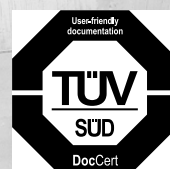




SEW
EURODRIVE

Operating Instructions



MOVIDRIVE® MDX60B / 61B





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1 General Information

1.1 How to use the operating instructions

The operating instructions are an integral part of the product and contain important information for operation and service. The operating instructions are written for all employees who assemble, install, startup, and service this product.

The operating instructions must be legible and accessible at all times. Make sure that staff responsible for the plant and its operation, as well as persons who work independently on the unit, have read 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, contact SEW-EURODRIVE.

1.2 Structure of the safety notes

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

Pictogram	 SIGNAL WORD
	Type and source of danger. Possible consequence(s) if disregarded. • Measure(s) to prevent the danger.

Pictogram	Signal word	Meaning	Consequences if disregarded
Example:  General danger  Specific danger, e.g. electric shock	 DANGER  WARNING  CAUTION NOTICE	Imminent danger Possible dangerous situation Possible dangerous situation Possible damage to property	Severe or fatal injuries Severe or fatal injuries Minor injuries Damage to the drive system or its environment
	INFORMATION	Useful information or tip. Simplifies the handling of the drive system.	



1.3 Rights to claim under limited warranty

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

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of the MOVIDRIVE® MDX60B/61B inverters and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE does not assume 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 notice

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Copyright law prohibits the unauthorized duplication, modification, distribution, and use of this document, in whole or in part.



2 Safety Notes

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

2.1 General information

Never install or start up damaged products. Submit a complaint to the shipping company immediately in the event of damage.

During operation, drive inverters can have live, bare and movable or rotating parts as well as hot surfaces, depending on their degree of protection.

Removing covers without authorization, improper use as well as incorrect installation or operation may result in severe injuries to persons or damage to property.

Refer to the documentation for additional information.

2.2 Target group

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

Qualified personnel in the context of these basic safety notes are: All 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.



2.3 Designated use

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

In case of installation in machines, startup of the drive inverters (meaning the start of proper use) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 98/37/EC (machine guideline); observe EN 60204.

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

The drive inverters meet the requirements stipulated in low voltage guideline 2006/95/EC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these drive inverters.

You must observe the technical data and information on the connection requirements as provided on the nameplate and in the documentation.

2.3.1 Safety functions

MOVIDRIVE® MDX60/61B inverters may not perform safety functions without higher-level safety systems. Use higher-level safety systems to ensure protection of equipment and personnel.

For safety applications, refer to the information in the following publications:

- Safe disconnection for MOVIDRIVE® MDX60B/61B – Conditions
- Safe disconnection for MOVIDRIVE® MDX60B/61B – Applications

2.4 Transportation, storage

Observe the notes on transportation, storage and proper handling. Observe the climatic conditions as stated in the section "General technical data".



2.5 Installation

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

Protect the drive inverters from excessive strain. Ensure that components are not deformed and/or insulation spaces are maintained, particularly during transportation. Avoid contact with electronic components and contacts.

Drive inverters contain components that can be damaged by electrostatic energy and improper handling. Prevent mechanical damage or destruction of electric components (may pose health risk)

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

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications which are subject to mechanical vibration and impact loads in excess of the requirements in EN 61800-5-1.

2.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live drive inverters (for example, BGV A3).

Electrical installation is to be carried out in compliance with 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 documentation of the drive inverters. Always observe these notes even with drive inverters bearing the CE marking. 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 the regulations in force (e.g. EN 60204 or EN 61800-5-1).

Required preventive measure: Grounding the unit.

MOVIDRIVE® B, size 7 has an additional display LED under the lower front cover. The lit display LED indicates a DC link voltage. Do not touch power connections. Check that there is no voltage present before touching power connections even if the LED display indicates that there is no voltage.

2.7 Safe disconnection

The unit meets all requirements for safe disconnection of power and electronic connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection.



2.8 Operation

Systems with integrated drive inverters must be equipped with additional monitoring and protection devices, if necessary, according to the applicable safety guidelines, such as legislation governing technical equipment, accident prevention regulations, etc. The operating software may be used to make changes to the drive inverter.

Do not touch live components or power connections immediately after disconnecting the drive inverters from the supply voltage because there may still be some charged capacitors. Note the respective reference plates on the drive inverter.

Keep all covers and doors closed during operation.

The fact that the status LED and other display elements (such as the display LED on size 7 units) are no longer illuminated does not indicate that the unit has been disconnected from the power supply and no longer carries any voltage.

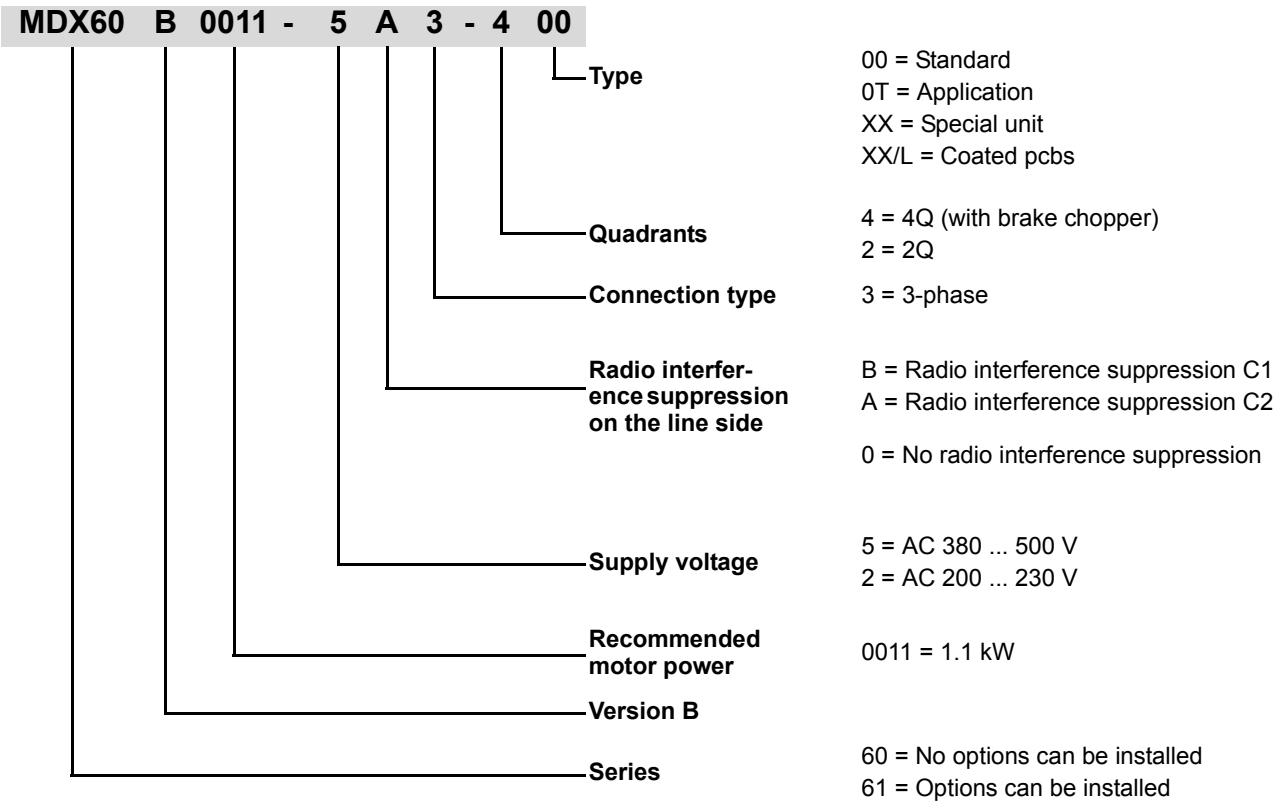
Check that there is no voltage present before touching power connections even if the LED display indicates that there is no voltage.

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, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the supply system before correcting the error.

3 Unit Structure

3.1 Unit designation, nameplates and scope of delivery

3.1.1 Example: Unit designation



3.1.2 Example: System nameplate size 0

The **system nameplate** for MDX60B/61B.. size 0 is attached to the side of the unit.

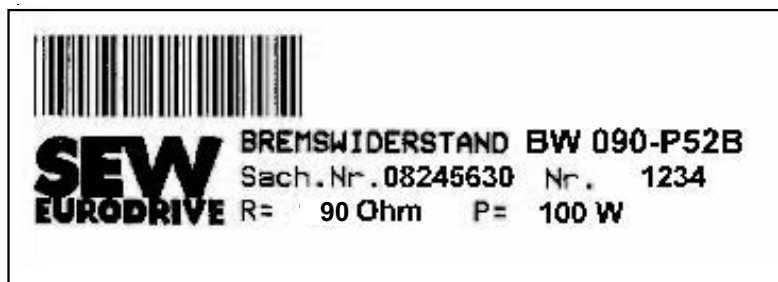


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3.1.3 Example: Nameplate for BW090-P52B braking resistor

The braking resistor BW090-P52B is only available for MDX60B/61B size 0.



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3.1.4 Example: System nameplate for sizes 1 - 7

The **system nameplate** is attached to MDX61B.. as follows:

- On the side of the units of size 1- 6
- On the upper front cover of size 7

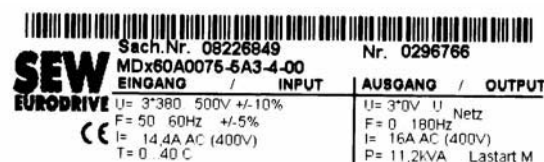


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3.1.5 Example: Nameplate for power section sizes 1 - 7

The **power section nameplate** is attached to MDX61B.. as follows:

- On the side of the units of size 1- 6
- Top left inside the size 7 unit



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3.1.6 Example: Nameplate for control unit sizes 1 - 7

The **control unit nameplate** is attached to the front of MDX61B.. size 1 - 7.



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3.1.7 Example: Option card nameplate



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3.2 Scope of delivery

3.2.1 Sizes 0 – 7

- Connector housing for all signal terminals (X10 ... X17), connected
- Connector housing for the power terminals (X1 ... X4), connected
- Pluggable memory card, connected

3.2.2 Size 0

- 1 set of shield clamps for power cable and signal cable, not installed. The set of shield clamps comprises:
 - 2 shield clamps for power cable (2 contact clips each)
 - 1 shield clamp for signal cable (1 contact clip) for MDX60B
 - 1 shield clamp for signal cable (2 contact clips) for MDX61B
 - 6 contact clips
 - 6 screws for attaching the contact clips
 - 3 screws for attaching the contact clips to the unit

3.2.3 Size 1 - 7

- 1 set of shield clamps for signal cable, not installed. The set of shield clamps comprises:
 - 1 shield clamp for signal cable (1 contact clip)
 - 2 contact clips
 - 2 screws for attaching the contact clips
 - 1 screw for attaching the shield clamp to the unit
- Only for size 6: Carrying bar and 2 split pins
- For size 7, you can order the connection set DLA11B (part no. 18223125) with connection screws and 3 PE terminals.



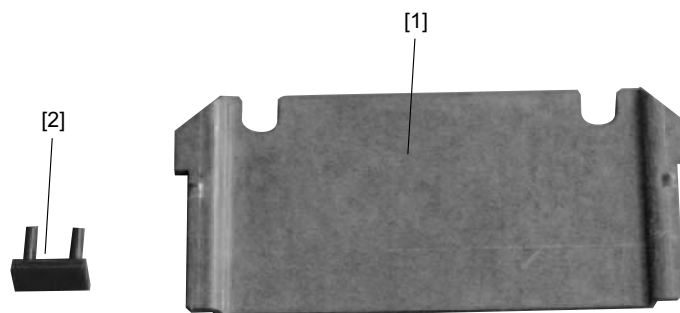
3.2.4 Size 2S

- Accessories set, not installed. The accessories set (→ following figure) comprises:
 - 2 mounting feet [1] to be plugged into the heat sink
 - 2 touch guards [2] to be fastened to terminals X4: -U_Z/+U_Z and -X3:-R(8)/+R(9).

Degree of protection IP20 is achieved as soon as one of the following conditions is fulfilled:

- Touch guard [2] mounted to X3/X4 (→ section "Touch guard")
- An adequately prefabricated cable is connected to X3/X4

If neither of the two conditions is fulfilled, the degree of protection is IP10.

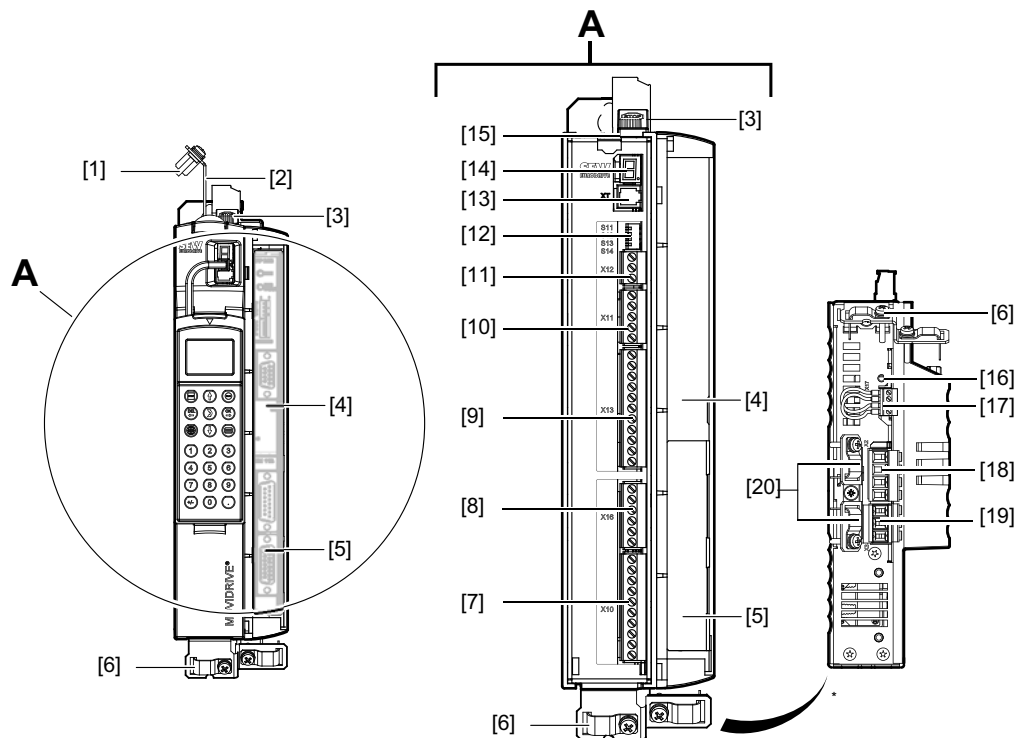


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3.3 Size 0

MDX60/61B-5A3 (AC 400/500 V units): 0005 / 0008 / 0011 / 0014



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* View of the underside of the unit

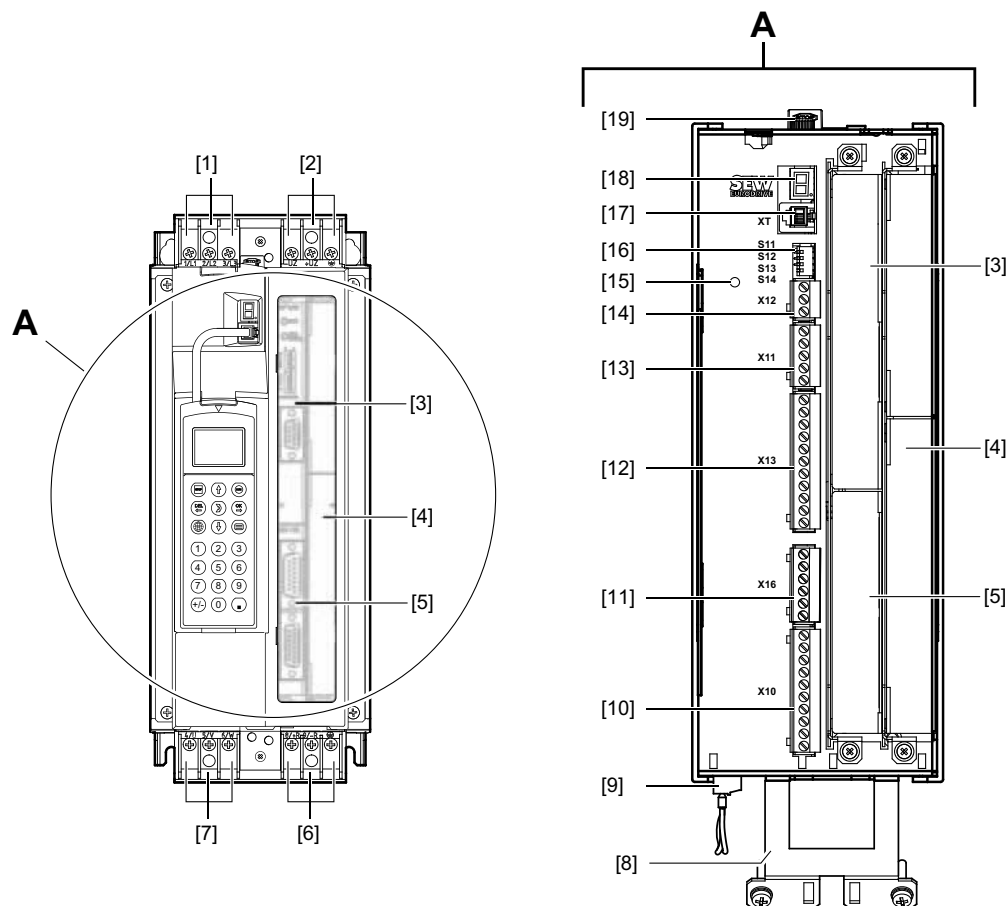
- [1] Power shield clamp for supply system connection and DC link connection
- [2] X4: Connection for DC link connection $-U_Z / +U_Z$ and PE connection, separable
- [3] X1: Power supply connection L1, L2, L3 and PE connection, separable
- [4] Only with MDX61B: Fieldbus port
- [5] Only with MDX61B: Encoder slot
- [6] Shield clamp for signal cables MDX61B size 0
- [7] X10: Signal terminal strip for binary outputs and TF/TH input
- [8] X16: Signal terminal strip binary inputs and outputs
- [9] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [10] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [11] X12: Signal terminal strip system bus (SBus)
- [12] DIP switches S11 ... S14
- [13] XT: Slot for DBG60B keypad or UWS21B serial interface
- [14] 7-segment display
- [15] Memory card
- [16] Grounding screw M4 × 14
- [17] X17: Signal terminal strip for safety contacts for safe stop
- [18] X2: Motor connection U, V, W and PE connection, separable
- [19] X3: Braking resistor connection +R / -R and PE connection, separable
- [20] Power shield clamp for motor connection and braking resistor connection



3.4 Size 1

MDX61B-5A3 (AC 400/500 V units): 0015 / 0022 / 0030 / 0040

MDX61B-2A3 (AC 230 V units): 0015 / 0022 / 0037



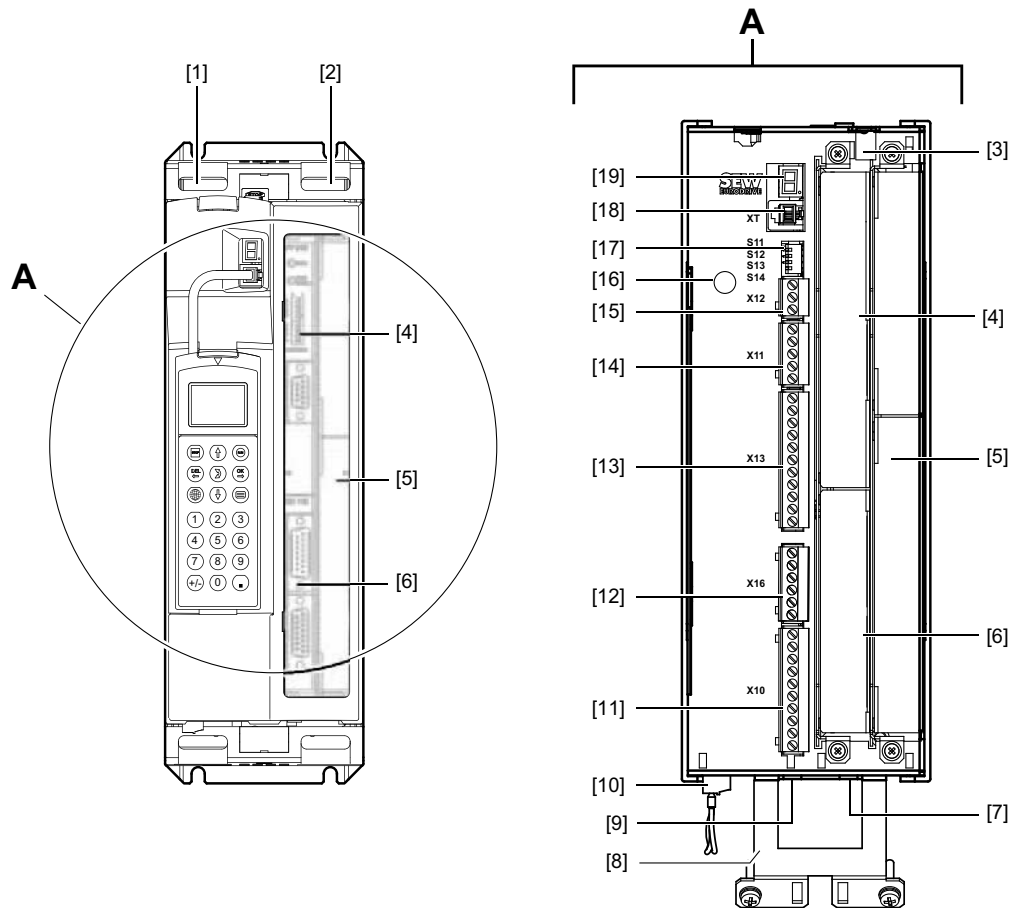
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- [1] X1: Power supply connection 1/L1, 2/L2, 3/L3, separable
- [2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$, separable
- [3] Fieldbus slot
- [4] Expansion slot
- [5] Encoder slot
- [6] X3: Braking resistor connection 8/+R, 9/-R and PE connection, separable
- [7] X2: Motor connection 4/U, 5/V, 6/W and PE connection, separable
- [8] Shield clamp for signal cables and PE connection
- [9] X17: Signal terminal strip for safety contacts for safe stop
- [10] X10: Signal terminal strip for binary outputs and TF/TH input
- [11] X16: Signal terminal strip binary inputs and outputs
- [12] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [13] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [14] X12: Signal terminal strip system bus (SBus)
- [15] Grounding screw M4 × 14
- [16] DIP switches S11 ... S14
- [17] XT: Slot for DBG60B keypad or UWS21B serial interface
- [18] 7-segment display
- [19] Memory card



3.5 Size 2S

MDX61B-5A3 (AC 400/500 V units): 0055 / 0075



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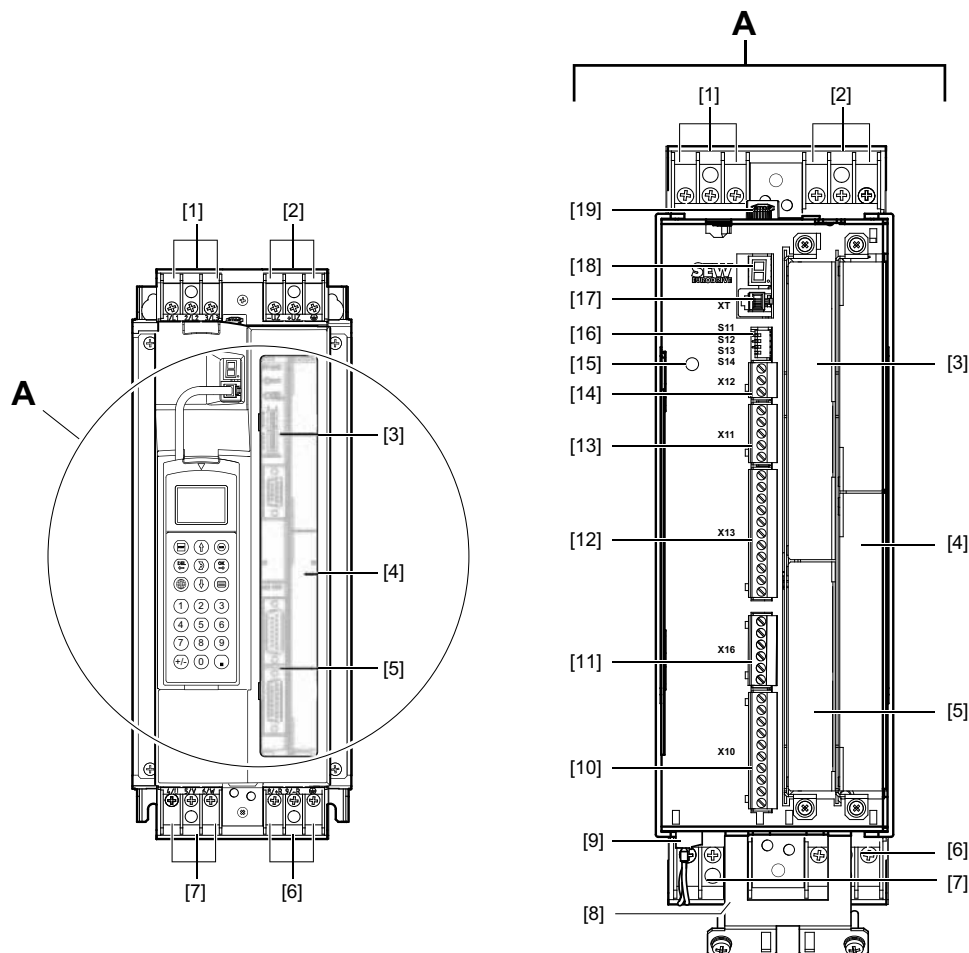
- [1] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
- [3] Memory card
- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] X3: Braking resistor connection 8/+R, 9/-R and PE connection
- [8] Shield clamp for signal cables and PE connection
- [9] X2: Motor connection 4/U, 5/V, 6/W
- [10] X17: Signal terminal strip for safety contacts for safe stop
- [11] X10: Signal terminal strip for binary outputs and TF/TH input
- [12] X16: Signal terminal strip binary inputs and outputs
- [13] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [14] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [15] X12: Signal terminal strip system bus (SBus)
- [16] Grounding screw M4 × 14
- [17] DIP switches S11 ... S14
- [18] XT: Slot for DBG60B keypad or UWS21B serial interface
- [19] 7-segment display



3.6 Size 2

MDX61B-5A3 (AC 400/500 V units): 0110

MDX61B-2A3 (AC 230 V units): 0055 / 0075



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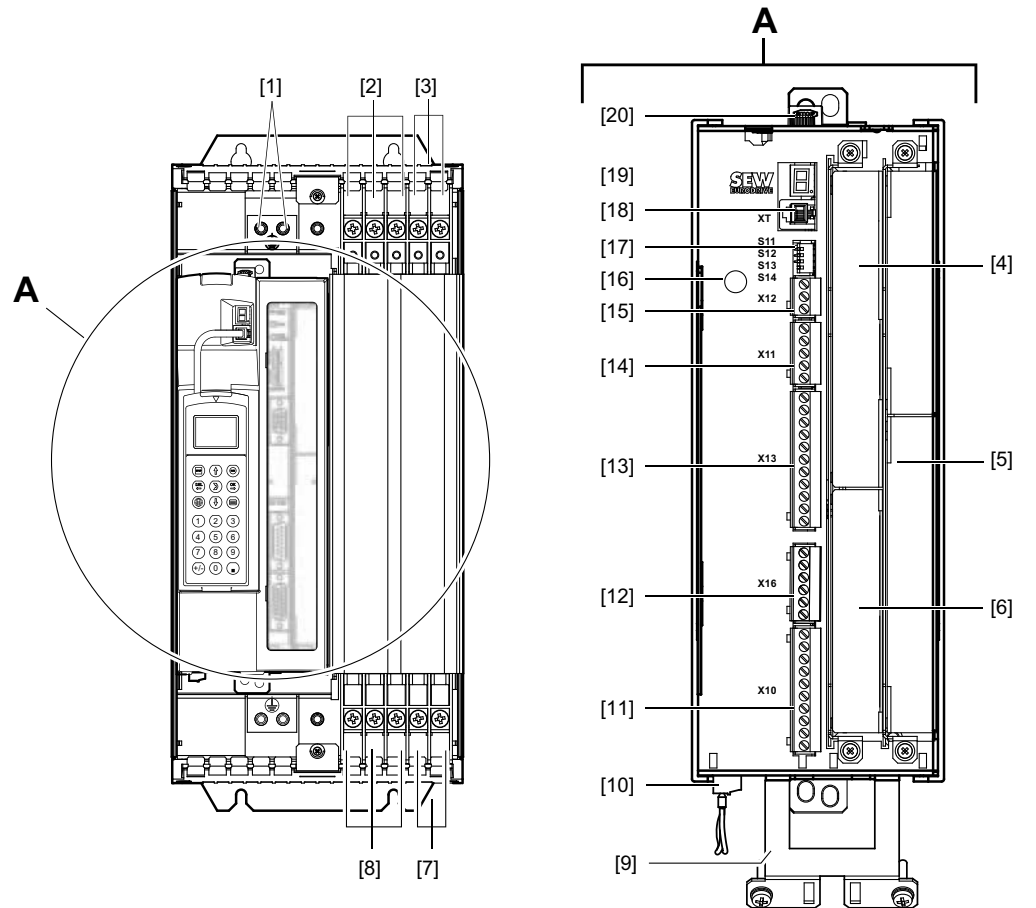
- [1] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
- [3] Fieldbus slot
- [4] Expansion slot
- [5] Encoder slot
- [6] X3: Braking resistor connection 8/+R, 9/-R and PE connection
- [7] X2: Motor connection 4/U, 5/V, 6/W
- [8] Shield clamp for signal cables and PE connection
- [9] X17: Signal terminal strip for safety contacts for safe stop
- [10] X10: Signal terminal strip for binary outputs and TF/TH input
- [11] X16: Signal terminal strip binary inputs and outputs
- [12] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [13] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [14] X12: Signal terminal strip system bus (SBus)
- [15] Grounding screw M4 × 14
- [16] DIP switches S11 ... S14
- [17] XT: Slot for DBG60B keypad or UWS21B serial interface
- [18] 7-segment display
- [19] Memory card



3.7 Size 3

MDX61B-503 (AC 400/500 V units): 0150 / 0220 / 0300

MDX61B-203 (AC 230 V units): 0110 / 0150



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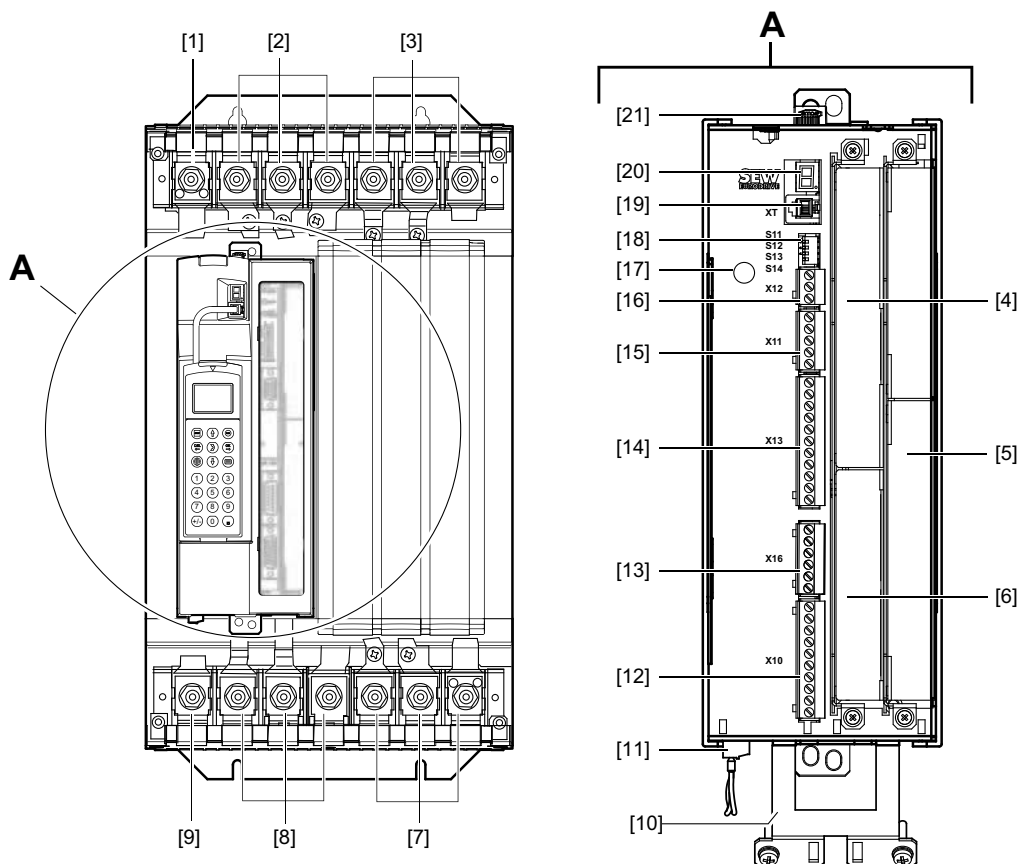
- [1] PE connection
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$
- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] X3: Braking resistor connection 8/+R, 9/-R
- [8] X2: Motor connection 4/U, 5/V, 6/W
- [9] Shield clamp for signal cables and PE connection
- [10] X17: Signal terminal strip for safety contacts for safe stop
- [11] X10: Signal terminal strip for binary outputs and TF/TH input
- [12] X16: Signal terminal strip binary inputs and outputs
- [13] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [14] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [15] X12: Signal terminal strip system bus (SBus)
- [16] Grounding screw M4 × 14
- [17] DIP switches S11 ... S14
- [18] XT: Slot for DBG60B keypad or UWS21B serial interface
- [19] 7-segment display
- [20] Memory card



3.8 Size 4

MDX61B-503 (AC 400/500 V units): 0370 / 0450

MDX61B-203 (AC 230 V units): 0220 / 0300



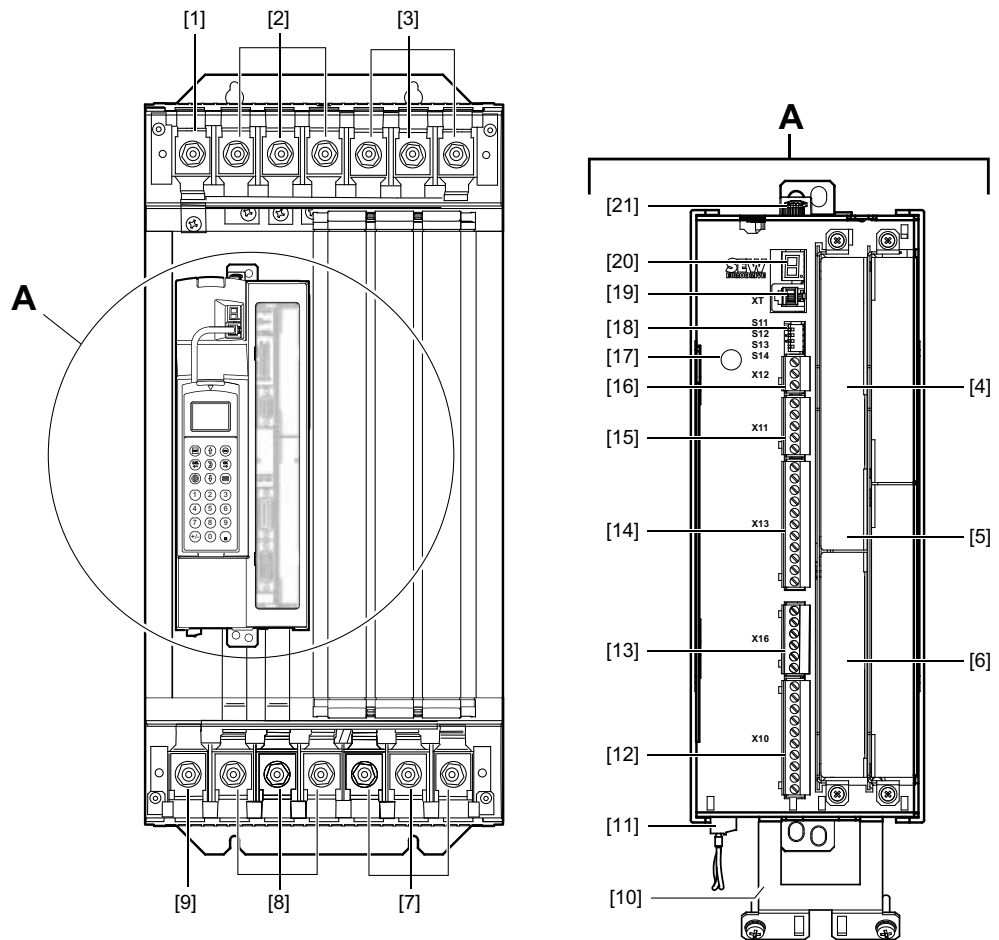
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- [1] PE connection
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] X3: Braking resistor connection 8/+R, 9/-R and PE connection
- [8] X2: Motor connection 4/U, 5/V, 6/W
- [9] PE connection
- [10] Shield clamp for signal cables
- [11] X17: Signal terminal strip for safety contacts for safe stop
- [12] X10: Signal terminal strip for binary outputs and TF/TH input
- [13] X16: Signal terminal strip binary inputs and outputs
- [14] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [15] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [16] X12: Signal terminal strip system bus (SBus)
- [17] Grounding screw M4 × 14
- [18] DIP switches S11 ... S14
- [19] XT: Slot for DBG60B keypad or UWS21B serial interface
- [20] 7-segment display
- [21] Memory card



3.9 Size 5

MDX61B-503 (AC 400/500 V units): 0550 / 0750



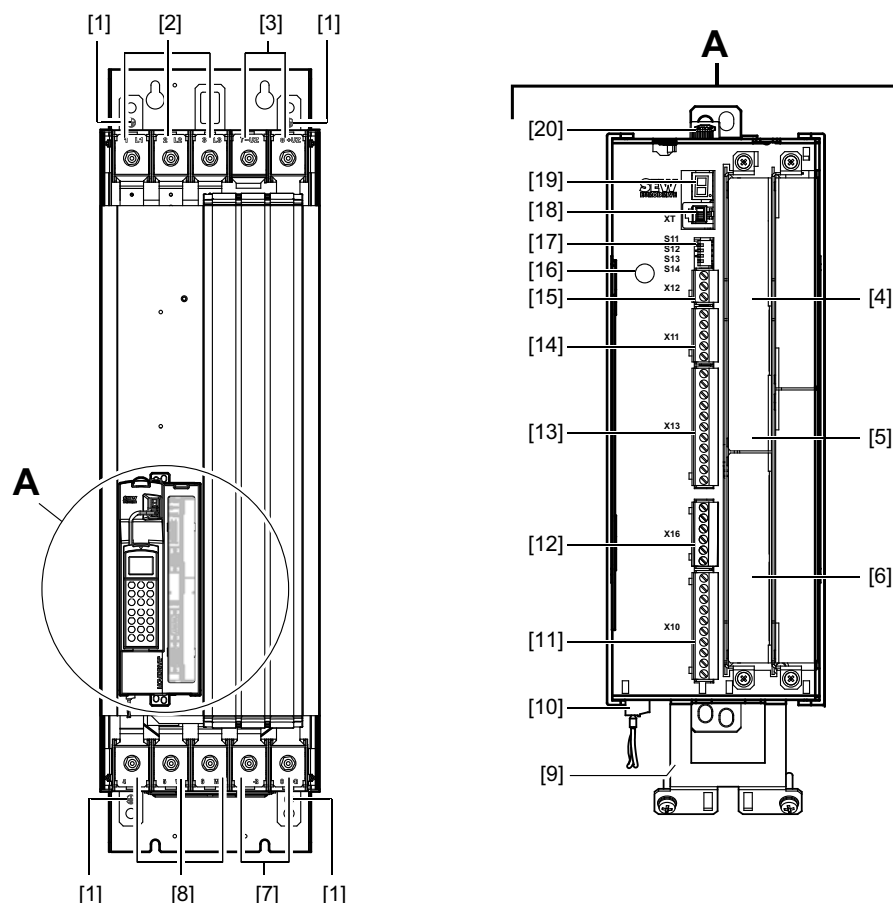
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- [1] PE connection
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection
- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] X3: Braking resistor connection 8/+R, 9/-R and PE connection
- [8] X2: Motor connection 4/U, 5/V, 6/W
- [9] PE connection
- [10] Shield clamp for signal cables
- [11] X17: Signal terminal strip for safety contacts for safe stop
- [12] X10: Signal terminal strip for binary outputs and TF/TH input
- [13] X16: Signal terminal strip binary inputs and outputs
- [14] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [15] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [16] X12: Signal terminal strip system bus (SBus)
- [17] Grounding screw M4 × 14
- [18] DIP switches S11 ... S14
- [19] XT: Slot for DBG60B keypad or UWS21B serial interface
- [20] 7-segment display
- [21] Memory card



3.10 Size 6

MDX61B-503 (AC 400/500 V units): 0900 / 1100 / 1320



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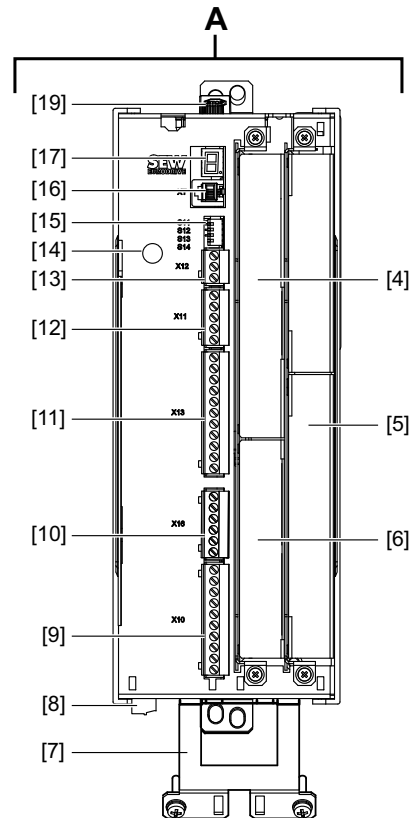
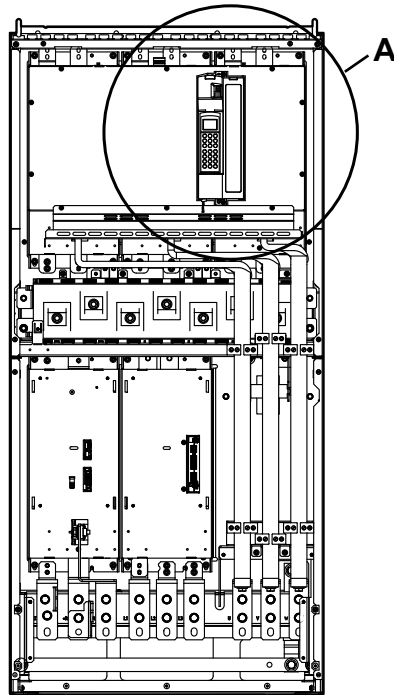
- [1] PE connection
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$
- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] X3: Braking resistor connection 8/+R, 9/-R
- [8] X2: Motor connection 4/U, 5/V, 6/W and PE connection
- [9] Shield clamp for signal cables
- [10] X17: Signal terminal strip for safety contacts for safe stop
- [11] X10: Signal terminal strip for binary outputs and TF/TH input
- [12] X16: Signal terminal strip binary inputs and outputs
- [13] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [14] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
- [15] X12: Signal terminal strip system bus (SBus)
- [16] Threaded hole for grounding screw M4 × 8 or M4 × 10
- [17] DIP switches S11 ... S14
- [18] XT: Slot for DBG60B keypad or UWS21B serial interface
- [19] 7-segment display
- [20] Memory card



3.11 Size 7

3.11.1 Control unit

MDX61B-503 (AC 400/500 V units): 1600 / 2000 / 2500



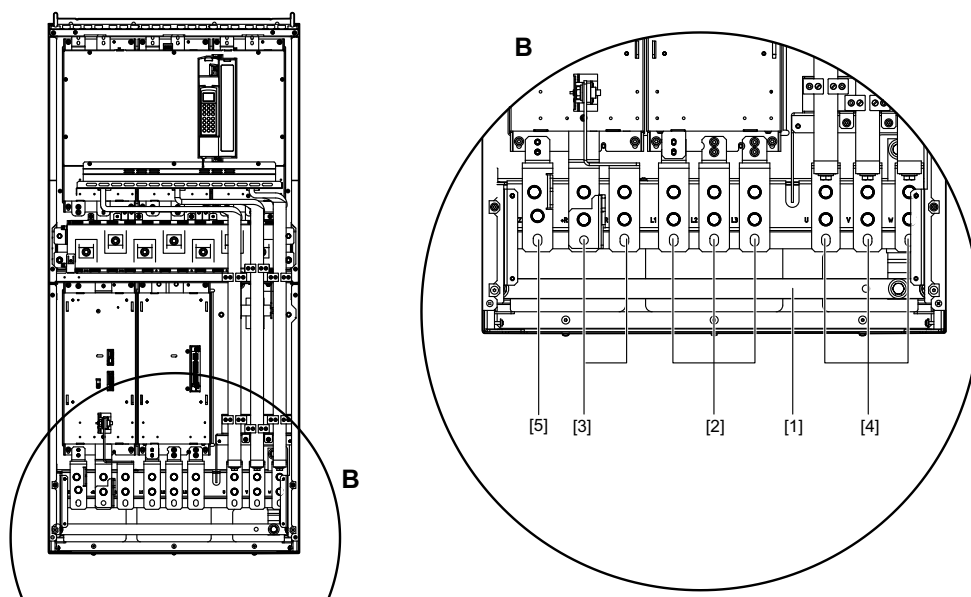
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- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] Shield clamp for signal cables
- [8] X17: Signal terminal strip for safety contacts for safe stop
- [9] X10: Signal terminal strip for binary outputs and TF/TH input
- [10] X16: Signal terminal strip binary inputs and outputs
- [11] X13: Signal terminal strip terminal strip for binary inputs and RS485 interface
- [12] X11: Signal terminal strip for setpoint input A11 and 10 V reference voltage
- [13] X12: Signal terminal strip system bus (SBus)
- [14] Grounding screw M4 × 14
- [15] DIP switches S11 ... S14
- [16] XT: Slot for DBG60B keypad or UWS21B serial interface
- [17] 7-segment display
- [19] Memory card



3.11.2 Power section

MDX61B-503 (AC 400/500 V units): 1600 / 2000 / 2500

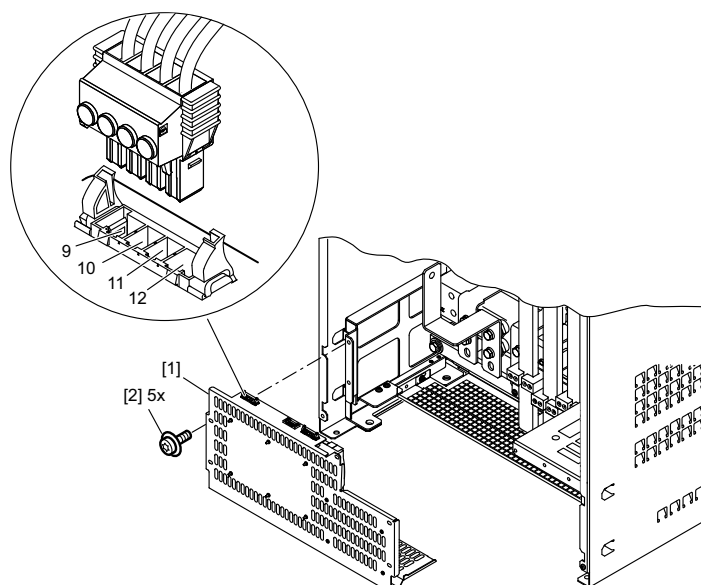


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- [1] PE connection rail (thickness = 10 mm)
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X3: Braking resistor connection 8/+R, 9/-R
- [4] X2: Motor connection 4/U, 5/V, 6/W
- [5] -U_z: Only with DC link adapter accessory

3.11.3 Power supply unit

MDX61B-503 (AC 400/500 V units): 1600 / 2000 / 2500



2306976267

- [1] DC power supply unit
- [2] Screw



4 Installation

4.1 Installation instructions for the basic unit

4.1.1 Tightening torques

Tightening torques of power terminals

Only use **original connection elements**. Note the **permitted tightening torques** for MOVIDRIVE® power terminals.

Size	Tightening torque	
	Nm	lb in
0, 1 and 2S	0.6	5
2	1.5	13
3	3.5	31
4 and 5	14.0	124
6	20.0	177
7	70.0	620

- The **permitted tightening torque** for the **signal terminals** is 0.6 Nm (5 lb in).

General tightening torques

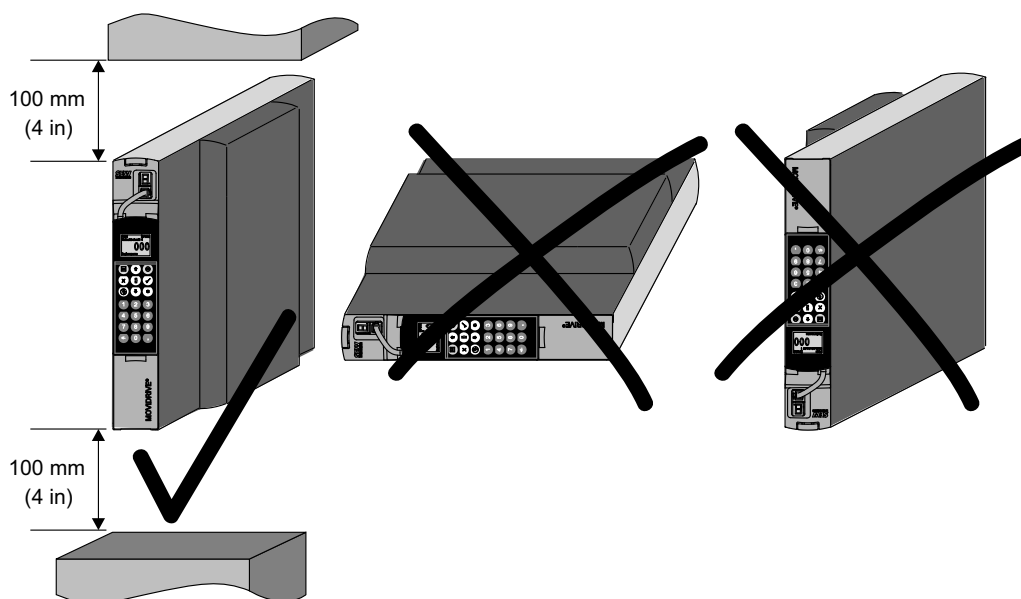
Note the permitted tightening torques:

Component	Screws	Tightening torque	
		Nm	lb in
Screw cover	M5 x 25	1.4 - 1.7	12 - 15
Screws with integral disk	M4	1.7	15
	M5	3.4	30
	M6	5.7	50
Current rail screws	M10	20	180
Insulating spacer	M10 (SW32)	30	270



4.1.2 Minimum clearance and mounting position

- Leave at least **100 mm (4 in)** clearance above and below the unit for optimum **cooling**. Make sure air circulation in the clearance is not impaired by cables or other installation equipment. With sizes 4, 5 and 6, do not install any components which are sensitive to high temperatures within 300 mm (12 in) of the top of the unit.
- Ensure unobstructed cooling air supply and make sure that the units are not subjected to heated air from nearby components.
- There is no need for clearance at the sides of the unit. You may line up the units directly next to each other.
- Only install the units **vertically**. Do not install them horizontally, tilted or upside down (→ following figure, applies to all sizes).



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4.1.3 Separate cable ducts

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



4.1.4 Fuses and earth-leakage circuit breakers

- Install the **input fuses at the beginning of the supply system lead** after the supply bus junction (→ Wiring diagram for basic unit, power section and brake).
- SEW-EURODRIVE recommends that you do not use earth-leakage circuit breakers but take alternative measures. Please refer to the section "PE connection". If you want to use an earth-leakage circuit breaker (RCD) nonetheless, **note the following according to EN 61800-5-1**:

	! WARNING
	MOVIDRIVE® can cause a DC current in the PE conductor, which might result in a malfunction of the earth leakage circuit breaker. The use of an incorrect earth-leakage circuit breaker type can cause death or severe injuries. • Either take alternative measures instead of earth-leakage circuit breakers according to the relevant standards (e.g. 61800-5-1, EN 60204-1) – see section "PE connection" – • or use earth-leakage circuit breakers of type B.

4.1.5 Line and brake contactors

- Only use **contactors in utilization category AC-3** (IEC 60947-4-1) as mains and brake contactors.

	INFORMATION
	• Only use the input contactor K11 (→ Sec. "Wiring diagram for basic unit") to switch the inverter on and off. Do not use it for jog mode. For jog mode, use the commands "Enable/stop", "CW/stop" or "CCW/stop". • Observe a minimum switch-off time of 10 s for the supply system contactor K11.

4.1.6 PE connection (→EN 61800-5-1)

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

- **Supply system lead $< 10 \text{ mm}^2$:**
Route a **second PE conductor with the cross section of the power supply line** in parallel to the protective earth via separate terminals or use a **copper protective earth conductor with a cross section of 10 mm^2 (AWG 7)**.
- **Supply system cable $10 \text{ mm}^2 \dots 16 \text{ mm}^2$:**
Route a **copper protective earth conductor with the cross section of the supply system lead**.
- **Supply system cable $16 \text{ mm}^2 \dots 35 \text{ mm}^2$:**
Route a **copper protective earth conductor with a cable cross section of 16 mm^2** .
- **Supply system cable $< 35 \text{ mm}^2$:**
Route a **copper protective earth conductor with the cross section of the supply system lead**.



4.1.7 IT systems

- MOVIDRIVE® B is designed for operation on TN and TT systems with a directly grounded star point. Operation on voltage supply systems with a non-grounded star point is permitted. In this case, SEW-EURODRIVE recommends using **earth-leakage monitors with pulse-code measurement** for voltage supply systems with a non-grounded star point (**IT systems**). Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter. **No EMC limits are specified for interference emission in voltage supply systems without grounded star point (IT systems).**
- Size 7 can be converted for IT networks. Note the information in the "MOVIDRIVE® MDX60B / 61B – Inspection and Maintenance of Size 7" manual.

4.1.8 Cable cross sections

- Supply system cable: **Cable cross section according to rated input current I_{mains}** at rated load.
- Motor cable: **Cable cross section according to rated output current I_{rated} .**
- Signal cables of basic unit (terminals X10, X11, X12, X13, X16):
 - One core per terminal 0.20 ... 2,5 mm² (AWG 24 to 13)
 - Two cores per terminal 0.25 ... 1 mm² (AWG 23 to 17)
- Signal cables of terminal X17 and DIO11B terminal expansion board (terminals X20, X21, X22):
 - One core per terminal 0,08 ... 1,5 mm² (AWG 28 to 16)
 - Two cores per terminal 0.25 ... 1 mm² (AWG 23 to 17)

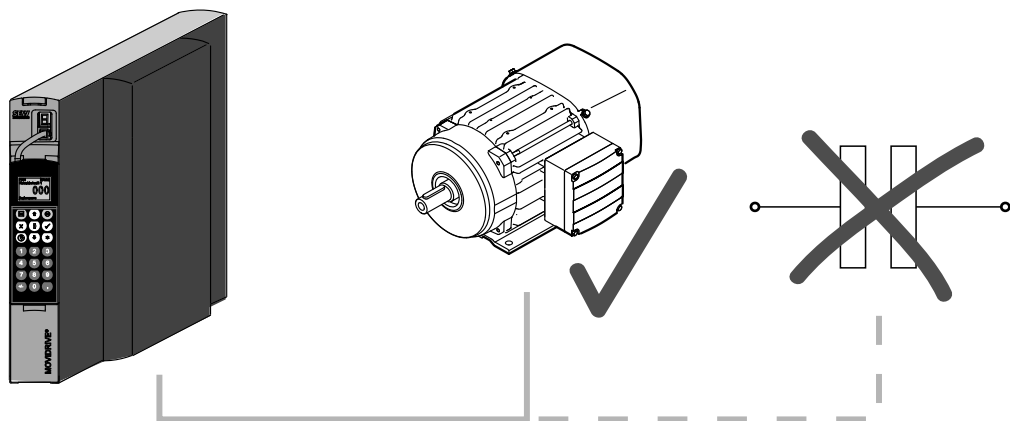
4.1.9 Unit output



NOTICE

MOVIDRIVE® B can suffer irreparable damage if you connect capacitive loads.

- **Only connect ohmic/inductive loads (motors).**
- **Never connect capacitive loads.**



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Installation

Installation instructions for the basic unit

4.1.10 Installing braking resistors BW.../ BW...-T / BW...-P

- Mounting permitted:
 - on horizontal surfaces
 - on vertical surfaces with brackets at the bottom and perforated sheets at top and bottom
- Mounting not permitted:
 - on vertical surfaces with brackets at the top, right or left

4.1.11 Connection of braking resistors

- Use **two tightly twisted leads or a 2-core shielded power cable**. Cable cross section according to trip current I_F of F16. The rated voltage of the cable must amount to at least $V_0/V = 300\text{ V} / 500\text{ V}$ (in accordance with DIN VDE 0298).
- Protect the braking resistor (except for BW90-P52B) using a **bimetallic relay** (→ wiring diagram for basic unit, power section and brake). Set the **trip current** according to the **technical data of the braking resistor**. SEW-EURODRIVE recommends using an overcurrent relay from trip class 10 or 10A in accordance with EN 60947-4-1.
- For braking resistors of the **BW...-T / BW...-P** series, the **integrated temperature switch/overcurrent relay can be connected using a 2-core shielded cable** as an **alternative** to a bimetallic relay.
- **Flat-type braking resistors** have internal thermal overload protection (fuse which cannot be replaced). Install the **flat-type braking resistors** together with the appropriate **touch guard**.

4.1.12 Operating braking resistors

- The connection leads to the braking resistors carry a **high pulsed DC voltage** during rated operation.

	! WARNING
	The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_{rated}. Risk of burns and fire. • Choose a suitable installation location. Braking resistors are usually mounted on top of the control cabinet. • Do not touch the braking resistors.

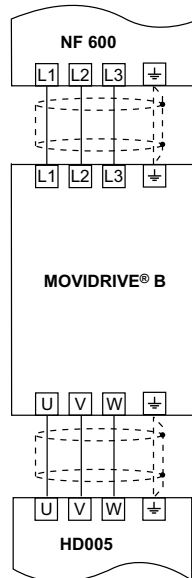
4.1.13 Binary inputs / binary outputs

- The **binary inputs** are electrically **isolated** by optocouplers.
- The **binary outputs** are **short-circuit proof** and **protected against external voltage to DC 30 V**. External voltages > DC 30 V can cause irreparable damage to binary outputs.



4.1.14 EMC-compliant installation

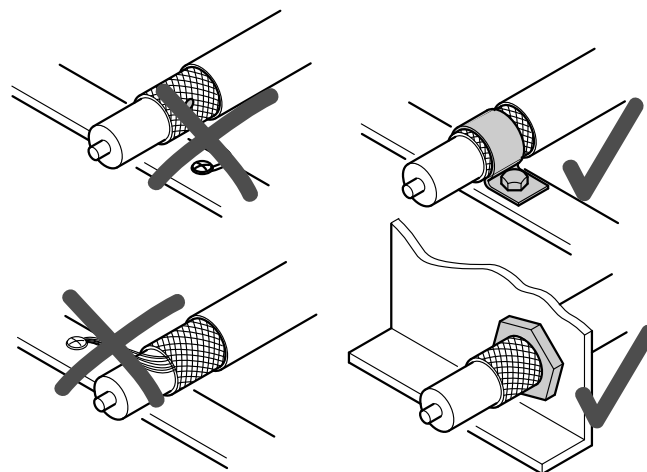
- All cables except for the supply system lead must be **shielded**. As an alternative to the shielding, the option HD.. (output choke) can be used for the motor cable to achieve the emitted interference limit values. .



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Fig. 1: Shielded cables

- When using shielded motor cables, e.g. prefabricated motor cables from SEW-EURODRIVE, you must keep the **unshielded conductors between the shield and connection terminal of the inverter as short as possible**.
- Apply the **shield by the shortest possible route and make sure it is grounded over a wide area at both ends**. Ground one end of the shield using an interference suppression capacitor (220 nF/50 V) to avoid ground loops. If using double-shielded cables, ground the outer shield on the inverter end and the inner shield at the other end.



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Fig. 1: Correct shield connection using metal clamp (shield clamp) or cable gland



Installation

Installation instructions for the basic unit

- You can also use **earthed sheet-metal ducts or metal pipes** to **shield the cables**. **Route the power and signal cables separately**.
- Ground the **inverter** and **all additional units to ensure high-frequency compatibility** (wide area, metal-on-metal contact between the unit housing and ground, e.g. unpainted control cabinet mounting panel).

	INFORMATION
	• MOVIDRIVE® B is a product with restricted availability in accordance with EN 61800-3. It may cause EMC interference. In this case, it may be recommended for the operator to carry out suitable measures. • For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

NF.. line filter

- The NF.. line filter option can be used to maintain the class C1 limit for MOVIDRIVE® MDX60B/61B units size 0 to 5.
- Do not switch between the line filter and MOVIDRIVE® MDX60B/61B.
- Install the **line filter close to the inverter** but outside the minimum clearance for cooling.
- Keep the **length of the cable between the line filter and inverter to an absolute minimum**, and never more than 400 mm. Unshielded, twisted cables are sufficient. Use also unshielded lines for the supply system cable.
- SEW-EURODRIVE recommends taking one of the following **EMC measures on the motor side to maintain class C1 and C2 limits**:
 - Shielded motor cable
 - HD... output choke option
 - HF.. output filter option (in operating modes VFC and V/f)

Interference emission category

Compliance with category C2 according to EN 61800-3 has been tested in a CE typical drive system. SEW-EURODRIVE can provide detailed information on request.

	 WARNING
	This product can cause high-frequency interferences in residential areas which can require measures for interference suppression.



HD... output choke

- Install the **output choke close to the inverter** but outside the minimum clearance for cooling.
- For HD001 ... HD003: Route **all three phases (U, V, W) of the motor cable [1] through the output choke**. To achieve a higher filter effect, **do not route the PE conductor through the output choke**.

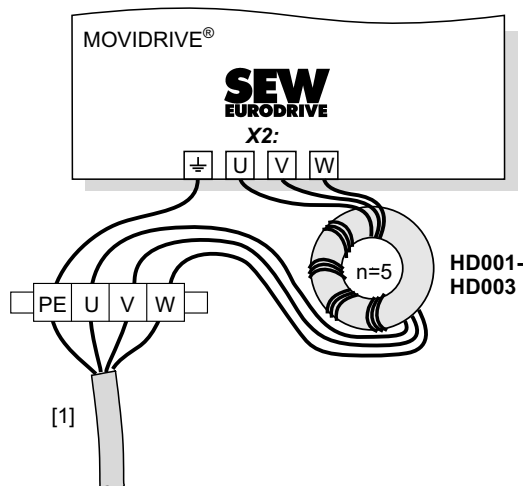


Fig. 2: Connection of output choke HD001 – HD003

[1] Motor cable

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Installation

Installation instructions for the basic unit

4.1.15 Installation notes for size 6

The MOVIDRIVE® units of size 6 (0900 ... 1320) are equipped with a factory mounted lifting lug [1]. Use a crane and the lifting eye [1] to install the unit.



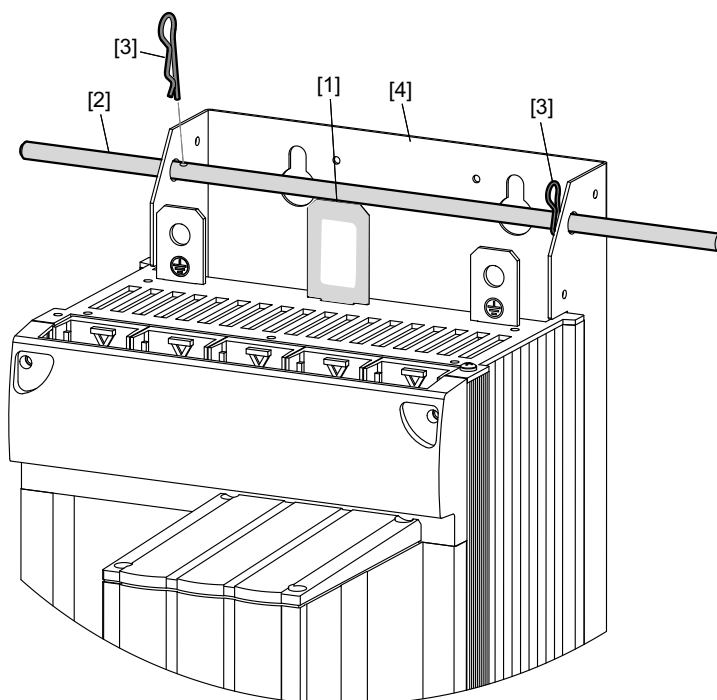
! DANGER

Suspended load.

Danger of fatal injury if the load falls.

- Do not stand under the suspended load.
- Secure the danger zone.

If a crane is not available, you can push a carrying bar [2] through the rear panel [4] to facilitate installation (included in the delivery scope of size 6). Secure the carrying bar [2] against axial displacement using the split pins [3] (see figure below).



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- [1] Fixed lifting eye
- [2] Carrying bar (included in the delivery of size 6)
- [3] 2 split pins (included in the delivery of size 6)
- [4] Rear panel



4.1.16 Installation notes for size 7

MOVIDRIVE® units size 7 (1600 - 2500) have 4 fixed lifting eyes [2] for transport. You may only use these four lifting eyes [2] for installation.

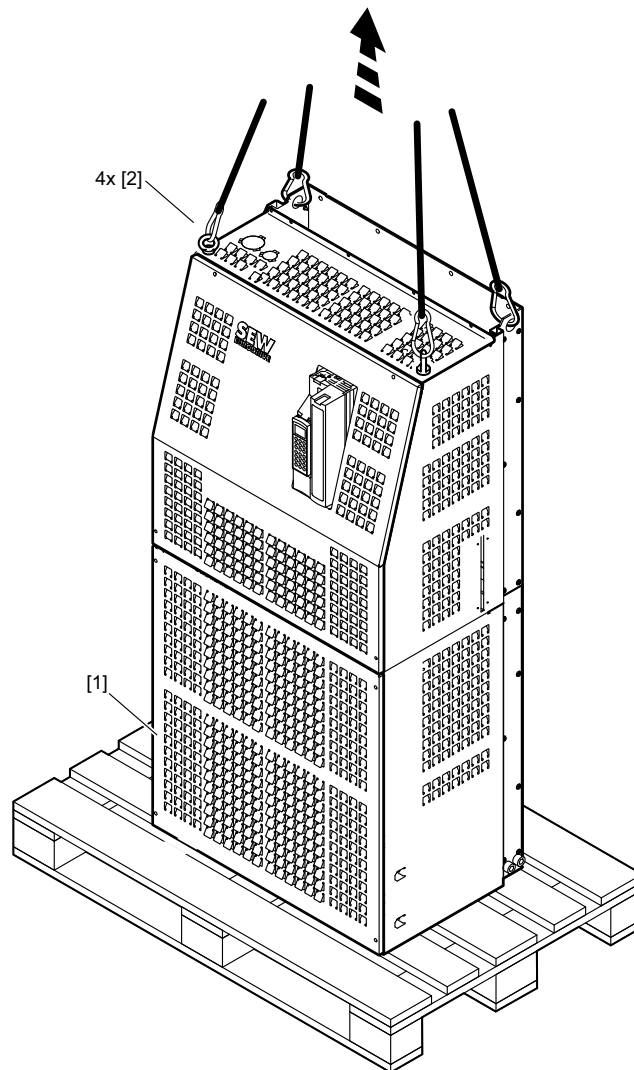


DANGER

Suspended load.

Danger of fatal injury if the load falls.

- Do not stand under the suspended load.
- Secure the danger zone.
- Always use all 4 lifting eyes.
- Align the lifting eyes with the direction of tension



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- [1] Installed front cover
[2] 4 lifting eyes



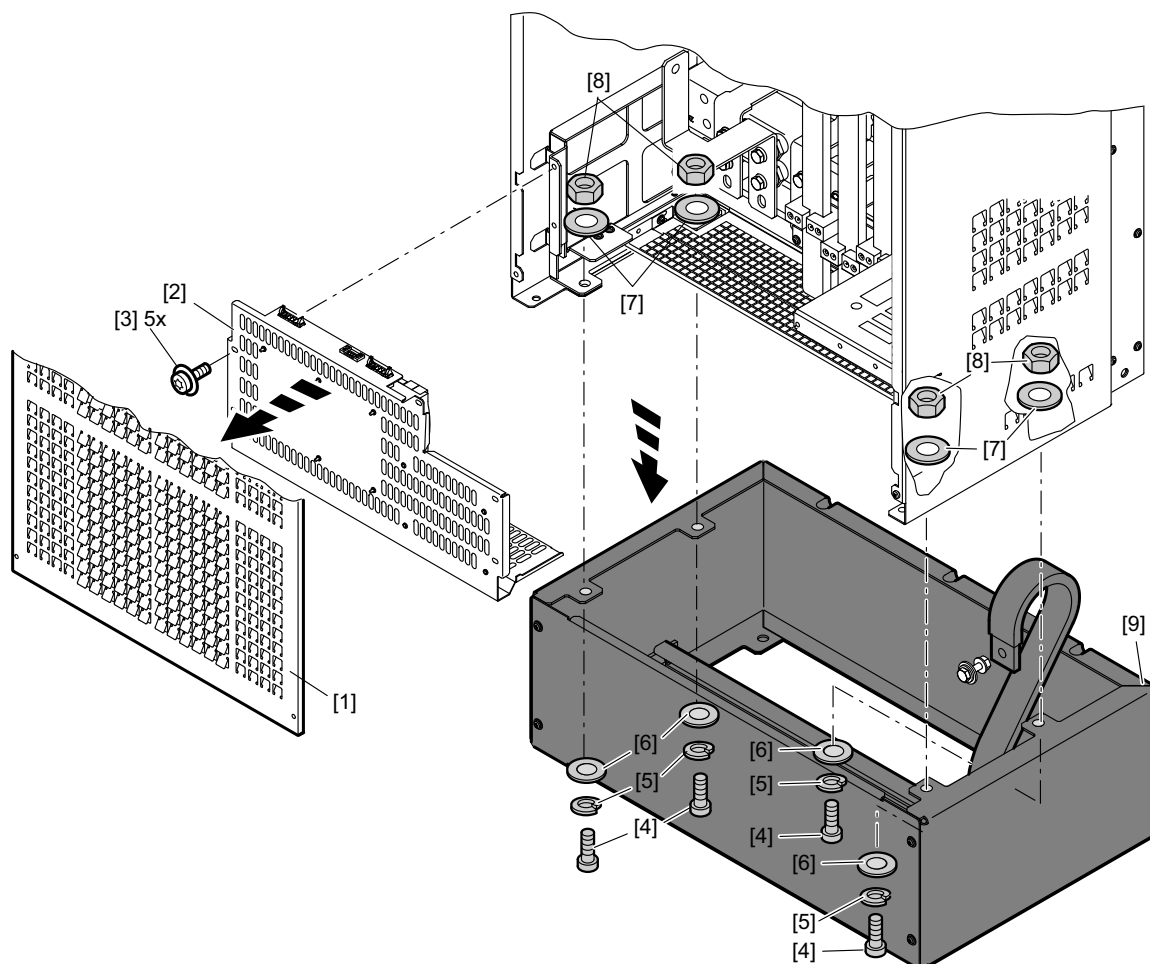
Installation

Installation instructions for the basic unit

4.1.17 Optional scope of delivery for size 7

Mounting base

The **mounting base DLS11B** with mounting material [9] (part no.: 1 822 602 7) is used to **install MOVIDRIVE® B, size 7 on the floor of the control cabinet**. MOVIDRIVE® B size 7 must be screwed onto the mounting base immediately after installation (see following figure). Do not take MOVIDRIVE® B size 7 into operation until the mounting base has been completely mounted.



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The mounting material (pos. 3 - 8) is enclosed in a plastic bag.

- | | |
|--|-----------------|
| [1] Front cover | [5] Lock washer |
| [2] Insert (for external power supply) | [6] Washer |
| [3] Retaining screws for insert | [7] Washer |
| [4] Machine screw M8 × 30 hexagon socket | [8] M8 nut |

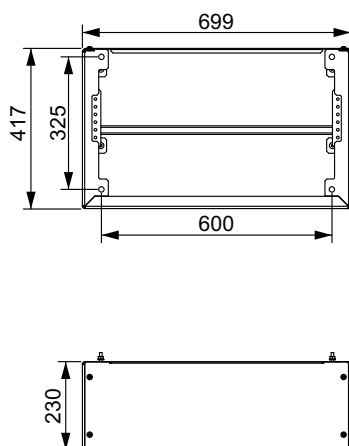


Do the following to install the mounting base [9] to MOVIDRIVE® B size 7:

1. Loosen (not unscrew!) the 4 retaining screws of the front cover [1] until you can lift it off. Remove the front cover [1].
2. Remove the insert [2]. Loosen the 5 retaining screws [5] to do so.
3. The following steps apply to each of the 4 mounting holes.
 - Position the washer [7] centrally between inverter and mounting base [9].
 - Place the lock washer [5] and the washer [6] onto the socket head screw [4] M8×30.
 - Insert the preassembled socket head screw through the mounting hole.
 - Screw the M8 nut [8] onto the socket head screw. Tightening torque 20 Nm. Apply thread locking compound.
4. Replace the insert [2] into the unit and fasten it using the 5 retaining screws.
5. Replace the front cover [1] onto the unit and fasten it using the 4 retaining screws.

*Dimension drawing
of mounting base*

The following figure shows the dimensions of the mounting base.



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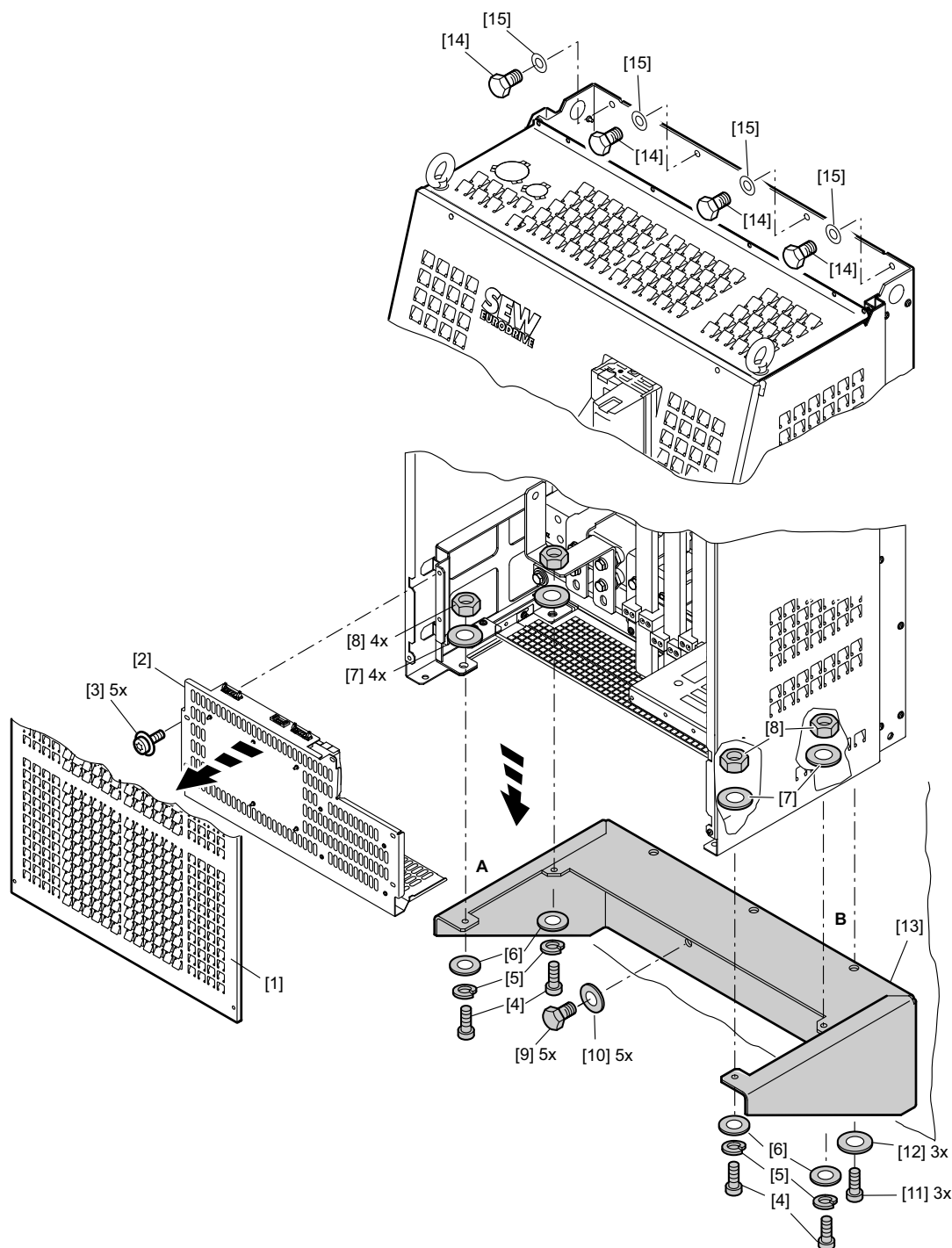


Installation

Installation instructions for the basic unit

Wall bracket

The **wall bracket DLH11B [13]** (part no: 1 822 610 8) is used to **attach MOVIDRIVE® B size 7 to the wall** (see following figure). Do not take MOVIDRIVE® B size 7 into operation until the installation of the unit is complete.



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The installation material for wall mounting is not included in the scope of delivery of SEW-EURODRIVE.



Proceed as follows to fasten the wall bracket [13] to MOVIDRIVE® B size 7:

1. Loosen (not unscrew!) the 4 retaining screws of the front cover [1] until you can lift it off. Remove the front cover [1].
2. Remove the insert [2]. Loosen the 5 retaining screws [5] to do so.
3. The wall bracket [13] is screwed onto MOVIDRIVE® B at 5 points [A, B] (see above figure).
 - Position the a washer [7] at each point centrically between inverter and wall bracket [13].
 - Place the lock washer [5] and the washer [6] onto the socket head screw [4] M8×30.
 - Insert the preassembled socket head screw through the two mounting holes [A].
 - Screw the M8 nut [8] onto the socket head screw. Tightening torque 20 Nm. Apply thread locking compound.
 - Screw the wall bracket to MOVIDRIVE® B at the 3 mounting bores [B] using the retaining screws [11] and washers [12].
4. Replace the insert [2] into the unit and fasten it using the 5 retaining screws.
5. Replace the front cover [1] onto the unit and fasten it using the 4 retaining screws.
6. To mount MOVIDRIVE® B size 7 to a wall (material not included in the scope of delivery), use
 - 4 retaining screws [14] and washers [15] for the 4 mounting holes at the top of the unit and
 - 5 retaining screws [9] and washers [10] for the 5 mounting holes on the wall bracket [13].

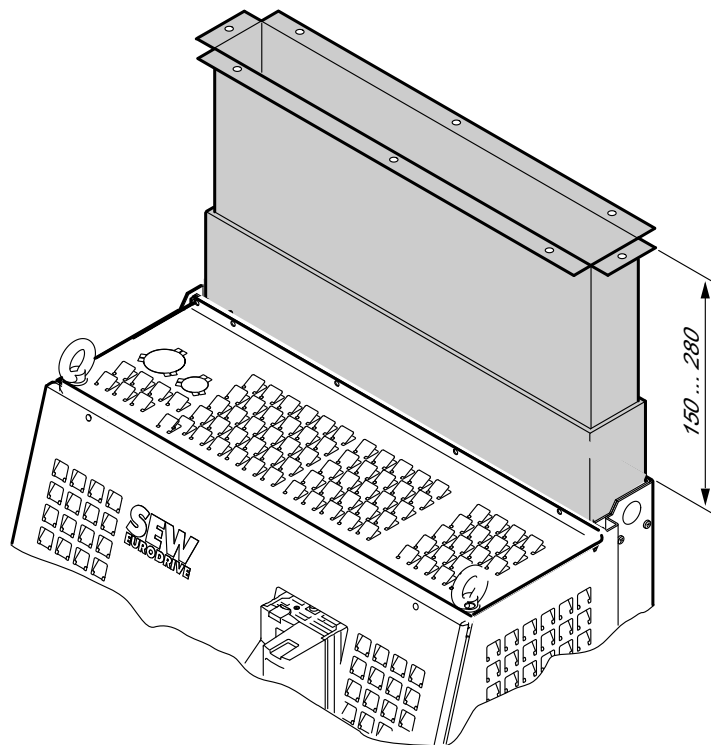


Installation

Installation instructions for the basic unit

*Heat dissipation
through air duct*

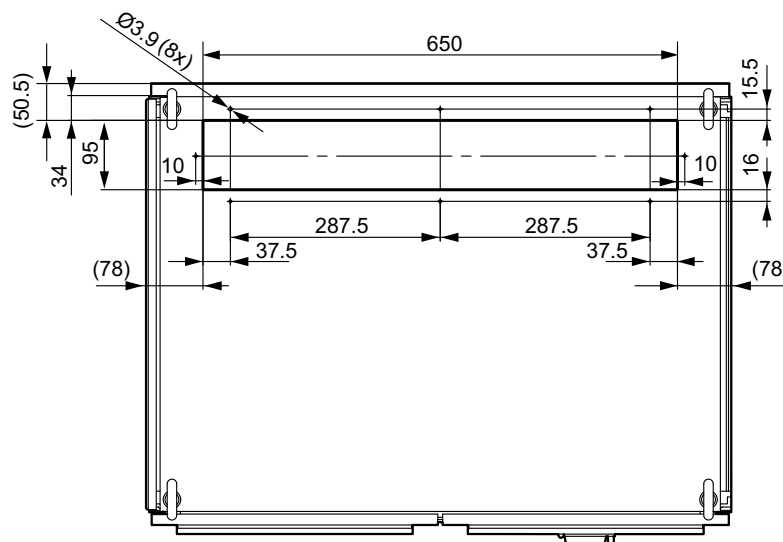
A **DLK11B air duct** (part no.: 1 822 603 5) is available as an option to dissipate heat of MOVIDRIVE® B size 7. Install the air duct in such a way that it points vertically upwards (see below figure).



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*Roof cut-out for
DLK11B air duct*

The following figure shows the cut-out of the control cabinet roof for the DLK11B air duct.

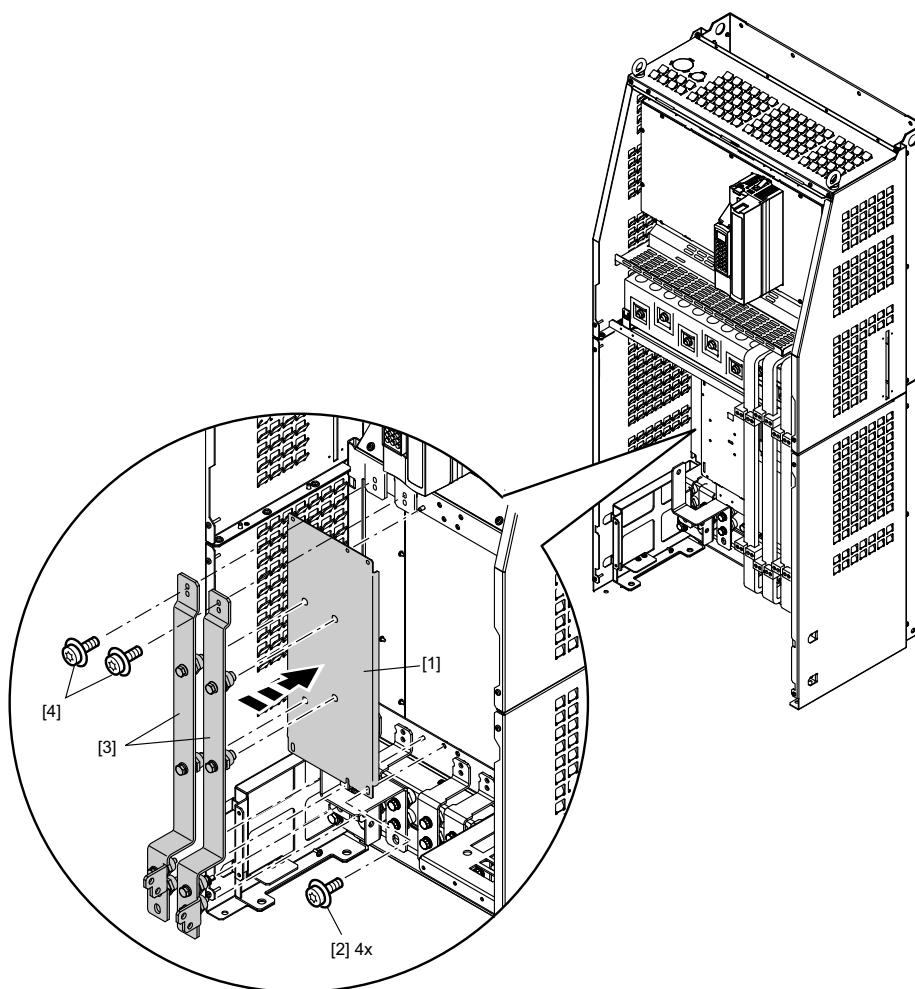


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DC link adapter 2Q

The **DC link adapter 2Q DLZ12B** (part no.: 1 822 729 5) can be used to provide a DC link connection at the bottom of the unit:



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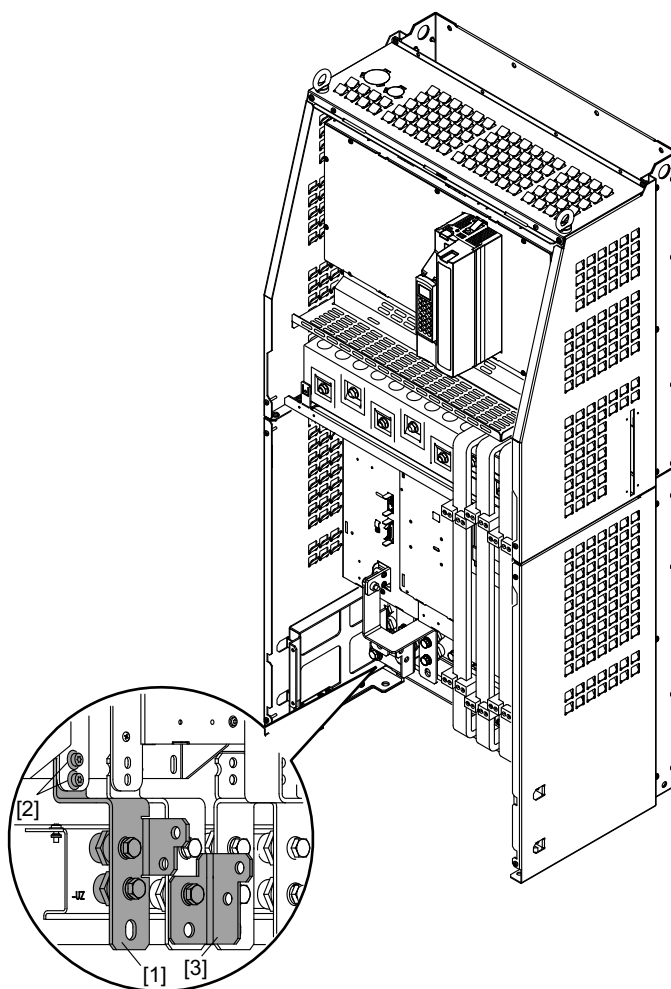
1. Loosen the 4 screws of both the upper and lower cover and remove them.
2. Loosen the 5 screws of the insert and remove it.
3. Place the cover panel on the fastening pin of the slot for the brake chopper module.
4. Position the 2 upper retaining screws [2] of the cover panel [1] in the frame. Position the 2 lower retaining screws of the cover panel in the frame.
5. Screw the insulating spacers tightly to the cover panel [1].
6. Screw the insulating spacers tightly to the frame (bottom).
7. Position the 2 screws of the fixing strap $-U_z$ at the DC link (top left).
8. Position the 2 screws of the fixing strap $+U_z$ at the DC link (top right).
9. Position the 4 screws of the fixing straps $-U_z$ and $+U_z$ on the insulating spacer.
10. Tighten all screws of the fixing straps $-U_z$ and $+U_z$.
11. Replace the covers.



Installation

Installation instructions for the basic unit

DC link adapter 4Q The **DC link adapter 4Q DLZ14B** (part no.: 1 822 728 7) can be used to provide a DC link connection at the bottom of the unit:



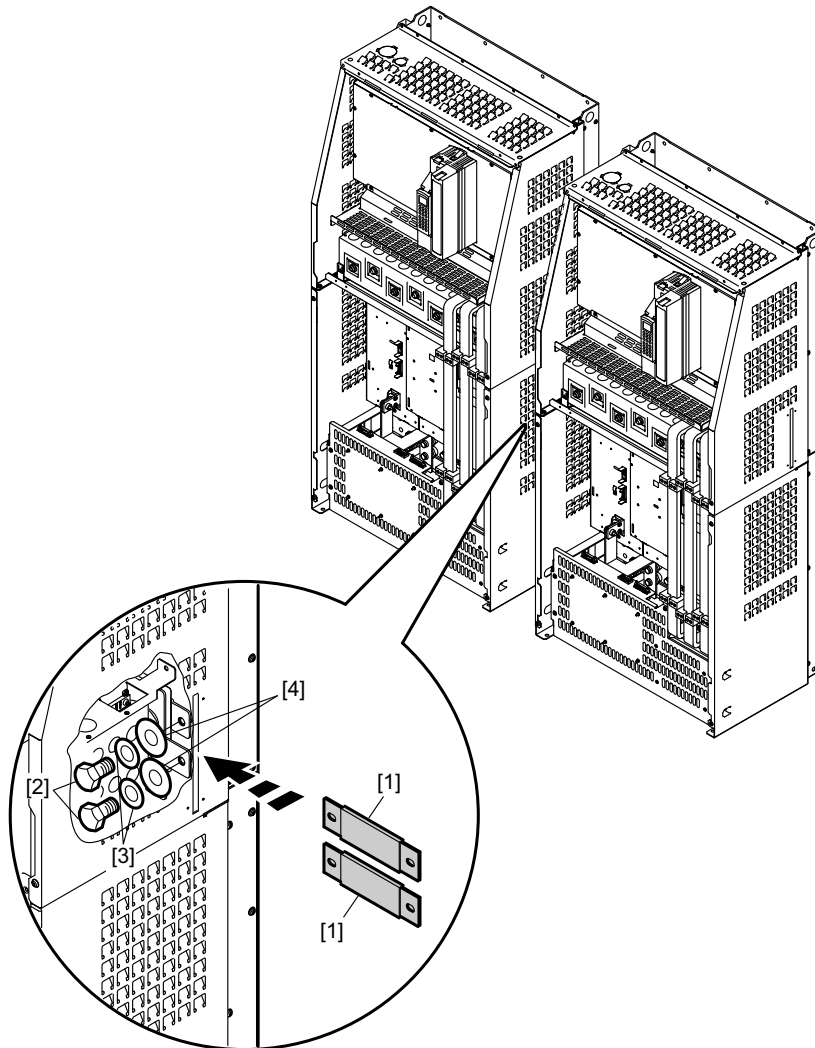
2276334603

1. Loosen the 4 screws of the upper cover and remove it.
2. Loosen the 4 screws of the lower cover and remove it.
3. Position the 2 screws of the conductor rail [1] -U_Z on the brake chopper module (bottom left) on the insulating spacer.
4. Position the 2 screws of the conductor rail [1] -U_Z on the insulating spacer.
5. Tighten all screws of the fixing strap -U_Z.
6. Screw on the angle bracket [3].
7. Replace the covers.



DC link coupling

To connect 2 inverters that are installed next to each other, you can use the **DLZ11B DC link coupling** (part no.: 1 823 193 4):



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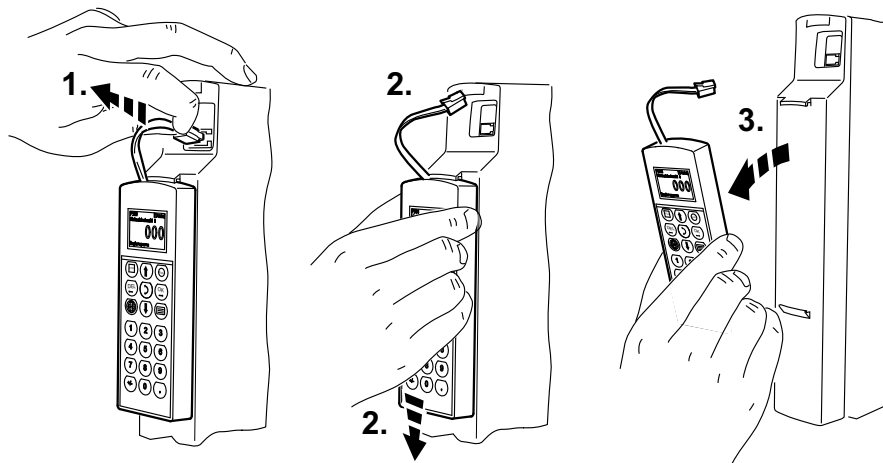
1. The units that you want to connect must be installed at ground level and 100 mm apart from each other.
2. Loosen the 4 screws of the upper cover and remove it.
3. Loosen the 4 screws of the lower cover and remove it.
4. Insert the 2 DC link couplings [1] into the units.
5. Screw the DC link coupling [1] to one unit first, before attaching it to the other units.
6. Tighten the screws [2].
7. Replace the covers.



4.2 Removing/installing the keypad

4.2.1 Removing the keypad

Proceed as follows:

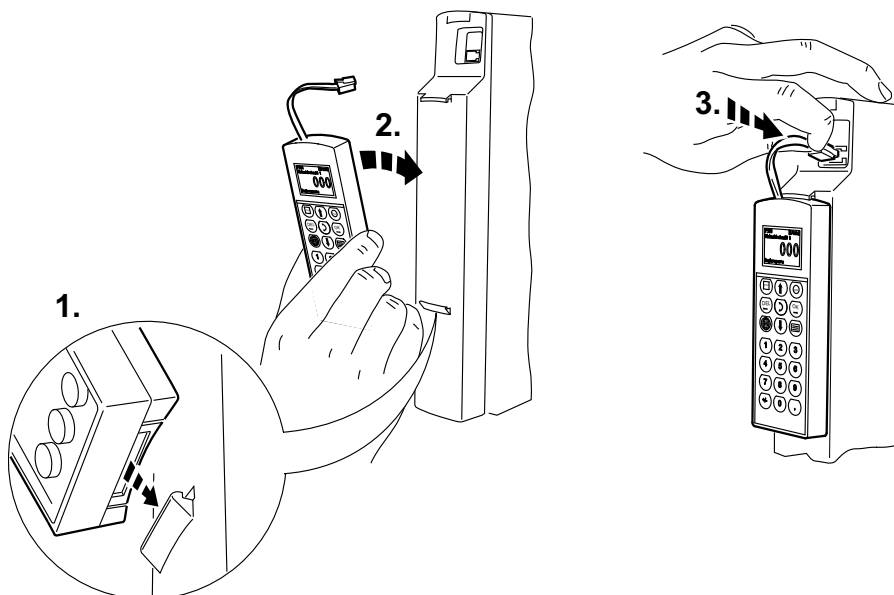


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1. Unplug the connection cable from the XT slot.
2. Carefully push the keypad downward until it comes off the upper fixture on the front cover.
3. Remove the keypad **forward** (not to the side!).

4.2.2 Installing the keypad

Proceed as follows:



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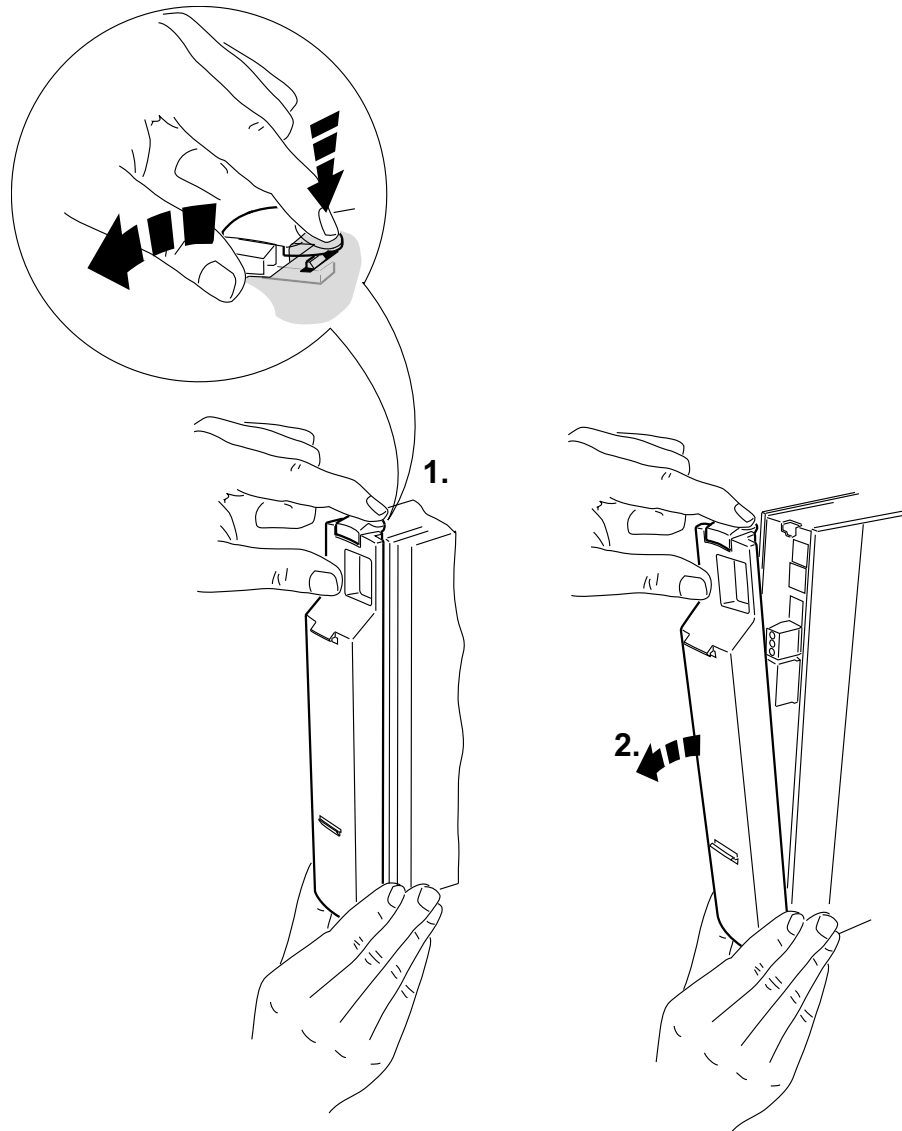
1. Place the underside of the keypad onto the lower fixture of the front cover.
2. Push the keypad into the upper fixture of the front cover.
3. Plug the connecting cable into the XT slot.



4.3 Removing/installing the front cover

4.3.1 Removing the front cover

Proceed as follows to remove the front cover:



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Fig. 9: Removing the front cover

1. If a keypad (page 44) is installed, remove it first.
2. Press the grooved clip on top of the front cover.
3. Keep the clip pressed down to remove the front cover.



4.3.2 Installing the front cover

Proceed as follows to install the front cover:

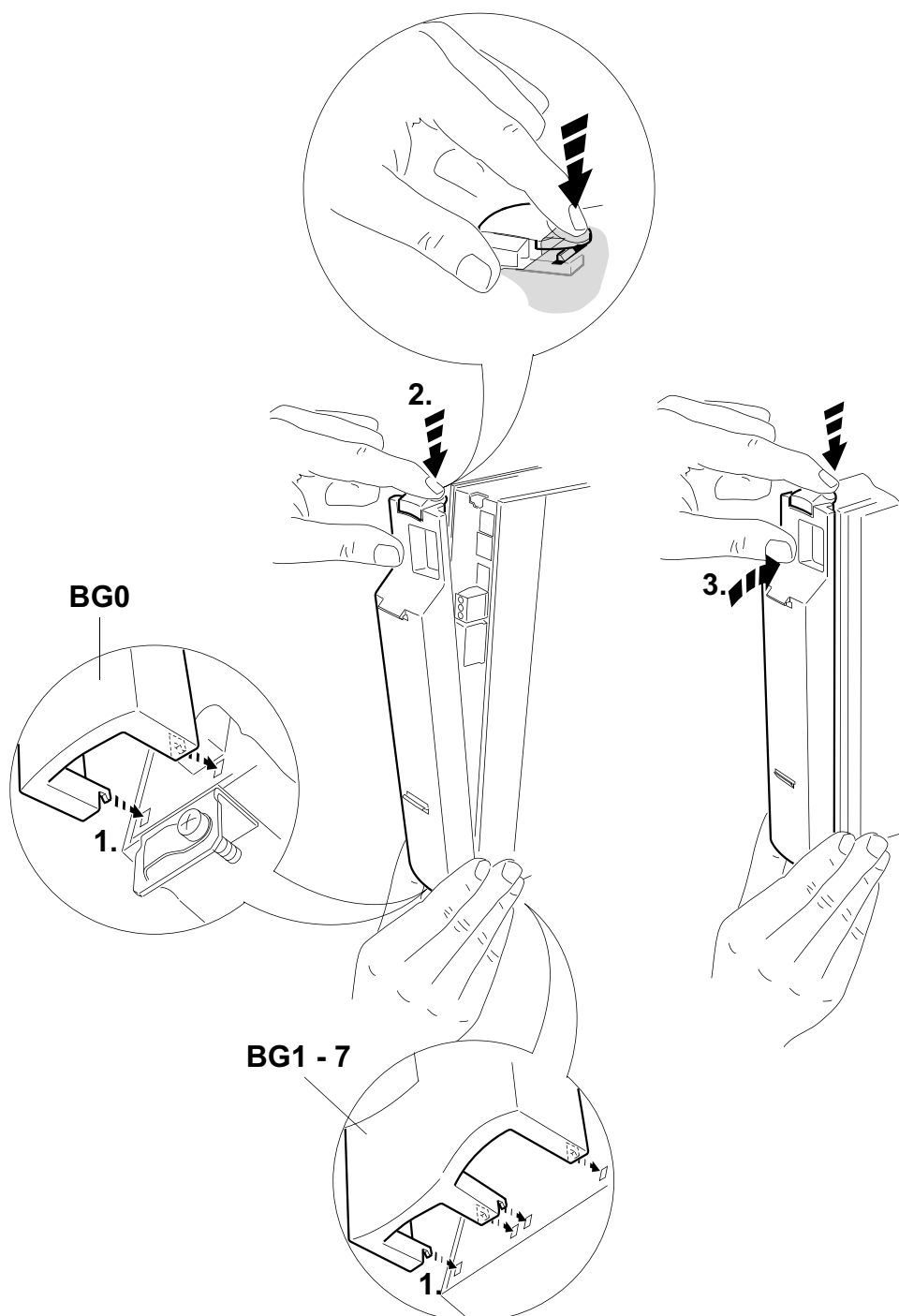


Fig. 10: Installing the front cover

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1. Insert the underside of the front cover into the support.
2. Keep the grooved clip on top of the front cover pressed down.
3. Push the front cover onto the unit.



4.4 Information regarding UL

4.4.1 Field wiring power terminals

- Use 60/75 °C copper wire only – Models with suffix 0003 to 0300.
Use 75 °C copper wire only – Models with suffix 0370 to 2500.
- Tighten terminals to in-lbs (Nm) as follows:

Series	Frame size	in-lbs	Nm
MOVIDRIVE® B	0XS, 0S, 0L	5	0.6
	1, 2S	5	0.6
	2	13	1.5
	3	31	3.5
	4, 5	120	14
	6	180	20
	7	620	70

4.4.2 Short-circuit current rating

- Suitable for use on a circuit capable of delivering not more than 5,000 rms symmetrical amperes:
 - MOVIDRIVE® B models with suffix 0005 to 0014 and 0055 to 0300 (400 V units only).
Max. voltage is limited to 500 V.
 - MOVIDRIVE® B models with suffix 0015 to 0150 (230 V units only).
Max. voltage is limited to 240 V.
- Suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical ampere:
 - MOVIDRIVE® B models with suffix 0015 to 0040 and 0370 to 1320 (400 V units only).
Max. voltage is limited to 500 V.
 - MOVIDRIVE® B models with suffix 0220 to 0300 (230 V units only).
Max. voltage is limited to 240 V.
- Suitable for use on a circuit capable of delivering not more than 18,000 rms symmetrical amperes:
 - MOVIDRIVE® B models with suffix 1600 to 2500 (400 V units only).
Max. voltage is limited to 500 V.



4.4.3 Branch circuit protection

AC 400/500 V
units

MOVIDRIVE® MDX60B/61B...5_3	Max. supply short circuit current	Max. supply voltage	Max. fuse rating
0005/0008/0011/0014	AC 5000 A	AC 500 V	AC 15 A / 600 V
0015/0022/0030/0040	AC 10000 A	AC 500 V	AC 35 A / 600 V
0055/0075	AC 5000 A	AC 500 V	AC 60 A / 600 V
0110	AC 5000 A	AC 500 V	AC 110 A / 600 V
0150/0220	AC 5000 A	AC 500 V	AC 175 A / 600 V
0300	AC 5000 A	AC 500 V	AC 225 A / 600 V
0370/0450	AC 10000 A	AC 500 V	AC 350 A / 600 V
0550/0750	AC 10000 A	AC 500 V	AC 500 A / 600 V
0900	AC 10000 A	AC 500 V	AC 250 A / 600 V
1100	AC 10000 A	AC 500 V	AC 300 A / 600 V
1320	AC 10000 A	AC 500 V	AC 400 A / 600 V
1600	AC 18000 A	AC 500 V	AC 400 A / 600 V
2000	AC 18000 A	AC 500 V	AC 500 A / 600 V
2500	AC 18000 A	AC 500 V	AC 600 A / 600 V

AC 230 V units

MOVIDRIVE® MDX61B...2_3	Max. supply short circuit current	Max. supply voltage	Max. fuse rating
0015/0022/0037	AC 5000 A	AC 240 V	AC 30 A / 250 V
0055/0075	AC 5000 A	AC 240 V	AC 110 A / 250 V
0110	AC 5000 A	AC 240 V	AC 175 A / 250 V
0150	AC 5000 A	AC 240 V	AC 225 A / 250 V
0220/0300	AC 10000 A	AC 240 V	AC 350 A / 250 V

4.4.4 Ambient temperature

The units are suitable for an ambient temperature of 40 °C, max. 60 °C with derated output current.

To determine output current rating at higher than 40 °C, the output current should be derated 2.5 % per °C between 40 °C and 50 °C, and 3 % per °C between 50 °C and 60 °C.



INFORMATION

- Use only tested units with a **limited output voltage** ($U_{\max} = \text{DC } 30 \text{ V}$) and **limited output current** ($I_{\max} = 8 \text{ A}$) as an **external DC 24 V voltage source**.
- **UL certification does not apply to operation in voltage supply systems with a non-grounded star point (IT systems).**



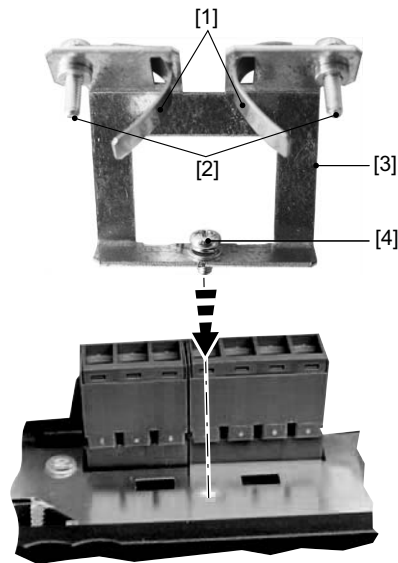
4.5 Shield clamps

4.5.1 Shield clamp for power section, size 0

A set of shield clamps is supplied as standard for the power section of MOVIDRIVE® MDX60B/61B size 0. The shield clamps are not yet installed.

Install the shield clamps for the power section as follows:

- Secure the contact clips to the shield plates.
- Secure the shield clamps to the top and the bottom of the unit.



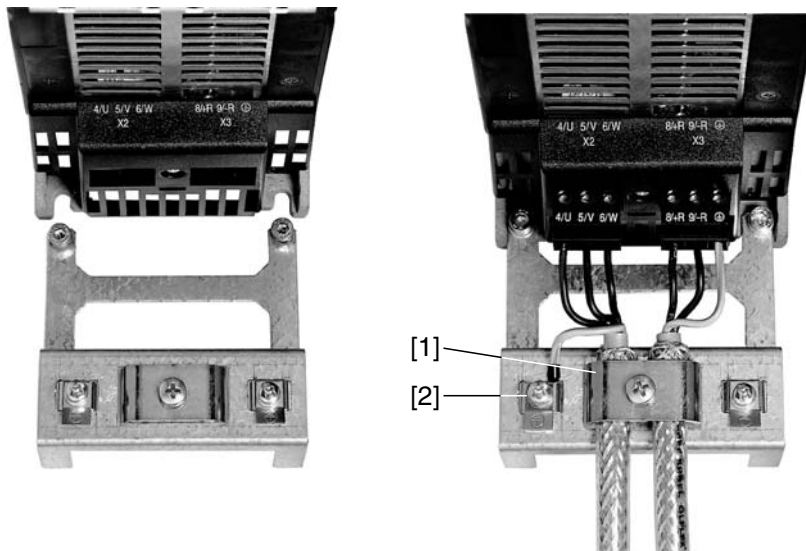
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- [1] Contact clips
- [2] Retaining screws for contact clip
- [3] Shield plate
- [4] Retaining screw for shield clamp



4.5.2 Shield clamp for power section, size 1

A shield clamp is supplied as standard for the power section with MOVIDRIVE® MDX61B size 1. Install this shield clamp on the power section together with the unit's retaining screws.



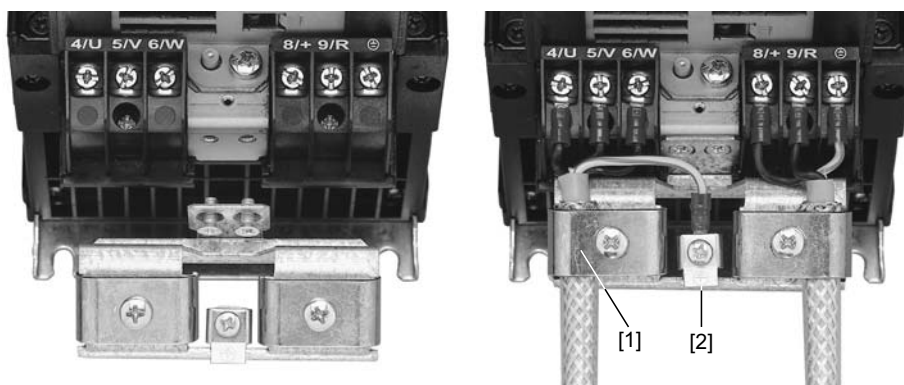
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[1] Power section shield clamp

[2] PE connection (y)

4.5.3 Shield clamp for power section, sizes 2S and 2

A shield clamp for the power section is supplied as standard with two retaining screws with MOVIDRIVE® MDX61B sizes 2S and 2. Install this shield clamp using the two retaining screws.



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[1] Power section shield clamp

[2] PE connection (y)

The shield clamps for the power section provide you with a very convenient way of installing the shield for the motor and brake cables. Apply the shield and PE conductor as shown in the figures below.

4.5.4 Shield clamp for power section, sizes 3 to 7

No shield clamps for the power section are supplied with MOVIDRIVE® MDX61B sizes 3 to 7. Use commercially available shield clamps for installing the shielding of motor and brake cables. Apply the shield as closely as possible to the inverter.

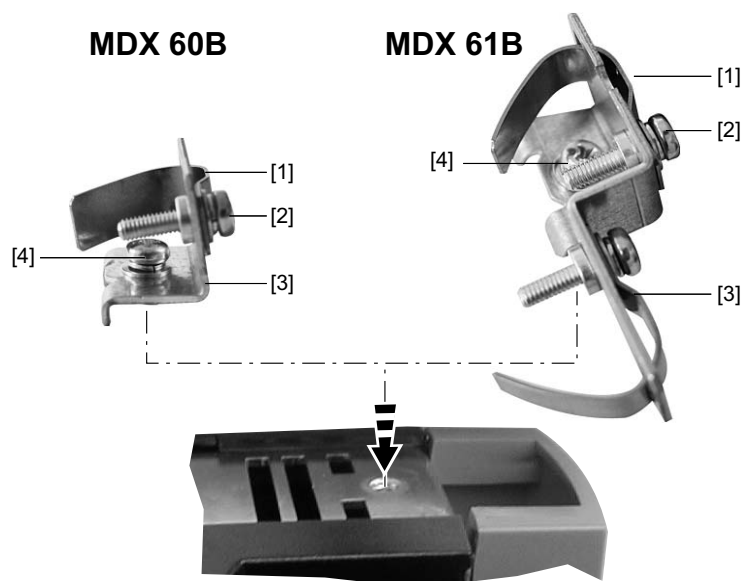


4.5.5 Shield clamp for signal cables

Install the shield clamp for the signal cable as follows:

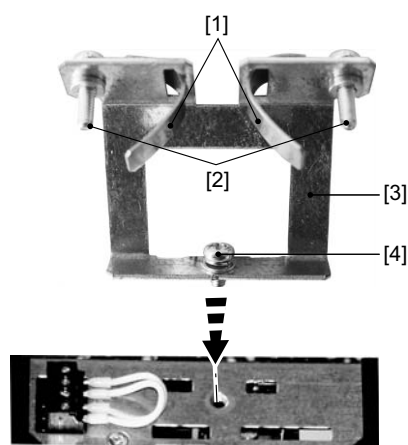
- If installed, remove the keypad and the front cover.
- Size 0: Attach the shield clamp on the bottom of the control unit.
- Sizes 1 to 7: Attach the shield clamp on the bottom of the control unit.

Size 0



1805296011

Sizes 1 to 7



1805401483

- [1] Contact clip(s)
- [2] Retaining screw(s) for contact clips
- [3] Shield plate
- [4] Retaining screw for shield clamp



4.6 Touch guard for power terminals



! DANGER

Uncovered power connections.

Severe or fatal injuries from electric shock.

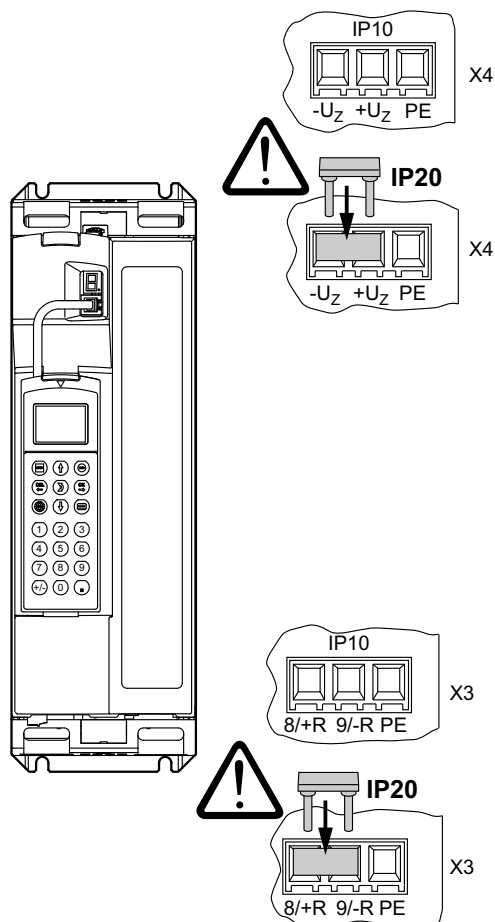
- Install the touch guard according to the regulations.
- Never start the unit if the touch guard is not installed.

4.6.1 Size 2S

IP20 is achieved for MOVIDRIVE® MDX61B size 2S if one of the following conditions is fulfilled:

- Touch guard is installed on X3 / X4.
- An adequate cable is connected to X3 / X4

If neither of the two conditions is fulfilled, the degree of protection is IP10.



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Fig. 4: Touch guard for MOVIDRIVE® MDX61B size 2S



4.6.2 Sizes 4 and 5

IP20 is achieved for MOVIDRIVE® MDX61B sizes 4 and 5 (AC 500 V units: MDX61B0370/0450/0550/0750; AC 230 V units: MDX61B0220/0300), as soon as one of the following conditions is fulfilled:

- Cables with shrink tubing and a cable cross section of $\geq 35 \text{ mm}^2$ (AWG2) are connected to X1, X2, X3, X4. The additional DLB11B touch guard need not be installed.
- Cables with shrink tubing and a cable cross section of $< 35 \text{ mm}^2$ (AWG2) are connected to X1, X2, X3, X4. The DLB11B touch guard must be installed properly (see section "Installing the DLB11B touch guard").
- The DLB11B must be connected to power terminals that are not connected. The DLB11B does not have to be connected to the PE terminals.

If neither of the conditions is fulfilled, the degree of protection is IP10. The **DLB11B touch guard (12 pieces included in the scope of delivery)** is available via the **part number 0823 111 7**.



Installation

Touch guard for power terminals

Installing the DLB11B touch guard

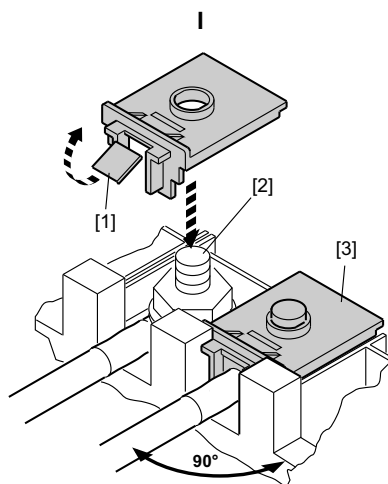
Proceed as follows to install the **DLB11B touch guard**:

- Figure I: Power terminal with connected power cable with a cable cross section of $< 35 \text{ mm}^2$ (AWG2):

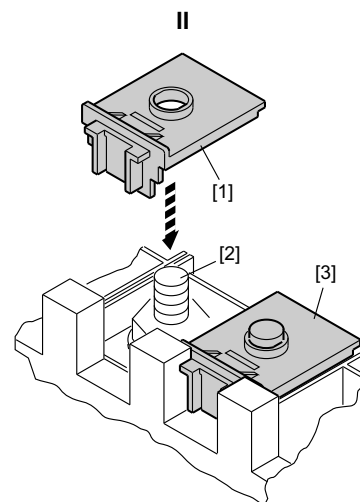
Remove the plastic saddle [1] and push the DLB11B touch guard [3] on the respective stud [2] of the power terminal. Make sure that the cable output is straight. Install the cover for the power terminals.

- Figure II: Power terminal without connected power cable:

Push the DLB11B touch guard [1] on the respective stud [2]. Install the cover for the power terminals.



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- [1] Plastic saddle
- [2] Terminal stud
- [3] Correctly mounted touch guard

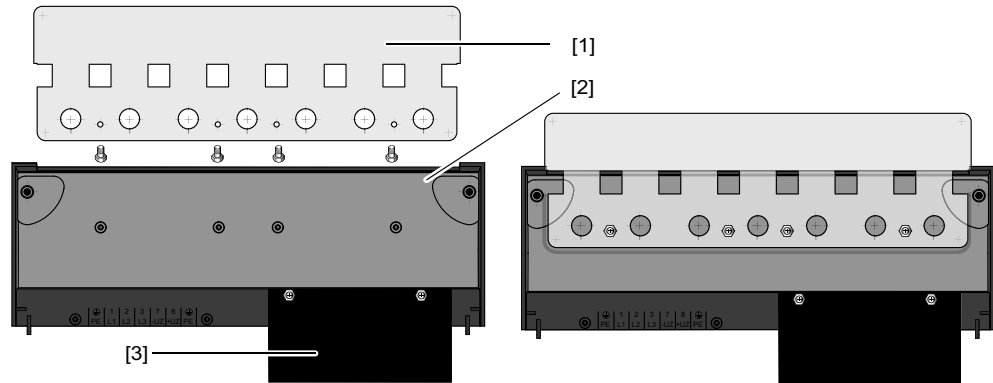
- [1] Touch guard
- [2] Terminal stud
- [3] Correctly mounted touch guard

For additional information on the X1, X2, X3 and X4 power terminals, refer to the "Technical Data" section.



4.6.3 Sizes 4 - 6

For MOVIDRIVE® size 4 (AC 500 V units: MDX61B0370/0450; AC 230 V units: MDX61B0220/0300), size 5 (MDX61B0550/0750) and size 6 (MDX61B0900/1100/1320), two (2) touch guards with eight (8) retaining screws are supplied as standard. Install the touch guard on both covers of the power terminals.



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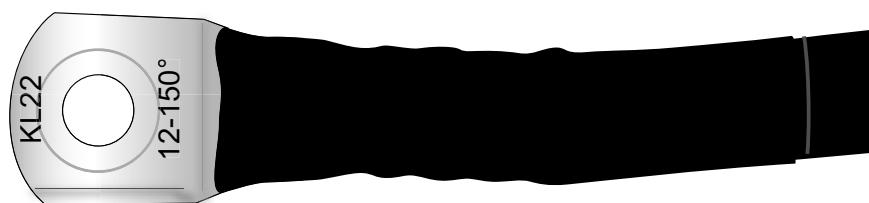
Fig. 5: Touch guard for MOVIDRIVE® MDX61B sizes 4, 5 and 6

The touch guard comprises the following parts:

- [1] Cover plate
- [2] Connection plate
- [3] Screen (only for size 5)

IP10 is only achieved for the MOVIDRIVE® MDX61B units sizes 4, 5 and 6 when the following conditions are fulfilled:

- Touch guard is fully installed
- Shrink tubing is installed on the power cables of all power terminals (X1, X2, X3, X4) (see following picture)



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	INFORMATION
	If the above conditions are not met, MOVIDRIVE® units sizes 4, 5 and 6 have degree of protection IP00.



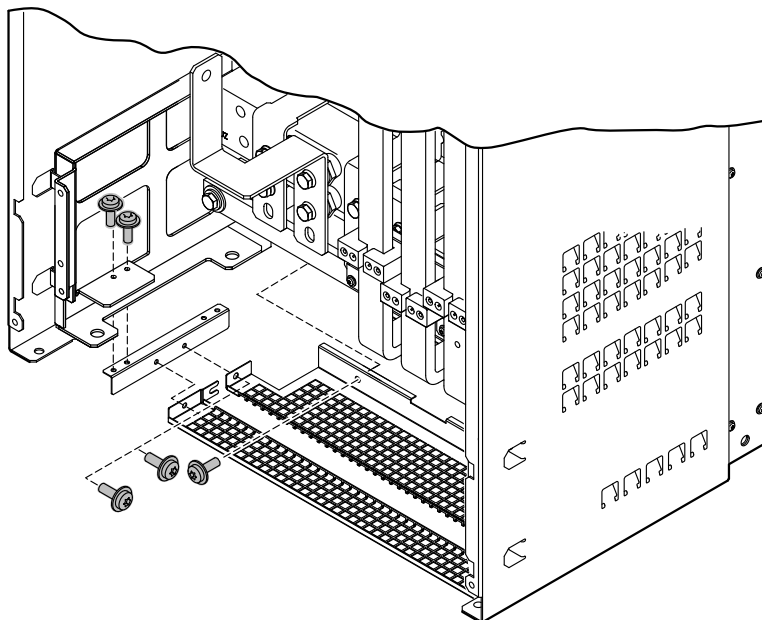
Installation

Touch guard for power terminals

4.6.4 Size 7

*Installation of
touch guard
DLB21B*

Degree of protection IP20 is achieved for MOVIDRIVE® MDX61B size 7 when the touch guard DLB21B (part no 1 822 608 6) is trimmed to size by the customer and mounted in front and behind the power connections.



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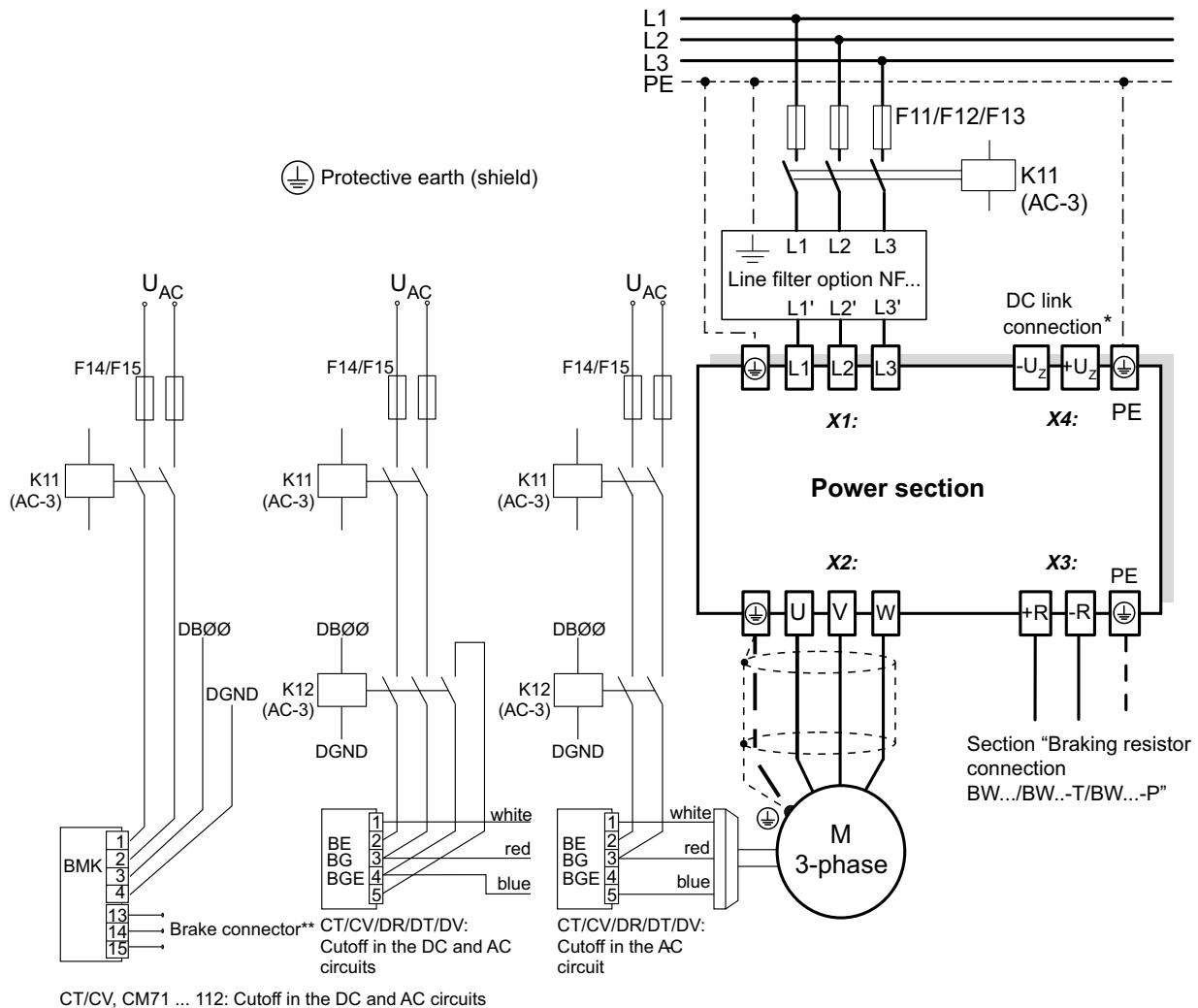
INFORMATION

If the above conditions are not met, MOVIDRIVE® units size 7 have degree of protection IP00.



4.7 Wiring diagram for basic unit

4.7.1 Power section and brake (size 1-6)



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* With sizes 1, 2 and 2S, there is no PE connection next to the supply system connection terminals and motor connection terminals (X1, X2). In this case, use the PE terminal next to the DC link connection (X4).

** **You must adhere to the connection sequence of the brake connector.** Incorrect connection will cause irreparable damage to the brake. **Read the operating instructions for the motors** when connecting the brake using the terminal box.



INFORMATION

- Connect the brake rectifier using a separate supply system lead.
- **Supply via the motor voltage is not permitted!**

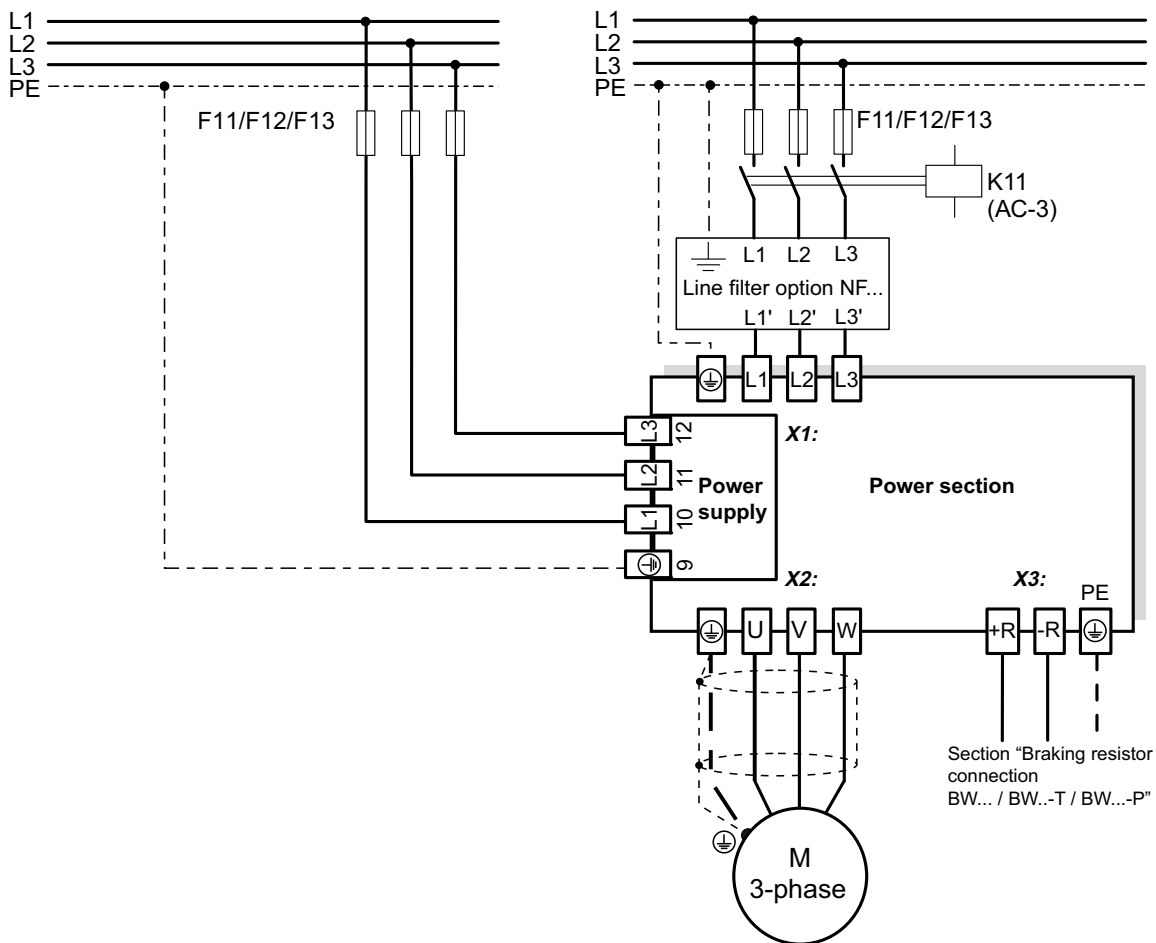
Always switch off the brake on the DC and AC sides with:

- all hoist applications,
- Drives that require a rapid brake response time
- CFC and SERVO operating modes



4.7.2 Power section and DC power supply unit (size7)

For connecting the brake, refer to the wiring diagram of size 1-6.



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Technical data of
DC power supply
unit:

- Rated current: AC 2.4 A
- Inrush current AC 30 A / AC 380 - 500 V



INFORMATION

Note that the connection of external +24 V power supply units to the X10:9 control terminal is not permitted in backup mode via power supply unit. Incorrect connection prompts an error message.

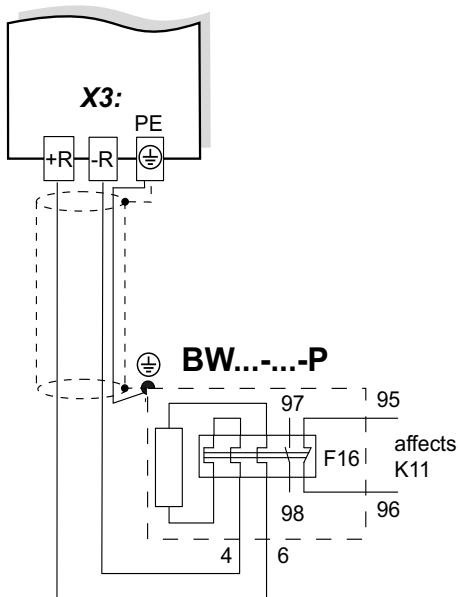
4.7.3 Brake rectifier in the control cabinet

Install the connection cables between the brake rectifier and the brake separately from other power cables when installing the brake rectifier in the control cabinet. Joint installation is only permitted with shielded power cables.



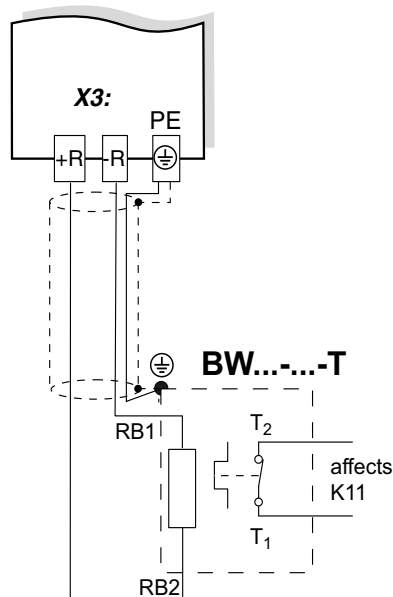
4.7.4 Braking resistor BW... / BW...-T / BW...-P

Power section



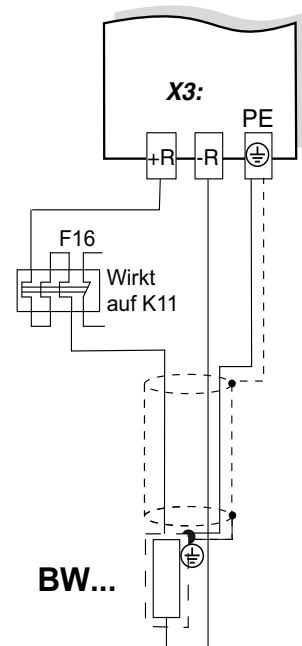
When the signal contact F16 trips, K11 must be opened and DIØØ"/Controller inhibit" must receive a "0" signal. The resistor circuit must not be interrupted!

Power section



When the internal temperature switch trips, K11 must be opened and DIØØ"/Controller inhibit" must receive a "0" signal. The resistor circuit must not be interrupted!

Power section



When the external bimetal relay (F16) trips, K11 must be opened and DIØØ"/Controller inhibit" must receive a "0" signal. The resistor circuit must not be interrupted!

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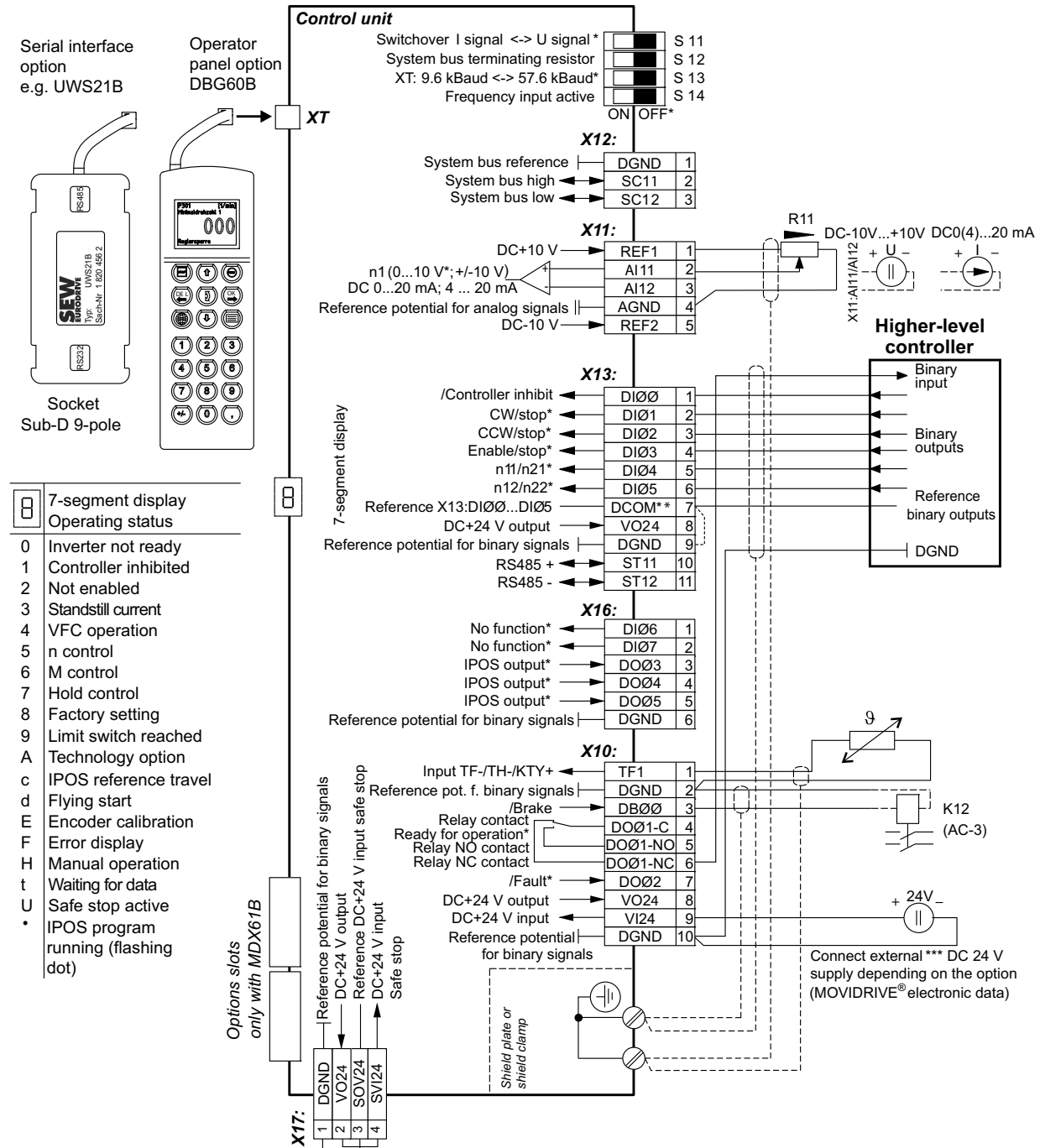
Braking resistor type	Overload protection		
	Design specified	Internal temperature switch (..T)	External bimetallic relay (F16)
BW...	-	-	Required
BW...-T	-	One of the two options (internal temperature switch/external bimetallic relay) is required.	
BW...-003 / BW...-005	Adequate	-	Permitted
BW090-P52B	Adequate	-	-



Installation

Wiring diagram for basic unit

4.7.5 Signal terminals



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* Factory setting

** If the binary inputs are connected to the DC 24 V voltage supply X13:8 "VO24", install a jumper between X13:7 (DCOM) and X13:9 (DGND) on MOVIDRIVE®.

DGND (X10, X12, X13, X16, X17) is connected with PE as standard (threaded hole, see section "Unit structure"). You can establish galvanic isolation by removing the M4 x 14 grounding screw.

*** External voltage supply via X:10 only for size 0-6. With size 7, the 24 V backup voltage must be connected via the DC power supply unit.



4.7.6 Description of terminal functions on the basic unit (power section and control unit)

Terminal		Function
X1:1/2/3 X2:4/5/6 X3:8/9 X4:	L1/L2/L3 (PE) U/V/W (PE) +R/-R (PE) +U _Z /-U _Z (PE)	Supply system connection Motor connection Braking resistor connection DC link connection
9,10,11,12	L1/L2/L3/PE	Connection of switched-mode power supply (only for size 7)
S11: S12: S13: S14:		Change I-signal DC(0(4)...20 am) ↔ V-signal DC(-10 V...0...10 V, 0...10 V), factory setting to V signal. Switching system bus terminating resistor on/off; factory setting: OFF. Set baud rate for the RS485 interface XT. Either 9.6 or 57.6 baud, factory setting: 75.6 baud. Switch frequency input on or off, factory setting: switched off.
X12:1 X12:2 X12:3	DGND SC11 SC12	Reference potential system bus System bus high System bus low
X11:1 X11:2/3 X11:4 X11:5	REF1 AI11/12 AGND REF2	DC+10 V (max. DC 3 am) for setpoint potentiometer Setpoint input n1 (differential input or input with AGND reference potential), signal form → P11_/ S11 Reference potential for analog signals (REF1, REF2, AI..., AO...) DC-10 V (max. DC 3 mA) for setpoint potentiometer
X13:1 X13:2 X13:3 X13:4 X13:5 X13:6	DIØØ DIØ1 DIØ2 DIØ3 DIØ4 DIØ5	Binary input 1, with fixed assignment "Controller inhibit" Binary input 2, factory setting "CW/stop" Binary input 3, factory setting "CCW/stop" Binary input 4, factory setting "Enable/stop" Binary input 5, factory setting "n11/n21" Binary input 6, factory setting "n12/n22"
X13:7	DCOM	Reference for binary inputs X13:1 to X13:6 (DIØØ to DIØ5) and X16:1/X16:2 (DIØ6 to DIØ7) - Switching binary inputs with DC+24 V external voltage: Connection X13:7 (DCOM) must be connected to the reference potential of the external voltage. - Without jumper X13:7-X13:9 (DCOM-DGND) → Isolated binary inputs - With jumper X13:7-X13:9 (DCOM-DGND) → Non-isolated binary inputs - The binary inputs must be switched with DC+24 V from X13:8 or X10:8 (VO24) → Jumper required X13:7-X13:9 (DCOM-DGND).
X13:8 X13:9 X13:10 X13:11	VO24 DGND ST11 ST12	Auxiliary supply output DC+24 V (max. load X13:8 and X10:8 = 400 mA) for external command switches Reference potential for binary signals RS485+ (baud rate has a fixed setting of 9.6 kBaud) RS485-
X16:1 X16:2 X16:3 X16:4 X16:5 X16:6	DIØ6 DIØ7 DOØ3 DOØ4 DOØ5 DGND	Binary input 7, factory setting "No function" Binary input 8, factory setting "No function" Binary output 3, factory setting "IPOS output" Binary output 4, factory setting "IPOS output" Binary output 5, factory setting "IPOS output" Do not connect external voltage to binary outputs X16:3 (DOØ3) and X16:5 (DOØ5)! Reference potential for binary signals



Terminal		Function
X10:1	TF1	KTY+/TF-/TH connection (connect to X10:2 via TF/TH), factory set to "No response" (→ P835) Reference potential for binary signals / KTY– Binary output DBØØ with fixed assignment "/Brake", load capacity max DC 150 mA (short-circuit proof, protected against external voltage to DC 30 V) Shared contact binary output 1, factory setting "Ready" Normally open contact binary output 1, max. load of relay contacts DC 30 V and DC 0.8 A NC contact binary output 1 Binary output DBØ2, factory set to "/Fault", max. load capacity DC 50 mA (short-circuit proof, protected against external voltage to DC 30 V). Selection options for binary outputs 1 and 2 (DOØ1 and DOØ2) → Parameter menu P62_. Do not apply external voltage to binary outputs X10:3 (DBØØ) and X10:7 (DOØ2).
X10:2	DGND	
X10:3	DBØØ	
X10:4	DOØ1-C	
X10:5	DOØ1-NO	
X10:6	DOØ1-NC	
X10:7	DOØ2	
X10:8	VO24	Auxiliary supply output DC+24 V (max. load X13:8 and X10:8 = 400 mA) for external command switches Input DC+24 V voltage supply (backup voltage depending on options, unit diagnosis when supply system off) Reference potential for binary signals Note for X:10.9: Only connect external backup voltage DC +24 V to sizes 0-6. With size 7, the DC power supply unit must be connected to the supply system. Refer to section "Power section and DC power supply unit (size 7)" (page 58).
X10:9	VI24	
X10:10	DGND	
X17:1	DGND	Reference potential for X17:2 Auxiliary supply voltage DC+24 V, only to supply X17:4 on the same unit Reference potential for DC+24 V "safe stop" input (safety contact) DC+24 V "safe stop" input (safety contact)
X17:2	VO24	
X17:3	SOV24	
X17:4	SVI24	
XT		Only service interface. Option slot: DBG60B / UWS21B / USB11A



4.8 Assignment of braking resistors, chokes and filters

4.8.1 AC 400/500 V units, size 0

MOVIDRIVE® MDX60/61B...-5A3				0005	0008	0011	0014
Size				0			
Braking resistors BW... / BW...-T	Trip current	Part number BW...	Part number BW...-T				
BW090-P52B ¹⁾	-	824 563 0					
BW072-003	$I_F = 0.8 \text{ A}$	826 058 3					
BW072-005	$I_F = 1.2 \text{ A}$	826 060 5					
BW168/BW168-T	$I_F = 3.6 \text{ A}$	820 604 X	1820 133 4				
BW100-006 BW100-006-T	$I_F = 2.4 \text{ A}$	821 701 7	1820 419 8				
Line chokes							
ND020-013	$\Sigma I_{line} = AC 20 \text{ A}$	826 012 5					
Line filter							
NF009-503	$U_{max} = AC 550 \text{ V}$	827 412 6					
Output chokes							
HD001	$d = 50 \text{ mm (2 in)}$	813 325 5		for cable cross sections 1.5 to 16 mm ² (AWG 16 to 6)			
HD002	$d = 23 \text{ mm (0.91 in)}$	813 557 6		For cable cross sections $\leq 1.5 \text{ mm}^2$ (AWG 16)			
Output filter (only in VFC operating mode)							
HF008-503		826 029 X			A		
HF015-503		826 030 3			B		A
HF022-503		826 031 1					B

1) Internal thermal overload protection, no bimetallic relay required.

- A** In rated operation (100 %)
B With variable torque load (125 %)



4.8.2 AC 400/500 V units, sizes 1, 2S, and 2

MOVIDRIVE® MDX61B...-5A3				0015	0022	0030	0040	0055	0075	0110
Size				1				2S		2
Braking resistors BW... / BW...-T	Trip current	Part number BW...	Part number BW...-T							
BW100-005	I _F = 1.0 A	826 269 1								
BW100-006/ BW100-006-T	I _F = 2.4 A	821 701 7	1820 419 8							
BW168/BW168-T	I _F = 3.6 A	820 604 X	1820 133 4							
BW268/BW268-T	I _F = 4.2 A	820 715 1	1820 417 1							
BW147/BW147-T	I _F = 5.1 A	820 713 5	1820 134 2							
BW247/BW247-T	I _F = 6.5 A	820 714 3	1820 084 2							
BW347/BW347-T	I _F = 9.2 A	820 798 4	1820 135 0							
BW039-012/ BW039-012-T	I _F = 5.5 A	821 689 4	1820 136 9							
BW039-026-T	I _F = 8.2 A		1820 415 5							
BW039-050-T	I _F = 11.3 A		1820 137 7							
Line chokes		Part number								
ND020-013	Σ I _{line} = AC 20 A	826 012 5								
ND045-013	Σ I _{line} = AC 45 A	826 013 3								
Line filter		Part number								
NF009-503	U _{max} = AC 550 V	827 412 6					A			
NF014-503		827 116 X					B		A	
NF018-503		827 413 4							B	
NF035-503		827 128 3								
Output chokes	Inner diameter	Part number								
HD001	d = 50 mm (2 in)	813 325 5		For cable cross sections 1.5 – 16 mm ² (AWG 16 – 26)						
HD002	d = 23 mm (0.91 in)	813 557 6		For cable cross sections ≤ 1.5 mm ² (AWG 16)						
HD003	d = 88 mm (3.5 in)	813 558 4		for cable cross sections > 16 mm ² (AWG 6)						
Output filter (only in VFC operating mode)		Part number								
HF015-503		826 030 3		A						
HF022-503		826 031 1		B	A					
HF030-503		826 032 X			B	A				
HF040-503		826 311 6				B	A			
HF055-503		826 312 4					B	A		
HF075-503		826 313 2						B	A	
HF023-403		825 784 1							B	A
HF033-403		825 785 X								B

A In rated operation (100 %)

B With variable torque load (125 %)



4.8.3 AC 400/500 V units, sizes 3 and 4

MOVIDRIVE® MDX61B...-503						0150	0220	0300	0370	0450
Size						3			4	
Braking resistors BW... / BW...-T BW...-P	Trip current	Part number BW...	Part number BW...-T	Part number BW...-P						
BW018-015/ BW018-015-P	I _F = 9.1 A	821 684 3		1 820 416 3					C	C
BW018-035-T	I _F = 13.9 A		1820 138 5						C	C
BW018-075-T	I _F = 20.4 A		1820 139 3						C	C
BW915-T	I _F = 32.7 A		1820 413 9							
BW012-025/ BW012-025-P	I _F = 14.4A	821 680 0		1 820 414 7						
BW012-050-T	I _F = 20.4 A		1820 140 7							
BW012-100-T	I _F = 28.9 A		1820 141 5							
BW106-T	I _F = 47.4 A		1820 083 4							
BW206-T	I _F = 54.8 A		1820 412 0							
Line chokes		Part number								
ND045-013	Σ I _{line} = AC 45 A	826 013 3				A				
ND085-013	Σ I _{line} = AC 85 A	826 014 1				B				A
ND150-013	Σ I _{line} = AC 150 A	825 548 2								B
ND300-0053	Σ I _{line} = AC 300 A	827 721 4								
Line filter		Part number								
NF035-503	U _{max} = AC 550 V	827 128 3			A					
NF048-503		827 117 8			B	A				
NF063-503		827 414 2				B	A			
NF085-503		827 415 0					B		A	
NF115-503		827 416 9								B
Output chokes	Inner diameter	Part number								
HD001	d = 50 mm	813 325 5	For cable cross sections 1.5 – 16 mm ² (AWG 16 – 6)							
HD003	d = 88 mm	813 558 4	for cable cross sections > 16 mm ² (AWG 6)							
Output filter (only in VFC operating mode)		Part number								
HF033-403		825 785 X			A	B / D	A / D			
HF047-403		825 786 8			B	A				
HF450-503		826 948 3					B			E

- A** In rated operation (100 %)
B With variable torque load (125 %)
C Connect two braking resistors in parallel and set twice the trip current on F16 ($2 \times I_F$)
D Connect three braking resistors in parallel and set three times the trip current on F16 ($3 \times I_F$)
E Connect four braking resistors in parallel and set four times the trip current on F16 ($4 \times I_F$)



4.8.4 AC 400/500 V units, sizes 5 to 7

MOVIDRIVE® MDX61B...-503			0550	0750	0900	1100	1320	1600	2000	2500
Size			5		6			7		
Braking resistors BW...-...-T	Trip current	Part number BW...-...-T								
BW106-T	I _F = 47.4 A	1820 083 4			C	C	C	D	E	F
BW206-T	I _F = 54.8 A	1820 412 0			C	C	C	D	E	F
BW1.4-170-T	I _F = 110 A	1330 152 7								
BW003-420-T	I _F = 129 A	1330 234 5						C	C	C
Line filter		Part number								
NF115-503	U _{max} = AC 550 V	827 416 9	A							
NF150-503		827 417 7	B							
NF210-503		827 418 5				A				
NF300-503		827 419 3				B				
NF600-503		1 796 338 9						B	B	B
Output chokes	Inner diameter	Part number								
HD001	d = 50 mm	813 325 5	For cable cross sections 1.5 – 16 mm ² (AWG 16 – 6)							
HD003	d = 88 mm	813 558 4	for cable cross sections > 16 mm ² (AWG 6)							
HD004	Connection with M12 bolt	816 885 7								
HD005	Connection With M12 cable lug, M10 PE connection	1 796 336 2						B	B	B
Output filter (only in V/f and VFC operating mode)		Part number								
HF450-503		826 948 3	H	H						
HF180-403		829 909 9								
HF325-403		829 948 3								

- A In rated operation (100 %)
 B With variable torque load (125 %)
 C Connect two braking resistors in parallel and set twice the trip current on F16 ($2 \times I_F$)
 D Connect three braking resistors in parallel and set three times the trip current on F16 ($3 \times I_F$)
 E Connect four braking resistors in parallel and set four times the trip current on F16 ($4 \times I_F$)
 F Connect five braking resistors in parallel and set five times the trip current on F16 ($5 \times I_F$)
 H Two filter in parallel



4.8.5 AC 230 V units, sizes 1 to 4

MOVIDRIVE® MDX61B...-2_3				0015	0022	0037	0055	0075	0110	0150	0220	0300
Size				1			2		3		4	
Braking resistors BW...-.../ BW...-...-T BW...-...-P	Trip current	Part number BW...	Part number BW...-...-T									
BW039-003	I _F = 2.7 A	821 687 8										
BW039-006	I _F = 3.9 A	821 688 6										
BW039-012 BW039-012-T	I _F = 5.5 A	821 689 4	1 820 136 9									
BW039-026-T	I _F = 8.1 A		1 820 415 5									
BW027-006	I _F = 4.7 A	822 422 6										
BW027-012	I _F = 6.6 A	822 423 4										
BW018-015-T	I _F = 9.1 A		1 820 416 3						C	C	C	C
BW018-035-T	I _F = 13.9 A		1 820 138 5						C	C	C	C
BW018-075-T	I _F = 20.4 A		1 820 139 3						C	C	C	C
BW915-T	I _F = 32.6 A		1 820 413 9						C	C	C	C
BW012-025-P	I _F = 14.4 A		1 820 414 7									
BW012-050-T	I _F = 20.4 A		1 820 140 7									
BW012-100-T	I _F = 28.8 A		1 820 141 5									
BW106-T	I _F = 47.4 A		1 820 083 4								C	C
BW206-T	I _F = 54.7 A		1 820 412 0								C	C
Line chokes		Part number										
ND020-013	S I _{line} = AC 20 A	826 012 5					A					
ND045-013	S I _{line} = AC 45 A	826 013 3					B		A			
ND085-013	S I _{line} = AC 85 A	826 014 1							B		A	
ND150-013	S I _{line} = AC 150 A	825 548 2									B	
Line filter		Part number										
NF009-503	U _{max} = AC 550 V	827 412 6			A							
NF014-503		827 116 X			B	A						
NF018-503		827 413 4				B						
NF035-503		827 128 3										
NF048-503		827 117 8							A			
NF063-503		827 414 2							B			
NF085-503		827 415 0									A	
NF115-503		827 416 9									B	
Output chokes	Inner diameter	Part number										
HD001	d = 50 mm (2 in)	813 325 5		for cable cross sections 1.5 to 16 mm ² (AWG 16 to 6)								
HD002	d = 23 mm (0.91 in)	813 557 6		For cable cross sections ≤ 1.5 mm ² (AWG 16)								
HD003	d = 88 mm (3.5 in)	813 558 4		for cable cross sections > 16 mm ² (AWG 6)								

A In rated operation (100 %)

B With variable torque load (125 %)

C Connect two braking resistors in parallel and set twice the trip current on F16 ($2 \times I_F$)



4.9 Connecting the system bus (SBus 1)



INFORMATION

Only when P884 "SBus baud rate" = 1000 kBaud:

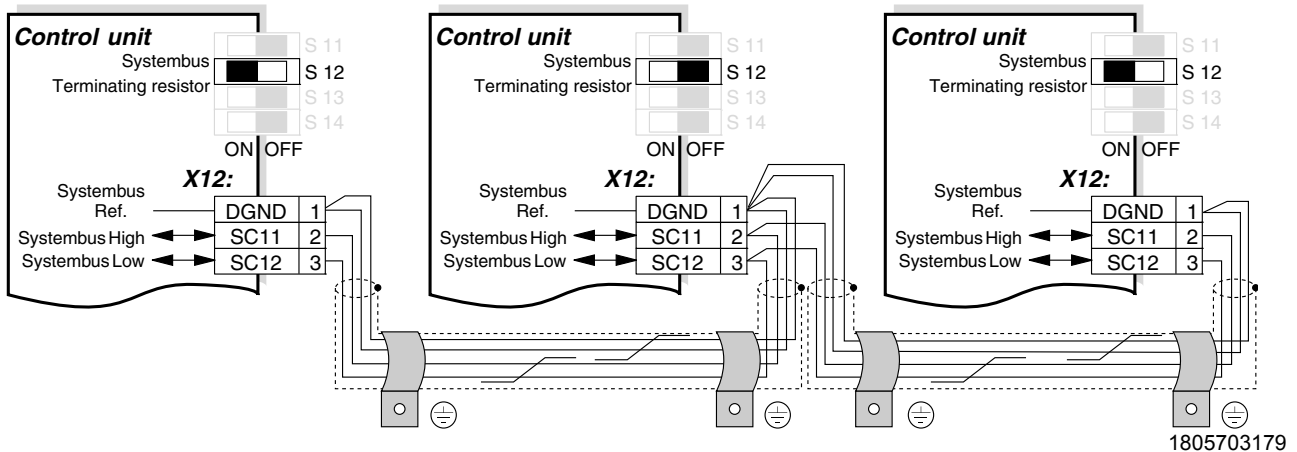
MOVIDRIVE® compact MCH4_A units are not allowed to be combined with other MOVIDRIVE® units in the same system bus combination.

The units are allowed to be mixed when baud rates $\neq$ 1000 kBaud.

Max. 64 CAN bus stations can be addressed via system bus (SBus). Use a repeater after 20 or 30 nodes, depending on the length of the cables and the cable capacity. The SBus supports transmission technology compliant with ISO 11898.

The "Serial Communication" manual contains detailed information about the system bus that can be ordered from SEW-EURODRIVE.

4.9.1 SBus wiring diagram



- Cable specification**
- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
 - Cable cross section 0.25 ... 0.75 mm² (AWG 23 to AWG 19)
 - Cable resistance 120 Ω at 1 MHz
 - Capacitance per unit length $\leq$ 40 pF/m at 1 kHz
- Suitable cables include CAN bus or DeviceNet cables.

- Connecting the shield**
- Connect the shield to the electronics shield clamp on the inverter or master controller and make sure it is connected over a wide area at both ends.

- Cable length**
- The permitted total cable length depends on the baud rate setting of the SBus (P884):
 - 125 kBaud → 320 m (1050 ft)
 - 250 kBaud → 160 m (525 ft)
 - **500 kBaud → 80 m (260 ft)**
 - 1000 kBaud → 40 m (130 ft)



Terminating resistor

- Switch on the system bus terminating resistor (S12 = ON) at the start and end of the system bus connection. Switch off the terminating resistor on the other units (S12 = OFF).



NOTICE

There must not be any potential displacement between the units connected with the SBus. This may affect the functionality of the units.

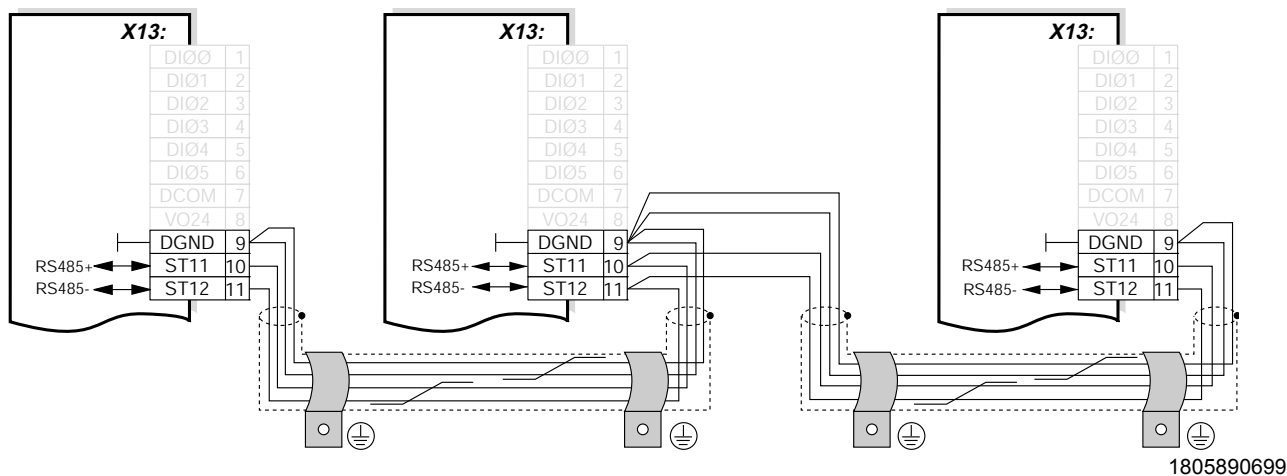
Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

4.10 Connecting the RS485 interface

The RS485 interface (X13:ST11, ST12) can be used for connecting max. 32 MOVIDRIVE® units, e.g. for master/slave operation, or 31 MOVIDRIVE® units and a master control system (PLC). The baud rate is set to 9.6 baud by default.



4.10.1 Wiring diagram of the RS485 interface (X13)

**Cable specification**

- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
 - Cable cross section 0.25 ... 0,75 mm² (AWG 23 to AWG 19)
 - Cable resistance 100 ... 150 Ω at 1 MHz
 - Capacitance per unit length ≤ 40 pF/m at 1 kHz

Connecting the shield

- Connect the shield to the electronics shield clamp on the inverter or higher-level controller and make sure it is connected over a wide area at both ends.



- Cable length
- The permitted total cable length is 200 m (656 ft).
- Terminating resistor
- Dynamic terminating resistors are installed. **Do not connect any external terminating resistors.**

NOTICE

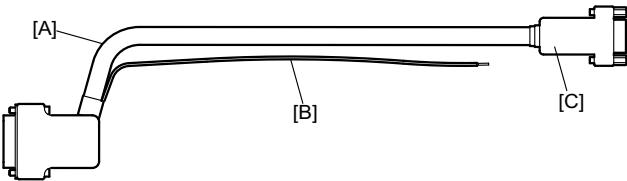
There must not be any potential displacement between the units connected via the RS485. This may affect the functionality of the units.

Take suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

4.11 Connecting the interface adapter option type DWE11B/12B

4.11.1 Part number and description

- DWE11B, part number 188 187 6
- The interface adapter DWE11B (HTL→TTL) in the form of an adapter cable is used **to connect single-ended HTL encoders to the DEH11B/DEH21B option**. Only the A, B and C tracks are connected. The interface adapter is suitable for all HTL encoders that were operated on MOVIDRIVE® A, MDV and MCV and can be connected without any rewiring effort.



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- [A] 5 x 2 x 0.25 mm² (AWG 23) / length 1000 mm (39.37 in) / max. cable length inverter - encoder: 100 m (328 ft)
- [B] DC 24 V connection for HTL encoder; 1 x 0.5 mm² (AWG 20) / length 250 mm (9.84 in)

Signal	Terminal of 9-pin sub D socket [C] (encoder end)
A	1
B	2
C	3
UB	9
GND	5

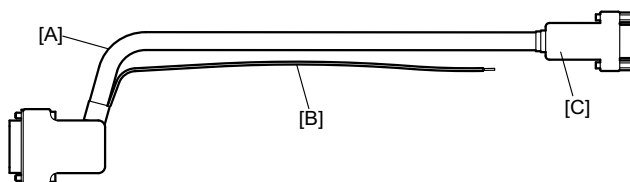


Installation

Connecting the interface adapter option type DWE11B/12B

- DWE12B, part number 188 180 9

The interface adapter DWE12B (HTL→TTL) in the form of an adapter cable is used **to connect single-ended HTL encoders to the DEH11B/DEH21B option**. In addition to the A, B and C track, you will also have to connect the negated tracks ($\bar{A}$, $\bar{B}$, $\bar{C}$). SEW-EURODRIVE recommends using this interface adapter for any new system.



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- [A] 4 x 2 x 0.25 mm² (AWG 23) / length 1000 mm (39.37 in) / max. cable length inverter - encoder: 200 m (656 ft)
 [B] DC 24 V connection for HTL encoder; 1 x 0.5 mm² (AWG 20) / length 250 mm (9.84 in)

Signal	Terminal of 9-pin sub D socket [C] (encoder end)
A	1
$\bar{A}$	6
B	2
$\bar{B}$	7
C	3
$\bar{C}$	8
UB	9
GND	5



4.12 Connection of interface adapter option UWS21B (RS232)

4.12.1 Part number

Interface adapter UWS21B: 1 820 456 2

4.12.2 Scope of delivery

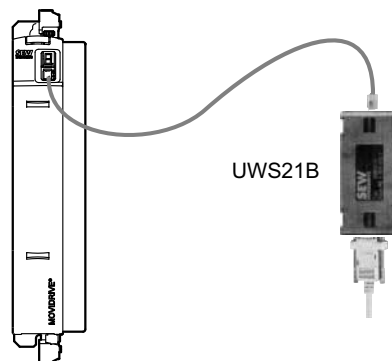
The scope of delivery for the UWS21B option includes:

- UWS21B
- CD-ROM with MOVITOOLS® MotionStudio
- Serial interface cable with 9-pin sub D socket and 9-pin sub D connector to connect the UWS21B option to the PC.
- Serial interface cable with two RJ10 connectors to connect UWS21B to MOVIDRIVE®.

4.12.3 MOVIDRIVE®-UWS21B connection

- Use the connection cable supplied to connect the UWS21B option to the MOVIDRIVE® unit.
- Plug the connection cable into the XT terminal socket of the MOVIDRIVE® unit.
- Note that the DBG60B keypad and the UWS21B serial interface cannot be connected to the MOVIDRIVE® at the same time.

MOVIDRIVE® MDX60/61B



UWS21B

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Fig. 6: Connection cable between MOVIDRIVE® and UWS21B



Installation

Connection of interface adapter option UWS21B (RS232)

4.12.4 Connecting UWS21B to PC

- Use the connection cable supplied (shielded RS232 standard interface cable) to connect the UWS21B option to the PC.

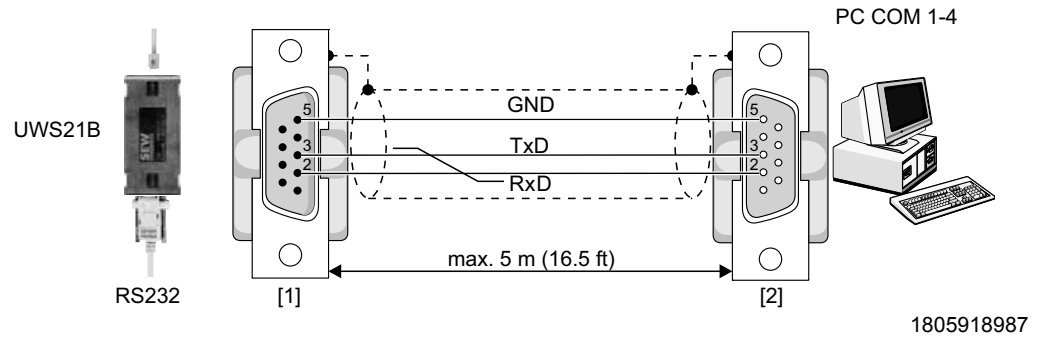


Fig. 7: UWS21B-PC connection cable (1:1 connection)

- [1] 9-pin D-sub connector
[2] 9-pin D-sub socket



4.13 Connecting the interface adapter option USB11A

4.13.1 Part number

Interface adapter USB11A: 824 831 1

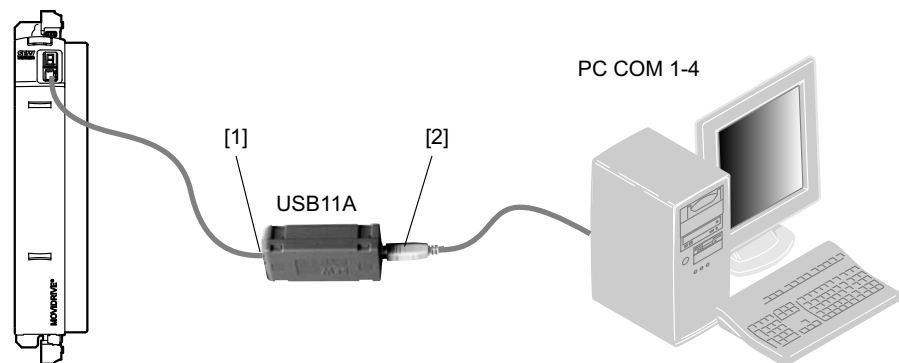
4.13.2 Scope of delivery

- The scope of delivery for the USB11A includes:
 - USB11A interface adapter
 - USB connection cable PC - USB11A (type USB A-B)
 - Connection cable for MOVIDRIVE® MDX60B/61B - USB11A (cable RJ10-RJ10)
 - CD-ROM with drivers and MOVITOOLS® MotionStudio
- The USB11A interface adapter supports USB 1.1 and USB 2.0.

4.13.3 Connecting MOVIDRIVE®-USB11A - PC

- Use the connection cable [1] (RJ10 - RJ10) supplied to connect the USB11A option to the MOVIDRIVE® unit.
- Plug the connection cable [1] into the XT terminal slot of the MOVIDRIVE® MDX60B/61B and into the RS485 slot of the USB11A.
- Note that the DBG60B keypad and the USB11A interface adapter cannot be connected to MOVIDRIVE® at the same time.
- Use the supplied USB connection cable [2] (type USB A-B) to connect the USB11A to the PC.

MOVIDRIVE® MDX60/61B



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Fig. 8: Connection cable for MOVIDRIVE® MDX60B/61B - USB11A



Installation

Connecting the interface adapter option USB11A

4.13.4 Installation

- Connect the USB11A to a PC and MOVIDRIVE® MDX60B/61B using the connection cables supplied.
- Insert the enclosed CD into the CD drive of your PC and install the driver. The first free COM port on the PC will be assigned to the USB11A interface adapter.

4.13.5 Operation with MOVITOOLS® MotionStudio

- After installation, the PC recognizes the USB11A interface adapter after approximately 5 to 10 s.
- Start MOVITOOLS® MotionStudio.



INFORMATION

If the connection between the PC and USB11A is interrupted, you will have to restart MOVITOOLS® MotionStudio.

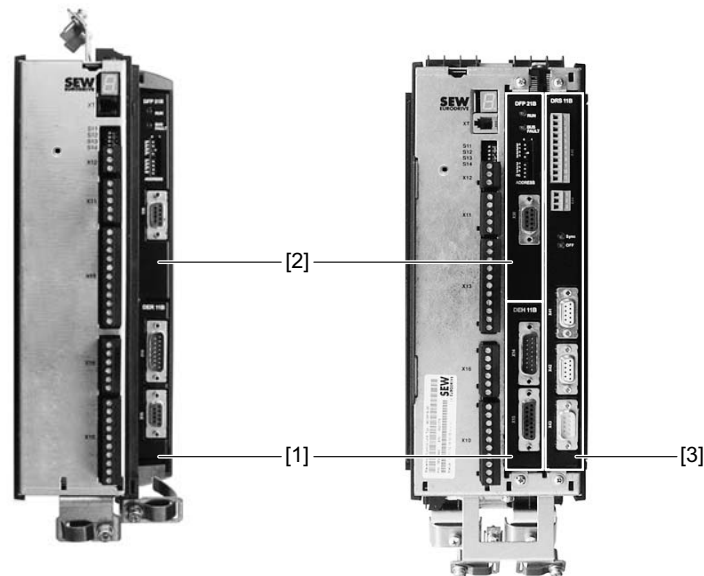


4.14 Option combinations for MDX61B

4.14.1 Arrangement of the option slots

Size 0 (0005 ... 0014)

Size 1 ... 6 (0015 ... 1320)



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- [1] Encoder slot for encoder options
- [2] Fieldbus slot for communication options
- [3] Expansion slot for communication options (only sizes 1 to 6)



4.14.2 Option card combinations for MDX61B

The option cards are different sizes and can only be installed in the matching option slots. The following list shows the possible combinations of option cards for MOVIDRIVE® MDX61B.

Option card	Designation	MOVIDRIVE® MDX61B		
		Encoder slot Size 0 - size 7	Fieldbus port Size 0 - size 7	Expansion slot Size 1 - size 7
DEH11B	Encoder input incr. / HIPERFACE®	X		
DEH21B	Encoder input absolute encoder	X		
DEU21B	Encoder input absolute encoder	X		
DER11B	Encoder input resolver/HIPERFACE®	X		
DFP21B	PROFIBUS fieldbus interface		X	
DFI11B	INTERBUS fieldbus interface		X	
DFI21B	Fieldbus interface INTERBUS LWL		X	
DFD11B	Fieldbus interface DeviceNet		X	
DFC11B	CAN/CANopen fieldbus interface		X	
DFE11B DFE12B DFE13B	Ethernet fieldbus interface		X	
DFE32B	PROFINET IO fieldbus interface		X	
DFE33B	EtherNet/IP fieldbus interface		X	
DFE24B	EtherCAT fieldbus interface		X	
DFS11B	PROFIBUS fieldbus interface with PROFIsafe (safe stop)		X	
DFS12B	PROFIBUS fieldbus interface with PROFIsafe		X	
DFS21B	PROFINET IO fieldbus Interface with PROFIsafe (Safe Stop)		X	
DCS21B/ 31B	Safety monitor			X
DIO11B	I/O expansion		X	X ¹⁾
DRS11B	Phase-synchronous operation			X
DIP11B	SSI encoder interface			X
DHP11B	User-programmable MOVI-PLC® <i>basic</i> controller		X	
DHE41B	User-programmable MOVI-PLC® <i>advanced</i> controller		X	X ¹⁾
DHF41B	User-programmable MOVI-PLC® <i>advanced</i> controller			X
DHR41B	User-programmable MOVI-PLC® <i>advanced</i> controller			X
DHP11B + OST11B	DHP11B + OST11B (RS485 interface, only in combination with DHP11B)	OST11B	DHP11B	DHP11B + OST11B ²⁾

1) When fieldbus slot is not available

2) When encoder slot is not available



4.15 Installing and removing option cards

	INFORMATION - For MOVIDRIVE® MDX61B size 0, only SEW-EURODRIVE is authorized to install or remove option cards. - For MOVIDRIVE® MDX61B sizes 1 to 7, you can install or remove the option cards yourself.
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4.15.1 Before you start

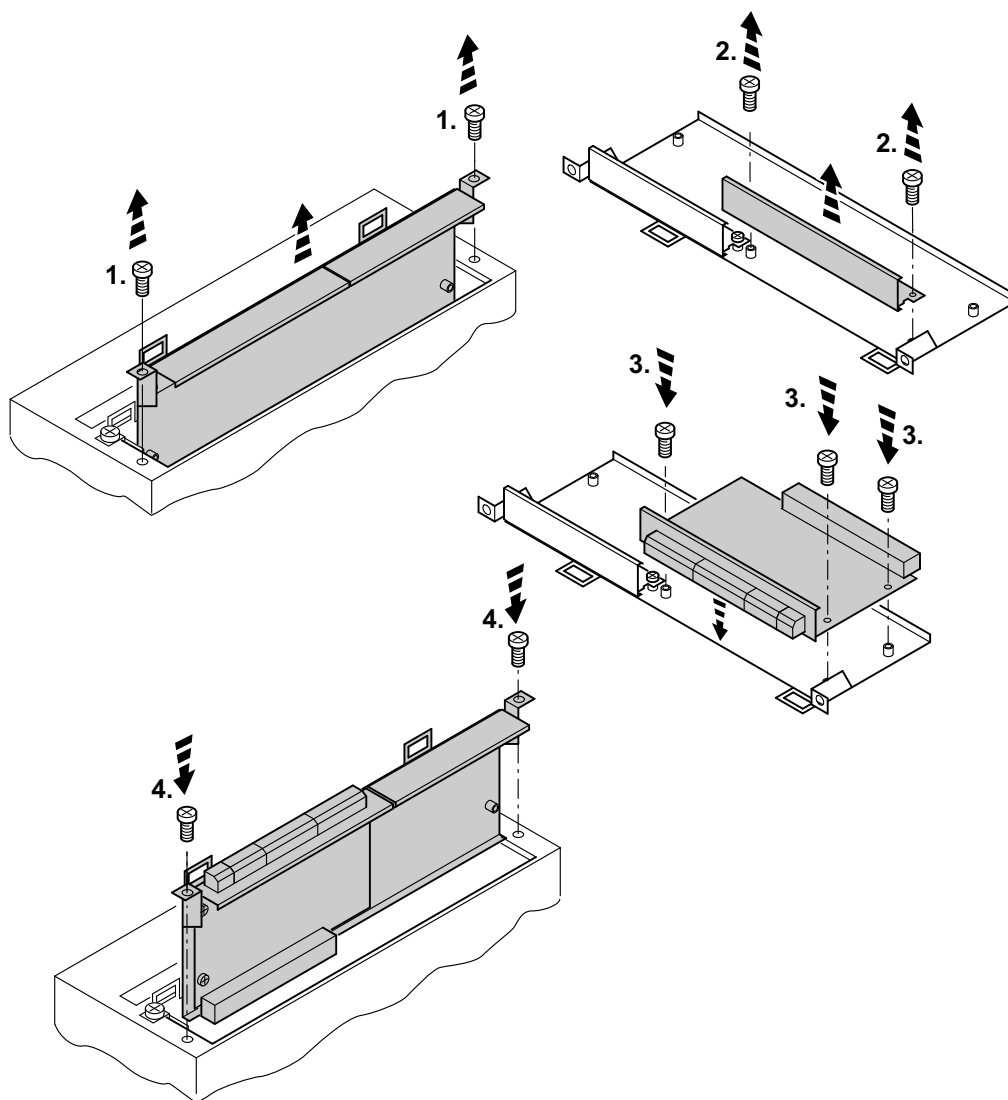
Observe the following notes before installing or removing an option card:

	NOTICE Electrostatic charge. Damage to electronic components. - Disconnect the inverter from the power. Switch off the DC 24 V and the supply system voltage. - Take appropriate measures to protect the option card from electrostatic charge (use discharge strap, conductive shoes, etc.) before touching it. Before installing the option card, remove the keypad (→ Sec. "Removing/installing the keypad") and the front cover (→ Sec. "Removing/installing the front cover"). After having installed the option card, replace the keypad (→ Sec. "Removing/installing the keypad") and the front cover (→ Sec. "Removing/installing the front cover"). - Keep the option card in its original packaging until immediately before you are ready to install it. - Hold the option card by its edges only. Do not touch any of the components.
--	---



4.15.2 Basic procedure for installing/removing an option card

The following figure shows the basic procedure for installing an option card in MOVIDRIVE® MDX61B size 1 - 7



1. Remove the retaining screws holding the card retaining bracket. Pull the card retaining bracket out evenly from the slot (do not twist!).
2. Remove the retaining screws of the black cover plate on the card retaining bracket. Remove the black cover plate.
3. Position the option card onto the retaining bracket so that the retaining screws fit into the corresponding bores on the card retaining bracket.
4. Insert the retaining bracket with the installed option card into the slot, pressing slightly so it is seated properly. Secure the card retaining bracket with the retaining screws.
5. To remove the option card, follow the instructions in reverse order.



4.16 Connecting encoders and resolvers

	INFORMATION
	• The wiring diagrams do not show the view onto the cable end but the connection to the motor or MOVIDRIVE®. • The conductor colors specified in the wiring diagrams are in accordance with IEC 757 and correspond to the conductor colors used in the pre-fabricated cables from SEW.

4.16.1 General installation notes

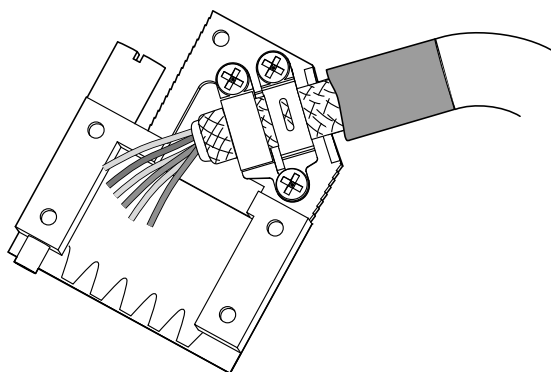
- The D-sub connectors shown in the wiring diagrams have a 4/40 UNC thread.
- Max. line length inverter – encoder/resolver: 100 m (328 ft) with a capacitance per unit length ≤ 120 nF/km.
- Cable cross section: $0.20 - 0.5 \text{ mm}^2$ (AWG 24 ... 20)
- If you cut a core of the encoder/resolver cable, insulate the cut-off end of the core.
- Use shielded cables with twisted pair conductors and make sure they are grounded on both ends over a large surface area:
 - At the encoder in the cable gland or in the encoder plug
 - At the inverter in the housing of the D-sub plug
- Route the encoder/resolver cable separately from the power cables.

4.16.2 Connecting the shield

Connect the shield of the encoder/resolver cable over a large area.

On the inverter

Connect the shield on the inverter end in the housing of the sub D connector (→ following figure).



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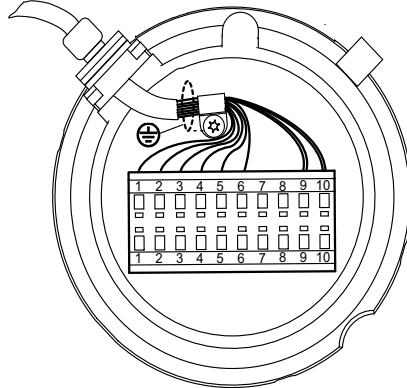


Installation

Connecting encoders and resolvers

*On the encoder/
resolver*

Connect the shield on the encoder/resolver side at the respective grounding clamps (→ following figure). When using an EMC screw fitting, apply the shield over a wide area in the cable gland. For drives with a plug connector, connect the shield on the encoder plug.



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4.16.3 Prefabricated cables

SEW-EURODRIVE offers pre-fabricated cables for connecting encoders/resolvers. We recommend using these prefabricated cables.

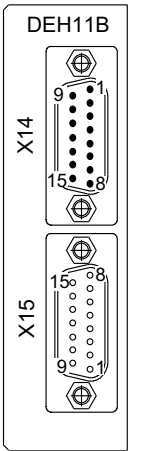


4.17 Connection and terminal description of the DEH11B (HIPERFACE®) option

4.17.1 Part number

HIPERFACE® encoder card type DEH11B option: 824 310 7

	INFORMATION
	- The "HIPERFACE® encoder card type DEH11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B. - The DEH11B option must be plugged into the encoder slot.

Front view of DEH11B	Description	Terminal	Function
 DEH11B X14 X15 1806062475	X14: Input for external encoder or output for incremental encoder simulation Pulse count of the incremental encoder simulation: 1024 pulses/revolution with HIPERFACE® encoder on X15 - As at X15: Motor encoder input with sin/cos encoder or TTL sensor on X15 X15: Motor encoder input	X14:1 X14:2 X14:3 X14:4 X14:5/6 X14:7 X14:8 X14:9 X14:10 X14:11 X14:12 X14:13/14 X14:15 X15:1 X15:2 X15:3 X15:4 X15:5 X15:6 X15:7 X15:8 X15:9 X15:10 X15:11 X15:12 X15:13 X15:14 X15:15	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) DATA+ Reserved Switchover Reference potential DGND (COS-) Signal track $\overline{A}$ ($\overline{K1}$) (SIN-) Signal track $\overline{B}$ ($\overline{K2}$) Signal track $\overline{C}$ ($\overline{K0}$) DATA- Reserved DC+12 V (tolerance range DC 10.5 – 13 V) (max. load X14:15 and X15:15 = DC 650 mA) (COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) DATA+ Reserved Reference potential TF/TH/KTY- Reserved Reference potential DGND (COS-) Signal track $\overline{A}$ ($\overline{K1}$) (SIN-) Signal track $\overline{B}$ ($\overline{K2}$) Signal track $\overline{C}$ ($\overline{K0}$) DATA- Reserved TF/TH/KTY+ connection DC+12 V (tolerance range DC 10.5 – 13 V) (max. load X14:15 and X15:15 = DC 650 mA)

**INFORMATION**

- If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8).
- The DC 12 V supply voltage from X14 and X15 is sufficient to operate SEW encoders (except HTL encoders) with a DC 24 V supply voltage. With all other encoders, check whether they can be connected to the DC 12 V supply voltage.

**NOTICE**

Do not connect HTL encoders E..C to X15 of option DEH11B.

Doing so can destroy the X15 (motor encoder input) on the DEH11B option.

Only connect HTL encoders E..C to option DEH11B/12B using the interface adapter DWE11B/12B (→ Sec. "Connecting the interface adapter type DWE11B/12B").

4.17.2 Permissible encoders at X:14

Refer to section "Connecting external encoders to X:14" (page 92).

4.17.3 Permissible encoders at X:15

The following SEW encoders can be connected to the option HIPERFACE® encoder card type DEH11B:

Encoder on DR series AC motors – MOVIDRIVE®					
Motor type	Encoder	MOVIDRIVE® inverter	Motor	Cable	Details
DR71 – DR132	ES7S ES7R AS7W			 1362 2021	(page 93)
DR160 – DR225	EG7S EG7R AG7W			 1362 2048	
DR71 – DR132	ES7S ES7R AS7W			 1361 7621	
DR160 – DR225	EG7S EG7R AG7W			 1361 7648	
DR315	EH7S			 1360 2659 1362 3206	



Encoders on DT../DV.. and CM series motors – MOVIDRIVE®					
Motor type	Encoder	MOVIDRIVE® inverter	Motor	Cable	Details
DT../DV.., DS56 CT../CV.., CM71 – 112 CMP	AS1H ES1H AK0H EK0H AV1H AF1H EG7C			 	(page 93)
CM71 – 112	AS1H ES1H AV1H AF1H EG7C			 	
DT../DV.., CT../CV..,	EH1S ES1S ES2S EV1S ES1R ES2R EV1R: EH1R			 	
DT../DV..,	ES1T ES2T EV1T EH1T	X15: DWI11A X2: 	DWI11A X1: 	 	



4.18 Connection and terminal description of the DEH21B option

4.18.1 Part number

Encoder card option DEH21B: 1820 818 5



INFORMATION

- For detailed information on the DEH21B option, refer to the "MOVIDRIVE® MDX61B DIP11B/DEH21B absolute encoder cards".
- The DEH21B option card can be installed in MOVIDRIVE® MDX61B sizes 0 to 7. Only SEW-EURODRIVE staff may install or remove the DEH21B option for MOVIDRIVE® MDX61B size 0.
- The DEH21B option card must be plugged into the encoder slot.
- The DC 24 V power supply of an encoder connected to X62 is ensured when X60 is supplied with DC 24 V. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.

Front view of DEH21B	Description	Terminal	Function
1806096139	X62: Absolute encoder connection	X62:1 X62:2 X62:3 X62:4 X62:5 X62:6 X62:7 X62:8 X62:9	Data + Reserved Cycle + Reserved DGND Data – Reserved Pulse – DC 24 V output
	X60: Voltage supply	X60:1 X60:2	24VIN DGND
	X15: Motor encoder input	X15:1 X15:2 X15:3 X15:4 X15:5 X15:6 X15:7 X15:8 X15:9 X15:10 X15:11 X15:12 X15:13 X15:14 X15:15	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) DATA+ Reserved Reference potential TF/TH/KTY– Reserved Reference potential DGND (COS–) Signal track $\bar{A}$ (K1) (SIN–) Signal track $\bar{B}$ (K2) Signal track $\bar{C}$ (K0) DATA– Reserved TF/TH/KTY+ connection DC+12 V (tolerance range DC 10.5 – 13 V) (max. load X15:15 = DC 650 mA)



INFORMATION

The DC 12 V supply voltage from X15 is sufficient to operate SEW encoders (except HTL encoders) with a DC 24 V supply voltage. With all other encoders, check whether they can be connected to the DC 12 V supply voltage.



NOTICE

Do not connect HTL encoders E..C to X15 of the DEH21B option.

Doing so can destroy the X15 (motor encoder input) of the DEH21B option.

Only connect HTL encoders E..C to option DEH21B using the interface adapter DWE11B/12B (→ Sec. "Connecting the interface adapter type DWE11B/12B").



4.19 Connection and terminal description of the DEU21B option

4.19.1 Part number

Multi-encoder card option type DEU21B: 18221696



INFORMATION

- For detailed information on the DEU21B option, refer to the "MOVIDRIVE® MDX61B multi-encoder card DEU21B" manual.
- The DEU21B option card can be installed in MOVIDRIVE® MDX61B sizes 0 to 7. Only SEW-EURODRIVE staff may install or remove the DEU21B option for MOVIDRIVE® MDX61B size 0.
- The DEU21B option card must be plugged into the encoder slot.
- The DC 24 V power supply of an encoder connected to X62 is ensured when X60 is supplied with DC 24 V. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.

Front view of DEU11B/21B	Description	Terminal	Function
DEU11B/21B X14 X15	X14: Input for external encoder or output for incremental encoder simulation	X14:1 X14:2 X14:3 X14:4 X14:5/6 X14:7 X14:8 X14:9 X14:10 X14:11 X14:12 X14:13 X14:14 X14:15	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) / pulse + DATA+ CANHigh Reserved Switchover Reference potential DGND (COS-) Signal track $\bar{A}$ ($\bar{K1}$) (SIN-) Signal track $\bar{B}$ ($\bar{K2}$) Signal track $\bar{C}$ ($\bar{K0}$) / pulse – DATA- CANLow DC 24 V encoder supply ¹⁾ Reserved ¹⁾ DC 12 V encoder power supply ¹⁾
	X15: Motor encoder input	X15:1 X15:2 X15:3 X15:4 X15:5 X15:6 X15:7 X15:8 X15:9 X15:10 X15:11 X15:12 X15:13 X15:14 X15:15	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) / pulse + DATA+ Reserved Reference potential TF/TH/KTY– Reserved Reference potential DGND (COS-) Signal track $\bar{A}$ ($\bar{K1}$) (SIN-) Signal track $\bar{B}$ ($\bar{K2}$) Signal track $\bar{C}$ ($\bar{K0}$) / pulse – DATA- DC 24 V encoder supply ¹⁾ TF/TH/KTY+ connection DC 24 V (tolerance range DC 10.5 - 13 V) ¹⁾

1) The maximum load on X14:13 and X15:13 is DC 650 mA in total. If the overall unit load on the 24 V level exceeds 400 mA, you must connect an external DC 24 V supply to X10:9/X10:10. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.



	NOTICE
	The connections on X14 and X15 must not be installed or removed during operation. Electrical components in the encoder or on the encoder card could be destroyed. De-energize the inverter before plugging or removing the encoder connections. Switch off the supply voltage and the DC 24 V (X10:9).
	INFORMATION
	• If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8). • The 24 V encoders from SEW (except HTL and Hiperface®) have a wide voltage range (DC 10 V – 30 V) and can be supplied alternatively with DC 24 V (PIN13) or DC 12 V (PIN15).



4.20 Connection and terminal description of the DER11B (resolver) option

4.20.1 Part number

Resolver card option type DER11B: 824 307 7



INFORMATION

- The "Resolver card type DER11B" option can only be used with MOVIDRIVE® MDX61B, not with MDX60B.
- The DER11B option must be plugged into the encoder slot.

Front view of DER11B	Description	Terminal	Function
1806100363	X14: Input for external encoder or output for incremental encoder simulation The pulse count of the incremental encoder simulation is always 1024 pulses per revolution	X14:1 X14:2 X14:3 X14:4 X14:5/6 X14:7 X14:8 X14:9 X14:10 X14:11 X14:12 X14:13/14 X14:15	(cos) signal track A (K1) (sin) signal track B (K2) Signal track C (K0) DATA+ Reserved Switchover Reference potential DGND (cos-) signal track $\bar{A}$ ($\bar{K1}$) (sin-) signal track $\bar{B}$ ($\bar{K2}$) Signal track $\bar{C}$ ($\bar{K0}$) DATA- Reserved DC+12 V (tolerance range DC 10.5 – 13 V) (max. load DC 650 mA)
	X15: Resolver input	X15:1 X15:2 X15:3 X15:4 X15:5 X15:6 X15:7 X15:8 X15:9	sin+ (S2) cos+ (S1) Ref.+ (R1) N.C. Reference potential TF/TH/KTY- sin- (S4) cos- (S3) Ref.- (R2) TF/TH/KTY+ connection



INFORMATION

- If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8).
- The DC 12 V supply voltage from X14 is sufficient to operate SEW encoders (except HTL encoders) with a DC 24 V supply voltage. With all other encoders, check whether they can be connected to the DC 12 V supply voltage.



4.20.2 Permissible encoders at X:14

Refer to section "Connecting external encoders to X:14" (page 92).

4.20.3 Resolver at X:15

2-pole resolvers, AC 7 V, 7 kHz, can be connected at X15 (resolver input). The gear ratio of the resolver amplitudes must be approximately $0.5 \pm 10\%$. The control dynamics decrease if the value is lower; the evaluation may be unstable if the value is higher.

SEW-EURODRIVE offers the following prefabricated cables for connecting resolvers to DER11B:

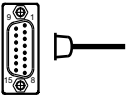
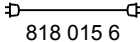
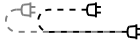
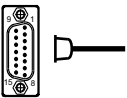
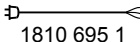
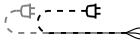
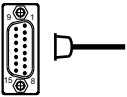
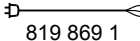
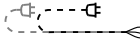
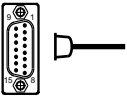
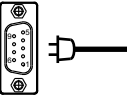
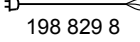
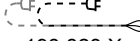
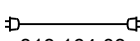
Encoders on DT../DV.. and CM series motors – MOVIDRIVE®					
Motor type	Encoder	MOVIDRIVE® inverter	Motor	Cable	Details
DS56 CM71..112	Resolver			 199 487 5 199 319 4	(page 96)
CM71 – 112	Resolver			 199 589 8 199 590 1	
DS56	Resolver			 1332 817 4 1332 844 1	
CMP	Resolver			 0199 487 5 0199 319 4	



4.21 Connecting external encoders to X:14

4.21.1 External encoder at DEH11B and DER11B (X:14)

The following external encoders can be connected to connector X14 of the DEH11B option and the DER11B option.

External encoder at DEH11B and DER11B - MOVIDRIVE® (X:14)			
Encoder	MOVIDRIVE® inverter	Cable	Details
AS1H ES1H AV1H		 818 015 6  818 165 9	(page 97)
AS1H ES1H AV1H		 1810 695 1  1810 697 8	
EH1S ES1S ES2S EV1S ES1R ES2R EV1R: EH1R		 819 869 1  818 168 3	
ES1T ES2T EV1T EH1T	 DWI11A X2: 	 198 829 8  198 828 X  818 164 03	



4.22 Connection of encoder options

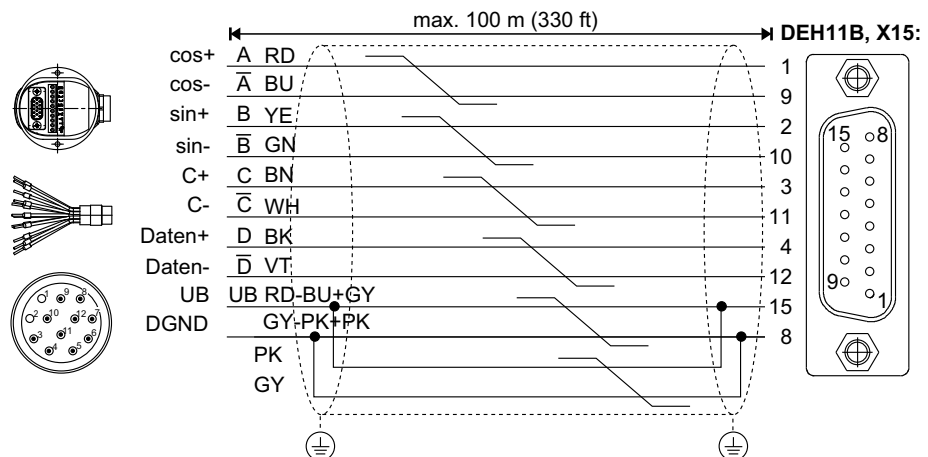
4.22.1 Connection of DEH11B option

Encoder connection at X:15

Depending on the motor type and motor configuration, the encoder is connected via plug connector or terminal box.

DR71...315

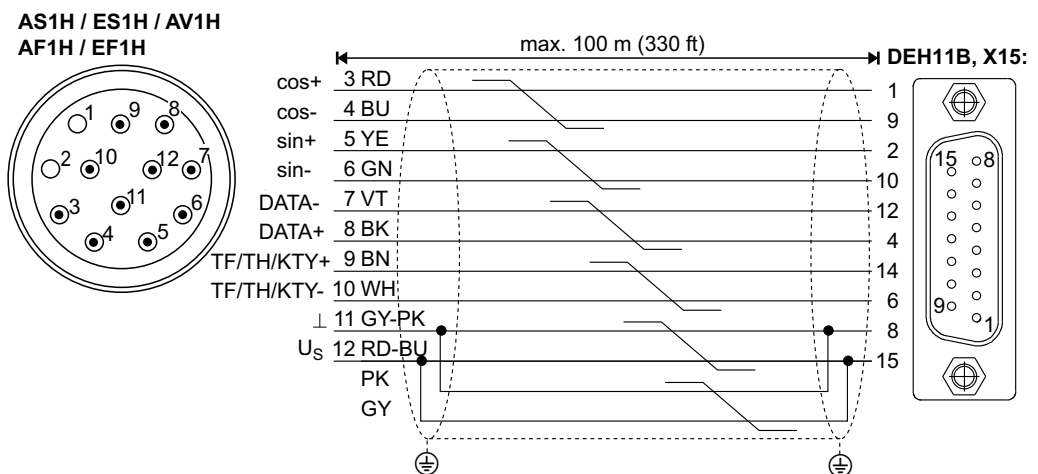
Connect the encoder to the option DEH11B as follows:



1806065547

DT../DV.., DS56,
CT../CV..,
CM71...112/CMP
with plug connector

Connect the HIPERFACE® encoder to the option DEH11B as follows:



1806065547

INFORMATION



Important for DT/DV or CT/CV motors: TF or TH is **not** connected with the encoder cable but must be connected using an additional 2-core shielded cable.

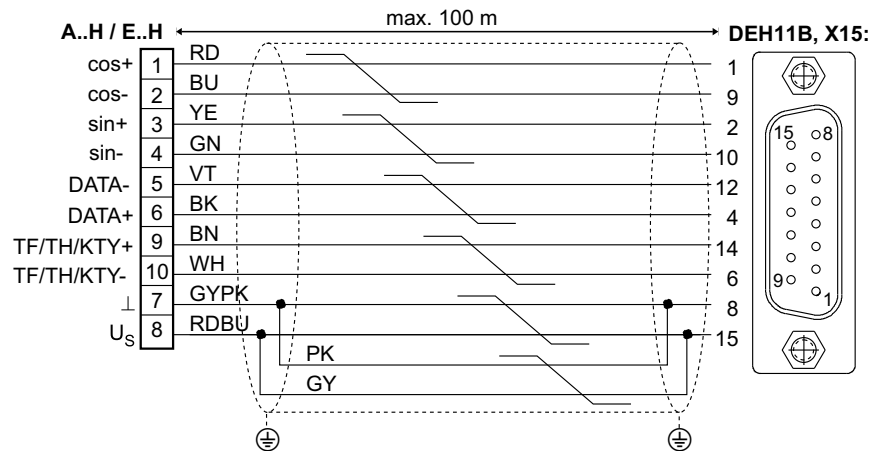


Installation

Connection of encoder options

CM71...112 with
terminal box

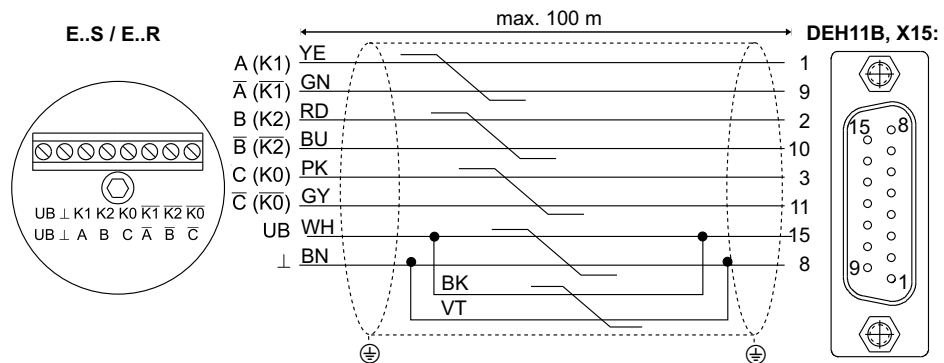
Connect the HIPERFACE® encoder to the option DEH11B as follows:



1806071179

Connecting sin/cos
and TTL encoders
(DC 24 V) to DT../
DV../ CT../CV..
motors

The high resolution sin/cos encoders and TTL encoders with DC 24 V supply can also be connected to DEH11B. Proceed as follows to connect sin/cos encoders and TTL encoders with DC 24 V supply to the DEH11B option:

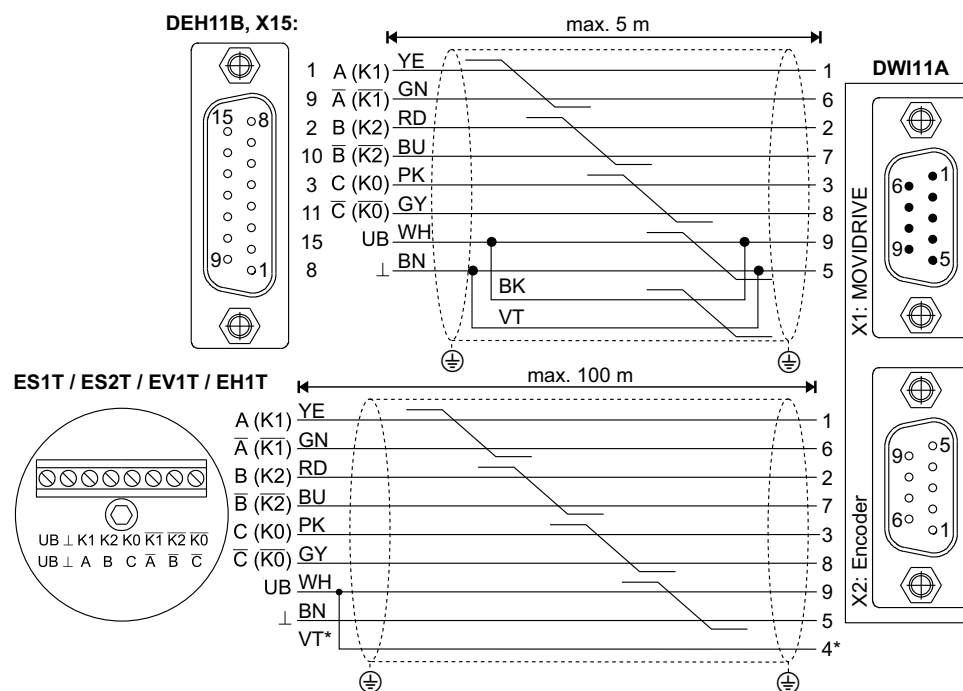


1806074507



Connecting TTL encoders (DC 5 V) to DT../DV.. motors

Connect the TTL encoders with a DC 5 V voltage supply via the "DC 5 V encoder power supply type DWI11A" option (part number 822 759 4). The sensor cable must also be connected to correct the supply voltage of the encoder. Connect this encoder as follows:



1806077579

* Connect the sensor cable (VT) on the encoder to UB, do not jumper on the DWI11A!



4.22.2 Connection of DER11B (resolver) option to X:15

Terminal/pin assignment

CM motors: The resolver connections are accommodated in a plug connector or on the 10-pin Wago terminal strip.

DS Motors: The resolver connections in the terminal box are either located on a 10-pin Phoenix terminal strip or in the plug connector.

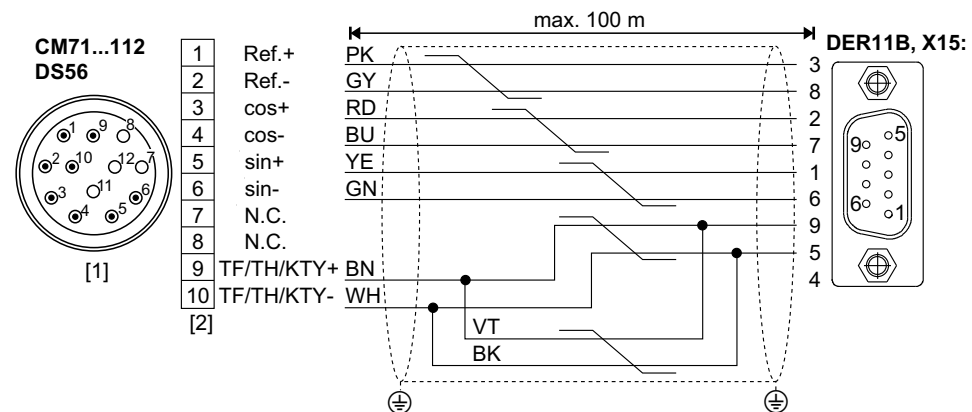
CM plug connector DS56: Intercontec, type ASTA021NN00 10 000 5 000

Terminal / pin	Description		Core color in prefabricated cable
1	Ref.+	Reference	Pink (PK)
2	Ref.-		Gray (GY)
3	cos +	Cosine signal	Red (RD)
4	cos-		Blue (BU)
5	sin+	Sine signal	Yellow (YE)
6	sin-		Green (GN)
9	TF/TH/KTY+	Motor protection	Brown (BN) / violet (VT)
10	TF/TH/KTY–		White (WH) / black (BK)

The resolver signals have the same numbering on the 10-pin Phoenix terminal strip and in the plug connectors.

Connection

Connect the resolver as follows:



1806120331



4.22.3 Connection of external encoders to the DEH11B and DER11B options

Voltage supply

SEW encoders with DC 24 V voltage supply (max. DC 180 mA) are connected directly to X14. . These SEW encoders are then powered by the inverter.

SEW encoders with a DC 5 V voltage supply must be connected via the "DC 5 V encoder power supply type DWI11A" option (part number 822 759 4).

HIPERFACE® encoder connection

Connect the HIPERFACE® encoder AV1H as follows:

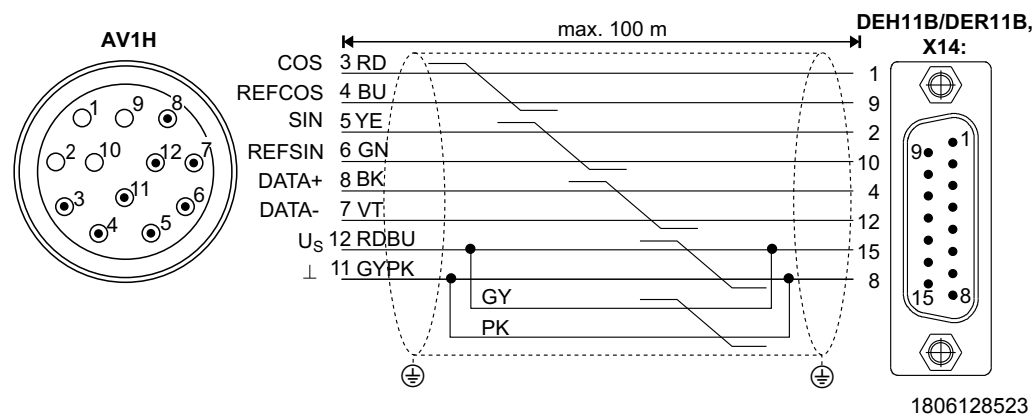


Fig. 12: Connecting the HIPERFACE® encoder AV1H to DEH11B/DER11B as external encoder

You may still connect HIPERFACE® encoders via a prefabricated cable with conductor end sleeves.

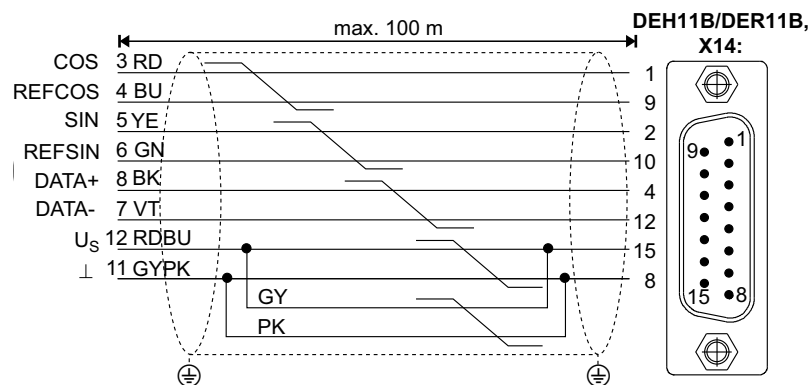


Fig. 13: Connecting the HIPERFACE® encoder AV1H to DEH11B/DER11B as external encoder



Installation

Connection of encoder options

Connection of sin/cos and TTL encoders (DC 24 V)

Proceed as follows to connect sin/cos encoders and TTL encoders with DC 24 V supply:

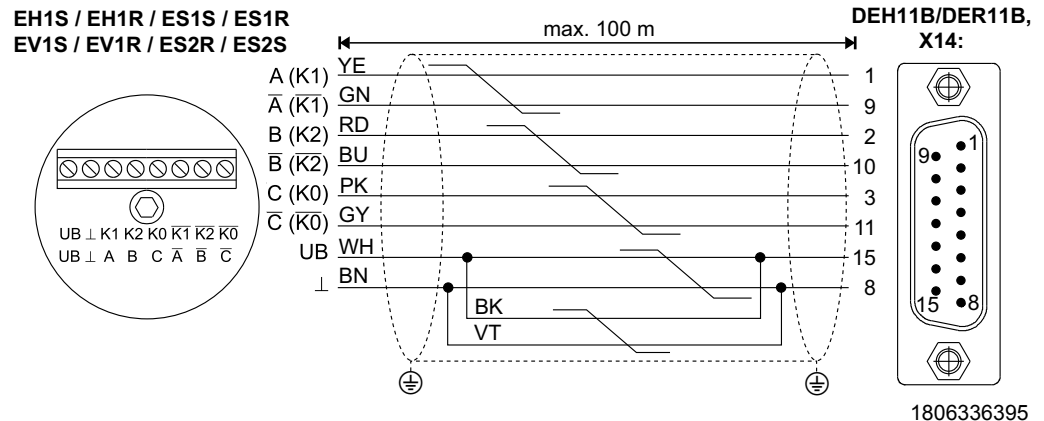


Figure 14: Connecting the sin/cos encoder to DEH11B/DER11B as an external encoder

Connection of TTL encoder (DC 5 V)

DC 5 V encoders with a DC 5 V voltage supply EV1T, EH1T, ES1T and ES2T must be connected via the "DC 5 V encoder power supply type DWI11A" option (part number 822 759 4). The sensor cable must also be connected to correct the supply voltage of the encoder. Connect this encoder as follows:

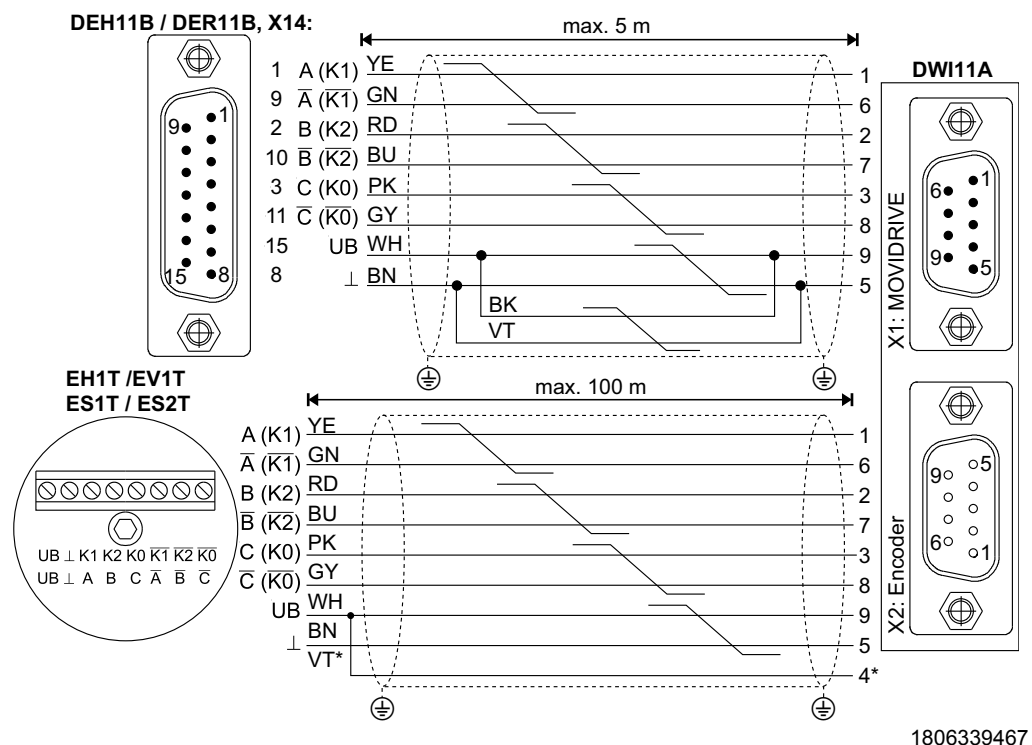


Fig. 15: Connecting the TTL encoder EV1T to MDX via DWI11A as an external encoder

* Connect the sensor cable (VT) on the encoder to UB, do not jumper with DWI11A!



4.23 Connection of incremental encoder simulation

4.23.1 Incremental encoder simulation

Connector X14 of the DEH11B or DER11B option can also be used as the incremental encoder simulation output. For this purpose, you must jumper "switchover" (X14:7) with DGND (X14:8). X14 then delivers the incremental encoder signals with a signal level according to RS422. The number of pulses is:

- With DEH11B as on X15 motor encoder input
- With DER11B 1024 pulses/revolution

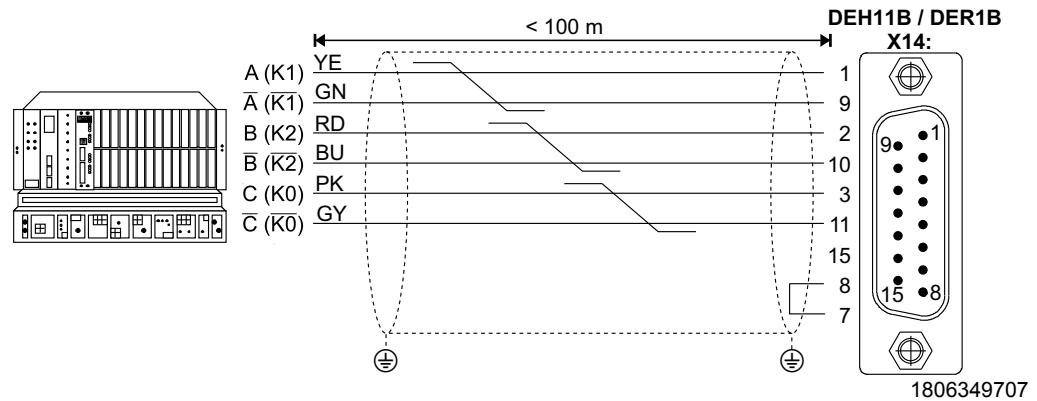


Fig. 16: Incremental encoder simulation connection to DEH11B or DER11B

Part number of the prefabricated cable:

- Option type DEH/DER11B X14: → Incremental encoder simulation
 - For fixed installation: 819 768 7

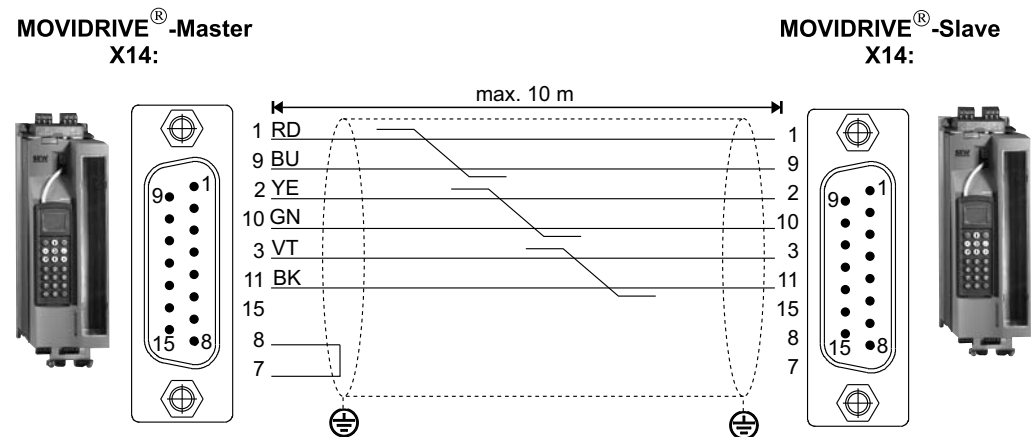


4.24 Master/slave connection

4.24.1 Master/Slave connection

Connector X14 of the DEH11B or DER11B option can also be used for the "internal synchronous operation" application (master/slave connection of several MOVIDRIVE® units). For this purpose, you must jumper "switchover" (X14:7) with DGND (X14:8) on the master end.

The following figure shows an X14-X14 connection (= master/slave connection) between two MOVIDRIVE® units.



Part number of the prefabricated cable:

- For fixed installation: 817 958 1



INFORMATION

- A maximum of 3 slaves can be connected to the MOVIDRIVE® master.
- Important: **Do not connect X14:7** when connecting the individual MOVIDRIVE® slaves together. Only jumper the connections **X14:7** and **X14:8** on the MOVIDRIVE® master.

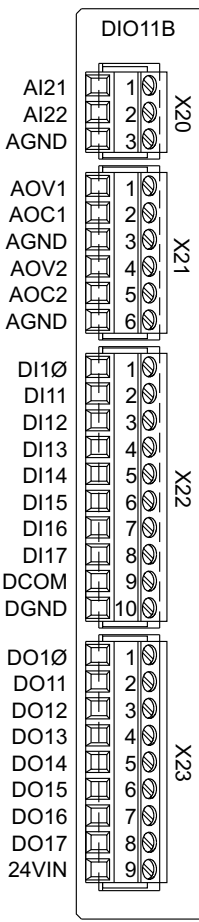


4.25 Connection and terminal description of the DIO11B option

4.25.1 Part number

Input/output card type DIO11B: 824 308 5

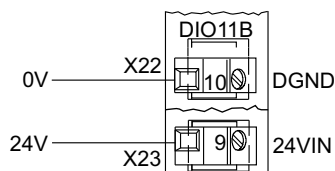
	INFORMATION
	- The "input/output card type DIO11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B. - The DIO11B option must be plugged into the fieldbus slot. If the fieldbus slot is not available, you can plug the DIO11B input/output card in the expansion slot. - The extended handle end of the plug connectors (terminals X20, X21, X22, X23) must only be used for removing the plug connectors (not for plugging them in!).

Front view of DIO11B	Terminal	Function
 1806361739	X20:1/2 AI21/22	Setpoint input n2, DC-10 V – 0 – 10 V or DC 0 – 10 V (Differential input or input with AGND reference potential)
	X20:3 AGND	Reference potential for analog signals (REF1, REF2, A.., AO..)
	X21:1 AOV1 X21:4 AOV2	Analog voltage output V1, factory setting: "actual speed" Analog voltage output V2, factory set to "output current" Load capacity of the analog voltage outputs: $I_{max} = DC\ 10\ mA$
	X21:2 AOC1 X21:5 AOC2	Analog current output C1, factory setting: actual speed Analog current output C2, factory setting: output current P642/645 "Operating mode AO1/2" sets whether the voltage outputs V1/2 (DC 10 V – 0 – 10 V) or the current outputs C1/2 DC (0(4) – 20 mA) are in effect. Selection options for the analog outputs → Parameter menu P640/643 Max. permitted cable length: 10 m / max output voltage: DC 15 V
	X21:3/6 AGND	Reference potential for analog signals (REF1, REF2, AI.., AO..)
	X22:1...8 DI1Ø...17	Binary inputs 1 – 8, factory setting: "No function" The binary inputs are electrically isolated by optocouplers. Selection options for the binary inputs → Parameter menu P61_
	X22:9 DCOM X22:10 DGND	Reference potential for the binary inputs DI1Ø – 17 Reference potential for binary signals – Without jumper X22:9-X22:10 (DCOM-DGND) → Isolated binary inputs – With jumper X22:9-X22:10 (DCOM-DGND) → Non-isolated binary inputs
	X23:1...8 DO1Ø...17	Binary outputs 1 – 8, factory setting: "No function" Load capacity of binary outputs: $I_{max} = DC\ 50\ mA$ (short-circuit proof, protected against external voltage to DC 30 V) Do not apply external voltage to the binary outputs.
	X23:9 24VIN	Supply voltage DC +24 V for binary outputs D01Ø - D017, non-isolated (reference potential DGND)



4.25.2 Voltage input 24 VIN

The 24VIN (X23:9) voltage input serves as DC+24 V supply voltage for the binary outputs DO1Ø – DO17. Reference potential is DGND (X22:10). The binary outputs do not give a level if the DC+24 V supply voltage is not connected. The supply voltage DC+24 V can also be jumpered from the X10:8 connection of the basic unit if the load does not exceed DC 400 mA (current limitation in X10:8).



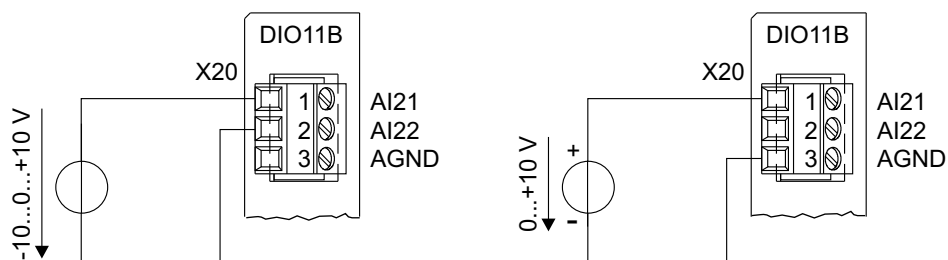
1806364811

Fig. 17: Voltage input 24VIN (X23:9) and reference potential DGND (X22:10)

4.25.3 Voltage input n2

The analog setpoint input n2 (AI21/22) can be used as a differential input or as an input with AGND reference potential.

Differential input Input with AGND reference potential



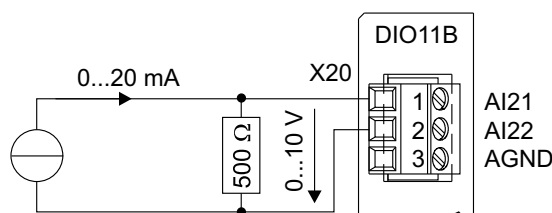
1806367883

Fig. 18: Setpoint input n2

4.25.4 Current input n2

You must use an external load if the analog setpoint input n2 (AI21/22) should be used as a current input.

For example $R_B = 500 \Omega \rightarrow \text{DC } 0 - 20 \text{ mA} = \text{DC } 0 - 10 \text{ V}$



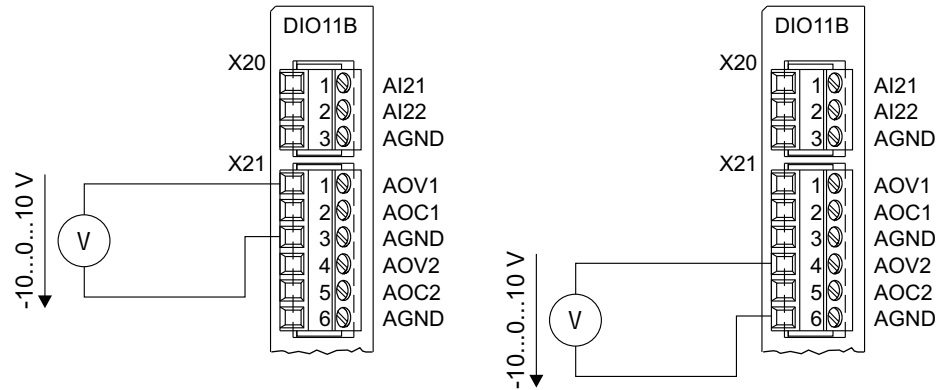
1806370955

Fig. 19: Current input with external load



4.25.5 Voltage outputs AOV1 and AOV2

Assign the analog voltage outputs AOV1 and AOV2 in accordance with the following figure:

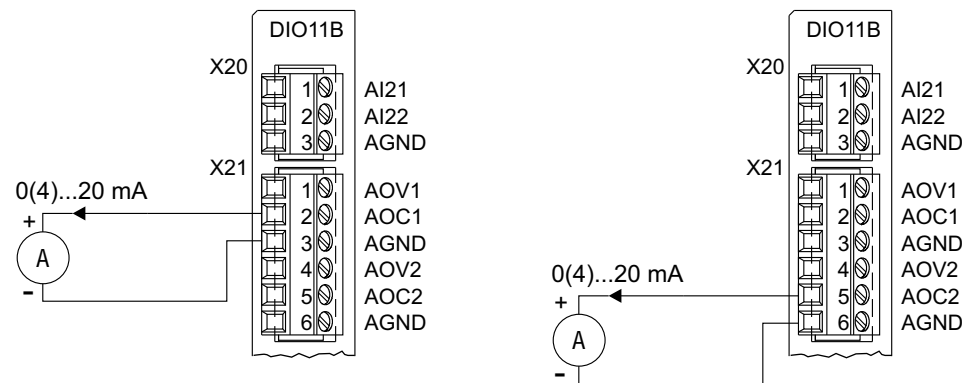


1806376075

Fig. 20: Voltage outputs AOV1 and AOV2

4.25.6 Current outputs AOC1 and AOC2

Assign the analog current outputs AOC1 and AOC2 in accordance with the following figure:



1806377995

Fig. 21: Current outputs AOV1 and AOV2

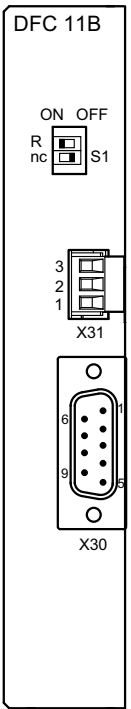


4.26 Connection and terminal description of the DFC11B option

4.26.1 Part number

CAN-Bus interface option type DFC11B: 824 317 4

	INFORMATION - The "CAN bus interface type DFC11B" option can only be used with MOVIDRIVE[®] MDX61B, not with MDX60B. - The DFC11B option must be plugged into the fieldbus slot. - The DFC11B option is powered via MOVIDRIVE[®] MDX61B. A separate voltage supply is not required.
---	--

Front view of DFC11B	Description	DIP switch Terminal	Function
 1806384907	DIP switch block S1: Sets the terminating resistor	R nc	Terminating resistor for the CAN-Bus cable Reserved
	X31: CAN bus connection	X31:3 X31:2 X31:1	CAN Low (jumped with X30:2) CAN High (jumped with X30:7) DGND CAN ¹⁾
	X30: CAN bus connection (Sub D9 to CiA standard)	X30:1 X30:2 X30:3 X30:4 X30:5 X30:6 X30:7 X30:8 X30:9	Reserved CAN Low (jumped with X31:3) DGND CAN ¹⁾ Reserved Reserved DGND CAN ¹⁾ CAN High (jumped with X31:2) Reserved Reserved

1) DGND of the CAN-Bus-interface is independent from DGND of the basic unit

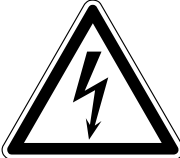
4.26.2 Connection MOVIDRIVE[®] - CAN

The DFC11B option is connected to the CAN bus at X30 or X31 in the same way as the SBus (→ Sec. "System bus connection (SBus 1)") in the basic unit (X12). In contrast to the SBus1, SBus2 is electrically isolated and made available via option DFC11B.



5 Startup

5.1 General startup instructions

	! DANGER Uncovered power connections. Severe or fatal injuries from electric shock. • Install the touch guard according to the regulations. • Never start the unit if the touch guard is not installed.
---	--

5.1.1 Requirements

The drive must be configured correctly to ensure that startup is successful. Refer to the MOVIDRIVE® MDX60/61B system manual for detailed project planning notes and an explanation of the parameters.

5.1.2 Parameters of non-SEW motors

The database stores parameters of SEW motors and non-SEW motors. We do not warrant that the parameter data of the non-SEW motors is correct and up to date.

5.1.3 VFC operating modes without speed control

MOVIDRIVE® MDX60/61B inverters are factory set to be taken into operation with the SEW motor which is adapted to the correct power level. The motor can be connected and the drive started immediately in accordance with section "Starting the motor" (→ page 102).

	INFORMATION The startup functions described in this section are used for setting the inverter so it can be adapted optimally to the motor that is connected and to suit the basic conditions.
---	--



5.1.4 Inverter/motor combinations

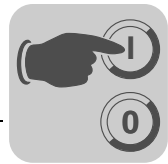
The following tables indicate which inverter/motor combinations this applies to.

400/500 V units

MOVIDRIVE® MDX60/61B in VFC operating mode	SEW motor
0005-5A3-4	DT80K4
0008-5A3-4	DT80N4
0011-5A3-4	DT90S4
0014-5A3-4	DT90L4
0015-5A3-4	DT90L4
0022-5A3-4	DV100M4
0030-5A3-4	DV100L4
0040-5A3-4	DV112M4
0055-5A3-4	DV132S4
0075-5A3-4	DV132M4
0110-5A3-4	DV160M4
0150-503-4	DV160L4
0220-503-4	DV180L4
0300-503-4	DV200L4
0370-503-4	DV225S4
0450-503-4	DV225M4
0550-503-4	DV250M4
0750-503-4	DV280S4
0900-503-4	DV280M4
1100-503-4	D315S4
1320-503-4	D315M4
1600-503-4	DRS315M4
2000-503-4	DRS315L4
2500-503-4	DRS315L4

230 V units

MOVIDRIVE® MDX60/61B in VFC operating mode	SEW motor
0015-2A3-4	DT90L4
0022-2A3-4	DV100M4
0037-2A3-4	DV112M4
0055-2A3-4	DV132S4
0075-2A3-4	DV132M4
0110-203-4	DV160M4
0150-203-4	DV160L4
0220-203-4	DV180L4
0300-203-4	DV200L4



5.1.5 Hoist applications

	! DANGER Risk of fatal injury if the hoist falls. Severe or fatal injuries. MOVIDRIVE® MDX60B/61B is not designed for use as a safety device in hoist applications. Use monitoring systems or mechanical protection devices to ensure safety.
---	--

5.2 Preliminary work and resources

- Check the installation.

	! DANGER Risk of crushing if the motor starts up unintentionally. Severe or fatal injuries. • Ensure that the motor cannot start inadvertently, for example, by removing the electronics terminal block X13. • Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.
--	---

- Performing **startup with the DBG60B keypad**:
Plug the connector of the DBG60B keypad into the XT slot.
- For **startup with PC and MOVITOOLS® MotionStudio**:
Plug an interface adapter (e.g. USB11A) into the XT slot and connect it to the PC with an interface cable (RS232). Install and start MOVITOOLS® MotionStudio on your PC.
- Switch on the supply voltage and, if necessary, the DC 24 V supply.
- Check that the default parameter settings are correct (e.g. factory setting).
- Check the set terminal assignment (→ P60_ / P61_).

	INFORMATION A group of parameter values is changed automatically at startup. The parameter description P700 "Operating modes" explains which parameters are affected by this step. For the parameter description, refer to the MOVIDRIVE® MDX60/61B system manual, section "Parameters".
---	---



5.3 Startup with DBG60B keypad

5.3.1 General information

Startup with the DBG60B keypad is only **possible in VFC operating modes**. Startup in CFC and SERVO operating modes is only possible using the MOVITOOLS® Motion-Studio operating software.

Required data

The following data is required to ensure startup is successful:

- Motor type (SEW or non-SEW motor)
- Motor data
 - Rated voltage and rated frequency
 - Additionally for non-SEW motors: Rated current, rated power, rated factor $\cos\phi$, and rated speed.
- Rated line voltage

The following data is also needed for startup with a speed controller:

- Encoder type and encoder resolution:

SEW encoder type	Startup parameters	
	Encoder type	PPR count
AK0H	HIPERFACE®	128
AS1H, ES1H, AV1H, AF1H	HIPERFACE®	1024
ES1S, ES2S, EV1S, EH1S, EF1H	SINE ENCODER	1024
ES1R, ES2R, EV1R, EH1R ES1T ¹⁾ , ES2T ¹⁾ , EV1T ¹⁾ , EH1T ¹⁾	INCREM. ENCODER	1024

1) DC 5 V TTL encoders ES1T, ES2T, EV1T and EH1T must be connected via the DWI11A option (see Installation section).

- Motor data
 - SEW motor: Brake yes or no and flywheel fan yes or no.
 - Non-SEW motor: Mass moment of inertia of motor, brake and fan
- Stiffness of the control system (factory setting = 1; suitable for most applications)

If the drive tends to oscillate → setting < 1

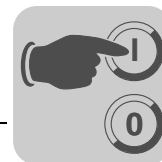
Transient recovery time is too long → Setting > 1

Recommended setting range: 0.90 – 1 – 1.10 (factory setting = 1)
- Converted mass moment of inertia of the load (gear unit + driven machine) on the motor shaft
- Time required for the shortest ramp



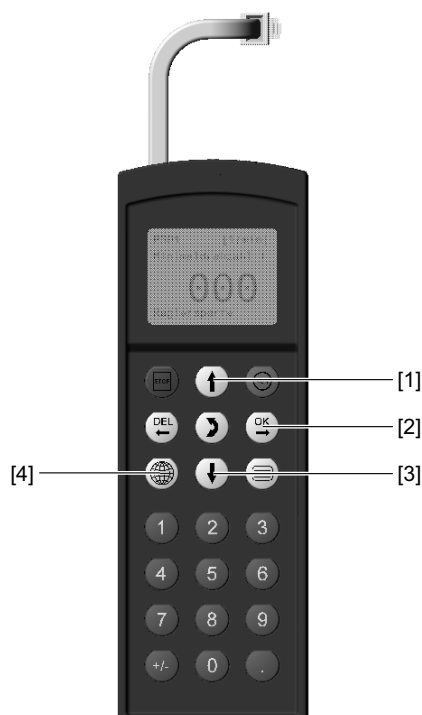
INFORMATION

- Activate encoder monitoring (P504 = "ON") after completing the startup. The function and voltage supply of the encoder will then be monitored.
- If a Hiperface® encoder is connected, it is always monitored regardless of the setting of parameter P504. Encoder monitoring is not a safety function!



5.3.2 Selecting a language

The figure below shows the keys for selecting the language.



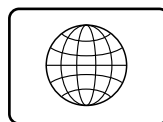
1809425035

- | | | | |
|-----|-----|--|----------------------------------|
| [1] | Key | | Move up to the next menu item |
| [2] | Key | | Confirm entry |
| [3] | Key | | Move down to the next menu item |
| [4] | Key | | A list of languages is displayed |

The following text appears on the display when the keypad is switched on for the first time or after activating the start mode:

SEW
EURODRIVE

The symbol for language selection then appears on the display.



1810055819

Proceed as follows to select the language:

- Press the key. A list of languages is displayed on the screen.
- Use the / keys to select the language you require.
- Confirm your selection using the key. The basic display is now shown in your chosen language.

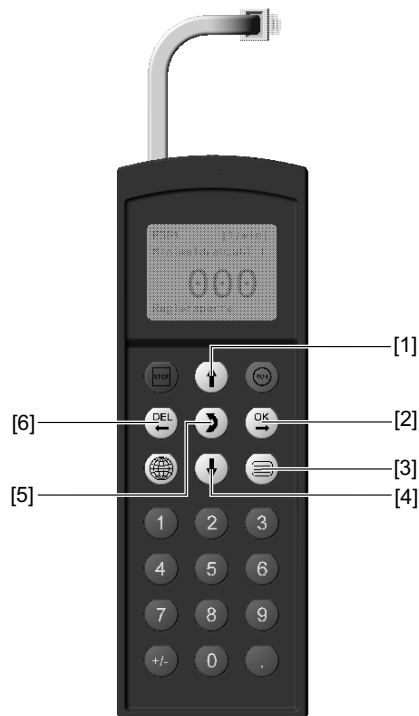


Startup

Startup with DBG60B keypad

5.3.3 Startup

The figure below shows the keys required for startup.



1810058891

- | | | | |
|-----|-----|--|---|
| [1] | Key | | Move up to the next menu item |
| [2] | Key | | Confirm entry |
| [3] | Key | | Activate the context menu |
| [4] | Key | | Move down to the next menu item |
| [5] | Key | | Change the menu, display mode ↔ edit mode |
| [6] | Key | | Cancel or abort startup |

5.3.4 Startup procedure

1. "0" signal at terminal X13:1 (DIØØ "/CONTROL.INHIBIT"), e.g. by disconnecting the electronics terminal block X13.

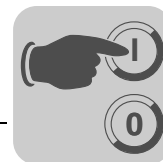
0.00rpm
0.000Amp
CONTROLLER INHIBIT

2. Activate the context menu by pressing the key.

BASIC VIEW
PARAMETER MODE
VARIABLE MODE

3. Press the key to scroll down to the "STARTUP" menu item.

MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX



4. Press the key to begin the startup procedure. The first parameter appears. The flashing cursor under the parameter number indicates that the keypad is in display mode.
 - Press the key to change to edit mode. The flashing cursor disappears.
 - Press the key or key to select "PARAMETER SET 1" or "PARAMETER SET 2".
 - Confirm the setting by pressing the key.
 - Press the key to return to display mode. The flashing cursor appears again.
 - Press the key to select the next parameter.

STARTUP
PREPARE FOR
STARTUP

C00*STARTUP

PARAMETER SET 1
PARAMETER SET 2

5. Select either stand-alone motor or group drive. Press the key to select the next parameter.

C22*MOTORS

SINGLE MOTOR
IDENT. MOTORS

6. Select the operating mode you require. Press the key to select the next parameter.

C26*OPER. MODE 1
STANDARD V/F
VFC

7. Select whether an encoder is to be evaluated. Press the key to select the next parameter.

C29*encoder

NO
YES

8. Select the operating mode you require. Press the key to select the next parameter.

C36*OPER.MODE

SPEED CONTROL
HOIST

9. Select the motor type. If a 2 or 4-pole SEW motor is connected, select the correct motor from the list. If a non-SEW motor or an SEW motor with more than four poles is connected, select "NON-SEW MOTOR" from the list. Press the key to select the next parameter.

C02*MOTOR TYPE 1
DT71D2
DT71D4
DT80K2

C02*MOTOR TYPE 1

NON-SEW MOTOR
DT63K4/DR63S4



Startup

Startup with DBG60B keypad

10. Enter the rated motor voltage for the selected connection type according to the value specified on the nameplate.

Example: Nameplate 230 Δ / 400 $\wedge$ 50 Hz

$\wedge$ connection → enter "400 V".

Δ connection/transition point at 50 Hz → enter "230 V".

Δ connection, transition point at 87 Hz → Also enter 230 V. However, set parameter P302 "MAXIMUM SPEED 1" to the value for 87 Hz after startup first and then start the drive.

Example: Nameplate 400 Δ /690 $\wedge$ 50 Hz

Only Δ connection possible → enter "400 V".

$\wedge$ connection is not possible.

Press the $\uparrow$ key to select the next parameter.

C03* V
MOT. RATED VOLT 1
400.000

11. Enter the rated frequency specified on the motor nameplate.

Example: 230 Δ /400 $\wedge$ 50 Hz

Enter "50 Hz" in $\wedge$ and Δ connection.

Press the $\uparrow$ key to select the next parameter.

C04* Hz
MOT. RATED FREQ. 1
50.000

FOR SEW MOTORS

12. The motor values are stored for SEW 2 and 4-pole motors and need not be entered.

FOR NON-SEW MOTORS

12. Enter the following motor nameplate data:

- C10* rated motor current, observe connection type ($\wedge$ or Δ).
- C11* rated motor power
- C12* power factor $\cos \varphi$
- C13* rated motor speed

13. Enter the rated power supply voltage (C05* for SEW motor, C14* for non-SEW motor).

C05* V
RATED MAINS VLTG
400.000

14. If no TF/TH is connected to X10:1/2 or X15 → Set "NO RESPONSE". If a TF/TH is connected, set the required error response. To select the sensor, you must set *P530 sensor type 1* after startup.

835* RESP. TF-SIG.
NO RESPONSE
DISPLAY ERROR

15. Start the calculation for the startup data by choosing "YES". The process lasts a few seconds.

C06*CALCULATION
NO
YES



FOR SEW MOTORS

16. The calculation is performed. After calculation, the next menu item appears automatically.

C06*SAVE

NO
YES

FOR NON-SEW MOTORS

16. For non-SEW motors, a calibration process is required to perform the calculation:
- When prompted, apply a "1" signal to terminal X13:1 (DIØØ "/CONTROL.INHIBIT").
 - Apply a "0" signal to terminal X13:1 again after the calibration is complete.
 - After calculation, the next menu item appears automatically.

17. Set "SAVE" to "YES" The data (motor parameters) are copied to the non-volatile memory of MOVIDRIVE®.

STARTUP
DATA IS
BEING COPIED...

18. The startup procedure is now complete. Press the  key to return to the context menu.

MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX

19. Press the  key to scroll down to the "QUIT" menu item.

SIGNATURE
QUIT
BASIC VIEW

20. Confirm the setting by pressing the  key. The basic display appears.

0.00rpm
0.000Amp
CONTROLLER INHIBIT



5.3.5 Starting up the speed controller

Startup is performed without the speed controller first (→ Section "Startup procedure, steps 1 through 17").

Important: Set encoder evaluation to "YES".

C29*encoder

NO
YES

1. Initiate the startup of the speed controller with "YES".

C09*n-CONTROL?

NO
YES

2. The selected operating mode is displayed. If the setting is correct, go to the next menu item.

C00*STARTUP
PARAMETER SET 2
VFC-n CONTROL

3. Select the correct encoder type.

C15*ENCODER TYPE
INCREM. ENCOD. TTL
SINE ENCODER
RESERVED

4. Set the correct encoder resolution.

C16*ENC. RESOLUT.
512 Inc
1024 Inc
2048 Inc

FOR SEW MOTORS

5. Enter whether the motor has a brake.

C17*BRAKE

WITHOUT
WITH

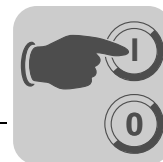
6. Set the stiffness of the control system.
If the drive tends to oscillate → setting < 1
Transient recovery time is too long → Setting > 1
Recommended setting range: 0,90 – 1 – 1,10

C18*
STIFFNESS
1.000

7. Enter whether the motor has a flywheel fan (Z fan).

C19*Z FAN

WITHOUT
WITH



FOR NON-SEW MOTORS

- | | |
|--|---|
| 5. Enter the moment of inertia of the motor. | D00*
J0 OF THE MOTOR
4.600 |
| 6. Set the stiffness of the control system.
If the drive tends to oscillate → setting < 1
Transient recovery time is too long → Setting > 1
Recommended setting range: 0,90 – <u>1</u> – 1,10 | C18*
STIFFNESS
1.000 |
| 7. Enter the moment of inertia of the brake and fan. | D00*
J BRAKE+FAN
1.000 |
| 8. Enter the mass moment of inertia of the load (gear unit + driven machine) extrapolated for the motor shaft. | C20* 10e-4kgm ²
LOAD MOMENT OF INERTIA
0.200 |
| 9. Enter the time for the shortest ramp you want. | C21* s
SHORTEST RAMP
0.100 |
| 10. Start the calculation for the startup data by choosing "YES".
The process lasts a few seconds. | C06*CALCULATION

NO
YES |
| 11. The calculation is performed. After calculation, the next menu item appears automatically. | C06*SAVE

NO
YES |
| 12. Set "SAVE" to "YES" The data (motor parameters) are copied to the non-volatile memory of MOVIDRIVE®. | STARTUP
DATA IS
BEING COPIED... |
| 13. The startup procedure is now complete. Press the  key to return to the context menu. | MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX |
| 14. Press the  key to scroll down to the "QUIT" menu item. | SIGNATURE
QUIT

BASIC VIEW |
| 15. Confirm the setting by pressing the  key. The basic display appears. | 0.00rpm
0.000Amp
CONTROLLER INHIBIT |



Startup

Startup with DBG60B keypad

- Once startup is complete, copy the parameter set from MOVIDRIVE® to the DBG60B keypad. You have the following options:
 - In the context menu, select the "COPY TO DBG" menu item. Confirm the setting by pressing the  key. The parameter set is copied from MOVIDRIVE® to DBG60B.
 - In the context menu, select the "PARAMETER MODE" menu item. Select parameter P807 "MDX → DBG". The parameter set is copied from MOVIDRIVE® to DBG60B.
- The parameter set can now be copied to other MOVIDRIVE® units using DBG60B. Plug the DBG60B keypad into the other inverter. You have the following options to copy the parameter set from DBG60B to another inverter:
 - In the context menu of the new inverter, choose the "COPY TO MDX" menu item and confirm your entry using the  key. The parameter set is copied from DBG60B to MOVIDRIVE®.
 - In the context menu, select the "PARAMETER MODE" menu item. Select parameter P806 "DBG → MDX". The parameter set is copied from DBG60B to MOVIDRIVE®.



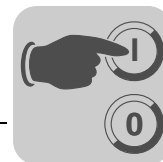
DANGER

Parameter settings incorrect due to unsuitable data sets.

Severe or fatal injury.

Make sure that the data set you copy is suitable for the application.

- Enter any parameter settings which differ from the factory settings in the parameter list (→ page 106).
- In the case of non-SEW motors, set the correct brake application time (P732 / P735).
- Observe the notes for starting the motor in the section "Starting the Motor" (→ page 102).
- In case of Δ connection and transition point at 87 Hz, set parameter P302/312 "Maximum speed 1/2" to the value for 87 Hz.
- Activate encoder monitoring for TTL and sin/cos encoders (P504 = "ON"). **Encoder monitoring is not a safety function.**



5.3.6 Setting parameters

Proceed in this order to set the parameters:

- Call up the context menu using the  key. In the context menu, select the "PARAMETER MODE" menu item. Confirm your entry with the  key. The flashing cursor under the parameter number indicates that the keypad is in parameter mode.
- Press the  key to change to edit mode. The flashing cursor disappears.
- You can use the  key or  key to select or set the correct parameter value.
- Confirm the setting by pressing the  key.
- Press the  key to return to the parameter mode. The flashing cursor appears again.
- Press the  key to select the next parameter.



5.4 Operation of MOVITOOLS® MotionStudio

5.4.1 Via MOVITOOLS® MotionStudio

Tasks

The software package enables you to perform the following tasks with consistency:

- Establishing communication with units
- Executing functions with the units

Establishing communication with other units

The SEW Communication Server is integrated into the MOVITOOLS® MotionStudio software package for establishing communication with the units.

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the units communicate via these communication channels using their communication options. You can operate up to four communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS-485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

The available channels can vary depending on the units and its communication options.

Executing functions with the units

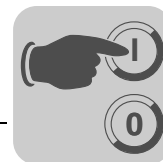
The software package offers uniformity in executing the following functions:

- Parameterization (for example in the parameter tree of the unit)
- Startup
- Visualization and diagnostics
- Programming

The following basic components are integrated into the MOVITOOLS® MotionStudio software package, allowing you to use the units to execute functions:

- MotionStudio
- MOVITOOLS®

All functions communicate using **tools**. MOVITOOLS® MotionStudio provides the right tools for every unit type.



Technical support

SEW-EURODRIVE offers you a 24-hour service hotline.

Simply dial **(+49) 0 18 05** and then enter the letters **SEWHELP** via the telephone keypad. Of course, you can also dial **(+49) 0 18 05 - 7 39 43 57**.

Online help

After installation, the following types of help are available to you:

- This documentation is displayed in a help window after you start the software.
If the help window does not appear at the start, deactivate the "Display" control field, in the menu under [Settings] / [Options] / [Help].
If the help window appears again, activate the "Display" control field, in the menu under [Settings] / [Options] / [Help].
- Context-sensitive help is available for the fields which require you to enter values. For example, you can use the <F1> key to display the ranges of values for the unit parameters.



5.4.2 First steps

Starting the software and creating a project

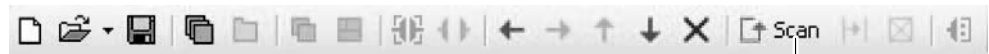
Proceed as follows to start MOVITOOLS® MotionStudio and create a project:

1. Start the MOVITOOLS® MotionStudio from the Windows start menu via:
[Start]/[Programs]/[SEW]/[MOVITOOLS-MotionStudio]/[MOVITOOLS-MotionStudio]
2. Create a project with name and storage location.

Establishing communication and scanning the network

Proceed as follows to establish a communication with MOVITOOLS® MotionStudio and scan your network:

1. Set up a communication channel to communicate with your units.
For detailed information on how to configure a communication channel, see the section regarding the relevant communication type.
2. Scan your network (unit scan). Press the [Start network scan] button [1] in the toolbar.



[1]

1132720523

1. Select the unit you want to configure.
2. Right-click to open the context menu.

As a result you will see a number of unit-specific tools to execute various functions with the units.

Starting up the units (online)

Proceed as follows to start up the units (online):

1. Switch to the network view.
2. Click on "Switch to online mode" [1] in the toolbar.

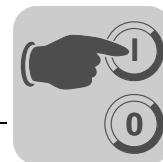


[1]

1184030219

[1] "Switch to online mode" symbol

3. Select the unit you want to startup.
4. Open the context menu and select the command [Startup] / [Startup].
The Startup wizard opens.
5. Follow the instructions of the startup wizard and then load the startup data onto your unit.



Startup for HTL motor encoders

Observe the following safety notes when starting up an HTL motor encoder to MOVIDRIVE® MDX61B:

SEW-motor type 1 IEC, NEMA, CSA, DX, DZ, JEC

Motor type 1	DT90S4	
Motor rated voltage 1 [V]	400	
Motor rated frequency 1 [Hz]	50	
Mains rated voltage [V]	400	
SEW encoder type	NON-SEW ENCODER	[1]
Encoder type	INCR. ENCODER TTL	[2]
Encoder increments [Inc/rev]	1024	[3]
835 Response TF sensor	NO RESPONSE	
530 Sensor type 1	NO SENSOR	

< Zurück Weiter > Abbrechen

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Fig. 23: Settings for startup of a motor with HTL motor encoder

- [1] "SEW encoder type" selection list
- [2] "Encoder type" selection list
- [3] "PPR count" selection list

- Select "Non-SEW encoder" from the "SEW encoder type" list [1].
- Select "INCREM. ENC. TTL" from the "Encoder type" list [2].
- In the dropdown menu "PPR count" [3] select the PPR count (1024 for SEW HTL encoders) printed on the HTL motor encoder.

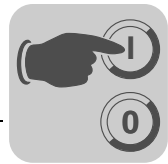


5.5 Starting the motor

5.5.1 Analog setpoint selection

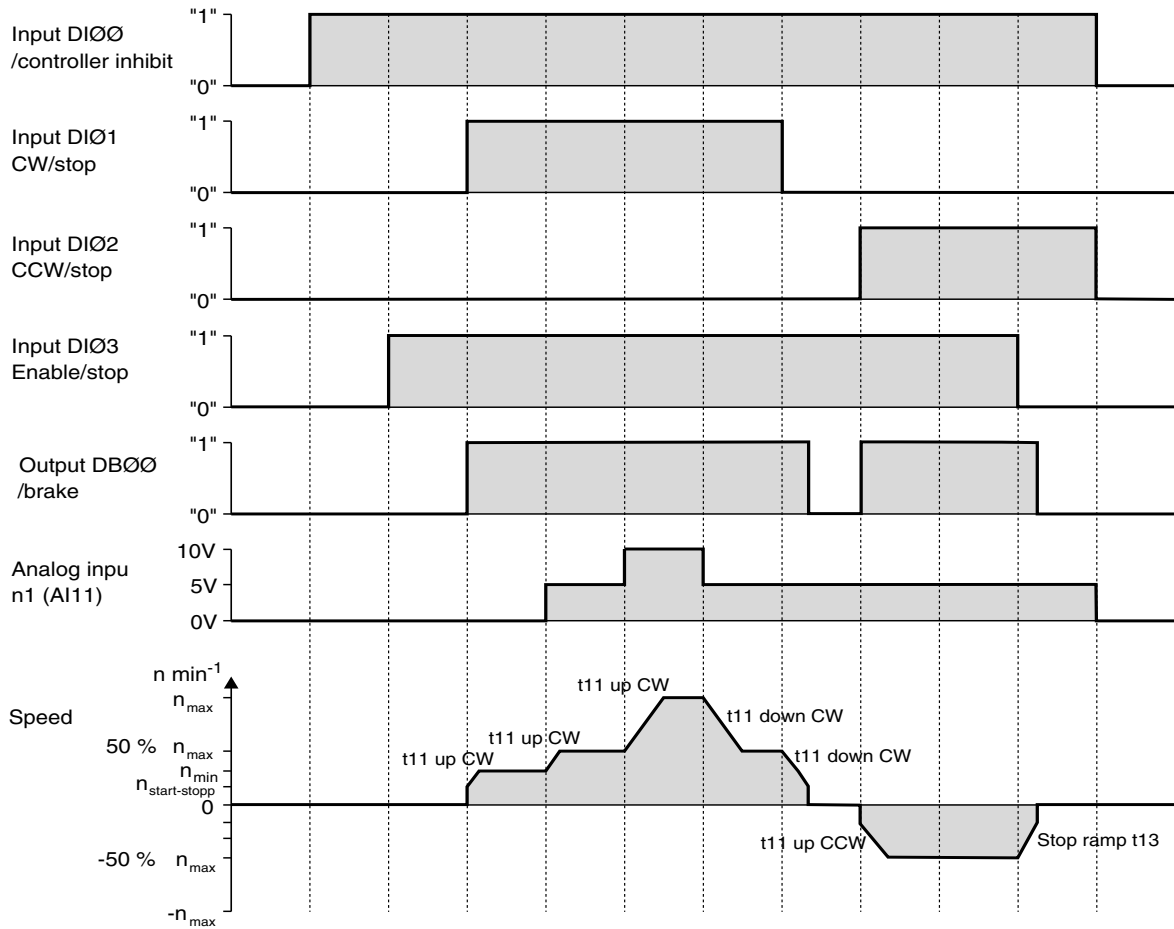
The following table shows the signals that must be present on terminals X11:2 (AI1) and X13:1 – X13:6 (DIØØ – DIØ5) when the "UNIPOL/FIX.SETPT" setpoint is selected (P100) to operate the drive with an analog setpoint entry.

Function	X11:2 (AI1) Analog input n1	X13:1 (DIØØ) /Controller inhibit	X13:2 (DIØ1) CW/stop	X13:3 (DIØ2) CCW/stop	X13:4 (DIØ3) Enable/stop	X13:5 (DIØ4) n11/n21	X13:6 (DIØ5) n12/n22
Controller inhibit	X	"0"	X	X	X	"0"	"0"
Stop	X	"1"	X	X	"0"	"0"	"0"
Enable and stop	X	"1"	"0"	"0"	"1"	"0"	"0"
Clockwise at 50 % n_{max}	5 V	"1"	"1"	"0"	"1"	"0"	"0"
Clockwise with n_{max}	10 V	"1"	"1"	"0"	"1"	"0"	"0"
Counterclockwise with 50 % n_{max}	5 V	"1"	"0"	"1"	"1"	"0"	"0"
Counterclockwise with n_{max}	10 V	"1"	"0"	"1"	"1"	"0"	"0"



5.5.2 Travel diagram

The following travel diagram shows by way of example how the motor is started with the wiring of terminals X13:1 – X13:4 and analog setpoints. Binary output X10:3 (DBØØ "/>



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INFORMATION

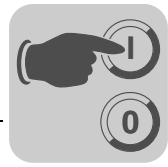
The motor is not energized in the event of a controller inhibit (DIØØ = "0"). A motor without brake will coast to standstill.



5.5.3 Fixed setpoints

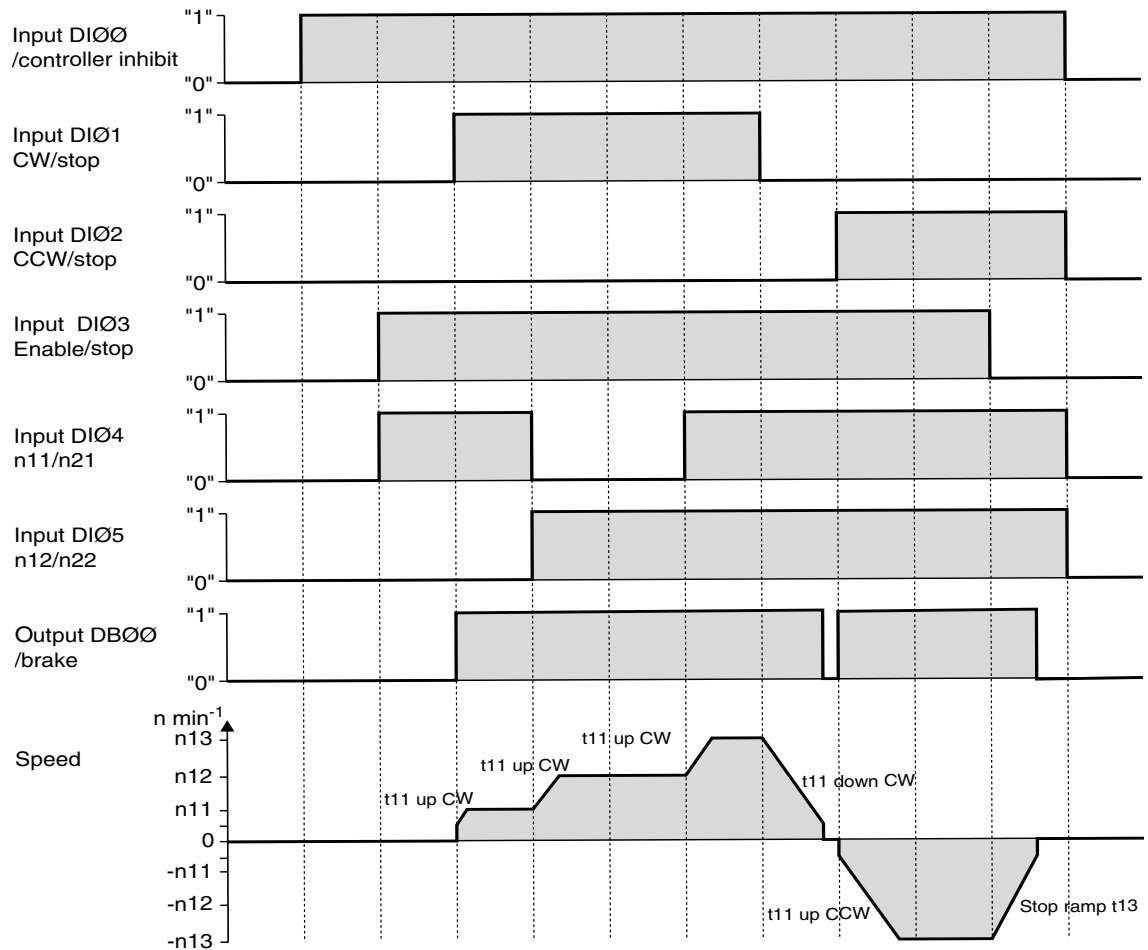
The following table shows the signals that must be present on terminals X13:1 – X13:6 (DIØØ – DIØ5) when the "UNIPOL/FIX.SETPT" setpoint is selected (P100) to operate the drive with the fixed setpoints.

Function	X13:1 (DIØØ) /Controller inhibit	X13:2 (DIØ1) CW/stop	X13:3 (DIØ2) CCW/stop	X13:4 (DIØ3) Enable/stop	X13:5 (DIØ4) n11/n21	X13:6 (DIØ5) n12/n22
Controller inhibit	"0"	X	X	X	X	X
Stop	"1"	X	X	"0"	X	X
Enable and stop	"1"	"0"	"0"	"1"	X	X
CW operation with n11	"1"	"1"	"0"	"1"	"1"	"0"
CW operation with n12	"1"	"1"	"0"	"1"	"0"	"1"
CW operation with n13	"1"	"1"	"0"	"1"	"1"	"1"
CCW operation with n11	"1"	"0"	"1"	"1"	"1"	"0"



5.5.4 Travel diagram

The following travel diagram shows an example of how the drive is started with the wiring of terminals X13:1 – X13:6 and internal fixed setpoints. Binary output X10:3 (DB00 "/Brake") is used for switching brake contactor K12.

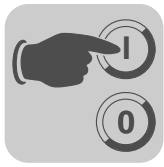


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INFORMATION

The motor is not energized in the event of a controller inhibit (DI00 = "0"). A motor without brake will coast to standstill.



5.5.5 Manual operation

The inverter can be controlled using the DBG60B keypad in manual operation (context menu → manual operation). The 7-segment display on the unit shows "H" during manual operation.

The binary inputs are then without any functions for the duration of manual operation, with the exception of X13:1 (DIØØ "/Controller inhibit"). Binary input X13:1 (DIØØ "/Controller inhibit") must get a "1" signal to enable the drive to be started in manual operation. The drive can also be stopped in manual operation by X13:1 = "0".

The direction of rotation is not determined by the "CW/stop" or "CCW/stop" binary inputs. Instead, you select the direction of rotation using the DBG60B keypad. Enter the required speed and then the direction of rotation (+ Δ CW / – Δ CCW) using the sign key (+/–).

Manual operation remains active when the power supply is switched off and on; however, the inverter is then inhibited. Use the "Run" key to enable and start the inverter at n_{min} in the selected direction of rotation. The speed is increased and decreased using the $\uparrow$ and $\downarrow$ keys.



INFORMATION

The signals at the binary inputs take effect as soon as manual operation is finished. Binary input X13:1 (DIØØ) /Controller inhibit does not have to be switched from "1" to "0" and back to "1". The drive can start according to the signals at the binary inputs and the setpoint sources.

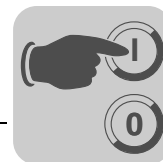


DANGER

Risk of crushing if the motor starts up unintentionally.

Severe or fatal injuries.

- Ensure that the motor cannot start inadvertently, for example, by removing the signal terminal block X13.
- Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.



5.5.6 Startup in "VFC & Flying start" operating mode

The parameter *P320 Automatic adjustment* is deactivated in the "VFC & Flying start" mode. It is important that the stator resistance (*P322 IxR compensation 1*) is set correctly to ensure that the flying start function is performed properly.

	INFORMATION
	Due to exact motor data, the proper function of the flying start function has only been tested with SEW motors. SEW-EURODRIVE does not guarantee a proper function of the flying start function for non-SEW motors.

Note the following when performing **startup for an SEW motor** with DBG60B or MOVITOOLS® MotionStudio:

The value of the stator resistance (*P322 IxR compensation 1*) is set for an SEW motor at operating temperature (winding temperature 80 °C). For flying start with a cold motor, you have to reduce the stator resistance (*P322 IxR compensation 1*) by 0.34 % per Kelvin.

Note the following when performing **startup for a non-SEW motor** with DBG60B or MOVITOOLS® MotionStudio:

Measure the stator resistance (*P322 IxR compensation 1*) at startup. Proceed as follows:

1. Start up the motor in "VFC" operation mode.
2. Enable the **motor in standstill**.
3. **Note** the value of *P322 IxR compensation 1* (stator resistance) for step 6.
4. Select the "VFC & Flying start" operating mode.
5. Set *P320 "Automatic adjustment 1"* to "Off".
6. In *P322 IxR compensation 1* (stator resistance) enter the **value you noted** in step 3.



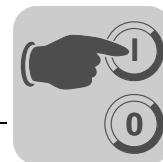
5.6 Complete parameter list

5.6.1 General information

- The parameters in the quick menu are marked by a "\ " (= display on the DBG60B keypad).
- The factory setting for the parameter is highlighted in bold.

Par.	Name	Value range
DISPLAY VALUES		
00_	Process values	
000	Speed	-6100 – 0 – 6100 rpm
\001	User display	"Text"
002	Frequency	0 – 600 Hz
003	Actual position	0 – 2 ³¹ -1 inc
004	Output current	0 – 250 % I _N
005	Active current	-250 – 0 – 250 % I _N
\006	Motor utilization 1	0 – 200 %
007	Motor utilization 2	0 – 200 %
008	DC link voltage	0 – 1000 V
009	Output current	A
01_	Status displays	
010	Inverter status	
011	Operating status	
012	Error status	
013	Current parameter set	1/2
014	Heat sink temperature	-20 – 0 – 100 °C
015	Operating hours	h
016	Enable hours	h
017	Work	kWh
018	KTY utilization 1	0 – 200 %
019	KTY utilization 2	0 – 200 %
02_	Analog setpoints	
020	Analog input AI1	-10 – 0 – 10 V
021	Analog input AI2	-10 – 0 – 10 V
022	External current limit	0 – 100 %
03_	Binary inputs of basic unit	
030	Binary input DIØØ	/CONTR. INHIBIT
031	Binary input DIØ1	Not in DBG60B
032	Binary input DIØ2	
033	Binary input DIØ3	
034	Binary input DIØ4	
035	Binary input DIØ5	
036	Binary input DIØ6	
037	Binary input DIØ7	
\039	Status of binary inputs DIØØ – DIØ7	

Par.	Name	Value range
04_	Binary input options	
040	Binary input DI1Ø	Not in DBG60B
041	Binary input DI11	
042	Binary input DI12	
043	Binary input DI13	
044	Binary input DI14	
045	Binary input DI15	
046	Binary input DI16	
047	Binary input DI17	
\048	Status of binary inputs DI1Ø - DI17	
05_	Binary outputs of basic unit	
050	Binary output DBØØ	/BRAKE
051	Binary output DOØ1	Not in DBG60B
052	Binary output DOØ2	
053	Binary output DOØ3	
054	Binary output DOØ4	
055	Binary output DOØ5	
\059	Status of binary outputs DBØØ, DOØ1 – DOØ5	
06_	Binary outputs option	
060	Binary output DO1Ø	Not in DBG60B
061	Binary output DO11	
062	Binary output DO12	
063	Binary output DO13	
064	Binary output DO14	
065	Binary output DO15	
066	Binary output DO16	
067	Binary output DO17	
\068	Status of binary outputs DO1Ø - DO17	
07_	Unit data	
070	Unit type	
071	Rated output current	
072	Option 1 encoder slot	
073	Option 2 fieldbus slot	
074	Option 3 expansion slot	
076	Basic unit firmware	
077	DBG firmware	Only in DBG60B
078	Technology function	
079	Unit type	Standard Application



08_	Error memory	
\080	Error t-0	
081	Error t-1	
082	Error t-2	
083	Error t-3	
084	Error t-4	
09_	Bus diagnostics	
090	PD configuration	
091	Fieldbus type	

092	Fieldbus baud rate	
093	Fieldbus address	
094	PO1 Setpoint	
095	PO2 Setpoint	
096	PO3 Setpoint	
097	PI1 Actual value	
098	PI2 Actual value	
099	PI3 Actual value	

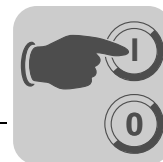
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
1_	SETPOINTS / RAMP GENERATORS		
10_	Setpoint selection		
\100	Setpoint source	UNIPOL./FIX.SETPT. BIPOL./FIX.SETPT UNIPOL./FIX.SETPT. RS485 Fieldbus Motor potentiometer Motor pot.+analog 1 Fix.setpt.+analog 1 Master SBus1 Master-RS485 SBus 1 Frequency input SBus 2 IPOS setpoint	
101	Control signal source	Terminals	
102	Frequency scaling	0.1 – 10 – 65 kHz	
105	Fault response to wire breakage AI1	No response Immediate stop/fault Rapid stop/fault Rapid stop/warning	
11_	Analog input AI1		
110	AI1 scaling	-10 – -0.1 / 0.1 – 1 – 10	
111	AI1 Offset	-500 – 0 – 500 mV	
112	AI1 operating mode	Ref. N-MAX Ref. 3000 rpm U-Off., N-MAX N-Off., N-MAX N-MAX, 0-20 mA N-MAX, 4-20 mA	
113	AI1 voltage offset	-10 – 0 – 10 V	
114	AI1 speed offset	-6000 – 0 – 6000 rpm	
115	Filter speed setpoint	0 – 5 – 100 ms 0 = Filter off	
12_	Analog inputs (optional)		
120	AI2 operating mode	No function 0 – 10 V + setpt.1 0 – 10 V I-limit: Actual value PID controller	
13_	Speed ramps 1		



Startup

Complete parameter list

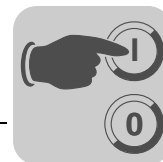
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
\130	Ramp t11 up CW	0 – 2 – 2000 s	
\131	Ramp t11 down CW	0 – 2 – 2000 s	
\132	Ramp t11 up CCW	0 – 2 – 2000 s	
\133	Ramp t11 down CCW	0 – 2 – 2000 s	
\134	Ramp t12 UP=DOWN	0 – 10 – 2000 s	
135	S pattern t12	0 – 3	
\136	Stop ramp t13	0 – 2 – 20 s	
\137	Emergency stop ramp t14	0 – 2 – 20 s	
138	Ramp limit VFC	Yes No	
139	Ramp monitoring 1	Yes No	
14_	Speed ramps 2		
140	Ramp t21 up CW	0 – 2 – 2000 s	
141	Ramp t21 down CW	0 – 2 – 2000 s	
142	Ramp t21 up CCW	0 – 2 – 2000 s	
143	Ramp t21 down CCW	0 – 2 – 2000 s	
144	Ramp t22 UP=DOWN	0 – 10 – 2000 s	
145	S pattern t22	0 – 3	
146	Stop ramp t23	0 – 2 – 20 s	
147	Emergency stop ramp t24	0 – 2 – 20 s	
149	Ramp monitoring 2	No Yes	
15_	Motor potentiometer (parameter sets 1 and 2)		
150	Ramp t3 up	0.2 – 20 – 50 s	
151	Ramp t3 down	0.2 – 20 – 50 s	
152	Save last setpoint	OFF ON	
16_	Fixed setpoints 1		
\160	Internal setpoint n11	-6000 – 150 – 6000 rpm (% I _N)	
\161	Internal setpoint n12	-6000 ... 750 ... 6000 rpm (% I _N)	
\162	Internal setpoint n13	-6000 ... 1500 ... 6000 rpm (% I _N)	
17_	Fixed setpoints 2		
170	Internal setpoint n21	-6000 – 150 – 6000 rpm (% I _N)	
171	Internal setpoint n22	-6000 – 750 – 6000 rpm (% I _N)	
172	Internal setpoint n23	-6000 – 1500 – 6000 rpm (% I _N)	
2_	CONTROLLER PARAMETERS		
20_	Speed control (only parameter set 1)		
200	P-gain n-controller	0.01 – 2 – 32	
201	Time constant n-controller	0 – 10 – 300 ms	
202	Gain Accel. prectrl.	0 – 65	
203	Filter acceleration precontrol	0 – 100 ms	
204	Filter actual speed value	0 – 32 ms	
205	Load precontrol CFC	– 150 % – 0 – 150 %	



Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
206	Sampling time n-controller	1 ms 0.5 ms	
207	Load precontrol VFC	- 150 % – 0 – 150 %	
21_	Hold controller		
210	P gain hold controller	0.1 – 0.5 – 32	
22_	Synchronous operation control (only parameter set 1)		
220	P-gain (DRS)	1 – 10 – 200	
221	Master gear ratio factor	1 – 3 999 999 999	
222	Slave gear ratio factor	1 – 3 999 999 999	
223	Mode selection	Mode 1 Mode 2 Mode 3 Mode 4 Mode 5 Mode 6 Mode 7 Mode 8	
224	Slave counter	-99 999 999 – -10 / 10 – 99 999 999 Inc	
225	Offset 1	-32 767 – -10 / 10 – 32 767 Inc	
226	Offset 2	-32 767 – -10 / 10 – 32 767 Inc	
227	Offset 3	-32 767 – -10 / 10 – 32 767 Inc	
228	Precontrol filter (DRS)	0 – 100 ms	With MOVITOOLS® MotionStudio only. Not visible on the DBG60B keypad.
23_	Synchr. oper. with synchr. encoder		
230	Synchronous encoder	Off Equal-ranked Chain	
231	Factor slave encoder	1 – 1000	
232	Factor slave synchronous encoder	1 – 1000	
233	Synchronous encoder resolution	128 / 256 / 512 / 1024 / 2048	
234	Master encoder resolution	128 / 256 / 512 / 1024 / 2048	
24_	Synchronous operation with catch up		
240	Synchronous speed	-6000 – 1500 – 6000 rpm	
241	Synchronous ramp	0 – 2 – 50 s	
26_	Process controller parameters		
260	Operating mode	Controller off / Control / Step response	
261	Cycle time	1 / 5 / 10 ms	
262	Interruption	No response / Move closer to setpoint	
263	Factor K _p	0 – 1 – 32,767	
264	Integrative time T _n	0 – 10 – 65535 ms	
265	Derivative time T _v	0 – 1 – 30 ms	
266	Precontrol	-32767 – 0 – 32767	
27_	Process controller input values		
270	Setpoint source	Parameters / IPOS variable / Analog 1 / Analog 2	
271	Setpoint	-32767 – 0 – 32767	
272	IPOS setpoint address	0 – 1023	
273	Time constant	0 – 0.01 – 2000 s	
274	Scaling setpoints	-32,767 – 1 – 32,767	



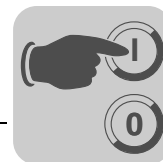
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
275	Actual value source	Analog 1 / Analog 2 / IPOS Variable	
276	IPOS actual value address	0 – 1023	
277	Actual value scaling factor	–32.767 – 1 – 32.767	
278	Actual offset value	–32767 – 0 – 32767	
279	Time constant actual value	0 – 500 ms	
28_	Process controller limits		
280	Minimum offset + actual value	–32767 – 0 – 32767	
281	Maximum offset + actual value	–32767 – 10000 – 32767	
282	Minimum output PID controller	–32767 – -1000 – 32767	
283	Maximum output PID controller	–32767 – 10000 – 32767	
284	Minimum output process controller	–32767 – 0 – 32767	
285	Maximum output process controller	–32767 – 7500 – 32767	
3_	MOTOR PARAMETERS		
30_ / 31_	Limits 1 / 2		
\300 / 310	Start/stop speed 1 / 2	0 – 150 rpm	
\301 / 311	Minimum speed 1 / 2	0 – 15 – 6100 rpm	
\302 / 312	Maximum speed 1 / 2	0 – 1500 – 6100 rpm	
\303 / 313	Current limit 1 / 2	0 – 150 % (BG0: 0 – 200 % I _N)	
304	Torque limit	0 – 150 % (BG0: 0 – 200 %)	
32_ / 33_	Motor compensation 1 / 2 (asynchronous)		
\320 / 330	Automatic adjustment 1/2	Off On	
321 / 331	Boost 1/2	0 – 100 %	
322 / 332	IxR adjustment 1	0 – 100 %	
323 / 333	Premagnetizing time 1 / 2	0 – 2 s	
324 / 334	Slip compensation 1 / 2	0 – 500 rpm	
34_	Motor protection		
340 / 342	Motor protection 1/2	Off On (asynchronous) On (synchronous)	
341 / 343	Type of cooling 1/2	Fan cooled Forced cooling	
344	Interval for motor protection	0.1 – 4 – 20 s	
345 / 346	I _N /U _L monitoring 1 / 2	0.1 – 500 A	
35_	Motor direction of rotation		
350 / 351	Direction of rotation reversal 1 / 2	Off On	
36_	Startup (only available in DBG60B)		
360	Startup	Yes/No	Only available in DBG60B, not in MOVITOOLS® Motion Studio/SHELL.
4_	REFERENCE SIGNALS		
40_	Speed reference signal		
400	Speed reference value	0 – 1500 – 6000 rpm	
401	Hysteresis	0 – 100 – 500 rpm	
402	Delay time	0 – 1 – 9 s	



Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
403	Signal = "1" if:	$n < n_{ref}$ $n > n_{ref}$	
41_	Speed window signal		
410	Window center	0 – 1500 – 6000 rpm	
411	Range width	0 – 6000 rpm	
412	Delay time	0 – 1 – 9 s	
413	Signal = "1" if:	Inner Outside	
42_	Speed setpoint/actual value comparison		
420	Hysteresis	0 – 100 – 300 rpm	
421	Delay time	0 – 1 – 9 s	
422	Signal = "1" if:	$n \neq n_{setp}$ $n = n_{setp}$	
43_	Current reference signal		
430	Current reference value	0 – 100 – 200 % I_N	
431	Hysteresis	0 – 5 – 30 % I_N	
432	Delay time	0 – 1 – 9 s	
433	Signal = "1" if:	$I < I_{ref}$ $I > I_{ref}$	
44_	I_{max} signal		
440	Hysteresis	0 – 5 – 50 % I_N	
441	Delay time	0 – 1 – 9 s	
442	Signal = "1" if:	$I = I_{max}$ / $I < I_{max}$	
5_	MONITORING FUNCTIONS		
50_	Speed monitoring		
500 / 502	Speed monitoring 1/2	Off Motor Regenerative Mot. & regener.	
501 / 503	Delay time 1/2	0 – 1 – 10 s	
504	Encoder monitoring motor	No Yes	
505	Synchronous encoder monitoring	No Yes	
51_	Synchronous operation monitoring		
510	Positional tolerance slave	10 – 25 – 32 768 Inc	
511	Lag error prewarning	50 – 99 999 999 Inc	
512	Lag error limit	100 – 4000 – 99 999 999 Inc	
513	Deceler. Lag error signal	0 – 1 – 99 s	
514	Counter LED display	10 – 100 – 32 768 Inc	
515	Delay time position signal	5 – 10 – 2000 ms	
516	X41 Encoder monitoring	Yes No	
517	X41 Pulse count monitoring	Yes No	
518	X42 Encoder monitoring	Yes No	
519	X42 Pulse count monitoring	Yes No	



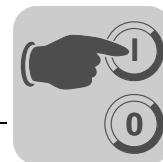
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
52_	Mains OFF monitoring		
520	Mains OFF response time	0 – 5 s	
521	Mains OFF response	Controller inhibit Emergency stop	
522	Phase failure monitoring	On Off	
53_	Motor temperature protection		
530	Sensor type 1	No sensor TF/TH/KTY (KTY: only for DS/CM motors)	
531	Sensor type 2	No sensor TF/TH/KTY (KTY: only for DS/CM motors)	
532	Source of motor temperature 1	X10/X15	
533	Source of motor temperature 2	X10/X15	
54_	Gear unit/motor monitoring		
540	Response to drive vibration / warn- ing	Display error	The following fault responses can be programmed: No response • display error • imm. stop/fault • emerg.st./fault • rapid stop/fault • rapid stop/warn. • emerg.st./warn. • rapid stop/warn.
541	Response to drive vibration / fault	Rapid stop/warning	
542	Response to oil aging/warning	Display error	
543	Response to oil aging/fault	Display error	
544	Response to oil aging/overtemper- ature	Display error	
545	Response to oil aging/ready	Display error	
549	Response to brake wear	Display error	
55_	DCS safety monitor		
550	Status DCS safety monitor	Display value that cannot be changed	
551	Binary inputs DCS 1 – 8		
552	Binary outputs DCS DO0_P – DO2_M		
553	Serial number DCS		
554	CRC DCS		
555	Fault response DCS	Immediate stop	The following fault responses can be programmed: No response • display error
556	DCS alarm response	Malfunction	
557	Actual position source DCS	Motor encoder (X15) Ext. encoder (X14) Absolute encoder (X62)	
56_	Current limit Ex-e motor:		
560	Current limit Ex-e motor:	On Off	
561	Frequency A	0 – 5 – 60 Hz	
562	Current limit A	0 – 50 – 150 %	
563	Frequency B	0 – 10 – 104 Hz	
564	Current limit B	0 – 80 – 200 %	
565	Frequency C	0 – 25 – 104 Hz	
566	Current limit C	0 – 100 – 200 %	



Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment	
6__	TERMINAL ASSIGNMENT			
60_	Binary inputs of basic unit			
-	Binary input DI00	Fixed assignment with: /CONTR. INHIBIT	The following functions can be programmed: No function • enable/stop • CW/stop • CCW/stop • n11/n21 • n12/n22 • fix. setpt. sw.over • param. sw.over • ramp sw.over • Motor potentiometer up • motor potentiometer down • /Ext. error • error reset • /hold control • /CW limit switch • /CCW limit switch • IPOS input • reference cam • ref. trav. start • slave free run • setpoint hold • mains on • set DRS zero point • DRS slave start • DRS teach in • DRS master stopped • oscillation/warning • break wear • oil aging/warning • oil aging/error • oil aging overtemp. • oil aging/ready	
600	Binary input DI01	CW/stop		
601	Binary input DI02	CCW/stop		
602	Binary input DI03	Enable/stop		
603	Binary input DI04	n11/n21		
604	Binary input DI05	n12/n22		
605	Binary input DI06	No function		
606	Binary input DI07	No function		
61_	Binary inputs option			
610	Binary input DI10	No function		
611	Binary input DI11	No function		
612	Binary input DI12	No function		
613	Binary input DI13	No function		
614	Binary input DI14	No function		
615	Binary input DI15	No function		
616	Binary input DI16	No function		
617	Binary input DI17	No function		
62_	Binary outputs of basic unit			
-	Binary output DB00	Fixed assignment with: /Brake	The following signals can be programmed: No function • /malfunction • ready • output stage on • rotating field on • brake rel • brake engaged • motor standstill • parameter set • speed reference • speed window • nom./act.val.comp. • curr. reference • lmax signal • /motor utilization 1 • /motor utiliz. 2 • /DRS PREWARN. • /DRS lag error • DRS slave in pos. • IPOS in position • IPOS reference • IPOS output • /IPOS malfunction • reserved • Ex-e current limit • LSM commutation • S pattern • safe stop	
620	Binary output DO01	Ready		
621	Binary output DO02	/fault		
622	Binary output DO03	IPOS output		
623	Binary output DO04	IPOS output		
624	Binary output DO05	IPOS output		
63_	Binary outputs option			
630	Binary output DO10	No function		
631	Binary output DO11	No function		
632	Binary output DO12	No function		
633	Binary output DO13	No function		
634	Binary output DO14	No function		
635	Binary output DO15	No function		
636	Binary output DO16	No function		
637	Binary output DO17	No function		
64_	Optional analog outputs			
640	Analog output AO1	Actual speed	The following functions can be programmed: No function • ramp input • setpoint speed • actual speed • actual frequency • output current • active current • unit utilization • IPOS output • relative torque • IPOS output 2	
641	Scaling AO1	-10 – 0 – 1 – 10		
642	Operating mode AO1	OFF / -10 – +10 V / 0 – 20 mA / 4 – 20 mA		
643	Analog output AO2	Output current		
644	Scaling AO2	-10 – 0 – 1 – 10		
645	Operating mode AO2	OFF / -10 – +10 V / 0 – 20 mA / 4 – 20 mA		



Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
7_	CONTROL FUNCTIONS		
70_	Operating modes		
700	Operating mode 1	VFC 1 VFC 1 & GROUP VFC 1 & HOIST VFC 1 & DC BRAK. VFC 1 & FLYSTART VFC-n CONTROL VFC-n-CTRL&GRP. VFC-n-CTRL&HOIST VFC-n-CTRL&SYNC VFC-n-CTRL& IPOS CFC CFC & M-CONTROL CFC&IPOS CFC&SYNC. SERVO SERVO&M-CONTROL SERVO&IPOS SERVO&SYNC.	
701	Operating mode 2	VFC 2 VFC 2 & GROUP VFC 2 & HOIST VFC 2 & DC BRAK. VFC 2 & FLYSTART	
702	Motor category	Rotational Linear	
71_	Standstill current		
710 / 711	Standstill current 1 / 2	0 – 50 % I _{Mot}	
72_	Setpoint stop function		
720 / 723	Setpoint stop function 1 / 2	Off On	
721 / 724	Stop setpoint 1 / 2	0 – 30 – 500 rpm	
722 / 725	Start offset 1 / 2	0 – 30 – 500 rpm	
73_	Brake function		
730 / 733	Brake function 1 / 2	Off On	
731 / 734	Brake release time 1 / 2	0 – 2 s	
732 / 735	Brake application time 1 / 2	0 – 2 s	
74_	Speed skip function		
740 / 742	Skip window center 1 / 2	0 – 1500 – 6000 rpm	
741 / 743	Skip width 1/2	0 – 300 rpm	
75_	Master/slave function		
750	Slave setpoint	Master/slave off Speed (RS485) Speed (SBus) speed (485+SBus) Torque (RS485) Torque (SBus) Torque (485+SBus) Load share (RS485) Load share (SBus) Load share (485+SBus)	



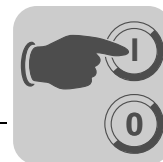
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
751	Scaling slave setpoint	– 10 – 0 – 1 – 10	
76_	Manual operation		
760	Lockout run/stop keys	No Yes	
77_	Energy-saving function		
770	Energy-saving function	Off On	
78_	Ethernet configuration		
780	IP address	000.000.000.000 – 192.168.10.x – 223.255.255.255	
781	Subnet mask	000.000.000.000 – 255.255.255.000 – 223.255.255.255	
782	Standard gateway	000.000.000.000 – 223.255.255.255	
783	Baud rate	Display value that cannot be changed (0 – 100 – 1000 MBaud)	
784	MAC address	Display value that cannot be changed (00-0F-69-XX-XX-XX)	
785	EtherNet/IP startup configuration	DHCP Saved IP parameters	
8_	UNIT FUNCTIONS		
80_	Setup		
800	User menu	On / off (only in DBG60B)	
801	Language	Dependent on DBG60B version	
\802	Factory setting	No Default Delivery state	
\803	Parameter lock	Off On	
804	Reset statistics data	No Error memory kWh counter Operating hours	
806	Copy DBG60B → MDX	Yes/ No	Only in DBG60B
807	Copy MDX → DBG60B	Yes/ No	Only in DBG60B
81_	Serial communication		
810	RS-485 address	0 – 99	
811	RS485 group address	100 – 199	
812	RS485 timeout interval	0 – 650 s	
819	Fieldbus timeout interval	0 – 0.5 – 650 s	
82_	Brake operation		
\820 / 821	4-quadrant operation 1/2	Off On	
83_	Error responses		
830	Response EXT. ERROR	Emergency stop/malf.	The following fault responses can be programmed: No response • display error • imm. stop/fault • emerg.st./fault • rapid stop/fault • rapid stop/warnng. • emerg.st./warnng. • rapid stop/warnng.
831	Response FIELDBUS TIMEOUT	Rapid stop/warning	
832	Response MOTOR OVERLOAD	Emergency stop/malf.	
833	Response RS485 TIMEOUT	Rapid stop/warning	
834	LAG ERROR response	Emergency stop/malf.	
\835	Response TF SIGNAL	No response	
836 / 837	Response SBus TIMEOUT 1 / 2	EMERG. ST/FAULT	
838	Response SW limit switch	Emergency stop/malf.	



Startup

Complete parameter list

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
839	Response to positioning interruption	No response	
84_	Reset behavior		
840	Manual reset	No Yes	
841	Auto reset	Off On	
842	Restart time	1 – 3 – 30 s	
85_	Scaling actual speed value		
850	Scaling factor numerator	1 – 65535	Can only be set via MOVITOOLS® MotionStudio
851	Scaling factor denominator	1 – 65535	
852	User-defined unit	rpm	
86_	Modulation		
860 / 861	PWM frequency 1 / 2 VFC	2.5 kHz 4 kHz 8 kHz 12 kHz 16 kHz	Factory setting of MOVIDRIVE® MDX61B size 7 (AC 500 V units: MDX61B1600/2000/ 2500) = 2.5 kHz
862 / 863	PWM fix 1 / 2	Off On	
864	PWM frequency CFC	2.5 kHz 4 kHz 8 kHz 16 kHz	Factory setting of MOVIDRIVE® MDX61B size 7 (AC 500 V units: MDX61B1600/2000/ 2500) = 2.5 kHz
87_	Process data description		
870	Setpoint description PO1	Control word 1	The following PO assignment can be set: No function • speed • current • position LO • max. speed • Max. current • slip • ramp • control word 1 • control word 2 • Speed [%] • IPOS PO DATA
871	Setpoint description PO2	Speed	
872	Setpoint description PO3	No function	
873	Actual value description PI1	Status word 1	The following PI assignment can be set: No function • speed • output current • active current • position LO • position HI • status word 1 • status word 2 • speed [%] • IPOS PI DATA • reserved • status word 3
874	Actual value description PI2	Speed	
875	Actual value description PI3	Output current	
876	PO data enable	Off On	
88_ / 89_	Serial communication SBus 1 / 2		
880 / 890	Protocol SBus 1 / 2	SBus MOVILINK® CANopen	
881 / 891	SBus address 1 / 2	0 – 63	
882 / 892	SBus group address 1 / 2	0 – 63	
883 / 893	SBus timeout interval 1 / 2	0 – 650 s	
884 / 894	Baud rate SBus 1 / 2	125 kBd 250 kBd 500 kBd 1000 kBd	
885 / 895	Synchronization ID SBus 1 / 2	0 – 2047	



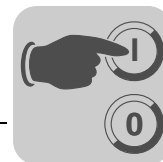
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
886 / 896	CANopen address 1 / 2	1 – 127	
887	Synchronization ext. Controller	Off On	
888	Synchronization time SBus 1/2	1 – 5 – 10 ms	
889 / 899	Parameter channel 2	Yes No	
9__	IPOS PARAMETERS		
90_	IPOS reference travel		
900	Reference offset	– (2 ³¹ – 1) – 0 – 2 ³¹ – 1 Inc	
901	Reference speed 1	0 – 200 – 6000 rpm	
902	Reference speed 2	0 – 50 – 6000 rpm	
903	Reference travel type	0 – 8	
904	Reference travel to zero pulse	Yes No	
905	HIPERFACE® Offset (X15)	– (2 ³¹ – 1) – 0 – 2 ³¹ – 1 Inc	
906	Cam distance	– (2 ³¹ – 1) – 0 – 2 ³¹ – 1 Inc	
910	Gain X controller	0.1 – 0.5 – 32	
911	Positioning ramp 1	0.01 – 1 – 20 s	
912	Positioning ramp 2	0.01 – 1 – 20 s	
913	Travel speed CW	0 – 1500 – 6000 rpm	
914	Travel speed CCW	0 – 1500 – 6000 rpm	
915	Velocity precontrol	-199.99 – 0 – 100 – 199.99 %	
916	Ramp type	Linear Sine Square Bus ramp Jerk-limited Electronic cam Synchronous operation Cross cutter	
917	Ramp mode	Mode 1 Mode 2	
918	Bus setpoint source	H0 – H499 – H1023	



Startup

Complete parameter list

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
92_	IPOS Monitoring		
920	SW limit switch CW	$-(2^{31}-1) \dots 0 \dots 2^{31}-1$ Inc	
921	SW limit switch CCW	$-(2^{31}-1) \dots 0 \dots 2^{31}-1$ Inc	
922	Position window	0 ... 50 ... 32767 inc	
923	Lag error window	0 ... 5000 ... $2^{31}-1$ inc	
924	'Position monitoring' detection	On/off	
93_	IPOS Special functions		
930	Override	On/off	
931	IPOS ctrl word Task 1	Stop / Start / Stop	Only available in DBG60B, not in MOVITOOLS® MotionStudio/SHELL.
932	IPOS ctrl word Task 2	Start / Stop	Only available in DBG60B, not in MOVITOOLS® MotionStudio/SHELL.
933	Jerk time	0.005 ... 2 s	
938	IPOS speed task 1	0 ... 9 additional commands/ms	
939	IPOS speed task 2	0 ... 9 additional commands/ms	
94_	IPOS Variables/encoder		
940	IPOS variables edit	On/off	This parameter is only available on the DBG60B keypad, not in MOVITOOLS® MotionStudio.
941	Source actual position	Motor encoder (X15) Ext. encoder (X14) Absolute encoder (X62)	
942	Encoder factor numerator	1 ... 32767	
943	Encoder factor denominator	1 ... 32767	
944	Encoder scaling ext. Encoder	x1/x2/x4/x8/x16/x32/x64	With MOVITOOLS® MotionStudio only. Not visible on the DBG60B keypad.
945	Synchronous encoder type (X14)	TTL SIN/COS HIPERFACE®	
946	Synchronous encoder counting direction (X14)	Normal Inverted	
947	HIPERFACE® Offset (X14)	$-(2^{31}-1) \dots 0 \dots 2^{31}-1$ Inc	
948	Automatic encoder replacement detection	On/off	
95_	Absolute encoder		
950	Encoder type	No encoder	
951	Counting direction	Normal Inverted	
952	Clock frequency	1 ... 200 %	
953	Position offset	$-(2^{31}-1) \dots 0 \dots 2^{31}-1$ Inc	
954	Zero point offset	$-(2^{31}-1) \dots 0 \dots 2^{31}-1$ Inc	
955	Encoder scaling	x1/x2/x4/x8/x16/x32/x64	
956	CAN encoder baud rate		
96_	IPOS Modulo function		
960	Modulo function	Off Short Right CCW	
961	Modulo numerator	0 ... 1 ... $2^{31}-1$	



Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
962	Modulo denominator	0 ... 1 ... $2^{31} - 1$	
963	Modulo encoder resolution	0 ... 4096 ... 20000	
97_	IPOS synchronization		
970	DRAM synchronization	No / yes	
971	Synchronization phase	-2 ... 0 ... 2 ms	
924	'Position monitoring' detection	On/ off	



6 Operation

6.1 Operating displays

6.1.1 7-segment display

The 7-segment display shows the operating condition of MOVIDRIVE® and, in the event of an error, an error or warning code.

7-segment display	Unit status (high byte in status word 1)	Meaning
0	0	24 V operation (inverter not ready)
1	1	Controller inhibit active
2	2	No enable
3	3	Standstill current
4	4	Enable
5	5	n-control (speed control)
6	6	M-control (torque control)
7	7	Hold control
8	8	Factory setting
9	9	Limit switch contacted
A	10	Technology option
c	12	IPOS ^{plus} ® reference travel
d	13	Flying start
E	14	Calibrate encoder
F	Error number	Error display (flashing)
H	Status display	Manual operation
t	16	Inverter is waiting for data
U	17	"Safe Stop" active
² (blinking dot)	-	IPOS ^{plus} ® program is running
Flashing display	-	STOP via DBG60B
71 ... 79	-	RAM defective

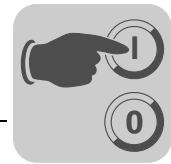


! WARNING

Incorrect interpretation of display U = "Safe stop" active.

Severe or fatal injuries.

The display U = "Safe stop" is not safety-related and must not be used as a safety function.



6.1.2 DC link voltage display of size 7

	INFORMATION
	The DC link voltage display goes out about 20 seconds after the power off.

6.1.3 DBG60B keypad

Basic displays:

0.00rpm
0.000Amp
CONTROLLER INHIBIT

Display when X13:1 (DIØØ "/CONTROL.INHIBIT") = "0".

0.00rpm
0.000Amp
NO ENABLE

Display when X13:1 (DIØØ "/CONTROL.INHIBIT") = "1" and inverter is not enabled ("ENABLE/STOP" = "0").

950.00rpm
0.990Amp
ENABLE (VFC)

Display for enabled inverter.

NOTE 6:
VALUE TOO HIGH

Information message

(DEL)=Quit
ERROR 9
STARTUP

Error display

6.2 Information messages

Information messages on the DBG60B (ca. 2 s in duration) or in MOVITOOLS® Motion-Studio/SHELL (message that can be acknowledged):

No.	Text DBG60B/SHELL	Description
1	ILLEGAL INDEX	Index addressed via interface not available.
2	NOT IMPLEMENT.	- Attempt to execute a non-implemented function. - An incorrect communication service has been selected. - Manual operation selected via invalid interface (e.g. fieldbus).
3	READ ONLY VALUE	Attempt to edit a read-only value.
4	PARAM. INHIBITED	Parameter lock P 803 = "ON", parameter cannot be altered.
5	SETUP ACTIVE	You tried to change parameters during setup.
6	VALUE TOO HIGH	You tried to enter a value that is too high.
7	VALUE TOO LOW	You tried to enter a value that is too low.
8	REQ. CARD MISSING	The option card required for the selected function is missing.
10	ONLY VIA ST1	Manual operation must be completed using X13:ST11/ST12 (RS 485).
11	ONLY TERMINAL	Manual operation must be exited via TERMINAL (DBG60B or UWS21B).
12	NO ACCESS	Access to selected parameter denied.
13	CTRL. INHIBIT MISSING	Set terminal DIØØ "/Controller inhibit" = "0" for the selected function.
14	INVALID VALUE	You tried to enter an invalid value.
16	PARAM. NOT LOCKED	Overflow of EEPROM buffer, e.g., due to cyclic write access. Parameter not stored in non-volatile EEPROM.

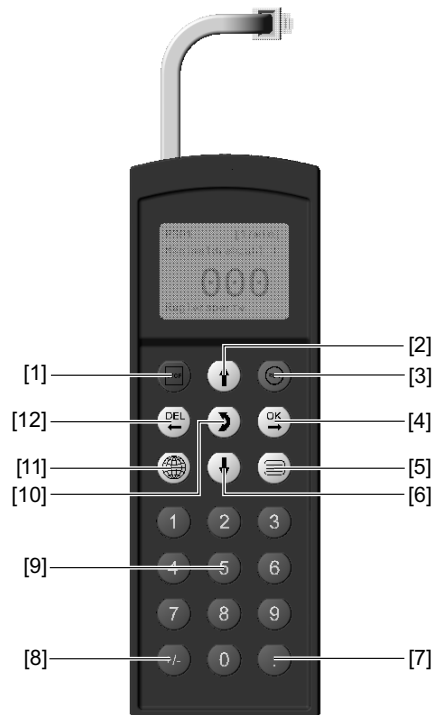


No.	Text DBG60B/SHELL	Description
17	INVERTER ENABLED	- Parameter to be changed can only be set in the state "CONTROLLER INHIBIT". - Attempt to change to manual mode during enabled operation.



6.3 Functions of the DBG60B keypad

6.3.1 Key assignment for DBG60B



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

6.3.2 Copy function of the DBG60B

The DBG60B keypad can be used for copying complete parameter sets from one MOVIDRIVE® unit to other MOVIDRIVE® units. Proceed as follows:

- In the context menu, select the menu item "COPY TO DBG". Confirm the setting by pressing the key.
- After the copying process has finished, plug the keypad in the other inverter.
- In the context menu, select the menu item "COPY TO MDX". Confirm the setting by pressing the key.



6.3.3 Parameter mode

Proceed as follows to set the parameters in parameter mode:

1. Activate the context menu by pressing the key.

BASIC VIEW
PARAMETER MODE
 VARIABLE MODE
 WAKE UP PARAMETER
2. Press the key to start the PARAMETER MODE. The first display parameter P000 "SPEED" appears. Press the key or key to select the main parameter groups 0 to 9.

P 000 upm
 SPEED
 0.0
 CONTROLLER INHIBIT
3. Press the key or key to select the required main parameter group. The flashing cursor is positioned under the number of the main parameter group.

P 1. SETPOINTS/
 RAMP GENERATORS

 CONTROLLER INHIBIT
4. Activate parameter subgroup selection in the main parameter group by pressing the key. The flashing cursor moves one position to the right.

P 1. SETPOINTS/
 RAMP GENERATORS

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

\ 13. SPEED
 RAMPS 1

 CONTROLLER INHIBIT
6. Activate parameter selection in the required parameter subgroup by pressing the key. The flashing cursor moves one position to the right.

\ 13. SPEED
 RAMPS 1

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

\ 132 s
 T11 UP CCW
 0.13
 CONTROLLER INHIBIT
8. Press the key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.

\ 132 s
 T11 UP CCW
 0.13_
 CONTROLLER INHIBIT
9. Press the key or key to select the desired parameter value.

\ 132 s
 T11 UP CCW
 0.20_
 CONTROLLER INHIBIT
10. Confirm the setting by pressing the key. Exit the setting mode by pressing the key. The flashing cursor is positioned under the third digit of the parameter number again.

\ 132 s
 T11 UP CCW
 0.20
 CONTROLLER INHIBIT



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

\ 13. SPEED
RAMPS 1

CONTROLLER INHIBIT

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

P 1.. SETPOINTS/
RAMP GENERATORS

CONTROLLER INHIBIT

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

BASIC VIEW
PARAMETER MODE
VARIABLE MODE
WAKE UP PARAMETER

6.3.4 Variable mode

H... variables are displayed in the variable mode. To call up the variable mode, proceed as follows:

- Use the key to call up the context menu. Select the "VARIABLE MODE" menu item and confirm with the key. The variable mode display appears.
- You can use the key to edit the variables.

6.3.5 User menu

The DBG60B keypad has a standard user menu containing the parameters that are used most often. The parameters in the user menu are displayed with a "\" before the parameter number (→ Sec. "Complete parameter list"). You can add or delete parameters. You can save a maximum of 50 parameter entries. The parameters are displayed in the order in which they are stored in the inverter. The parameters are not sorted automatically.

- Use the key to call up the context menu. Select the menu item "USER MENU" and press the OK key to confirm. The user menu with the most frequently used parameters appears.



Adding parameters to the user menu

Proceed in this order to add parameters to the user menu:

- Use the  key to call up the context menu. Select the "PARAMETER MODE" menu item.
- Choose the parameter you require and confirm your entry using the  key.
- Press the  key to return to the context menu. In the context menu, select the menu item "ADD Pxxx". "xxx" is the parameter you selected previously. Confirm the setting by pressing the  key. The selected parameter is stored in the user menu.

Deleting parameters from the user menu

Proceed in this order to delete parameters from the user menu:

- Use the  key to call up the context menu. Select the menu item "USER MENU".
- Select the parameter that is to be deleted. Confirm the setting by pressing the  key.
- Press the  key to return to the context menu. In the context menu, select the menu item "DELETE Pxxx". "xxx" is the parameter you selected previously. Confirm the setting by pressing the  key. The selected parameter is deleted from the user menu.

6.3.6 Wake-up parameter

The wake-up parameter is the parameter that is displayed when the DBG60B is switched on. The factory setting for the wake up parameter is the basic display. You can select which parameter should be the wake-up parameter. The following options can be used as the wake-up parameter:

- Parameter (→ parameter mode)
- Parameter from the user menu (→ user menu)
- H variable (→ variable mode)
- Basic display

Proceed as follows to save a wake-up parameter:

- First select the required parameter in parameter mode.
- In the context menu, select the menu item "XXXX INITIAL PARAM.". "XXXX" is the selected initial parameter. Confirm the setting by pressing the  key.



6.3.7 IPOS^{plus}®

MOVITOOLS[®] MotionStudio is required for programming IPOS^{plus}®. You can only use the DBG60B keypad to edit or change IPOS^{plus}® variables (H__).

The IPOS^{plus}® program is also stored in the DBG60B keypad when it is saved and is consequently also transferred when the parameter set is copied to another MOVIDRIVE[®] unit.

Parameter P931 can be used for starting and stopping the IPOS^{plus}® program from the DBG60B keypad.

6.4 Memory card

The pluggable memory card is installed in the basic unit. The basic data is stored on the memory card and is always up-to-date. If a unit has to be replaced, the plant can be started up again quickly without PC and data backup by simply re-plugging the memory card. You can install as many option cards as required.

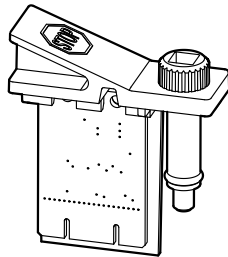


Fig. 34: MDX60B/61B memory card

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6.4.1 Notes for replacing the memory card

- Only plug in the memory card when the MOVIDRIVE® B unit is switched off.
- You can install the memory card from the original unit in a new inverter. The following combinations are permitted:

Original unit MOVIDRIVE® MDX60B/61B...	New inverter MOVIDRIVE® MDX60B/61B...
00	00 or 0T
0T	0T

- The same options that were available in the original unit must be installed in the new inverter.

If this is not the case, the error message "79 HW configuration" (hardware configuration) is displayed. You can remedy the error by calling up the "DELIVERY CONDITION" menu item from the context menu (P802 factory setting). This resets the unit to its initial delivery condition. You must then restart the unit.

- The counter status of the DRS11B option and the data of the DH..1B and DCS..B options are not stored on the memory card. When you replace the memory card, you have to install the DRS11B, DH..1B and DCS..B option cards from the original unit in the new inverter.

If the original unit was a MOVIDRIVE® B size 0 unit with the option DHP11, you have to use a new DHP11B option card with the configuration data set (file name.sewcopy) that you saved previously.

- If an absolute encoder is used as a motor or synchronous encoder, you must reference the encoder after you have replaced the unit.
- When replacing an absolute encoder, you have to reference it again.



7 Service

7.1 Error information

7.1.1 Error memory

The fault memory (P080) stores the last five error messages (errors t-0...t-4). The oldest error message is deleted whenever more than five error messages have occurred. The following information is stored when a malfunction occurs:

Error that has occurred · Status of binary inputs/outputs · Operating status of the inverter · Inverter status · Heat sink temperature · Speed · Output current · Active current · Unit utilization · DC link voltage · ON hours · Enable hours · Parameter set · Motor utilization.

7.1.2 Switch-off responses

There are three switch-off responses depending on the fault; the inverter remains inhibited in fault status:

Immediate disconnection

The unit can no longer brake the drive; the output stage goes to high resistance in the event of a fault and the brake is applied immediately (DBØØ "/Brake" = "0").

Rapid stop

The drive is braked with the stop ramp t13/t23. Once the stop speed is reached, the brake is applied (DBØØ "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 / P735).

Emergency stop

The drive is braked with the emergency ramp t14/t24. Once the stop speed is reached, the brake is applied (DBØØ "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 / P735).

7.1.3 Reset

An error message can be acknowledged by:

- Switching the supply system off and on again
Recommendation: Observe a minimum switch-off time of 10 s for the supply system contactor K11.
- Reset via input terminals; that is, via an appropriately assigned binary input (DIØ1 to DIØ7 with the basic unit, DI1Ø to DI17 with the DIO11B option).
- Manual reset in SHELL (P840 = "YES" or [Parameter] / [Manual reset]).
- Manual reset using the DBG60B.
- Auto reset performs up to five unit resets with an adjustable restart time.



! DANGER

Risk of crushing if the motor starts up automatically after an auto reset.

Severe or fatal injuries.

- Do not use auto reset with drives where an automatic restart represents a danger to people or units.
- Perform a manual reset.



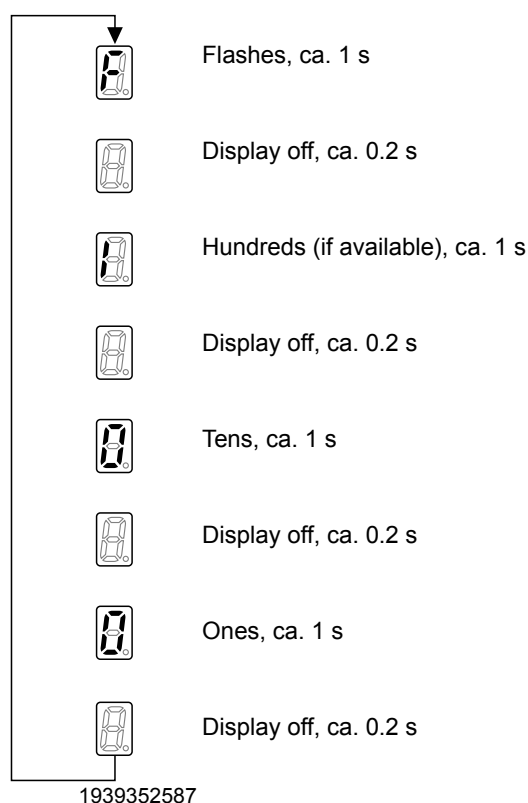
7.1.4 Inverter is waiting for data

If the inverter is controlled via a communication interface (fieldbus, RS485 or SBus) and the power was switched off and back on again or a fault reset was performed, then the enable remains ineffective until the inverter receives valid data again via the interface, which is monitored with a timeout.

7.2 Error messages and list of errors

7.2.1 Error message via 7-segment display

The fault code is shown in a 7-segment display. The following display sequence is used (e.g. fault code 100):



Following a reset or if the error code resumes the value "0", the display switches to the operating display.

7.2.2 Suberror code – display

The suberror code is displayed in MOVITOOLS® MotionStudio (version 4.50 and higher) or in the DBG60B keypad.



7.2.3 Error list

The factory set error response is listed in the "Response P" column. (P) indicates that the response is programmable (via *P83_error response* or with IPOS^{plus®}). In the event of error 108, (P) indicates that the response can be programmed via *P555 DCS error response*. In the event of error 109, (P) indicates that the response can be programmed via *P556 DCS alarm response*.

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
00	No error					
01	Overcurrent	Immediate disconnection	0	Output stage	- Short circuit at output - Motor too large - Defective output stage - Power supply - Current converters - Ramp limit is deactivated and set ramp time is too short - Defective phase module - Supply voltage 24 V or 24V generated from it is instable - Interruption or short circuit on the signal lines from the phase modules	- Rectify the short circuit - Connect a smaller motor - Contact SEW Service for advice if the output stage is defective. - Activate P138 and/or increase ramp time
			1	V _{CE} monitoring or under-voltage monitoring of the gate driver		
			5	Inverter remains in hardware current limit		
			6	V _{CE} monitoring or under-voltage monitoring of the gate driver or overcurrent of the current converter. ..Phase U		
			7	..Phase V		
			8	..Phase W		
			9	..Phase U and V		
			10	..Phase U and W		
			11	..Phase V and W		
			12	..Phase U and V and W		
			13	Voltage supply Current converter in status mains operation		
			14	MFE signal lines		
03	Ground fault	Immediate disconnection	0	Ground fault	Ground fault - in the motor lead - in the inverter - in the motor	- Eliminate ground fault - Consult SEW Service
04	Brake chopper	Immediate disconnection	0	DC link voltage too high in 4Q operation	- Too much regenerative power - Braking resistor circuit interrupted - Short circuit in the braking resistor circuit - Brake resistance too high - Brake chopper is defective	- Extend deceleration ramps - Check supply cable to braking resistor - Check technical data of braking resistor - Replace MOVIDRIVE® if the brake chopper is defective
			1			
06	Mains phase failure	Immediate disconnection	0	DC link voltage periodically too low	- Phase failure - Inadequate line voltage quality	- Check the line cable - Check configuration of the supply system. - Check supply (fuses, contactor)
			3	Line frequency fault		
			4	-		
07	DC link over-voltage	Immediate disconnection	0	DC link voltage too high in 2Q operation	DC link voltage too high	- Extend deceleration ramps - Check supply cable to the braking resistor - Check technical data of braking resistor
			1	DC link voltage too high in 4Q operation .. Phase U		
			2	.. Phase V		
			3	.. Phase W		
			4	.. Phase W		



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Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
08	Speed monitoring	Immediate disconnection (P)	0	Inverter in current limit or in slip limit	- Speed controller or current controller (in VFC operating mode without encoder) operating at setting limit due to mechanical overload or phase failure in the power supply or motor. - Encoder not connected correctly or incorrect direction of rotation. n_{max} is exceeded during torque control. - In operating mode VFC: Output frequency ≥ 150 Hz - In operating mode V/f: Output frequency ≥ 600 Hz	- Reduce load - Increase deceleration time (P501 or P503). - Check encoder connection, swap A/A and B/B pairs if necessary - Check encoder voltage supply - Check current limitation - Extend ramps if necessary - Check motor cable and motor - Check mains phases
			3	"Actual speed" system limit exceeded. Speed difference between ramp setpoint and actual value for $2 \times$ ramp time higher than expected slip.		
			4	Maximum rotating field speed exceeded. Maximum rotating field frequency (with VFC max 150 Hz and V/f max 600 Hz) exceeded.		
09	Startup	Immediate disconnection	0	Startup missing	Inverter has not been started up for the selected operating mode.	Perform startup for the required operating mode.
			1	Wrong operating mode selected		
			2	Wrong encoder type or defective encoder card		
10	IPOS-ILLOP	Emergency stop	0	Invalid IPOS command	- Incorrect command detected during IPOS^{plus}® program execution. - Incorrect conditions during command execution.	- Check the content of the program memory and, if necessary, correct. - Load the correct program into the program memory. - Check program sequence (→ IPOS^{plus}® manual)
11	Overtemperature	Emergency stop (P)	0	Heat sink temperature too high or temperature sensor defective	- Thermal overload of inverter - Temperature sensor of a phase module faulty. (size 7)	- Reduce load and/or ensure adequate cooling. - Check fan. - If F-11 is issued even though the temperatures is obviously not too high, this indicates a faulty temperature sensor of the phase module. Replace the phase module (Size 7)
			3	Overtemperature switched-mode power supply		
			6	Heat sink temperature too high or temperature sensor defective. ..Phase U		
			7	..Phase V		
			8	..Phase W (size 7)		
13	Control signal source	Immediate disconnection	0	Control signal source not available, e.g. control signal source fieldbus without fieldbus card	Control signal source not defined or defined incorrectly.	Set correct control signal source (P101).



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
14	Encoder	Immediate disconnection	0	Encoder not connected, defective encoder, defective encoder cable	- Encoder cable or shield not connected correctly - Short circuit/broken encoder wire - Encoder defective	Check encoder cable and shield for correct connection, short circuit and broken wire.
			25	Encoder error X15 - Speed range exceeded. Encoder at X15 turns faster than 6542 rpm.		
			26	Encoder error X15 - Card is defective. Error in the quadrant evaluation.		
			27	Encoder error – encoder connection or encoder is defective		
			28	Encoder error X15 - Communication error RS485 channel.		
			29	Encoder error X14 - Communication error RS485 channel.		
			30	Unknown encoder type at X14/X15		
			31	Plausibility check fault X14/X15 Increments have been lost.		
			32	Encoder error X15 Hiperface®. Hiperface® encoder at X15 reports error.		
			33	Encoder error X14 Hiperface®. Hiperface® encoder at X14 reports error.		
			34	Encoder error X15 resolver. Encoder connection or encoder is defective.		
17	System malfunction	Immediate disconnection	0	"Stack overflow" error	Inverter electronics disrupted, possibly due to effect of EMC.	- Check grounding and shielding and improve, if necessary. - Consult SEW service if the error reoccurs.
18			0	"Stack underflow" error		
19			0	Fault "External NMI"		
20			0	Fault "Undefined opcode"		
21			0	"Protection fault" error		
22			0	"Illegal word operand access" error		
23			0	"Illegal instruction access" error		
24			0	"Illegal external bus access" error		
25	EEPROM	Rapid stop	0	Read or write error on EEPROM power section	Access to the EEPROM of the memory card has failed	- Activate factory settings, perform reset and reset parameters. - Contact SEW service if the error occurs again. - Replace memory card.
			11	NV memory read error NV-RAM inside the unit		
			13	NV memory chip card System module defective		
			14	NV memory chip card Memory card defective		
			16	NV memory initialization error		
26	External terminal	Emergency stop (P)	0	External terminal	Read in external error signal via programmable input.	Eliminate respective cause; reprogram terminal if necessary.



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Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
27	No limit switches	Emergency stop	0	Both limit switches missing or open circuit	- Open circuit/both limit switches missing. - Limit switches are swapped over in relation to direction of rotation of motor	- Check wiring of limit switches. - Swap over limit switch connections. - Reprogram terminals
			2	Limit switch reversed		
			3	Both limit switches are active simultaneously		
28	Fieldbus Timeout	Rapid stop (P)	0	Fault "Fieldbus timeout"	No communication between master and slave within the projected response monitoring.	- Check communications routine of the master - Extend fieldbus timeout time (P819) or deactivate monitoring
			2	Fieldbus card does not boot		
29	Limit switch contacted	Emergency stop	0	Hardware limit switch approached	A limit switch was reached in IPOS ^{plus} ® operating mode.	- Check travel range. - Correct user program.
30	Emergency stop Timeout	Immediate disconnection	0	Time violation stop emergency stop rate	- Drive overloaded - Emergency stop ramp too short.	- Check configuration - Extend emergency stop ramp
31	TF/TH sensor tripped	No response (P)	0	Thermal motor protection error	- Motor too hot, TF/TH has triggered - TF/TH of the motor not connected or connected incorrectly - MOVIDRIVE® connection and TF/TH connection on motor interrupted	- Let motor cool off and reset error - Check connections/link between MOVIDRIVE® and TF/TH. - If a TF/TH is not connected: Jumper X10:1 with X10:2. - Set P835 to "No response".
32	IPOS index overflow	Emergency stop	0	IPOS program defective	Programming principles violated leading to system internal stack overflow	Check and correct the IPOS ^{plus} ® user program (see IPOS ^{plus} ® manual).
33	Setpoint source	Immediate disconnection	0	Setpoint source not available, e.g. control signal source fieldbus without fieldbus card	Setpoint source not defined or defined incorrectly.	Set correct setpoint source (P100).
34	Ramp Timeout	Immediate disconnection	0	Time violation rapid stop ramp	Time of downward ramps exceeded, e.g. due to overload.	- Extend the downwards ramps - Eliminate overload
35	Operating mode	Immediate disconnection	0	Operating mode not available	- Operating mode not defined or defined incorrectly - P916 was used to set a ramp function that is needed by a MOVIDRIVE® unit in technology version. - P916 was used to set a ramp type that does not match the selected technology function. - P916 was used to set a ramp type that does not match the selected synchronization time (P888).	- Use P700 or P701 to set correct operating mode. - Use MOVIDRIVE® in technology version (...OT). - From the "Startup → Select technology function..." menu, select the technology function that matches P916. - Check the settings of P916 and P888
			1	Wrong assignment operating mode - hardware		
			2	Wrong assignment operating mode - technology function		
36	Option missing	Immediate disconnection	0	Hardware is missing or not permitted.	- Type of option card not allowed - Setpoint source, control signal source or operating mode not permitted for this option card - Incorrect encoder type set for DIP11B.	- Use correct option card - Set correct setpoint source (P100) - Set correct control signal source (P101) - Set correct operating mode (P700 or P701) - Set the correct encoder type
			2	Encoder slot error.		
			3	Fieldbus slot error.		
			4	Expansion slot error.		
37	System watchdog	Immediate disconnection	0	Error "watchdog overflow system"	Error while executing system software	Consult SEW Service.
38	System software	Immediate disconnection	0	"System software" error	System malfunction	Consult SEW Service.



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
39	Reference travel	Immediate disconnection (P)	0	"Reference travel" error	- The reference cam is missing or does not switch - Limit switches are connected incorrectly - Reference travel type was changed during reference travel	- Check reference cam - Check limit switch connection - Check reference travel type setting and required parameters.
40	Boot synchronization	Immediate disconnection	0	Timeout at boot synchronization with option.	- Error during boot synchronization between inverter and option. - Synchronization ID not/incorrectly transmitted	Install a new option card if this error reoccurs.
41	Watchdog option	Immediate disconnection	0	Error – Watchdog timer from/to option.	- Error in communication between system software and option software - Watchdog in the IPOS^{plus}® program	- Consult SEW Service. - Check IPOS program
			17	Watchdog IPOS error.		
42	Lag error	Immediate disconnection (P)	0	Positioning lag error	- Encoder connected incorrectly - Acceleration ramps too short - P component of positioning controller too small - Incorrectly set speed controller parameters - Value of lag error tolerance too small	- Check encoder connection - Extend ramps - Set P component to higher value - Reset speed controller parameters - Increase lag error tolerance - Check wiring of encoder, motor and mains phase. - Check whether mechanical system components can move freely or if they are blocked
43	RS485-Timeout	Rapid stop (P)	0	Communication timeout at RS485 interface.	Error during communication via interface RS485	Check RS485 connection (e.g. inverter - PC, inverter - DBG60B). If necessary, contact SEW Service.
44	Unit utilization	Immediate disconnection	0	Unit utilization error	Unit utilization (IxT value) > 125%	- Decrease power output - Extend ramps - If suggested actions not possible, use larger inverter. - Reduce load
			8	UL monitoring error		
45	Initialization	Immediate disconnection	0	General error during initialization	- No parameters set for EEPROM in power section, or parameters set incorrectly. - Option card not in contact with backplane bus.	- Restore factory settings - Consult SEW Service if the error still cannot be reset. - Insert the option card correctly.
			3	Data bus error during RAM check		
			6	CPU clock error.		
			7	Error in the current evaluation.		
			10	Error setting the flash protection		
			11	Data bus error during RAM check		
			12	Parameter setting error synchronous operation (internal synchronous operation)		



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Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
46	System bus 2 timeout	Rapid stop (P)	0	Timeout system bus CAN2	Error during communication via system bus 2.	Check system bus connection.
47	System bus 1 timeout	Rapid stop (P)	0	Timeout system bus CAN1	Error during communication via system bus 1.	Check system bus connection.
48	Hardware DRS	Immediate disconnection	0	Hardware synchronous operation	Only with DRS11B: - Encoder signal from master/synchronous encoder faulty. - Hardware required for synchronous operation is faulty.	- Check encoder signals of master/synchronous encoder. - Check encoder wiring. - Replace synchronous operation card.
77	IPOS control word	No response (P)	0	Invalid control word IPOS	Only in IPOS^{plus}® operating mode: - An attempt was made to set an invalid automatic mode (via external controller). - P916 = BUS RAMP is set.	- Check serial connection to external control. - Check write values of external control. - Set correct value for P016.
78	IPOS SW limit switch	No response (P)	0	Software limit switch reached	Only in IPOS^{plus}® operating mode: Programmed target position is outside travel range delimited by software limit switches.	- Check the user program - Check position of the software limit switches
79	Hardware configuration	Immediate disconnection	0	Deviating hardware configuration when replacing the memory card	The following items do not match anymore after having replaced the memory card: - Power - Rated voltage - Variant identification - Unit series - Application or standard version - Option cards	Ensure identical hardware or restore factory setting (parameter = factory setting).
80	RAM test	Immediate disconnection	0	"RAM test" error	Internal unit fault, RAM defective.	Consult SEW Service.
81	Start condition	Immediate disconnection	0	Start condition error with VFC hoist	Only in "VFC hoist" operating mode: The motor could not be supplied with the correct amount of current during the pre-magnetizing time: - Rated motor power too small in relation to rated inverter power. - Motor cable cross section too small. Only for operation with a linear motor (as of firmware 18): - The drive has been set to "Enable" although the commutation offset between linear motor and linear encoder is not known. This means that the inverter cannot set the current indicator correctly.	- Check startup data and perform new startup, if necessary. - Check connection between inverter and motor. - Check cross section of motor cable and increase if necessary. - Perform commutation travel in the "No enable" state and then switch to "Enable" once the inverter has acknowledged in status word bit 25 that commutation was successful.
82	Open output	Immediate disconnection	0	Output open with VFC hoist	Only in "VFC hoist" operating mode: - Two or all output phases interrupted. - Rated motor power too small in relation to rated inverter power.	- Check connection between inverter and motor. - Check startup data and perform new startup, if necessary.



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
84	Motor protection	Emergency stop (P)	0	"Motor temperature simulation" error	- Motor utilization too high. - I_N-U_L monitoring 1 triggered - P530 set later to "KTY"	- Reduce load. - Extend ramps. - Observe longer pause times. - Check P345/346 - Select a larger motor
			2	Short circuit or open circuit in the temperature sensor		
			3	No thermal motor model available		
			4	UL monitoring error		
86	Memory module	Immediate disconnection	0	Error in connection with memory module	- No memory card - Memory card defective	- Tighten knurled screw - Insert and secure memory card - Replace memory card
			2	Hardware card detection wrong memory card		
87	Technology function	Immediate disconnection	0	Technology function selected with standard unit	A technology function was activated in a standard version.	Disable technology function
88	Flying start	Immediate disconnection	0	"Flying start" error	Only in VFC n-CTRL operating mode: Actual speed > 6000 rpm with the inverter enabled.	Inverter not enabled before actual speed is ≤ 6000 rpm.
92	DIP encoder problem	Error display (P)	1	Stahl WCS3 dirt problem	Encoder signals an error	Possible cause: Encoder is dirty → clean encoder
93	DIP encoder error	Emergency stop (P)	0	Fault "Absolute encoder"	The encoder signals an error, e.g. power failure.	- Check absolute encoder connection. - Check connection cables. - Set correct cycle frequency. - Reduce maximum traveling velocity or ramp. - Replace absolute encoder.
					- Connection cable between the encoder and DIP11B does not meet the requirements (twisted pair, shielded). - Cycle frequency for cable length too high. - Permitted max. speed/acceleration of encoder exceeded. - Encoder defective.	
94	EEPROM checksum	Immediate shut-off	0	Power section parameters	Inverter electronics disrupted, possibly due to effect of EMC or a defect.	Send unit in for repair.
			5	Control unit data		
			6	Power section data		
			7	Invalid version of the configuration data set		
95	DIP plausibility error	Emergency stop (P)	0	Validity check of absolute position	No plausible position could be determined. - Incorrect encoder type set. - IPOS^{plus}® travel parameter set incorrectly. - Numerator/denominator factor set incorrectly. - Zero adjustment performed. - Encoder defective.	- Set the correct encoder type. - Check IPOS^{plus}® travel parameters. - Check traveling velocity. - Correct numerator/denominator factor. - After zero adjustment reset. - Replace absolute encoder.
97	Copy error	Immediate disconnection	0	Parameter set upload is/ was faulty	- Memory card cannot be written or read. - Error during data transmission	- Repeat copying process - Restore default setting (P802) and repeat copying process
			1	Download of parameter set to unit cancelled.		
			2	Not possible to adopt parameters. Not possible to adopt parameters from memory card.		
98	CRC error	Immediate disconnection	0	"CRC via internal flash" error	Internal unit error Flash memory defective	Send unit in for repair.



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Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
99	IPOS ramp calculation	Immediate disconnection	0	"Ramp calculation" error	Only in IPOS^{plus}® operating mode: Positioning ramp is sinusoidal or square and an attempt is made to change ramp times and traveling velocities with enabled inverter.	Rewrite the IPOS ^{plus} ® program so that ramp times and traveling velocities can only be altered when the inverter is inhibited.
100	Vibration warning	Display error (P)	0	Vibrations diagnostics warning	Vibration sensor warning (→ "DUV10A" operating instructions).	Determine cause of vibrations. Continue operation until F101 occurs.
101	Vibration error	Rapid stop (P)	0	Vibration diagnostics error	Vibration sensor reports error.	SEW-EURODRIVE recommends that you remedy the cause of the vibrations immediately
102	Oil aging warning	Display error (P)	0	Oil aging warning	Error message from the oil aging sensor	Schedule oil change.
103	Oil aging error	Display error (P)	0	Oil aging error	Error message from the oil aging sensor	SEW-EURODRIVE recommends that you change the gear unit oil immediately.
104	Oil aging overtemperature	Display error (P)	0	Oil aging overtemperature	Overtemperature signal from the oil aging sensor	- Let oil cool down - Check if the gear unit cools properly
105	Oil aging ready signal	Display error (P)	0	Oil aging ready signal	Oil aging sensor is not ready for operation	- Check voltage supply of oil aging sensor - Check and, if necessary, replace the oil aging sensor
106	Brake wear	Display error (P)	0	Brake wear error	Brake lining worn	Replace brake lining (→ "Motors" operating instructions).
107	Line components	Immediate disconnection	1	No feedback signal from main contactor.	Defective main contactor	- Check main contactor - Check control cables.



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
108	DCS error	Immediate stop/mal-function (P)	0	DCS error		
			1	Error during transfer of configuration data to the monitoring unit.	Interruption in connection during program download	Send the configuration files again
			2	Configuration data for software version of the subassembly is invalid.	Subassembly configured with incorrect software version of the programming interface.	Configure subassembly with permitted version of the programming interface. Then switch subassembly off and on again.
			3	Unit was programmed with incorrect programming interface.	Program or configuration data was loaded into the unit with an incorrect programming interface.	Check the design of the subassembly. Configure again with a valid programming interface. Then switch the unit off and on again.
			4	Faulty reference voltage.	- Supply voltage of the subassembly is defective. - Faulty component in the subassembly	- Check supply voltage - Switch unit off and on again
			5			
			6	Faulty system voltage.		
			7			
			8	Faulty test voltage		
			9			
			10	Faulty DC 24 V voltage supply		
			11	Ambient temperature of the unit is not in the defined range.	Temperature at the place of operation is not in the permitted range.	Check the ambient temperature.
			12	Plausibility error for position changeover	For the position changeover, ZSC, JSS or DMC is permanently activated.	- Check ZSC activation - Check JSS activation - Check DMC activation (only for monitoring via position)
			13	Faulty switching of the LOSIDE driver DO02_P / DO02_M	Short circuit of the output.	Check wiring at the output.
			14	Faulty switching of the HISIDE driver DO02_P / DO02_M		
			15	Faulty switching of the LOSIDE driver DO0_M		
			16	Faulty switching of the HISIDE driver DO0_P		
			17	Faulty switching of the LOSIDE driver DO01_M		
			18	Faulty switching of the HISIDE driver DO01_P		



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
109	DCS alarm	Rapid stop/ warning (P)	0	DCS alarm		
			1	Communication error at the CAN interface of the inverter.	The DCS21B/31B option does not receive any valid data from the inverter.	• Check hardware connection to the inverter • Check version of the inverter
			2	Plausibility error digital input at pulse P1	No pulse1 voltage present at binary input DI1	• Check configuration of the DI1 binary input according to configuration and wiring diagram • Check the wiring • Check configuration of the DI2 binary input according to configuration and wiring diagram • Check the wiring • Check configuration of the DI3 binary input according to configuration and wiring diagram • Check the wiring • Check configuration of the DI4 binary input according to configuration and wiring diagram • Check the wiring • Check configuration of the DI5 binary input according to configuration and wiring diagram • Check the wiring • Check configuration of the DI6 binary input according to configuration and wiring diagram • Check the wiring • Check configuration of the DI7 binary input according to configuration and wiring diagram • Check the wiring • Check configuration of the DI8 binary input according to configuration and wiring diagram • Check the wiring
			3			
			4	Plausibility error digital input at pulse P2		
			5			
			6	Pulse 1 plausibility error at binary input DI3		
			7			
			8	Pulse 1 plausibility error at binary input DI4		
			9			
			10	Pulse 1 plausibility error at binary input DI5		
			11			
			12	Pulse 1 plausibility error at binary input DI6		
			13			
			14	Pulse 1 plausibility error at binary input DI7		
			15			
			16	Pulse 1 plausibility error at binary input DI8		
			17			



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
109	DCS alarm	Rapid stop/ warning (P)	18 19	Pulse 2 plausibility error at binary input DI1	No pulse 2 voltage present at binary input DI1.	- Check configuration of the DI1 binary input according to configuration and wiring diagram - Check the wiring
			20 21	Pulse 2 plausibility error at binary input DI2		- Check configuration of the DI2 binary input according to configuration and wiring diagram - Check the wiring
			22 23	Pulse 2 plausibility error at binary input DI3		- Check configuration of the DI3 binary input according to configuration and wiring diagram - Check the wiring
			24 25	Pulse 2 plausibility error at binary input DI4		- Check configuration of the DI4 binary input according to configuration and wiring diagram - Check the wiring
			26 27	Pulse 2 plausibility error at binary input DI5		- Check configuration of the DI5 binary input according to configuration and wiring diagram - Check the wiring
			28 29	Pulse 2 plausibility error at binary input DI6		- Check configuration of the DI6 binary input according to configuration and wiring diagram - Check the wiring
			30 31	Pulse 2 plausibility error at binary input DI7		- Check configuration of the DI7 binary input according to configuration and wiring diagram - Check the wiring
			32 33	Pulse 2 plausibility error at binary input DI8		- Check configuration of the DI8 binary input according to configuration and wiring diagram - Check the wiring
			34 35	Plausibility error in the speed recording	The difference between the two velocity sensors is higher than the configured speed cut-off threshold.	- Check track again with the data of the encoder configuration. - Check the velocity sensor - Use the SCOPE function to set speed signals so that they are congruent
			36 37	Plausibility error in the position acquisition	The difference between the two position sensors is higher than the configured value.	- Check track with the configured data of the encoder setting - Check position signal - Are all signals connected correctly to the 9-pin encoder connector? - Check the encoder connector for correct wiring. Is the jumper between pin 1 and pin 2 on the 9-pin encoder connector closed (SSI absolute encoder)? - Use the SCOPE function to set positions signals so that they are congruent



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Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
109	DCS alarm	Rapid stop/ warning (P)	38 39	Plausibility error incorrect position range	The current position is outside the configured range.	- Check track with the configured data of the encoder setting - Check position signal, correct offset if necessary - Use the SCOPE function to read off the position and set in ratio to the configured values
			40 41	Plausibility error incorrect speed.		
			42 43	Configuration error: Acceleration	The current acceleration is outside the configured acceleration range.	- The drive moves outside the permitted and configured velocity range - Check configuration (set max. velocity) - Analyze the velocity development using the SCOPE function
			44 45	Plausibility error in encoder interface (A3401 = encoder 1 and A3402 = encoder 2).		
			46 47	Encoder supply voltage error (A3403 = encoder 1 and A3404 = encoder 2)	Encoder voltage supply is outside the defined range (min. DC 20 V / max. DC 29 V).	- Check encoder type and configuration (SSI/ incremental) - Check the encoder connection/wiring - Check polarity of the encoder data - Check function of the encoder
			48 49	Reference voltage error		
			50 51	Difference level RS485 driver 1 (error INC_B or SSI_CLK) faulty	No encoder connection, incorrect encoder type.	Check the encoder connection.
			52 53	Difference level RS485 driver 2 (error INC_A or SSI_DATA) faulty.		
			54 55	Incremental counter deviation		
			56 57	Plausibility error in encoder interface (A3401 = encoder 1 and A3402 = encoder 2)		



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
109	DCS alarm	Rapid stop/ warning (P)	58	Plausibility error SIN/COS encoder connection.	Incorrect encoder type connected.	• Check the encoder connection • Check the encoder connection (jumper between pin 1 and pin2)
			59			
			60			
			61			
			62	Plausibility error incremental encoder connection	Phase error of the incremental or sin/cos encoder.	• Check the encoder connection • Replace the defective encoder
			63			
			64	Plausibility error - SSI encoder connection.	Connected encoder type does not correspond to the configuration.	• Check the encoder connection • Check connected encoder
			65			
			66	Plausibility error - SSI listener encoder connection		
			67			
			68	Faulty switching of the LOSIDE driver DO2_M	DC 0 V short circuit at the output.	Check wiring at the output.
			69	Faulty switching of the HISIDE driver DO2_P		
			70	Faulty switching of the LOSIDE driver DO0_M		
			71	Faulty switching of the HISIDE driver DO0_P		
			72	Faulty switching of the LOSIDE driver DO1_M		
			73	Faulty switching of the HISIDE driver DO1_P		
			74	Undervoltage test watchdog for LOSIDE driver	DC 0 V short circuit at on of the DC 0 V outputs.	Check wiring at the outputs.
			75	Undervoltage test watchdog for HISIDE driver	DC 24 V short circuit at on of the DC 24 V outputs.	
			76	CCW and CW monitoring (in DMC module) activated simultaneously	Multiple activation.	Only one direction of rotation can be activated in the DMC module.
			77			
			78			
79						
80	CCW and CW monitoring (in JSS module) was activated simultaneously					
81						
82	Timeout error MET.	Input element with time monitoring is faulty.	• Check wiring of input element • Input element is faulty			
83	Time monitoring start signal for confirmation button.					
84	Timeout error MEZ.	Two-hand operation with time monitoring is faulty.				
85	Time monitoring for two-hand button.					
86	EMU1 monitoring error	Faulty monitoring of the external disconnection channel	• Check hardware connections • Pick-up or release time to short • Check switching contacts			
87						
88	EMU2 monitoring error					
89						
110	"Ex-e protection" error	Emergency stop	0	Duration of operation below 5 Hz exceeded	Duration of operation below 5 Hz exceeded	• Check configuration • Shorten duration of operation below 5 Hz
113	Analog input open circuit	No response (P)	0	AI1 analog input open circuit	AI1 analog input open circuit	Check wiring
116	"Timeout MOVI-PLC" error	Rapid stop/ warning	0	MOVI-PLC® communication timeout		• Check startup • Check wiring
123	Positioning interruption	Emergency stop (P)	0	Error "Positioning/Positioning interruption"	Target monitoring when interrupted positioning is resumed. Target would be overrun.	Perform positioning process without interruption until it is complete.



Service

Error messages and list of errors

Error			Suberror			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
124	Ambient conditions	Emergency stop (P)	1	Permitted ambient temperature exceeded	Ambient temperature > 60°C	- Improve ventilation and cooling conditions - Improve air supply to the control cabinet; check filter mats.
196	Power section	Immediate disconnection	1	Discharge resistor	Discharge resistor overload	Observe waiting time for power on/off
			2	Hardware ID precharge/discharge control	Incorrect precharge/discharge control variant	- Consult SEW Service - Replace precharge/discharge control
			3	Inverter coupling PLD Live	Defective inverter coupling	- Consult SEW Service - Replace inverter coupling
			4	Inverter coupling reference voltage	Defective inverter coupling	- Consult SEW Service - Replace inverter coupling
			5	Power section configuration	Different phase modules installed in the unit	- Inform SEW service. - Check and replace phase modules
			6	Control unit configuration	Control unit line inverter or motor inverter incorrect	Replace or correctly assign the control unit of line and motor inverter.
			7	Communication power section control unit	No communication	Check control unit installation.
			8	Communication pre-charge/discharge control inverter coupling	No communication	- Check wiring - Consult SEW Service
			10	Communication power section control unit	The inverter coupling does not support protocol	Replace inverter coupling
			11	Communication power section control unit	Faulty communication with inverter coupling at power-up (CRC error).	Replace inverter coupling
			12	Communication power section control unit	Inverter coupling uses protocol that does not match control unit	Replace inverter coupling
			13	Communication power section control unit	Faulty communication with inverter coupling during operation: More than once per second a CRC error.	Replace inverter coupling
			14	Control unit configuration	Missing PLD functionality for EEPROM data set size 7.	Replace control unit
			15	Inverter coupling error	Inverter coupling processor has signaled internal error.	- Consult SEW service if the error reoccurs - Replace inverter coupling
			16	Inverter coupling error: PLD version incompatible		Replace inverter coupling
			17	Precharge/discharge control error	Precharge/discharge control processor has signaled internal error	- Consult SEW service if the error reoccurs - Replace precharge/discharge control
			18	Defective DC link fan	The DC link fan is faulty.	- Consult SEW Service - Check whether DC link choke fan is connected or faulty
			19	Communication power section control unit	Faulty communication with inverter coupling during operation: More than once per second an internal error.	- Consult SEW service if the error reoccurs. - Replace inverter coupling
			20	Communication power section control unit	The control unit has not sent any messages to the inverter coupling for a while.	- Consult SEW service if the error reoccurs. - Replace inverter coupling
			21	Uz measurement implausible phase R	Defective phase module	Consult SEW service if the error reoccurs
			22	Uz measurement implausible phase S		
			23	Uz measurement implausible phase T		



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
197	Supply system	Immediate disconnection	1	Line overvoltage (motor inverter only at start of pre-charging process)	Inadequate line voltage quality.	• Check supply (fuses, contactor) • Check configuration of the supply system
			2	Line undervoltage (only with line inverter)		
199	DC link charging	Immediate disconnection	4	Precharging was aborted	Unable to charge DC link.	• Precontrol overload • Connected DC link capacity too high • Short circuit in the DC link; check DC link connection in case of several units.



7.3 **SEW Electronics Service**

7.3.1 **Send in for repair**

Please contact the **SEW-EURODRIVE electronics service** if an error cannot be rectified (→ "Customer and spare parts service").

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

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

- Serial number (→ nameplate)
- Unit designation
- Standard version or application version
- Digits on the status label
- Short description of application (drive application, control via terminals or serial)
- Connected motor (motor type, motor voltage, connection λ or Δ)
- Nature of the fault
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

7.4 **Extended storage**

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

Procedure when maintenance has been neglected:

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

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



The following stages are recommended:

AC 400/500 V units:

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

AC 230 V units:

- Stage 1: AC 170 V for 15 minutes
- Stage 2: AC 200 V for 15 minutes
- Stage 3: AC 240 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.

7.5 Disposal

Please follow the current instructions. Dispose in accordance with the material structure and the regulations in force for instance as:

- Electronics scrap (circuit boards)
- Plastic (housing)
- Sheet metal
- copper



8 Technical Data and Dimension Drawings

8.1 CE marking, UL approval and C-Tick

8.1.1 CE-marking

- Low voltage directive
MOVIDRIVE® MDX60B/61B inverters comply with the regulations of the Low Voltage Directive 2006/95/EC.
- Electromagnetic compatibility (EMC)
The designated use of MOVIDRIVE® inverters and regenerative power supply units is as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided that you comply with the installation instructions for the SEW components, the CE marking requirements for the entire machine/system in which they are installed are satisfied on the basis of the EMC directive 2004/108/EC. For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.
- Compliance with limit classes C1, C2 or C3 has been tested in a CE-typical drive system. SEW-EURODRIVE can provide detailed information on request.



The CE-mark on the nameplate indicates conformity with the low voltage directive 2006/95/EC. We can provide a declaration of conformity on request.

8.1.2 UL- / cUL / GOST-R



UL, cUL approval (USA) and the GOST-R certificate (Russia) have been approved for the entire MOVIDRIVE® unit series. cUL is equivalent to CSA approval.

8.1.3 C-Tick



C-Tick approval has been granted for the entire MOVIDRIVE® range of units. C-Tick certifies conformity with ACMA (Australian Communications and Media Authority) standards.



8.2 General technical data

The following table lists the technical data applicable to all MOVIDRIVE® MDX60B/61B inverters, regardless of their type, version, size and performance.

MOVIDRIVE® MDX60B/61B	All sizes
Interference immunity	Meets EN 61800-3
Interference emission with EMC compliant installation	Sizes 0 to 7 meet EN 61800-3 Sizes 0 to 5: According to limit value class C1 to 61800-3 with a corresponding line filter Sizes 0, 1, 2S, and 2 in accordance with limit value class C2 to EN 61800-3 without additional measures Size 6 and 7 in accordance with limit value class C2 to EN 61800-3 with corresponding line filter
Ambient temperature ϑ_U	0 °C...+50 °C at $I_D = 100\% I_N$ and $f_{PWM} = 4$ kHz / size 7: 2.5 kHz 0 °C...+40 °C at $I_D = 125\% I_N$ and $f_{PWM} = 4$ kHz / size 7: 2.5 kHz 0 °C...+40 °C at $I_D = 100\% I_N$ and $f_{PWM} = 8$ kHz / size 7: 4 kHz
I_N reduction Ambient temperature	2.5 % I_N per K between 40 °C - 50 °C 3 % I_N per K at 50 °C - 60 °C
Climate class	EN 60721-3-3, class 3K3
Storage temperature¹⁾ ϑ_L	-25 °C...+70 °C (EN 60721-3-3, class 3K3) DBG keypad: -20 °C...+60 °C
Cooling type (DIN 41751)	Forced cooling (temperature-controlled fan, response threshold 45 °C)
Degree of protection EN 60529 (NEMA1) Sizes 0 to 3 Sizes 4 to 6 Size 7	IP20 IP00 (power connections) IP10 (power connections) with • fitted Plexiglas cover supplied as standard and • shrink tubing (not included in scope of delivery) IP10 (power connections) Refer to section "Touch guard" (page 56).
Operating mode	Continuous operation with 50% overload capacity (size 0: 100 %)
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Protection against mechanically active substances	391
Protection against chemically active substances	3C2
Installation altitude h	Up to $h \leq 1000$ m (3281 ft) without restrictions. The following restrictions apply at $h \geq 1000$ m (3281 ft): • from 1000 m (3281 ft) to max. 4000 m (13120 ft): – I_N reduction by 1 % per 100 m (328 ft) • from 2000 m (6562 ft) to max. 4000 m (13120 ft): – AC 230 V units: U_N reduction by AC 3 V per 100 m (328 ft) – AC 500 V units: U_N reduction by AC 6 V per 100 m (328 ft) Over 2000 m (6562 ft) only overvoltage class 2, external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.

1) In case of long-term storage, the unit must be connected to the mains voltage for at least 5 minutes every two years, otherwise the unit's service life may be reduced.



8.2.1 MOVIDRIVE® MDX60/61B unit series, size 0

The following figure shows the MOVIDRIVE® MDX60/61B unit series, size 0



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8.2.2 MOVIDRIVE® MDX61B unit series, sizes 1 to 7

The following figure shows the MOVIDRIVE® MDX61B unit series, sizes 1 to 7



2059056779



8.3 MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

8.3.1 Size 0

MOVIDRIVE® MDX60/61B		0005-5A3-4-0_		0008-5A3-4-0_		0011-5A3-4-0_		0014-5A3-4-0_			
Size		OS				OM					
INPUT											
Nominal supply voltage (to EN 50160) V_{supply}		3 × AC 380 V - 500 V									
Line frequency f_{supply}		50 Hz ... 60 Hz ±5 %									
Nominal supply system current ¹⁾ (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)		I_{supply} 100 % 125 %		AC 1.8 A		AC 2.2 A		AC 2.8 A		AC 3.6 A	
				AC 2.3 A		AC 2.7 A		AC 3.5 A		AC 4.5 A	
OUTPUT											
Apparent output power ²⁾ (at $V_{\text{supply}} = 3 \times \text{AC } 380...500 \text{ V}$)		S_N		1.4 kVA		1.6 kVA		2.1 kVA		2.8 kVA	
Rated output current ¹⁾ (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)		I_N		AC 2 A		AC 2.4 A		AC 3.1 A		AC 4 A	
Continuous output current (= 125 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ and $f_{\text{PWM}} = 4 \text{ kHz}$)		I_D		AC 2.5 A		AC 3 A		AC 3.8 A		AC 5 A	
Continuous output current (= 100 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ and $f_{\text{PWM}} = 8 \text{ kHz}$)		I_D		AC 2 A		AC 2.4 A		AC 3.1 A		AC 4 A	
Current limitation I_{max}		Motor and regenerative 200 % I_N , duration depending on capacity utilization									
Internal current limitation		$I_{\text{max}} = 0...200 \%$ adjustable									
Minimum permitted brake resistance value (4Q operation) R_{BWmin}		68 Ω									
Output voltage V_O		Max. V_{line}									
PWM frequency f_{PWM}		Adjustable: 4/8/12/16 kHz									
Speed range/resolution $n_A / \Delta n_A$		−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range									
GENERAL INFORMATION											
Power loss at S_N ²⁾ P_{Vmax}		42 W		48 W		58 W		74 W			
Cooling air consumption		3 m³/h						9 m³/h			
Cross section of unit terminals X1, X2, X3, X4		Terminal blocks 4 mm ² conductor end sleeves DIN 46228									
Tightening torque		0.6 Nm									

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B standard version	0005-5A3-4-00	0008-5A3-4-00	0011-5A3-4-00	0014-5A3-4-00
Part number	827 722 2	827 723 0	827 724 9	827 725 7
MDX61B Application version	0005-5A3-4-0T	0008-5A3-4-0T	0011-5A3-4-0T	0014-5A3-4-0T
Part number	827 726 5	827 727 3	827 728 1	827 729 X
 Constant load Recommended motor power P_{Mot}	0.55 kW (0.74 HP)	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	0.75 kW (1.0 HP)	1.1 kW (1.5 HP)	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)
Weight	2.0 kg (4.4 lb)		2.5 kg (5.5 lb)	
Dimensions W × H × D	45 mm × 317 mm × 260 mm (1.8 in × 12.5 in × 10.2 in)		67,5 mm × 317 mm × 260 mm (2.66 in × 12.5 in × 10.2 in)	

MDX61B standard version (VFC/CFC/SERVO)	0005-5A3-4-00	0008-5A3-4-00	0011-5A3-4-00	0014-5A3-4-00
Part number	827 730 3	827 731 1	827 732 X	827 733 8
MDX61B Application version (VFC/CFC/SERVO)	0005-5A3-4-0T	0008-5A3-4-0T	0011-5A3-4-0T	0014-5A3-4-0T
Part number	827 734 6	827 735 4	827 736 2	827 737 0
Weight	2.3 kg (5.1 lb)		2.8 kg (6.2 lb)	
Dimensions W × H × D	72.5 mm × 317 mm × 260 mm (2.85 in ×12.5 in ×10.2 in)		95 mm × 317 mm × 260 mm (3.7 in ×12.5 in ×10.2 in)	
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"			



Technical Data and Dimension Drawings

MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

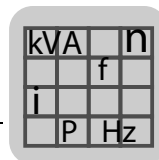
8.3.2 Size 1 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0015-5A3-4-0_	0022-5A3-4-0_	0030-5A3-4-0_	0040-5A3-4-0_
INPUT				
Nominal supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V			
supply frequency f_{supply}	50 Hz ... 60 Hz ±5 %			
Nominal supply system current ¹⁾ I_{supply} 100 % (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$) 125 %	AC 3.6 A AC 4.5 A	AC 5.0 A AC 6.2 A	AC 6.3 A AC 7.9 A	AC 8.6 A AC 10.7 A
OUTPUT				
Apparent output power ²⁾ S_N (at $V_{\text{supply}} = 3 \times \text{AC } 380...500 \text{ V}$)	2.8 kVA	3.8 kVA	4.9 kVA	6.6 kVA
Rated output current ¹⁾ I_N (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)	AC 4 A	AC 5.5 A	AC 7 A	AC 9.5 A
Continuous output current (= 125 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ and $f_{\text{PWM}} = 4 \text{ kHz}$)	AC 5 A	AC 6.9 A	AC 8.8 A	AC 11.9 A
Continuous output current (= 100 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ and $f_{\text{PWM}} = 8 \text{ kHz}$)	AC 4 A	AC 5.5 A	AC 7 A	AC 9.5 A
Current limitation I_{max}	Motor and regenerative 150 % I_N , duration depending on capacity utilization			
Internal current limitation	$I_{\text{max}} = 0...150 \%$ adjustable			
Minimum permitted brake resistance value (4Q operation) R_{BWmin}	68 Ω			
Output voltage V_O	Max. V_{supply}			
PWM frequency f_{PWM}	Adjustable: 4/8/12/16 kHz			
Speed range/resolution $n_A / \Delta n_A$	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range			
GENERAL INFORMATION				
Power loss at S_N ²⁾ P_{Vmax}	85 W	105 W	130 W	180 W
Cooling air consumption	40 m ³ /h			
Weight	3.5 kg (7.7 lb)			
Dimensions $W \times H \times D$	105 mm × 314 mm × 234 mm (4.13 in ×12.4 in ×9.21 in)			
Cross section of unit terminals X1, X2, X3, X4	Terminal blocks 4 mm ² conductor end sleeves DIN 46228			
Tightening torque	0.6 Nm			

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version	0015-5A3-4-00	0022-5A3-4-00	0030-5A3-4-00	0040-5A3-4-00
Part number	827 957 8	827 958 6	827 959 4	827 960 8
MDX61B Application version	0015-5A3-4-0T	0022-5A3-4-0T	0030-5A3-4-0T	0040-5A3-4-0T
Part number	827 975 6	827 976 4	827 977 2	827 978 0
 Constant load Recommended motor power P_{Mot}	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)	4.0 kW (5.4 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	2.2 kW (3.0 HP)	3.0 kW (4.0 HP)	4.0 kW (5.4 HP)	5.5 kW (7.4 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"			



8.3.3 Sizes 2S and 2 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0055-5A3-4-0_	0075-5A3-4-0_	0110-5A3-4-0_
Size	2S		2
INPUT			
Nominal supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V		
supply frequency f_{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply system current ¹⁾ I_{supply} 100 % (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$) 125 %	AC 11.3 A AC 14.1 A	AC 14.4 A AC 18.0 A	AC 21.6 A AC 27.0 A
OUTPUT			
Apparent output power ²⁾ S_N (at $V_{\text{supply}} = 3 \times \text{AC } 380...500 \text{ V}$)	8.7 kVA	11.2 kVA	16.8 kVA
Rated output current ¹⁾ I_N (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)	AC 12.5 A	AC 16 A	AC 24 A
Continuous output current (= 125 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)	AC 15.6 A	AC 20 A	AC 30 A
Continuous output current (= 100 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)	AC 12.5 A	AC 16 A	AC 24 A
Current limitation I_{max}	Motor and regenerative 150 % I_N , duration depending on capacity utilization		
Internal current limitation	$I_{\text{max}} = 0...150 \%$ adjustable		
Minimum permitted brake resistance value (4Q operation) R_{BWmin}	47 Ω		22 Ω
Output voltage V_O	Max. V_{supply}		
PWM frequency f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution $n_A / \Delta n_A$	-6000 ... 0 ... +6000 min ⁻¹ / 0.2 min ⁻¹ across the entire range		
GENERAL INFORMATION			
Power loss at S_N ²⁾ P_{Vmax}	220 W	290 W	400 W
Cooling air consumption	80 m ³ /h		
Weight	6.6 kg (15 lb)		
Dimensions $W \times H \times D$	105 mm × 335 mm × 294 mm (4.13 in × 13.2 in × 11.6 in)		135 mm × 315 mm × 285 mm (5.31 in × 12.4 in × 11.2 in)
Cross section of unit terminals X1, X2, X3, X4	Terminal blocks 4 mm ² conductor end sleeves DIN 46228 M4 screw and washer assembly with terminal clip 4 mm ² conductor end sleeve DIN 46228 6 mm ² crimp cable lug DIN 46234		
Tightening torque	0.6 Nm		1.5 Nm

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version	0055-5A3-4-00	0075-5A3-4-00	0110-5A3-4-00
Part number	827 961 6	827 962 4	827 963 2
MDX61B Application version	0055-5A3-4-0T	0075-5A3-4-0T	0110-5A3-4-0T
Part number	827 979 9	827 980 2	827 981 0
 Constant load Recommended motor power P_{Mot}	5.5 kW (7.4 HP)	7.5 kW (10 HP)	11 kW (15 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	7.5 kW (10 HP)	11 kW (15 HP)	15 kW (20 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"		



Technical Data and Dimension Drawings

MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

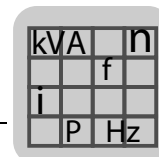
8.3.4 Size 3 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0150-503-4-0_	0220-503-4-0_	0300-503-4-0_
INPUT			
Nominal supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V		
supply frequency f_{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply system current ¹⁾ I_{supply}	100 %	AC 28.8 A	AC 41.4 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)	125 %	AC 36 A	AC 51.7 A
OUTPUT			
Apparent output power ²⁾ S_N	22.2 kVA	31.9 kVA	41.6 kVA
(at $V_{\text{supply}} = 3 \times \text{AC } 380...500 \text{ V}$)			
Rated output current ¹⁾ I_N	AC 32 A	AC 46 A	AC 60 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)			
Continuous output current (= 125 % I_N) I_D	AC 40 A	AC 57.5 A	AC 75 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)			
Continuous output current (= 100 % I_N) I_D	AC 32 A	AC 46 A	AC 60 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)			
Current limitation I_{max}	Motor and regenerative 150 % I_N , duration depending on capacity utilization		
Internal current limitation	$I_{\text{max}} = 0...150 \%$ adjustable		
Minimum permitted brake resistance value (4Q operation) R_{BWmin}	15 Ω	12 Ω	
Output voltage V_O	Max. V_{supply}		
PWM frequency f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution $n_A / \Delta n_A$	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range		
GENERAL INFORMATION			
Power loss at S_N ²⁾ P_{Vmax}	550 W	750 W	950 W
Cooling air consumption	180 m³/h		
Weight	15.0 kg (33 lb)		
Dimensions $W \times H \times D$	200 mm × 465 mm × 308 mm (7.87 in ×18.3 in ×12.1 in)		
Cross section of unit terminals X1, X2, X3, X4	M6 screw with washer max. 25 mm ² Crimp cable lug DIN 46234		
Tightening torque	3.5 Nm		

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version	0150-503-4-00	0220-503-4-00	0300-503-4-00
Part number	827 964 0	827 965 9	827 966 7
MDX61B Application version	0150-503-4-0T	0220-503-4-0T	0300-503-4-0T
Part number	827 982 9	827 983 7	827 984 5
 Constant load Recommended motor power P_{Mot}	15 kW (20 HP)	22 kW (30 HP)	30 kW (40 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	22 kW (30 HP)	30 kW (40 HP)	37 kW (50 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"		



8.3.5 Size 4 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0370-503-4-0_	0450-503-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 380 V - 500 V	
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %	
Nominal supply system current ¹⁾	I_{supply}	100 %	AC 65.7 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)		125 %	AC 81.9 A
AC 80.1 A			
AC 100.1 A			
OUTPUT			
Apparent output power ²⁾	S_N	51.1 kVA	62.3 kVA
(at $V_{\text{supply}} = 3 \times \text{AC } 380...500 \text{ V}$)			
Rated output current ¹⁾	I_N	AC 73 A	AC 89 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$)			
Continuous output current (= 125 % I_N)	I_D	AC 91 A	AC 111 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)			
Continuous output current (= 100 % I_N)	I_D	AC 73 A	AC 89 A
(at $V_{\text{supply}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)			
Current limitation	I_{max}	Motor and regenerative 150 % I_N , duration depending on capacity utilization	
Internal current limitation		$I_{\text{max}} = 0...150 \%$ adjustable	
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	6 Ω	
Output voltage	V_O	Max. V_{supply}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	$n_A / \Delta n_A$	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range	
GENERAL INFORMATION			
Power loss at S_N ²⁾	P_{Vmax}	1200 W	1450 W
Cooling air consumption		180 m ³ /h	
Weight		27 kg (60 lb)	
Dimensions	$W \times H \times D$	280 mm × 522 mm × 307 mm (11.0 in ×20.6 in ×12.1 in)	
Cross section of unit terminals X1, X2, X3, X4		M10 bolt with nut Max. 70 mm ² Press cable lug DIN 46235	
Tightening torque		14 Nm	

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version	0370-503-4-00	0450-503-4-00
Part number	827 967 5	827 968 3
MDX61B Application version	0370-503-4-0T	0450-503-4-0T
Part number	827 985 3	827 986 1
 Constant load Recommended motor power P_{Mot}	37 kW (50 HP)	45 kW (60 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	45 kW (60 HP)	55 kW (74 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"	



Technical Data and Dimension Drawings

MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

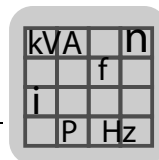
8.3.6 Size 5 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0550-503-4-0_	0750-503-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V _{supply}	3 × AC 380 V - 500 V	
supply frequency	f _{supply}	50 Hz ... 60 Hz ±5 %	
Nominal supply system current ¹⁾ (at V _{supply} = 3 × AC 400 V)	I _{supply} 100 % 125 %	AC 94.5 A AC 118.1 A	AC 117 A AC 146.3 A
OUTPUT			
Apparent output power ²⁾ (at V _{supply} = 3 × AC 380...500 V)	S _N	73.5 kVA	91.0 kVA
Rated output current ¹⁾ (at V _{supply} = 3 × AC 400 V)	I _N	AC 105 A	AC 130 A
Continuous output current (= 125 % I _N) I _D (at V _{supply} = 3 × AC 400 V with f _{PWM} = 4 kHz)		AC 131 A	AC 162 A
Continuous output current (= 100 % I _N) I _D (at V _{supply} = 3 × AC 400 V with f _{PWM} = 8 kHz)		AC 105 A	AC 130 A
Current limitation	I _{max}	Motor and regenerative 150 % I _N , duration depending on capacity utilization	
Internal current limitation		I _{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R _{BWmin}	6 Ω	4 Ω
Output voltage	V _O	Max. V _{supply}	
PWM frequency	f _{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n _A / Δn _A	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range	
GENERAL INFORMATION			
Power loss at S _N ²⁾	P _{Vmax}	1700 W	2000 W
Cooling air consumption		360 m ³ /h	
Weight		35 kg (77 lb)	
Dimensions	W × H × D	280 mm × 610 mm × 330 mm (11.0 in ×24.0 in ×13.0 in)	
Cross section of unit terminals X1, X2, X3, X4		M10 bolt with nut Max. 70 mm ² Press cable lug DIN 46235	
Tightening torque		14 Nm	

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version		0550-503-4-00	0750-503-4-00
Part number		827 969 1	827 970 5
MDX61B Application version		0550-503-4-0T	0750-503-4-0T
Part number		827 988 8	827 989 6
 Constant load Recommended motor power P_{Mot}		55 kW (74 HP)	75 kW (100 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}		75 kW (100 HP)	90 kW (120 HP)
Recommended motor power		→ MOVIDRIVE® B system manual, section "Motor selection"	



8.3.7 Size 6 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0900-503-4-0_	1100-503-4-0_	1320-503-4-0_
INPUT				
Nominal supply voltage (to EN 50160)	V _{supply}	3 × AC 380 V - 500 V		
supply frequency	f _{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply system current ¹⁾	I _{supply}	100 %	AC 153 A	AC 180 A
(at V _{supply} = 3 × AC 400 V)		125 %	AC 191 A	AC 225 A
OUTPUT				
Apparent output power ²⁾	S _N	118 kVA	139 kVA	174 kVA
(at V _{supply} = 3 × AC 380...500 V)				
Rated output current ¹⁾	I _N	AC 170 A	AC 200 A	AC 250 A
(at V _{supply} = 3 × AC 400 V)				
Continuous output current (= 125 % I _N)	I _D	AC 212 A	AC 250 A	AC 312 A
(at V _{supply} = 3 × AC 400 V with f _{PWM} = 4 kHz)				
Continuous output current (= 100 % I _N)	I _D	AC 170 A	AC 200 A	AC 250 A
(at V _{supply} = 3 × AC 400 V with f _{PWM} = 4 kHz)				
Temperature range 0 °C ... +50 °C				
Current limitation	I _{max}	Motor and regenerative 150 % I _N , duration depending on capacity utilization		
Internal current limitation		I _{max} = 0...150 % adjustable		
Minimum permitted brake resistance value (4Q operation)	R _{BWmin}	2.7 Ω		
Output voltage	V _O	Max. V _{supply}		
PWM frequency	f _{PWM}	Adjustable: 4 or 8 kHz		
Speed range/resolution	n _A / Δn _A	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range		
GENERAL INFORMATION				
Power loss at S _N ²⁾	P _{Vmax}	2300 W	2500 W	2700 W
Cooling air consumption		600 m³/h		
Weight		60 kg (130 lb)		
Dimensions	W × H × D	280 mm × 1000 mm × 382 mm (11.0 in × 39.37 in × 15.0 in)		
Cross section of unit terminals X1, X2, X3, X4		M12 bolt with nut Max. 185 mm² Press cable lug DIN 46235		
Tightening torque		20 Nm		

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version		0900-503-4-00	1100-503-4-00	1320-503-4-00
Part number		827 971 3	827 972 1	827 974 8
MDX61B Application version		0900-503-4-0T	1100-503-4-0T	1320-503-4-0T
Part number		827 991 8	827 992 6	827 993 4
 Constant load Recommended motor power P_{Mot}		90 kW (120 HP)	110 kW (148 HP)	132 kW (177 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}		110 kW (148 HP)	132 kW (177 HP)	160 kW (215 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"			



Technical Data and Dimension Drawings

MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

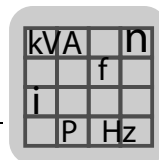
8.3.8 Size 7 (AC 400/500 V units)

MOVIDRIVE® MDX61B		1600-503-2-0T/L 1600-503-4-0T/L	2000-503-2-0T/L 2000-503-4-0T/L	2500-503-2-0T/L 2500-503-4-0T/L
INPUT				
Nominal supply voltage (to EN 50160)	V _{supply}	3 × AC 380 V - 500 V		
supply frequency	f _{supply}	50 Hz ... 60 Hz ±5 %		
Nominal supply current ¹⁾ (at V _{supply} = 3 × AC 400 V)	I _{supply} 100 % 125 %	AC 280 A AC 340 A	AC 340 A AC 425 A	AC 435 A AC 535 A
OUTPUT				
Apparent output power ²⁾ (at V _{supply} = 3 × AC 380...500 V)	S _N	208 kVA	263 kVA	326 kVA
Rated output current ¹⁾ (at V _{supply} = 3 × AC 400 V)	I _N	AC 300 A	AC 380 A	AC 470 A
Continuous output current (= 125 % I _N) I _D (at V _{supply} = 3 × AC 400 V with f _{PWM} = 2.5 kHz)		AC 375 A	AC 475 A	AC 588 A
Continuous output current (= 100 % I _N) I _D (at V _{supply} = 3 × AC 400 V with f _{PWM} = 2.5 kHz)		AC 300 A	AC 380 A	AC 470 A
Temperature range 0 °C ... +50 °C				
Current limitation	I _{max}	Motor and regenerative 150 % I _N , duration depending on capacity utilization		
Internal current limitation		I _{max} = 0...150 % adjustable		
Minimum permitted brake resistance value (4Q operation)	R _{BWmin}	1.1 Ω		
Output voltage	V _O	Max. V _{supply}		
PWM frequency	f _{PWM}	Adjustable: 2.5 or 4 kHz		
Speed range/resolution	n _A / Δn _A	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range		
GENERAL INFORMATION				
Power loss at S _N ²⁾	P _{Vmax}	3000 W	3600 W	4400 W
Cooling air consumption		1200 m ³ /h		
Weight		2Q variant: 260 kg (573 lb) 4Q variant: 280 kg (617 lb)		
Dimensions	W × H × D	700 mm × 1490 mm × 470 mm (27.6 in ×58.7 in ×18.5 in)		
Conductor rails X1, X2, X3		Connection rail with bore for M12 Max. 2 x 240 mm ² Press cable lug DIN 46235		
Tightening torque		70 Nm (620 lb in)		

1) The system and output currents must be reduced by 20 % from the nominal values for $V_{\text{supply}} = 3 \times \text{AC } 500 \text{ V}$.

2) The performance data applies to $f_{\text{PWM}} = 2.5 \text{ kHz}$.

MDX61B Application version With coated printed circuit boards		1600-503-2-0T/L 1600-503-4-0T/L	2000-503-2-0T/L 2000-503-4-0T/L	2500-503-2-0T/L 2500-503-4-0T/L
Part number		829 976 5 829 980 3	829 977 3 829 981 1	829 978 1 829 983 8
 Constant load Recommended motor power P_{Mot}		160 kW (215 HP)	200 kW (268 HP)	250 kW (335 HP)
 Variable torque load or constant load without overload Recommended motor power P_{Mot}		200 kW (268 HP)	250 kW (335 HP)	315 kW (422 HP)
Recommended motor power		See MOVIDRIVE® B system manual, section "Motor selection"		



8.4 MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

8.4.1 Size 1 (AC 230 V units)

MOVIDRIVE® MDX61B		0015-2A3-4-0_	0022-2A3-4-0_	0037-2A3-4-0_
INPUT				
Nominal supply voltage (to EN 50160)	V _{supply}	3 × AC 200 V - 240 V		
supply frequency	f _{supply}	50 Hz ... 60 Hz ±5 %		
Rated supply current (at V _{supply} = 3 × AC 230 V)	I _{supply} 100 % 125 %	AC 6.7 A AC 8.4 A	AC 7.8 A AC 9.8 A	AC 12.9 A AC 16.1 A
OUTPUT				
Apparent output power ¹⁾ (at V _{supply} = 3 × AC 230...240 V)	S _N	2.7 kVA	3.4 kVA	5.8 kVA
Nominal output current (at V _{supply} = 3 × AC 230 V)	I _N	AC 7.3 A	AC 8.6 A	AC 14.5 A
Continuous output current (= 125 % I _N) I _D (at V _{supply} = 3 × AC 230 V with f _{PWM} = 4 kHz)		AC 9.1 A	AC 10.8 A	AC 18.1 A
Continuous output current (= 100 % I _N) I _D (at V _{supply} = 3 × AC 230 V with f _{PWM} = 8 kHz)		AC 7.3 A	AC 8.6 A	AC 14.5 A
Current limitation	I _{max}	Motor and regenerative 150 % I _N , duration depending on capacity utilization		
Internal current limitation		I _{max} = 0...150 % adjustable		
Minimum permitted brake resistance value (4Q operation)	R _{BWmin}	27 Ω		
Output voltage	V _O	Max. V _{supply}		
PWM frequency	f _{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution	n _A / Δn _A	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range		
GENERAL INFORMATION				
Power loss at S _N ¹⁾	P _{Vmax}	110 W	126 W	210 W
Cooling air consumption		40 m ³ /h		
Weight		2.8 kg (6.2 lb)		
Dimensions	W × H × D	105 mm × 314 mm × 234 mm (4.13 in ×12.4 in ×9.21 in)		
Cross section of unit terminals X1, X2, X3, X4		Separable terminal strip 4 mm ² conductor end sleeve DIN 46228		
Tightening torque		0.6 Nm		

1) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version	0015-2A3-4-00	0022-2A3-4-00	0037-2A3-4-00
Part number	827 994 2	827 995 0	827 996 9
MDX61B Application version	0015-2A3-4-0T	0022-2A3-4-0T	0037-2A3-4-0T
Part number	828 003 7	828 004 5	828 005 3
 Constant load Recommended motor power P_{Mot}	1.5 kW (2.0 HP)	2.2 kW (3.0 HP)	3.7 kW (5.0 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	2.2 kW (3.0 HP)	3.7 kW (5.0 HP)	5.0 kW (6.7 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"		



Technical Data and Dimension Drawings

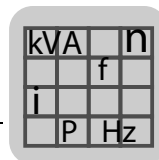
MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

8.4.2 Size 2 (AC 230 V units)

MOVIDRIVE® MDX61B		0055-2A3-4-0_	0075-2A3-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V _{supply}	3 × AC 200 V - 240 V	
supply frequency	f _{supply}	50 Hz ... 60 Hz ±5 %	
Rated supply current (at V _{supply} = 3 × AC 230 V)	I _{supply} 100 % 125 %	AC 19.5 A AC 24.4 A	AC 27.4 A AC 34.3 A
OUTPUT			
Apparent output power ¹⁾ (at V _{supply} = 3 × AC 230...240 V)	S _N	8.8 kVA	11.6 kVA
Nominal output current (at V _{supply} = 3 × AC 230 V)	I _N	AC 22 A	AC 29 A
Continuous output current (= 125 % I _N) I _D (at V _{supply} = 3 × AC 230 V with f _{PWM} = 4 kHz)		AC 27.5 A	AC 36.3 A
Continuous output current (= 100 % I _N) I _D (at V _{supply} = 3 × AC 230 V with f _{PWM} = 8 kHz)		AC 22 A	AC 29 A
Current limitation	I _{max}	Motor and regenerative 150 % I _N , duration depending on capacity utilization	
Internal current limitation		I _{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R _{BWmin}	12 Ω	
Output voltage	V _O	Max. V _{supply}	
PWM frequency	f _{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n _A / Δn _R	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range	
GENERAL INFORMATION			
Power loss at S _N ¹⁾	P _{Vmax}	300 W	380 W
Cooling air consumption		80 m³/h	
Weight		5.9 kg (13 lb)	
Dimensions	W × H × D	135 mm × 315 mm × 285 mm (5.31 in ×12.4 in ×11.2 in)	
Cross section of unit terminals X1, X2, X3, X4		M4 screw and washer assembly with terminal clip 4 mm² conductor end sleeve DIN 46228 6 mm² crimp cable lug DIN 46234	
Tightening torque		1.5 Nm	

1) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version	0055-2A3-4-00	0075-2A3-4-00
Part number	827 997 7	827 998 5
MDX61B Application version	0055-2A3-4-0T	0075-2A3-4-0T
Part number	828 006 1	828 008 8
 Constant load Recommended motor power P_{Mot}	5.5 kW (7.4 HP)	7.5 kW (10 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	7.5 kW (10 HP)	11 kW (15 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"	



8.4.3 Size 3 (AC 230 V units)

MOVIDRIVE® MDX61B		0110-203-4-0_	0150-203-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V _{supply}	3 × AC 200 V - 240 V	
supply frequency	f _{supply}	50 Hz ... 60 Hz ±5 %	
Rated supply current (at V _{supply} = 3 × AC 230 V)	I _{supply} 100 % 125 %	AC 40 A AC 50 A	AC 49 A AC 61 A
OUTPUT			
Apparent output power ¹⁾ (at V _{supply} = 3 × AC 230...240 V)	S _N	17.1 kVA	21.5 kVA
Nominal output current (at V _{supply} = 3 × AC 230 V)	I _N	AC 42 A	AC 54 A
Continuous output current (= 125 % I _N) I _D (at V _{supply} = 3 × AC 230 V with f _{PWM} = 4 kHz)		AC 52.5 A	AC 67.5 A
Continuous output current (= 100 % I _N) I _D (at V _{supply} = 3 × AC 230 V with f _{PWM} = 8 kHz)		AC 42 A	AC 54 A
Current limitation	I _{max}	Motor and regenerative 150 % I _N , duration depending on capacity utilization	
Internal current limitation		I _{max} = 0...150 % adjustable	
Minimum permitted brake resistance value (4Q operation)	R _{BWmin}	7.5 Ω	5.6 Ω
Output voltage	V _O	Max. V _{supply}	
PWM frequency	f _{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n _A / Δn _A	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range	
GENERAL INFORMATION			
Power loss at S _N ¹⁾	P _{Vmax}	580 W	720 W
Cooling air consumption		180 m³/h	
Weight		14.3 kg (31.5 lb)	
Dimensions	W × H × D	200 mm × 465 mm × 308 mm (7.87 in ×18.3 in ×12.1 in)	
Cross section of unit terminals X1, X2, X3, X4		M6 screw and washer assembly with washer max. 25 mm² Crimp cable lug DIN 46234	
Tightening torque		3.5 Nm	

1) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version	0110-203-4-00	0150-203-4-00
Part number	827 999 3	828 000 2
MDX61B Application version	0110-203-4-0T	0150-203-4-0T
Part number	828 009 6	828 011 8
 Constant load Recommended motor power P_{Mot}	11 kW (15 HP)	15 kW (20 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}	15 kW (20 HP)	22 kW (30 HP)
Recommended motor power	→ MOVIDRIVE® B system manual, section "Motor selection"	



Technical Data and Dimension Drawings

MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

8.4.4 Size 4 (AC 230 V units)

MOVIDRIVE® MDX61B		0220-203-4-0_	0300-203-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{supply}	3 × AC 200 V - 240 V	
supply frequency	f_{supply}	50 Hz ... 60 Hz ±5 %	
Rated supply current (at $V_{\text{supply}} = 3 \times \text{AC } 230 \text{ V}$)	I_{supply} 100 % 125 %	AC 72 A AC 90 A	AC 86 A AC 107 A
OUTPUT			
Apparent output power ¹⁾ (at $V_{\text{supply}} = 3 \times \text{AC } 230...240 \text{ V}$)	S_N	31.8 kVA	37.8 kVA
Nominal output current (at $V_{\text{supply}} = 3 \times \text{AC } 230 \text{ V}$)	I_N	AC 80 A	AC 95 A
Continuous output current (= 125 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)		AC 100 A	AC 118 A
Continuous output current (= 100 % I_N) I_D (at $V_{\text{supply}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)		AC 80 A	AC 95 A
Current limitation	I_{max}	Motor and regenerative 150 % I_N , duration depending on capacity utilization	
Internal current limitation		$I_{\text{max}} = 0...150 \%$ adjustable	
Minimum permitted brake resistance value (4Q operation)	R_{BWmin}	3 Ω	
Output voltage	V_O	Max. V_{supply}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	$n_A / \Delta n_A$	−6000 ... 0 ... +6000 min ^{−1} / 0.2 min ^{−1} across the entire range	
GENERAL INFORMATION			
Power loss at S_N ¹⁾	$P_{V\text{max}}$	1100 W	1300 W
Cooling air consumption		180 m ³ /h	
Weight		26.3 kg (57 lb)	
Dimensions	$W \times H \times D$	280 mm × 522 mm × 307mm (11.0 in × 20.6 in × 12.1 in)	
Cross section of unit terminals X1, X2, X3, X4		M10 bolt with nut max. 70 mm ² Press cable lug DIN 46235	
Tightening torque		3.5 Nm	

1) The performance data applies to $f_{\text{PWM}} = 4 \text{ kHz}$.

MDX61B Standard version		0220-203-4-00	0300-203-4-00
Part number		828 001 0	828 002 9
MDX61B Application version		0220-203-4-0T	0300-203-4-0T
Part number		828 012 6	828 013 4
 Constant load Recommended motor power P_{Mot}		22 kW (30 HP)	30 kW (40 HP)
 Variable torque load or constant load without overload recommended motor power P_{Mot}		30 kW (40 HP)	37 kW (50 HP)
Recommended motor power		→ MOVIDRIVE® B system manual, section "Motor selection"	



8.5 MOVIDRIVE® MDX60/61B electronics data

MOVIDRIVE® MDX60/61B		General electronics data	
Voltage supply for setpoint input	X11:1 X11:5	REF1: DC+10 V +5 % / -0 %, $I_{\max}$ = DC 3 mA REF2: DC-10 V +0 % / -5 %, $I_{\max}$ = DC 3 mA	Reference voltages for setpoint potentiometer
Setpoint input n1 (differential input) Operating mode AI11/AI12 Resolution Internal resistance	X11:2/X11:3	AI11/AI12: Voltage or current input, can be set with S11 and P11_, sampling interval 1 ms Voltage input: n1 = DC 0...+10 V or DC -10 V...0...+10 V 12 bit R_i = 40 k Ω (external voltage supply) R_i = 20 k Ω (supply from REF1/REF2)	Current input: n1 = DC 0...20 mA or DC 4...20 mA 11 bit R_i = 250 Ω
Internal setpoints		Parameter set 1: n11/n12/n13 = -6000...0...+6000 rpm Parameter set 2: n21/n22/n23 = -6000...0...+6000 rpm	
Time ranges of the speed ramps at Δn = 3000 rpm		1. Ramp t_{11}/t_{21} up: 0...2000 s down: 0...2000 s 2. Ramp t_{12}/t_{22} up = down: 0...2000 s Stop ramp t_{13}/t_{23} down: 0...20 s Emergency ramp t_{14}/t_{24} down: 0...20 s Motor potentiometer t_3 up: 0.2...50 s down: 0.2...50 s	
Auxiliary voltage output ¹⁾	X13:8/X10:8	VO24: V_{OUT} = DC 24 V, maximum current carrying capacity $I_{\max}$ = DC 400 mA	
External voltage supply ¹⁾	X10:9	VI24: U_{IN} = DC 24 V -15 % / +20 % according to EN 61131-2 With size 7, connect 24 V backup voltage via the DC power supply unit. No connection at the control unit.	
Binary inputs X13:1...X13:6 and X16:1/X16:2 Internal resistance Signal level Function	X13:1 X13:2...X13:6, X16:1/X16:2	Isolated (optocoupler), PLC-compatible (EN 61131), sampling interval 1 ms DIØØ...DIØ5 and DIØ6/DIØ7 $R_i \approx$ 3 k Ω , $I_E \approx$ DC 10 mA DC +13 V...+30 V = "1" = Contact closed DC -3 V...+5 V = "0" = Contact open According to EN 61131 DIØØ: With fixed assignment "/Controller inhibit" DIØ1...DIØ5, DIØ6/DIØ7: Selection option → Parameter menu P60_	
Binary outputs ¹⁾ X10:3/X10:7 and X16:3...X16:5 Signal level Function	X10:3 X10:7, X16:3...X16:5	PLC-compatible (EN 61131-2), response time 1 ms DBØØ/DOØ2 and DOØ3...DOØ5 "0" = DC 0 V "1" = DC +24 V Important: Do not apply external voltage! DBØØ: With fixed assignment "/Brake", $I_{\max}$ = DC 150 mA, short-circuit proof, protected against external voltage to DC 30 V DOØ2, DOØ3...DOØ5: Selection option → Parameter menu P62_ $I_{\max}$ = DC 50 mA, short-circuit proof, protected against external voltage to DC 30 V	
Relay output Function	X10:4...X10:6 X10:4 X10:5 X10:6	DOØ1: Load capacity of the relay contacts $U_{\max}$ = DC 30 V, $I_{\max}$ = DC 800 mA DOØ1-C: Shared relay contact DOØ1-NO: Normally open contact DOØ1-NC: NC contact Selection option → Parameter menu P62_	
System bus (SBus)	X12:1 X12:2 X12:3	DGND: Reference potential SC11: SBus high SC12: SBus low	CAN bus according to CAN specification 2.0, parts A and B, transmission technology according to ISO 11898, max. 64 stations, terminating resistor (120 Ω) can be activated using DIP switches
RS485 interface	X13:10 X13:11	ST11: RS485+ ST12: RS485-	EIA standard, 9.6 kbaud, max. 32 stations Max. cable length 200 m Dynamic terminating resistor with fixed installation
TF/TH/KTY input	X10:1	TF1: Response threshold at $R_{TF} \geq 2.9$ k $\Omega \pm 10$ %	

1) The unit provides a current of $I_{\max}$ = DC 400 mA for the DC+24 V outputs (VO24, binary outputs). If this value is insufficient, a DC 24 V voltage supply must be connected to X10:9 (VI24).

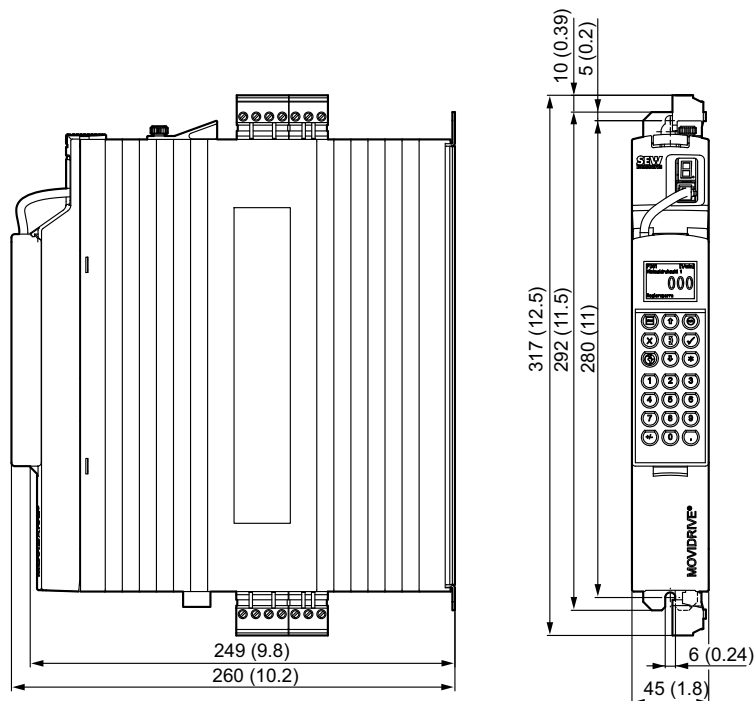


MOVIDRIVE® MDX60/61B		General electronics data
Reference terminals	X11:4 X12:1/X13:9/X16:6/X10:2/X10:10 X13:7	AGND: Reference potential for analog signals and terminals X11:1 and X11:5 (REF1/REF2) DGND: Reference potential for binary signals, system bus, RS485 interface and TF/TH DCOM: Reference potential for binary inputs X13:1...X13:6 and X16:1/X16:2 (DIØØ...DIØ5 and DIØ6/DIØ7)
Permitted cable cross section		One core per terminal: 0.20...2.5 mm ² (AWG 24...12) Two cores per terminal: 0.25...1 mm ² (AWG 22...17)
Safety contact	X17:1 X17:2 X17:3 X17:4	DGND: Reference potential for X17:2 VO24: : V _{OUT} = DC 24 V, only to supply X17:4 of the same unit; cannot be used to supply other units. SOV24: Reference potential for DC+24 V "safe stop" input (safety contact) SVI24: DC+24 V "safe stop" input (safety contact)
Permitted cable cross section		One core per terminal: 0.08...1.5 mm ² (AWG28...16) Two cores per terminal: 0.25 ... 1.0 mm ² (AWG23...17)
Power consumption	X17:4	Size 0: 3 W Size 1: 5 W Size 2, 2S: 6 W Size 3: 7.5 W Size 4: 8 W Size 5: 10 W sizes 6 to 7: 6 W
Input capacitance	X17:4	Size 0: 27 µF Sizes 1...7: 270 µF
Time for restart Time to inhibit output stage		t _A = 200 ms t _S = 100 ms
Signal level		DC +19.2 V...+30 V = "1" = Contact closed DC -30 V...+5 V = "0" = Contact open

8.6 MOVIDRIVE® MDX60B dimension drawings

8.6.1 Size 0S

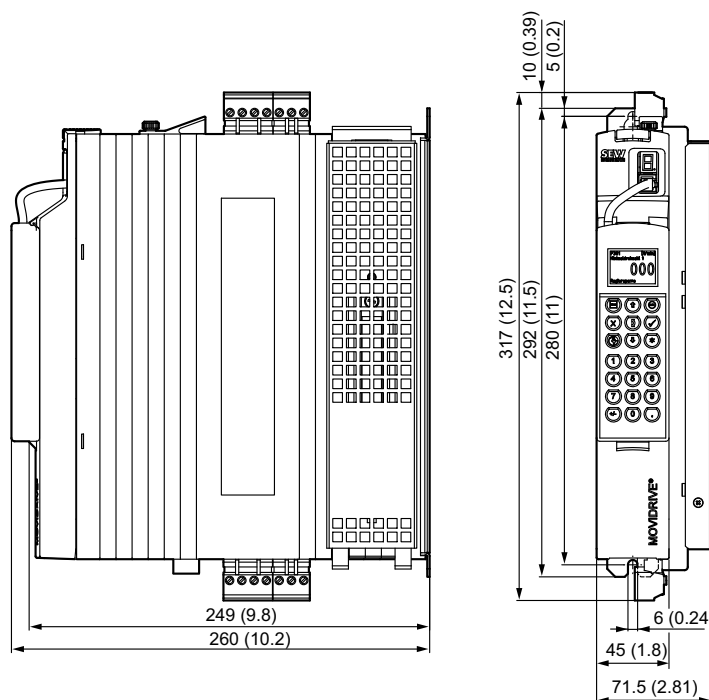
The following dimension drawing shows MDX60B size 0S, dimensions in mm (in)



1940795915

8.6.2 Size 0S with mounted braking resistor

The following dimension drawing shows MDX60B size 0S with braking resistor, dimensions in mm (in)

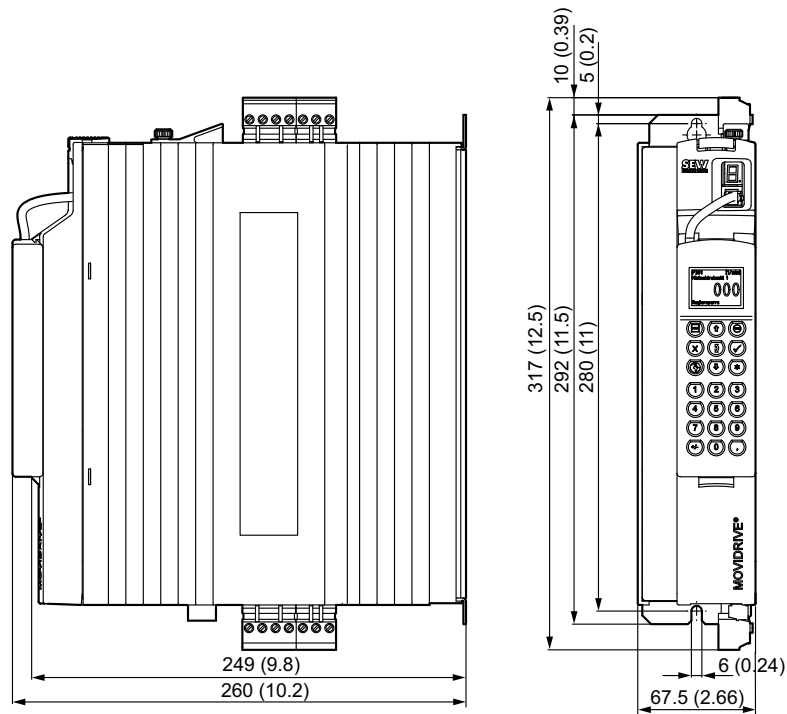


1940798987



8.6.3 Size 0M

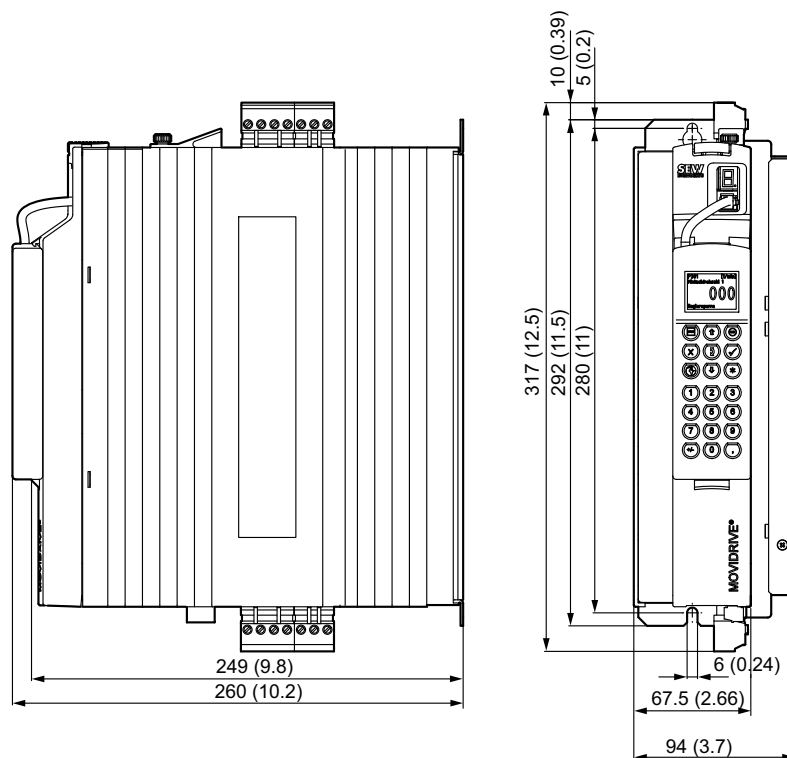
The following dimension drawing shows MDX60B size 0M, dimensions in mm (in)



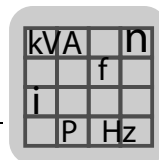
1940843915

8.6.4 Size 0M with mounted braking resistor

The following dimension drawing shows MDX60B size 0M with braking resistor, dimensions in mm (in)



1940846987

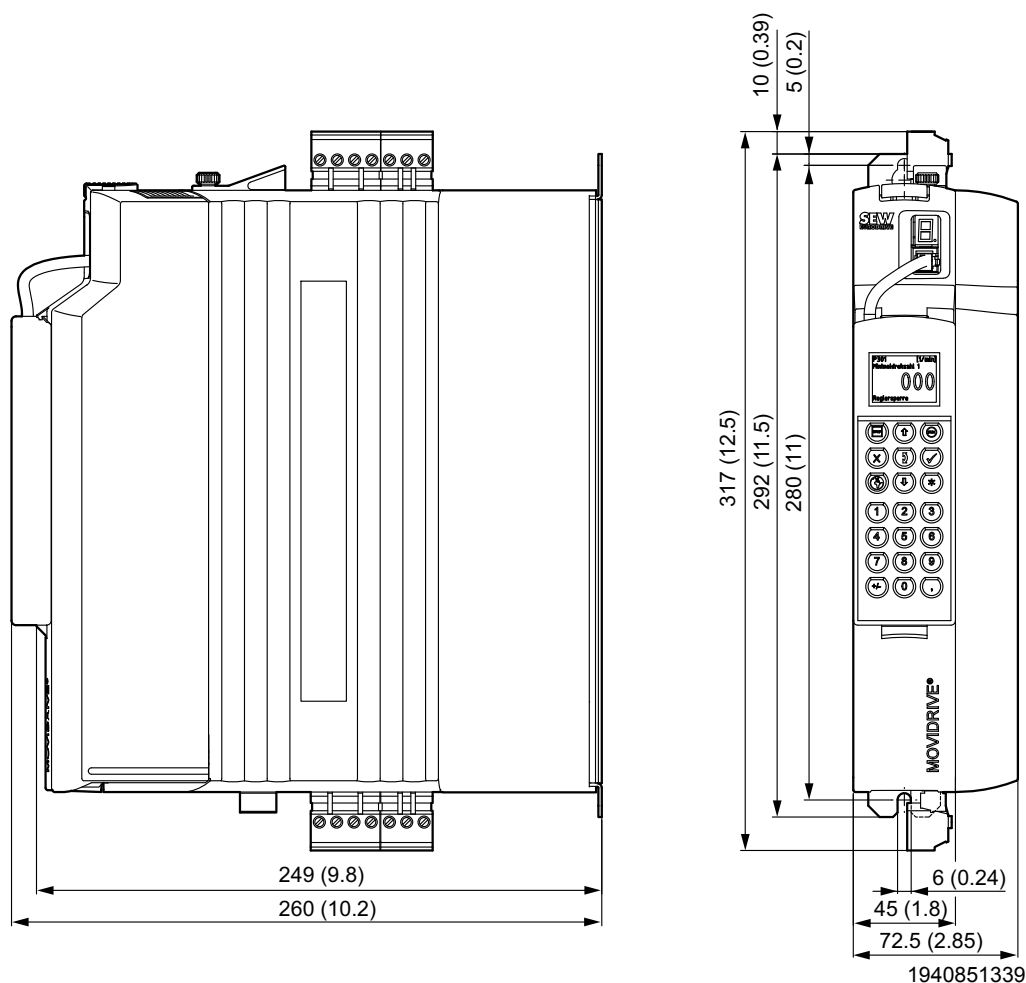


8.7 MOVIDRIVE® MDX61B dimension drawings

	INFORMATION For MOVIDRIVE® MDX61B size 0, installing a braking resistor does not affect the dimensions. Therefore, MOVIDRIVE® MDX61B size 0 dimensions are displayed without an installed braking resistor.
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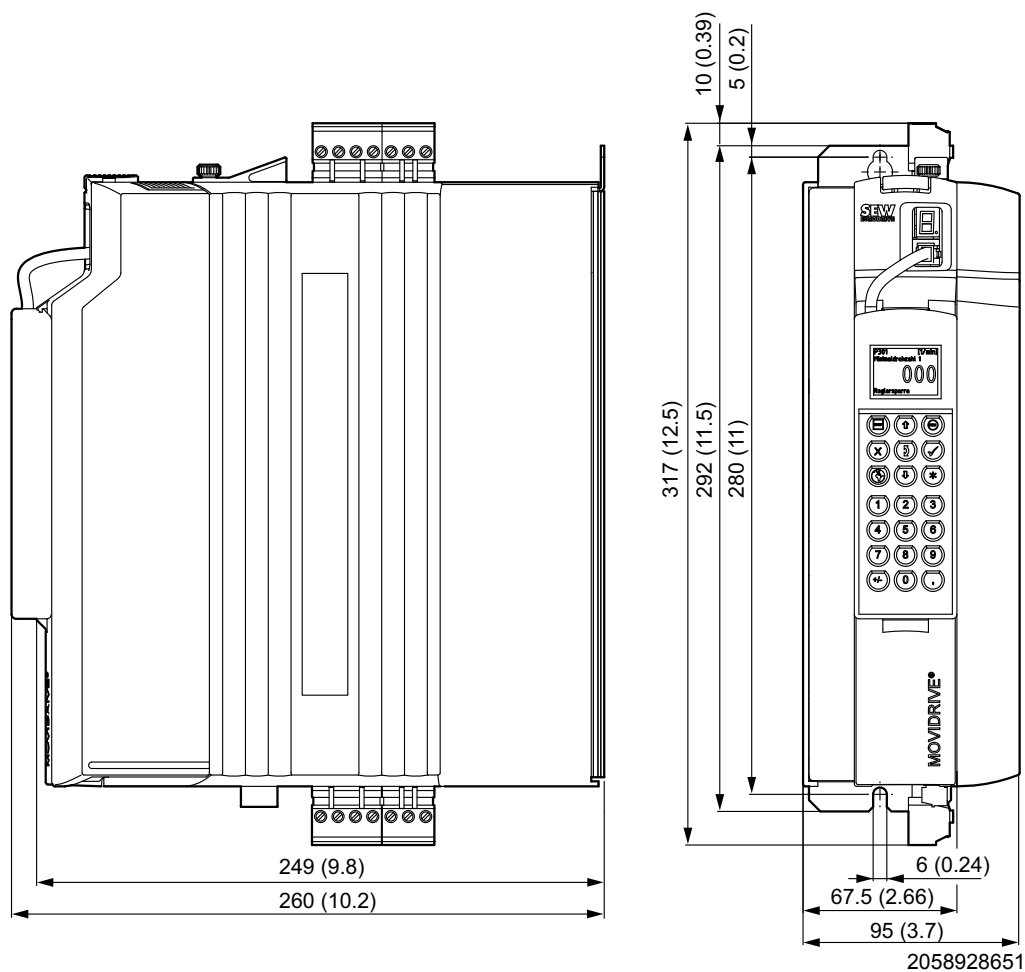
8.7.1 Size 0S

The following dimension drawing shows MDX61B size 0S, dimensions in mm (in)



8.7.2 Size 0M

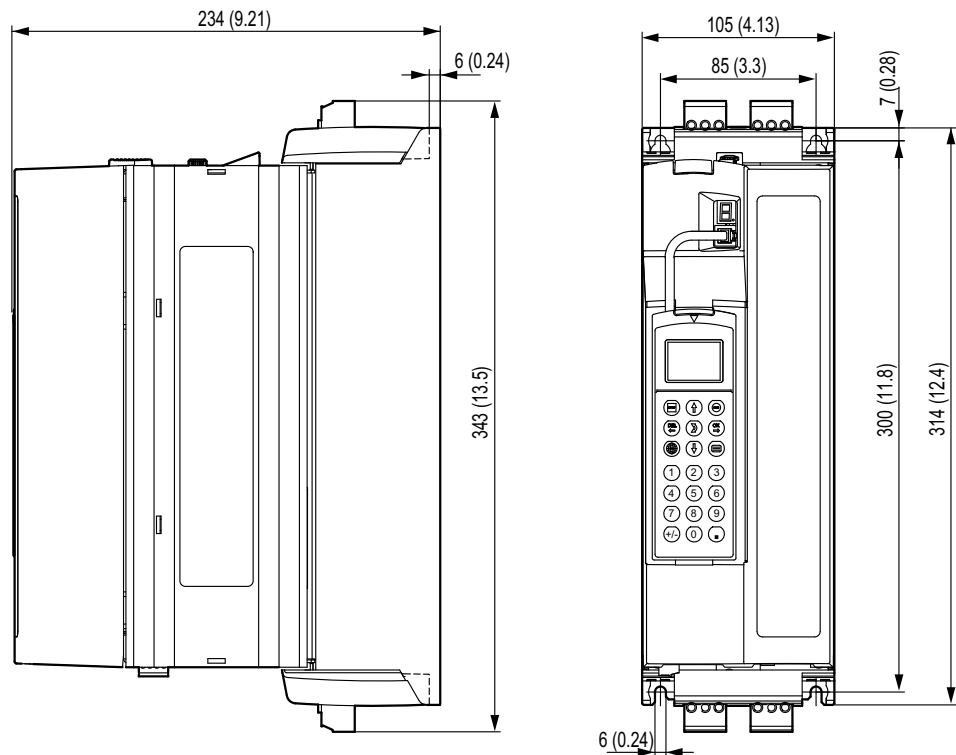
The following dimension drawing shows MDX61B size 0M, dimensions in mm (in)



kVA	n
f	
i	
P	Hz

8.7.3 Size 1

The following dimension drawing shows MDX61B size 1, dimensions in mm (in)

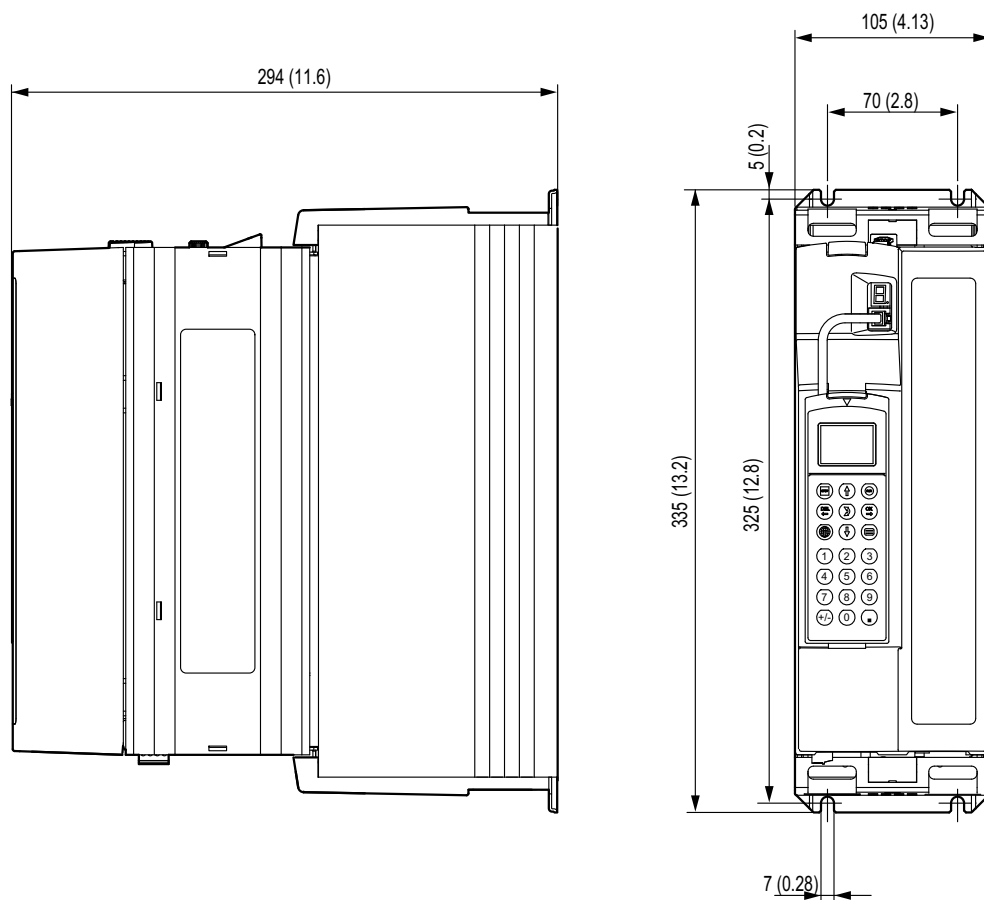


2058933131



8.7.4 Size 2S

The following dimension drawing shows MDX61B size 2S, dimensions in mm (in)

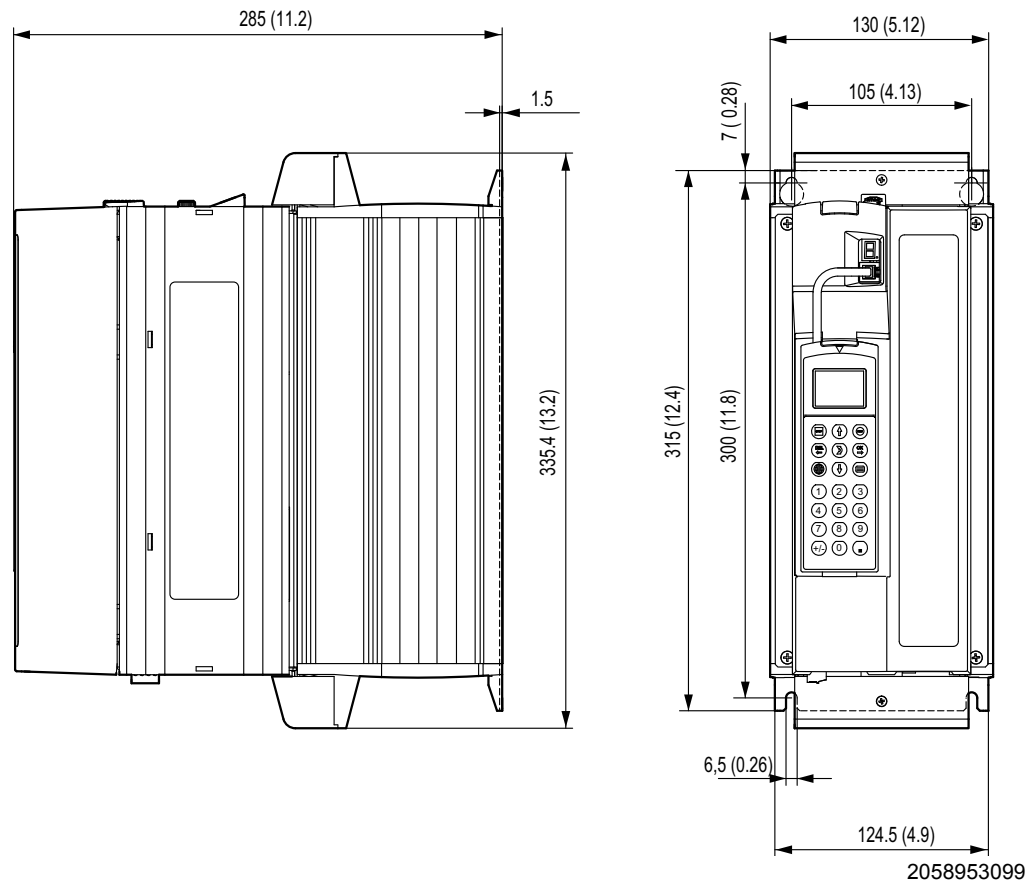


2058949003

kVA	n
f	
i	
P	Hz

8.7.5 Size 2S

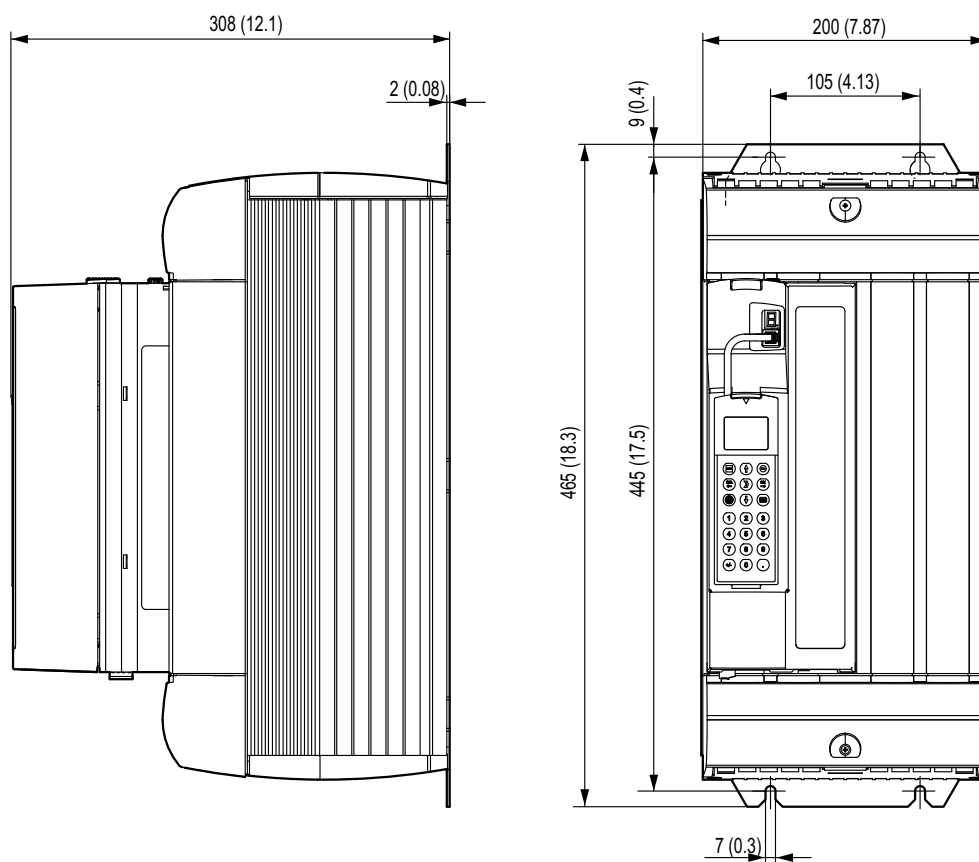
The following dimension drawing shows MDX61B size 2, dimensions in mm (in)





8.7.6 Size 3

The following dimension drawing shows MDX61B size 3, dimensions in mm (in)

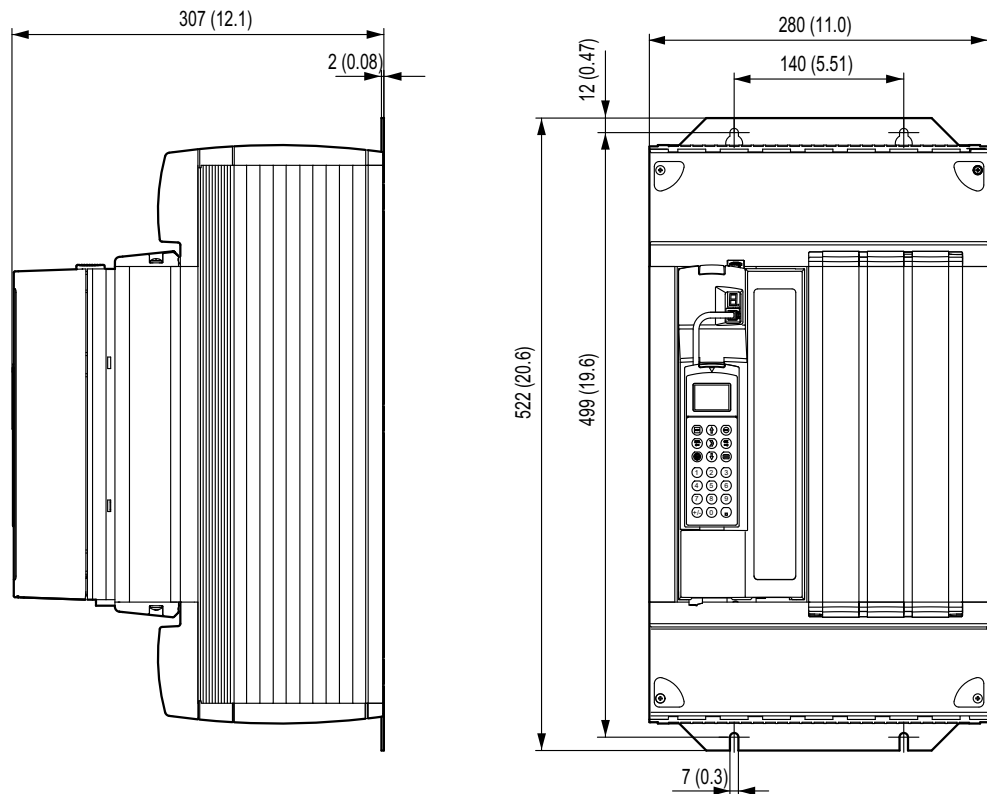


2058956683

kVA	n
f	
i	
P	Hz

8.7.7 Size 4

The following dimension drawing shows MDX61B size 4, dimensions in mm (in)

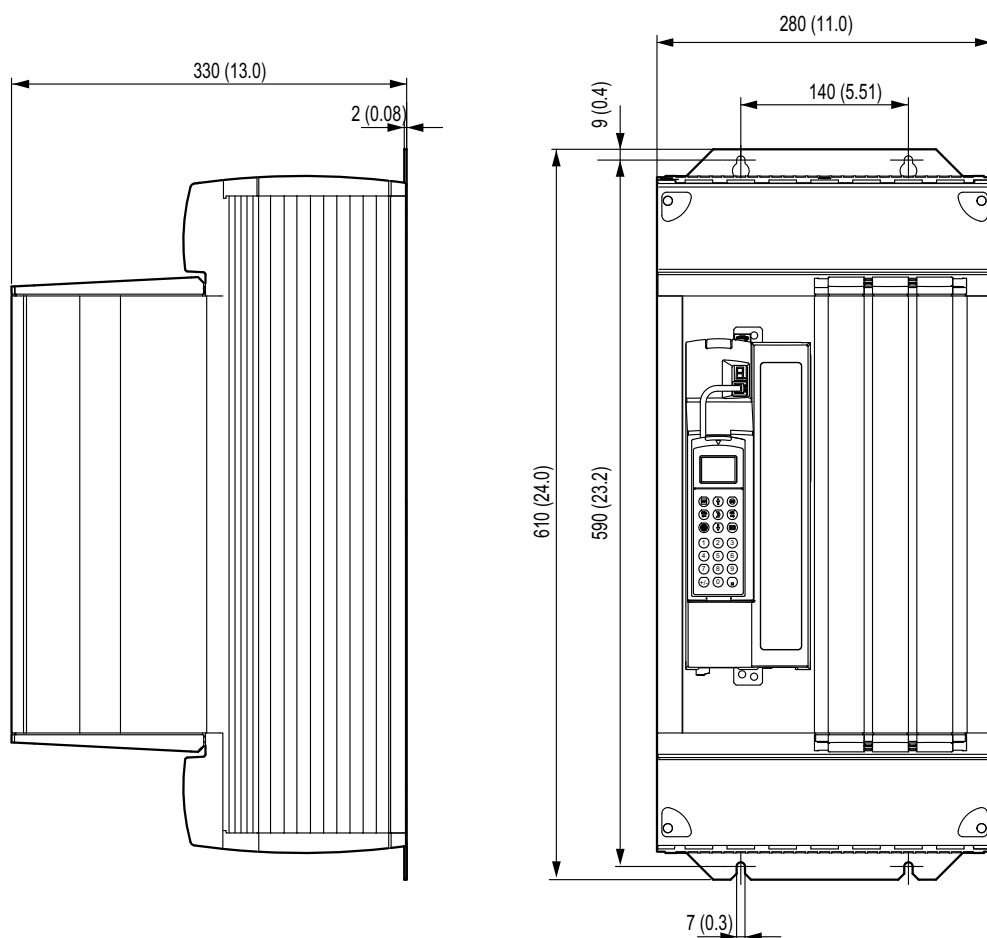


2058960267



8.7.8 Size 5

The following dimension drawing shows MDX61B size 5, dimensions in mm (in)

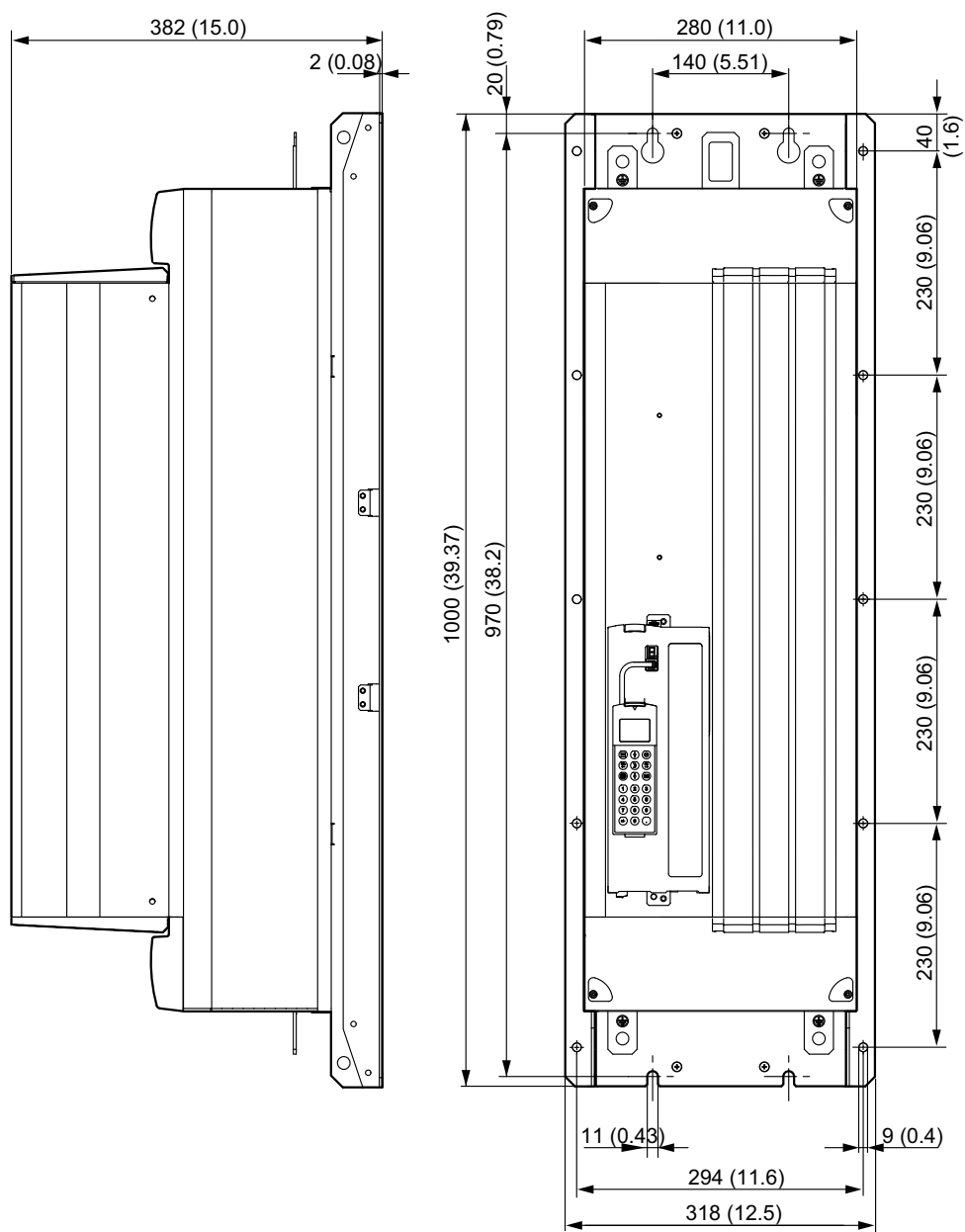


2058963851

kVA	n
f	
i	
P	Hz

8.7.9 Size 6

The following dimension drawing shows MDX61B size 6, dimensions in mm (in)

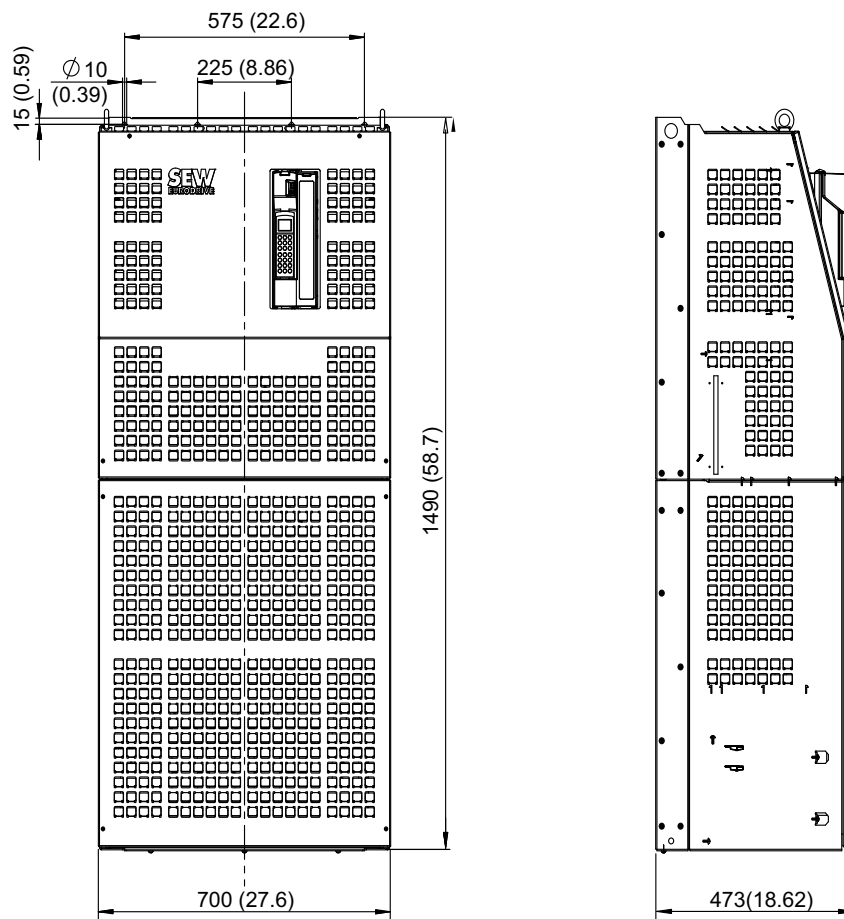


2058967435

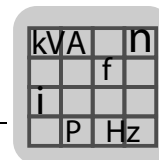


8.7.10 Size 7

The following dimension drawing shows MDX61B size 7, dimensions in mm (in)

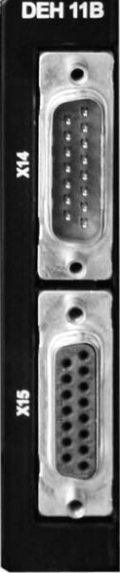


2058967435



8.8 Technical data for options DEH11B, DEH21B, DEU21B, DER11B, BW...-T/...-P

8.8.1 "HIPERFACE® encoder card type DEH11B" option

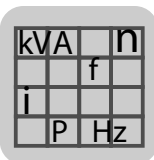
Option DEH11B			
 2058970635	Output for incremental encoder simulation or Input for external encoder X14:	Output for incremental encoder simulation: Signal level to RS422 The number of pulses at X14 corresponds to the number of pulses at X15 motor encoder input	External encoder input (max. 200 kHz): Permitted encoder types: - HIPERFACE® encoder - sin/cos encoder AC 1 V_{pp} - TTL encoder with negated tracks - Encoder with signal level to RS422 Encoder power supply: - DC+12 V¹⁾ (tolerance range DC 10.5 - 13 V) - I_{max} = DC 650 mA
	Motor encoder input X15:	Permitted encoder types: - HIPERFACE® encoder - sin/cos encoder AC 1 V_{pp} - TTL encoder with negated tracks - Encoder with signal level to RS422 - Permitted PPR count: 128/256/512/1024/2048 Encoder power supply: - DC+12 V¹⁾ (tolerance range DC 10.5 - 13 V) - I_{max} = DC 650 mA	

1) Total current load of DC 12 V encoder supply ≤ DC 650 mA.

8.8.2 "Encoder card type DEH21B" option

DEH21B option		
 2058987019	Encoder input X62:	SSI encoder input
	Motor encoder input X15:	Permitted encoder types: - HIPERFACE® encoder - sin/cos encoder AC 1 V_{pp} - TTL encoder with negated tracks - Encoder with signal level to RS422 - Permitted PPR count: 128/256/512/1024/2048 Encoder power supply: - DC+12 V¹⁾ (tolerance range DC 10.5 - 13 V) - I_{max} = DC 650 mA
	External power supply connection X60:	24VIN: DC 24 V power supply for encoder connected to X62

1) Total current load of DC 12 V encoder supply ≤ DC 650 mA.



Technical Data and Dimension Drawings

Technical data for options DEH11B, DEH21B, DEU21B, DER11B, BW...-T/...-

8.8.3 "Encoder card type DEU21B" option

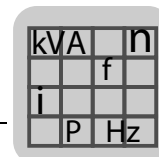
DEU21B option	
	External encoder connection X14: Output for incremental encoder simulation: - Signal level to RS422 - The number of pulses is the same as on X15 motor encoder input
	Motor encoder connection X15: Permitted encoder types: - HIPERFACE® encoders - sin/cos encoder AC 1 V_{pp} - CANopen encoder - TTL encoder with negated tracks - HTL encoder - SSI encoder - SSI combination encoder - EnDat encoder - Encoder with signal level to RS422 - Permitted PPR count: 2-4096 increments Encoder power supply: - DC 24 V encoder supply¹⁾ - DC 24 V encoder supply¹⁾

1) The maximum load on X14:13 and X15:13 is DC 650 mA in total. If the overall unit load on the 24 V level exceeds 400 mA, you must connect an external DC 24 V supply to X10:9/X10:10. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual.

8.8.4 "Resolver card type DER11B" option

DER11B option	
	Output for incremental encoder simulation or external encoder input X14: Output for incremental encoder simulation: Signal level to RS422 The number of pulses is 1024 pulses/revolution
	Motor encoder input X15: Resolver 2-pole, U _{ref} = AC 7 V _{eff} , 7 kHz U _{in} / U _{ref} = 0.5

1) Total current load of DC 12 V encoder supply ≤ DC 650 mA.



8.8.5 "BW...-T / BW...-P braking resistor" option

BW...-T / BW...-P braking resistor	
Connection cross section for signal contact	1 x 2.5 mm ²
Switching capability of the thermostat's signal contact	- DC 2 A / DC 24 V (DC11) - AC 2 A / AC 230V (AC11)
Switching contact	According to EN 61800-5-1

8.9 Technical data of DIO11B and DFC11B options

8.9.1 "Input/output card type DIO11B" option

Option DIO11B			
 2058995467	Setpoint input n2	X20:1/X20:2	AI21/AI22: Voltage input Differential input or input with AGND reference potential n2 = DC 0...+10 V or DC -10 V...0...+10 V 12 bit, sampling time 1 ms R _i > 40 kΩ
	AI21/AI22 operating mode		
	Resolution		
	Internal resistance		
	Analog outputs	X21:1/X21:4 X21:2/X21:5	AOV1/AOV2: Voltage outputs DC-10 V...0...+10 V, I _{max} = DC 10 mA, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_ AOC1/AOC2: Current outputs DC 0(4)...20 mA, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_
	Response time		5 ms
	Resolution		12 bit
	Binary inputs	X22:1...X22:8	Isolated (optocoupler), PLC compatible (EN 61131) DI1Ø...DI17 R _i ≈ 3 kΩ, I _E ≈ DC 10 mA Sampling interval 1 ms
	Internal resistance		
	Signal level		DC+13 V...+30 V = "1" = Contact closed DC -3 V...+5 V = "0" = Contact open
	Function	X22:1...X22:8	DI10...DI17: Selection option → Parameter menu P61_
	Binary outputs	X23:1...X23:8	DO1Ø...DO17: PLC-compatible (EN 61131-2), response time 1 ms
	Signal level		"0" = DC 0 V "1" = DC+24 V
	Function	X23:1...X23:8	DO10...DO17: Selection option → Parameter menu P63_ I _{max} = DC 50 mA, short-circuit proof and protected against external voltage to DC 30 V
	Reference terminals	X20:3/X21:3/ X21:6 X22:9 X22:10	AGND: Reference potential for analog signals (AI21/AI22/AO_1/AO_2) DCOM: Reference potential for binary inputs X22:1...X22:8 (DI1Ø...DI17) DGND: Reference potential for binary signals, reference potential for DC 24 V supply
	Voltage input	X23:9	24VIN: Supply voltage DC +24 V for binary outputs DO1Ø...DO17
	Permitted line cross section		One core per terminal: 0.08...1.5 mm ² (AWG 28...16) Two cores per terminal: 0.25...1 mm ² (AWG 22...17)



8.9.2 "CAN-Bus interface type DFC11B" option

DFC11B option		
	Communication profile	- SEW-MOVILINK® - CANopen - CAN Layer 2
	Number of process data words	1 ... 10 process data words
	Baud rate	Setting using parameter P894: 125 kbaud / 250 kbaud / 500 kbaud / 1 Mbaud
	Connection technology	Sub-D9 plug connector X30 (plug assigned to CIA standard) or via terminal X31
	Permitted line cross section X31 (CAN-Bus connection)	One core per terminal: 0.20 ... 2.5 mm ² (AWG24 ... 12) Two cores per terminal: 0.25 ... 1 mm ² (AWG22 ... 17)
	Terminating resistor	120 Ω (set using DIP switch S1-R)
	Addressing	Setting via parameter P891 (SBus MOVILINK) or P896 (CANopen)
	Tools for startup	- MOVITOOLS® MotionStudio software - DBG60B keypad



9 Declarations of Conformity

9.1 MOVIDRIVE®

EC Declaration of Conformity



900230010

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



declares under sole responsibility that the

frequency inverters of the series **MOVIDRIVE® B**

are in conformity with

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

- 1) These 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 11.12.09

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



Declarations of Conformity

MOVIDRIVE® with DFS11B/DFS21B

9.2 MOVIDRIVE® with DFS11B/DFS21B

EC Declaration of Conformity



900010010

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

declares under sole responsibility that the



frequency inverters of the series	MOVIDRIVE® B	
with built-in	DFS11B DFS21B	PROFIsafe® PROFIsafe®
are in conformity with		
Machinery Directive	2006/42/EC	1)
Low Voltage Directive	2006/95/EC	
EMC Directive	2004/108/EC	4)
applied harmonized standards	EN 13849-1:2008 EN 62061: 2006 EN 61800-5-1:2007 EN 61800-3:2007	5)

- 1) These 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 11.12.09

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



9.3 MOVIDRIVE® with DCS21B/DCS31B

EC Declaration of Conformity



900020010

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

declares under sole responsibility that the



frequency inverters of the series	MOVIDRIVE® B	
with built-in	DCS21B DCS31B	PROFIsafe®
are in conformity with		
Machinery Directive	2006/42/EC	1)
Low Voltage Directive	2006/95/EC	
EMC Directive	2004/108/EC	4)
applied harmonized standards	EN 13849-1:2008 EN 61800-5-1:2007 EN 61800-3:2007	5)

- 1) These 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 11.12.09

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



10 Address Directory

Germany			
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
	Graben	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf P.O. Box Postfach 1220 • D-76671 Graben-Neudorf	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production	Östringen	SEW-EURODRIVE Östringen GmbH Franz-Gurk-Straße 2 D-76684 Östringen P.O. Box Postfach 1174 • D-76677 Östringen	Tel. +49 7253 92540 Fax +49 7253 925490 oestringen@sew-eurodrive.de
	Central	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
Service Competence Center	North	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (near Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Dänkritzter Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	South	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (near München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
Technical Offices	Augsburg	SEW-EURODRIVE GmbH & Co KG August-Wessels-Straße 29 D-86156 Augsburg	Tel. +49 821 22779-10 Fax +49 821 22779-50 tb-augsburg@sew-eurodrive.de
	Berlin	SEW-EURODRIVE GmbH & Co KG Lilienthalstraße 3a D-12529 Schönefeld	Tel. +49 306331131-30 Fax +49 306331131-36 tb-berlin@sew-eurodrive.de
	Bodensee	SEW-EURODRIVE GmbH & Co KG Burgberggring 91 D-88662 Überlingen	Tel. +49 7551 9226-30 Fax +49 7551 9226-56 tb-bodensee@sew-eurodrive.de
	Bremen	SEW-EURODRIVE GmbH & Co KG Bornstr. 19 ... 22 D-28195 Bremen	Tel. +49 421 33918-10 Fax +49 421 33918-22 tb-bremen@sew-eurodrive.de
	Dortmund	SEW-EURODRIVE GmbH & Co KG Hildastraße 10 D-44145 Dortmund	Tel. +49 231 912050-10 Fax +49 231 912050-20 tb-dortmund@sew-eurodrive.de
	Dresden	SEW-EURODRIVE GmbH & Co KG Hauptstraße 32 D-01445 Radebeul	Tel. +49 351 26338-0 Fax +49 351 26338-38 tb-dresden@sew-eurodrive.de



Germany			
	Erfurt	SEW-EURODRIVE GmbH & Co KG Dubliner Straße 12 D-99091 Erfurt	Tel. +49 361 21709-70 Fax +49 361 21709-79 tb-erfurt@sew-eurodrive.de
	Güstrow	SEW-EURODRIVE GmbH & Co KG Am Gewerbegrund 3 D-18273 Güstrow P.O. Box Postfach 1216 • D-18262 Güstrow	Tel. +49 3843 8557-80 Fax +49 3843 8557-88 tb-guestrow@sew-eurodrive.de
	Hamburg	SEW-EURODRIVE GmbH & Co KG Bramfelder Straße 119 D-22305 Hamburg	Tel. +49 40 298109-60 Fax +49 40 298109-70 tb-hamburg@sew-eurodrive.de
	Hannover/Garbsen	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Str.40-42 D-30823 Garbsen P.O. Box Postfach 1104 53 • D-30804 Garbsen	Tel. +49 5137 8798-10 Fax +49 5137 8798-50 tb-hannover@sew-eurodrive.de
	Heilbronn	SEW-EURODRIVE GmbH & Co KG Zeppelinstraße 7 D-74357 Bönningheim	Tel. +49 7143 8738-0 Fax +49 7143 8738-25 tb-heilbronn@sew-eurodrive.de
	Herford	SEW-EURODRIVE GmbH & Co KG Radewiger Straße 21 D-32052 Herford P.O. Box Postfach 4108 • D-32025 Herford	Tel. +49 5221 9141-0 Fax +49 5221 9141-20 tb-herford@sew-eurodrive.de
	Karlsruhe	SEW-EURODRIVE GmbH & Co KG Ettlinger Weg 2 D-76467 Bietigheim P.O. Box Postfach 43 • D-76463 Bietigheim	Tel. +49 7245 9190-10 Fax +49 7245 9190-20 tb-karlsruhe@sew-eurodrive.de
	Kassel	SEW-EURODRIVE GmbH & Co KG Lange Straße 14 D-34253 Lohfelden	Tel. +49 561 95144-80 Fax +49 561 95144-90 tb-kassel@sew-eurodrive.de
	Koblenz	SEW-EURODRIVE GmbH & Co KG Bahnstraße 17a D-56743 Mendig	Tel. +49 2652 9713-30 Fax +49 2652 9713-40 tb-koblenz@sew-eurodrive.de
	Lahr	SEW-EURODRIVE GmbH & Co KG Europastraße 3/1 D-77933 Lahr / Schwarzwald	Tel. +49 7821 90999-60 Fax +49 7821 90999-79 tb-lahr@sew-eurodrive.de
	Langenfeld	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 tb-langenfeld@sew-eurodrive.de
	Magdeburg	SEW-EURODRIVE GmbH & Co KG Breiteweg 53 D-39179 Barleben	Tel. +49 39203 7577-1 Fax +49 39203 7577-9 tb-magdeburg@sew-eurodrive.de
	Mannheim	SEW-EURODRIVE GmbH & Co KG Besselstraße 26 D-68219 Mannheim	Tel. +49 621 71683-10 Fax +49 621 71683-22 tb-mannheim@sew-eurodrive.de
	München	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim	Tel. +49 89 90955-110 Fax +49 89 90955-150 tb-muenchen@sew-eurodrive.de
	Münster	SEW-EURODRIVE GmbH & Co KG Hafenplatz 4 D-48155 Münster	Tel. +49 251 41475-11 Fax +49 251 41475-50 tb-muenster@sew-eurodrive.de
	Nürnberg	SEW-EURODRIVE GmbH & Co KG Plattenäckerweg 6 D-90455 Nürnberg	Tel. +49 911 98884-50 Fax +49 911 98884-60 tb-nuernberg@sew-eurodrive.de



Germany			
	Regensburg	SEW-EURODRIVE GmbH & Co KG Im Gewerbepark A15 D-93059 Regensburg	Tel. +49 941 46668-68 Fax +49 941 46668-66 tb-regensburg@sew-eurodrive.de
	Rhein-Main	SEW-EURODRIVE GmbH & Co KG Niederstedter Weg 5 D-61348 Bad Homburg	Tel. +49 6172 9617-0 Fax +49 6172 9617-50 tb-rheinmain@sew-eurodrive.de
	Stuttgart	SEW-EURODRIVE GmbH & Co KG Friedrich-List-Straße 46 D-70771 Leinfelden-Echterdingen	Tel. +49 711 16072-0 Fax +49 711 16072-72 tb-stuttgart@sew-eurodrive.de
	Ulm	SEW-EURODRIVE GmbH & Co KG Dieselstraße 14 D-89160 Dornstadt	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 tb-ulm@sew-eurodrive.de
	Würzburg	SEW-EURODRIVE GmbH & Co KG Nürnbergerstraße 118 D-97076 Würzburg-Lengfeld	Tel. +49 931 27886-60 Fax +49 931 27886-66 tb-wuerzburg@sew-eurodrive.de
	Zwickau / Meerane	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg1 D-08393 Meerane	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 tb-zwickau@sew-eurodrive.de
France			
Production Sales Service	Hagenau	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Hagenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocom.com sew@usocom.com
Production	Forbach	SEW-EUROCOME Zone Industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Assembly Sales Service	Bordeaux	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Technical Offices	Alsace	SEW-USOCOME 1 rue Auguste Gasser F-68360 Soultz	Tel. +33 3 89 74 51 62 Fax +33 3 89 76 58 71
	Aquitaine / Charentes	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Auvergne / Limousin	SEW-USOCOME 27 avenue du Colombier F-19150 Laguenne	Tel. +33 5 55 20 12 10 Fax +33 5 55 20 12 11
	Basse-Normandie	SEW-USOCOME 5 rue de la Limare F-14250 Brouay	Tel. +33 2 31 37 92 86 Fax +33 2 31 74 68 15



France			
Bourgogne	SEW-USOCOME 10 rue de la Poste F-71350 Saint Loup Géanges	Tel. +33 3 85 49 92 18 Fax +33 3 85 49 92 19	
Bretagne	SEW-USOCOME Le bois Foucaud F-44270 Saint Même Le Tenu	Tel. +33 2 28 21 12 52 Fax +33 2 28 21 12 84	
Centre / Poitou	SEW-USOCOME 18 avenue André Ampère Appartement 14 F-37540 Saint Cyr sur Loire	Tel. +33 2 47 41 33 23 Fax +33 2 47 41 34 03	
Champagne-Ardenne	SEW-USOCOME Impasse des Ouisés F-10120 Saint André les Vergers	Tel. +33 3 25 79 63 24 Fax +33 3 25 79 63 25	
Franche-Comté	SEW-USOCOME 5 route de Besançon Maison B F-25870 Devecey	Tel. +33 3 81 60 20 47 Fax +33 3 81 87 75 93	
Ile-de-France est / Somme	SEW-USOCOME 45 rue des Cinelles F-77700 Bailly Romainvilliers	Tel. +33 1 64 17 02 47 Fax +33 1 64 17 66 49	
Ile-de-France nord / Picardie	SEW-USOCOME 25bis rue Kléber F-92300 Levallois Perret	Tel. +33 1 41 05 92 74 Fax +33 1 41 05 92 75	
Ile-de-France sud	SEW-USOCOME 6 chemin des Bergers Lieu-dit Marchais F-91410 Roinville sous Dourdan	Tel. +33 1 60 81 10 56 Fax +33 1 60 81 10 57	
Lorraine / Alsace nord	SEW-USOCOME 1 rue de la Forêt F-54250 Champigneulles	Tel. +33 3 83 96 28 04 Fax +33 3 83 96 28 07	
Midi-Pyrénées / Roussillon	SEW-USOCOME 179 route de Grazac F-31190 Caujac	Tel. +33 5 61 08 15 85 Fax +33 5 61 08 16 44	
Nord-Pas de Calais	SEW-USOCOME 209 route d'Hesdigneul F-62360 Hesdin l'Abbé	Tel. +33 3 21 10 86 86 Fax +33 3 21 10 86 87	
Paris / Ile-de-France ouest	SEW-USOCOME 42 avenue Jean Jaurès F-78580 Maule	Tel. +33 1 30 90 89 86 Fax +33 1 30 90 93 15	
Pays de la Loire	SEW-USOCOME 4 rue des Châtaigniers F-44830 Brains	Tel. +33 2 51 70 54 04 Fax +33 2 51 70 54 05	
Provence-Alpes-Côte d'Azur	SEW-USOCOME Résidence Les Hespérides Bât. B2 67 boulevard des Alpes F-13012 Marseille	Tel. +33 4 91 18 00 11 Fax +33 4 91 18 00 12	
Rhône-Alpes est	SEW-USOCOME Montée de la Garenne F-26750 Génissieux	Tel. +33 4 75 05 65 95 Fax +33 4 75 05 65 96	
Rhône-Alpes nord	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 03 Fax +33 4 72 15 37 15	



France			
	Rhône-Alpes ouest	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 04 Fax +33 4 72 15 37 15
Algeria			
Sales	Alger	Réducom 16, rue des Frères Zagnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84 reducom_sew@yahoo.fr
Argentina			
Assembly Sales Service	Buenos Aires	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Australia			
Assembly Sales Service	Melbourne	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Sales Service	Adelaide	SEW-EURODRIVE PTY. LTD. 9C Park Way Mawson Lakes, SA 5095	Tel. +61 8 8161 4000 Fax +61 8 8161 4002 enquires@sew-eurodrive.com.au
	Brisbane	SEW-EURODRIVE PTY.LTD. 1 /34 Collinsvale St Rocklea, Queensland, 4106	Tel. +61 7 3276 5100 Fax +61 7 3276 5102 enquires@sew-eurodrive.com.au
	Perth	SEW-EURODRIVE PTY. LTD. 105 Robinson Avenue Belmont, W.A. 6104	Tel. +61 8 9478-2688 Fax +61 8 9277-7572 enquires@sew-eurodrive.com.au
Technical Office	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au
Austria			
Assembly Sales Service	Wien	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Technical Offices	Linz	SEW-EURODRIVE Ges.m.b.H. Reuchlinstr. 6/3 A-4020 Linz	Tel. +43 732 655 109-0 Fax +43 732 655 109-20 tb-linz@sew-eurodrive.at
	Graz	SEW-EURODRIVE Ges.m.b.H. Grabenstraße 231 A-8045 Graz	Tel. +43 316 685 756-0 Fax +43 316 685 755 tb-graz@sew-eurodrive.at
	Dornbirn	SEW-EURODRIVE Ges.m.b.H. Lustenauerstraße 27/1 A-6850 Dornbirn	Tel. +43 5572 3799-0 Fax +43 5572 3725 99-20 tb-dornbirn@sew-eurodrive.at
Bangladesh			
Sales	Dhaka	Jainex Industrial and Engineering Ltd B 12 Apon Nibash East Nasirabad Bangladesh	Tel. +880 1713103502 Fax +880 31 613041 jainexbd@onlinectg.net



Belarus			
Sales	Minsk	SEW-EURODRIVE BY Rybalko Str. 26 BY-220033 Minsk	Tel. +375 (17) 298 38 50 Fax +375 (17) 29838 50 sales@sew.by
Belgium			
Assembly Sales Service	Brüssel	SEW Caron-Vector Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.be info@caron-vector.be
Service Competence Center	Industrial Gears	SEW Caron-Vector Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
	Antwerp	SEW Caron-Vector Glasstraat, 19 BE-2170 Merksem	Tel. +32 3 64 19 333 Fax +32 3 64 19 336 http://www.sew-eurodrive.be service-antwerpen@sew-eurodrive.be
Brazil			
Production Sales Service	Sao Paulo	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net
Cameroon			
Sales	Douala	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137
Canada			
Assembly Sales Service	Toronto	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
Additional addresses for service in Canada provided on request!			
Chile			
Assembly Sales Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPÁ RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl



China			
Production Assembly Sales Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267891 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478398 Fax +86 27 84478388
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 88241718 Fax +86 29 68686296 logistic-xa@sew-eurodrive.cn
Colombia			
Assembly Sales Service	Bogotá	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co
Croatia			
Sales Service	Zagreb	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Sales	Praha	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Technical Offices	Brno	SEW-EURODRIVE CZ S.R.O. Křenová 52 CZ -60200 Brno	Tel. +420 543 256 151 +420 543 256 163 Fax +420 543 256 845
	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 CZ-50202 Hradec Králové	Tel. +420 495 510 141 Fax +420 495 521 313
	Plzeň	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradní 173/2 CZ-32600 Plzeň	Tel. +420 378 775 300 Fax +420 377 970 710
	Ostrava	SEW-EURODRIVE CZ S.R.O. Studenská 6202/17 CZ-708 00 Ostrava-Poruba	Tel. +420 738 339 044 Mobile +420 724 889 965



Czech Republic			
	Klatovy	SEW-EURODRIVE CZ S.R.O. Technická kancelář Klatovy Domažlická 800 CZ-33901 Klatovy	Tel. +420 376 310 729 Fax +420 376 310 725
Denmark			
Assembly Sales Service	Kopenhagen	SEW-EURODRIVE A/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales Service	Cairo	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 + 1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg
Service	Sharjah	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah United Arabian Emirates	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae
Estonia			
Sales	Tallin	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee
Finland			
Assembly Sales Service	Lahti	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 sew@sew.fi http://www.sew-eurodrive.fi
Technical Offices	Helsinki	SEW-EURODRIVE OY Luutnantintie 5 FIN-00410 Helsinki	Tel. +358 201 589-300 Fax + 358 9 5666-311 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Hietasaarenkatu 18 FIN-65100 Vaasa	Tel. +358 201 589-300 Fax +358 6 3127-470 sew@sew.fi
	Rovaniemi	SEW-EURODRIVE OY Valtakatu 4 A FIN-96100 Rovaniemi	Tel. +358 201 589-300 Fax +358 201 589-239 sew@sew.fi
Production Assembly	Karkkila	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi
Gabon			
Sales	Libreville	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059
Great Britain			
Assembly Sales Service	Normanton	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk



Great Britain			
Technical Offices	London	SEW-EURODRIVE Ltd. 764 Finchely Road, Temple Fortune GB-London N.W.11 7TH	Tel. +44 20 8458-8949 Fax +44 20 8458-7417
	Midlands	SEW-EURODRIVE Ltd. 5 Sugar Brook court, Aston Road, Bromsgrove, Worcs B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245
	Scotland	SEW-EURODRIVE Ltd. Scottish Office No 37 Enterprise House Springkerse Business Park GB-Stirling FK7 7UF Scotland	Tel. +44 17 8647-8730 Fax +44 17 8645-0223
	Northern Ireland	Heyn Engineering (NI) Ltd. 1 Corry Place, Belfast, BT3 9AH	Tel. +44 02890350022 Fax +44 02890350012 info@heyn.co.uk http://www.heyn.co.uk
Greece			
Sales Service	Athen	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Technical Office	Thessaloniki	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr
Hong Kong			
Assembly Sales Service	Hong Kong	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk
Hungary			
Sales Service	Budapest	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu
Iceland			
Sales	Reykjavik	Vélaverk ehf. Bólholti 8, 3h. IS - 105 Reykjavik	Tel. +354 568 3536 Fax +354 568 3537 velaverk@velaverk.is
India			
Registered Office Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.com
Assembly Sales Service	Chennai	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 c.v.shivkumar@seweurodriveindia.com



India			
Technical Offices	Ahmedabad	SEW-EURODRIVE India Private Limited 306, Shaan office complex, Behind Sakar-IV, Ellisebridge, Ashram Road Ahmedabad – Gujarat	Tel. +91 79 40072067/68 Fax +91 79 40072069 bankim.barot@seweurodriveindia.com
	Bengaluru	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bengaluru - 560052 - Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveindia.com ganesh@seweurodriveindia.com
	Chandigarh	SEW EURODRIVE India Private Limited Sujit Kumar Mishra H.No.5464/3 Modern Housing Complex Manimajra Chandigarh -160101	Tel. +91 9878469579 Fax +91 1722738664 saleschand@seweurodriveindia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu	Tel. +91 44 42849813 Fax +91 44 42849816 saleschen@seweurodriveindia.com c.v.shivkumar@seweurodriveindia.com
	Coimbatore	SEW-EURODRIVE India Private Limited Office No 60 Arpee Centre (Opp Annapoorna Hotel) 420 N, NSR Road, Saibaba Colony Coimbatore 641 0111 - Tamil Nadu	Tel. +91 422 2455420 Fax +91 422 2443988 salescmb@seweurodriveindia.com p.selvakumar@seweurodriveindia.com
	Cuttack	SEW-EURODRIVE India Private Limited Plot No.- 1764, Nuasahi, Nayapalli Bhubaneswar-12 Orissa	Tel. +91 9937446333 manoranjana.sahoo@seweurodriveindia.com
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpet Hyderabad - 500016 - Andhra Pradesh	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyd@seweurodriveindia.com ma.choudary@seweurodriveindia.com
	Jamshedpur	SEW-EURODRIVE India Private Limited Flat No.: B/2, B.S. Apartment Road No.: 4, Contractor's area, Bistupur Jamshedpur 831 001 - Chhattisgarh	Tel. +91 9934123671 siddaratha.mishra@seweurodriveindia.com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal	Tel. +91 33 22827457 Fax +91 33 22894204 saleskal@seweurodriveindia.com a.j.biswas@seweurodriveindia.com
	Lucknow	SEW-EURODRIVE India Private Limited 69, Shiv Vihar Colony Vikas Nagar-5 Lucknow 226022 - Uttar Pradesh	Tel. +91 9793627333 amit.nigam@seweurodriveindia.com
	Madgaon	SEW-EURODRIVE India Private Limited Flat No.-G1, Shivas-Laxmi Prasad Co-Operative Housing Society, Padmanarayan Estate, Near Jivottaam Math, Gagole Madgao, Goa - 403 602	samrat.chakravorty@seweurodriveindia.com



India			
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com p.s.ray@seweurodriveindia.com
	New Delhi	SEW-EURODRIVE India Private Limited 418-419, Suneja Tower-1 District Centre, Janak Puri New Delhi 110 058	Tel. +91 11 25544111 Fax +91 11 25544113 salesdelhi@seweurodriveindia.com vikram.juneja@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Lunawat Prism 4th floor, S. No. 148, Neena Co-Operative Housing Society, Paud Road, Pune 411038 - Maharashtra	Tel. +91 20 25380730 / 735 Fax +91 20 25380721 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited A-42, Ashoka Millenium Complex, Ring Road-1, Raipur 492 001 - Chhattisgarh	Tel. +91 771 4090765 Fax +91 771 4090765 sutanu.sarkar@seweurodriveindia.com
Indonesia			
Represented by	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Ireland			
Sales Service	Dublin	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie
Israel			
Sales	Tel-Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly Sales Service	Milano	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical Offices	Bologna	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 I-40064 Ozzano dell'Emilia (Bo)	Tel. +39 051 65-23-801 Fax +39 051 796-595
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 I-81020 S. Nicola la Strada (Caserta)	Tel. +39 0823 219011 Fax +39 0823 421414
	Pescara	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa,132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 085 41-59-643
	Torino	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C I-10135 Torino	Tel. +39 011 3473780 Fax +39 011 3473783
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via P. Sgulmero, 27/A I-37132 Verona	Tel. +39 045 89-239-11 Fax +39 045 97-6079



Ivory Coast			
Sales	Abidjan	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36
Japan			
Assembly Sales Service	Iwata	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical Offices	Fukuoka	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th flor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Omarimon Yusen Bldg. 13th floor 3-23-5 Nishinbashi, Minato-ku Tokyo 105-0003	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp
Kazakhstan			
Sales	Almaty	SEW-EURODRIVE LLP Raimbek Ave. 348 KZ-050061 Almaty	Tel. +7 (727) 334 1880 Fax +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
Korea			
Assembly Sales Service	Ansan-City	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master@sew-korea.co.kr
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr
Technical Offices	Daegu	SEW-EURODRIVE KOREA Co., Ltd. No.1108 Sungan officetel 87-36, Duryu 2-dong, Dalseo-ku Daegu 704-712	Tel. +82 53 650-7111 Fax +82 53 650-7112
	DaeJeon	SEW-EURODRIVE KOREA Co., Ltd. No. 1502, Hongin officetel 536-9, Bongmyung-dong, Yusung-ku Daejeon 305-301	Tel. +82 42 828-6461 Fax +82 42 828-6463
	Kwangju	SEW-EURODRIVE KOREA Co., Ltd. 4fl., Dae-Myeong B/D 96-16 Unam-dong, Buk-ku Kwangju 500-170	Tel. +82 62 511-9172 Fax +82 62 511-9174
	Seoul	SEW-EURODRIVE KOREA Co., Ltd. No.504 Sunkyung officetel 106-4 Kuro 6-dong, Kuro-ku Seoul 152-054	Tel. +82 2 862-8051 Fax +82 2 862-8199



Latvia			
Sales	Riga	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139253 Fax +371 7139386 http://www.alas-kuul.com info@alas-kuul.com
Lebanon			
Sales	Beirut	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 ssacar@inco.com.lb
	Beirut	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 philipppe.acar@medrives.com
Lithuania			
Sales	Alytus	UAB Irseva Naujoji 19 LT-62175 Alytus	Tel. +370 315 79204 Fax +370 315 56175 info@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
Assembly Sales Service	Brüssel	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.sew-eurodrive.lu info@caron-vector.be
Malaysia			
Assembly Sales Service	Johore	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical Offices	Kota Kinabalu	SEW-EURODRIVE Sdn Bhd (Kota Kinabalu Branch) Lot No. 2, 1st Floor, Inanam Baru Phase III, Miles 5.1 /2, Jalan Tuaran, Inanam 89350 Kota Kinabalu Sabah, Malaysia	Tel. +60 88 424792 Fax +60 88 424807
	Kuala Lumpur	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 5229633 Fax +60 3 5229622 sewpoj@po.jaring.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTLD Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 seweurodrive@po.jaring.my



Mauritania			
Sales	Zouérate	AFRICOM - SARL En Face Marché Dumez P.B. 88 Zouérate	Tel. +222 54 40134 Fax +222 54 40538 cybertiris@mauritel.mr
Mexico			
Assembly Sales Service	Quéretaro	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Morocco			
Sales	Casablanca	Afit 5, rue Emir Abdelkader MA 20300 Casablanca	Tel. +212 522618372 Fax +212 522618351 ali.alami@premium.net.ma
Netherlands			
Assembly Sales Service	Rotterdam	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu
		VECTOR Aandrijftechniek B.V. Gelderhorst 10 NL-7207 BH Zutphen Industrieterrein de Revelhorst	Tel. +31 575 57 44 94 Fax +31 575 57 24 43 oost@vector.nu
		VECTOR Aandrijftechniek B.V. Mercuriusweg 8A NL-5971 LX Grubbenvorst	Tel. +31 77 36 61 873 Fax +31 77 36 62 109 zuid@vector.nu
		VECTOR Aandrijftechniek B.V. Weberstraat 74 NL-1446 VV Purmerend Industrieterrein "De Baansteer"	Tel. +31 299 66 63 38 Fax +31 299 47 60 55 noordwest@vector.nu
New Zealand			
Assembly Sales Service	Auckland	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferryhead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Technical Office	Palmerston North	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz
Norway			
Assembly Sales Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no



Peru			
Assembly Sales Service	Lima	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe
Philippines			
Represented by	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Poland			
Assembly Sales Service	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 45 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
		24 Hour Service	Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Technical Office	Tychy	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fabryczna 5 PL-43-100 Tychy	Tel. +48 32 32 32 610 Fax +48 32 32 32 647
	Bydgoszcz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Fordońska 246 PL-85-959 Bydgoszcz	Tel. +48 52 3606590 Fax +48 52 3606591
	Poznan	SEW-EURODRIVE Polska Sp.z.o.o. ul. Romana Maya 1 PL-61-371 Poznań	Tel. +48 61 8741640 Fax +48 61 8741641
	Radom	SEW-EURODRIVE Polska Sp.z.o.o. ul. Słowackiego 84 PL-26-600 Radom	Tel. +48 48 365 40 50 Fax +48 48 365 40 51
	Szczecinek	SEW-EURODRIVE Polska Sp.z.o.o. ul. Mickiewicza 2 PL-78-400 Szczecinek	Tel. +48 94 3728820 Fax +48 94 3728821
Portugal			
Assembly Sales Service	Coimbra	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
Technical Offices	Lisboa	SEW-EURODRIVE, LDA. Núcleo Empresarial I de São Julião do Tojal Rua de Entremuros, 54 Fracção I P-2660-533 São Julião do Tojal	Tel. +351 21 958-0198 Fax +351 21 958-0245 esc.lisboa@sew-eurodrive.pt
	Porto	SEW-EURODRIVE, LDA. Av. 25 de Abril, 68 4440-502 Valongo	Tel. +351 229 350 383 Fax +351 229 350 384 MobilTel. +351 9 32559110 esc.porto@sew-eurodrive.pt
Romania			
Sales Service	Bucureşti	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro



Russia			
Assembly Sales Service	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Technical Office	Yekaterinburg	ZAO SEW-EURODRIVE Kominterna Str. 16 Office 614 RUS-620078 Ekaterinburg	Tel. +7 343 310 3977 Fax +7 343 310 3978 eso@sew-eurodrive.ru
	Irkutsk	ZAO SEW-EURODRIVE 5-Armii Str., 31 RUS-664011 Irkutsk	Tel. +7 3952 25 5880 Fax +7 3952 25 5881 iso@sew-eurodrive.ru
	Moskau	ZAO SEW-EURODRIVE RUS-107023 Moskau	Tel. +7 495 9337090 Fax +7 495 9337094 mso@sew-eurodrive.ru
	Novosibirsk	ZAO SEW-EURODRIVE pr. K Marksa, d.30 RUS-630087 Novosibirsk	Tel. +7 383 3350200 Fax +7 383 3462544 nso@sew-eurodrive.ru
	Togliatti	ZAO SEW-EURODRIVE Sportivnaya Str. 4B, office 2 Samarskaya obl. RUS-445057 Togliatti	Tel. +7 8482 710529 Fax +7 8482 810590
Senegal			
Sales	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn
Serbia			
Sales	Beograd	DIPAR d.o.o. Ustanicka 128a PC Košum, IV floor SCG-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.co.yu
Singapore			
Assembly Sales Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com
Slovakia			
Sales	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovska cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk



Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net
South Africa			
Assembly Sales Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
Technical Offices	Port Elizabeth	SEW-EURODRIVE PTY LTD. 8 Ruan Access Park Old Cape Road Greenbushes 6000 Port Elizabeth	Tel. +27 41 3722246 Fax +27 41 3722247 dtait@sew.co.za
	Richards Bay	SEW-EURODRIVE PTY LTD. 103 Bulion Blvd Richards Bay P.O. Box 458 Richards Bay, 3900	Tel. +27 35 797-3805 Fax +27 35 797-3819 jswart@sew.co.za
Spain			
Assembly Sales Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es
Technical Offices	Barcelona	Delegación Barcelona Avenida Francesc Macià 40-44 Oficina 4.2 E-08208 Sabadell (Barcelona)	Tel. +34 93 7162200 Fax +34 93 7233007
	Lugo	Delegación Noroeste Apartado, 1003 E-27080 Lugo	Tel. +34 639 403348 Fax +34 982 202934
	Madrid	Delegación Madrid Gran Vía. 48-2° A-D E-28220 Majadahonda (Madrid)	Tel. +34 91 6342250 Fax +34 91 6340899
	Seville	MEB Pólogono Calonge, C/A Nave 2 - C E-41.077 Sevilla	Tel. +34 954 356 361 Fax +34 954 356 274 mebsa.sevilla@mebsa.com



Spain			
	Valencia	MEB Músico Andreu i Piqueres, 4 E-46.900 Torrente (Valencia)	Tel. +34 961 565 493 Fax +34 961 566 688 mebsa.valencia@mebsa.com
Sri Lanka			
Sales	Colombo	SM International (Pte) Ltd 254, Galle Raod Colombo 4, Sri Lanka	Tel. +94 1 2584887 Fax +94 1 2582981
Sweden			
Assembly Sales Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se
Sales	Göteborg	SEW-EURODRIVE AB Gustaf Werners gata 8 S-42132 Västra Frölunda	Tel. +46 31 70968 80 Fax +46 31 70968 93 goteborg@sew.se
	Stockholm	SEW-EURODRIVE AB Björkholmsvägen 10 S-14146 Huddinge	Tel. +46 8 44986 80 Fax +46 8 44986 93 stockholm@sew.se
	Malmö	SEW-EURODRIVE AB Borrgatan 5 S-21124 Malmö	Tel. +46 40 68064 80 Fax +46 40 68064 93 malmo@sew.se
	Skellefteå	SEW-EURODRIVE AB Trädgårdsgatan 8 S-93131 Skellefteå	Tel. +46 910 7153 80 Fax +46 910 7153 93 skelleftea@sew.se
Switzerland			
Assembly Sales Service	Basel	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Technical Offices	Rhaetian Switzerland	André Gerber Es Perreyres CH-1436 Chamblon	Tel. +41 24 445 3850 Fax +41 24 445 4887
	Bern / Solothurn	Rudolf Bühler Muntersweg 5 CH-2540 Grenchen	Tel. +41 32 652 2339 Fax +41 32 652 2331
	Central Switzerland and Ticino	Beat Lütolf Baumacher 11 CH-6244 Nebikon	Tel. +41 62 756 4780 Fax +41 62 756 4786
	Central Switzerland, Aargau	Armin Pfister Stierenweid CH-4950 Huttwill, BE	Tel. +41 62 962 54 55 Fax +41 62 962 54 56
	Zürich, Ticino	Gian-Michele Muletta Fischerstrasse 61 CH-8132 Egg bei Zürich	Tel. +41 44 994 81 15 Fax +41 44 994 81 16
	Bodensee and East Switzerland	Markus Künzle Eichweg 4 CH-9403 Goldach	Tel. +41 71 845 2808 Fax +41 71 845 2809
Taiwan (R.O.C.)			
Sales	Nan Tou	Ting Shou Trading Co., Ltd. No. 55 Kung Yeh N. Road Industrial District Nan Tou 540	Tel. +886 49 255353 Fax +886 49 257878



Taiwan (R.O.C.)			
	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Hwa South Road, Taipei	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net
Thailand			
Assembly Sales Service	Chonburi	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Technical Offices	Bangkok	SEW-EURODRIVE (Thailand) Ltd. 6th floor, TPS Building 1023, Phattanakarn Road Suanluang Bangkok, 10250	Tel. +66 2 7178149 Fax +66 2 7178152 sewthailand@sew-eurodrive.com
	Hadyai	SEW-EURODRIVE (Thailand) Ltd. Hadyai Country Home Condominium 59/101 Soi. 17/1 Rachas-Utid Road. Hadyai, Songkhla 90110	Tel. +66 74 359441 Fax +66 74 359442 sewthailand@sew-eurodrive.com
	Khonkaen	SEW-EURODRIVE (Thailand) Ltd. 4th Floor, Kaow-U-HA MOTOR Bldg, 359/2, Mitraphab Road. Muang District Khonkaen 40000	Tel. +66 43 225745 Fax +66 43 324871 sew-thailand@sew-eurodrive.com
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn
Turkey			
Assembly Sales Service	Istanbul	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 4419164 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
Technical Offices	Adana	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Kizilay Caddesi 8 Sokak No 6 Daötekin Is Merkezi Kat 4 Daire 2 TR-01170 SEYHAN / ADANA	Tel. +90 322 359 94 15 Fax +90 322 359 94 16
	Ankara	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Özcelik Is Merkezi, 14. Sok, No. 4/42 TR-06370 Ostim/Ankara	Tel. +90 312 385 33 90 Fax +90 312 385 32 58
	Bursa	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Üçevler Mah. Bayraktepe Sok. Akay İş Merkezi Kat:3 No: 7/6 TR Nilüfer/Bursa	Tel. +90 224 443 45 60 Fax +90 224 443 45 58
	Izmir	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. 1203/11 Sok. No. 4/613 Hasan Atli Is Merkezi TR-35110 Yenisehir-Izmir	Tel. +90 232 469 62 64 Fax +90 232 433 61 05



Ukraine			
Sales Service	Dnepropetrovsk	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua
	Kiev	SEW-EURODRIVE GmbH S. Oleynika str. 21 02068 Kiev	Tel. +380 44 503 95 77 Fax +380 44 503 95 78 kso@sew-eurodrive.ua
	Donetsk	SEW-EURODRIVE GmbH 25th anniversary of RKKA av. 1-B, of. 805 Donetsk 83000	Tel. +380 62 38 80 545 Fax +380 62 38 80 533 dso@sew-eurodrive.ua
Uruguay			
Sales	Montevideo	SEW-EURODRIVE Uruguay, S. A. Jose Serrato 3569 Esquina Corumbe CP 12000 Montevideo	Tel. +598 2 21181-89 Fax +598 2 21181-89 sewuy@sew-eurodrive.com.uy
USA			
Production Assembly Sales Service Corporate Offices	Southeast Region	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly Sales Service	Northeast Region	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Additional addresses for service in the USA provided on request!		
Venezuela			
Assembly Sales Service	Valencia	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net



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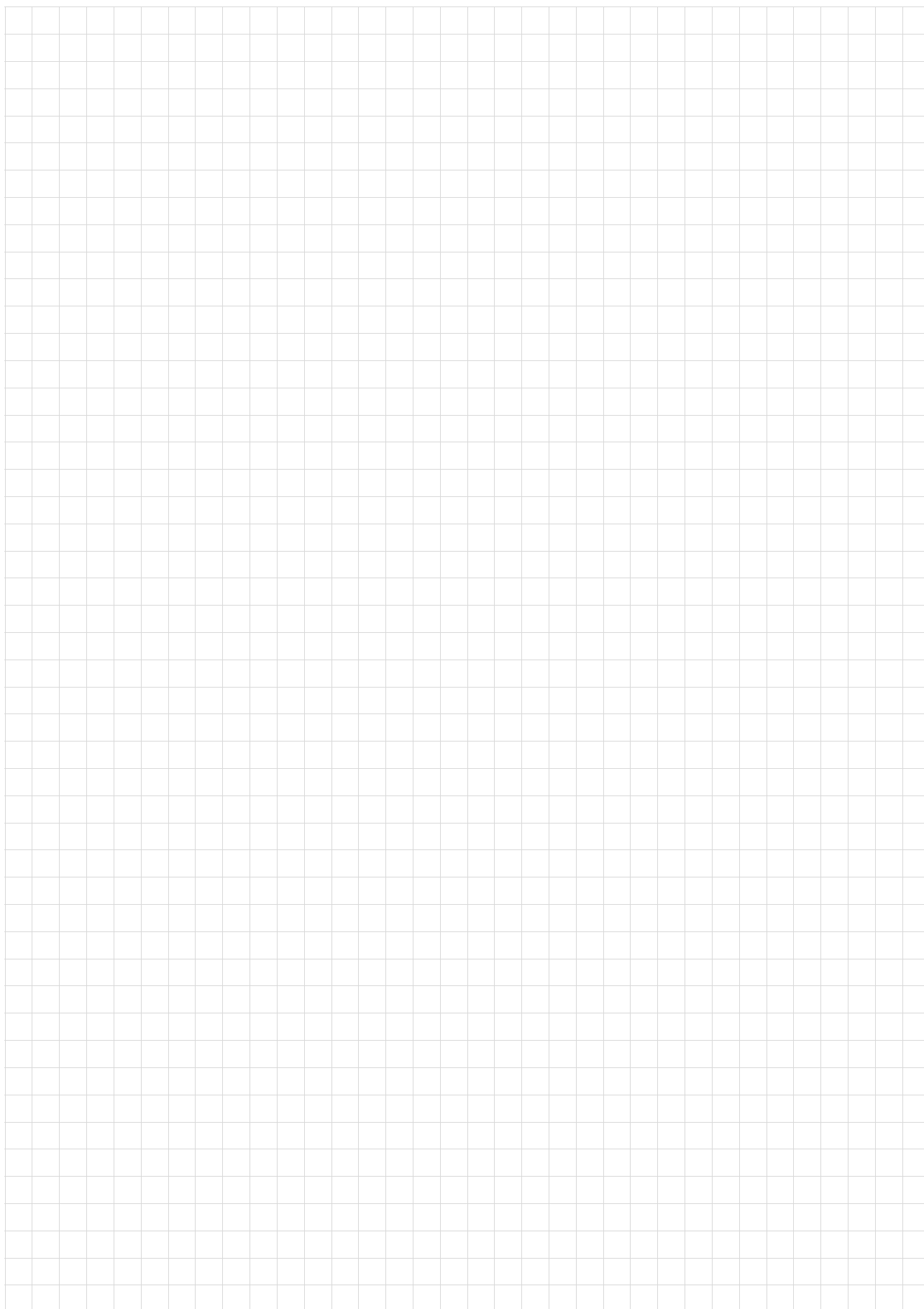
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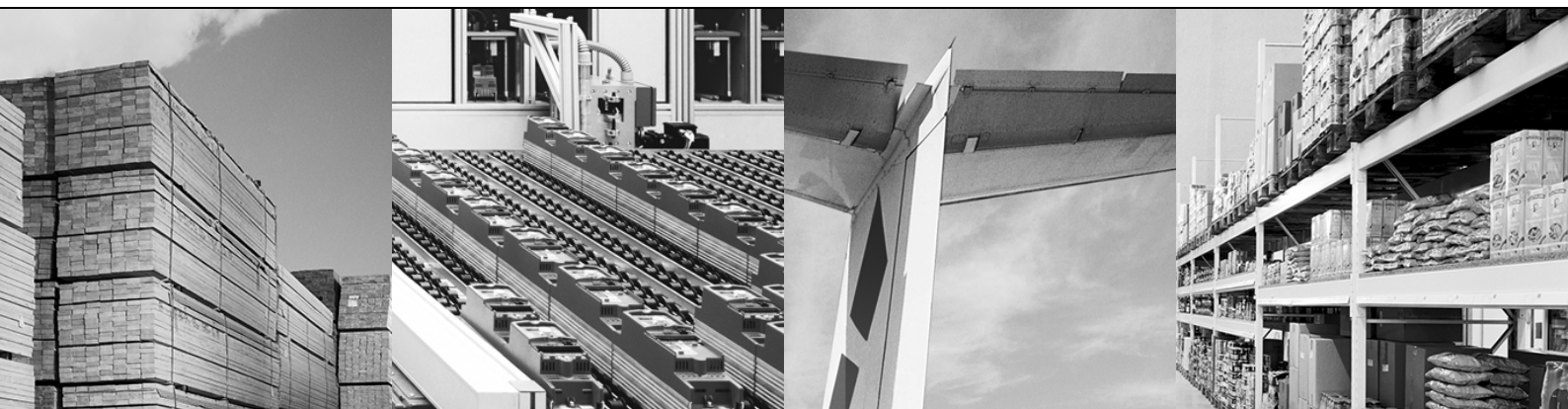
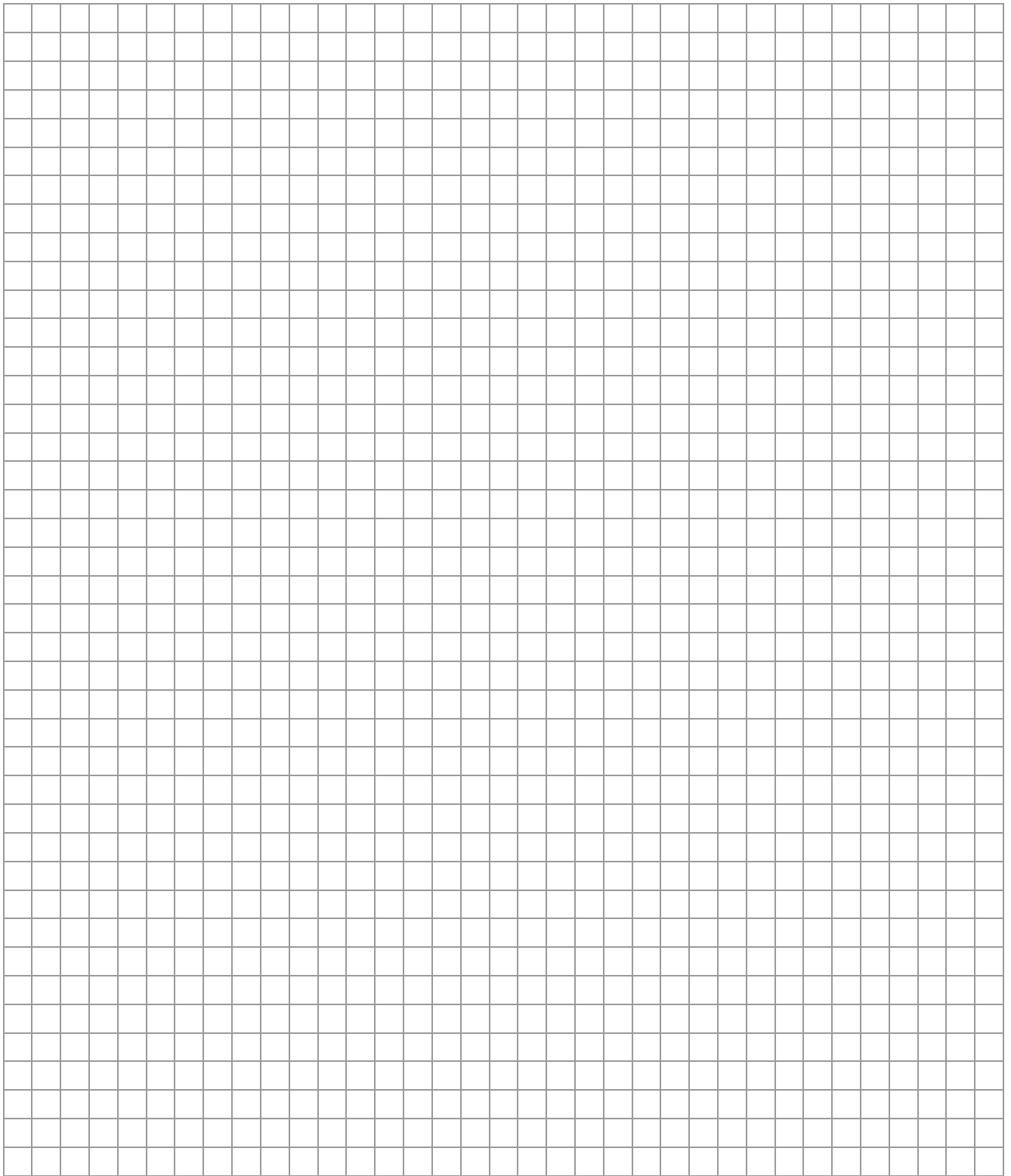
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SEW-EURODRIVE
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SEW
EURODRIVE

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Str. 42
76646 BRUCHSAL
GERMANY
Tel. +49 7251 75-0
Fax +49 7251 75-1970
sew@sew-eurodrive.com
→ www.sew-eurodrive.com