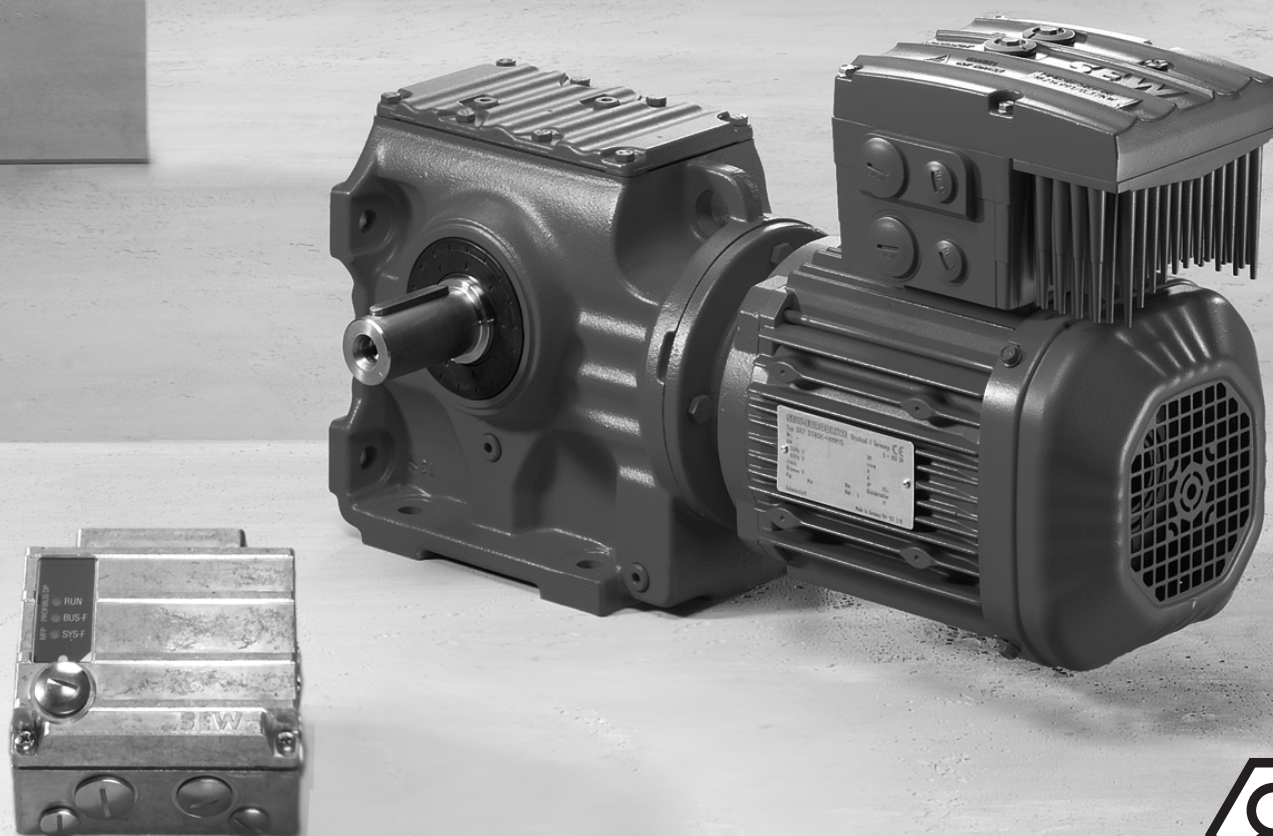




SEW
EURODRIVE

Operating instructions



Decentralized drive systems

Explosion-protected MOVIMOT® MM..D drives

with 3D category EDRN.. AC motors



Table of contents

1	Valid components	6
1.1	1400 min ⁻¹ $\triangleleft$ 3 × 400 – 500 V (400 V)	6
1.2	2900 min ⁻¹ $\triangle$ 3 × 400 – 500 V (400 V)	6
1.3	Setpoint converter MLA12A in category 3D	6
2	General information	7
2.1	Structure of the safety notes	7
2.2	Decimal separator in numerical values	9
2.3	Rights to claim under limited warranty	9
2.4	Recycling, reprocessing, reuse	9
2.5	Product names and trademarks	9
2.6	Copyright notice	9
3	Safety notes	10
3.1	Preliminary information	10
3.2	Duties of the user	10
3.3	Target group	11
3.4	IT security	11
3.5	Designated use	15
3.6	Functional safety technology	15
3.7	Transportation/storage	16
3.8	Installation/assembly	16
3.9	Electrical installation	16
3.10	Protective separation	17
3.11	Startup/operation	18
4	Unit design	19
4.1	MOVIMOT® drive	19
4.2	MOVIMOT® inverter	20
4.3	Type designation MOVIMOT® drive	22
4.4	MOVIMOT® inverter type designation	23
4.5	Identification of explosion-protected drives	25
5	Mechanical installation	29
5.1	Installation notes	29
5.2	Tools required	29
5.3	Installation tolerances	30
5.4	Installation requirements	30
5.5	Installation of MOVIMOT® gearmotor	31
5.6	Setpoint converter MLA12A installation	32
5.7	Tightening torques	33
6	Electrical installation	35
6.1	EMC-compliant installation	35
6.2	Installation notes	38
6.3	Installation instructions	39
6.4	Protection concept	47
6.5	MOVIMOT® connection with binary control	48

6.6	MOVIMOT® connection with RS485 bus operation	49
6.7	MOVIMOT® options connection	50
6.8	Connection of the RS485 bus master	51
6.9	Wiring check	51
7	Startup	52
7.1	Overview	52
7.2	General information concerning startup	53
7.3	Easy startup	54
7.4	"Easy" startup with RS485 interface	69
7.5	"Expert" startup with parameter function	84
8	Operation	85
8.1	Operating notes	85
8.2	Drive ID module	86
8.3	IT security	87
9	Service	88
9.1	Status and error display	88
9.2	Fault description	90
9.3	Repairs	95
9.4	Unit replacement	96
9.5	SEW-EURODRIVE Service	98
9.6	Shutdown	98
9.7	Storage	98
9.8	Extended storage	99
9.9	IT security guidelines for secure disposal	99
9.10	Waste disposal	101
10	Inspection and maintenance	102
10.1	MOVIMOT® inverter	102
10.2	Motor	102
10.3	Gear units (only for MOVIMOT® gearmotors)	102
11	Technical data	103
11.1	Motor with operating point 400 V/50 Hz or 400 V/100 Hz	103
11.2	Electronics data	105
11.3	Ports and services	106
11.4	Integrated RS485 interface	107
11.5	Diagnostic interface	107
11.6	Technical data of option MLA12A 3D	108
11.7	Assignment of the drive ID module	108
11.8	Permitted operating modes	109
11.9	Overhung and axial loads for motor shaft ends	111
11.10	Permitted rolling bearing types	116
11.11	Lubricant tables	117
11.12	Order information for lubricants, anti-corrosion agents, and sealants	117
11.13	Operating characteristics	118
11.14	Braking torque assignment	119

11.15	Assignment of internal braking resistors	119
11.16	Braking work, working air gap, and brake lining carrier thickness	119
11.17	Resistance and assignment of the brake coil	120
12	Contacting SEW-EURODRIVE.....	121

1 Valid components

INFORMATION



These operating instructions apply to the following MOVIMOT® drives:

1.1 1400 min⁻¹ 3 × 400 – 500 V (400 V)

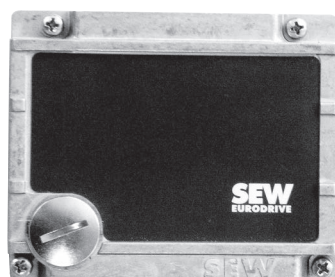
Type	P _N kW	M _N Nm	M _A /M _N Nm	n _N min ⁻¹	I _{line} A	cos φ	Brake	M _B Nm
EDRN71MS4../MM03/3D	0.25	1.7	1.8	1400	1.0	0.99	BE05	3.5
EDRN71M4../MM05/3D	0.37	2.5	1.8	1400	1.3	0.99	BE1	5
EDRN80MK4../MM07/3D	0.55	3.75	1.8	1400	1.6	0.99	BE1	7
EDRN80M4../MM11/3D	0.75	5.1	1.8	1400	1.9	0.99	BE2	10
EDRN90S4../MM15/3D	1.1	7.5	1.8	1400	2.4	0.99	BE2	14
EDRN90L4../MM22/3D	1.5	10.2	1.8	1400	3.5	0.99	BE2	14
EDRN100LS4../MM30/3D	2.2	15	1.8	1400	5.0	0.99	BE5	28
EDRN100L4../MM40/3D	3.0	20.5	1.8	1400	6.7	0.99	BE5	28

1.2 2900 min⁻¹ 3 × 400 – 500 V (400 V)

Type	P _N kW	M _N Nm	M _A /M _N Nm	n _N min ⁻¹	I _{line} A	cos φ	Brake	M _B Nm
EDRN71MS4../MM05/3D	0.37	1.2	1.8	2900	1.3	0.99	BE05	3.5
EDRN71M4../MM07/3D	0.55	1.8	1.8	2900	1.6	0.99	BE1	5
EDRN80MK4../MM11/3D	0.75	2.5	1.8	2900	1.9	0.99	BE1	7
EDRN80M4../MM15/3D	1.1	3.6	1.8	2900	2.4	0.99	BE2	10
EDRN90S4../MM22/3D	1.5	4.9	1.8	2900	3.5	0.99	BE2	14
EDRN90L4../MM30/3D	2.2	7.2	1.8	2900	5.0	0.99	BE2	14
EDRN100LS4../MM40/3D	3.0	9.9	1.8	2900	6.7	0.99	BE5	28

1.3 Setpoint converter MLA12A in category 3D

The following figure shows the MLA12A setpoint converter in category 3D:



Setpoint converter	MLA12A
Part number	08232342

The MLA12A setpoint converter in category 3D is only available mounted on the MOVIMOT® connection box.

2 General information

2.1 Structure of the safety notes

2.1.1 Meaning of signal words

The following table shows the graduation and meaning of the signal words in the safety notes.

Signal word	Meaning	Consequences if not observed
⚠ DANGER	Imminent danger	Death or severe injuries
⚠ WARNING	Possibly dangerous situation	Death or severe injuries
⚠ CAUTION	Possibly dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the product or its environment
INFORMATION ON EXPLOSION PROTECTION	Important information regarding explosion protection	
INFORMATION	Useful information or tip: Simplifies handling of the product.	

2.1.2 Structure of section-related safety notes

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

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



SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

2.1.3 Meaning of the hazard symbols

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

Hazard symbol	Meaning
	General hazard
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Information on explosion protection
	Warning of automatic startup

2.1.4 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

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

2.2 Decimal separator in numerical values

In this document, a period is used to indicate the decimal separator.

Example: 30.5 kg

2.3 Rights to claim under limited warranty

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

2.4 Recycling, reprocessing, reuse

When manufacturing products, SEW-EURODRIVE makes sure to keep the use of new natural resources to a minimum in the interests of the circular economy. Key aspects here are the recycling of materials as well as the inspection and/or processing of returned components and their reuse in new products. These processes are only used at SEW-EURODRIVE if the resulting materials and components correspond to the quality of new products.

2.5 Product names and trademarks

The product names mentioned in this documentation are trademarks or registered trademarks of the respective titleholders.

2.6 Copyright notice

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3 Safety notes

3.1 Preliminary information

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

3.2 Duties of the user

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

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

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

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

- The national and regional regulations governing safety and the prevention of accidents
- Product safety label on the product
- All other associated project planning documents, installation and startup instructions, as well as connection and wiring diagrams
- Do not assemble, install, or operate damaged products
- All system-specific specifications and regulations

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

3.3 Target group

Specialist for mechanical work	All mechanical work must only be carried out by qualified specialists with appropriate training. Specialists in the context of this documentation are persons who are familiar with the design, mechanical installation, troubleshooting, and maintenance of the product, and who possess the following qualifications: • Qualifications in the field of mechanics in accordance with the national regulations • Familiarity with this documentation
Specialist for electrical work	All electrical work must only be carried out by electrically skilled persons with appropriate training. Electrically skilled persons in the context of this documentation are persons who are familiar with electrical installation, startup, troubleshooting, and maintenance of the product, and who possess the following qualifications: • Qualifications in the field of electrical engineering in accordance with the national regulations • Familiarity with this documentation
Additional qualifications	In addition to that, these persons must be familiar with the valid safety regulations and laws, as well as with the requirements of the standards, directives, and laws specified in this documentation. The persons must have the express authorization of the company to operate, program, parameterize, label, and ground devices, systems, and circuits in accordance with the standards of safety technology.
Instructed persons	All work in the areas of transport, storage, installation, operation and waste disposal must only be carried out by persons who are trained and instructed appropriately. These instructions must enable the persons to carry out the required activities and work steps safely and in accordance with regulations.

3.4 IT security

3.4.1 Contact



SEW-EURODRIVE offers the following communication channels for IT security:

- Report incidents regarding cybersecurity by e-mail to cert@sew-eurodrive.com or via the contact form on the Product Security Management website (<http://go.sew/psm>).
- Security advisories can be found in the SEW-EURODRIVE Online Support.
 - For automatic updates on new and changed security advisories, subscribe to the newsletter on the Product Security Management page (<http://go.sew/psm>).
- If you need support with the configuration, contact SEW-EURODRIVE Service.

3.4.2 IT security of the product



The IT security of the product is only guaranteed when used in an environment secured by defense-in-depth strategies.

Further information, e.g. regarding additional organizational measures to meet regulatory requirements, refer to "IT security in the context of regulatory requirements" (→ 13).

Possible hazards

Access points for manipulations

The device has interfaces that allow remote access to non-safety functions. In this context, "remote access" means that access is made available directly or indirectly via the local communication interfaces of the device with a software function beyond the physical limits of machine, inverter, and brake. These interfaces allow all parameters to be changed without a safety protocol.

Potential hazards

Potential hazards posed by unauthorized individuals with remote access to the software functions include:

- Manipulation of the speed, resulting in accelerations and decelerations.
- Unintended actuation of the power section, resulting in hazardous movement at the motor shaft.
- Unintended actuation of the brake (brake release), resulting in hazardous movement at the motor shaft.
- Excessive heating of the device and motor, resulting in thermal destruction.

Technically excluded hazards

The following hazards due to remote access by an unauthorized person are technically excluded:

- Danger due to electric shock due to corruption of general electrical safety, e.g. the separation between high and extra-low voltage.

3.4.3 IT security of the environment



For drive and control components that are integrated in a network (e.g. fieldbus, Wi-Fi, or Ethernet network), settings can even be made from more remote locations. This entails the danger of a parameter change that is not visible externally resulting in unexpected, but not uncontrolled system behavior, which in turn may impact negatively on operational safety and reliability, system availability, or data security.

Observe the following:

- The IT security of the product is only guaranteed when used in an environment secured by defense-in-depth strategies.
- Particularly in networked systems based on Wi-Fi or Ethernet and at engineering interfaces, ensure that unauthorized access is prevented. Using IT-specific security standards, such as network segmentation, adds to the security of the ports.
 - For information on the communication interfaces of the device, refer to this documentation.
 - In particular, refer to chapter "Ports and services" (→ 106) regarding the provided services of the communication interfaces.
- Ensure that clear responsibility for security is guaranteed during operation. SEW-EURODRIVE recommends an IT security management system in accordance with ISO/IEC 27001 and ISO/IEC 62443-2-4.

3.4.4 IT security in the context of regulatory requirements



Below you will find information on adhering to cybersecurity requirements with regard to various regulations.

EU Machinery Regulation

The EU Machinery Regulation (Regulation 2023/1230, "MR") sets special requirements on safety components and machines to protect them from corruption.

The described device integrates safety components that can be used to reduce hazards in machines. The safety subfunctions are implemented only electronically, without the use of software. The functionality of the safety-related components cannot therefore be corrupted via software.

Observe the following:

- Perform a risk assessment and risk minimization of the machine according to ISO 12100.
- Implement suitable technical and organizational measures to prevent unauthorized access to safety-relevant and non-safety-relevant functions, if their manipulation can lead to a hazard according to the risk assessment (see "Possible hazards" (→ 12)).

Strictly observe the following documentation:

- "Cybersecurity for generation B inverters" manual

Protection of the STO control

The safety subfunction STO is implemented only electronically, without the use of software. The software functions of the device have no effect on the STO safety subfunction. A potential attacker has no means of compromising the safety subfunctions by manipulating software or data that is transmitted to the device.

Observe the following:

- Secure the machine and its components that control the STO safety subfunction against possible compromise.

EU Data Act

The product offers "Access by Design" for all data generated by the product and thus meets the requirements of the EU Data Act (Regulation 2023/2851):

Storing data	• Data in the product is stored until it is actively deleted or overwritten. • Log and scope data is automatically overwritten in the designated ring buffers as soon as they are full. • Scope data is only stored in the device-internal RAM and is deleted after the device is restarted.
Accessing data	• All data can be read from the product using freely available engineering software from SEW-EURODRIVE or via local interfaces or network connections. Corresponding HMI systems and external controllers can also access the data of the product.
Deleting data	• For information on deleting data, refer to "IT security guidelines for secure disposal" (→ 99).
Data transmission	• The product does not automatically transfer data to devices in its environment.
Quality of service	• The device has different qualities of service for data communication: – Cyclic communication to control the device. A few bytes are transferred real-time capably and cyclically. – Acyclic access to all idle data stored on the device. • The response time depends on the communication interface used. • The cycle time is determined by the controlling or requesting device, and is usually between 1 ms and 100 ms.

For information regarding the data generated by the product, stored internally and transferred to other devices in the environment, as well as regarding deletion of data, refer to "IT security guidelines for secure disposal" (→ 99).

For more information on the EU Data Act, refer to the following documentation:

- "Cybersecurity for generation B inverters" manual

3.5 Designated use

The product is intended for use in industrial and commercial systems.

In the case of installation in electrical systems or machines, it is prohibited to start the proper operation of the product until it is determined that the machine meets the requirements stipulated in the local laws and directives.

The standards given in the declaration of conformity apply to the product.

The motor must only be operated on an inverter if the requirements of the type examination certificate, this documentation, and the information on the nameplate of the motor are fulfilled.

Operation of the motor in areas or applications where electrostatically charged processes can occur on the motor housing is not permitted.

3.5.1 Restrictions under the European WEEE Directive 2012/19/EU

Options and accessories from SEW-EURODRIVE must only be used in combination with products from SEW-EURODRIVE.

3.5.2 Lifting applications

The product must not be used for lifting applications or inclined paths.

3.5.3 Restrictions of use

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

- Use in areas exposed to harmful oils, acids, gases, vapors, dust, and radiation
- Use in applications with impermissibly high mechanical vibration and shock loads
- Operation in areas or applications where hybrid mixtures (mixtures of air and combustible substances in different physical states) are present

3.6 Functional safety technology

The product optionally includes the STO safety subfunction.

The product is not permitted to perform any safety function without higher-level safety systems.

Observe the product manual of the product for use of the STO safety subfunction or other safety subfunctions.

3.7 Transportation/storage

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately about any damage. If the product or the packaging is damaged, do not assemble, install, connect, or start up the product. If the packaging is damaged, the product itself may also be damaged.

The lifting eyebolts are designed to carry only the weight of the motor without gear unit. Tighten installed lifting eyebolts. Mounted gear units have separate suspension attachments, which must be used according to the gear unit operating instructions when lifting the gearmotor. Do not mount any additional loads.

The installed lifting eyebolts are in accordance with DIN 580. Observe the loads and regulations specified there. The tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

If necessary, use suitable, sufficiently dimensioned handling equipment.

Observe the following notes when transporting the device:

- Always use all attachment points if available. The attachment points are designed to carry only the mass of the product. Do not apply any additional loads.
- Ensure that the product is not subject to mechanical impact.

If the product is not immediately installed, it must be stored in a dry and dust-free location. The product can be stored for up to 9 months without requiring any special measures before startup. Do not store the product outdoors.

Do not transport or store the product on the fan guard.

3.8 Installation/assembly

Note the following points during installation:

- Make sure that the supports are even, the foot and flange mounting is correct and if there is direct coupling, align with precision.
- Avoid resonance between the rotational frequency and the double supply system frequency.
- Release the brake (for motors with mounted brake).
- Turn the rotor by hand and listen for unusual grinding noise.
- Check the direction of rotation in decoupled state.
- Only install or remove belt pulleys and couplings using suitable devices (heat up). Cover the belt pulleys and couplings with a touch guard. Avoid unacceptable belt tension.
- Establish any necessary pipe connections.
- Mounting positions with the shaft end pointing upward must be equipped with a cover to prevent foreign objects from falling into the fan. Ensure that ventilation openings are not obstructed and that used air cannot be drawn in again straight away. The same applies to air from adjacent units.

See also the information in chapter "Mechanical installation".

3.9 Electrical installation

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

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

3.9.1 Required protective measure

Make sure that the product is correctly attached to the ground connection.

3.10 Protective separation

The product meets all requirements for protective separation of power and electronics connections in accordance with IEC 61800-5-1. The connected signal circuits must meet requirements according to SELV (**S**afety **E**xtra **L**ow **V**oltage) or PELV (**P**rotective **E**xtra **L**ow **V**oltage) to ensure protective separation. The installation must meet the requirements for protective separation.

In order to avoid exceeding the permitted contact voltages in SELV or PELV power circuits in the event of an error, continuous equipotential bonding is required in the vicinity of these power circuits. If this is not possible, other protective measures must be taken. These protective measures are described in IEC 61800-5-1.

3.11 Startup/operation

Observe the safety notes in chapters "Startup" and "Operation" (→ 85) in this documentation.

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

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

When the system is switched on, dangerous voltages are present on all voltage-controlled product parts as well as any cables and terminals that are connected. This also applies even when the product is inhibited and the motor is in an idle state. Do not touch the components during operation.

Do not separate the connection to the product during operation. This may result in dangerous electric arcs damaging the product.

If you disconnect the product from the voltage supply, do not touch any live components or power connections because capacitors might still be charged. Observe the following minimum switch-off time:

1 minute.

Observe the corresponding information signs on the product.

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

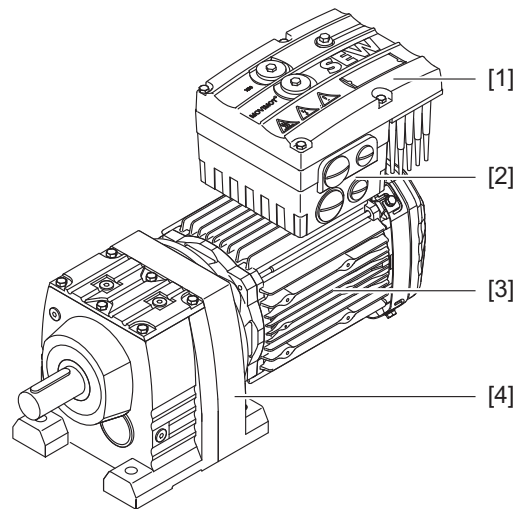
Mechanical blocking or internal protective functions of the product can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive restarting automatically. If, for safety reasons, this is not permitted for the drive-controlled machine, first disconnect the product from the supply system and then start troubleshooting.

Risk of burns: The surface temperature of the product can exceed 60 °C during operation. Do not touch the product during operation. Let the product cool down before touching it.

4 Unit design

4.1 MOVIMOT® drive

The following figure shows an example of a MOVIMOT® drive with helical gear unit:



9007203246818443

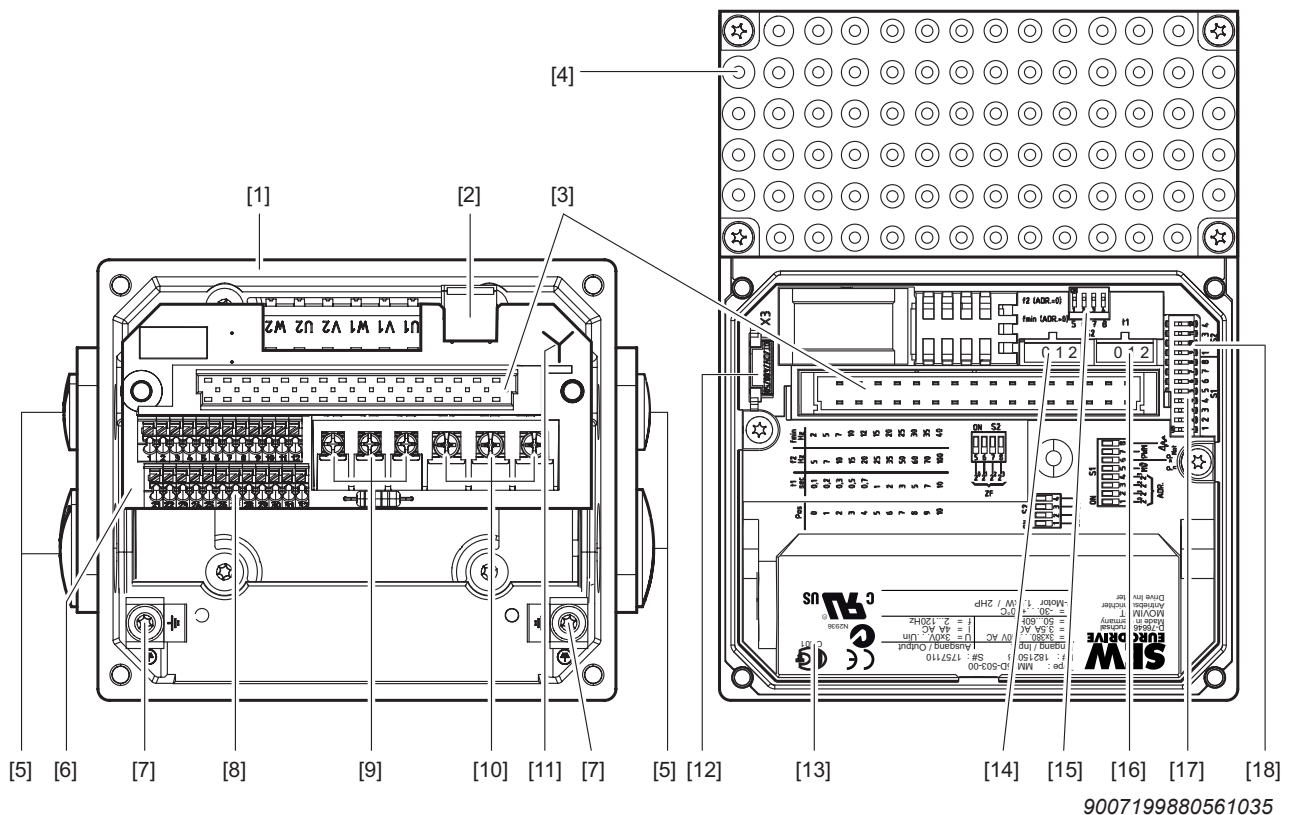
- [1] MOVIMOT® inverter
- [2] Connection box
- [3] Motor
- [4] Helical gear unit

A MOVIMOT® drive is a combination of:

- MOVIMOT® inverter
- Motor
- Gear unit (optional, see gear unit operating instructions)

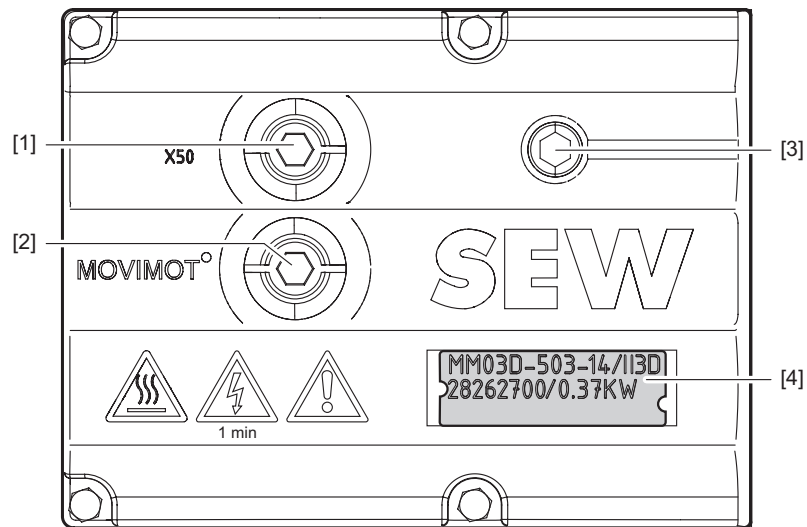
4.2 MOVIMOT® inverter

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



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

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



28722977291

- [1] X50: Diagnostic interface with screw plug
- [2] Setpoint potentiometer f1 with screw plug
- [3] Status LED
- [4] Identification tag

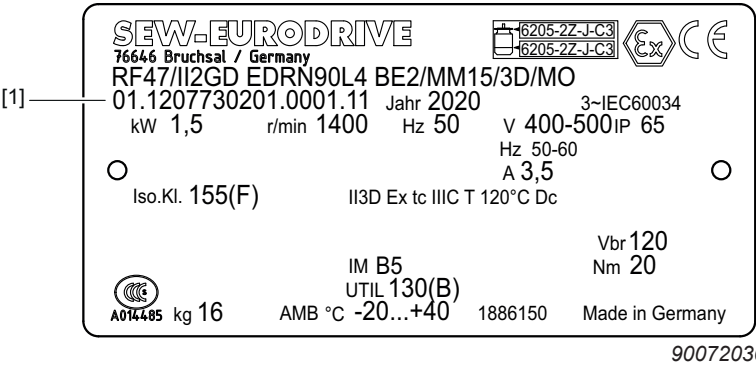
4.2.1 MOVIMOT® features

- Frequency inverter with vector-oriented control mode
- Power range: 0.25 – 3.0 kW
- Voltage range: 3 × 400 – 500 V
- Application-specific parameterization possible
- Pluggable parameter memory for data backup (drive ID module)
- Comprehensive protection and monitoring functions
- Low-noise due to PWM clock frequency of 16 kHz
- Status LED for fast diagnostics
- Diagnostic interface with connector as a standard feature
- Diagnostics and manual operation using MOVITOOLS® MotionStudio
- 4-quadrant operation as a standard feature
- Integrated brake management:
 - For motors with a mechanical brake, the brake coil is used as the braking resistor.
 - For motors without brake, MOVIMOT® is supplied with internal braking resistor as standard.
- Control is either realized via binary signals or via the RS485 serial interface.

4.3 Type designation MOVIMOT® drive

4.3.1 Nameplate

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



9007203056235915

[1] Serial number

4.3.2 Type designation

The following table shows an example of the type designation of the MOVIMOT® drive RF47/II2GD EDRN90L4 BE2/MM15/3D/MO:

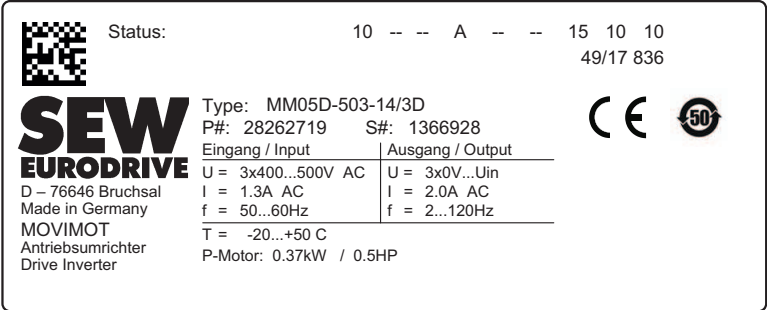
RF	Gear unit series
47	Gear unit size
II2GD	Ex design gear unit according to Directive 94/9/EC
E	Code letter for explosion protection of the motor
DRN	Motor series
90L4	Size, number of poles of motor
BE2	Additional feature motor (brake)
/	
MM15	MOVIMOT® inverter
/	
3D	Category 3D (explosion protection)
/	
MO	Additional feature: inverter ¹⁾

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

4.4 MOVIMOT® inverter type designation

4.4.1 Nameplate

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



9007203169833227

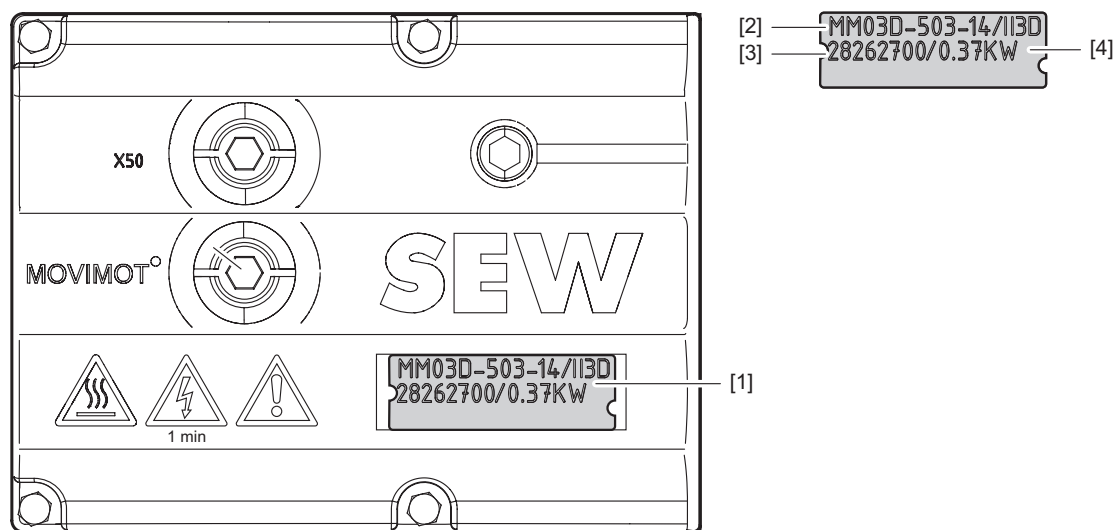
4.4.2 Type designation

The following table shows an example of the type designation of the MOVIMOT® inverter **MM05D-503-14/3D**:

MM	Series: MM = MOVIMOT®
05	Inverter size: 05 = 0.55 kW
D	Version D
–	
50	Connection voltage: 50 = AC 380 – 500 V
3	Connection type 3 = 3-phase
–	
14	Design 14 = Special design 14
/	
3D	Category 3D (explosion protection)

4.4.3 Identification tag

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



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4.5 Identification of explosion-protected drives

4.5.1 Identification according to EU directive

At least the following information must be attached visibly and permanently to each unit and protection system:

- Name, registered trade name, or registered trade brand, and manufacturer's address
- CE marking (see annex II to regulation (EC) no. 765/2008)
- Designation of the series and type
- If applicable, batch number or serial number
 - Year of manufacture, special hexagonal explosion protection mark, and the mark for equipment group and equipment category.
 - For equipment group II, the letter G (for areas with potentially explosive gas, vapor, or mist/air mixtures).
 - The letter D (for areas in which dust could produce potentially explosive atmospheres).

In addition, all safety-relevant information must be attached to the equipment before operation.

4.5.2 Identification in accordance with directives and standards

According to EU Directive 2014/34/EU, the protection types are linked to the equipment groups, categories, potentially explosive atmospheres, minimum protection types, and temperature classes, and are specified on the nameplate.

The identification according to the standard includes the following symbols:

- The Ex symbol, which indicates that the electrical equipment meets the requirements of one or more protection types
- The symbol for the relevant protection type
- The symbol for the group plus information on gas or dust

The IECEx identification consists of the normative part.



Example of explosion-protected motors

Example 1: Operating resources in protection type "e" for increased safety:
II 2G Ex eb IIC T3 Gb

Example 2: Operating resources in protection type "t" for dust explosion protection
provided by the housing: II 3D Ex tc IIIC T120 °C Dc

Example 1	Example 2	Meaning
Marking according to EU directive		
		CE marking
0102		Identification number of the notified body (here: Physikalisch-Technische Bundesanstalt in Braunschweig [German Federal Institute of Metrology in Braunschweig] – PTB) according to EU register, applicable for equipment category 2
		Explosion protection mark
II		Equipment group
2	3	Equipment category
G	D	- G for areas containing potentially explosive mixtures of gas, steam, fog, and air. - D for areas where dust may create potentially explosive atmospheres.
Marking according to standard		
Ex		Symbol indicating that the device and/or the drive complies with one or more protection types.
eb	tc	Specification of the protection type/protection level - eb: Increased safety - tc: Protection by housing
IIC	IIIC	Specification of the group: - Group IIC - Group IIIC
T3	T120 °C	T3: Temperature class T120 °C: Maximum surface temperature in degrees Celsius
Gb	Dc	Equipment protection level (EPL)

Example of explosion-protected gear units

Example 1	Example 2		Meaning
		Designation according to EU directive	CE marking
			Explosion protection mark
II			Equipment group
2			Equipment category
G	D	Designation according to standard	- G for areas containing potentially explosive mixtures of gas, steam, fog, and air. - D for areas where dust may create potentially explosive atmospheres.
Ex			Symbol indicating that the equipment complies with one or more protection types.
h			Non-electrical equipment for use in potentially explosive atmospheres
IIC	IIIC		Following information: - IIC: Gas group - IIIC: Dust group
T4	T120 °C		T4: Temperature class T120 °C: Maximum surface temperature in degrees Celsius
Gb	Db		Equipment protection level (EPL)

4.5.3 Identification for potentially explosive dust atmospheres

Example:

Ex tc	Symbol for explosion protection with protection type/protection level
IIIC	Classification of the dust group
T120 °C	Maximum surface temperature in °C
Dc	Equipment protection level

Classification of the dust group

Equipment group III is additionally divided into subgroups A, B, or C, depending on the type of dust. This also includes a minimum requirement on the degree of protection according to IEC/EN 60529:

Equipment group	Suitable for atmospheres with	Minimum degree of protection IP
IIIA	Flammable lint	5x ¹⁾
IIIB	Non-conductive dust	5x ¹⁾
IIIC	Conductive dust	6x ¹⁾

1) x is a placeholder.

4.5.4 Explosion-protected MOVIMOT® MM..D drives in category 3D

The explosion-protected MOVIMOT® MM..D drives in category 3D comply with the following regulations and directives:

Marks	Definition
	The UKCA mark indicates compliance with the following British directives¹⁾: • Electrical Equipment (Safety) Regulations 2016 S.I. 2016 No. 1101 • Electromagnetic Compatibility Regulations 2016 S.I. 2016 No. 1091 • Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016 S.I. 2016 No. 1101 • Supply of Machinery (Safety) Regulations 2008 S.I. 2008 No. 1597 • The Ecodesign for Energy-Related Products Regulations 2021 S.I. 2021 No. 745 • The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 S.I. 2012 No. 3032

1) The selectable approvals UKCA (Great Britain) and NM (Morocco) are mutually exclusive.

5 Mechanical installation

5.1 Installation notes

INFORMATION



You must observe the general safety notes.



⚠ WARNING

Improper assembly/disassembly of MOVIMOT® drives and add-on parts.

Risk of injury.

- You must observe the information regarding installation and disassembly.
- Before releasing any shaft connections, make sure there is no active torque on the shaft (tension within the system).



⚠ WARNING

Risk of injury due to unintentional start-up of the drive and danger due to electrical voltage.

Dangerous voltages may still be present for up to 1 minute after disconnection from the supply system.

- Disconnect the MOVIMOT® drive from the power supply before you start working on the unit and secure it against unintentional reconnection to the voltage supply.
- Secure the output shaft against rotation.
- Wait for at least 1 minute before removing the MOVIMOT® inverter.
- Comply with all instructions referring to the technical data and the permissible conditions where the unit is operated.
- Only use the provided attachment options when mounting the MOVIMOT® drive.
- Use only the mounting and locking elements that fit into the existing bores, threads, and countersinks.

5.2 Tools required

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

5.3 Installation tolerances

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

Shaft end	Flange
Diameter tolerance according to EN 50347 • ISO j6 at $\varnothing \leq 26$ mm • ISO k6 with $\varnothing \geq 38$ mm up to ≤ 48 mm • ISO m6 at $\varnothing > 55$ mm • Centering bore according to DIN 332, shape DR..	Centering shoulder tolerance according to EN 50347 • ISO j6 at $\varnothing \leq 250$ mm • ISO h6 at $\varnothing > 300$ mm

5.4 Installation requirements

Make sure that the following requirements are met before installation:

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

5.5 Installation of MOVIMOT® gearmotor

5.5.1 Setting up MOVIMOT®

NOTICE

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

Damage to the MOVIMOT® inverter.

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

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

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

Open condensation drain holes are not permitted. Higher degrees of protection are no longer valid for open condensation drain holes.

5.5.2 Installation in damp areas or outdoors

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

- Use suitable cable glands for the supply cable. If necessary, use reducers.
- Coat the thread of cable glands and screw plugs with sealing compound and tighten them well. Then coat the cable glands again.
- Seal the cable entries properly.
- Thoroughly clean the sealing surfaces of the MOVIMOT® inverter before reassembly.
- If the corrosion protection coating is damaged, restore the coating.
- Check whether the degree of protection specified on the nameplate is permitted in the ambient conditions on site.

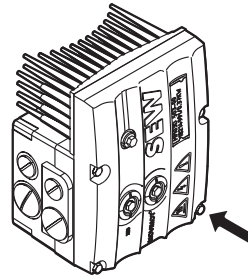
5.6 Setpoint converter MLA12A installation**INFORMATION**

- The MLA12A setpoint converter in category 3D is only available in combination with a MOVIMOT® drive.
 - Installation and assembly on the MOVIMOT® connection box must only be carried out by SEW-EURODRIVE personnel
-

5.7 Tightening torques

5.7.1 MOVIMOT® inverter

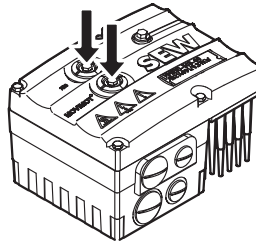
Tighten the retaining screws of the MOVIMOT® inverter to 3.0 Nm in diametrically opposite sequence.



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5.7.2 Screw plugs

Tighten the screw plugs of potentiometer f1 and connection X50 with 2.5 Nm.

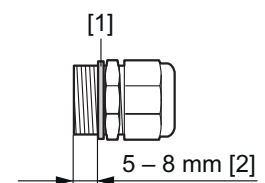


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5.7.3 Cable glands

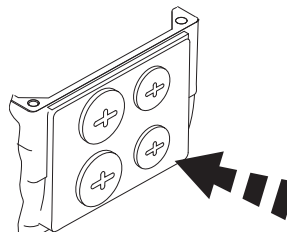
Observe the manufacturer's specifications and the following information for cable glands:

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



5.7.4 Screw plugs for cable entries

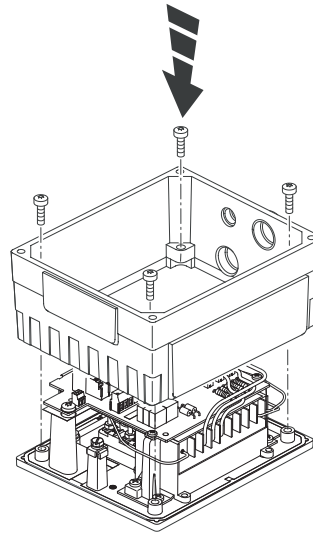
Tighten screw plugs with 2.5 Nm.



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5.7.5 Modular connection box

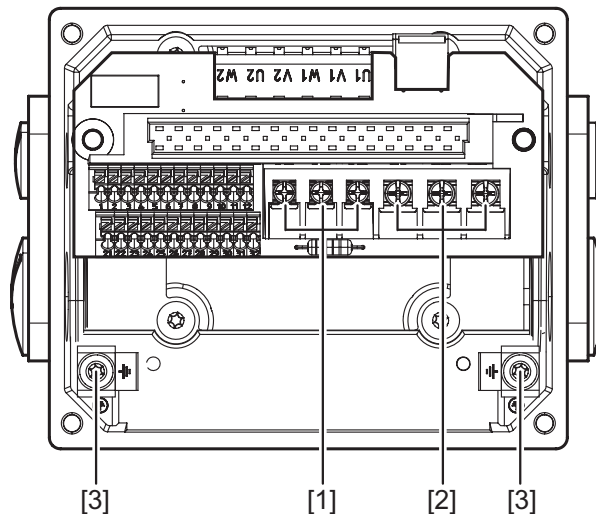
Tighten the retaining screws of the connection box on the mounting plate to 3.3 Nm.



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5.7.6 Tightening torques for terminals

Observe the following tightening torques for terminals during installation work:



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- [1] 0.8 – 1.5 Nm
- [2] 1.2 – 1.6 Nm
- [3] 2.0 – 2.4 Nm

6 Electrical installation

6.1 EMC-compliant installation

INFORMATION



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

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

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

6.1.1 Equipotential bonding

In accordance with EN 60079-14, the unit must be connected to an equipotential bonding system. For this connection, there is a 2nd connection option on the stator housing. Observe chapter "Improvement of grounding (EMC), HF grounding" (→ 35).

6.1.2 Improving the grounding (EMC), HF grounding

For improved, low-impedance grounding at high frequencies, we recommend using the following connections with corrosion protected connection elements.

HF grounding is not installed as standard.

The HF grounding option can be combined with LF grounding at the terminal box.

If you require LF grounding in addition to HF grounding, you can connect the conductor to the same point.

The HF grounding option can be ordered as follows:

- Completely preassembled at the factory
- As "grounding terminal" kit for customer installation; part numbers listed in the following table.

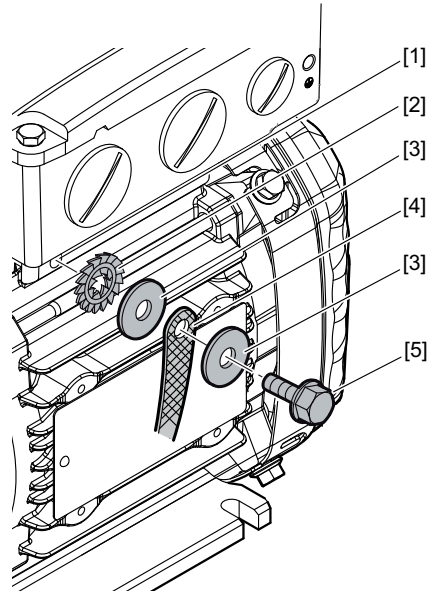
Motors	Part number of the "Grounding terminal" kit
EDRS71, EDRN71 EDRE80, EDRN80	21015988
EDRE90, EDRN90	
EDRE100M, EDRN100LS	
EDRE100L – 132, EDRN100L – 132S	13633945

INFORMATION



If 2 or more ground straps are used, you have to attach them with a longer screw. The specified tightening torques refer to a strap thickness $t \leq 3$ mm.

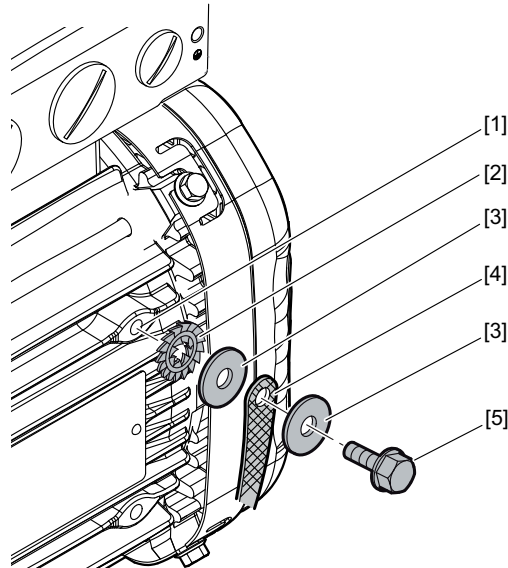
EDRN71 – 80 motors with HF (+LF) grounding



18014406536249995

- | | |
|--|--|
| [1] Use of the pre-cast bore on the stator housing | [4] Ground strap (not included in the scope of delivery) |
| [2] Serrated lock washer | [5] Self-tapping screw M6 × 16, tightening torque 10 Nm |
| [3] Washer ISO 7093 | |

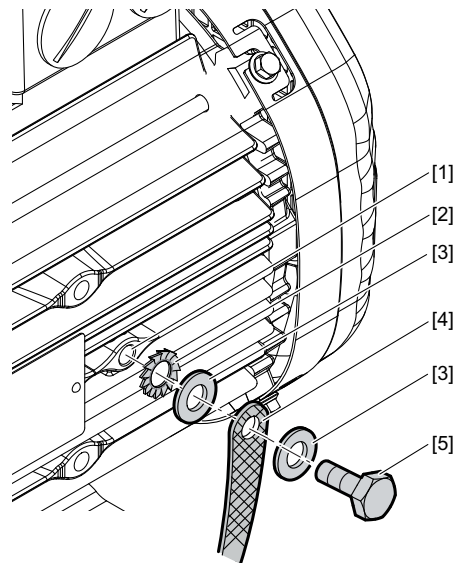
EDRN90 motors with HF (+LF) grounding



18014406536255115

- | | |
|--|--|
| [1] Use of the pre-cast bore on the stator housing | [4] Ground strap (not included in the scope of delivery) |
| [2] Serrated lock washer | [5] Self-tapping screw M6 × 16, tightening torque 10 Nm |
| [3] Washer ISO 7093 | |

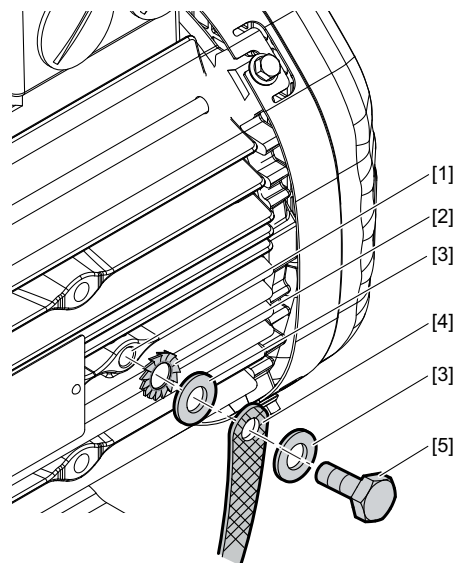
EDRN100LS motors with HF (+LF) grounding



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- | | |
|--|--|
| [1] Use of the pre-cast bore on the stator housing | [4] Ground strap (not included in the scope of delivery) |
| [2] Serrated lock washer | [5] Self-tapping screw M6 × 16, tightening torque 10 Nm |
| [3] Washer ISO 7093 | |

EDRN100L – 132S motors with HF (+LF) grounding



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- | | |
|---|--|
| [1] Use of tapped hole for lifting eyes | [4] Ground strap (not included in the scope of delivery) |
| [2] Serrated lock washer DIN 6798 | [5] Hex head screw ISO 4017 M8 × 18, tightening torque 10 Nm |
| [3] Washer ISO 7089/ISO 7090 | |

6.1.3 Installation planning of MOVIMOT® with fieldbus interface under EMC aspects

Arrangement of installation components

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

Always adhere to the **relevant standards**. Observe the following notes:

- **Equipotential bonding**

Low-impedance, HF-capable equipotential bonding must be provided independent of the functional ground (PE terminal) (see also VDE 0113 or VDE 0100 part 540) using, for example

- flat contact surface connection of metal components
- flat grounding strips (HF litz wire)

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

- **Data lines and 24 V supply**

Route data lines and 24 V supply separately from cables that emit interference (such as control cables of solenoid valves, motor cables).

- **Cable glands**

Select a cable gland with a shield connected over a large area.

- **Cable shield**

- The cable shield must have good EMC characteristics (high shield attenuation).
- It must protect the cable mechanically and serve as a shield.
- It must be connected to a wide area of the unit's metal housing at the cable ends (via EMC metal cable glands).

INFORMATION



Additional information is available in the SEW publication "Drive Engineering – Practical Implementation, EMC in Drive Engineering."

6.2 Installation notes

Observe the following information on electrical installation:

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

6.3 Installation instructions

6.3.1 Cable glands



INFORMATION

The terminal boxes have metric threaded holes according to EN 60079-0 and EN 60079-31 or NPT threaded holes according to ANSI B1.20.1-1983. All bores are equipped with explosion-protected screw plugs upon delivery.

- In order to provide for a correct cable entry, you have to replace the screw plugs by cable glands with strain relief, that are certified for use in the respective explosion-protected zone.
- Select the cable glands according to the diameter of the respective cable. For further information, refer to the documentation from the cable gland manufacturer.
- The cable glands must comply with the requirements according to EN 60079-0 and EN 60079-31. The degree of protection must be ensured in accordance with the data on the nameplate.
- For ambient temperatures > 40 °C, use cable glands and cables that are suited for a temperature > 90 °C.
- Close all unused cable entries with suitable closing plugs.

6.3.2 Connecting power supply cables

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

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

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

Dimension the fuses according to the cable cross section.

- Observe the information in chapter "Technical data" when selecting the fuse.
- SEW-EURODRIVE recommends using insulation monitors with pulse-code measurement in voltage supply systems with a non-grounded star point (IT systems). Using such devices prevents false tripping of the insulation monitor due to the earth capacitance of the inverter.
- Size the cable cross section according to the input current I_{grid} for rated power (see operating instructions, "Technical data" chapter).
- For ensuring the isolation and the effectiveness of preventive measures, you have to perform the checks of the valid and applicable standards (e.g. EN 60204-1 or EN 61800-5) after any wiring work for installation, conversion, repair, etc.
- When using a regenerative power supply in the system, SEW-EURODRIVE recommends a line choke in the supply line of the MOVIMOT® drive unit.

6.3.3 Overview of cable entries and line entries at EDR. and EDRN motors

	EDRS EDRE	–	71	80	90	100	112/132
	EDRN	63	71	80	90	100	112/132S
Thread size/through hole and tolerance specification	Ø16 +0.5/-0	x	–	–	–	–	–
	Ø20 +0.5/-0	x	–	–	–	–	–
	M12x1.5 6H	–	x	x	x	x	x
	M16x1.5 6H	–	x	x	x	x	x
	M20x1.5 6H	–	x	x	x	x	x
	M25x1.5 6H	–	x	x	x	x	x
	M32x1.5 6H	–	x	x	x	x	x
	M50x1.5 6H	–	x	x	x	x	x
	NPT 1/2"	–	x	x	x	x	x
	NPT 3/4"	–	x	x	x	x	x
Housing material	GD-AL	x	x	x	x	x	x
Gasket	–	O-ring/gasket					
Surface roughness on sealing surface	R _z in µm	max. 63	max. 30				
Wall thickness	With GD-AL in mm	2	6				
Rectangularity	mm	< 0.2	< 0.1				
Grounding connections	–	2 internal and 1 external					

6.3.4 Permitted cable cross section of the MOVIMOT® terminals

Power terminals

Observe the permitted cable cross sections for installation:

Power terminals	
Cable cross section	1.0 mm ² – 4.0 mm ² (2 x 4.0 mm ²)
Conductor end sleeves	• For single assignment: Connect only single-wire conductors or flexible conductors with conductor end sleeves (DIN 46228, material E-CU) with or without plastic collars. • For double assignment: Connect only flexible conductors with conductor end sleeve (DIN 46228 - 1, material E-CU) without plastic collar. • Permitted length of the conductor end sleeve: at least 8 mm

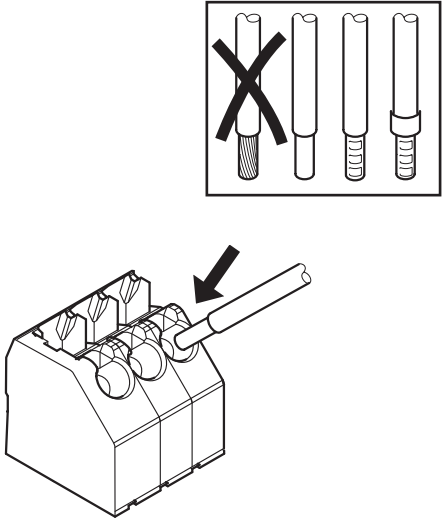
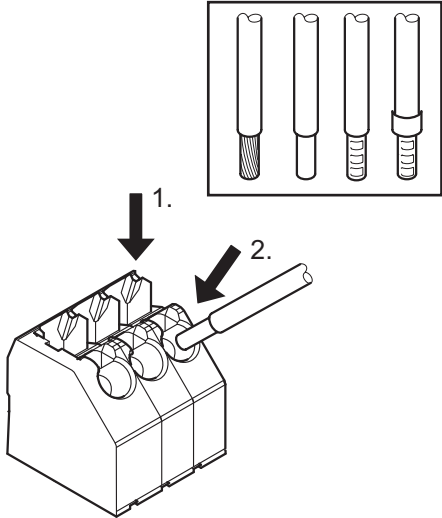
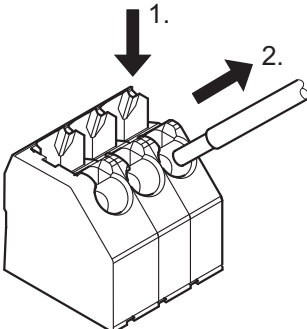
Control terminals

Observe the permitted cable cross sections for installation:

Control terminals	
Cable cross section • Single-wire conductor (bare wire) • Flexible conductor (bare litz wire) • Conductor end sleeve without plastic collar	0.5 mm ² – 1.0 mm ²
• Conductor end sleeve with plastic collar	0.5 mm ² – 0.75 mm ²
Conductor end sleeves	• Connect only single-wire conductors or flexible wire conductors with or without conductor end sleeve (DIN 46228, material E-CU). • Permitted length of the conductor end sleeve: at least 8 mm

6.3.5 Using the control terminals X5 – X6

Note the following information for actuating the control terminal clamps:

Connect conductor without pressing the activation button.	Connect conductor after pressing the activation button.
 18014399174706827	 18014399877894923
The following conductors can be installed directly (without tools) up to two cross section sizes below the nominal cross section: • Single-wire conductors • Flexible conductors with end sleeves	When connecting the following conductors, you must press the actuation button on top to open the clamping spring: • Untreated, flexible conductors • Conductors with small cross sections that cannot be plugged in directly
Removing the conductor. First press the activation button.	
	

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

6.3.6 Selecting the residual current device

The inverter can cause a direct current in the PE conductor.

Proceed as follows to select the residual current device:

1. If using a residual current device is not mandatory according to the standards, SEW-EURODRIVE recommends not using a residual current device.
2. **⚠ WARNING!** No protection against electric shock if an incorrect type of residual current device is used. Severe or fatal injuries.
If a residual current device (residual current device RCD or residual current monitor RCM) is provided, use an all-current-sensitive RCD or RCM of type B.
3. If a residual current device is required, select the residual current device according to the requirements for protecting persons, fire protection or system protection. Observe the tripping characteristic, the deceleration and the rated tripping current of the residual current device during selection.
4. During project planning, note that leakage currents which are as low as possible occur in the system for operational reasons.
5. If the operational leakage currents in a system are too high for a single residual current device, you can split the current supply to several circuits with their own residual current devices.

6.3.7 Line contactor

NOTICE

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

Damage to the MOVIMOT® inverter.

- Do not use the line contactor for jog mode, but only for switching the inverter on and off.
 - Observe a minimum switch-off time of 2 s for the line contactor.
-
- Use only a contactor of utilization category AC3 (EN 60947-4-1) as a line contactor.

Recommendation when using an external 24 V supply: To avoid transient issues when switching on, there should be at least 2 seconds between activation of the 24 V supply and grid.

6.3.8 Notes on PE connection

⚠ WARNING

Electric shock due to faulty ground connection or faulty equipotential bonding.

Severe, fatal injuries

- The permitted tightening torque for the screw fitting is 2.0 to 2.4 Nm.
- Make sure to install the ground connection and equipotential bonding correctly.

Not permitted mounting	Recommendation: Installation with forked cable lug Permitted for all cross sections	Installation with solid connection wire Permitted for cross sections up to max. 2.5 mm ²

[1] Forked cable lug suitable for M5 PE screws

During normal operation, leakage currents ≥ 3.5 mA may occur. In order to fulfill EN 61800-5-1, observe the following information:

- The ground connection (PE) must be installed so that it meets the requirements for systems with high leakage currents.
- This usually means
 - Installing a PE connection cable with a minimum cross section of 10 mm²
 - or installing a second PE connection cable via separate terminals that must not be smaller than the cable cross section of the supply system cable.

6.3.9 Connecting the 24 V supply

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

6.3.10 Binary control

Connect the required control cables

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

6.3.11 Control via RS485 interface

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

- MF.. fieldbus interfaces
- SPS bus master
- MLA21A setpoint converter

INFORMATION



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

6.3.12 Protection devices

MOVIMOT® drives have integrated protection devices against overload and short circuit. External overload devices are not required.

6.3.13 Installation altitude

The maximum installation altitude of 1000 m above sea level must not be exceeded.

6.3.14 Ambient conditions during operation**Ambient temperature**

If MOVIMOT® drives are used at an ambient temperature above +40 °C (max. +50 °C), the cables and cable glands in use must be designed for temperatures ≥ 90 °C.

Hazardous radiation

MOVIMOT® drives must not be exposed to harmful radiation (e.g. ionizing radiation). Contact SEW-EURODRIVE if necessary.

Hazardous gases, vapors and dusts

If used according to their designated use, explosion-protected motors are incapable of igniting explosive gases, vapors or dusts. However, explosion-protected motors must not be subjected to gases, vapors or dusts that endanger operational safety, for example through

- Corrosion
- Damage to the protective coating
- Damage to the sealing material, etc.

Gasket selection

If the motor is operated in environments with high environmental impact, such as increased ozone levels, EDR. motors can optionally be equipped with higher-quality gaskets. If you have doubts regarding the stability of the gaskets in connection with the respective environmental impacts, consult SEW-EURODRIVE.

6.4 Protection concept

INFORMATION



To avoid exceeding the permitted temperature, you must only operate the MOVIMOT® drive in accordance with the operating characteristics, see "Operating characteristics" in the "Technical data" chapter.

- MOVIMOT® drives in category 3D come equipped with a temperature switch (TH). If the motor winding exceeds the permitted maximum temperature, the TH trips.
- Tripping of the TH must be monitored by an independent evaluation unit.
- When the TH trips, the drive must be disconnected from the supply system.
- If the temperature falls below the maximum temperature, the TH switches on again automatically. A restart inhibit must prevent the drive from starting up again.
- Notice: The drive must not be switched on again until the cause has been checked. The inspection must be carried out by trained specialists.

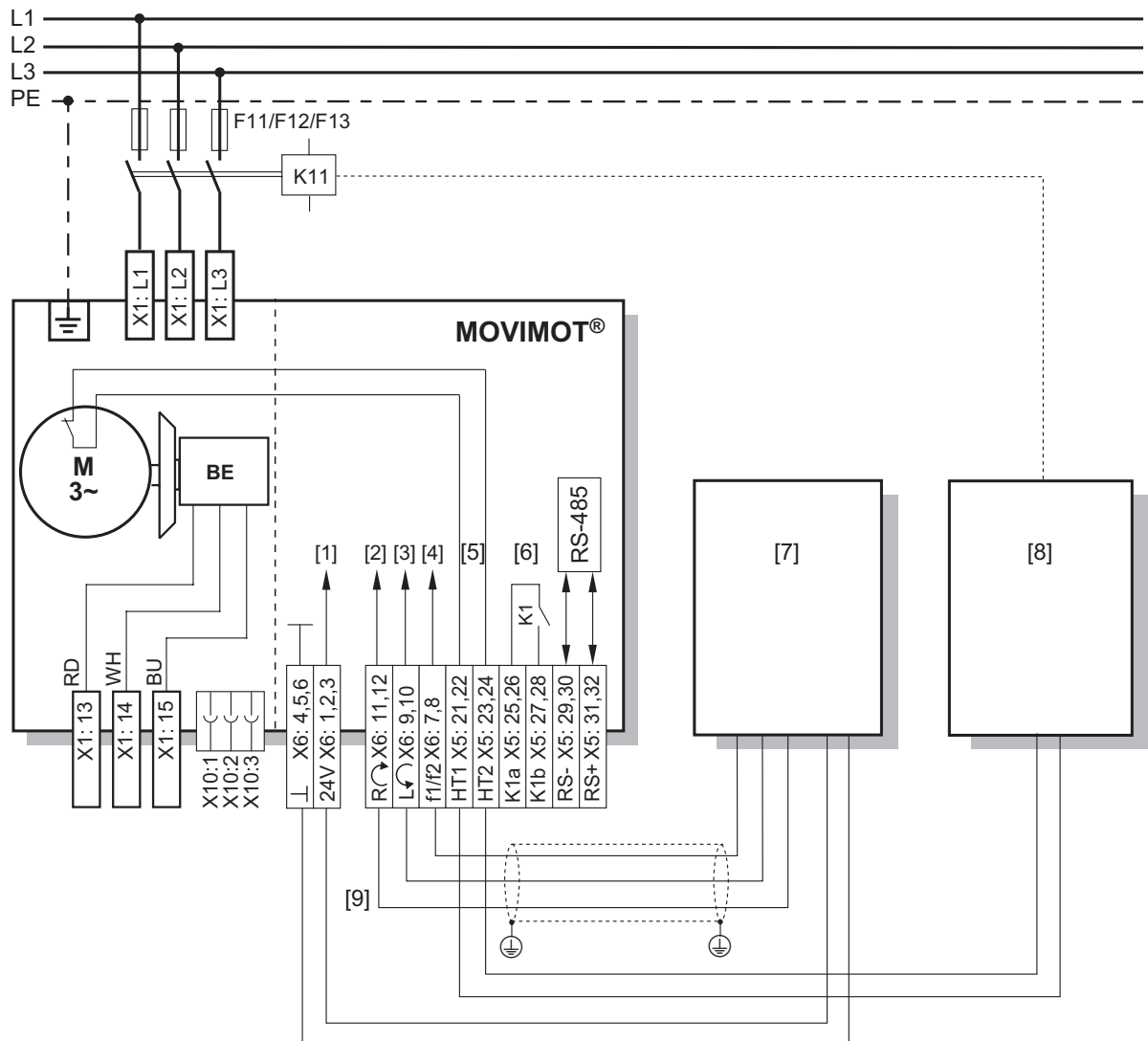
6.4.1 Protection concept in connection with MLA12A

In connection with the MLA12A setpoint converter, the TH is already wired at the factory. When the TH trips, the DC 24 V supply of the MOVIMOT® inverter is interrupted and the drive is stopped. At the same time, the ready contact of MOVIMOT® drops out (terminal ready signal).

A restart inhibit must prevent the drive from starting up again when the TH is switched on.

6.5 MOVIMOT® connection with binary control

The following wiring diagram shows the connection of MOVIMOT® with binary control:

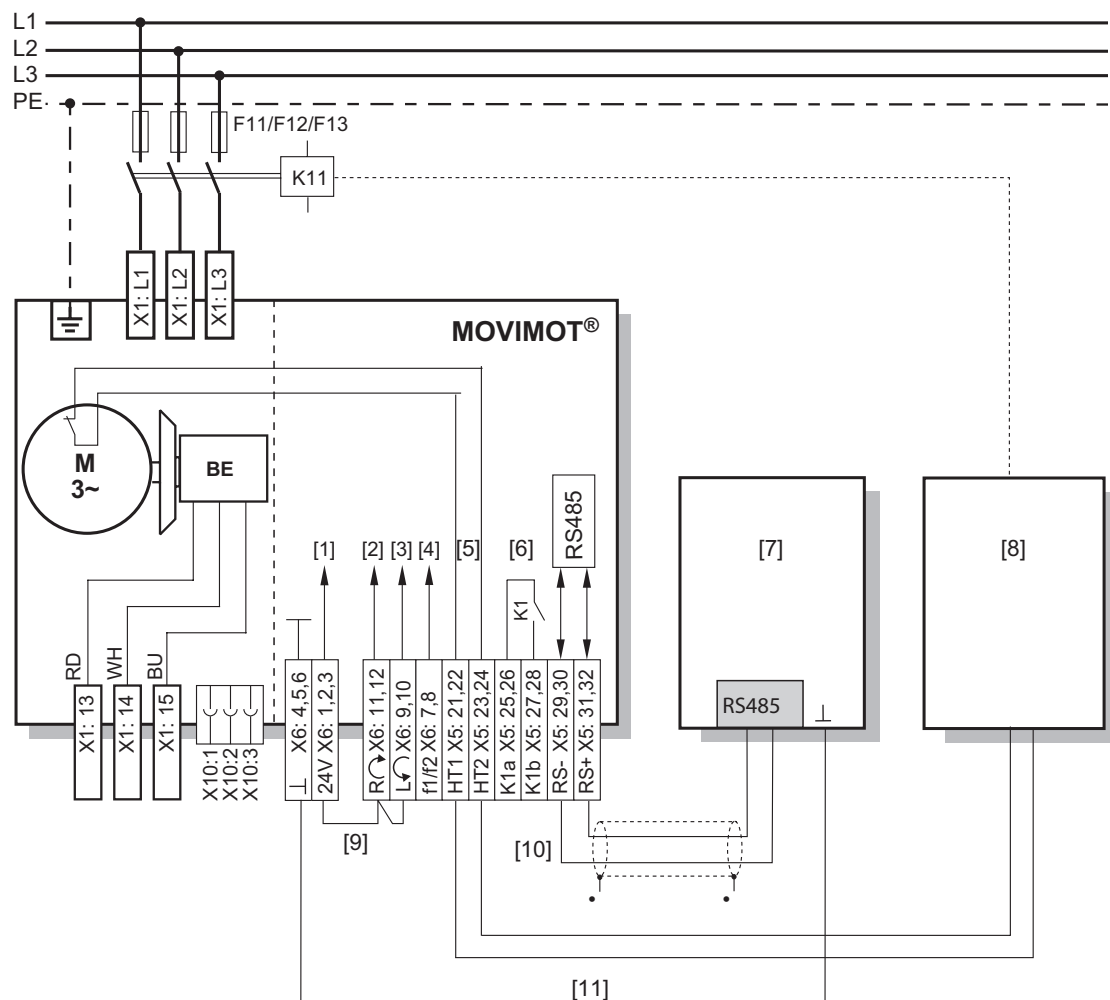


9007203062174219

- [1] DC 24 V supply
- [2] CW/stop
- [3] CCW/stop
- [4] Setpoint changeover f1/f2
- [5] HT1 / HT2: Intermediate terminals for TH temperature switch (max. 24 V + 10% to ground)
- [6] Ready signal (contact closed = ready for operation)
- [7] Higher-level controller (PLC)
- [8] Independent evaluation unit with switch-on inhibit
The independent evaluation unit must contain basic insulation to safely electrically isolated circuits.
- [9] Metal cable gland

6.6 MOVIMOT® connection with RS485 bus operation

The following wiring diagram shows the connection of MOVIMOT® with RS485 bus operation:



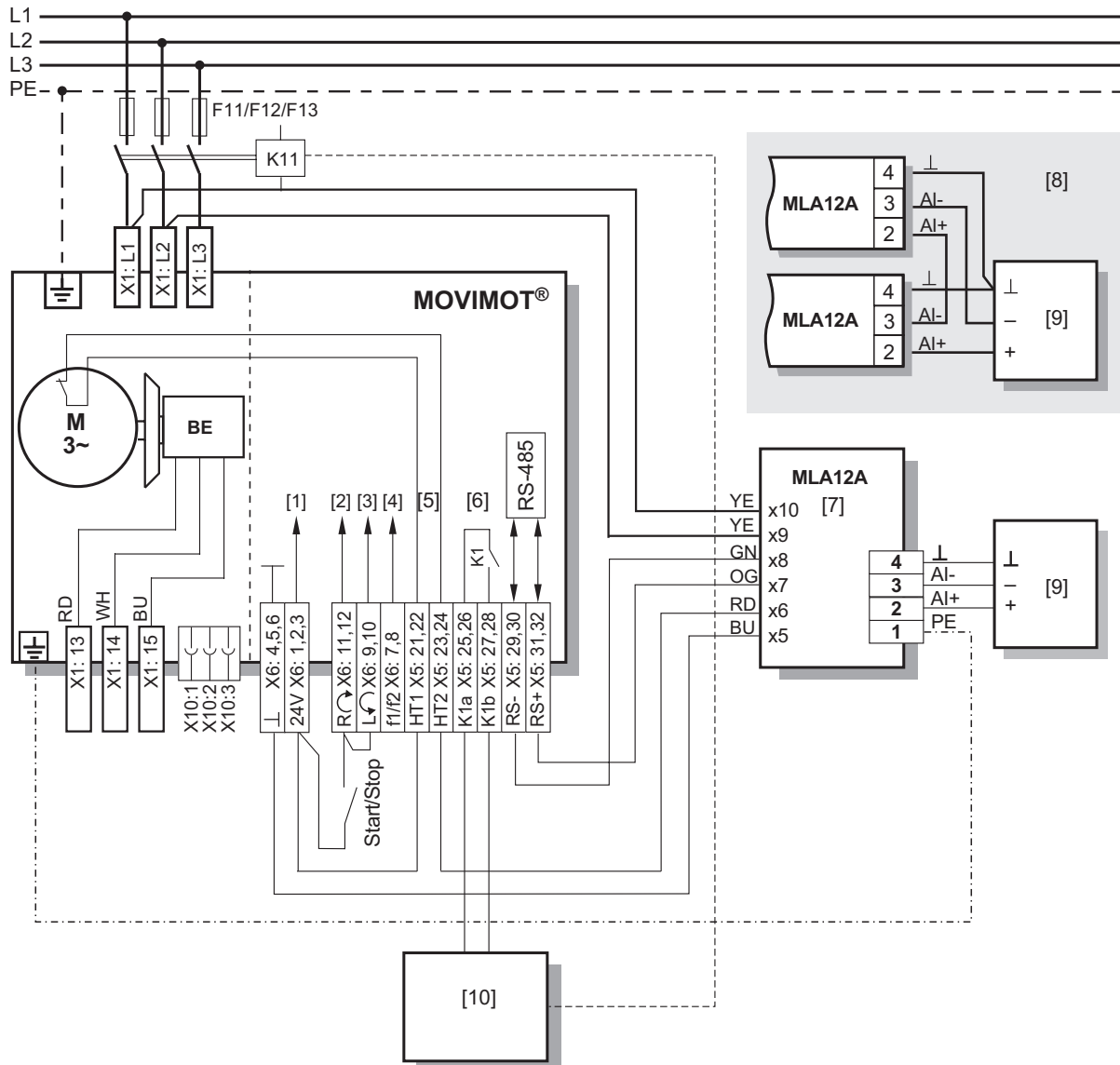
9007203069187595

- [1] DC 24 V supply
- [2] CW/stop
- [3] CCW/stop
- [4] Setpoint changeover f1/f2
- [5] HT1 / HT2: Intermediate terminals for TH temperature switch (max. 24 V + 10% to ground)
- [6] Ready signal (contact closed = ready for operation)
- [7] RS485 bus master
- [8] Independent evaluation unit with switch-on inhibit
The independent evaluation unit must contain basic insulation to safely electrically isolated circuits.
- [9] Both directions of rotation enabled
- [10] Metal cable gland
- [11] Equipotential bonding with the RS485 bus master

6.7 MOVIMOT® options connection

6.7.1 MOVIMOT® connection with MLA12A setpoint converter

The following wiring diagram shows the connection of MOVIMOT® in conjunction with the MLA12A setpoint converter:

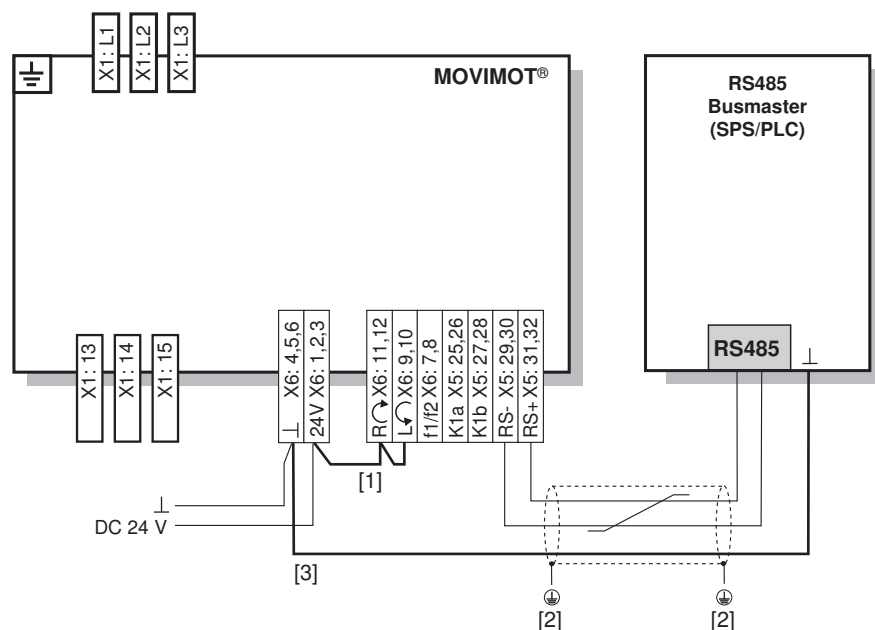


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- [1] DC 24 V supply
- [2] CW/stop
- [3] CCW/stop
- [4] Setpoint changeover f1/f2
- [5] HT1 / HT2: Intermediate terminals for TH temperature switch (max. 24 V + 10% to ground)
- [6] Ready signal (contact closed = ready for operation)
- [7] MLA21A setpoint converter
- [8] Connection example with several MLA12A setpoint converters
- [9] Higher-level controller (PLC)
- [10] Relay monitoring with switch-on inhibit

6.8 Connection of the RS485 bus master

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



36028797343253515

- [1] Observe direction of rotation enable.
See chapter "MOVIMOT® connection",
Functions of the CW/Stop and CCW/Stop terminals with control via RS485 interface
- [2] EMC metal cable gland
- [3] MOVIMOT®/RS485 master equipotential bonding

6.9 Wiring check

It is necessary to check the wiring before energizing the system for the first time in order to prevent injury to persons or damage to the system.

- Remove all the fieldbus interfaces from the connection module.
- Check the isolation of the wiring according to the regionally applicable standards.
- Check the grounding.
- Check the isolation between the supply system cable and the DC 24 V cable.
- Check the insulation between mains cable and communication cable.
- Check the polarity of the DC 24 V cable.
- Check the polarity of the communication cable.
- Provide for the equipotential bonding between the fieldbus interfaces.

6.9.1 After the wiring check

- Install all the fieldbus interfaces.

7 Startup

7.1 Overview

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

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

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

7.2 General information concerning startup

INFORMATION



You must comply with the general safety notes in chapter "Safety notes" during start-up.

⚠ WARNING



Risk of crushing due to missing or defective protective covers.

Severe or fatal injuries.

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

⚠ WARNING



Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

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

⚠ WARNING



Device malfunction due to incorrect device setting.

Severe or fatal injuries.

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

⚠ WARNING



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

Severe injuries.

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

INFORMATION



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

INFORMATION



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

7.3 Easy startup

7.3.1 Requirements

The following prerequisites are required for startup:

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

7.3.2 Description of the controls

Setpoint potentiometer f1

NOTICE

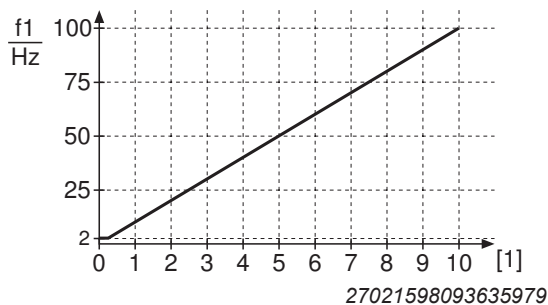
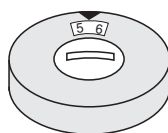
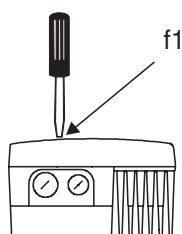
Loss of guaranteed degree of protection if the screw plugs on the f1 setpoint potentiometer and diagnostic interface are not installed or not installed correctly.

Damage to the MOVIMOT® inverter.

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

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

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



[1] Potentiometer setting

Switch f2

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

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



Switch f2											
Detent setting	0	1	2	3	4	5	6	7	8	9	10
Setpoint f2 Hz	5	7	10	15	20	25	35	50	60	70	100
Minimum frequency Hz	2	5	7	10	12	15	20	25	30	35	40

Switch t1

Use switch t1 to set the acceleration of the MOVIMOT® drive. The ramp time is based on a setpoint step change of 1500 min⁻¹ (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

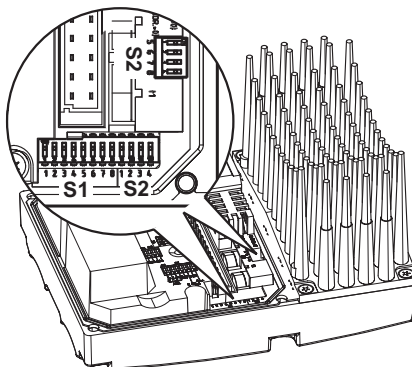


NOTICE

Damage to the DIP switches caused by unsuitable tools.

Damage to the DIP switches.

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



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DIP switch S1:

S1	1	2	3	4	5	6	7	8
Meaning	Binary coding RS485 device address				Motor protection	Motor power section	PWM frequency	No-load damping
	2 ⁰	2 ¹	2 ²	2 ³				
ON	1	1	1	1	Off	No function ¹⁾	Variable (16, 8, 4 kHz)	No function ²⁾
OFF	0	0	0	0	On		4 kHz	

1) The motor power stage is always adapted.

2) No-load damping is always disabled.

DIP switch S2:

S2	1	2	3	4	5	6	7	8
Meaning		Brake release without enable	Operating mode	Speed monitoring	Binary encoding additional functions			
					2 ⁰	2 ¹	2 ²	2 ³
ON	No function	On	No function ¹⁾	On	1	1	1	1
OFF		Off		Off	0	0	0	0

1) The operating mode is always set to VFC.

33955344/EN – 04/2026

7.3.3 Description of the DIP switches S1

DIP switches S1/1 - S1/4

Selecting the RS485 address of the MOVIMOT® drive via binary coding

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

X = ON

– = OFF

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

Control	RS485 address
Binary control	0
Via MLA12A setpoint converter	1
Via MF.. fieldbus interface	1
Via PLC bus master	1

DIP switch S1/5

Motor protection switched on / switched off

SEW-EURODRIVE recommends that the motor protection is always switched on, i.e. S1/5 = "OFF".

7.3.4 Description of DIP switches S2

DIP switches S2/5 – S2/8

Additional functions

- You can activate additional functions by binary coding of the DIP switches S2/5 to S2/8.
- Proceed as follows to activate possible additional functions:

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

7.3.5 Selectable additional functions MM..D-503-14

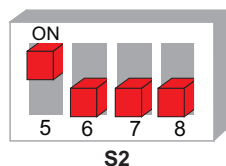
Overview of the available additional functions

You can activate the following additional function at DIP switches S2/5 to S2/8:

Decimal value	Brief description	Operating mode		Description
		Control via RS485	Binary control	
0	Basic functionality, no additional function active	X	X	–
1	MOVIMOT® with increased ramp times	X	X	"Additional function 1" (→ 58)
2 – 5	Not assigned	–	–	–
6	MOVIMOT® with maximum 8 kHz PWM frequency	X	X	"Additional function 6" (→ 59)
7 – 9	Not assigned	–	–	–
10	MOVIMOT® with minimum frequency 0 Hz and reduced torque at low frequencies	X	X	"Additional function 10" (→ 60)
11 – 15	Not assigned	–	–	–

Additional function 1

MOVIMOT® with increased ramp times



329690891

Functional description

- It is possible to set ramp times of up to 40 s.
- In RS485 control mode, a ramp time of max. 40 s can be transmitted when using 3 process data units.

Changed ramp times

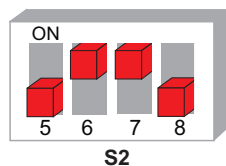


Switch t1											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 s	0.1	0.2	0.3	0.5	0.7	1	20	25	30	35	40

- = corresponds to standard setting
 = changed ramp times

Additional function 6

MOVIMOT® with maximum 8 kHz PWM frequency



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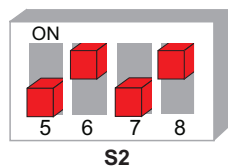
Functional description

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

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

Additional function 10

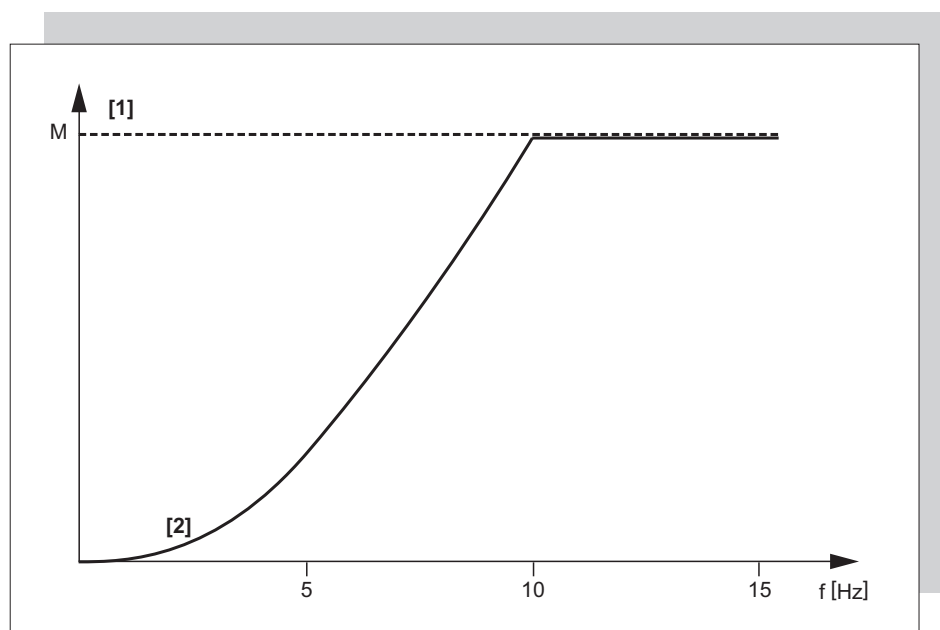
MOVIMOT® with reduced torque at low frequencies



9007199584920203

Functional description

- When activated, drive monitoring is deactivated by the current limit characteristic. Operating characteristic curves can be permanently exceeded. The TH temperature switch protects against impermissible heating.
- Through reducing the slip compensation and active current at low speeds, the drive only develops a reduced torque (see the following figure):
- Minimum frequency = 0 Hz



334866315

[1] Maximum torque in VFC mode

[2] Maximum torque when additional function 10 is activated

Minimum frequency = 0 Hz

Control via RS485:

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

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

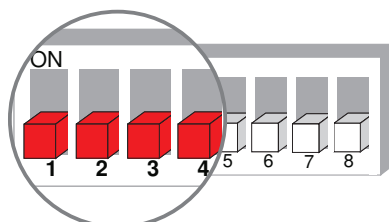
Binary control:

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

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

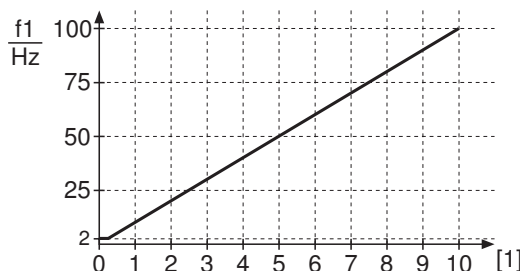
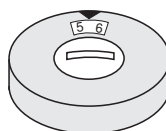
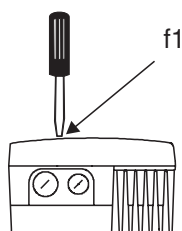
7.3.6 Startup with binary control

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



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4. Set the first Speed at setpoint potentiometer f1 (active when terminals f1/f2 X6:7,8 = "0"), factory setting: about 50 Hz (1500 min⁻¹).



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[1] Potentiometer setting

5. **NOTICE!** Loss of the specified degree of protection if the screw plugs on the f1 setpoint potentiometer and the X50 diagnostic interface are not installed or not installed correctly. Damage to the MOVIMOT® inverter.
Make sure the screw plug of the setpoint potentiometer has a seal and screw it in.

INFORMATION



During operation, the openings of f1 potentiometer and X50 diagnostic interface must be closed with the screw plugs.

This is the only way to ensure explosion protection.

- You must only remove the screw plugs if there is no potentially explosive dust-air mixture



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

f2 switch											
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

33955344/EN – 04/2026

INFORMATION



During operation, the 1st speed can be continuously adjusted using the externally accessible setpoint potentiometer f1.

The speeds f1 and f2 can be set independently of each other.

7. Set the ramp time using switch t1.

⇒ The ramp time is based on a setpoint step change of 1500 min^{-1} (50 Hz).



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

8. Place the MOVIMOT® inverter onto the connection box and screw it in place.

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

⚠ WARNING

Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

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



INFORMATION

During operation, the openings of potentiometer f1 and the diagnostic interface X50 must be closed with the closing plugs. This is the only way to provide for explosion protection. The closing plugs must only be removed if there is no explosive dust/air mixture.



Inverter behavior depending on the terminal level

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

Inverter behavior	Terminal signal level					Status LED
	Supply system	24V	f1/f2	CW/stop	CCW/stop	
	X1:L1 – L3	X6:1,2,3	X6:7,8	X6:11,12	X6:9,10	
Inverter off	0	0	X	X	X	Off
Inverter off	1	0	X	X	X	Off
Stop, no supply system	0	1	X	X	X	Flashing yellow
Stop	1	1	X	0	0	Yellow
CW rotation with f1	1	1	0	1	0	Green
CCW rotation with f1	1	1	0	0	1	Green
CW rotation with f2	1	1	1	1	0	Green
CCW rotation with f2	1	1	1	0	1	Green
Stop	1	1	x	1	1	Yellow

Key:

0 = No voltage

1 = Voltage

X = Any

Evaluation of the TH

- The disconnection of the TH must be monitored by an independent evaluation unit.
- Disconnect the drive from the power supply source when the TH triggers.

INFORMATION



- The TH automatically switches itself back on when the temperature drops below the maximum value. The evaluation unit must prevent the automatic restart of the drive (restart lockout).
- Do not switch the drive back on until the cause of the problem has been checked. This check must be performed by a trained specialist.

Function check of the brake

INFORMATION



- When using brakemotors, it is important to check that the brake is functioning correctly. Make sure that the brake does not drag.
- You must prevent any dragging and the resulting unacceptable heating of the brake.

7.3.7 Startup with MLA12A setpoint converter

⚠ WARNING



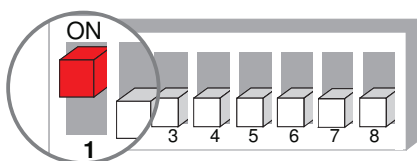
Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

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

– **1 minute**

1. Check whether the MOVIMOT® drive is installed correctly both mechanically and electrically.
⇒ Refer to chapters "Mechanical Installation" and "Electrical Installation".
2. Set the MOVIMOT® DIP switch S1/1 to "ON" (= address 1).



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3. Set the minimum frequency $f_{\min}$ using the 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

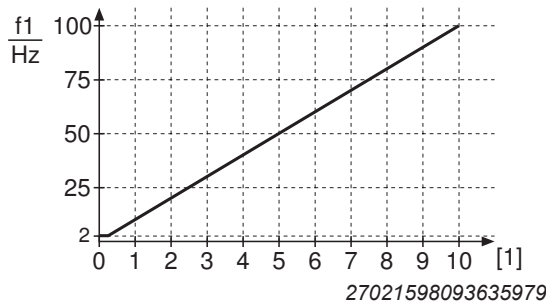
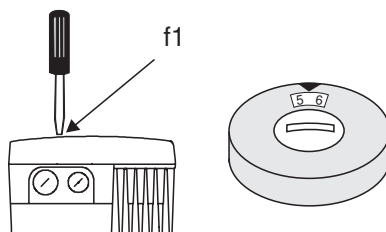
4. Set the ramp time using switch t1.

⇒ The ramp time is based on a setpoint step change of 1500 min^{-1} (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. Place the MOVIMOT® inverter onto the connection box and screw it in place.
6. Set the maximum speed required using setpoint potentiometer f1.



[1] Potentiometer setting

7. **⚠ WARNING!** Loss of the specified degree of protection if the screw plugs on the f1 setpoint potentiometer and the X50 diagnostic interface are not installed or not installed correctly. Damage to the MOVIMOT® inverter.
Make sure the screw plug of the setpoint potentiometer has a seal and screw it in
8. Set the sign for the analog input (terminals 2 and 3) and thus the direction of rotation at S1 DIP switch in the connection box of the MLA12A option.

Direction of rotation	S1/1	S1/2
Clockwise rotation	OFF	N. C.
Counterclockwise rotation	ON	N. C.

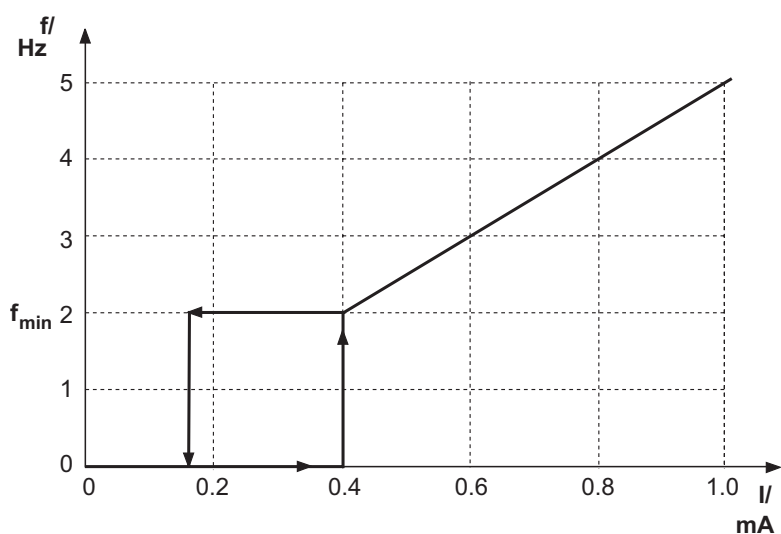
9. Switch on the DC 24 V control voltage and the line voltage.

Control

Control the speed of the MOVIMOT® drive with the analog signal at terminals 2 and 3 between $f_{\min}$ and $f_{\max}$.

Setpoint stop function

The following diagram shows the output frequency depending on the setpoint analog signal of the MLA12A option:



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Evaluation of the TH

- In connection with the MLA12A option, the TH is already wired at the factory.
- When the TH trips, the 24 V supply of the MOVIMOT® is interrupted and the drive is stopped. At the same time, the "Ready contact" of MOVIMOT® drops out ("Ready contact" terminals).

INFORMATION

- If the temperature falls below the maximum temperature, the TH switches on again automatically. The evaluation unit must prevent the drive from being automatically switched on again (restart inhibit).
 - The drive must not be switched on again until the cause has been checked. The inspection must be carried out by trained specialists.
-

Function check of the brake**INFORMATION**

- If you use brakemotors, you have to check the brake for flawless functioning. Make sure that the brake does not drag.
 - You must prevent any dragging and the resulting unacceptable heating of the brake.
-

7.4 "Easy" startup with RS485 interface

7.4.1 Requirements

The following prerequisites are required for startup:

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

7.4.2 Startup procedure



⚠ WARNING

Electric shock caused by dangerous voltages in the connection box. Dangerous voltages may still be present for up to 1 minute after disconnection from the power supply.

Severe or fatal injuries.

- De-energize the unit using a suitable disconnection device.
- Protect it against unintentional reconnection to the voltage supply.
- Wait for at least 1 minute before disassembling the device.



INFORMATION

During operation, the openings of potentiometer f1 and the diagnostic interface X50 must be closed with the closing plugs. This is the only way to provide for explosion protection. The closing plugs must only be removed if there is no explosive dust/air mixture.

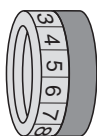
1. Remove the MOVIMOT® inverter from the connection box.
2. Check whether the MOVIMOT® drive is installed correctly both mechanically and electrically. Refer to chapters "Mechanical Installation" and "Electrical Installation".
3. Set the correct RS485 address of the drive at DIP switches S1/1 – S1/4.
 - ⇒ In conjunction with SEW fieldbus interfaces (MF../MQ..) or with MOVIFIT®, always set address "1".

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

X = ON

– = OFF

4. Set the minimum frequency $f_{\min}$ using the switch f2.



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

5. If the ramp time is not specified via the fieldbus, set the ramp time at switch t1.

⇒ The ramp time is based on a setpoint step change of 1500 min^{-1} (50 Hz).



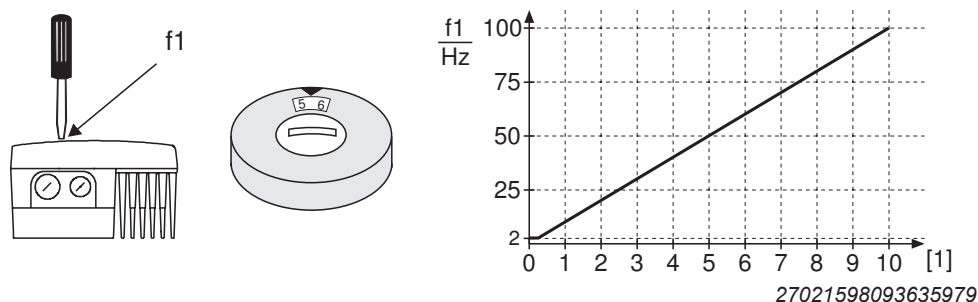
Switch t1											
Detent position	0	1	2	3	4	5	6	7	8	9	10
Ramp time t1 s	0.1	0.2	0.3	0.5	0.7	1	2	3	5	7	10

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

CW/stop	CCW/stop	Meaning
Activated	Activated	Both directions of rotation are enabled.
Activated	Not activated	- Only CW rotation is enabled. - Setpoint input for CCW rotation will stop the drive.
Not activated	Activated	- Only CCW rotation is enabled. - Setpoint input for CW rotation will stop the drive.
Not activated	Not activated	The device is inhibited or the drive is stopped.

7. Place the MOVIMOT® inverter onto the connection box and screw it in place.

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



[1] Potentiometer setting

9. **⚠ WARNING!** Loss of the specified degree of protection if the screw plugs on the f1 setpoint potentiometer and the X50 diagnostic interface are not installed or not installed correctly. Damage to the MOVIMOT® inverter.

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

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

For further information on the function in conjunction with the RS485 master, refer to chapter "Function with RS485 master" (→ 79) in the operating instructions.

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

Evaluation of the TH

- The disconnection of the TH must be monitored by an independent evaluation unit.
- Disconnect the drive from the power supply source when the TH triggers.

INFORMATION



- The TH automatically switches itself back on when the temperature drops below the maximum value. The evaluation unit must prevent the automatic restart of the drive (restart lockout).
- Do not switch the drive back on until the cause of the problem has been checked. This check must be performed by a trained specialist.

Function check of the brake

INFORMATION



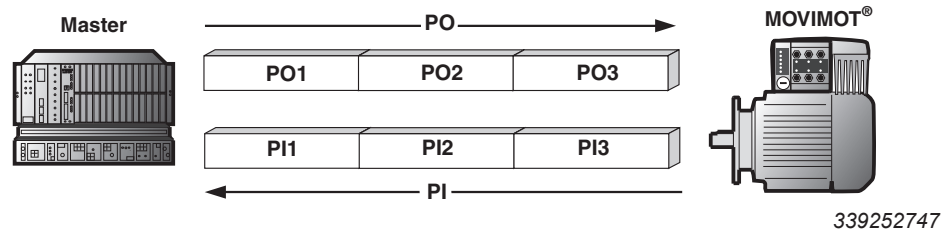
- When using brakemotors, it is important to check that the brake is functioning correctly. Make sure that the brake does not drag.
- You must prevent any dragging and the resulting unacceptable heating of the brake.

7.4.3 Coding of process data

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

MOVIMOT® is available in the following variants:

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



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

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

2 process data words

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

3 process data words

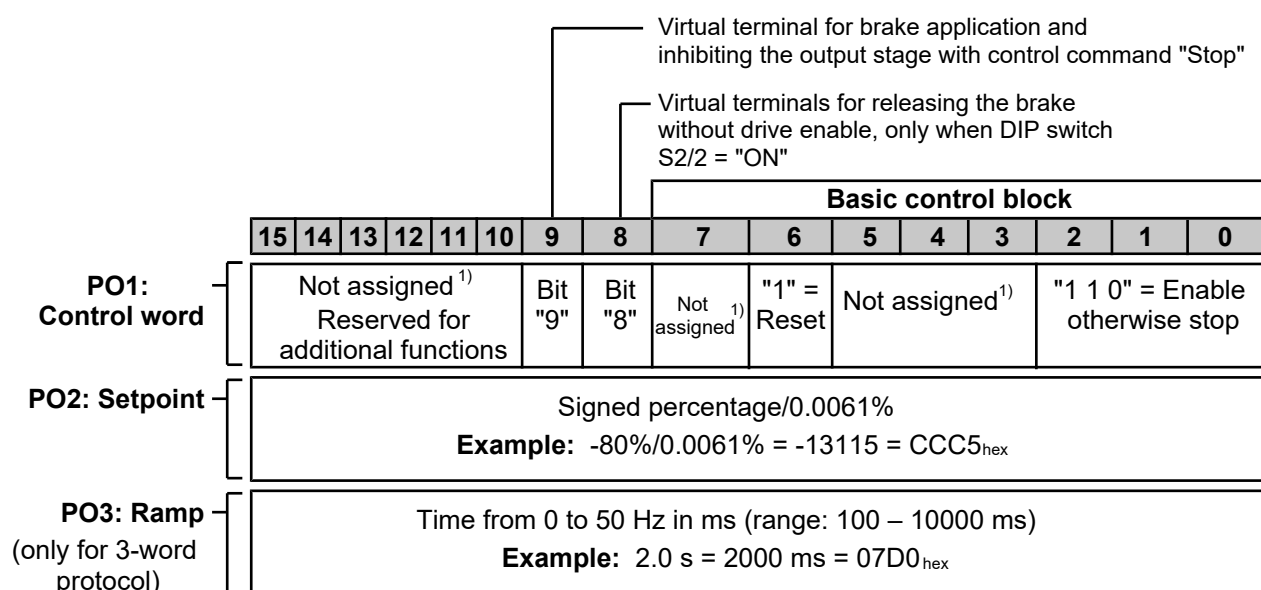
For control with 3 process data words, the "ramp" is sent as an additional process data output word and "Status word 2" is sent as the third process data input word.

Process output data

Process output data is sent from the higher-level controller to the MOVIMOT® inverter (control information and setpoints). However, they only become effective in the MOVIMOT® inverter if the RS485 address in MOVIMOT® (DIP switches S1/1 to S1/4) is set to a value other than 0.

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

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



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

Control word, bit 0 – 2

The "Enable" control command is specified with bits 0 – 2 by entering the control word = 0006_{hex}. To enable the MOVIMOT® inverter, you must also switch terminal R ↻ X6:11,12 and/or L ↻ X6:9,10 to +24 V (jumper with terminal 24V X6:1,2,3).

The "Stop" control command is issued when bit 2 = "0" is reset. Use the stop command 0002_{hex} to ensure compatibility with other SEW inverter series. If bit 2 = "0", the MOVIMOT® inverter stops the drive with the current ramp.

Control word, bit 6 = reset

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

Control word, bit 8 = release brake without drive enable

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

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

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

INFORMATION



Note that this function is only available in conjunction with an activated additional function 8 or 12.

Speed [%]

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

Coding: $C000_{\text{hex}}$ = -100% (CCW rotation)
 4000_{hex} = +100% (CW rotation)
 → 1 digit = 0.0061%

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

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

Ramp

If the process data is exchanged via 3 process data, the current integrator ramp is transferred in the process data output word PO3. The integrator ramp set with switch t1 is used if MOVIMOT® is controlled by two process data items.

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

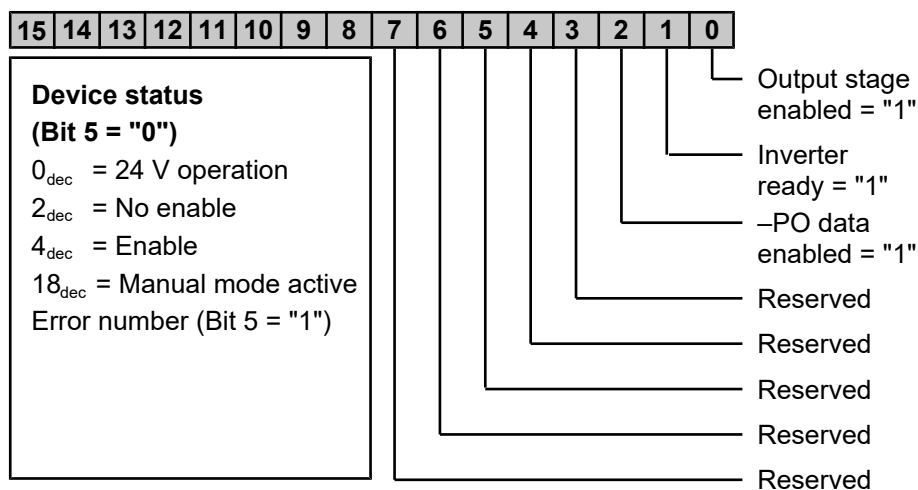
Process input data

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

The MOVIMOT® inverter supports the following process input data:

- PI1: Status word 1
- PI2: DC link voltage + output current
- PI3: Motor model temperature + speed

PI1: Status word 1



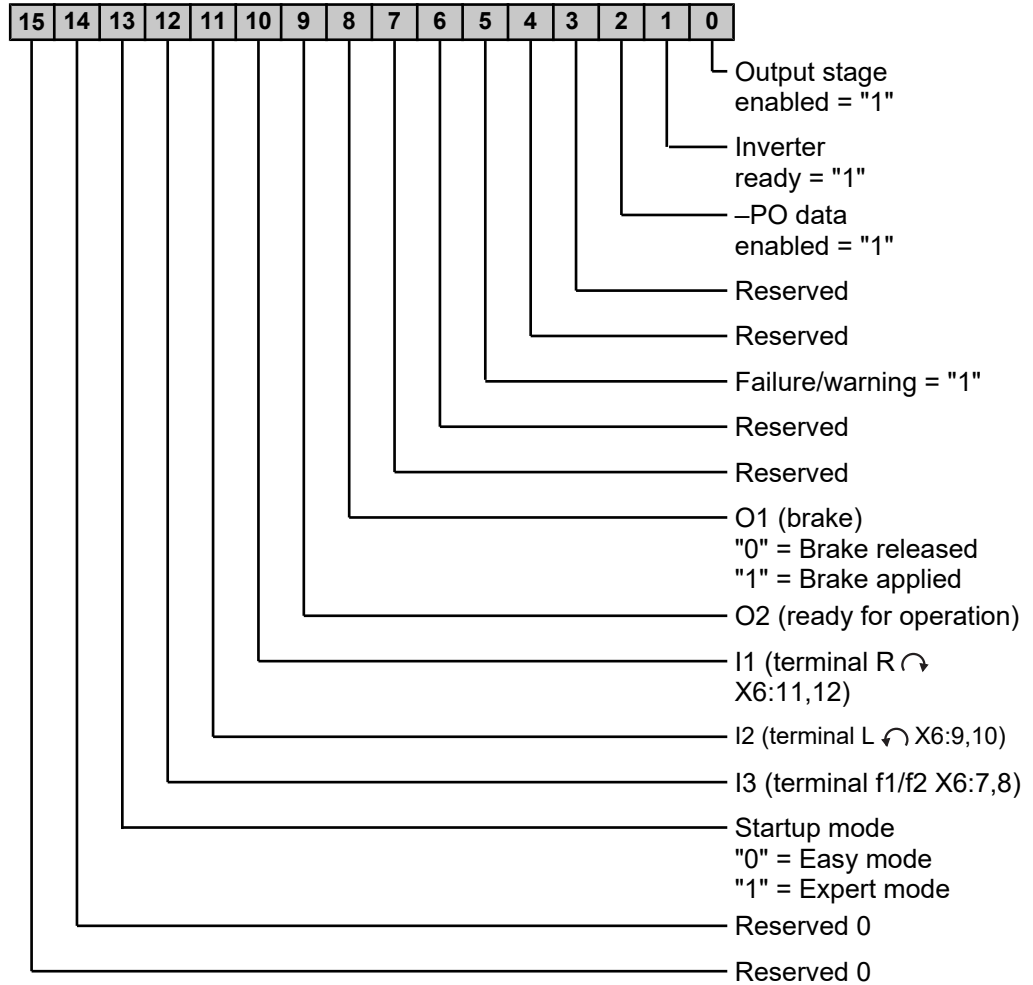
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PI2: Current actual value

16 bit integer with sign $\times 0.1\% I_N$

Example: $0320_{\text{hex}} = 800 \times 0.1\% I_N = 80\% I_N$

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



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Assignment status word 1

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

Assignment of status word 2

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

7.4.4 Function with RS485 master

- The higher-level controller (e.g. PLC) is the master, the MOVIMOT® inverter is the slave.
- 1 start bit, 1 stop bit and 1 parity bit (even parity) are used.
- Transmission complies with the SEW MOVILINK® protocol (see chapter "Coding of process data" (→ 71)) with a fixed transfer rate of 9600 baud.

Telegram structure



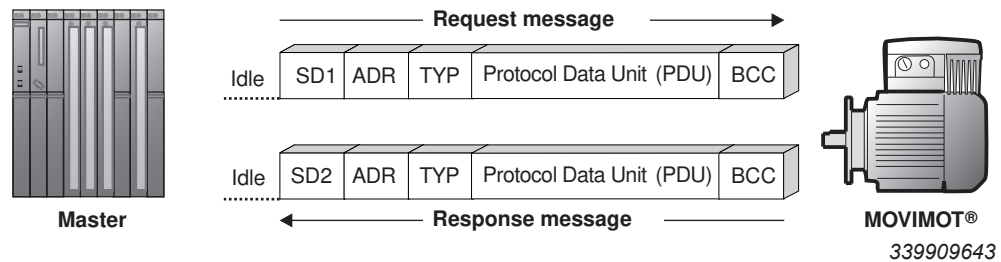
⚠ WARNING

Danger of fatal injury due to uncontrolled operation.

Timeout monitoring is not performed when "acyclic" telegrams (type = "acyclic") are transferred. If the bus connection is interrupted, the drive can continue to run uncontrollably.

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

The following figure shows the message structure between the RS485 master and the MOVIMOT® inverter:



- Idle = Idle period of at least 3.44 ms
- SD1 = Start delimiter 1: Master → MOVIMOT®: 02_{hex}
- SD2 = Start delimiter 2: MOVIMOT® → Master: 1D_{hex}
- ADR = Address 1 – 15
Group address 101 – 115
254 = Point-to-point
255 = Broadcast
- TYPE = Payload data type
- PDU = Payload data
- BCC = Block Check Character: XOR of all bytes

INFORMATION



When "cyclic" messages (type = "cyclic") are sent, the MOVIMOT® inverter expects the next bus activity after a maximum time of 1 second (master protocol). If the MOVIMOT® inverter does not detect this bus activity, the MOVIMOT® inverter automatically stops the drive (timeout monitoring).

Idle and start delimiter

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

Address (ADR)

The MOVIMOT® inverter supports the address range from 0 – 15 as well as access via the point-to-point address (254) or via the broadcast address (255).

It is only possible to read the current process input data (status word, output current) via address 0. The process output data sent by the master does not come into effect because PO data processing is not active when the address setting is 0.

Group address

Furthermore, ADR = 101 – 115 makes it possible to group several MOVIMOT® inverters. When this is done, all MOVIMOT® inverters in one group are set to the same RS485 address (e.g. group 1: ADR = 1, group 2: ADR = 2).

The master can now specify new group setpoints for these groups with ADR = 101 (setpoints to inverters of group 1) and ADR = 102 (setpoints to group 2). The inverters do not provide a response for this addressing variant. The master must observe a min. rest time of 25 ms between two broadcast or group messages!

User data type (TYPE)

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

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

Timeout monitoring

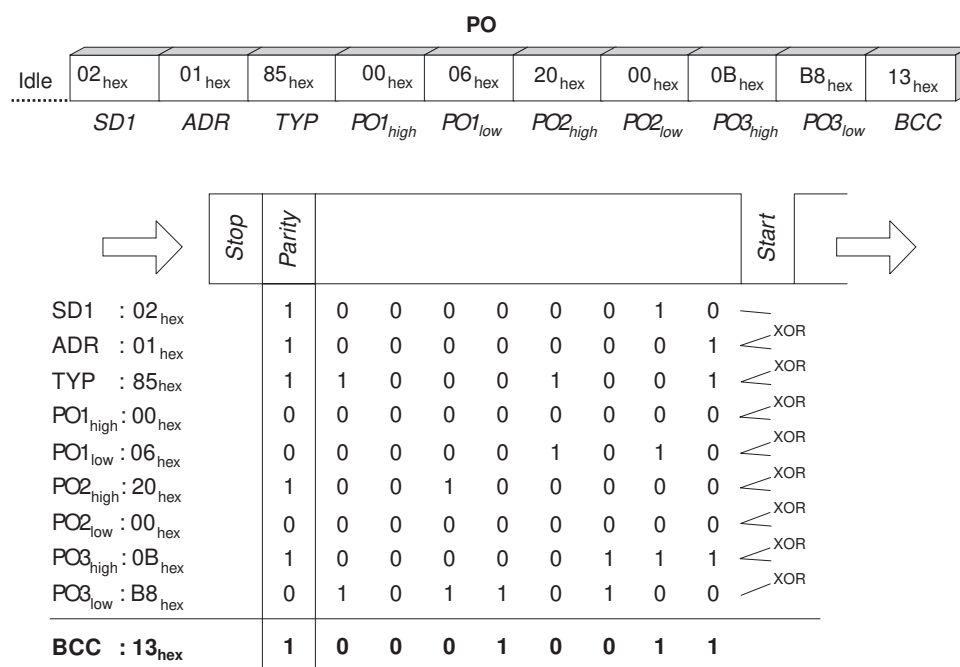
In the "cyclical" transmission variant, the MOVIMOT® inverter expects the next bus activity (request message of types named above) after a maximum of one second. If this bus activity is not detected, the drive automatically decelerates with the most recently valid ramp (timeout monitoring). The signal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

Block check character BCC

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

Example

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



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Telegram processing in the MOVILINK®master

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

a) Send request message

Example: Send setpoints to the MOVIMOT® inverter.

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

b) Receive response message

(Acknowledgment signal + actual values from MOVIMOT® inverter)

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

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

Sample message

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

Request message from RS485 master to MOVIMOT®

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

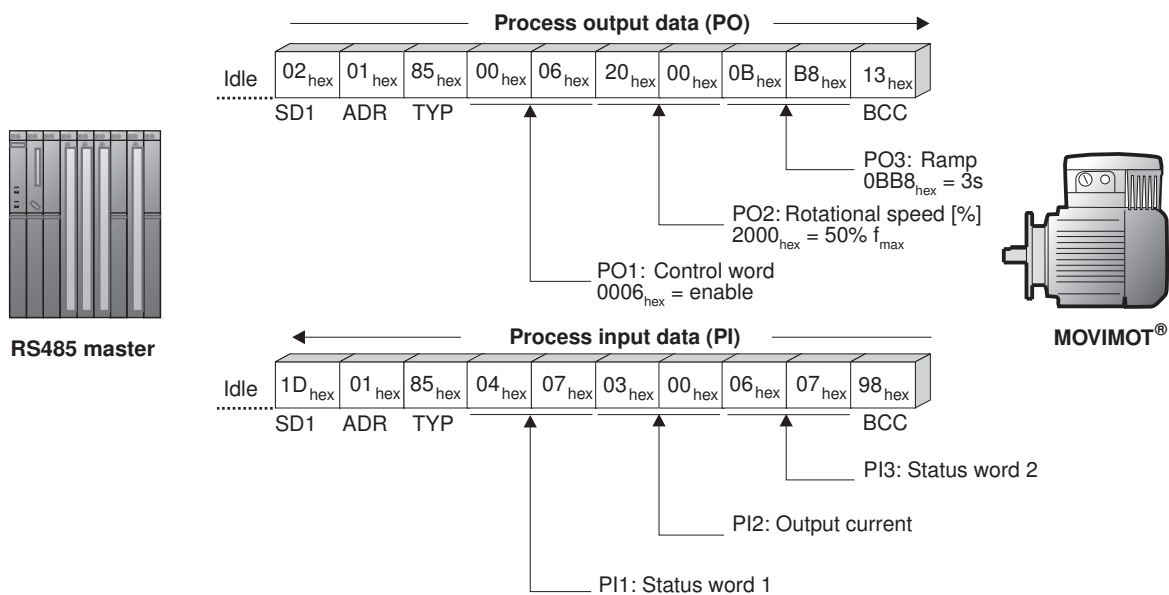
1) f_{max} is specified on setpoint potentiometer f1.

Response message from MOVIMOT® to RS485 master

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

For information on coding of the process data, refer to chapter "Coding of process data" (→ 71).

Sample message "3 PD acyclical"



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This example shows the acyclical transmission variant. The timeout monitoring in the MOVIMOT® inverter is deactivated. The cyclical transmission variant can be implemented with the entry TYPE = 05_{hex}. In this case, the MOVIMOT® inverter expects the next bus activity (request message of types named above) after a maximum of 1 second. Otherwise, the MOVIMOT® inverter automatically stops the drive (timeout monitoring).

7.5 "Expert" startup with parameter function

INFORMATION



Startup in expert mode is only required if you want to set parameters during startup.

Startup in Expert mode is only possible if:

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

For startup in expert mode, refer to chapter "Expert startup with parameter function" in the "MOVIMOT® MM..D" operating instructions. There you will also find the parameter list of MOVIMOT®.

Note that the following parameters are fixed and cannot be changed for explosion-protected MOVIMOT® MM..D drives:

Parameter no.	Index	Name	Fixed value for MM..D-503-14/3D
102	10096.30	Deactivation of mechanical setting elements	Bit 5: Motor protection is active Bit 8: No-load damping is not active Bit 11: Operating mode is VFC
325	8834	No-load damping	0: OFF
340	8533	Motor protection	1: ON
700	8574	Operating mode	0: VFC
710	8576	Standstill current	0% I_{Mot}

8 Operation

8.1 Operating notes



⚠ WARNING

Electric shock due to dangerous voltages at connections, cables, and motor terminals.

When the device is switched on, dangerous voltages are present at the connections as well as at any connected cables and motor terminals. This even applies when the device is inhibited and the motor is in an idle state.

Severe or fatal injuries.

- Avoid switching under load.
- Before performing any work on the device, disconnect it from the voltage supply. Note that dangerous voltages can be present at the terminals and connections for up to 1 minute after the controller is switched off.
- Block the output stage of the inverter before switching at the output of the device.



⚠ WARNING

Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

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



⚠ WARNING

Danger if the motor starts up unintentionally

Severe or fatal injuries.

- Observe the startup instructions.
- Deactivate all control signals.



⚠ WARNING

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

Severe injuries.

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



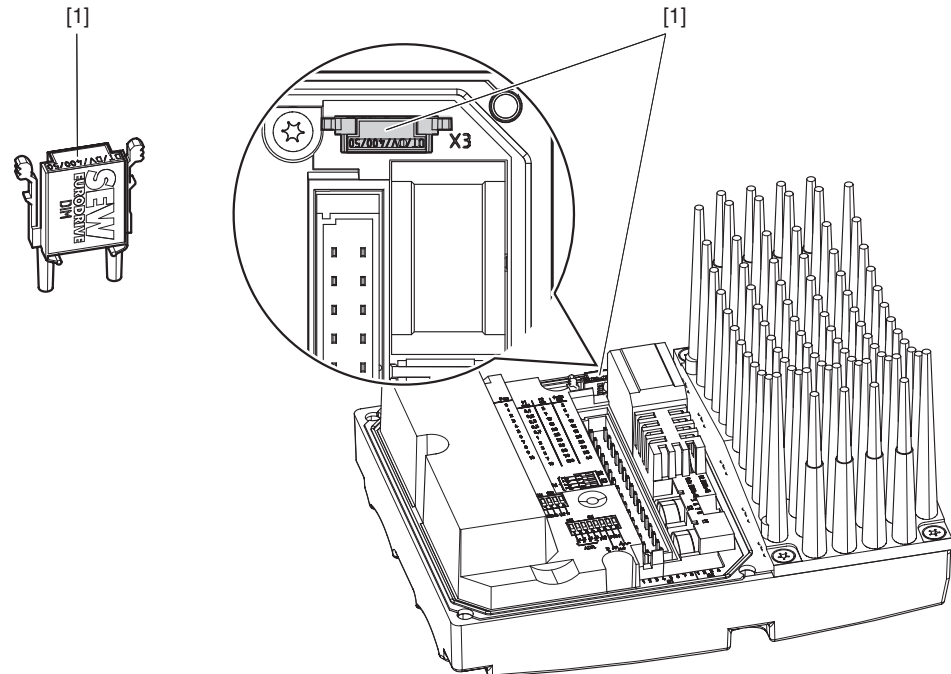
INFORMATION

- The maximum output frequency in any operating mode is 120 Hz.
- If the maximum output frequency is exceeded, the status LED of the MOVIMOT® inverter flashes slowly red (fault 08 "speed monitoring").

8.2 Drive ID module

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

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



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[1] Drive ID module

The drive ID module contains a memory module on which the following information is saved:

- Motor data
- Brake data
- User parameter

If a MOVIMOT® inverter has to be replaced, you can re-startup the system by simply re-plugging the Drive ID module without a PC/laptop or data backup.

If, during a device replacement

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

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

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

For information on device replacement, refer to chapter "Unit replacement" (→ 96).

8.3 IT security

8.3.1 Hardening measures



Perform the following hardening measures:

- Report incidents regarding cybersecurity by e-mail to cert@sew-eurodrive.com or via the contact form on the Product Security Management website (<http://go.sew/psm>).
- Regularly check which security advisories are available in the Online Support of SEW-EURODRIVE.
- Evaluate the fault memories and diagnostics information of your products regularly and check whether there are entries that affect IT security.

8.3.2 Guidelines for secure operation



The engineering protocol from SEW-EURODRIVE allows to activate various interfaces on the device. No authentication takes place and no user account management guidelines are applied that are used to protect against changes or to prevent attacks on IT security.

To prevent misuse of the interfaces, access must be restricted using state-of-the-art technology. For more information, refer to section "IT security of the environment" (→ 13).

8.3.3 Guidelines for user account management

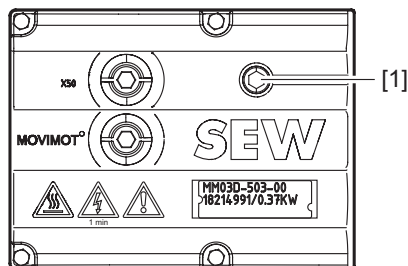


The device has no user accounts.

9 Service

9.1 Status and error display

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



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[1] MOVIMOT® status LED

9.1.1 Meaning of the status LED

The 3-color status LED indicates the operating and error states of the MOVIMOT® inverter.

LED Color Status	MeaningOperating state error code	Possible cause
Off	Not ready for operation	No 24 V voltage supply.
Yellow Flashing steadily	Not ready for operation	Self-test phase active or 24 V power supply present but line voltage is not OK.
Yellow Flashing steadily fast	Ready	Releasing the brake without drive enable active (only with S2/2 = "ON").
Yellow steady light	Ready but unit inhibited	24 V power supply and line voltage is OK, but no enable signal. If the drive does not run when enable signal is present, check startup.
Yellow 2x flashing, pause	Ready, but manual mode without unit enable	24 V power supply and line voltage OK. Stop manual mode to activate automatic mode.
	Ready, Prioritized fixed setpoint control	Terminals R ↻ and L ↻ are supplied with 24 V. To activate RS485 operation, remove the bridges installed in the factory. See chapter "Electrical installation".
Yellow/green Flashing with alternating colors	Ready, but timeout	Communication is interrupted during cyclical data exchange.
Green Steady light	Device enabled	Motor is in operation.

LED Color Status	MeaningOperat- ing state error code	Possible cause
Green Flashing steadily fast	Current limit active	Drive is at the current limit.
Green Flashing steadily	Ready	Idle state current function active.
Green 2x flashing, pause	Device enabled	MOVIMOT® drive is in operation. Prioritized fixed setpoint control is active. See chapter "Parameter description" > "Parameter 600".
Green/Red/Green Flashing with alternat- ing colors, pause	Localization func- tion active	Localization function was activated. See parameter 590.
Red 2x flashing, pause	Fault 07	DC link voltage too high.
Red Flashing slowly	Fault 08	Speed monitoring error (only when S2/4 = "ON") or additional function 13 is active.
	Fault 09	Startup fault Additional functions 4, 5, 12 (DIP switches S2/5 – S2/8) are not permitted.
		Firmware does not support MLK..A option (only with MOVIMOT® with AS-Interface).
	Fault 15	24 V supply error
	Error 17 – 24, 37	CPU fault
	Error 25, 94	EEPROM fault
	Error 38, 45	Device and motor data error
	Fault 44	The current limit was exceeded for more than 500 ms. (only with additional function 2)
Red 3x flashing, pause	Fault 90	Incorrect motor/inverter assignment.
	Fault 97	Error while transmitting a parameter set
Red 4x flashing, pause	Fault 01	Overcurrent in output stage
	Fault 11	Overtemperature in output stage
Red 5x flashing, pause	Fault 84	Motor overload
Red 5x flashing, pause	Fault 4	Brake chopper fault
	Fault 89	Overtemperature of the brake Incorrect motor – frequency inverter assignment. At terminals X1:13– X1:15, both brake and braking resistor are connected. This is not permitted.

LED Color Status	Meaning Operating state error code	Possible cause
Red 6x flashing, pause	Fault 06	Line phase failure
	Fault 81	Start condition
	Fault 82	Output phases are interrupted.
Red steady light	Not ready for operation	Check 24 V supply. A smoothed DC voltage with a maximum residual ripple of 13% must be present.

Flashing codes of the status LED

Flashing steadily:	LED 600 ms on, 600 ms off
Flashing steadily, fast:	LED 100 ms on, 300 ms off
Flashing with alternating colors:	LED 600 ms green, 600 ms yellow
Flashing with alternating colors, pause:	LED 100 ms green, 100 ms red, 100 ms green, 300 ms pause
N x flashing, pause:	LED N x (600 ms red, 300 ms off), then LED off for 1 s

9.2 Fault description

The following table helps you with troubleshooting:

Code	Error	Possible cause	Measure
–	Communication timeout (Motor stops, without error code)	Missing connection $\perp$, RS+, RS- between MOVIMOT® and RS485 master	Check and establish the connection, especially ground.
		EMC influence	Check the shielding of signal cables and improve, if necessary.
		Incorrect type (cyclical) for acyclical data traffic, the protocol period between the individual telegrams is longer than the set timeout interval.	Check the number of MOVIMOT® drives connected to the master. If the timeout interval is 1 s, for example, you can connect a maximum of 8 MOVIMOT® drives as slaves for cyclical communication. Reduce message cycle, increase timeout interval, or select message type "acyclic".
–	Supply voltage not present (Motor stops, without error code)	DC link voltage too low, Power off has been detected.	Check supply system cables and line voltage for interruption.

Code	Error	Possible cause	Measure
–	24 V supply not present (Motor stops, without error code)	24 V supply voltage not present.	Check 24 V supply voltage for interruption. Check the value of the 24 V supply voltage. Permitted voltage: DC 24 V ± 25%, EN 61131-2, residual ripple max. 13% Motor restarts automatically as soon as the voltage reaches normal values.
		AUX power supply voltage not available. (only for MOVIMOT® with AS-Interface)	Check AUX power supply voltage for interruption. Check the value of the AUX power supply voltage. Permitted voltage: DC 24 V ± 25%, EN 61131-2, residual ripple max. 13% Motor restarts automatically as soon as the voltage reaches normal values.
01	Overcurrent in output stage	Short circuit of inverter output	Check the connection between the inverter output and the motor as well as the motor winding for short circuits. Reset the error. ¹⁾
04	Brake chopper	Overcurrent in brake output, resistor damaged, resistance too low-impedance	Check the connection of the resistor/replace it.
		Short circuit in brake coil	Replace brake.
06	Phase failure (The error can only be detected when the drive is under load)	Phase failure	Check the supply system cables for phase failure. Reset the fault ¹⁾ .
07	DC link voltage too high	Ramp time too short.	Extend the ramp time. Reset the fault ¹⁾ .
		Faulty brake coil/braking resistor connection	Check the braking resistor/brake coil connection. Correct, if necessary. Reset the fault ¹⁾ .
		Incorrect internal resistance of brake coil/braking resistor	Check internal resistance of brake coil/braking resistor (see operating instructions, chapter "Technical data"). Reset the fault ¹⁾ .
		Thermal overload in braking resistor, wrong size of braking resistor selected	Dimension the braking resistor correctly. Reset the fault ¹⁾ .
		Invalid voltage range of line input voltage	Check the line input voltage for permissible voltage range. Reset the fault ¹⁾ .

Code	Error	Possible cause	Measure
08	Speed monitoring	Rotational speed deviation due to operation at the current limit	Reduce the drive load. Reset the fault ¹⁾ .
09	Startup	Improper drive ID module for MOVIMOT® with 230 V supply	For MOVIMOT® with 230 V supply, not all drive ID modules are permitted (see operating instructions, chapter "Assignment of the drive ID module"). Check/correct the drive ID module.
		The additional functions 4, 5, 12 are not permitted for MOVIMOT® MM..D with AS-Interface.	Correct the setting of DIP switches S2/5 to S2/8.
		Firmware does not support MLK..A option (only with MOVIMOT® with AS-Interface).	Contact SEW-EURODRIVE Service.
11	Thermal overload of the output stage or internal unit error	Heat sink is dirty.	Clean the heat sink. Reset the fault ¹⁾ .
		Ambient temperature too high.	Lower the ambient temperature. Reset the fault ¹⁾ .
		Heat build-up at MOVIMOT® drive.	Prevent heat build-up. Reset the fault ¹⁾ .
		Drive load too high.	Reduce the drive load. Reset the fault ¹⁾ .
15	24 V monitoring	Voltage dip in the 24 V supply	Check the 24 V supply. Reset the fault ¹⁾ .
17 - 24 37	CPU fault	CPU fault	Reset the fault ¹⁾ . If the error reoccurs, contact SEW-EURODRIVE Service.
25	EEPROM fault	Error when accessing EEPROM	Set parameter <i>P802</i> to "Delivery state". Reset the fault ¹⁾ . Re-parameterize MOVIMOT® inverter. If the error reoccurs, contact SEW-EURODRIVE Service.
26	External terminal	External signal at terminal X6: 9.10 not present.	Correct/reset external error.
38	System software error	Internal error	Contact SEW-EURODRIVE Service.

Code	Error	Possible cause	Measure
43	Communication timeout	Communication timeout during cyclical communication via RS485. If this error occurs, the drive is decelerated and stopped along the set ramp.	Check/re-establish the communication link between the RS485 master and the MOVIMOT® inverter. NOTICE! When communication is restored, the drive will be enabled again.
			Check the number of slaves connected to the RS485 master. If the timeout interval of the MOVIMOT® inverter is set to 1 s, you can connect a maximum of 8 MOVIMOT® inverters (slaves) to the RS485 master for cyclical communication.
		Internal communication error (at MOVIMOT® MM..D with AS-Interface)	Contact SEW-EURODRIVE Service.
44	Current limit exceeded	The set current limit was exceeded for more than 500 ms. This error is only active with additional function 2. The status LED flashes red.	Reduce load or increase current limit at switch f2 (only with additional function 2).
81	Start condition error	The inverter could not be supplied with the correct amount of current during the premagnetization time. Rated motor power too small in relation to rated inverter power.	Check connection between MOVIMOT® inverter and motor.
82	Output open error	Two or all output phases are interrupted.	Check connection between MOVIMOT® inverter and motor.
		Rated motor power too small in relation to rated inverter power.	Check the combination of motor and MOVIMOT® inverter.

Code	Error	Possible cause	Measure
84	Thermal overload of the motor	If the MOVIMOT® inverter is mounted close to the motor, the motor protection is active.	Set DIP switch S1/5 to "ON". Reset the fault ¹⁾ .
		The performance level is set incorrectly for the combination of MOVIMOT® inverter and motor.	Check the setting of DIP switch S1/6. Reset the fault ¹⁾ .
		Ambient temperature too high.	Lower the ambient temperature. Reset the fault ¹⁾ .
		Heat build-up at MOVIMOT® drive.	Prevent heat build-up. Reset the fault ¹⁾ .
		Motor load too high.	Reduce the load on the motor. Reset the fault ¹⁾ .
		Speed too low.	Increase the speed. Reset the fault ¹⁾ .
		If the error is signaled just after the first enable signal.	Check the combination of motor and MOVIMOT® inverter. Reset the fault ¹⁾ .
		The temperature monitoring in the motor (TH winding thermostat) has tripped when using a MOVIMOT® inverter with the selected extra function 5.	Reduce the load on the motor. Reset the fault ¹⁾ .
89	Overtemperature of the brake	Load too high (> 140% nominal motor current or > 140% device current)	
		Thermal overload of brake coil	Extend the ramp time. Reset the fault ¹⁾ .
		Brake coil is defective.	Contact SEW-EURODRIVE Service.
		Brake coil and braking resistor connected.	Connect either brake or braking resistor to drive.
		Inverter does not match the motor. (only if error occurs after first enable)	Check the combination of motor (brake coil) and MOVIMOT® inverter. Check/correct the settings of DIP switches S1/6 and S2/1. Reset the fault ¹⁾ .

Code	Error	Possible cause	Measure
90	Output stage detection	The inverter/motor combination is not permitted.	Check/correct the settings of DIP switches S1/6 and S2/1.
			Check/correct the connection type of the motor.
			Check whether the drive ID module fits the motor and is plugged in correctly.
			Use a MOVIMOT® inverter or a motor with another power rating.
91	Communication timeout bus module – MOVIMOT®	Timeout between the fieldbus interface and the MOVIMOT® inverter.	Check/re-establish the communication link between the fieldbus interface and the MOVIMOT® inverter. The fieldbus interface reports the error only to the higher-level controller.
94	EEPROM checksum error	EEPROM defective.	Contact SEW-EURODRIVE Service.
97	Copy error	DBG keypad or PC/laptop disconnected during the copy process.	Before acknowledging the error, load the factory setting or the complete data set from the DBG keypad or the MOVITOOLS® MotionStudio software.
		Switching the 24 V voltage supply off and on during the copying process.	Before acknowledging the error, load the factory setting or the complete data set from the DBG keypad or the MOVITOOLS® MotionStudio software.
110	Ex-e protection	MOVIMOT® was operated for more than 60 s at a setpoint speed of less than 5 Hz.	Increase setpoint speed. Reset the error by switching off the 24 V supply voltage or by resetting the error.
		Operating point was outside the operating characteristic curves	

1) With standard MOVIMOT® units, reset the error by switching off the 24 V supply voltage or by performing an error reset.

9.3 Repairs

All repairs must be carried out by SEW-EURODRIVE only.

9.4 Unit replacement



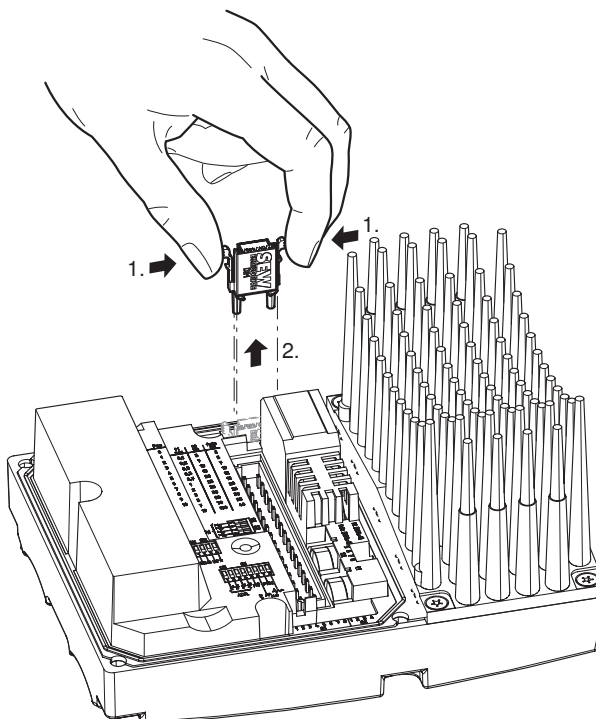
⚠ WARNING

Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

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

1. Remove the screws and take off the MOVIMOT® inverter from the connection box.
2. Compare the data on the nameplate of the previous MOVIMOT® inverter with the data on the nameplate of the new MOVIMOT® inverter.
 - ⇒ The MOVIMOT® inverter must only be replaced with a MOVIMOT® inverter with the same part number.
3. Set the following control elements on the new MOVIMOT® inverter according to the control elements of the previous MOVIMOT® inverter:
 - ⇒ DIP switch S1
 - ⇒ DIP switch S2
 - ⇒ Setpoint potentiometer f1
 - ⇒ Switch f2
 - ⇒ Switch t1
4. Unlock the drive ID module of the new MOVIMOT® inverter and pull it out carefully.



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

6. Insert this drive ID module into the new MOVIMOT® inverter.
 - ⇒ Make sure that the drive ID module snaps into place.
7. Place the new MOVIMOT® inverter onto the connection box and screw it in place.
8. Supply voltage to the MOVIMOT® inverter.
 - ⇒ When switching on the new inverter the first time after a unit replacement, the 24 V supply must be connected for at least 10 seconds without interruptions.
 - ⇒ After the unit replacement, it can take up to 6 s before the MOVIMOT® inverter signals the ready signal.
9. Check whether the new MOVIMOT® inverter is functioning properly.

9.5 SEW-EURODRIVE Service

If you are unable to rectify a fault, contact SEW-EURODRIVE Service. For addresses, refer to www.sew-eurodrive.com.

When contacting SEW-EURODRIVE Service, always specify the following information so that our service personnel can assist you more effectively:

- Information on the nameplate (e.g. type designation, serial number, part number, product key, purchase order number)
- Brief description of the application
- Error message on the status display
- Type of fault
- Accompanying circumstances
- Unusual events preceding the problems

9.6 Shutdown

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



▲ WARNING

Electric shock from capacitors that have not been fully discharged.

Severe or fatal injuries.

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

9.7 Storage

Observe the following instructions when shutting down or storing MOVIMOT® drive:

- If you shut down and store the MOVIMOT® drive for a longer period, you must close open cable bushings and cover ports with protective caps.
- Make sure that the device is not subject to mechanical impact during storage.

Observe the notes on storage temperature in the "Technical data" section.

9.8 Extended storage

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

9.8.1 Procedure when maintenance has been neglected

Electrolytic capacitors are used in the inverters. They are subject to aging effects when de-energized. This effect can damage the capacitors if the device is connected directly to the nominal voltage after a longer period of storage.

In the event of failure to perform maintenance, SEW-EURODRIVE recommends that you slowly increase the line voltage up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. Following this regeneration, the device can be used immediately or, with maintenance, remain in extended storage.

The following graduations are recommended:

AC 400/500 V devices:

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

9.9 IT security guidelines for secure disposal

9.9.1 Removing the product from its intended environment



If you consider the data stored on the product relevant to IT security, remove the data in accordance with the section "Secure removal of data stored in the product." (→ 100)

Although this product does not independently transmit data to devices in its environment, other devices in the environment, such as controllers, HMIs, engineering PCs, or operator panels, can read and store data from the product. This includes reference data, configuration data, log data and other data belonging to the product.

If the data stored in the environment is classified as relevant for IT security, remove this data according to the documentation of the respective devices in the environment.

For data that can be saved with the engineering software from SEW-EURODRIVE, refer to "Deleting data saved using the engineering software" (→ 100).

9.9.2 Secure removal of data stored in the product



Some of the data of the product is stored on a removable storage medium (DIM module). If the data on the removable storage medium is classified as sensitive data from the operator's point of view and is not intended for later use, reset the device to the factory settings using MOVITOOLS® MotionStudio before disposing of the data. This also deletes the storage medium content. Alternatively, remove the DIM module and disposed of it through a qualified disposal process.

The following data is deleted/reset:

- Configuration of the device
- Device name
- Device address
- Safety-relevant data

The following data is not reset during this procedure and can be modified individually if available on the described product:

- AS-Interface address
- DIP switch settings
- Potentiometer settings
- Scope recording of the device
- Fault memory

9.9.3 Deleting data saved using the engineering software



Using the MOVITOOLS® MotionStudio engineering software, you can retrieve all product data and store it locally or on remote storage locations.

If the data saved in this way is classified as relevant for IT security, delete the data when removing the product from the environment.

When data is saved by an engineering software in the environment of the product, the following data types and data volumes are created:

Software	Data type	Data volume
MOVITOOLS® MotionStudio	Proprietary SEW device format	< 1 MB

9.10 Waste disposal

Dispose of the product and all parts separately in accordance with their material structure and the national regulations. Put the product through a recycling process or contact a specialist waste disposal company. If possible, divide the product into the following categories:

- Iron, steel, or cast iron
- Stainless steel
- Magnets
- Aluminum
- Copper
- Electronic parts
- Plastics

The following materials are hazardous to health and the environment. These materials must be collected and disposed of separately:

- Oil and grease

Collect used oil and grease separately according to type. Ensure that the used oil is not mixed with solvent. Dispose of used oil and grease correctly.

- Screens
- Capacitors



Waste disposal according to WEEE Directive 2012/19/EU

This product and its accessories may fall within the scope of the country-specific application of the WEEE Directive. Dispose of the product and its accessories according to the national regulations of your country.

For further information, contact the responsible SEW-EURODRIVE branch or an authorized partner of SEW-EURODRIVE.

10 Inspection and maintenance

10.1 MOVIMOT® inverter

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

Exception: For extended storage, refer to the instructions in chapter "Extended storage" (→  99).

10.2 Motor

The motor requires regular inspection and maintenance work.

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

10.3 Gear units (only for MOVIMOT® gearmotors)

The gear unit requires regular inspection and maintenance work.

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

11 Technical data

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

MOVIMOT® type		MM 03D- 503-14	MM 05D- 503-14	MM 07D- 503-14	MM 11D- 503-14	MM 15D- 503-14	MM 22D- 503-14	MM 30D- 503-14	MM 40D- 503-14
Part number		282627 00	282627 19	282627 27	282627 35	282627 43	282627 51	282627 78	282627 86
		Size 1					Size 2		Size 2L
Apparent output power at V_{line} = AC 400 – 500 V	S_N	0.8 kVA	1.1 kVA	1.4 kVA	1.8 kVA	2.2 kVA	2.8 kVA	3.8 kVA	5.1 kVA
Connection voltages	V_{line}	AC 3 × 400 V / 415 V / 460 V / 500 V							
Permitted range		V_{line} = AC 400V -10% – AC 500V +10%							
Line frequency	f_{line}	50 – 60 Hz ±10%							
Nominal line current (at V_{line} = AC 400 V)	I_{line}	AC 1.0 A	AC 1.3 A	AC 1.6 A	AC 1.9 A	AC 2.4 A	AC 3.5 A	AC 5.0 A	AC 6.7 A
Output frequency	f_A	2 – 100 Hz							
Pulse frequency		≥ 4 kHz (also applies to MOVIMOT® type MM.. 503-04)							
DC link voltage		560 V – 707 V (also applies to MOVIMOT® type MM.. 503-04)							
Resolution		0.01 Hz							
Operating point		400 V at 50 Hz/100 Hz							
Nominal output current	I_N	AC 1.6 A	AC 2.0 A	AC 2.5 A	AC 3.2 A	AC 4.0 A	AC 5.5 A	AC 7.3 A	AC 8.7 A
Motor power S1 PWM frequency 4 (factory setting)/ 8/16 ¹⁾ kHz	P_{Mot}	0.25 kW 0.34 HP	0.37 kW 0.5 HP	0.55 kW 0.75 HP	0.75 kW 1.0 HP	1.1 kW 1.5 HP	1.5 kW 2.0 HP	2.2 kW 3.0 HP	3.0 kW 4.0 HP
Current limitation	I_{max}	Motoring operation: Regenerative operation:		160% for λ and Δ					
External braking resistor	R_{min}	Installation not permitted							
Interference immunity		Complies with EN 61800-3							
Interference emission		Complies with category C2 according to EN 61800-3 (limit value class A to EN 55011 and EN 55014)							
Ambient temperature	ϑ_A	-20 – +40 °C at surface temperature up to max. 120 °C -20 – +50 °C at surface temperature up to max. 140 °C							
Climate class		EN 60721-3-3, class 3K3							
Storage temperature ²⁾		-30 to +85 °C (EN 60721-3-3, class 3K3)							

Technical data

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

MOVIMOT® type		MM 03D- 503-14	MM 05D- 503-14	MM 07D- 503-14	MM 11D- 503-14	MM 15D- 503-14	MM 22D- 503-14	MM 30D- 503-14	MM 40D- 503-14
Part number		282627 00	282627 19	282627 27	282627 35	282627 43	282627 51	282627 78	282627 86
		Size 1					Size 2		Size 2L
Maximum permitted vibration and impact load		In accordance with EN 50178							
Degree of protection (depending on the motor)		IP54, IP55, IP65 (optional, specify when ordering) (Connection box closed and all cable entries sealed; if the motor has a lower degree of protection, the degree of protection of the MOVIMOT® drive is reduced accordingly)							
Operating mode		S1 (EN 60149-1-1 and 1-3), S3 max. cycle duration 10 minutes							
Type of cooling (DIN 41751)		Natural cooling							
Installation altitude		h ≤ 1000 m above sea level							
Mass		See "MOVIMOT® gearmotors" catalog							
Dimensions, dimension drawings									
Output torques									
Required preventive measures		Grounding of the device							

- 1) 16 kHz PWM frequency (low-noise): When DIP SWITCH S1/7 is set to ON, the devices operate at a PWM frequency of 16 kHz (low noise) and switch back in steps to lower clock frequencies depending on the heat sink temperature and the load.
- 2) If the device is undergoing extended storage, connect it to the line voltage for at least 5 minutes every 2 years. Otherwise, the service life of the device will be reduced.

11.2 Electronics data

MOVIMOT® type		MM 03D- 503-14	MM 05D- 503-14	MM 07D- 503-14	MM 11D- 503-14	MM 15D- 503-14	MM 22D- 503-14	MM 30D- 503-14	MM 40D- 503-14
Part number		28262 700	28262 719	28262 727	28262 735	28262 743	28262 751	28262 778	28262 786
		Size 1					Size 2	Size 2L	
External electronics supply	Terminal 24 V	V = +24 V ±25%, EN 61131-2, residual ripple max. 13%							
	X6:1,2,3	I _E ≤ 250 mA (typically 120 mA at 24 V)							
		Input capacitance 120 µF							
3 binary inputs		Isolated via optocoupler; PLC-compatible (EN 61131-2) R _i ≈ 3.0 kΩ, I _E ≈ 10 mA, sampling cycle ≤ 5 ms							
Signal level		+13 – +30 V -3 – +5 V	= "1" = contact closed = "0" = contact open						
Control functions	Terminal R ↻ X6:11,12	CW/stop							
	Terminal L ↻ X6:9,10	CCW/stop							
	Terminal f1/f2 X6:7,8	"0" = Setpoint 1 "1" = Setpoint 2							
Output relay Contact details	Terminal K1a X5:25,26	Response time ≤ 15 ms DC 24 V / 0.6 A / DC 12 according to IEC 60947-5-1 (only SELV or PELV circuits)							
	Terminal K1b X5:27,28								
Signal function		NO contact for ready signal				Contact closed: – With voltage present (24 V + line) – If no error was detected – After completed self-testing phase (after switch-on)			
Serial interface	Terminal RS+ X5:29,30	RS485							
	Terminal RS- X5:31,32								

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11.3 Ports and services



The product has no Wi-Fi or Ethernet-based ports or services.

For information on other communication interfaces, refer to the relevant chapters of this documentation.

11.4 Integrated RS485 interface

RS485 interface	
Standard	RS485 to EIA standard (with integrated dynamic terminating resistor)
Baud rate	9.6 kBaud 31.25 kBaud (in connection with MF.., MQ.., MOVIFIT® MC)
Start bits	1 start bit
Stop bits	1 stop bit
Data bits	8 data bits
Parity	1 parity bit, completing for even parity (even parity)
Data direction	Bidirectional
Operating mode	Asynchronous, semi-duplex
Timeout time	1 s
Cable length	Max. 200 m for RS485 operation with 9600 baud Max. 30 m at transmission rate: 31250 Baud ¹⁾
Number of devices	- max. 32 devices (1 bus master ²⁾) broadcast and group addresses possible 15 MOVIMOT® can be addressed individually

1) Transmission rate of 31,250 Bd will be detected automatically in case of operation with MF.. fieldbus interface.

2) ext. control or option MBG11A, MWA21A or MLG..A + 31 MOVIMOT®

11.5 Diagnostic interface

Diagnostic interface X50	
Standard	RS485 to EIA standard (with integrated dynamic terminating resistor)
Baud rate	9.6 kbaud
Start bits	1 start bit
Stop bits	1 stop bit
Data bits	8 data bits
Parity	1 parity bit, completing for even parity (even parity)
Data direction	Bidirectional
Operating mode	Aynchronous, semi-duplex
Connection	RJ10 socket

11.6 Technical data of option MLA12A 3D

MLA12A 3D			
Part number		0 823 234 2	
Function		Setpoint converter	
Input voltage		X9 / X10	AC 400 – 500 V ± 10%
Output voltage		X6	DC 24 V ± 25 % (max. 200 mA)
		X5	0 V reference potential
Terminals		TI. 1	PE
	Analog input:	CI. 2 / cl. 3	0 – 20 mA
		TI. 4	Reference potential analog input
Serial interface		X7 / X8	RS485 (to EIA standard) transmission rate: 9600 / 31250 Baud
Degree of protection		IP65	

11.7 Assignment of the drive ID module

Motor			Drive ID module		
Type	Line voltage	Line frequency	Identification	Identification color	Part number
EDRN	230/400 V	50 Hz	EDRN/3D/400/50	Gray	28259327

11.8 Permitted operating modes

The following brake types are permitted for MOVIMOT® of category 3D:

- 4Q operation for motors with mechanical brake
- 4Q operation with integrated BW.. braking resistor (for motors with mechanical brake)

INFORMATION

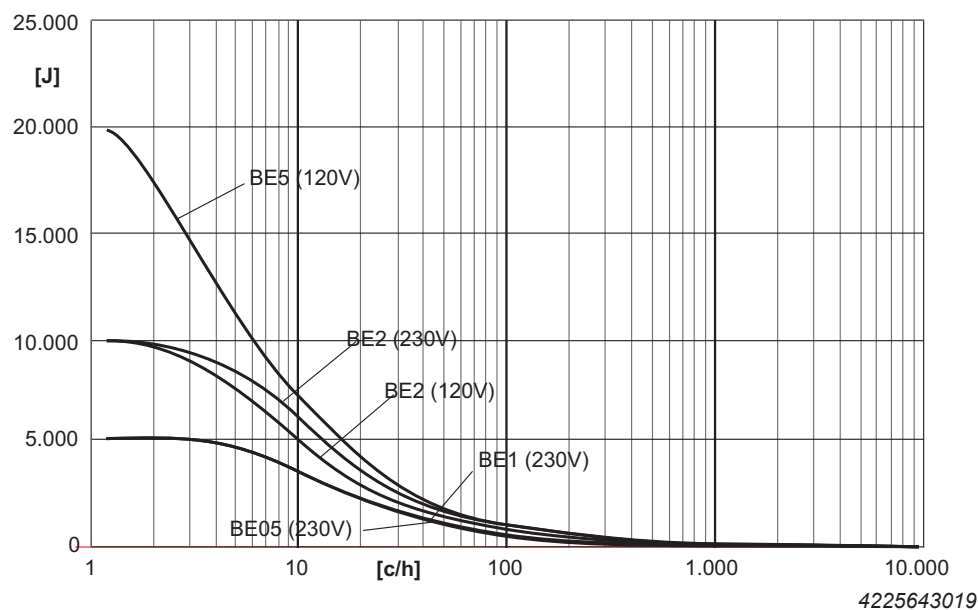


4Q operation with **external braking resistor** is **not permitted** for MOVIMOT® of category 3D.

11.8.1 4Q operation with motors with a mechanical brake

- In 4Q operation, the brake coil can be used as a braking resistor.
- You must not connect an external braking resistor.
- Brake voltage is generated internally within the unit, which means it is independent of the grid.

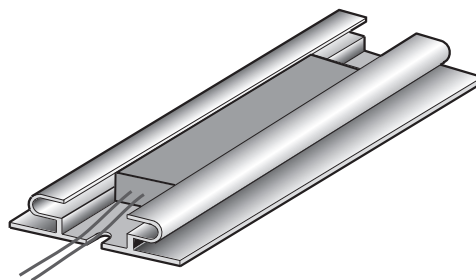
The following figure shows the regenerative load capacity of BE brake coils:



[J] Braking work in Joule
[c/h] Cycles/hour

11.8.2 4Q operation with integrated braking resistor BW..

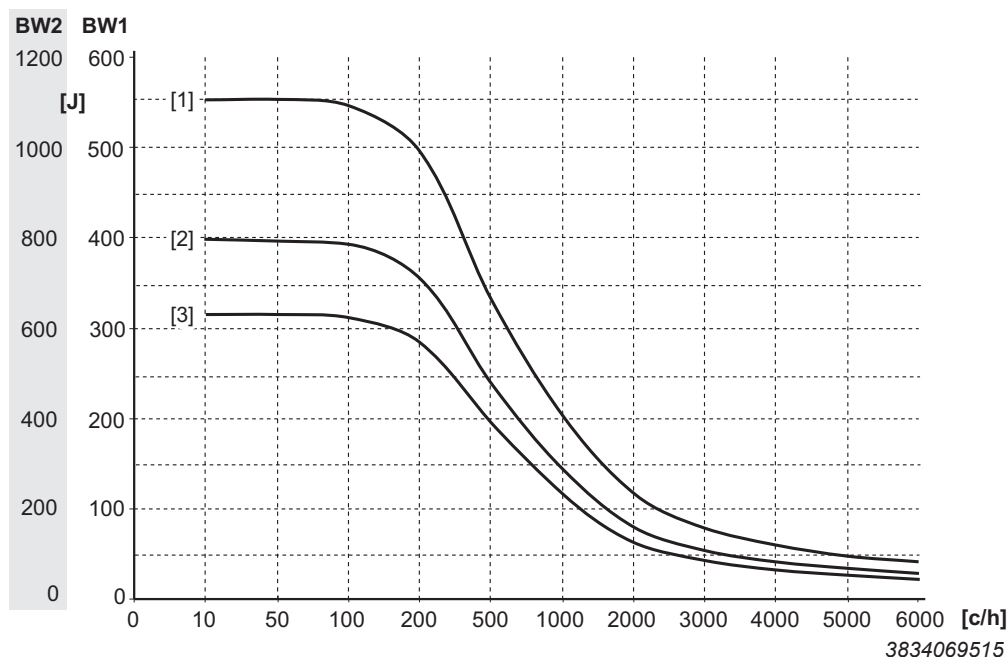
The following figure shows the braking resistor in the connection box:



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- The braking resistor is integrated in the connection box of the MOVIMOT® as standard for motors without a mechanical brake.
- For applications with low regenerative energy, SEW-EURODRIVE recommends 4Q operation.
- The resistor protects itself (reversible) against regenerative overload by changing abruptly to high resistance and no longer consuming any more energy. The inverter then switches off with the "overvoltage" error (error code 07).

The following figure shows the regenerative load capacity of the internal braking resistor:



- [J] Braking work in Joule
 [c/h] Cycles/hour
 [1] Deceleration time = 10 s
 [3] Deceleration time = 4 s
 [4] Deceleration time = 0.2 s

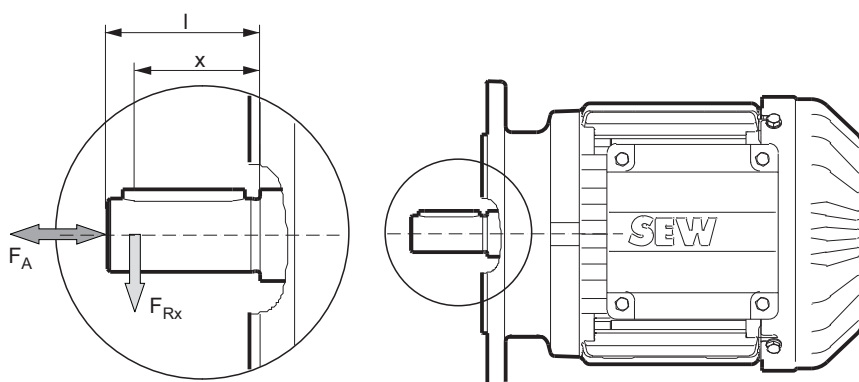
11.9 Overhung and axial loads for motor shaft ends

Refer to the following diagrams for the permitted overhung load F_{Rx} for AC motors/brakemotors. To read the permitted overhung load from the diagram, you must know the distance x of the force application of the overhung load F_R from the shaft collar.

All overhung load diagrams are designed for a bearing service life of 40000 hours. A detailed bearing service life calculation is available on request.

If an additional overhung load acts on the optional 2nd shaft end, the bearing service life is reduced to 20000 hours.

The following figure shows the point of force application of the overhung load F_{Rx} at point X.



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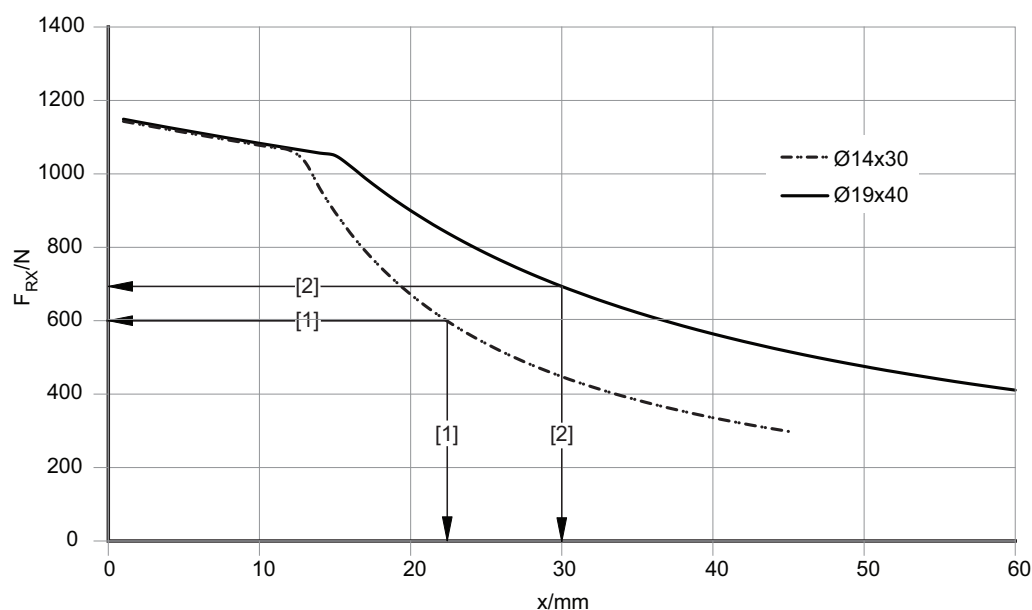
l = Length of the shaft end

x = Distance of the force application point from the shaft collar

F_{Rx} = Overhung load at the point of application of force

F_A = Axial load

The following diagram shows an example of how you can read the overhung load from the diagram:



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- [1] Motor with shaft diameter 14 mm, force application x at 22 mm, permitted overhung load $F_{Rx} = 600 \text{ N}$
- [2] Motor with shaft diameter 19 mm, force application x at 30 mm, permitted overhung load $F_{Rx} = 700 \text{ N}$

During determining the overhung load, the transmission element factors f_z must be considered. The transmission element factor depends on the used transmission element, such as gears, chains, V-belts, flat belts, or toothed belts. When belt pulleys are used, the initial belt tension must be considered as well. The overhung loads F_R calculated with the transmission element factor must not exceed the permitted overhung load of the motor.

Transmission element	Transmission element factor f_z	Comments
Direct drive	1.0	–
Gear wheels	1.0	≥ 17 teeth
Gear wheels	1.15	< 17 teeth
Sprockets	1.0	≥ 20 teeth
Sprockets	1.25	< 20 teeth
Narrow V-belt	1.75	Influence of pretension force
Flat belt	2.50	Influence of pretension force
Toothed belt	1.50	Influence of pretension force
Gear rack	1.15	< 17 teeth (pinion)

The following equation is used to calculate the overhung load with the transmission element factor f_z :

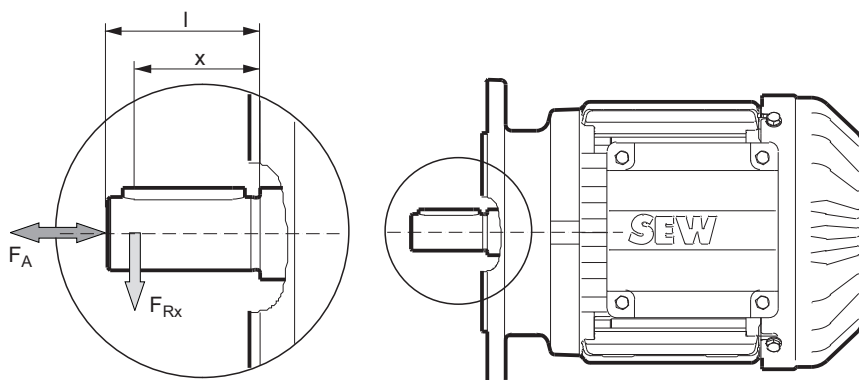
$$F_R = f_z \times F_{Rx}$$

11.9.1 Permitted overhung load

You can read the maximum permitted overhung load F_{Rx} of the respective motor depending on the point of force application relative to the shaft shoulder from the following diagrams.

All overhung load diagrams depict the values for a statistical bearing service life of 40000 hours at the input side shaft end. A detailed bearing service life calculation is available on request.

The following figure shows the point of force application of the overhung load F_{Rx} at point X.



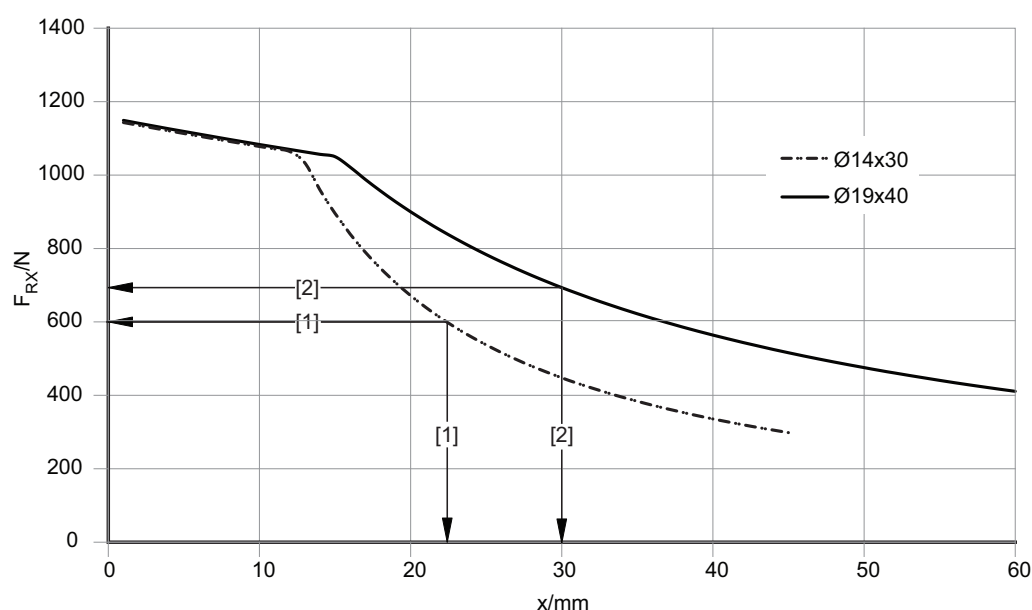
3980490891

- l Length of the shaft end
- x Distance between overhung load application point and shaft shoulder
- F_{Rx} Maximum permitted overhung load at point of force application
- F_A Maximum permitted axial load

The customer's overhung load F_R always has to be less than or equal to the maximum permitted overhung load F_{Rx} from the diagrams:

$$F_R \leq F_{Rx}$$

The following diagram shows an example of how you can read the maximum overhung load from the diagram:



18014402489974539

- [1] Motor with shaft diameter 14 mm, force application x at 22 mm, maximum permitted overhung load $F_{Rx} = 600$ N
- [2] Motor with shaft diameter 19 mm, force application x at 30 mm, maximum permitted overhung load $F_{Rx} = 700$ N

When determining the overhung load, a transmission element factor f_z must be considered under certain conditions. This factor depends on the used transmission elements, such as gear wheels, chains, V-belts, flat belts or toothed belts.

When belt pulleys are used, the initial belt tension must be considered as well. In total, the overhung loads F_R calculated with the transmission element factor must not exceed the maximum permitted overhung load of the motor F_{Rx} .

Transmission element	Transmission element factor f_z	Comments
Direct drive	1.0	–
Gear wheels	1.0	≥ 17 teeth
Gear wheels	1.15	< 17 teeth
Sprockets	1.0	≥ 20 teeth
Sprockets	1.25	< 20 teeth
Narrow V-belt	1.75	Influence of pretensioning
Flat belt	2.50	Influence of pretensioning
Toothed belt	1.50	Influence of pretensioning
Gear rack	1.15	< 17 teeth (pinion)

The resulting customer overhung load is calculated using the following equation:

$$F_R \times f_z \leq F_{Rx}$$

The diagrams are summarized according to the motor size. The shaft ends available for the respective size are represented in one diagram.

The information considers the rated speed n_N and the higher-level rated torque M_N for continuous duty (S1) of the motor.

For duty types other than S1 (e.g. S2, S3, etc.), the permitted values for F_{Rx} and F_A have to be multiplied with the factor 0.8.

$$F_{Rx, \text{switching operation}} = F_{Rx} \times 0.8$$

$$F_{A, \text{switching operation}} = F_A \times 0.8$$

If further application conditions occur that are not considered in the descriptions or diagrams in this chapter, consult SEW-EURODRIVE.

11.9.2 Overhung load diagrams

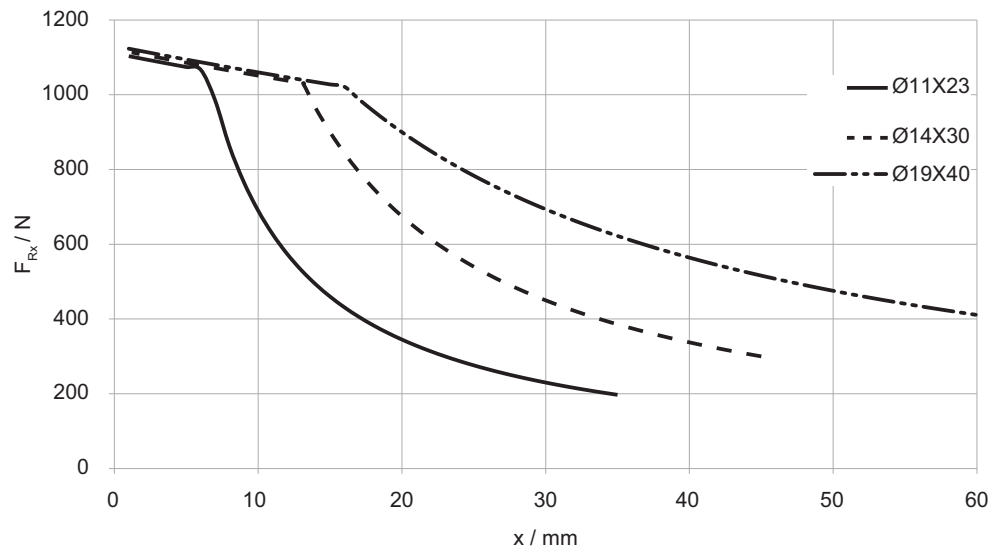
Key

2, 4, 6 Number of poles

Ø 19 x 40 Shaft end

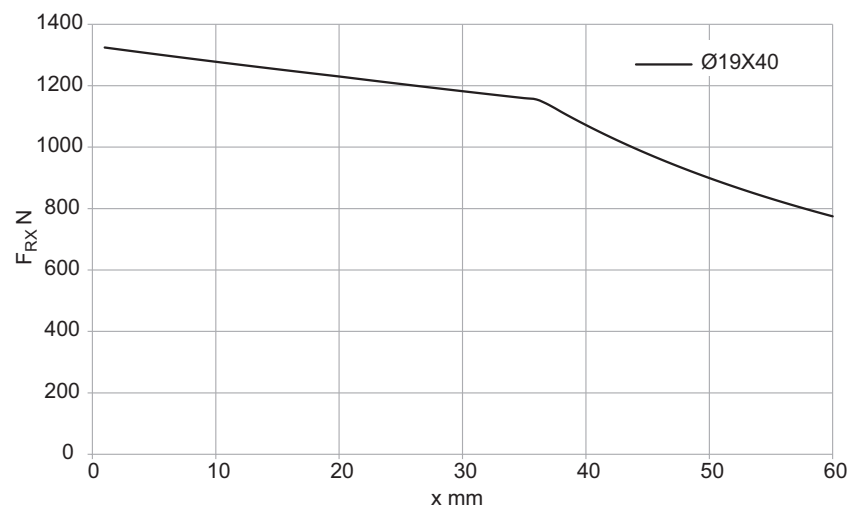
For overhung load diagrams of the second shaft end, refer to chapter "Output".

Overhung load diagram of EDRN71



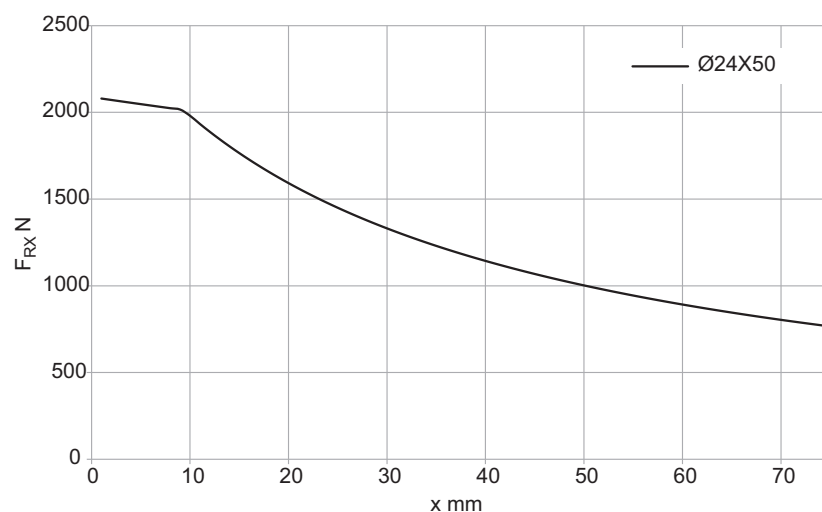
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Overhung load diagram EDRN80



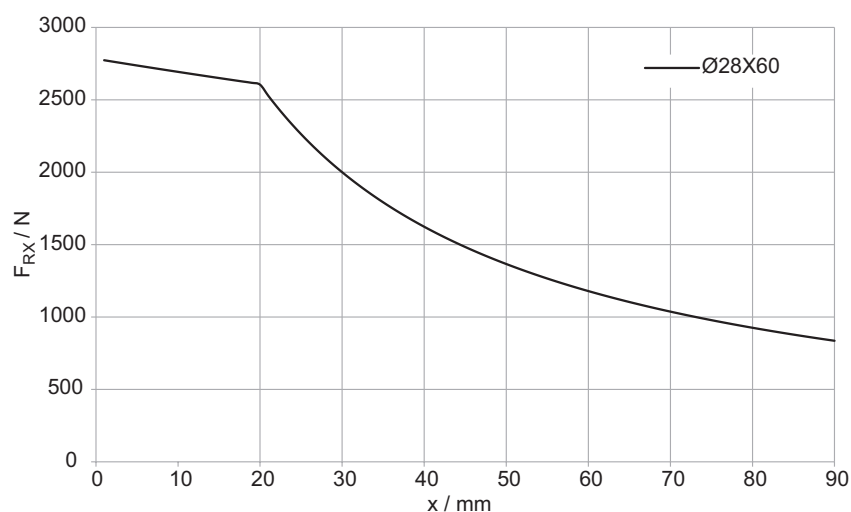
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Overhung load diagram EDRN90



9007227634090763

Overhung load diagram EDRN100



9007227634137483

11.10 Permitted rolling bearing types

Motor type	A-side bearing		B-side bearing	
	IEC motor	Gearmotor	AC motor	Brakemotor
EDRN71	6204-2Z-J-C3	6303-2Z-J-C3	6203-2Z-J-C3	6203-2RS-J-C3
EDRN80	6205-2Z-J-C3	6304-2Z-J-C3	6304-2Z-J-C3	6304-2RS-J-C3
EDRN90	6306-2Z-J-C3		6205-2Z-J-C3	6205-2RS-J-C3
EDRN100				

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11.11 Lubricant tables

11.11.1 Lubricant table for rolling bearings

INFORMATION



Use of wrong bearing grease can damage the bearings.

Motors with sealed bearings

The bearings are 2Z or 2RS closed bearings and cannot be relubricated. They are used for EDRN63 – 280 motors.

	Ambient temperature	Manufacturer	Type	DIN designation
Motor rolling bearings	-20 °C to +80 °C	Mobil	Polyrex EM ¹⁾	K2P-20
	+20 °C to +100 °C	Klüber	Klüberquiet BQ72-72 ²⁾	KX2U
	-40 °C to +60 °C	Kyodo Yushi	Multemp SRL ²⁾	KE2N-40
	-20 °C to +60 °C	SKF	LHT23 ²⁾	KE2N-40

1) Mineral lubricant (= mineral-based bearing grease)

2) Synthetic lubricant (= synthetic-based bearing grease)

11.12 Order information for lubricants, anti-corrosion agents, and sealants

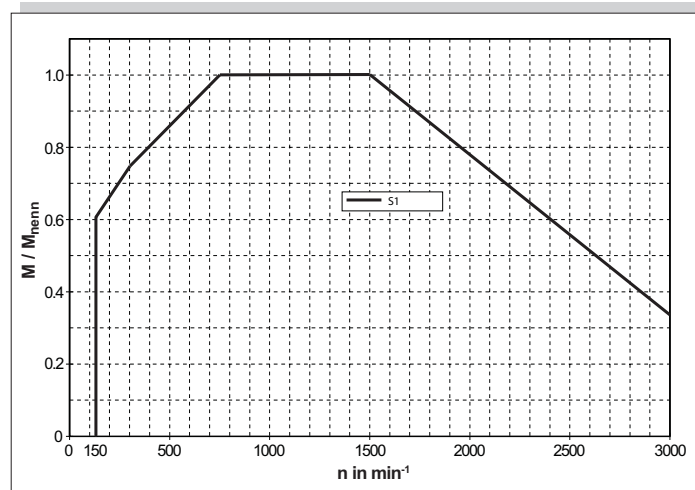
Lubricants, anti-corrosion agents, and sealants can be obtained directly from SEW-EURODRIVE using the following purchase order numbers.

Use	Manufacturer	Type	Quantity	Purchase order number
Lubricant for rolling bearing	Mobile	Polyrex EM	400 g	09101470
	SKF	LGHP2	400 g	09101276
Lubricant for sealing rings				
Material: NBR/FKM	Klüber	Petamo GHY 133N	10 g	04963458
Material: EPDM/EPP	Klüber	Klübersynth LPR 46-122	6 g	03070530
Corrosion protection and lubricant	SEW-EURODRIVE	NOCO-Paste	5.5 g	09107819
Sealant	Marston Domsel	SEW-L-Spezial	80 g	09112286
Backstop lubricant	Mobile	Grease LBZ 1	400 g	03287211

11.13 Operating characteristics

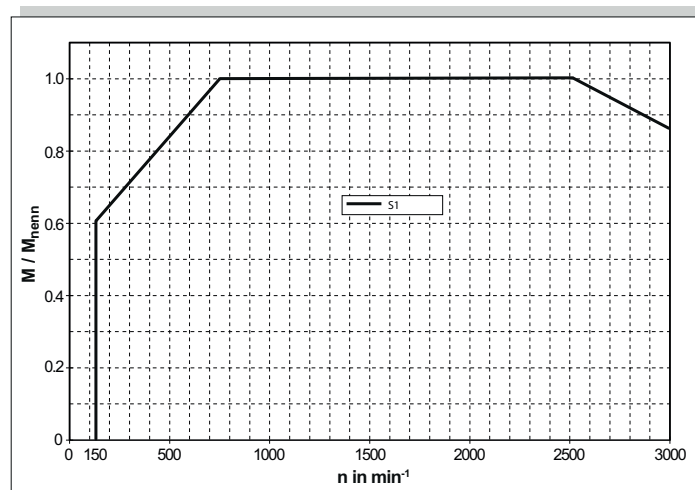
- The operating characteristics provide information about the torques MOVIMOT® may be loaded with depending on the speed.
- **Continuous exceeding leads to impermissible heating.**
- Short-term overloads are permitted.

11.13.1 1400 min⁻¹ $\curvearrowright$ 3 × 400 – 500 V (400 V)



9007203123000459

11.13.2 2900 min⁻¹ $\triangle$ 3 × 400 – 500 V (400 V)



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11.14 Braking torque assignment

Motor type	Brake type	Braking torque steps									
		Nm									
EDRN71S	BE05	1.8	2.5	3.5							
EDRN71M	BE1				5.0	7.0					
EDRN80MK	BE1				5.0	7.0					
EDRN80M	BE2					7.0	10	14			
EDRN90	BE2					7.0	10	14			
EDRN100	BE5								20	28	40

11.15 Assignment of internal braking resistors

The delivery includes 2 screws of size M4 × 8 each.

MOVIMOT® type	Braking resistor
MM03D-503-14 – MM15D-503-14	BW1, part number 08228973
MM22D-503-14 – MM40D-503-14	BW2, part number 08231362

11.16 Braking work, working air gap, and brake lining carrier thickness

If the brake is used in combination with a safety encoder, or if the brake is designed as a safety brake, the maximum values for the working air gap and for the minimum permissible thickness of the brake lining carrier are lower. For the new values, refer to the addendum to the operating instructions for safety brakes and safety encoders.

Brake	Braking work until maintenance ¹⁾	Working air gap		Brake lining carrier
		Minimum ²⁾	Maximum	Minimum
	10 ⁶ J	mm	mm	mm
BE05	120	0.25	0.6	11.0
BE1	120	0.25	0.6	11.0
BE2	180	0.25	0.6	11.0
BE5	390	0.25	0.9	11.0

1) The specified values are nominal values that were determined during rating operation. The actual braking work that can be reached before maintenance may vary depending on the actual load during operation.

2) When checking the working air gap, note: After a test run, parallelism tolerances on the brake lining carrier may give rise to deviations of ±0.15 mm.

11.17 Resistance and assignment of the brake coil

Brake	Resistance of the brake coil ¹⁾	
	120 V	230 V
BE05	–	312 Ω
BE1	–	312 Ω
BE2	58 Ω	–
BE5	51 Ω	–

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

12 Contacting SEW-EURODRIVE

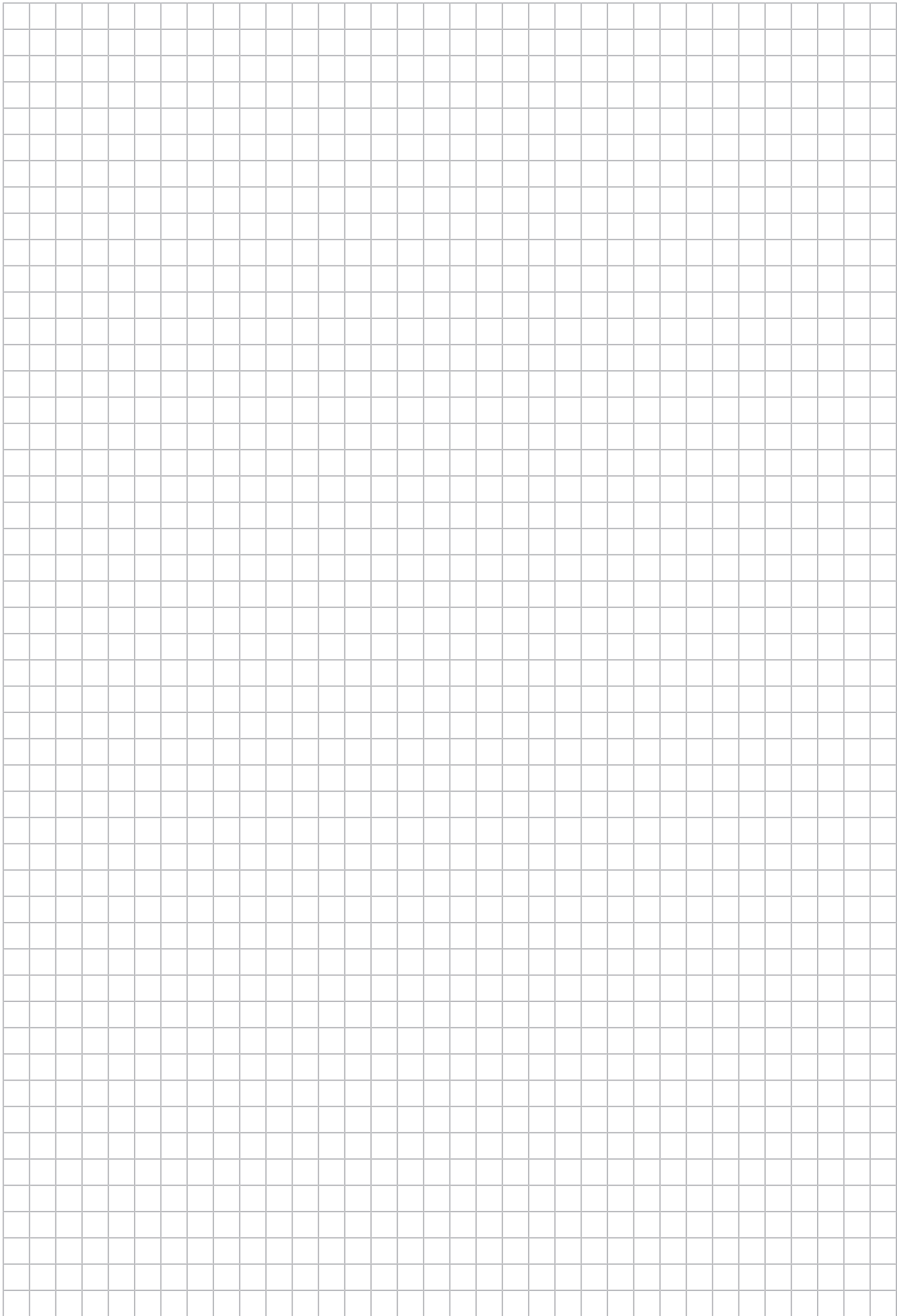
You can find the worldwide contact data and locations on the **SEW-EURODRIVE website** via the following link or the QR code shown below.

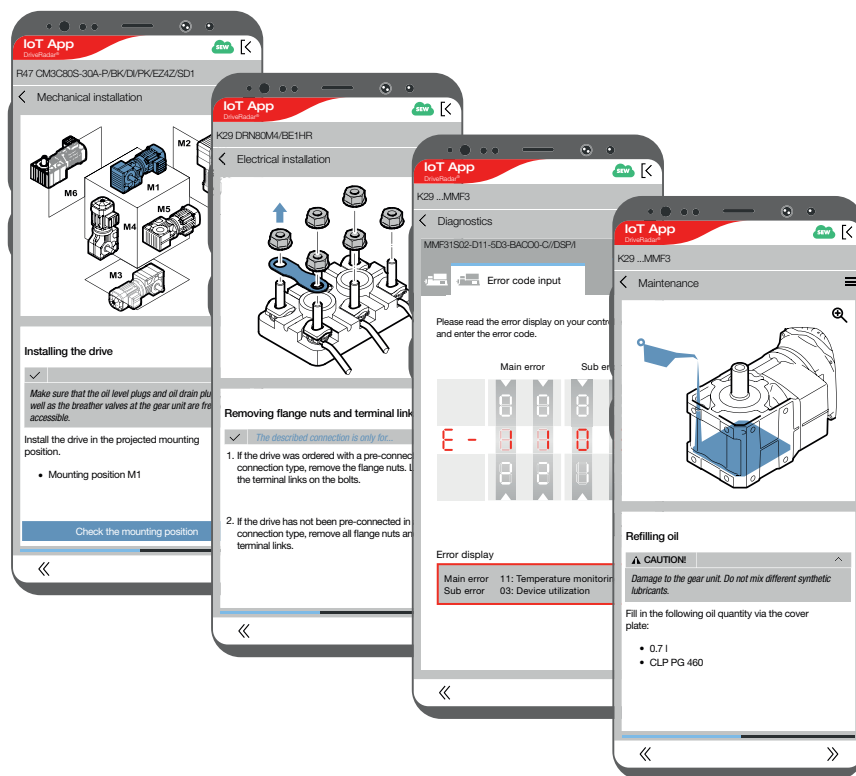
<https://www.sew-eurodrive.de/contacts-worldwide>



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<https://iotapp.io>



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