User-friendly documentation

TÜV SÜD

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Checked documentation

☑ comprehensible
☑ complete
☑ safe

Voluntary test according to TPS-Standard PPP 13010

SEW EURODRIVE

MOVIDRIVE® MDX60B / 61B

GA430000

Operating **I**nstructions

1 Structure of the Safety Notes

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

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

Pictogram	Signal word	Meaning	Consequences in case of disregard
Example: ⚠ General danger ⚡ Specific danger, e.g. electric shock	⚠ DANGER!	Imminent danger	Severe or fatal injuries
	⚠ WARNING!	Possible dangerous situation	Severe or fatal injuries
	⚠ CAUTION!	Possible dangerous situation	Minor injuries
🛑 STOP	STOP!	Possible damage to property	Damage to the drive system or its environment
ℹ	NOTE	Useful information or a tip Simplifies the handling of the drive system	

	⚠ CAUTION!
⚠	**A requirement of fault-free operation** and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the **operating instructions**. Therefore, **read the operating instructions** before you start operating the unit! Make sure that the operating instructions are available to persons responsible for the plant and its operation, as well as to person who work independently on the unit. You must also ensure that the documentation is legible.

Exclusion of liability:

You must comply with the information contained in these operating instructions to ensure safe operation of the MOVIDRIVE® MDX60B/61B drive 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 must be read carefully 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 plant and its operation, as well as persons who work independently on the unit, have read through the operating instructions carefully and understood them. If you are unclear about any of the information in this documentation, or if you require further information, please contact SEW-EURODRIVE.

2.1 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, drive 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 machinery.

Consult the documentation for additional information.

2.2 Target group

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

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

All work related to transport, storage, operation and disposal must be carried out only by personnel who have been trained and instructed accordingly.

2.3 Designated use

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

In case of installation in machines, startup of the drive inverters (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 EMC (89/336/EEC) guideline.

The drive inverters meet the requirements stipulated in low voltage guideline 73/23/EEC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these drive inverters.

Technical data and information on the connection requirements are given on the nameplate and in the documentation; they have to be observed under all circumstances.

Safety functions   The MOVIDRIVE® MDX60B/61B drive 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, putting into storage

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

2.5   Installation

Installation and cooling of the devices must take place according to the guidelines listed in the corresponding documentation.

Protect the drive 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.

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

The following applications are prohibited unless measures are expressly taken to make them possible:

- Use in potentially explosive atmospheres
- 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 drive inverters (e.g. BGV A3).

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

You will find notes on EMC-compliant installation, such as shielding, grounding, arrangement of filters and routing of lines, in the documentation of the drive inverters. Always observe these notes even with drive inverters bearing the CE marking. The manufacturer of the system or machine is responsible for maintaining the limits established by the 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 measures: Ground 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 drive 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 drive inverter using the operating software are permitted.

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

Keep all covers and doors closed during operation.

The fact that the status LED and other display elements 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. Removing the cause of the problem or performing a reset can result in the drive re-starting on its own. If, for safety reasons, this is not permitted for the driven machine, disconnect the unit from the mains before correcting the fault.

3 Index of Changes

3.1 Changes compared to the previous version

The following section lists the changes made to the individual sections from edition 01/2005, publication number 11300310 (EN).

Important notes
- The section "Important Notes" has been completely revised.

Safety notes
- The section "Safety Notes" has been completely revised.

Unit design
- The illustrations for unit sizes 0, 1 and 2 have been updated.
- The option "Interface adapter DWE11B/DWE12B" has been included.

Installation
- The following subsections have been included in this section:
  - "DWE11B/DWE12B interface adapter"
  - "UWS21B interface adapter"
- The following parts have been revised in the "Installation instructions for the basic unit" subsection:
  - Section "Tightening torques"
  - Section "Fuses and earth-leakage circuit breakers"
  - Section "PE input connection"
  - Section "IT systems"
  - Section "Connecting braking resistors"
  - Section "Installing braking resistors BW.../BW...-T/BW...-P"
- All wiring diagrams (power section, braking resistors, electronic terminals) have been revised.
- The subsection "Assignment of braking resistors, chokes and filters" have been completely revised.
- In the subsection "Option combinations for MDX61B," the combinations of the options cards for MDX61B have been updated.

Startup
- Startup for an HTL motor encoder has been included.
- Missing parameters have been added to the subsection "Complete parameter list".

Operation and service
- The subsections "Memory card" and "Error messages and list of faults" have been completely revised.
- The subsection "Extended storage" has been included.

Technical data and dimension drawings
- The section has been completely revised.

4 Unit Design

4.1 Unit designation, nameplates and scope of delivery

Example: Unit designation

| MDX60 | B | 0011 | - | 5 | A | 3 | - | 4 | 00 |

Implementation
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 B
A = Radio interference suppression A
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 MDX60B/61B.. Size 0

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

TYP: MDX60B0005-5A3-4-00
P/N: 08275661 SO#: 01.0123456789.0001.03
SEW EURODRIVE
D-76646 Bruchsal
Umrichter
Movidrive
Made in Germany

Eingang / Input	Ausgang / Output
U = 3*380...500V +/-10%	U = 3*0V...U
f = 50...60Hz +/-5%	f = 0...180Hz
I = 2,6 A AC (400V)	I = 2,4 A AC (400V)
T = 0...40°C IP 20	P = 1,6 KVA Lastart M

Status: 12 10 13 11 1A -- -- 11

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Figure 1: Example: System nameplate for MDX60B/61B.. Size 0

Example: Nameplate of braking resistor for MDX60B/61B..

The braking resistor BW090-P52B is only available for MDX60B/61B size 0.
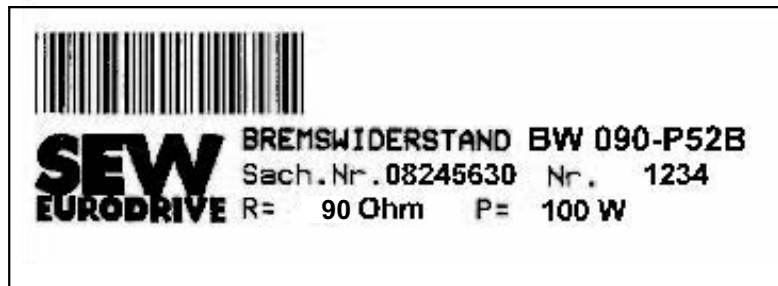
54522AXX

Figure 2: Nameplate of braking resistor for MDX60B/61B.. Size 0

Example: System nameplate for MDX61B.. sizes 1 - 6

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

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Figure 3: Example: System nameplate for MDX61B.. sizes 1 - 6

Example: Nameplate of power section for MDX61B.. sizes 1 - 6

For MDX61B.. sizes 1-6, the **nameplate of the power section** is located at the side of the unit.
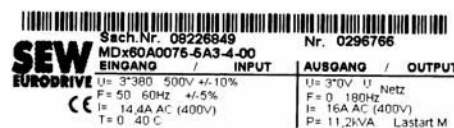
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Figure 4: Nameplate of power section for MDX61B.. sizes 1 - 6

Example: Nameplate of control unit for MDX61B.. 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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Figure 5: Nameplate of control unit MDX61B.. sizes 1 - 6

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 ($\rightarrow$ Following illustration) 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). Once the touch guards [2] have been installed, the enclosure is IP20. Otherwise it is IP10 ($\rightarrow$ Section "Touch guards").

[1]
[2]
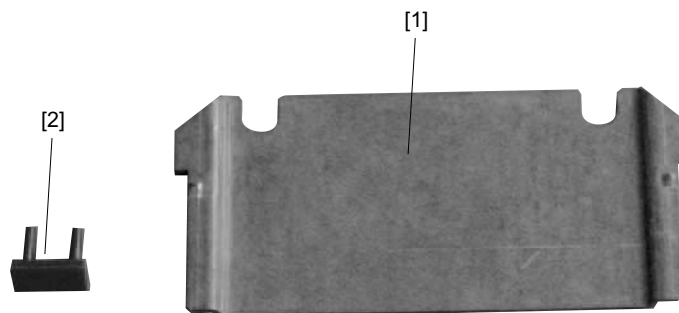
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Optional scope of delivery

All sizes
- Option DBM60B: Door installation for separate mounting of the DBG60B keypad (e.g. in the control cabinet).

  Part number 824,853 2.

  The DBM60B option consists of the housing with enclosure IP65 **and** a 5 m extension cable (→ Following illustration). Das Bediengerät DBG60B ist in dieser Option nicht enthalten und muss separat bestellt werden.

DBM60B
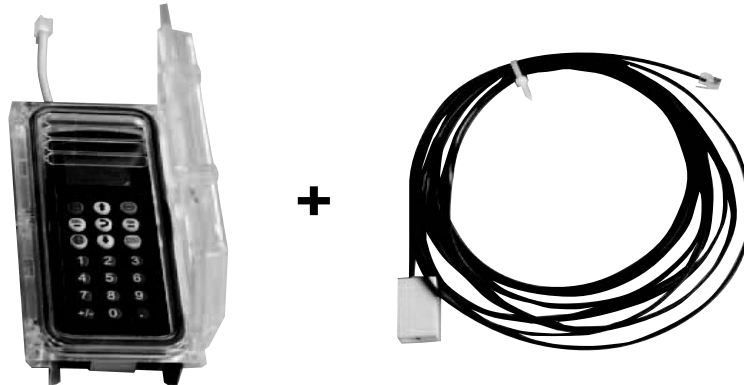
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- Option DKG60B: 5 m Verlängerungskabel für Bediengerät DBG60B.

  Part number 817 583 7.

  5 m extension cables are available for mounting the keypad separately in customer housing (→ Following illustration).

DKG60B

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Size 2 S
- DMP11B mounting panel ($\rightarrow$ following figure), not installed.

  Part number 818 398 8.

  If a MOVIDRIVE® MD_60A size 2 unit is to be replaced by MOVIDRIVE® MDX61B size 2S, the MDX61B size 2S can be fitted on the existing mounting plate with the DMP11B mounting panel. New retaining holes do not have to be drilled.

DMP11B
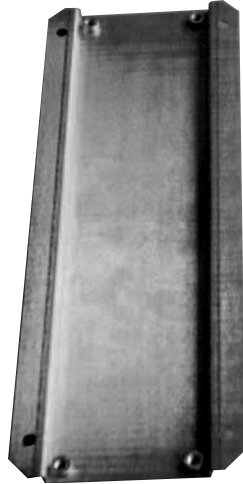
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Connector adapter for replacing MOVIDRIVE® A with MOVIDRIVE® B

The following adapters are available for rapid replacement of a MOVIDRIVE® A unit with a MOVIDRIVE® B unit.

• DAT11B: Terminal adapter, part number 824 671 8

X10 can be rearranged directly when using MOVIDRIVE® MDF, MDV or MDS. Three plugs have to be rewired. You can avoid such rewiring work by using the DAT11B terminal adapter. Using this adapter will prevent incorrect connection and save time. The terminal adapter is required for terminals X11 (analog input), X12 (SBus) and X13 (binary inputs).

DAT11B
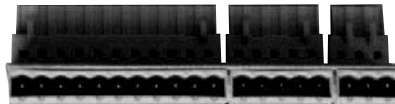
54589AXX

• DAE15B: Encoder adapter X15, part number 817 629 9

If a motor with encoder on X15 is in operation on an MDV or MCV, the encoder is connected via a 9-pin plug connector to MOVIDRIVE® A. Since the DEH11B option for MOVIDRIVE® MDX61B comes equipped with a 15-pin socket, you will either have to convert the encoder cable or use the encoder adapter. The encoder adapter DAE15B for connecting sin/cos and TTL encoders can be inserted directly between the existing encoder cable with a 9-pin connector and the 15-pin socket on DEH11B. This step makes for fail-safe and fast connection of existing drives. HTL encoders must be connected to MOVIDRIVE® B with the option DWE11B/12B ($\rightarrow$ section "DWE11B/12B interface adapter option").

DAE15B

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Length of DAE15B: 200 mm±20 mm

Line cross section: 6 x 2 x 0.25 mm^2

Terminal of the 15-pin sub D plug (MOVIDRIVE® MDX61B, option DEH11B, X15)	Core color in prefabricated cable	Terminal of 9-pin sub D socket (encoder end)
1	Yellow (YE)	1
2	Red (RD)	2
3	Pink (PK)	3
4	Violet (VT)	4
8	Brown (BN)	5
9	Green (GN)	6
10	Blue (BU)	7
11	Gray (GY)	8
15	White (WH)	9

- DAE14B: Encoder adapter X14, part number 817 630 2

  If a synchronous encoder is operated at X14 on MOVIDRIVE® MDV, MDS, MCV or MCS, connection takes place via a 9-pin connector. Since the DEH11B and DER11B options for MOVIDRIVE® MDX61B come equipped with a 15-pin plug, you will either have to rework the encoder cable or use the encoder adapter. The encoder adapter can be plugged directly between the existing encoder cable with 9-pin socket and the 15-pin connector on DEH11B/DER11B. This step makes for fail-safe and fast connection of existing drives.

DAE14B

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Length of DAE14B: 200 mm±20 mm

Line cross section: 6 x 2 x 0.25 mm^2

Terminal of the 15-pin sub D socket (MOVIDRIVE® MDX61B, option DEH11B/DER11B, X14)	Core color in prefabricated cable	Terminal of the 9-pin sub D connector (encoder end)
1	Yellow (YE)	1
2	Red (RD)	2
3	Pink (PK)	3
7	Violet (VT)	4
8	Brown (BN)	5
9	Green (GN)	6
10	Blue (BU)	7
11	Gray (GY)	8
15	White (WH)	9

- DWE11B: Interface adapter (adapter cable), 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 HIPERFACE®encoder card DEH11B**. 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.

58748AXX

[A] $5 \times 2 \times 0.25$ mm^2 / length 1000 mm / max. cable length between inverter - encoder: 100 m

[B] DC 24 V connection for HTL encoder; 1×0.5 mm^2 / 250 mm long

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

- DWE12B: : Interface adapter (adapter cable), part number 188 180 9

  The interface adapter DWE12B (HTL→TTL) in the form of an adapter cable is used **to connect push-pull HTL encoders to the HIPERFACE® encoder card DEH11B**. 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] $4 \times 2 \times 0{,}25$ mm^2 / length 1000 mm / max. cable length between inverter - encoder: 200 m

[B] DC 24 V connection for HTL encoder; 1×0.5 mm^2 / 250 mm long

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

4.2   Size 0

MDX60/61B-5A3 (AC 400/500 V units): 0005 ... 0014
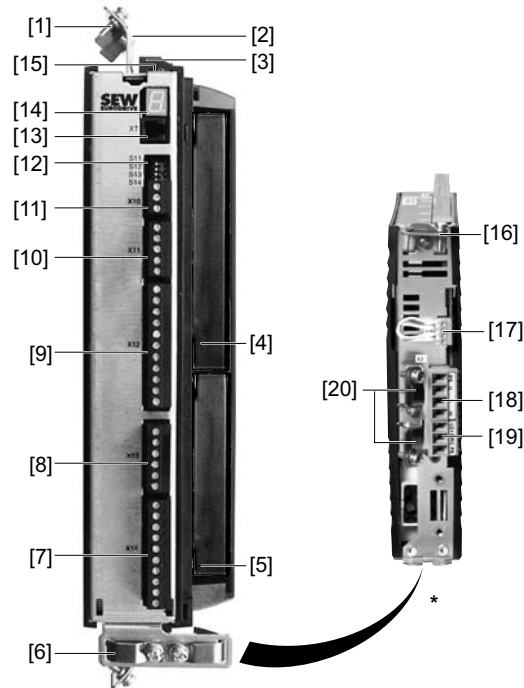
59238AXX

* View of the underside of the unit

[1] Power shield clamp for mains connection and connection for DC link connection

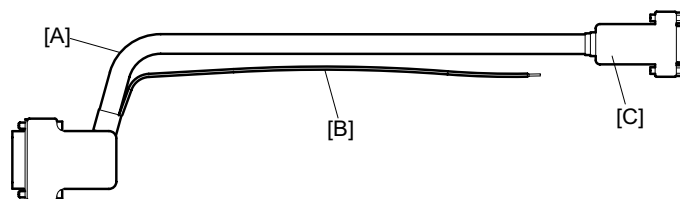[2] X4: Connection for DC link connection U_Z- / U_Z+ and PE connection, separable

[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] Electronics shield clamp MDX61B size 0

[7]   X10: Electronics terminal strip for binary outputs and TF/TH input

[8] X16: Electronics terminal strip for binary inputs and outputs

[9] X13: Electronics terminal strip for binary inputs and RS-485 interface

[10] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[11] X12: Electronics terminal strip for system bus (SBus)

[12] DIP switches S11 ... S14

[13] XT: Slot for DBG60B keypad or UWS21B serial interface

[14] 7-segment display

[15] Memory card

[16] Electronics shield clamp MDX60B size 0

[17] X17: Electronics 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

4.3 Size 1

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

MDX61B-2A3 (AC 230 V units): 0015 ... 0037
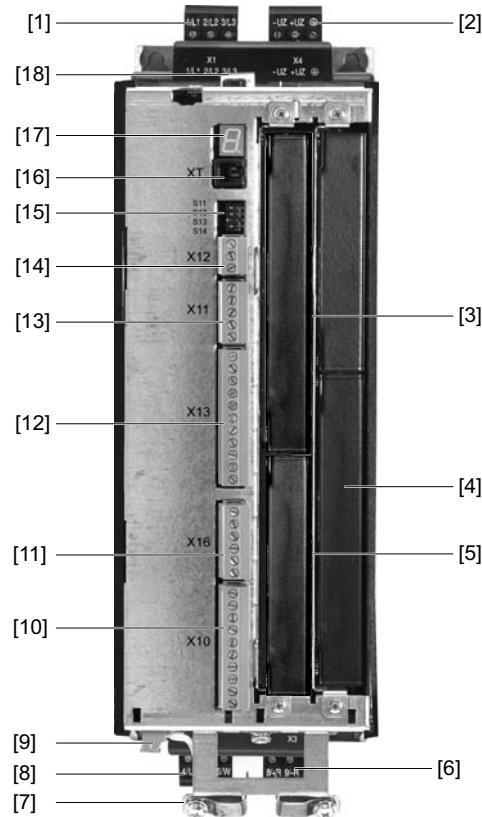
59242AXX

[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] Electronics shield clamp and PE connection

[8] X2: Motor connection 4/U, 5/V, 6/W and PE connection, separable

[9] X17: Electronics terminal strip for safety contacts for safe stop

[10] X10: Electronics terminal strip for binary outputs and TF/TH input

[11] X16: Electronics terminal strip for binary inputs and outputs

[12] X13: Electronics terminal strip for binary inputs and RS485 interface

[13] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[14] X12: Electronics terminal strip for system bus (SBus)

[15] DIP switches S11 ... S14

[16] XT: Slot for DBG60B keypad or UWS21B serial interface

[17] 7-segment display

[18] Memory card

4.4   Size 2S

MDX61B-5A3 (AC 400/500 V units): 0055 / 0075
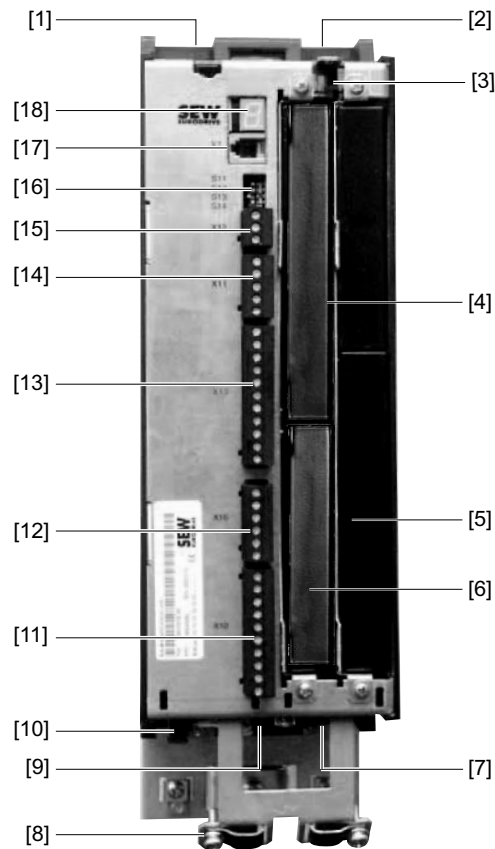
54525AXX

[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] Electronics shield clamp and PE connection

[9] X2: Motor connection 4/U, 5/V, 6/W

[10] X17: Electronics terminal strip for safety contacts for safe stop

[11] X10: Electronics terminal strip for binary outputs and TF/TH input

[12] X16: Electronics terminal strip for binary inputs and outputs

[13] X13: Electronics terminal strip for binary inputs and RS485 interface

[14] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[15] X12: Electronics terminal strip for system bus (SBus)

[16] DIP switches S11 ... S14

[17] XT: Slot for DBG60B keypad or UWS21B serial interface

[18] 7-segment display

4.5   Size 2

MDX61B-5A3 (AC 400/500 V units): 0110
MDX61B-2A3 (AC 230 V units): 0055 / 0075

59243AXX

[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] Electronics shield clamp and PE connection

[8] X2: Motor connection 4/U, 5/V, 6/W

[9] X17: Electronics terminal strip for safety contacts for safe stop

[10] X10: Electronics terminal strip for binary outputs and TF/TH input

[11] X16: Electronics terminal strip for binary inputs and outputs

[12] X13: Electronics terminal strip for binary inputs and RS485 interface

[13] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[14] X12: Electronics terminal strip for system bus (SBus)

[15] DIP switches S11 ... S14

[16] XT: Slot for DBG60B keypad or UWS21B serial interface

[17] 7-segment display

[18] Memory card

4.6 Size 3

MDX61B-503 (AC 400/500 V units): 0150 ... 0300
MDX61B-203 (AC 230 V units): 0110 / 0150

59979AXX

[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] Electronics shield clamp and PE connection

[10] X17: Electronics terminal strip for safety contacts for safe stop

[11] X10: Electronics terminal strip for binary outputs and TF/TH input

[12] X16: Electronics terminal strip for binary inputs and outputs

[13] X13: Electronics terminal strip for binary inputs and RS485 interface

[14] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[15] X12: Electronics terminal strip for system bus (SBus)

[16] DIP switches S11 ... S14

[17] XT: Slot for DBG60B keypad or UWS21B serial interface

[18] 7-segment display

[19] Memory card

4.7 Size 4

MDX61B-503 (AC 400/500 V units): 0370 / 0450
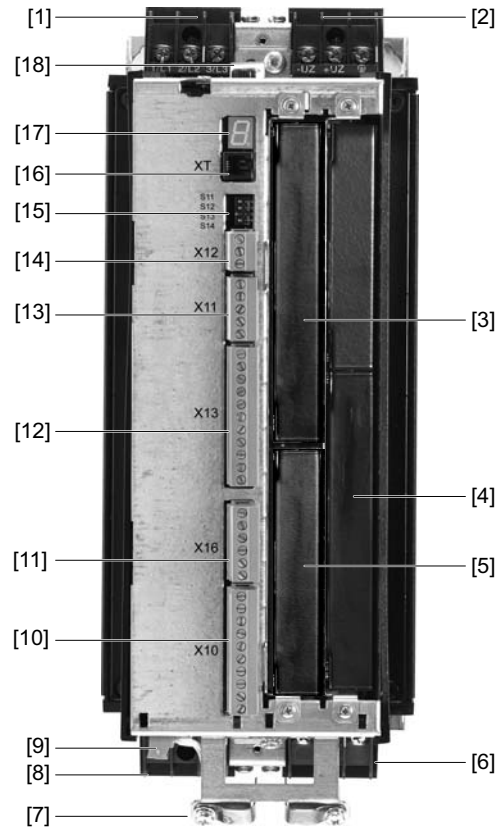
MDX61B-203 (AC 230 V units): 0220 / 0300

59980AXX

[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] Electronics shield clamp

[11] X17: Electronics terminal strip for safety contacts for safe stop

[12] X10: Electronics terminal strip for binary outputs and TF/TH input

[13] X16: Electronics terminal strip for binary inputs and outputs

[14] X13: Electronics terminal strip for binary inputs and RS485 interface

[15] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[16] X12: Electronics terminal strip for system bus (SBus)

[17] DIP switches S11 ... S14

[18] XT: Slot for DBG60B keypad or UWS21B serial interface

[19] 7-segment display

[20] Memory card

4.8   Size 5

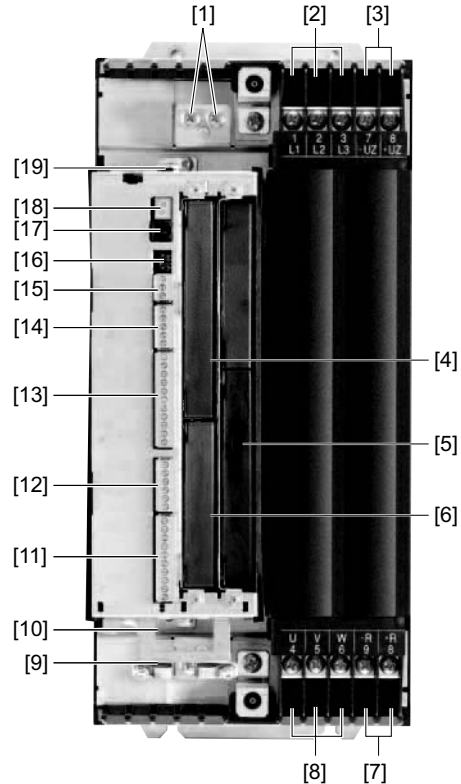MDX61B-503 (AC 400/500 V units): 0550 / 0750

59981AXX
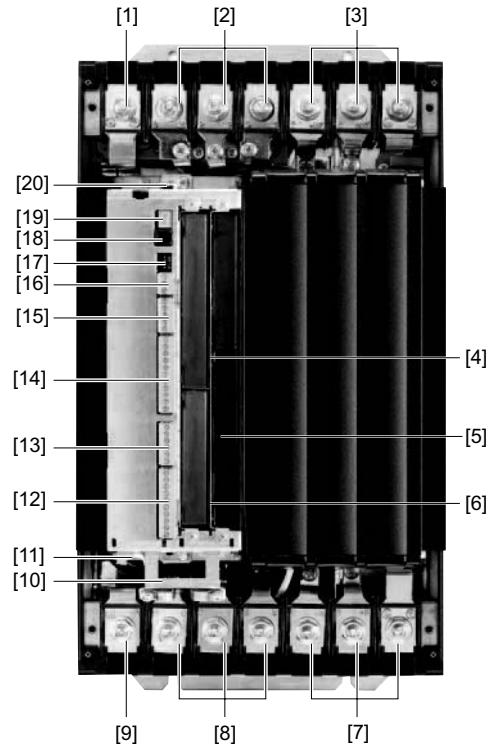
[1] PE connection

[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] Electronics shield clamp

[11] X17: Electronics terminal strip for safety contacts for safe stop

[12] X10: Electronics terminal strip for binary outputs and TF/TH input

[13] X16: Electronics terminal strip for binary inputs and outputs

[14] X13: Electronics terminal strip for binary inputs and RS485 interface

[15] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[16] X12: Electronics terminal strip for system bus (SBus)

[17] DIP switches S11 ... S14

[18] XT: Slot for DBG60B keypad or UWS21B serial interface

[19] 7-segment display

[20] Memory card

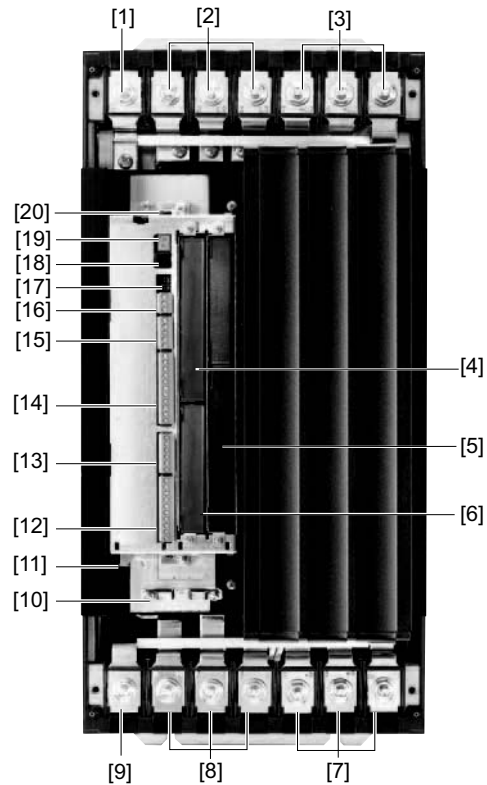## 4.9 Size 6

MDX61B-503 (AC 400/500 V units): 0900 ... 1320
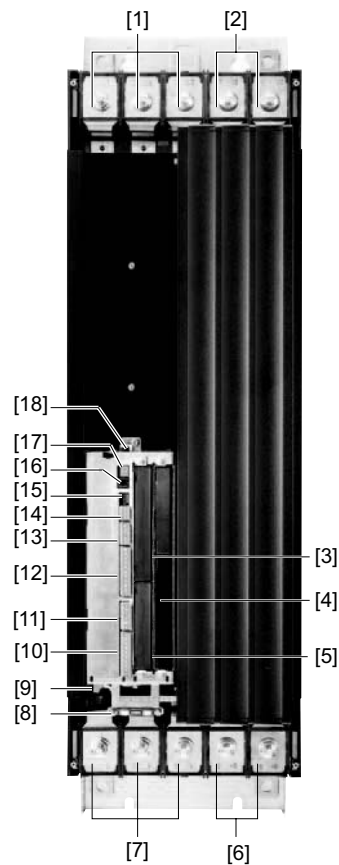
59982AXX

[1] X1: Power supply connection 1/L1, 2/L2, 3/L3 and PE connection

[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] X2: Motor connection 4/U, 5/V, 6/W and PE connection

[8] Electronics shield clamp

[9] X17: Electronics terminal strip for safety contacts for safe stop

[10] X10: Electronics terminal strip for binary outputs and TF/TH input

[11] X16: Electronics terminal strip for binary inputs and outputs

[12] X13: Electronics terminal strip for binary inputs and RS485 interface

[13] X11: Electronics terminal strip for setpoint input AI1 and 10 V reference voltage

[14] X12: Electronics terminal strip for system bus (SBus)

[15] DIP switches S11 ... S14

[16] XT: Slot for DBG60B keypad or UWS21B serial interface

[17] 7-segment display

[18] Memory card

5 Installation

5.1 Installation instructions for the basic unit

Installation 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.

	⚠ DANGER!
	Suspended load.
	Danger of fatal injury if the load falls.
	• Do not stand under the suspended load.
	• Secure the danger zone.

If a crane is not available, you can push a carrying bar [2] through the rear panel [4] to facilitate installation (included in the delivery scope of size 6). Secure the carrying bar [2] against axial displacement using the split pin [3].
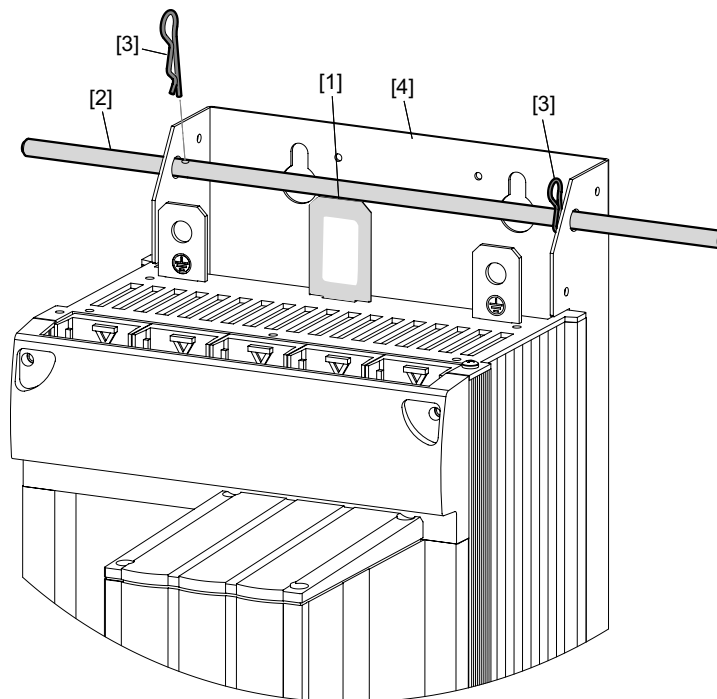
59892AXX

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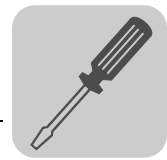
[1] Fixed lifting eye

[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** for MOVIDRIVE® power terminals.
  - Sizes 0, 1 and 2S→   0.6 Nm
  - Size 2   →   1.5 Nm
  - Size 3   →   3.5 Nm
  - Sizes 4 and 5   →   14.0 Nm
  - Size 6   →   20.0 Nm
- The **permitted tightening torque** of the **signal terminals** is 0.6 Nm.

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 that are sensitive to high temperatures within 300 mm 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 can line up the units directly next to one another.
- Only install the units **vertically**. Do not install them horizontally, tilted or upside down (→ following figure, applies to all sizes).

100 mm
(4 in)

100 mm
(4 in)
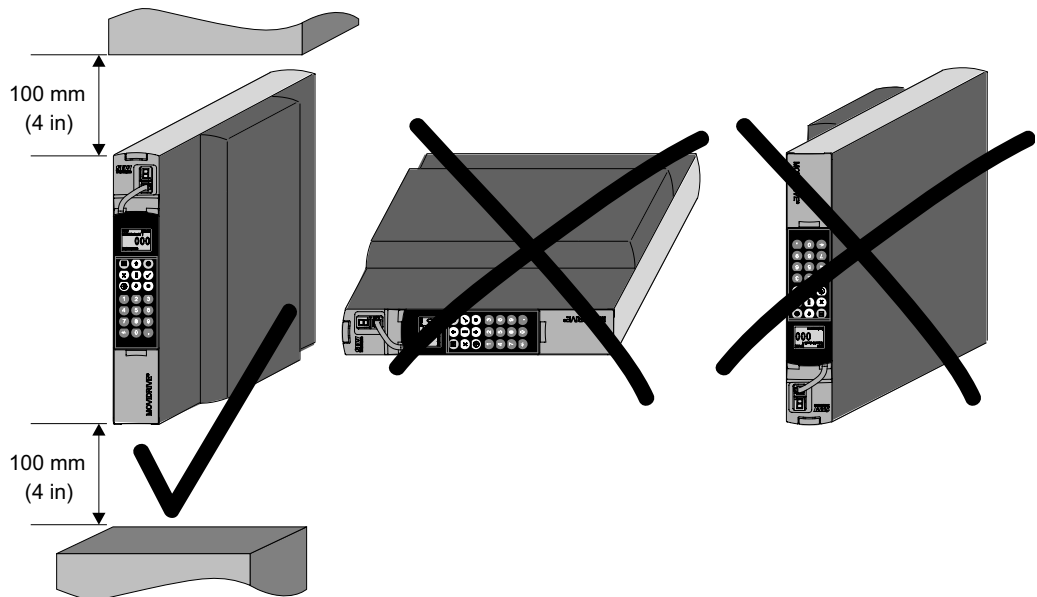
60030AXX

Figure 7: Minimum clearance and mounting position of the units

Separate cable ducts
- Route **power cables** and **electronics cables** in **separate cable ducts**.

Fuses and earth-leakage circuit breakers

- Install the **fuses at the beginning of the supply system lead** after the supply bus junction ($\rightarrow$ 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** ($\rightarrow$ Sec. "Wiring diagram for 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 mains contactor K11.

PE connection ($\rightarrow$ EN 61800-5-1)

Earth-leakage currents $\geq$ 3.5 mA may occur during normal operation. To meet the requirements of EN 61800-5-1 observe the following points:
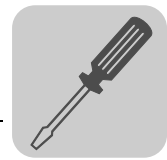
- **Supply system lead < 10 mm^2**: Route a **second PE conductor with the cross section of the supply system lead** in parallel to the protective earth via separate terminals or use a **copper protective earth conductor with a cross section of 10 mm^2**.
- **Supply system lead 10 mm^2 ... 16 mm^2**: Route a **copper protective earth conductor with the cross section of the supply system lead**.
- **Supply system lead 16 mm^2 ... 35 mm^2**: Route a **copper protective earth conductor with the cross section of 16 mm^2**.
- **Supply system lead > 35 mm^2**: Route a **copper protective earth conductor with half the cross section of the supply system lead**.

IT systems

- SEW-EURODRIVE recommends using **earth-leakage monitors with pulse-code measurement** for voltage supply systems with a non-grounded star point **(IT systems)**. Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter. **No EMC limits are specified for interference emission** in **voltage supply systems without grounded star point** (IT systems).

Cross sections

- Supply system lead: **Cross section according to rated input current** I_{mains} at rated load.
- Motor lead: **Cross section according to rated output current** I_{rated}.
- Electronics cables of basic unit (terminals X10, X11, X12, X13, X16):
  - One core per terminal 0.20 ... 2.5 mm^2 (AWG 24 ... 12)
  - Two cores per terminal 0.25 ... 1 mm^2 (AWG 22 ... 17)

- Electronics cables of terminal X17 and DIO11B terminal expansion board (terminals X20, X21, X22):
    - 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)

Unit output

	STOP! MOVIDRIVE® B can suffer irreparable damage if you connect capacitive loads. • **Only connect ohmic/inductive loads (motors).** • Never connect capacitive loads.
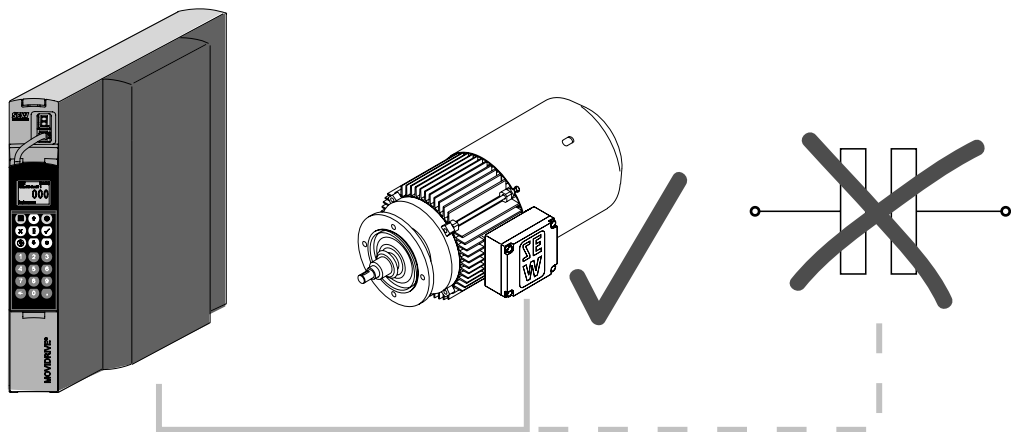
60031AXX

Figure 8: Only connect ohmic/inductive loads; do not connect capacitive loads

Connecting braking resistors

- Use **two tightly twisted leads or a 2-core shielded power cable**. Cross section according to the rated output current of the inverter. The rated voltage of the cable must amount to at least U_0/U = 300 V / 500 V (in accordance with DIN VDE 0298).

- Protect the braking resistor (except for BW90-P52B) using a **bimetallic relay** (→ wiring diagram for basic unit, power section and brake). Set the **trip current** according to the **technical data of the braking resistor**. SEW-EURODRIVE recommends using an overcurrent relay from trip class 10 or 10A in accordance with EN 60947-4-1.

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

- **Flat-type braking resistors** have internal thermal overload protection (fuse which cannot be replaced). Install the **flat-type braking resistors** together with the appropriate **touch guard**.

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

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

*Operating brak-
ing 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 volt-age to DC 30 V.** External voltages > DC 30 V can cause irreparable damage to binary outputs.
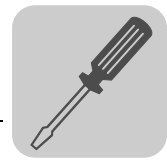
*EMC-compliant
installation*
- All cables except for the supply system lead must be **shielded**. As an alternative to the shielding, the option HD.. (output choke) can be used for the motor cable to achieve the emitted interference limit values.
- When using shielded motor cables, e.g. prefabricated 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.
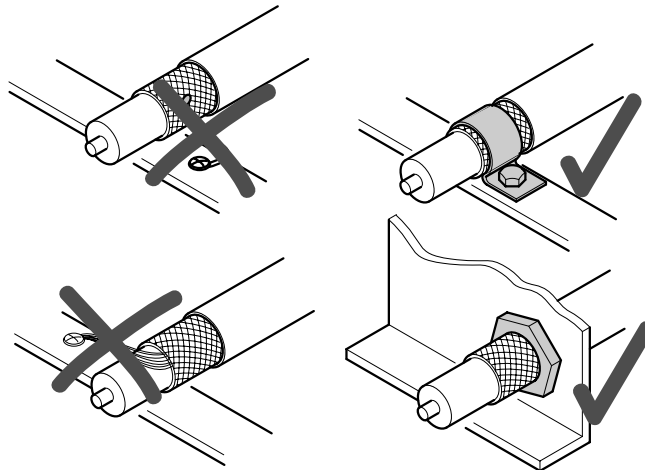
60028AXX

Figure 9: Correct shield connection using metal clamp (shield clamp) or cable gland

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

	NOTES
![i]	• This is a product with restricted availability in accordance with IEC 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.

NF.. line filter

• The NF.. line filter option can be used to maintain the class B limit for MOVIDRIVE® MDX60B/61B units size 0 to 5.

• Do not switch between the line filter and MOVIDRIVE® MDX60B/61B.

• Install the **line filter close to the inverter** but outside the minimum clearance for cooling.

• Keep the **length of the cable between the line filter and inverter to an absolute minimum**, and never more than 400 mm. Unshielded, twisted cables are sufficient. Use also unshielded lines for the supply system lead.

• SEW-EURODRIVE recommends taking one of the following **EMC measures on the motor side to maintain class A and B limits**:

    – Shielded motor cable
    – HD... output choke option
    – HF.. output filter option (in operating modes VFC and U/f)

HD... output choke

• Install the **output choke close to the inverter** but outside the minimum clearance for cooling.

• 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**.
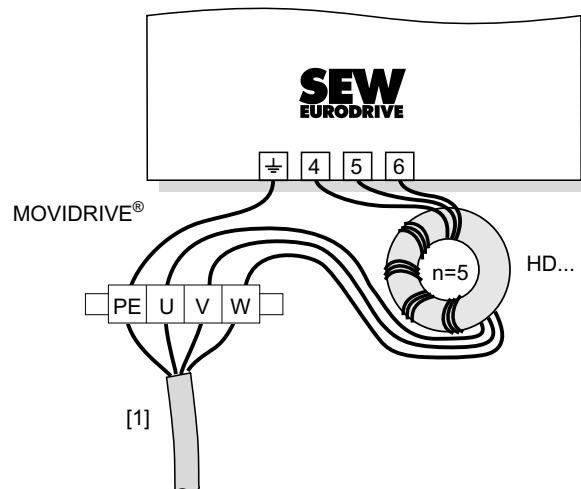
60029AXX

Figure 10: Connecting the HD.. output choke

[1] Motor cable

5.2 Removing/installing the keypad

Removing the keypad

Proceed as follows to remove the keypad:
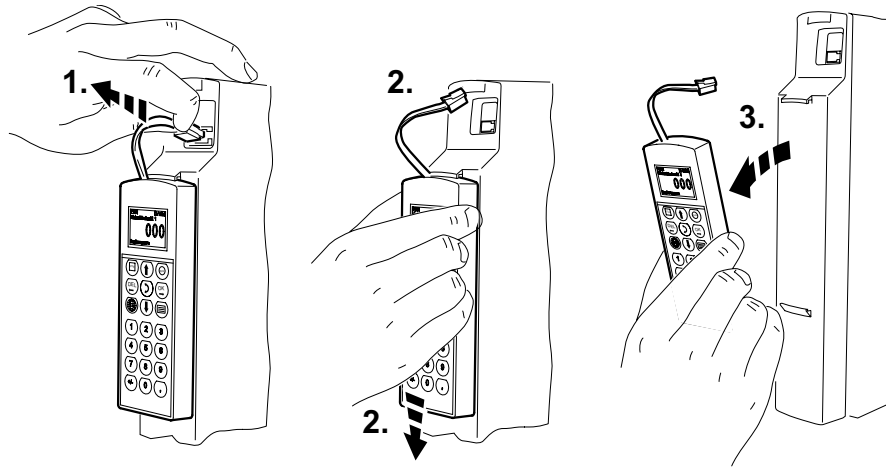
60032AXX

Figure 11: 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 to install the keypad:
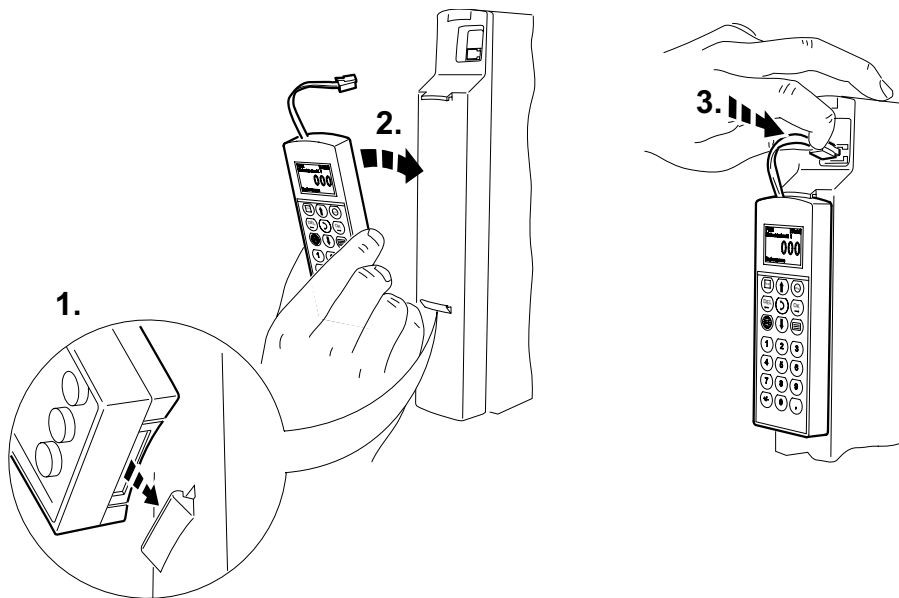
60033AXX

Figure 12: 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.

5.3 Removing/installing the front cover

Removing the front cover   Proceed as follows to remove the front cover:
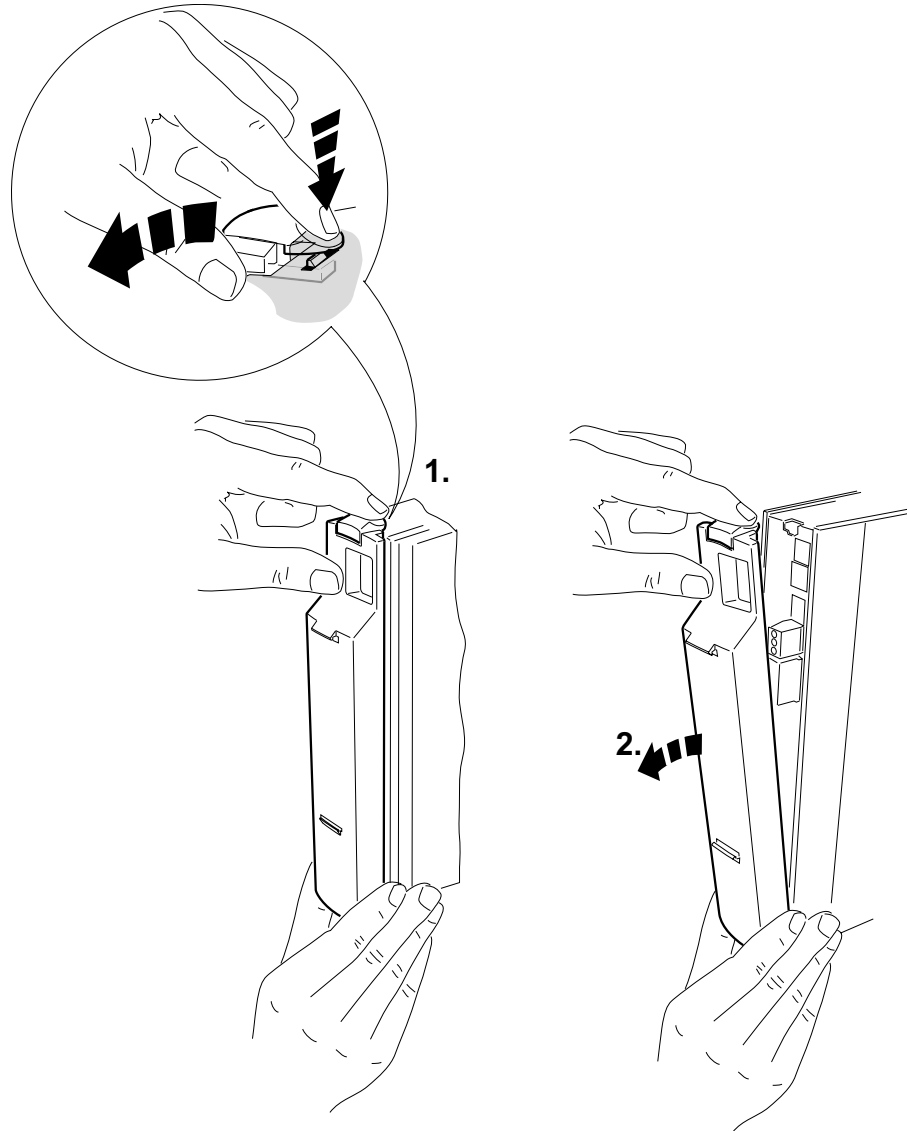
60034AXX

Figure 13: Removing the front cover

1. If a keypad is installed, remove it first (→ page 32).
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:

BG0

BG1 -6
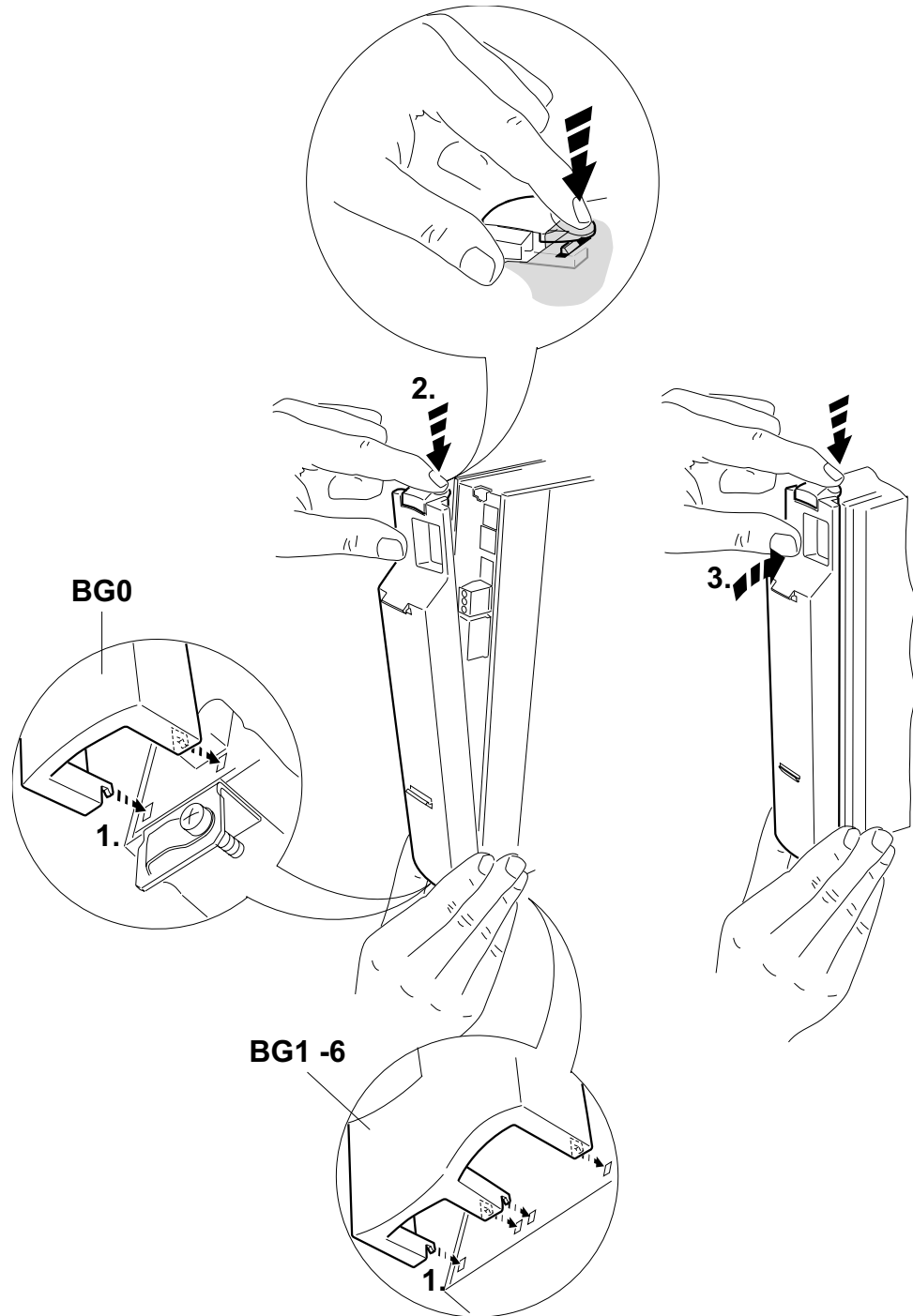
60035AXX

Figure 14: Installing the front cover

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.

5.4 UL-compliant installation

Note the following points 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:
    - Sizes 0, 1 and 2S   →   0.6 Nm
    - Size 2   →   1.5 Nm
    - Size 3   →   3.5 Nm
    - Sizes 4 and 5   →   14.0 Nm
    - Size 6   →   20.0 Nm

- MOVIDRIVE® drive inverters are **suitable for operation in voltage power systems with a grounded star point** (TN and TT systems) 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 fuses for each inverter. Only use melting fuses.

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

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} = DC 30 V) and **limited output current** ($I \leq 8$ 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).**

5.5   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.
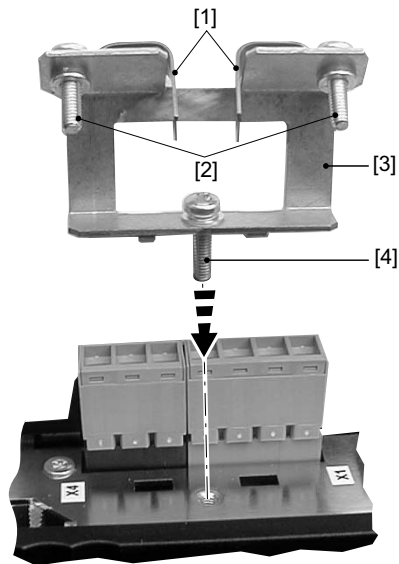
60036AXX

Figure 15: Securing the shield clamp of the power section (size 0)

[1]   Contact clips

[2]   Retaining screws for contact clip

[3]   Shield plate

[4]   Retaining screw of the shield clamp for the control unit

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.
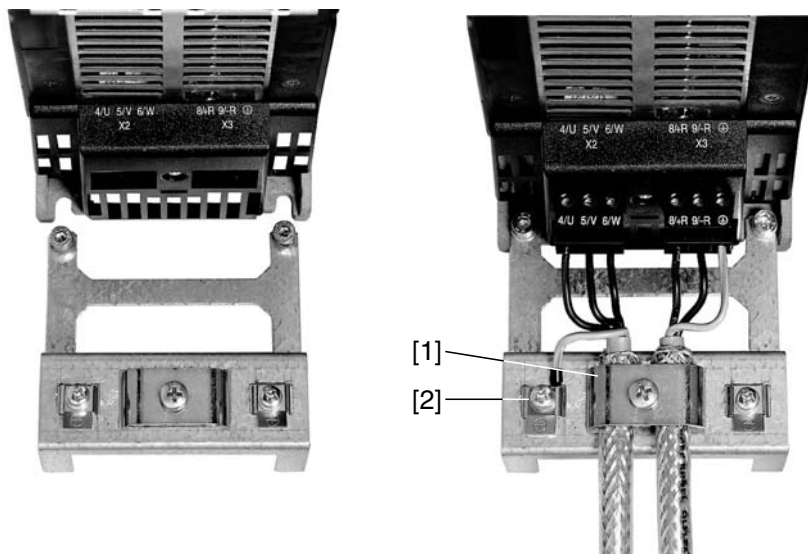
60019AXX

Figure 16: 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.
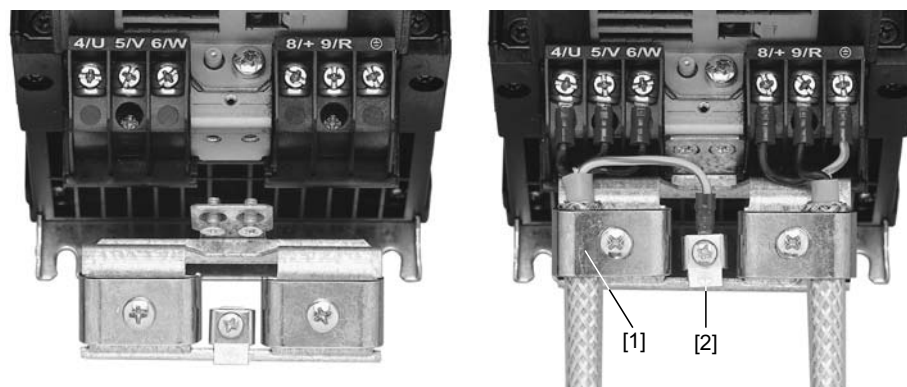
60020AXX

Figure 17: Securing the shield clamp on the power section (illustration 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.

Shield clamp for control unit

Install the shield clamp for the control unit as follows:

• If installed, remove the keypad and the front cover.

• Size 0: Secure the shield clamp for the control unit to the bottom of the unit directly under the electronic terminal strip X14.

• Sizes 1 to 6: Secure the shield clamp for the control unit to the bottom of the unit.

Size 0
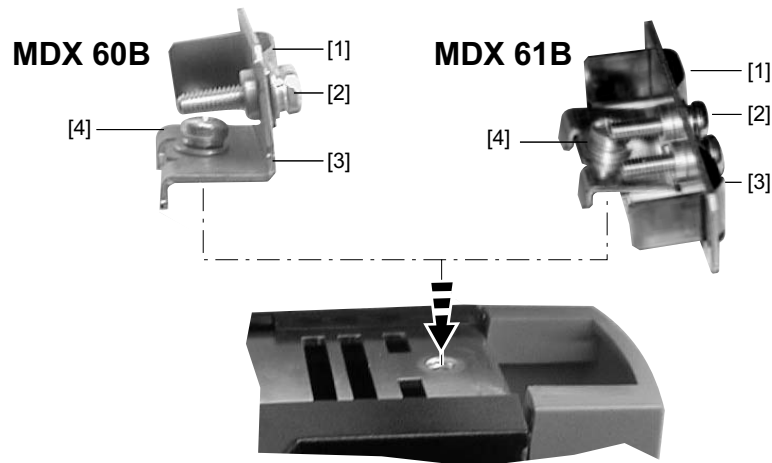
60037AXX

Figure 18: Installing the shield clamp for the control unit (size 0)

Sizes 1 to 6
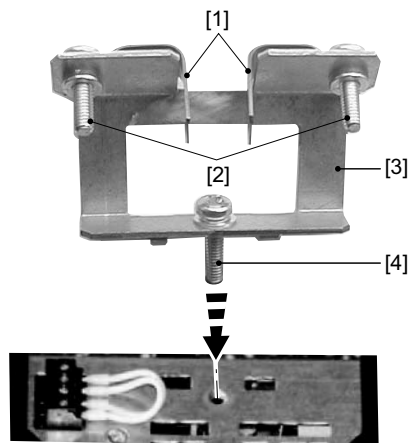
60038AXX

Figure 19: Securing the shield clamp for the control unit (sizes 1 - 6)

[1] Contact clip(s)

[2] Retaining screw(s) for contact clips

[3] Shield plate

[4] Retaining screw of shield clamp for control unit

5.6 Touch guard

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

Size 2S
If the touch guard (→ following figure) is attached at the connections X4:-U_z/+U_z and X3:+R/-R, the MOVIDRIVE® MDX61B units size 2S have enclosure IP20; without touch guard they have enclosure IP10.
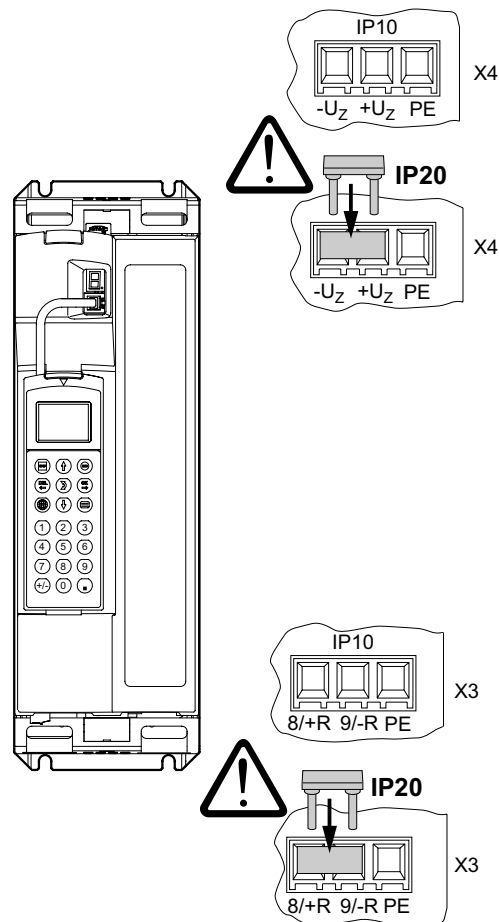
54408AXX

Figure 20: Touch guard for MOVIDRIVE® MDX61B size 2S

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 section terminals.
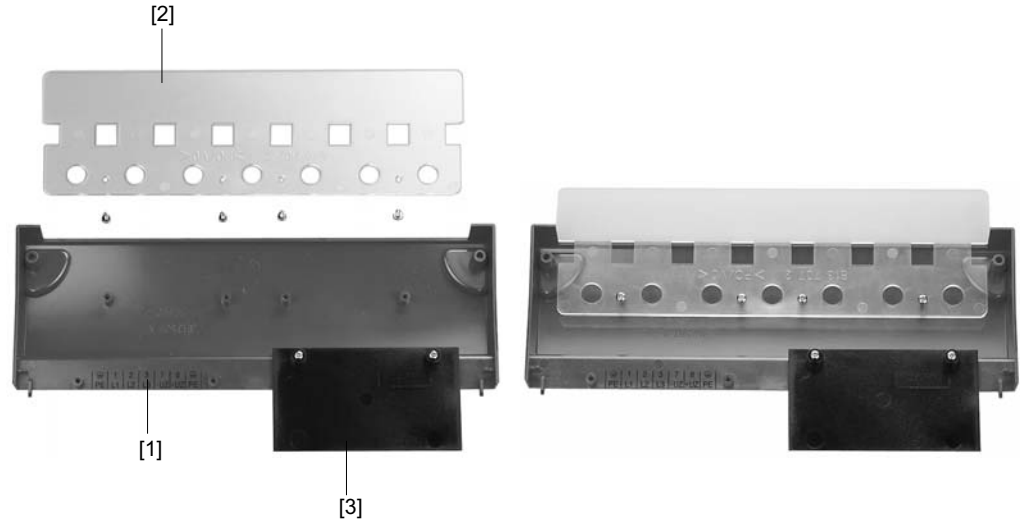
06624AXX

Figure 21: Touch guard for MOVIDRIVE® MDX61B sizes 4, 5 and 6

The touch guard comprises the following parts:

[1] Cover plate

[2] Connection plate

[3] Screen (only for sizes 4 and 5)

The MOVIDRIVE® MDX61B units sizes 4, 5 and 6 can only achieve enclosure IP10 when the following conditions are met:

• Touch guard is fully installed

• Shrink tubing is installed on the power cables at all power terminals (X1, X2, X3, X4)

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

5.7 Wiring diagrams for basic unit

Power section and brake
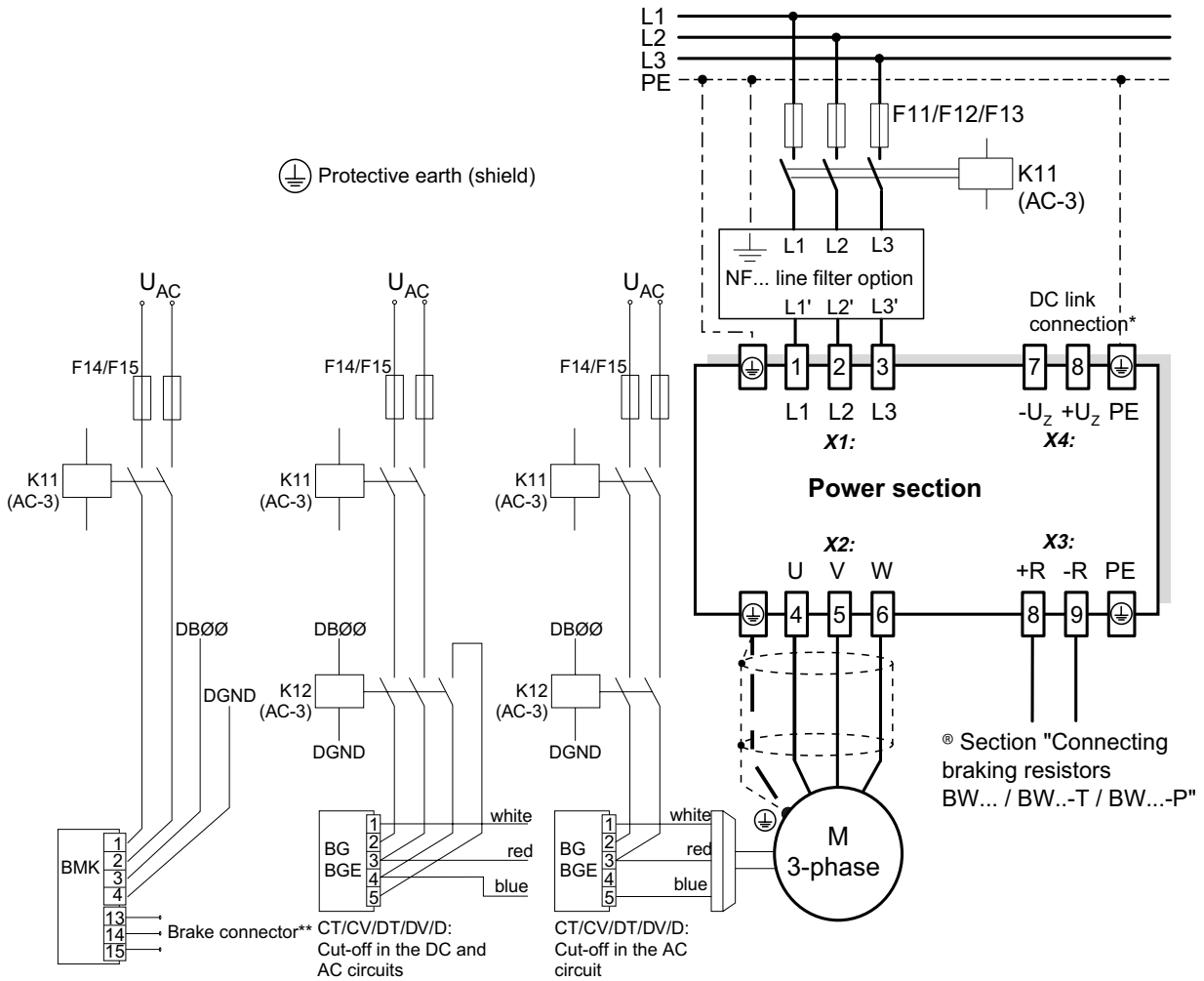
55310BEN

* 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.

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

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

– All hoist applications

– Drives that require a rapid brake response time

– CFC and SERVO operating modes

Brake rectifier in 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　　　　**Power section**　　　　**Power section**
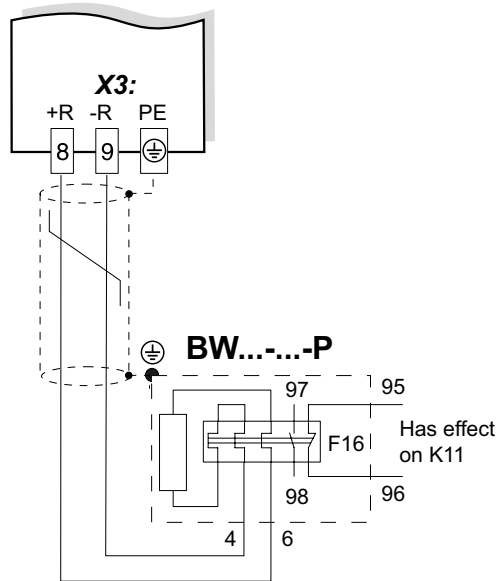
When the auxiliary contact trips, K11 must be opened and DIØØ"/Controller inhibit" assigned a "0" signal. Do not interrupt the resistor circuit!
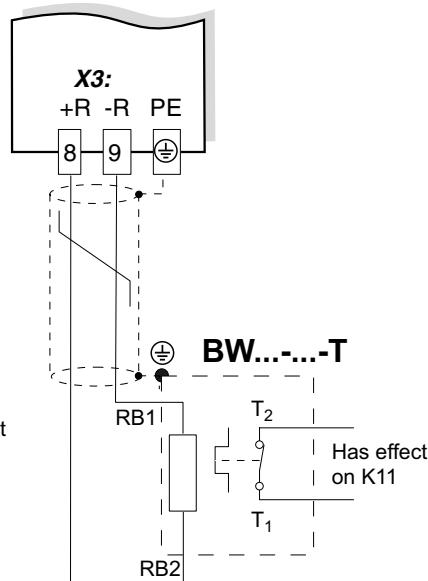
When the internal temperature switch triggers, K11 must be opened and DIØØ"/Controller inhibit assigned a "0" signal. Do not interrupt the resistor circuit!
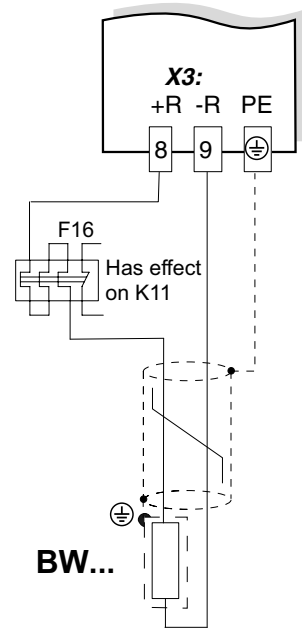
When the external bimetallic relay (F16) triggers, K11 must be opened and DIØØ"/Controller inhibit" assigne a "0" signal. Do not interrupt the resis circuit!

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

Electronic terminals

Option
serial interface
UWS21B

Option
keypad
DBG60B

RS485

RS232

SEW EURODRIVE
Typ: UWS21B
Sach-Nr. 1.820.456 2

Socket
sub D 9-pin

	7-segment display
	Operating status
0	Inverter not ready
1	Controller inhibit active
2	No enable
3	Standstill current
4	VFC operation
5	n-control
6	M-control
7	Hold control
8	Factory setting
9	Limit switch contacted
A	Technology option
b	Free
c	IPOS reference travel
d	Flying start
E	Calibrate encoder
F	Fault display
H	Manual operation
t	Waiting for data
U	Safe stop active
•	IPOS program Runnning (flashing dot)

XT

7-segment display

Option slots
Only with MDX61B

Control unit

Switchover I signal <-> U signal *   S 11
System bus terminating resistor   S 12
XT: 9.6 kBaud <-> 57.6 kBaud*   S 13
Frequency input active   S 14
ON   OFF*

X12:
System bus reference — DGND 1
System bus high — SC11 2
System bus low — SC12 3

X11:   R11   DC-10V...+10   DC0(4)...20 mA
DC+10 V — REF1 1
n1 (0...10 V*; +/-10 V) — AI11 2
DC 0...20 mA; 4 ... 20 mA — AI12 3
Reference pot. analog signals — AGND 4
DC-10 V — REF2 5

X11:AI11/AI12

Higher-level controller

X13:
/Controller inhibit — DIØØ 1   Binary input
CW/stop* — DIØ1 2
CCW/stop* — DIØ2 3
Enable/stop* — DIØ3 4   Binary outputs
n11/n21* — DIØ4 5
n12/n22* — DIØ5 6
Ref. X13:DIØØ...DIØ5 — DCOM** 7   Reference binary outputs
DC+24 V output — VO24 8
Reference pot. binary signals — DGND 9
RS485 + — ST11 10   DGND
RS485 - — ST12 11

X16:
No function* — DIØ6 1
No function* — DIØ7 2
IPOS output* — DOØ3 3
IPOS output* — DOØ4 4
IPOS output* — DOØ5 5
Reference pot. binary signals — DGND 6

X10:
Input TF-/TH-/KTY+ — TF1 1
Reference pot. binary signals — DGND 2
/brake — DBØØ 3
Relay contact — DOØ1-C 4   K12
Ready* — DOØ1-NO 5   (AC-3)
Relay NO contact
Relay NC contact — DOØ1-NC 6
/Fault* — DOØ2 7
DC+24 V output — VO24 8
DC+24 V input — VI24 9   + 24V −
Reference pot. binary signals — DGND 10

Connect external DC 24 V supply
depending on the options used
(MOVIDRIVE® electronics data)

Shield plate or shield clamp

Reference potential binary signals
DC+24 V output
Ref. DC+24 V input for safe stop
DC+24 V input for safe stop

X17:
DGND 1
VO24 2
SOV24 3
SVI24 4

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*   Factory setting

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

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

Terminal		Function	
X1:1/2/3 X2:4/5/6 X3:8/9 X4:	**L1/L2/L3 (PE)** **U/V/W (PE)** **+R/-R (PE)** **+U$_Z$/-U$_Z$ (PE)**	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. 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	**DIØØ** **DIØ1** **DIØ2** **DIØ3** **DIØ4** **DIØ5**	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"	• The binary inputs are electrically isolated by optocouplers. • Selection options for binary inputs 2 to 6 (DIØ1 ... DIØ5) → Parameter menu P60_

X13:7	**DCOM**	Reference for binary inputs X13:1 to X13:6 (DIØØ ... DIØ5) and X16:1/X16:2 (DIØ6 ... DIØ7)
		• Switching binary inputs with DC+24 V external voltage: Connection X13:7 (DCOM) must be connected to the reference potential of the external voltage.
		  – Without jumper X13:7-X13:9 (DCOM-DGND) → Isolated binary inputs
		  – With jumper X13:7-X13:9 (DCOM-DGND) → Non-isolated binary inputs
		• The binary inputs must be switched with DC+24 V from X13:8 or X10:8 (VO24) → Jumper required X13:7-X13:9 (DCOM-DGND).	

X13:8 X13:9 X13:10 X13:11	**VO24** **DGND** **ST11** **ST12**	Auxiliary supply output DC+24 V (max. load X13:8 **and** X10:8 = 400 mA) for external command switches Reference potential for binary signals RS485+ RS485-	
X16:1 X16:2 X16:3 X16:4 X16:5 X16:6	**DIØ6** **DIØ7** **DOØ3** **DOØ4** **DOØ5** **DGND**	Binary input 7, factory setting "no function" Binary input 8, factory setting "no function" Binary output 3, factory setting "IPOS output" Binary output 4, factory setting "IPOS output" Binary output 5, factory setting "IPOS output" **Do not connect external voltage to binary outputs X16:3 (DOØ3) and X16:5 (DOØ5)!** Reference potential for binary signals	• The binary inputs are electrically isolated by optocouplers. • Selection options for binary inputs 7 and 8 (DIØ6/DIØ7) → Parameter menu P60_ • Selection option for binary inputs 3 to 5 (DOØ3...DOØ5) → Parameter menu P62_
X10:1 X10:2 X10:3 X10:4 X10:5 X10:6 X10:7	**TF1** **DGND** **DBØØ** **DOØ1-C** **DOØ1-NO** **DOØ1-NC** **DOØ2**	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 DBØØ 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 DBØ2, 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 (DOØ1 and DOØ2) → Parameter menu P62_. Do not apply external voltage to binary outputs X10:3 (DBØØ) and X10:7 (DOØ2).	
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	

5.8 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	$I_F = 2.5\ A_{RMS}$	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	$\Sigma\ I_{mains} = AC\ 20\ A$	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	813 325 5		for cable cross sections 1.5 ... 16 mm² (AWG 16 ... 6)			
HD002	d = 23 mm	813 557 6		for cable cross sections ≤ 1.5 mm² (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	$\Sigma I_{mains} = AC\ 20\ A$	826 012 5		■	■	■	■			
ND045-013	$\Sigma I_{mains} = AC\ 45\ A$	826 013 3						■	■	■
Line filter		**Part number**								
NF009-503		827 412 6		■	■	■	A			
NF014-503	$U_{max} = AC\ 550\ V$	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	813 325 5		for cable cross sections 1.5 ... 16 mm² (AWG 16 ... 6)						
HD002	d = 23 mm	813 557 6		for cable cross sections ≤ 1.5 mm² (AWG 16)						
HD003	d = 88 mm	813 558 4		for cable cross sections > 16 mm² (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 %)

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	$I_F = 14.4 A_{RMS}$	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	$I_F = 47.4\ A_{RMS}$		1820 083 4						
BW206-T	$I_F = 54.7\ A_{RMS}$		1820 412 0						
Line chokes		Part number							
ND045-013	$\Sigma\ I_{mains} = AC\ 45\ A$	826 013 3				A			
ND085-013	$\Sigma\ I_{mains} = AC\ 85\ A$	826 014 1				B			A
ND150-013	$\Sigma\ I_{mains} = AC\ 150\ A$	825 548 2							B
ND300-0053	$\Sigma\ I_{mains} = AC\ 300\ A$	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	$\Sigma\,I_{mains}$ = AC 45 A	826 013 3						
ND085-013	$\Sigma\,I_{mains}$ = AC 85 A	826 014 1						
ND150-013	$\Sigma\,I_{mains}$ = AC 150 A	825 548 2						
ND300-0053	$\Sigma\,I_{mains}$ = 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 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		827 128 3	A									
NF048-503		827 117 8	B	A								
NF063-503		827 414 2		B	A							
NF085-503	U_{max} = AC 550 V	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 mm² (AWG 16...6)									
HD003	d = 88 mm	813 558 4	for cable cross sections > 16 mm² (AWG 6)									
HD004	Connection with M12 bolt	816 885 7										

Output filter (only in VFC operating mode)	**Part number**		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
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 %): Connect two output filters in parallel
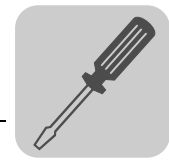
AC 230 V units, sizes 1 to 4

MOVIDRIVE® MDX61B...-2_3				0015	0022	0037	0055	0075	0110	0150	0220	0300
Size					1			2		3		4
Braking resistors BW...-.../ BW...-...-T	**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-T	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	$\Sigma\ I_{mains}$ = AC 20 A	826 012 5		░			A					
ND045-013	$\Sigma\ I_{mains}$ = AC 45 A	826 013 3					B		A			
ND085-013	$\Sigma\ I_{mains}$ = AC 85 A	826 014 1							B		A	
ND150-013	$\Sigma\ I_{mains}$ = AC 150 A	825 548 2									B	░

Line filter		Part number										
NF009-503		827 412 6		░	A							
NF014-503		827,116 X			B	A						
NF018-503		827 413 4				B						
NF035-503	U_{max} = AC 550 V	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	813 325 5	for cable cross sections 1.5 ... 16 mm^2 (AWG 16 ... 6)										
HD002	d = 23 mm	813 557 6	for cable cross sections ≤ 1.5 mm^2 (AWG 16)										
HD003	d = 88 mm	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 ($2 \times I_F$)

5.9 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 ≠ 1000 kbaud. |

Max. 64 CAN bus stations can be addressed using 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
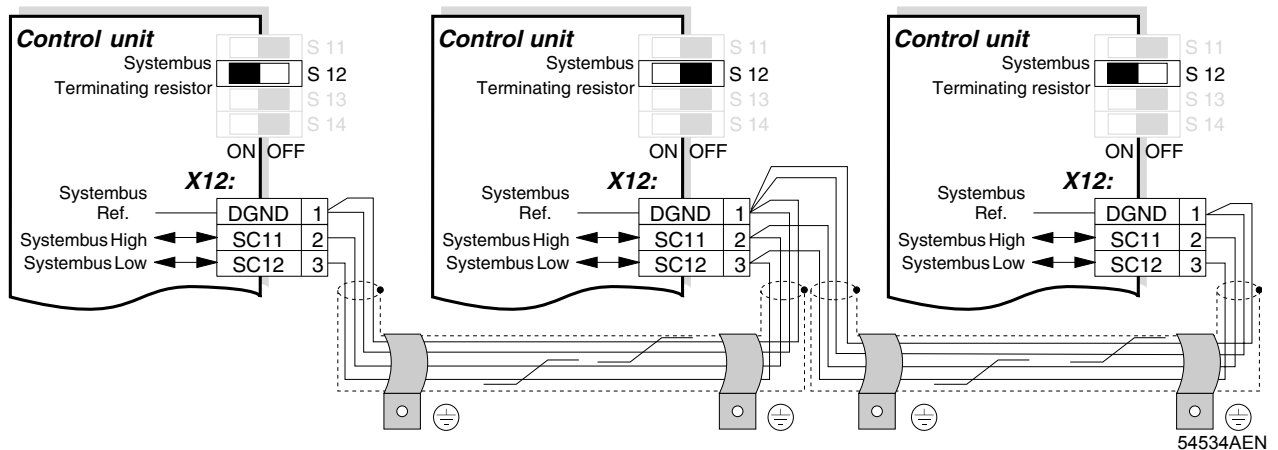
54534AEN

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:
  - Core cross section 0.25 ... 0.75 mm^2 (AWG 23 ... AWG 18)
  - 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.

Shielding
- 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
  - 250 kbaud → 160 m
  - **500 kBaud → 80 m**
 - 1000 kbaud → 40 m

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 can restrict 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.

5.10 Connecting the RS485 interface

The RS485 interface 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).

Wiring diagram for RS485 interface
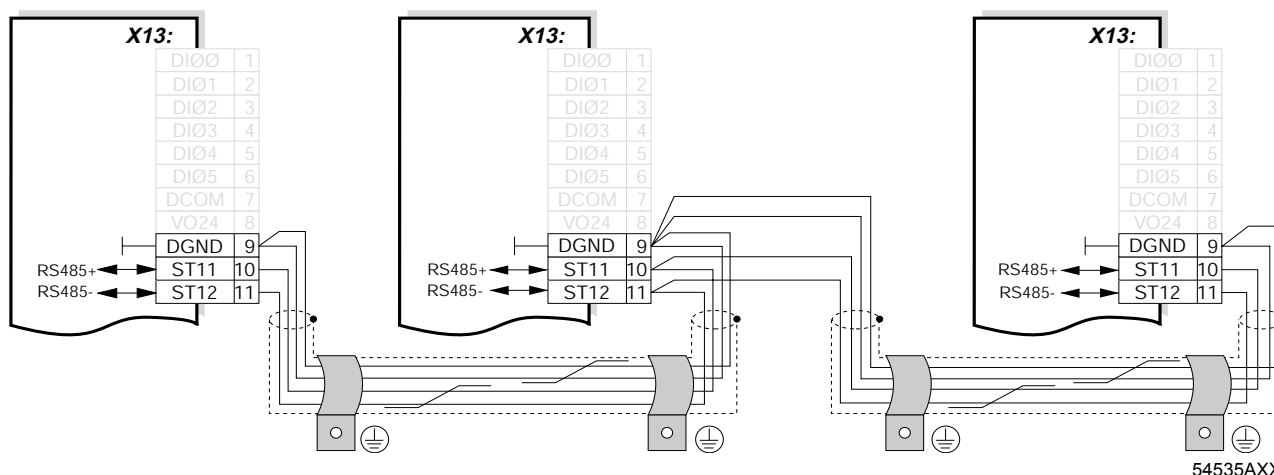
54535AXX

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:
  – Core cross section 0.25 ... 0.75 mm^2
  – Cable resistance 100 ... 150 Ω at 1 MHz
  – Capacitance per unit length $\leq$ 40 pF/m at 1 kHz

Shielding

• 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.

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 can restrict 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.

## 5.11 Connecting the interface adapter type DWE11B/12B

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 HIPERFACE® encoder card DEH11B**. 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.
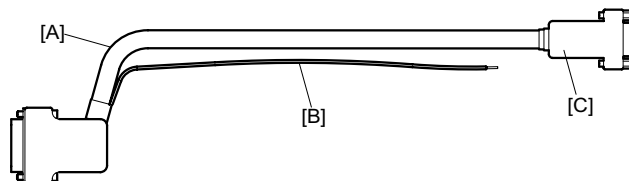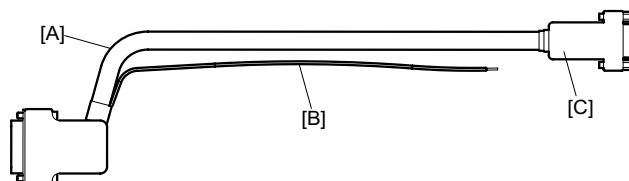

58748AXX

[A] 5 x 2 x 0.25 mm^2 / length 1000 mm / max. cable length between inverter - encoder: 100 m

[B] DC 24 V connection for HTL encoder; 1 x 0.5 mm^2 / 250 mm long

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 interface adapter DWE12B (HTL→TTL) in the form of an adapter cable is used **to connect push-pull HTL encoders to the HIPERFACE® encoder card DEH11B**. 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.
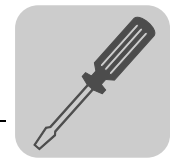

58748XX

[A] 4 x 2 x 0,25 mm^2 / length 1000 mm / max. cable length between inverter - encoder: 200 m

[B] DC 24 V connection for HTL encoder; 1 x 0.5 mm^2 / 250 mm long

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

5.12 Connecting interface adapter UWS21B (RS232)

Part number
Interface adapter UWS21B: 1 820 456 2

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

- UWS21B adapter
- 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.
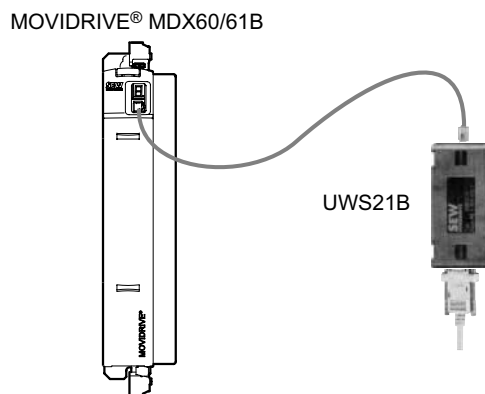
MOVIDRIVE® MDX60/61B

UWS21B

59193AXX

Figure 22: Connection cable between MOVIDRIVE® and UWS21B

Connecting UWS21B to PC

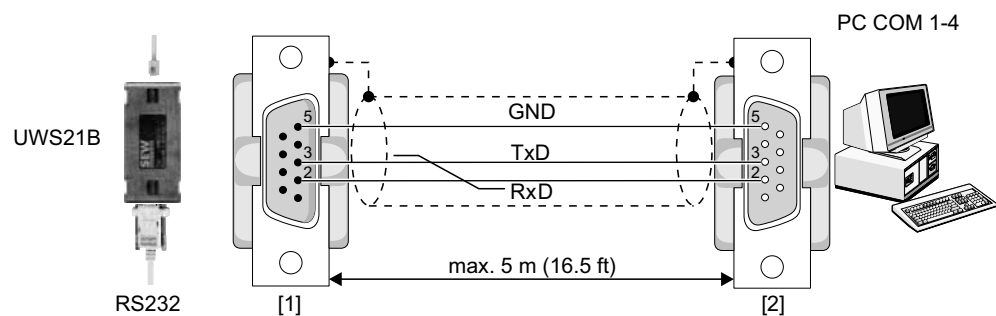- Use the connection cable supplied (shielded RS232 standard interface cable) to connect the UWS21B option to the PC.

PC COM 1-4

UWS21B

GND
TxD
RxD

max. 5 m (16.5 ft)

RS232   [1]   [2]

59194AXX

Figure 23: UWS21B-PC connection cable (1:1 connection assignment)

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

## 5.13 Connecting the interface adapter USB11A

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
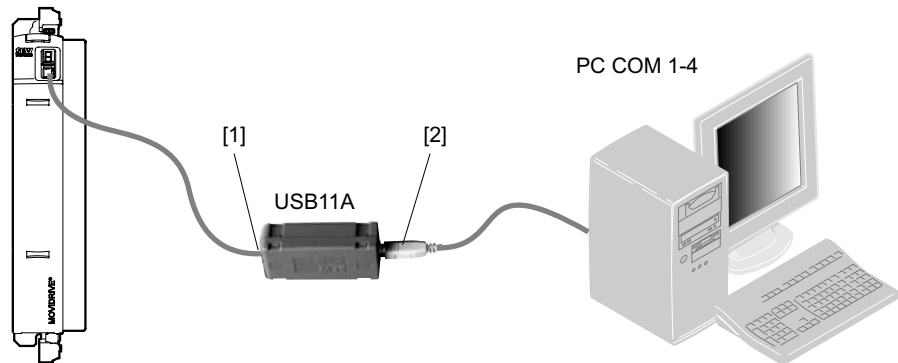
54532AXX

Figure 24: 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®.

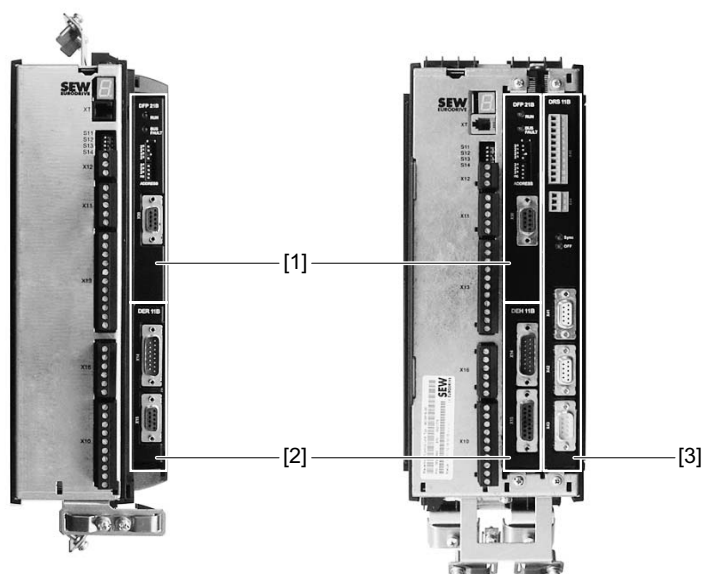|	**NOTE**
ℹ	If the connection between the PC and USB11A is interrupted, you will have to restart MOVITOOLS®.

5.14   Option combinations for MDX61B

Arrangement of the option slots

Size 0 (0005 ... 0014)   Sizes 1 ... 6 (0015 ... 1320)

60004AXX

[1]   Fieldbus slot for communication options

[2]   Encoder slot for encoder 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	Name	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		
DER11B	Encoder input resolver / Hiperface®	X		
DFP21B	Fieldbus interface Profibus		X	
DFI11B	Fieldbus interface Interbus		X	
DFI21B	Fieldbus interface Interbus LWL		X	
DFD11B	Fieldbus interface DeviceNet		X	
DFC11B	Fieldbus interface CAN/CANopen		X	
DFE11B DFE12B DFE13B	Fieldbus interface Ethernet		X	
DIO11B	I/O expansion		X	X[1]
DRS11B	Phase-synchronous operation			X
DIP11B	SSI encoder interface			X
DHP11B	User-programmable MOVI-PLC® basic 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

5.15 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 (→ Sec. "Removing/installing the keypad") and the front cover (→ Sec. "Removing/installing the front cover").
- **After having installed the option card**, replace the keypad (→ Sec. "Removing/installing the keypad") and the front cover (→ Sec. "Removing/installing the front cover").
- Keep the option card in its original packaging until immediately before you are ready to install it.
- Hold the option card by its edges only. Do not touch any components.

Basic procedure for installing/removing an option card (MDX61B, sizes 1 - 6)
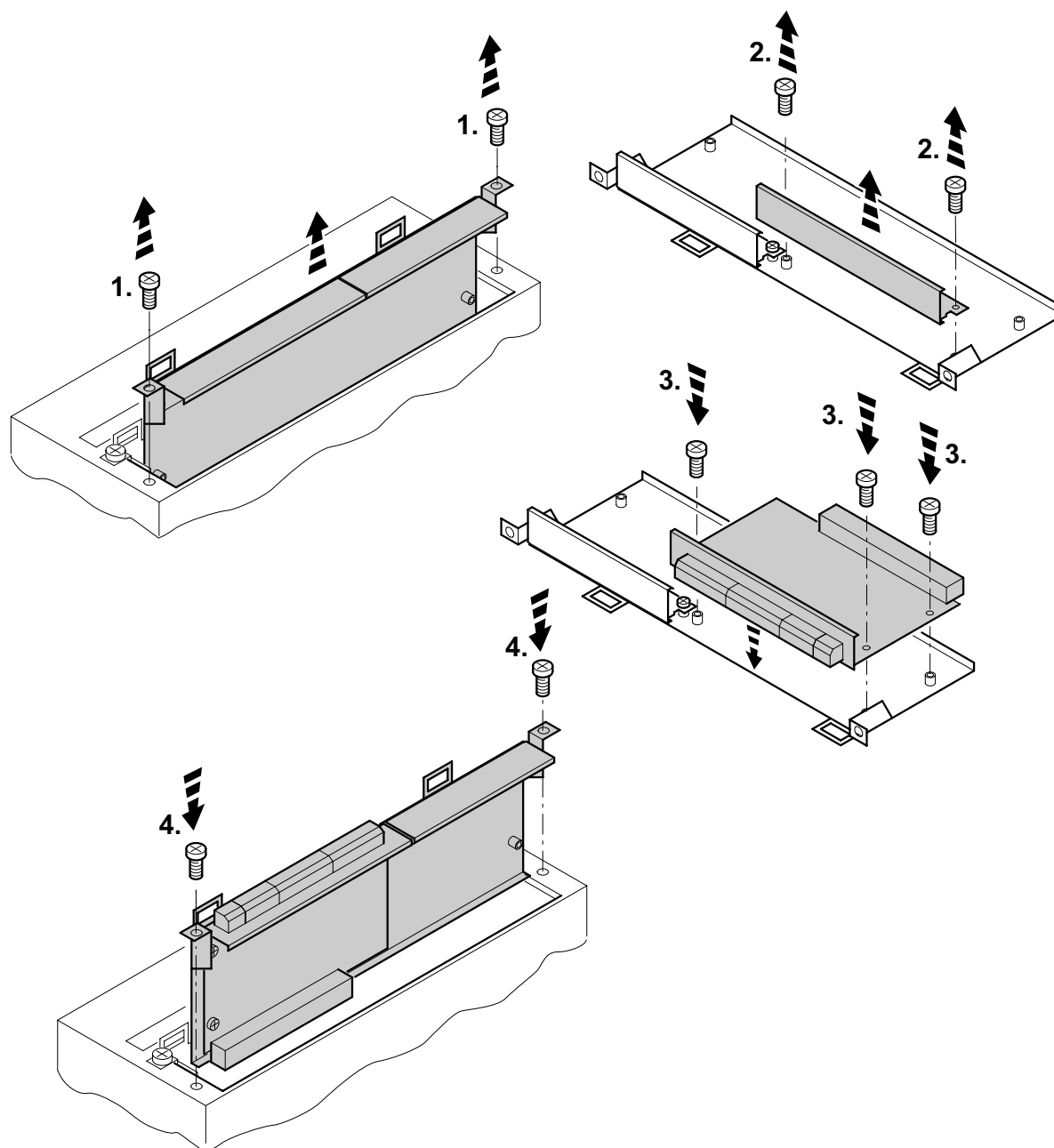
60039AXX

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.

5.16   Connecting the encoder and resolver

|	**NOTES**
i	• 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 installa-
tion 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 with a capacitance per unit length ≤ 120 nF/km.

• Core cross section: 0,20 ... 0.5 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 sub D connector

• Route the encoder/resolver cable separately from the power cables.
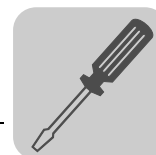
Shielding

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 illustration).
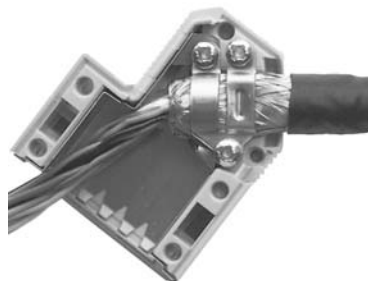
01939BXX

On the
encoder/resolver

Connect the shield on the encoder/resolver side at the respective earthing clamps ($\rightarrow$ following illustration). 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.
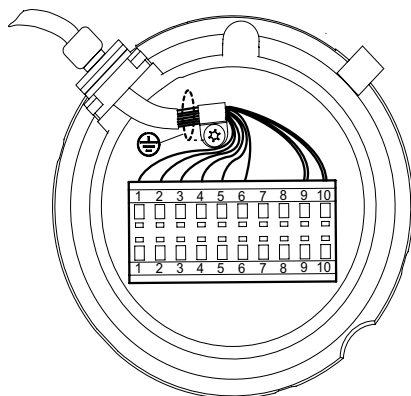
55513AXX

Prefabricated
cables

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

5.17 Connecting option DEH11B (HIPERFACE®)

Part number   HIPERFACE® encoder card type DEH11B: 824 310 7

	NOTES
i	• 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 9 □ 1 15 □ 8 X15 15 □ 8 9 □ 1 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** **X14:2** **X14:3** **X14:4** **X14:5/6** **X14:7** **X14:8** **X14:9** **X14:10** **X14:11** **X14:12** **X14:13/14** **X14:15**	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) DATA + Reserved switchover Reference potential DGND (COS−) Signal track A (K1) (SIN−) Signal track B (K2) Signal track C (K0) DATA - Reserved DC+12 V (max. load X14:15 **and** X15:15 = DC 650 mA)
	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 (max. load X14:15 **and** X15:15 = DC 650 mA)

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

	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 ($\rightarrow$ Sec. "Connecting the interface adapter type DWE11B/12B").

Permitted encoders

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

- 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 option DWI11A

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:

54439BXX
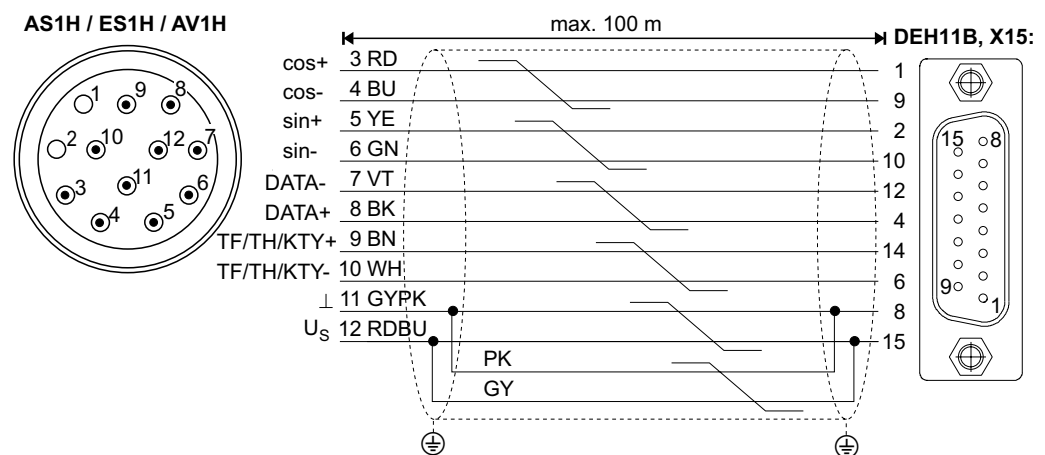
	NOTE
	Important for DT/DV and CT/CV motors: The TF or TH is **not** connected to the encoder cable but must be connected using an additional 2-core shielded cable.

Part numbers of the prefabricated cables:

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

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

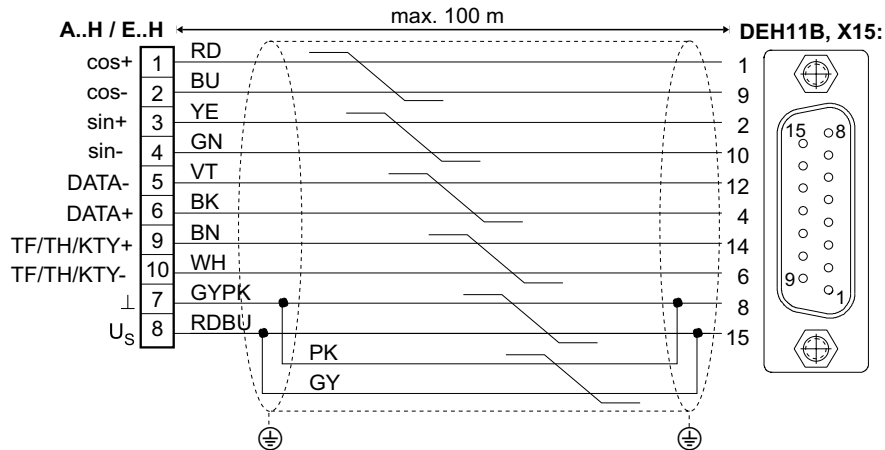Connect the HIPERFACE® encoder to the option DEH11B as follows:

54440CXX

Figure 25: Connecting HIPERFACE® encoder to DEH11B as a motor encoder

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 connected to DEH11B. Connect the sin/cos encoder to the option DEH11B as follows:
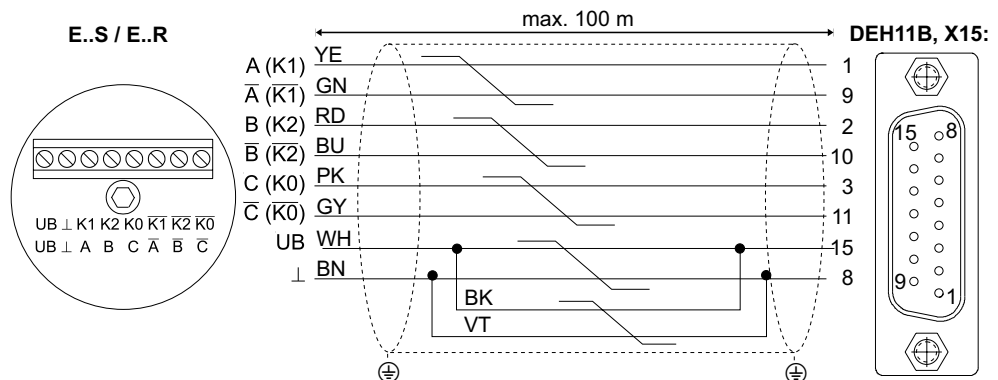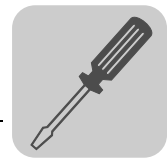

54329CXX

Figure 26: Connecting the sin/cos encoder to DEH11B as a motor encoder

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 26).

DC 5 V voltage
supply

TTL encoders with a DC 5 V voltage supply ES1T, ES2T, EH1T or EV1T 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:
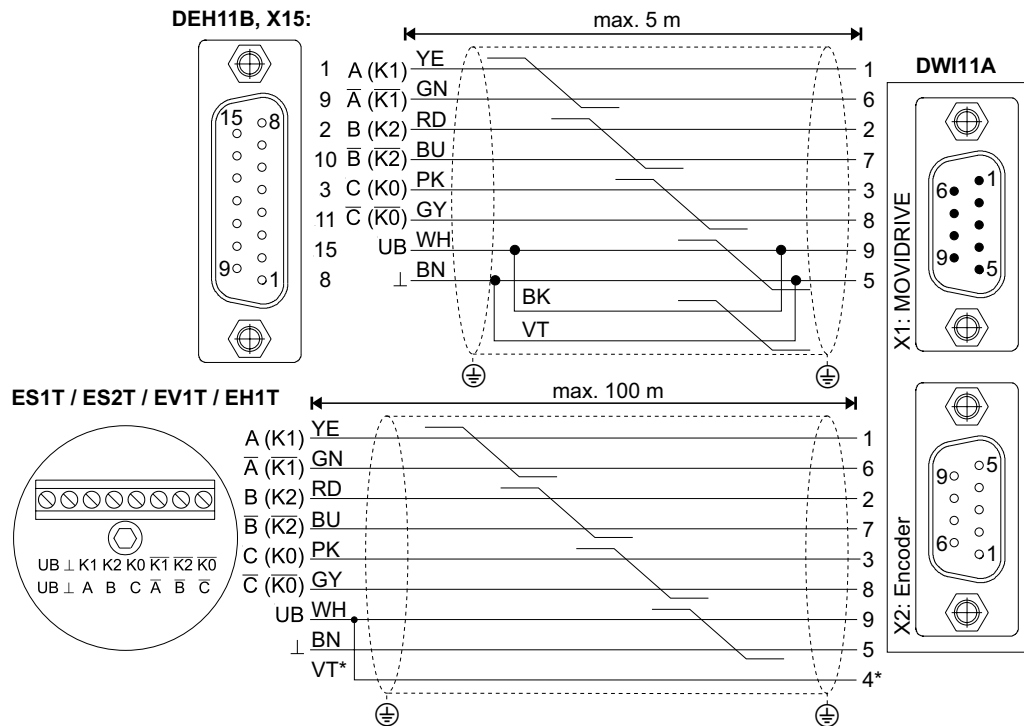
54330BXX

Figure 27: 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: Encoders

– For fixed routing: 198 829 8
– For cable carrier routing: 198,828 X

5.18   Connecting option DER11B (resolver)

Part number   Resolver card option type DER11B: 824 307 7

	NOTES
i	• 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
DER11B X14 9 1 15 8 X15 9 5 6 1 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 switchover Reference potential DGND (cos–) Signal track $\overline{A}$ ($\overline{K1}$) (sin–) Signal track $\overline{B}$ ($\overline{K2}$) Signal track C (K0) DATA - Reserved DC+12 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!
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
i	• If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8). • The DC 12 V supply voltage from X14 is sufficient to operate SEW encoders (except HTL encoders) with a DC 24 V supply voltage. With all other encoders, check whether they can be connected to the DC 12 V supply voltage.
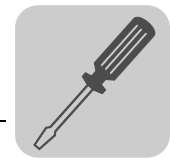
Permitted encoders	The following encoders can be connected at X14 (external encoder inputs):

- 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 option DWI11A

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 routing	**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.
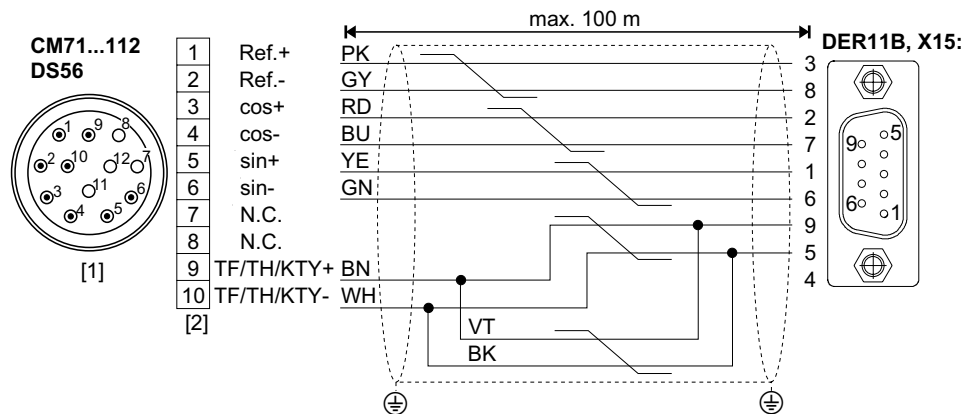
Connection   Connect the resolver as follows:

54331BXX

[1] Plug connector

[2] Terminal strip

5.19   Connecting an external encoder

External encoder   The following external encoders can be connected to connector X14 of the DEH11B option and the DER11B option.
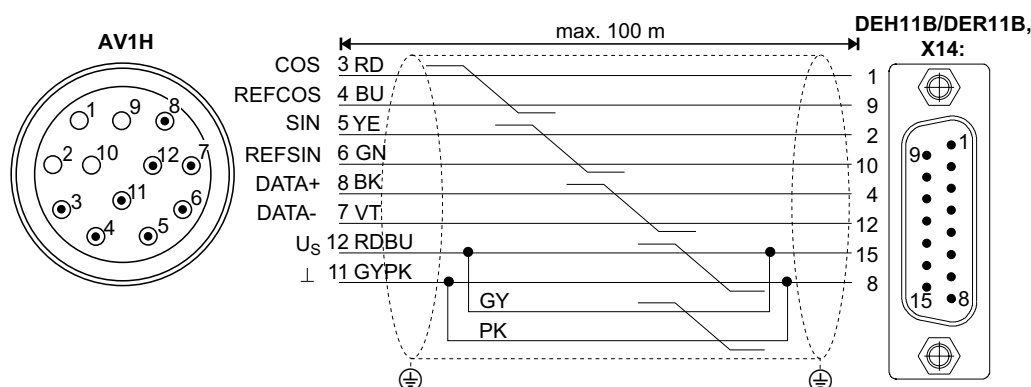
- HIPERFACE® encoder AV1H

- High-resolution sin/cos encoders with signal voltage 1 V_{SS}

- DC 5 V 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).

Connecting HIPERFACE® encoder AV1H   Connect the HIPERFACE® encoder AV1H as follows:

54332BXX

Figure 28: 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

sin/cos encoder connection

Connect the sin/cos encoder as follows:
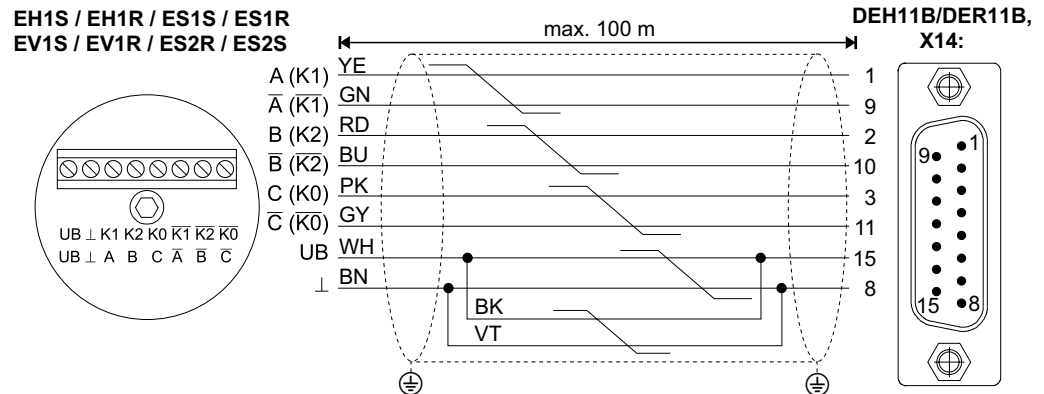
Figure 29: Connecting the sin/cos encoder to DEH11B/DER11B as an external encoder

54333BXX

Part numbers of the prefabricated cables:

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

TTL encoder connection

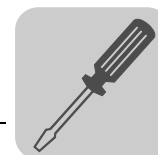TTL encoders from SEW-EURODRIVE are available with DC 24 V and DC 5 V voltage supply.

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 26).

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:
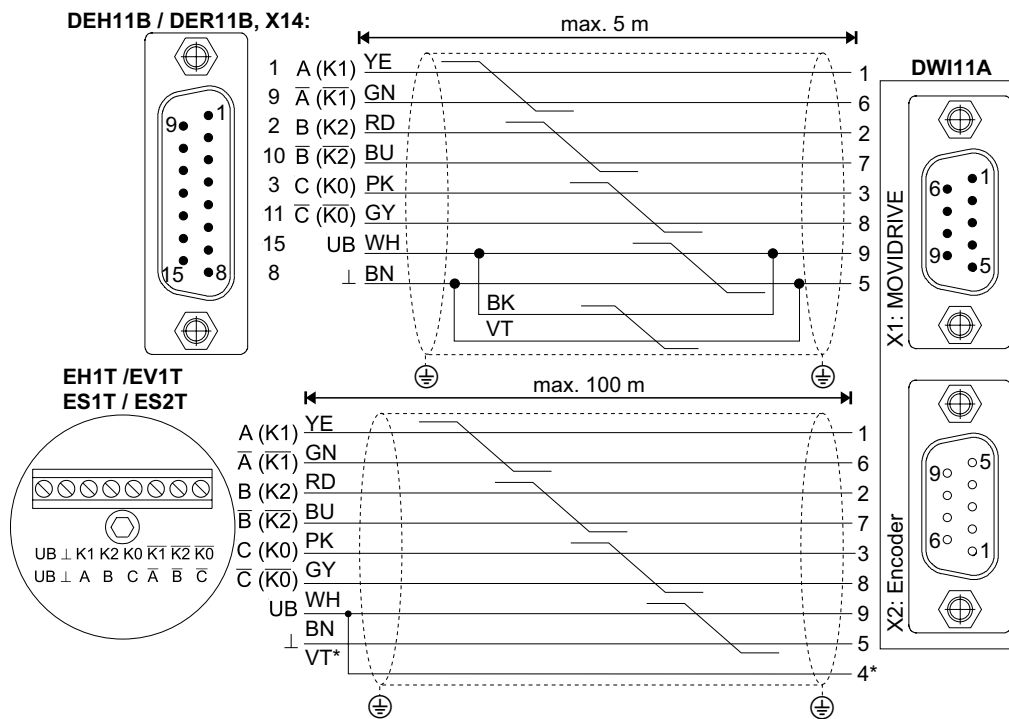
54335BXX

Figure 30: 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: Encoders
  - For fixed routing: 198 829 8
  - For cable carrier routing: 198,828 X

5.20 Connection of 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 "switchover" (X14:7) with DGND (X14:8). X14 then delivers the incremental encoder signals with a signal level according to RS422. The number of pulses is:

* With DEH11B as on X15 motor encoder input
* With DER11B 1024 pulses/revolution
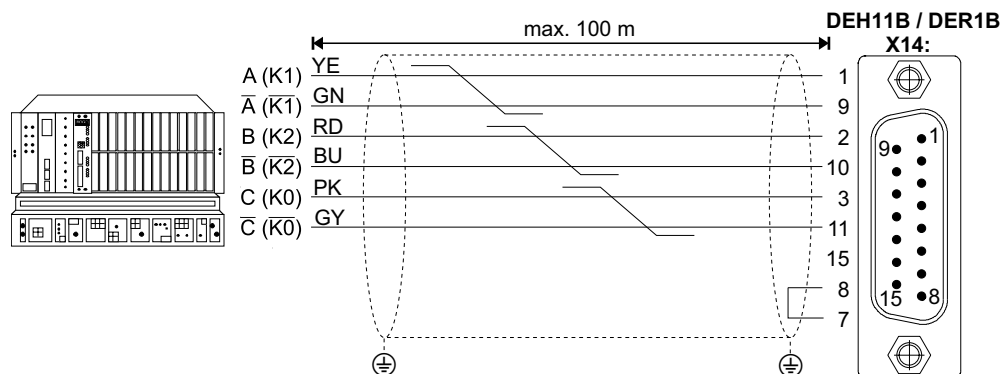
Figure 31: Incremental encoder simulation connection to DEH11B or DER11B

Part number of the prefabricated cable:

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

5.21   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 "switchover" (X14:7) with DGND (X14:8) on the master end.

The following figure shows an X14-X14 connection (= master/slave connection) between two MOVIDRIVE® units.
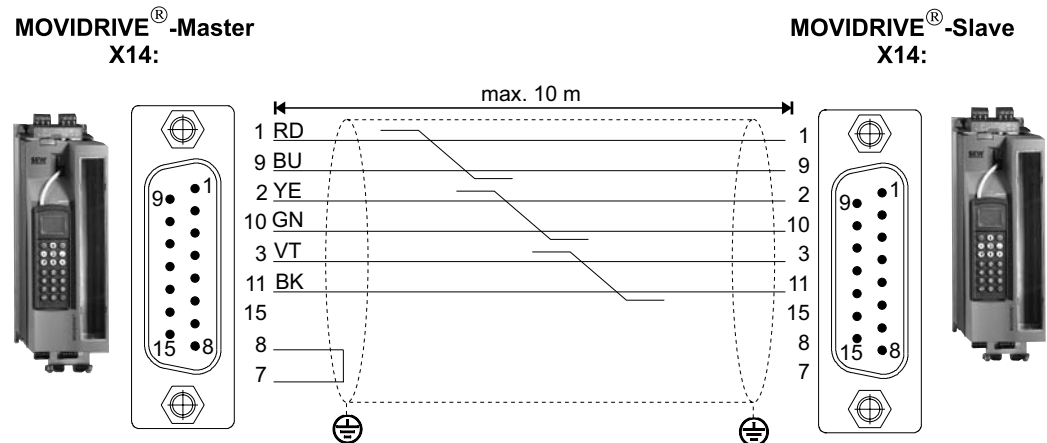
59308AXX

Part number of the prefabricated cable:

• For fixed routing: 817 958 1

	NOTES
i	• 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**.

5.22 Connection and terminal description of the DIO11B option

Part number   Terminal expansion board type DIO11B: 824 308 5

|	NOTES
i	• 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 **X20:3**	AI21/22 AGND	Setpoint input n2, DC-10 V...0...10 V or DC 0...10 V (Differential input or input with AGND reference potential) Reference potential for analog signals (REF1, REF2, AI.., AO..)
	X21:1 **X21:4** **X21:2** **X21:5** **X21:3/6**	AOV1 AOV2 AOC1 AOC2 AGND	Analog voltage output V1, with factory setting to "actual speed" Analog voltage output V2, with factory setting to "output current" Load capacity of the analog voltage outputs: I_{max} = DC 10 mA 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 Reference potential for analog signals (REF1, REF2, AI.., AO..)
	X22:1...8 **X22:9** **X22:10**	DI1Ø...17 DCOM DGND	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_ Reference potential for the binary inputs DI1Ø...17 Reference potential for binary signals – Without jumper X22:9-X22:10 (DCOM-DGND) → Isolated binary inputs – With jumper X22:9-X22:10 (DCOM-DGND) → Non-isolated binary inputs
	X23:1...8 **X23:9**	DO1Ø...17 24VIN	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.** Supply voltage DC+24 V for binary outputs D01Ø ... D017, non-isolated (reference potential DGND)

Front view labels: DIO11B — AI21, AI22, AGND (X20 1,2,3); AOV1, AOC1, AGND, AOV2, AOC2, AGND (X21 1,2,3,4,5,6); DI1Ø, DI11, DI12, DI13, DI14, DI15, DI16, DI17, DCOM, DGND (X22 1–10); DO1Ø, DO11, DO12, DO13, DO14, DO15, DO16, DO17, 24VIN (X23 1–9)

06193AXX

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).
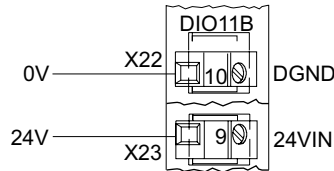
06556AXX

Figure 32: Voltage input 24VIN (X23:9) and reference potential DGND (X22:10)

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
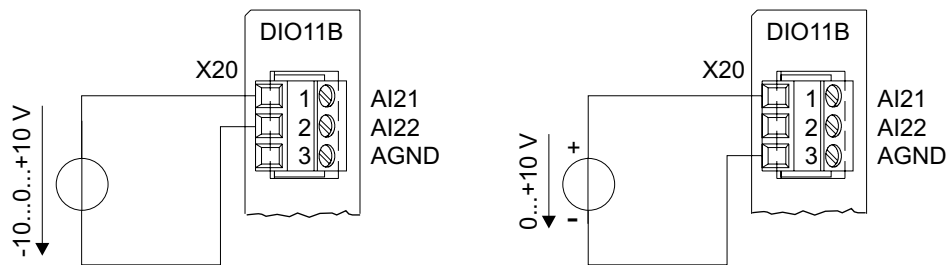
06668AXX

Figure 33: Setpoint input n2

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 Ω → DC 0...20 mA = DC 0...10 V
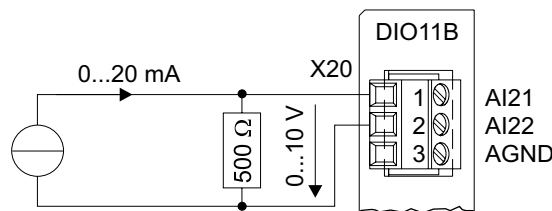
06669AXX

Figure 34: Current input with external load

***Voltage outputs
AOV1 and AOV2***

Assign the analog voltage outputs AOV1 and AOV2 in accordance with the following figure:
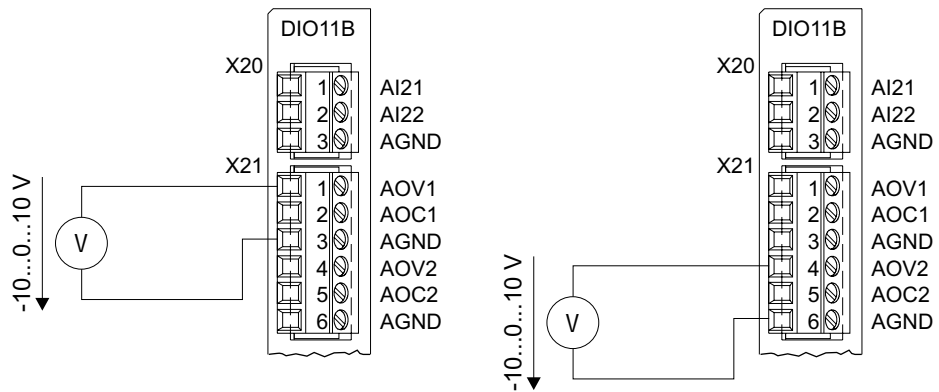
06196AXX

Figure 35: Voltage outputs AOV1 and AOV2

***Current outputs
AOC1 and AOC2***

Assign the analog current outputs AOC1 and AOC2 in accordance with the following figure:
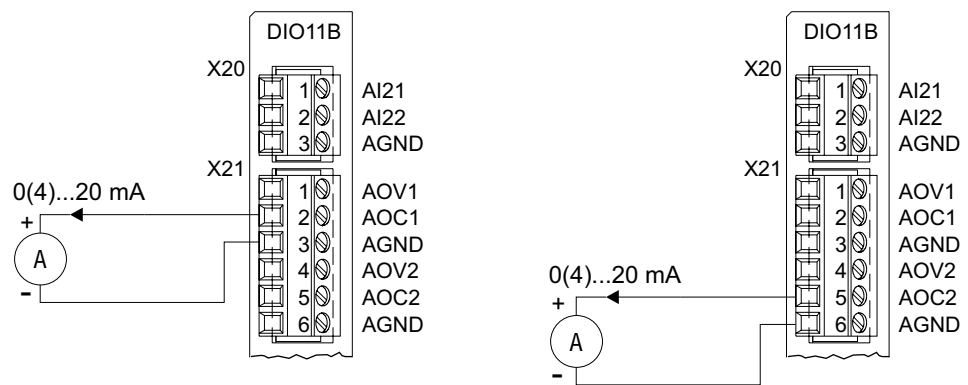
06197AXX

Figure 36: Current outputs AOC1 and AOC2
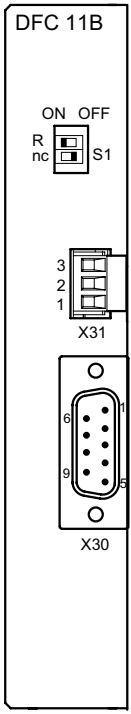
5.23   Connecting Option DFC11B

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

	NOTES
[i]	• 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 switches Terminal	Function
DFC 11B ON OFF R nc S1 3 2 1 X31 6 1 9 5 X30 55405AXX	**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 (jumpered with X30:2) CAN High (jumpered with X30:7) DGND
	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**	N.C. CAN Low (jumpered with X31:3) DGND N.C. N.C. DGND CAN High (jumpered with X31:2) N.C. N.C.

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

6 Startup

6.1 General startup instructions

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

Prerequisites   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 drive 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
i	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.
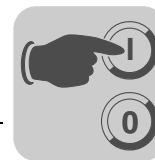
Inverter/motor combinations

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

400/500 V units

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 applica-tions

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

6.2 Preliminary work and resources

- Check the installation.

	⚠ **DANGER!**
	Risk of crushing if the motor starts up unintentionally.
	Severe or fatal injuries.
	• Ensure that the motor cannot start 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 the UWS21B option into the XT slot and use an interface cable (RS232) to connect it to the PC. 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 ($\rightarrow$ P60_ / P61_).

	NOTE
i	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**.

6.3   Startup with the 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 $\cos\varphi$ and rated speed
- Rated supply 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**
AS1H, ES1H, AV1H	HIPERFACE®	1024
ES1S, ES2S, EV1S, EH1S	SINE ENCODER	1024
ES1R, ES2R, EV1R, EH1R ES1T[1]**, ES2T**[1]**, EV1T**[1]**, EH1T**[1]	INCREM. TTL ENCODER	1024

1) DC 5 V TTL encoders ES1T, ES2T, EV1T and EH1T must be connected via the DWI11A option (→ Sec. 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
i	• 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!

Select language   The figure below shows the keys for selecting the language.
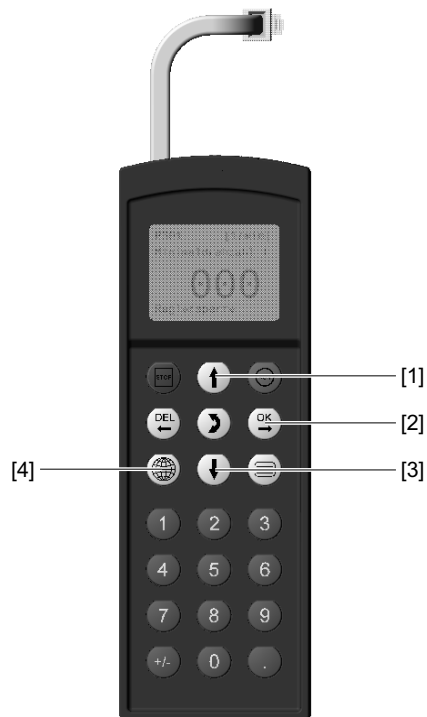
60008AXX

[1]   Key ↑   Move up to the next menu item
[2]   Key OK   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.
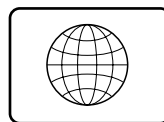
54533AXX

Proceed as follows to select the language:

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

Startup
The figure below shows the keys required for startup.
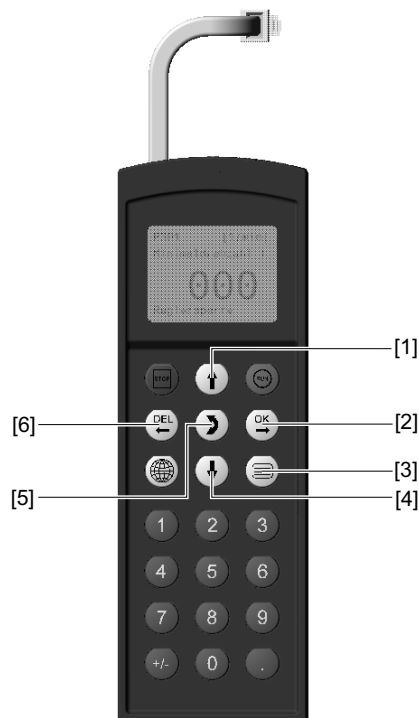
60010AXX

[1] Key ⬆ Move up to the next menu item
[2] Key OK→ 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 DEL← 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 PARAMET.
COPY TO DBG
COPY TO MDX
```

4. Press the [OK] 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 [OK] 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 PARAMET.
PREPARE FOR STARTUP
```

```
C00*STARTUP

PARAMETER SET 1
PARAMETER SET 2
```

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

```
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⅄ 50 Hz
   ⅄ 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⅄ 50 Hz
   Only Δ connection possible → Enter "400 V".
   ⅄ connection is not possible.

   Use the [↑] key to select the next parameter.

```
C03*                    V
MOT. RATED VOLT 1
            +400.000
```

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

   Use the [↑] key to select the next parameter.

```
C04*                   Hz
MOT. RATED 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 (⅄ 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
MAINS RAT. 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 fault 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 [DEL] key to return to the context menu.

```
MANUAL MODE
STARTUP PARAMET.
COPY TO DBG
COPY TO MDX
```

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

```
EXIT UNIT
SETTINGS
```

17. Confirm the setting using the [OK] key. The basic display appears.

```
0.00rpm
0.000Amp
CONTROLLER INHIBIT
```

Starting up the speed controller

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

Important: 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 INERTIA	
	+0.200

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

C21*	s
SHORTEST RAMP	
	+0.100

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

```
C06*CALCULATION

NO
YES
```

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

```
C06*SAVE

NO
YES
```

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

```
DATA IS
BEING COPIED...
```

13. The startup procedure is now complete. Use the [DEL] key to return to the context menu.

```
MANUAL MODE
STARTUP PARAMET.
COPY TO DBG
COPY TO MDX
```

14. Use the [↓] key to scroll down to the "EXIT" menu item.

```
EXIT UNIT
SETTINGS
```

15. Confirm the setting using the [OK] 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 [OK] 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 [OK] key. The parameter set is copied from DBG60B to MOVIDRIVE®.
  - In the context menu, select the "PARAMETER MODE" menu item. Select parameter P806 "DBG → MDX". The parameter set is copied from DBG60B to MOVIDRIVE®.
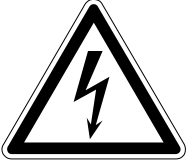
> ⚠ **DANGER!**
>
> Parameter settings incorrect due to unsuitable data sets.
>
> Severe or fatal injury.
>
> Make sure that the data set you copy is suitable for the application.

- Enter parameter settings that differ from the factory setting in the parameter list ($\rightarrow$ 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 $\rightarrow$ 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 entry 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.
- Confirm the setting using the ⌗ key.
- Use the ⟨⟩ key to return to the parameter mode. The flashing cursor appears again.
- Use the ↑ key to select the next parameter.
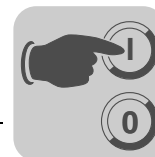
6.4 Startup with PC and MOVITOOLS®

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

General information

- 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) to which the inverter is connected.
- 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."
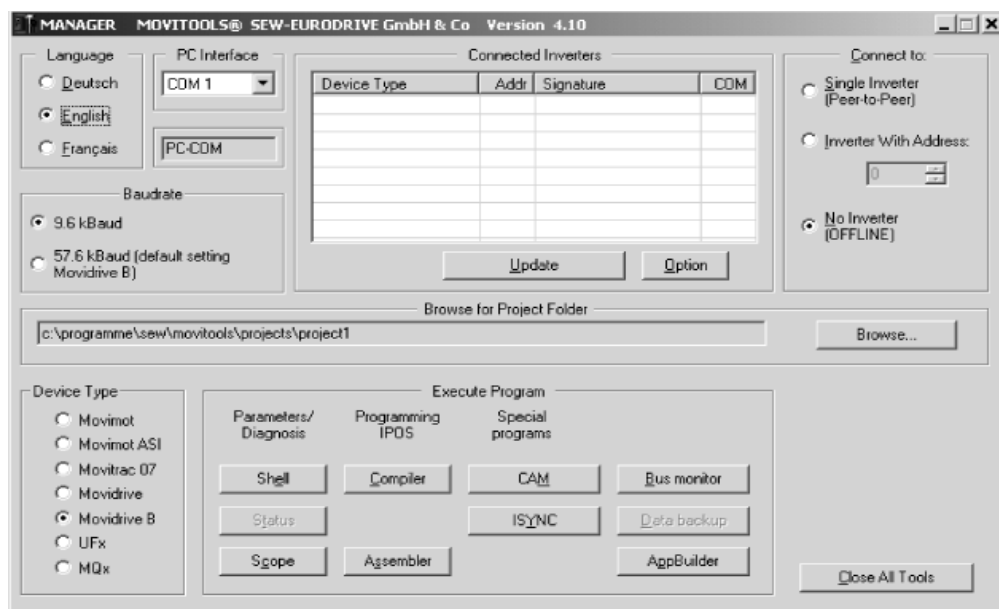
10985AEN

Figure 37: 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 for HTL motor encoders

Adhere to the following startup instructions for starting an HTL motor encoder on the optional HIPERFACE®encoder card DEH11B of MOVIDRIVE® MDX61B.

60101AEN

Figure 38: Settings for startup of a motor with HTL motor encoder

[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.

6.5   *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 (AI11) Analog inp. n1	X13:1 (DIØØ) /Cntr 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"
CCW with 50 % n_{max}	5 V	"1"	"0"	"1"	"1"	"0"	"0"
CCW with n_{max}	10 V	"1"	"0"	"1"	"1"	"0"	"0"

Travel diagram

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

05033BEN

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

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) /Ctrl 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 with n11	"1"	"1"	"0"	"1"	"1"	"0"
CW with n12	"1"	"1"	"0"	"1"	"0"	"1"
CW with n13	"1"	"1"	"0"	"1"	"1"	"1"
CCW with n11	"1"	"0"	"1"	"1"	"1"	"0"

Travel diagram
The following travel diagram shows an example of how the drive is started with the wiring of terminals X13:1 ... X13:6 and internal fixed setpoints. Binary output X10:3 /DBØØ "(/Brake") is used for switching brake contactor K12.
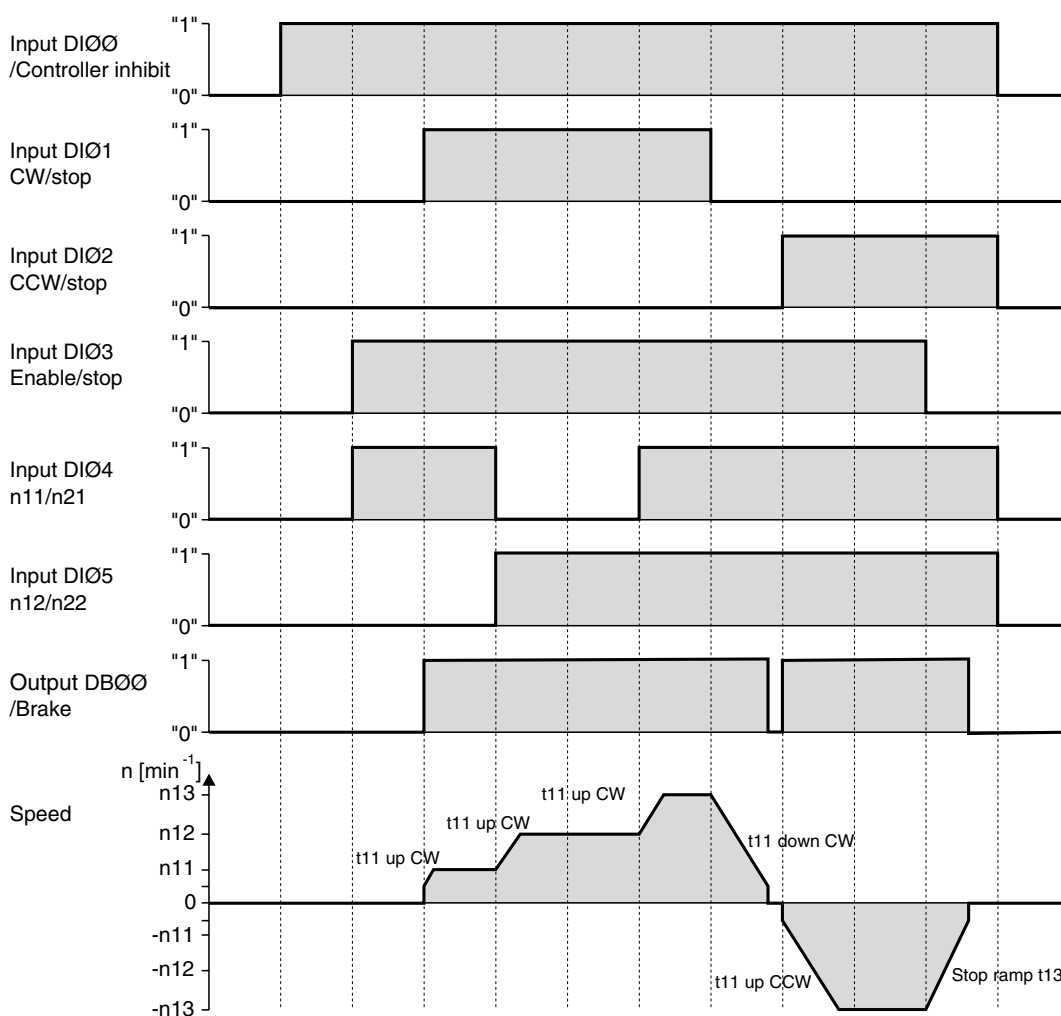
05034BEN

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

	⚠ DANGER!
	Risk of crushing if the motor starts up unintentionally.
	Severe or fatal injuries.
	• Ensure that the motor cannot start 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.

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 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 adjustment 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.
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.
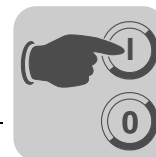
6.6   Complete parameter list

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 1/min
\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 state	
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 limitation	0 ... 100 %
03_	**Binary inputs basic unit**	
030	Binary input DIØØ	/CONTROL.INHIBIT
031	Binary input DIØ1	
032	Binary input DIØ2	
033	Binary input DIØ3	
034	Binary input DIØ4	Not in DBG60B
035	Binary input DIØ5	
036	Binary input DIØ6	
037	Binary input DIØ7	
\039	Status binary inputs DIØØ...DIØ7	
04_	**Binary input options**	
040	Binary input DI1Ø	
041	Binary input DI11	
042	Binary input DI12	
043	Binary input DI13	
044	Binary input DI14	Not in DBG60B
045	Binary input DI15	
046	Binary input DI16	
047	Binary input DI17	
\048	Status binary inputs DI1Ø...DI17	

Par.	Name	Value range
05_	**Binary outputs basic unit**	
050	Binary output DBØØ	/BRAKE
051	Binary output DOØ1	
052	Binary output DOØ2	
053	Binary output DOØ3	Not in DBG60B
054	Binary output DOØ4	
055	Binary output DOØ5	
\059	Status binary outputs DBØØ, DOØ1...DOØ5	
06_	**Binary outputs option**	
060	Binary output DO1Ø	
061	Binary output DO11	
062	Binary output DO12	
063	Binary output DO13	
064	Binary output DO14	Not in DBG60B
065	Binary output DO15	
066	Binary output DO16	
067	Binary output DO17	
\068	Status binary outputs DO1Ø...DO17	
07_	**Unit data**	
070	Unit type	
071	Rated output current	
072	Option 1 encoder slot	
073	Option 2 fieldbus slot	
074	Option 3 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	

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**	
101	Control signal source	**TERMINALS**	
102	Frequency scaling	0.1 .. **10** ... 65 kHz	
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**	
113	AI1 voltage offset	-10 ... **0** ... 10 V	
114	AI1 speed offset	-6000 ... **0** ... 6000 1/min	
115	Filter speed setpoint	0 ... **5**...100 ms 0 = Filter off	
12_	**Analog inputs (optional)**		
120	AI2 operating mode	**NO FUNCTION**	
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	
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 1/min (% I_N)	
\161	Internal setpoint n12	-6000 ... **750** ... 6000 1/min (% I_N)	
\162	Internal setpoint n13	-6000 ... **1500** ... 6000 1/min (% I_N)	
17_	**Fixed setpoints 2**		
170	Internal setpoint n21	-6000 ... **150** ... 6000 1/min (% I_N)	
171	Internal setpoint n22	-6000 ... **750** ... 6000 1/min (% I_N)	
172	Internal setpoint n23	-6000 ... **1500** ... 6000 1/min (% I_N)	
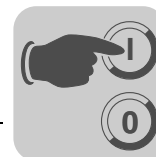
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
2__	**CONTROLLER PARAMETERS**		
20_	**Speed control (only parameter set 1)**		
200	P-gain n-controller	0.01 ... **2** ... 32	
201	Time constant n-controller	0 ... **10** ... 300 ms	
202	Gain Accel. feedforw.	**0** ... 65	
203	Filter acceleration feedforward	**0** ... 100 ms	
204	Filter speed actual value	**0** ... 32 ms	
205	Load feedforward CFC	**– 150 %** ... 0 ... 150 %	
206	Sampling time n-controller	**1 ms** 0.5 ms	
207	Load feedforward 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_	**Synchronous operation with synchronous encoder**		
230	Synchronous encoder	**OFF** EQUAL-RANKING: CHAIN	
231	Factor slave encoder	**1** ... 1000	
232	Factor slave synchronous encoder	**1** ... 1000	
233	Synchronous encoder resolution	128 / 256 / 512 / **1024** / 2048	
234	Master encoder resolution	128 / 256 / 512 / **1024** / 2048	
24_	**Synchr. oper. w. catch up**		
240	Synchronous speed	-6000 ... **1500** ... 6000 1/min	
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 [0.2/min]	
27_	**Process controller input values**		
270	Setpoint source	**Parameter** / IPOS variable / Analog 1 / Analog 2	
271	setpoint	–32767 ...**0** ... 32767 [0.2/min]	
272	IPOS setpoint address	**0** ... 1023	
273	Time constant	**0** ... 0.01 ... 2000 s	

Par.	Name / Selectable par. / Parameter set 1/2	Setting range / Factory setting	Comment
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 [0.2/min]	
283	PID controller maximum output	–32767 .... **10000** ... 32767 [0.2 / min]	
284	Minimum output process controller	–32767 ...**0** ... 32767 [0.2/min]	
285	Maximum output process controller	–32767 ...**7500** ... 32767 [0.2/min]	
3__	**MOTOR PARAMETERS**		
30_ / 31_	**Limits 1 / 2**		
\300 / 310	Start/stop speed 1 / 2	0 ... 150 1/min	
\301 / 311	Minimum speed 1/2	0 ... **15**..0.6100 1/min	
\302 / 312	Maximum speed 1 / 2	0 ... **1500** ... 6100 1/min	
\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 1/min	
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	
36_	**Startup (only available in DBG60B)**		
360	Startup	YES / **NO**	Only available in DBG60B, not in MOVITOOLS®/SHELL!
4__	**REFERENCE SIGNALS**		
40_	**Speed reference message**		
400	Speed reference value	0 ... **1500** ... 6000 1/min	
401	Hysteresis	0 ... **100** ... 500 1/min	
402	Delay time	0 ... **1** ... 9 s	
403	Signal = "1" if:	**n < n_{ref}** n > n_{ref}	
41_	**Speed window message**		
410	Window center	0 ... **1500** ... 6000 1/min	
411	Range width	**0** ... 6000 1/min	
412	Delay time	0 ... **1** ... 9 s	
413	Signal = "1" if:	**INSIDE** OUTSIDE	
42_	**Speed setpoint/actual value comp**		
420	Hysteresis	0 ... **100** ... 300 1/min	
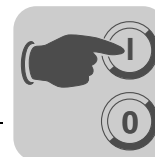
Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
421	Delay time	0 ... **1** ... 9 s	
422	Signal = "1" if:	$n \neq n_{setp}$ **n = n$_{setp}$**	
43_	**Current reference message**		
430	Current reference value	0 ...**100** ... 200 % I_N	
431	Hysteresis	0 ... **5** ... 30 % I_N	
432	Delay time	0 ... **1** ... 9 s	
433	Signal = "1" if:	**I < I$_{ref}$** I > I$_{ref}$	
44_	**Imax 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 MODE REGENERAT. MODE **MOT. & REGEN.MODE**	
501 / 503	Delay time 1/2	0 ... **1** ... 10 s	
504	Encoder monitoring motor	**No** Yes	
505	Synchronous encoder monitoring	**No** Yes	
51_	**Synchr. operation monitoring**		
510	Positional tolerance slave	10 ... **25** ... 32 768 inc	
511	Prewarning lag error	**50** ... 99,999,999 inc	
512	Setpoint deviation limit	100 ... **4000** ... 99,999,999 inc	
513	Lag error delay 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**	
52_	**Mains OFF monitoring**		
520	Mains OFF response time	**0** ... 5 s	
521	Mains OFF response	**CONTROLLER INHIBIT** EMERGENCY STOP	
522	Phase failure monitoring	**ON** Off	
53_	**Motor temperature protection**		
530	Sensor type 1	**No sensor** TF/TH/KTY (KTY: only for DS/CM motors)	
531	Sensor type 2	**No sensor** TF/TH/KTY (KTY: only for DS/CM motors)	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
54_	**Gear unit/motor monitoring**		
540	Response drive vibration/warning	**Display fault**	**The following error responses can be programmed:**
541	Response drive vibration/fault	**Rapid stop/Warning**	NO RESPONSE • DISPLAY FAULT •
542	Response oil aging/warning	**Display fault**	IMM. STOP/FAULT •
543	Response oil aging/fault	**Display fault**	EMERG.STOP/FAULT • RAPID
544	Response oil aging/overtemperature	**Display fault**	STOP/FAULT •
545	Response oil aging/ready message	**Display fault**	IMM. STOP/WARN. • EMERG.STOP/WARNG • RAPID
546	Response brake wear	**Display fault**	STOP/WARNG
6__	**TERMINAL ASSIGNMENT**		
60_	**Binary inputs basic unit**		
-	Binary input DIØØ	With fixed assignment with: **/CONTROLLER INHIBIT**	
600	Binary input DIØ1	**CW/STOP**	**The following functions can be programmed:**
601	Binary input DIØ2	**CCW/STOP**	NO FUNCTION • ENABLE/STOP •
602	Binary input DIØ3	**ENABLE /STOP**	CW/STOP •
603	Binary input DIØ4	**n11/n21**	CCW/STOP•n11/n21 •n12/n22 • FIX SETPT SW.OV. •
604	Binary input DIØ5	**n12/n22**	PAR. SWITCHOVER • RAMP
605	Binary input DIØ6	**NO FUNCTION**	SWITCHOVER • MOTOR POT UP •
606	Binary input DIØ7	**NO FUNCTION**	MOTOR POT DOWN • /EXT. FAULT •
61_	**Binary inputs option**		FAULT RESET •
610	Binary input DI1Ø	**NO FUNCTION**	/HOLD CONTROL • /LIM. SWITCH CW • /LIM. SWITCH CCW •
611	Binary input DI11	**NO FUNCTION**	IPOS INPUT • REFERENCE CAM •
612	Binary input DI12	**NO FUNCTION**	REF.TRAVEL START •
613	Binary input DI13	**NO FUNCTION**	SLAVE FREE RUNN. • SETPOINT HOLD • MAINS ON •
614	Binary input DI14	**NO FUNCTION**	DRS SET ZERO • DRS SLAVE START
615	Binary input DI15	**NO FUNCTION**	• DRS TEACH IN •
616	Binary input DI16	**NO FUNCTION**	DRS MASTER STOP • OSC./WARNING • BRAKE WEAR •
617	Binary input DI17	**NO FUNCTION**	OIL AGING/WARN. • OIL AGING/FAULT • OIL AGING OVER-TEMP. • OIL AGING/READY
62_	**Binary outputs basic unit**		
-	Binary output DBØØ	With fixed assignment with: **/BRAKE**	
620	Binary output DOØ1	**READY FOR OPERATION**	**The following signals can be programmed:**
621	Binary output DOØ2	**/FAULT**	NO FUNCTION • /FAULT • READY •
622	Binary output DOØ3	**IPOS OUTPUT**	OUTP. STAGE ON • ROT. FIELD ON •
623	Binary output DOØ4	**IPOS OUTPUT**	BRAKE RELEASED •
624	Binary output DOØ5	**IPOS OUTPUT**	BRAKE APPLIED • MOTOR STAND-STILL • PARAMETER SET •
63_	**Binary outputs option**		SPEED REFERENCE • SPEED WIN-
630	Binary output DO1Ø	**NO FUNCTION**	DOW • SP/ACT.VAL.COMP. •
631	Binary output DO11	**NO FUNCTION**	CURR. REFERENCE • Imax SIGNAL •
632	Binary output DO12	**NO FUNCTION**	/MOTOR UTILIZ. 1 •
633	Binary output DO13	**NO FUNCTION**	/MOTOR UTILIZ. 2 • /DRS PREWARN-ING • /DRS LAG ERROR •
634	Binary output DO14	**NO FUNCTION**	DRS SLAVE IN POS • IPOS IN POSI-
635	Binary output DO15	**NO FUNCTION**	TION • IPOS REFERENCE •
636	Binary output DO16	**NO FUNCTION**	IPOS OUTPUT • /IPOS FAULT
637	Binary output DO17	**NO FUNCTION**	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
64_	**Optional analog outputs**		
640	Analog output AO1	**ACTUAL SPEED**	
641	Scaling AO1	-10 ... 0 ... **1** ... 10	**The following functions can be pro-grammed:** NO FUNCTION • RAMP INPUT • SPEED SETPOINT • ACTUAL SPEED • ACTUAL FRE-QUENCY • OUTPUT CURRENT • ACTIVE CURRENT • UNIT UTILIZA-TION • IPOS OUTPUT • RELATED TORQUE • IPOS OUTPUT 2
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	
7__	**CONTROL FUNCTIONS**		
70_	**Operating modes**		
700	Operating mode 1	**VFC 1** VFC 1 & GROUP VFC 1 & HOIST VFC 1 & DC BRAK. VFC 1 & FLYSTART VFC n-CONTROL VFC-n-CTRL&GRP. VFC-n-CTRL&HOIST VFC-n-CTRL&SYNC VFC-n-CTRL& IPOS CFC CFC & M-CONTROL CFC&IPOS CFC&SYNC. SERVO SERVO&M-CONTROL SERVO&IPOS SERVO&SYNC.	
701	Operating mode 2	**VFC 2** VFC 2 & GROUP VFC 2 & HOIST VFC 2 & DC BRAK. VFC 2 & FLYSTART	
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 1/min	
722 / 725	Start offset 1/2	0 ... **30** ... 500 1/min	
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 hide**		
740 / 742	Skip window center 1/2	0 ... **1500** ... 6000 1/min	
741 / 743	Skip width 1/2	**0** ... 300 1/min	
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 S.(485+SBus)	
751	Scaling slave setpoint	– 10 ... 0 ... **1** ... 10	
76_	**Manual operation**		
760	Locking Run/Stop keys	**No** Yes	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
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	
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 parameter	
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 condition	
\803	Parameter lock	**Off** On	
804	Reset statistics data	**NO** ERROR MEMORY kWh COUNTER OPERATING HOURS	
806	Copy DBG60B → MDX	YES / **NO**	Only in DBG60B
807	Copy MDX → DBG60B	YES / **NO**	Only in DBG60B
81_	**Serial communication**		
810	RS-485 address	**0** ... 99	
811	RS485 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	**EMERG.STOP/FAULT**	**The following error responses can be programmed:** NO RESPONSE • DISPLAY FAULT • IMM. STOP/FAULT • EMERG.STOP/FAULT • RAPID STOP/FAULT • IMM. STOP/WARN. • EMERG.STOP/WARNG • RAPID STOP/WARNG
831	Response FIELDBUS TIMEOUT	**RAPID STOP/WARNG**	
832	Response MOTOR OVERLOAD	**EMERG.STOP/FAULT**	
833	Response RS485 TIMEOUT	**RAPID STOP/WARNG**	
834	LAG ERROR response	**EMERG.STOP/FAULT**	
\835	Response TF sensor SIGNAL	**NO RESPONSE**	
836 / 837	Response SBus TIMEOUT 1 / 2	**EMERG.STOP/FAULT**	
838	SW limit switch	**EMERG.STOP/FAULT**	With P831 "Response FIELDBUS-TIMEOUT", fault response "PADATA = 0/WARN." is also available.
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-defined unit	**1/min**	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
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	
87_	**Process data description**		
870	Setpoint description PO1	**CONTROL WORD 1**	**The following PO assignment can be set:**
871	Setpoint description PO2	**SPEED**	NO FUNCTION • SPEED • CURRENT • POSITION LO •
872	Setpoint description PO3	**NO FUNCTION**	MAX: SPEED • MAX: CURRENT • SLIP • RAMP • CONTROL WORD 1 • CONTROL WORD 2 • SPEED [%] • IPOS ΠΑ-ΔΑΤΑ
873	Actual value description PI1	**STATUS WORD 1**	**The following PI assignment can be set:**
874	Actual value description PI2	**SPEED**	NO FUNCTION • SPEED • OUTPUT CURRENT •
875	Actual value description PI3	**OUTPUT CURRENT**	ACTIVE CURR. • POSITION LO • POSITION HI • STATUS WORD 1 • STATUS WORD 2 • SPEED [%] • IPOS PI-DATA • RESERVED • STATUS WORD 3
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**..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) ... **0** ... 2^{31}– 1 Inc	
901	Reference speed 1	0 ... **200** ... 6000 1/min	
902	Reference speed 2	0 ... **50** ... 6000 1/min	
903	Reference travel type	**0** ... 8	
904	Reference travel to zero pulse	**Yes** No	
905	HIPERFACE® Offset X15	– (2^{31}– 1) ... **0** ... 2^{31}– 1 Inc	
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 1/min	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
914	Positioning speed CCW	0 ... **1500** ... 6000 1/min	
915	Speed feedforward	-199.99 ... 0 ... **100** ... 199.99 %	
916	Ramp function	**LINEAR** SINE SQUARED BUS RAMP JERK LIMITED ELECTRONIC CAM SYNCHRONOUS OPERATION CROSS CUTTER	
917	Ramp mode	**MODE 1** MODE 2	
92_	**IPOS Monitoring**		
920	CW SW limit switch	$-(2^{31}-1)$ ... **0** ... $2^{31}-1$ Inc	
921	CCW SW limit switch	$-(2^{31}-1)$...**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 MOVI-TOOLS®/SHELL!
932	IPOS CTRL word Task 2	START / **STOP**	Only available in DBG60B, not in MOVI-TOOLS®/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 (DIP)	
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	
95_	**DIP**		
950	Encoder type	**NO ENCODER**	
951	Counting direction	**NORMAL** INVERTED	
952	Cycle frequency	**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	

Par.	Name Selectable par. Parameter set 1/2	Setting range Factory setting	Comment
97_	**IPOS synchronization**		
970	DRAM synchronization	**NO** / YES	
971	Synchronization phase	–2 ... **0** ...2 ms	

7 Operation

7.1 Operating displays

7-segment display

The 7-segment display shows the operating condition of MOVIDRIVE® and, in the event of a fault, a fault 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	Technologieoption
b	-	Unassigned
c	12	IPOS^{plus}® reference travel
d	13	Flying start
E	14	Adjust encoder
F	11	Fault 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

> ⚠ **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 INHBIT") = "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 PARAMET.
```
Error display

7.2   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 function that is not implemented. • An incorrect communication service has been selected. • Manual operation selected via invalid interface (e.g. fieldbus).
3	READ ONLY VALUE	Attempt to modify a read only value.
4	PARAM. LOCKED	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. through cyclic write access. Parameter not stored in non-volatile EEPROM.
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

7.3 Functions of the DBG60B keypad

*Key assignments
for DBG60B*
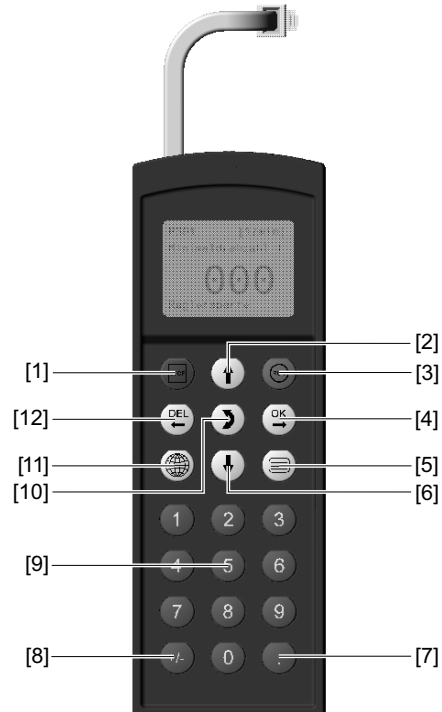
60017AXX

[1]	Key [STOP]	Stop
[2]	Key [↑]	Up arrow, moves up to the next menu item
[3]	Key [RUN]	Start
[4]	Key [OK]	OK, confirms the entry
[5]	Key [≡]	Activate the context menu
[6]	Key [↓]	Down arrow, moves down to the next menu item
[7]	Key [·]	Decimal point
[8]	Key [+/-]	Sign reversal
[9]	Key 0 ... 9	Digits 0 ... 9
[10]	Key [ↄ]	Change menu
[11]	Key [⊕]	Select language
[12]	Key [DEL]	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. Confirm the setting using the [OK] 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. Confirm the setting using the [OK] 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".

> **PARAMETER MODE**
> VARIABLE MODE
> BASIC VIEW

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.

> P 000   rpm
> SPEED
>   +0.0
> CONTROLLER INHIBIT

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.

> P 1.. SETPOINTS/
> RAMP GENERATORS
>
> CONTROLLER INHIBIT

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

> P 1.. SETPOINTS/
> RAMP GENERATORS
>
> CONTROLLER INHIBIT

5. Use the ↑ key or the ↓ key to select the required parameter subgroup. The flashing cursor is positioned under the number of the parameter subgroup.

> \ 13. SPEED
> RAMPS 1
>
> CONTROLLER INHIBIT

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

> \ 13. SPEED
> RAMPS 1
>
> CONTROLLER INHIBIT

7. Use the ↑ key or the ↓ key to select the desired parameter. The flashing cursor is positioned under the third digit of the parameter number.

> \ 132   s
> T11 UP CCW
>   +0.13
> CONTROLLER INHIBIT

8. Press the ⌗ key to activate the setting mode for the selected parameter. The cursor is positioned under the parameter value.

> \ 132   s
> T11 UP CCW
>   +0.13_
> CONTROLLER INHIBIT

9. Use the ↑ key or the ↓ key to select the desired parameter value.

> \ 132   s
> T11 UP CCW
>   +0.20_
> CONTROLLER INHIBIT

10. Confirm the setting using the ⌗ key. Exit the setting mode by pressing the ↩ key. The flashing cursor is positioned under the third digit of the parameter number again.

> \ 132   s
> T11 UP CCW
>   +0.20
> CONTROLLER INHIBIT

11. Use the ↑ key or the ↓ to select another parameter or go back to the parameter subgroup menu using the ⌫ key.

> \ 13. SPEED
> RAMPS 1
>
> CONTROLLER INHIBIT

12. Use the ↑ key or the ↓ key to select another parameter subgroup or go back to the main parameter group menu using the ⌫ key.

> P 1.. SETPOINTS/
> RAMP GENERATORS
>
> CONTROLLER INHIBIT

13. Use the ▤ key to return to the context menu.

> **PARAMETER MODE**
> VARIABLE MODE
> BASIC VIEW

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 "\" before the parameter number (→ Sec. "Complete parameter list"). You can add or delete parameters. You can save a maximum of 50 parameter entries. The parameters are displayed in the order in which they are stored in the inverter. The parameters are not sorted automatically.

- Use the ⊟ key to call up the context menu. Select the "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. Confirm the setting using 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. Confirm the setting using the ⊙ key.
- Use the ⊟ key to return to the context menu. In the context menu, select the "DE-LETE Pxxx" menu item. "xxx" is the parameter you selected previously. Confirm the setting using 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. Confirm the setting using 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.

7.4 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.
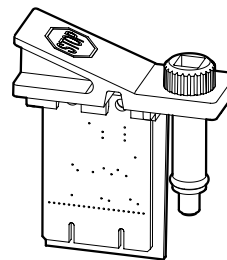
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Figure 39: MDX60B/61B memory card

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 (P802 factory setting) from the context menu. This resets the unit to its initial delivery condition. You must then restart the unit.

- Counter status and data of the DRS11B and DHP11B options are not saved on the memory card. When you replace the memory card, you have to install the DRS11B and DHP11B 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.

8 Service

8.1 Fault information

Fault memory

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

Fault 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 fault; the inverter remains inhibited in fault status:

Immediate stop

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

Rapid stop

The drive is braked with the stop ramp t13/t23. 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).

Emergency stop

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.

	⚠ **DANGER!**
	Risk of crushing if the motor starts up automatically after an auto reset.
	Severe or fatal injuries.
	• Do not use auto reset with drives where an automatic restart represents a danger to people or units.
	• Perform a manual reset.

Inverter is waiting for data

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

8.2 Fault messages and list of faults

Fault message in 7-segment display

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

Flashes, ca. 1 s

Display off, ca. 0.2 s

Hundreds (if available), ca. 1 s

Display off, ca. 0.2 s

Tens, ca. 1 s

Display off, ca. 0.2 s

Ones, ca. 1 s

Display off, ca. 0.2 s

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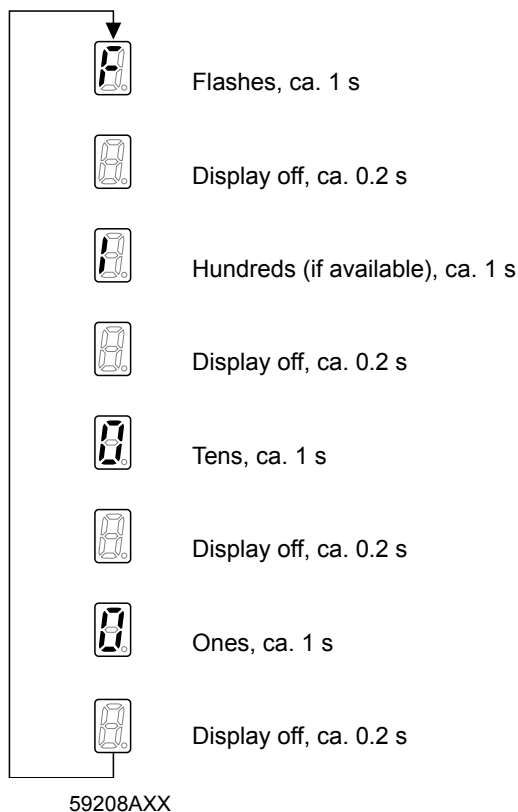
Following a reset or if the fault code resumes the value '0', the display switches to the operating display.

Fault list

A dot in the "P" column indicates that the response is programmable (P83_ Fault response). The factory set error response appears in the "Response" column.

Fault code	Name	Response	P	Possible cause	Measure
00	No error	-			
01	over-current	Immediate shut-off		• Short circuit output • Motor too large • Defective output stage • Ramp limit is deactivated and set ramp time is too short	• Rectify the short circuit • Connect a smaller motor • Contact SEW Service if the output stage is defective • Activate P138 and/or increase ramp time
03	Ground fault in the motor lead	Immediate shut-off		ground fault • In the motor lead • in the inverter • in the motor	• Eliminate ground fault • Consult SEW Service
04	Brake chopper	Immediate switch-off		• Too much regenerative power • Braking resistor circuit interrupted • Short circuit in the braking resistor circuit • Brake resistor has too high resistance • Brake chopper is defective	• Extend deceleration ramps • Check supply cable to braking resistor • Check technical data of braking resistor • Install a new MOVIDRIVE® unit if the brake chopper is defective
06	Mains phase failure	Immediate shut-off		Phase failure	Check the supply system lead

Fault code	Name	Response	P	Possible cause	Measure
07	U$_Z$ overvoltage	Immediate switch-off		DC link voltage too high	• Extend deceleration ramps • Check supply cable to the braking resistor • Check technical data of braking resistor
08	n-monitoring	Immediate switch-off	•	• 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 setting (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
09	Startup	Immediate switch-off		Inverter has not been taken into operation for the selected operating mode.	Perform startup for the required operating mode.
10	IPOS-ILLOP	Emergency stop		• 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)
11	Excessive temperature	Emergency stop	•	Thermal overload of inverter	Reduce load and/or ensure adequate cooling.
13	Control signal source	Immediate switch-off		Control signal source not defined or defined incorrectly.	Set correct control signal source (P101).
14	Encoder	Immediate switch-off		• Encoder cable or shield not connected correctly • Short circuit/broken encoder wire • Encoder defective	Check encoder cable and shield for correct connection, short circuit and broken wire.
17-24	System error	Immediate switch-off		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.
25	EEPROM	Rapid stop		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.
26	External terminal	Emergency stop	•	Read in external error signal via programmable input.	Eliminate specific cause of error; reprogram terminal if necessary.
27	No limit switches	Emergency stop		• 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
28	Fieldbus Timeout	Rapid stop	•	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
29	Limit switch contacted	Emergency stop		A limit switch was reached in IPOS$^{plus®}$ operating mode.	• Check travel range. • Correct user program.
30	Emergency stop Timeout	Immediate switch-off		• Drive overloaded • Emergency stop ramp too short.	• Check project planning • Extend emergency stop ramp
31	TF/TH trip	No response	•	• 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		Programming principles violated leading to system internal stack overflow	Check and correct the IPOS$^{plus®}$ user program (→ IPOS$^{plus®}$ manual).
33	Setpoint source	Immediate switch-off		Setpoint source not defined or defined incorrectly	Set correct setpoint source (P100).
34	Ramps Timeout	Immediate switch-off		Time of downward ramps exceeded, e.g. due to overload.	• Extend the downwards ramps • Eliminate overload

Fault code	Name	Response	P	Possible cause	Measure
35	Operating mode	Immediate switch-off		• 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 function 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 the 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
36	Option missing	Immediate switch-off		• 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 the correct operating mode (P700 or P701). • Set the correct encoder type.
37	System watchdog	Immediate switch-off		Error during execution of system software	Contact SEW Service.
38	System software	Immediate switch-off		System error	Contact SEW Service.
39	Reference travel	Immediate switch-off	•	• The reference cam is missing or does not switch • Limit switches are connected incorrectly • Reference travel type was changed during reference travel	• Check reference cam • Check limit switch connection • Check reference travel type setting and required parameters.
40	Boot synchronization	Immediate switch-off		**Only with DIP11B or DRS11B:** Error during boot synchronization between inverter and option.	Install a new option card if this fault reoccurs.
41	Watchdog option IPOS watchdog	Immediate switch-off		• Error in communication between system software and option software. • Watchdog in the IPOS 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)
42	Lag error	Immediate switch-off	•	• Encoder connected incorrectly • Acceleration ramps too short • P component of positioning controller too small • Incorrectly set speed controller parameters • Value of lag fault tolerance too small	• Check encoder connection • Extend ramps • Set P component to higher value • Reset speed controller parameters • Increase lag fault 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	•	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		• Unit utilization (IxT value) > 125 %	• Decrease power output • Extend ramps • If proposed actions are not possible, use larger inverter. • Reduce load
45	Initialization	Immediate switch-off		• 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 fault still cannot be reset. • Insert the option card correctly.
46	System bus 2 timeout	Rapid stop	•	Fault during communication via system bus 2.	Check system bus connection.
47	System bus 1 timeout	Rapid stop	•	Fault during communication via system bus 1.	Check system bus connection.

Fault code	Name	Response	P	Possible cause	Measure
48	Hardware DRS	Immediate switch-off		**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 board.
77	IPOS^{plus®} control word	No response	•	**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^{plus®} SW limit switches	No response	•	**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	HW configuration (hardware configuration)	Immediate stop		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		Internal unit fault, RAM defective.	Contact SEW Service.
81	Start condition	Immediate switch-off		**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		**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.
84	Motor protection	Emergency stop	•	• 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
86	Memory module	Immediate switch-off		• No memory card • Memory card defective	• Tighten knurled screw • Insert and secure memory card • Replace memory card
87	Technology function	Immediate switch-off		A technology function was activated in a standard version.	Disable technology function
88	Flying start	Immediate switch-off		**Only in VFC n-CTRL operating mode:** Actual speed > 6000 1/min when inverter enabled.	Inverter not enabled before actual speed is ≤ 6000 1/min.
92	DIP encoder problem	Fault display	•	Encoder signals a fault	Possible cause: Encoder is dirty → clean encoder
93	DIP encoder fault	Emergency stop	•	**Only with DIP11B option:** The encoder signals a fault, e.g. power failure: • Connection cable between encoder and DIP 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. • Install new absolute encoder.
94	EEPROM checksum	Immediate switch-off		Inverter electronics disrupted, possibly due to effect of EMC or a defect.	Send unit in for repair.

Fault code	Name	Response	P	Possible cause	Measure
95	DIP plausibility error	Emergency stop	•	**Only with DIP11B option:** 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. • Install new absolute encoder.
97	Copy data	Immediate switch-off		• Memory card cannot be written or read. • Error during data transmission	• Repeat copying process • Restore default setting (P802) and repeat copying process
98	CRC error flash	Immediate switch-off		Internal unit fault Flash memory defective	Send unit in for repair.
99	IPOS ramp calculation error	Immediate switch-off		**Only in IPOS$^{plus®}$ operating mode:** Positioning ramp is sinusoidal or square and an attempt is made to change ramp times and traveling velocities with enabled inverter.	Rewrite the IPOS$^{plus®}$ program so that ramp times and traveling velocities can only be altered when the inverter is inhibited.
100	Vibra-tion/Warning	Display fault	•	Vibration sensor warns ($\rightarrow$ operating instructions for "DUV10A")	Determine cause of vibrations. Continue operation until F101 occurs.
101	Vibration fault	Rapid stop	•	Vibration sensor reports fault	SEW-EURODRIVE recommends that you remedy the cause of the vibrations immediately
102	Oil aging/warning	Display fault	•	Oil aging sensor warns	Schedule oil change
103	Oil aging/fault	Display fault	•	Oil aging sensor reports fault	SEW-EURODRIVE recommends that you change the gear unit oil immediately.
104	Oil aging/over-temperature	Display fault	•	Oil aging sensor reports overtemperature	• Let oil cool down • Check if the gear unit cools properly
105	Oil aging/ready message	Display fault	•	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 fault	•	Brake lining worn down.	Change brake lining ($\rightarrow$ operating instructions for "Motors")

8.3   SEW Electronics Service

Send in for repair   Please contact the **SEW-EURODRIVE electronics service if a fault cannot be rectified** ($\rightarrow$ "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 ($\rightarrow$ 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, $\curlywedge$ or Δ connection)
- Nature of the error
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

8.4   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. We recommend that you increase the voltage from 0 V to the first stage after a few seconds.

The following stages are recommended:

AC 400/500 V units:

- Stage 1: AC 350 V for 15 minutes
- Stage 2: AC 420 V for 15 minutes
- Stage 3: 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.

8.5 Disposal

Please follow the current regulations. Dispose of the individual materials separately in accordance with the regulations in force, for example as:

- Electronics scrap (printed circuit boards)
- Plastics (housing)
- Sheet metal
- Copper
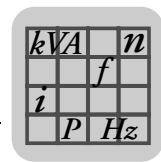
9 Technical Data and Dimension Drawings

9.1 CE marking, UL approval and C-Tick

CE marking
- Low voltage directive

  MOVIDRIVE® MDX60B/61B drive inverters comply with the regulations of the Low Voltage Directive 73/23/EEC.

- Electromagnetic compatibility (EMC)

  MOVIDRIVE® drive 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 class A or B 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 73/23/EEC and the EMC Directive 89/336/EEC. We can provide a declaration of conformity on request.

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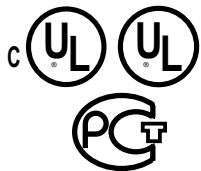
UL, cUL approval (USA) and the GOST-R certificate (Russia) have been approved for the entire MOVIDRIVE® unit series. cUL is equivalent to CSA approval.

C-Tick

C-Tick approval has been granted for the entire MOVIDRIVE® range of units. C-Tick certifies conformity with ACA (Australian Communications Authority) standards.
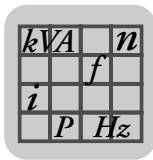
9.2 General technical data

The following table lists the technical data applicable to all MOVIDRIVE® MDX60/61B drive inverters, regardless of their type, version, size and performance.

MOVIDRIVE® MDX60B/61B	All sizes
Interference immunity	Fulfills EN 61800-3
Interference emission with EMC compliant installation	Sizes 0 to 6 meet EN 61800-3 Sizes 0 to 5: In accordance with limit value class B to EN 55011 and EN 55014 with corresponding line filter Sizes 0, 1, and 2 in accordance with limit value class A to EN 55011 and EN 55014 without additional measures Size 6 in accordance with limit value class A to EN 55011 and EN 55014 with corresponding line filter
Ambient temperature ϑ_U **Derating ambient temperature** **Climate class**	$0\ °C...+50\ °C$ when $I_D = 100\ \%\ I_N$ and $f_{PWM} = 4$ kHz $0\ °C...+40\ °C$ when $I_D = 125\ \%\ I_N$ and $f_{PWM} = 4$ kHz $0\ °C...+40\ °C$ when $I_D = 100\ \%\ I_N$ and $f_{PWM} = 8$ 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 51751)	Forced cooling (temperature-controlled fan, response threshold 45 °C)
Enclosure **Sizes 0 to 3** **EN 60529** **Sizes 4 to 6** **(NEMA1)**	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 ≤ 1000 m without restrictions. The following restrictions apply at heights ≥ 1000 m: • From 1000 m (3,280 ft.) to max. 4,000 m (6561 ft.): – I_N reduction by 1% per 100 m (330 ft) • From 2000 m (6,561 ft.) to max. 4000 m (13,123 ft.): – AC 230 V units: V_N reduction by AC 3 V per 100 m – AC 500 V units: V_N reduction by AC 6 V per 100 m Over 2000 m only overvoltage class 2, external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.

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

MOVIDRIVE®
MDX60B/61B
series, size 0

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Figure 40: MOVIDRIVE® MDX60/61B series, size 0

MOVIDRIVE®
MDX61B series,
sizes 1 to 6

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Figure 41: MOVIDRIVE® MDX61B series, sizes 1 to 6
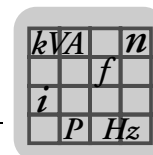
9.3 MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

Size 0

MOVIDRIVE® MDX60/61B			0005-5A3-4-0_	0008-5A3-4-0_	0011-5A3-4-0_	0014-5A3-4-0_
Size			0S		0M	
INPUT						
Supply voltage	U_{mains}		$3 \times$ AC 380 V –10 % ... $3 \times$ AC 500 V +10 %			
Supply frequency	f_{mains}		50 Hz ... 60 Hz $\pm$ 5 %			
Rated supply current[1] (at $V_{mains} = 3 \times$ AC 400 V)	I_{mains}	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 $V_{mains} = 3 \times$ AC 380...500 V)	S_N		1.4 kVA	1.6 kVA	2.1 kVA	2.8 kVA
Rated output current[1] (at $V_{mains} = 3 \times$ 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 $U_{mains} = 3 \times$ 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 $U_{mains} = 3 \times$ 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	

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

2) The performance data applies to f_{PWM} = 4 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	0.75 kW	1.1 kW	1.5 kW
Variable torque load or constant load without overload — Recommended motor power	P_{Mot}	0.75 kW	1.1 kW	1.5 kW	2.2 kW
Weight		2.0 kg		2.5 kg	
Dimensions	W $\times$ H $\times$ D	45 $\times$ 317 $\times$ 260 mm		67.5 $\times$ 317 $\times$ 260 mm	

| 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		2.8 kg	
Dimensions	W $\times$ H $\times$ D	72.5 $\times$ 317 $\times$ 260 mm		95 $\times$ 317 $\times$ 260 mm	
Recommended motor power		$\rightarrow$ 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						
Supply voltage	U_{mains}		$3 \times AC$ 380 V –10 % ... $3 \times AC$ 500 V +10 %			
Supply frequency	f_{mains}		50 Hz ... 60 Hz $\pm$ 5 %			
Rated supply current[1] (at $V_{mains} = 3 \times AC$ 400 V)	I_{mains}	100 %	AC 3.6 A	AC 5.0 A	AC 6.3 A	AC 8.6 A
		125 %	AC 4.5 A	AC 6.2 A	AC 7.9 A	AC 10.7 A
OUTPUT						
Apparent output power[2] (at $V_{mains} = 3 \times AC$ 380...500 V)	S_N		2.8 kVA	3.8 kVA	4.9 kVA	6.6 kVA
Rated output current[1] (at $V_{mains} = 3 \times AC$ 400 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 $U_{mains} = 3 \times AC$ 400 V and f_{PWM} = 4 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 $U_{mains} = 3 \times AC$ 400 V and f_{PWM} = 8 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_{max} = 0...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 / 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}		85 W	105 W	130 W	180 W
Cooling air consumption			40 m^3/h			
Weight			3.5 kg			
Dimensions	$W \times H \times D$		105 $\times$ 314 $\times$ 234 mm			

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

2) The performance data applies to f_{PWM} = 4 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	2.2 kW	3.0 kW	4.0 kW
Variable torque load or constant load without overload Recommended motor power	P_{Mot}	2.2 kW	3.0 kW	4.0 kW	5.5 kW
Recommended motor power		$\rightarrow$ MOVIDRIVE® B system manual, section 'Motor Selection'			

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					
Supply voltage	U_{mains}		$3 \times$ AC 380 V –10 % ... $3 \times$ AC 500 V +10 %		
Supply frequency	f_{mains}		50 Hz ... 60 Hz $\pm$ 5 %		
Rated supply current[1] (at $V_{mains} = 3 \times$ AC 400 V)	I_{mains}	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 $V_{mains} = 3 \times$ AC 380...500 V)	S_N		8.7 kVA	11.2 kVA	16.8 kVA
Rated output current[1] (at $V_{mains} = 3 \times$ AC 400 V)	I_N		AC 12.5 A	AC 16 A	AC 24 A
Continuous output current (= 125 % I_N) I_D (at $U_{mains} = 3 \times$ AC 400 V with $f_{PWM} = 4$ kHz)			AC 15.6 A	AC 20 A	AC 30 A
Continuous output current (= 100 % I_N) I_D (at $U_{mains} = 3 \times$ AC 400 V with $f_{PWM} = 8$ 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			$I_{max} = 0...150$ % 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 / 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}		220 W	290 W	400 W
Cooling air consumption			80 m³/h		
Weight			6.6 kg		
Dimensions	$W \times H \times D$		105 × 335 × 294 mm		135 × 315 × 285 mm

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

2) The performance data applies to $f_{PWM} = 4$ 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	7.5 kW	11 kW
Variable torque load or constant load without overload Recommended motor power	P_{Mot}	7.5 kW	11 kW	15 kW
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					
Supply voltage	U_{mains}		$3 \times AC\ 380\ V\ -10\ \%\ ...\ 3 \times AC\ 500\ V\ +10\ \%$		
Supply frequency	f_{mains}		50 Hz ... 60 Hz ± 5 %		
Rated supply current[1] (at $V_{mains} = 3 \times AC\ 400\ V$)	I_{mains}	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 $V_{mains} = 3 \times AC\ 380...500\ V$)	S_N		22.2 kVA	31.9 kVA	41.6 kVA
Rated output current[1] (at $V_{mains} = 3 \times AC\ 400\ V$)	I_N		AC 32 A	AC 46 A	AC 60 A
Continuous output current (= 125 % I_N) I_D (at $U_{mains} = 3 \times AC\ 400\ V$ with $f_{PWM} = 4$ kHz)			AC 40 A	AC 57.5 A	AC 75 A
Continuous output current (= 100 % I_N) I_D (at $U_{mains} = 3 \times AC\ 400\ V$ with $f_{PWM} = 8$ 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_{max} = 0...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 / 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}		550 W	750 W	950 W
Cooling air consumption			180 m³/h		
Weight			15.0 kg		
Dimensions	$W \times H \times D$		200 × 465 × 308 mm		

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

2) The performance data applies to $f_{PWM} = 4$ 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	22 kW	30 kW
Variable torque load or constant load without overload Recommended motor power P_{Mot}	22 kW	30 kW	37 kW
Recommended motor power	→ MOVIDRIVE® B system manual, section 'Motor Selection'		
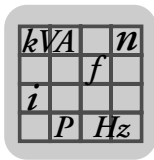
Size 4 (AC 400/500 V units)

MOVIDRIVE® MDX61B			0370-503-4-0_	0450-503-4-0_
INPUT				
Supply voltage		U_{mains}	$3 \times$ AC 380 V –10 % ... $3 \times$ AC 500 V +10 %	
Supply frequency		f_{mains}	50 Hz ... 60 Hz $\pm$ 5 %	
Rated supply current[1] (at $V_{mains} = 3 \times$ AC 400 V)	I_{mains}	100 % 125 %	AC 65.7 A AC 81.9 A	AC 80.1 A AC 100.1 A
OUTPUT				
Apparent output power[2] (at $V_{mains} = 3 \times$ AC 380...500 V)		S_N	51.1 kVA	62.3 kVA
Rated output current[1] (at $V_{mains} = 3 \times$ AC 400 V)		I_N	AC 73 A	AC 89 A
Continuous output current (= 125 % I_N) I_D (at $U_{mains} = 3 \times$ AC 400 V with $f_{PWM} = 4$ kHz)			AC 91 A	AC 111 A
Continuous output current (= 100 % I_N) I_D (at $U_{mains} = 3 \times$ AC 400 V with $f_{PWM} = 8$ 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_{max} = 0...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 / 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}	1200 W	1450 W
Cooling air consumption			180 m^3/h	
Weight			27 kg	
Dimensions		$W \times H \times D$	$280 \times 522 \times 307$ mm	

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

2) The performance data applies to $f_{PWM} = 4$ 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	45 kW
Variable torque load or constant load without overload Recommended motor power P_{Mot}	45 kW	55 kW
Recommended motor power	→ MOVIDRIVE® B system manual, section 'Motor Selection'	
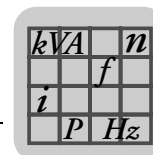
Size 5 (AC 400/500 V units)

MOVIDRIVE® MDX61B			0550-503-4-0_	0750-503-4-0_
INPUT				
Supply voltage	U_{mains}		$3 \times$ AC 380 V –10 % ... $3 \times$ AC 500 V +10 %	
Supply frequency	f_{mains}		50 Hz ... 60 Hz $\pm$ 5 %	
Rated supply current[1] (at $V_{mains} = 3 \times$ AC 400 V)	I_{mains}	100 % 125 %	AC 94.5 A AC 118.1 A	AC 117 A AC 146.3 A
OUTPUT				
Apparent output power[2] (at $V_{mains} = 3 \times$ AC 380...500 V)	S_N		73.5 kVA	91.0 kVA
Rated output current[1] (at $V_{mains} = 3 \times$ AC 400 V)	I_N		AC 105 A	AC 130 A
Continuous output current (= 125 % I_N) I_D (at $U_{mains} = 3 \times$ AC 400 V with $f_{PWM} = 4$ kHz)			AC 131 A	AC 162 A
Continuous output current (= 100 % I_N) I_D (at $U_{mains} = 3 \times$ AC 400 V with $f_{PWM} = 8$ kHz)			AC 105 A	AC 130 A
Current limitation	I_{max}		Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation			I_{max} = 0...150 % adjustable	
Minimum permitted 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 / Δn_A		–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL INFORMATION				
Power loss at S_N[2]	P_{Vmax}		1700 W	2000 W
Cooling air consumption			360 m^3/h	
Weight			35 kg	
Dimensions	$W \times H \times D$		280 $\times$ 610 $\times$ 330 mm	

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

2) The performance data applies to $f_{PWM} = 4$ 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	75 kW
Variable torque load or constant load without overload Recommended motor power	P_{Mot}	75 kW	90 kW
Recommended motor power		$\rightarrow$ MOVIDRIVE® B system manual, section 'Motor Selection'	
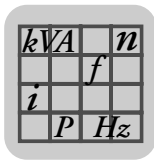
Size 6 (AC 400/500 V units)

MOVIDRIVE® MDX61B			0900-503-4-0_	1100-503-4-0_	1320-503-4-0_
INPUT					
Supply voltage		U_{mains}	$3 \times$ AC 380 V -10 % ... $3 \times$ AC 500 V $+10$ %		
Supply frequency		f_{mains}	50 Hz ... 60 Hz $\pm$ 5 %		
Rated supply current[1] (at $V_{mains} = 3 \times$ AC 400 V)	I_{mains}	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 $V_{mains} = 3 \times$ AC 380...500 V)		S_N	118 kVA	139 kVA	174 kVA
Rated output current[1] (at $V_{mains} = 3 \times$ AC 400 V)		I_N	AC 170 A	AC 200 A	AC 250 A
Continuous output current (= 125 % I_N) I_D (at $U_{mains} = 3 \times$ 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 $U_{mains} = 3 \times$ 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		
Dimensions		$W \times H \times D$	$280 \times 1000 \times 382$ mm		

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

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

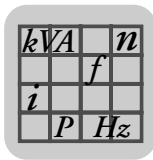| MDX61B Standard version		0900-503-4-00	1100-503-4-00	1320-503-4-00
Part number		827 971 3	827 972 1	827 974 8
MDX61B Application version		0900-503-4-0T	1100-503-4-0T	1320-503-4-0T
Part number		827 991 8	827 992 6	827 993 4
Constant load Recommended motor power	P_{Mot}	90 kW	110 kW	132 kW
Variable torque load or constant load without overload Recommended motor power	P_{Mot}	110 kW	132 kW	160 kW
Recommended motor power		$\rightarrow$ MOVIDRIVE® B system manual, section 'Motor Selection'		
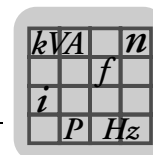
9.4 MOVIDRIVE® MDX61B...-2_3 (AC 230 V units)

Size 1 (AC 230 V units)

MOVIDRIVE® MDX61B			0015-2A3-4-0_	0022-2A3-4-0_	0037-2A3-4-0_
INPUT					
Supply voltage	U_{mains}		$3 \times$ AC 200 V –10 % ... $3 \times$ AC 240 V +10 %		
Supply frequency	f_{mains}		50 Hz ... 60 Hz $\pm$ 5 %		
Rated supply current (at V_{mains} = $3 \times$ AC 230 V)	I_{mains}	100 % 125 %	AC 6.7 A AC 8.4 A	AC 7.8 A AC 9.8 A	AC 12.9 A AC 16.1 A
OUTPUT					
Apparent output power[1] (at V_{mains} = $3 \times$ AC 230...240 V)	S_N		2.7 kVA	3.4 kVA	5.8 kVA
Rated output current (at V_{mains} = $3 \times$ AC 230 V)	I_N		AC 7.3 A	AC 8.6 A	AC 14.5 A
Continuous output current (= 125 % I_N) I_D (at U_{mains} = $3 \times$ AC 230 V with f_{PWM} = 4 kHz)			AC 9.1 A	AC 10.8 A	AC 18.1 A
Continuous output current (= 100 % I_N) I_D (at U_{mains} = $3 \times$ AC 230 V with f_{PWM} = 8 kHz)			AC 7.3 A	AC 8.6 A	AC 14.5 A
Current limitation	I_{max}		Motor and regenerative 150 % I_N, duration depending on capacity utilization		
Internal current limitation			I_{max} = 0...150 % adjustable		
Minimum permitted 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 / Δn_A		–6000 ... 0 ... +6000 min^{-1} / 0.2 min^{-1} across the entire range		
GENERAL INFORMATION					
Power loss at S_N[1]	P_{Vmax}		110 W	126 W	210 W
Cooling air consumption			40 m^3/h		
Weight			2.8 kg		
Dimensions	$W \times H \times D$		105 $\times$ 314 $\times$ 234 mm		

1) The performance data applies to f_{PWM} = 4 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	2.2 kW	3.7 kW
Variable torque load or constant load without overload Recommended motor power	P_{Mot}	2.2 kW	3.7 kW	5.0 kW
Recommended motor power		$\rightarrow$ MOVIDRIVE® B system manual, section 'Motor Selection'		

Size 2 (AC 230 V units)

MOVIDRIVE® MDX61B			0055-2A3-4-0_	0075-2A3-4-0_
INPUT				
Supply voltage		U_{mains}	3 × AC 200 V –10 % ... 3 × AC 240 V +10 %	
Supply frequency		f_{mains}	50 Hz ... 60 Hz ± 5 %	
Rated supply current (at V_{mains} = 3 × AC 230 V)	I_{mains}	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_{mains} = 3 × AC 230...240 V)		S_N	8.8 kVA	11.6 kVA
Rated output current (at V_{mains} = 3 × AC 230 V)		I_N	AC 22 A	AC 29 A
Continuous output current (= 125 % I_N) I_D (at U_{mains} = 3 × AC 230 V with f_{PWM} = 4 kHz)			AC 27.5 A	AC 36.3 A
Continuous output current (= 100 % I_N) I_D (at U_{mains} = 3 × AC 230 V with f_{PWM} = 8 kHz)			AC 22 A	AC 29 A
Current limitation		I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation			I_{max} = 0...150 % adjustable	
Minimum permitted 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 / Δn_A	–6000 ... 0 ... +6000 min⁻¹ / 0.2 min⁻¹ across the entire range	
GENERAL INFORMATION				
Power loss at S_N[1]		P_{Vmax}	300 W	380 W
Cooling air consumption			80 m³/h	
Weight			5.9 kg	
Dimensions		$W × H × D$	135 × 315 × 285 mm	

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

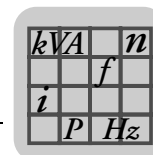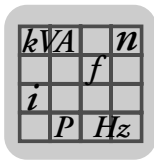| MDX61B Standard version	0055-2A3-4-00	0075-2A3-4-00
Part number	827 997 7	827 998 5
MDX61B Application version	0055-2A3-4-0T	0075-2A3-4-0T
Part number	828 006 1	828 008 8
Constant load / Recommended motor power P_{Mot}	5.5 kW	7.5 kW
Variable torque load or constant load without overload / Recommended motor power P_{Mot}	7.5 kW	11 kW
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				
Supply voltage		U_{mains}	$3 \times$ AC 200 V –10 % ... $3 \times$ AC 240 V +10 %	
Supply frequency		f_{mains}	50 Hz ... 60 Hz $\pm$ 5 %	
Rated supply current (at $V_{mains} = 3 \times$ AC 230 V)	I_{mains}	100 % 125 %	AC 40 A AC 50 A	AC 49 A AC 61 A
OUTPUT				
Apparent output power[1] (at $V_{mains} = 3 \times$ AC 230...240 V)		S_N	17.1 kVA	21.5 kVA
Rated output current (at $V_{mains} = 3 \times$ AC 230 V)		I_N	AC 42 A	AC 54 A
Continuous output current (= 125 % I_N) I_D (at $U_{mains} = 3 \times$ AC 230 V with f_{PWM} = 4 kHz)			AC 52.5 A	AC 67.5 A
Continuous output current (= 100 % I_N) I_D (at $U_{mains} = 3 \times$ AC 230 V with f_{PWM} = 8 kHz)			AC 42 A	AC 54 A
Current limitation		I_{max}	Motor and regenerative 150 % I_N, duration depending on capacity utilization	
Internal current limitation			I_{max} = 0...150 % adjustable	
Minimum permitted 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 / Δn_A	-6000 ... 0 ... $+6000$ min^{-1} / 0.2 min^{-1} across the entire range	
GENERAL INFORMATION				
Power loss at S_N[1]		P_{Vmax}	580 W	720 W
Cooling air consumption			180 m³/h	
Weight			14.3 kg	
Dimensions		$W \times H \times D$	$200 \times 465 \times 308$ mm	

1) The performance data applies to f_{PWM} = 4 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 kW
Variable torque load or constant load without overload Recommended motor power P_{Mot}	15 kW	22 kW
Recommended motor power	$\rightarrow$ MOVIDRIVE® B system manual, section 'Motor Selection'	

Size 4 (AC 230 V units)

MOVIDRIVE® MDX61B			0220-203-4-0_	0300-203-4-0_
INPUT				
Supply voltage		U_{mains}	$3 \times$ AC 200 V -10 % ... $3 \times$ AC 240 V $+10$ %	
Supply frequency		f_{mains}	50 Hz ... 60 Hz $\pm$ 5 %	
Rated supply current (at $V_{mains} = 3 \times$ AC 230 V)	I_{mains}	100 % 125 %	AC 72 A AC 90 A	AC 86 A AC 107 A
OUTPUT				
Apparent output power[1] (at $V_{mains} = 3 \times$ AC 230...40 V)		S_N	31.8 kVA	37.8 kVA
Rated output current (at $V_{mains} = 3 \times$ AC 230 V)		I_N	AC 80 A	AC 95 A
Continuous output current (= 125 % I_N) I_D (at $U_{mains} = 3 \times$ AC 230 V with $f_{PWM} = 4$ kHz)			AC 100 A	AC 118 A
Continuous output current (= 100 % I_N) I_D (at $U_{mains} = 3 \times$ AC 230 V with $f_{PWM} = 4$ 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			$I_{max} = 0...150$ % adjustable	
Minimum permitted braking resistor value (4Q operation)		R_{BRmin}	3.0 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[1]		P_{Vmax}	1100 W	1300 W
Cooling air consumption			180 m^3/h	
Weight			26.3 kg	
Dimensions		$W \times H \times D$	$280 \times 522 \times 307$ mm	

1) The performance data applies to $f_{PWM} = 4$ 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 kW
Variable torque load or constant load without overload Recommended motor power P_{Mot}	30 kW	37 kW
Recommended motor power	$\rightarrow$ MOVIDRIVE® B system manual, section 'Motor Selection'	

9.5 MOVIDRIVE® MDX60/61B electronics data

MOVIDRIVE® MDX60/61B	General electronics data		
Voltage supply X11:1 for setpoint input 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 X11:2/X11:3	AI11/AI12: Voltage or current input, can be set with S11 and P11_, sampling interval 1 ms		
(differential input) Operating mode AI11/AI12 Resolution Internal resistance	Voltage input: n1 = DC 0...+10 V or DC –10 V...0...+10 V 12 bit R_i = 40 kΩ (external voltage supply) R_i = 20 kΩ (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..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...50 s Down: 0.2...50 s		
Auxiliary voltage output[1] X13:8/X10:8	VO24: V_{OUT} = DC 24 V, maximum current carrying capacity I_{max} = DC 400 mA		
External voltage supply[1] X10:9	VI24: U_{IN} = DC 24 V –15 % / +20 % according to EN 61131-2		
Binary inputs X13:1...X13:6 and X16:1/X16:2 Internal resistance	Isolated (optocoupler), PLC compatible (EN 61131), sampling interval 1 ms DIØØ...DIØ5 and DIØ6/DIØ7 R_i ≈ 3 kΩ, I_E ≈ DC 10 mA		
Signal level	DC +13 V...+30 V= "1" = Contact closed DC–3 V...+5 V = "0" = Contact open	meets EN 61131	
Function X13:1 X13:2...X13:6, X16:1/X16:2	DIØØ: fixed assignment with "/Controller inhibit" DIØ1...DIØ5, DIØ6/DIØ7: Selection option → Parameter menu P60_		
Binary outputs[1] X10:3/X10:7 and X16:3...X16:5	PLC-compatible (EN 61131-2), response time 1ms DBØØ/DOØ2 and DOØ3...DOØ5		
Signal level	"0" = DC 0 V "1" = DC +24 V **Important:** Do not apply external voltage!		
Function X10:3 X10:7, X16:3...X16:5	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 X10:4...X10:6	DOØ1: Load capacity of the relay contacts U_{max} = DC 30 V, I_{max} = DC 800 mA		
Function X10:4 X10:5 X10:6	DOØ1-C: Shared relay contact DOØ1-NO: Normally open contact DOØ1-NC: Normally closed 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 (120Ω) 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} ≥ 2.9 kΩ ±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 conductor per terminal: 0.20...2.5 mm^2 (AWG 24...12) Two conductors 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).
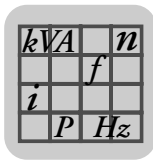
MOVIDRIVE® MDX60/61B		General electronics data
Safety contact	X17:1	DGND: Reference potential for X17:3
	X17:2	VO24: : U_{OUT} = DC 24 V, only to supply X17:4 of the same unit; **it cannot be used** to supply other units.
	X17:3	SOV24: Reference potential for DC+24 V input "Safe stop" (safety contact)
	X17:4	SVI24: DC+24 V input "Safe stop" (safety contact)
Permitted cable cross section		One conductor per terminal: 0.08...1.5 mm^2 (AWG28...16)
		Two conductors per terminal: 0.25 ... 1.0 mm^2 (AWG23...17)
Power consumption X17:4		Size 0: 3 W
		Size 1: 5 W
		Size 2, 2S: 6 W
		Size 3: 7.5 W
		Size 4: 8 W
		Size 5: 10 W
		Size 6: 6 W
Input capacitance X17:4		Size 0: 27 µF
		Size 1..0.6: 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

9.6 MOVIDRIVE® MDX60B dimension drawings

Size 0S
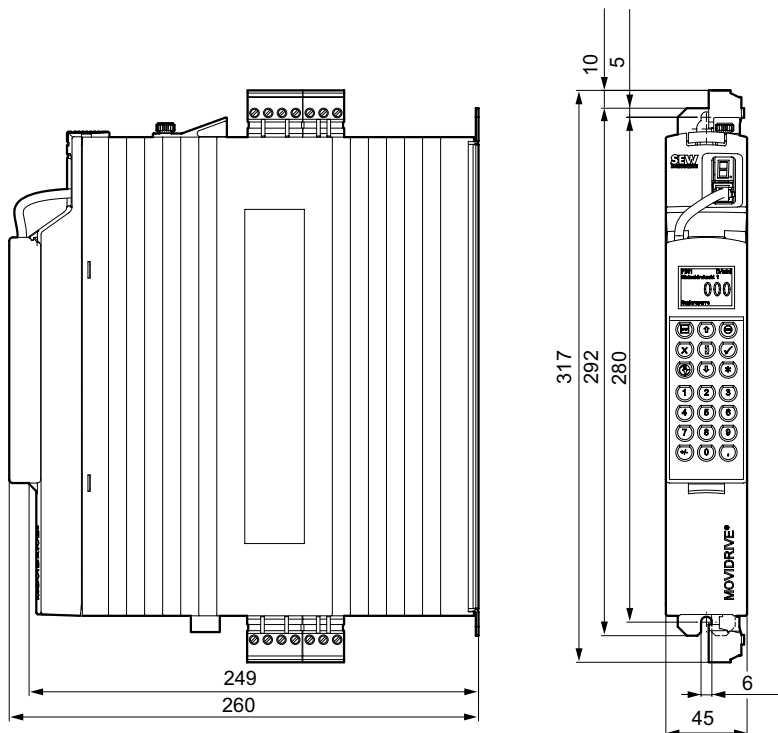
53019BXX

Figure 42: Dimension drawing for MDX60B size 0S, dimensions in mm

Size 0S with mounted braking resistor
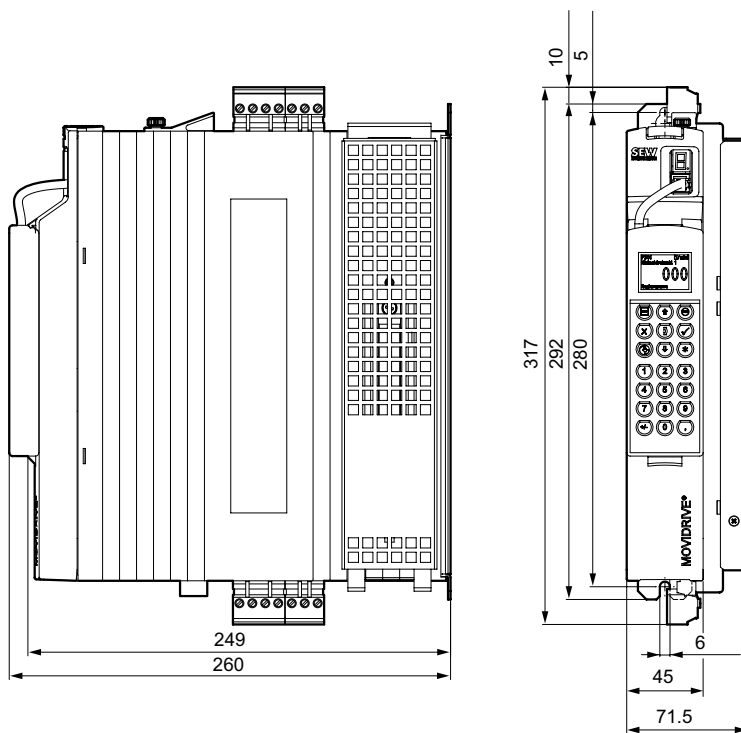
53020BXX

Figure 43: Dimension drawing for MDX60B size 0S with braking resistor, dimensions in mm
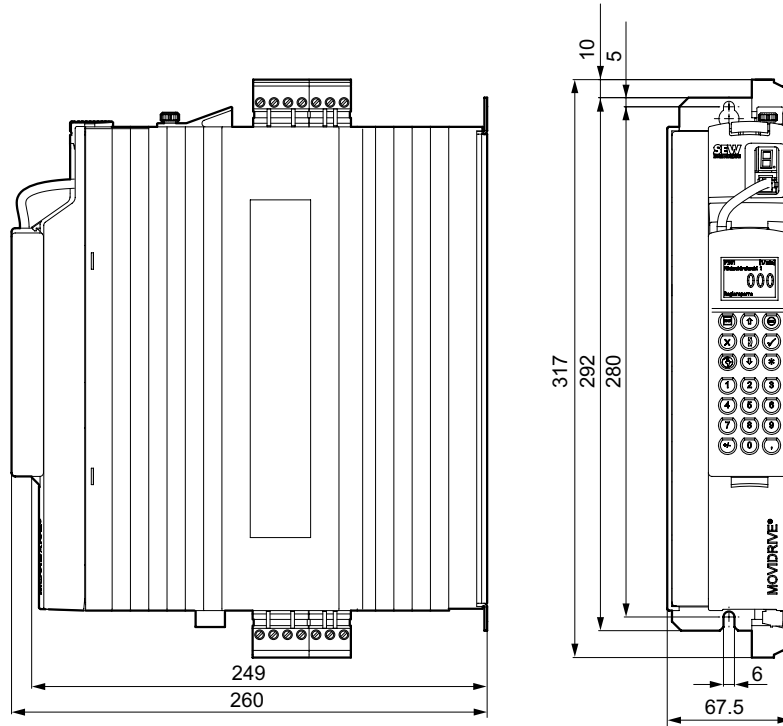
Size 0M

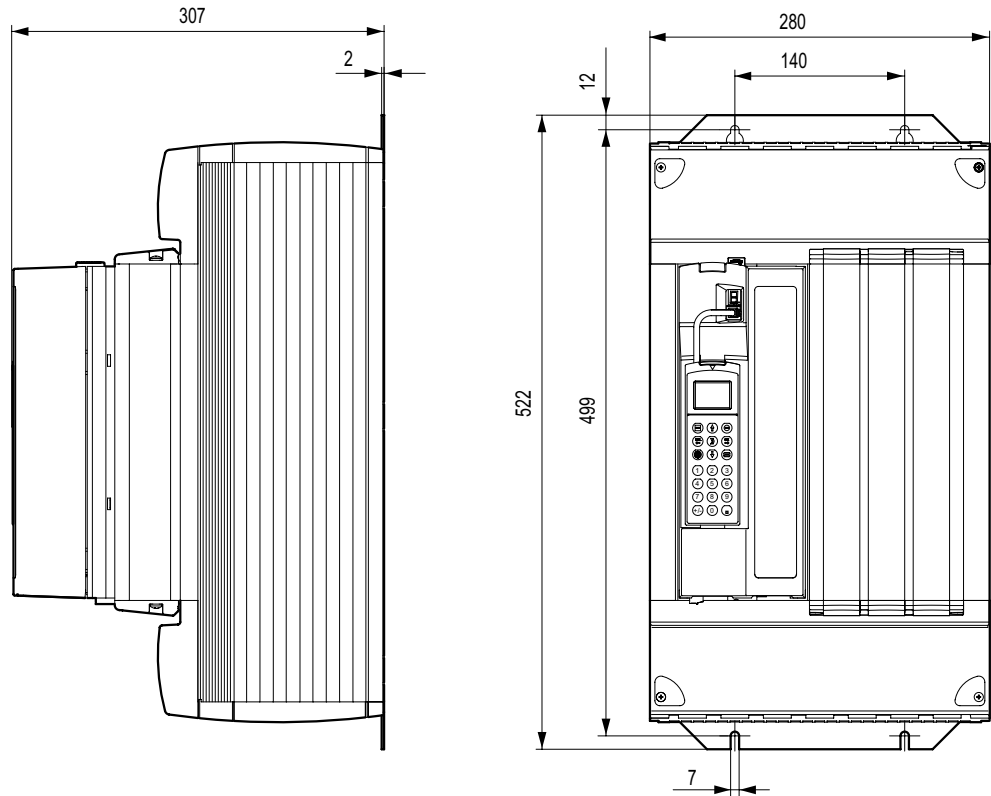*Figure 44: Dimension drawing for MDX60B size 0M, dimensions in mm*

53022BXX

*Size 0M with
mounted braking
resistor*
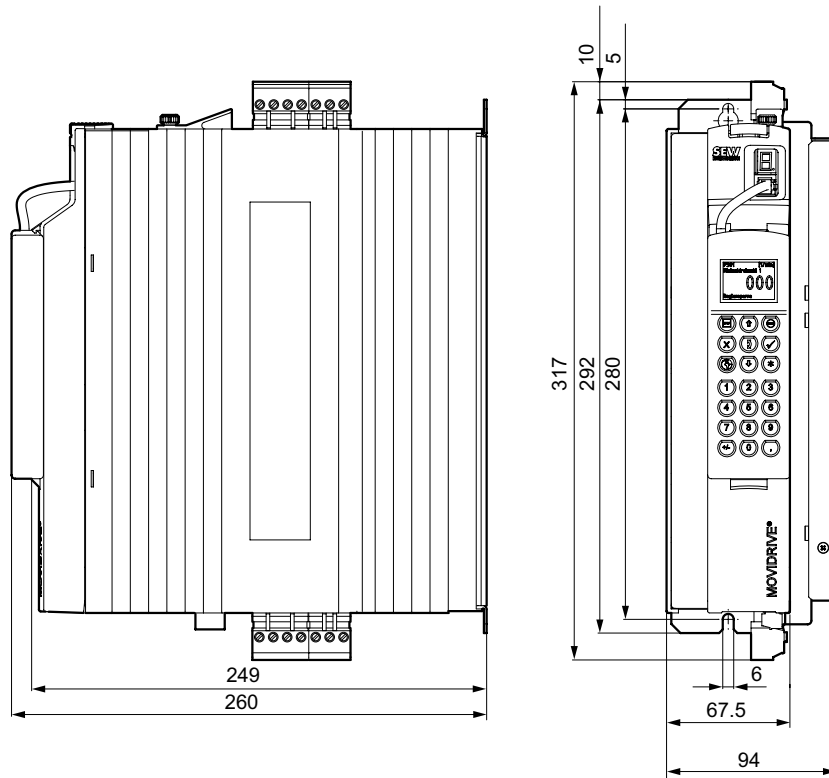
53023BXX

Figure 45: Dimension drawing for MDX60B size 0M with braking resistor, dimensions in mm
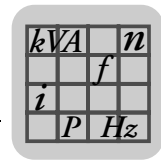
9.7   MOVIDRIVE® MDX61B dimension drawings

	NOTE
i	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
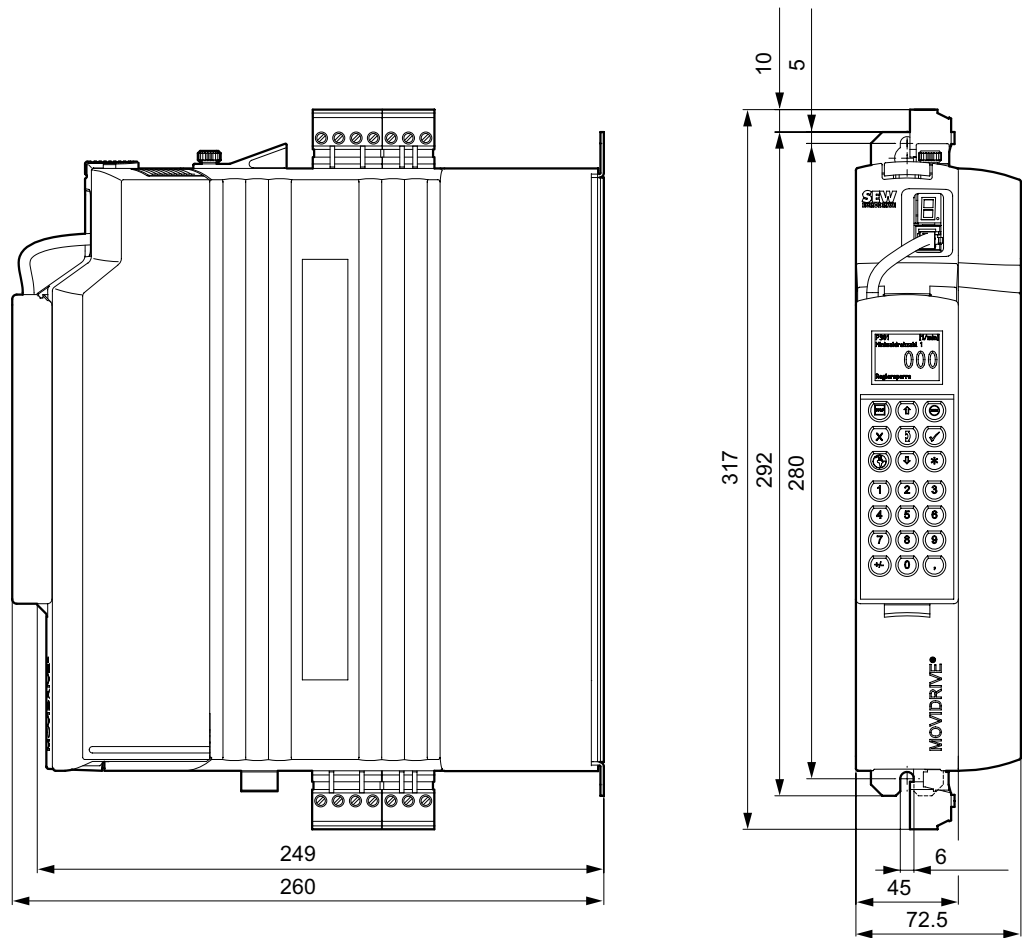
51381BXX

Figure 46: Dimension drawing for MDX61B size 0S, dimensions in mm
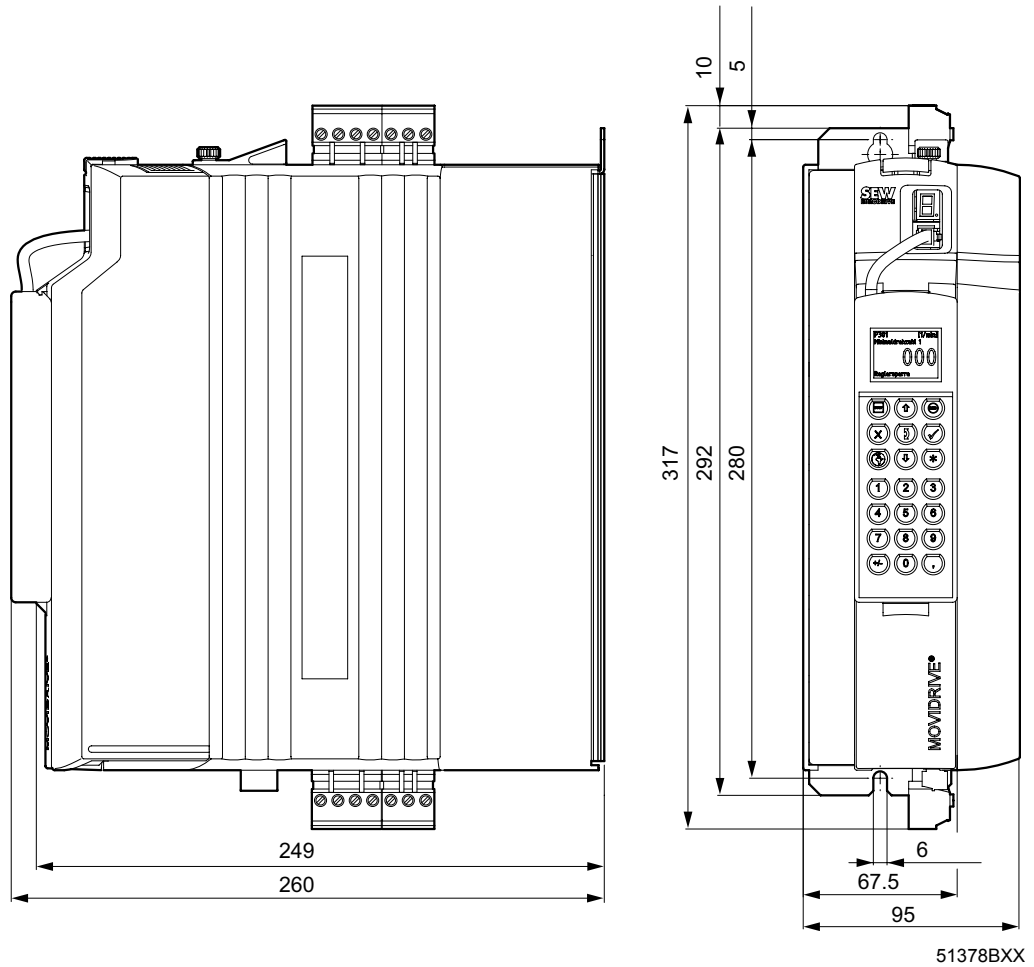
Size 0M

Figure 47: Dimension drawing for MDX61B size 0M, dimensions in mm

51378BXX
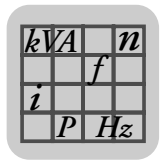
Size 1
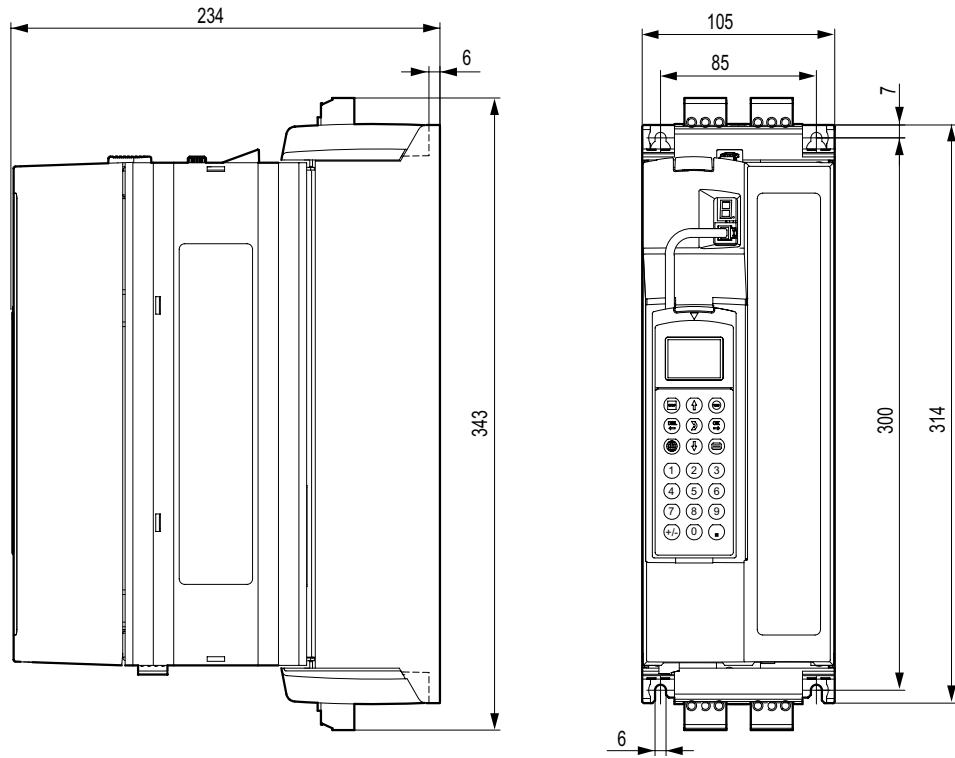
Figure 48: Dimension drawing for MDX61B size 1, dimensions in mm

52274BXX
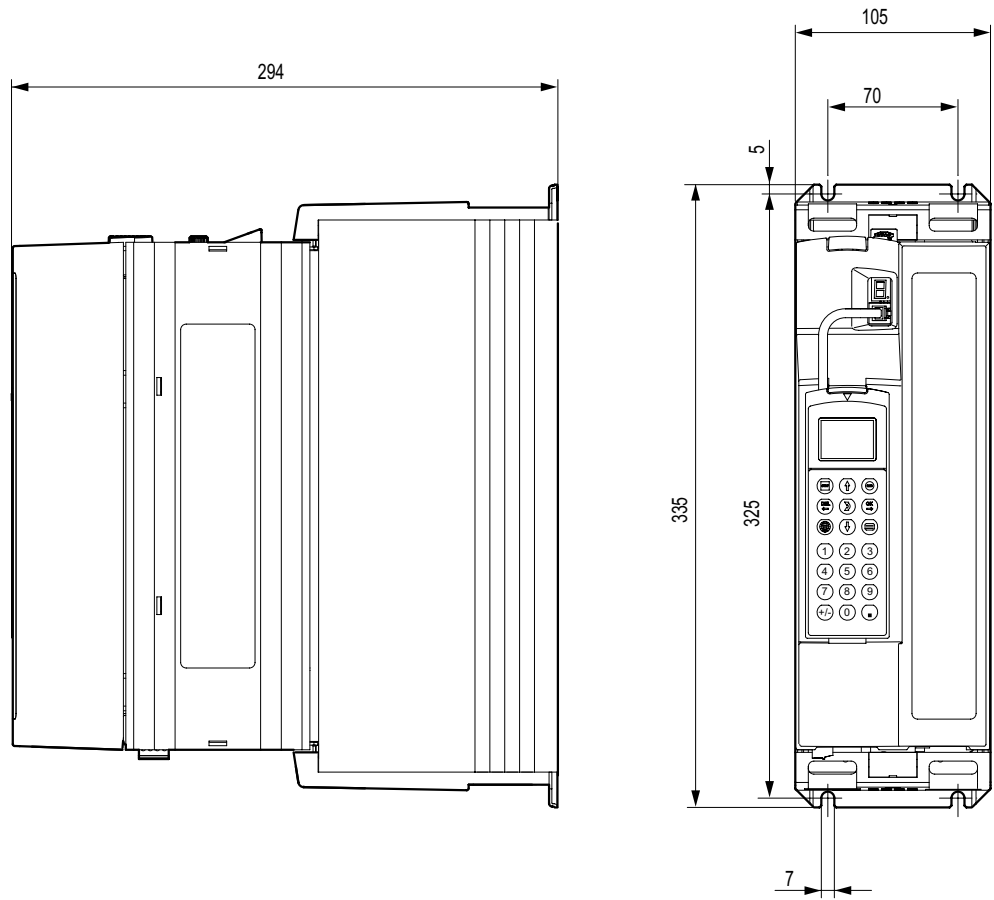
Size 2S

52273BXX

Figure 49: Dimension drawing for MDX61B size 2S, dimensions in mm
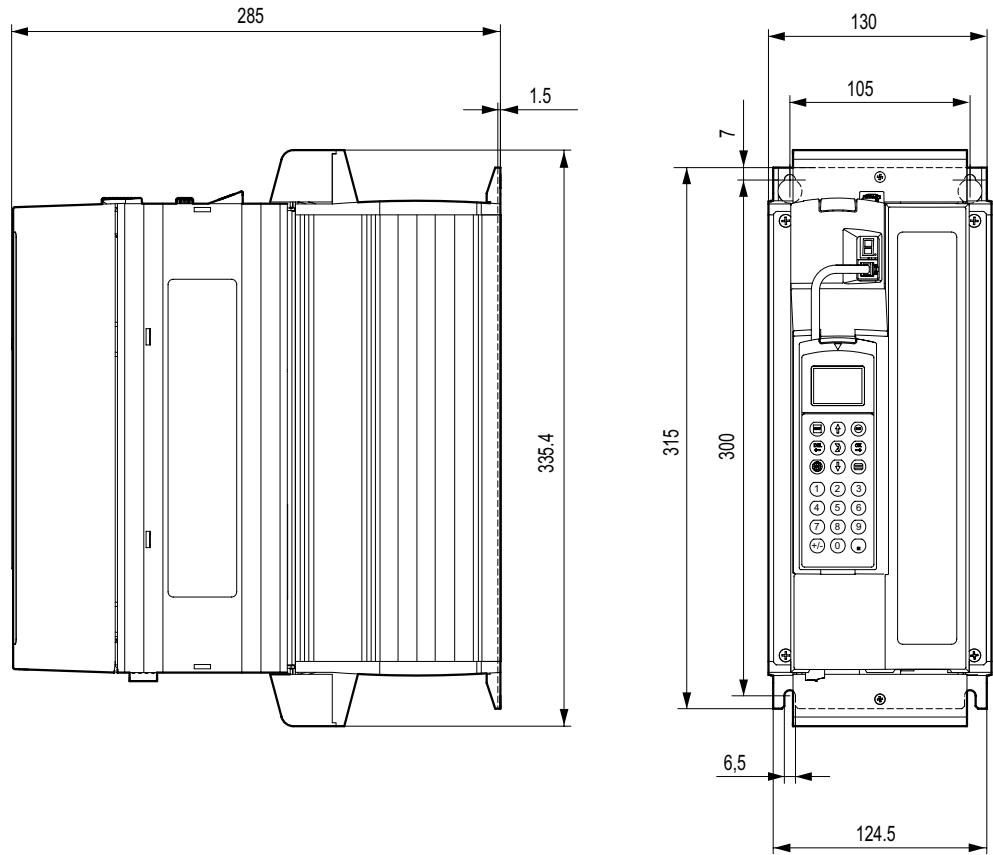
Size 2

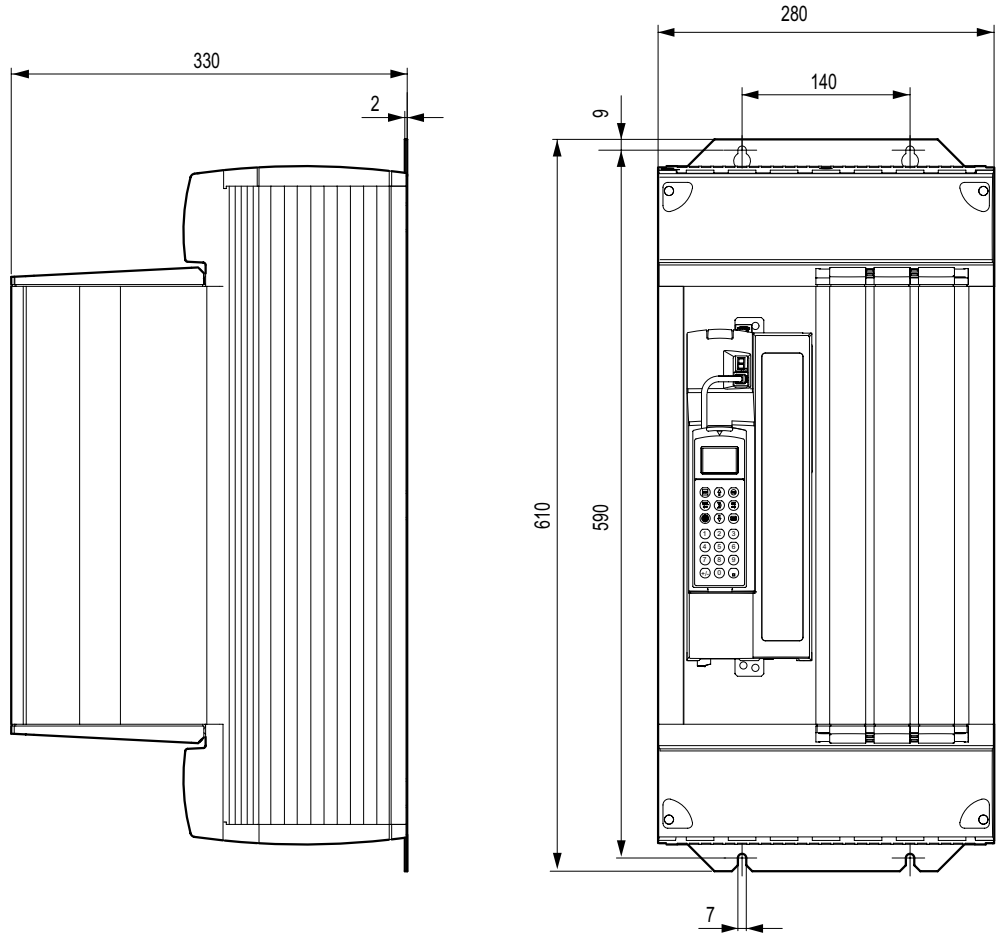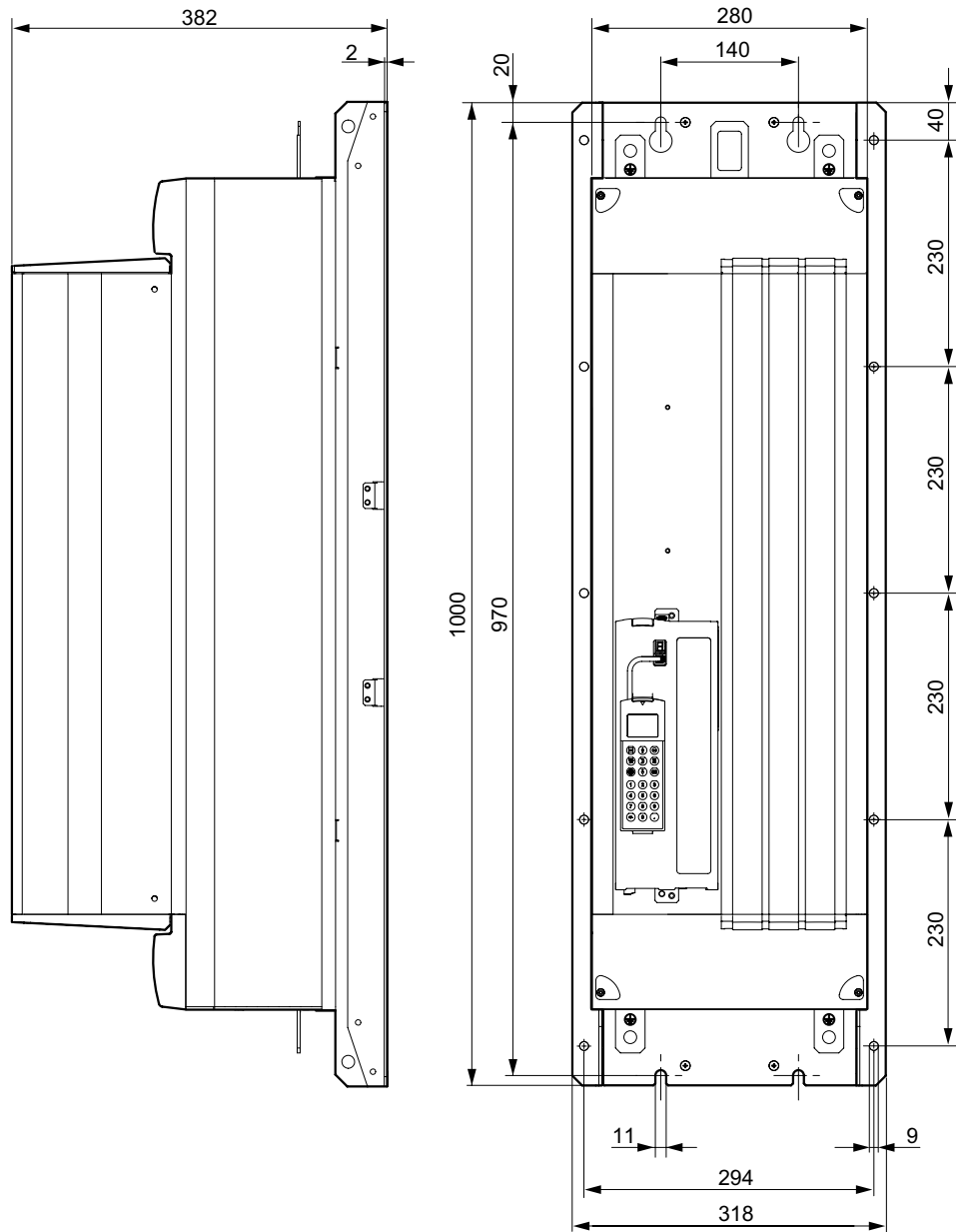*Figure 50: Dimension drawing for MDX61B size 2, dimensions in mm*

52276BXX
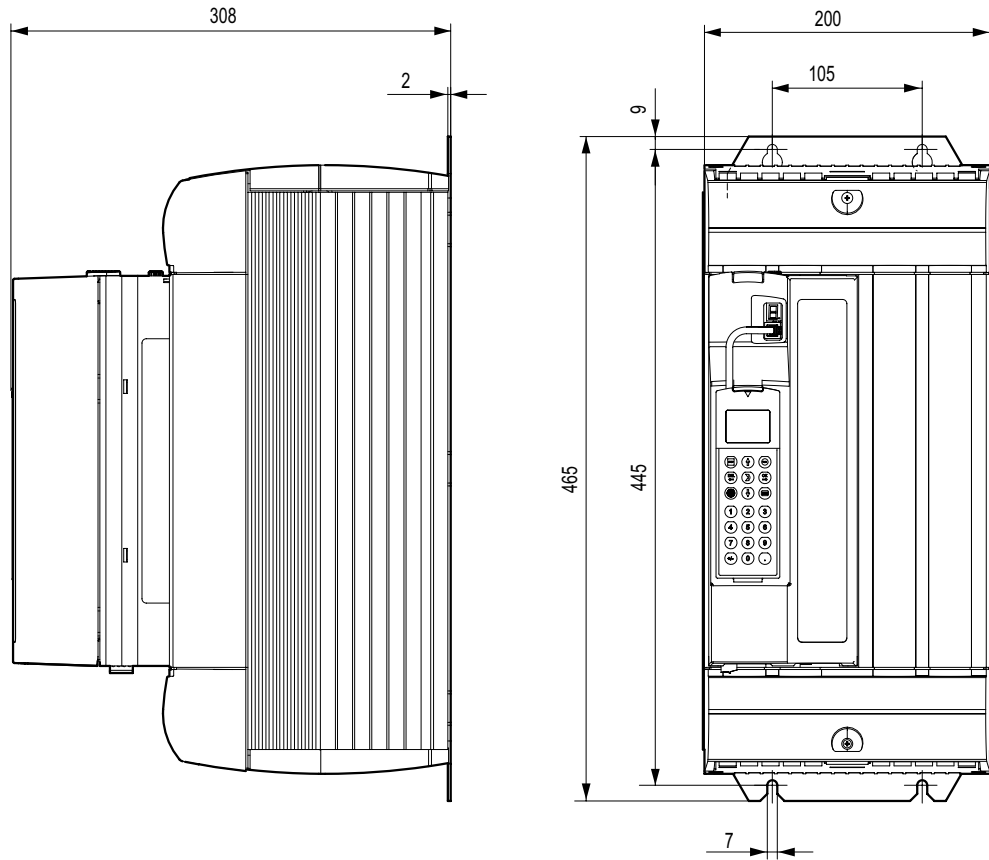
Size 3

52315BXX

Figure 51: Dimension drawing for MDX61B size 3, dimensions in mm

Size 4

52277BXX

Figure 52: Dimension drawing for MDX61B size 4, dimensions in mm
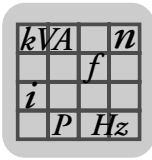
Size 5

52278BXX

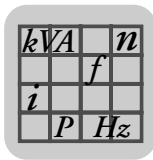*Figure 53: Dimension drawing for MDX61B size 5, dimensions in mm*

Size 6

53389BXX

Figure 54: Dimension drawing for MDX61B size 6, dimensions in mm

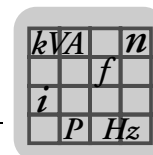## 9.8 Technical data for options DEH11B, DER11B and BW...-T/...-P

"HIPERFACE® encoder card type DEH11B"

Option DEH11B		
DEH 11B X14 X15 53156AXX	**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 (Hiperface® encoder on X15) • as at X51: Motor encoder input (sin/cos encoder or TTL sensor with negated tracks at X15)	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 V, I_{max} = DC 650 mA[1]
	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 [increments/revolution] Encoder power supply: DC+12 V, I_{max} = DC 650 mA[1]	

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

Resolver card type DER11B

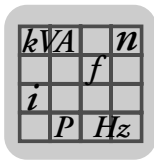| Option DER11B		
DER 11B X14 X15 53157AXX	**Output for incremental encoder simulation or external encoder input X14:**	Output for incremental encoder simulation: Signal level to RS422 The number of pulses is 1024 pulses/revolution	External encoder input (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder • sin/cos encoder AC 1 V_{SS} • TTL encoder with negated tracks Encoder power supply: DC+12 V, I_{max} = DC 650 mA
	Motor encoder input X15:	Resolver 2-pole, U_{ref} = AC 3.5 V_{eff}, 4 kHz U_{in} / U_{ref} = 0.5	

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

Braking resistor BW...-T / BW...-P	
Connection cross section for signal contact	$1 \times 2.5 \text{ mm}^2$
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

9.9 Technical data of DIO11B and DFC11B options

Input/output card type DIO11B

DIO11B option			
  53159AXX	Setpoint input n2 Mode AI21/AI22 Resolution Internal resistance	X20:1/X20:2	AI21/AI22: Voltage input Differential input or input with AGND reference potential n2 = DC 0...+10 V or DC -10 V...0...+10 V 12 bit, sampling time 1 ms R_i = 40 kΩ
	Analog outputs Response time Resolution	X21:1/X21:4 X21:2/X21:5	AOV1/AOV2: Voltage outputs DC -10 V...0...+10 V, I_{max} = DC 10 mA, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_ AOC1/AOC2: Current outputs DC 0(4)...20 mA, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_ 5 ms 12 bit
	Binary inputs X22:1...X22:8 Internal resistance		Isolated (optocoupler), PLC compatible (EN 61131) DI1Ø...DI17 R_i ≈ 3 kΩ, I_E ≈ DC 10 mA Sampling interval 1 ms
	Signal level		DC+13 V...+30 V= "1" = Contact closed DC-3 V...+5 V = "0" = Contact open	Fulfills EN 61131
	Function	X22:1...X22:8	DI10...DI17: Selection option → Parameter menu P61_
	Binary outputs	X23:1...X23:8	DO1Ø...DO17: PLC-compatible (EN 61131-2), response time 1ms
	Signal level		"0" = DC 0 V "1" = DC+24 V
	Function	X23:1...X23:8	DO10...DO17: Selection option → Parameter menu P63_, I_{max} = DC 50 mA, short-circuit proof and protected against external voltage to DC 30 V
	Reference terminals X20:3/X21:3/X21:6 	 X22:9 X22:10	AGND: Reference potential for analog signals (AI21/AI22/AO_1/AO_2) DCOM: Reference potential for binary inputs X22:1...X22:8 (DI1Ø...DI17) DGND: Reference potential for binary signals, reference potential for DC 24 V power supply
	Voltage input	X23:9	24VIN: Supply voltage DC +24 V for binary outputs DO1Ø...DO17
	Permitted line cross section		One core per terminal: $0.08...1.5 \text{ mm}^2$ (AWG 28...16) Two cores per terminal: $0.25...1 \text{ mm}^2$ (AWG 22...17)

Note: In the signal level row, "Fulfills EN 61131" spans the rightmost position.

CAN bus interface type DFC11B

DFC11B option		
DFC 11B ON OFF R nc S1 3 2 1 X31 X30 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

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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** Gear units / Motors	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-gm@sew-eurodrive.de
	Central Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-mitte-e@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 Dänkritzer 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
	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**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Assembly **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62, avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 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 Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

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

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

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.caron-vector.be info@caron-vector.be

Brazil			
Production Sales Service	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	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

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 4322-99 Fax +237 4277-03

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 l.reynolds@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 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly Sales Service	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 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 gm-tianjin@sew-eurodrive.cn http://www.sew-eurodrive.com.cn
Assembly Sales Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew.com.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@net.hr

Czech Republic			
Sales	Praha	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luzna 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, P.O. Box 100 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	Tallin	ALAS-KUUL AS Mustamäe tee 24 EE-10620Tallin	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

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 sew@sewhk.com

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	Baroda	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi • Baroda - 391 243 Gujarat	Tel. +91 265 2831086 Fax +91 265 2831087 http://www.seweurodriveindia.com mdoffice@seweurodriveindia.com
Technical Offices	Bangalore	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore	Tel. +91 80 22266565 Fax +91 80 22266569 salesbang@seweurodriveinindia.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

Israel			
Sales	Tel-Aviv	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 lirazhandasa@barak-online.net

Italy			
Assembly Sales Service	Milano	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 02 96 9801 Fax +39 02 96 799781 http://www.sew-eurodrive.it sewit@sew-eurodrive.it

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	Toyoda-cho	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp

Korea			
Assembly Sales Service	Ansan-City	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr 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.caron-vector.be 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 Industrail 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 richard.miekisiak@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 69 241-020 Fax +47 69 241-040 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 http://www.sew-eurodrive.com.pe sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	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. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
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 dipar@yubc.net

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. Rybnicna 40 SK-83107 Bratislava	Tel. +421 2 49595201 Fax +421 2 49595200 http://www.sew.sk sew@sew-eurodrive.sk
	Zilina	SEW-Eurodrive SK s.r.o. ul. Vojtecha Spanyola 33 SK-010 01 Zilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	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. UI. 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

South Africa			
	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 9 4431 84-70 Fax +34 9 4431 84-71 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**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76 tms@tms.com.tn

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 164 3838014/15 Fax +90 216 3055867 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

USA			
Assembly Sales Service	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 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 sewventas@cantv.net sewfinanzas@cantv.net
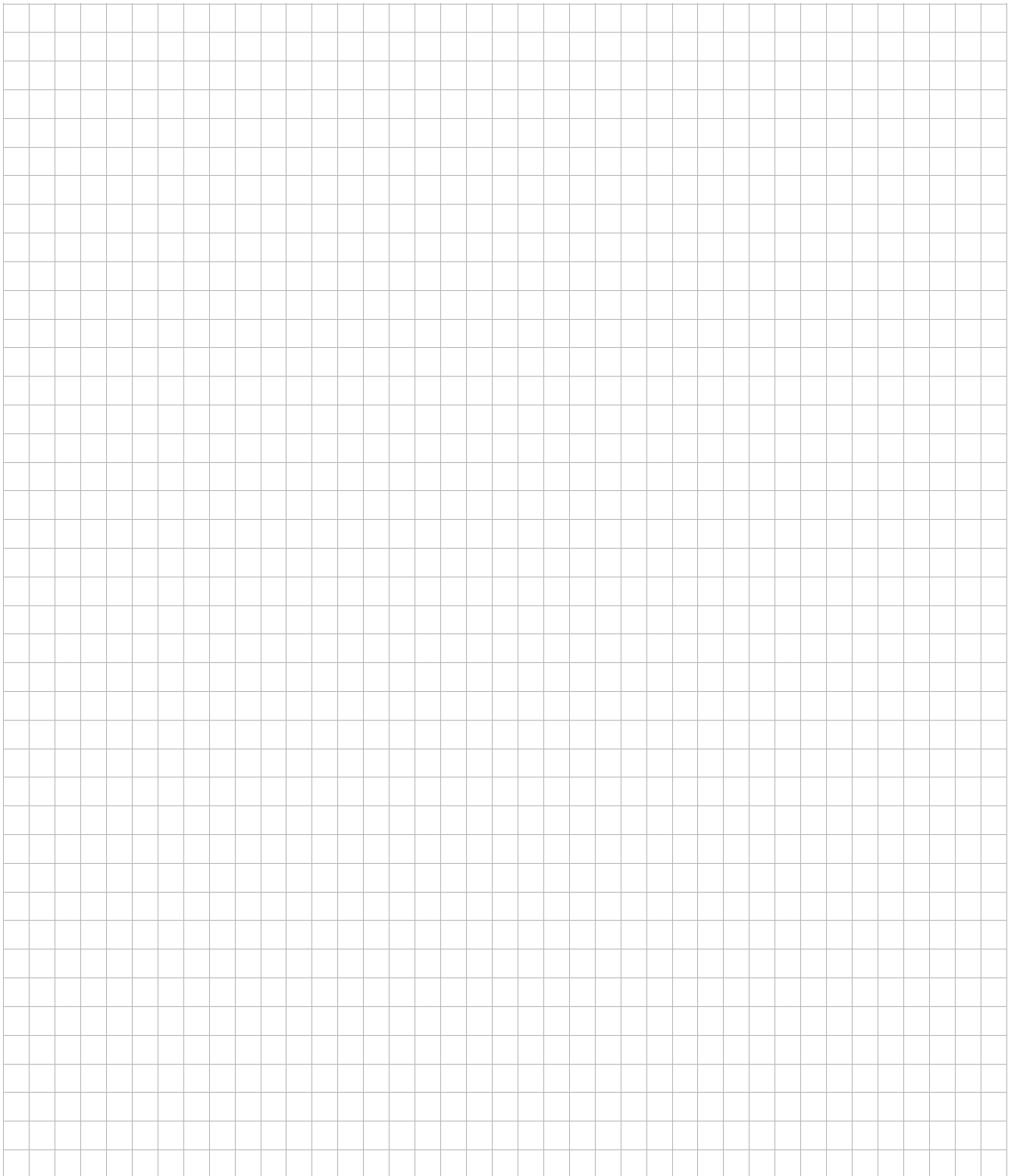
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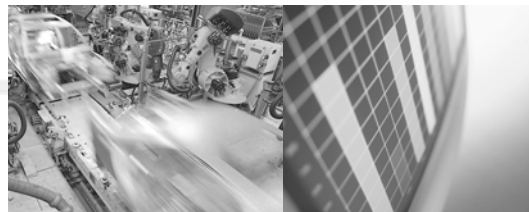develop the
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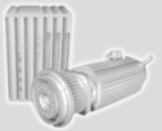service network that is
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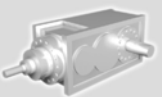cost and complexity of
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