

SEW
EURODRIVE



MOVIDRIVE® MDX60B/61B

Edition 03/2008

11696613 / EN

Operating Instructions





1	General Information	5
1.1	Structure of the safety notes	5
1.2	Rights to claim under warranty	5
1.3	Exclusion of liability	5
2	Safety Notes	6
2.1	General information	6
2.2	Target group	6
2.3	Designated use	6
2.4	Transportation, storage	7
2.5	Installation	7
2.6	Electrical connection	7
2.7	Safe disconnection	8
2.8	Operation	8
3	Unit Design	9
3.1	Unit designation, nameplates and scope of delivery	9
3.2	Size 0	12
3.3	Size 1	13
3.4	Size 2S	14
3.5	Size 2	15
3.6	Size 3	16
3.7	Size 4	17
3.8	Size 5	18
3.9	Size 6	19
4	Installation	20
4.1	Installation instructions for the basic unit	20
4.2	Removing/installing the keypad	27
4.3	Removing/installing the front cover	28
4.4	UL-compliant installation	30
4.5	Shield clamps	32
4.6	Touch guard power terminals	35
4.7	Wiring diagrams – basic unit	38
4.8	Assignment of braking resistors, chokes and filters	42
4.9	Connecting the system bus (SBus 1)	48
4.10	Connecting the RS485 interface	49
4.11	Connecting the DWE11B/12B interface adapter	50
4.12	Connecting UWS21B (RS232) interface adapter	52
4.13	Connecting the USB11A interface adapter	53
4.14	Option combinations for MDX61B	54
4.15	Installing and removing options cards	56
4.16	Connecting the encoder and resolver	58
4.17	Terminal description of the DEH11B option (HIPERFACE®) and connection .	60
4.18	DEH21B option connection and terminal description	64
4.19	Connecting option DER11B (resolver)	66
4.20	Connecting an external encoder	69
4.21	Connecting an incremental encoder simulation	72
4.22	Master/slave connection	73
4.23	DIO11B – connection and terminal description	74
4.24	DFC11B – connection and terminal description	77



5	Startup.....	78
5.1	General startup instructions	78
5.2	Preliminary work and resources	80
5.3	Startup with DBG60B keypad	81
5.4	Startup with PC and MOVITOOLS®	89
5.5	Starting the motor	91
5.6	Complete parameter list	95
6	Operation	106
6.1	Operating displays	106
6.2	Information messages	107
6.3	Functions of the DBG60B keypad	108
6.4	Memory card	111
7	Service	113
7.1	Fault information	113
7.2	Error messages and list of errors	114
7.3	SEW Electronics Service	127
7.4	Extended storage	127
7.5	Disposal	128
8	Technical Data and Dimension Drawings	129
8.1	CE marking, UL approval and C-Tick	129
8.2	General technical data	130
8.3	MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)	132
8.4	MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)	139
8.5	MOVIDRIVE® MDX60/61B electronics data	143
8.6	MOVIDRIVE® MDX60B dimension drawings	145
8.7	MOVIDRIVE® MDX61B dimension drawings	147
8.8	Technical data for options DEH11B, DEH21B, DER11B and BW...-T/...-P	156
8.9	Technical data of DIO11B and DFC11B options	158
9	Index	159



1 General Information

1.1 Structure of the safety notes

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

Symbol	 SIGNAL WORD
	Nature and source of hazard. Possible consequence(s) if disregarded. Measure(s) to avoid the hazard.

Symbol	Signal word	Meaning	Consequences if disregarded
Example:  General hazard	 HAZARD	Imminent hazard	Severe or fatal injuries
 Specific hazard, e.g. electric shock	 WARNING!	Possible hazardous situation	Severe or fatal injuries
	 CAUTION!	Possible hazardous situation	Minor injuries
	STOP!	Possible damage to property	Damage to the drive system or its environment
	NOTE	Useful information or tip. Simplifies handling of the drive system.	

1.2 Rights to claim under warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the **operating instructions**. **Read the operating instructions** before you start operating the unit!

Make sure that the operating instructions are available to persons responsible for the system and its operation as well as to persons who work independently on the unit. You must also ensure that the documentation is legible.

1.3 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** assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.



2 Safety Notes

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

2.1 General information

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

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

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

Consult the documentation for additional information.

2.2 Target group

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

All activity in the other areas of transportation, storage, operation, and disposal must be carried out by persons who are appropriately trained.

2.3 Designated use

Inverters are components intended for installation in electrical systems or machines.

In case of installation in machines, startup of the inverters (i.e. start of designated operation) 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. start of designated operation) is only permitted with adherence to the EMC (89/336/EEC) guideline.

The inverters comply with the 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 inverters.

Technical data and information on the connection requirements are provided on the nameplate and in the documentation; these must be observed under all circumstances.



Safety functions The MOVIDRIVE® MDX60B/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

You must 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 inverters from excessive strain. Especially during transportation and handling, do not allow the components to be deformed or insulation spaces altered. Avoid contact with electronic components and contacts.

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 areas
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc.
- Use in non-stationary applications that are subject to mechanical vibration and shock 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 inverters (e.g. BGV A3).

Perform electrical installation according to the pertinent regulations (e.g. line cross sections, fusing, protective conductor connection). Additional information is contained in the 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 inverters. Always observe these notes even with inverters bearing the CE marking. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

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

Required preventive measure: grounding the unit.



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 inverters must be equipped with additional monitoring and protection devices, if necessary, according to the applicable safety guidelines, such as the law governing technical equipment, accident prevention regulations, etc. Changes to the inverter using the operating software are permitted.

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

Keep all covers and doors closed during operation.

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

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



3 Unit Design

3.1 Unit designation, nameplates and scope of delivery

Example: Unit designation

MDX60 B 0011 - 5 A 3 - 4 00									
				Design		00 = Standard 0T = Application XX = Special unit			
				Quadrants		4 = 4Q (with brake chopper)			
				Connection type		3 = 3-phase			
				Radio interference suppression on the line side		B = Radio interference suppression C1 A = Radio interference suppression C2 0 = No radio interference suppression			
				Supply voltage		5 = AC 380 ... 500 V 2 = AC 200 ... 230 V			
				Recommended motor power		0011 = 1.1 kW			
				Version B					
				Series		60 = No options can be installed 61 = Options can be installed			

Example: System nameplate size 0

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



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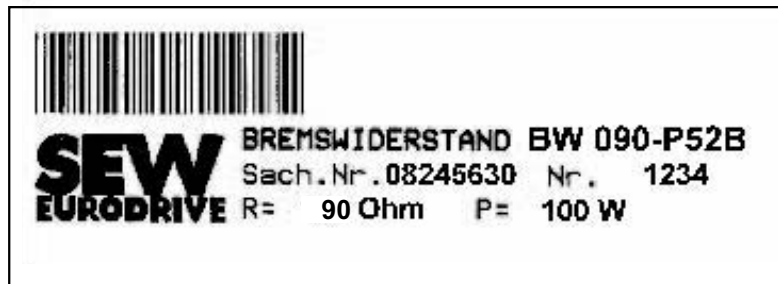


Unit Design

Unit designation, nameplates and scope of delivery

Example:
Nameplate
BW090-P52B
braking resistor

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



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Example: System
nameplate
sizes 1 - 6

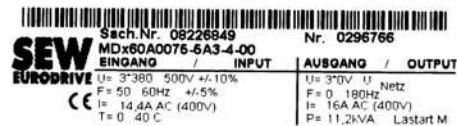
For MDX61B.. sizes 1 - 6, the **system nameplate** is attached to the side of the unit.



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Example:
Nameplate power
section sizes 1 - 6

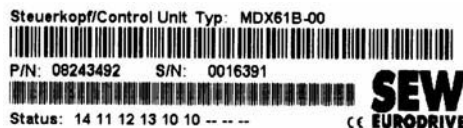
For MDX61B.. sizes 1-6, the **nameplate of the power section** is located at the side of the unit.



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Example:
Nameplate control
unit sizes
1 - 6

For MDX61B.. sizes 1-6, the **nameplate of the control unit** is located at the side of the unit.



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Example:
Nameplate
option card



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Scope of delivery

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

Size 0

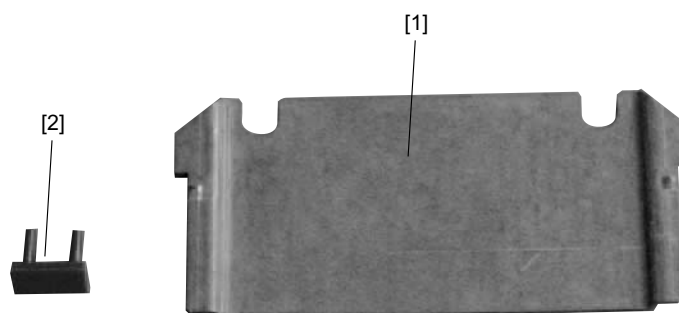
- 1 set of shield clamps for power cable and signal cable, not installed. The set of shield clamps comprises:
 - 2 shield clamps for power cable (2 contact clips each)
 - 1 shield clamp for signal cable (1 contact clip) for MDX60B
 - 1 shield clamp for signal cable (2 contact clips) for MDX61B
 - 6 contact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

Sizes 1-6

- 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

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:
- The touch guard [2] mounted to X3 / X4 (→chapter "Touch guard")
 - An adequate cable connected to X3 / X4
- If neither of the two conditions is fulfilled, the degree of protection is IP10.

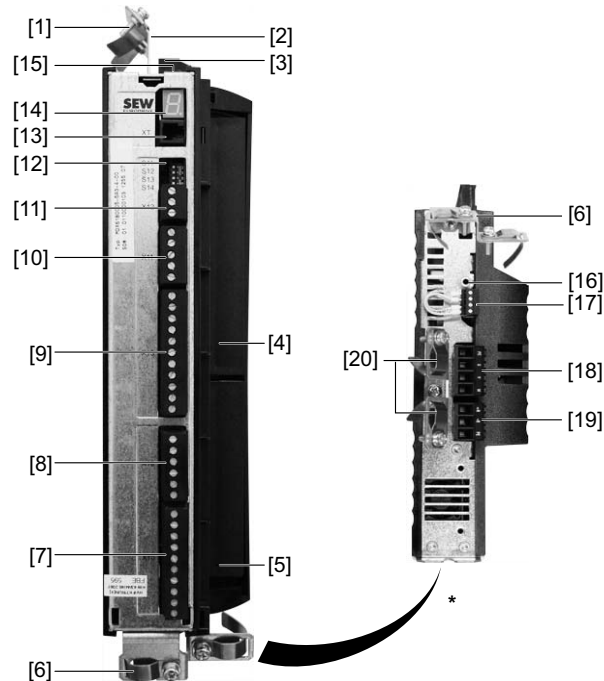


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3.2 Size 0

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



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* View of the bottom of the unit

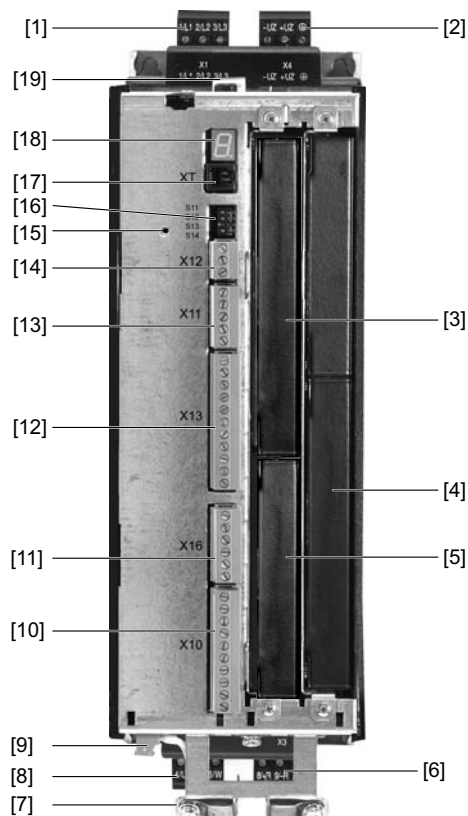
- [1] Power shield clamp for mains connection and connection for DC link connection
- [2] X4: Connection for DC link connection U_{Z-} / U_{Z+} and PE connection, separable
- [3] X1: Power supply connection L1, L2, L3 and PE connection, separable
- [4] Only with MDX61B: Fieldbus slot
- [5] Only with 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] S11 DIP switch ... S14
- [13] XT: Slot for DBG60B keypad or UWS21B serial interface
- [14] 7-segment display
- [15] Memory card
- [16] Threaded hole for grounding screw M4×8 or M4×10
- [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



3.3 Size 1

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

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



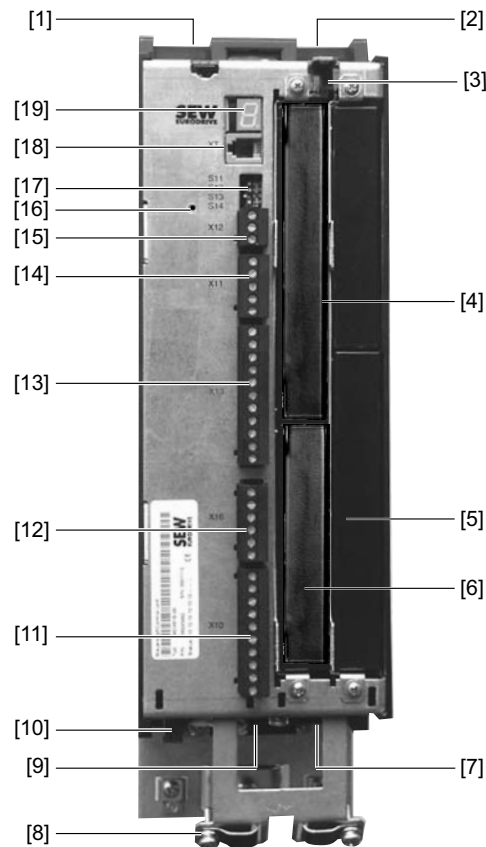
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- [1] X1: Power supply connection 1/L1, 2/L2, 3/L3, separable
- [2] X4: Connection for DC link connection $-U_Z$ $+U_Z$, separable
- [3] Fieldbus slot
- [4] Expansion slot
- [5] Encoder slot
- [6] X3: Braking resistor connection 8/+R, 9/-R and PE connection, separable
- [7] Shield clamp for signal cables and PE connection
- [8] X2: Motor connection 4/U, 5/V, 6/W and PE connection, separable
- [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] Threaded hole for grounding screw M4×8 or M4×10
- [16] S11 DIP switch ... S14
- [17] XT: Slot for DBG60B keypad or UWS21B serial interface
- [18] 7-segment display
- [19] Memory card



3.4 Size 2S

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



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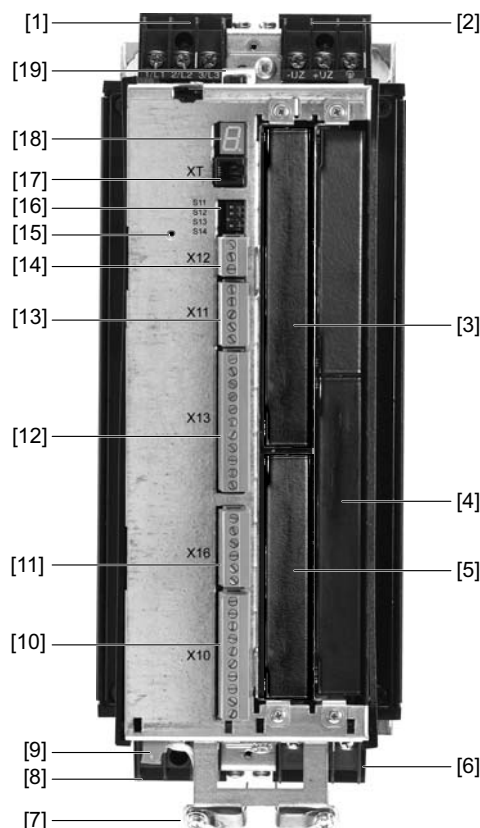
- [1] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [2] X4: Connection for DC link connection $-U_Z$ $+U_Z$ and PE connection
- [3] Memory card
- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] X3: Braking resistor connection 8/+R, 9/-R and PE connection
- [8] Shield clamp for signal 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] Threaded hole for grounding screw M4×8 or M4×10
- [17] S11 DIP switch ... S14
- [18] XT: Slot for DBG60B keypad or UWS21B serial interface
- [19] 7-segment display



3.5 Size 2

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

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



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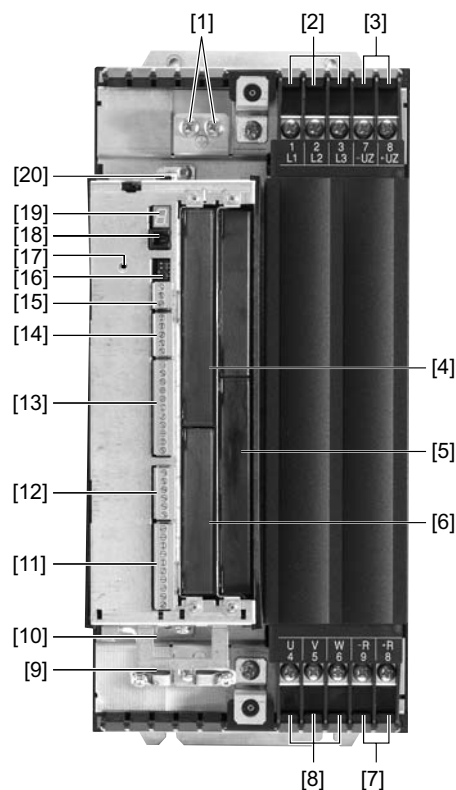
- [1] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [2] X4: Connection for DC link connection $-U_Z$ $+U_Z$ and PE connection
- [3] Fieldbus slot
- [4] Expansion slot
- [5] Encoder slot
- [6] X3: Braking resistor connection 8/+R, 9/-R and PE connection
- [7] Shield clamp for signal cables and PE connection
- [8] X2: Motor connection 4/U, 5/V, 6/W
- [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] Threaded hole for grounding screw M4×8 or M4×10
- [16] S11 DIP switch ... S14
- [17] XT: Slot for DBG60B keypad or UWS21B serial interface
- [18] 7-segment display
- [19] Memory card



3.6 Size 3

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

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



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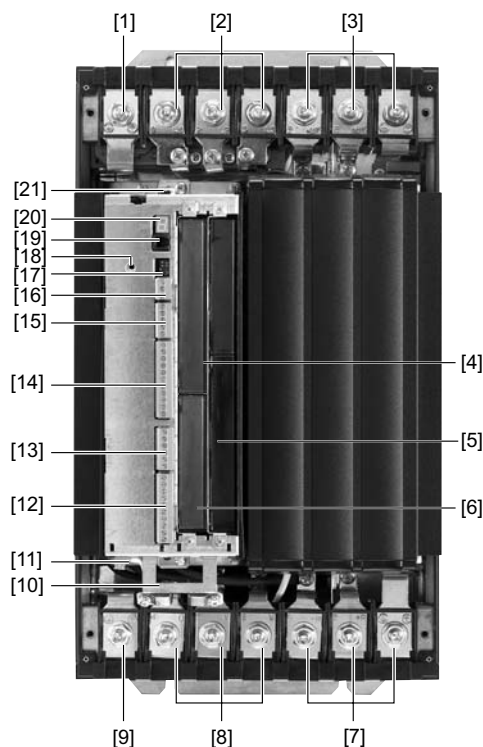
- [1] PE connections
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link connection $-U_Z$ $+U_Z$
- [4] Fieldbus slot
- [5] Expansion slot
- [6] Encoder slot
- [7] X3: Braking resistor connection 8/+R, 9/-R
- [8] X2: Motor connection 4/U, 5/V, 6/W
- [9] Shield clamp for 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] S11 DIP switch ... S14
- [17] Threaded hole for grounding screw M4×8 or M4×10
- [17] XT: Slot for DBG60B keypad or UWS21B serial interface
- [18] 7-segment display
- [19] Memory card



3.7 Size 4

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

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



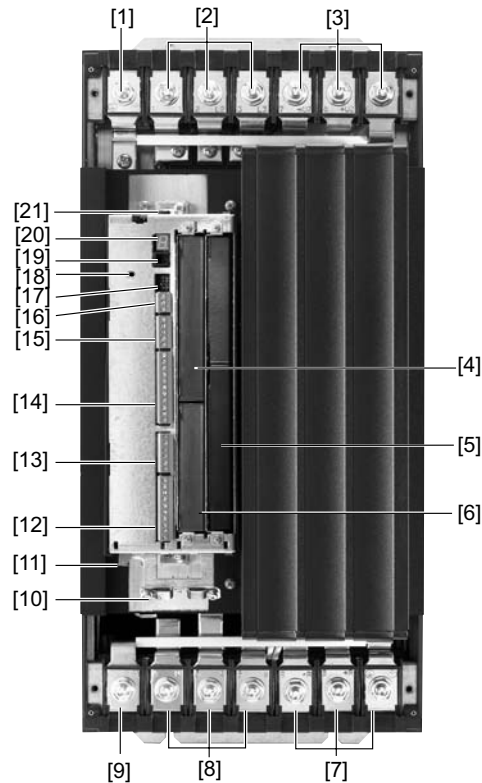
62715AXX

- [1] PE connection
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link connection $-U_Z$ $+U_Z$ 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] S11 DIP switch ... S14
- [18] Threaded hole for grounding screw M4×8 or M4×10
- [19] XT: Slot for DBG60B keypad or UWS21B serial interface
- [20] 7-segment display
- [21] Memory card



3.8 Size 5

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



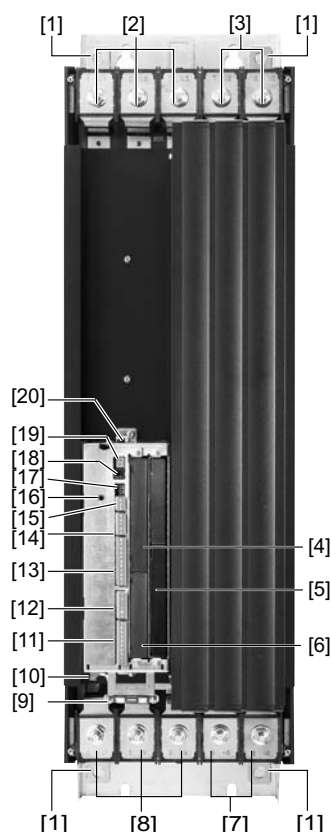
62716AXX

- [1] PE connection
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link connection $-U_Z$ $+U_Z$ 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] S11 DIP switch ... S14
- [18] Threaded hole for grounding screw M4×8 or M4×10
- [19] XT: Slot for DBG60B keypad or UWS21B serial interface
- [20] 7-segment display
- [21] Memory card



3.9 Size 6

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



62717AXX

- [1] PE connection
- [2] X1: Power supply connection 1/L1, 2/L2, 3/L3
- [3] X4: Connection for DC link connection $-U_Z$ $+U_Z$
- [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] S11 DIP switch ... S14
- [18] XT: Slot for DBG60B keypad or UWS21B serial interface
- [19] 7-segment display
- [20] Memory card



Installation

Installation instructions for the basic unit

4 Installation

4.1 Installation instructions for the basic unit

Assembly notes for size 6

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



! HAZARD

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 pin [3].

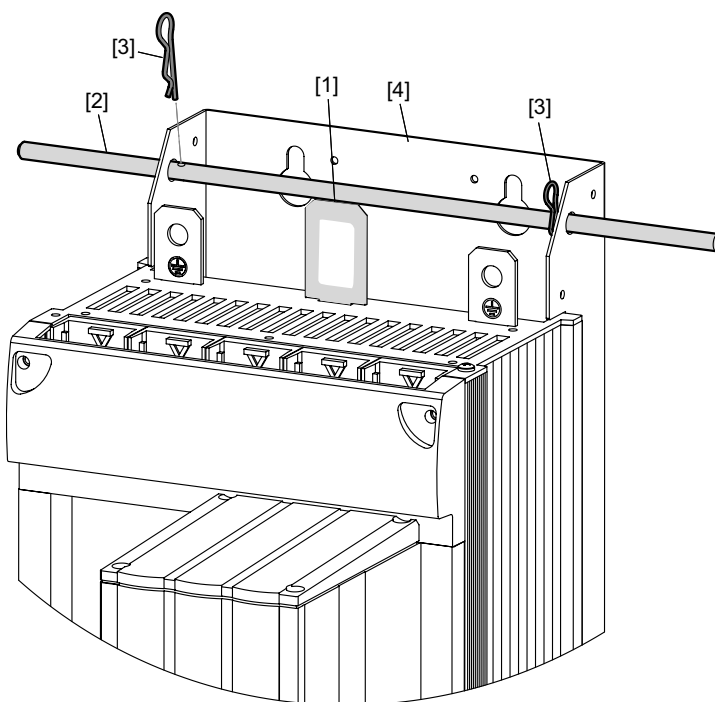


Figure 1: Installing MOVIDRIVE® size 6 with fixed lifting eye and carrying bar

59892AXX

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



Tightening torques

- Only use **original connection elements**. Note the **permitted tightening torques** of MOVIDRIVE® power terminals.
 - Sizes 0, 1 and 2S → 0.6 Nm (5 lb in)
 - Size 2 → 1.5 Nm (13 lb in)
 - Size 3 → 3.5 Nm (31 lb in)
 - Sizes 4 and 5 → 14.0 Nm (120 lb in)
 - Size 6 → 20.0 Nm (180 lb in)
- The **permitted tightening torque** of the **signal terminals** is 0.6 Nm (5 lb.in).

Minimum clearance and Mounting position

- Leave at least **100 mm 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 air heated by other units cannot be drawn in or reused.
- 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).

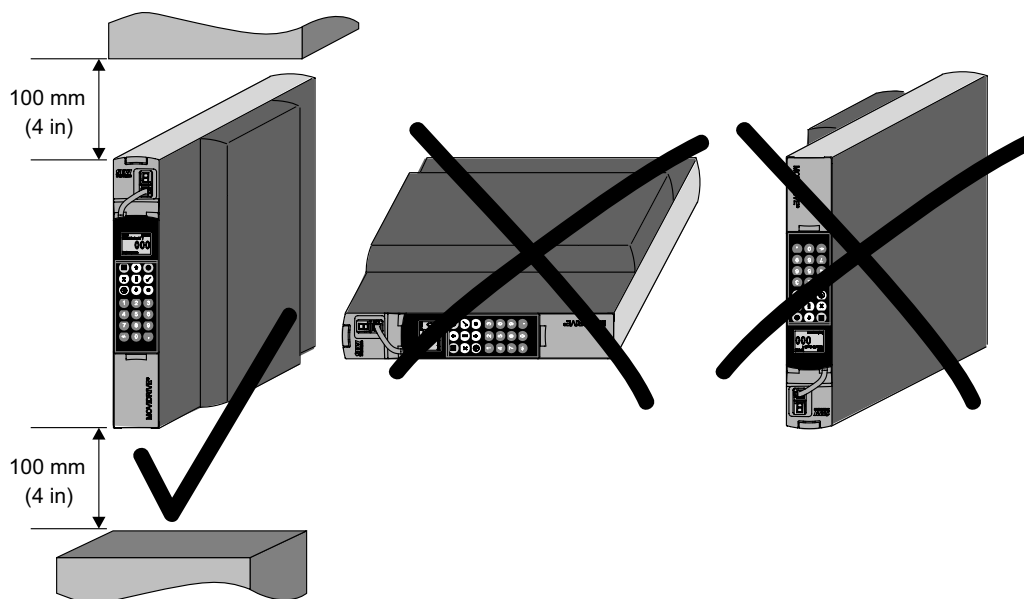


Figure 2: Minimum clearance and mounting position of the units

60030AXX

Separate cable ducts

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



Installation

Installation instructions for the basic unit

Fuses and earth-leakage circuit breaker

- Install the **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. However, if an earth-leakage circuit breaker is stipulated for direct or indirect protection against contact, observe the **following note in accordance with EN 61800-5-1**:

	! WARNING!
	Incorrect earth-leakage circuit breaker installed. Severe or fatal injuries. MOVIDRIVE® can cause direct current in the protective earth. In cases where an earth-leakage circuit breaker is used for protection against direct or indirect contact, only install a type B earth-leakage circuit breaker on the power supply end of the MOVIDRIVE® unit.

Mains and brake contactors

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

	NOTES
	• Only use the mains contactor K11 (→ section. "Wiring diagram – basic unit") to switch the inverter on and off. Do not use it for jog mode. Use the commands "Enable/Stop", "CW/Stop" or "CCW/Stop" for jog mode. • Observe a minimum switch-off time of 10 s for the input contactor K11.

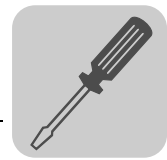
PE connection (→EN 61800-5-1)

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

- **Supply system cable $< 10 \text{ mm}^2$ (AWG 7):**
Route a **second PE conductor with the cable 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 cable cross section of 10 mm^2 (AWG 7)**.
- **Supply system cable $10 \text{ mm}^2 \dots 16 \text{ mm}^2$ (AWG 7 ... AWG 6):**
Route a **copper protective earth conductor with the cable cross section of the supply system cable**.
- **Supply system cable $16 \text{ mm}^2 \dots 35 \text{ mm}^2$ (AWG 6 ... AWG 2):**
Route a **copper protective earth conductor with a cable cross section of 16 mm^2** .
- **Supply system cable $> 35 \text{ mm}^2$ (AWG 2):**
Route a **copper protective earth conductor with half the cable cross section of the supply system cable**.

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 from mis-tripping due to the ground capacitance of the inverter. **No EMC limits have been specified for interference emission in voltage supply systems without grounded star point (IT systems).**

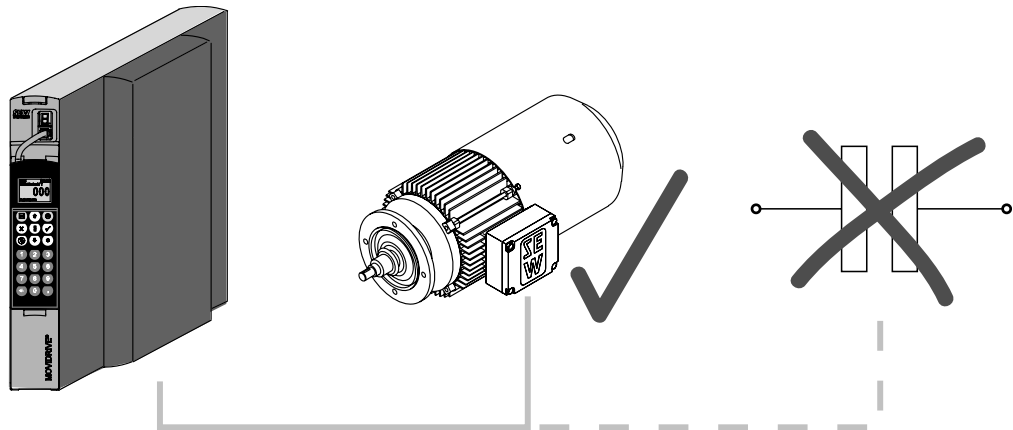


Cable cross sections

- Supply cable: **Cable cross section according to rated input current I_{Supply}** at rated load.
- Motor cable: **Cable cross section according to rated output current I_N .**
- Signal cables of basic unit (terminals X10, X11, X12, X13, X16):
 - One core per terminal 0.20 ... 2.5 mm² (AWG 24 ... 13)
 - Two cores per terminal 0.25 ... 1 mm² (AWG 23 ... 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 ... 16)
 - Two cores per terminal 0.25 ... 1 mm² (AWG 23 ... 17)

Unit output

	STOP! MOVIDRIVE® B can suffer irreparable damage if you connect capacitive loads. • Only connect ohmic/inductive loads (motors). • Never connect capacitive loads.
--	---



60031AXX

Figure 3: Only connect ohmic/inductive loads; do not connect capacitive loads

**Installing the
BW...braking
resistors/ BW...-T/
BW...-P**

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

**ACconnecting
braking resistors**

- Use **two closely twisted cables 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 $U_0/U = 300 \text{ V} / 500 \text{ V}$ (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.



Installation

Installation instructions for the basic unit

- For braking resistors of the **BW...-T / BW...-P** series, the **integrated temperature switch/overcurrent relay can be connected using a shielded 2-core 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**.

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.

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.

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. .
- 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 via a 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 on the other end.

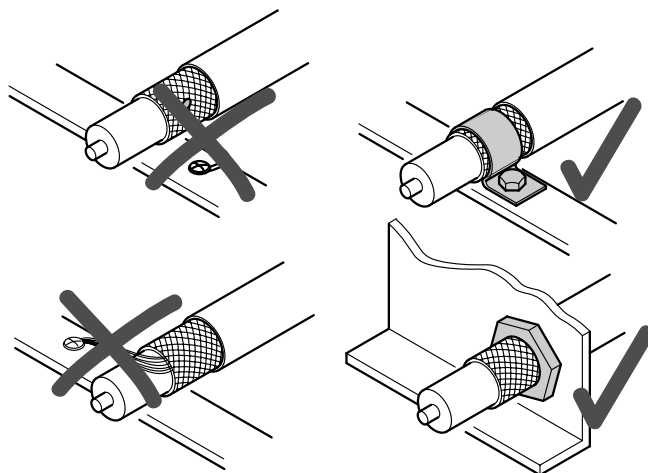
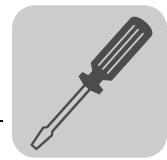


Figure 4: Correct shield connection using metal clamp (shield clamp) or cable gland

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- You can also use **grounded 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).

	NOTES • MOVIDRIVE® B is a product with restricted availability in accordance with EN 61800-3. It may cause EMC interference. In this case, the operator may need to implement appropriate measures. • For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.
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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. Also use unshielded cables as the supply system lead.
- 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 U/f)

Interference emission category

Compliance with category C2 according to EN 61800-3 has been tested on a specified test setup. 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.
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Installation

Installation instructions for the basic unit

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 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**!

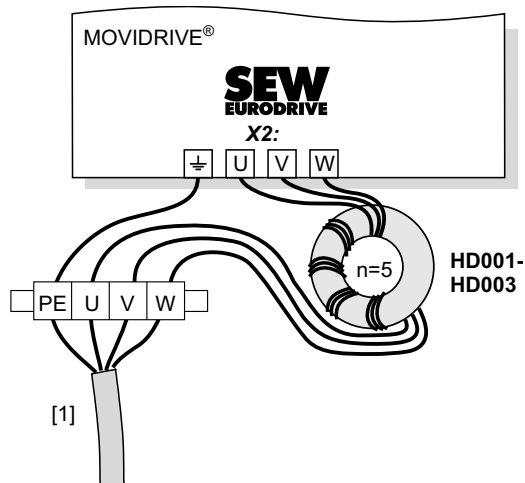


Figure 5: Connecting the HD001 ... HD003 output choke

[1] Motor cable

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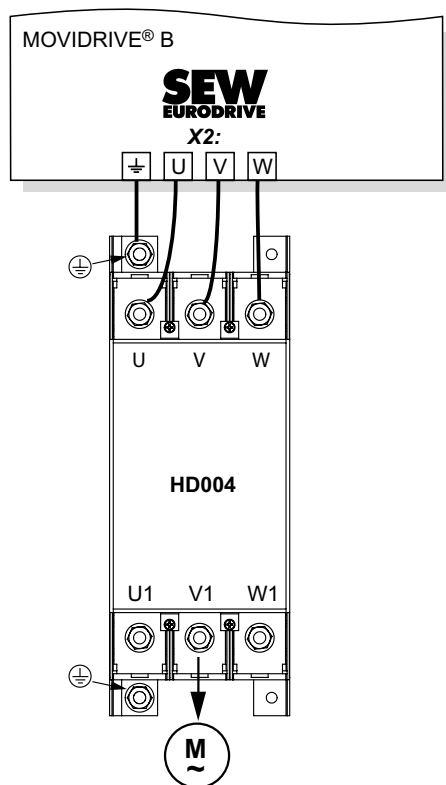


Figure 6: Connecting the HD004 output choke

[1] Motor cable

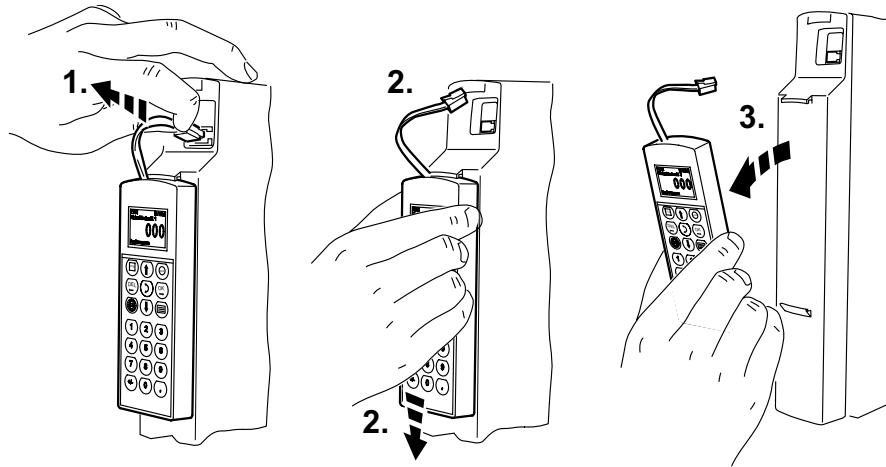
62879AXX



4.2 Removing/installing the keypad

Removing the keypad

Proceed as follows:



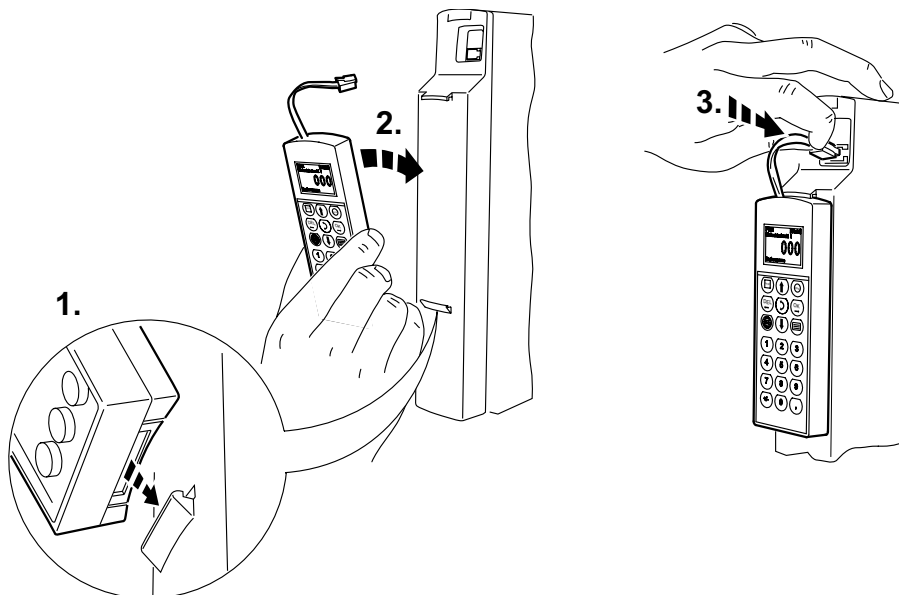
60032AXX

Figure 7: Removing the keypad

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

Installing the keypad

Proceed as follows:



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Figure 8: Installing the keypad

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.



Installation

Removing/installing the front cover

4.3 Removing/installing the front cover

Removing the front cover

Proceed as follows to remove the front cover:

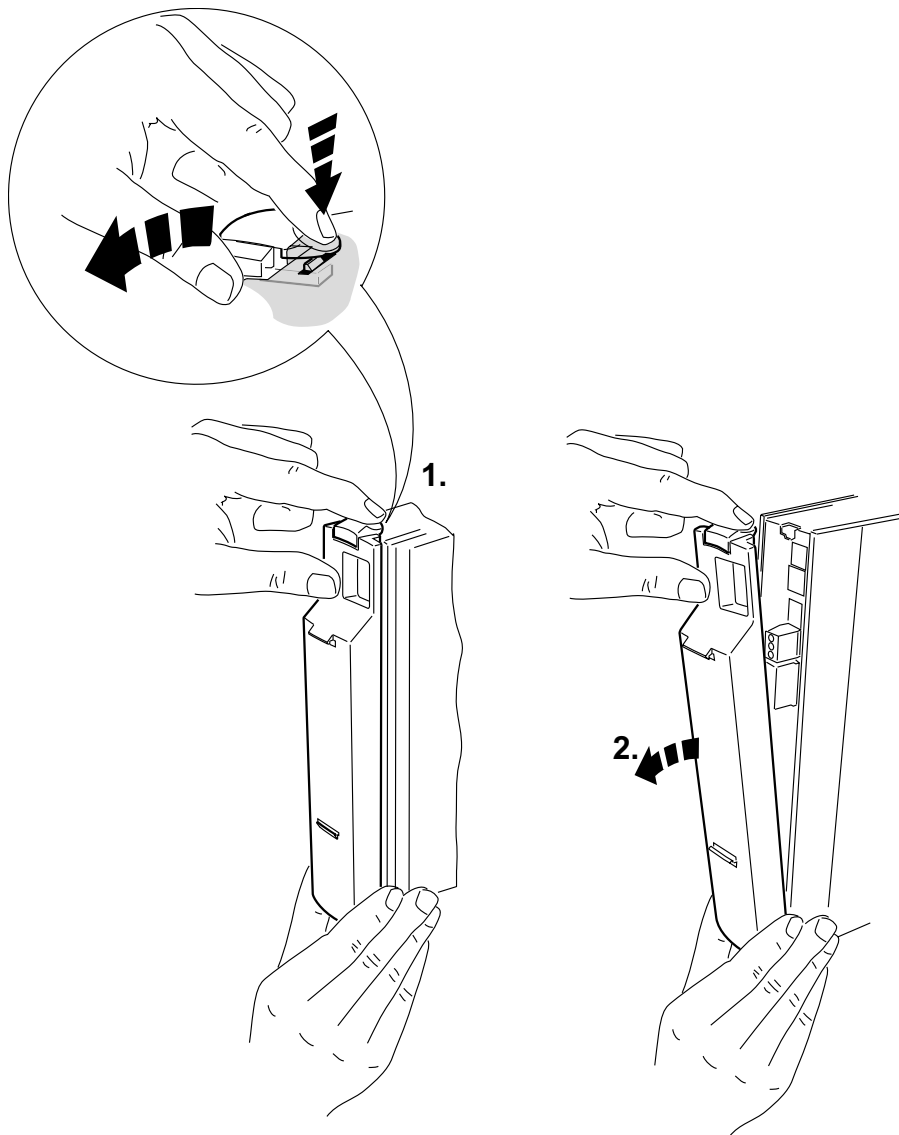


Figure 9: Removing the front cover

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1. If a keypad is installed, remove it first (→ page 27).
2. Press the grooved clip on top of the front cover.
3. Keep the clip pressed down to remove the front cover.



Installing the front cover

Proceed as follows to install the front cover:

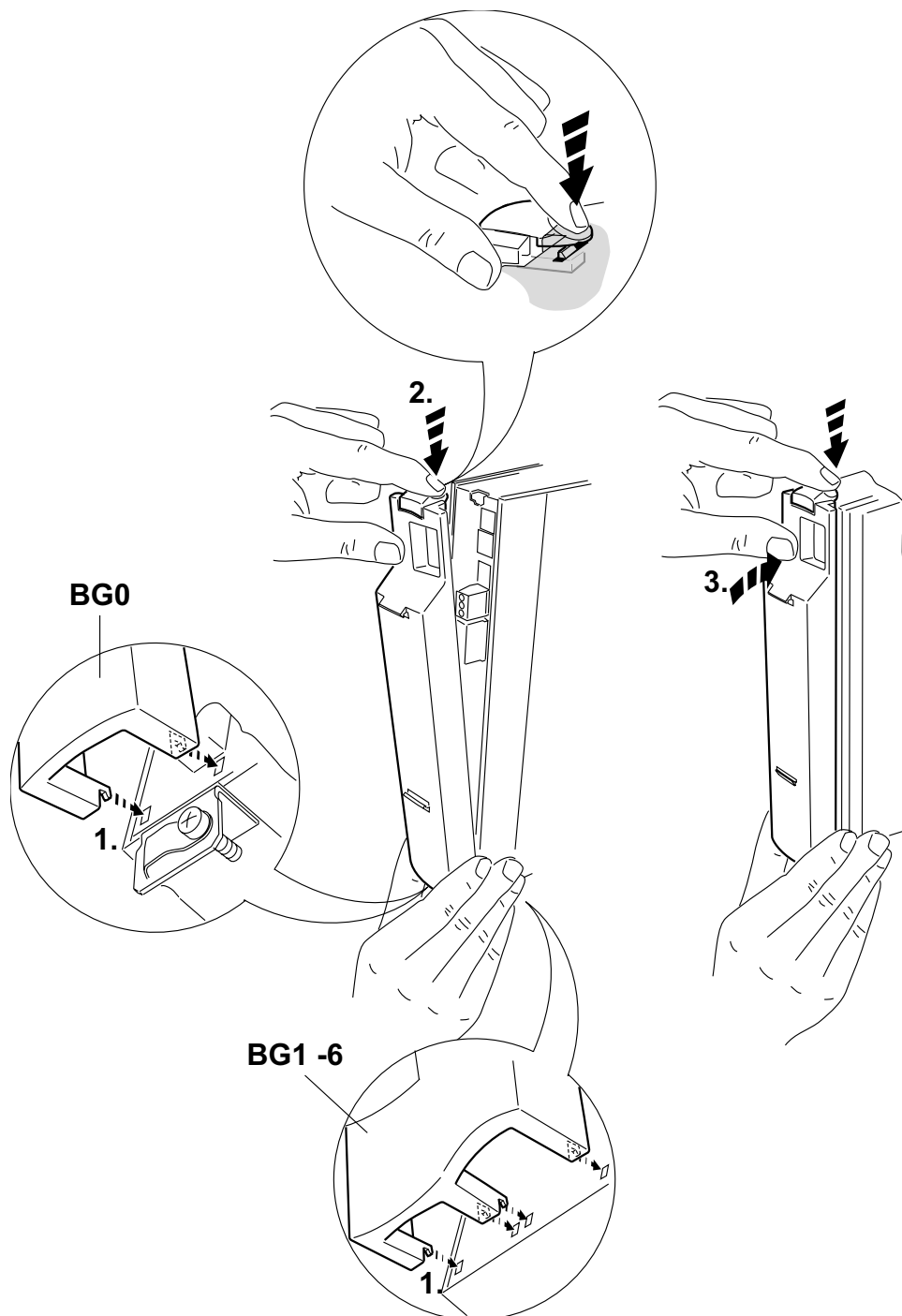


Figure 10: Installing the front cover

60035AXX

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 UL-compliant installation

Observe the following notes for UL-compliant installation:

- Only use copper cables with the **following rated thermal values as connection cables**:
- MOVIDRIVE® MDX60B/61B0005 ... 0300:
Rated thermal value 60 °C / 75 °C
- MOVIDRIVE® MDX61B0370 ... 1320:
Rated thermal value 75 °C
- **Permitted tightening torques** for MOVIDRIVE® power terminals:
 - Size 0,1 and 2S → 0.6 Nm (5 lb in)
 - Size 2 → 1.5 Nm (13 lb in)
 - Size 3 → 3.5 Nm (31 lb in)
 - Sizes 4 and 5 → 14.0 Nm (120 lb in)
 - Size 6 → 20.0 Nm (180 lb in)
- MOVIDRIVE® inverters are **suitable for operation in TN and TT voltage power systems with a directly grounded star point** which can supply a max. supply current and a max. supply voltage in accordance with the following table. The fuses listed in the following tables are the maximum permitted back-up fuse of the respective inverter. Only use UL-approved fuses.

AC 400/500 V units

MOVIDRIVE® MDX60B/61B...5_3	Max. supply current	Max. supply voltage	Fuses
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



AC 230 V units

MOVIDRIVE® MDX61B...2_3	Max. supply current	Max. supply voltage	Fuses
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



NOTES

- Use only tested units with a **limited output voltage** ($U_{\max} = \text{DC } 30 \text{ V}$) and **limited output current** ($I \leq 8 \text{ A}$) 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

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.

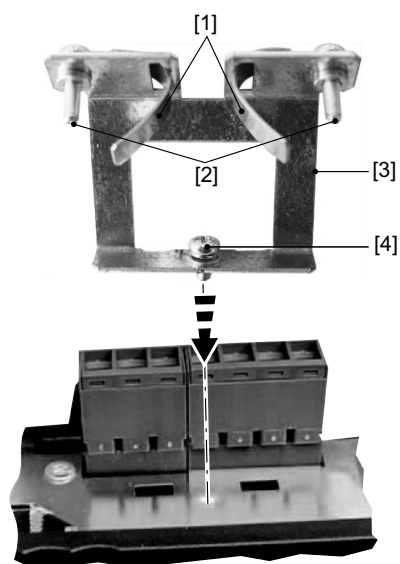


Figure 11: Securing the shield clamp of the power section (size 0)

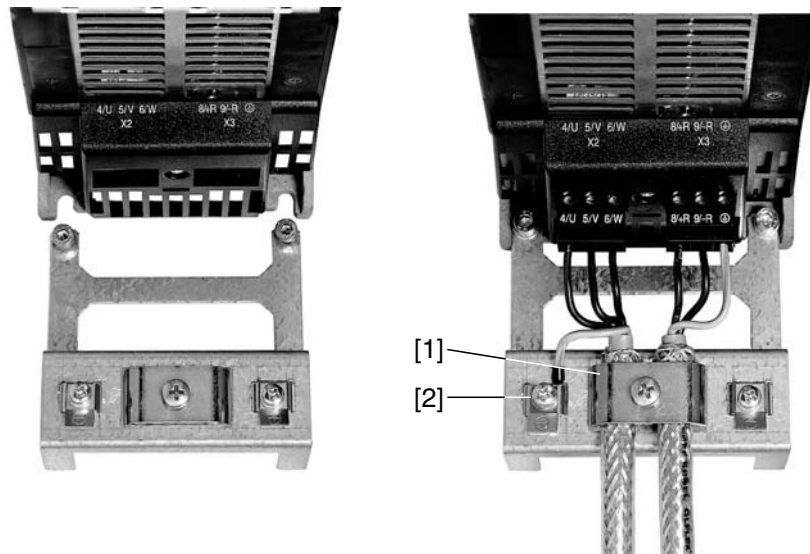
62718AXX

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



**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.



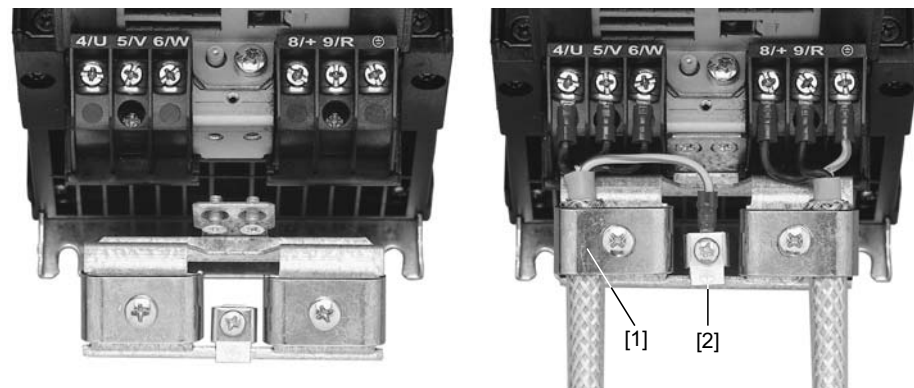
60019AXX

Figure 12: Securing the shield clamp on the power section (size 1)

- [1] Power section shield clamp [2] PE connection (⊕)

**Shield clamp for
power section,
size 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 these shield clamp using the two retaining screws.



60020AXX

Figure 13: Securing the shield clamp on the power section (figure shows size 2)

- [1] Power section shield clamp [2] PE connection (⊕)

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.

**Shield clamp for
power section,
sizes 3 to 6**

No shield clamps for the power section are supplied with MOVIDRIVE® MDX61B sizes 3 to 6. Use commercially available shield clamps for installing the shielding of motor and brake cables. Apply the shield as closely as possible to the inverter.



Installation

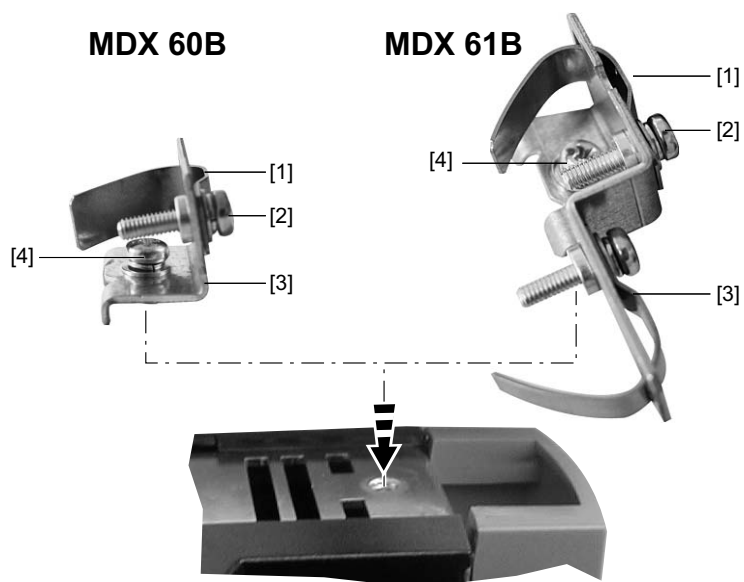
Shield clamps

Shield clamp for signal cables

Install the shield clamp for the signal cable as follows:

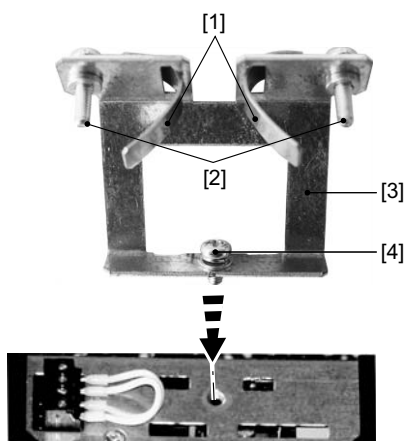
- If installed, remove the keypad and the front cover.
- Size 0: Attach the shield clamp on the bottom of the unit.
- Sizes 1 to 6: Attach the shield clamp on the bottom of the control unit.

Size 0



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Sizes 1 to 6



62719AXX

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



4.6 Touch guard power terminals

	! HAZARD
	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.

Size 2S

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

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

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

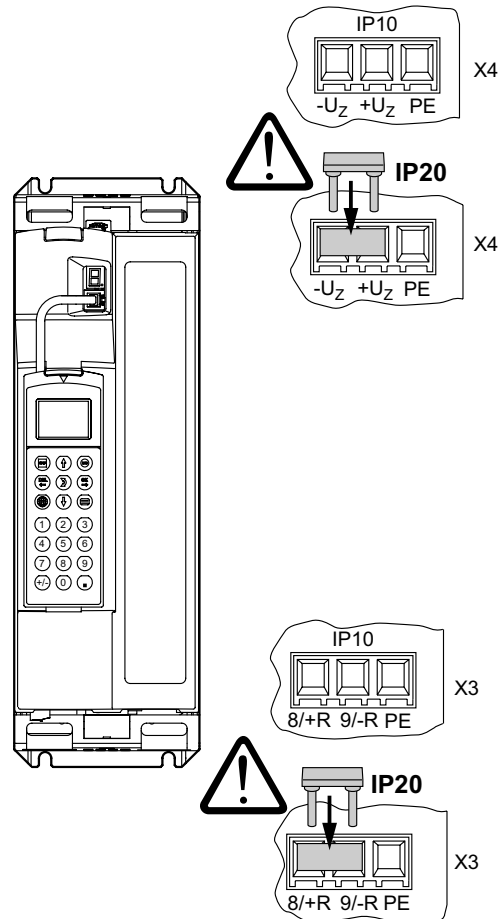


Figure 14: Touch guard for MOVIDRIVE® MDX61B size 2S

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Installation

Touch guard power terminals

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 does not have to 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 (12 pieces included in the scope of delivery)** is available via the **part number 0823 111 7**.

Installing the DLB11B touch guard

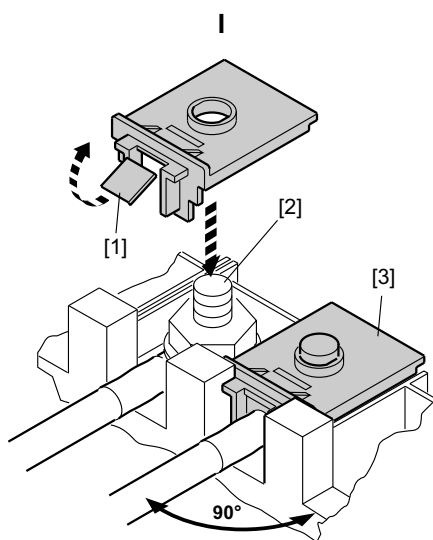
Proceed as follows when installing the DLB11B touch guard:

- 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.

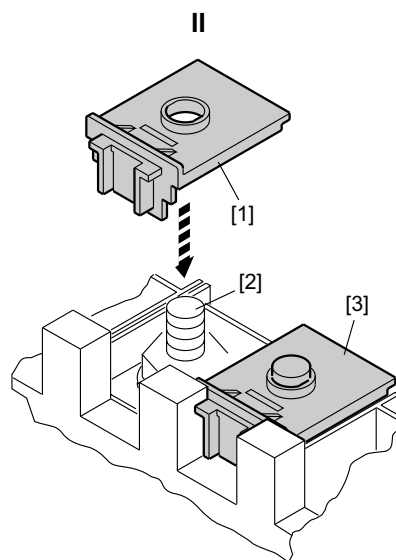
- Figure II: Power terminal without connected power cable:

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



63208AXX

- [1] Plastic saddle
- [2] Terminal stud
- [3] Touch guard properly installed



63206AXX

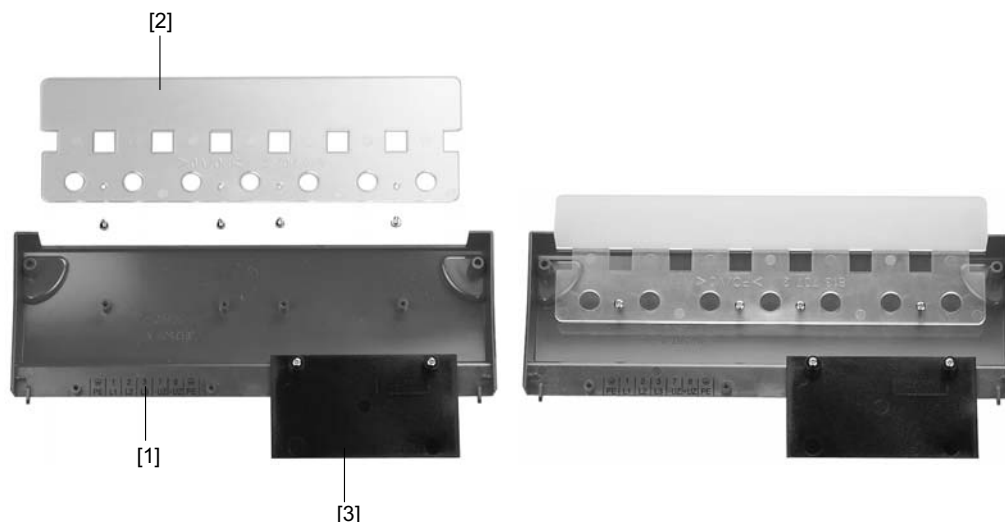
- [1] Touch guard
- [2] Terminal stud
- [3] Touch guard properly installed

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



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 touch guards with eight retaining screws are supplied as standard. Install the touch guard on both covers of the power terminals.



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Figure 15: 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 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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NOTE

If the above conditions are not met, MOVIDRIVE® units sizes 4, 5 and 6 have enclosure IP00.

Power section and brake



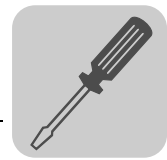
* With sizes 1, 2 and 2S, there is no PE connection next to the supply system connection terminals and motor connection terminals (X1, X2). In this case, use the PE terminal next to the DC link connection (X4).

**** 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.



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

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

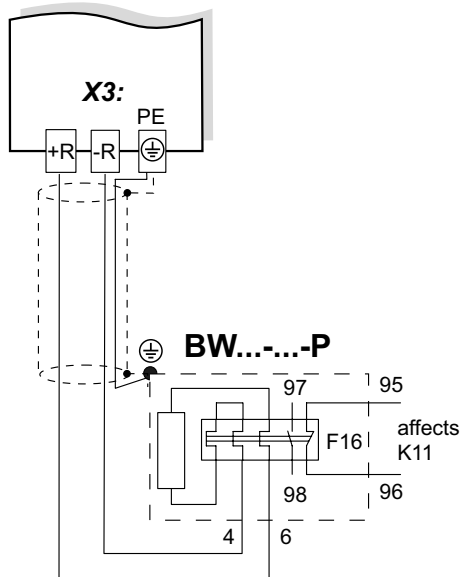


Brake rectifier in the control cabinet

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.

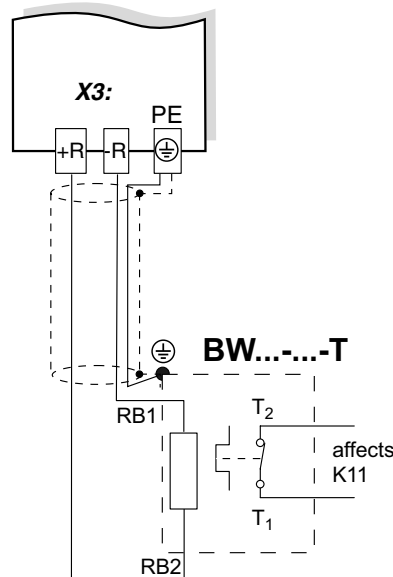
Braking resistor BW... / BW...-T / BW...-P

Power section



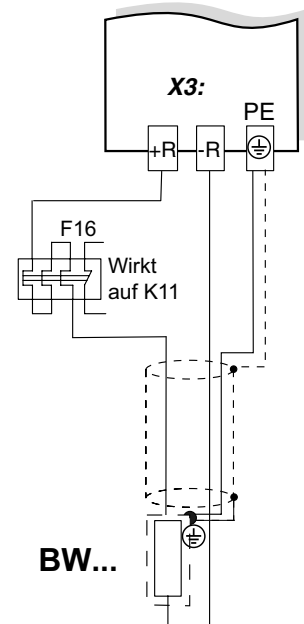
When the signal contact F16 trips, K11 must be opened and DIØØ"/Controller inhibit" must receive a "0" signal. The resistor circuit must not be interrupted!

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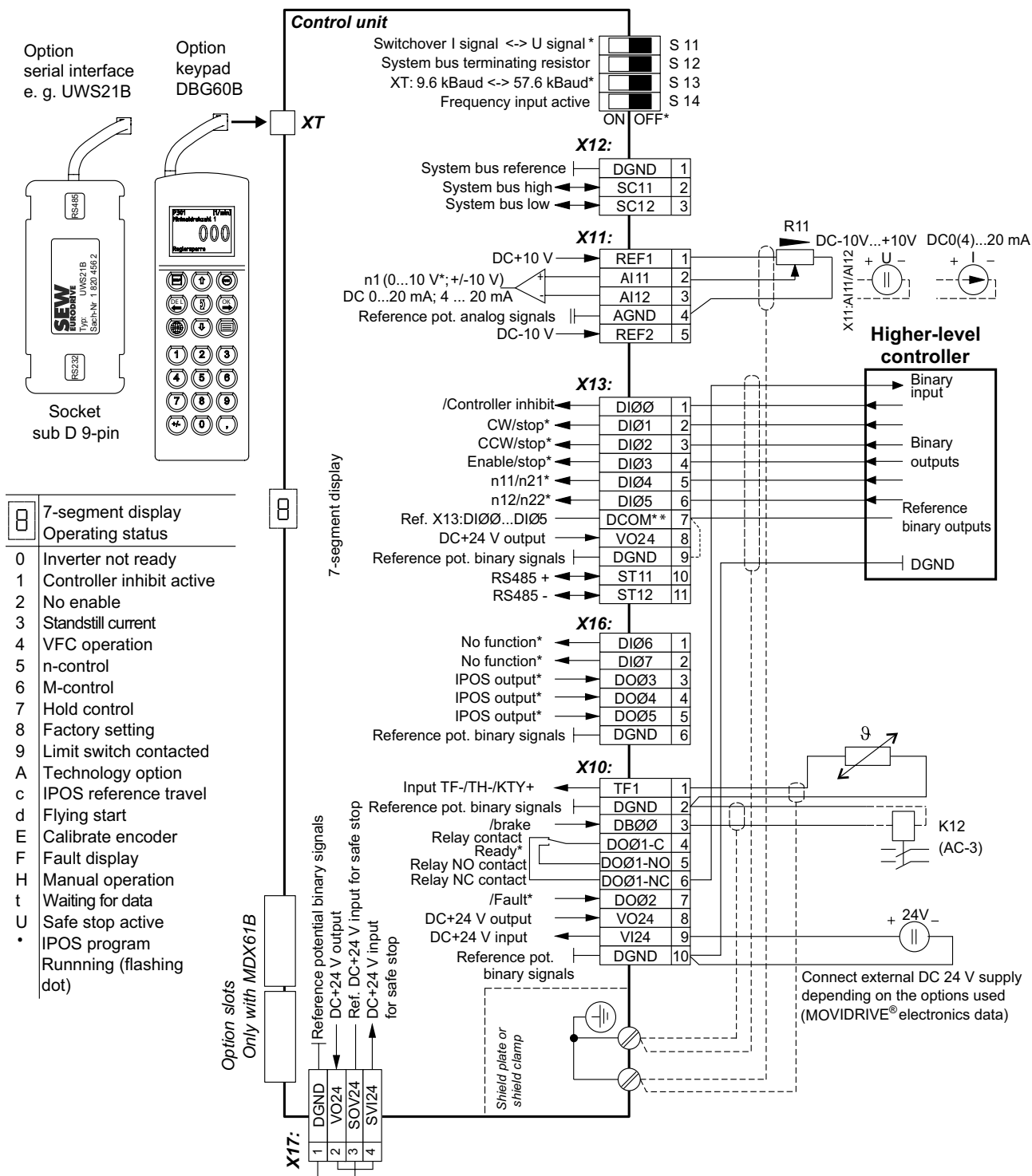
Braking resistor type	Design specified	Overload protection	
		Internal temperature switch (..T)	External bimetallic relay (F16)
BW...	-	-	Required
BW...-T	-	One of the two options (internal temperature switch / external bimetallic relay) is required.	
BW...-003 / BW...-005	Adequate	-	Permitted
BW090-P52B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



Installation

Wiring diagrams – basic unit

Signal terminals



59219ADE

* 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 electrically isolated as standard. The electrical isolation can be disabled by means of a M4 x 8 or M4 x 10 grounding screw (tightening torque 1.4 ... 1,61.6 Nm). The grounding screw (threaded hole ? chapter →Unit Design→) is not included in the scope of delivery.



Description of terminal functions of 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)	Power supply connection Motor connection Braking resistor connection DC link connection
S11 S12: S13: S14:		Change I-signal DC(0(4)...20 mA) ↔ 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 kBaud, factory setting: 75.6 kBaud. 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 mA) 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	DI00 DI01 DI02 DI03 DI04 DI05	Binary input 1, with fixed assignment"/Controller inhibit" Binary input 2, factory setting to "CW/stop" Binary input 3, factory setting to "CCW/stop" Binary input 4, factory setting to "Enable/Stop" Binary input 5, factory setting to "n11/n21" Binary input 6, factory setting to "n11/n22"
X13:7	DCOM	Reference for binary inputs X13:1 to X13:6 (DI00 ... DI05) and X16:1/X16:2 (DI06 ... DI07) - 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	DI06 DI07 DO03 DO04 DO05 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 (DO03) and X16:5 (DO05)! Reference potential for binary signals
X10:1 X10:2 X10:3 X10:4 X10:5 X10:6 X10:7	TF1 DGND DB00 DO01-C DO01-NO DO01-NC DO02	KTY+/TF-/TH connection (connect to X10:2 via TF/TH), factory setting to "No response" (→ P835) Reference potential for binary signals / KTY- Binary output DB00 has 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 DB02, factory setting "/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 (DO01 and DO02) → Parameter menu P62_. Do not apply external voltage to binary outputs X10:3 (DB00) and X10:7 (DO02).
X10:8 X10:9 X10:10	VO24 VI24 DGND	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
X17:1 X17:2 X17:3 X17:4	DGND VO24 SOV24 SVI24	Reference potential for X17:3 Auxiliary supply voltage DC+24 V, only to supply X17:4 on the same unit Reference potential for DC+24 V input "Safe stop" (safety contact) DC+24 V input "Safe stop" (safety contact)
XT		Only service interface. Option slot: DBG60B / UWS21B / USB11A



Installation

Assignment of braking resistors, chokes and filters

4.8 Assignment of braking resistors, chokes and filters

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 = 0.6 A _{RMS}	826 058 3					
BW072-005	I _F = 1.0 A _{RMS}	826 060 5					
BW168/BW168-T	I _F = 3.4 A _{RMS}	820 604 X	1820 133 4				
BW100-006 BW100-006-T	I _F = 2.4 A _{RMS}	821 701 7	1820 419 8				
Line chokes		Part number					
ND020-013	Σ I _{mains} = AC 20 A	826 012 5					
Line filter		Part number					
NF009-503	U _{max} = AC 550 V	827 412 6					
Output chokes	Inside diameter	Part number					
HD001	d = 50 mm (2 in)	813 325 5		for cable cross sections 1.5 ... 16 mm ² (AWG 16 ... 6)			
HD002	d = 23 mm (0.91 in)	813 557 6		for cable cross sections ≤ 1.5 mm ² (AWG 16)			
Output filter (only in VFC operating mode)		Part number					
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 %)



AC 400/500 V units, size 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 = 0.8 A _{RMS}	826 269 1								
BW100-006/ BW100-006-T	I _F = 2.4 A _{RMS}	821 701 7	1820 419 8							
BW168/BW168-T	I _F = 3.4 A _{RMS}	820 604 X	1820 133 4							
BW268/BW268-T	I _F = 4.2 A _{RMS}	820 715 1	1820 417 1							
BW147/BW147-T	I _F = 5 A _{RMS}	820 713 5	1820 134 2							
BW247/BW247-T	I _F = 6.5 A _{RMS}	820 714 3	1820 084 2							
BW347/BW347-T	I _F = 9.2 A _{RMS}	820 798 4	1820 135 0							
BW039-012/ BW039-012-T	I _F = 5.5 A _{RMS}	821 689 4	1820 136 9							
BW039-026-T	I _F = 8.1 A _{RMS}		1820 415 5							
BW039-050-T	I _F = 11.3 A _{RMS}		1820 137 7							
Line chokes		Part number								
ND020-013	Σ I _{mains} = AC 20 A	826 012 5								
ND045-013	Σ I _{mains} = 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	Inside diameter	Part number								
HD001	d = 50 mm (2 in)	813 325 5		for cable cross sections 1.5 ... 16 mm ² (AWG 16 ... 6)						
HD002	d = 23 mm (0.91 in)	813 557 6		for cable cross sections ≤ 1.5 mm ² (AWG 16)						
HD003 output choke	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 %)



Installation

Assignment of braking resistors, chokes and filters

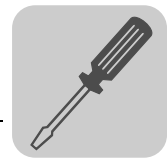
AC 400/500 V units, sizes 3 and 4

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 _{RMS}	821 684 3		1 820 416 3					C	C
BW018-035-T	I _F = 13.9 A _{RMS}		1820 138 5						C	C
BW018-075-T	I _F = 20.4 A _{RMS}		1820 139 3						C	C
BW915-T	I _F = 32.6 A _{RMS}		1820 413 9							
BW012-025/ BW012-025-P	I _F = 14.4A _{RMS}	821 680 0		1 820 414 7						
BW012-050-T	I _F = 20.4 A _{RMS}		1820 140 7							
BW012-100-T	I _F = 28.8 A _{RMS}		1820 141 5							
BW106-T	I _F = 47.4 A _{RMS}		1820 083 4							
BW206-T	I _F = 54.7 A _{RMS}		1820 412 0							
Line chokes		Part number								
ND045-013	Σ I _{mains} = AC 45 A	826 013 3				A				
ND085-013	Σ I _{mains} = AC 85 A	826 014 1				B				A
ND150-013	Σ I _{mains} = AC 150 A	825 548 2								B
ND300-0053	Σ I _{mains} = AC 300 A	827 721 4								

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 ($2 \times I_F$)



AC 400/500 V units, sizes 5 and 6

MOVIDRIVE® MDX61B...-503					0550	0750	0900	1100	1320
Size					5		6		
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 _{RMS}	821 684 3		1 820 416 3					
BW018-035-T	I _F = 13.9 A _{RMS}		1820 138 5						
BW018-075-T	I _F = 20.4 A _{RMS}		1820 139 3						
BW915-T	I _F = 32.6 A _{RMS}		1820 413 9						
BW012-025/ BW012-025-P	I _F = 14.4 A _{RMS}	821 680 0		1 820 414 7					
BW012-050-T	I _F = 20.4 A _{RMS}		1820 140 7						
BW012-100-T	I _F = 28.8 A _{RMS}		1820 141 5						
BW106-T	I _F = 47.7 A _{RMS}		1820 083 4				C	C	C
BW206-T	I _F = 54.7 A _{RMS}		1820 412 0				C	C	C
Line chokes		Part number							
ND045-013	Σ I _{mains} = AC 45 A	826 013 3							
ND085-013	Σ I _{mains} = AC 85 A	826 014 1							
ND150-013	Σ I _{mains} = AC 150 A	825 548 2							
ND300-0053	Σ I _{mains} = AC 300 A	827 721 4							

- 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 ($2 \times I_F$)



Installation

Assignment of braking resistors, chokes and filters

AC 400/500 V units, sizes 3 to 6

MOVIDRIVE® MDX61B...-503			0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
Size			3			4		5		6		
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	A				
NF150-503		827 417 7						B				
NF210-503		827 418 5									A	
NF300-503		827 419 3										B
Output chokes	Inside diameter	Part number										
HD001	d = 50 mm	813 325 5	for cable cross sections 1.5...16 mm ² (AWG 16...6)									
HD003 output choke	d = 88 mm	813 558 4	for cable cross sections > 16 mm ² (AWG 6)									
HD004	Connection with M12 bolt	816 885 7										
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	D	D			

- A In rated operation (100 %)
- B With variable torque load (125 %)
- D Connect two output filters in parallel
- E In rated operation (100 %): one output filter
With variable torque load (125 %): two output filters in parallel



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 _{RMS}	821 687 8										
BW039-006	I _F = 3.9 A _{RMS}	821 688 6										
BW039-012 BW039-012-T	I _F = 5.5 A _{RMS}	821 689 4	1 820 136 9									
BW039-026-T	I _F = 8.1 A _{RMS}		1 820 415 5									
BW027-006	I _F = 4.7 A _{RMS}	822 422 6										
BW027-012	I _F = 6.6 A _{RMS}	822 423 4										
BW018-015-T	I _F = 9.1 A _{RMS}		1 820 416 3						C	C	C	C
BW018-035-T	I _F = 13.9 A _{RMS}		1 820 138 5						C	C	C	C
BW018-075-T	I _F = 20.4 A _{RMS}		1 820 139 3						C	C	C	C
BW915-T	I _F = 32.6 A _{RMS}		1 820 413 9						C	C	C	C
BW012-025-P	I _F = 14.4 A _{RMS}		1 820 414 7									
BW012-050-T	I _F = 20.4 A _{RMS}		1 820 140 7									
BW012-100-T	I _F = 28.8 A _{RMS}		1 820 141 5									
BW106-T	I _F = 47.4 A _{RMS}		1 820 083 4								C	C
BW206-T	I _F = 54.7 A _{RMS}		1 820 412 0								C	C
Line chokes		Part number										
ND020-013	Σ I _{mains} = AC 20 A	826 012 5					A					
ND045-013	Σ I _{mains} = AC 45 A	826 013 3					B		A			
ND085-013	Σ I _{mains} = AC 85 A	826 014 1							B		A	
ND150-013	Σ I _{mains} = 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	Inside diameter	Part number										
HD001	d = 50 mm (2 in)	813 325 5		for cable cross sections 1.5 ... 16 mm ² (AWG 16 ... 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 ($2 \times I_F$)



Installation

Connecting the system bus (SBus 1)

4.9 Connecting the system bus (SBus 1)



NOTE

Only if P884 "SBus baud rate" = 1000 kbaud:

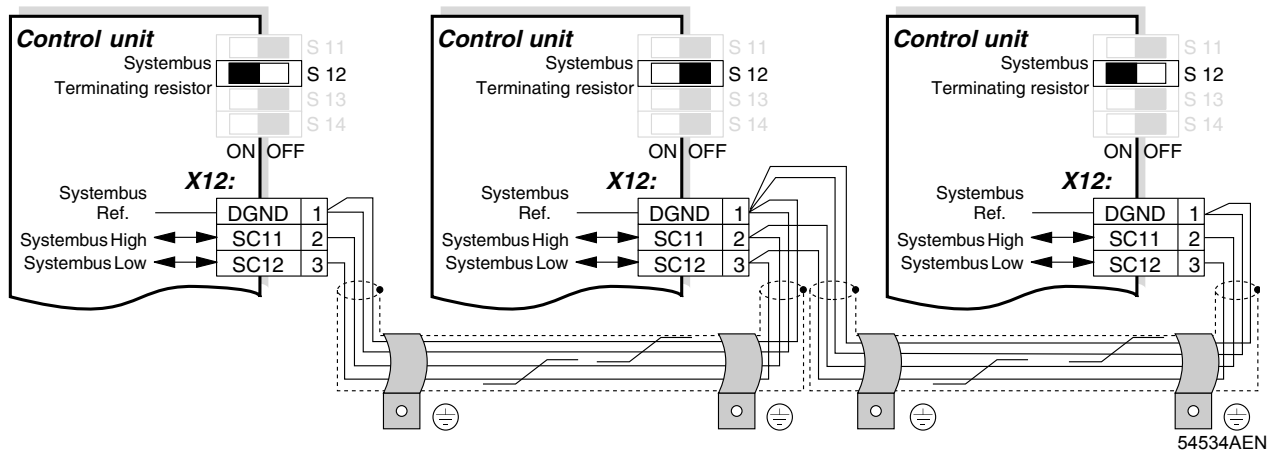
Do not combine MOVIDRIVE® *compact* MCH4_A units with other MOVIDRIVE® units in the same system bus combination.

The units may be combined at baud rates $\neq$ 1000 kbaud.

Max. 64 CAN bus nodes can be addressed via the system bus (SBus). Use a repeater after 20 or 30 stations, 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. This manual can be ordered from SEW-EURODRIVE.

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 ... AWG 19)
- Line resistance 120 Ω at 1 MHz
- Capacitance per unit length ≤ 40 pF/m at 1 kHz

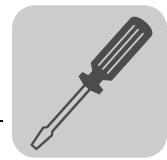
Suitable cables include CAN bus or DeviceNet cables.

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

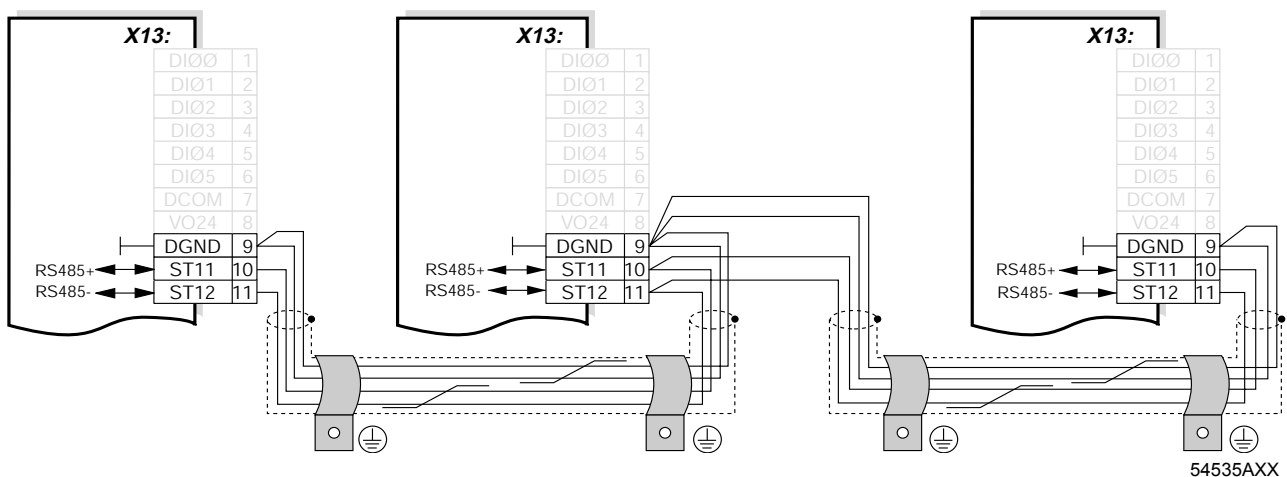
- Switch on the system bus terminating resistor (S12 = ON) at the start and end of the system bus connection. Switch off the terminating resistor on the other units (S12 = OFF).

	STOP!
	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 a potential displacement, e.g. by connecting the unit ground connectors using a separate lead.

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.

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 ... 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 (660 ft).

Terminating resistor

- Dynamic terminating resistors are installed. **Do not connect any external terminating resistors.**

	STOP!
	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 a potential displacement, e.g. by connecting the unit ground connectors using a separate lead.



Installation

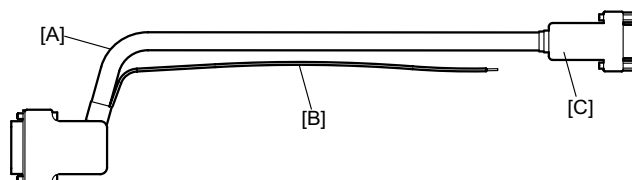
Connecting the DWE11B/12B interface adapter

4.11 Connecting the DWE11B/12B interface adapter

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)

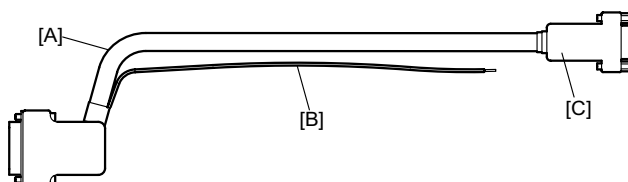
[B] DC 24 V connection for HTL encoder; 1 x 0.5 mm² (AWG 20) / length 250 mm (9.84 in)

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



- DWE12B, part number 188 180 9

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



58748XX

[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
$\overline{A}$	6
B	2
$\overline{B}$	7
C	3
$\overline{C}$	8
UB	9
GND	5



Installation

Connecting UWS21B (RS232) interface adapter

4.12 Connecting UWS21B (RS232) interface adapter

Part number Interface adapter UWS21B: 1 820 456 2

Scope of delivery The scope of delivery for the UWS21B option includes:

- UWS21B unit
- CD-ROM with MOVITOOLS®
- 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®.

Connecting MOVIDRIVE® to UWS21B

- Use the connection cable supplied to connect the UWS21B option to the MOVIDRIVE® unit.
- Plug the connection cable into the XT slot 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

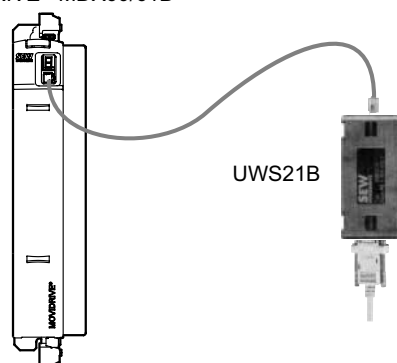


Figure 16: Connection cable between MOVIDRIVE® and UWS21B

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Connecting UWS21B to PC

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

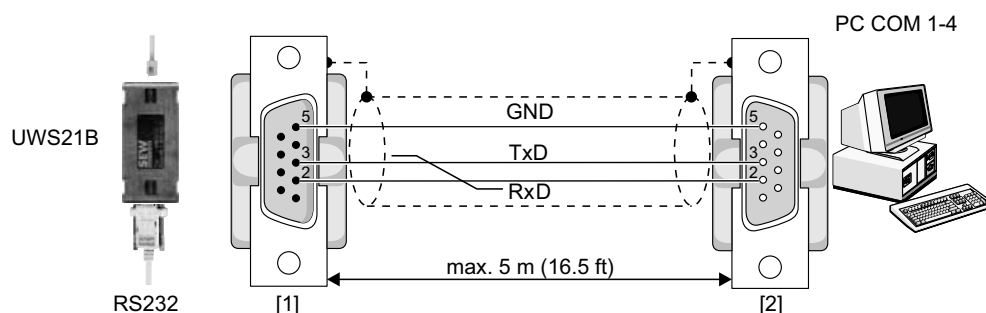
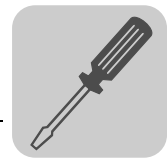


Figure 17: UWS21B-PC connection cable (1:1 connection assignment)

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



4.13 Connecting the USB11A interface adapter

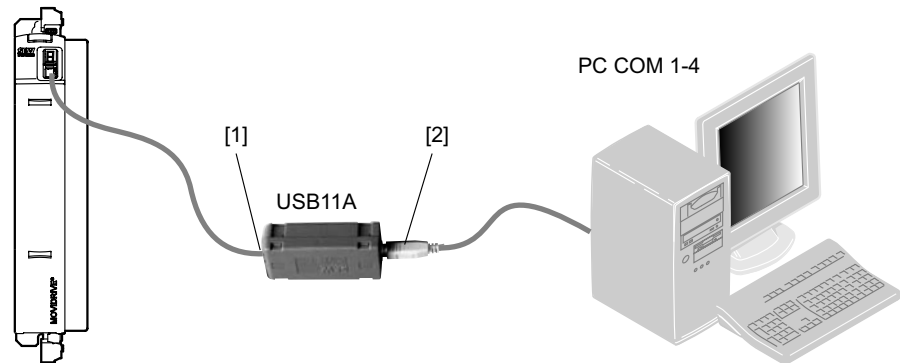
Part number Interface adapter USB11A: 824 831 1

- 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®
 - The USB11A interface adapter supports USB 1.1 and USB 2.0.

**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 slot of 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 the MOVIDRIVE® at the same time.
- Use the USB connection cable [2] (type USB A-B) to connect the USB11A to the PC.

MOVIDRIVE® MDX60/61B



54532AXX

Figure 18: Connection cable for MOVIDRIVE® MDX60B/61B - USB11A

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.

**Operation with
MOVITOOLS®**

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

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

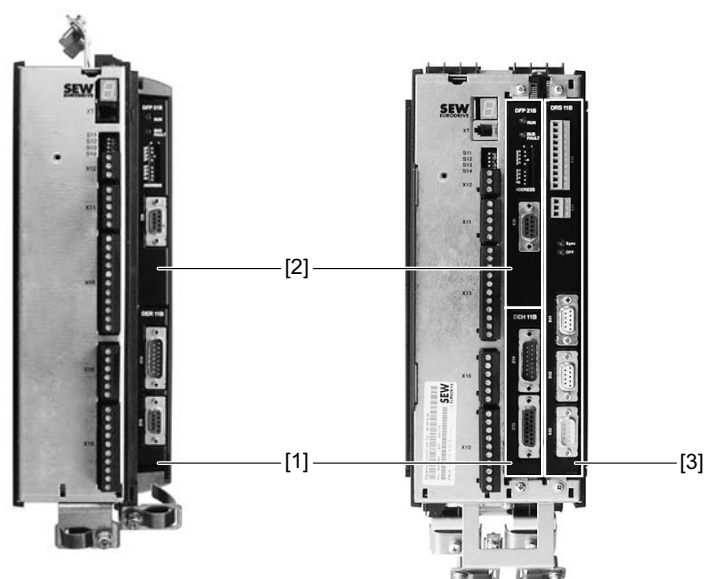


4.14 Option combinations for MDX61B

**Arrangement of
the option slots**

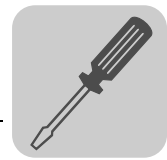
Size 0 (0005 ... 0014)

Sizes 1 ... 6 (0015 ... 1320)



62725AXX

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



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 6	Fieldbus slot Size 0 - size 6	Expansion slot Size 1 - size 6
DEH11B	Encoder input incr. / Hiperface®	X		
DEH21B	Encoder input absolute encoder	X		
DER11B	Encoder input resolver / Hiperface®	X		
DFF21B	Fieldbus interface Profibus		X	
DFI11B	Fieldbus interface Interbus		X	
DFI21B	Fieldbus interface Interbus LWL		X	
DFD11B	DeviceNet fieldbus interface		X	
DFC11B	Fieldbus interface CAN/CANopen		X	
DFE11B DFE12B DFE13B	Fieldbus interface Ethernet		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



Installation

Installing and removing options cards

4.15 Installing and removing options cards

	NOTES - For MOVIDRIVE® MDX61B size 0, only SEW-EURODRIVE is authorized to install or remove option cards. - You can install or remove the option cards yourself for MOVIDRIVE® MDX61B sizes 1 to 6.
--	---

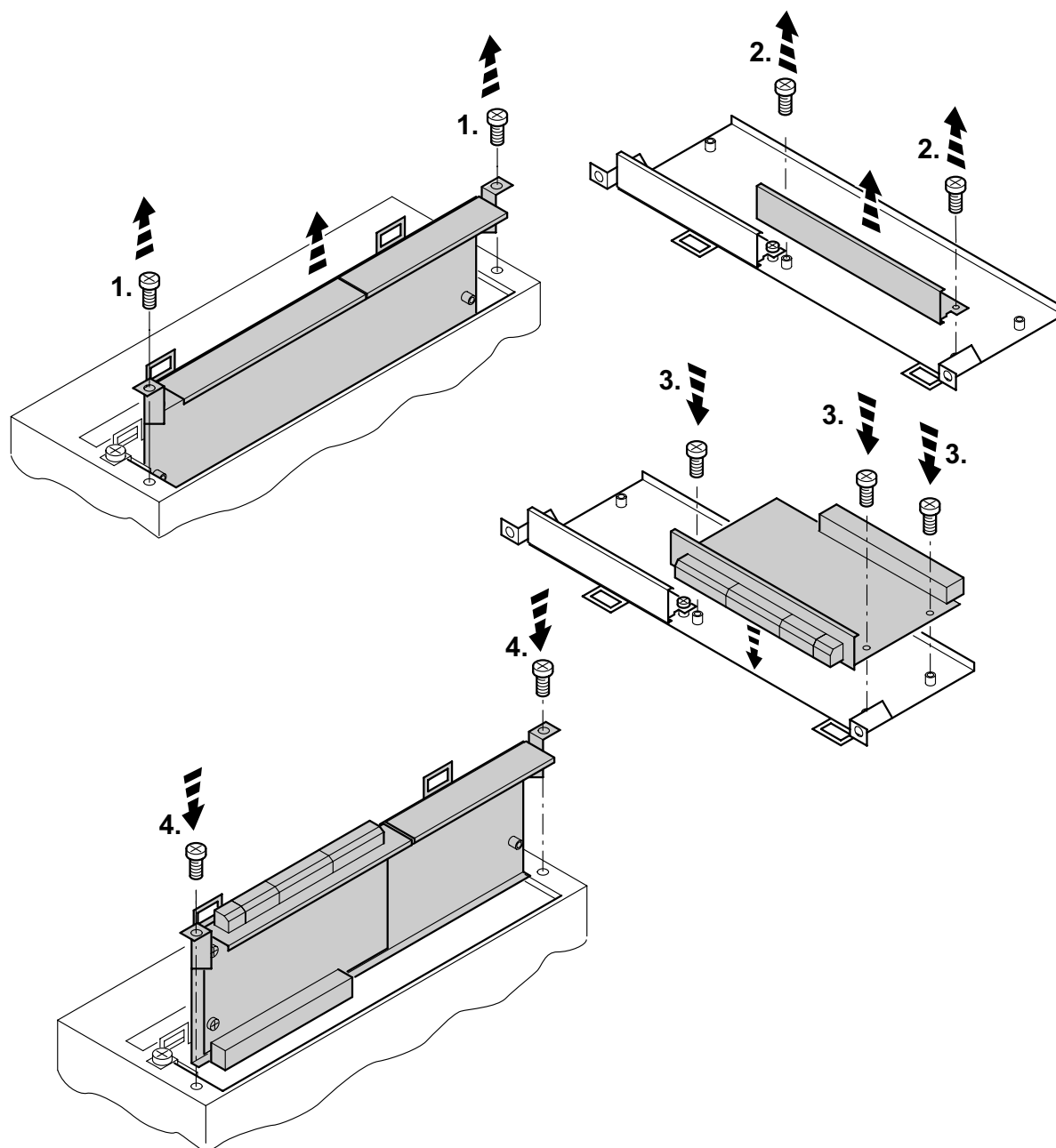
Before you begin

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

	STOP! Electrostatic charge. Damage to electronic components. - Disconnect the inverter from the power. Switch off the DC 24 V and the supply 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 (→ section "Removing/installing the keypad") and the front cover (→ section "Removing/installing the front cover"). After having installed the option card, replace the keypad (→ Sec. "Removing/installing the keypad") and the front cover (→ section "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 components.
--	--



Basic procedure for installing/removing an option card (MDX61B, sizes 1 - 6)



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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 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 the encoder and resolver



NOTES

- The wiring diagrams do now show the view onto the cable end. They show the connection to the motor or MOVIDRIVE®.
- The core colors specified in the wiring diagrams are in accordance with the IEC 757 color code and correspond to the core colors used in the prefabricated cables from SEW.

General installation information

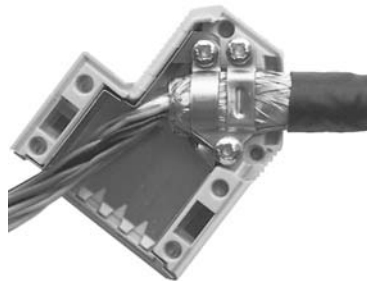
- The sub D connectors shown in the wiring diagrams have a 4/40 UNC thread.
- Max. line length from inverter - encoder/resolver: 100 m (328 ft) with a capacitance per unit length ≤ 120 nF/km
- Cable cross section: $0.20 \dots 0.5 \text{ mm}^2$ (AWG 24 ... 20)
- If you cut a core of the encoder/resolver cable, isolate 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 cables separately from the power cables.

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).

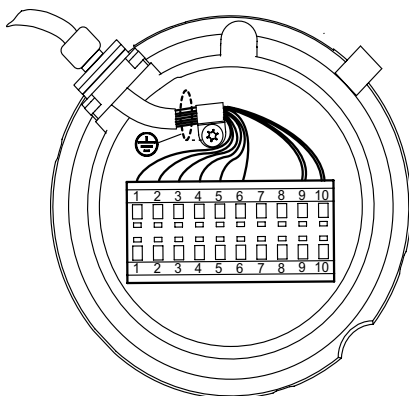


01939BXX



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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Prefabricated cables

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



Installation

Terminal description of the DEH11B option (HIPERFACE®) and connection

4.17 Terminal description of the DEH11B option (HIPERFACE®) and connection

Part number DEH11B HIPERFACE® encoder card: 824 310 7



NOTES

- 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 59239AXX	X14: Input for external encoder or output for incremental encoder simulation Connection → page 69 to page 72 Pulse count of the incremental encoder simulation: • 1024 pulses/revolution with HIPERFACE® encoder on X15 • as at X51: Motor encoder input with sin/cos encoder or TTL encoder on X15	X14:1 (COS+) signal track A (K1) X14:2 (SIN+) signal track B (K2) X14:3 Signal track C (K0) X14:4 DATA+ X14:5/6 Reserved X14:7 switch-over X14:8 Reference potential <u>D</u> GND X14:9 (COS-) Signal track <u>A</u> (K1) X14:10 (SIN-) Signal track <u>B</u> (K2) X14:11 Signal track C (K0) X14:12 DATA- X14:13/14 Reserved X14:15 DC+12 V (tolerance range DC 10.5 - 13 V) (max. load X14:15 and X15:15 = DC 650 mA)	
	X15: Motor encoder input	X15:1 (COS+) signal track A (K1) X15:2 (SIN+) signal track B (K2) X15:3 Signal track C (K0) X15:4 DATA+ X15:5 Reserved X15:6 Reference potential TF/TH/KTY- X15:7 Reserved X15:8 Reference potential <u>D</u> GND X15:9 (COS-) Signal track <u>A</u> (K1) X15:10 (SIN-) Signal track <u>B</u> (K2) X15:11 Signal track C (K0) X15:12 DATA- X15:13 Reserved X15:14 TF/TH/KTY+ connection X15:15 DC+12 V (tolerance range DC 10.5 - 13 V) (max. load X14:15 and X15:15 = DC 650 mA)	



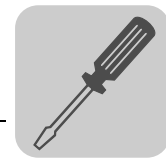
STOP!

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).



NOTES

- If X14 is used as an incremental encoder simulation output, the switch-over (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.



	STOP!
	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 using the interface adapter DWE11B/12B (→ section "Connecting the DWE11B/12B interface adapter").

Permitted encoders

The following encoders may be connected to the "HIPERFACE® encoder card type DEH11B" option:

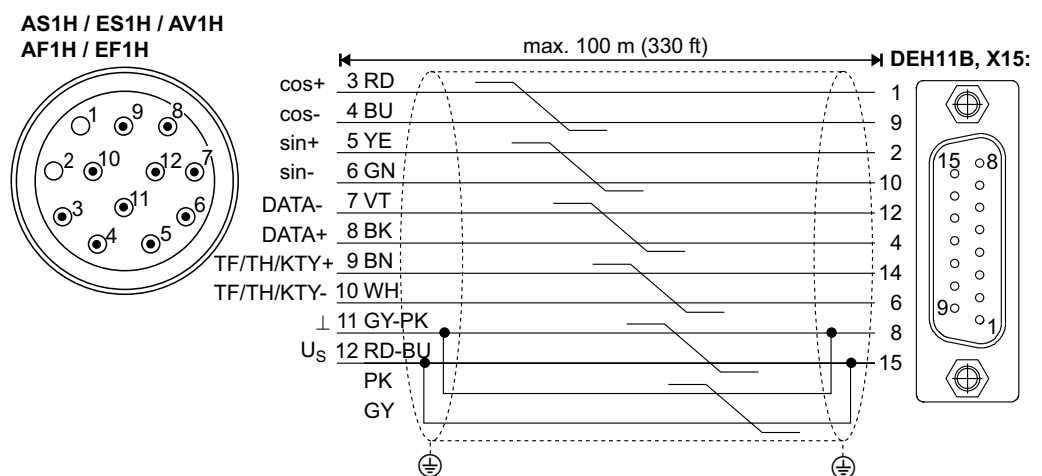
- HIPERFACE® encoder type AS1H, ES1H, AV1H, AF1H or EF1H
- sin/cos encoder type ES1S, ES2S, EV1S or EH1S
- DC 5 V TTL encoder with DC 24 V voltage supply type ES1R, ES2R, EV1R or EH1R
- DC 5 V TTL encoder with DC 5 V voltage supply type ES1T, ES2T, EV1T or EH1T via DW11A option or encoder with signal level to RS422

HIPERFACE® encoder connection

HIPERFACE® encoders AS1H, ES1H and AV1H are recommended for operation with DEH11B. Depending on the motor type and motor configuration, the encoder is connected via plug connector or terminal box.

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

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



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

Part numbers of the prefabricated cables:

- For fixed routing: 1332 453 5
- For cable carrier routing: 1332 455 1



Installation

Terminal description of the DEH11B option (HIPERFACE®) and connection

Part numbers of the prefabricated extension cables:

- For fixed routing: 199 539 1
- For cable carrier routing: 199 540 5

CM71...112 with
terminal box

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

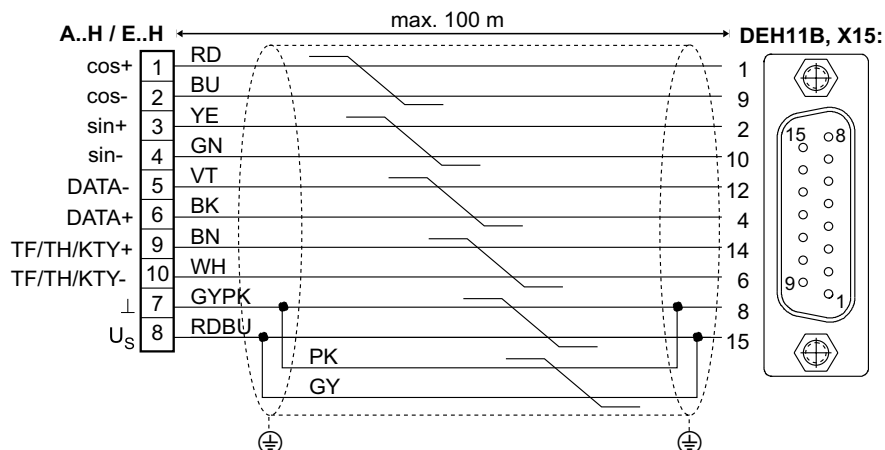


Figure 19: Connecting HIPERFACE® encoder to DEH11B as a motor encoder

54440CXX

Part numbers of the prefabricated cables:

- For fixed routing: 1332 457 8
- For cable carrier routing: 1332 454 3

**Connecting
sin/cos encoder
to DT../DV..,
CT../CV motors**

The high resolution sin/cos encoders EH1S, ES1S, ES2S or EV1S can also be connect-
ed to DEH11B. Connect the sin/cos encoder to the option DEH11B as follows:

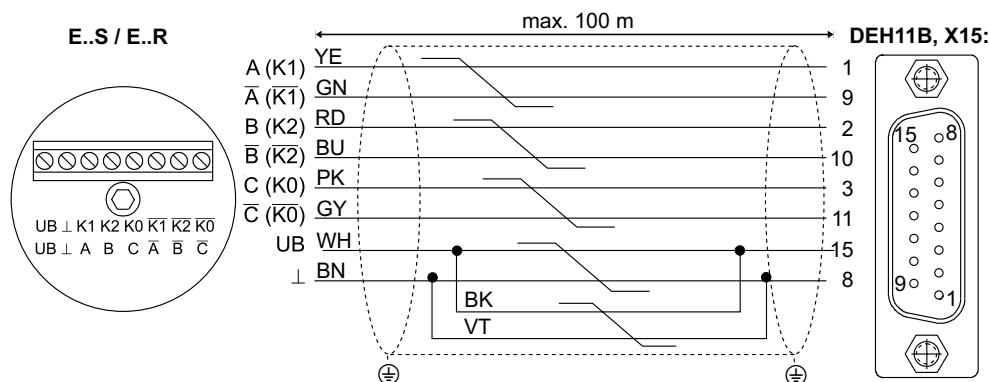


Figure 20: Connecting the sin/cos encoder to DEH11B as a motor encoder

54329CXX

Part numbers of the prefabricated cables:

- For fixed routing: 1332 459 4
- For cable carrier routing: 1332 458 6



Connecting TTL encoders to DT../DV.. motors

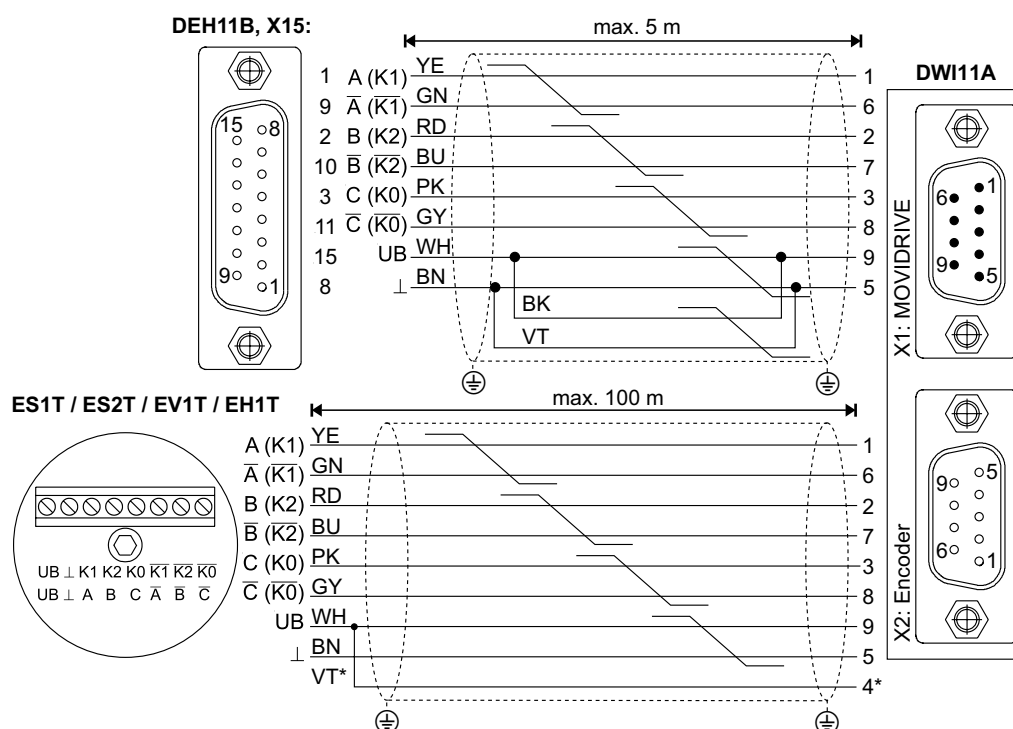
TTL encoders from SEW-EURODRIVE are available with DC 24 V and DC 5 V voltage supply.

DC 24 V voltage supply

Connect TTL encoders with DC 24 V voltage supply EH1R, ES1R, ES2R or EV1R in the same way as the high-resolution sin/cos encoders (→ Figure 20).

DC 5 V voltage supply

You must connect TTL encoders with a DC 5 V voltage supply ES1T, ES2T, EH1T or EV1T 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:



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Figure 21: Connecting the TTL encoder via DWI11A to DEH11B as a motor encoder

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

Part numbers of the prefabricated cables:

- HIPERFACE® encoder card type DEH11B X15 option: → DWI11A X1: MOVIDRIVE®
 - For fixed routing: 817 957 3
- Encoders ES1T / ES2T / EV1T / EH1T → DWI11A X2: Encoder
 - For fixed routing: 198 829 8
 - For cable carrier routing: 198 828 X



Installation

DEH21B option connection and terminal description

4.18 DEH21B option connection and terminal description

Part number Encoder card option DEH21B: 1820 818 5

	NOTES
	- 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 6. 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 chapter 'Project Planning' chapter in the MOVIDRIVE® MDX60B/61B system manual.

Front view of DEH21B	Description	Terminal	Function
	X62: Connection absolute encoder	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: Power 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 A (K1) (SIN–) Signal track B (K2) Signal track 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)

	STOP!
	Encoders connected to X15 and X62 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).



	NOTE
	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.

	STOP!
	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 the DEH21B option using the interface adapter DWE11B/12B (→ Sec. "Connecting the interface adapter type DWE11B/12B").



Installation

Connecting option DER11B (resolver)

4.19 Connecting option DER11B (resolver)

Part number Resolver card option type DER11B: 824 307 7



NOTES

- The "resolver card type DER11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B.
- The DER11B option must be plugged into the encoder slot.

Front view of DER11B	Description	Terminal	Function
59240AXX	X14: Input for external encoder or output for incremental encoder simulation Connection → page 69 to page 72 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 switch-over Reference potential DGND (cos-) Signal track A (K1) (sin-) Signal track B (K2) Signal track C (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



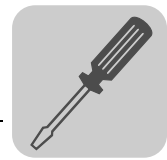
STOP!

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).



NOTES

- If X14 is used as an incremental encoder simulation output, the switch-over (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.



Permitted encoders

The following encoders can be connected at X14 (external encoder inputs):

- HIPERFACE® encoder type AS1H, ES1H or AV1H
- sin/cos encoder type ES1S, ES2S, EV1S or EH1S
- DC 5 V TTL encoder with DC 24 V voltage supply type ES1R, ES2R, EV1R or EH1R
- DC 5 V TTL encoder with DC 5 V voltage supply type ES1T, ES2T, EV1T or EH1T via DWI11A option or encoder with signal level to RS422

2-pole resolvers, AC 7 V_{eff}, 7 kHz, can be connected at X15 (resolved input). The gear ratio of the resolver amplitudes must be approximately 0.5. The control dynamics decrease if the value is lower; the evaluation may be unstable if the value is higher.

Resolver

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

For motor type		Part number	
		Fixed installation	Cable carrier installation
DS56 CM71 ... 112	With plug connector	199 487 5	199 319 4
	Extension cable	199 542 1	199 541 3
CM71 ... 112	With terminal box	199 589 8	199 590 1
DS56	With terminal box	1332 817 4	1332 844 1

Terminal / pin assignment

CM motors: The resolver connections are located in a plug connector or on a 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 signals	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.

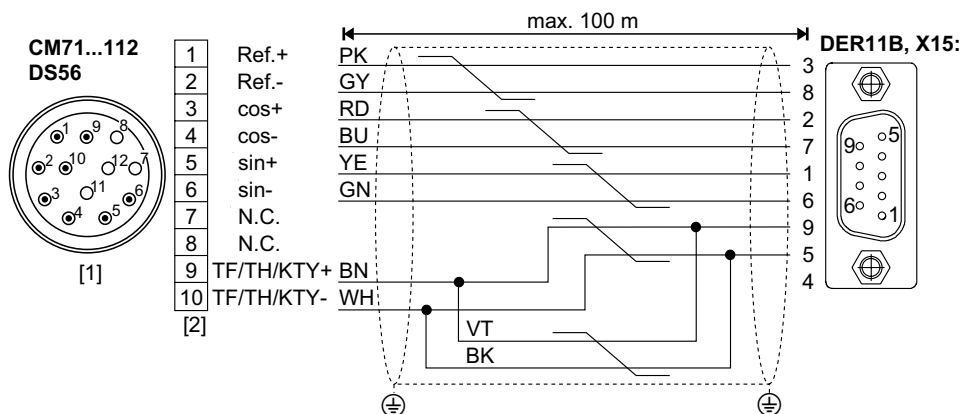


Installation

Connecting option DER11B (resolver)

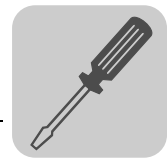
Connection

Connect the resolver as follows:



[1] Plug connector

[2] Terminal strip



4.20 Connecting an external encoder

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

- HIPERFACE® encoder AV1H
- High-resolution sin/cos encoders with signal voltage 1 V_{SS}
- Encoder with signal level to RS422

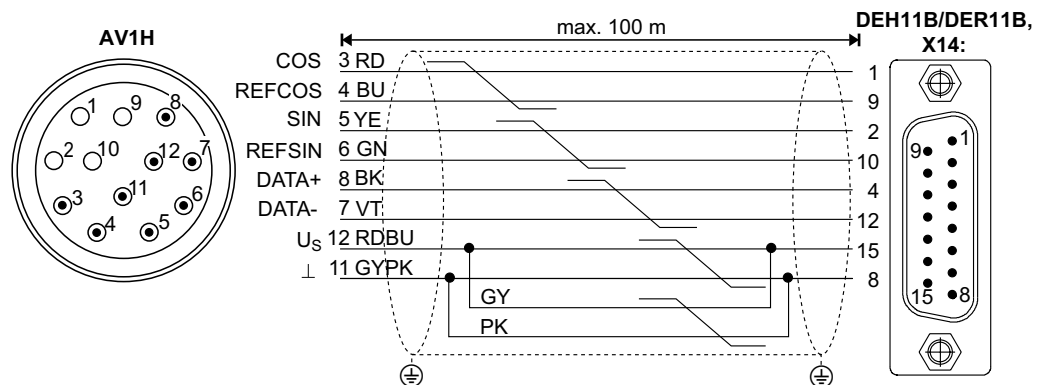
Voltage supply

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:



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Figure 22: Connecting the HIPERFACE® encoder AV1H to DEH11B/DER11B as external encoder

Part numbers of the prefabricated cables:

- For fixed routing: 818 015 6
- For cable carrier routing: 818 165 9

Part numbers of the prefabricated extension cables:

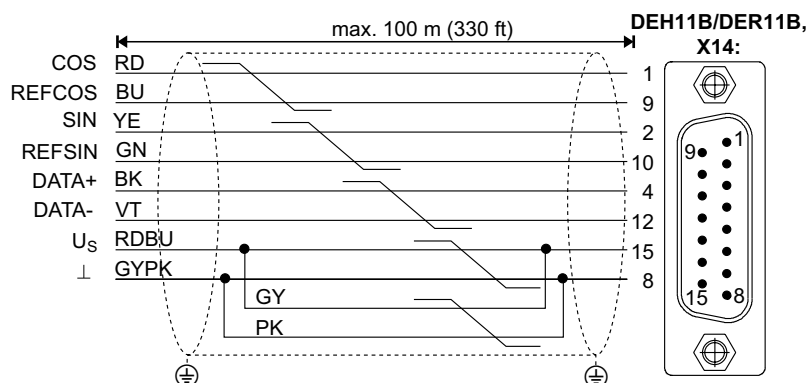
- For fixed routing: 199 539 1
- For cable carrier routing: 199 540 5



Installation

Connecting an external encoder

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



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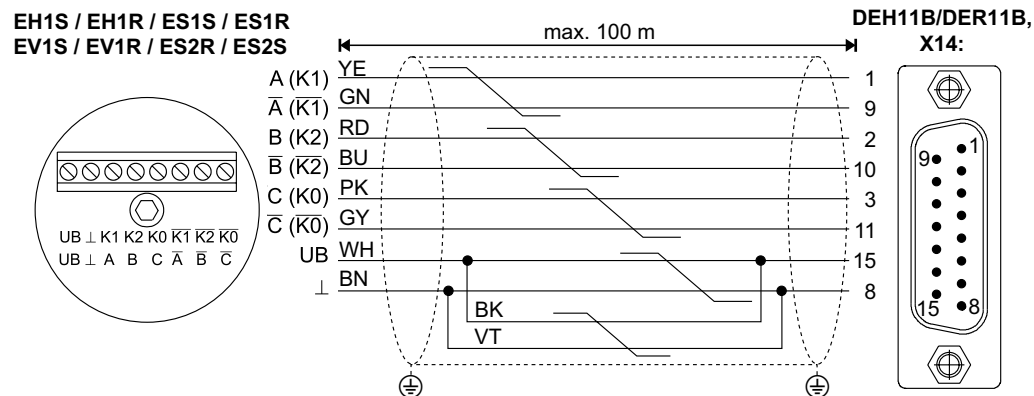
Figure 23: Connecting the HIPERFACE® encoder to DEH11B/DER11B as external encoder

Part numbers of the prefabricated cables:

- For fixed routing: 1810 695 1
- For cable carrier routing: 1810 697 8

sin/cos encoder connection

Connect the sin/cos encoder as follows:



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Figure 24: Connecting the sin/cos encoder to DEH11B/DER11B as an external encoder

Part numbers of the prefabricated cables:

- For fixed routing: 819 869 1
- For cable carrier routing: 818 168 3



TTL encoder connection

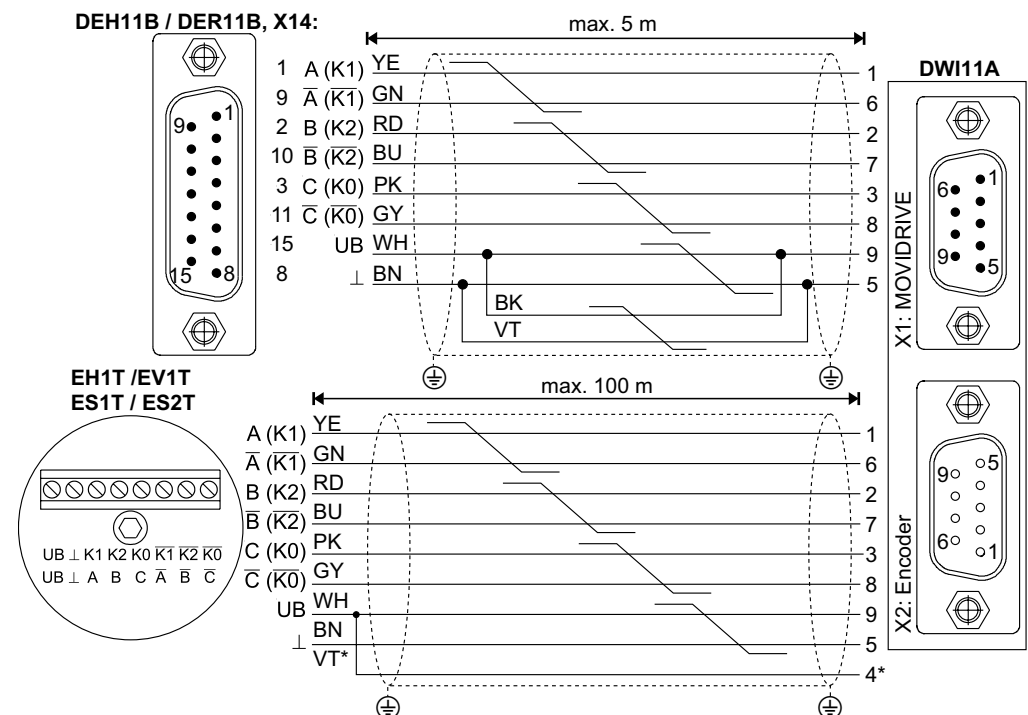
TTL encoders from SEW-EURODRIVE are available with DC 24 V and DC 5 V voltage supply.

DC 24 V voltage supply

Connect TTL encoders with DC 24 V voltage supply EV1R in the same way as the high-resolution sin/cos encoders (→ Figure 20).

DC 5 V voltage supply

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:



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Figure 25: 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!

Part numbers of the prefabricated cables:

- HIPERFACE® encoder card type DEH11B X14: → DWI11A X1: MOVIDRIVE®
 - For fixed routing: 818 164 0
- Encoder EV1T → DWI11A X2: Encoder
 - For fixed routing: 198 829 8
 - For cable carrier routing: 198 828 X



Installation

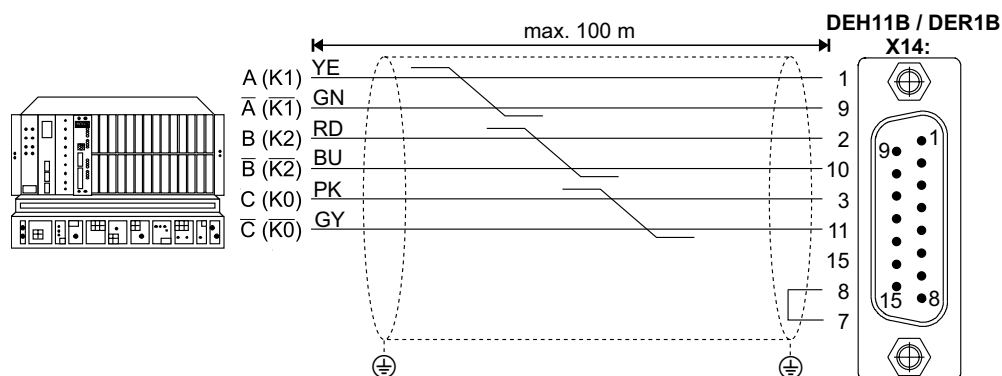
Connecting an incremental encoder simulation

4.21 Connecting an incremental encoder simulation

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 "switch-over" (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

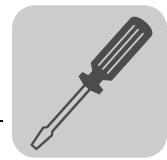


59307ADE

Figure 26: Incremental encoder simulation connection to DEH11B or DER11B

Part number of the prefabricated cable:

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

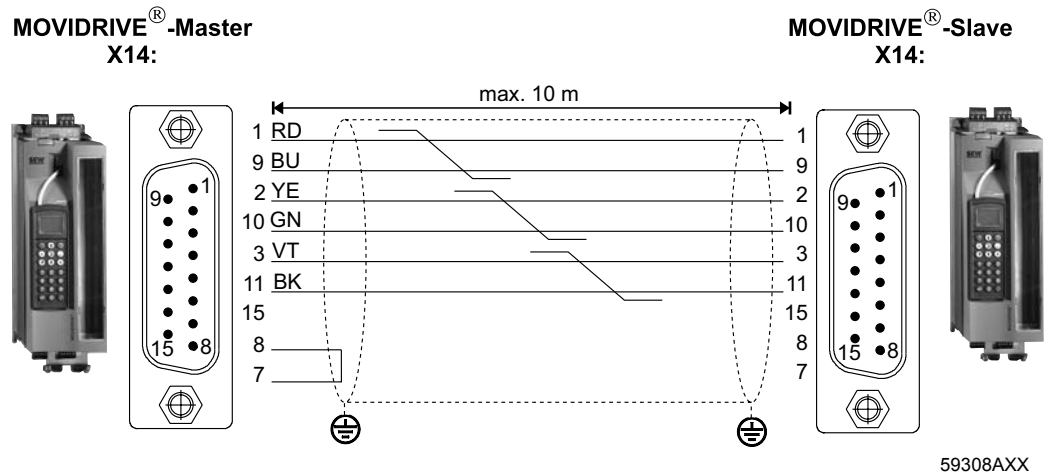


4.22 Master/slave connection

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 "switch-over" (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 routing: 817 958 1



NOTES

- 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.



Installation

DIO11B – connection and terminal description

4.23 DIO11B – connection and terminal description

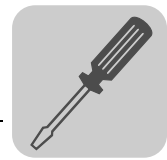
Part number Terminal expansion board type DIO11B: 824 308 5



NOTES

- The "input/output board 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 expansion board 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
	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, AI..., AO...)
	X21:1 AOV1	Analog voltage output V1, with factory setting to "actual speed"
	X21:4 AOV2	Analog voltage output V2, with factory setting to "output current"
	X21:2 AOC1	Load capacity of the analog voltage outputs: $I_{max} = DC\ 10\ mA$
	X21:5 AOC2	Analog current output C1, with factory setting "actual speed"
		Analog current output C2, with 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, with factory setting "no function"
		The binary inputs are electrically isolated by optocouplers.
		Selection options for the binary inputs → Parameter menu P61_
	X22:9 DCOM	Reference potential for the binary inputs DI1Ø...17
	X22:10 DGND	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, with 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 DO1Ø ... DO17, non-isolated (reference potential DGND)



Voltage input 24VIN

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).

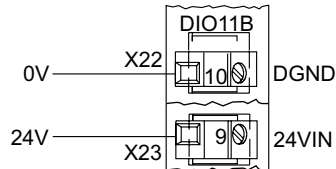


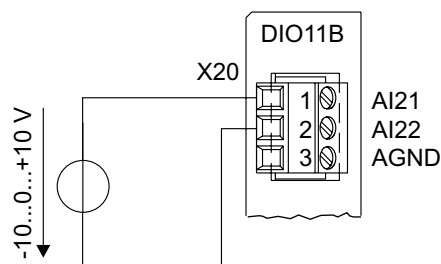
Figure 27: Voltage input 24VIN (X23:9) and reference potential DGND (X22:10)

06556AXX

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

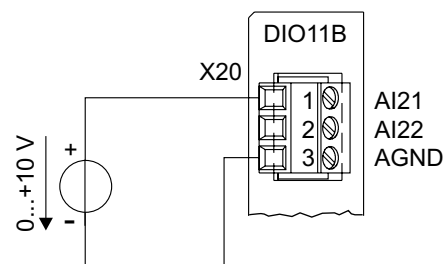


Figure 28: Setpoint input n2

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

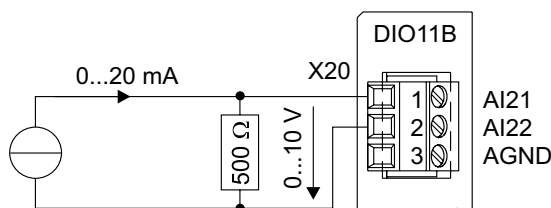


Figure 29: Current input with external load

06669AXX



Installation

DIO11B – connection and terminal description

Voltage outputs AOV1 and AOV2

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

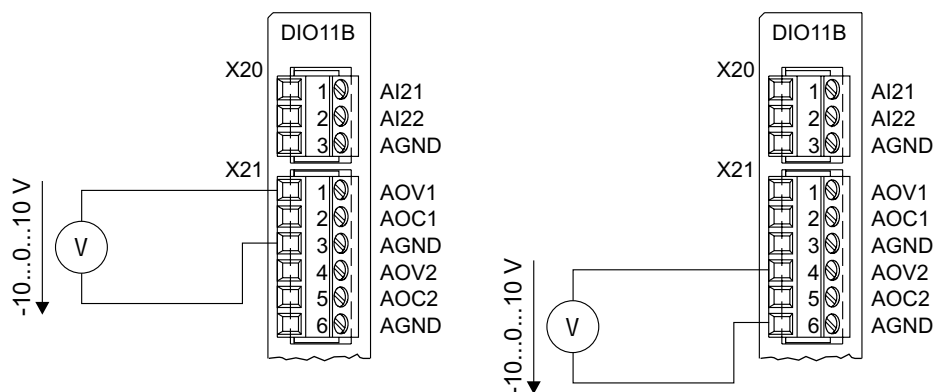


Figure 30: Voltage outputs AOV1 and AOV2

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Current outputs AOC1 and AOC2

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

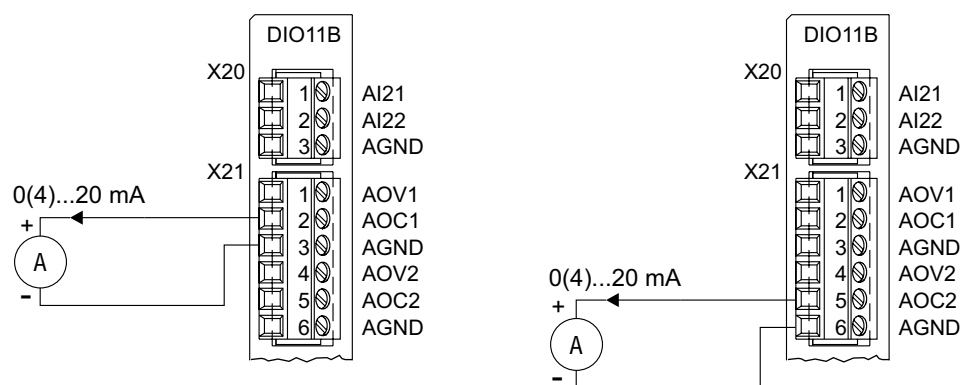
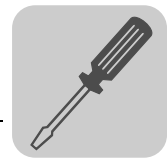


Figure 31: Current outputs AOC1 and AOC2

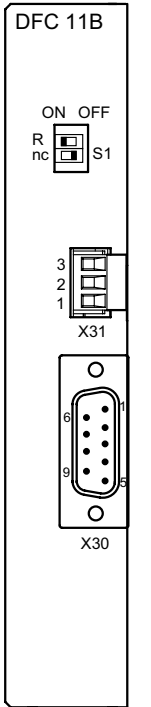
06197AXX



4.24 DFC11B – connection and terminal description

Part number CAN-Bus interface type DFC11B: 824 317 4

	NOTES
	- The "CAN-Bus interface type DFC11B" option is only possible in conjunction 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
	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

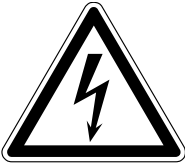
Connection MOVIDRIVE® to CAN

The DFC11B option is connected to the CAN bus at X30 or X31 in the same way as the SBus (→ section "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

	HAZARD 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.
---	---

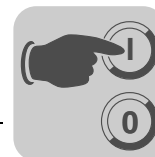
Prerequisite

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.

VFC operating modes without speed control

MOVIDRIVE® MDX60/61B inverters are designed 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 the section "Starting the motor" (→ page 91) .

	NOTE 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.
---	---



Inverter/motor combinations

400/500 V units

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

MOVIDRIVE® MDX60/61B in VFC 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

230 V units

MOVIDRIVE® MDX60/61B in VFC 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

Hoist applications



HAZARD

Risk of fatal injury if the hoist falls.

Severe or fatal injuries.

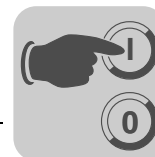
MOVIDRIVE® MDX60B/61B is not designed for use as a safety device in hoist applications. Use monitoring systems or mechanical protection devices to ensure safety.



5.2 Preliminary work and resources

- Check the installation.

	HAZARD Risk of crushing if the motor starts up unintentionally. Severe or fatal injuries. • Ensure that the motor cannot start unintentionally, 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. • Performing startup with a PC and MOVITOOLS®: 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® 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 terminal assignment that has been set (→ P60_ / P61_).
	NOTE A group of parameter values is changed automatically at startup. The description of parameter P700 "Operating modes" explains which parameters are affected by this step. Refer to the MOVIDRIVE® MDX60/61B System Manual, section /Parameters/ for the parameter description.



5.3 Startup with DBG60B keypad

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® 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, power factor $\cos\phi$ and rated speed
- Rated mains voltage

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

- Encoder type and encoder resolution:

SEW encoder type	Startup parameter	
	Encoder type	Encoder resolution
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 (→ section Installation).

- 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

NOTES	
	• Activate encoder monitoring (P504 = "ON") after completing 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!

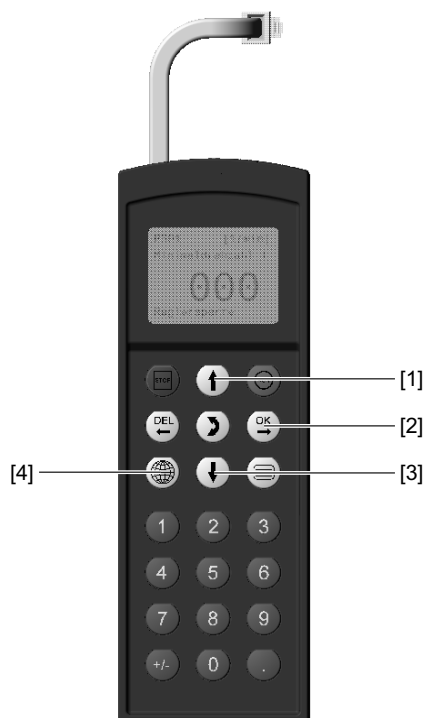


Startup

Startup with DBG60B keypad

Select language

The figure below shows the keys for selecting the language.



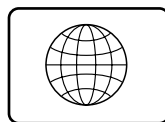
60008AXX

- [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

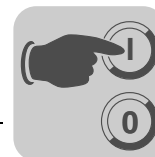
The symbol for language selection then appears on the display.



54533AXX

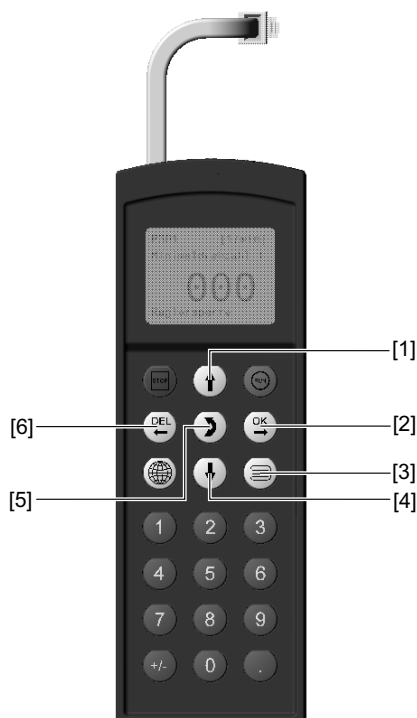
Proceed as follows to select the language:

- Press the key . A list of available 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

The figure below shows the keys required for startup.



60010AXX

- [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

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.

PARAMETER MODE
VARIABLE MODE
BASIC VIEW

3. Use the key to scroll down to the "STARTUP PARAMET." menu item.

MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX



Startup

Startup with DBG60B keypad

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.
 - Use the key to change to edit mode. The flashing cursor disappears.
 - Use the key or the key to select "PARAMETER SET 1" or "PARAMETER SET 2".
 - Confirm the setting using the key to confirm your selection.
 - Use the key to return to the display mode. The flashing cursor appears again.
 - Use the key to select the next parameter.

STARTUP
PREPARE FOR STARTUP

5. Select the operating mode you require. Use the key to select the next parameter.

C00*STARTUP
PARAMETER SET 1
PARAMETER SET 2

C01*OPER. MODE 1
VFC1
VFC1&GROUP

6. 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.
Use the key to select the next parameter.

C02*MOTOR TYPE 1
DT71D2
DT71D4
DT80K2

C02*MOTOR TYPE 1
NON-SEW MOTOR
DT63K4/DR63S4

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

Example: Nameplate 230Δ/400 Δ 50 Hz

Δ 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, after startup first set parameter P302 "MAXIMUM SPEED 1" to the value for 87 Hz and then start the drive.

Example: Nameplate 400Δ/690 Δ 50 Hz

Only Δ connection possible → Enter "400 V".

Δ connection is not possible.

Use the key to select the next parameter.

C03*
RATED MOT. VOLT 1
+400.000

8. Enter the rated frequency specified on the motor nameplate.
Example: 230Δ/400 Δ 50 Hz
Enter "50 Hz" in Δ and Δ connection.

Use the key to select the next parameter.

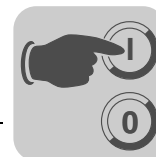
C04*
RATED MOT. FREQ. 1
+50.000

FOR SEW MOTORS

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

FOR NON-SEW MOTORS

9. Enter the following motor nameplate data:
 - C10* rated motor current, note the connection type (Δ or Δ).
 - C11* rated motor power
 - C12* power factor cos ϕ
 - C13* rated motor speed



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

C05* V
RAT. MAINS VOLT. 1
+400.000

11. 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

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

C06*CALCULATION
NO
YES

FOR SEW MOTORS

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

C06*SAVE
NO
YES

FOR NON-SEW MOTORS

13. 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.

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

DATA IS
BEING COPIED...

15. The startup procedure is now complete. Use the  key to return to the context menu.

MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX

16. Use the  key to scroll down to the "EXIT" menu item.

UNIT SETTINGS
EXIT

17. Confirm the setting using the  key. The basic display appears.

0.00rpm
0.000Amp
CONTROLLER INHIBIT



Startup

Startup with DBG60B keypad

Starting up the speed controller

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

Note: Set the VFC-n-CONTROL mode.

C01*OPER. MODE 1
VFC1&FLYSTART
VFC1-n-CONTROL
VFC-n-CTRL.GRP

1. Commence startup for the speed controller by choosing "YES".

C09*STARTUPn-CTRL.
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
INCREM. ENCOD. HTL

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* 10e-4kgm²
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 ... 1 ... 1.10

C18*
STIFFNESS
+1.000

7. Enter the moment of inertia of the brake and fan.

D00* 10e-4kgm²
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-4kgm²
LOAD MOMENT OF INER-
TIA
+0.200



9. Enter the time for the shortest ramp you want.

C21*
SHORTEST RAMP
+0.100 s
 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®.

DATA IS
BEING COPIED...
 13. The startup procedure is now complete. Use the  key to return to the context menu.

MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX
 14. Use the  key to scroll down to the "EXIT" menu item.

UNIT SETTINGS
EXIT
 15. Confirm the setting using the  key. The basic display appears.

0.00rpm
0.000Amp
CONTROLLER INHIBIT
- 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 using 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®.



Startup

Startup with DBG60B keypad



HAZARD

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 parameter settings that differ from the factory setting in the parameter list (→ page 95).
- In the case of non-SEW motors, set the correct brake application time (P732 / P735).
- For starting the motor, refer to the "Starting the motor" section (" page 91).
- With 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.**

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 selection using the  key. The flashing cursor under the parameter number indicates that the keypad is in parameter mode.
- Use the  key to change to edit mode. The flashing cursor disappears.
- You can use the  key or the  key to select or set the correct parameter value.
- Use the  key to confirm the selection or setting.
- Use the  key to return to the parameter mode. The flashing cursor appears again.
- Use the  key to select the next parameter.

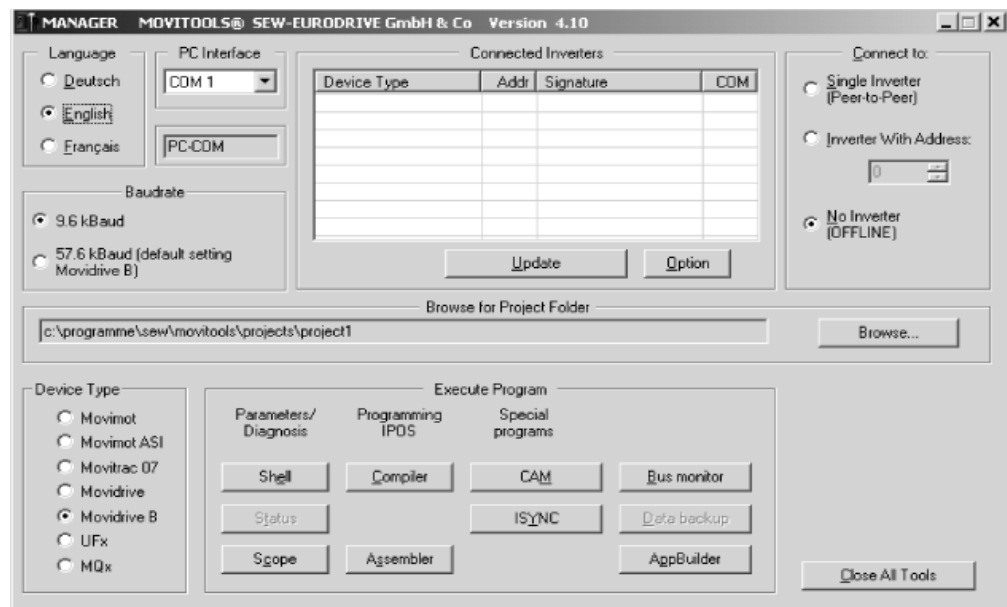


5.4 Startup with PC and MOVITOOLS®

General information

MOVITOOLS® software version 4.20 or higher is required for startup with a PC.

- Terminal X13:1 (DIØØ "/CONTROL.INHIBIT") must receive a "0" signal!
- Start MOVITOOLS®.
- Select the language you want in the "Language" selection field.
- From the "PC-COM" drop down menu, select the PC port (e.g. COM 1) the inverter is connected to.
- In the "Device type" field, select "Movidrive B".
- In the "Baudrate" field, select the baud rate set on the basic unit with the DIP switch S13 (standard setting → "57.6 kBaud").
- Press the <Update> button The connected inverter is displayed under "Connected devices."



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Figure 32: MOVITOOLS® initial screen

Commencing startup

- In the "Execute Program" group box, press the <Shell> button under "Parameters/Diagnosis". The Shell program is started.
- In the Shell program, select the [Startup] / [Startup...] menu command. MOVITOOLS® opens the startup menu. Follow the instructions of the startup assistant. For questions on startup, refer to the MOVITOOLS® online help.



Startup

Startup with PC and MOVITOOLS®

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

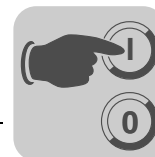
< Zurück Weiter > Abbrechen

Figure 33: Settings for startup of a motor with HTL motor encoder

60101ADE

- [1] Dropdown menu "SEW encoder type"
- [2] Dropdown menu "Encoder type"
- [3] Dropdown menu "PPR count"

- Choose "Non-SEW encoder" from the [SEW encoder type] [1] dropdown menu.
- Choose "INCREM. ENCODER TTL" from the [encoder type] [2] in the dropdown menu.
- 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

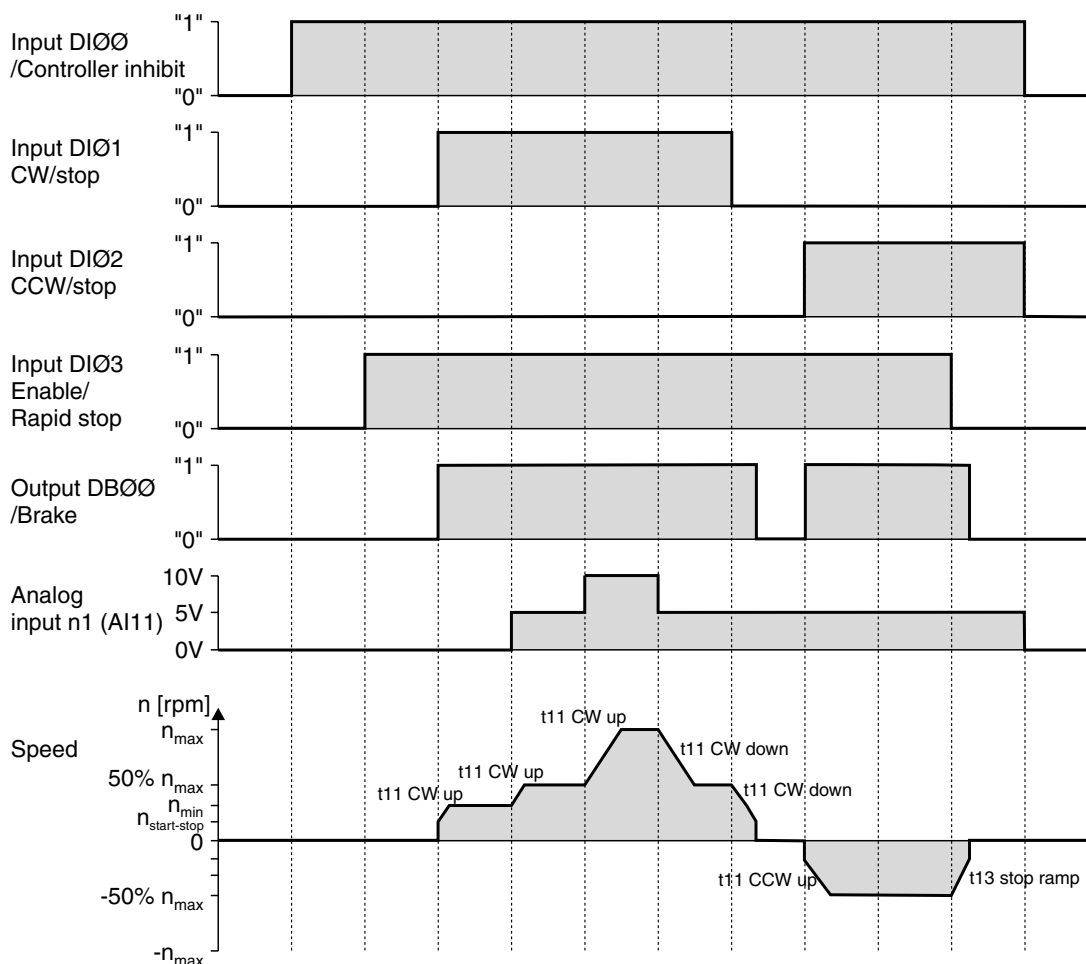
Analog setpoint selection

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 selection.

Function	X11:2 (AI1) Analoginput 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"

Travel diagram

The following travel diagram is an example of how the drive is started with the wiring of terminals X13:1 ... X13:4 and analog setpoints. Binary output X10:3 /DBØØ "/Brake") is used for switching brake contactor K12.



05033BDE



NOTE

The motor is not energized in the event of controller inhibit (DIØØ = "0"). A motor with-out brake will coast to standstill.



Startup Starting the motor

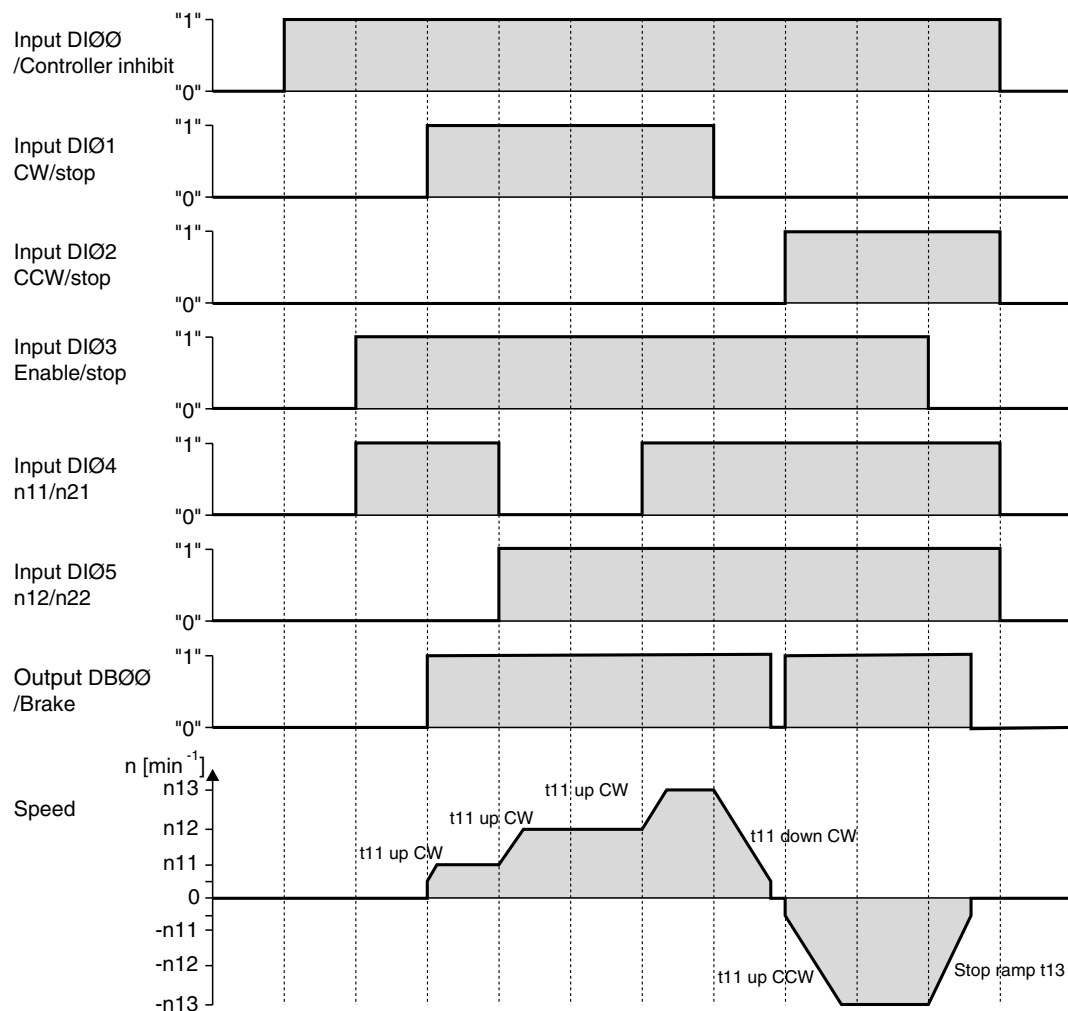
Fixed setpoints

The following table shows the signals that must be present on terminals X13:1 to X13:6 (DIØØ to 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"

Travel diagram

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

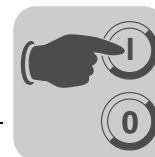


05034BDE



NOTE

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



Manual operation

The inverter can be controlled using the DBG60B keypad with the manual operation function (Context menu → Manual operation). The 7-segment display on the unit shows "H" during manual mode.

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 receive a "1" signal to enable the drive to be started in manual operation. The drive can also be stopped in manual operation by setting 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 (+ = CW = / 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 ↑ and ↓ keys.



NOTE

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.



HAZARD

Risk of crushing if the motor starts up unintentionally.

Severe or fatal injuries.

- Ensure that the motor cannot start unintentionally, 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.



Startup Starting the motor

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.



NOTE

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.

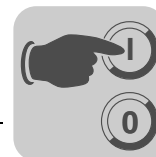
Note the following when performing **startup for an SEW motor** with DBG60B or MOVITOOLS®:

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®:

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

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 1rpm
\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	Hours of operation	h
016	Enable hours	h
017	Work	kWh
018	KTY capacity utilization 1	0 ... 200 %
019	KTY capacity 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 basic unit	
030	Binary input DI00	/CONTROLLER INHIBIT
031	Binary input DI01	Not in DBG60B
032	Binary input DI02	
033	Binary input DI03	
034	Binary input DI04	
035	Binary input DI05	
036	Binary input DI06	
037	Binary input DI07	
\039	Status binary inputs DI00...DI07	
04_	Binary input options	
040	Binary input DI10	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 binary inputs DI10...DI17	

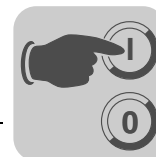
Par.	Name	Value range
05_	Binary outputs basic unit	
050	Binary output DB00	/BRAKE
051	Binary output DO01	Not in DBG60B
052	Binary output DO02	
053	Binary output DO03	
054	Binary output DO04	
055	Binary output DO05	
\059	Status binary outputs DB00, DO01...DO05	
06_	Binary outputs option	
060	Binary output DO10	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 binary outputs DO10...DO17	
07_	Unit data	
070	Unit type	
071	Rated output current	
072	Option 1 encoder slot	
073	Option 2 fieldbus slot	
074	Option 3 extension slot	
076	Firmware basic unit	
077	DBG firmware	Only in DBG60B
078	Technology function	
079	Unit type	Standard Technology
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	



Startup

Complete parameter list

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	Error response to wire breakage AI1	No response Immediate stop/malfunction Rapid stop/malfunction 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 Reference 3000 rpm V 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		
\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 up 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	



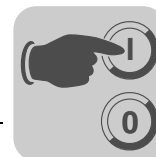
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
147	Emergency stop ramp t24	0 ... 2 ... 20 s	
149	Ramp monitoring 2	No Yes	
15_	Motor potentiometer (parameter sets 1 and 2)		
150	Ramp t3 up	0.2 ... 20 ... 50 s	
151	Ramp t3 down	0.2 ... 20 ... 50 s	
152	Save last setpoint	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. feedforw.	0 ... 65	
203	Filter acceleration feedforward	0 ... 100 ms	
204	Filter speed actual value	0 ... 32 ms	
205	Load precontrol CFC	- 150 % ... 0 ... 150 %	
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	Feedforward filter (DRS)	0 ... 100 ms	Only with MOVITOOLS®. 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	



Startup

Complete parameter list

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
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	Feedforward	-32767 ... 0 ... 32767	
27_	Process controller input values		
270	Setpoint source	Parameter / 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 setpoint	-32.767 ... 1 ... 32.767	
275	Actual value source	Analog 1 / Analog 2 / IPOS variable	
276	IPOS actual value address	0 ... 1023	
277	Actual scaling factor	-32.767 ... 1 ... 32.767	
278	Actual offset value	-32767 ... 0 ... 32767	
279	Actual time constant	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	PID controller maximum output	-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 1rpm	
\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 compensation 1	0 ... 100 %	
323 / 333	Premagnetizing time 1 / 2	0 ... 2 s	
324 / 334	Slip compensation 1 / 2	0 ... 500 1rpm	
34_	Motor protection		
340 / 342	Motor protection 1 / 2	Off On (asynchronous) On (synchronous)	
341 / 343	Cooling type 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_	Direction of rotation of the motor		
350 / 351	Change direction of rotation 1 / 2	Off On	



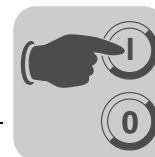
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
36_	Startup (only available in DBG60B)		
360	Startup	Yes/No	Only available in DBG60B, not in MOVI-TOOLS®/SHELL!
4_	REFERENCE SIGNALS		
40_	Speed reference message		
400	Speed reference value	0 ... 1500 ... 6000 rpm	
401	Hysteresis	0 ... 100 ... 500 rpm	
402	Delay time	0 ... 1 ... 9 s	
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:	Indoors 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	Prewarning lag error	50 ... 99,999,999 inc	
512	Lag error limit	100 ... 4000 ... 99,999,999 inc	
513	Delay Lag error message	0 ... 1 ... 99 s	
514	Counter LED display	10 ... 100 ... 32 768 inc	
515	Delay in-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	



Startup

Complete parameter list

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
52_	Mains-off check		
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)	
54_	Gear unit/motor monitoring		
540	Response drive vibration/warning	Display error	The following error responses can be programmed: No response • display error • imm. stop/malf. • emerg.stop/malf. • rapid stop/malf. • rapid stop/warnng. • emerg.stop/warnng. • rapid stop/warnng.
541	Response drive vibration/error	Rapid stop/warning	
542	Response oil aging/warning	Display error	
543	Response oil aging/error	Display error	
544	Response oil aging/overtemperature	Display error	
545	Response oil aging/ready signal	Display error	
549	Response 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	DCS error response	immediate stop malfunction	The following error responses can be programmed: No reaction • display error
556	DCS alarm response		
557	DCS source actual position	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 %	



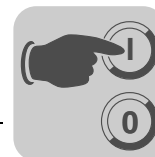
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment	
6__	TERMINAL ASSIGNMENT			
60__	Binary inputs basic unit			
-	Binary input DIØØ	Fixed assignment with: /CONTROLLER INHIBIT	The following functions can be programmed: No function • enable/stop • CW stop • CCW stop • n11/n21 • n12/n22 • fix.setpt. sw.over. • param. sw.over • ramp sw.over • Motor potentiometer uo • motor potentiometer down • /ext. error • error reset • hold control • /CW limit switch • /CCW limit switch • IPOS input • reference cam • ref. trav. start • slave free runn • setpoint hold • mains on • set DRS zero point • DRS slave start • DRS teach in • DRS master stop • oscillation/warn. • break wear • oil aging/warn. • oil aging/error • oil aging overtemp. • oil aging/ready	
600	Binary input DIØ1	CW/stop		
601	Binary input DIØ2	CCW/stop		
602	Binary input DIØ3	Enable/stop		
603	Binary input DIØ4	n11/n21		
604	Binary input DIØ5	n12/n22		
605	Binary input DIØ6	No function		
606	Binary input DIØ7	No function		
61__	Binary inputs option			
610	Binary input DI1Ø	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 basic unit			
-	Binary output DBØØ	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. • current reference • imax 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 DOØ1	Ready		
621	Binary output DOØ2	/Malfunction		
622	Binary output DOØ3	IPOS output		
623	Binary output DOØ4	IPOS output		
624	Binary output DOØ5	IPOS output		
63__	Binary outputs option			
630	Binary output DO1Ø	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		



Startup

Complete parameter list

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 BRAKE VFC 1 & FLYING START 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 BRAKE VFC 2 & FLYING START	
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)	
751	Scaling slave setpoint	- 10 ... 0 ... 1 ... 10	
76_	Manual operation		
760	Locking 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	Subnetwork mask	000.000.000.000 ... 255.255.255.000 ... 223.255.255.255	
782	Standard gateway	000.000.000.000 ... 223.255.255.255	



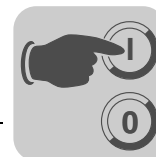
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
783	Baud rate	Display value that cannot be changed (0 ... 100 ... 1000 Mbaud)	
784	MAC address	Display value that cannot be changed (00-0F-69-XX-XX-XX)	
785	EtherNet/IP startup configuration	DHCP Saved IP parameters	
8_	UNIT FUNCTIONS		
80_	Setup		
800	User menu	On / off (only in DBG60B)	
801	Language	Dependent on DBG60B version	
\802	Factory setting	No Default standard Delivery status	
\803	Parameter lock	Off On	
804	Reset statistical 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	RS485 address	0 ... 99	
811	RS485 groupsaddress	100 ... 199	
812	RS485 timeout delay	0 ... 650 s	
819	Fieldbus timeout delay	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/malfunction	The following error responses can be programmed: No reaction • display error • imm. stop/malf. • emerg.stop/malf. • rapid stop/malf. • Rapid stop/warnng. • emerg.stop/warnng. • rapid stop/warnng.
831	Response FIELDBUS TIMEOUT	Rapid stop/warning	
832	Response MOTOR OVERLOAD	Emergency stop/malfunction	
833	Response RS485 TIMEOUT	Rapid stop/warning	
834	LAG ERROR response	Emergency stop/malfunction	
\835	Response TF sensor SIGNAL	No response	
836 / 837	Response SBus TIMEOUT 1 / 2	Emergency stop/malfunction	
838	SW limit switch	Emergency stop/malfunction	
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 using MOVITOOLS®
851	Scaling factor denominator	1 ... 65535	
852	User travel unit	rpm	
86_	Modulation		
860 / 861	PWM frequency 1 / 2 VFC	4 kHz 8 kHz 12 kHz 16 kHz	
862 / 863	PWM fix 1/2	Off On	
864	PWM frequency CFC	4 kHz 8 kHz 16 kHz	



Startup

Complete parameter list

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
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 1 / 2 groupaddress	0...63	
883 / 893	SBus timeout delay 1 / 2	0...650 s	
884 / 894	Baud rate SBus 1 / 2	125 kbaud 250 kbaud 500 kbaud 1000 kbaud	
885 / 895	Synchronization ID SBus 1 / 2	0...2047	
886 / 896	CANopen address 1 / 2	1...127	
887	Synchronization ext. control	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	$-(2^{31}-1) \dots 0 \dots 2^{31}-1$ 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	$-(2^{31}-1) \dots 0 \dots 2^{31}-1$ 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	Positioning speed CW	0 ... 1500 ... 6000 rpm	
914	Positioning speed CCW	0 ... 1500 ... 6000 rpm	
915	Speed feedforward	-199.99 ... 0 ... 100 ... 199.99 %	
916	Ramp type	Linear Sine Squared Bus ramp Jerk-limited Electronic cam Synchronous operation Cross Cutter	
917	Ramp mode	Mode 1 Mode 2	



Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
92_	IPOS Monitoring		
920	SW limit switch RIGHT	– (2 ³¹ – 1) ... 0 ... 2 ³¹ – 1 Inc	
921	SW limit switch LEFT	– (2 ³¹ – 1)... 0 ...2 ³¹ – 1 Inc	
922	Position window	0 ... 50 ... 32767 inc	
923	Lag error window	0 ... 5000 ... 2 ³¹ –1 Inc	
93_	IPOS Special functions		
930	Override	On/Off	
931	IPOS CTRL WORD Task 1	Stop/start/hold	Only available in DBG60B, not in MOVITOOLS®/SHELL!
932	IPOS CTRL WORD Task 2	Start/stop	Only available in DBG60B, not in MOVITOOLS®/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®!
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	Only with MOVITOOLS®. 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)... 0 ...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 rate	1 ... 200 %	
953	Position offset	– (2 ³¹ – 1)... 0 ...2 ³¹ – 1 Inc	
954	Zero point offset	– (2 ³¹ – 1)... 0 ...2 ³¹ – 1 Inc	
955	Encoder scaling	x1/x2/x4/x8/x16/x32/x64	
96_	IPOS Modulo function		
960	Modulo function	Off Short CW CCW	
961	Modulo numerator	0 ... 1 ... 2 ³¹ – 1	
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	



6 Operation

6.1 Operating displays

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	Adjust encoder
F	11	Error display (flashing)
H	-	Manual operation
t	16	Inverter is waiting for data
U	17	"Safe Stop" active
• (blinking dot)	-	IPOS ^{plus} ® program is running
Flashing display	-	STOP via DBG60B
1 ... 9	-	RAM defective



WARNING!

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

Severe or fatal injuries.

The display U = "Safe stop" active is not safety-related and may not be used as a safety function!



DBG60B keypad

Basic displays:

0.00rpm
0.000Amp
CONTROLLER INHIBIT

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

0.00rpm
0.000Amp
NO ENABLE

Display for X13:1 (DIØØ "/CONTROLLER INHIBIT") = "1" and disabled inverter ("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 long) or in MOVITOOLS®/SHELL (message can be acknowledged):

No.	Text in 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 P803 = "ON", Parameter cannot be altered.
5	SETUP ACTIVE	Attempt to change parameters when factory setting is active.
6	VALUE TOO HIGH	Attempt to enter a value that is too high.
7	VALUE TOO LOW	Attempt 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 mode must be exited via X13:ST11/ST12 (RS485).
11	ONLY TERMINAL	Manual mode 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	Attempt to enter an invalid value.
16	PARAM. NOT SAVED	Overflow of EEPROM buffer, e.g., due to cyclic write access. Parameter is saved in EEPROM and is not protected against loss following POWER OFF.
17	INVERTER ENABLED	- Parameter to be changed can only be set in the state "CONTROLLER INHIBIT." - Attempt to change to manual mode during live operation.

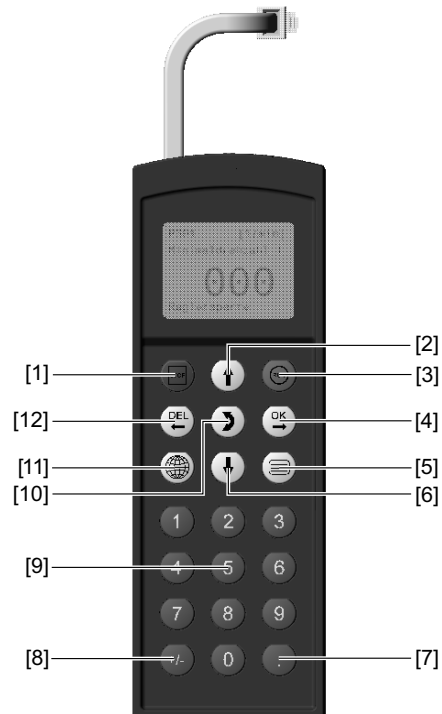


Operation

Functions of the DBG60B keypad

6.3 Functions of the DBG60B keypad

Key assignments 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] | Keys 0 ... 9 | Digits 0... 9 |
| [10] | Key | Change menu |
| [11] | Key | Select language |
| [12] | Key | Delete previous entry |

Copy function of DBG60B

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

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



Parameter mode

Proceed as follows to set the parameters in parameter mode:

1. Activate the context menu by pressing the key. The first menu item is "PARAMETER MODE".
2. Press the key to start the PARAMETER MODE. The first display parameter P000 "SPEED" appears. Use the key or the key to select the main parameter groups 0 to 9.
3. Use the key or the key to select the required main parameter group. The flashing cursor is positioned under the number of the main parameter group.
4. Activate parameter subgroup selection in the main parameter group by pressing the key. The flashing cursor moves one position to the right.
5. Use the key or the key to select the required parameter subgroup. The flashing cursor is positioned under the number of the parameter subgroup.
6. Activate parameter selection in the required parameter subgroup by pressing the key. The flashing cursor moves one position to the right.
7. Use the key or the key to select the desired parameter. The flashing cursor is positioned under the third digit of the parameter number.
8. Press the key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.
9. Use the key or the key to select the desired parameter value.
10. Use the key. Exit the setting mode by pressing the key. The flashing cursor is positioned under the third digit of the parameter number again.
11. Use the key or the key to select another parameter or go back to the parameter subgroup menu using the key.
12. Use the key or the key to select another parameter subgroup or go back to the main parameter group menu using the key.
13. Use the key to return to the context menu.

PARAMETER MODE
VARIABLE MODE
BASIC VIEW

P 000 rpm
SPEED
+0.0
CONTROLLER INHIBIT

P 1. SETPOINTS/
RAMP GENERATORS
CONTROLLER INHIBIT

P 1. SETPOINTS/
RAMP GENERATORS
CONTROLLER INHIBIT

\ 13. SPEED
RAMPS 1
CONTROLLER INHIBIT

\ 13. SPEED
RAMPS 1
CONTROLLER INHIBIT

\ 132 s
T11 UP CCW
+0.13
CONTROLLER INHIBIT

\ 132 s
T11 UP CCW
+0.13
CONTROLLER INHIBIT

\ 132 s
T11 UP CCW
+0.20
CONTROLLER INHIBIT

\ 132 s
T11 UP CCW
+0.20
CONTROLLER INHIBIT

\ 13. SPEED
RAMPS 1
CONTROLLER INHIBIT

P 1. SETPOINTS/
RAMP GENERATORS
CONTROLLER INHIBIT

PARAMETER MODE
VARIABLE MODE
BASIC VIEW



Operation

Functions of the DBG60B keypad

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 use the  key. The variable mode display appears.
- You can use the  to edit the variables.

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 "V" before the parameter number (→ section "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 "USER MENU" menu item and confirm your entry by pressing OK. 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.
- Use the  key to return to the context menu. In the context menu, select the "ADD Pxxx" menu item. "xxx" is the parameter you selected previously. Use 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 "USER MODE" menu item.
- Select the parameter that is to be deleted. Use the  key.
- Use the  key to return to the context menu. In the context menu, select the "DELETE Pxxx" menu item. "xxx" is the parameter you selected previously. Use the  key. The selected parameter is deleted from the user menu.

Wake-up parameters

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 "XXXX WAKE-UP PARAM." menu item. "XXXX" is the selected wake up parameter. Use the key.

IPOS^{plus}®

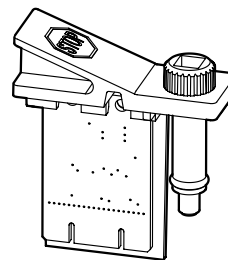
MOVITOOLS[®] is required to program IPOS^{plus}®. You can only use the DBG60B keypad to edit or change IPOS^{plus}® variables (H__).

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 to start and stop 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 system/machine can be operated again quickly without a PC and data backup simply by replugging the memory card. You can install as many option cards as required.



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Figure 34: MDX60B/61B memory card

Notes on 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) appears. 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.



Operation

Memory card

- 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.sew-copy) 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.



7 Service

7.1 Fault information

Error memory	The error memory (P080) stores the last five error messages (error t-0 to t-4). The oldest error message is deleted whenever more than five error messages have occurred. The following information is stored when the malfunction occurs: Error that 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.
Switch-off responses	There are three switch-off responses depending on the malfunction; the inverter remains blocked in fault status:
<i>Immediate switch-off</i>	The unit can no longer brake the drive; the output stage goes to high resistance in the event of an error and the brake is applied immediately (DBØØ "/Brake" = "0").
<i>Rapid stop</i>	The drive is braked with the stop ramp t13/t23. The brake is applied once the stop speed is reached (DBØØ "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 P735).
<i>Emergency stop</i>	The drive is braked with the emergency ramp t14/t24. The brake is applied once the stop speed is reached (DBØØ "/Brake" = "0"). The output stage goes to high resistance after the brake reaction time has elapsed (P732 P735).
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.



HAZARD

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.

Inverter is waiting for data

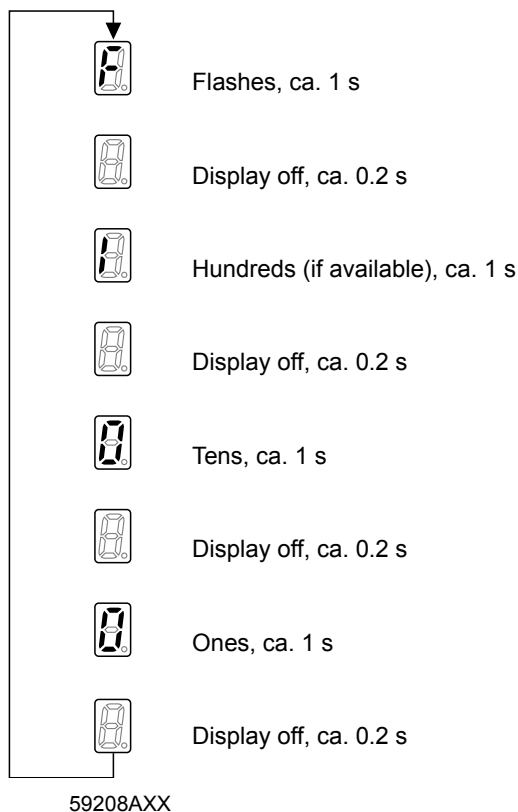
If the inverter is controlled via a communication interface (fieldbus, RS485 or SBus) and the power was switched off and back on again or an error reset was performed, then the enable remains ineffective until the inverter receives valid data again via the interface, which is monitored with a timeout.



7.2 Error messages and list of errors

Error message in 7-segment display

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



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

Display suberror code

The suberror code is displayed in MOVITOOLS® (as of version 4.50) or in the DBG60B keypad.



Error list

The factory set error response appears 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 switch-off	0	Output stage	- Short circuit at output - Motor too large - Defective output stage - Ramp limit is deactivated and set ramp time is too short	- Rectify the short circuit - connect smaller motor - Contact SEW Service if the output stage is defective - Activate P138 and/or increase ramp time
			1	V _{CE} monitoring or under-voltage monitoring of the unit driver		
			5	Inverter remains in hardware current limit		
03	Ground fault	Immediate switch-off	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 switch-off	0	DC link voltage too high in 4Q operation	- Too much regenerative power - Braking resistor circuit interrupted - Short circuit in the braking resistor circuit - Resistance of the brake resistor too high - Brake chopper is defective	- Extend deceleration ramps - Check braking resistor supply cable - Check technical data of braking resistor - Replace MOVDRIVE® if the brake chopper is defective.
			1			
06	Mains phase failure	Immediate switch-off	0	DC link voltage periodically too low	Phase failure	Check the supply system lead
07	DC link over-voltage	Immediate switch-off	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			
08	Speed monitoring	Immediate switch-off (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 U/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 the voltage supply of the encoder - Check current limitation - Extend ramps if necessary - Check motor cable and motor - Check mains phases
			3	System limit "Actual speed" exceeded. Speed difference between ramp setpoint and actual value for 2×ramp time higher than expected slip.		
			4	Maximum rotating field speed exceeded. Maximum rotating field frequency (with VFC max 150 Hz and U/f max 600 Hz) exceeded.		
09	Startup	Immediate switch-off	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 running of IPOS^{plus}® program. - 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)



Service

Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
11	Excessive temperature	Emergency stop (P)	0	Heat sink temperature too high or defective temperature sensor	Thermal overload of inverter	Reduce load and/or ensure adequate cooling.
			3	Overtemperature switched-mode power supply		
13	Control signal source	Immediate switch-off	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).
14	Encoder	Immediate switch-off	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 open circuit.
			25	Encoder fault X15 - speed range exceeded. Encoder at X15 turns faster than 6542 rpm.		
			26	Encoder fault X15 - defective card Error in the quadrant evaluation.		
			27	Encoder fault - defective encoder connection or encoder		
			28	Encoder fault X15 - communication error RS485 channel		
			29	Encoder fault X14 - communication error RS485 channel		
			30	Unknown encoder type at X14/X15		
			31	Plausibility check error Hiperface X14/X15 Increments have been lost.		
			32	Encoder fault X15 Hiperface Hiperface encoder at X15 reports fault.		
			33	Encoder fault X14 Hiperface Hiperface encoder at X14 reports fault.		
			34	Encoder fault X15 Resolver Encoder connection or encoder is faulty.		
17	System error	Immediate switch-off	0	"Stack overflow" error	Inverter electronics disrupted, possibly due to effect of EMC.	Check ground connections and shielding and correct if necessary. Contact SEW service if this error occurs again.
18			0	"Stack underflow" error		
19			0	"External NMI" error		
20			0	"Undefined opcode" error		
21			0	"Protection fault"		
22			0	"Illegal word operand access" error		
23			0	"Illegal instruction access" error		
24			0	"Illegal external bus access" error		



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
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 specific cause of error; reprogram terminal if necessary.
27	limit switches are missing	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 active simultaneously		
28	Fieldbus timeout	Rapid stop (P)	0	"Fieldbus timeout" error	No communication between master and slave within the projected response monitoring.	• Check the communication routine of the master • Extend fieldbus timeout time (P819)/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 switch-off	0	Time violation stop emergency stop rate	• Drive overloaded • Emergency stop ramp too short.	• Check project planning • Extend emergency stop ramp
31	TF/TH trip	No response (P)	0	"Motor protection" error	• Motor too hot, TF/TH has triggered • TF/TH of the motor not connected or connected incorrectly • Connection between MOVIDRIVE[®] and TF/TH on motor interrupted	• Let motor cool down and reset error • Check connection 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 faulty	Programming principles violated leading to internal stack overflow	Check and correct the IPOS ^{plus} user program (→ IPOS ^{plus} manual).
33	Setpoint source	Immediate switch-off	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 switch-off	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 switch-off	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		



Service

Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
36	Option missing	Immediate switch-off	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 switch-off	0	"System watchdog overflow" error	Error during execution of system software	Contact SEW Service.
38	System software	Immediate switch-off	0	"System software" error	System error	Contact SEW Service.
39	Reference travel	Immediate switch-off (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 connections - Check reference travel type setting and required parameters.
40	Boot synchronization fault	Immediate switch-off	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 fault reoccurs.
41	Watchdog option	Immediate switch-off	0	Error Watchdog timer from/to option.	- Error in communication between system software and option software Watchdog in the IPOS^{plus}® program - An application module without the application version has been loaded in a MOVIDRIVE[®] B unit - The wrong technology function has been set if an application module is used	- Contact SEW Service. - Check IPOS program - Check whether the unit has been activated for the application version (P079) - Check the selected technology function (P078)
			17	Watchdog IPOS error.		
42	Lag error	Immediate switch-off (P)	0	Lag error positioning	- Encoder connected incorrectly - Acceleration ramps too short - P component of positioning controller too small - Speed controller parameters set incorrectly - Value for 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 encoder wiring, motor and mains phase wiring. - Check whether mechanical system components can move freely or if they are blocked
43	RS485-Timeout	Rapid stop (P)	0	Communication time-out 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 switch-off	0	Unit utilization error	Unit utilization (IxT value) > 125 %	- Decrease power output - Extend ramps - If proposed actions are not possible, use a larger inverter. - Reduce load
			8	UL monitoring error		



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
45	Initialization	Immediate switch-off	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)		
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 switch-off	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. - Install a new 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 switch-off	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 - Technology or standard version - Option cards	Ensure identical hardware or restore factory setting (parameter = factory setting).
80	RAM test	Immediate switch-off	0	"RAM test" error	Internal unit fault, RAM defective.	Contact SEW Service.
81	Start condition	Immediate switch-off	0	Error start condition at 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.	- 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.
82	Open output	Immediate switch-off	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.



Service

Error messages and list of errors

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 switch-off	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 switch-off	0	Technology function selected with standard unit	A technology function was activated in a standard unit.	Disable technology function
88	Flying start	Immediate switch-off	0	"Flying start" error	Only in VFC n-CTRL operating mode: Actual speed > 6000 rpm when inverter enabled.	Inverter not enabled before actual speed is ≤ 6000 rpm.
92	DIP encoder problem	Error display (P)	1	Soiling problem Stahl WCS3	Encoder signals an error	Possible cause: Encoder is dirty → clean encoder
93	DIP encoder error	Emergency stop (P)	0	"absolute encoder" error	The encoder signals an error, e.g. power failure. - 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.	- Check absolute encoder connection. - Check connection cables. - Set correct cycle frequency. - Reduce maximum traveling velocity or ramp. - Replace absolute encoder.
94	EEPROM checksum	Immediate switch-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 switch-off	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 switch-off	0	"CRC via internal flash" error	Internal unit fault Flash memory defective	Send unit in for repair.
99	IPOS ramp calculation	Immediate switch-off	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.



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
100	Vibration warning	Display error (P)	0	Vibrations diagnostics warning	Vibration sensor warns (→ "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	Warning signal 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 agingovertemperature	Overtemperature signal from the oil aging sensor	- Let oil cool down - Check gear unit cooling
105	Oil aging ready signal	Display error (P)	0	Oil aging ready signal	Oil aging sensor is not ready for operation	- Check the voltage supply of the 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	Change brake lining (→ "Motors" operating instructions).



Service

Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
108	DCS error	Immediate stop/malfunction (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			
			9	Faulty test voltage		
			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 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	Emergency stop/mal-function (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	There is no pulse 1 voltage at the DI1 binary input.	• Check configuration of the DI1 binary input according to configuration and wiring diagram • Check wiring • Check configuration of the DI2 binary input according to configuration and wiring diagram • Check wiring • Check configuration of the DI3 binary input according to configuration and wiring diagram • Check wiring • Check configuration of the DI4 binary input according to configuration and wiring diagram • Check wiring • Check configuration of the DI5 binary input according to configuration and wiring diagram • Check wiring • Check configuration of the DI6 binary input according to configuration and wiring diagram • Check wiring • Check configuration of the DI7 binary input according to configuration and wiring diagram • Check wiring • Check configuration of the DI2 binary input according to configuration and wiring diagram • Check 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			



Service

Error messages and list of errors

Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
109	DCS alarm	Emergency stop/mal-function (P)	18 19	Pulse 2 plausibility error at binary input DI1	There is no pulse 2 voltage at the DI1 binary input.	- Check configuration of the DI1 binary input according to configuration and wiring diagram - Check 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 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 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 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 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 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 wiring
			32 33	Pulse 2 plausibility error at binary input DI8		- Check configuration of the DI2 binary input according to configuration and wiring diagram - Check wiring
			34 35	Plausibility error speed detection	The difference between the two speed 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 position detection	The difference between the two position signals 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



Error			Suberror		Possible cause	Measure
Code	Designation	Response (P)	Code	Designation		
109	DCS alarm	Rapid stop warning (P)	38	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
			39			
			40	Plausibility error incorrect speed.	The current velocity exceeds the configured maximum velocity.	• The drive moves outside the permitted and configured velocity range • Check configuration (set max. velocity) • Analyze the velocity development using the SCOPE function
			41			
			42	Configuration error: Acceleration	The current acceleration is outside the configured acceleration range.	• Check encoder type and configuration (SSI/incremental) • Check the encoder connection/wiring • Check polarity of the encoder data • Check function of the encoder
			43			
			44	Plausibility error in encoder interface (A3401 = encoder 1 and A3402 = encoder 2).	The wiring of the encoder does not correspond to the configured data.	• Check encoder type and configuration (SSI/incremental) • Check the encoder connection/wiring • Check polarity of the encoder data • Check function of the encoder
			45			
			46	Encoder supply voltage error (A3403 = encoder 1 and A3404 = encoder 2)	Encoder voltage supply is outside of the defined range (min. DC 20 V / max. DC 29 V).	• Overload in the supply voltage of the encoder; internal fuse has triggered • Check supply voltage of the DCS21B/31B option
			47			
			48	Reference voltage error	The reference voltage input of the encoder system is outside the defined range.	Check reference voltage input of the encoder system.
			49			
			50	Difference level of RS485 driver 1 (error INC_B or SSI_CLK) is faulty	No encoder connection, incorrect encoder type.	Check the encoder connection.
			51			
			52	Difference level of RS485 driver 2 (error INC_A or SSI_DATA) is faulty.		
			53			
54	Incremental counter deviation					
55						
56	Plausibility error in encoder interface (A3401 = encoder 1 and A3402 = encoder 2)	The wiring of the encoder does not correspond to the configured data.	• Check encoder type and configuration (SSI/incremental) • Check the encoder connection/wiring • Check polarity of the encoder data • Check function of the encoder			
57						



Service

Error messages and list of errors

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 pin 2)
			59			
			60	Plausibility error SSI encoder connection	Phase error of the incremental or sin/cos encoder.	- Check the encoder connection - Replace the defective encoder
			61			
			62			
			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	Watchdog undervoltage test for LOSIDE driver	DC 0 V short circuit at on of the DC 0 V outputs.	Check wiring at the outputs.
			75	Watchdog undervoltage test 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) activated simultaneously.	Input element with time monitoring is faulty.	- Check wiring of the input element - Input element is faulty
			81			
			82	Timeout error MET.	Two-hand control with time monitoring is faulty.	
			83	Time monitoring start signal for confirmation button.		
			84	Timeout error MEZ.	Faulty monitoring of the external disconnection channel	- Check hardware connections - Pick-up or release time to short - Check switching contacts
			85	Time monitoring for two-hand button.		
			86	EMU1 monitoring error		
			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 project planning - Shorten duration of operation below 5 Hz
113	Open circuit analog input	No response (P)	0	Open circuit AI1 analog input	Open circuit AI1 analog input	Check wiring
116	"Timeout MOVI-PLC" error	Rapid stop/Warning	0	MOVI-PLC® communication timeout		- Check startup - Check wiring



7.3 SEW Electronics Service

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.

Please 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, Δ or Δ connection)
- Type of error
- 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 being 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 supply 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

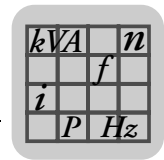
After you have completed the regeneration process, the unit can be used immediately or stored again for an extended period with maintenance.



7.5 Disposal

Dispose of materials separately in accordance with the current regulations in force, for example:

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



8 Technical Data and Dimension Drawings

8.1 CE marking, UL approval and C-Tick

CE marking

- Low voltage directive
MOVIDRIVE® MDX60B/61B inverters comply with the regulations of the Low Voltage Directive 2006/95/EC.
- Electromagnetic compatibility (EMC)
MOVIDRIVE® inverters and regenerative power supply units are designed for use as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives." Provided the installation instructions are complied with, they satisfy the appropriate requirements for CE marking of the entire machine/system in which they are installed, on the basis of the EMC Directive 89/336/EEC. For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.
- Compliance with limit classes C1 or C2 has been tested on a specified test setup. 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.

UL - / cUL / GOST-R

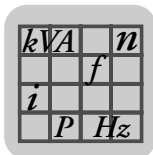
UL, cUL approval (USA) and the GOST-R certificate (Russia) have been approved for the entire MOVIDRIVE® unit series. cUL is equivalent to CSA approval.



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® MDX60/61B inverters, regardless of their type, version, size and performance.

MOVIDRIVE® MDX60B/61B	All sizes
Interference resistance	Complies with EN 61800-3
Interference emission with EMC compliant installation	Sizes 0 to 6 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, and 2 in accordance with limit value class C2 to EN 61800-3 without additional measures Size 6 in accordance with limit value class C2 to EN 61800-3 with corresponding line filter
Ambient temperature ϑ_U Derating Ambient temperature Climate class	0 °C...+50 °C when $I_D = 100 \% I_N$ and $f_{PWM} = 4 \text{ kHz}$ 0 °C...+40 °C when $I_D = 125 \% I_N$ and $f_{PWM} = 4 \text{ kHz}$ 0 °C...+40 °C when $I_D = 100 \% I_N$ and $f_{PWM} = 8 \text{ kHz}$ Derating: • 2.5 % I_N per K between 40 °C - 50 °C • 3 % I_N per K for 50 °C - 60 °C EN 60721-3-3, class 3K3
Storage temperature ¹⁾ 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	IP20 IP00 (power connections) IP10 (power connections) with • fitted plexiglass cover supplied as standard and • shrink tubing (not included in scope of delivery)
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)
Installation altitude h	Up to $h \leq 1000 \text{ m}$ (3281 ft) without restrictions. At $h \geq 1000 \text{ m}$ (3281 ft), the following restrictions apply: • 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: V_N reduction by AC 3 V per 100 m (328 ft) – AC 500 V units: V_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, otherwise the unit's service life may be reduced.

kVA	n
f	
i	
P	H_z

MOVIDRIVE®
MDX60B/61B
series, size 0



Figure 35: MOVIDRIVE® MDX60/61B series, size 0

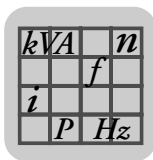
51485AXX

MOVIDRIVE®
MDX61B series,
sizes 1 to 6



Figure 36: MOVIDRIVE® MDX61B series, sizes 1 to 6

52159AXX



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

Size 0

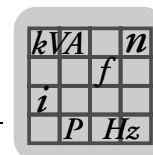
MOVIDRIVE® MDX60/61B		0005-5A3-4-0_	0008-5A3-4-0_	0011-5A3-4-0_	0014-5A3-4-0_
Size		OS		OM	
INPUT					
Rated supply voltage (to EN 50160)	V _{supply}	3 × AC 380 V -500 V			
Supply frequency	f _{supply}	50 Hz ... 60 Hz ±5%			
Rated supply current ¹⁾ (at V _{mains} = 3 × AC 400 V)	I _{supply} 100% 125 %	AC 1.8 A AC 2.3 A	AC 2.2 A AC 2.7 A	AC 2.8 A AC 3.5 A	AC 3.6 A AC 4.5 A
OUTPUT					
Apparent output power ²⁾ (at V _{mains} = 3 × AC 380...500 V)	S _N	1.4 kVA	1.6 kVA	2.1 kVA	2.8 kVA
Rated output current ¹⁾ (at V _{mains} = 3 × AC 400 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 U _{mains} = 3 × AC 400 V and f _{PWM} = 4 kHz)		AC 2.5 A	AC 3 A	AC 3.8 A	AC 5 A
Continuous output current (= 100 % I _N)I _D (at U _{mains} = 3 × AC 400 V and f _{PWM} = 8 kHz)		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 _{max} = 0...200 % adjustable			
Minimum permitted braking resistor value (4Q operation)	R _{BRmin}	68 Ω			
Output voltage	U _A	Max. V _{mains}			
PWM frequency	f _{PWM}	Can be set: 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}	42 W	48 W	58 W	74 W
Cooling air consumption		3 m ³ /h		9 m ³ /h	
Unit terminal cross section	X1, X2, X3, X4	Separable terminal block 4 mm ² conductor end sleeve DIN 46228			
Tightening torque		0.6 Nm			

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

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 $W \times H \times D$	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'			



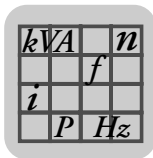
size 1 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0015-5A3-4-0_	0022-5A3-4-0_	0030-5A3-4-0_	0040-5A3-4-0_
INPUT				
Rated supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V			
Supply frequency f_{supply}	50 Hz ... 60 Hz ±5%			
Rated supply current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_{supply}	100% 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
OUTPUT				
Apparent output power ²⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 380 \dots 500 \text{ V}$) S_N	2.8 kVA	3.8 kVA	4.9 kVA	6.6 kVA
Rated output current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_N	AC 4 A	AC 5.5 A	AC 7 A	AC 9.5 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ 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 $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ 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	$I_{\text{max}} = 0 \dots 150 \%$ adjustable			
Minimum permitted braking resistor value (4Q operation) R_{BRmin}	68 Ω			
Output voltage U_A	Max. V_{mains}			
PWM frequency f_{PWM}	Can be set: 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⁾ $P_{V\text{max}}$	85 W	105 W	130 W	180 W
Cooling air consumption	40 m³/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)			
Unit terminal cross section $X1, X2, X3, X4$	Separable terminal block 4 mm² conductor end sleeve DIN 46228			
Tightening torque	0.6 Nm			

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

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'			



Technical Data and Dimension Drawings

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

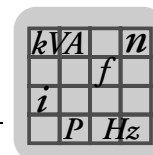
Size 2S, 2 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0055-5A3-4-0_	0075-5A3-4-0_	0110-5A3-4-0_
Size	2S		2
INPUT			
Rated supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V		
Supply frequency f_{supply}	50 Hz ... 60 Hz ±5%		
Rated supply current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_{supply} 100% 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⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 380...500 \text{ V}$) S_N	8.7 kVA	11.2 kVA	16.8 kVA
Rated output current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_N	AC 12.5 A	AC 16 A	AC 24 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ 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 $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ 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 braking resistor value (4Q operation) R_{BRmin}	47 Ω		22 Ω
Output voltage U_A	Max. V_{mains}		
PWM frequency f_{PWM}	Can be set: 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⁾ $P_{V\text{max}}$	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)
Unit terminal cross section $X1, X2, X3, X4$	Terminal strips 4 mm^2 conductor end sleeve DIN 46228		M4 screw and washer assembly with terminal clip 4 mm^2 conductor end sleeve DIN 46228 6 mm^2 crimp cable connector DIN 46234
Tightening torque	1.5 Nm		

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

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'		



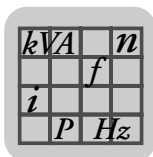
Size 3 (AC 400/500 V units)

MOVIDRIVE® MDX61B	0150-503-4-0_	0220-503-4-0_	0300-503-4-0_
INPUT			
Rated supply voltage (to EN 50160) V_{supply}	3 × AC 380 V - 500 V		
Supply frequency f_{supply}	50 Hz ... 60 Hz ±5%		
Rated supply current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_{supply} 100% 125 %	AC 28.8 A AC 36 A	AC 41.4 A AC 51.7 A	AC 54 A AC 67.5 A
OUTPUT			
Apparent output power ²⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 380\text{...}500 \text{ V}$) S_N	22.2 kVA	31.9 kVA	41.6 kVA
Rated output current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_N	AC 32 A	AC 46 A	AC 60 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)	AC 40 A	AC 57.5 A	AC 75 A
Continuous output current (= 100 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)	AC 32 A	AC 46 A	AC 60 A
Current limitation I_{max}	Motor and regenerative 150 % I_N , duration depending on capacity utilization		
Internal current limitation	$I_{\text{max}} = 0\text{...}150 \%$ adjustable		
Minimum permitted braking resistor value (4Q operation) R_{BRmin}	15 Ω	12 Ω	
Output voltage U_A	Max. V_{mains}		
PWM frequency f_{PWM}	Can be set: 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⁾ $P_{V\text{max}}$	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)		
Unit terminal cross section $X1, X2, X3, X4$	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 $V_{\text{mains}} = 3 \times \text{AC } 500 \text{ V}$.

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'		



Technical Data and Dimension Drawings

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

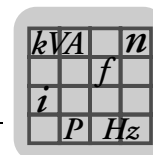
Size 4 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0370-503-4-0_	0450-503-4-0_
INPUT			
Rated supply voltage (to EN 50160) V_{supply}		3 × AC 380 V - 500 V	
Supply frequency f_{supply}		50 Hz ... 60 Hz ±5%	
Rated supply current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_{supply}	100% 125 %	AC 65.7 A AC 81.9 A	AC 80.1 A AC 100.1 A
OUTPUT			
Apparent output power ²⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 380 \dots 500 \text{ V}$) S_N		51.1 kVA	62.3 kVA
Rated output current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_N		AC 73 A	AC 89 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)		AC 91 A	AC 111 A
Continuous output current (= 100 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)		AC 73 A	AC 89 A
Current limitation I_{max}		Motor and regenerative 150 % I_N , duration depending on capacity utilization	
Internal current limitation		$I_{\text{max}} = 0 \dots 150 \%$ adjustable	
Minimum permitted braking resistor value (4Q operation) R_{BRmin}		6 Ω	
Output voltage U_A		Max. V_{mains}	
PWM frequency f_{PWM}		Can be set: 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⁾ $P_{V\text{max}}$		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)	
Unit terminal cross section $X1, X2, X3, X4$		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 $V_{\text{mains}} = 3 \times \text{AC } 500 \text{ V}$.

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'	



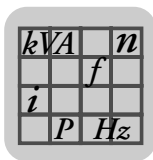
Size 5 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0550-503-4-0_	0750-503-4-0_
INPUT			
Rated supply voltage (to EN 50160) V_{supply}		3 × AC 380 V - 500 V	
Supply frequency f_{supply}		50 Hz ... 60 Hz ±5%	
Rated supply current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) 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 $V_{\text{mains}} = 3 \times \text{AC } 380...500 \text{ V}$) S_N		73.5 kVA	91.0 kVA
Rated output current ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$) I_N		AC 105 A	AC 130 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)		AC 131 A	AC 162 A
Continuous output current (= 100 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 400 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)		AC 105 A	AC 130 A
Current limitation I_{max}		Motor and regenerative 150 % I_N , duration depending on capacity utilization	
Internal current limitation		$I_{\text{max}} = 0...150 \%$ adjustable	
Minimum permitted braking resistor value (4Q operation) R_{BRmin}		6 Ω	4 Ω
Output voltage U_A		Max. V_{mains}	
PWM frequency f_{PWM}		Can be set: 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⁾ $P_{V\text{max}}$		1700 W	2000 W
Cooling air consumption		360 m³/h	
Weight		35 kg (77 lb)	
Dimensions $W \times H \times D$		280 mm×610 mm × 330 mm (11.0 in ×24.0 in×13.0 in)	
Unit terminal cross section $X1, X2, X3, X4$		M10 bolt with nut Max. 70 mm² 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 $V_{\text{mains}} = 3 \times \text{AC } 500 \text{ V}$.

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'	



Technical Data and Dimension Drawings

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

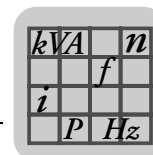
Size 6 (AC 400/500 V units)

MOVIDRIVE® MDX61B		0900-503-4-0_	1100-503-4-0_	1320-503-4-0_
INPUT				
Rated supply voltage (to EN 50160)	V _{supply}	3 × AC 380 V - 500 V		
Supply frequency	f _{supply}	50 Hz ... 60 Hz ±5%		
Rated supply current ¹⁾ (at V _{mains} = 3 × AC 400 V)	I _{supply} 100% 125 %	AC 153 A AC 191 A	AC 180 A AC 225 A	AC 225 A AC 281 A
OUTPUT				
Apparent output power ²⁾ (at V _{mains} = 3 × AC 380...500 V)	S _N	118 kVA	139 kVA	174 kVA
Rated output current ¹⁾ (at V _{mains} = 3 × AC 400 V)	I _N	AC 170 A	AC 200 A	AC 250 A
Continuous output current (= 125 % I _N)I _D (at U _{mains} = 3 × AC 400 V with f _{PWM} = 4 kHz)		AC 212 A	AC 250 A	AC 312 A
Continuous output current (= 100 % I _N)I _D (at U _{mains} = 3 × AC 400 V with f _{PWM} = 4 kHz)		AC 170 A	AC 200 A	AC 250 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 braking resistor value (4Q operation)	R _{BRmin}	2.7 Ω		
Output voltage	U _A	Max. V _{mains}		
PWM frequency	f _{PWM}	Can be set: 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 m ³ /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		
Unit terminal cross section	X1, X2, X3, X4	M12 bolt with nut Max. 185 mm ² 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 $V_{\text{mains}} = 3 \times \text{AC } 500 \text{ V}$.

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'		



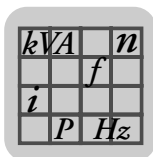
8.4 MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

Size 1 (AC 230 V units)

MOVIDRIVE® MDX61B	0015-2A3-4-0_	0022-2A3-4-0_	0037-2A3-4-0_
INPUT			
Rated 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 I_{supply} (at $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$) 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⁾ S_N (at $V_{\text{mains}} = 3 \times \text{AC } 230..0.240 \text{ V}$)	2.7 kVA	3.4 kVA	5.8 kVA
Rated output current I_N (at $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$)	AC 7.3 A	AC 8.6 A	AC 14.5 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)	AC 9.1 A	AC 10.8 A	AC 18.1 A
Continuous output current (= 100 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)	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	$I_{\text{max}} = 0...150 \%$ adjustable		
Minimum permitted braking resistor value (4Q operation) R_{BRmin}	27 Ω		
Output voltage U_A	Max. V_{mains}		
PWM frequency f_{PWM}	Can be set: 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⁾ $P_{V\text{max}}$	110 W	126 W	210 W
Cooling air consumption	40 m ³ /h		
Weight	2.8 kg (6.2 lb)		
Dimensions $W \times H \times D$	105 mm×314 mm × 234 mm (4.13 in×12.4 in × 9.21 in)		
Unit terminal cross section $X1, X2, X3, X4$	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

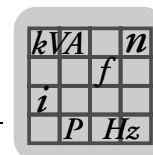
MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

Size 2 (AC 230 V units)

MOVIDRIVE® MDX61B		0055-2A3-4-0_	0075-2A3-4-0_
INPUT			
Rated 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 $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$) 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 $V_{\text{mains}} = 3 \times \text{AC } 230 \dots 0.240 \text{ V}$) S_N		8.8 kVA	11.6 kVA
Rated output current (at $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$) I_N		AC 22 A	AC 29 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)		AC 27.5 A	AC 36.3 A
Continuous output current (= 100 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)		AC 22 A	AC 29 A
Current limitation I_{max}		Motor and regenerative 150 % I_N , duration depending on capacity utilization	
Internal current limitation		$I_{\text{max}} = 0 \dots 150 \%$ adjustable	
Minimum permitted braking resistor value (4Q operation) R_{BRmin}		12 Ω	
Output voltage U_A		Max. V_{mains}	
PWM frequency f_{PWM}		Can be set: 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⁾ $P_{V\text{max}}$		300 W	380 W
Cooling air consumption		80 m^3/h	
Weight		5.9 kg (13 lb)	
Dimensions $W \times H \times D$		135 mm × 315 mm × 285 mm (5.31 in × 12.4 in × 11.2 in)	
Unit terminal cross section $X1, X2, X3, X4$		M4 screw and washer assembly with terminal clip 4 mm^2 conductor end sleeve DIN 46228 6 mm^2 crimp cable connector DIN 46234	
Tightening torque		0.6 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'	

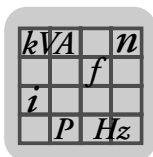


Size 3 (AC 230 V units)

MOVIDRIVE® MDX61B		0110-203-4-0_	0150-203-4-0_
INPUT			
Rated supply voltage (to EN 50160) V_{supply}		$3 \times \text{AC } 200 \text{ V} - 240 \text{ V}$	
Supply frequency f_{supply}		50 Hz ... 60 Hz $\pm 5\%$	
Rated supply current (at $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$) I_{supply}	100% 125 %	AC 40 A AC 50 A	AC 49 A AC 61 A
OUTPUT			
Apparent output power ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 230\text{..}0.240 \text{ V}$) S_N		17.1 kVA	21.5 kVA
Rated output current (at $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$) I_N		AC 42 A	AC 54 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)		AC 52.5 A	AC 67.5 A
Continuous output current (= 100 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 8 \text{ kHz}$)		AC 42 A	AC 54 A
Current limitation I_{max}		Motor and regenerative 150 % I_N , duration depending on capacity utilization	
Internal current limitation		$I_{\text{max}} = 0\text{...}150 \%$ adjustable	
Minimum permitted braking resistor value (4Q operation) R_{BRmin}		7.5 Ω	5.6 Ω
Output voltage U_A		Max. V_{mains}	
PWM frequency f_{PWM}		Can be set: 4/8/12/16 kHz	
Speed range / resolution $n_A / \Delta n_A$		$-6000 \dots 0 \dots +6000 \text{ min}^{-1} / 0.2 \text{ min}^{-1}$ across the entire range	
GENERAL INFORMATION			
Power loss at S_N ¹⁾ $P_{V\text{max}}$		580 W	720 W
Cooling air consumption		180 m ³ /h	
Weight		14.3 kg (31.5 lb)	
Dimensions $W \times H \times D$		200 mm $\times$ 465 mm $\times$ 308 mm (7.87 in $\times$ 18.3 in $\times$ 12.1 in)	
Unit terminal cross section $X1, X2, X3, X4$		M6 screw and washer assembly with washer max. 25 mm ² 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

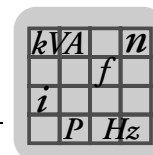
MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

Size 4 (AC 230 V units)

MOVIDRIVE® MDX61B		0220-203-4-0_	0300-203-4-0_
INPUT			
Rated supply voltage (to EN 50160) V_{supply}		$3 \times \text{AC } 200 \text{ V} - 240 \text{ V}$	
Supply frequency	f_{supply}	50 Hz ... 60 Hz $\pm 5\%$	
Rated supply current (at $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$)	$I_{\text{supply}} 100\% 125 \%$	AC 72 A AC 90 A	AC 86 A AC 107 A
OUTPUT			
Apparent output power ¹⁾ (at $V_{\text{mains}} = 3 \times \text{AC } 230..0.240 \text{ V}$)	S_N	31.8 kVA	37.8 kVA
Rated output current (at $V_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$)	I_N	AC 80 A	AC 95 A
Continuous output current (= 125 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ with $f_{\text{PWM}} = 4 \text{ kHz}$)		AC 100 A	AC 118 A
Continuous output current (= 100 % I_N) I_D (at $U_{\text{mains}} = 3 \times \text{AC } 230 \text{ V}$ 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 braking resistor value (4Q operation)	R_{BRmin}	3 Ω	
Output voltage	U_A	Max. V_{mains}	
PWM frequency	f_{PWM}	Can be set: 4/8/12/16 kHz	
Speed range / resolution	$n_A / \Delta n_A$	$-6000 \dots 0 \dots +6000 \text{ min}^{-1} / 0.2 \text{ min}^{-1}$ 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 $\times$ 522 mm $\times$ 307mm (11.0 in $\times$ 20.6 in $\times$ 12.1 in)	
Unit terminal cross section	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 $f_{\text{PWM}} = 4 \text{ kHz}$.

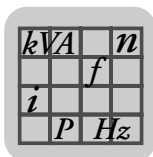
MDX61B Standard version	0220-203-4-00	0300-203-4-00
Part number	828 001 0	828 002 9
MDX61B Application version	0220-203-4-0T	0300-203-4-0T
Part number	828 012 6	828 013 4
 Constant load Recommended motor power P_{Mot}	22 kW (30 HP)	30 kW (40 HP)
 Variable torque load or constant load without overload 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	
Power 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 min ⁻¹ Parameter set 2: n21/n22/n23 = -6000...0...+6000 min ⁻¹	
Time ranges of the speed ramps at Δn = 3000 min ⁻¹		1. Ramp t11/t21 Up: 0...2000 s Down: 0..2000 s 2. Ramp t12/t22 Up = down: 0...2000 s Stop ramp t13/t23 Down: 0..0.20 s Emergency ramp t14/t24 Down: 0..0.20 s Motor potentiometer t3 Up: 0.2..0.50 s Down: 0.2..0.50 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	
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 = 3 k Ω , I_E = DC 10 mA DC +13 V...+30 V = "1" = Contact closed DC-3 V...+5 V = "0" = Contact open DIØØ: fixed assignment with "/Controller inhibit" DIØ1...DIØ5, DIØ6/DIØ7: Selection option → Parameter menu P60_	According to EN 61131
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 1ms DBØØ/DOØ2 and DOØ3...DOØ5 "0" = DC 0 V "1" = DC +24 V Caution: 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 X10:5 X10:6	X10:4...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 switch.
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 $\Omega \pm 10$ %	
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...0.25 mm ² (AWG 24...0.12) Two cores per terminal: 0.25...1 mm ² (AWG 22...17)	

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).



Technical Data and Dimension Drawings

MOVIDRIVE® MDX60/61B electronics data

MOVIDRIVE® MDX60/61B		General electronics data
Safety contact	X17:1	DGND: Reference potential for X17:3
	X17:2	VO24: : V_{OUT} = DC 24 V, only to supply X17:4 of the same unit; it cannot be used to supply other units.
	X17:3	SOV24: Reference potential for DC+24 V input "Safe stop" (safety contact)
	X17:4	SVI24: DC+24 V input "Safe stop" (safety contact)
Permitted cable cross section		One core per terminal: 0.08...1.5 mm ² (AWG 28...16) Two cores per terminal: 0.25 ... 1.0 mm ² (AWG 23...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 Size 6: 6 W
Input capacitance X17:4		Size 0: 27 µF Sizes 1...6: 270 µF
Time for restart		t_A = 200 ms
Time to inhibit output stage		t_S = 200 ms
Signal level		DC +19.2 V...+30 V = "1" = Contact closed DC -30 V...+5 V = "0" = Contact open

8.6 MOVIDRIVE® MDX60B dimension drawings

Size 0S

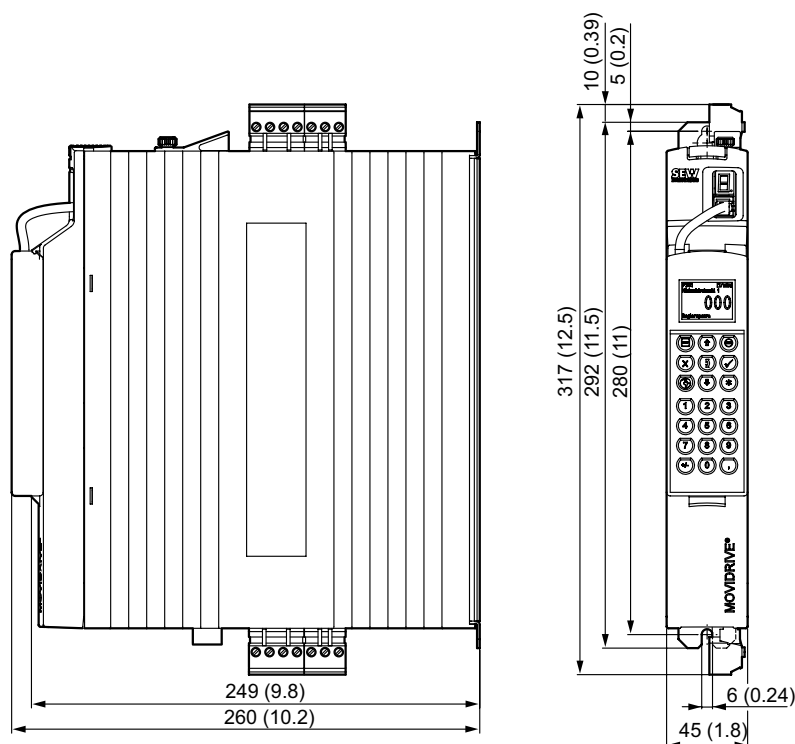


Figure 37: Dimensions for MDX60B size 0S, dimensions in mm (in)

53019CXX

Size 0S with mounted braking resistor

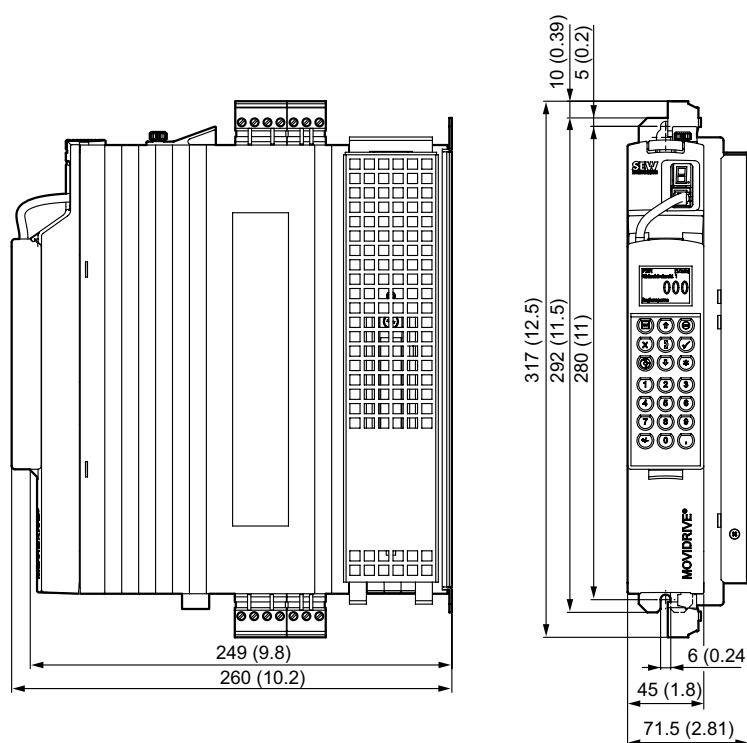
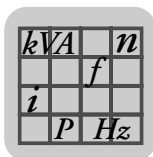


Figure 38: Dimensions for MDX60B size 0S with braking resistor, dimensions in mm (in)

53020CXX



Size 0SM

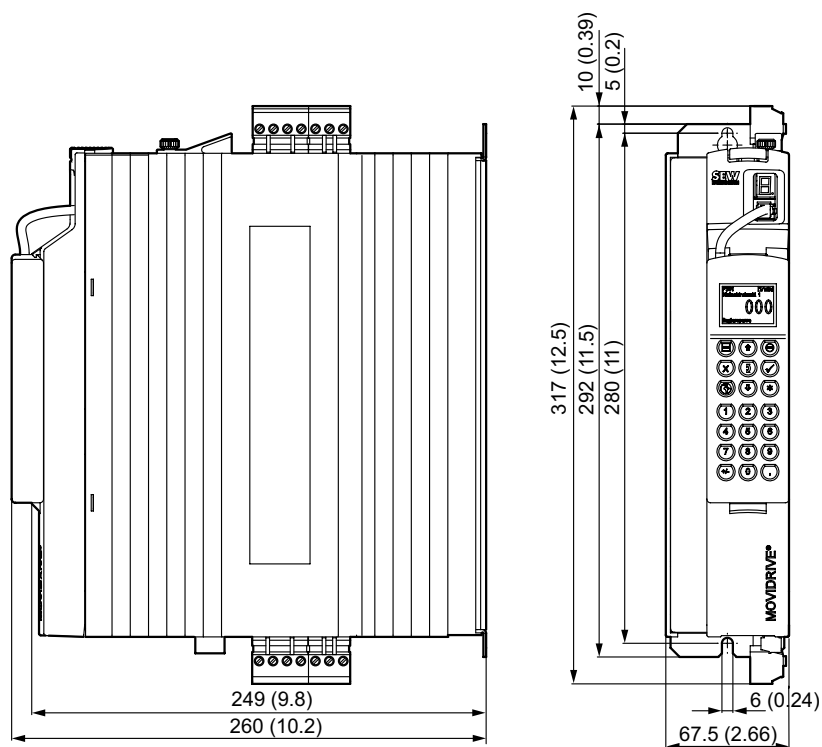


Figure 39: Dimensions for MDX60B size 0M, dimensions in mm (in)

53022CXX

Size 0M with mounted braking resistor

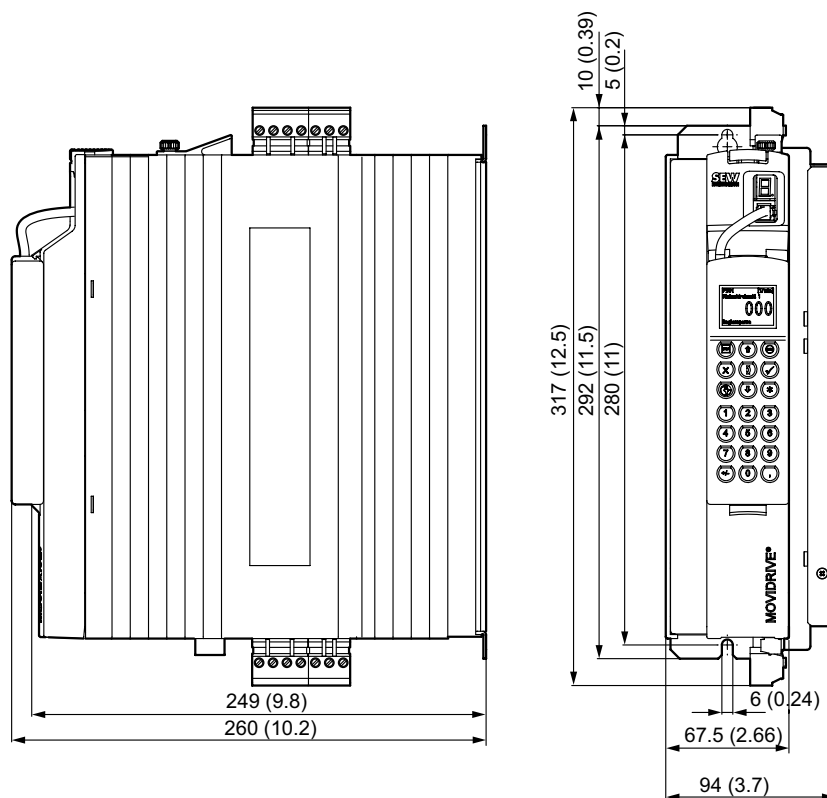
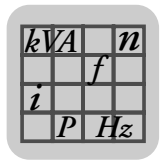


Figure 40: Dimensions for MDX60B size 0M with braking resistor, dimensions in mm (in)

53023CXX



8.7 MOVIDRIVE® MDX61B dimension drawings

	NOTE
	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.

Size 0S

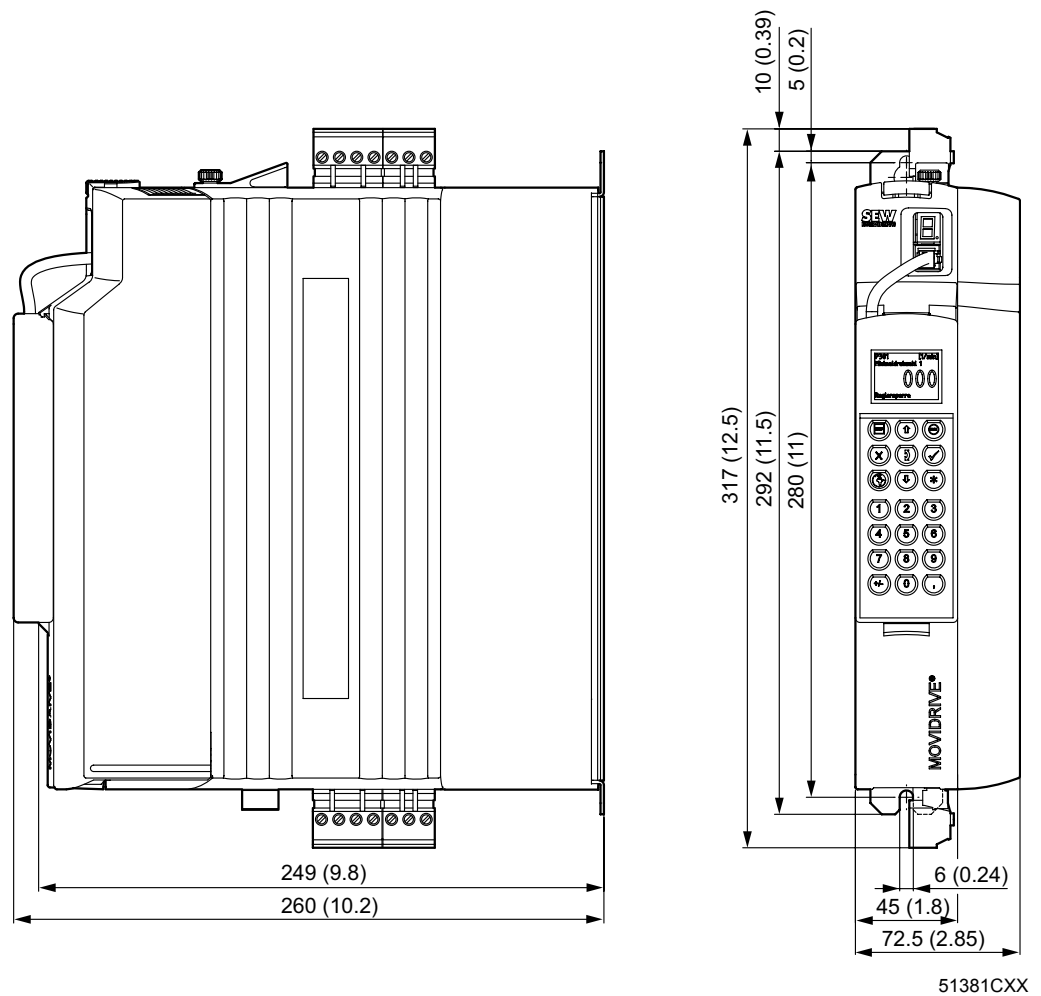
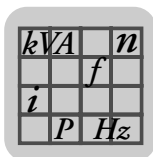
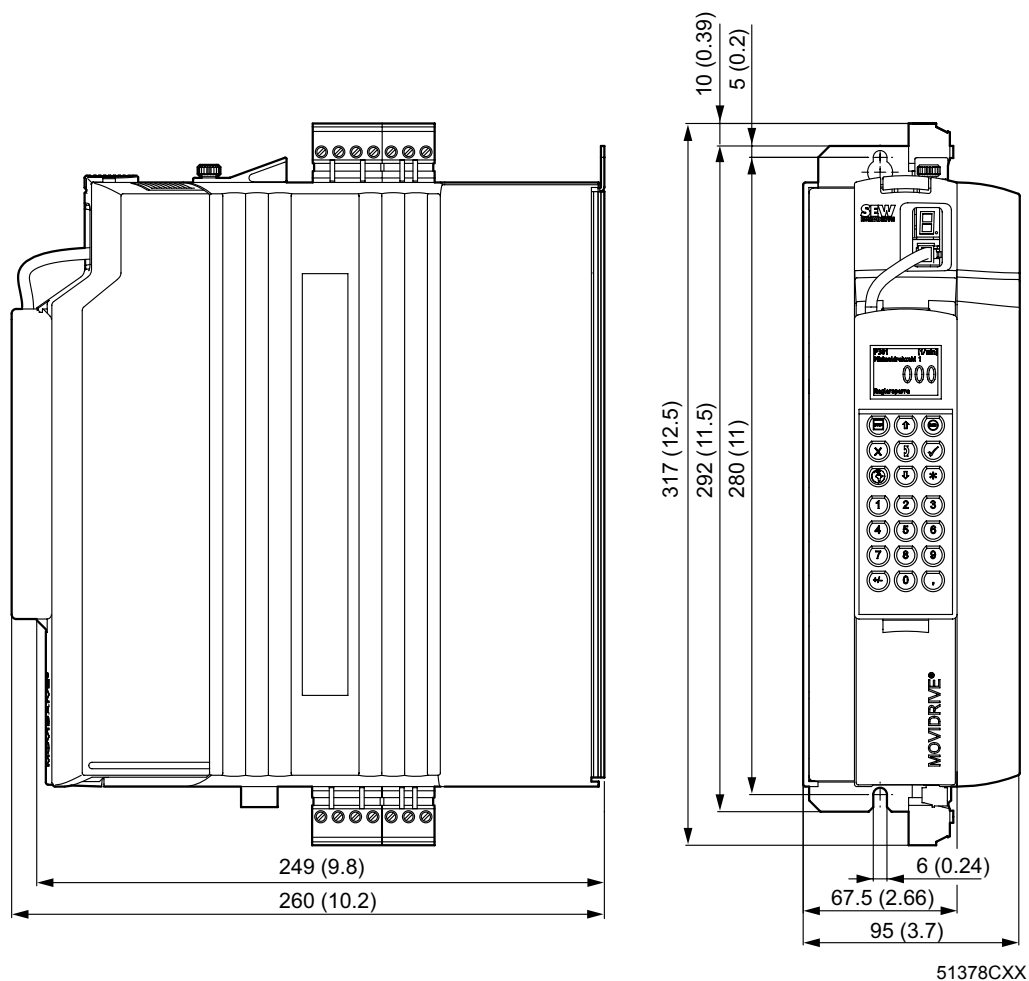


Figure 41: Dimensions for MDX61B size 0S, dimensions in mm (in)

51381CXX



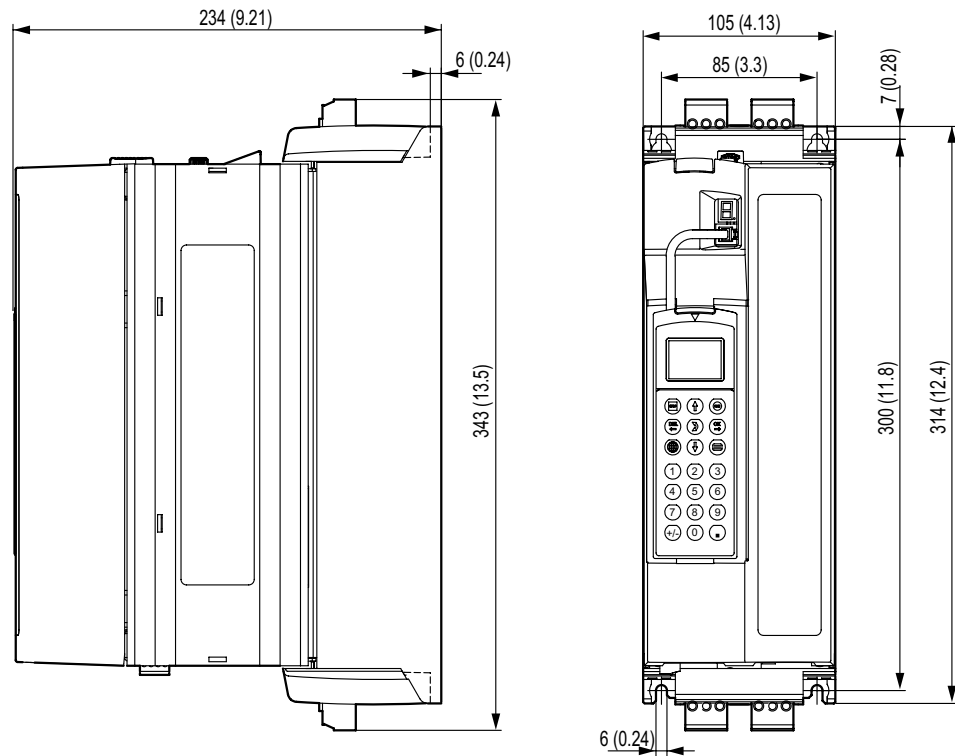
Size 0SM



51378CXX

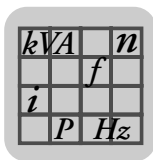
Figure 42: Dimensions for MDX61B size 0M, dimensions in mm (in)

Size 1



52274CXX

Figure 43: Dimensions for MDX61B size 1, dimensions in mm (in)



Size 2S

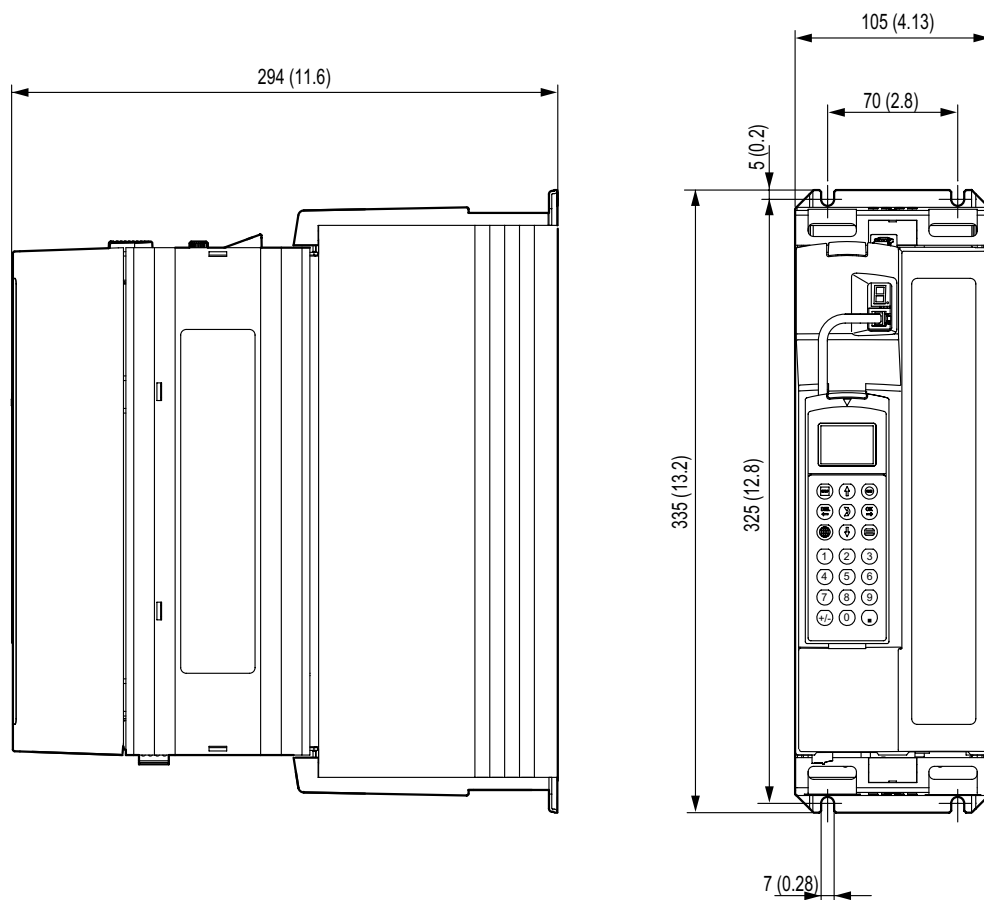
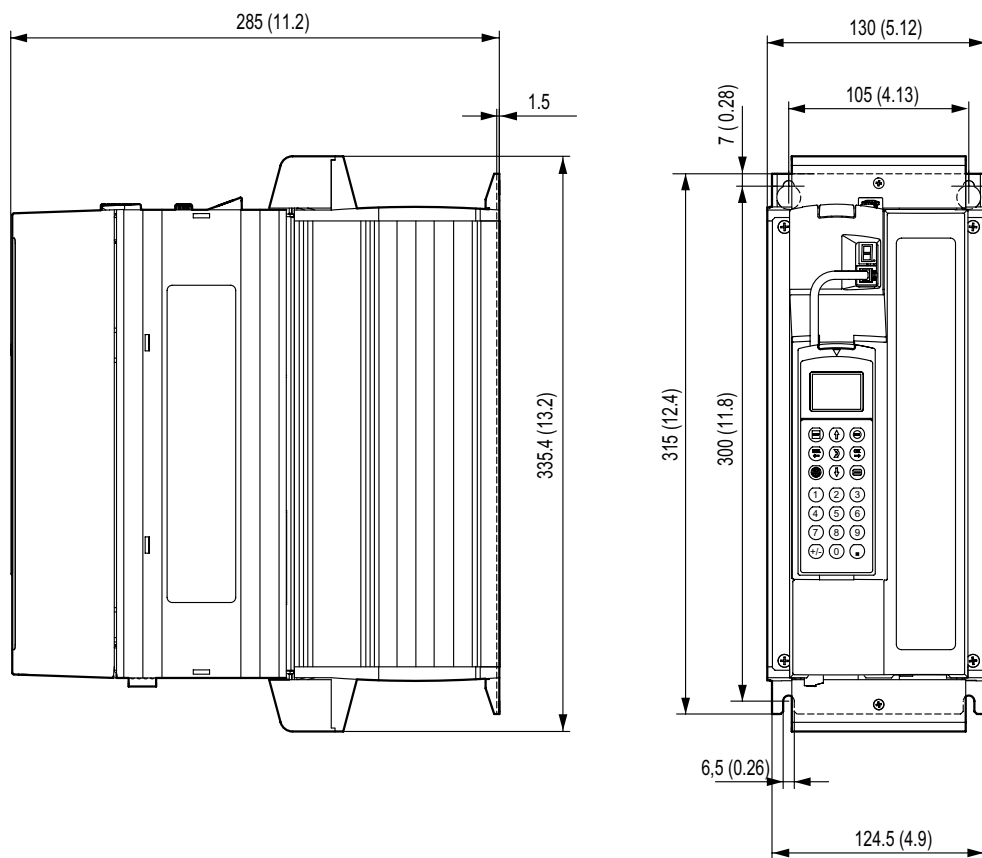


Figure 44: Dimensions for MDX61B size 2S, dimensions in mm (in)

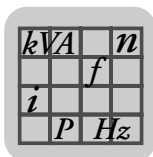
52273CXX

Size 2



52276CXX

Figure 45: Dimensions for MDX61B size 2, dimensions in mm (in)



Size 3

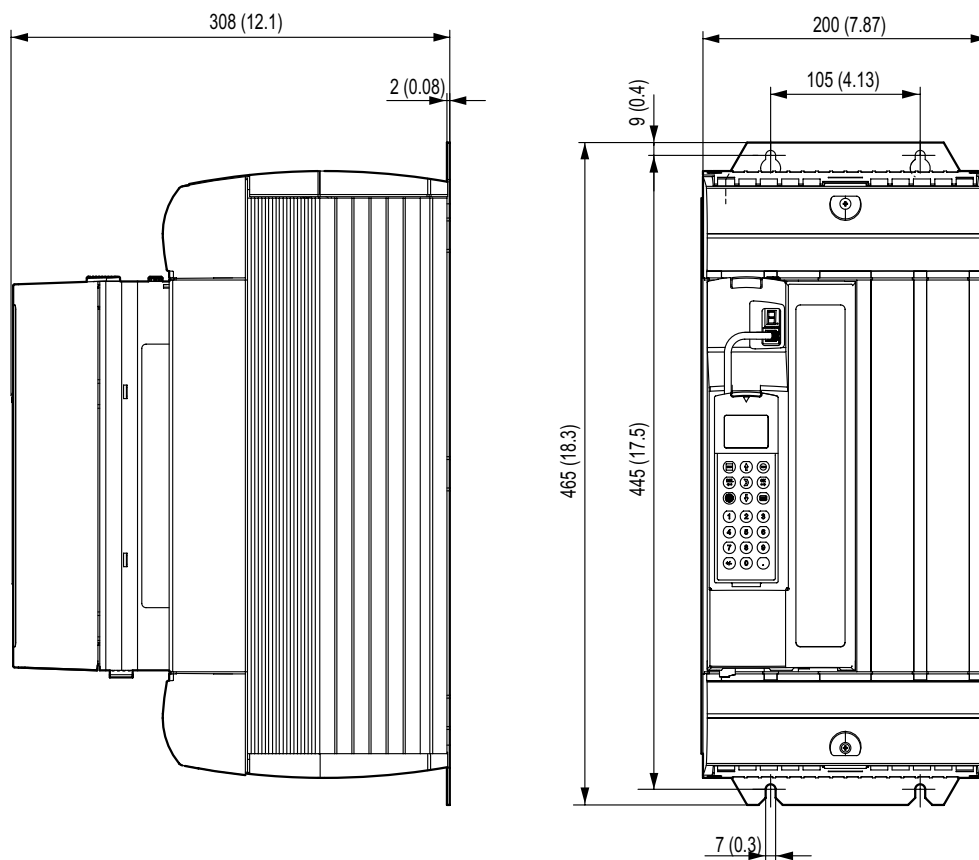


Figure 46: Dimensions for MDX61B size 3, dimensions in mm (in)

52315CXX

Size 4

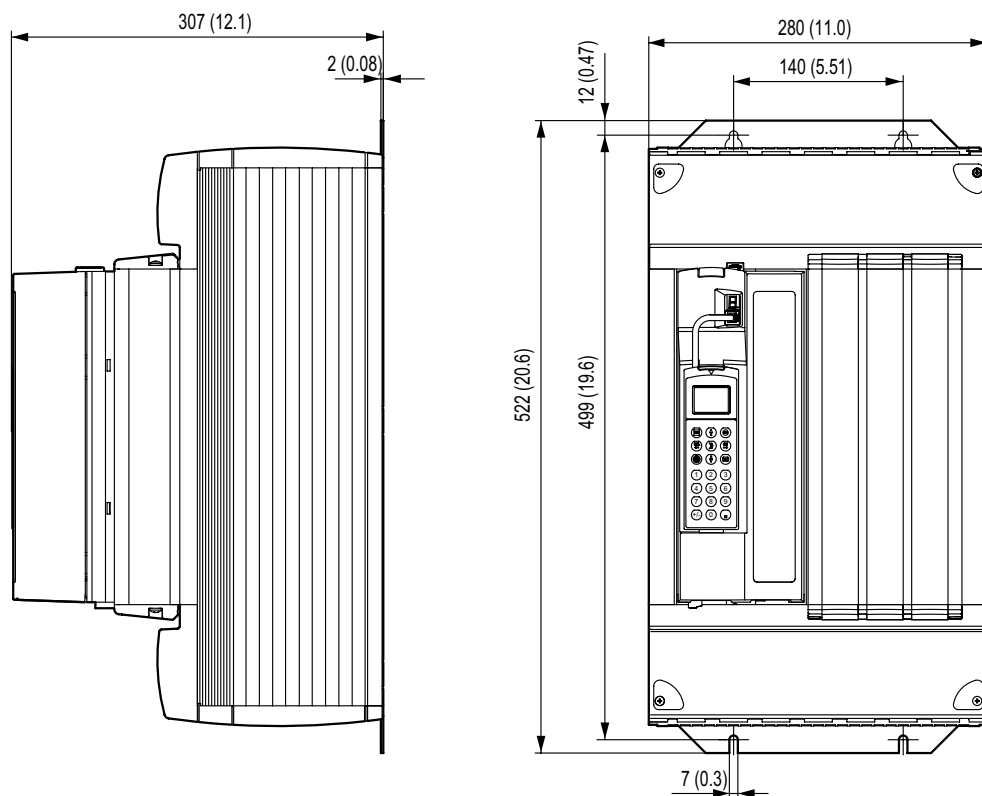
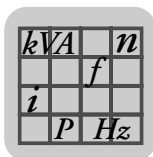


Figure 47: Dimensions for MDX61B size 4, dimensions in mm (in)

52277CXX



Size 5

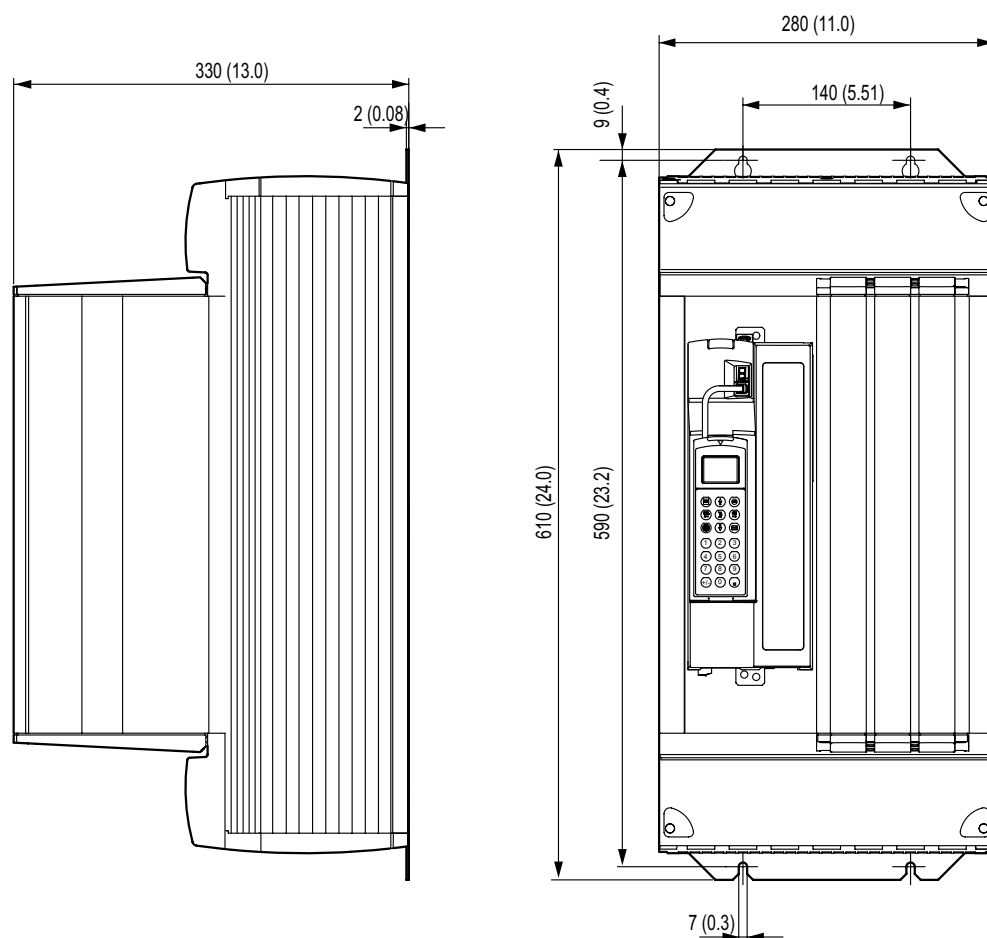
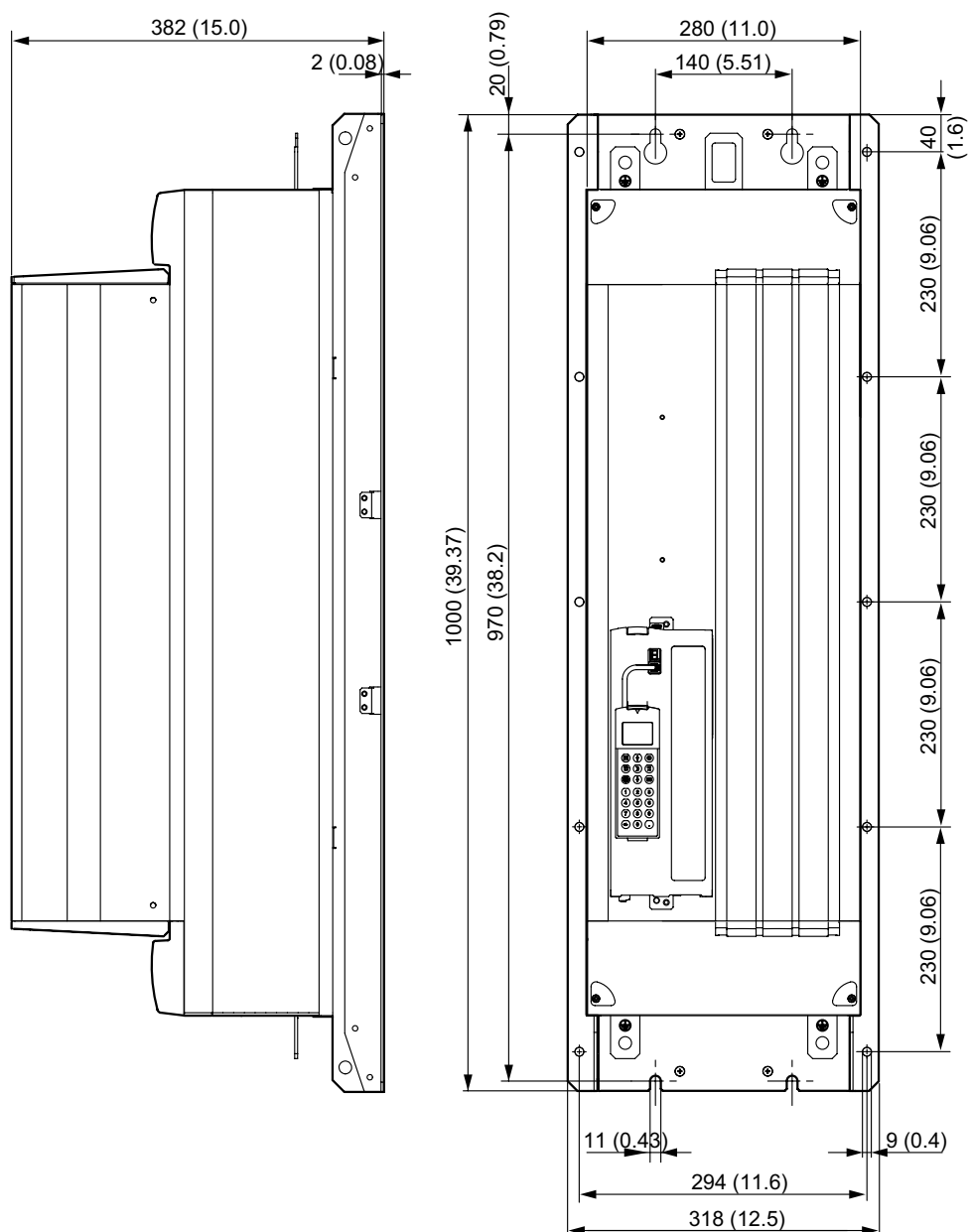


Figure 48: Dimensions for MDX61B size 5, dimensions in mm (in)

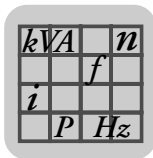
52278CXX

Size 6



58389CXX

Figure 49: Dimensions for MDX61B size 6, dimensions in mm (in)



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

HIPERFACE® encoder card option type DEH11B

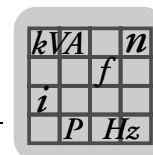
Option DEH11B			
 11870AXX	Output for incremental encoder simulation or External encoder input X14:	Output for incremental encoder simulation: Signal level to RS422 The number of pulses at X14 corresponds to the number of pulses at X15 motor encoder input	External encoder input (max. 200 kHz): Permitted encoder types: - HIPERFACE® encoder - sin/cos encoder AC 1 V_{SS} - 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_{SS} - TTL encoder with negated tracks - Encoder with signal level to RS422 - Permitted resolution: 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.

Encoder card option type DEH21B

Option DEH21B			
 11935AXX	Encoder input X62:	SSI encoder input	
	Motor encoder input X15:	Permitted encoder types: - HIPERFACE® encoder - sin/cos encoder AC 1 V_{SS} - TTL encoder with negated tracks - Encoder with signal level to RS422 - Permitted resolution: 128/256/512/1024/2048 Encoder power supply: - DC+12 V¹⁾ (tolerance range DC 10.5 - 13 V) - I_{max} = DC 650 mA	
	Voltage 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.



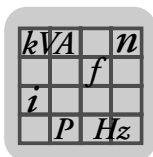
Resolver card type DER11B

Option DER11B			
 11871AXX	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, $U_{ref} = AC\ 3.5\ V_{eff}$, 4 kHz $U_{in} / U_{ref} = 0.5$
		External encoder input (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder • sin/cos encoder AC 1 V_{SS} • TTL encoder with negated tracks 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.

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

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

Input/output card type DIO11B

DIO11B option		
 11872AXX	Setpoint input n2	X20:1/X20:2
	Mode AI21/AI22	AI21/AI22: Voltage input
	Resolution	Differential input or input with AGND reference potential
	Internal resistance	n2 = DC 0...+10 V or DC -10 V...0...+10 V 12 bit, sampling time 1 ms $R_i = 40 \text{ k}\Omega$
	Analog outputs	X21:1/X21:4
		X21:2/X21:5
	Response time	AOV1/AOV2: Voltage outputs DC -10 V...0...+10 V, $I_{\max} = \text{DC } 10 \text{ mA}$, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_
	Resolution	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_
	Binary inputs	X22:1...X22:8
	Internal resistance	Isolated (optocoupler), PLC compatible (EN 61131) DI1Ø...DI17 $R_i \approx 3 \text{ k}\Omega$, $I_E \approx \text{DC } 10 \text{ mA}$ Sampling interval 1 ms
	Signal level	DC+13 V...+30 V = "1" = Contact closed DC-3 V...+5 V = "0" = Contact open
	Function	X22:1...X22:8
	Binary outputs	X23:1...X23:8
	Signal level	DO1Ø...DO17: PLC-compatible (EN 61131-2), response time 1ms
	Function	X23:1...X23:8
	Reference terminals	X20:3/X21:3/X21:6
		X22:9
		X22:10
	Voltage input	X23:9
	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)

CAN bus interface type DFC11B

DFC11B option		
 55728AXX	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 (setting at DIP switch S1-R)
	Addressing	Setting via parameter P891 (SBus MOVILINK) or P896 (CANopen)
	Tools for startup	- MOVITOOLS® software - DBG60B keypad

9 Index

Numerics

7-segment display (error message) 114

A

Accessories set, size 2S 11
 Arrangement of the option slots 54
 Assembly notes for size 6 20
 Assignment of braking resistors, chokes and filters
 AC 230 V units, sizes 1 to 4 47
 AC 400/500 V units, size 0 42
 AC 400/500 V units, size 1, 2S, 2 43
 AC 400/500 V units, sizes 3 and 4 44
 AC 400/500 V units, sizes 5 and 6 45

B

Baud rate 158
 Braking resistor BW...-T
 Technical data 157

C

C-Tick approval 129
 CE marking 129
 Connecting external encoder 69
 Connection
 Encoder and resolver, general information .. 58
 Incremental encoder simulation 72
 Option DEH11B 60
 Option DER11B 66
 Option DFC11B 77
 Option DIO11B 74
 Resolver 67
 RS485 interface 49
 System bus (SBus) 48
 Connection technology 158

D

DBG60B
 Delivery condition 82
 Language selection 82
 Starting up the speed controller 86
 Startup procedure 83
 DBG60B keypad
 Basic displays 107
 Copy function 108
 Edit IPOS parameters 111
 Functions of the keys 108
 Information messages 107
 Parameter mode 109
 Startup functions 83
 User menu 110
 Variable mode 110
 Wake-up parameters 110
 DEH11B
 Connection 60
 Technical data 156
 Terminal description 60

DEH21B
 Connection 64
 Technical data 156
 Terminal description 64
 DER11B
 Connection 66
 Technical data 157
 Terminal description 66
 DFC11B
 Technical data 158
 Terminal description 77
 Dimension drawings
 MDX60B, size 0M 146
 MDX60B, size 0M with mounted braking resistor 146
 MDX60B, size 0S 145
 MDX61B, size 0M 148
 MDX61B, size 0S 147
 MDX61B, size 1 149
 MDX61B, size 2 151
 MDX61B, size 2S 150
 MDX61B, size 3 152
 MDX61B, size 4 153
 MDX61B, size 5 154
 MDX61B, size 6 155
 DIO11B
 Connection 74
 Technical data 158
 Terminal description 74

E

Earth-leakage monitor for IT systems 22
 Ein-/Ausgabekarte DIO11B
 Anschluss 74
 Error list 115
 Error memory 113
 Error message in 7-segment display 114
 Extended storage 127

I

Incremental encoder simulation
 Connection 72
 Information messages on DBG60B 107
 Installation
 BW braking resistor 23
 Cable cross sections 23
 Cables and fuses 21
 HD output choke 26
 Mains and brake contactors 22
 PE connection 22
 Shielded control cables 24
 UL-compliant 30
 Installing and removing options cards 56
 Interface adapter
 DWE11B/12B 50
 USB11A 53



UWS21B	52	Preliminary work and resources	80
L		Startup instructions	78
Long-term storage	130	With DBG60B keypad	81
M		Startup with DBG60B	
Master/Slave connection	73	Set parameters	88
Memory card	111	Storage temperature	130
Notes on replacing the memory card	111	Switch-off responses in the event of a malfunction	
Minimum clearance	21	113	
mounting position	21	System bus (SBus), connection	48
N		T	
Nameplate		Technical data	
BW090-P52B braking resistor	10	AC 230 V units	
Control unit sizes 1 - 6	10	Size 1	139
Option card	10	Size 2	140
Power section sizes 1 - 6	10	Size 3	141
Size 0	9	Size 4	142
Sizes 1 - 6	10	AC 400/500 V units	
O		Size 1	133
Operating displays		Size 2S, 2	134
7-segment display	106	Size 3	135
Basic displays in the DBG60B keypad	107	Size 4	136
Option cards		Size 5	137
Installation and removal	56	Size 6	138
Option combinations, overview	54	Braking resistor BW...-T	157
Option DWE11B/12B	50	Electronics data basic units	143
Option slots, arrangement	54	General technical data	130
Option USB11A	53	Option DEH11B	156
Option UWS21B	52	Option DEH21B	156
P		Option DER11B	157
Parameter list	95	Option DFC11B	158
Parameter mode	109	Option DIO11B	158
Power shield clamp	32	size 0 (AC 400/500 V units)	132
R		Terminal description	
Removing/installing the front cover	28	Basic unit (power section and control unit) ..	41
Removing/installing the keypad	27	DFC11B	77
Repair	127	Option DIO11B	74
Reset	113	Tightening torques for power terminals	21
Resolver, connection	67	Timeout active	113
RS485 interface, description and connection	49	Touch guard power terminals	35
S		Size 2S	35
Safety notes	6	Sizes 4 and 5 (DLB11B)	36
Scope of delivery	11	Sizes 4-6	37
MDX60B/61B size 0	11	U	
MDX60B/61B size 2S	11	UL approval	129
MDX60B/61B sizes 1 - 6	11	UL-compliant installation	30
SEW Electronics Service	127	Unit design	
Starting the motor		MDX60B/61B size 0	12
Analog setpoint selection	91	MDX61B size 1	13
Fixed setpoints	92	MDX61B size 2	15
Manual operation	93	MDX61B size 2S	14
Startup		MDX61B size 3	16
PC and MOVITOOLS®	89	MDX61B size 4	17
		MDX61B size 5	18
		MDX61B size 6	19
		Unit designation	9



User menu110

V

Variable mode110

W

Wake-up parameters110

Wiring diagrams

Braking resistor BW... / BW...-T / BW...-P39

Power section and brake38

Signal terminals40



Address List

Germany			
Headquarters Production Sales	Bruchsal	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal P.O. Box Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Service Competence Center	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
	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 Dankritzer 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
	Additional addresses for service in Germany provided on request!		
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.usocomme.com sew@usocomme.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
Additional addresses for service in France provided on request!			



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
	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://sew-eurodrive.at sew@sew-eurodrive.at
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 S.A. 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 S.A. 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
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 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
Additional addresses for service in Brazil provided on request!			
Bulgaria			
Sales	Sofia	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@fastbg.net



Address List

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, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca marketing@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 marketing@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 marketing@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 LAMP 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
	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
Assembly Sales Service	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
Additional addresses for service in China provided on request!			
Colombia			
Assembly Sales Service	Bogotá	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	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 220121234 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
Denmark			
Assembly Sales Service	Kopenhagen	SEW-EURODRIVEA/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
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
Production Assembly Service	Karkkila	SEW Industrial Gears OY Valurinkatu 6 FIN-03600 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi
Gabon			
Sales	Libreville	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12
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
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
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 2 7960477 + 79604654 Fax +852 2 7959129 contact@sew-eurodrive.hk



Address List

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
India			
Assembly Sales Service	Vadodara	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com sales@seweurodriveindia.com subodh.ladwa@seweurodriveindia.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. Blicke & 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
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
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
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 gacar@beirut.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
Mexico			
Assembly Sales Service	Queretaro	SEW-EURODRIVE MEXIKO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Queretaro C.P. 76220 Queretaro, Mexico	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 22618372 Fax +212 22618351 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
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, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 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



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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
Poland			
Assembly Sales Service	Lodz	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 67710-90 Fax +48 42 67710-99 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
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
Romania			
Sales Service	București	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
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-83554 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk

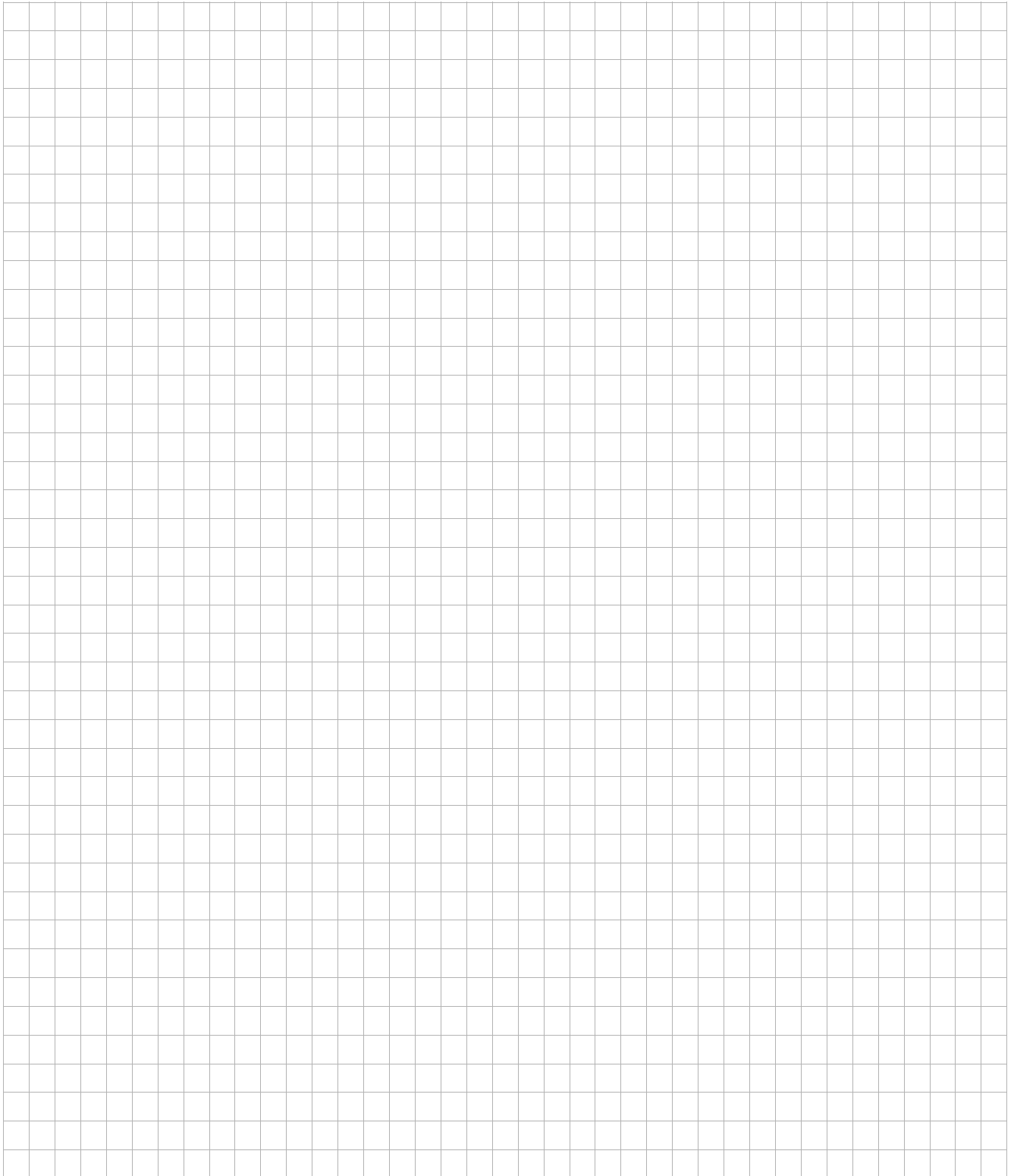


Slovakia			
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-97411 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
Slovenia			
Sales Service	Celje	Pakman - Pogonska Tehnika d.o.o. Ul. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 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 dross@sew.co.za
	Capetown	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 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@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
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 info@sew-eurodrive.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
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
Tunisia			
Sales	Tunis	T. M.S. Technic Marketing Service 5, Rue El Houdaibiah 1000 Tunis	Tel. +216 71 4340-64 + 71 4320-29 Fax +216 71 4329-76 tms@tms.com.tn



Address List

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 4419164, 3838014, 3738015 Fax +90 216 3055867 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr
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
USA			
Production Assembly Sales Service	Greenville	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 Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly Sales Service	San Francisco	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Philadelphia/PA	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
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@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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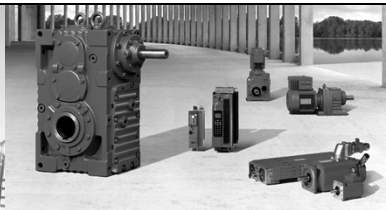
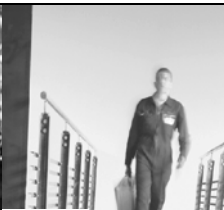
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sew@sew-eurodrive.com

→ www.sew-eurodrive.com