

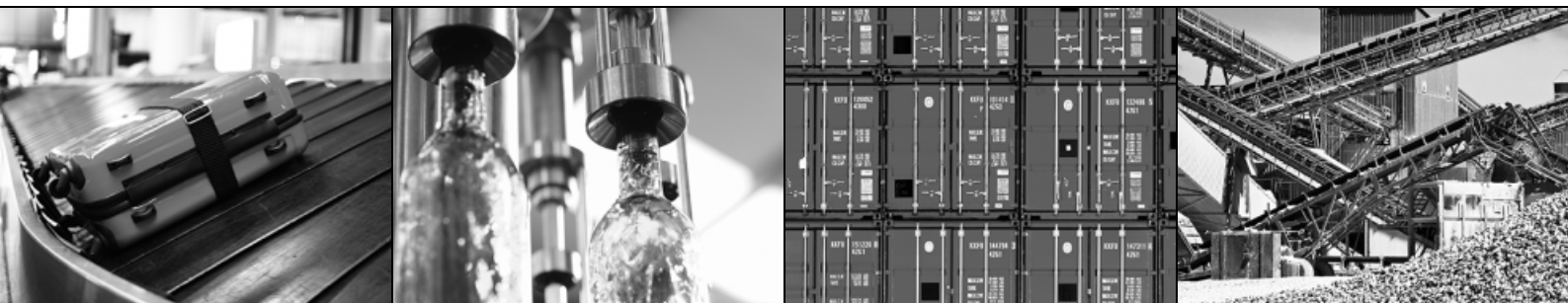


SEW
EURODRIVE

Operating Instructions



Decentralized Servo Inverters
MOVIAxis® MMD60B





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1 General Information

1.1 How to use this documentation

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

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

1.2 Structure of the safety notes

1.2.1 Meaning of signal words

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

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

1.2.2 Design of the section-related safety notes

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

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



▲ SIGNAL WORD

Type and source of danger.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the danger.

1.2.3 Design of the embedded safety notes

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

This is the formal structure of an embedded safety note:

- **▲ SIGNAL WORD** Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.



1.3 *Rights to claim under warranty*

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

1.4 *Exclusion of liability*

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

1.5 *Copyright*

© 2013 SEW-EURODRIVE. All rights reserved.

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

1.6 *Product names and trademarks*

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



2 Safety Notes

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

2.1 Preliminary information

The following safety notes are primarily concerned with the use of the MOVIAXIS® MMD60B. If you use other SEW components, also refer to the safety notes for the respective components in the corresponding documentation.

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

2.2 General

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

During operation, MOVIAXIS® MMD60B drives can have movable or rotating parts as well as hot surfaces.

Removing cover plates without authorization, improper use or incorrect installation and operation may result in severe injury to persons, or damage to machinery. Consult the documentation for further information.

2.3 Target group

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

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

Any activities regarding transportation, storage, operation, and disposal must be carried out by persons who have been instructed appropriately.



2.4 Designated use

The MOVIAXIS® MMD60B inverter is an appliance for industrial and commercial units. It is used to operate servomotors. These motors must be suitable for operation with frequency inverters. No other loads may be connected to the MOVIAXIS® MMD60B.

The MOVIAXIS® MMD60B inverter is either permanently installed on the motor or designed as a field unit for mounting close to the motor. All information provided in the technical data and the permitted conditions for the operating location of the unit must be observed.

Do not start up the components (operate in the designated fashion) until you have established that the unit complies with the EMC Directive 2004/108/EC and that the end product conforms to Machinery Directive 2006/42/EC.

MOVIAXIS® MMD60B inverters comply with the regulations of the Low Voltage Directive 2006/95/EC. The standards given in the declaration of conformity are used for the MOVIAXIS® MMD60B inverter.

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

2.4.1 Safety functions

The MOVIAXIS® MMD60B inverter may not be used for any safety functions.

If a safety function becomes necessary, it has to be implemented by using upstream safety devices, such as a safety control.

2.4.2 Hoist applications

The MOVIAXIS® MMD60B inverter may not be used for any safety functions in conjunction with hoist applications.

Use monitoring systems or mechanical protection devices as safety equipment to avoid possible damage to property or injury to people.

2.5 Other applicable documentation

The MOVIAXIS® MMD60B is similar to SEW-EURODRIVE's MOVIAXIS® series of multi-axis amplifiers, control units and safety technology.

Observe the following publications:

- "MOVIAXIS® Multi-Axis Servo Inverter" operating instructions
- "MOVIAXIS® MMD60B – Functional Safety" manual

Information on the CM and CMP synchronous servomotors is available in the following publications:

- "CMP40 – CMP100, CMPZ71 – CMPZ100 Synchronous Servomotors" operating instructions
- "DFS, CFM Synchronous Servomotors" operating instructions

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



2.6 Transportation and storage

Observe the notes on transportation, storage and proper handling. Comply with the requirements for climatic conditions stated in chapter "Technical Data." Tighten installed eyebolts securely. They are designed for the weight of the MOVIAXIS® MMD60B drive. Do not attach any additional loads. Use suitable, sufficiently rated handling equipment (e.g. rope guides) if required.

2.7 Installation

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

Protect the MOVIAXIS® MMD60B inverter from excessive strain.

The following applications are prohibited unless explicitly permitted:

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

2.8 Electrical connection

Observe the applicable national accident prevention guidelines when working on live MOVIAXIS® MMD60B drives (e.g. BGV A3).

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

You will find notes on EMC-compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the publication "Electromagnetic Compatibility in Drive Engineering" and in these operating instructions. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

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

2.9 Safe disconnection

MOVIAXIS® MMD60B inverters meet all requirements for reliable isolation of power and electronics connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection to ensure reliable isolation.



2.10 Operation

Systems with integrated MOVIAXIS® MMD60B inverters must be equipped with additional monitoring and protection devices according to the applicable safety guidelines, such as legislation governing technical equipment, accident prevention regulations, etc. Additional protective measures may be necessary for applications with increased potential risk.

Do not touch live components and power connections immediately after disconnection of the MOVIAXIS® MMD60B inverters from the supply voltage because some capacitors might still be charged. Wait at least 10 minutes after the supply voltage is switched off.

When operating, all necessary plug connectors must be connected. Unused plug connections must be sealed using the corresponding caps / screw plugs. The inverter must be attached to the motor or a suitable location.

The unit may not be opened. Otherwise, the operating license becomes void.

The fact that the 7-segment display and other display elements are no longer illuminated does not indicate that the unit has been disconnected from the grid and no longer carries any voltage.

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

Warning – danger of burns: The surface temperature of the MOVIAXIS® MMD60B drive and the external options (e.g. the braking resistor heat sink) can exceed 60°C during operation.



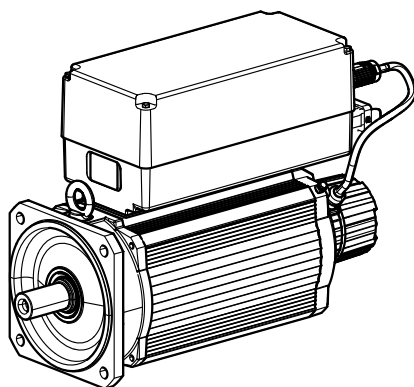
3 Unit Structure

3.1 Description

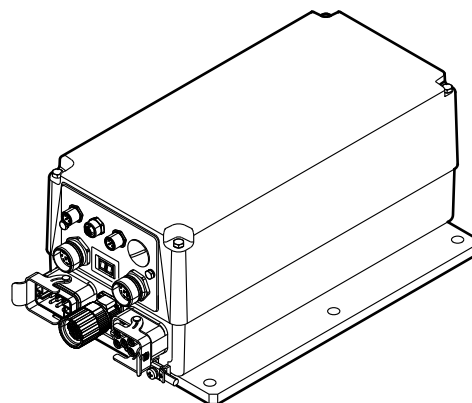
The MOVIAXIS® MMD60B is a decentralized drive unit consisting of a synchronous servomotor and a matching powerful drive inverter.

The MOVIAXIS® MMD60B is available in 2 different models:

- Drive with integrated inverter
- Decentralized frequency inverter for mounting close to the motor



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3.1.1 Unit variants

MOVIAXIS® MMD60B is available in 3 sizes:

Designation	Maximum output current [A]
MMD60B019-5A3-4-00	19.0
MMD60B024-5A3-4-00	24.0
MMD60B036-5A3-4-00	36.0

The following motor/inverter combinations are available:

Motor	MOVIAXIS® MMD60B designation		
	019	024	036
CM71L, $n_n = 4500 \text{ rpm}^{1)}$	–	X	X
CM90L, $n_n = 4500 \text{ rpm}^{1)}$	–	–	X
CM112L, $n_n = 1200 \text{ rpm}^{1)}$	–	–	X
Decentralized frequency inverter for mounting close to the motor	X	X	X

1) Drive with integrated inverter

Information on motor/inverter assignment for mounting close to the motor is available in chapter "Motor/inverter assignment" (→ p. 99).



3.1.2 Benefits and key features of the MOVIAxis® MMD60B

Highly dynamic drive solution

Technology and motion control functions that meet the highest standards, combined with maximum dynamics – all this is provided by SEW-EURODRIVE's modular system of highly dynamic servo drives. The MOVIAxis® MMD60B is the perfect decentralized servo inverter for drive and automation solutions that save time, costs and effort.

The powerful and reliable MOVIAxis® MMD60B handles a variety of drive solutions and offers a wide range of solution options for almost any application.

Integrated in the SEW modular system

The MOVIAxis® MMD60B has a special position in the portfolio of the servo drive systems. With its wide range of drive and automation solutions, the MOVIAxis® MMD60B expands the existing modular MOVIAxis® design in the control cabinet, and it is also suitable for decentralization without the use of a control cabinet.

Software support

The entire system is supported by the "all-in-one" software MOVITOOLS® MotionStudio. This software can be used for startup, parameterization, programming, and diagnostics. The execution of these functions is quick, easy, and graphically supported.

Description

The decentralized servo inverter MOVIAxis® MMD60B has been designed for compact machine and plant automation systems at the highest stage. Productivity and intelligence are combined in an ideal way, allowing for a wide range of application.

Characteristic criteria

MOVIAxis® MMD60B has the above-mentioned features thanks to the following:

- It is compact thanks to its integrated motor
- Full access to SEW's modular system, straightforward options for connecting with SEW-EURODRIVE's drive electronics in the control cabinet (e.g. MOVIAxis®, MOVI-PLC®) or decentralized operation (e.g. MOVIPRO®).
- Fully scalable when mounted close to motor with CM, CMP and CMPZ with all options.
- Direct, decentralized control of 24 V brakes is available
- More efficient use of space in control cabinet, even for high power demands of > 3 kW
- Need for control cabinet eliminated completely; no need for supply module or coupling module in control cabinet
- The entire system's EMC improves: Unshielded supply cables of unlimited length are permitted. A very short motor cable connects the motor and inverter.
- Sturdy, strong metal housing with the IP65 degree of protection
- High overload capacity: to 400%
- Peak currents of up to 36 A
- Simple to mount, reduced installation effort
- Motion control functions that range from simple, graphically selectable technology functions to optional powerful 32-bit control systems

Tiered motion control that ranges from simple positioning to support of customer-specific sequences of motion.



3.1.3 Differences compared to control cabinet functions of MOVIAXIS®

In the classic control cabinet, the MOVIAXIS® series of servo inverters consists of the following:

- Modular servo inverters with technological options
- 250% overload capacity
- Scalable system bus options
- Supply modules
- Master modules

To users familiar with MOVIAXIS® units in the control cabinet, the main differences of the MOVIAXIS® MMD60B decentralized inverter are as follows:

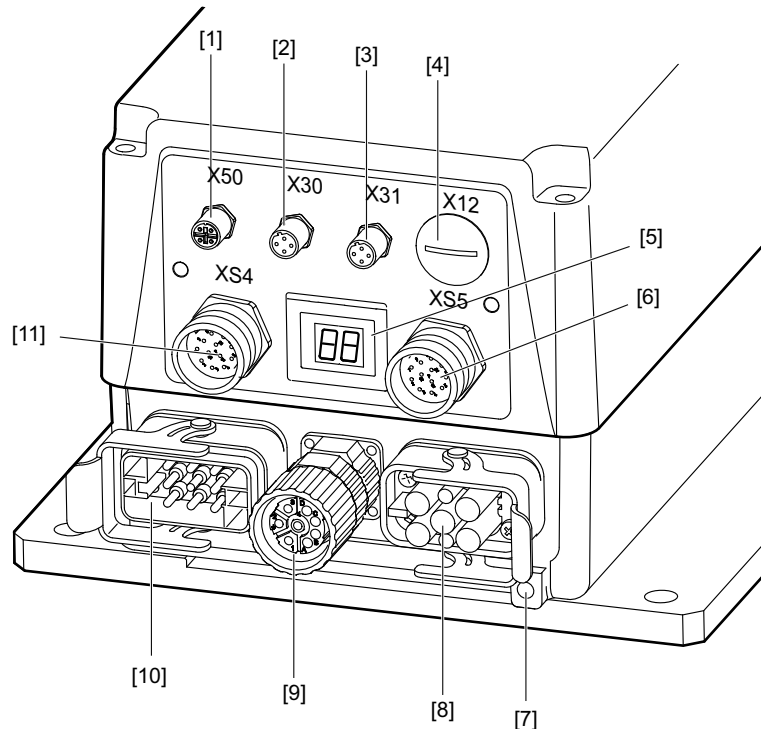
- The inverters are available with peak currents of 19, 24 and 36 A.
 - The actual level of usable continuous current depends on the following:
 - Integrated mounting or mounting close to the motor
 - PWM frequency
 - Installation of a forced cooling fan (applies only to integrated mounting)
- All 3 sizes have the same nominal current but different peak currents. An overload of up to 400% is possible.
- The reference value for all inverters' relative current levels depends on the type of cooling deployed and unit variant. This reference value deviates from the actual, unit-specific nominal current. The firmware uses the reference value to indicate current in the parameter tree and display the measured current levels in the drive oscilloscope. The following reference values apply:
 - 12.5 A \triangleq 100% for the MOVIAXIS® MMD60B, 19 A unit
 - 16.0 A \triangleq 100% for the MOVIAXIS® MMD60B, 24 A unit
 - 24.0 A \triangleq 100% for the MOVIAXIS® MMD60B, 36 A unit
 - The STO connection functions according to the principles of a +24 V input for safe disconnection. The STO connection does not function according to the MOVIAXIS® principle as an isolated relay with positively-driven feedback contacts.
 - The CAN2 bus can only be used as a point-to-point diagnostics interface for the MOVIAXIS® MMD60B. This CAN bus does not transfer cyclical process data and is preset to the address 0 with 500 kB.
 - The CAN system bus connects the supply module with the axis modules in the system of modular components and is not available to customers.
 - 6 inputs and 2 outputs are available.
 - Field bus communication with higher-level control exclusively uses the permanently installed X30 or X31 EtherCAT® interface.
 - There are no additional options, e.g. encoder connections, encoder emulations, or analog channels.

Starting the MOVIAXIS® MMD60B is like starting the MOVIAXIS® in the classic control cabinet with MOVITOOLS® MotionStudio software. Identical startup menus are used. Functions that are not available for the MOVIAXIS® MMD60B are not explicitly deactivated.



3.2 Principles of the MOVIAXIS® MMD60B's structure

The illustration below shows the basic structure of the MOVIAXIS® MMD60B inverter:



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- [1] X50: STO connection for safe disconnection
- [2] X30: EtherCAT® input signal connection
- [3] X31: EtherCAT® output signal connection
- [4] X12: Diagnostics interface (covered by screw plug)
- [5] 7-segment display
- [6] XS5: Binary inputs/outputs signal connection
- [7] PE connection
- [8] XS2: Braking resistor connection
- [9]¹⁾ XS3: Motor connection (only for mounting close to the motor)
- [10] X1: Line connection
- [11] XS4: Motor encoder input signal connection

1) The MOVIAXIS® MMD60B variant with an integrated inverter and VR forced cooling fan has a cable bushing / PG fitting at position [9] for attaching the forced cooling fan.

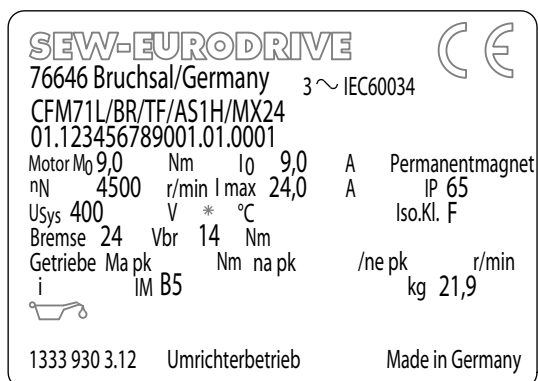


3.3 Type designation for drive with integrated inverter

3.3.1 Nameplate

The drive's nameplate is located on the inverter's face.

Example: Nameplate of a motor with an integrated inverter:

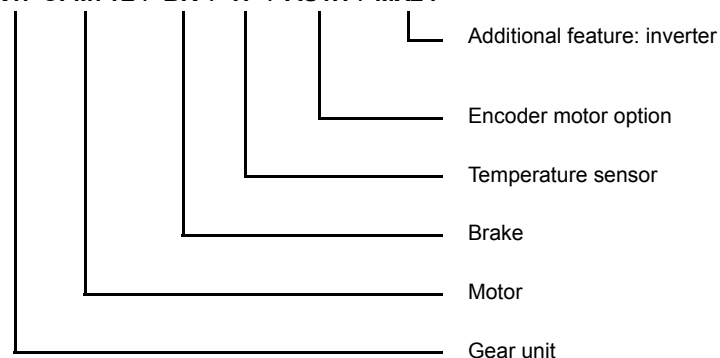


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3.3.2 Type designation

The following table shows the type designation of the MOVIAXIS® MMD60B drive:

K47 CFM71L / BR / TF / AS1H / MX24



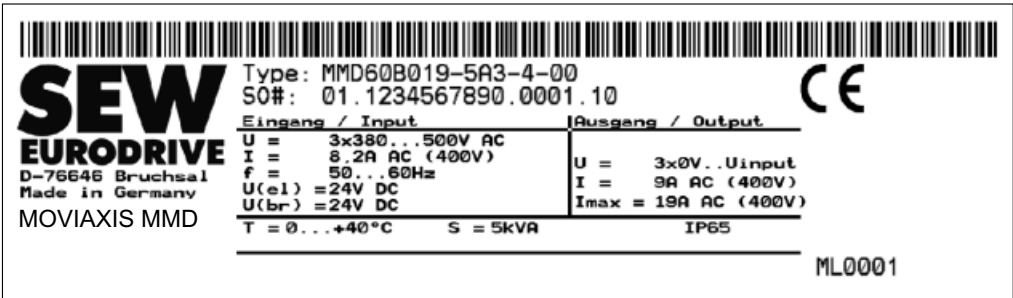
MX19: 19 A
MX24: 24 A
MX36: 36 A



3.4 Type designation of the variant "Mounted Close to the Motor"

3.4.1 Nameplate

The nameplate is located on the inverter's side.
Example: AC variant mounted close to motor



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3.4.2 Type designation

The following table displays the type designation of a MOVIAXIS® MMD60B inverter mounted close to the motor:

MMD	60B	019	5A3	4	00	
						Version
						Operating mode
						Supply voltage
						EMC filter
						Connection type
						Peak current
						Version
						Unit series

00 = Standard
4 = 4 Quadrants
5 = 380 – 500 V
A = with EMC filter
3 = 3 phases
019 = 19 A
024 = 24 A
036 = 36 A
MMD = MOVIAXIS® MMD60B



3.5 Accessories

The following accessories are available for the MOVIAXIS® MMD60B

Accessories	Part number
STO jumper plug	1 174 709 9
DI00 jumper plug	1 909 330 6

3.5.1 STO jumper plug



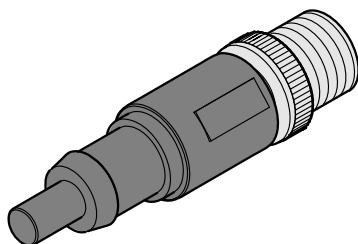
⚠ WARNING

Danger through unexpected unit behavior Safe disconnection (STO) of the MOVIAXIS® MMD60B is no longer possible if the STO jumper plug is in the X50 plug connector.

Severe or fatal injuries.

- Use the STO jumper plug only if the MOVIAXIS® MMD60B will not perform any safety functions according to DIN EN ISO 13849-1.

The following figure shows the STO jumper plug:



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The STO jumper plug can be inserted in the MOVIAXIS® MMD60B inverter's X50 connection. The STO jumper plug deactivates the safety functions of the MOVIAXIS® MMD60B.

Refer to the "MOVIAXIS® MMD60B – Functional Safety" manual when inserting the STO jumper plug.



3.5.2 DI00 jumper plug



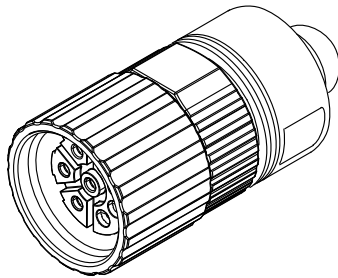
⚠ WARNING

Danger through unexpected unit behavior. If you insert the DI00 into the XS5 plug connector before starting, motor can be energized. The drive may start unexpectedly as a result.

Severe or fatal injuries.

- Insert the DI00 jumper plug only
 - if the MOVIAXIS® MMD60B is without voltage
 - and the motor's start (parameterization) has been completed correctly.

The following figure shows the DI00 jumper plug:



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The DI00 jumper plug can be inserted into the MOVIAXIS® MMD60B inverter's XS5 connection if the binary inputs are not in use.

The DI00 jumper plug permanently sets binary input DI00 to 24 V, thereby enabling the output stage. SBus^{PLUS} can now be used to control the drive of the higher-level control without connecting the binary inputs.

If, after the motor has been started, binary input DI00 = 1 and STO is not active, the drive is already energized (FCB13 Stop at application limits). Therefore, you should insert the jumper plug into the XS5 plug connector only after startup (parameterization).



4 Mechanical Installation

4.1 General information

Observe the following notes.

- Observe the information in the chapter "Safety Notes" during installation.
- 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 MOVIAXIS[®] MMD60B drive. Only use mounting and locking elements that fit into the existing bores, threads and countersinks.

4.2 Installation requirements

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

- The information on the drive's nameplate must match the voltage grid.
- The drive is undamaged (no damage caused by transport or storage)
- The ambient temperature corresponds to the specifications in chapter "Technical Data." Note that the temperature range of the gear unit may also be restricted (see gear unit operating instructions).
- The MOVIAXIS[®] MMD60B drive must not be installed under the following harmful ambient conditions:
 - In potentially explosive atmospheres
 - In the presence of dangerous oils, acids, gases, vapors, radiation, etc.

4.2.1 Installation tolerances

Information regarding the permitted tolerances of the shaft ends, center bores and flanges is available in the latest motor or gearmotor catalogs from SEW-EURODRIVE.



4.3 Installing the MOVIAXIS® MMD60B

Note the following when installing the MOVIAXIS® MMD60B drive:

- Only install the MOVIAXIS® MMD60B drive on a level, low-vibration, and torsionally rigid support structure.
- Observe the mounting positions specified on the nameplate.
- Thoroughly remove any anti-corrosion agent from shaft ends. Use a commercially available solvent. Do not expose the bearings and sealing rings to the solvent – damage to the material!
- Align the MOVIAXIS® MMD60B inverter and motor carefully to avoid placing any unacceptable strain on the motor shafts. Observe the permitted overhung and axial loads in accordance with the motor / gearmotor 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 allow for adequate cooling. Ensure that exhaust air warmed by other devices cannot be drawn in.
- Balance components that were subsequently mounted to the shaft with a half key (output shafts are balanced with a half key).
- The condensation drain holes are sealed with plastic plugs. Unplug them only if necessary.

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



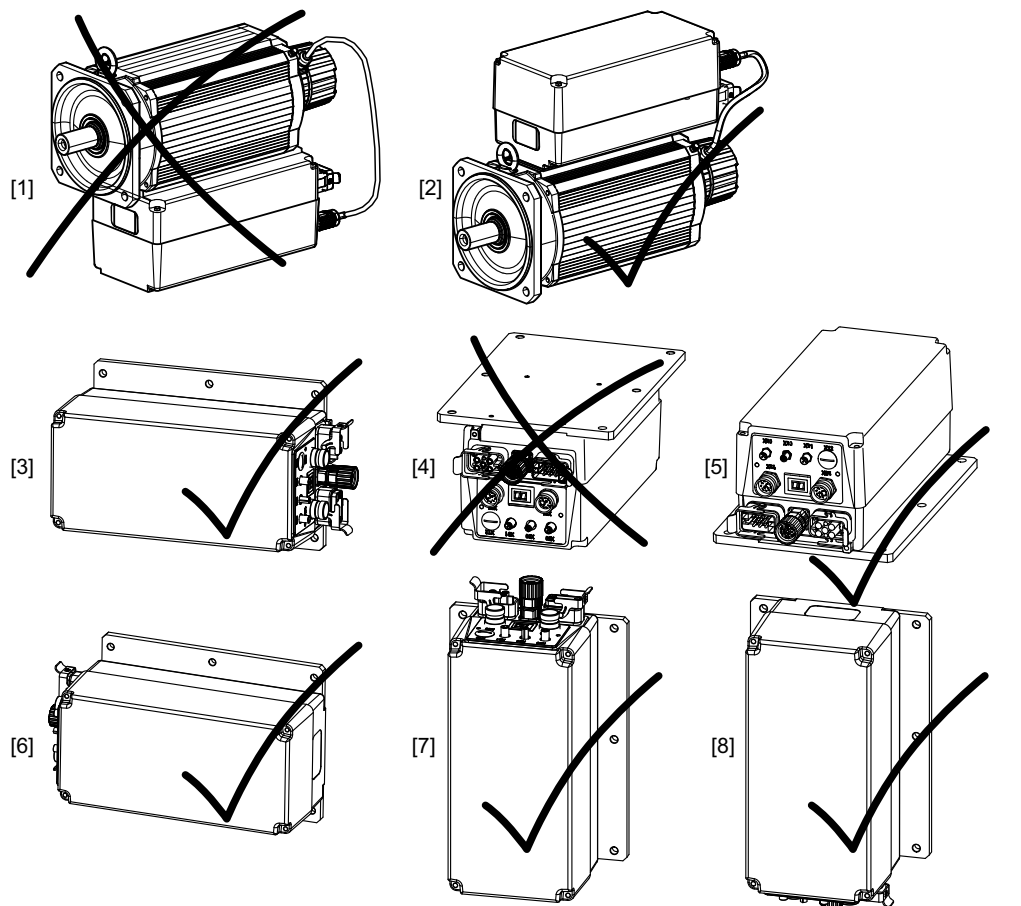
INFORMATION

The degree of protection specified in the technical data only applies if the MOVIAXIS® MMD60B inverter is properly installed.



4.4 Mounting position

The following figure shows permitted and prohibited mounting positions for the MOVIAXIS® MMD60B:



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Version	Mounting position			
	Number	Permitted	Preferred	Prohibited
Drive with integrated inverter	[1] ¹⁾			X
	[2] ²⁾	X	X	
Mounting the inverter close to the motor	[3]	X		
	[4] ¹⁾			X
	[5] ³⁾	X		
	[6]	X		
	[7]	X	X	
	[8]	X		

1) Positions [1] and [4] do not necessarily enable heat to be dissipated as required.

2) MOVIAXIS®-MMD60B drives with an integrated inverter are permitted for all mounting positions except for no. [1].

3) Output power can be increased, depending on the type and size of the mounting plate (see the chapter "Technical Data").



4.5 Assembly

The unit comes with installation bores on the base plate for mechanical installation (see the chapter "Dimension drawings") (→ p. 108).

When installing the inverter close to the motor, make sure large areas of the metal base plate are attached to the unit to ensure proper heat transfer.



5 Electrical Installation

5.1 General information

Observe the following notes on electrical installation:

- Observe the general safety notes.
- Strictly observe all instructions as to the technical data and the permissible conditions regarding the place of installation.
- Use suitable screw fittings for the cables (use reducing adapters if necessary). With connector plug versions, you must use a suitable mating connector.
- Seal open cable entries with screw plugs.
- Use protective caps to seal plug connectors not in use.

5.2 Installation instructions

5.2.1 Input fuses and earth-leakage circuit breakers

Install input fuses at the start of the grid lead after the supply bus junction.

Do not use an earth-leakage circuit breaker as the only protection device. During normal operation of the inverter, earth-leakage currents of > 3.5 mA may occur. Only use universal current-sensitive earth-leakage circuit breakers.

5.2.2 Line contactors

Use only a contactor of utilization category AC-3 (EN 60947-4-1) as a line contactor.

5.2.3 More than 4 units

If more than 4 units are connected to a line contactor rated for the total current, you will have to install a 3-phase line choke to limit the input current.

5.2.4 24 V supplies

Use a 4 A fuse to protect both the +24 V and +24 V_BR 24 V supply.



5.2.5 Information on PE connection

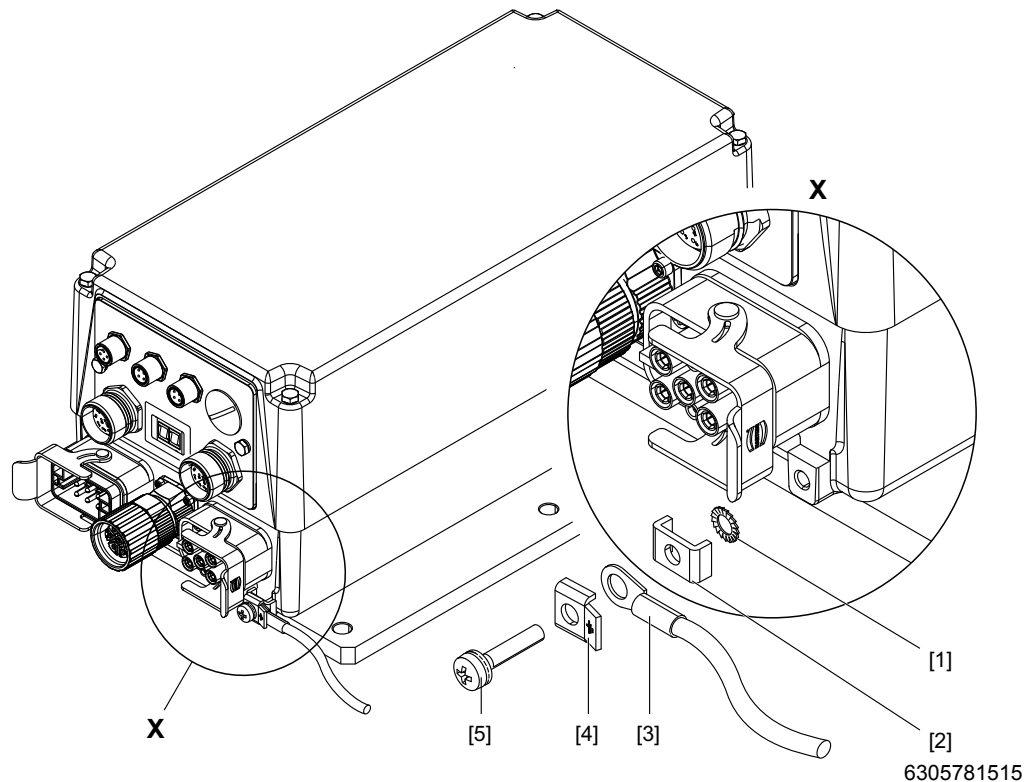


⚠ WARNING

Electric shock due to incorrect connection of PE.

Severe or fatal injuries.

- The screw's permitted tightening torque is 5 Nm (40 lb.in).
- Observe the following notes regarding PE connection.



- [1] Tooth lock washer
- [2] Terminal clip
- [3] Crimp cable lug for M5
- [4] Terminal clip
- [5] Screw M5 x 16

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

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



5.2.6 Core cross sections

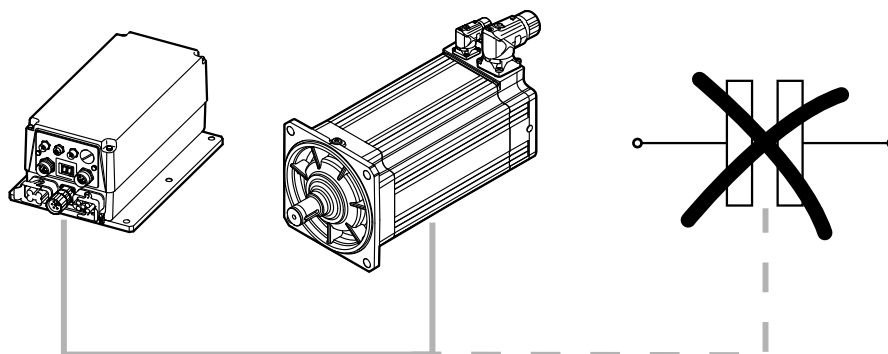
Line cable: **Core cross section according to nominal input current I_{grid} at nominal load.**

Motor lead: **Core cross section according to nominal output current I_{rated} .**

5.2.7 Unit output

Only connect ohmic/inductive loads (motors).

Never connect capacitive loads.



6456229003

5.2.8 Connecting braking resistors

Use 2 tightly twisted lines or a 2-core shielded power cable to connect the braking resistors. The cross section must be designed for the inverter's nominal output current.

Use a bimetallic relay / thermal overload relay to protect the braking resistor (BW...-...T) if this component does not come equipped with its own protection device.

5.2.9 Operating braking resistors

The connection leads running to the braking resistors carry a high DC voltage (approx. 900 V) during nominal operation.

The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_N . Choose a suitable installation location.

Install the flatpack braking resistors using appropriate touch guards.

5.2.10 Binary inputs / binary outputs

The binary inputs are electrically isolated by optocouplers.

The binary outputs are short-circuit proof but not interference-voltage-proof. External voltage can destroy the binary outputs. See the chapter "Technical Data" / "Electronic Data."



5.3 Installation planning taking EMC aspects into account



INFORMATION

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

MOVIAXIS® MMD60B units can cause EMC interference within the permitted limit range according to EN 61800-3. In this case, it is recommended for the operator to take suitable measures.

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

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

You must always apply the **relevant standards**.

Observe the notes in the following chapters in particular.

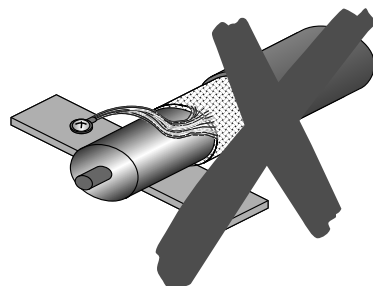
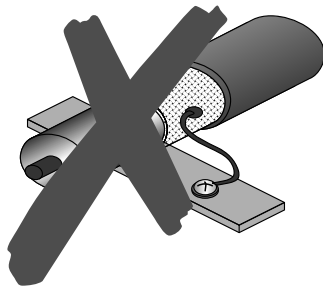
5.3.1 Separate cable ducts

- Route **power cables** and **electronic cables** in **separate cable ducts**.

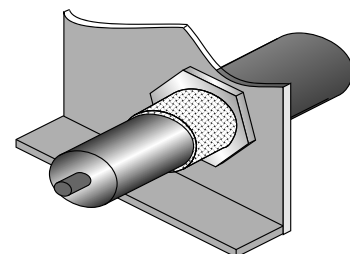
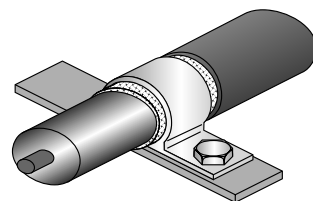
5.3.2 Shielding and grounding

- Only use shielded control cables.
- Connect the shield by the shortest possible route and make sure it is grounded over a wide area at both ends. This also applies to cables with several shielded core strands.

The following figure displays examples of correct shield connections using a metal clamp (shield terminal) or metal screw fitting.



Incorrect shield connection
via wire extension
or twisted braiding



Correct shield connection
over entire circumference to housing
or grounded surface

235857803



- Shielding can also be achieved by laying the cables in grounded sheet metal ducts or metal pipes. Always install the power and control cables separately.
- Ground the inverter and all additional devices to meet the high-frequency guidelines. This can be done by creating wide area metal-on-metal contact between the unit housing and ground.

5.3.3 Line filter

Units feature a line filter as standard. This line filter was used to demonstrate compliance with the category C2 limit class in accordance with EN 61800-3.

Installing an NF...-... line filter is an option for ensuring compliance with category C1 limit classes.

5.3.4 Interference emission

The only way to ensure compliance with category C1 and C2 limit classes in accordance with EN 61800-3 is to use a shielded motor cable on the output side for units mounted close to the motor.

5.3.5 Permitted voltage grids

MOVIAXIS[®] MMD60B is intended for operation on voltage grids with a directly grounded star point (TN and TT power systems).

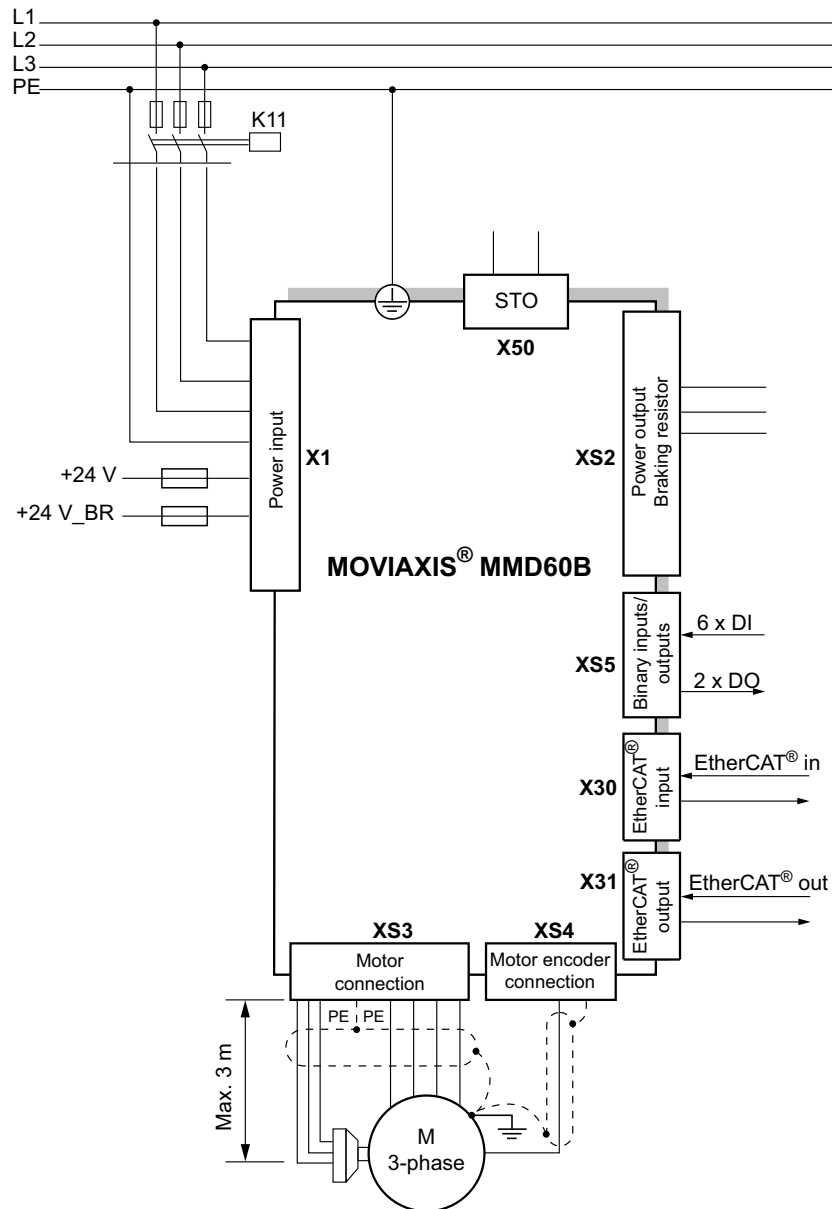
Operation on voltage grids with a non-grounded star point (IT power systems) is not permitted.



5.4 Overview of connections

5.4.1 Connection for mounting close to the motor

The following figure shows the MOVIAXIS® MMD60B inverter's connection when mounted close to the motor:

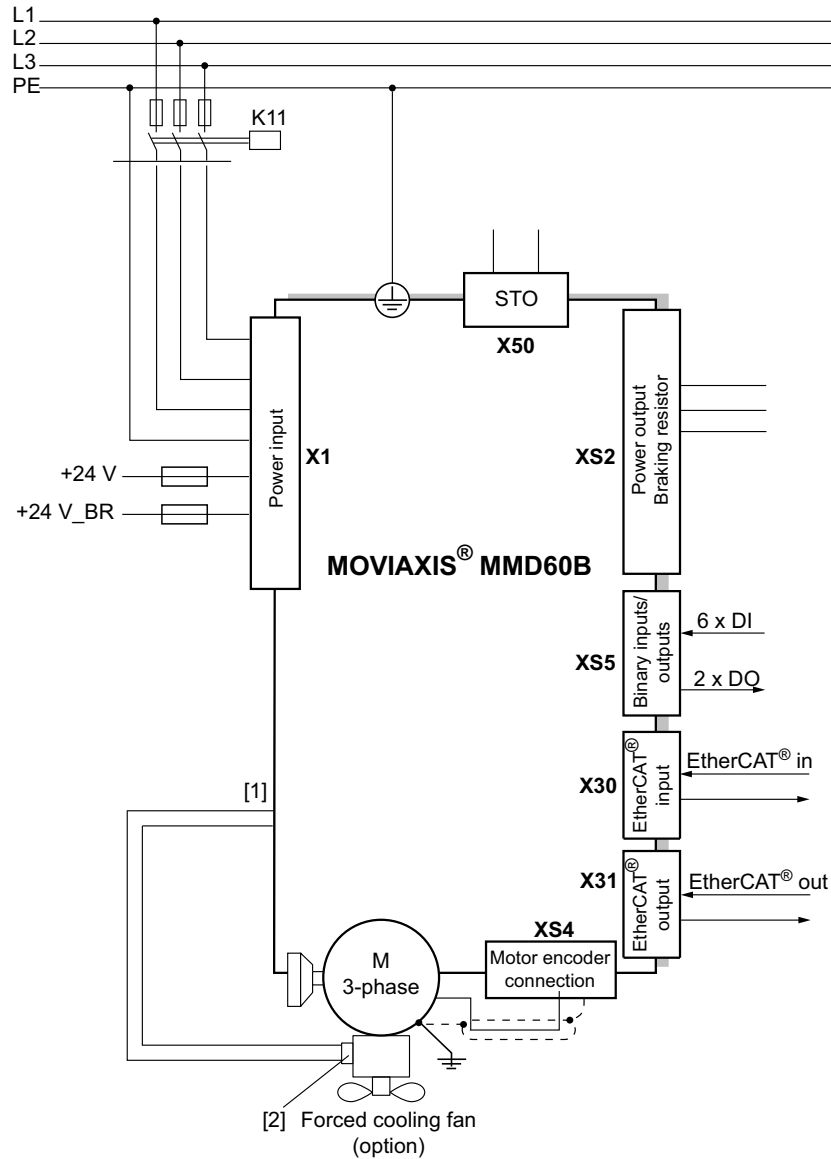


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5.4.2 Connection: drive with integrated inverter

The following figure shows the MOVIAXIS® MMD60B drive's connection with an integrated inverter:



6456521995

- [1] Cable extension with cable bushing (restricted to forced cooling fan option)
- [2] STAK200 plug connector; further information about the forced cooling fan is available in the motor catalog.

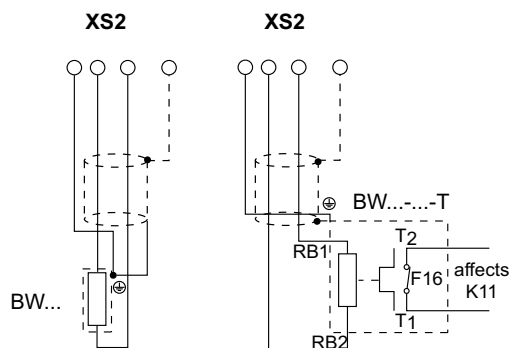


Electrical Installation

Mounting flange

5.4.3 Braking resistor connection

The following figure shows the MOVIAXIS® MMD60B inverter's braking resistor connection:



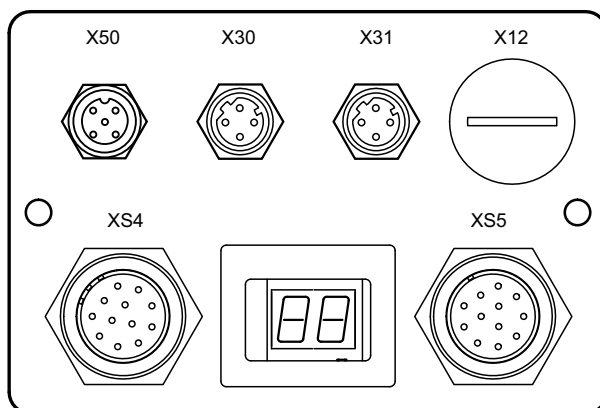
7676144395

Braking resistor	Overload protection
BW..	Intrinsically safe
BW...-T	<p>Overload protection thanks to internal temperature switch:</p> <ul style="list-style-type: none"> When the internal temperature switch trips, K11 (relay) must open. When F16 (trip contact at overload relay or temperature switch) triggers, K11 must open and "Output stage enable" must receive a "0" signal. F16 is a signal contact, which means the resistor circuit must not be interrupted.

5.5 Mounting flange

5.5.1 Signal connection panel

The following figure shows the MOVIAXIS® MMD60B inverter's signal connection area.



6457060619

	Function	Connector type
XS4	Motor encoder input	M23, 12-pole, female, 20°-coded
XS5	Binary inputs/outputs	M23, 12-pole, female, 0°-coded
X12	CAN diagnostics interface	RJ10 (behind screw fitting)
X30	EtherCAT® input	M12, 4-pin, female, D-coded
X31	EtherCAT® output	M12, 4-pin, female, D-coded
X50	STO connection for safe disconnection	M12, 5-pole, female, A-coded

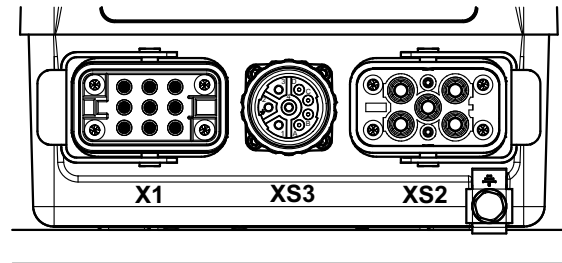


5.5.2 Power connection designs

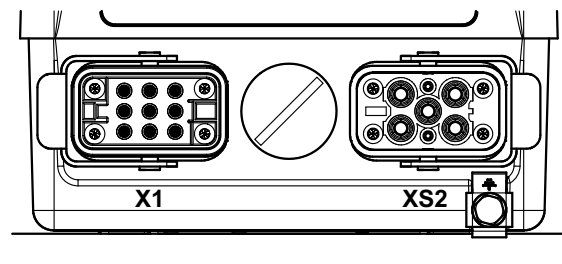
Output connection of AC MOVIAxis® MMD60B...-5A3-4-00

The following figure shows the power connections of different MOVIAxis®-MMD60B models:

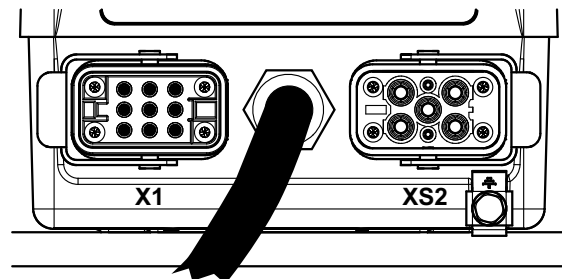
Inverter, mounted close to the motor



Drive with integrated inverter
without VR forced cooling fan



Drive with integrated inverter
with VR forced cooling fan



6457186443

	Function	Connector type
X1	AC power input	Han® Q8/0-M, male
XS2	Braking resistor	Han® Q4/2-F, female
XS3	Motor connection	Intercontec, type B DF A108



5.6 Electrical connections

5.6.1 Reference potentials

The following table shows the designations of the unit-internal reference potentials:

Designation	Meaning
GND	0V24 reference potential backup voltage of the control electronics. There is a galvanic connection to PE.
DCOM	Reference potential for binary inputs
0V24_BR	Referential potential for brake There is a galvanic connection to GND.

5.6.2 X1: Power input (AC variants only)

The following table shows information about this connection:

Function		
AC power input		
Connection type		
Han® Q8/0-M, male		
Wiring diagram		
7529682827		
Assignment		
No.	Name	Function
1	n. c.	Not assigned
2	L2	Phase L2 line connection
3	+24 V	DC 24 V input – electronics
4	+24 V_BR	DC 24 V input – brake
5	0V24_BR	0V24 reference potential – brake
6	L3	Phase L3 line connection
7	GND	Reference potential – electronics
8	L1	Line connection phase L1
PE	PE	Protective earth



5.6.3 XS2: Power output and braking resistor connection



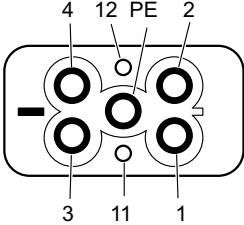
⚠ WARNING

Electric shock due to contact with the DC link voltage during operation without braking resistance.

Severe or fatal injuries.

- If no braking resistance is connected, you must close the XS2 plug connector with the cap (Harting, item no. 09120085408).

The following table shows information about this connection:

Function		
DC power output and braking resistor connection		
Connection type		
Han® Q4/2, female		
Wiring diagram		
		
7529678219		
Assignment		
No.	Name	Function
1	Uz+	DC link +
2	BRC	Output brake chopper
3	Uz-	DC link -
4	n. c.	Not assigned
PE	PE	Protective earth
11	res.	reserved (jumped internally using X1, pin 3)
12	res.	reserved (jumped internally using X1, pin 7)

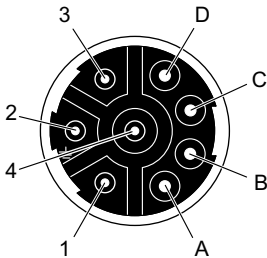
Connect the braking resistance between pin 1 (Uz+) and pin 2 (BRC).

Do not connect any other loads (e.g. DC link rounding).



5.6.4 XS3: Motor connection

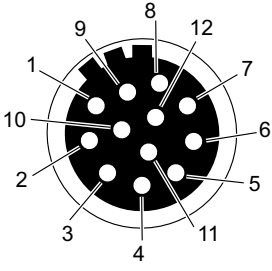
The following table shows information about this connection:

Function		
Motor connection		
Connection type		
Intercontec, B series, 8 pole, female		
Wiring diagram		
		
6474421771		
Assignment		
No.	Name	Function
1	U	U motor phase output
2	PE	Protective earth
3	W	W motor phase output
4	V	V motor phase output
A	n. c.	Not assigned
B	14	SEW brake, terminal 14 (white)
C	13	SEW brake, terminal 13 (red)
D	15	SEW brake, terminal 15 (blue)



5.6.5 XS4: Motor encoder connection

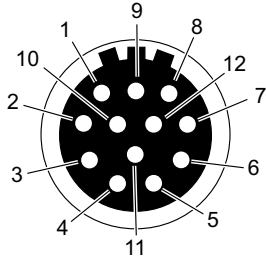
The following table shows information about this connection:

Function		
Motor encoder connection (HIPERFACE)		
Connection type		
M23, 12-pole, female, 20°-coded		
Wiring diagram		
		
2461813259		
Assignment		
No.	Name	Function
1	C	Signal track C (K0)
2	/C	Negated signal track C (/K0)
3	A	Signal track A (cos+)
4	/A	Negated signal track A (cos -)
5	B	Signal track B (sin+)
6	/B	Negated signal track B (sin -)
7	Data-	Data line (-)
8	Data+	Data line (+)
9	TF/TH/KTY+	Motor temperature sensor (+)
10	TF/TH/KTY-	Motor temperature sensor (-)
11	GND	Reference potential
12	+12 V	DC 12 V output



5.6.6 XS5: Binary inputs/outputs

The following table shows information about this connection:

Function		
Binary inputs/outputs		
Connection type		
M23, 12-pole, female, 0°-coded		
Wiring diagram		
		
2461813259		
Assignment		
No.	Name	Function
1	DI00	Binary input DI00 ¹⁾
2	DI01	Binary input DI01
3	DI02	Binary input DI02
4	DI03	Binary input DI03
5	DI04	Binary input DI04
6	DI05	Binary input DI05
7	DO01	Binary output DO01, can be configured as required
8	DO02	Binary output DO02, can be configured as required
9	DCOM	Reference potential binary inputs
10	DGND	Reference potential binary outputs
11	+24 V_O	24 V auxiliary voltage output
12	PE	Shielding

1) (with fixed assignment "Output stage enable")

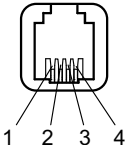
DI00 jumper plug

If the binary inputs/outputs are not in use, you can insert the DI00 jumper plug into the XS5 plug connector. See chapter "DI00 jumper plug." (→ p. 108). The DI00 jumper plug jumpers pin 1 with pin 11, and pin 9 with pin 10. This enables the output stage.



5.6.7 X12: Diagnostics interface (underneath the screw fitting)

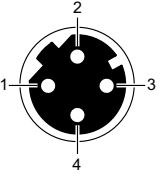
The following table shows information about this connection:

Function		
Diagnostics interface		
Connection type		
RJ10, female		
Wiring diagram		
 <div>2354433675</div>		
Assignment		
No.	Name	Function
1	n.c.	Not assigned
2	CAN_H	CAN data line (high)
3	CAN_L	CAN data line (low)
4	GND	Reference potential



5.6.8 X30 / X31: EtherCAT® input/output

The following table shows information about this connection:

Function		
EtherCAT® input/output		
Connection type		
M12, 4-pole, female, D-coded		
Wiring diagram		
		
2461813259		
Assignment		
No.	Name	Function
1	TX1+	Sending cable +
2	RX1+	Receive line +
3	TX1-	Sending cable -
4	RX1-	Receiving cable -
Screw fitting		Shielding

Connection cable

Always use shielded CAT5e Ethernet cables as connection cables.

Company Phoenix Contact offers prefabricated cables with configurable lengths. The following cables are compatible with the MOVIAXIS® MMD60B:

Plug connector	Article designation at Phoenix Contact	Use
RJ45 (male) <-> M12 (male)	Network cable VS-MSD-IP20-93E (e.g. 5 m purchase order number: 1403500)	MOVI-PLC® Advanced, X36 MOVI-PLC® Power LAN2, MOVIAXIS® in the control cabinet, XFE or SEW inverter with DFE <-> MOVIAXIS® MMD60B, M12
M12 (male) <-> M12 (male)	Bus system cable SAC-4P-M12MSD/ 5,0 933/M12MSD (5 m, purchase order number: 1524381)	MOVIAXIS® MMD60B, M12 or MOVIPRO®-ADC, X4251 <-> MOVIAXIS® MMD60B, M12 or MOVIPRO®-ADC, X4251



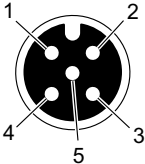
5.6.9 X50: STO connection for safe disconnection



INFORMATION

Refer to the "MOVIAXIS® MMD60B – Functional Safety" manual when using the X50 STO connection for safety functions.

The following table shows information about this connection:

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

Use only shielded cables for this connection.

STO jumper plug

Insert the STO jumper plug into connection X50 when not using the X50 STO connection for safety functions. See chapter "STO jumper plug" (→ p. 17).

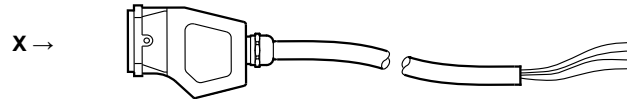


5.7 AC power connection cable

The following cable is available for connecting the MOVIAXIS® MMD60-B to the AC voltage supply.

5.7.1 Figure

Connection to X1



5.7.2 Type

Plug connector type	Number of cores and cable cross section	Part number	Installation type
Han® Q8, female	7 x 1.5 mm ² + 2 x 0.75 mm ²	1 174 124 4	Cable carrier installation

5.7.3 Pin assignment

MOVIAXIS® MMD60B connection				
Plug connector	Pin	Description	Wire color and designation	Contact type
Han® Q8, female View X	8	L1	BK / U1	Cut-off length: about 300 mm
	2	L2	BK / V1	
	6	L3	BK / W1	
	PE	PE	GN/YE	
	5	0V24_BR	BU / 15	
	4	+24 V_BR	RD / 13	
	1	n. c.	WH / 14	
	3	+24 V	BK / 1	
	7	GND	BK / 2	



5.8 Braking resistor connection

5.8.1 Braking resistor cables



⚠ WARNING

Electric shock from dangerous DC voltage levels in braking resistance cable (approx. 900 V).

Severe or fatal injuries.

- Only use the following braking resistance cable:



⚠ WARNING

Danger of burns from braking resistor's hot surfaces (in particular the heat sink).

Serious injuries

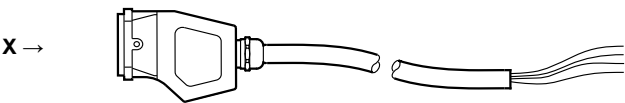
- Do not touch the braking resistor until it has cooled down sufficiently.
- Provide for sufficient cooling.

The braking resistor's cable may be no longer than 5 m.

The following prefabricated cable is available for connecting braking resistors:

Figure

Connection to XS2

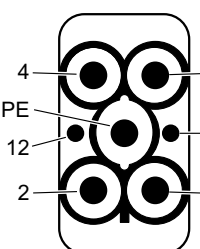


(Inverter side)

Type

Plug connector type	Number of cores and cable cross section	Part number	Installation type
Han® Q4/2, male	3 x 2.5 mm ²	1 174 357 3	Fixed installation

Pin assignment

Plug connector	Pin	Description	Wire color and designation	Contact type
Han® Q4/2, male  View X	1	+R	(BK) Black / 1	Cut-off length about 300 mm
	2	−R	(BK) Black / 2	
	3	n. c.	–	
	4	n. c.	–	
	11	n. c.	–	
	12	n. c.	–	
	PE	PE	(GN/YE) Green/yellow	



5.8.2 Braking resistor plug connector

The following plug connectors are available for customer-side braking resistor cables when connecting the braking resistor:

Plug connector type	Permitted cable Number of cores and cable cross section	Part number
Han Q4/2 / 2 x 1.5 ² , male	2 x 1.5 mm ²	1 823 032 6
Han Q4/2 / 2 x 2.5 ² , male	2 x 2.5 mm ²	1 823 033 4



5.9 Motor cable



INFORMATION

The motor cable may be no longer than 3 m.

The following prefabricated cables are available for connecting servomotors:

5.9.1 Brakemotor cable for CMP / CMPZ motors with round plug connector

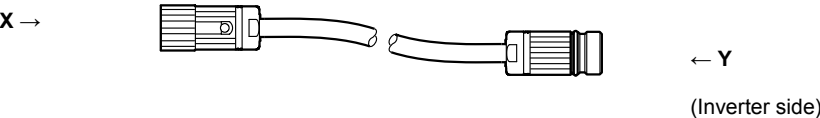


INFORMATION

The core cross section for brake control must be at least 1 mm².

Figure

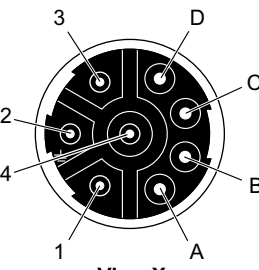
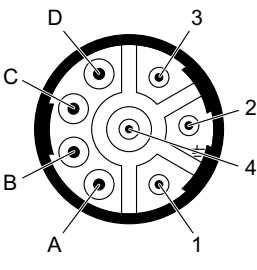
Connection to XS3



Type

Plug connector type	Number of cores and cable cross section	Part number	Installation type
SM12 / SB12	4 × 2.5 mm ² + 3 × 1 mm ²	1 335 424 8	Cable carrier installation

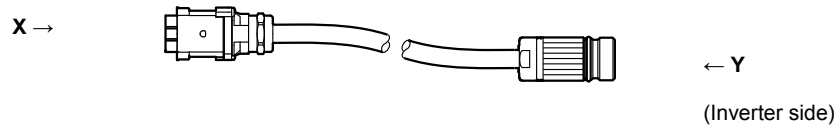
Pin assignment

Plug connector	Pin	Wire color and designation	Description	Pin	Plug connector
BSTA 078 female  View X	1	(BK / WH) Black with white lettering U, V, W	U	1	BKUA 199 male  View Y
	4		V	4	
	3		W	3	
	2	(GN / YE) Green/yellow	PE	2	
	A	–	n. c.	A	
	B	(BK / WH) Black with white lettering 1, 2, 3	2	B	
	C		1	C	
	D		3	D	



5.9.2 Brakemotor cables for CM motors with Amphenol plug connector

Figure Connection to XS3



Type

Plug connector type	Number of cores and cable cross section	Part number	Installation type
SB52 / SB62	4 x 2.5 mm ² + 3 x 1 mm ²	1 173 447 7	Cable carrier installation

Pin assignment

Plug connector	Pin	Wire color and designation	Description	Pin	Plug connector
C148 female View X	U1	(BK/WH)	U	1	BKUA 199 male View Y
	V1	Black with white lettering U, V, W	V	4	
	W1		W	3	
	PE	(GN/YE) Green/Yellow	PE	2	
		–	n. c.	A	
	3	(BK/WH)	1	C	
	4	Black with white lettering 1, 2, 3	2	B	
	5		3	D	
Plug connector type	Number of cores and cable cross section	Part number	Installation type		
BKUA199 / C148	4 x 2.5 mm ² + 3 x 1 mm ²	1 173 447 7	Cable carrier installation		



5.10 Motor encoder cable



⚠ WARNING

Electric shock from dangerous contact voltages at the unit terminals if connecting the wrong temperature sensors.

Severe or fatal injuries.

- Only connect temperature sensors with reliable isolation from the motor winding to the temperature evaluation system. Otherwise, the requirements for reliable isolation are not met.



INFORMATION

The encoder cable may be no longer than 3 m.

Please refer to the publication "Encoder Systems from SEW-EURODRIVE" in the "Drive Engineering – Practical Implementation" series for detailed information about encoder systems.

5.10.1 Motor encoder overview

You can connect the following encoders to MOVIAXIS® MMD60B:

- EK0H
- EK1H
- ES1H
- EV1H
- AK0H
- AK1H
- AS1H
- AV1H

The drives of the CM servomotors and integrated MOVIAXIS® MMD60B are equipped with HIPERFACE® encoder as standard.



INFORMATION

For further information on the encoders, please refer to the operating instructions "MOVIAXIS® Multi-Axis Servo Inverters" and publication "Encoder Systems from SEW-EURODRIVE" in the "Drive Engineering – Practical Implementation" series.

ES1H / AS1H

Type	ES1H	AS1H
Pulses (sine cycles) per revolution	1024	
Output amplitude per track	0.9 – 1.1 V _{SS} sin/cos	
Single-turn resolution	32768 increments/revolution (15 bits)	
Multi-turn resolution	–	4096 revolutions (12 bits)
Transmission protocol	HIPERFACE®	
Serial data output	Driver to EIA RS485	
Vibration (55 – 2000 Hz)	≤ 200 m/s ² (DIN IEC 68-2-6)	
Maximum speed	9000 rpm	6000 rpm



5.10.2 Encoder cable

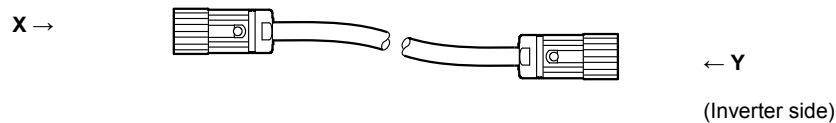
General installation information

- Max. cable length inverter – encoder: 3 m (9.8 ft) with a capacitance per unit length of ≤ 120 nF/km (193 nF/mile).
- Core cross section
 - HIPERFACE® encoder: $0.25 - 0.5$ mm² (AWG 23 – 20)
- If you cut off a conductor of the encoder cable: Isolate the core at the end.
- Use shielded cables with twisted pair conductors and make sure they are grounded on both ends over a large surface area:
 - on the encoder or on the encoder connector
 - at the inverter in the housing of the M23 connector
- Use encoder connectors with metal housing.
- Route the encoder cables separately from the power cables.
- Encoder with screw fitting: Observe the permitted diameter of the encoder cable to ensure that the screw fitting functions correctly.

The following prefabricated encoder cable is necessary when connecting the encoders of the MOVIAXIS® MMD60B drive.

Figure

Connection to XS4

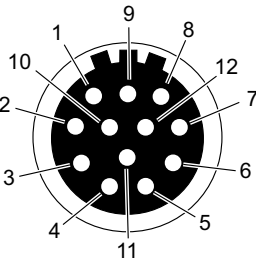
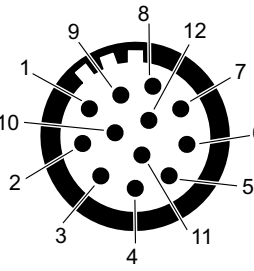


Type

Plug connector type	Part number	Installation type
ASTA021FR / ASTA021MR	1 812 145 4	Cable carrier installation



Pin assignment

Plug connector	Pin	Description	Cable core color	Pin	Plug connector
ASTA 021FR M23, 12-pole, female, 0° coded  View X	1	n. c.	—	1	AKUA 021MR M23, 12-pole, male, 20°-coded  View Y
	2	n. c.	—	2	
	3	Cos+	(RD) Red	3	
	4	Cos–	(BU) Blue	4	
	5	Sin+	(YE) Yellow	5	
	6	Sin–	(GN) Green	6	
	7	Data –	(VT) Violet	7	
	8	Data+	(BK) Black	8	
	9	TF/TH/KTY+	(BN) Brown	9	
	10	TF/TH/KTY–	(WH) White	10	
	11	GND	(GY/PK) Gray/Pink / (PK) Pink	11	
	12	+12 V	(RD/BU) Red/Blue / (GY) Gray	12	



5.11 Connection cable for binary inputs/outputs

5.11.1 Connection cable

The following prefabricated cable is available for connecting the binary inputs/outputs.

Figure

Connection to XS5

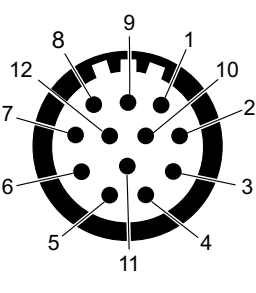


(Inverter side)

Type

Plug connector type	Number of cores and cable cross section	Part number	Installation type
M23, 12-pole, male, 0°-coded	6 x 2 x 2.5 mm ²	1 174 145 7	Cable carrier installation

Pin assignment

Plug connector	Pin	Description	Cable core color	Contact type
M23, 12-pole, male, 0°-coded  View X	1	DI00	(PK) Pink	Open cores of variable length
	2	DI01	(GY) Gray	
	3	DI02	(RD) Red	
	4	DI03	(BU) Blue	
	5	DI04	(YE) Yellow	
	6	DI05	(GN) Green	
	7	DO01	(VT) Violet	
	8	DO02	(BK) Black	
	9	DCOM	(BN) Brown	
	10	DGND	(WH) White	
	11	+24 V _O	(GY/PK) Gray/Pink	
	12	PE	(RD/BU) Red/Blue	



5.12 Optional motor brake

The optional motor brake functions as a DC-operated fail-safe brake, which means the brake is released electrically. The brake is applied automatically with spring force when the voltage is switched off or there is a power outage.

The disk brake is completely integrated into motors of the CM, CMP and CMPZ servomotor series. For these motors, the 24 V brake can be connected to the XS3 plug connector.

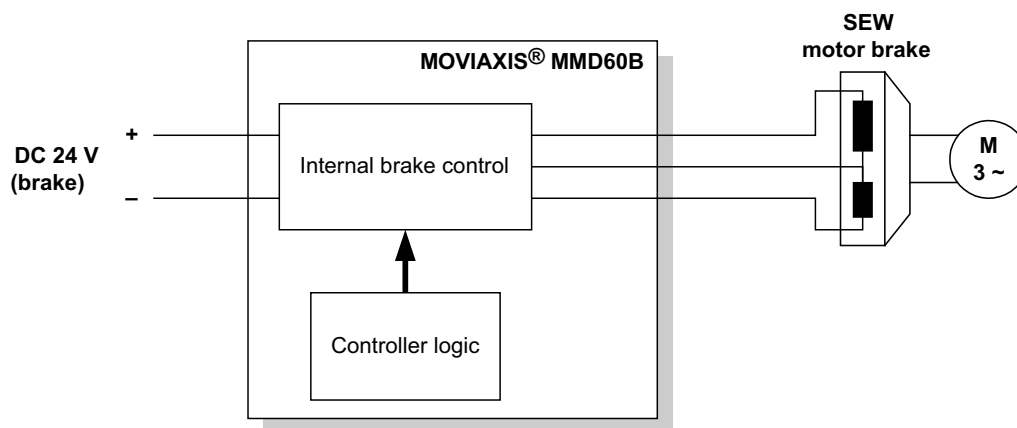
The motor brake is controlled via the internal brake control.

Refer to the motor catalog for detailed information on SEW-EURODRIVE brakes.

5.12.1 Internal brake control

The BMV internal brake control supplies and controls a 24 V brake. An additional brake rectifier is not required.

The following figure shows an example of how a 3-wire brake can be connected:



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MOVIAxis® MMD60B drives are equipped with BMV brake control as standard.

Pay attention to the following when dimensioning the 24 V supply voltage:

- Holding current I_H
- Motor brake accelerator current I_B
- The permitted voltage tolerance

See chapter "Technical data/mounting positions."

5.12.2 Cross section of the brake cable

Select the cross section of the brake cables according to the currents of the brakes used.



6 Startup

6.1 General information

Observe the information in the chapter "Safety Notes" when installing the MOVIAXIS® MMD60B.



⚠ WARNING

Electric shock from exposed power connections.

Severe or fatal injuries.

- Never start up the MOVIAXIS® MMD60B without the plug connectors' touch guards.
- Observe chapter "Electrical Installation."

6.1.1 Prerequisite:

Correct project planning for the drive is a prerequisite for successful startup. Refer to the "MOVIAXIS® Multi-Axis Servo Inverter" project planning manual for detailed project planning notes and an explanation of the parameters.

The startup functions described in this section are used to set the MOVIAXIS® MMD60B inverter so it is optimally adapted to the connected motor and to the basic condition specified. Startup has to take place according to the instructions in this section.

6.1.2 Hoist applications



⚠ WARNING

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

- The MOVIAXIS® MMD60B inverter may not be used for any safety functions in conjunction with hoist applications.
- Use monitoring systems or mechanical protection devices to ensure safety.

6.1.3 Grid connection of the servo inverter



NOTICE

Damage to the MOVIAXIS® MMD60B inverter via the line contractor's jog mode.

Damage to the inverter or unforeseeable malfunctions.

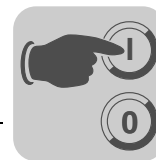
- **Do not** turn the power on or off **more than once per minute**.
- Observe a minimum switch-off time of 10 s for the line contactor.

6.1.4 Connecting cables, operating switches



INFORMATION

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



6.2 Communication between the MOVIAXIS® MMD60B and PC

There are the following communication paths for connecting laptops/PCs to the MOVIAXIS® MMD60B inverter:

- Connection via the X12 diagnostics interface of the MOVIAXIS® MMD60B
Connecting to the RJ10 socket facilitates CAN-based system bus diagnostics and parameterization.



INFORMATION

However, CAN-based cyclical process data exchange is not possible via the X12 diagnostics interface.

- Connecting via the X30 or X31 signal connection of the MOVIAXIS® MMD60B inverter: This facilitates diagnostics and parameterization based on SBus^{PLUS} or EtherCAT®

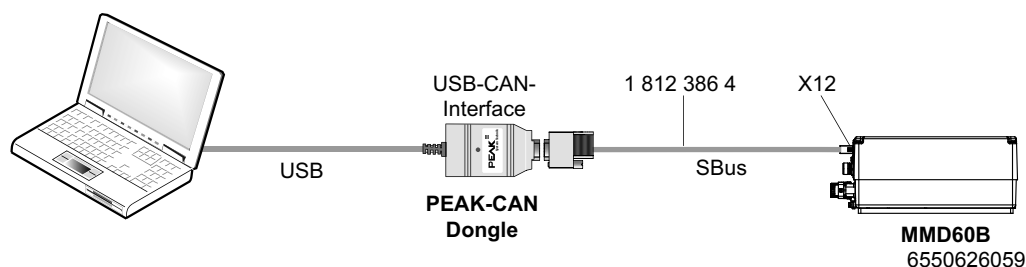
6.2.1 Communication via the X12 diagnostics interface

The X12 diagnostics interface is permanently set to the address 0 with a transmission rate of 500 kbaud. It is not possible to change the address or transmission rate.

Communication via CAN adapter

Use the CAN adapter with part number 1 821 059 7 for communicating between laptops/PCs and the MOVIAXIS® MMD60B inverter. SEW-EURODRIVE delivers this CAN adapter with a prefabricated cable and terminating resistor.

As an alternative, the CAN adapter "USB Port PCAN-USB ISO (IPEH 002022)" from the company Peak can be used. Use this CAN adapter and the cable with part number 1 812 386 4 to connect the MOVIAXIS® MMD60B inverter to laptops/PCs according to the following figure:





Startup

Communication between the MOVIAXIS® MMD60B and PC

6.2.2 Communication via the X30 or X31 signal connection

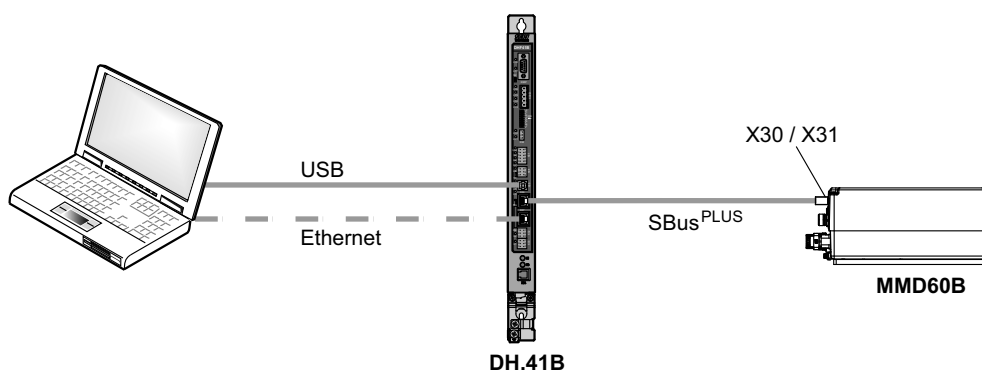
Communication via MOVI-PLC® card

Use MOVI-PLC® cards DH.41B or UHX71B for communication between laptops/PCs and the MOVIAXIS® MMD60B inverter.

Connect the MOVIAXIS® MMD60B drive to the MOVI-PLC® card via the SBus^{PLUS} system bus.

Connect laptops/PCs with MOVITOOLS® MotionStudio to the MOVI-PLC® via USB or Ethernet.

The MOVIAXIS® MMD60B inverter is identified as connected when the MOVI-PLC® card's interfaces are scanned. The MOVI-PLC® card establishes communication with the MOVIAXIS® MMD60B drive.



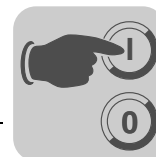
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Communication with EtherCAT® master

Connect the EtherCAT® master to the X30 or X31 signal connection of the MOVIAXIS® MMD60B inverter.

The acyclic data exchange takes place via the mailbox gateway of the EtherCAT® master. This inserts the parameter adjustment services in the EtherCAT® telegrams.

Further information on this communication variant is available in the "Communication Interface FSE24B EtherCAT® for MOVITRAC® B" manual.



6.3 MOVITOOLS® MotionStudio

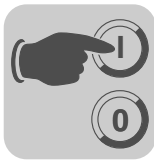
The "MOVITOOLS® MotionStudio" software package is the SEW engineering tool that you can use to access all SEW drive units. For the MOVIAxis® MMD60B, you can use MOVITOOLS® MotionStudio for startup, parameterization and diagnostics.

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

6.3.1 Integrating the MOVIAxis® MMD60B into MOVITOOLS® MotionStudio

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

1. Install the current software version of MOVITOOLS® MotionStudio on your PC.
2. Connect the MOVIAxis® MMD60B with PC/laptop.
See chapter "Communication between the MOVIAxis® MMD60B and PC." (→ p. 51).
3. Start MOVITOOLS® MotionStudio.
See Start\Programs\SEW\MOVITOOLS® MotionStudio.
4. Create a project and network.
5. Configure communication channels.
6. Perform an online scan.



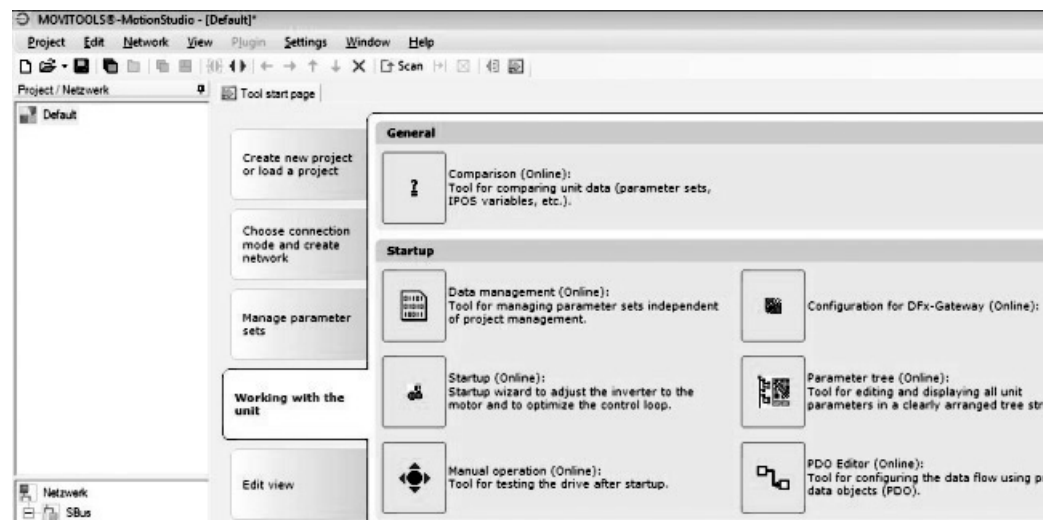
Startup Commencing startup

6.4 Commencing startup

Before startup:

Connect the MOVIAXIS® MMD60B drive to laptop/PC

and integrate the MOVIAXIS® MMD60B drive into MOVITOOLS® MotionStudio. See previous page.

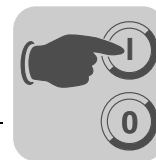


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1. Click on the corresponding unit in the hardware tree.
Click the "Working with the unit" tab.
2. Start the motor startup procedure by clicking the [Startup (online)] button.
MOVITOOLS® MotionStudio opens the start menu for motor startup:



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3. Follow the instructions of the startup assistant.

For questions on startup, refer to the MOVITOOLS® MotionStudio online help.

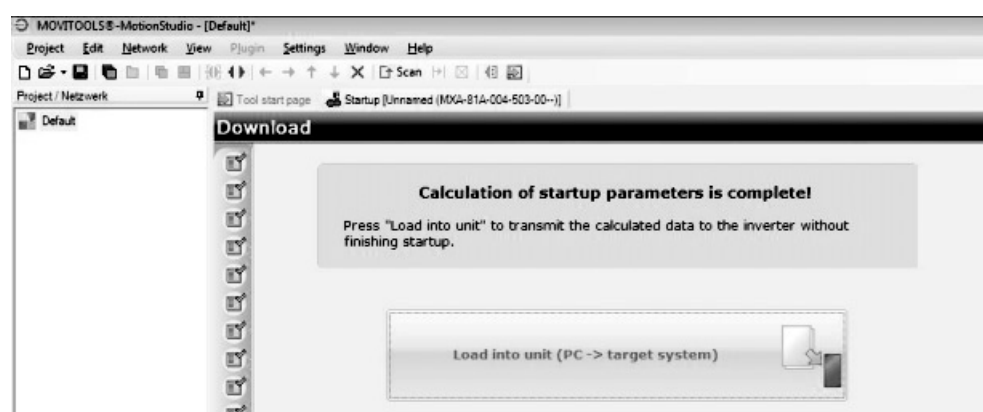


INFORMATION

- A detailed description of the startup procedure is available in the "MOVIAXIS® Multi-Axis Servo Inverters" operating instructions.
- The motor startup menus display the MOVIAXIS® multi-axis servo inverter multiple times.

4. Proceed with startup until the last motor startup menu.

Use the [Load into unit] button to load the selected/set parameters into the MOVIAXIS® MMD60B inverter.



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Once startup has been successfully completed, you can optimize the parameters in the parameter tree and operate the MOVIAXIS® MMD60B drive in manual mode.



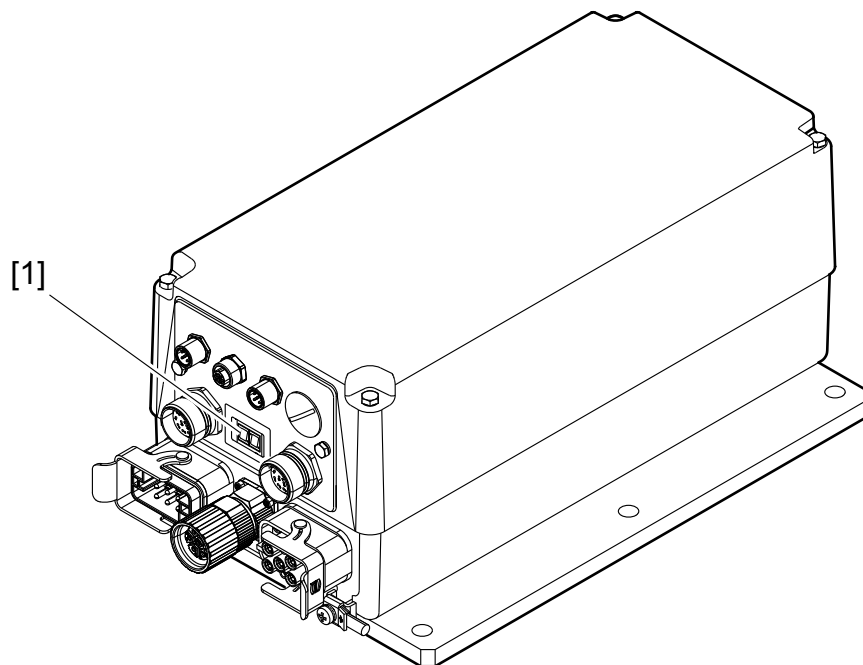
Operation

Operating display (7-segment)

7 Operation

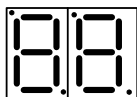
7.1 Operating display (7-segment)

The MOVIAXIS® MMD60B has a 2-digit 7-segment display:



6609184395

[1] 7-segment display



The 7-segment display displays the unit's operating status.



7.2 Table of displays

	Description	Status	Comment / action
Displays during boot process			
<div>b0</div>	The unit passes through various statuses as the firmware is being loaded (booting) before it is ready for operation.	<ul style="list-style-type: none">Status: Not ready.Output stage is inhibited.No communication possible.	<ul style="list-style-type: none">Waiting for boot process to finish.Unit retains the following status: Unit defective.
<div>b1</div>			
<div>b2</div>			
<div>b3</div>			
<div>br</div>			
Displays for various unit statuses			
<div>00</div>	No DC link voltage.	<ul style="list-style-type: none">Status: Not ready.Output stage is inhibited.Communication is possible.	Check grid.
<div>01</div>	Supply module not ready.		Check supply module.
<div>02</div>	Axis module 24 V or internal switched-mode power supply module of axis not ready for operation.		24 V check or unit defective.
<div>02</div> <div>Flashing</div>	Axis module in safe stop.		Safety function activated.
<div>03</div>	Synchronization with bus is incorrect. Processing of process data not ready.		<ul style="list-style-type: none">Check bus connection.Check synchronization setting on unit and controller.Check process data settings on unit and controller.Check if a PDO is missing.
<div>04</div> <div>Flashing</div>	The incremental encoder evaluation is not ready.		<ul style="list-style-type: none">Encoders are being initialized.Unit retains the following status:<ul style="list-style-type: none">No encoder selected."Source of actual speed" parameter shows an encoder that does not exist.
Displays during initialization processes (parameters are reset to default values)			
<div>d0</div>	Basic initialization.	<ul style="list-style-type: none">Status: Not ready.Output stage is inhibited.Communication is possible.	Waiting for initialization to finish.
<div>d1</div>	Initialization of delivery condition.		
<div>d2</div>	Initialization of factory setting.		
<div>d3</div>	Initialization of customer-specific set 1.		
<div>d4</div>	Initialization of customer-specific set 2.		



Operation

Table of displays

	Description	Status	Comment / action
Displays during normal operation			
	Output stage inhibit	<ul style="list-style-type: none"> Output stage is inhibited. 	The drive is not actuated by the output stage. The brake is applied; without brake the motor coasts to a halt. This FCB is permanently selected with terminal DI00. But it can be also selected by other sources.
	Unassigned	<p>For more information, refer to the chapter parameter description in the project planning manual.</p>	
	Unassigned		
	Unassigned		
	n-control (speed control)		Speed control with internal ramp generator.
	Interpolated n-control		Speed control with setpoints cyclically via bus. The ramp generator is located externally, e.g. in the higher-level controller.
	M-control (torque control)		Torque control
	Interpolated M-control		Torque control with setpoints cyclically via bus.
	Position control		Positioning mode with internal ramp generator.
	Interpolated position control		Positioning mode with setpoints cyclically via bus. The ramp generator is located externally, e.g. in the higher-level controller.
	Limit switch (HW & SW): free, or hit		This FCB is activated by the firmware when the limit switch is hit.
	Reference travel		The drive performs reference travel.
	Stop		Deceleration at application limit. This FCB also becomes active if no other FCB is selected as default FCB.
	Emergency stop		Deceleration at emergency stop limit.
	Stop at system limit		Deceleration at system limit.
	Electronic cam		Electronic cam active.
	Synchronous operation		Synchronous operation active.
	Calibrate encoder		Encoder commutation for synchronous motors.
	Hold control		Position control at current position.
	Jog mode		Jog mode active.
	Brake test		Brake is tested by applying torque while brake is closed.



8 Service

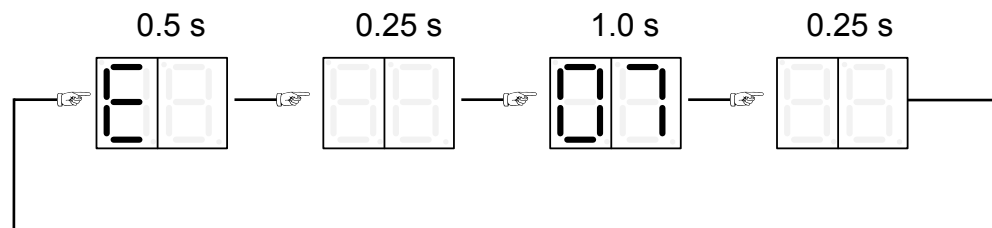
8.1 Error displays (7-segment)

The MOVIAXIS® MMD60B detects any errors that occur and displays them as error code. Each error is clearly defined by its error code and corresponding attributes, such as

- The error response
- The final status after executing the error response
- The type of reset response.

8.1.1 Error messages with the 7-segment display

MOVIAXIS® MMD60B displays the error codes as flashing numerical values on the unit. The error code is displayed in the following display sequence:



1409738251

In addition to the error code, a "sub-error code" has been defined to further localize the reason for the error. The "sub-error code" can be read by the operator via the communication connection.

The display can jump back to the statistical operation display depending on the type of error and the response programmed for an error.

8.1.2 List of faults

Explanation of terms in the error lists

Terms and abbreviations	Meaning
P	Programmable error response
D	Default error response set at the factory
SW	Software
AWE	User unit

The final error status determines which reset type will be executed in case of an error reset, see following table.

Final fault status	Response to error confirmation, also see page
Display fault only	Warm start (delete error code)
System waiting	Warm start (delete error code)
System blocked	System restart (execute soft reset)
System blocked	CPU reset (execute CPU reset)



8.1.3 Responses to error acknowledgment

CPU reset

A true restart of the microcontroller and the firmware will take place in the event of a CPU reset. The firmware system is started as though a new axis module has been connected to the network.

A restart of the system has the following effects:

- the bootstrap loader will be activated, "b0" will appear in the display
- reference positions of incremental encoder systems will be lost
- any existing fieldbus interfaces will be reset
- any existing control options will be reset
- fieldbus communication will be interrupted
- the interface between options and firmware system is initialized again a new boot synchronization to the fieldbus or control option takes place
- communication via CAN interfaces of the system will be interrupted
- the active "fault message" is reset [binary output = 1, system status = 0].

The ready signal will be reset by the system status control after the reset by the system status control.

System restart

There is **no** true reset of the microcontroller with a system restart.

The system restart has the following results:

- the firmware will be restarted, without the boot loader becoming active (no display "b0" !)
- reference positions of incremental encoder systems will be lost
- any existing fieldbus interfaces are not affected
- any existing control options are not affected
- the interface between options and firmware system is initialized again; a new boot synchronization to the fieldbus or control option takes place
- communication via CAN interfaces of the system will be interrupted
- connection to the supply module will be synchronized again (hardware information system)
- the active "fault message" is reset [binary output = 1, system status = 0].

The ready signal will be reset by the system status control after the reset by the system status control.

Warm start

A warm start only resets the fault code.

The warm start has the following effects:

- The firmware system is not rebooted
- All reference positions are maintained
- Communication is not interrupted
- The active "fault message" is reset [binary output = 1, system status = 0].



8.1.4 Table of errors



INFORMATION

Errors or sub-error codes, which are not included in the following list, can be displayed within the framework of displayed errors. In this case, contact SEW-EURODRIVE.

A "P" in the column "Error response" indicates that the response is programmable. The factory set error response is listed in the column "Error response."

The following abbreviations are used for the module designations:

- "AM" for axis module
- "SM" for supply module

Code	Error	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause	Response ²⁾		
00	No error (this display is an operating display -> see operating displays)	---	---	---	---	Ready = 1 (depending on system state) Fault = 1
01	"Overcurrent" error		<ul style="list-style-type: none"> • Output short circuit • Motor too large • Defective output stage 	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
02	"UCE monitoring" error		The error is an additional kind of over-current, measured at the collector-emitter voltage of the output stage. The possible cause of the error is identical with error 01. The distinction serves only for internal purposes.	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
03	"Ground fault" error		Ground fault <ul style="list-style-type: none"> • in the motor cable • in the inverter • in the motor 	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
04	"Brake chopper" error		Error message by supply module via signaling bus. <ul style="list-style-type: none"> • Too much regenerative power • Braking resistor circuit interrupted • Short circuit in the braking resistor circuit • Braking resistance too high • Brake chopper defective 	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
05	"Timeout HW info system" error		The connection between supply module and axis module via signaling bus has been interrupted	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Connection to signaling bus interrupted			
		02	Signaling bus timeout flag cannot be reset			
06	"Line phase failure" error		Error message by supply module via signaling bus. A missing line phase was detected.	Display only	-----	
07	"DC link" error		Error message by supply module via signaling bus when DC link voltage is too high	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0



Service Error displays (7-segment)

Code	Error	Sub error Code	Error	Response ²⁾	System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause			
08	"Speed monitoring" error		Active speed monitoring has detected an unacceptable deviation between setpoint and actual speed	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	Motor speed monitoring			
		02	Regenerative speed monitoring			
		03	System limit actual speed exceeded			
11	"AM overtemperature" error		The temperature of the AM has reached or exceeded the switch-off threshold. Possible reasons: <ul style="list-style-type: none"> Ambient temperature too high Unfavorable air convection Fan is defective Medium capacity utilization too high 	Shutdown with emergency stop delay (D), (P)	System waiting Warm start	Ready = 1 Fault = 0
		01	Limit of heat sink temperature exceeded.			
		02	The electronics' second temperature sensor signals overtemperature			
		12	The electronics' second temperature sensor signals overtemperature pre-warning.			
12	"Brake output" error		<ul style="list-style-type: none"> No brake connected Brake cable disconnected in "on" status Overload through overcurrent > 2 A (F13 has priority) Overload due to excessive connection (approx. > 0.5 Hz) Monitoring is only active with parameter settings "Brake installed" and "Brake applied."	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	Brake output			
13	"Brake supply" error		Brake supply voltage not within tolerance range of +10/-0%. Monitoring only possible with parameter settings "Brake installed" and "Brake applied" as well as with CMP and DS motors.	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	Brake supply voltage			
14	"Resolver" error		Error with resolver or resolver evaluation.	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Wire break detection resolver			
		02	Emulation error resolver (excessive speed)			
		03	Invalid period of synchronization signal			
		04	Failure of synchronization signal			
		05	Faulty parameters set for DSP			
		06	Overload at AD converter input			
		07	PLL could not be initialized			
		08	CRC error via data flash (X-flash)			
		09	CRC error via program flash (P-flash)			
		10	CRC error via program flash (P-flash)			



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		11	DSP watchdog has tripped			
		12	Invalid instruction in DSP			
		13	Unexpected interrupt in DSP			
		14	Software interrupt in DSP			
		15	Hardware stack overflow in DSP			
		16	ONCE trap in DSP			
		17	Interrupt A in DSP			
		18	Interrupt B in DSP			
		19	Invalid angle during calibration			
		20	Error deleting flash during calibration			
		21	Error programming flash during calibration			
		22	Error verifying flash during calibration			
		23	Resolver evaluation is not calibrated			
		24	PLL has locked during operation			
		256	Init phase of DSP not finished within permitted time period			
		267	Ready signal of DSP not within permitted time period			
		512	Protection against division overflow by limiting the actual speed		Set the correct system numerator/denominator values	
15	"Absolute encoder" error		An error has occurred in the checksum of the Hiperface [®] signals.	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
	Encoder input of basic unit	01	Comparison of the absolute encoder position (via Hiperface parameter channel) with the incremental position of the axis every second.		<ul style="list-style-type: none"> Check track signal wiring Check interference sources Replace encoder Replace card 	
		02	Unknown encoder type		Clarify if this encoder may be used	
		03	Encoder nameplate data corrupt BlockCheck sum via encoder manufacturer's data field range is incorrect.		Replace encoder	
		32 – 67	Encoder signals internal error. The error code is displayed as follows: [displayed value] -32. Please contact SEW-EURODRIVE for further information.		<ul style="list-style-type: none"> Check wiring and interference sources Otherwise: replace encoder 	



Service

Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
	Encoder input of basic unit	256	<ul style="list-style-type: none"> SSI encoder: Voltage dip at in voltage supply (12 V) SSI encoder signals error via set error bit in SSI protocol 		<ul style="list-style-type: none"> Check voltage supply to SSI encoder 	
					<ul style="list-style-type: none"> Check settings of SSI encoder (via error bit) Check wiring Check interference sources Replace encoder 	
		257	SSI encoder: Interrupted clock or data line		<ul style="list-style-type: none"> Check wiring Check interference source and supply voltage Check startup parameters Replace encoder 	
		258	SSI encoder: Position not within tolerance range		<ul style="list-style-type: none"> Check interference sources (interrupted beam, reflectors, data cables, etc.) Check startup parameters 	
		259	SSI encoder: SSI pulse train does not match speed sampling interval		<ul style="list-style-type: none"> Increase SSI cycle frequency Check startup parameters 	
		260	SSI encoder: User-defined errors via fault mask		<ul style="list-style-type: none"> SSI encoder reports errors, see encoder data sheet Check startup parameters 	
		261	SSI encoder: No high level present		<ul style="list-style-type: none"> Check wiring Replace encoder 	
		513	Comparison between raw position and track counter for EnDat encoder faulty		<ul style="list-style-type: none"> Check track signal wiring Check interference sources Replace encoder Replace card 	
		514	EnDat parameters measuring step is invalid		<ul style="list-style-type: none"> It may not be possible to use the EnDat encoder type. Replace encoder 	
		515	EnDat parameters PPR count is invalid		<ul style="list-style-type: none"> It may not be possible to use the EnDat encoder type. Replace encoder 	
		516	EnDat parameters multi-turn is invalid		<ul style="list-style-type: none"> It may not be possible to use the EnDat encoder type. Replace encoder 	
		544 – 575	EnDat encoder signals error status. Error codes are listed in the EnDat protocol description. EnDat error code = subcode - 544 or subcode - 4640 or subcode - 8736		<ul style="list-style-type: none"> Replace encoder 	



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
	Encoder option 1	4097	Comparison of the absolute encoder position (via Hiperface® parameter channel) with the incremental position of the axis every second.		<ul style="list-style-type: none"> • Check track signal wiring • Check interference sources • Replace encoder • Replace card 	
		4098	Unknown encoder type			
		4099	Encoder nameplate data corrupt BlockCheck sum via encoder manufacturer's data field range is incorrect.		Replace encoder	
		4128 – 4163	Hiperface® encoder signals internal error. The error code is displayed as follows: [displayed value] -4128. Please contact SEW-EURODRIVE for further information.		<ul style="list-style-type: none"> • Check wiring and interference sources • Otherwise: replace encoder 	
		4352	SSI encoder option 1: Voltage dip at in voltage supply (12 V)		Check voltage supply to SSI encoder	
		4353	SSI encoder option 1: Interrupted clock or data line		Check connection to SSI encoder	
		4354	SSI encoder option 1: Position not within tolerance range		Minimize interference	
		4355	SSI encoder option 1: SSI pulse train does not match speed sampling interval		Set a higher cycle frequency	
		4356	SSI encoder option 1: User-defined errors via fault mask			
		4357	SSI encoder option 1: No high level present		Replace option card or encoder	
		4609	Faulty comparison between raw position and check counter with EnDat encoder			
	Encoder option 1	4610	Incorrect EEPROM values in encoder			
		4611	Incorrect EEPROM values in encoder			
		4612	Incorrect EEPROM values in encoder			
		4640 – 4671	EnDat encoder signals error status. The error code is displayed as follows: [displayed value] - 5640. Error codes are listed in the EnDat protocol description.			
		4672	EnDat encoder signals internal warning			



Service

Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
	Encoder option 2	8193	Comparison of the absolute encoder position (via Hiperface [®] parameter channel) with the incremental position of the axis every second.		<ul style="list-style-type: none"> Check track signal wiring Check interference sources Replace encoder Replace card 	
		8194	Unknown encoder type			
		8195	Encoder nameplate data corrupt BlockCheck sum via encoder manufacturer's data field range is incorrect.		Replace encoder	
		8224 – 8259	Hiperface [®] encoder signals internal error. The error code is displayed as follows: [displayed value] - 8224. Please contact SEW-EURODRIVE for further information.		<ul style="list-style-type: none"> Check wiring and interference sources Otherwise: replace encoder 	
		8448	SSI encoder signals a voltage dip			
		8449	SSI encoder: Wire break detected			
		8450	SSI encoder: position not within tolerance range			
		8451	SSI encoder: SSI pulse train does not match speed sampling interval		Increase cycle frequency	
		8452	SSI encoder: user-defined errors via fault mask			
		8453	SSI encoder: no high level present		Replace option card or encoder	
		8705	Faulty comparison between raw position and check counter with EnDat encoder			
		8706	Incorrect EEPROM values in encoder			
		8707	Incorrect EEPROM values in encoder			
		8708	Incorrect EEPROM values in encoder			
		8736 – 8767	EnDat encoder signals error status. The error code is displayed as follows: [displayed value] - 8736. Error codes are listed in the EnDat protocol description.			
		8768	EnDat encoder signals internal warning			



Code	Error	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause	Response ²⁾		
16	"Startup" error		Error during startup	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Denominator of pole pair number of resolver not equal to 1			
		02	Numerator of pole pair number of resolver too large			
		03	Numerator of pole pair number of resolver too small, i.e. = 0			
		04	Denominator of emulation PPR count for resolver not equal to 1			
		05	Numerator of emulation PPR count for resolver too small			
		06	Numerator of emulation PPR count for resolver too large			
		07	Numerator of emulation PPR count for resolver is not a power of two			
		08	Denominator of emulation PPR count for sine encoder is not equal to 1			
		09	Denominator of emulation PPR count for sine encoder too small			
		10	Numerator of emulation PPR count for sine encoder too large			
		11	Numerator of emulation PPR count for sine encoder is not a power of two			
		100	The motor-inverter combination cannot reach the required test torque with the present limit values		Check limit values, adjust test torque	
		512	Invalid motor type taken into operation			
		513	Set current limit exceeds maximum current of axis			
		514	Set current limit is less than nominal magnetizing current of the motor			
		515	CFC: Factor for calculating the q-current cannot be displayed			
		516	Invalid parameterization for PWM frequency			
		517	"Final speed flux table" parameter not within permitted range			
		518	"Final flux ID table" parameter not within permitted range			
		519	Output stage enable requested without valid motor startup			
		520	Motor startup not possible with enabled output stage			
		521	Factor for torque limit cannot be displayed (A)			
		522	Factor for torque limit cannot be displayed (B)			
		525	Factors for current setpoint filter cannot be displayed			
		526	Factors for current increase limit cannot be displayed			
		527	Position FIR filter cannot show the encoder delay			
		528	Speed FIR filter cannot show the encoder delay			



Service Error displays (7-segment)

Error		Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
Code	Signal		Cause	Response ²⁾		
		529	Thermal motor monitoring I2t: Two curve points with identical speed in the speed-torque characteristics		Increase distance between curve points	
		530	Maximum motor current parameter set incorrectly			
		531	Rotor position identification: forward correction table not increasing in strictly uniform manner			
		532	Rotor position identification: CMMin too small		Nominal axis current too high compared to motor	
		533	Rotor position identification not permitted for started-up motor			
		534	PWM frequency for FCB 25 must be 8 kHz		Setting the PWM frequency to 8 kHz	
		535	TMU-Init index not set		Set TMU-Init index	
		1024	NV memory parameter of nominal unit current is greater than NV memory parameter of current measuring range			
		1025	NV memory parameter of current measuring range is zero			
		1026	NV memory parameter of current measuring range is zero			
		1027	NV memory parameter of current measuring range is too large			
		1028	System limits for speed are greater than max. possible speed			
		1029	Application limits for speed are greater than max. possible speed			
		1030	Invalid sensor type set for output stage temperature			
		1031	CFC: No absolute encoder used as motor encoder for synchronous motors			
		1032	CFC: No absolute encoder used as motor encoder for synchronous motors			
		1033	Position range in position detection mode "without overflow counter" exceeded		Correct the project planning of the travel distance	
		1034	FCB dual drive: Lag error window adjustment must not be smaller than "standard" lag error window			
		1035	FCB dual drive: Lag error window may not be smaller than adjustment threshold			
		1036	Modulo reference offset is not within modulo limit		Perform error-free startup	
		1037	Position values of software limit switch reversed, positive < negative			
		1038	Encoder system: Denominator factor (system unit) larger than or equal to numerator factor (system unit)		<ul style="list-style-type: none">Performing startupIncrease numerator factor (system unit)	
		1039	Encoder option 1 unable to evaluate set encoder type		Encoder must be operated on XGS11A	



Code	Error		Error		System status Measure Reset type	Binary output message ¹⁾
	Signal	Sub error Code	Cause	Response ²⁾		
		1040	Encoder option 2 unable to evaluate set encoder type		Use corresponding option card or connect the required encoder to the proper hardware	
		1041	The unit or option is unable to evaluate the set encoder type		Use corresponding option card or connect the required encoder to the proper hardware	
		1042	No commutation present		Set commutation with FCB25	
		1043	Standstill current not permitted for synchronous motor		Disable standstill current function	
17	Internal processor error (traps)		CPU has detected internal error	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
18	Internal software error		The software has detected a non-permissible status.	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
19	Process data error		Process data not valid	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Process data: Negative maximum torque indicated			
		02	Process data: Positive minimum torque indicated			
		03	Process data: Negative motor torque limit indicated			
		04	Process data: Negative regenerative torque limit indicated			
		05	Process data: Torque limit for quadrant 1 is negative			
		06	Process data: Torque limit for quadrant 2 is negative			
		07	Process data: Torque limit for quadrant 3 is negative			
		08	Process data: Torque limit for quadrant 4 is negative			
		09	Torque control: Maximum speed < minimum speed			
		10	Position control: Maximum speed value < 0			
		11	Position control: Maximum speed < 0			
		12	Position control: Minimum speed > 0			
		13	Process data: Enter negative acceleration			
		14	Process data: Enter negative delay			
		15	Process data: Enter negative jerk			
		16	Combination of FCB number and FCB instance does not exist			
		17	Target position outside limit switch range			
		18	Test torque in braking taste is greater than system limit		Set test torque to less than system limit	
		19	Process data: Negative speed limit		Enter positive speed limit	



Service Error displays (7-segment)

Code	Error		Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
	Signal			Cause	Response ²⁾		
			20	Switching parameter set required for active output stage		Block output stage before activating data set switch via process data (select FCB01 or approval = 0)	
			21	Selection for target or source not within permitted range		Selections for target and source must be valid table indexes	
			30	FCB 09: Target specifications in user unit outside set modulo range		Adjust modulo underflow and modulo overflow to the travel range used / select target specifications in such a way that they are within the active modulo range.	
			31	FCB 09: Target specification in user unit results in target overflow in SYS units		Increase resolution of the user unit position	
			32	FCB 09: Modulo underflow >= module overflow		Exchange modulo overflow and underflow values	
			33	FCB 09: Absolute target position requested but not referenced		Perform reference travel for position encoder	
			34	FCB 09: Acceleration or deceleration limit = 0 sent		Inspect local setpoint, application limits, system limits, sent process data	
20	Electronic cam lag error			The preset setpoint deviation limit in electronic cam mode was exceeded	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
			01	CAM: Electronic cam lag error			
21	Dual drive lag error			The preset lag error in dual drive mode "Engel" was exceeded	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
			01	FCB dual drive: Conditioning phase lag error			
			02	FCB dual drive: Lag error in normal operation			
25	"Non-volatile parameter memory" error			An error was detected during access to non-volatile parameter memory	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
			01	NV memory address access			
			02	NV memory runtime error (MemoryDevice)			
			03	Error reading data from non-volatile memory. Data cannot be used due to faulty identification or checksum.			
			04	Initialization error of memory system.			
			05	The read-only memory contains invalid data.			
			06	The read-only memory contains incompatible data of another device (for exchangeable data memories)			
			07	NV memory initialization error			
			08	NV memory internal error			
			09	NV memory JFLASH error			
			10	NV memory FLASH error			



Code	Error	Sub error Code	Error	Response ²⁾	System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause			
26	"External terminal" error		An error has been reported by a binary input terminal.	Stop with emergency stop delay (D), (P)	System waiting Warm start	Ready = 1 Fault = 0
		01	External terminal error			
27	"Limit switch" error		One or both limit switches cannot be detected at the programmed input terminals or in the control word.	Shutdown with emergency stop delay	System waiting Warm start	Ready = 1 Fault = 0
		01	Both limit switches missing or wire break			
		02	Limit switch reversed			
28	"Fieldbus timeout" error		Process data communication is interrupted.	Stop with emergency stop delay (D), (P)	System waiting Warm start	Ready = 1 Fault = 0
		01	Fieldbus timeout error			
29	"Approach hardware limit switch" error		Move to hardware limit switch during positioning	Stop with emergency stop delay (D), (P)	System waiting Warm start	Ready = 1 Fault = 0
		01	Move to right limit switch			
		02	Move to left limit switch			
30	"Deceleration timeout" error		The drive did not come to a standstill within the preset delay time.	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	Stop ramp timeout			
		02	Timeout stop at application limit			
		03	Timeout stop at system limit			
		04	Emergency stop ramp timeout			
31	Error "TF/TH Motor thermal protection"		Overtemperature sensor (KTY/TF/TH) of the drive has triggered for motor protection	"No response" (D), (P)	No response	Ready = 1 Fault = 1
		01	Motor temperature sensor wire break detected			
		02	Motor temperature sensor short circuit detected			
		03	Motor overtemperature KTY			
		04	Motor overtemperature (synchronous motor model)			
		05	Motor overtemperature (TF/TH)			
		06	Motor overtemperature I2t model			
33	"SM Boot Timeout" error		The supply module (SM) is not or no longer ready.	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	SM boot synchronization error with supply module			
36	"Lag distance synchronous operation" error		A preset, maximum permitted lag error was exceeded during synchronous operation	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	FCB synchronous operation: Lag error			
37	"System watchdog" error		Internal watchdog timer setting has been exceeded	Output stage inhibit	System blocked / CPU reset	Ready = 0 Fault = 0
38	"Technology functions" error		Error in one technology function	Shutdown with application limits [P]	System waiting Warm start	Ready = 1 Fault = 0



Service

Error displays (7-segment)

Error		Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
Code	Signal		Cause	Response ²⁾		
		01	Cam function: Trip point with negative edge < positive edge has been entered			
		02	Cam function: Command overflow trip-point processing			
		03	Cam: invalid flow control block type			
		04	Cam: invalid flow table block type			
		05	Cam: invalid ProfGen block type			
		06	Cam: invalid derivative gen. block type			
		07	Cam: invalid motor mgmt. block type			
		08	Cam: flow control block version is newer than that of the firmware			
		09	Cam: flow table block version is newer than that of the firmware			
		10	Cam: ProfGen block version is newer than that of the firmware			
		11	Cam: derivative gen. block version is newer than that of the firmware			
		12	Cam: motor mgmt. block version is newer is newer than that of the firmware			
		13	Cam: start address of cam flow table block not within DDB			
		14	Cam: the denominator of a mathematical curve must not be zero			
		15	Cam: invalid start curve type			
		16	Cam: this curve type is not permitted.			
		17	Cam: the length of the mathematical curve must be greater than or equal to 2			
		18	Cam: the master cycle of a curve defined by curve points must be greater than zero.			
		19	Cam: a sequence of transfer functions is not permitted			
		20	Cam: the sequence of transfer functions to SpeedControl is not permitted			
		21	Cam: the sequence of SpeedControl to math. curve is not permitted			
		22	Cam: the sequence of SpeedControl to abs. position control is not permitted			
		23	Cam: the sequence of SpeedControl to abs. position control is not permitted			
		24	Cam: start curve number is negative (not initialized)			
		35	Cam: a negative curve number is not permitted (not initialized)			
		26	Cam: a negative start address of a math. curve is not permitted (not initialized)			
		28	Cam: invalid initialization mode			
		29	Cam: invalid remaining distance correction mode			



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		30	Cam: start address of Cam_ProfGen block not within DDB			
		31	Cam: start address of Cam1 block not within DDB			
		32	Cam: address of Cam1 master source not within DDB			
		33	Cam: start address of Cam2 block not within DDB			
		34	Cam: address of Cam2 master source not within DDB			
		35	Cam: start address of Cam3 block not within DDB			
		36	Cam: address of CAM3 master source not within DDB			
		37	Cam: start address of CAM_DerivativeGen block not within DDB			
		38	Cam: address of derivative generator source not within DDB			
		39	Cam: start address of motor management block not within DDB			
		40	Cam: address of motor management Y source not within DDB			
		41	Cam: address of motor management V source not within DDB			
		42	Cam: address of motor management A source not within DDB			
		43	Cam: address of motor management MVorst source not within DDB			
		44	Cam: address of motor management JRel source not within DDB			
		45	Cam: address of motor management JRelNachPhi source not within DDB			
		46	Cam: the length of the mathematical curve must be greater than or equal to 3			
		47	Cam: invalid motor management mode			
		48	Cam: invalid initialization mode of the CAM-Prof-Gen			
		50	PositionSetpointGen: setpoint change is switched off			
		51	PositionSetpointGen: data structure exceeds DDB limit			
		52	PositionSetpointGen: invalid type			
		53	PositionSetpointGen: version in DDB is higher than firmware version			
		54	EGear: the master cycle for position-dependent synchronization must not be zero			
		55	EGear: the slave cycle for position-dependent synchronization must not be zero			
		56	EGear: invalid parameters for time-dependent synchronization			



Service

Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		57	PositionSetpointGen: the filter time is outside the limits			
		58	PositionSetpointGen: the slave factor is zero			
		59	EGear: parameter not activated			
		60	EGear: incorrect type			
		61	EGear: version in DDB is higher than the firmware version			
		62	PositionSetpointGen: ModuloMin \geq ModuloMax or a parameter is not within the limits			
		63	PositionSetpointGen: position source not within DDB			
		80	Position source not within DDB			
		100	VEncoder: data structure exceeds DDB limit			
		101	VEncoder: incorrect type			
		102	VEncoder: version in DDB is higher than firmware version			
		103	VEncoder: ramp parameters are invalid			
		104	VEncoder: the divisor is zero			
		105	VEncoder: ModuloMin \geq ModuloMax			
		106	VEncoder: target specification not within permitted range			
		107	VEncoder: position out of permitted range			
		108	VEncoder: operating mode not permitted			
		109	VEncoder: speed is high enough to exceed ModuloValue in 500 μ s			
		110	VEncoder: parameter max. velocity, max. jerk out of permitted range			
		120	DataRecord: data structure exceeds DDB limit			
		121	DataRecord: incorrect type.			
		122	DataRecord: version in DDB is higher than firmware version.			
		123	DataRecord: interpolation time not within limits			
		124	DataRecord: ModuloMin \geq ModuloMax or a parameter is not within the limits			
		125	DataRecord: position source not within DDB			
		126	DataRecord: the interrupt source has changed to "Waiting for interrupt" status			
		127	DataRecord: the interrupt level has changed to "Wait for interrupt" status			
		128	DataRecord: PositionExternSource is not within DDB or is not a permitted index			
		140	DataBuffer: data structure exceeds DDB limit			
		141	DataBuffer: incorrect type			
		142	DataBuffer: version in DDB is higher than firmware version			



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		160	SystemData: data structure exceeds DDB limit			
		161	SystemData: incorrect type			
		162	SystemData: version in DDB is higher than firmware version			
		180	EventControl: incorrect type			
		181	EventControl: version in DDB is higher than firmware version			
		182	EventControl: ModuloMin \geq ModuloMax or a parameter is not within the limits			
		183	EventControl: source not within DDB			
		184	CAM controller: invalid length of DDB structure			
		185	CAM controller: invalid type of DDB structure			
		186	CAM controller: invalid version of DDB structure			
		187	CAM controller: invalid data source			
		188	CAM controller: invalid cam reference			
		189	CAM controller: invalid cam data			
		190	CAM controller: track error			
39	"Reference travel" error		An error has occurred during reference travel	Output stage inhibit (D), (P)	System waiting Warm start	Ready = 1 Fault = 0
		01	FCB reference travel: timeout error during search for zero pulse			
		02	FCB reference travel: hardware limit switch before reference cam			
		03	FCB reference travel: hardware limit switch and reference cam not flush			
		04	FCB reference travel: referencing for type 0 must be set to TP			
		06	Fixed stop comes before limit switches/reference cams		Shift or activate limit switches/reference cams	
		07	Limit switches/reference cams do not overlap/overlap with fixed stop		Set limit switches/reference cams so they overlap, or that they overlap with fixed stop.	
		08	Reference offset must be smaller than 1 encoder revolution in "Single turn absolute position" encoder position mode		Set reference offset smaller than 1 encoder revolution	
		99	FCB reference travel: Reference type was changed during travel			
40	"Boot synchronization" error		Synchronization with an option card could not be executed properly	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Option bus not ready or option card faulty			
		02	Timeout during boot synchronization with option or option card faulty			
		03	New boot synchronization required for NG-DPRAM option			
		04	Timeout during boot synchronization with option or encoder option card faulty		Check connection to option bus	



Service

Error displays (7-segment)

Code	Error	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause	Response ²⁾		
41	"Watchdog timer to option" error		Connection between main processor and option card processor no longer exists	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Burst on option bus aborted by single access			
		02	Too many options in total or too many options of one kind			
		03	Resource management subsystem option error			
		04	Error in an option driver			
		05	Invalid burst length			
		06	Option found with address selection switch set to 0		Set address selection switch so that it matches the option card slot	
		07	Two options with same address selection switch found		Set address selection switch so that it matches the option card slot	
		08	CRC error XIA11A		Replace XIA11A option	
		09	Watchdog occurred at XIA11A		Replace XIA11A option	
		10	Alleged XIA11A system tick cycle violation		Inform developer	
		11	SERR on option bus		Replace option	
		12	5-volt reset on XFP11A option			
		13	Watchdog error on CP923X		Replace option or replace firmware of option	
		14	Timeout while accessing option bus		Replace option	
		15	Error interrupt for which no cause could be determined			
		18	Error on option bus		Check option card (possibly defective)	
		19	Error message from option bus connection		Report firmware error	
		21	No sync signal within a certain wait time			
		22	Sync period not divisible as whole number by basic period			
		23	Invalid sync/basic period ratio			
		24	Sync period duration not within permitted range			
		25	Timer overflow in the area of writing the timer register			
		26	Reference lost between EncEmu and count timer			
		27	Speed too high (max. counts exceeded)			
		28	Illegal parameter (emu. source, emu. hysteresis, emu. resolution)			
		29	Phase controller in setpoint limitation			
		30	No capture occurred			
		31	Encoder option 1 or 2: CRC error in the internal flash of XC161		Replace XGH / XGS	
		32	Maximum angle difference exceeded			
		33	XGS/XGH option 1: Position mode not supported		Firmware update of the option	



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		34	XGS/XGH option 2: Position mode not supported		Firmware update of the option	
42	"Lag distance positioning" error		<p>A preset, maximum permitted lag error was exceeded during positioning</p> <ul style="list-style-type: none"> Incremental encoder connected incorrectly Acceleration ramps too short P component of positioning controller too small Incorrect speed controller parameters Value of lag error tolerance too small 	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	FCB positioning lag error			
		02	FCB jog lag error			
		03	FCB standard lag error			
43	"Remote timeout" error		An interruption has occurred during control via a serial interface	Stop with application limits	System waiting Warm start	Ready = 1 Fault = 0
		01	FCB jog mode: Communication timeout during direction control			
		02	The watchdog for secure parameter communication has been activated, but was not re-triggered in time. (No connection to the device or connection too slow)		1. Check connection to device 2. Extend timeout interval of watchdog (max 500 ms) 3. Decrease utilization of computer to be controlled, close additional programs, such as MotionStudio plug-ins you no longer need	
44	"Ixt utilization" error		Inverter overloaded	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	Ixt current limit less than required D current			
		02	Chip temperature rise limit exceeded			
		03	Chip temperature limit exceeded			
		04	El.-mech. capacity utilization limit exceeded			
		05	Short circuit of sensor detected			
		06	Motor current limit exceeded			
45	"System initialization" error		Error during initialization of the system	Output stage inhibit	System blocked / CPU reset	Ready = 0 Fault = 0
		01	The measured current offsets are outside the permitted limit values			
		02	An error occurred during CRC generation for the firmware			
		03	Data bus error during RAM test			
		04	Address bus error during RAM test			
		05	Memory cell error during RAM test			
		20	Wrong FPGA version for current firmware		Reload BSP or firmware	
46	"Timeout SBUS #2" error		Communication via SBUS#2 is interrupted	Stop with emergency stop delay (D)	System waiting Warm start	Ready = 1 Fault = 0
		01	Timeout CANopen, CAN2: Control failure, cable breakage			



Service Error displays (7-segment)

Code	Error	Sub error Code	Error	Response ²⁾	System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause			
50	24 V supply voltage error		Error in the 24 V supply voltage	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	24 V signals faulty or switched-mode power supply defective		Check the 24 V supply	
		04	Internal AD converter: No conversion performed			
51	"Software limit switch" error		A software limit switch was approached during positioning	Shutdown with emergency stop delay (D), (P)	System waiting Warm start	Ready = 1 Fault = 0
		01	The right software limit switch was approached			
		02	The left software limit switch was approached			
53	"CRC flash" error		A CRC error occurred while checking the program code by flash in code RAM or resolver DSP.	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	CRC32 error in flash EEPROM section "Initial Boot Loader"			
		02	CRC32 error in flash EEPROM section "Boot Loader"			
		03	CRC32 error in flash EEPROM section "DSP firmware"			
		04	CRC32 error in code RAM (firmware) after copying from flash EEPROM			
		05	CRC32 error in code RAM (firmware) with ongoing control during operation			
		06	CRC32 error in code RAM (firmware) following a software or watchdog reset (CPU error triggered by code inconsistency)			
		07	CRC32 error in code RAM (firmware): Repeated reading of same memory cell yielded different data			
		09	Correctable bit error detected in Boot Loader Package			
		10	Correctable bit error detected in Boot Support Package			
		11	Correctable bit error detected in firmware			
55	"FPGA configuration" error		Internal error in logic module (FPGA)	Output stage inhibit	System blocked / CPU reset	Ready = 0 Fault = 0
56	"External RAM" error		Internal error in RAM module	Output stage inhibit	System blocked / CPU reset	Ready = 0 Fault = 0
		01	Asynchronous DRAM read&write check error			
		02	Asynchronous burst-RAM read & write check error			
		03	Synchronous burst-RAM read check error (burst mode failure)			
		04	FRAM error			
		05	FRAM consistency management error detected			
57	"TTL encoder" error		Error in TTL encoder	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	TTL encoder: Wire break			



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		02	TTL encoder: Emulation error (excessive speed)			
		03	TTL encoder: Invalid period of synchronization signal			
		04	TTL encoder: Failure of synchronization signal			
		05	TTL encoder: Faulty parameters set for DSP			
		06	TTL encoder: Overload at AD converter input			
		07	TTL encoder: PLL could not be initialized			
		08	TTL encoder: CRC error via data flash (X-flash)			
		09	TTL encoder: CRC error via boot flash (B-flash)			
		10	TTL encoder: CRC error via program flash (P-flash)			
		11	TTL encoder: DSP watchdog has tripped			
		12	TTL encoder: Invalid instruction in DSP			
		13	TTL encoder: Unexpected interrupt in DSP			
		14	TTL encoder: Software interrupt in DSP			
		15	TTL encoder: Hardware stack overflow in DSP			
		16	TTL encoder: ONCE trap in DSP			
		17	TTL encoder: Interrupt A in DSP			
		18	TTL encoder: Interrupt B in DSP			
		19	TTL encoder: Invalid angle during calibration			
		20	TTL encoder: Error deleting flash during calibration			
		21	TTL encoder: Error programming flash during calibration			
		22	TTL encoder: Error verifying flash during calibration			
		23	TTL encoder: Resolver evaluation is not calibrated			
		24	TTL encoder: PLL has locked during operation			
		256	TTL encoder: Init phase of DSP not finished within permitted time period			
		257	TTL encoder: Ready signal of DSP not within permitted time period			
		512	Encoder basic unit: TTL encoder: Amplitude control has failed		<ul style="list-style-type: none"> • Check wiring if error occurs immediately • Check interference source if error occurs sporadically • Replace encoder • Replace card 	
		513	Encoder basic unit: TTL encoder: EPLD reports error		Please contact SEW-EURODRIVE	



Service Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		514	Encoder basic unit: TTL encoder: Protection against division overflow by limiting the actual speed		Set the correct system numerator/denominator values	
		4608	TTL encoder option 1: Error in amplitude control			
		4609	TTL encoder option 1: EPLD error message			
		4610	TTL encoder option 1: Protection against division overflow by limiting the actual speed			
		8704	TTL encoder option 2: Error in amplitude control			
		8705	TTL encoder option 2: EPLD error message			
		8706	TTL encoder option 2: Protection against division overflow by limiting the actual speed			
58	"Sine/cosine encoder" error		Error in sine/cosine encoder evaluation	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Sine/cosine encoder: Wire break detection			
		02	Sine/cosine encoder: Emulation error (excessive speed)			
		03	Sine/cosine encoder: Invalid period of synchronization signal			
		04	Sine/cosine encoder: Failure of synchronization signal			
		05	Sine/cosine encoder: Faulty parameters set for DSP			
		06	Sine/cosine encoder: Overload at AD converter input			
		07	Sine/cosine encoder: PLL could not be initialized			
		08	Sine/cosine encoder: CRC error via data flash (X-flash)			
		09	Sine/cosine encoder: CRC error via boot flash (B-flash)			
		10	Sine/cosine encoder: CRC error via program flash (P-flash)			
		11	Sine/cosine encoder: DSP watchdog has tripped			
		12	Sine/cosine encoder: Invalid instruction in DSP			
		13	Sine/cosine encoder: Unexpected interrupt in DSP			
		14	Sine/cosine encoder: Software interrupt in DSP			
		15	Sine/cosine encoder: Hardware stack overflow in DSP			
		16	Sine/cosine encoder: ONCE trap in DSP			
		17	Sine/cosine encoder: Interrupt A in DSP			
		18	Sine/cosine encoder: Interrupt B in DSP			
		19	Sine/cosine encoder: Invalid angle during calibration			
		20	Sine/cosine encoder: Error deleting flash during calibration			



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		21	Sine/cosine encoder: Error program- ming flash during calibration			
		22	Sine/cosine encoder: Error verifying flash during calibration			
		23	Sine/cosine encoder: Resolver evalu- ation is not calibrated			
		24	Sine/cosine encoder: PLL has locked during operation			
		256	Sine/cosine encoder: Init phase of DSP not finished within permitted time period			
		257	Sine/cosine encoder: Ready signal of DSP not within permitted time period			
		512	Encoder basic unit: Sine/cosine encoder: Amplitude control has failed		<ul style="list-style-type: none"> • Check wiring if error occurs immediately • Check interference source if error occurs sporadically • Replace encoder • Replace card 	
		513	Encoder basic unit: Sine/cosine encoder: Initialization of track counter not possible		Please contact SEW- EURODRIVE	
		514	Encoder basic unit: Sine/cosine encoder: Quadrant control has failed		Set the correct system numerator/denominator values	
		515	Encoder basic unit: Sine/cosine encoder: Protection against division overflow by limiting the actual speed		Set the correct system numerator/denominator values	
		4608	Sine/cosine encoder option 1: Error in amplitude control			
		4609	Sine/cosine encoder option 1: Initial- ization of track counter not possible			
		4610	Sine/cosine encoder option 1: Error in quadrant control			
		4611	Sine/cosine encoder option 1: Protec- tion against division overflow by limiting the actual speed Error also possible with SSI encoders that can also be speed sensors, e.g. CE65.			
		8704	Sine/cosine encoder option 2: Error in amplitude control			
		8705	Sine/cosine encoder option 2: Initial- ization of track counter not possible			
		8706	Sine/cosine encoder option 2: Error in quadrant control			
		8707	Sine/cosine encoder option 2: Protec- tion against division overflow by limiting the actual speed. Error also possible with SSI encoders that can also be speed sensors, e.g. CE65.			
59	"Encoder communica- tion" error		Error of Hiperface® encoder or in Hiperface® evaluation	Shutdown with emer- gency stop delay	System waiting Warm start	Ready = 1 Fault = 0



Service

Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
	Encoder basic unit	01	Hiperface® encoder: Quadrant control has failed		<ul style="list-style-type: none"> Delete serial number when encoder is disconnected (index 9807, 1/2/3 at standard input, index 9808, 1/2/3 at Option1 and Index 9809, 1/2/3 at Option2) The reconnect encoder Restart MOVIAXIS® 	
		02	Hiperface® encoder: Track angle offset is incorrect. Can occur when replacing brake (motor sent in for brake replacement, encoder is recalibrated and commutated)			
		16	Hiperface® encoder: Encoder does not respond during communication			
		64	Hiperface® encoder: Communication error when reading type		Eliminate interference sources	
		128	Hiperface® encoder: Communication error when reading status			
		192	Hiperface® encoder: Communication error when reading serial number			
		256	Hiperface® encoder: Communication error when initializing absolute position			
		320	Hiperface® encoder: Communication error when re-initializing absolute position			
		384	Hiperface® encoder: Communication error when checking absolute position			
		448	Hiperface® encoder: Communication error when writing position			
		512	Hiperface® encoder: No response when reading analog values			
		576	Hiperface® encoder: No response when requesting encoder nameplate			
		1024	EnDat encoder: Communication error during reset command			
		1088	EnDat encoder: Communication error when initializing position			
		1152	EnDat encoder: Communication error when checking position			
		1216	EnDat encoder: Communication error when selecting memory range			
		1280	EnDat encoder: Communication error when reading a parameter			
		1388	EnDat encoder: Communication error when writing a parameter			
	Option 1	4097	Hiperface® encoder option 1: Error when checking quadrants			
		4098	Hiperface® encoder option 1: Track angle offset not correct			
		4112	Hiperface® encoder option 1: No response when requesting communication			
		4160	Hiperface® encoder option 1: No response when requesting type			
		4224	Hiperface® encoder option 1: No response when requesting status			
		4288	Hiperface® encoder option 1: No response when requesting serial number			
		4352	Hiperface® encoder option 1: No response when requesting initialization position			



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
	Option 1	4416	Hiperface® encoder option 1: No response when reinitializing position			
		4480	Hiperface® encoder option 1: No response when checking position plausibility			
		4544	Hiperface® encoder option 1: No response when writing position			
		4608	Hiperface® encoder option 1: No response when reading analog values		Check communication	
		4672	Hiperface® encoder option 1: No response when requesting encoder nameplate		Check communication	
		5120	EnDat encoder option 1: Communication error during reset command			
		5184	EnDat encoder option 1: Communication error when initializing position			
		5248	EnDat encoder option 1: Communication error when checking position			
		5312	EnDat encoder option 1: Communication error when selecting memory range			
		5376	EnDat encoder option 1: Communication error when reading a parameter			
		5440	EnDat encoder option 1: Communication error when writing a parameter			
		8193	Hiperface® encoder option 2: Error in quadrant control			
		8194	Hiperface® encoder option 2: Track angle offset is incorrect			
		8208	Hiperface® encoder option 2: No response when requesting communication			
		8256	Hiperface® encoder option 2: No response when requesting type			
	Option 2	8320	Hiperface® encoder option 2: No response when requesting status			
		8384	Hiperface® encoder option 2: No response when requesting serial number			
		8448	Hiperface® encoder option 2: No response when requesting initialization position			
		8512	Hiperface® encoder option 2: No response when reinitializing position			
		8576	Hiperface® encoder option 2: No response when checking position plausibility			
		8640	Hiperface® encoder option 2: No response when writing position			
		8704	Hiperface® encoder option 2: No response when reading analog values		Check communication	
		8768	Hiperface® encoder option 2: No response when requesting encoder nameplate		Check communication	
		9216	EnDat encoder option 2: Communication error during reset command			
		9280	EnDat encoder option 2: Communication error when initializing position			



Service Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
	Option 2	9344	EnDat encoder option 2: Communication error when checking position			
		9408	EnDat encoder option 2: Communication error when selecting memory range			
		9472	EnDat encoder option 2: Communication error when reading a parameter			
		9536	EnDat encoder option 2: Communication error when writing a parameter			
60	"DSP Communication" error		Error when flashing DSP	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Error DSP JTAG Comm: No JTAG connection			
		02	DSP Once Comm error: Debug status could not be reached			
		03	DSP Once Comm error: DSP_CPU was not in debug mode prior to execution of DSP_Code			
		04	DSP Once Comm error: DSP-PLL not locked or no external cycle present			
		05	DSP flash info FW error: ID code unknown			
		06	DSP flash info FW error: CRC error when checking one of the four flash areas			
		07	DSP flash info FW error: Unknown flash info version in DSP firmware in tri core flash			
		08	DSP flash info DSP error: Unknown flash info version in DSP firmware in DSP flash			
		09	DSP flash info DSP error: DSP code routine for calculating three CRCs not executed completely			
		10	DSP flash programming error Error deleting B-flash			
		11	DSP flash programming error Error deleting P-flash			
		12	DSP flash programming error Error deleting X-flash			
		13	DSP flash programming error Access to Flash register set during BUSY Bit			
		14	DSP flash programming error Access to FIU_CNTL register set during BUSY Bit			
		15	DSP flash programming error: Write-Read access to Flash during deletion			
		16	DSP flash programming error: Write-Read access to Flash during programming			
		17	DSP flash programming error: Flash access outside the valid range			
		18	DSP flash programming error: Error verifying B flash			
		19	DSP flash programming error: Error verifying P flash			



Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		20	DSP flash programming error: Error verifying X-flash			
		21	DSP flash programming error: Access to Flash register set during BUSY flag			
		22	DSP flash programming error: Access to FIU_CNTL register set during BUSY Bit			
		23	DSP flash programming error: Write-Read access to Flash during deletion			
		24	DSP flash programming error: Write-Read access to Flash during programming			
		25	DSP flash programming error: Flash access outside the valid range			
		26	DSP flash programming error: No longer used			
		27	DSP flash programming error: Invalid programming mode			
		28	DSP flash programming error: Page and row length not defined			
		29	DSP calibration error: CRC error X-flash			
		30	DSP calibration error: Wire break detection resolver			
		31	DSP calibration error: Emulation error resolver (excessive speed)			
		32	DSP calibration error: Invalid period of synchronization signal			
		33	DSP calibration error: Failure of synchronization signal			
		34	DSP calibration error: Faulty parameterization			
		35	DSP calibration error: Overload at AD converter input			
		36	DSP calibration error: PLL could not be initialized			
		37	DSP calibration error: CRC error via X-flash			
		38	DSP calibration error: CRC error via B-flash			
		39	DSP calibration error: CRC error via P-flash			
		40	DSP calibration error: DSP watchdog has tripped			
		41	DSP calibration error: Invalid instruction in DSP			
		42	DSP calibration error: Unexpected interrupt in DSP			
		43	DSP calibration error: Software interrupt in DSP			
		44	DSP calibration error: Hardware stack overflow in DSP			
		45	DSP calibration error: ONCE trap in DSP			
		46	DSP calibration error: Interrupt A in DSP			
		47	DSP calibration error: Interrupt B in DSP			



Service

Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		48	DSP calibration error: Invalid angle during calibration			
		49	DSP calibration error: Error deleting flash during calibration			
		50	DSP calibration error: Error programming flash during calibration			
		51	DSP calibration error: Error verifying flash during calibration			
		52	DSP calibration error: Resolver evaluation is not calibrated			
		53	DSP calibration error: PLL has locked during operation			
		54	DSP calibration error: Unknown DSP error			
66	Process data configuration error		Process data configuration error	Shutdown with emergency stop delay	System blocked System restart	Ready = 0 Fault = 0
		01	The process data configuration has been changed. The entire process data subsystem has to be restarted by means of an inverter reset.			
		102	Process data configuration error: Incorrect input process data length of communication option			
		201	Process data configuration error: 2 I/O PDOs connected to one option		I/O PDOs must be connected with different options	
		301	Two PDO mapper channels linking to the same target		Eliminate conflict of PDO mapper channels.	
		1001	Software error in process data subsystem: Process data buffer stack overflow			
		1002	Software error in process data subsystem: Process data buffer stack underflow			
		1003	Software error in process data subsystem: Too many users for process data buffer stack			
		1004	Software error in process data subsystem: 1004			
		1005	Software error in process data subsystem: 1005			
		1006	Software error in process data subsystem: 1006			
		1007	Software error in process data subsystem: Too many PDO users			
		1008	Software error in process data subsystem: Too many PDO user nodes			
		1009	Software error in process data subsystem: 1009			
		1010	Firmware error: Permitted number of PDO mapper channels exceeded			
		2000	Software		Perform factory setting	
		2001	Address is equal to 0 or higher than 127		Address 1 to 127 assigned	
		2002	Invalid PDO mapping			



Code	Error		Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
	Signal			Cause	Response ²⁾		
			10001	A PDO configured to CAN has an ID located in the area (0x200-0x3ff and 0x600-0x7ff) used for parameterization by the SBus.			
			10002	A PDO configured to CAN has an ID located in the area used by CANopen for parameterization (0x580-0x67f).			
			10003	A PDO configured to CAN is to transmit more than 4 PD. Only 0 – 4 PD are possible for CAN.			
			10004	Two or more PDOs configured to the same CAN bus use the same ID.			
			10005	Two PDOs configured to the same CAN bus use the same ID.			
			10006	Process data configuration error: Too many PDOs set to CAN (missing mem.)			
			10007	Process data configuration error: Too many PDOs set to CAN (missing CAN res.)			
			10008	Invalid transmission mode entered for a PDO configured to CAN.			
			10009	Process data configuration error: CAN ID has already been used by scope on the same CAN			
			10010	Process data configuration error: CAN ID has already been used by sync on the same CAN			
			10011	Process data configuration error: Send problems on CAN (double send err.)			
			10012	Process data configuration error: Send problems on system bus (double send err.)			
			10013	Process data configuration error: Send problems on application CAN (double send err.)			
			10014	The inhibit time is not a whole-numbered multiple of the current process data processing		Adjust inhibit time or change current process data processing	
			10015	The event timer is not a whole-numbered multiple of the current process data processing		Adjust event timer or current process data processing	
			10016	The CAN setpoint cycle is not a whole-numbered multiple of the current process data processing		Adjust CAN setpoint cycle or current process data processing	
				The CAN sync period is not a whole-numbered multiple of the current process data processing		Adjust CAN sync period or current process data processing	
			10018	The CAN sync offset is not a whole-numbered multiple of the current process data processing		Adjust CAN sync offset or current process data processing	
			10019	Data acceptance time of synchronous out-PDOs greater than or equal to CAN setpoint processing cycle. This means out-PDOs are no longer sent		Set the time of data acceptance of synchronous out-PDOs to a smaller value than the CAN setpoint processing cycle	
			20001	Configuration conflict with the master			



Service Error displays (7-segment)

Code	Error Signal	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
			Cause	Response ²⁾		
		20002	Process data configuration error: Bus master has deactivated OUT PDO or specified invalid offset			
		20003	Process data configuration error: Bus master has deactivated IN PDO or specified invalid offset			
		20004	Process data configuration error: More input PDO on K-net than permitted			
		20005	Process data configuration error: More output PDO on K-net than permitted			
		20006	Process data configuration error: More PDO words on K-net than permitted			
67	PDO timeout errors		An input PDO whose timeout interval is not 0, that has not been set to "Offline", and that has already been received once, has exceeded its timeout interval.	Stop with application delay (D), (P)	System waiting Warm start	Ready = 1 Fault = 0
		0	PDO 0			
		1	PDO 1			
		2	PDO 2			
		3	PDO 3			
		4	PDO 4			
		5	PDO 5			
		6	PDO 6			
		7	PDO 7			
		8	PDO 8			
		9	PDO 9			
		10	PDO 10			
		11	PDO 11			
		12	PDO 12			
		13	PDO 13			
		14	PDO 14			
		15	PDO 15			
68	External synchronization errors			Shutdown with emergency stop delay	System waiting Warm start	Ready = 1 Fault = 0
		01	Time limit for expected synchronization signal exceeded			
		02	Synchronization lost, synchronization period outside tolerance range			
		03	Synchronization to sync. signal not possible			
		04	Duration of sync. signal is not an integer multiple of the PDO system duration			
		05	Time limit for synchronization signal exceeded			
		06	Synchronization lost, invalid period of synchronization signal			
		07	No synchronization of the synchronization signal possible			
		08	Duration of system interval too short			
		09	Duration of system interval too long			



Code	Error	Sub error Code	Error		System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause	Response ²⁾		
		10	Duration of system interval is a multiple of the base interval			
69	Prewarning motor overtemperature errors		Motor temperature has exceeded the adjustable prewarning threshold	No response, display only	-----	Ready = 1 Fault = 1
		01	Thermal motor protection: Prewarning triggered by KTY temperature			
		02	Thermal motor protection: Prewarning triggered by synchronous motor model temperature			
		03	Thermal motor protection: Warning threshold I _{2t} model exceeded			
70	Error message word 0 errors		The error message of an unknown device was detected in the error message word	No response, display only	-----	
		01	Message error control word 0			
71	Error message word 1 errors		The error message of an unknown device was detected in the error message word	No response, display only	-----	
		01	Message error control word 1			
72	Error message word 2 errors		The error message of an unknown device was detected in the error message word	No response, display only	-----	
		01	Message error control word 2			
73	Error message word 3 errors		The error message of an unknown device was detected in the error message word	No response, display only	-----	
		01	Message error control word 3			
74	Error message word 4 errors		The error message of an unknown device was detected in the error message word	No response, display only	-----	
		01	Message error control word 4			
75	Error message word 5 errors		The error message of an unknown device was detected in the error message word	No response, display only	-----	
		01	Message error control word 5			
76	Intelligent option errors		MOVI-PLC® error	No response, display only	-----	
81	DC link overcurrent SM errors		The DC link current in the supply module has exceeded the maximum limit of 260% I _{rated}	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	SM: DC link current too high			
82	I ² xt monitoring SM prewarning		Utilization of supply module has reached prewarning level	No response (D), (P)	-----	Ready = 1 Fault = 1
		01	SM: Ixt utilization prewarning			
83	I ² xt monitoring SM errors		Utilization of supply module has reached or exceeded the cut-off threshold	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	SM: Ixt utilization error			



Service Error displays (7-segment)

Code	Error	Sub error Code	Error	Response ²⁾	System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause			
84	Brake chopper at AM errors		Error message through supply module via hardware information system. The brake chopper in the supply module is not ready for operation, triggered by BRC short-circuit monitoring or driver voltage monitoring.	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	SM: Error brake chopper			
85	Temperature monitoring SM prewarning		The temperature of the supply module is approaching the cut-off threshold	No response (D), (P)	-----	Ready = 1 Fault = 1
		01	SM: Temperature prewarning			
86	Overtemperature SM errors		The temperature of the SM has reached or exceeded the cut-off threshold.	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	SM: Temperature error			
87	Utilization braking resistor in SM prewarning		The capacity utilization of the braking resistor installed in the SM has reached the prewarning threshold (applies to 10 kW version only)	No response (D), (P)	-----	Ready = 1 Fault = 1
		01	SM: Ixt prewarning braking resistor			
88	Utilization braking resistor in SM errors		The capacity utilization of the braking resistor installed in the SM has reached or exceeded the switch-off threshold (applies to 10 kW version only)	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0
		01	Ixt utilization error braking resistor of the SM			
89	Switched-mode power supply SM errors		Switched-mode power supply SM errors	No response	-----	Ready = 1 Fault = 1
		01	At least one of the supply voltages in the SM is not present			
91	SM 24 V voltage supply warning displayed in supply module only		24 V electronics supply less than 17 V -> No error message for the axis !!	No response	-----	Ready = 1 Fault = 1
		01	24 V electronics power supply too low			
94	Device configuration data errors		An error has occurred in the device configuration data block during testing in the reset phase	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Device configuration data: Checksum error			
		02	Device configuration data: Invalid version of the configuration data set			
		03	Device configuration data: Unexpected nominal unit current		Rectify configuration or adjust firmware	
97	Copy parameter set errors		Parameter set could not be copied correctly	Output stage inhibit	System blocked System restart	Ready = 0 Fault = 0
		01	Download of parameter set to unit canceled		Repeat download or restore delivery condition	
107	Line components errors		The firmware has detected an error in one of the line components (choke, line filter, line contactor)	Display only	-----	
115	Safety functions errors		Connections X7:1 (+24 V) / X7:2 (RGND) or X8:1 (+24 V) / X8:2 (RGND) are reversed. Check wiring. Encoder cabled incorrectly	Output stage inhibit	System waiting Warm start	Ready = 1 Fault = 0



Code	Error	Sub error Code	Error	Response ²⁾	System status Measure Reset type	Binary output message ¹⁾
	Signal		Cause			
		01	Safety relays: Switching delay between shutdown channels 1 and 2 is too large. Encoder cabled incorrectly		<ul style="list-style-type: none"> One safety relay in the unit: Check fuse PCB Two safety relays in the unit: Check control/cabling of both relays: Permitted switching delay: 100 ms Check encoder wiring 	
116	Timeout MOVI-PLC errors		Communication timeout via DPRAM or SBus between MOVI-PLC [®] and unit	Emergency stop	System waiting Checking communication connection Warm start	Ready = 1 Fault = 0
197	Power failure errors		The firmware has detected a power failure	Display only	-----	

1) valid for default reaction / failure = 0 at the binary output means: Fault present

2) P = programmable, D = default response

8.2 SEW Electronics Service

8.2.1 Sending in for repair

Please contact the **SEW-EURODRIVE Electronics Service** if a fault **cannot be rectified**.

When contacting the SEW electronics service, always quote the digits of the service code so that our service personnel can assist you more effectively.

Provide the following information when sending the unit in for repair:

- Serial number (→ nameplate)
- Type designation
- Standard version or application version
- Digits of the service code
- Short description of the application (application, control via terminals or serial)
- Connected motor (motor type, motor voltage, Δ or \triangle circuit)
- Nature of the fault
- Accompanying circumstances
- Your own assumptions
- Any unusual events preceding the problem, etc.



8.3 *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.

The 24 V DC voltage supply can be applied without paying attention to any particular notes.

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 unit is connected using the nominal voltage after a longer period of storage.

If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. After you have completed the regeneration process, the unit can be used immediately or stored again.

The following stages are recommended:

AC 400/500 V units:

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

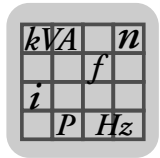
After you have completed the regeneration process, the unit can be used immediately or stored again for an extended period with maintenance.

8.4 *Disposal*

This product consists of:

- Iron
- Aluminum
- Copper
- Plastics
- Electronic components

Dispose of all components in accordance with applicable regulations!



9 Technical Data

9.1 CE marking and approvals

The MOVIAXIS® MMD60B inverter complies with the following directives and guidelines.

9.1.1 CE marking

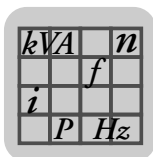
- Low Voltage Directive 2006/95/EC.
- Electromagnetic Compatibility Directive 2004/108/EC.

The MOVIAXIS® MMD60B inverter is designed for use as a component for installation in machinery and systems. It complies with the EMC product standard EN 61800-3 "Variable-speed electrical drives." Provided that you comply with the installation notes for SEW components, the CE marking requirements for the entire machine/system in which they are installed are satisfied on the basis of EMC Directive 2004/108/EC.

- Compliance with category "C2" according to EN 61800-3 has been tested on a specified test setup. SEW-EURODRIVE provides detailed information on request.



The CE mark on the nameplate indicates conformity with the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC. SEW-EURODRIVE can provide a declaration of conformity on request.



9.2 General technical data

The technical data in the following tables is valid for all MOVIAXIS® MMD60B inverters, regardless of type, version, size and performance.

MOVIAXIS® MMD60B		General technical data
Interference immunity		Meets EN 61800-3
Interference emission and EMC-compliant installation		Category C2 according to 61800-3
Ambient temperature	ϑ_A	From 0°C to 40°C
Climate class		EN 60721-3-3, class 3K3
Storage temperature	ϑ_S	From -25°C to +70°C
Storage period		Up to 2 years without special measures, see chapter "Service" for longer periods.
Degree of protection ¹⁾		IP65 according to EN 60529 (NEMA1)
Operating mode		S1 according to EN 60149-1-1 and 1-3
Pollution class		2 according to IEC 60664-1 (VDE 0110-1)
Overvoltage category		III according to IEC 60664-1 (VDE 0110-1)
Installation altitude		Up to $h \leq 1000$ m without restrictions The following restrictions apply to heights > 1000 m: • $1000 < h \leq 2000$: I_N reduction by 1% per 100 m

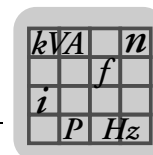
- 1) The degree of protection can be lower for drives with integrated inverters, depending on the motor, gear unit and forced cooling fan.

9.3 Unit-specific technical data

MOVIAXIS® MMD60B			Unit-specific technical data		
			019	024	036
Input					
AC power	Supply voltage	V _{line}	3 × AC 380 V –10% – 3 × AC 480 V +6%		
	Line frequency	f _{line}	50 – 60 Hz ±5%		
Output					
Output voltage		V _O	max. V _{power}		
PWM frequency		f _{PWM}	4 / 8 kHz (8 kHz = factory setting)		
Maximum output frequency			600 Hz		
Minimum permitted braking resistance ¹⁾		R _{BRmin}	47 Ω		22 Ω
Dimensions W x H x D [mounting close to the motor]			220 x 154 x 328 mm		
Weight	Version: mounting close to the motor		7.8 kg		
	Version: with servomotor ²⁾		Motor without brake	Motor with brake	
	CFM71L		19.6 kg	21.9 kg	
	CFM90L		28.5 kg	33.1 kg	
	CFM112L		45.9 kg	51.5 kg	

- 1) Only use braking resistors in accordance with the chapter "Braking resistors."

- 2) Without gear unit and forced cooling fan



9.3.1 MOVIAXIS® MMD60B decentralized frequency inverter for mounting close to the motor

MOVIAXIS® MMD60B		019	024	036
Maximum output current I_{\max}		AC 19 A	AC 24 A	AC 36 A
Continuous output current I_D	$f_{\text{PWM}} = 4 \text{ kHz}$	AC 9.0 A ¹⁾		
	$f_{\text{PWM}} = 8 \text{ kHz}$	AC 5.5 A ¹⁾		
Apparent output power S_N	$f_{\text{PWM}} = 4 \text{ kHz}$	6.2 kVA ¹⁾		
	$f_{\text{PWM}} = 8 \text{ kHz}$	3.8 kVA ¹⁾		
Nominal line current (for $V_{\text{power}} = 3 \times \text{AC } 400 \text{ V}$)	$f_{\text{PWM}} = 4 \text{ kHz}$	AC 8.2 A ¹⁾		
	$f_{\text{PWM}} = 8 \text{ kHz}$	AC 6.9 A ¹⁾		

1) These values increase by up to 25% when the decentralized frequency inverter is mounted on an aluminum cooling surface 4 times the size (440 x 620 x 10 mm).

9.3.2 MOVIAXIS® MMD60B, integrated in servomotor CFM71L

MOVIAXIS® MMD60B		024	024/VR ¹⁾	036	036/VR ¹⁾
Standstill torque M_0	$f_{\text{PWM}} = 4 \text{ kHz}$	9 Nm	13 Nm	9 Nm	13 Nm
	$f_{\text{PWM}} = 8 \text{ kHz}$	6.7 Nm	10.5 Nm	6.7 Nm	10.5 Nm
Maximum torque M_{\max}		23 Nm		30 Nm	
Nominal line current (for $V_{\text{line}} = 3 \times \text{AC } 400 \text{ V}$)		AC 2.2 A	AC 7.9 A	AC 2.2 A	AC 7.9 A
Nominal speed n_n		4500 rpm			

1) VR = with forced cooling fan option

9.3.3 MOVIAXIS® MMD60B, integrated in servomotor CFM90L

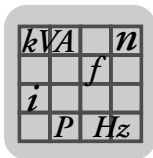
MOVIAXIS® MMD60B		036	036/VR ¹⁾
Standstill torque M_0	$f_{\text{PWM}} = 4 \text{ kHz}$	11 Nm	22 Nm
	$f_{\text{PWM}} = 8 \text{ kHz}$	8 Nm	16 Nm
Maximum torque M_{\max}		35 Nm	
Nominal line current (for $V_{\text{line}} = 3 \times \text{AC } 400 \text{ V}$)		AC 3.0 A	AC 9.0 A
Nominal speed n_n		4500 rpm	

1) VR = with forced cooling fan option

9.3.4 MOVIAXIS® MMD60B, integrated in servomotor CFM112L

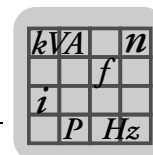
MOVIAXIS® MMD60B		036	036/VR ¹⁾
Standstill torque M_0	$f_{\text{PWM}} = 4 \text{ kHz}$	36 Nm	67 Nm
	$f_{\text{PWM}} = 8 \text{ kHz}$	26 Nm	58 Nm
Maximum torque M_{\max}		127 Nm	
Nominal line current (for $V_{\text{line}} = 3 \times \text{AC } 400 \text{ V}$)		AC 5.6 A	AC 13.4 A
Nominal speed n_n		1200 rpm	

1) VR = with forced cooling fan option



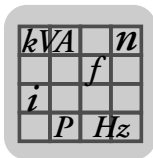
9.3.5 Electronics data

MOVIAXIS® MMD60B		General electronics data	
6 binary inputs (XS5)			
		Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 1 ms	
Internal resistance		$R_i \approx 3.0 \text{ k}\Omega$, $I_E \approx 10 \text{ mA}$	
Signal level		13 V – 30 V = "1" = contact closed -3 V – 5 V = "0" = contact open	according to EN 61131
Function		DI00: "Output stage enable" fixedly assigned DI01 – DI08: Selection option → parameter menu DI01 and DI02 suitable for touch probe function (latency period < 100 µs)	
2 binary outputs (XS5)			
		PLC-compatible (EN 61131-2), response time 1 ms, short-circuit-proof, $I_{\text{max}} = 50 \text{ mA}$	
Signal level		"0" = 0 V, "1" = +24 V, Important: Do not apply external voltage!	
Function		DO00 – DO03: Selection option → parameter menu	
CAN diagnostics interface (X12)			
		CAN bus in accordance with CAN specification 2.0, parts A and B, transmission technology in accordance with ISO 11898, max. 64 stations	
STO connection for safe disconnection (X50)			
Power consumption		6 W	
Inherent capacitance		270 µF	
Time for restart	t_A	200 ms	
Time to inhibit output stage	t_S	200 ms	
Signal level		DC +19.2 V – +30 V = "1" = contact closed DC -30 V – +5 V = "0" = contact open	
24 volt power supply "Electronics" (X1) ¹⁾			
Without motor forced cooling fan		24 V	+/- 25 % (in accordance with EN 61131)
With motor forced cooling fan		24 V	+/- 10 % The forced cooling fan is powered by the electronics supply.
Power consumption		21 W (+1 W for encoders)	



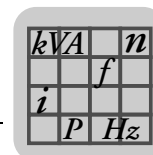
MOVIAXIS® MMD60B		General electronics data		
24 volt power supply "Brake" (X1) ¹⁾ (drive with integrated inverter)				
BR, BY working brake		24 V	0 to 10 %	
BP holding brake		24 V	0 to 10 %	
For motor / brake		CM71L / BR1	CM90L / BR2	CM112L / BR8
Max. braking torque	M _{Bmax}	20 Nm	40 Nm	90 Nm
Current consumption		1.5 A	1.7 A	2.6 A
Power consumption	P _B	36 W	41 W	62 W
Inrush current ratio ²⁾	I _B /I _H	4.0	4.0	6.3
Holding current	I _H	1.5 A	1.7	2.6
24 volt power supply "Brake" (X1) ¹⁾ (mounting close to the motor)				
The power consumption of other brakes is available in the motor catalog. For emergency stop, emergency switch-off and hoist applications, all poles of the supply voltage must be disconnected.				
Only connect SEW brakes with the following values to the BMV internal brake control:				
Supply voltage of the SEW brake		24 V		
Max. holding current	I _H	3.0 A		
24 volt supply "Forced cooling fan" ³⁾ (only for drives with integrated inverters)				
For motor		CM71	CM90	CM112
Supply voltage		DC 24 V ± 10 %	DC 24 V ± 10 %	DC 24 V ± 10 %
Current consumption		0.46 A	0.46 A	0.75 A
Power consumption		11 W	11 W	18 W
Air discharge rate		118 m³/h	118 m³/h	275 m³/h
Ambient temperature		–20 – +60°C	–20 – +60°C	–20 – +60°C
Degree of protection		IP54 / IP55	IP54 / IP55	IP54 / IP55
Connection	I _H	Plug connector	Plug connector	Plug connector
Auxiliary voltage output "Sensors / Actuators" (XS5)				
Auxiliary voltage		24 V		
Tolerance		Tolerance of the electronics supply		
Maximum current	I _{max}	700 mA		
Reference potential		DGND		

- 1) To guarantee higher inrush currents, the current source must be able to supply twice the necessary rated current for 1 second.
- 2) The acceleration current I_B (= inrush current) only flows for a short time (ca. 120 ms) when the brake is released or during voltage dips below 70% of rated voltage. The values for the holding currents I_H are arithmetic mean values.
- 3) Using the VR forced cooling fan increases the continuous thermal torque. Refer to the characteristic curves for the increased continuous torque values. The increased continuous torque values for motors with the VR forced cooling fan mounted close to the motor are available from the corresponding motor catalogs. The power consumption of other forced cooling fans is available in the motor catalog.



9.3.6 Plug connectors and core cross sections

Connection		Plug connector Type	Max. core cross section for connection
Power			
Power connection	X1	Han® Q8/0	4 mm ²
DC link connection	X1 or XS2	Han® Q8/0 or Han Q4/2	4 mm ² or 6 mm ²
Motor connection	XS3	Intercontec B, 8-pole	4 mm ²
Braking resistor connection	XS2	Han® Q4/2	6 mm ²
24 V supply			
Electronics supply	X1	Han® Q8/0	4 mm ²
Mass electronics supply	X1	Han® Q8/0	4 mm ²
Brake supply	X1	Han® Q8/0	4 mm ²
Mass brake supply	X1	Han® Q8/0	4 mm ²
Encoders and binary inputs/outputs			
Encoder connection	XS4	M23, 12-pole	1 mm ² (crimp) 1.5 mm ² (solder)
Binary inputs/outputs	XS5	M23, 12-pole	1 mm ² (crimp) 1.5 mm ² (solder)
EtherCAT® and STO			
EtherCAT® connection	X30 and X31	M12, 4-pole	See network specification
STO connection	X50	M12, 5-pole	See electronics data
Service interface			
Connection	X12	RJ10	See chapter "Electr. Installation" / "Electr. Connections" / "X12: -Diagnostics interface"



9.4 Motor/inverter assignment

Note the following motor/inverter assignment for mounting close to the motor:

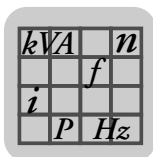
9.4.1 Motor/inverter assignment for CMP. motors

CMP. motor,
2000 rpm

CMP. servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	9	9	9
						I_{max} [A]	19	24	36
2000	CMP.71M	9.4	30.8	5.0	26.2	M_{max} [Nm]	22.1	29.5	30.8
	CMP.71L	13.1	46.9	6.3	38.9	M_{max} [Nm]	26.5	40.1	45.8
	CMP.80S	13.4	42.1	6.9	32.6	M_{max} [Nm]	25.4	37.3	42.1
	CMP.80M	18.7	62.6	9.3	47.6	M_{max} [Nm]		44.0	56.1
	CMP.80L	27.3	106.9	12.4	71.5	M_{max} [Nm]			71.3
	CMP.100S	25.6	68.3	13.3	49.4	M_{max} [Nm]		44.0	58.7

CMP. motor
3000 rpm

CMP. servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	9	9	9
						I_{max} [A]	19	24	36
3000	CMP.63L	7.1	30.4	5.0	29.7	M_{max} [Nm]	17.8	27.0	30.4
	CMP.71S	6.4	19.2	4.9	25.4	M_{max} [Nm]	14.9	18.9	19.2
	CMP.71M	9.4	30.8	7.5	39.0	M_{max} [Nm]	16.2	24.7	29.6
	CMP.71L	13.1	46.9	9.4	57.7	M_{max} [Nm]		30.8	40.3
	CMP.80S	13.4	42.1	10.0	47.4	M_{max} [Nm]	17.9	29.9	37.7
	CMP.80M	18.7	62.6	13.4	68.7	M_{max} [Nm]			45.2



Technical Data

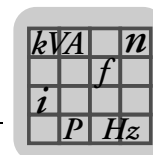
Motor/inverter assignment

CMP. motor,
4500 rpm

CMP. servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	9	9	9
						I_{max} [A]	19	24	36
4500	CMP.63M	5.3	21.4	5.4	32.4	M_{max} [Nm]	12.2	18.3	21.4
	CMP.63L	7.1	30.4	6.9	41.4	M_{max} [Nm]	17.2	21.6	28.2
	CMP.71S	6.4	19.2	7.3	37.9	M_{max} [Nm]	14.2	16.5	19.0
	CMP.71M	9.4	30.8	10.9	57.1	M_{max} [Nm]		18.8	24.3
	CMP.71L	13.1	46.9	14.1	86.6	M_{max} [Nm]			30.8
	CMP.80S	13.4	42.1	15.3	72.7	M_{max} [Nm]			29.4

CMP. motor,
6000 rpm

CMP. servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	9	9	9
						I_{max} [A]	19	24	36
6000	CMP.63M	5.3	21.4	6.9	41.4	M_{max} [Nm]	12.6	15.6	20.0
	CMP.63L	7.1	30.4	9.3	55.8	M_{max} [Nm]		17.0	23.3
	CMP.71S	6.4	19.2	9.6	49.6	M_{max} [Nm]		14.0	17.5
	CMP.71M	9.4	30.8	14.7	76.5	M_{max} [Nm]			20.4



9.4.2 Motor/inverter assignment for CM motors

CM motor,
2000 rpm

CM servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	12	16	24
						I_{max} [A]	19	24	36
2000	CM90S	11	39.4	4.9	19.6	M_{max} [Nm]	38.2	39.4	
	CM90M	14.5	51.8	6.9	27.5	M_{max} [Nm]	38.0	46.9	51.8
	CM90L	21	75.1	9.9	39.5	M_{max} [Nm]	39.3	49.6	70.3
	CM112S	23.5	81.9	10	40	M_{max} [Nm]	43.6	54.8	76.2
	CM112M	31	108.0	13.5	54	M_{max} [Nm]		54.7	79.3
	CM112L	45	156.8	20	80	M_{max} [Nm]			80.3

CM motor,
3000 rpm

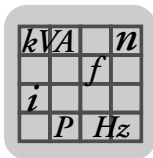
CM servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	9	9	9
						I_{max} [A]	19	24	36
3000	CM71L	9.5	31.5	6.2	25.0	M_{max} [Nm]	26.2	30.8	31.5
	CM90S	11	39.2	7.3	29.0	M_{max} [Nm]	27.4	34.0	39.2
	CM90M	14.5	52.0	10.1	40.5	M_{max} [Nm]	26.6	33.7	47.8
	CM90L	21	75.6	14.4	58.0	M_{max} [Nm]		34.7	51.1
	CM112S	23.5	81.9	15.0	60.0	M_{max} [Nm]		37.4	54.8

CM motor,
4500 rpm

CM servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	9	9	9
						I_{max} [A]	19	14	36
4500	CM71S	5	16.5	4.9	19.6	M_{max} [Nm]	16.1	16.5	
	CM71M	6.5	21.5	6.6	26.5	M_{max} [Nm]	17.1	20.3	21.5
	CM71L	9.5	31.5	9.6	38.5	M_{max} [Nm]	18.1	22.5	30.3
	CM90S	11	39.5	11.1	44.5	M_{max} [Nm]	18.4	23.4	33.6
	CM90M	14.5	52.1	14.7	59.0	M_{max} [Nm]		23.5	34.6

CM motor,
6000 rpm

CM servomotors						Assignment to MOVIAXIS® MMD60B			
400 V / 4 and 8 kHz						Size	1	2	3
n_N [rpm]	Type	M_0 [Nm]	M_{max} [Nm]	I_0 [A]	I_{max} [A]	I_N [A]	9	9	9
						I_{max} [A]	19	24	36
6000	CM71S	5	16.5	6.5	26.0	M_{max} [Nm]	9.1	13.3	15.8
	CM71M	6.5	21.5	8.6	34.5	M_{max} [Nm]	9.0	13.7	16.8
	CM71L	9.5	31.4	12.5	50.0	M_{max} [Nm]		14.1	17.9
	CM90S	11	39.4	14.5	58.0	M_{max} [Nm]		14.2	18.1



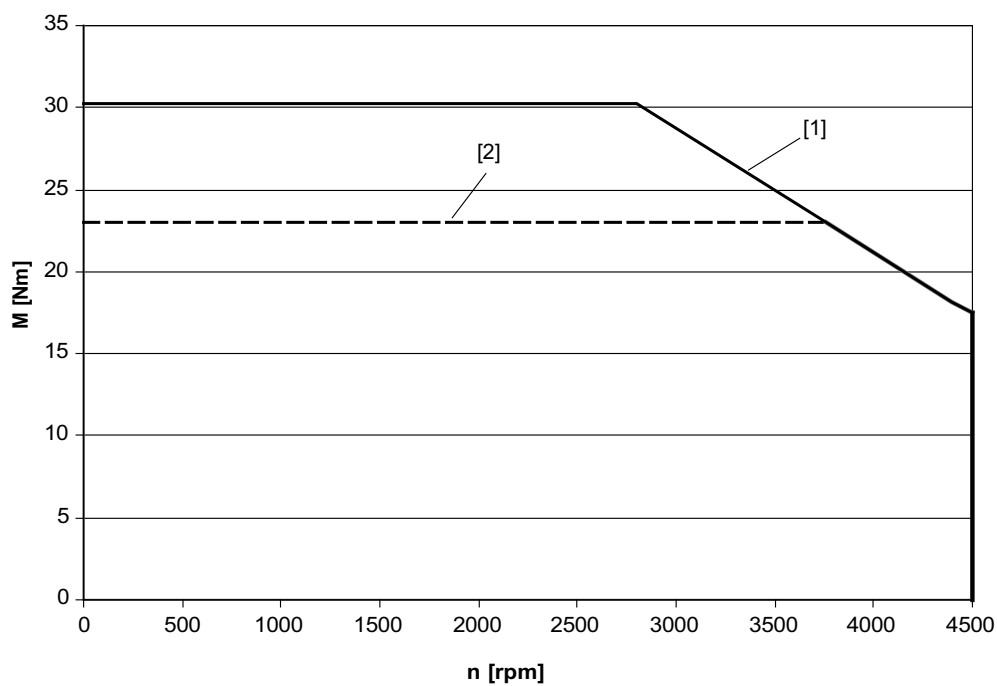
Technical Data

Characteristic curves (for drives with integrated inverters)

9.5 Characteristic curves (for drives with integrated inverters)

9.5.1 Dynamic limit characteristic curves

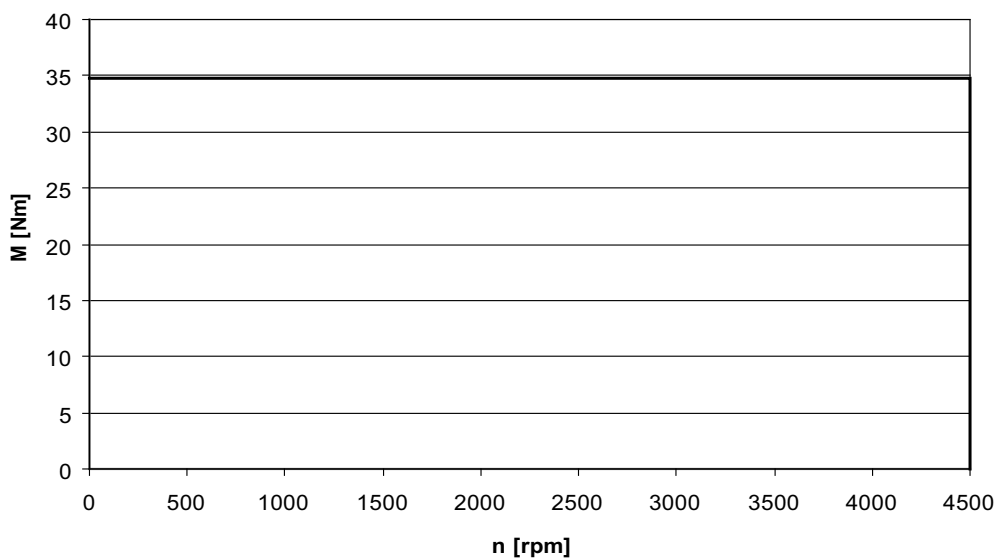
MOVIAXIS® MMD60B, integrated in servomotor CFM71L



6610096395

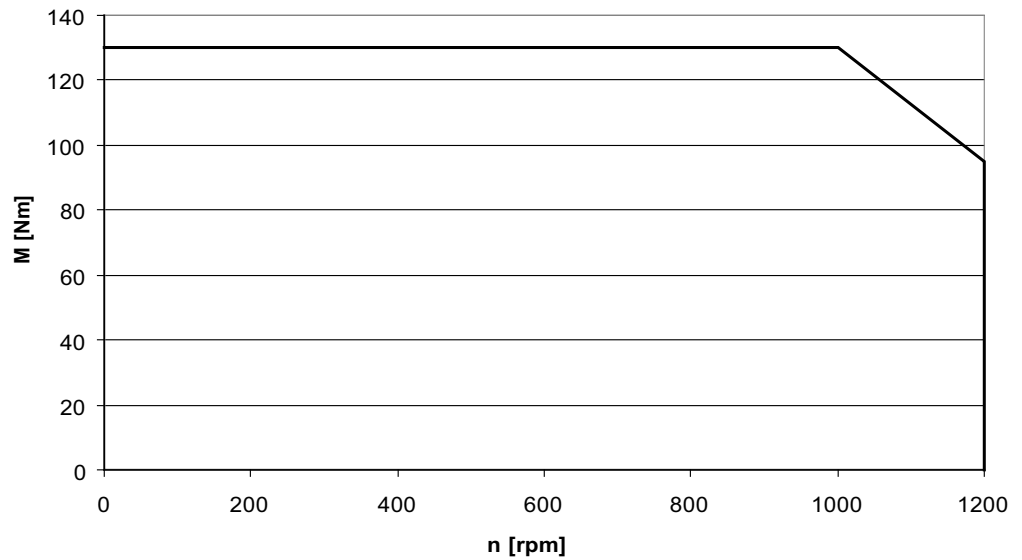
- [1] 36 A peak current
[2] 24 A peak current

MOVIAXIS® MMD60B, integrated in servomotor CFM90L



6610099339

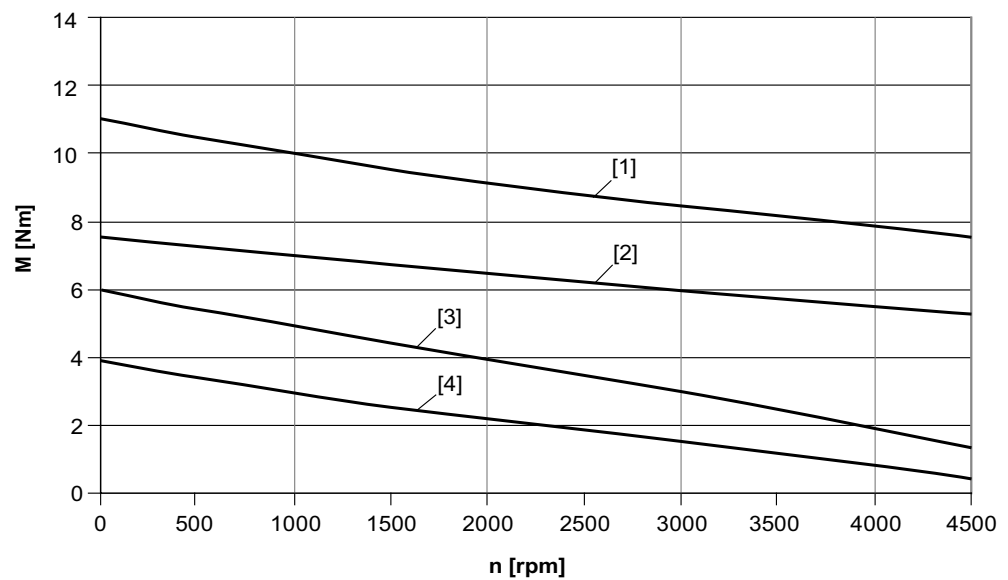
MOVIAXIS® MMD60B, integrated in servomotor CFM112L



6610102027

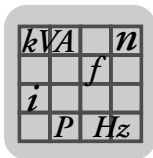
9.5.2 Thermal characteristic curves

MOVIAXIS® MMD60B, integrated in servomotor CFM71L



6610105355

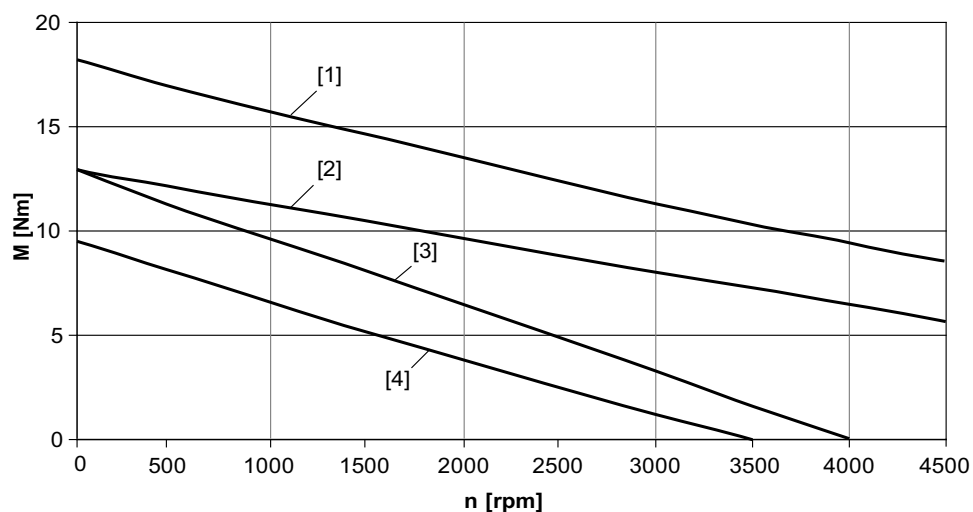
- [1] With forced cooling fan, $f_{PWM} = 4$ kHz
- [2] With forced cooling fan, $f_{PWM} = 8$ kHz
- [3] $f_{PWM} = 4$ kHz
- [4] $f_{PWM} = 8$ kHz



Technical Data

Characteristic curves (for drives with integrated inverters)

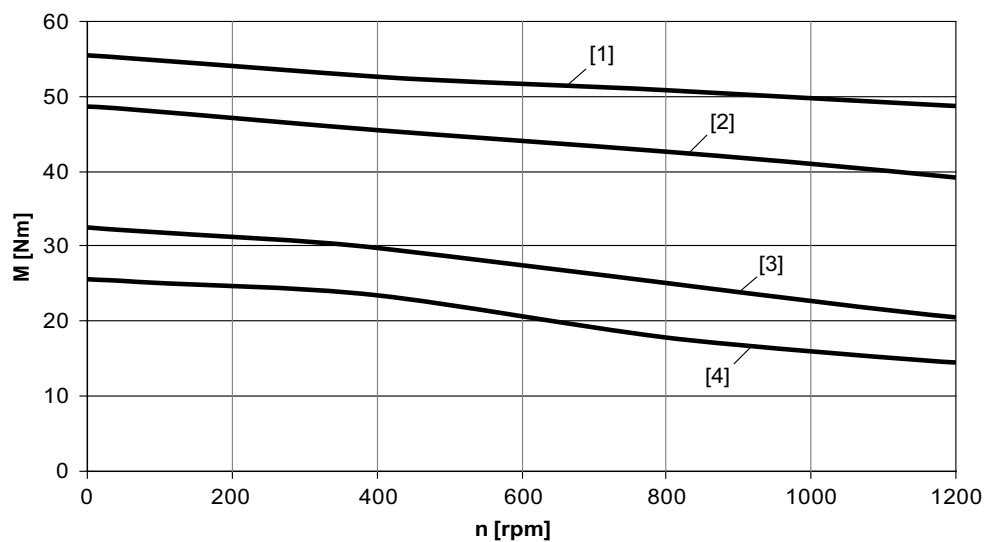
MOVIAXIS® MMD60B, integrated in servomotor CFM90L



6611749131

- [1] With forced cooling fan, $f_{PWM} = 4$ kHz
- [2] With forced cooling fan, $f_{PWM} = 8$ kHz
- [3] $f_{PWM} = 4$ kHz
- [4] $f_{PWM} = 8$ kHz

MOVIAXIS® MMD60B, integrated in servomotor CFM112L



6611749131

- [1] With forced cooling fan, $f_{PWM} = 4$ kHz
- [2] With forced cooling fan, $f_{PWM} = 8$ kHz
- [3] $f_{PWM} = 4$ kHz
- [4] $f_{PWM} = 8$ kHz

9.6 Braking resistors



⚠ WARNING

The incoming cables leads to the braking resistor carry **high DC voltages (approx. 900 V)**.

Severe or fatal injuries from electric shock.

- Only use braking resistor cables suitable for this high DC voltage.



⚠ WARNING

Danger of burns from braking resistor's hot surfaces (in particular the heat sink).

Serious injuries

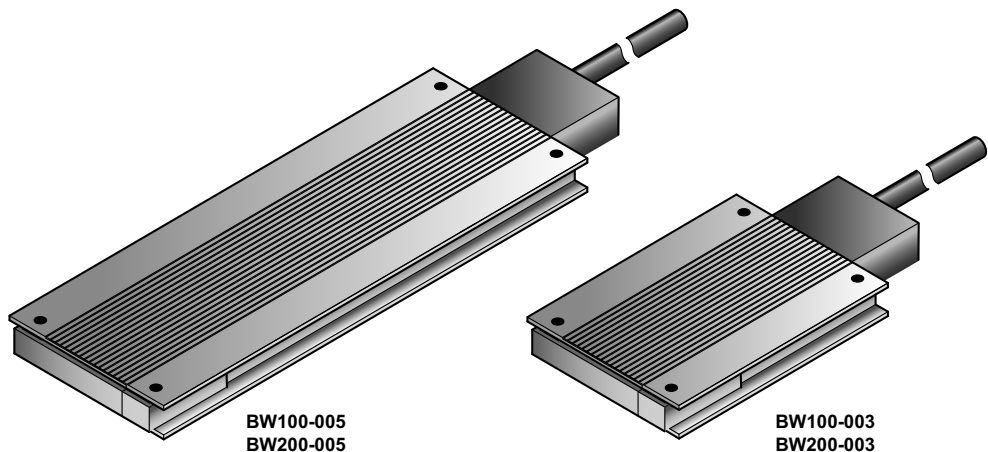
- Do not touch the MOVIMOT® drive and external options until they have cooled down sufficiently.
- Provide for sufficient cooling.



INFORMATION

To dissipate energy during regenerative mode, the following braking resistors are permitted:

9.6.1 Flatpack braking resistors with a 1500 mm round cable

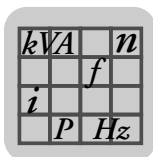


6615246731

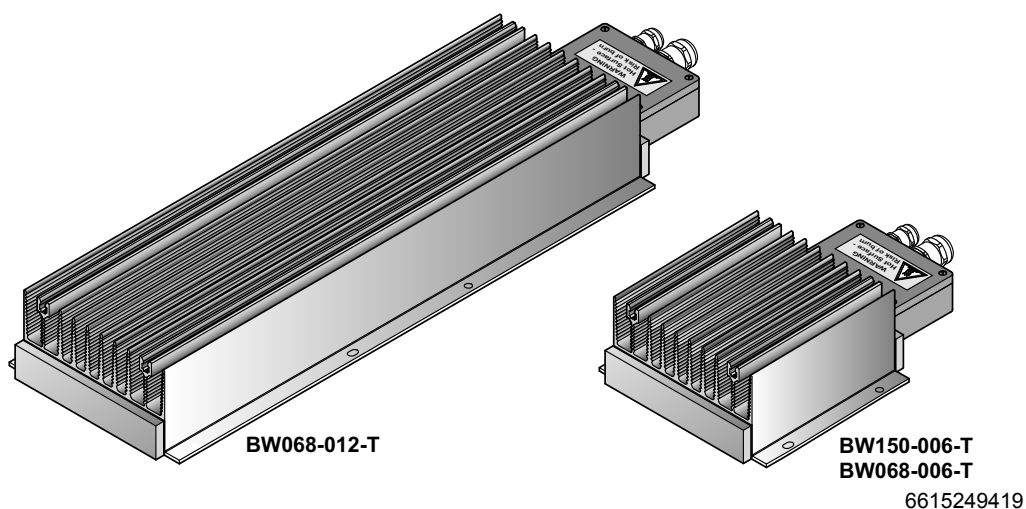
Type	Part number	R _{BW} [Ω]	Degree of protection	Power [W] at cyclic duration factor ¹⁾				
				100%	50%	25%	12%	6%
BW100-003/K-1.5	828 293 5	100	IP65	100	150	300	500	900
BW200-003/K-1.5	828 291 9	200	IP65	100	150	300	500	900
BW100-005/K-1.5	828 286 2	100	IP65	200	300	600	1000	1700
BW200-005/K-1.5	828 283 8	200	IP65	200	300	600	1000	1700

1) Cyclic duration factor in relation to a cycle duration of T ≤ 120 s.

The flatpack resistors come equipped with intrinsic safety features. The resistor turns high-resistance in case of an extended overload. A temperature contact for protecting the resistor is not required.



9.6.2 Compact braking resistors



Type	Part number	R_{BW} [Ω]	Degree of protec- tion	Power [W] at cyclic duration factor ¹⁾				
				100%	50%	25%	12%	6%
BW150-006-T	1 796 956 5	150	IP66	600	1100	2300	4300	8200
BW068-006-T	1 797 000 8	68	IP66	600	1100	2300	4300	8200
BW068-012-T	1 797 001 6	68	IP66	1200	2200	4600	7600	10000

1) Cyclic duration factor in relation to a cycle duration of $T \leq 120$ s.

The compact resistors come equipped with intrinsic safety features. The resistor turns high-resistance in case of an extended overload. A temperature contact for protecting the resistor is not required.

9.6.3 Braking resistors on ceramic core (wire resistors)

Type	Part number	R_{BW} [Ω]	Degree of protec- tion	Power [kW] at cyclic duration factor ¹⁾				
				100%	50%	25%	12%	6%
BW039-012-T	1 820 136 9	39 ²⁾	IP20 ³⁾	1.2	2.1	3.8	7.2	11.4
BW039-026-T	1 820 415 5	39 ²⁾	IP20 ³⁾	2.6	4.7	8.3	15.6	24.0 ⁴⁾
BW147-T	1 820 134 2	47	IP20 ³⁾	1.2	2.2	3.8	7.2	11
BW247-T	1 820 084 2	47	IP20 ³⁾	2.0	3.6	6.4	12	19
BW168-T	1 820 133 4	68	IP20 ³⁾	0.8	1.4	2.6	4.8	7.6
BW268-T	1 820 417 1	68	IP20 ³⁾	1.2	2.2	3.8	7.8	11
BW100-006-T	1 820 419 8	100	IP20 ³⁾	0.6	1.1	1.9	3.6	5.7

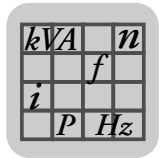
1) Cyclic duration factor in relation to a cycle duration of $T \leq 120$ s.

2) Permitted only for MOVIAXIS® MMD60B 019 and 024. The minimum permitted braking resistance for MOVIAXIS® MMD60B 036 has not been met.

3) In assembled state

4) Physical power limit due to DC link voltage and resistance value

The inbuilt thermal signal contact and line contactor K11 (see unit connection plan) work together to protect the resistors from overheating.



Braking power

Due to the DC link voltage and the resistance value, the peak braking power can be less than the load capacity of the braking resistor. The peak braking power is calculated as follows:

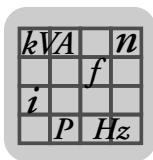
$$P_{\max} = \frac{U_{\text{DC}}^2}{R}$$

6615252107

V_{DC} is the switch-on threshold of the brake chopper. For MOVIAxis® MMD60B, this is $V_{\text{DC}} = 822 V_{\text{DC}}$.

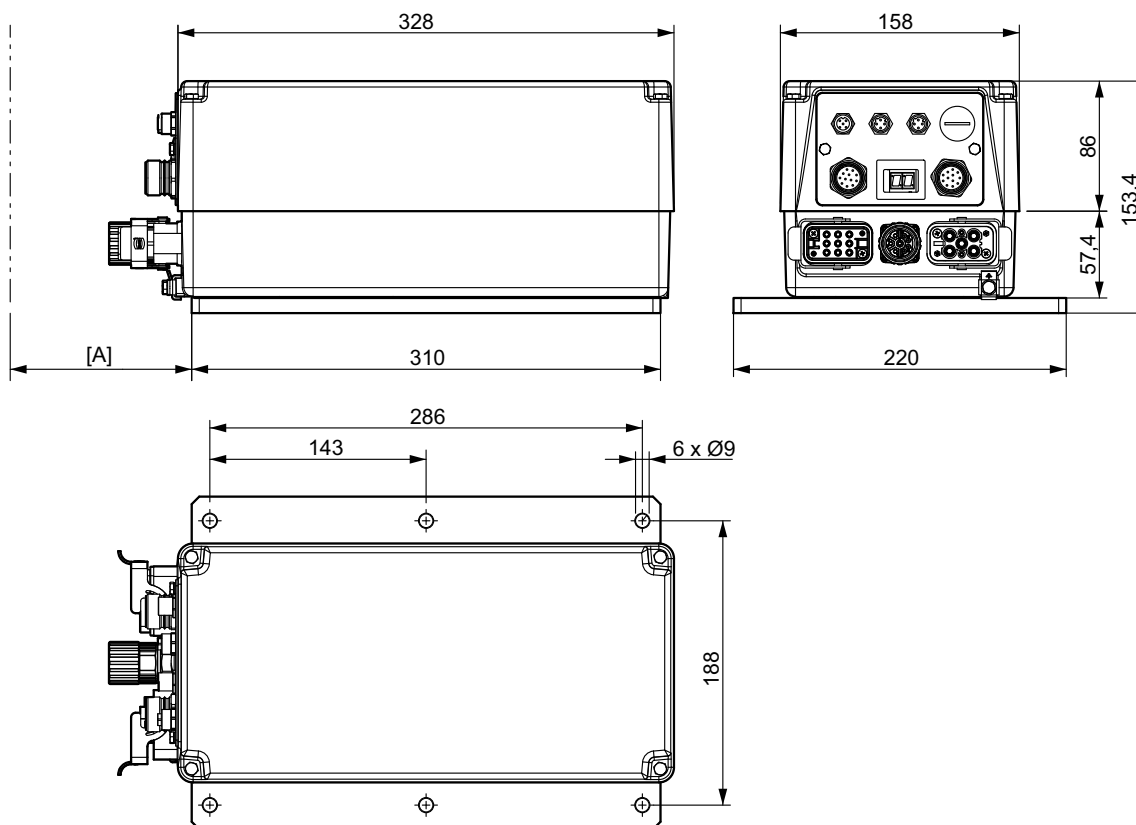
The following table lists the peak braking power levels that are possible for the different resistance values.

Resistance value	Peak braking power
200 Ω	3.4 kW
150 Ω	4.5 kW
100 Ω	6.7 kW
68 Ω	10.0 kW
47 Ω	14.4 kW
39 Ω	17.3 kW



9.7 Dimension drawings

9.7.1 MOVIAXIS® MMD60B dimension drawing



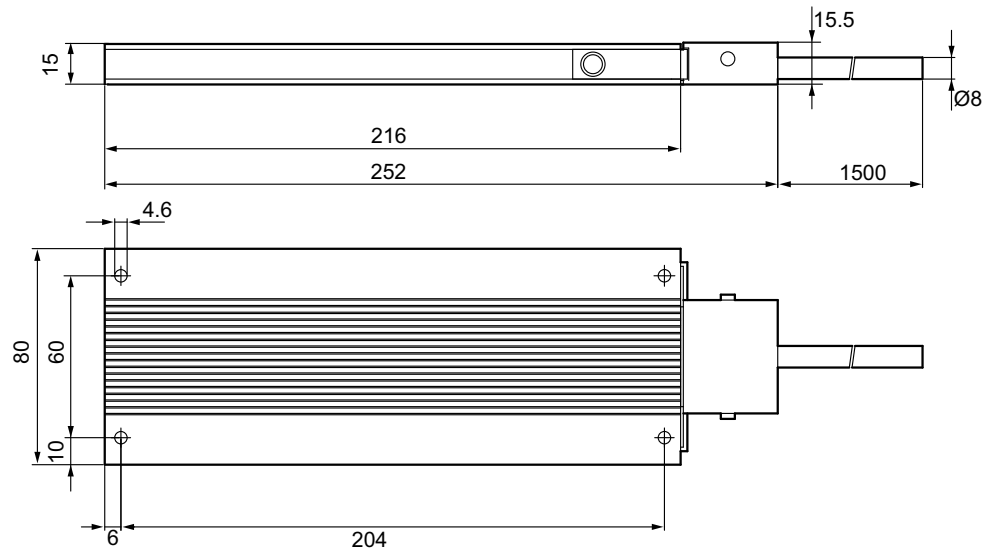
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[A] Minimum distance = 300 mm

Observe the permitted bending radii of the cables used and the dimensions of the plug connectors.

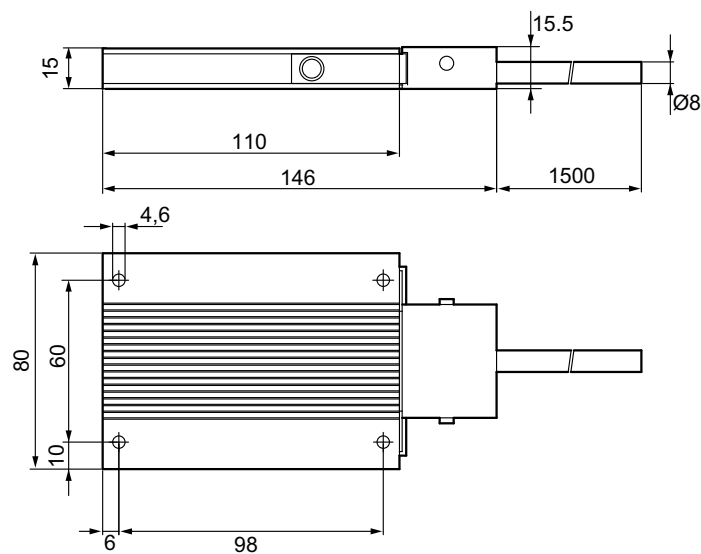
9.7.2 Dimension drawings of flatpack braking resistors

Dimension drawing of BW100-005 and BW200-005

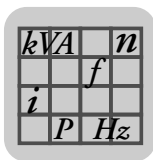


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Dimension drawing of BW100-003 and BW200-003

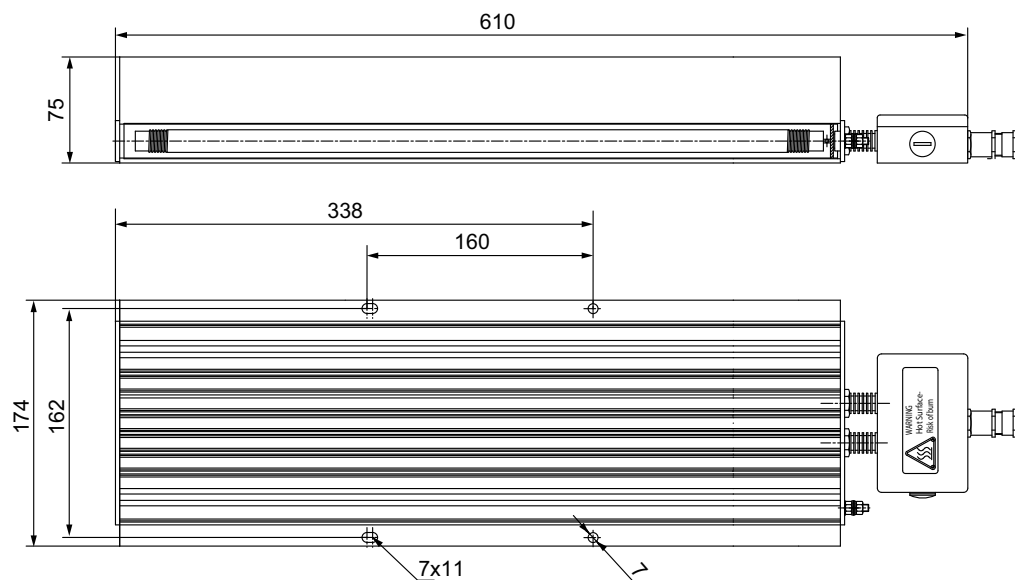


1490212491



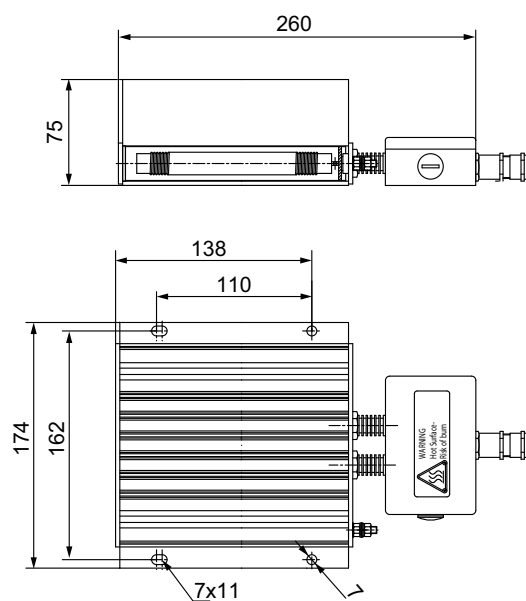
9.7.3 Dimension drawings of compact braking resistors

Dimension drawing of BW068-012-T

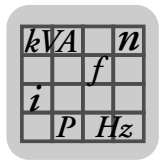


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Dimension drawing of BW068-006-T and BW150-006-T

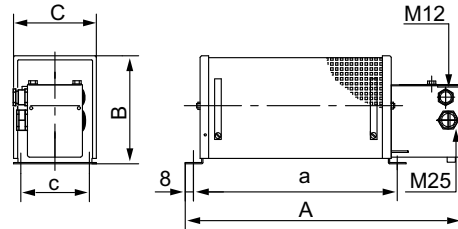


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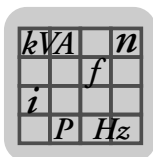
9.7.4 Dimension drawing of braking resistors on ceramic core (wire resistors)

Braking resistors BW...-T



6615290123

BW... type	Main dimensions mm (in)			Fastening parts mm (in)		Screw fitting	Weight kg (lb)
	A	B	C	a	c		
BW039-012-T	549 (21.6)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	M12 + M25	4.9 (11)
BW039-026-T	649 (25.6)	120 (4.72)	275 (10.8)	530 (20.9)	240 (9.45)	M12 + M25	7.5 (17)
BW147-T	549 (21.6)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	M12 + M25	4.9 (11)
BW247-T	749 (29.5)	120 (4.72)	185 (7.28)	626 (24.6)	150 (5.91)	M12 + M25	9.2 (20)
BW168-T	449 (17.7)	120 (4.72)	185 (7.28)	326 (12.8)	150 (5.91)	M12 + M25	3.6 (7.9)
BW268-T	549 (21.6)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	M12 + M25	4.9 (11)
BW100-006-T	549 (21.6)	120 (4.72)	92 (3.6)	430 (16.9)	80 (3.1)	M12 + M25	3.0 (6.6)



10 Declaration of Conformity

EC Declaration of Conformity



901970113

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal

declares under sole responsibility that the



decentralized servo inverters
MOVIAXIS®

MMD60B019-5A3-4-00
MMD60B024-5A3-4-00
MMD60B036-5A3-4-00

are in conformity with

Machinery Directive	2006/42/EC	1)
Low Voltage Directive	2006/95/EC	
EMC Directive	2004/108/EC	4)
Applied harmonized standards:	EN ISO 13849-1:2008	5)
	EN 60204-1:2006	
	EN 61800-5-1:2007	
	EN 61800-3:2004	

- 1) The products are intended for installation in machines. Startup is prohibited until it has been established that the machinery into which these products are to be incorporated complies with the provisions of the aforementioned Machinery Directive.
- 4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. The assessment was verified for a typical system constellation, but not for the individual product.
- 5) All safety-relevant requirements of the product-specific documentation (operating instructions, manual, etc.) must be met over the entire product life cycle.

Bruchsal 23.09.13

Place

Date

Johann Soder
 Managing Director Technology

a) b)

- a) Authorized representative for issuing this declaration on behalf of the manufacturer
 b) Authorized representative for compiling the technical documents

9007202377664523



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