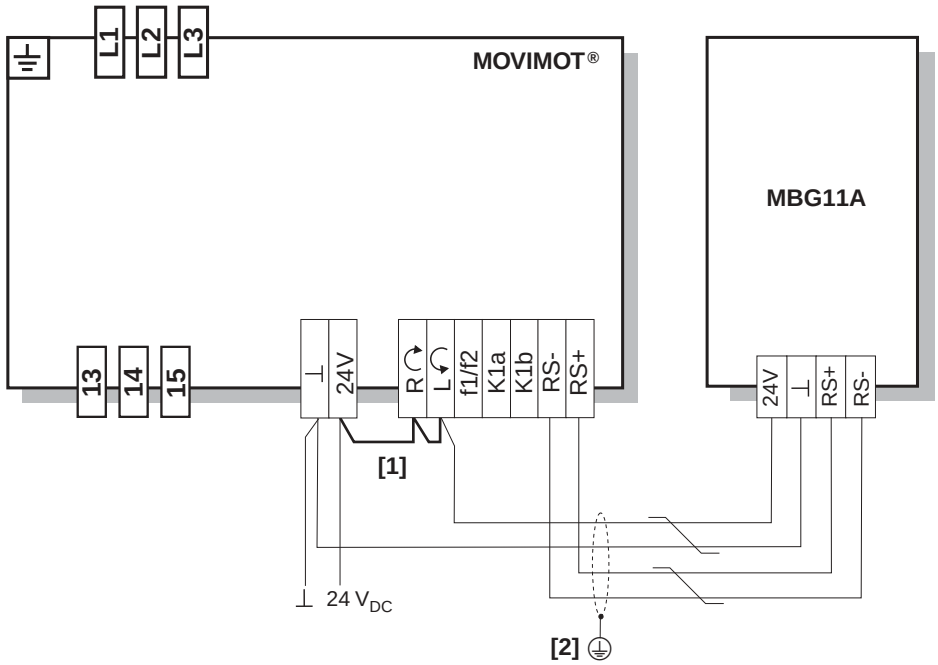
5.4 Connection of MLG11A option



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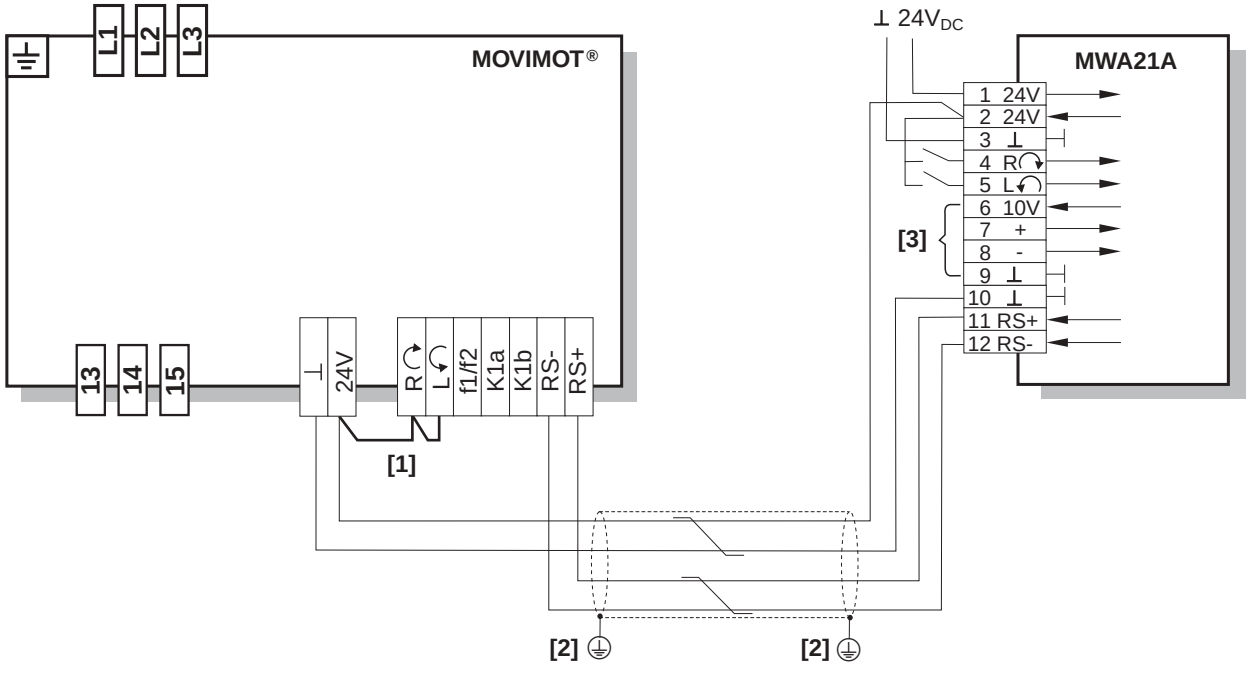
[1] Observe the enabled direction of rotation (see section 'Connection of MOVIMOT® Basic Unit'
Functions of CW/Stop, CCW/Stop terminals with control via RS-485 interface)

5.5 Connection of MBG11A option



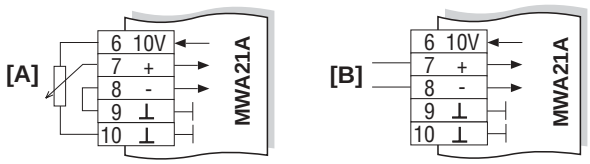
03183CXX

5.6 Connection of MWA21A option

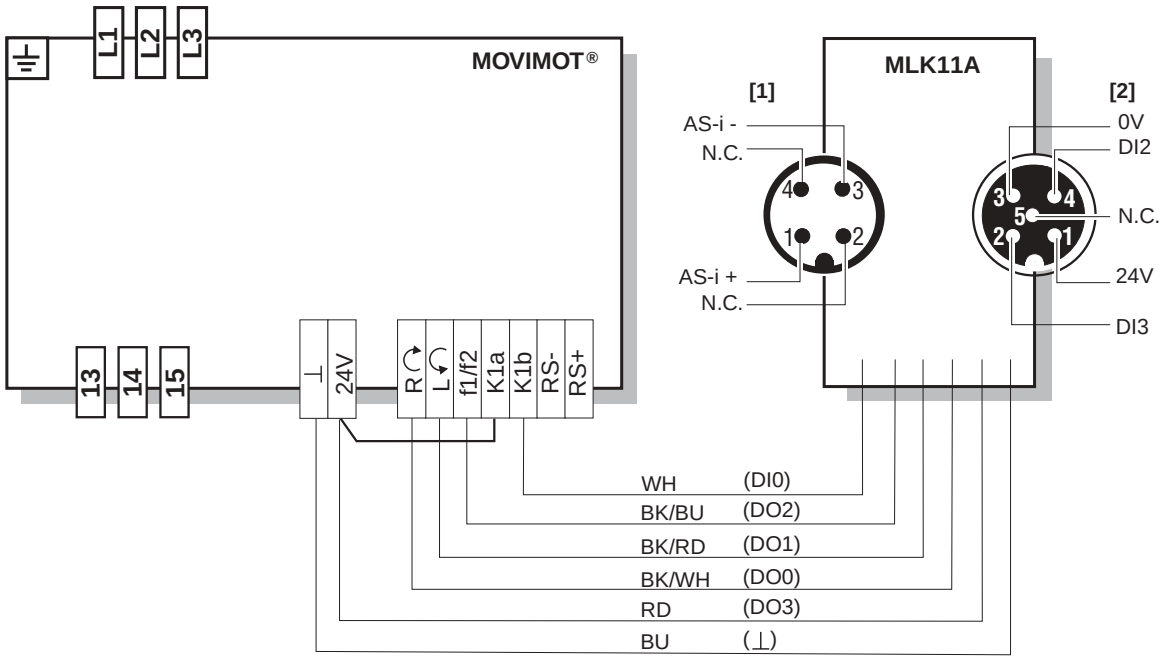


03184CXX

[1] Observe the enabled direction of rotation (see section 'Connection of MOVIMOT® Basic Unit' Functions of CW/Stop, CCW/Stop terminals with control via RS-485 interface)
[2] EMC metal cable gland
[3] Potentiometer with integration of 10 V reference voltage **[A]** or potential-free analog signal **[B]**



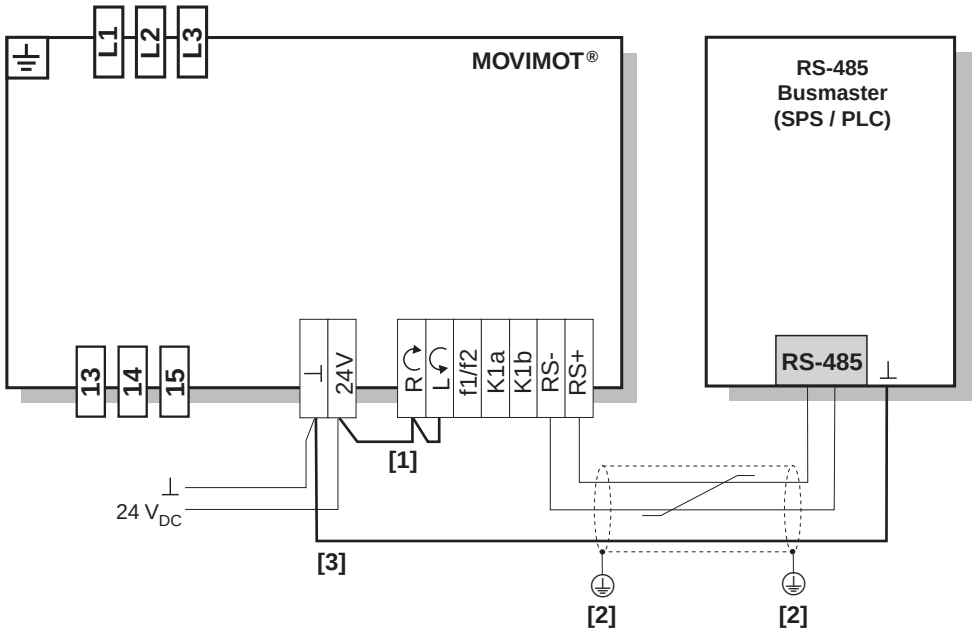
5.7 Connection of AS-i binary slave MLK11A



05118BXX

[1] AS-i connection
[2] Connection for 2 external sensors

5.8 Connection of RS-485 bus master

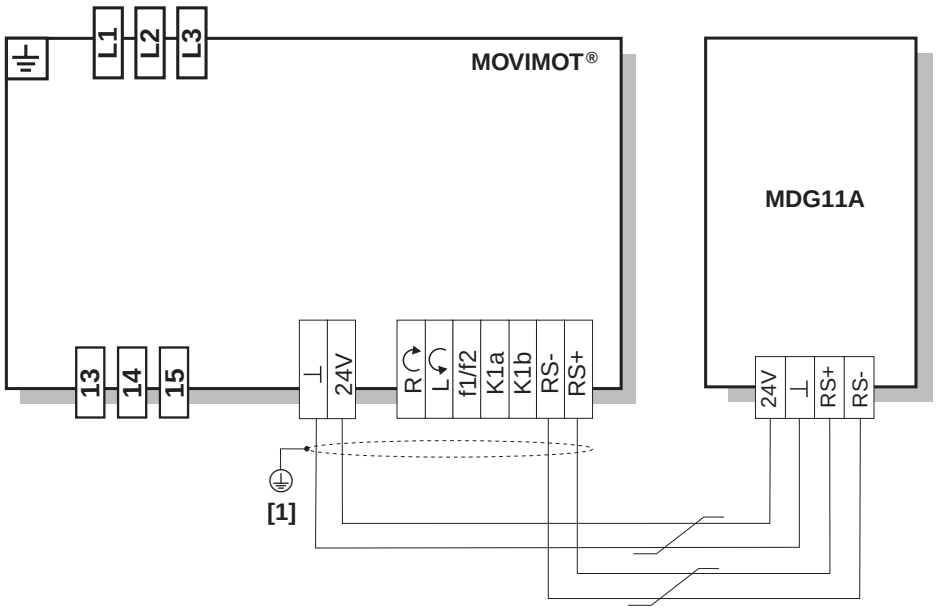


03177BXX

[1] Observe the enabled direction of rotation (see section 'Connection of MOVIMOT® Basic Unit' Functions of CW/Stop, CCW/Stop terminals with control via RS-485 interface)
[2] EMC metal cable gland
[3] Equipotential bonding MOVIMOT®/RS-485 master

5.9 Connection of MDG11A option

- The diagnostic unit must be connected prior to the possible occurrence of a fault, as MOVIMOT® error messages are not saved and the information is lost when the 24 V supply is disconnected.
- Connecting the MDG11A to an RS-485 bus with several MOVIMOT® is not allowed.
- The diagnostic unit can be used if the MOVIMOT® is controlled via terminals (= address 0 [S1/1-S1/4 = OFF]).
- Using the diagnostic unit with setpoint setting via RS-485 interface is not permitted.



03404CXX

[1] EMC metal cable gland

For operation see section 'Diagnostics'

6 Startup

6.1 Important startup instructions

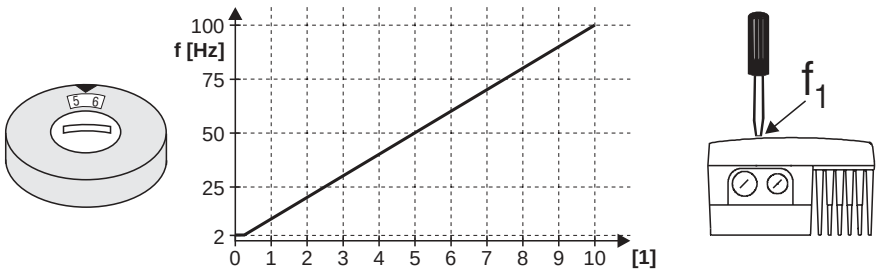
- **It is essential to comply with the safety notes during installation!**
- Disconnect MOVIMOT® from the supply system before removing/replacing the connection box cover.
- Before startup, make sure that the drive has not been damaged.
- Check that all protective covers are installed correctly.
- Use CW/Stop or CCW/Stop for jog mode.
- A minimum switch-off time of 2 seconds must be maintained for the supply system contactor K11.

6.2 Description of MOVIMOT® controls

Setpoint potentiometer f1

The potentiometer has a different function, depending on the unit operating mode:

- Control via terminals: Setpoint f1 (selected by tl. f1/f2 = '0')
- Control via RS-485: Maximum frequency f_{max}



05066BXX

[1] Pot. position

Setpoint switch f2

The function of the switch changes depending on the unit operating mode:

- Control via terminals: Setpoint f2 (selected by tl. f1/f2 = '1')
- Control via RS-485: Minimum frequency 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

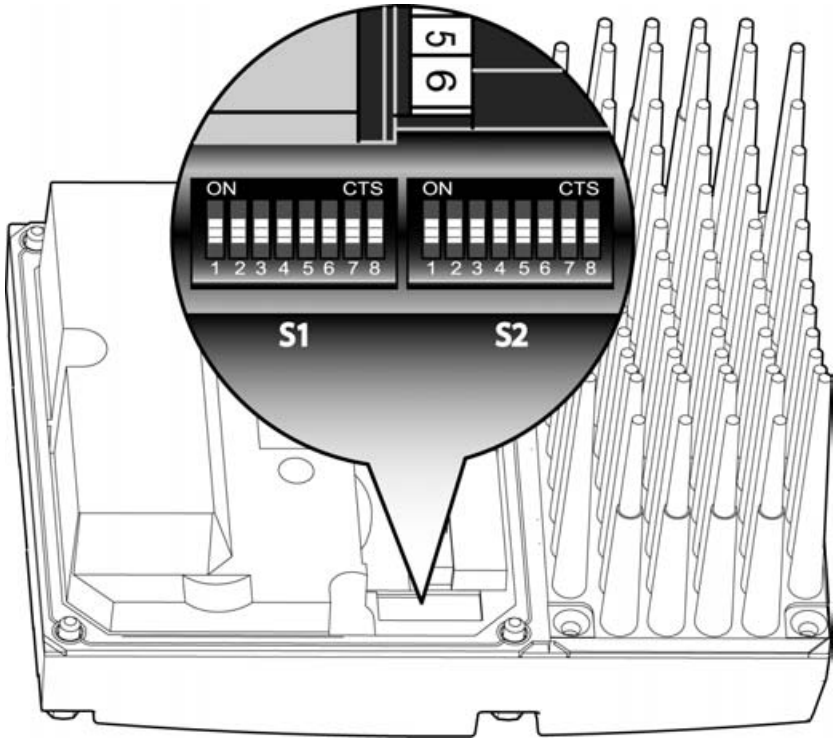
Switch t1

For integrator ramp (ramp times based on a setpoint jump of 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

DIP switches S1 and S2



50522AXX

DIP switch S1:

S1	1	2	3	4	5	6	7	8
Message	**RS-485 address**				**Motor protec-tion**	**Motor rating class**	**PWM frequency**	**No-load damping**
	20	**21**	**22**	**23**				
ON	1	1	1	1	Off	Motor one stage smaller	Variable (16, 8, 4 kHz)	On
OFF	**0**	**0**	**0**	**0**	**On**	**adapted**	**4 kHz**	**Off**

DIP switch S2:

S2	1	2	3	4	5	6	7	8
Message	**Motor type**	**Brake release without enable**	**Control process**	**Speed monitoring**	**Special functions**			
					20	**21**	**22**	**23**
ON	–	On	U/f	On	1	1	1	1
OFF	**always OFF**	**Off**	**VFC**	**Off**	**0**	**0**	**0**	**0**

6.3 Description of the DIP switches S1

DIP switches S1/1-S1/4

Selection of RS485 address of MOVIMOT® via binary coding

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

X = ON

– = OFF

Depending on the control of MOVIMOT®, different addresses must be set:

Control	RS485 address
Binary control (terminal operation)	0
Via AS-i binary slave	0
Via keypad (MLG.., MBG..)	1
Via fieldbus interface (MF..)	1
Via fieldbus interface with integrated small control system (MQ..)	1 to 15[1)]
Via RS-485 master	1 to 15[1)]

1) Only the current process input data (status word, current actual value) can be read via address 0. The output data sent by the master are not in effect because process output data processing is not active when the address setting is 0.

DIP switches S1/5

Motor protection activated or deactivated

- The motor protection must be deactivated if the MOVIMOT® is used as an integrated component of the field distributor MFZ.8.
- To ensure motor protection after all, a TH (bimetallic thermostat) must be used. In this case, the TH opens the sensor circuit after reaching the nominal response temperature (see the 'Startup with field distributor' section in the 'Drive System for Decentralized Installation' system manual).

DIP switches S1/6

Motor rating class smaller

- If it is activated, the DIP switch enables the assignment of MOVIMOT® to a motor with a smaller rating class. The rated power of the unit remains unchanged.
- If a motor with less power is used, the overload capacity of the drive may increase since the motor considers the MOVIMOT® to be one power increment too high. A larger current may be impressed for a short period of time, which results in higher torques.
- The purpose of switch S1/6 is the short-term utilization of the motor peak torque. The current limit of the respective unit is always the same, independent of the switch setting. The motor protection function is adapted in reference to the switch setting.
- **In this operating mode with S1/6 = 'ON,' a pull-out protection of the motor is not possible.**

MOVIMOT® Inverter	Assigned motor			
	S1/6 = OFF		S1/6 = ON	
	⅄	△	⅄	△
MM03	DT71D4	DR63L4[1)]	DR63L4[1)]	–
MM05	DT80K4	DT71D4	DT71D4	DFR63L4[1)]
MM07	DT80N4	DT80K4	DT80K4	DT71D4
MM11	DT90S4	DT80N4	DT80N4	DT80K4
MM15	DT90L4	DT90S4	DT90S4	DT80N4
MM22	DV100M4	DT90L4	DT90L4	DT90S4
MM30	DV100L4	DV100M4	DV100M4	DT90L4
MM3X	–	DV100L4	DV100L4	DV100M4

1) Only possible with offset assembly

DIP switches S1/7

Setting the maximum PWM frequency

- With setting DIP SWITCH S1/7 = OFF, MOVIMOT® operates with 4 kHz PWM frequency.
- With setting DIP SWITCH S1/7 = ON, MOVIMOT® operates with a 16 kHz PWM frequency (low noise) and switches back in steps to lower switching frequencies depending on the heat sink temperature.

DIP switches S1/8

No-load damping function (S1/8 = ON)

Upon activation, the function prevents resonant oscillations in no-load operation.

6.4 Description of the DIP switches S2

DIP switches S2/1

Motor type

With IEC and NEMA motors, DIP switch S2/1 must always be set to OFF!

DIP switches S2/2

Releasing the brake without enable

With activated switch S2/2 = 'ON,' the brake can also be released if no drive enable is present.

Operation with braking resistor

The special function is not in effect if operated with braking resistor.

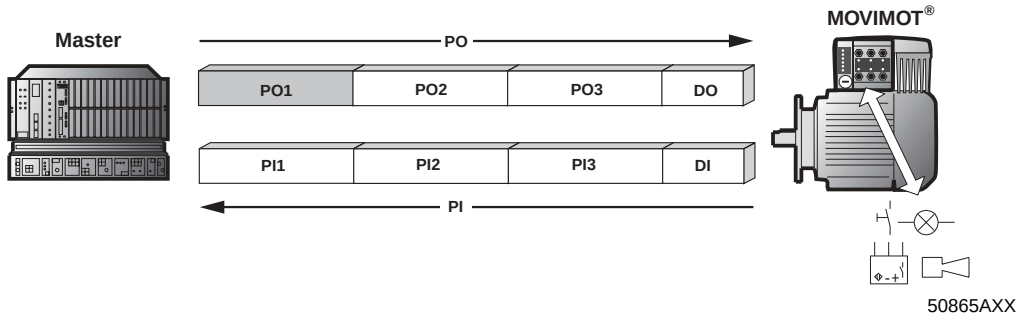
Function with terminal control (address = 0)

With terminal control, the brake can be released by setting terminal f1/f2 if the following requirements exist:

Terminal status			Enable status	Fault status	Brake function
R	L	f1/f2			
'1' '0'	'0' '1'	'0'	Unit enabled	No unit fault	Brake is controlled by MOVIMOT®, setpoint f1
'1' '0'	'0' '1'	'1'	Unit enabled	No unit fault	Brake is controlled by MOVIMOT®, setpoint f2
'1' '0'	'1' '0'	'0'	Unit not enabled	No unit fault	Brake closed
'1'	'1'	'1'	Unit not enabled	No unit fault	Brake closed
'0'	'0'	**'1'**	**Unit not enabled**	**No unit fault**	**Brake released for manual procedure**
All conditions possible			Unit not enabled	Unit fault	Brake closed

Functions in bus operation

In bus operation, the brake is released through control in 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

Setting bit 8 in the control word allows the brake to be released under the following conditions:

								Basic control block							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Control word

Not assigned	**Bit '8'**		'1' = Reset	Not assigned	'1 1 0' = Release otherwise stop

Virtual terminals for releasing the brake without drive enable

Enable condition	Fault condition	Status of bit 8 in control word	Brake function
Unit enabled	No unit fault / no communications timeout	'0'	Brake is controlled by MOVIMOT®
Unit enabled	No unit fault / no communications timeout	'1'	Brake is controlled by MOVIMOT®
Unit not enabled	No unit fault / no communications timeout	'0'	Brake closed
Unit not enabled	**No unit fault / no communications timeout**	**'1'**	**Brake released for manual procedure**
Unit not enabled	Unit fault / communications timeout	'1' or '0'	Brake closed



In case of a unit fault / communications timeout, the brake cannot be released via special function.

Setpoint selection in terminal operation

Setpoint selection in terminal operation depends on status of terminal f1/f2:

Enable condition	Terminal f1/f2	Active setpoint
Unit enabled	Terminal f1/f2 = '0'	Setpoint potentiometer f1 active
Unit enabled	Terminal f1/f2 = '1'	Setpoint potentiometer f2 active

Behavior with a non-operating unit

In case the unit is not ready for operation, the brake is applied independent of the setting of terminal f1/f2 or bit 8 in the control word.

LED display

The yellow LED display flashes periodically and quickly (t_{on} : t_{off} = 100 ms : 300 ms) if the brake was released for manual procedure. This applies to terminal operation as well as bus operation.



DIP switches S2/3

Control process

- DIP switches S2/3 = OFF: VFC operation for 4-pole motors
- DIP switches S2/3 = ON: U/f operation reserved for special cases

DIP switches S2/4

Speed monitoring

- Speed monitoring (S2/4='ON') is used for the protection of the drive during blocking.
- If the drive is operated at the current limit for more than 1 second with active speed monitoring (S2/4= 'ON'), the speed monitoring trips. MOVIMOT® signals a fault via status LED (red, flashing slowly, fault code 08). The current limit must be attainable without interruption for the duration of the delay time before the monitoring function responds.

DIP switches S2/5 to S2/8

Special functions

- Special functions can be selected using the binary coding of the DIP switches.
- The possible values can be set as follows:

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

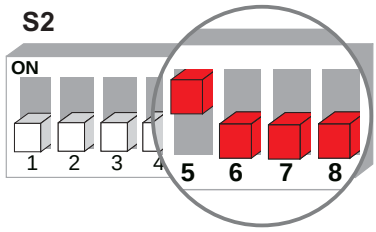
- An overview of the selectable special functions can be found on page 26.

6.5 Special functions

Overview of selectable special functions

Decimal value	Brief description	Intended operating mode		see page	Replaces MOVIMOT® B type
		Bus	Terminals		
0	Basic functionality, no special function selected	X	X	–	–
1	MOVIMOT® with increased ramp times	X	X	page 27	MM..B-503-**01**
2	MOVIMOT® with adjustable current limitation (fault if exceeded)	X	X	page 27	MM..B-503-**02**
3	MOVIMOT® with adjustable current limitation (switchable via terminal f1/f2)	X	X	page 28	MM..B-503-**05**
4	MOVIMOT® with bus parameter setting	X	–	page 30	–
5	MOVIMOT® with motor protection in field distributor Z.8	X	–	page 32	MM..B-503-**14** (partially)
6	MOVIMOT® with maximum 8 kHz PWM frequency	X	X	page 33	MM..B-503-**13**
7	MOVIMOT® with rapid start/stop	X	X	page 34	–
8	MOVIMOT® with minimum frequency 0 Hz	X	X	page 36	–
9	MOVIMOT® for hoist applications	X	X	page 37	–
10	MOVIMOT® with minimum frequency 0 Hz and reduced torque at low frequencies\	X	X	page 39	–
11 to 15	Not assigned	–	–	–	–

Special function 1 MOVIMOT® with increased ramp times



05592AXX

Description of function

- It is possible to set ramp times up to 40 s.
- If three process data words are used in bus operation, a ramp time of up to 40 s can be transmitted.

Changed ramp times

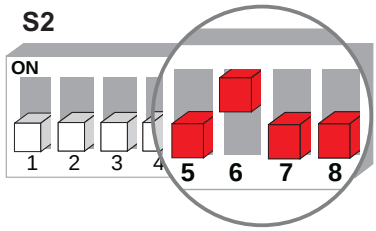


Switch t1											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	20	25	30	35	40

= Corresponds to standard setting

= Changed ramp times

Special function 2 MOVIMOT® with adjustable current limitation (fault if exceeded)



05596AXX

Description of function

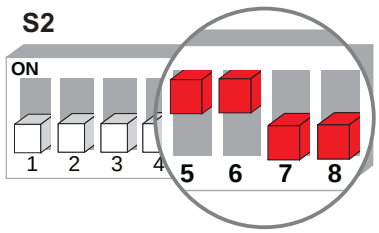
- The current limit can be set via switch f2.
- The setpoint f2 (with control via terminals) or the minimum frequency (with control via RS-485) can no longer be changed and are permanently set to the following values:
  - Setpoint f2: 5 Hz
  - Minimum frequency:2 Hz
- Monitoring becomes effective above 15 Hz. If the drive is operated at the current limit for more than 500 ms, the unit changes to the fault status (fault 44). The status is indicated through rapid red flashing.

Adjustable current limits



Switch f2											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Imax [%] of IN	90	95	100	105	110	115	120	130	140	150	160

Special function 3 **MOVIMOT® with adjustable current limitation (switch-selectable via terminal f1/ f2), with reduction of frequency if exceeded**



05598AXX

Description of function

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

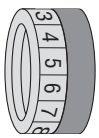
Response after reaching the current limit

- After reaching the current limit, the unit reduces the frequency using the current limitation function and if necessary stops the ramp to prevent the current from increasing.
- If the unit operates at the current limitation, the status is displayed through rapid green flashing of the status LED.

In-system values for setpoint f2/minimum frequency

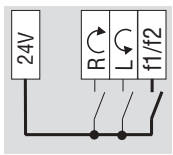
- It is no longer possible to toggle via terminals between setpoint f1 and setpoint f2 in terminal operation or to set the minimum frequency in bus operation.
- The minimum frequency in bus operation is permanently set to 2 Hz.

Adjustable current limits



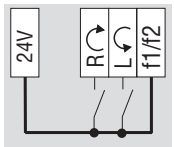
Switch f2											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Imax [%] of IN	60	70	80	90	100	110	120	130	140	150	160

Selection of current limits via binary input terminal f1/f2



03819AXX

f1/f2 = '0' 160 % current limitation is active



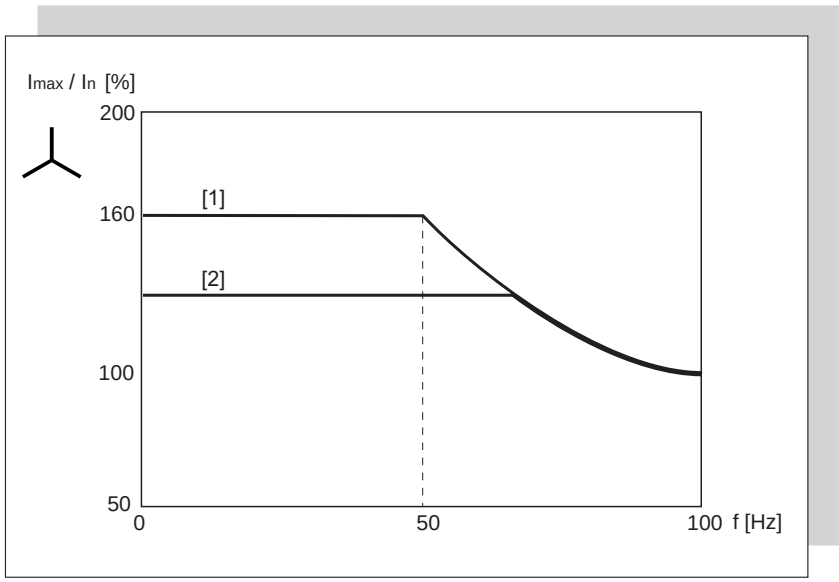
03820AXX

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

Influencing the current characteristic curve

By selecting a lower current limit, the calculation of the current limit is carried out with a constant factor.

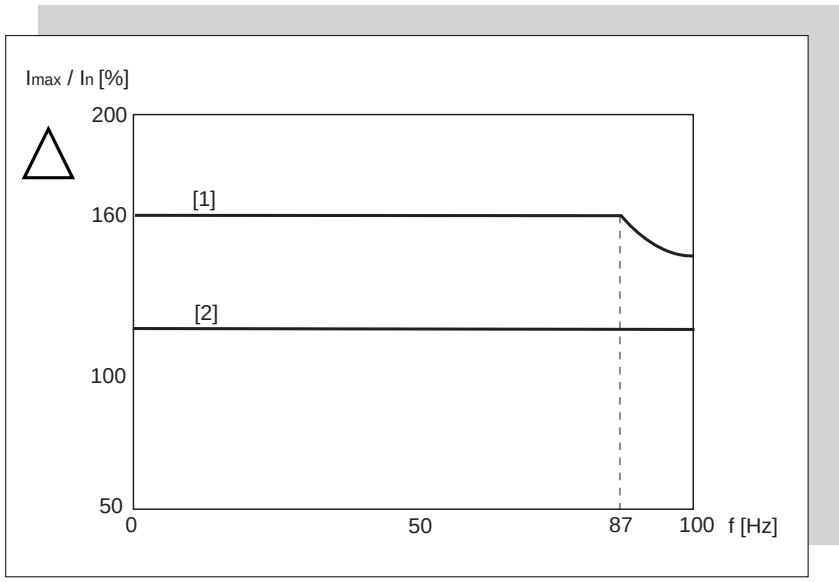
Motor with star connection



50851AXX

[1] Current limit characteristic curve of standard function
[2] Reduced current limit for special function 3 and terminals f1/f2 = '1'

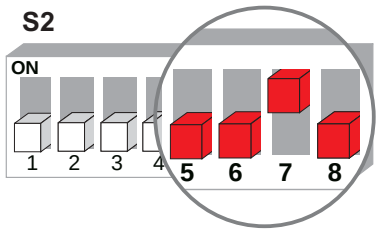
Motor with delta connection



50852AXX

[1] Current limit characteristic curve of standard function
[2] Reduced current limit for special function 3 and terminals f1/f2 = '1'

Special function 4 MOVIMOT® with bus parameter setting



05599AXX

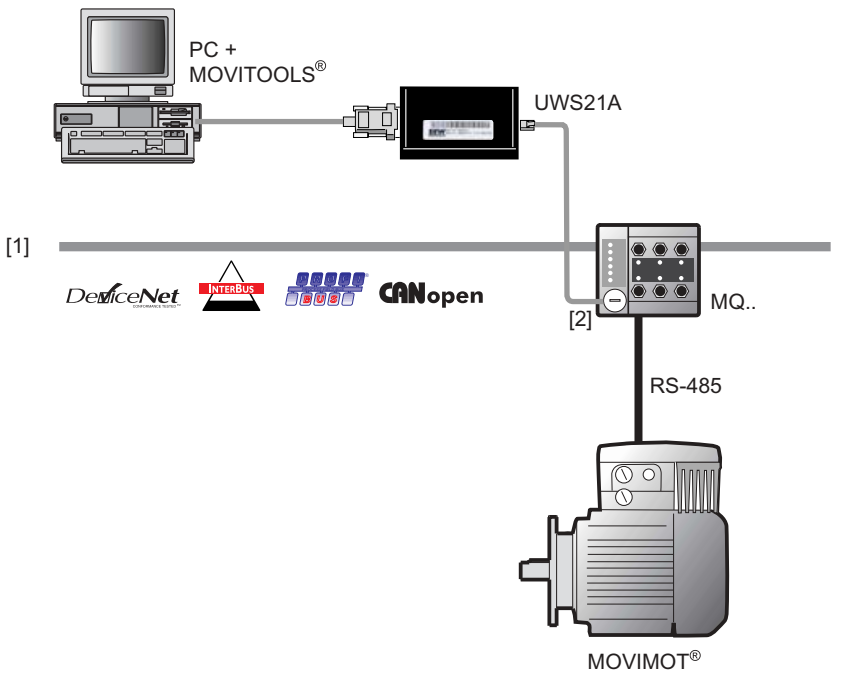
The function is implemented exclusively with bus operation via MQ.. intelligent fieldbus modules.

A parameter channel is available to operate the unit and the values are saved in EEPROM (additional information can be found in the 'Communications interfaces' section in the 'Drive System for Decentralized Installation' system manual).

Description of function

Potentiometer f1 and switches f2 and t1 are deactivated. The settings of the potentiometer and the switches are ignored by MOVIMOT®. The setting of the DIP switches continues to be read in by the unit. Functions selected via DIP switches cannot be changed using the bus.

Block diagram



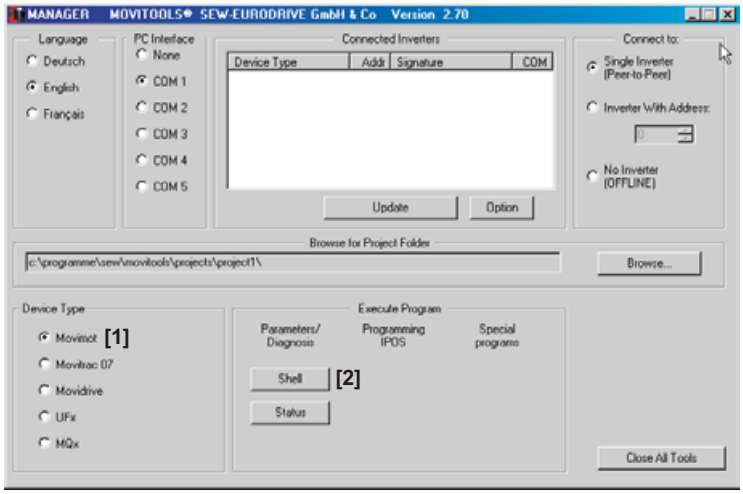
50853AXX

(1) Fieldbus
(2) Diagnostics interface

Changing the parameters in MOVITOOLS®

Open MOVITOOLS®/Shell as follows

- Select 'MOVIMOT®' equipment class [1]
- Under program execution, select 'Shell' [2]



05595AEN

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

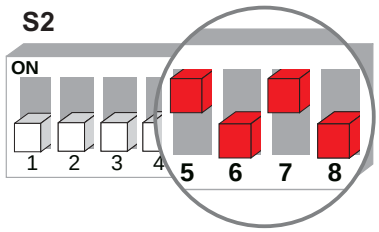
Name	Area	Index	Parameter number	Step width
Ramp up	0.1...**1**...2000 [s]	8807	130	0.1 s – 1 s: 0.01 1 s – 10 s: 0,1 10 s – 100 s: 1 100 s – 2000 s: 10
Ramp down	0.1...**1**...2000 [s]	8808	131	
Minimum frequency	**2**...100 [Hz]	8899	305	0.1
Maximum frequency1)	2...**100** [Hz]	8900	306	0.1
Current limit	60...**160** [%]	8518	303	1
Pre-magnetization time	0...**0.4**...2 [s]	8526	323	0.001
Post-magnetization time	0...**0.1**...2 [s]	8585	732	0.001
Parameter lock	On/**Off**	8595	803	–
Factory setting	Yes/**No**	8594	802	–
Delay time Speed monitoring	0...**1**...10.0 [s]	8558	501	0.1

Factory setting = in bold

1) Example: Maximum frequency = 60 Hz
Bus setpoint = 10 %
Frequency setpoint = 6 Hz

- The factory setting is activated as soon as special function 4 is activated via DIP switches. If the special function selected via DIP switches remains unchanged after switching off the 24 V operating voltage, the reactivation will use the last known values from EEPROM.
- The start frequency is permanently set to 0.5 Hz, the stop frequency to 3 Hz.
- If the selected setpoint or the maximum frequency is lower than the set minimum frequency, the minimum frequency becomes active.
- The indexes are evaluated with this special function only.

Special function 5 MOVIMOT® motor protection in connection with field distributor MFZ.8



05600AXX

The special function is only intended for bus operation. Motor protection in the field distributor becomes active only if DIP switch S1/5 is set to 'ON' and the TH controls terminals 'R' and 'L' using a corresponding circuitry.

Description of function

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

- If both direction of rotation terminals are opened, special function 5 generates fault 84 (overtemperature motor).
- In connection with field distributor \MFZ.8, the direction of rotation terminals are set to '0' by the TH in case of motor overtemperature.
- Fault 84 is displayed by means of a flashing signal of the status LED at MOVIMOT®.
- The generated fault 84 is also transmitted via fieldbus.

Functions in connection with fieldbus interfaces MQ..:

- MOVIMOT® bus parameter setting according to special function 4 (see page 30)

Functions in connection with fieldbus interfaces MF..:

- Potentiometer f1 and switches f2 and t1 are deactivated and the following values apply:

Name	Value
Ramp up	1 [s]
Ramp down	1 [s]
Minimum frequency	2 [Hz]
Maximum frequency	100 [Hz]
Current limit	160 [%]
Pre-magnetization time	0.4 [s]
Post-magnetization time	0.1 [s]
Delay time speed monitoring	1 [s]

Tripping conditions for fault 84

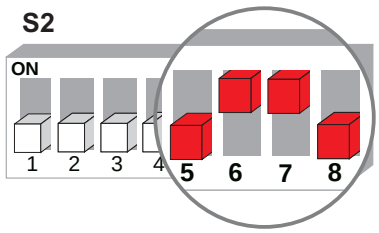
Fault 84 'Overtemperature Motor' is tripped if **all** of the following requirements are met:

- Supply voltage is present at the MOVIMOT®
- DIP switch S1/5 = 'ON' (motor protection deactivated)
- Terminal R = '0'
- Terminal L = '0'

STOP

The fault is not triggered, if **only the 24 V_{DC} supply voltage** is present at the MOVIMOT®.

Special function 6 MOVIMOT® with 8 kHz maximum PWM frequency



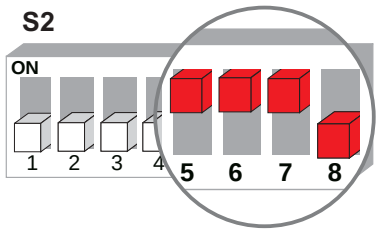
05601AXX

Description of function

- The special function reduces the maximum adjustable PWM frequency via S1/7 from 16 kHz to 8 kHz.
- With DIP switch S1/7 = 'ON,' the unit operates with a 8 kHz PWM frequency (low noise) and switches back to 4 kHz depending on the heat sink temperature.

	S1/7 without special function 6	S1/7 with special 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

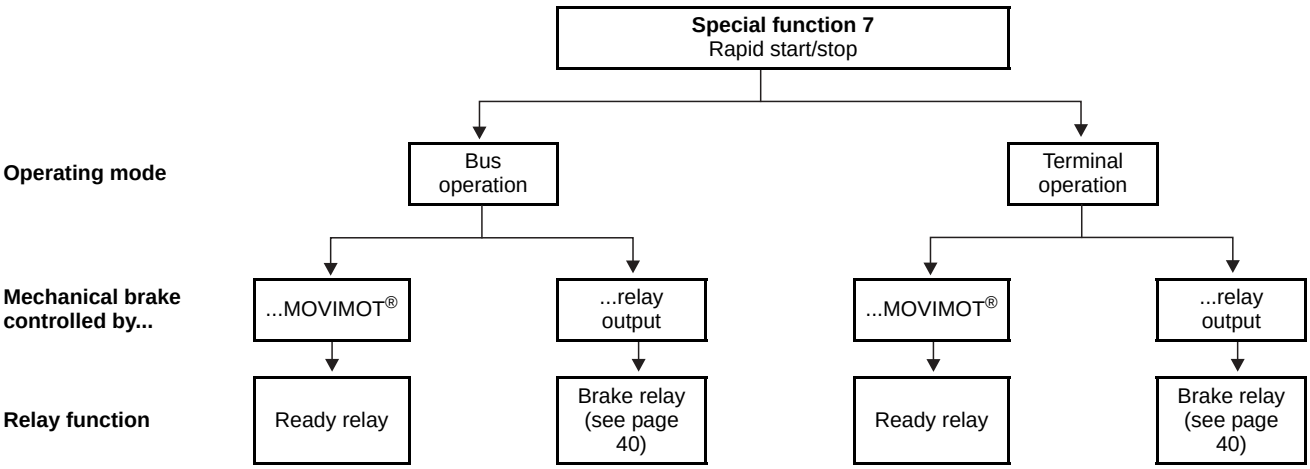
Special function 7 MOVIMOT® with rapid start/stop



05602AXX

Description of function

- The pre-magnetization time is permanently set to 0 s, regardless if the MOVIMOT® is operated in bus or terminal mode.
- Pre-magnetization is not carried out at the beginning of the enable sequence to start the acceleration at the setpoint ramp as quickly as possible.
- The subsequent MOVIMOT® behavior depends on the operating mode and presence of a mechanical brake.



Bus operation

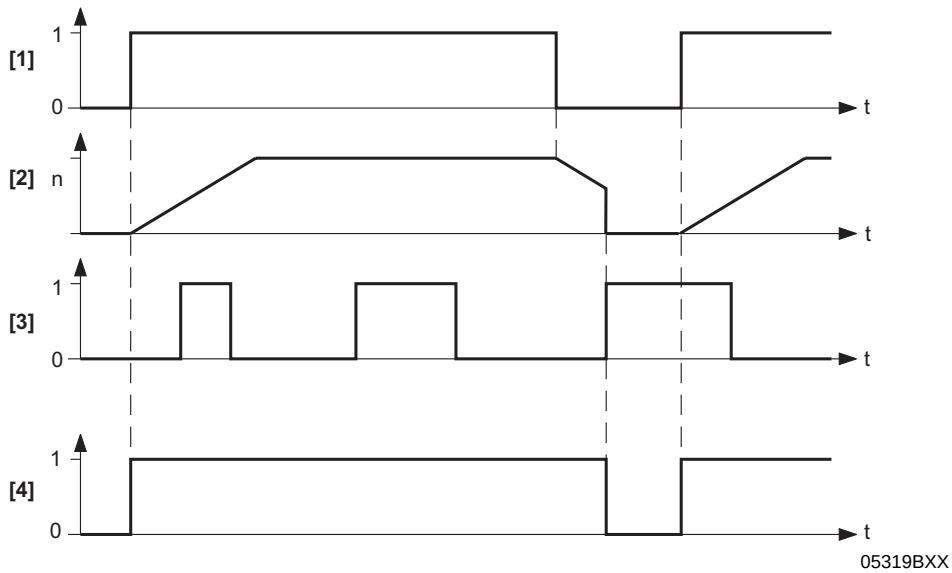
Mechanical brake is controlled by MOVIMOT®:

- Terminals 13, 14 and 15 are assigned to the brake coil of the mechanical brake at the wiring board of the MOVIMOT® unit.
- The new function 'Brake applied at down ramp' is introduced. Bit 9 in the control word is assigned with this function as virtual terminal according to the MOVILINK® profile.
- As soon as bit 9 is set during the down ramp, MOVIMOT® applies the brake and inhibits the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied independent of the status of bit 9.
- The relay is switched as ready relay (standard function).

Mechanical brake controlled by relay output:

- A braking resistor (BW..) must be connected to terminals 13 and 15 at the wiring board of the MOVIMOT® unit; terminal 14 is not assigned.
- The relay functions as a brake control relay so that the ready signal function is no longer available (it is imperative that you are familiar with the section 'Use of relay output with special functions 7 + 9' starting on page 40).
- The new function 'Brake applied at down ramp' is introduced. Bit 9 in the control word is assigned with this function as virtual terminal according to the MOVILINK® profile.
- As soon as bit 9 is set during the down ramp, the relay output applies the brake and the MOVIMOT® unit inhibits the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied independent of the status of bit 9.

'Brake control in bus operation' flowchart:



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

Terminal operation

Mechanical brake controlled by MOVIMOT®

- Terminals 13, 14 and 15 are assigned to the brake coil of the mechanical brake at the wiring board of the MOVIMOT® unit.
- The mechanical brake cannot be influenced by the terminals. The brake works analogous to a unit without special function.
- The relay is switched as ready relay (standard function).

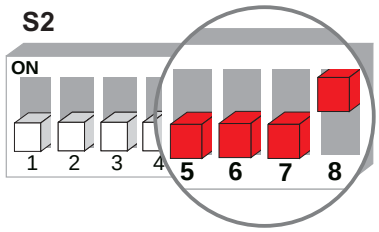
Mechanical brake controlled by relay output

- A braking resistor (BW..) must be connected to terminals 13 and 15 at the wiring board of the MOVIMOT® unit, terminal 14 is not assigned.
- The relay functions as brake control relay so that the ready signal function is no longer available (it is imperative that you observe section 'Use of relay output with special functions 7 + 9' starting on page 40).



Important: The rapid stop function cannot be used in terminal operation!

Special function 8 **MOVIMOT® with minimum frequency 0 Hz**



05603AXX

Description of function

Control via RS-485:

If switch f2 is in position of rest 0, the minimum frequency measures 0 Hz with activated special function. All other adjustable values of switch f2 remain unchanged.

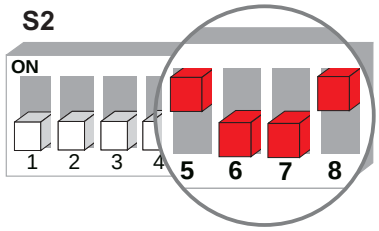


Switch f2											
Detent position	**0**	1	2	3	4	5	6	7	8	9	10
Minimum frequency [Hz] with activated special function	**0**	5	7	10	12	15	20	25	30	35	40
Minimum frequency [Hz] without special function	**2**	5	7	10	12	15	20	25	30	35	40

Control via terminals:

If the special function is activated, the minimum frequency generally measures 0 Hz with terminal control.

Special function 9 MOVIMOT® for hoist applications



05604AXX

Pre-requisites

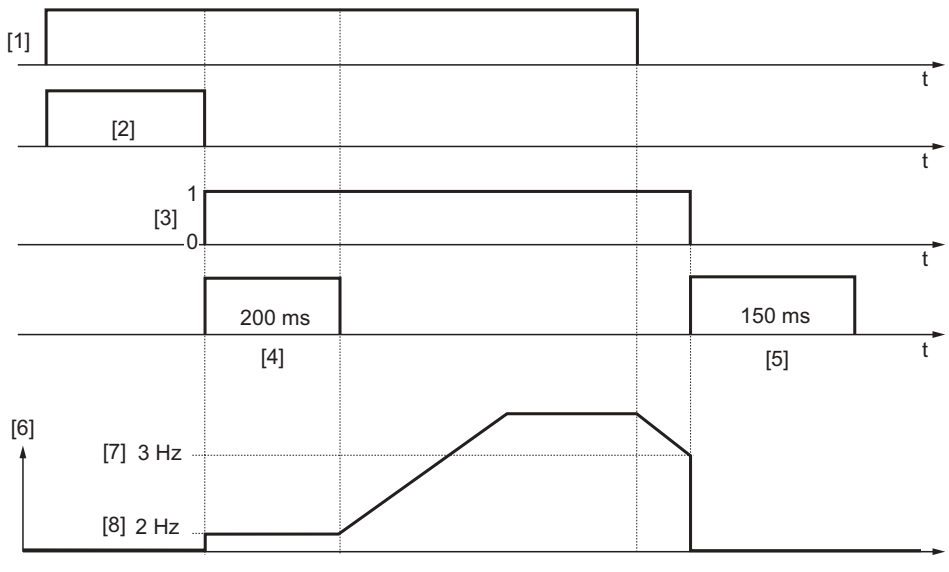
MOVIMOT® may only be used in hoist applications if the following pre-requisites are met:

- Special function 9 is available in connection with brake motors only.
- Ensure that VFC operation (DIP switches S2/3 = OFF) is selected.
- The use of brake control BGM in connection with an external braking resistor is imperative (starting on page 40).
- It is recommended to activate the function 'Speed monitoring' (page 25).

Description of function

- The start frequency is 2 Hz with terminal and bus operation. If the function is not activated, the start frequency is 0.5 Hz.
- The brake release time is permanently set to 200 ms (standard = 0 ms), which prevents the motor from working against the applied brake.
- The brake reaction time (post-magnetization time) is 150 ms (standard = 100 ms), which ensures that the brake is applied as soon as the motor stops generating torque.
- The subsequent behavior of MOVIMOT® is dependent on the operating mode (see page 38)

Overview of brake control with special function 9:

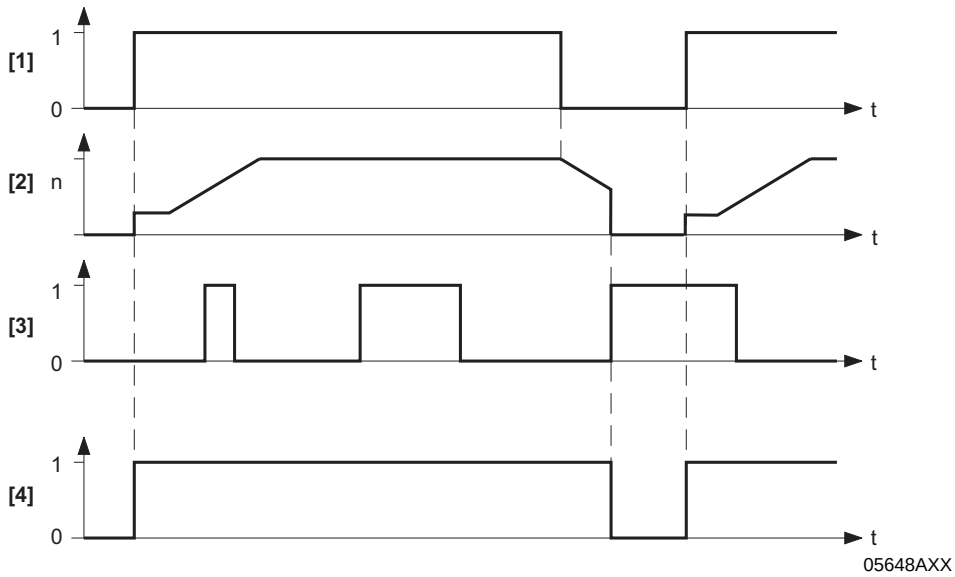


05613AXX

[1] Enable
[2] Pre-magnetization time
[3] Brake control signal
1 = open, 0 = closed
[4] Brake release time
[5] Brake reaction time (post-magnetization time)
[6] Frequency
[7] Stop frequency
[8] Start/minimum frequency

Bus operation

- **The mechanical brake is controlled by the relay output.**
- A braking resistor (BW..) must be connected to terminals 13 and 15 at the wiring board of the MOVIMOT® unit; terminal 14 is not assigned.
- The relay functions as brake control relay so that the ready signal function is no longer available (it is imperative that you observe section 'Use of relay output with special functions 7 + 9' starting on page 40).
- The new function 'Brake applied at down ramp' is introduced. Bit 9 in the control word is assigned with this function as virtual terminal according to MOVILINK® profile.
- As soon as bit 9 is set during the down ramp, the relay output applies the brake and MOVIMOT® inhibits the output stage.
- If the motor frequency is lower than the stop frequency, the brake is applied independent of the status of bit 9.



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

Terminal operation

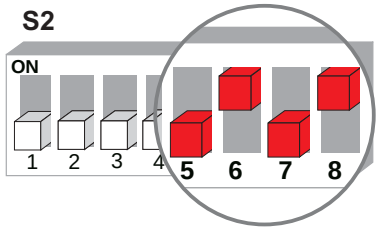
- **The mechanical brake is controlled by the relay output.**
- A braking resistor (BW..) must be connected to terminal 13 and 15 at the wiring board of MOVIMOT®, terminal 14 is not assigned.
- The relay functions as brake control relay so that the ready signal function is no longer available (it is imperative that you observe section 'Use of relay output with special functions 7 + 9' starting on page 40).



- **Brake cannot be applied via bit 9 in terminal operation.**

Special function 10

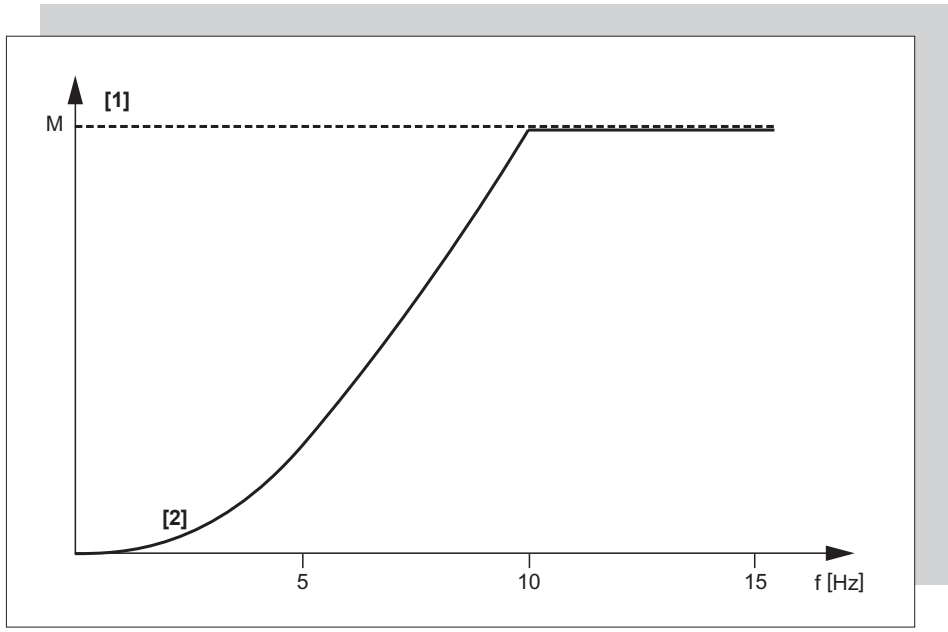
MOVIMOT® with reduced torque at low frequencies



05606AXX

Description of function

- The drive builds up only a reduced torque due to a reduction in slip and active current at low speeds (see following figure):
- Minimum frequency = 0 Hz (see special function 8 on page 36)



50907AXX

[1] Maximum torque with VFC operation
[2] Maximum torque with activated special function

Use of relay output with special functions 7 + 9

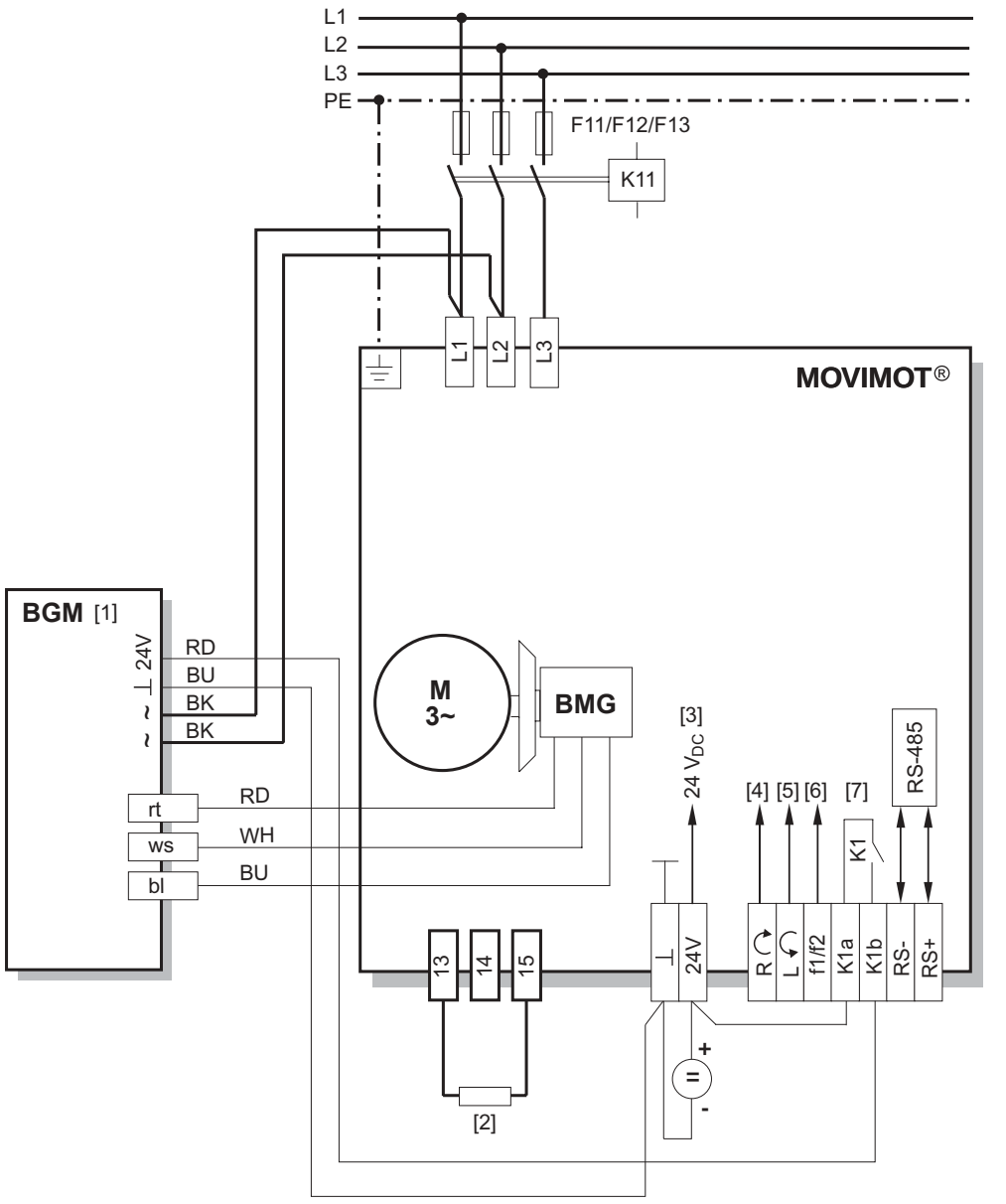


The following figure shows the use of relay contact K1 to control the mechanical brake with brake rectifier BGM.

Important: Please observe the following before startup with brake control BGM:

- The brake coil must correspond to the supply voltage (e.g. 400 V).
- **Special functions 7 or 9 must be activated, otherwise the brake is permanently released. This must also be observed in case of an exchange of the inverter electronics (terminal box cover).**

  If neither of the two functions is activated, relay contact K1 functions as ready signal contact. **This means the brake will be released without enable if the BGM is used.**



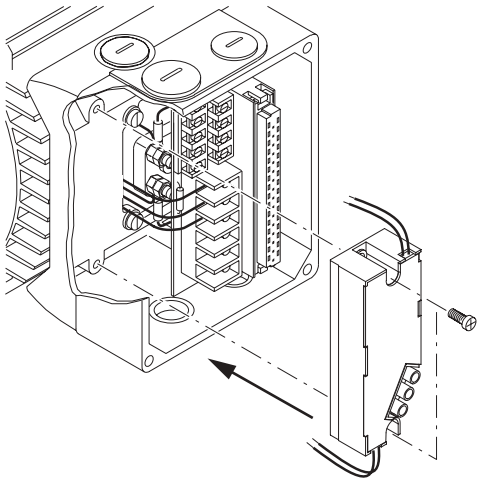
50857AXX

[1] Brake control BGM installed in the terminal box
[2] External braking resistor BW
(see the 'Technical Data' section for the assignment)
[3] 24 V_{DC} supply
[4] CW/Stop
[5] CCW/Stop
[6] Setpoint toggle f1/f2
[7] Brake relays

Retrofitting the brake rectifier

If the brake rectifier BGM was not ordered as installed option, it must be retrofitted as follows:

1. Exchange the brake coil (brake coil must correspond to the supply voltage).
2. Mount the brake control BGM with 2 screws according to the following figure (connection according to wiring diagram on page 40).

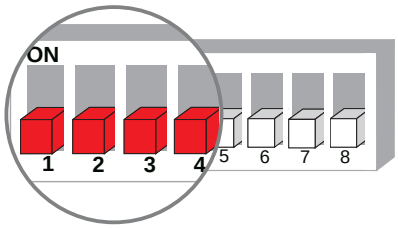


50998AXX

3. Connect the external braking resistor according to the wiring diagram on page 40 (see the 'Technical Data' section for assignment).

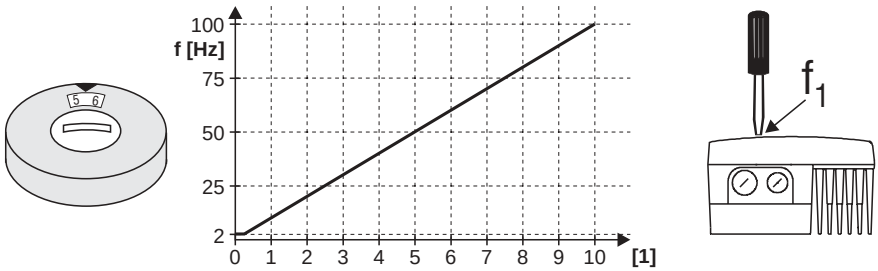
6.6 Startup with binary control (control via terminals)

1. **Review correct connection of MOVIMOT® (see the section 'Electrical Installation').**
2. Make sure DIP switches S1/1 – S1/4 are set to OFF (= address 0).



05062AXX

3. Set first speed with f1 setpoint potentiometer (activated if terminal f1/f2 = '0') (factory setting: approx. 50 Hz).



05066BXX

[1] Pot. position

4. Set the second speed with switch f2 (active when tl. f1/f2 = '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

During operation, the first speed is infinitely variable using the setpoint potentiometer f1 which is accessible from the outside.

Speeds f1 and f2 can be set independently to any value.

5. Set the ramp time with switch t1 (ramp times in relation to a setpoint step change of 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. Replace and fasten terminal box cover.
7. Install cover with gasket and fasten with retaining screw.
8. Switch on the control voltage 24 V_{DC} and supply system.

Inverter response according to the terminal level

Network	24 V	f1/f2	CW/Stop	CCW/Stop	Status LED	Inverter behavior
0	0	x	x	x	Off	Inverter off
1	0	x	x	x	Off	Inverter off
0	1	x	x	x	Flashing yellow	Stop, supply system missing
1	1	x	0	0	yellow	Stop
1	1	0	1	0	green	Clockwise with f1
1	1	0	0	1	green	Counterclockwise with f1
1	1	1	1	0	green	Clockwise with f2
1	1	1	0	1	green	Counterclockwise with f2
1	1	x	1	1	yellow	Stop

Legend

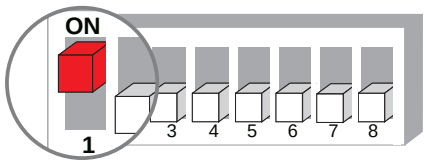
0 = No voltage

1 = Voltage

X = Any

6.7 Startup with MBG11A or MLG11A options

1. **Review correct connection of MOVIMOT® (see the section 'Electrical Installation').**
2. Set DIP switch S1/1 (on MOVIMOT®) to ON (= address 1).



05064AXX

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



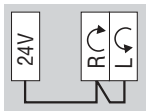
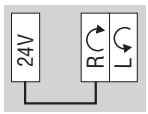
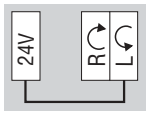
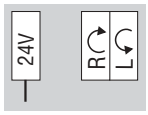
Switch f2											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency fmin [Hz]	2	5	7	10	12	15	20	25	30	35	40

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

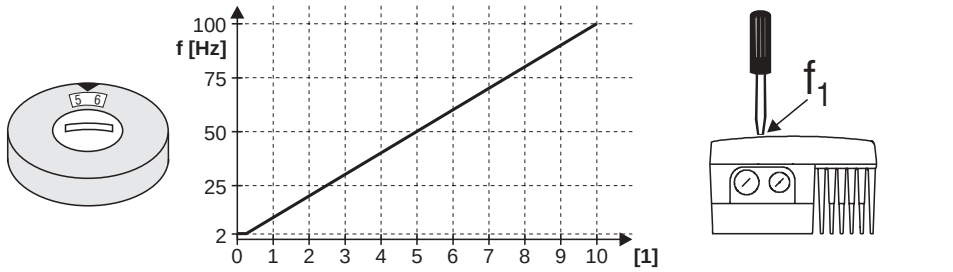


Switch t1											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10

5. Check whether the required direction of rotation is enabled.

Terminal R	Terminal L	Message
Activated	Activated	• Both directions of rotation are enabled
		
Activated	Not activated	• Only clockwise direction of rotation is enabled • Preselected setpoints for counterclockwise rotation result in standstill of drive
		
Not activated	Activated	• Only counterclockwise direction of rotation is enabled • Setpoint selections for clockwise lead to the drive being stopped
		
Not activated	Not activated	• Unit is blocked or the drive is stopped
		

6. Replace and fasten terminal box cover.
7. Set the required maximum speed using setpoint potentiometer f1.

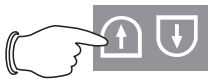
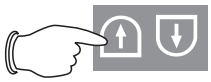
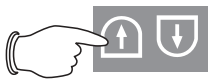


05066BXX

[1] Pot. position

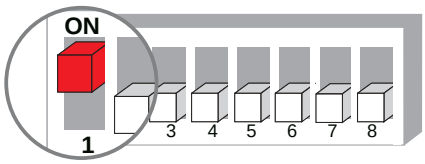
8. Install cover with gasket and fasten with retaining screw.
9. Switch on the voltage.

Operating MBG11A and MLG11A options

Function	Explanation
Display	Negative display value e.g.:  = Counterclockwise Positive display value e.g.:  = Clockwise The displayed value relates to the speed set using setpoint potentiometer f1. Example: Display '50' = 50 % of the speed set using the setpoint potentiometer. **Important: With display '0' the drive rotates with fmin.**
Increase the speed	With CW rotation:  With CCW rotation: 
Reduce speed	With CW rotation:  With CCW rotation: 
Block MOVIMOT®	Press the following keys simultaneously:  Display = 
Enable MOVIMOT®	 **or**  **Important: After release, MOVIMOT® accelerates to the value and direction of rotation saved last.**
Change in direction of rotation from CW to CCW	1.  until display =  2. Pressing it again  changes direction of rotation from CW to CCW.
Change in direction of rotation from CCW to CW	1.  until display =  2. Pressing it again  changes direction of rotation from CCW to CW.
Memory function	After the supply system has been switched off and on again, the value last set is retained provided the 24 V supply was present for at least 4 seconds following the most recent setpoint change.

6.8 Startup with MWA21A option (speed control module)

1. **Review correct connection of MOVIMOT® (see the section 'Electrical Installation').**
2. Set DIP switch S1/1 (on MOVIMOT®) to ON (= address 1).



05064AXX

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



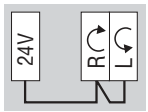
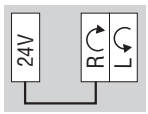
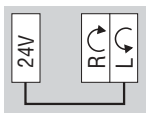
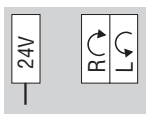
Switch f2											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency f_{min} [Hz]	2	5	7	10	12	15	20	25	30	35	40

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

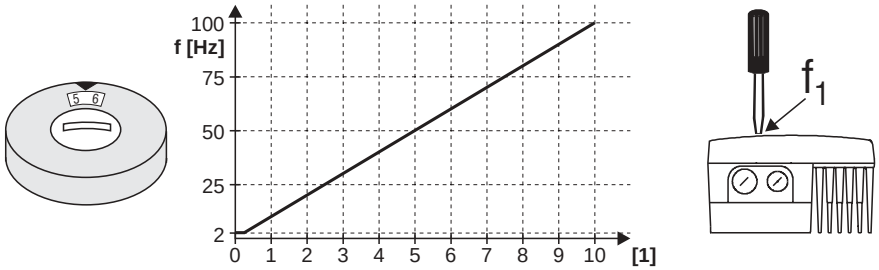


Switch t1											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10

5. Check whether the required direction of rotation is enabled.

Terminal R	Terminal L	Message
Activated	Activated	• Both directions of rotation are enabled
		
Activated	Not activated	• Only clockwise direction of rotation is enabled • Preselected setpoints for counterclockwise rotation result in standstill of drive
		
Not activated	Activated	• Only counterclockwise direction of rotation is enabled • Setpoint selections for clockwise lead to the drive being stopped
		
Not activated	Not activated	• Unit is blocked or the drive is stopped
		

6. Replace and fasten terminal box cover.
7. Set the required maximum speed using setpoint potentiometer f1.



05066BXX

(1) Pot. setting

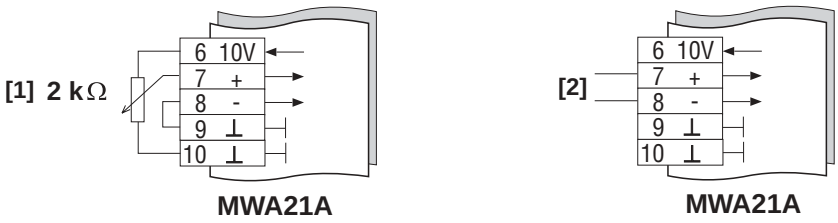
8. Install cover with gasket and fasten with retaining screw.
9. Select the signal type for the analog input (tl. 7 and tl. 8) of the MWA21A option using switches S1 and S2.

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

10. Switch on the voltage.
11. Release MOVIMOT® by applying +24 V to tl. 4 (CW rotation) or tl. 5 (CCW rotation) of the MWA21A.

Control

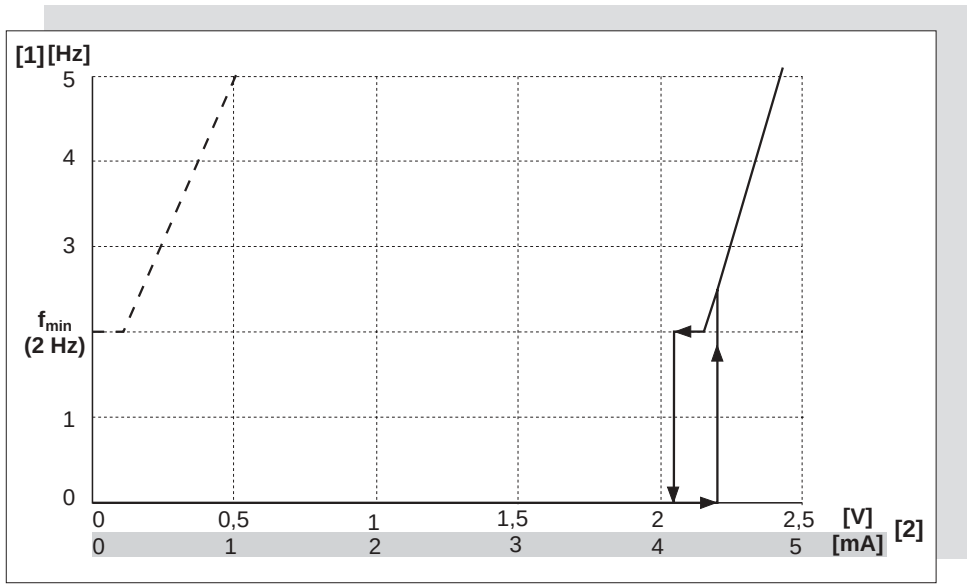
MOVIMOT® is controlled from f_{min} to f_{max} using the analog signal at terminal 7 and terminal 8.



05067BXX

[1] Potentiometer using the 10 V reference voltage (alternatively 5 kΩ)
[2] Floating analog signal

Setpoint stop function



05068BXX

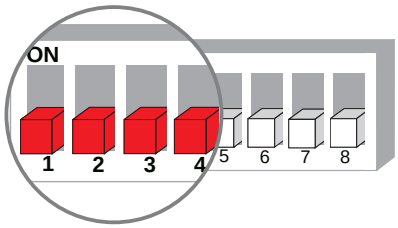
Setting:

– – – –	**0...10 V / 0...20 mA**
———	**2...10 V / 4...20 mA**

[1] Output frequency
[2] Setpoint

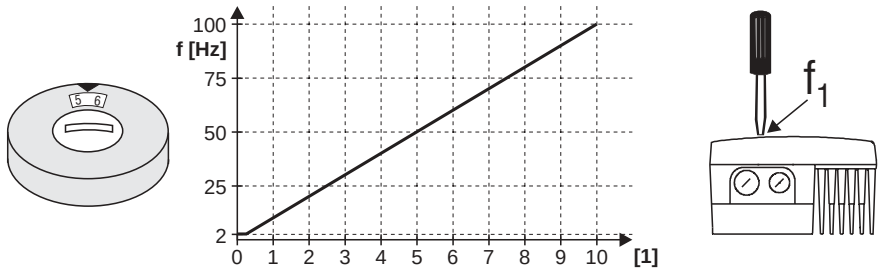
6.9 AS-i binary slave MLK11A startup

1. **Review correct connection of MOVIMOT® (see the section 'Electrical Installation').**
2. Make sure DIP switches S1/1 – S1/4 are set to OFF (= address 0).



05062AXX

3. Set first speed with f1 setpoint potentiometer (activated if terminal f1/f2 = '0') (factory setting: approx. 50 Hz).



05066BXX

[1] Pot. position

4. Set the second speed with switch f2 (activated if tl. f1/f2 = '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

During operation, the first speed is infinitely variable using the externally accessible setpoint potentiometer f1.

Speeds f1 and f2 can be set independently to any value.

5. Set the ramp time with switch t1 (ramp times in relation to a setpoint step change of 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. Replace and fasten terminal box cover.
7. Install cover with gasket and fasten with retaining screw.
8. Connect AS-i supply voltage and supply.

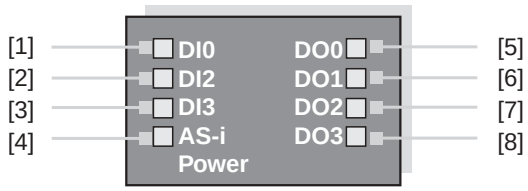
Outputs (function and designation)

Bit	Function	Display / LED color
D0	Clockwise (terminal R)	DO 0 / yellow
D1	Counterclockwise (terminal L)	DO 1 / yellow
D2	Speed f1 / speed f2 (terminal f1/ f2)	DO 2 / yellow
D3	Voltage supply / reset (terminal 24 V)	DO3 / green

Inputs (function and designation)

Bit	Function	Display / LED color
D0	Ready signal (relay K1)	DI 0 / yellow
D1	-	-
D2	Sensor 1 (M12 socket, pin 4)	DI 2 / yellow
D3	Sensor 2 (M12 socket, pin 2)	DI 3 / yellow

LED display



05070BXX

[1] MOVIMOT® ready for operation
[2] External input DI2
[3] External input DI3
[4] Voltage supply via AS-i system is ok
[5] Clockwise rotation activated
[6] Counterclockwise rotation activated
[7] Speed f2 activated
[8] MOVIMOT® voltage supply

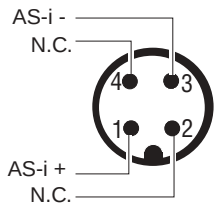
Assigning slave address via programming device

An AS-i addressing device can be used to assign the slave address. This device allows simple and network-independent addressing.

The AS-i addressing devices offer the following functions:

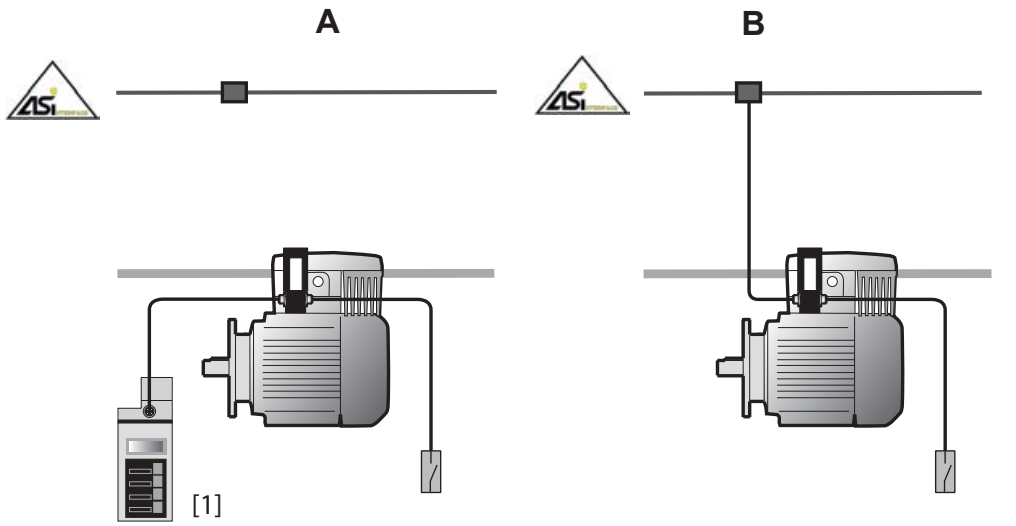
- Reading an AS-i slave address
- Incremental adjustment of address to new value
- New addressing of slaves
- Functional test with output to LCD display

The use of an addressing device requires an adapter that fits onto the M12 plug connector of the MLK module (see the following figure).



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Example: Every AS-i station is individually addressed (A) and then reintegrated in the bus (B).



50475BXX

(1) AS-i addressing device

6.10 Startup with communications interface / fieldbus

1. **Review correct connection of MOVIMOT® (see the section 'Electrical Installation').**
2. Set the correct RS-485 address on DIP switches S1/1...S1/4. **Always set address '1' in conjunction with SEW fieldbus interfaces (MF...).**

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

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



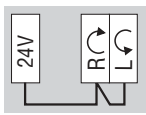
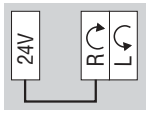
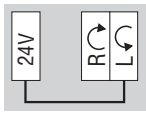
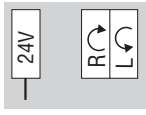
Switch f2											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Minimum frequency f_{min} [Hz]	2	5	7	10	12	15	20	25	30	35	40

4. If ramp is not set via fieldbus, set ramp time with switch t1 (ramp times are based on a setpoint jump of 50 Hz).

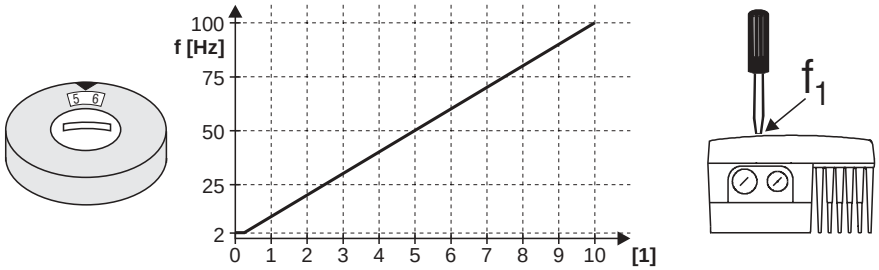


Switch t1											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 [s]	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10

5. Check whether the required direction of rotation is enabled.

Terminal R	Terminal L	Message
Activated	Activated	• Both directions of rotation are enabled
		
Activated	Not activated	• Only clockwise direction of rotation is enabled • Preselected setpoints for counterclockwise rotation result in standstill of drive
		
Not activated	Activated	• Only counterclockwise direction of rotation is enabled • Setpoint selections for clockwise lead to the drive being stopped
		
Not activated	Not activated	• Unit is blocked or the drive is stopped
		

6. Replace and fasten terminal box cover.
7. Set the required maximum speed using setpoint potentiometer f1.



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[1] Pot. position

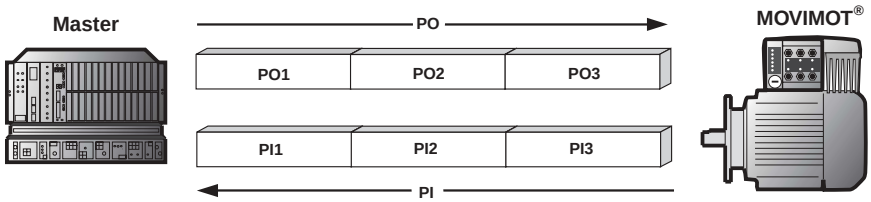
8. Install cover with gasket and fasten with retaining screw.
9. Switch on the voltage.

Refer to the 'Drive System for Decentralized Installation' system manual for more detailed information.

6.11 MOVILINK® unit profile (coding of process data)

The same process data information is used for controlling and selecting setpoints for all fieldbus systems. The process data are coded using the uniform MOVILINK® profile for SEW drive inverters. In the case of MOVIMOT®, it is always possible to differentiate between the following variants:

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



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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

Two process data words

In order to control MOVIMOT® using two process data words, the master programmable controller sends the process output data "Control word" and "Speed [%]" to the MOVIMOT® unit; the process input data "Status word 1" and "Output current" are sent from the MOVIMOT® unit to the programmable controller.

Three process data words

With control via three process data words, the "Ramp" is sent as the additional process output data word; "Status word 2" is sent as the third process input data word.

Process output data

Process output data are sent from the master programmable controller to the MOVIMOT® unit (control information and setpoints). However, they only come into effect in the MOVIMOT® unit if the RS-485 address in the MOVIMOT® is set to a value other than 0 (DIP switches S1/1 to 4). MOVIMOT® can be controlled with the following process output data:

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

								Basic control block							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Control word:

Not assigned	'1' = Reset	Not assigned	'1 1 0' = Release otherwise stop

Setpoint:

Signed percentage / 0.0061 % **Example:** -80% / 0.0061 % = - 13115 = $CC5_{hex}$

Ramp (with 3 word protocol only\):

Time from 0 to 50 Hz in ms (range: 100 10000 ms) **For example:** 0.2 s = 2000 ms = $07DO_{hex}$

Control word, bits 0...2

The 'Enable' control command is specified with bits 0...2 by entering the control word = 0006_{hex}. The CW and/or CCW input terminal must also be set to +24 V (jumpered) in order to enable MOVIMOT®.

The 'Stop' control command is issued by resetting bit 2 = '0'. You should use the stop command 0002_{hex} in order to stay compatible with other SEW inverter ranges. However, MOVIMOT® always triggers a stop with the current ramp whenever bit 2 = '0', regardless of the status of bit 0 and bit 1.

Control word bit 6 = Reset

In the event of a malfunction, the fault can be acknowledged with bit 6 = '1' (Reset). The value of unassigned control bits should be 0 to ensure compatibility.

Speed [%]

The speed setpoint is specified as a percentage, relative to the maximum speed set with the f1 setpoint potentiometer.

Coding: $C000_{hex}$ = -100 % (counterclockwise)
4000_{hex} = +100 % (clockwise)
→ 1 digit = 0,0061 %

For example: 80 % f_{max}, direction of rotation CCW:

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 using the switch t1 is used if MOVIMOT® is being controlled by 2 process data.

Coding: 1 digit = 1 ms

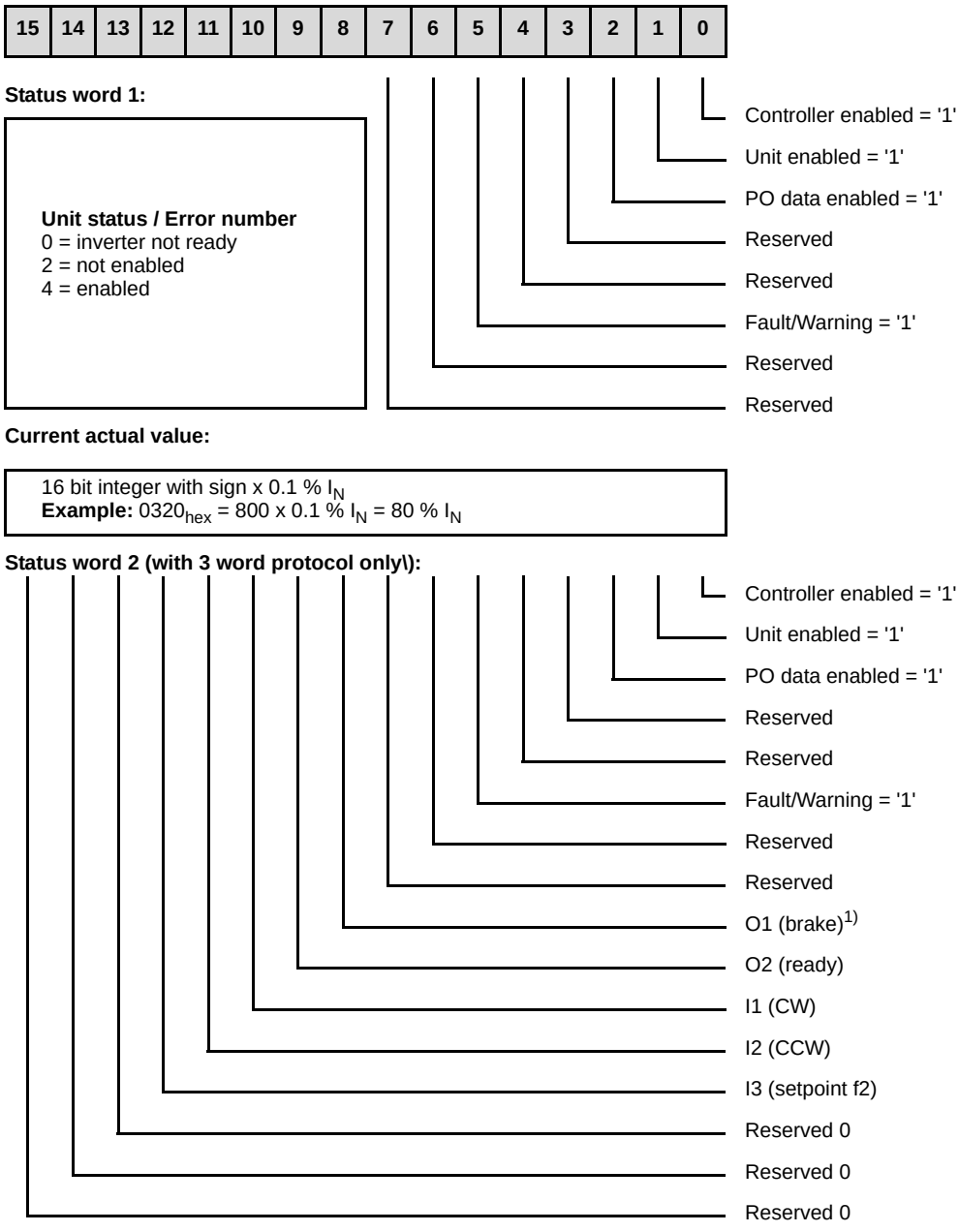
Range: 100...10000 ms

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

Process input data

The MOVIMOT® unit sends process input data back to the programmable master controller. The process input data consist of status and actual value information. The following process input data are supported by MOVIMOT®:

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



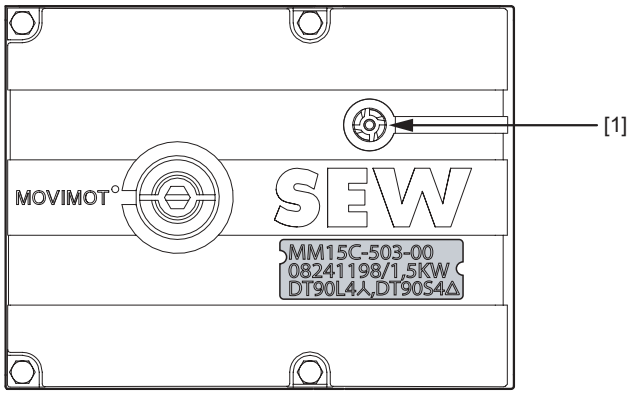
1) '1' = brake engaged, '0' = brake released

Refer to the 'Drive System for Decentralized Installation' system manual for more detailed information.

7 Diagnostics

7.1 Status LED

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



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[1] MOVIMOT® status LED

Meaning of the status LED states

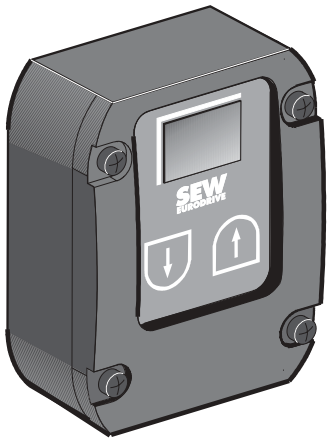
The 3-color LED signals the operating and fault states.

LED color	LED status	Operational status	Description
–	Off	Not ready	No 24 V power supply
Yellow	Steady flashing	Not ready	Self-test phase active or 24 V power supply present but supply voltage not OK
Yellow	Steady, fast flashing	Ready	Releasing the brake without active drive enable (only with S2/2 = 'ON')
Yellow	Steady light	Ready, but unit is inhibited	24 V power supply and supply voltage OK, but no enable signal
Green / yellow	Flashing with alternating colors	Ready, but timeout	Communication faulty with cyclical data exchange
Green	Steady light	Unit enabled	Motor operating
Green	Steady, fast flashing	Current limit active	Drive has reached the current limit
Red	Steady light	Not ready	Check the 24 V_{DC} supply Make sure that there is a smoothing DC voltage with a low ripple (residual ripple max. 13%) present
Red	2 x flash, pause	Fault 07	DC link voltage too high
Red	Flashing slowly	Fault 08	Fault speed monitoring (only with S2/4='ON')
		Fault 90	Assignment of motor – inverter incorrect (e.g. MM03 – DT71D4 △)
		Fault 17 to 24, 37	CPU fault
		Fault 25, 94	EEPROM error
Red	3 x flash, pause	Fault 01	Overcurrent of output stage
		Fault 11	Excessive temperature in output stage
Red	4 x flash, pause	Fault 84	Excessive temperature in motor Assignment of motor-frequency inverter incorrect
Red	5 x flash, pause	Fault 89	Excessive temperature in brake Assignment of motor-frequency inverter incorrect
Red	6 x flash, pause	Fault 06	Mains phase fault

7.2 List of faults

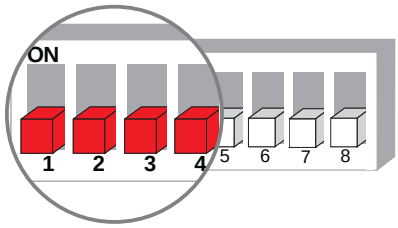
Faults	Cause / solution
Timeout of communication (motor stops without fault code)	A Missing connection ⊥, RS+, RS- between MOVIMOT® and RS-485 master. Check the connection, particularly the ground, and repair. B EMC interference. Check the shielding of the data cables and improve if necessary. C Incorrect type (cyclical) in acyclical protocol time between the individual messages >1 s with protocol type 'cyclical.' Shorten message cycle or select 'acyclical.'
DC link voltage too low, supply system off detected (motor stops without fault code)	Check supply system leads and supply voltage for interruption. Motor restarts automatically as soon as the supply voltage reaches normal values.
Fault code 01 Overcurrent of output stage	Short circuit of inverter output. Check the connection between inverter output and motor for short circuit.
Fault code 06 Phase fault	Check the supply system leads for phase fault. Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 07 DC link voltage too high	A Ramp time too short → Increase ramp time B Faulty connection between brake coil and braking resistor. → Check the connection between braking resistor and brake coil and correct, if necessary. C Incorrect internal resistance of brake coil/braking resistor → Check the internal resistance of the brake coil/braking resistor (see the 'Technical Data' section) D Thermal overload in braking resistor → Wrong size of braking resistor selected Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 08 Speed monitoring	Speed monitoring tripped Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 11 Thermal overload of the output stage or internal unit fault	• Clean the heat sink • Reduce the ambient temperature • Prevent heat accumulation • Reduce the load on the drive Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 17 to 24, 37 CPU fault	Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 25, 94 EEPROM error	Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 84 Thermal overload of motor	• Reduce the ambient temperature • Prevent heat accumulation • Reduce the load on the motor • Increase the speed • Check the combination of the drive and MOVIMOT® frequency inverter if the fault is signaled shortly after the first release. • The temperature monitoring in the motor (TH winding thermostat) tripped with the use of MOVIMOT® integrated in the field distributor Z.8 and selected special function 5 → Reduce load on the motor. Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 89 Thermal overload of brake coil or brake coil defective	• Extend the set ramp time • Brake inspection (see the 'Inspection and Maintenance' section) • Contact SEW service • If the fault should occur shortly after the initial enable, check the combination of drive (brake coil) and MOVIMOT® frequency inverter. Reset the fault by switching off the 24 V_{DC} supply voltage or use MOVILINK®.
Fault code 91 Communications fault between fieldbus gateway and MOVIMOT®	• Check electrical connection between fieldbus gateway and MOVIMOT® (RS-485) • The fault is automatically reset after removing the cause, a reset via control word is not possible.

7.3 Diagnostics via MDG11A option



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- The diagnostic unit must be connected prior to the possible occurrence of a fault, as MOVIMOT® error messages are not saved and the information is lost when the 24 V supply is disconnected.
- The diagnostic unit may be connected only with a MOVIMOT®.
- Connecting the MDG11A to an RS-485 bus with several MOVIMOT® is not allowed.
- The diagnostic unit can be used only if the MOVIMOT® is controlled via terminals. This requires that the DIP switches S1/1 to S1/4 are set to OFF (= address 0).



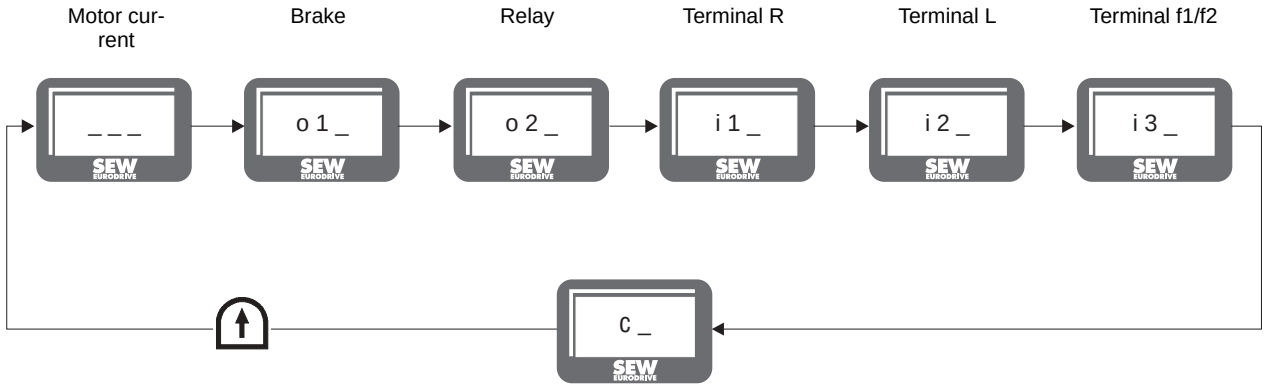
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- **Do not use the diagnostic unit with setpoint setting via RS-485 interface.**
- Connection according to section 'Electrical Installation'

Diagnostics procedure

The diagnostic unit can display different information such as operating status, motor current, status of input terminals, status of message relay and brake. The selection is made by pressing the button. If a fault occurs, the fault number is automatically displayed.



Operational status 05623AXX

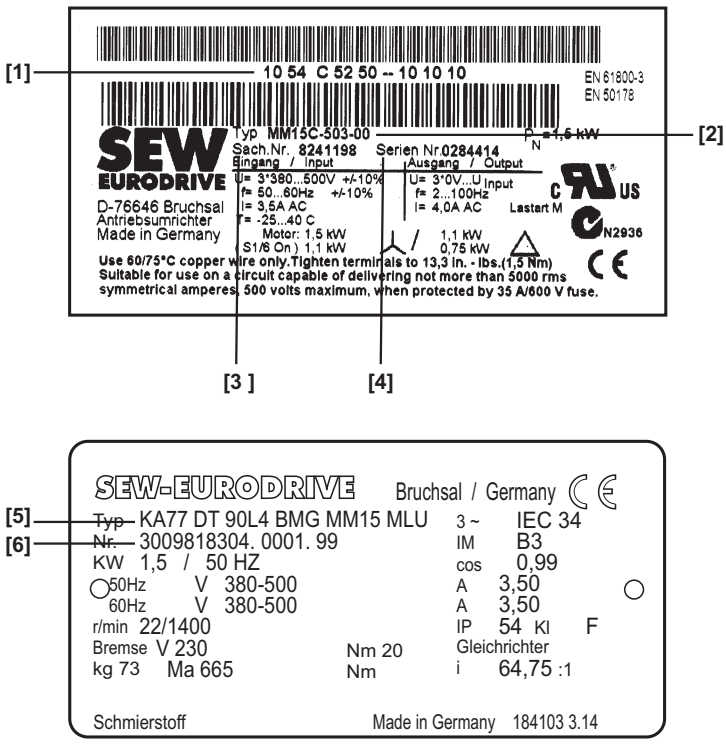
Display		Message
Operational status	`---`	No communication, i.e. missing 24 V at MOVIMOT® or RS-485 connection incorrect (interrupted or switched cable)
	`c 0`	Not ready, i.e. supply voltage is missing, but 24 V present
	`c 2`	Ready for operation, i.e. supply voltage and 24 V are present, but no enable signal at terminal R or L
	`c 4`	Enabled, i.e. the motor turns
Fault codes	`F01`	Short circuit of inverter output
	`F06`	Mains phase fault
	`F07`	DC link voltage too high
	`F11`	Thermal overload of the output stage
	`F84`	Thermal overload of the motor or motor blocked
	`F89`	Thermal overload of the brake or internal resistance of the brake not correct
	`F90`	Assignment motor–inverter incorrect (e.g. MM03 – DT71D4 △)
Motor current	`0...180`	Displays percentage of nominal inverter current, from 0% to 180%
Brake	`o10`	Brake applied
	`o11`	Brake released
Relay	`o20`	Inverter not ready for operation (supply voltage is missing or inverter is in 'fault' condition, see Operating States or Fault Codes)
	`o21`	Inverter ready
Terminal R	`i10`	Terminal R = '0'
	`i11`	Terminal R = '1' = Clockwise
Terminal L	`i20`	Terminal L = '0'
	`i21`	Terminal L = '1' = Counterclockwise
Terminal f1/f2	`i30`	Terminal f1/f2 = '0' = Setpoint f1 active
	`i31`	Terminal f1/f2 = '1' = Setpoint f2 active

7.4 Important information for servicing

If a fault cannot be corrected, please consult the SEW Service department (→ "Customer and Spare Parts Service").

If you consult the SEW service, please state the following:

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



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8 Inspection and Maintenance

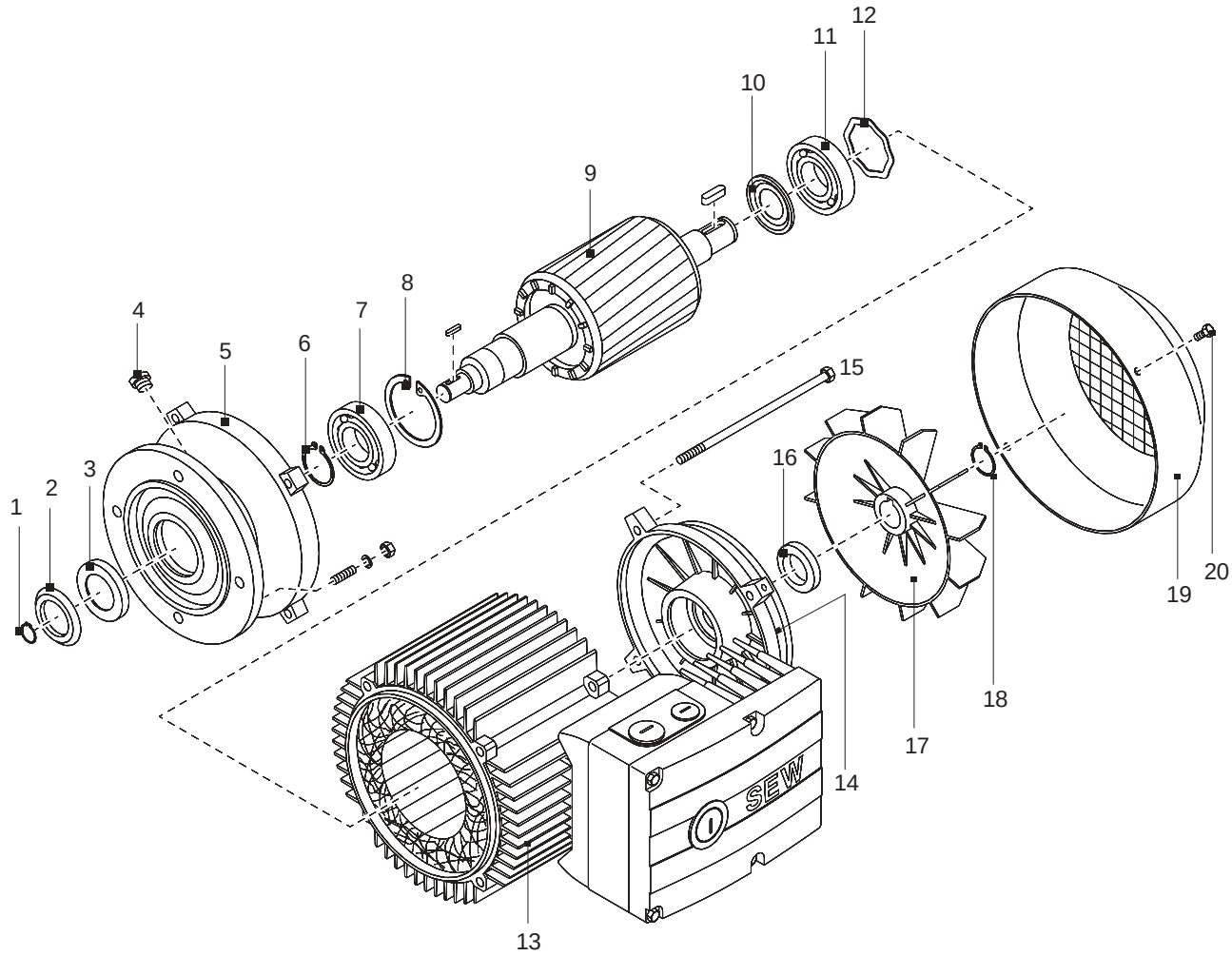
- Use only genuine spare parts in accordance with the valid parts list!
- Important Danger of burns: Motors can become very hot during operation!

8.1 Inspection and maintenance periods

Frequency	Unit/Unit part	What to do
Depending on loading conditions: Every 2 to 4 years[1)]	Brake	• Inspect the brake (working air gap, brake disk, pressure plate, carrier / gearing, pressure rings) • Extract the abraded matter
Every 10,000 operating hours	Motor	• Inspect motor (replace ball bearing/oil seal) • Clean the cooling air passages
Varies (depending on external factors)	Motor	• Touch up or renew the anticorrosion coating

1) The periods of wear are affected by many factors and may be short. Calculate the required inspection and maintenance intervals separately in accordance with the project planning documents.

8.2 Inspection and maintenance work on the motor



02575AXX

1 Circlip
2 Oil flinger
3 Oil seal
4 Screw plug
5 Drive end bearing end shield
6 Circlip
7 Ball bearing
8 Circlip
9 Rotor
10 Nilos ring
11 Ball bearing
12 Equalizing ring
13 Stator
14 Non-drive end bearing end shield
15 Hex head screw
16 V-ring
17 Fan
18 Circlip
19 Fan guard
20 Housing screw

Inspecting the motor



1. **Important: Isolate MOVIMOT® from the supply, safeguarding it against unintentional power-up.**
2. Remove proximity sensor NV16 / NV26 if fitted.
3. Remove the flange cover or fan guard (19).
4. Remove the hexagon head cap screws (15) from the drive end bearing end shield (5) and the non-drive end bearing end shield (14), release the stator (13) from the drive end bearing end shield.
5. a) Motors with a brake
   - Open the connection box cover, unfasten the brake cable from its terminals
   - Push the non-drive end bearing end shield and the brake off the stator and carefully lift them off (if necessary, run the brake cable along with trailing wire)

   b) Pull the stator back by approx. 3–4 cm.
6. Visual check:

   Are there traces of gear oil or condensation inside the stator?

   – If not, continue with 9.

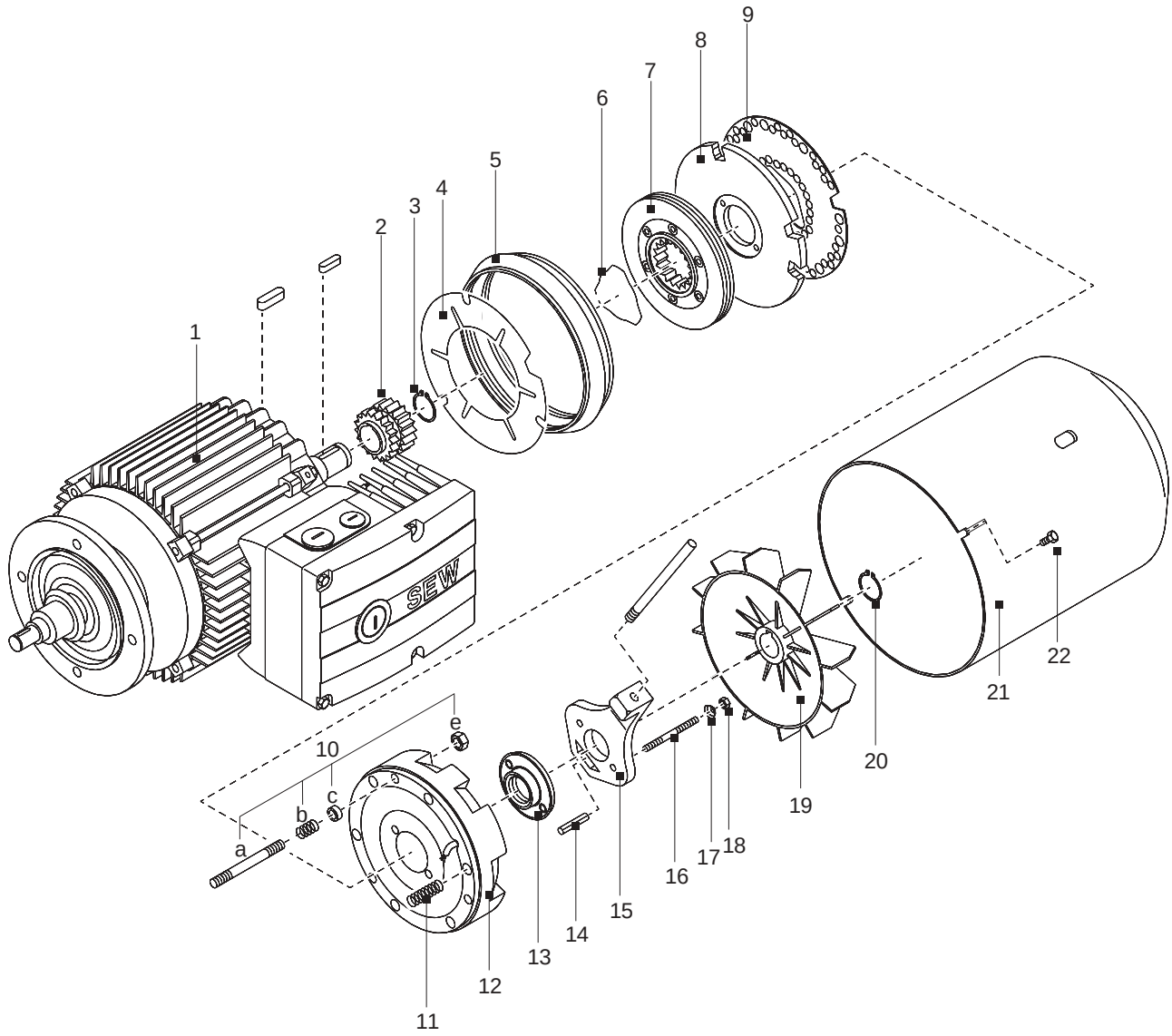
   – If condensation is present, continue with 7.

   – If gear oil is present, the motor must be repaired by a specialized workshop.
7. a) Geared motors: Remove the motor from the gear unit.

   b) Motors without a gear unit: Remove the drive end flange.

   c) Remove the rotor (9).
8. Clean the winding, dry it and check it electrically.
9. Replace the ball bearings (7, 11) (use only approved ball bearings, see page 70).
10. Fit a new oil seal (3) in the drive end bearing end shield.
11. Reseal the stator seat, reassemble the motor, brake, etc.
12. Check the gear unit, if applicable (see Gear Unit Operating Instructions).

8.3 Inspection and maintenance work on the brake

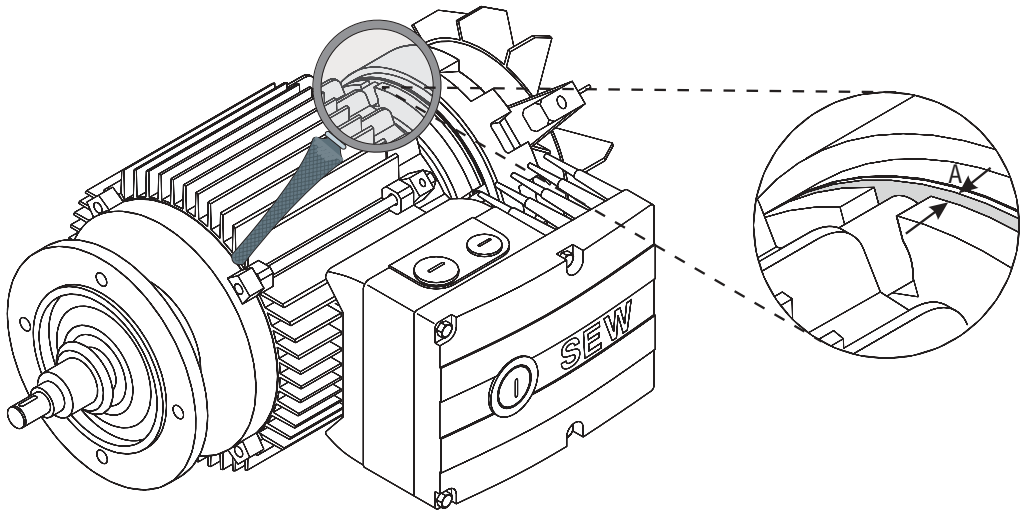


02576AXX

1	Motor with brake end shield	10a	Stud (3 pcs.)	16	Stud (2 pcs.)
2	Carrier	10b	Counter spring	17	Conical coil spring
3	Circlip	10c	Pressure ring	18	Setting nut
4	Niro disk	10e	Hex nut	19	Fan
5	Rubber sealing collar	11	Brake spring	20	Circlip
6	Annular spring	12	Brake coil body	21	Fan guard
7	Brake disk	13	Sealing washer	22	Housing screw
8	Pressure plate	14	Dowel pin		
9	Damping plate (BMG only)	15	Releasing lever with hand lever		

Inspecting the brake, adjusting the working air gap

1. **Isolate MOVIMOT® from the supply, safeguarding it against unintentional power-up.**
2. Remove the following:
   - Proximity sensor NV16 / NV26, if fitted
   - Flange cover or fan guard (21).
3. Push the rubber sealing collar (5) aside (loosen the clamp to do this if necessary). Vacuum up the abraded particles.
4. Measure the brake disk (7, 7b):
   - If the brake disk is ≤ 9 mm: Fit a new brake disk (see page 68)
5. Measure the working air gap A (see the following figure):
   - use a feeler gauge at three points offset by approx. 120° between the pressure plate and damping plate (9)



02577AXX

6. Tighten the hexagon nuts (10e) until the working air gap is set correctly (see page 70).
7. Fit the rubber sealing collar back in place and re-install the dismantled parts.

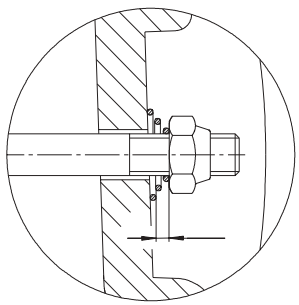
Fitting a new brake disk

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

1. Isolate MOVIMOT® from the supply, safeguarding it against unintentional power-up.
2. Remove the following:
   – Proximity sensor NV16 / NV26, if fitted
   – Flange cover or fan guard (21), circlip (20) and fan (19)
3. Remove the rubber sealing collar (5).

   Remove manual brake release: Setting nuts (18), conical coil springs (17), studs (16), releasing lever (15).
4. Loosen hexagon nuts (10e), carefully pull off the coil body (12) (Caution, brake cable!), and take out the brake springs (11).
5. Remove the damping plate (9), pressure plate (8) and brake disk (7, 7b) and clean the brake components.
6. Fit a new brake disk.
7. Re-install brake components (except rubber sealing collar, fan and fan guard). Set working air gap (page 67, Points 5 to 7).
8. With manual brake release (type HF or HR):

   Set the floating clearance via the setting nuts between the conical coil springs (pressed flat) and setting nuts (see the following figure).



01111AXX

Brake	Floating clearance [mm]
BMG 05 - 1	1.5
BMG 2 - BMG4	2

Important: This floating clearance is necessary so that the pressure plate can move up as the brake lining wears.

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

Note:

- The lockable manual brake release (type HF) is already released if a resistance is encountered when operating the grub screw.
- The self-reengaging manual brake release (type HR) can be operated with normal hand pressure.

Important: In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance. A bracket is provided for storing it on the outside of the motor.

Changing the braking torque

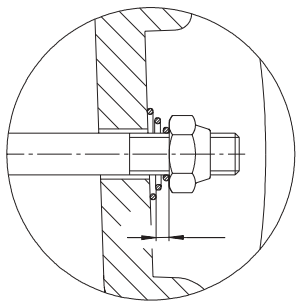
The braking torque can be adjusted in steps (see page 70).

- by installing different brake springs,
- by changing the number of brake springs.

1. Isolate MOVIMOT® from the supply, safeguarding it against unintentional power-up.
2. Remove the following:
   – NV16 / NV26 proximity sensor, flange cover or fan guard (21), snap ring (20) and fan (19), if available.
3. Remove the rubber sealing collar (5).

   Remove the manual brake release: Setting nuts (18), conical coil springs (17), studs (16), releasing lever (15).
4. Unscrew the hex nuts (10e) and pull off the brake coil body (12) by approximately 50 mm (caution: brake cable!).
5. Change or add brake springs (11). (Position the brake springs symmetrically.)
6. Re-install brake components except for rubber sealing collar, fan and fan guard. Set working air gap (see page 67, Points 5 to 7).
7. With manual brake release:

   Set the floating clearance between the conical coil springs (pressed flat) and release lever via the setting nuts (see the following figure).



01111AXX

Brake	Floating clearance [mm]
BMG 05 - 1	1.5
BMG 2 - BMG4	2



Important: This floating clearance is necessary so that the pressure plate can move up as the brake lining wears.

8. Fit the rubber sealing collar back in place and re-install the dismantled parts.



Note: Fit new setting nuts (18) and hex nuts (10e) if the removal procedure is repeated! (due to reduced self-locking of nuts!).

8.4 Permitted ball bearing types

Motor type	Driving end A-bearing (AC motor, brake motor)			Non drive-end bearing (foot, flanged or geared motors)	
	Flange-mounted motor	Geared motor	Foot-mounted motor	AC motor	Brake motor
DT 71-80	6204-Z-J	6303-Z-J	6204-Z-J	6203-J	6203-RS-J-C3
DT 90-DV100	6306-Z-J-C3			6205-J	6205-RS-J-C3

8.5 Working air gap and braking torque of brake

Brake	Motor	Working air gap mm		Braking torque settings				
		min.[1]	max.	Braking torque [Nm]	Type and no. of springs		Order numbers of springs	
					Normal	Red	Normal	Red
BMG 05	**DT 71**	0.25	0.6	5.0 4.0 2.5 1.6 1.2	3 2 - - -	- 2 6 4 3	135 017 X	135 018 8
BMG 1	**DT 80**			10 7.5 6.0	6 4 3	- 2 3		
BMG 2	**DT 90**			20 16 10 6.6 5.0	3 2 - - -	- 2 6 4 3	135 150 8	135 151 6
BMG 4	**DV 100**			40 30 24	6 4 3	- 2 3		

1) Please note when checking the working air gap: After a test run, deviations of +/- 0.1 mm may occur due to parallelism tolerances of the brake disc.

9 Technical Data

9.1 IEC design with connection voltages 380...500 V_{AC}

MOVIMOT® type		MM 03C-503-00	MM 05C-503-00	MM 07C-503-00	MM 11C-503-00	MM 15C-503-00	MM 22C-503-00	MM 30C-503-00	MM 3XC-503-00
Part number		**824 115 5**	**824 116 3**	**824 117 1**	**824 118 X**	**824 119 8**	**824 120 1**	**824 121 X**	**824 180 5**
Output apparent power at Vmains = 380...500 VAC	P_{rated}	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 Permitted range	V_{mains}	3 x 380 V_{AC} / **400 V_{AC}** /415 V_{AC} /460 V_{AC} /500 V_{AC} V_{mains} = 380 V_{AC} -10 % ... 500 V_{AC} +10 %							
Supply frequency	f_{mains}	50 Hz ... 60 Hz ± 10 %							
Rated system current (at Vmains = 400 VAC)	I_{mains}	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}	8.6 A_{AC}
Output voltage	V_{out}	0...V_{mains}							
Output frequency Resolution Operating point	f_{out}	2...100 Hz 0.01 Hz 400 V at 50 Hz / 100 Hz							
Rated output current	I_{rated}	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}	9.6 A_{AC}
Motor power S1	P_{mot}	**0.37 kW**	**0.55 kW**	**0.75 kW**	**1.1 kW**	**1.5 kW**	**2.2 kW**	**3.0 kW**	**3.0 kW**
Motor power S3 25 % ED									**4.0 kW**
PWM frequency		**4 (factory setting)** / 8 / 16[1] kHz							
Current limitation	I_{max}	**Motor:** 160 % with ⅄ and △ **Regenerative:**160 % with ⅄ and △							
External braking resistor	R_{min}	200 Ω					100 Ω		
Interference immunity		Meets EN 61800–3							
Interference emission		Meets EN 61800–3 and class A limit to EN 55011 and EN 55014							
Ambient temperature	ϑ_{amb}	**-25 °C...40 °C** (P_{rated} reduction: 3 % I_{rated} per K to max. 60 °C)							[2]
Climate class		3 K3							
Enclosure (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering) IP67 (only available for inverters with terminal box)							
Operating mode		DB (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes							
Cooling type (DIN 41 751)		Self-cooling							
Altitude		h ≤ 1000 m (P_{rated} reduction: 1 % per 100 m starting at an altitude of 1000 m, see also the section on 'Electrical Installation – Installation Instructions')							
Ext. power supply to electronics	Tl. 24 V	V = +24 V ± 25 %, EN 61131-2, residual ripple max. 13 % I_{in} ≤ 250 mA (typ. 180 mA at 24 V) Starting current: 1 A							
3 binary inputs		Isolated by opto-coupler, PLC-compatible (EN 61131-2) R_i ≈ 3.0 kΩ, I_{in} ≈ 10 mA, sampling time ≤ 5 ms							
Signal level		+13 V...+30 V = '1' = Contact made -3 V...+5 V = '0' = Contact not made							
Control functions	Tl. R Tl. L Tl. f1/f2	↷ CW/Stop ↶ CCW/Stop '0' = Setpoint 1 / '1' = Setpoint 2							
Output relay Contact data	Tl. K1a Tl. K1b	Response time ≤ 15 ms 24 V_{DC} / 0.6 A_{DC} / DC11 to IEC 337-1							
Signaling function		Normally open contact for ready signal Contact made: – with applied voltage (24 V + supply) – if no fault was detected – after self-test phase concluded (after switch-on)							
Serial interface	Tl. RS+ Tl. RS-	RS-485							

1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 = ON, the units operate with a 16 kHz PWM frequency (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature.

2) -25 °C...40 °C with S3 25% ED (up to 60 °C with S3 10 % ED)

9.2 UL design with connection voltages 380...500 V_{AC}

MOVIMOT® type		MM 03C-503-00	MM 05C-503-00	MM 07C-503-00	MM 11C-503-00	MM 15C-503-00	MM 22C-503-00	MM 30C-503-00	MM 3XC-503-00
Part number		**824 115 5**	**824 116 3**	**824 117 1**	**824 118 X**	**824 119 8**	**824 120 1**	**824 121 X**	**824 180 5**
Output apparent power at Vmains = 380...500 VAC	P_{rated}	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 Permitted range	V_{mains}	3 x 380 V_{AC} / 400 V_{AC} /415 V_{AC} /**460 V_{AC}** /500 V_{AC} V_{mains} = 380 V_{AC} -10 % ... 500 V_{AC} +10 %							
Supply frequency	f_{mains}	50 Hz ... 60 Hz ± 10 %							
Rated system current (at Vmains = 460 VAC)	I_{mains}	1.1 A_{AC}	1.4 A_{AC}	1.7 A_{AC}	2.1 A_{AC}	3.0 A_{AC}	4.3 A_{AC}	5.8 A_{AC}	7.5 A_{AC}
Output voltage	V_{out}	0...V_{mains}							
Output frequency Resolution Operating point	f_{out}	2...100 Hz 0.01 Hz 460 V at 60 Hz							
Rated output current	I_{rated}	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}	9.6 A_{AC}
Motor power	P_{mot}	**0.5 HP 0.37 kW**	**0.75 HP 0.55 kW**	**1.0 HP 0.75 kW**	**1.5 HP 1.1 kW**	**2 HP 1.5 kW**	**3.0 HP 2.2 kW**	**5 HP 3.7 kW**	**5.4 HP**[1] **4 kW**
PWM frequency		**4 (factory setting)** / 8 / 16[2] kHz							
Current limitation	I_{max}	**Motor:** 160 % with ⅄ **Regenerative:**160 % with ⅄							
External braking resistor	R_{min}	200 Ω					100 Ω		
Interference immunity		Meets EN 61800–3							
Interference emission		Meets EN 61800–3 and class A limit to EN 55011 and EN 55014							
Ambient temperature	ϑ_{amb}	**-25 °C...40 °C** (P_{rated} reduction: 3 % I_{rated} per K to max. 60 °C)							[3]
Climate class		3 K3							
Enclosure (motor-dependent)		IP54, IP55, IP65, IP66 (options, specify when ordering) IP67 (only available for inverters with terminal box)							
Operating mode		DB (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes							
Type of cooling (DIN 41 751)		Self-cooling							
Altitude		h ≤ 1000 m (P_{rated} reduction: 1 % per 100 m starting at an altitude of 1000 m, see also the section on 'Electrical Installation – Installation Instructions')							
Ext. power supply to electronics	Tl. 24 V	V = +24 V ± 25 %, EN 61131-2, residual ripple max. 13 % I_{in} ≤ 250 mA (typ. 180 mA at 24 V) Starting current: 1 A							
3 binary inputs		Isolated by opto-coupler, PLC-compatible (EN 61131-2) R_i ≈ 3.0 kΩ, I_{in} ≈ 10 mA, sampling time ≤ 5 ms							
Signal level		+13 V...+30 V = '1' = Contact made -3 V...+5 V = '0' = Contact not made							
Control functions	Tl. R Tl. L Tl. f1/f2	↷ CW/Stop ↶ CCW/Stop '0' = Setpoint 1 / '1' = Setpoint 2							
Output relay Contact data	Tl. K1a Tl. K1b	Response time ≤ 15 ms 24 V_{DC} / 0.6 A_{DC} / DC11 to IEC 337-1							
Signaling function		Normally open contact for ready signal Contact made: – with applied voltage (24 V + supply) – if no fault was detected – after self-test phase concluded (after switch-on)							
Serial interface	Tl. RS+ Tl. RS-	RS-485							

1) Only possible with S3 25 % ED

2) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 = ON, the units operate with a 16 kHz PWM frequency (low noise) and switch back in steps to lower switching frequencies depending on the heat sink temperature.

3) -25 °C...40 °C with S3 25% ED (up to 60 °C with S3 10 % ED)

9.3 Technical data, options

MLU11A



MLU11A option	
Option	**MLU11A**
Part number	823 383 7
Input voltage	380... 500 V_{AC} ± 10 %
Output voltage	24 V_{DC} ± 25 %
Output power	max. 6 W
Enclosure	IP 65
Ambient temperature	-25...60 °C

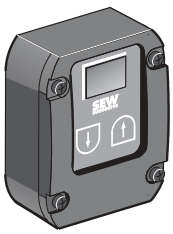
MLG11A



MLG11A option	
Option	**MLG11A**
Part number	823 384 5
Input voltage	380... 500 V_{AC} ± 10 %
Output voltage	24 V_{DC} ± 25 %
Output power	max. 6 W
Setpoint resolution	1 %
Serial interface[1)]	RS-485 for connecting a MOVIMOT® inverter
Enclosure	IP 65
Ambient temperature	-25...60 °C

1) with integrated dynamic terminating resistor

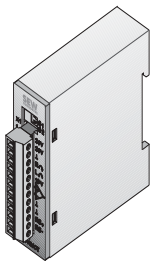
MBG11A



MBG11A option	
Part number	822 547 8
Input voltage	24 V_{DC} ± 25 %
Current consumption	approx. 70 mA
Setpoint resolution	1 %
Serial interface[1)]	RS-485 for connecting max. 31 MOVIMOT® inverters (max. 200 m, 9600 baud)
Enclosure	IP 65
Ambient temperature	-15...60 °C

1) with integrated dynamic terminating resistor

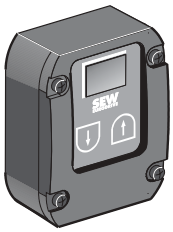
MWA21A



MWA21A option	
Part number	823 006 4
Input voltage	24 V_{DC} ± 25 %
Current consumption	approx. 70 mA
Serial interface[1)]	RS-485 for connecting max. 31 MOVIMOT® inverters (max. 200 m, 9600 baud) Unidirectional communication Cycle time: 100 ms
Analog input	0...10 V / 2...10 V, $R_i \approx 12$ kΩ 0...20 mA / 4...20 mA, $R_i \approx 22$ Ω
Setpoint resolution of the analog input	8 bit (± 1 bit)
Signal level of binary inputs	+13 V ...+30 V = “1” - 3 V ...+5 V = “0”
Enclosure	IP 20
Ambient temperature	-15...60 °C

1) with integrated dynamic terminating resistor

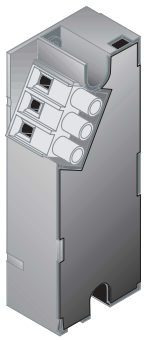
MDG11A



MDG11A option	
Part number	822 941 4
Input voltage	24 V_{DC} ± 25 %
Current consumption	approx. 70 mA
Serial interface	RS-485 for connection of **one** MOVIMOT® inverter with control via terminals
Enclosure	IP 65
Ambient temperature	-15...60 °C

BGM brake rectifier

Important: The brake coil must correspond to the supply voltage



BGM brake rectifier	
Part number	827 602 1
Enclosure	IP20
Rated supply voltage (black connecting leads)	230 V_{AC}...500 V_{AC}, +10% / -15% 50 Hz...60 Hz, ± 5%
Control voltage (red / blue connecting leads)	+13 V...+30 V = '1“ -3 V...+5 V = '0“
Brake current (brake connection 13, 14, 15)	max. 0.8 A_{DC}
Ambient temperature	-25...60 °C

9.4 Integrated RS-485 interface

RS-485 interface	
Standard	RS-485 to EIA standard (with integrated dynamic terminating resistor)
Baud rate	9.6 kbaud 31.25 kbaud (in conjunction with fieldbus interfaces MF..)
Start bits	1 start bit
Stop bits	1 stop bit
Data bits	8 data bits
Parity	1 parity bit, supplementing to even parity
Data direction	Unidirectional
Operating mode	Asynchronous, half-duplex
Timeout interval	1 s
Line length	max. 200 m in RS-485 operation at 9600 baud Max. 30 m with transmission rate: 31,250 baud [1]
Number of stations	• max. 32 stations (1 bus master[2] + 31 MOVIMOT®) broadcast and group addresses possible • 15 MOVIMOT® individually addressable

1) Transmission rate 31,250 baud is detected automatically when operating with fieldbus interface MF...

2) Ext. control or MBG11A, MWA21A or MLG..A option

9.5 Assignment of internal braking resistors

MOVIMOT® type	Braking resistor	Part number
MM03 to MM15	BW1	822 897 3[1]
MM22 to MMM3X	BW2	823 136 2[1]

1) 2 screws M4 x 8, included in delivery

9.6 Assignment of external braking resistors

MOVIMOT® type	Braking resistor	Part number	Protective guard
MM03 to MMM15	BW200-003	826 267 5	813 151 1
	BW200-005	826 270 5	813 151 1
MM22 to MMM3X	BW100-003	826 266 7	813 152 X
	BW100-005	826 269 1	813 152 X

9.7 Resistance and assignment of the brake coil

Motor	Brake	Resistance of the brake coil[1]
DT71	**BMG05**	277 Ω (230 V)
DT80	**BMG1**	248 Ω (230 V)
DT90	**BMG2**	216 Ω (230 V) / 54.2 Ω (110 V)
DV100/DT100	**BMG4**	43.5 Ω (110 V)

1) Rated value measured between the red connection (terminal 13) and the blue connection (terminal 15) at 20 °C, temperature-dependent fluctuations in the range -25 % / +40 % are possible.

Index of Changes

The following amendments and changes have been implementd in this new edition when compared with the preceding edition of the MOVIMOT® operating instructions (publication number: 1050 5806, edition: 10/2000):

- New MOVIMOT® version (old B, new C)
- New representation of the MOVIMOT® type designation, divided up by electronics nameplate, motor nameplate and device identification (section Unit Structure).
- Expanded assembly instructions for the MOVIMOT® options (section Mechanical Installation).
- New information on operation at 1000 m above sea level (section Installation guidelines).
- Description of the MDG11A option (section Installation, Startup and Diagnostics)
- Description of the modified DIP switches (section Startup).
- Description of all special functions that can be selected via DIP switches (section startup).
- Updated startup sequence resulting from the modified DIP switch assignment (section Startup).
- Updated operating and fault states (section Diagnostics).
- Adapted data for MOVIMOT® C (section Technical Data).
- New brake rectifier BGM option (sections Startup and Technical Data).
- New assignment table for external braking resistors (section Technical Data).
- Units with supply voltages of 200...240 V_{AC} are not described in these operating instructions. These units are still covered by the “MOVIMOT® MM03B - MM30B“ operating instructions (publication number: 1050 5806, edition: 10/2000).

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Address List

Germany			
Headquarters **Production** **Sales** **Service**	**Bruchsal**	SEW-EURODRIVE GmbH & Co Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 · D-76642 Bruchsal	Tel. +49 (0) 72 51 / 75-0 Fax +49 (0) 72 51 / 75-19 70 http://www.sew-eurodrive.de sew@sew-eurodrive.de Service Electronics: Tel. +49 (0) 1 71 / 7 21 07 91 Service Gear Units and Motors: Tel. +49 (0) 1 72 / 7 60 13 77
Assembly **Service**	**Garbsen** (near Hannover)	SEW-EURODRIVE GmbH & Co Alte Ricklinger Straße 40-42 D-30823 Garbsen P.O. Box Postfach 110453 · D-30804 Garbsen	Tel. +49 (0) 51 37 / 87 98-30 Fax +49 (0) 51 37 / 87 98-55 scm-garbsen@sew-eurodrive.de
	Kirchheim (near München)	SEW-EURODRIVE GmbH & Co Domagkstraße 5 D-85551 Kirchheim	Tel. +49 (0) 89 / 90 95 52-10 Fax +49 (0) 89 / 90 95 52-50 scm-kirchheim@sew-eurodrive.de
	Langenfeld (near Düsseldorf)	SEW-EURODRIVE GmbH & Co Siemensstraße 1 D-40764 Langenfeld	Tel. +49 (0) 21 73 / 85 07-30 Fax +49 (0) 21 73 / 85 07-55 scm-langenfeld@sew-eurodrive.de
	Meerane (near Zwickau)	SEW-EURODRIVE GmbH & Co Dänkritzer Weg 1 D-08393 Meerane	Tel. +49 (0) 37 64 / 76 06-0 Fax +49 (0) 37 64 / 76 06-30 scm-meerane@sew-eurodrive.de
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France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 185 F-67506 Haguenau Cedex	Tel. +33 (0) 3 88 73 67 00 Fax +33 (0) 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 (0) 5 57 26 39 00 Fax +33 (0) 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 (0) 4 72 15 37 00 Fax + 33 (0) 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 (0) 1 64 42 40 80 Fax +33 (0) 1 64 42 40 88
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Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 (0) 33 27 45 72 84 Fax +54 (0) 33 27 45 72 21 sewar@sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 (0) 3 99 33 10 00 Fax +61 (0) 3 99 33 10 03 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 (0) 2 97 25 99 00 Fax +61 (0) 2 97 25 99 05 enquires@sew-eurodirve.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 (0) 16 17 55 00-0 Fax +43 (0) 16 17 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at



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Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 (0) 10 23 13 11 Fax +32 (0) 10 2313 36 http://www.caron-vector.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos - Cep.: 07251-250	Tel. +55 (0) 11 64 89 90 00 Fax +55 (0) 11 64 89 90 09 http://www.sew.com.br filial.sp@sew.com.br
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Bulgaria			
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Canada			
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	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 (0) 604 9 46-55 35 Fax +1 (0) 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 (0) 514 3 67-11 24 Fax +1 (0) 514 3 67-36 77 a.peluso@sew-eurodrive.ca
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Chile			
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China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 (0) 22 25 32 26 12 Fax +86 (0) 22 25 32 26 11 http://www.sew.com.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 (0) 5715 47 50 50 Fax +57 (0) 5715 47 50 44 sewcol@andinet.com

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 (0) 14 61 31 58 Fax +385 (0) 14 61 31 58 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 (0) 2 20 12 12 34 + 2 20 12 12 36 Fax +420 (0) 2 20 12 12 37 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz



Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 (0) 43 95 8500 Fax +45 (0) 43 95 8509 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
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Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 (0) 3 589 300 Fax +358 (0) 3 780 6211 http://www.sew-eurodrive.fi sew@sew-eurodrive.fi

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Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 (0) 19 24 89 38 55 Fax +44 (0) 19 24 89 37 02 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 (0) 1 04 22 51 34 Fax +30 (0) 1 04 22 51 59 http://www.boznos.gr Boznos@otenet.gr

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Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 (0) 2-7 96 04 77 + 79 60 46 54 Fax +852 (0) 2-7 95-91 29 sew@sewhk.com

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India			
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Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 (0) 18 30 62 77 Fax +353 (0) 18 30 64 58

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 (0) 2 96 98 01 Fax +39 (0) 2 96 79 97 81 sewit@sew-eurodrive.it

Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Toyoda-cho, Iwata gun Shizuoka prefecture, 438-0818	Tel. +81 (0) 53 83 7 3811-13 Fax +81 (0) 53 83 7 3814 sewjapan@lilac.ocn.ne.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 (0) 3 14 92-80 51 Fax +82 (0) 3 14 92-80 56 master@sew-korea.co.kr

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Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +352 (0) 10 23 13 11 Fax +352 (0) 10 2313 36 http://www.caron-vector.be info@caron-vector.be

Macedonia			
Sales	**Skopje**	SGS-Skopje / Macedonia "Teodosij Sinactaski" 66 91000 Skopje / Macedonia	Tel. +389 (0) 9 91 38 43 90 Fax +389 (0) 9 91 38 43 90 sgs@mol.com.mk

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 (0) 73 54 57 07 + 73 54 94 09 Fax +60 (0) 73 5414 04 kchtan@pd.jaring.my

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 (0) 10 44 63 700 Fax +31 (0) 10 41 55 552 http://www.vector-aandrijftechniek.nl info@vector.nu

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Poland			
Sales	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 3/5 PL-92-519 Lodz	Tel. +48 (0) 4 26 77 10 90 Fax +48 (0) 4 26 77 10 99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 (0) 2 31 20 96 70 Fax +351 (0) 2 31 20 36 85 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
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Russia			
Sales	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 263 RUS-195220 St. Petersburg	Tel. +7 (0) 812 5 35 71 42 + 812 5 35 04 30 Fax +7 (0) 812 5 35 22 87 sew@sew-eurodrive.ru

Singapore			
Assembly **Sales** **Service**		SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 (0) 68 62 17 01 ... 17 05 Fax +65 (0) 68 61 28 27 Telex 38 659 sales@sew-eurodrive.com.sg

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO – 3000 Celje	Tel. +386 (0) 3 490 83 20 Fax +386 (0) 3 490 83 21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. + 27 (0) 11 248 70 00 Fax +27 (0) 11 494 23 11 ljansen@sew.co.za
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	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 (0) 31 700 34 51 Fax +27 (0) 31 700 38 47 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 (0) 9 44 31 84 70 Fax +34 (0) 9 44 31 84 71 sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 (0) 36 34 42 00 Fax +46 (0) 36 34 42 80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred lmhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 (0) 6 14 17 17 17 Fax +41 (0) 6 14 17 17 00 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 (0) 38 21 40 22 Fax +66 (0) 38 21 45 31 sewthailand@sew-eurodrive.co.th

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sirketi Bagdat Cad. Koruma Cikmazi No. 3 TR-81540 Maltepe ISTANBUL	Tel. +90 (0) 216 4 41 91 63 + 216 4 41 91 64 + 216 3 83 80 14 Fax +90 (0) 216 3 05 58 67 seweurodrive@superonline.com.tr

USA			
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	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 (0) 9 37 3 35-00 36 Fax +1 (0) 9 37 4 40-37 99 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 (0) 214 3 30-48 24 Fax +1 (0) 214 3 30-47 24 csdallas@seweurodrive.com
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Venezuela			
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