Drive Technology \ Drive Automation \ System Integration \ Services

System Manual

MOVIDRIVE® MDX60B/61B

Edition 08/2017

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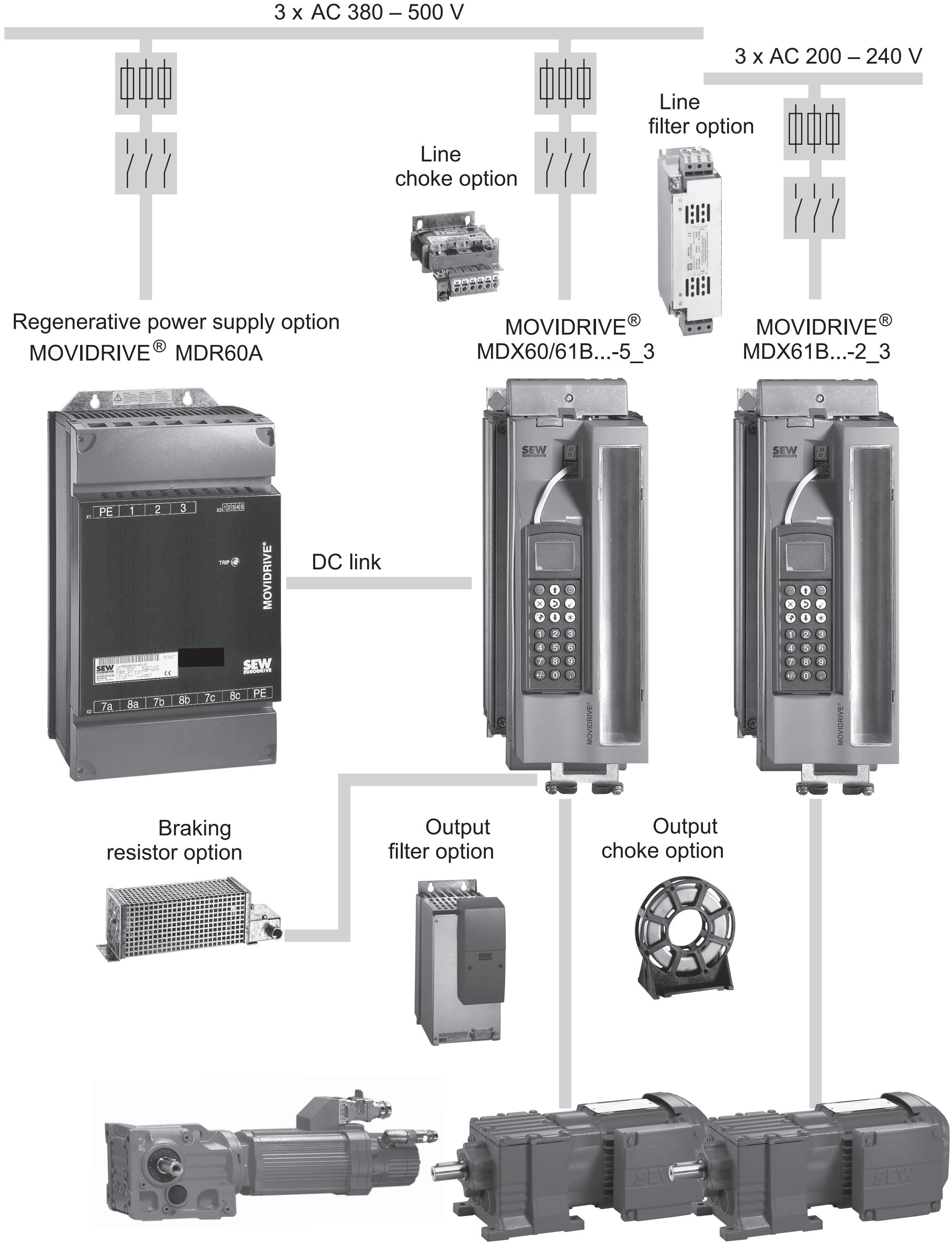
1 System description

1.1 System overview of MOVIDRIVE® MDX60B/61B

1.1.1 Power components



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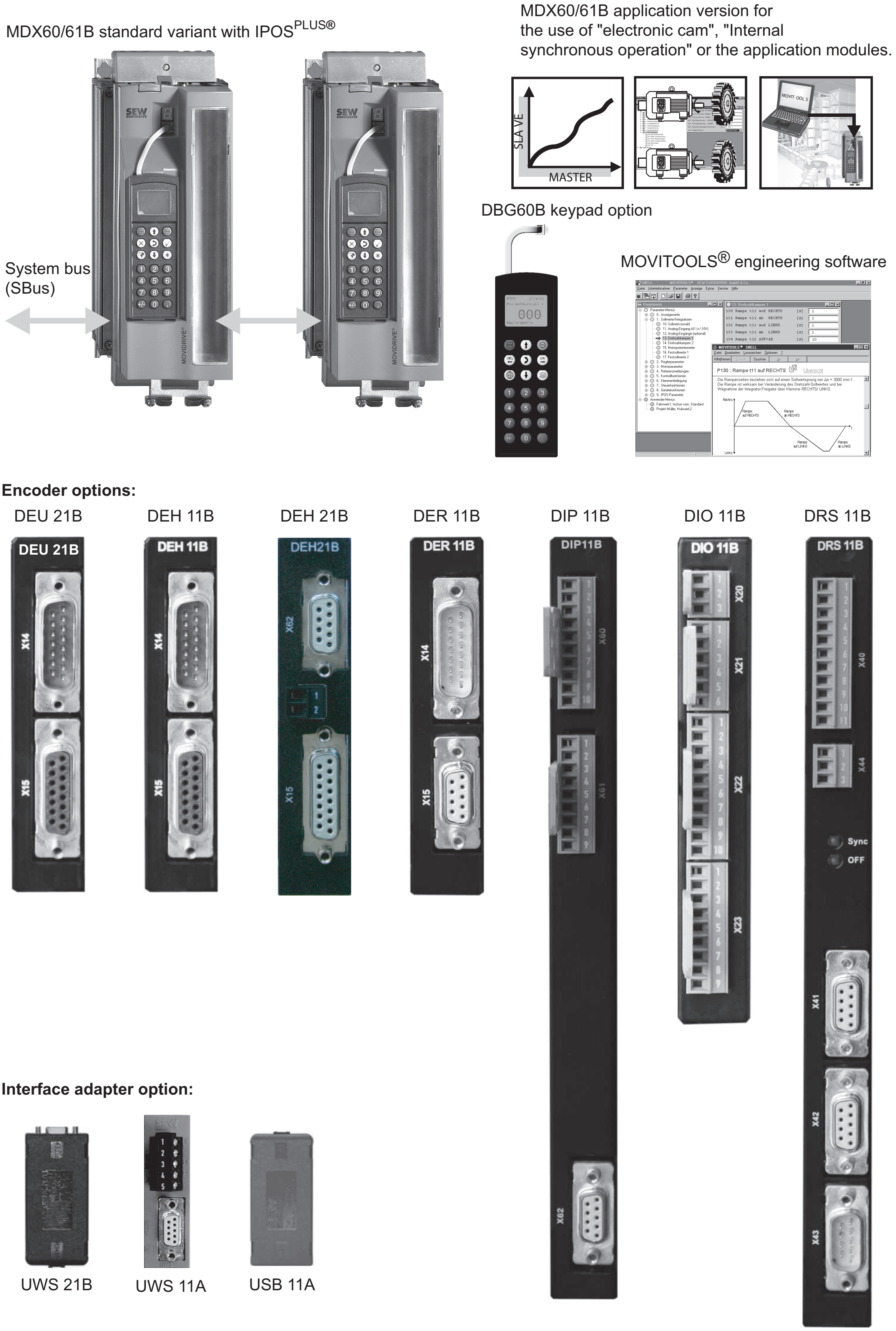
1.1.2 Encoder and communication options



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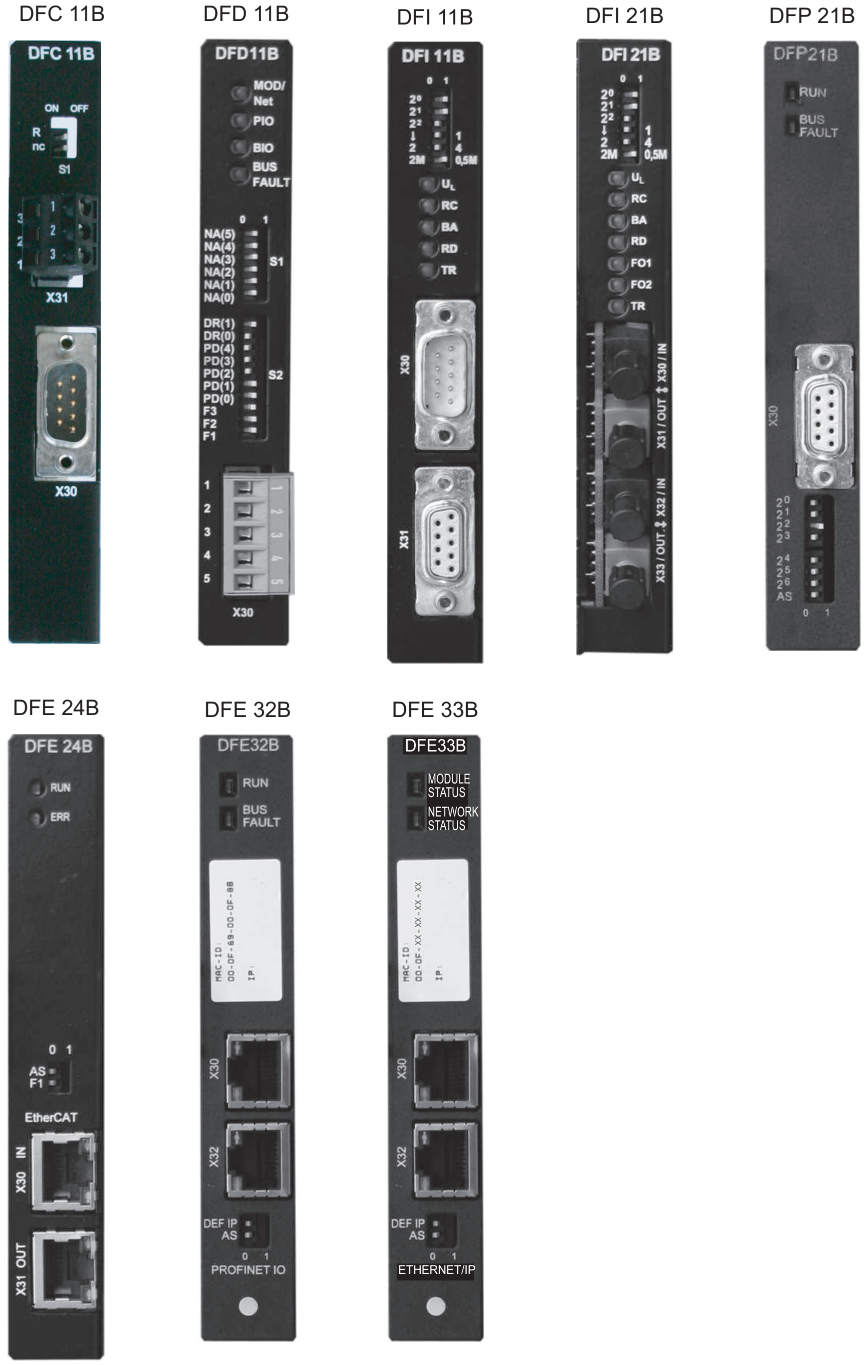
1.1.3 Fieldbus options



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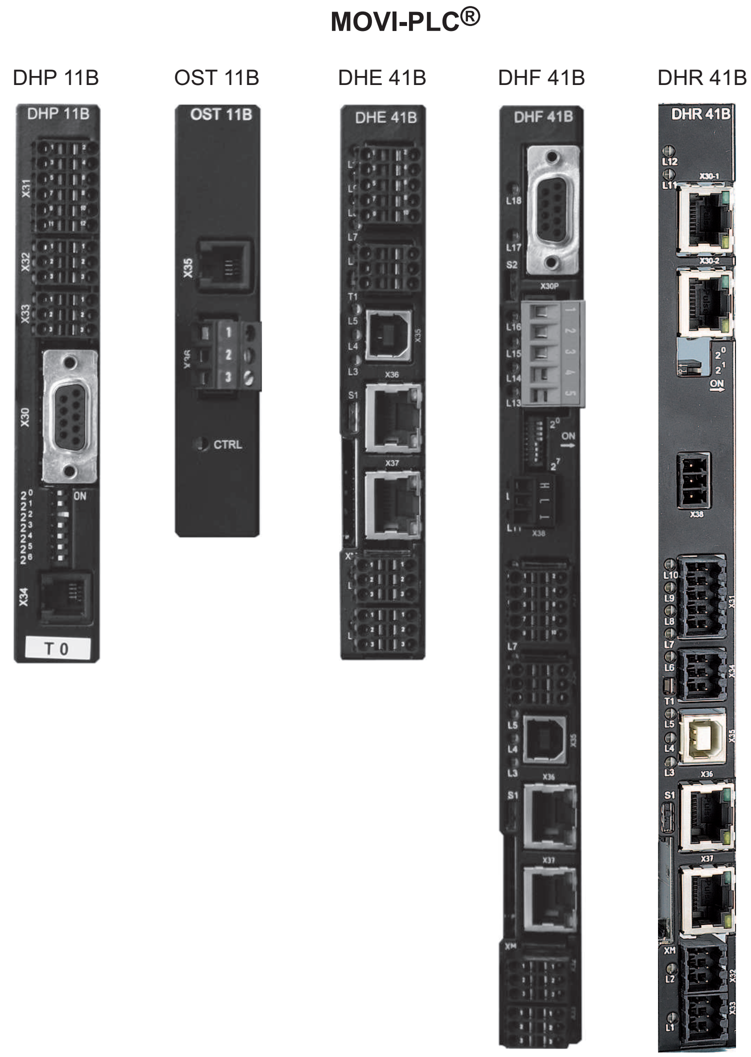
1.1.4 Control options



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1.1.5 Safety options

DFS 11B DFS 12B DFS 21B DFS 22B DCS 21B/22B DCS 31B/32B

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1.1.6 Description

This documentation describes the **MOVIDRIVE® MDX60B/61B** drive inverters by SEW-EURODRIVE. The drive inverters of the MOVIDRIVE® B series impress with their proven basic functions and the modular device concept.

Three-phase drives in the power range 0.55 – 315 kW can be flexibly operated in combination with inverter technology. The levels of dynamic performance and control quality that can now be achieved with MOVIDRIVE® for asynchronous AC motors were only possible using servo drives or DC motors in the past. The integrated control functionality and the option to extend the drive using technology and communication options creates drive systems that are designed to be particularly cost-effective with regards to the diversity of applications, project planning, startup and operation.

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1.1.7 Low-emission

The MOVIDRIVE® MDX60B/61B drive inverters are produced according to particularly low-emission regulations, but with the usual high level of quality. One particular feature is the consistent use of lead-free soldering materials in the production of electronics products. These lead-free soldering processes are in line with the RoHS 2011/65/EU Directive and the law on electronic equipment.

1.1.8 Product family

The **MOVIDRIVE®** device family includes three series:

- MOVIDRIVE® MDX60B: Drive inverter for asynchronous AC motors without encoder feedback. The devices are not option-capable.
- MOVIDRIVE® MDX61B: Drive inverter for asynchronous AC motors with or without encoder feedback, or for asynchronous and synchronous servomotors. The devices are option-capable.
- MOVIDRIVE® MDR60A/61B: Regenerative power supply; MOVIDRIVE® drive inverters (400/500 V devices) operate in regenerative mode to feed energy back into the supply system.

1.1.9 Unit variants

MOVIDRIVE® MDX60B/61B size 0 – 6 drive inverters are available in two variants, namely the standard design and the technology version. MOVIDRIVE® MDX60B/61B size 7 drive inverters are only available as technology version with coated PCBs (-0T/L).

Standard design

The devices are equipped with integrated IPOS$^{PLUS®}$ positioning and sequence control as standard. MOVIDRIVE® MDX61B can be expanded with the available options.

The standard version is indicated by the "00" digits at the end of the type designation.

Technology version

In addition to the features of the standard design, these devices include the electronic cam and internal synchronous operation technology functions. Furthermore, you can use all the application modules available in the MOVITOOLS® MotionStudio engineering software with the devices in application version.

The technology version is indicated by "0T" following the type designation.

Variants with coated printed circuit boards

The devices are designed for use in harsh environments. The coating of the printed circuit boards increases their resistivity against environmental influences.

The design with coated PCBs is indicated by "/L" at the end of the type designation.

1.1.10 Modular unit concept

The option-capable MOVIDRIVE® MDX61B devices have the following option card slots:

- Size 0 (0005 – 0014) → 2 option card slots

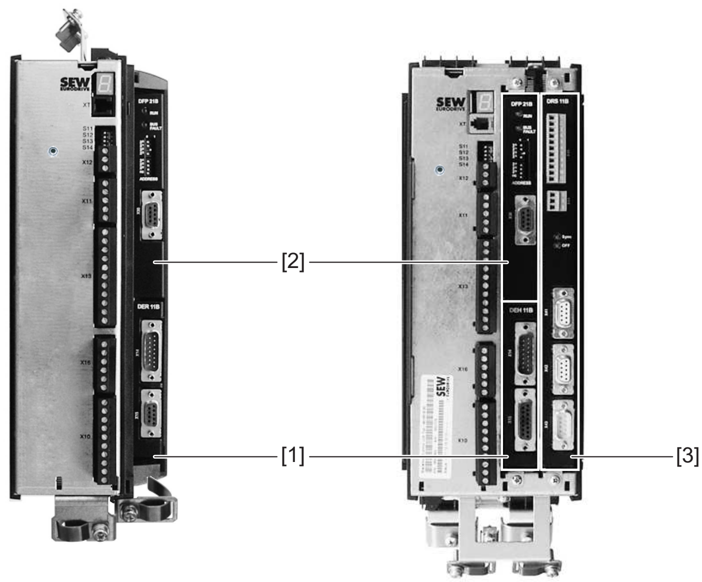
  – 1 option card slot for encoder connection
  – 1 option card slot for a communication option
- Size 1 – 7 (0015 – 2500) → 3 option card slots
  – 1 option card slot for encoder connection
  – 1 option card slot for a communication option
  – 1 option card slot for an expansion option

INFORMATION

- **Customers can only install or remove option cards later on in MDX61B sizes 1 to 7. The firmware of the option cards and the basic device must be compatible.**
- For **MDX61B devices in size 0, option cards can only be installed and removed later on by SEW-EURODRIVE.** Please take this aspect into account when you place your order/perform project planning.

1.1.11 Option card slots of MOVIDRIVE® MDX61B

Size 0 (0005 – 0014) Size 1 – 7 (0015 – 2500)



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[1] Encoder slot for encoder option

[2] Fieldbus slot for communication option

[3] Expansion slot for communication option (only sizes 1 – 7)

The modular device concept allows you to choose the right option according to your application. For example, when you have an asynchronous AC motor with encoder feedback (HIPERFACE®, sin/cos, or TTL), you would need the HIPERFACE® encoder card type option DEH11B.

Application	Required option	Option card slot
Encoder option		

Application	Required option	Option card slot
Asynchronous AC motor with encoder feedback (HIPERFACE®, sin/cos, TTL)	HIPERFACE® encoder card DEH11B	1
Asynchronous or synchronous servomotor with HIPERFACE® encoder		
Synchronous servomotor with resolver	Resolver card type DER11B	
Asynchronous or synchronous motors with absolute encoder	DEU21B multi-encoder card	
SSI encoder interface	DEH21B absolute encoder card	
Communication options (fieldbus, control)		
User-programmable MOVI-PLC® controller	MOVI-PLC®*basic* DHP11B controller	2 (3 only if slot 2 is occupied)
Additional RS485 interface (only in combination with option DHP11B)	DHP11B + OST11B	• DHP11B in 2, OST11B in 1 • If 1 is occupied: DHP11B + OST11B in 3
Freely programmable motion and logic controller (MOVI-PLC®)	Controller • DHE21B (standard) • DHE41B (advanced)	2 (3 only if slot 2 is occupied)
	Controller • DHF21B (standard) • DHF41B (advanced)	3
	Controller • DHR21B (standard) • DHR41B (advanced)	3
Additional analog and digital inputs/outputs are required	Input/output card type DIO11B	2 (3 only if slot 2 is occupied)

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Application	Required option	Option card slot
Integration into an PROFIBUS system	PROFIBUS interface type DFP21B	2
Integration into a PROFIBUS system with PROFIsafe	DFS11B fieldbus interface	
Integration into an INTERBUS system	INTERBUS interface type DFI11B / DFI21B	
Integration into an Ethernet system with PROFIsafe	DFS21B fieldbus interface	
Integration into an EtherCAT® system	EtherCAT® interface type DFE24B	
Integration into an DeviceNet system	DeviceNet™ interface type DFD11B	
Integration into an CANopen system	CANopen interface type DFC11B	
Expansion option		
SSI encoder interface	DIP11B absolute encoder card	3
Phase-synchronous operation	Synchronous operation card DRS11B	
Safety module	DCS21B/22B option (only in combination with DFS12B/22B option) / DCS31B/32B	

1.1.12 Control modes

The VFC (Voltage Mode Flux Control) and CFC (Current Mode Flux Control)/SERVO control modes are features of MOVIDRIVE® MDX60B/61B drive inverters. The continuous calculation of the complete motor model forms the basis for both control modes.

VFC control mode (Voltage Mode Flux Control)	Control mode CFC (Current Mode Flux Control)/SERVO
Voltage-controlled control mode for asynchronous AC motors with and without encoder feedback. • With encoder feedback – At least 150% torque, with a power-matched, stopped motor – Characteristics similar to servo operation • Without encoder feedback – At least 150% torque up to 0.5 Hz, with a power-matched motor	Current-controlled control mode for asynchronous and synchronous servomotors. Encoder feedback is always required. • At least 160% torque, with a power-matched, stopped motor • Maximum precision and concentric running characteristics right down to standstill • servo characteristics and torque control even for asynchronous AC motors • reacts to load changes within a few milliseconds

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1.1.13 System bus (SBus)

The system bus (SBus), which is installed as standard, allows several MOVIDRIVE® drive inverters to be networked together. This system bus enables fast data exchange between the devices. The MOVILINK® device profile is used for communication via the SBus. MOVILINK® is the universal SEW-EURODRIVE standard for serial communication. The SBus can be switched to CANopen.

1.1.14 MOVILINK®

MOVILINK® always uses the same message format independent of the selected interface (SBus, RS485, fieldbus interfaces). As a result, the control software is independent of the selected interface.

1.1.15 IPOS^PLUS®

A significant feature of MOVIDRIVE® drive inverters is that the IPOS^PLUS® positioning and sequence control system is integrated as a standard. IPOS^PLUS® enables you to control sequences of motion directly in the inverter, right on the plant floor. The load on the higher-level controller is reduced and modular concepts are easier to implement.

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1.1.16 Device overview

MOVIDRIVE® MDX60/61B for 3 × AC 380 – 500 V connection voltage (400/500 V devices):

Recommended motor power (VFC)		Continuous output current	MOVIDRIVE® type		Size
			MDX60B not option-capable	MDX61B Option-capable	
4Q devices (with brake chopper)					
0.55 kW	0.75 kW	AC 2.0 A	0005-5A3-4-..	0005-5A3-4-..	0
0.75 kW	1.1 kW	AC 2.4 A	0008-5A3-4-..	0008-5A3-4-..	
1.1 kW	1.5 kW	AC 3.1 A	0011-5A3-4-..	0011-5A3-4-..	
1.5 kW	2.2 kW	AC 4.0 A	0014-5A3-4-..	0014-5A3-4-..	
1.5 kW	2.2 kW	AC 4.0 A	–	0015-5A3-4-..	1
2.2 kW	3.0 kW	AC 5.5 A	–	0022-5A3-4-..	
3.0 kW	4.0 kW	AC 7.0 A	–	0030-5A3-4-..	
4.0 kW	5.5 kW	AC 9.5 A	–	0040-5A3-4-..	
5.5 kW	7.5 kW	AC 12.5 A	–	0055-5A3-4-..	2S, 2
7.5 kW	11 kW	AC 16 A	–	0075-5A3-4-..	
11 kW	15 kW	AC 24 A	–	0110-5A3-4-..	
15 kW	22 kW	AC 32 A	–	0150-503-4-..	3
22 kW	30 kW	AC 46 A	–	0220-503-4-..	
30 kW	37 kW	AC 60 A	–	0300-503-4-..	
37 kW	45 kW	AC 73 A	–	0370-503-4-..	4
45 kW	55 kW	AC 89 A	–	0450-503-4-..	
55 kW	75 kW	AC 105 A	–	0550-503-4-..	5
75 kW	90 kW	AC 130 A	–	0750-503-4-..	
90 kW	110 kW	AC 170 A	–	0900-503-4-..	6
110 kW	132 kW	AC 200 A	–	1100-503-4-..	
132 kW	160 kW	AC 250 A	–	1320-503-4-..	
2Q devices (without brake chopper)					
160 kW	200 kW	AC 300 A	–	1600-503-2-0T/L	7
200 kW	250 kW	AC 380 A	–	2000-503-2-0T/L	
250 kW	315 kW	AC 470 A	–	2500-503-2-0T/L	
4Q devices (with brake chopper)					

Recommended motor power (VFC)		Continuous output current	MOVIDRIVE® type		Size
			MDX60B not option-capable	**MDX61B** Option-capable	
160 kW	200 kW	AC 300 A	–	1600-503-4-0T/L	7
200 kW	250 kW	AC 380 A	–	2000-503-4-0T/L	
250 kW	315 kW	AC 470 A	–	2500-503-4-0T/L	

MOVIDRIVE® MDX60/61B for 3 × AC 200 – 240 V connection voltage (230 V devices):

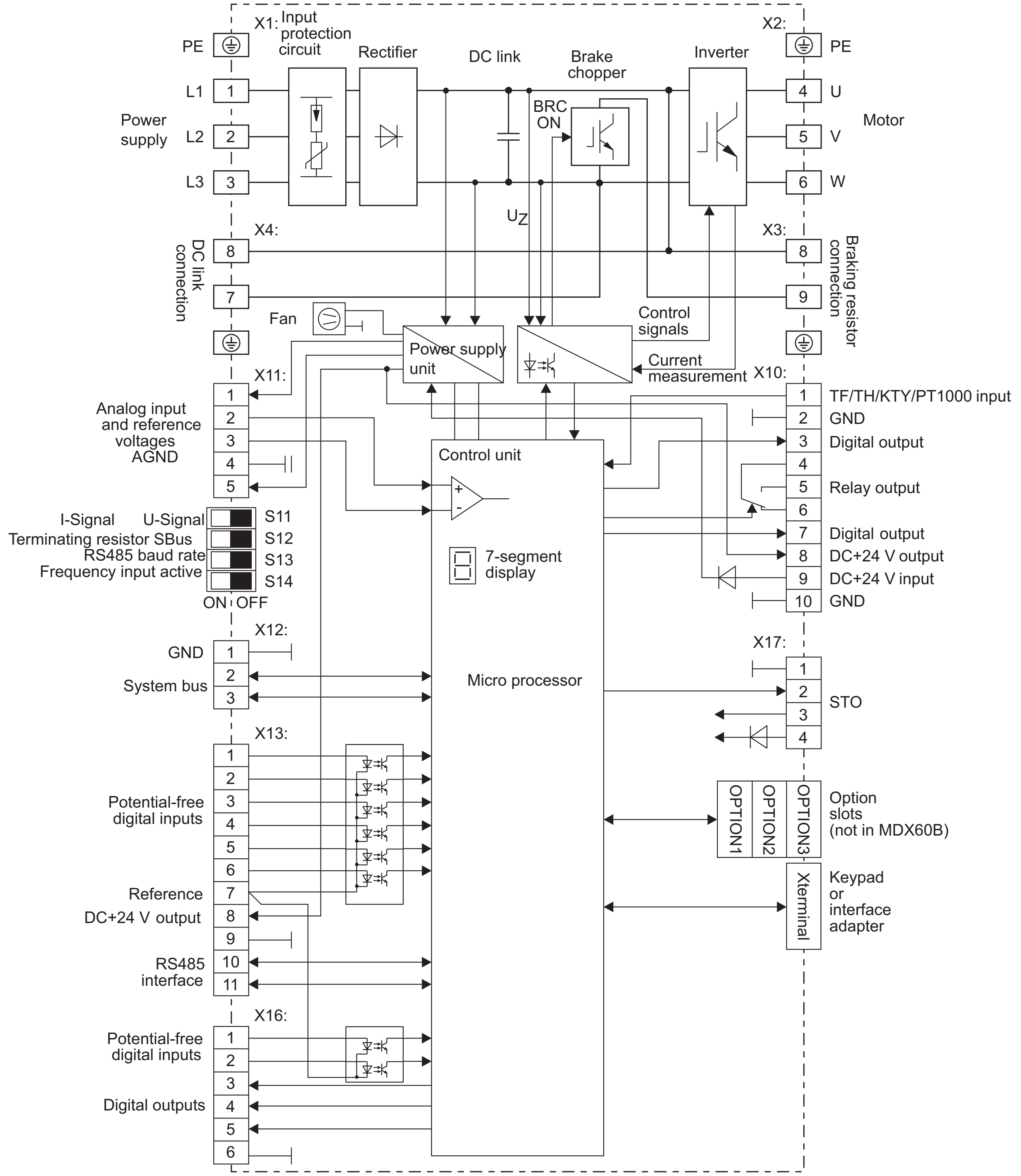
Recommended motor power (VFC)		Continuous output current	MOVIDRIVE® type	Size
			MDX61B Option-capable	
1.5 kW	2.2 kW	AC 7.3 A	0015-2A3-4-..	1
2.2 kW	3.7 kW	AC 8.6 A	0022-2A3-4-..	
3.7 kW	5.0 kW	AC 14.5 A	0037-2A3-4-..	
5.5 kW	7.5 kW	AC 22 A	0055-2A3-4-..	2
7.5 kW	11 kW	AC 29 A	0075-2A3-4-..	
11 kW	15 kW	AC 42 A	0110-203-4-..	3
15 kW	22 kW	AC 54 A	0150-203-4-..	
22 kW	30 kW	AC 80 A	0220-203-4-..	4
30 kW	37 kW	AC 95 A	0300-203-4-..	

MOVIDRIVE® MDR60A/61B regenerative power supply units for 400/500 V devices:

MOVIDRIVE® MDR60A/61B regenerative power supply unit		Size	MOVIDRIVE® MDX60B/61B ...-5_3
0150-503-00	I_{line} = AC 29 A, I_{DC} = DC 35 A	2, 3, 4, 6	0005 – 0150
0370-503-00	I_{line} = AC 66 A, I_{DC} = DC 70 A		0005 – 0370
0750-503-00	I_{line} = AC 117 A, I_{DC} = DC 141 A		0005 – 0750
1320-503-00 As of series no. DCV2000100	I_{line} = AC 260 A, I_{DC} = DC 324 A		0005 – 1600
1600-503-00/L	I_{line} = AC 250 A, I_{DC} = DC 255 A	7	0005 – 1600
2500-503-00/L	I_{line} = AC 400 A, I_{DC} = DC 407 A		0005 – 2500

1.1.17 Block circuit diagram

The following block diagram shows the basic structure and theory of operation of MOVIDRIVE® MDX60B/61B drive inverters.



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1.2 Functions/features

1.2.1 Device properties

- Wide voltage range
  - 400/500 V devices for the voltage range 3 × AC 380 – 500 V
  - 230 V devices for the voltage range 3 × AC 200 – 240 V
- High overload capacity
  - Size 0: 200% I_N for at least 60 s
  - Size 1 – 7: 150% I_N for at least 60 s
  - All sizes: 125% I_N, continuous operation without overload (pumps, fans)
- Size 0 – 6:
  - With 4 kHz switching frequency, I_N is permitted for an ambient temperature of ϑ = 50 °C
  - 4Q capability due to integrated brake chopper installed as standard
- Size 7:
  - With 2.5 kHz switching frequency, I_N is permitted for an ambient temperature of ϑ = 50 °C
  - 2Q devices without brake chopper or 4Q devices with brake chopper can be selected
- Compact device design for minimum control cabinet space requirement and optimum utilization of control cabinet volume
- Integrated line filter fitted as standard in sizes 0, 1, 2S and 2, adherence to class C2 limit on the input side without any additional measures
- 8 isolated digital inputs and 6 digital outputs, one of which is a relay output; programmable inputs/outputs
- 1 TF/TH/KTY input for motor protection using a PTC thermistor or thermo contact
- 7-segment display for operating and fault states
- Separate DC 24 V voltage input for powering the inverter electronics (parameter setting, diagnostics and data storage even when the supply system is switched off)
- Separable electronic terminals
- Separable power terminals for devices in size 0 and 1
- STO in accordance with EN 61800-5-2, up to
  - Category 3 performance level d according to EN ISO 13849-1

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1.2.2 Control functions

- VFC or CFC control modes for field-oriented operation (asynchronous servo)
- IPOS$^{PLUS®}$ positioning and sequence control system integrated as standard
- 2 complete parameter sets
- Automatic brake control by the inverter
- DC braking to decelerate the motor even in 1Q mode
- Energy-saving function for optimizing the magnetization current automatically
- Slip compensation for high stationary speed accuracy, even without encoder feedback
- Flying restart circuit for synchronizing the inverter to an already rotating motor
- Hoist capability with all motor systems that can be connected
- Motor stall prevention through sliding current limitation in the field weakening range
- Function to hide speed window to avoid mechanical resonances
- Heating current to avoid condensation build-up in the motor
- Parameter lock for protection against changes to parameters
- Speed controller and encoder input for incremental, HIPERFACE® or SSI encoders and resolvers. User-friendly controller setting tool in the operator interface.
- Protective feature for complete protection of the inverter and motor (short circuit, overload, overvoltage/undervoltage, low-impedance ground fault, excess temperature in the inverter, motor stall prevention, excess temperature in the motor)
- Speed monitoring and monitoring of the motor and regenerative limit power
- Programmable signal range monitoring (speed, current, maximum current)
- Memory for displaying X/t diagrams using SCOPE process data visualization four channels (8 channels, real-time capable)
- Fault memory (5 memory slots) with all relevant operating data at the moment of the fault
- Elapsed-time counter for operating hours (device connected to supply system or DC 24 V) and enable hours (output stage energized)
- Modular option technology for application-specific device configuration
- Uniform operation, identical parameter setting and the same device connection technology for the entire MOVIDRIVE® B device family

1.2.3 Setpoint technology

- Ramp set changeover (total of 4 ramps)
- Motor potentiometer, can be combined with analog setpoint and internal fixed setpoints
- External setpoint selections: DC (0 – +10 V, -10 V – +10 V, 0 – 20 mA, 4 – 20 mA)
- S pattern for jerk-free speed changes
- Programmable input characteristic for flexible setpoint processing
- 6 bipolar fixed setpoints which can be mixed with external setpoints and motor potentiometer function
- Primary frequency input
- Adjustable jerk limitation

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1.2.4 Communication/operation

- System bus for networking max. 64 MOVIDRIVE® devices to one another
- RS485 interface for communication between one PLC/IPC and up to 31 inverters
- Simple startup and parameter setting using keypad or PC
- Pluggable memory module for quick device replacement during service

1.2.5 System expansion

- Extensive expansion options, for example:
  – Removable plain text keypad with parameter memory
  – Interface adapter USB11A, UWS21A
  – Fieldbus interface, optionally PROFIBUS, INTERBUS, Ethernet, DeviceNet™, CAN/CANopen, PROFINET, EtherCAT®, Modbus TCP, Ethernet/IP™
  – Input/output card
  – Braking resistors, line filters, line chokes, output chokes, output filters
- MOVITOOLS® MotionStudio with SCOPE process data visualization
- Technology version with access to technology functions and to application modules allows for comfortable solutions of drive tasks.
- MOVIDRIVE® MDR60A/61B regenerative power supply unit. Regenerative energy is fed back into the supply system, which removes the thermal load from the control cabinet and saves costs.

1.2.6 Standards and approvals

- UL, cUL, and RCM approval. MOVIDRIVE® MDR60A1320-503-00 is not UL, cUL or RCM approved.
- EAC certificate has been granted for the entire MOVIDRIVE® device family.
- Safe disconnection of power and electronic connections according to EN 61800-5-1
- Compliance with all the requirements for CE marking of machines and plants equipped with MOVIDRIVE® on the basis of the Low Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU. Complies with the EMC product standard EN 61800-3.
- STO in accordance with EN 61800-5-2, up to
  – Category 3 performance level d according to EN ISO 13849-1

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1.3 Additional functions of the application variants

SEW-EURODRIVE offers additional functions for special applications. You can use these additional functions with the MOVIDRIVE® devices of the technology version (...-0T).

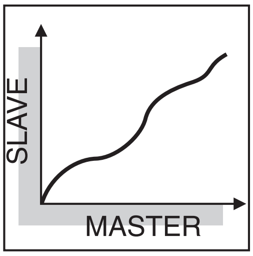
The following additional functions are available:

- Electronic cam
- Internal synchronous operation

INFORMATION

Please refer to the "Electronic Cam" and "Internal Synchronous Operation" manuals for detailed information about the additional functions.

1.3.1 Electronic cam



You can use the MOVIDRIVE® product series with the "electronic cam" module whenever you need to harmonize complex sequences of motion in cyclical machines. This solution gives you much greater flexibility in comparison to the mechanical cam. As a result, it meets the needs of modern production and processing lines.

A user-friendly cam editor supports you during startup. Existing cam data can also be imported. You can also set application-specific parameters for the engagement and disengagement phases using the cam editor.

Note the following points:

- The "electronic cam" can only be implemented with the MOVIDRIVE® MDX61B technology version (...-0T).
- Encoder feedback is mandatory. This is why the "electronic cam" can only be realized in "CFC", "SERVO" and "VFC-n control" operating modes with master/slave connection via X14-X14 or with an SBus connection.
- "Electronic cam" is only available in parameter set 1.
- The "DRS11B synchronous operation card" option cannot be used together with the "electronic cam" function.

Motors and encoders

Use the following motor types:

- For operation with MOVIDRIVE® MDX61B...-4-0T:
  - DRL asynchronous servomotor, high-resolution sin/cos encoder installed as standard or HIPERFACE® encoder
  - DR.. AC motor with incremental encoder, preferably high-resolution sin/cos encoder or HIPERFACE® encoder.
  - CM../CMP.. synchronous servomotors, resolver (installed as standard) or HIPERFACE® encoder

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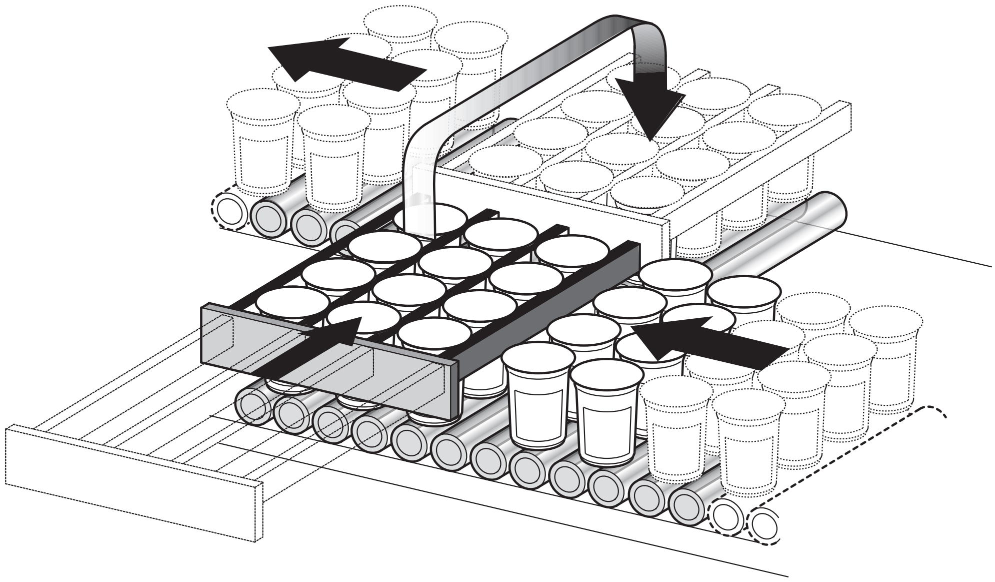
High-resolution speed measurement is required for optimum operation of the electronic cam. The encoders installed as standard on DRL.. and CM../CMP.. motors meet these requirements. SEW-EURODRIVE recommends using high-resolution sin/cos encoders as incremental encoders if DR.. motors are used.

Example

The figure below shows a typical application example for the "electronic cam." Filled yogurt cups are transported for further processing. The "electronic cam" enables smooth movement, which is an important requirement for this application.



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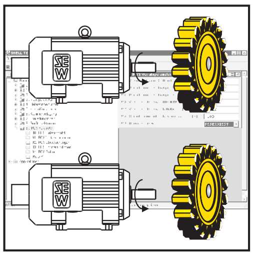
1.3.2 Internal synchronous operation



You can always use the MOVIDRIVE® device series with "internal synchronous operation" whenever a group of motors has to be operated phase-synchronously in relation to one another or with an adjustable proportional ratio (electronic gear unit). A user-friendly editor guides you through the startup procedure.

Note the following points:

- "Internal synchronous operation" can only be implemented with MOVIDRIVE® MDX61B of the technology version (...-0T).
- Encoder feedback is mandatory. For this reason "internal synchronization operation" can only be realized in "CFC", "SERVO" and "VFC-n control" operating modes with master/slave connection via X14-X14 or with an SBus connection.
- "Internal synchronous operation" is only available in parameter set 1.
- The "DRS11B synchronous operation card" option cannot be used together with "internal synchronous operation".

Motors and encoders

Use the following motor types for operation with MOVIDRIVE® MDX61B...-4-0T:

- DRL.. asynchronous servomotor, high-resolution sin/cos encoder installed as standard or HIPERFACE® encoder
- DR.. AC motor with incremental encoder, preferably high-resolution sin/cos encoder or HIPERFACE® encoder.
- CM../CMP.. synchronous servomotors, resolver (installed as standard) or HIPERFACE® encoder

High-resolution speed measurement is required for optimum "internal synchronous operation". The encoders installed as standard with DRL.. and CM../CMP.. motors meet these requirements. SEW-EURODRIVE recommends using high-resolution sin/cos encoders as incremental encoders if DR.. motors are used.

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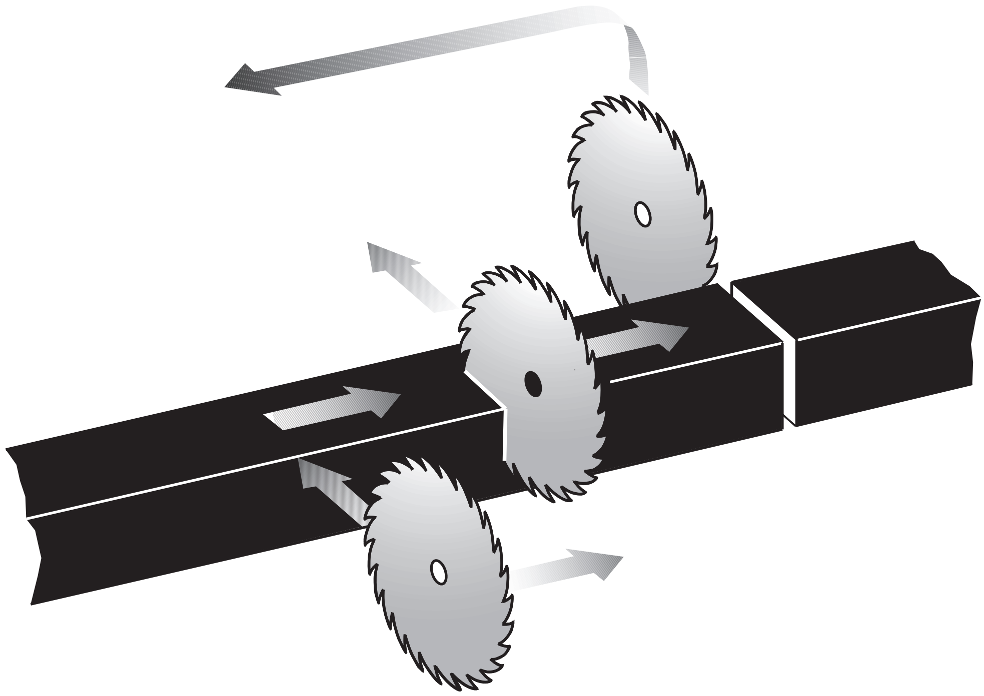
Example

The figure below shows a typical application with "internal synchronous operation". Extruder material must be cut to length. The saw receives a start signal and synchronizes with the material. During the sawing process, the saw moves synchronously with the material. At the end of the sawing process the saw moves back to its starting position.



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1.4 Application modules for MOVIDRIVE® MDX61B

1.4.1 The drive task

The drive application often involves more than just adjusting the speed of a motor. The inverter often has to control motion sequences and take on typical PLC tasks. More and more complex drive applications have to be solved, without this resulting in lengthy project planning and startup.

1.4.2 The solution using MOVIDRIVE®

SEW-EURODRIVE offers various standardized control programs specifically for "positioning," "winding," and "controlling" applications. These programs are called application modules. The application modules are incorporated into MOVITOOLS® MotionStudio and can be used with the technology version.

A user-friendly user interface guides you through the process of setting the parameters. All you have to do is enter the parameters you need for your application. The application module uses this information to create the control program, then loads it onto the inverter. MOVIDRIVE® takes over complete control of the motion processes, the load is taken off the higher-level controller and decentralized concepts are easier to implement.

The advantages at a glance

- Wide range of functions
- User-friendly user interface
- You only have to enter the parameters needed for the application
- Guided parameter setting instead of complicated programming
- No programming experience required
- No lengthy training, therefore quick project planning and startup
- All motions are controlled directly via MOVIDRIVE®
- Decentralized concepts can be implemented more easily

1.4.3 Scope of delivery and documentation

The application modules are part of the MOVITOOLS® MotionStudio engineering software and can be used with MOVIDRIVE® MDX61B in the technology version (...-0T). The individual application manuals can also be downloaded as PDF from the SEW-EURODRIVE website.

1.4.4 Available application modules

The application modules currently available are listed below. These application modules are explained in the following pages.

Positioning

Linear movement; the inverter manages the movement records:

- Table positioning via terminal or fieldbus

Linear movement; the PLC manages the movement records:

- Bus positioning

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- Extended positioning via bus
- Absolute positioning (rapid/creep speed positioning)

Rotary motion:

- Modulo positioning via terminals: The inverter manages the movement records
- Modulo positioning via fieldbus: The PLC manages the movement records

Winding

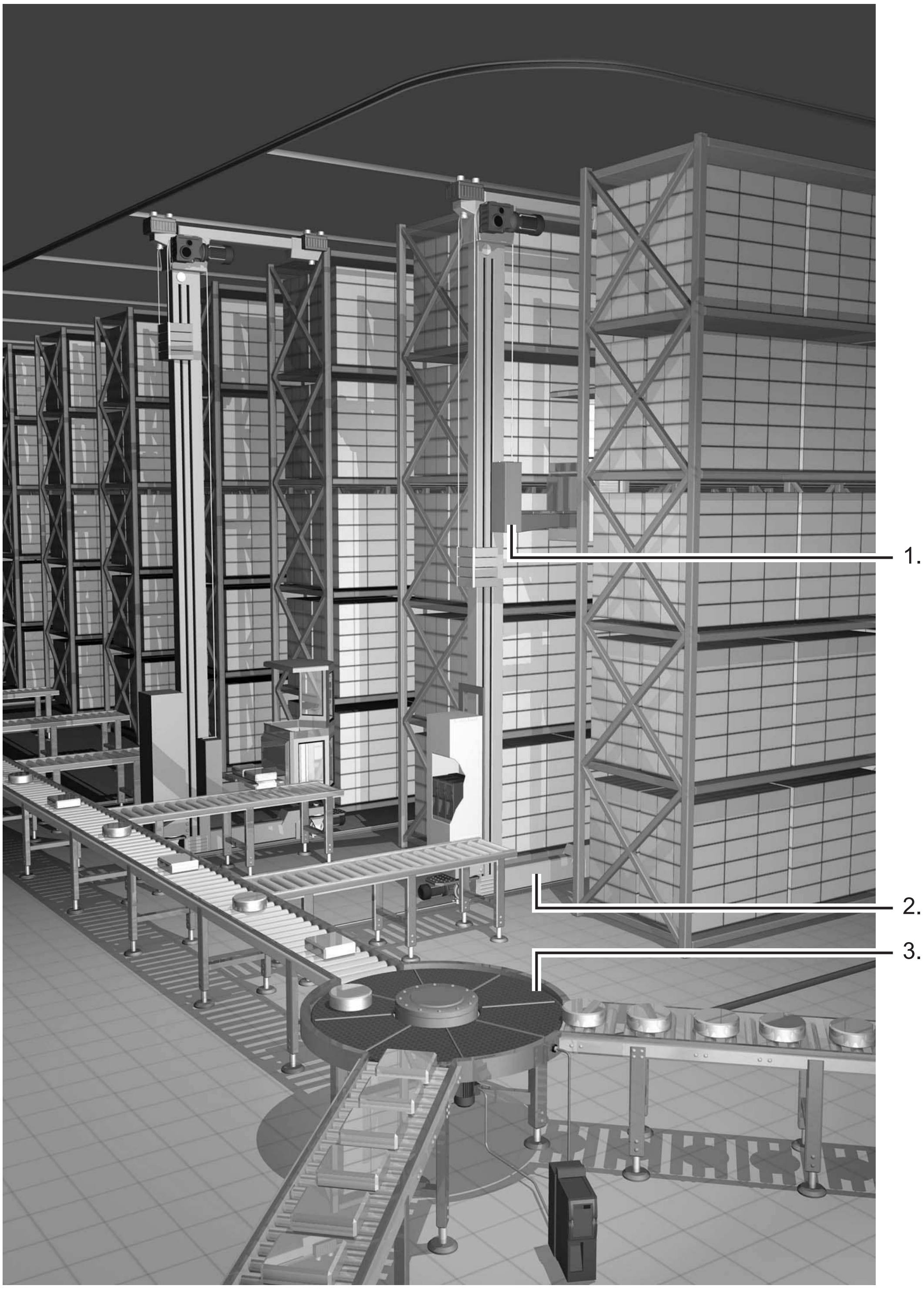
- Center winder

Control

- Flying saw
- DriveSync via fieldbus
- Sensor-based positioning

1.4.5 Application

The following illustration shows an example of how the various SEW-EURODRIVE application modules are used in a high-bay warehouse.



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1. Hoist: Table positioning
2. Travel axis: Absolute or bus positioning
3. Rotary distributor: Modulo positioning

1.4.6 Positioning

The application modules for the “Positioning” application are suited to all applications in which target positions are specified and movement then takes place to those positions. Movement can either be linear or rotatory.

For example, horizontal drives, hoists, gantries, rotary tables, swiveling devices as well as storage/retrieval units.

1.4.7 Linear positioning

In the case of application modules for linear positioning, SEW-EURODRIVE distinguishes between whether the movement records are administered in the inverter or in the higher-level PLC.

Movement records in the inverter

- **Table positioning via terminals**
- **Table positioning via fieldbus**

This application modules are suited to applications in which movement only has to take place to a limited number of target positions and in which the highest possible degree of independence from the higher-level controller is required.

Up to 32 movement records can be managed in the inverter in these application modules. A movement record comprises target position, speed and ramp. The target position to which movement is to take place is selected using binary code, by means of the digital inputs of the inverter or via the virtual terminals (fieldbus, system bus). The application modules offer the following features:

- Up to 32 table positions can be defined and selected.
- The travel speed can be selected for each positioning movement.
- The ramp can be set separately for each positioning movement.
- Software limit switches can be defined and evaluated.
- Either incremental encoders or absolute encoders can be evaluated as encoders.
- Guided startup and diagnostics.

Four operating modes are available for controlling the machine:

- Jog mode: The machine can be moved manually.
- Reference travel: The machine zero is determined automatically for incremental position measurement.
- Teach-In: The saved position can be corrected without a programming device.
- Automatic mode: The higher-level PLC controls the process automatically.

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Movement records in the PLC

Bus positioning and extended bus positioning

These application modules are suited to applications in which movement to various of target positions is required.

The movement records are managed in the PLC for these application modules. The target position and travel speed are specified via the fieldbus or system bus. The application modules offer the following features:

- Any number of target positions can be defined and selected via fieldbus/system bus.
- The traveling velocity can be selected as required via the fieldbus/system bus for each positioning movement.
- Software limit switches can be defined and evaluated.
- Either incremental encoders or absolute encoders can be evaluated as encoders.
- Straightforward connection to the higher-level controller.
- Guided startup and diagnostics.

Three operating modes are available for controlling the machine:

- Jog mode: The machine can be moved manually.
- Reference travel: The machine zero is determined automatically for incremental position measurement.
- Automatic mode: The higher-level PLC controls the process automatically.

Absolute positioning (rapid/creep speed positioning)

In this application module, the movement records are also managed in the PLC and specified via the fieldbus or system bus. No motor encoder is required. The absolute encoder mounted on the travel path is used for positioning. This application module has the following features:

- Any number of target positions can be defined and selected via fieldbus/system bus.
- Software limit switches can be defined and evaluated.
- Only absolute encoders are used for position measurement.
- No motor encoder is required.
- Straightforward connection to the higher-level controller.
- Guided startup and diagnostics.

The following operating modes are available for controlling the machine:

- Jog mode: The machine can be moved manually.
- Automatic mode: The higher-level PLC controls the process automatically.

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1.4.8 Rotary positioning

Modulo positioning

A large number of movements have to be controlled in automated conveyor and logistics applications in order to transport the material. Linear movements of vertical drives or hoists, and rotary movements via rotary tables are important in these applications.

Rotary movements are often synchronized (rotary tables); the material is fed at a specific degree value. However, there are also many rotary applications in which the material has to be moved to its destination by the shortest possible route (distance-optimized positioning) or in which movement to the target position is only permitted in a defined direction of rotation (positioning with fixed direction of rotation).

The position axis is represented on a numbered circle from 0° to 360° to meet these requirements. The actual position is always in this range.

The "modulo positioning" application module accomplishes these tasks using various operating modes which are selected via digital inputs (16 table positions) or virtual terminals (control via fieldbus, variable positions).

The following operating modes are available for controlling the machine:

- Jog mode
- Teach mode (terminal control only)
- Referencing mode
- Automatic mode with position optimization
- Automatic mode with direction of rotation inhibit (clockwise – counterclockwise)
- Synchronous automatic mode

The "modulo positioning" module offers the following advantages:

- User-friendly user interface
- Only the parameters required for Modulo positioning (number of teeth in the gear unit, speed) have to be entered
- Guided parameter setting instead of complicated programming
- Monitor mode for optimum diagnostics
- Users do not need any programming experience
- Rapid familiarization with the system

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1.4.9 Winding

Center winder

The "center winder" application module is suitable for applications in which endless material, such as paper, plastic, fabrics, sheet metal or wire, must be wound, unwound or rewound continuously.

The system is controlled by means of the digital inputs of the inverter or via the virtual terminals (fieldbus, system bus).

The "central winder" application module has the following features:

- Constant tensile force or path velocity independent of the diameter.
- Automatic calculation of the speed-dependent friction factors via a teach-in run.
- Winding characteristics to prevent the winding material from becoming loose.
- Binary selection of 4 different winding cores.
- Diameter can be determined using a diameter calculator (master encoder required) or an analog input (distance sensor required).
- Free-running function (jog).
- CW/CCW winding, winding/unwinding.
- Simple connection to the higher-level controller (PLC).
- Guided startup and diagnostics.

Four operating modes are available for controlling the machine:

- Jog mode: The machine can be moved to the right or the left manually.
- Teach-in run: The speed-dependent friction factors are determined automatically.
- Automatic mode with constant tension.
- Automatic mode with constant velocity.

1.4.10 Controlling

Flying saw

The "Flying saw" application module is suited to applications in which endless material has to be cut, sawn or pressed, for example in diagonal saws or flying punches.

This application module is used to control the sequence of motion according to specific values. This application module has the following features:

- Choice of fieldbus or terminal control.
- Cut edge protection or singling using the “Draw gap” function.
- Immediate cut function in the form of manual interrupt.
- Counter for material length.
- Straightforward connection to the higher-level controller.
- Guided startup and diagnostics.

Four operating modes are available for controlling the machine:

- Jog mode: The machine can be moved manually.
- Reference travel: The system reference point is determined.
- Positioning mode
- Automatic mode

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DriveSync via fieldbus

The "DriveSync via fieldbus" application module makes it possible to implement conveyor systems and machinery with drives that occasionally or permanently have to move phase-synchronously.

The program can be used for the master drive and the slave drive. The master works in the "Jog" and "Positioning" operating modes, while the slave drives are operated in "synchronous operation" mode.

If the "Synchronous operation" mode is deselected for the slave drives, they can be operated with free-running in "Jog" and "Positioning" operating modes.

The "DriveSync via fieldbus" application module has the following features:

- Guided startup as well as extensive diagnostic functions.
- High degree of similarity with "Extended positioning via bus".
- One program module for master and slave drive.
- The selected IPOS$^{PLUS®}$ encoder source is also effective in synchronous operation.
- The master value for "synchronous operation" mode can be adjusted.
- A mechanical vertical shaft can be replaced by transferring the virtual master value via an SBus connection.
- Endless rotation is supported by the modulo function.

Four operating modes are available for controlling the application:

- Jog mode
- Reference travel
- Positioning mode
- Synchronous mode
  - The electrical connection of the master/slave can be made using the X14 encoder connection or an SBus connection.
  - If the SBus connection is used, the content of the send object can be adjusted.
  - Time or position-related sequence of motion for synchronization processes.
  - The startup cycle process can also be started with interrupt control.

Sensor-based positioning

This application module is used to position the drive using an external sensor signal plus an adjustable remaining distance. This application module is especially suitable for applications in the following industrial sectors:

- Materials handling technology
  - Trolleys
  - Hoists
  - Rail vehicles
- Logistics
  - Storage and retrieval systems
  - Transverse carriage

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1.5 MOVITOOLS® MotionStudio engineering software

1.5.1 Tasks

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

- Establishing communication with devices
- Executing functions of the devices

1.5.2 Establishing communication with the units

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

The SEW Communication Server allows you to create **communication channels**. Once the channels are established, the devices communicate via these communication channels using their communication options. You can operate up to 4 communication channels at the same time.

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT®
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

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

1.5.3 Executing functions with the units

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

- Parameterization (e. g. in the parameter tree of the device)
- Startup
- Visualization and diagnostics
- Programming

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

- MotionStudio
- MOVITOOLS®

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

1.5.4 Technical support

SEW-EURODRIVE offers a 24-hour service hotline.

Simply dial **(+49) 0800** and enter the letters **SEWHELP** using the telephone keypad. Of course, you can also dial **(+49) 0800 - 7 39 43 57**.

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1.5.5 Online help

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

- This documentation is displayed in a help window after you start the software.

  If the help window does not appear at the start, deactivate the "Display" check box, in the menu under [Settings] / [Options] / [Help].

  If the help window appears again, activate the "Display" control field, in the menu under [Settings] / [Options] / [Help].
- Context-sensitive help is available for the fields which require you to enter values. For example, you can use the <F1> key to display the ranges of values for the device parameters.

1.6 SEW-Workbench

The SEW-Workbench is the central configuration software for inverters by SEW-EURODRIVE.

All necessary configurations can be processed, from entering the application to gear unit, motor and inverter calculations. Other features are optimization of the various axis cycles including the selection of accessories and a fault check of the entire drive system configuration.

Of course, the workbench can also be used to select and dimension all other products from SEW-EURODRIVE (such as decentralized drives and gearmotors). This means the SEW-Workbench allows for specifying drive solutions from the entire range of products from SEW-EURODRIVE. The straightforward operation saves a lot of time and minimizes complexity.

The key features of the SEW-Workbench are:

- Application selection.
- Calculation of gear unit and motor.
- Price-optimized project planning.
- Comparison of different solutions.
- Inverter calculation.
- Multi-axis optimization.
- Parameterization of cable and accessories selection.
- Dimensioning faults check.
- Parts list generation.
- Electronic catalog with all products.

The project planning software SEW-Workbench is available for download from the official SEW-EURODRIVE website.

To use SEW-Workbench, all you need to do is to register via the Online Support once you have downloaded the software or received the data DVD. An Internet update service ensures that products and functions are always up-to-date.

2 Technical data of basic device

2.1 CE marking, approvals

2.1.1 CE marking

- Low Voltage Directive

MOVIDRIVE® MDX60B/61B drive inverters comply with the regulations of the Low Voltage Directive 2014/35/EU.

- 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 that you comply with the installation instructions for the SEW components, the CE marking requirements for the entire machine/system in which they are installed are satisfied on the basis of the EMC directive 2014/30/EU. For detailed information on EMC compliant installation, refer to the documentation "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

- Compliance with limit classes C1, C2 or C3 has been tested in a CE-typical drive system. SEW-EURODRIVE provides detailed information on request.

The CE mark on the nameplate indicates conformity with the low voltage directive 2014/35/EU. We can provide a declaration of conformity on request.

2.1.2 UL / cUL / EAC

UL and cUL approval (USA) has been granted for the entire MOVIDRIVE® device series. Only the MOVIDRIVE® MDR60A1320-503-00 is not UL or cUL approved. cUL is equivalent to the CSA approval.

The MOVIDRIVE® device series meets the requirements of the technical regulations of the Customs Union of Russia, Kazakhstan, and Belarus.

The EAC marking on the nameplate certifies the conformity with the safety requirements of the Custom Union.

2.1.3 RCM

RCM approval has been granted for the entire MOVIDRIVE® device family. RCM certifies conformity with ACMA (Australian Communications and Media Authority) standards.

2.1.4 KC

The KC certificate is approved for size 0– 6 of the MOVIDRIVE® device family. The KC certificate states the registration with the Korean RRA (National Radio Research Agency).

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2.2 General technical data

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

MOVIDRIVE® MDX60B/61B	All sizes
Interference immunity	Meets EN 61800-3
Interference emission with EMC compliant installation	Sizes 0 to 7 meet EN 61800-3 Sizes 0 to 5: According to limit value class C1 to EN 61800-3 with a corresponding line filter Sizes 0, 1, 2S, and 2 in accordance with limit value class C2 to EN 61800-3 without additional measures Size 6 and 7 in accordance with limit value class C2 to EN 61800-3 with corresponding line filter
Ambient temperature ϑ_{amb}	0 °C – +50 °C at I_D = 100% I_N and f_{PWM} = 4 kHz / size 7: 2.5 kHz 0 °C – +40 °C at I_D = 125% I_N and f_{PWM} = 4 kHz / size 7: 2.5 kHz 0 °C – +40 °C at I_D = 100% I_N and f_{PWM} = 8 kHz (size 0 – 6) 0 °C – +40 °C at I_D = 100% I_N and f_{PWM} = 4 kHz (size 7)
I_N reduction Ambient temperature	2.5% I_N per K at 40 °C to 50 °C 3% I_N per K at 50 °C to 60 °C
Climate class	EN 60721-3-3 class 3K3
Storage temperature[1)] ϑ_L	-25 °C – +70 °C (EN 60721-3-3, class 3K3) DBG keypad: -20 °C – +60 °C
Cooling type (DIN 41751)	Forced cooling (temperature-controlled fan, response threshold 45 °C)
Degree of protection EN 60529 (NEMA1)	
Sizes 0 to 2	IP20
Size 3	• IP10 without touch guard • IP20 (power connections) with connected cable and installed heat shrink tubing (not included in the delivery) or with the delivered protection caps
Sizes 4 to 5	IP00 (power connections) IP10 (power connections) with • fitted Plexiglas cover supplied as standard and • fitted heat shrink tubing (not included in scope of delivery) IP20 (power connections) with • Mounted option DLB11B
Size 6	IP00 (power connections) IP10 (power connections) with • fitted Plexiglas cover supplied as standard and • fitted heat shrink tubing (not included in scope of delivery)
Size 7	IP00 (power connections) IP20 (power connections) with • installed DLB21B touch guard
Operating mode	Continuous duty with 50% overload capacity (size 0: 100%)
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Protection against mechanically active substances	3S1 DIN EN 60721-3-3 / IEC 721-3-3
Protection against chemically active substances	3C2 DIN EN 60721-3-3 / IEC 721-3-3

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MOVIDRIVE® MDX60B/61B	All sizes
Installation altitude h	Up to h ≤ 1000 m without restrictions. The following restrictions apply at h ≥ 1000 m: • From 1,000 m to max. 4,000 m: – I_N reduction by 1% per 100 m • From 2,000 m to max. 4,000 m: – The safe disconnection of power and electronics connections can no longer be assured above 2000 m. This requires external measures (IEC 60664-1/EN 61800-5-1) – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.

1) In case of extended storage, connect the device to the power supply for at least 5 minutes every two years, otherwise the device's service life may be reduced.

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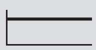
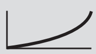
2.3 MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V units)

2.3.1 MOVIDRIVE® MDX60/61B0005/0008/0011/0014 size 0 (AC 400/500 V devices)

MOVIDRIVE® MDX60/61B		**0005-5A3-4-0_**	**0008-5A3-4-0_**	**0011-5A3-4-0_**	**0014-5A3-4-0_**
Size		0S		0M	
INPUT					
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V			
Line frequency	f_{line}	50 Hz – 60 Hz ±5%			
Nominal line current[1] I_{line}	100%	AC 1.8 A	AC 2.2 A	AC 2.8 A	AC 3.6 A
(at V_{line} = 3 × AC 400 V)	125%	AC 2.3 A	AC 2.7 A	AC 3.5 A	AC 4.5 A
OUTPUT					
Apparent output power[2] (at V_{line} = 3 × AC 380 – 500 V)	S_N	1.4 kVA	1.6 kVA	2.1 kVA	2.8 kVA
Nominal output current[1] (at V_{line} = 3 × AC 400 V)	I_N	AC 2 A	AC 2.4 A	AC 3.1 A	AC 4 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 400 V and f_{PWM} = 4 kHz)	I_D	AC 2.5 A	AC 3 A	AC 3.8 A	AC 5 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V and f_{PWM} = 8 kHz)	I_D	AC 2 A	AC 2.4 A	AC 3.1 A	AC 4 A
Max. output frequency	f_{max}	599 Hz			
Current limiting	I_{max}	Motor and generator mode 200% I_N, duration depending on the capacity utilization			
Internal current limit		I_{max} = 0 – 200% adjustable			
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	68 Ω			
Output voltage	V_O	Max. V_{line}			
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz			
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range			
GENERAL					
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	
Cross section of device terminals X1, X2, X3, X4		Separable terminal strips 4 mm^2 conductor end sleeve DIN 46228			
Tightening torque		0.6 Nm			

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.
2) The performance data applies to f PWM = 4 kHz.

MDX61B standard version Design with coated printed circuit boards		0005-5A3-4-00	0008-5A3-4-00	0011-5A3-4-00	0014-5A3-4-00
		0005-5A3-4-00/L	0008-5A3-4-00/L	0011-5A3-4-00/L	0014-5A3-4-00/L
Part number		8277222	8277230	8277249	8277257
		8289476	8289484	8289492	8289506
MDX61B Application version		0005-5A3-4-0T	0008-5A3-4-0T	0011-5A3-4-0T	0014-5A3-4-0T
Design with coated printed circuit boards		0005-5A3-4-0T/L	0008-5A3-4-0T/L	0011-5A3-4-0T/L	0014-5A3-4-0T/L
Part number		8277265	8277273	8277281	827729X
		8289514	8289522	8289530	8289549
Recommended motor power					
 Constant load	P_{Mot}	0.55 kW	0.75 kW	1.1 kW	1.5 kW
 Variable torque load or constant load without overload	P_{Mot}	0.75 kW	1.1 kW	1.5 kW	2.2 kW
Mass		2.0 kg		2.5 kg	
Dimensions	W × H × D	45 mm × 317 mm × 260 mm		67.5 mm × 317 mm × 260 mm	

MDX61B standard version (VFC/CFC/SERVO) Design with coated printed circuit boards	0005-5A3-4-00 0005-5A3-4-00/L	0008-5A3-4-00 0008-5A3-4-00/L	0011-5A3-4-00 0011-5A3-4-00/L	0014-5A3-4-00 0014-5A3-4-00/L

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Part number		8277303 8289557	8277311 8289565	827732X 8289573	8277338 8289581
MDX61B technology version (VFC/CFC/SERVO) Design with coated printed circuit boards		0005-5A3-4-0T 0005-5A3-4-0T/L	0008-5A3-4-0T 0008-5A3-4-0T/L	0011-5A3-4-0T 0011-5A3-4-0T/L	0014-5A3-4-0T 0014-5A3-4-0T/L
Part number		8277346 8289603	8277354 8289611	8277362 8289638	8277370 8289646
Mass		2.3 kg		2.8 kg	
Dimensions	W × H × D	72.5 mm × 317 mm × 260 mm		95 mm × 317 mm × 260 mm	
Recommended motor power		→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 🗎 352)			

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2.3.2 MOVIDRIVE® MDX61B0015/0022/0030/0040 size 1 (AC 400/500 V devices)

MOVIDRIVE® MDX61B		0015-5A3-4-0_	0022-5A3-4-0_	0030-5A3-4-0_	0040-5A3-4-0_
INPUT					
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V			
Line frequency	f_{line}	50 Hz – 60 Hz ±5%			
Nominal line current[1] I_{line}	100%	AC 3.6 A	AC 5.0 A	AC 6.3 A	AC 8.6 A
(at V_{line} = 3 × AC 400 V)	125%	AC 4.5 A	AC 6.2 A	AC 7.9 A	AC 10.7 A
OUTPUT					
Apparent output power[2] (at V_{line} = 3 × AC 380 – 500 V)	S_N	2.8 kVA	3.8 kVA	4.9 kVA	6.6 kVA
Nominal output current[1] (at V_{line} = 3 × 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) (at V_{line} = 3 × AC 400 V and f_{PWM} = 4 kHz)	I_D	AC 5 A	AC 6.9 A	AC 8.8 A	AC 11.9 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V and f_{PWM} = 8 kHz)	I_D	AC 4 A	AC 5.5 A	AC 7 A	AC 9.5 A
Max. output frequency	f_{max}	599 Hz			
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization			
Internal current limit		I_{max} = 0 – 150% adjustable			
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	68 Ω			
Output voltage	V_O	Max. V_{line}			
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz			
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range			
GENERAL					
Power loss at S_N[2]	P_{Vmax}	85 W	105 W	130 W	180 W
Cooling air consumption		40 m^3/h			
Mass		3.5 kg			
Dimensions	W × H × D	105 mm × 314 mm × 234 mm			
Cross section of device terminals X1, X2, X3, X4		Separable terminal strips 4 mm^2 conductor end sleeve DIN 46228			
Tightening torque		0.6 Nm			

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.

2) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0015-5A3-4-00	0022-5A3-4-00	0030-5A3-4-00	0040-5A3-4-00
Design with coated printed circuit boards		0015-5A3-4-00/L	0022-5A3-4-00/L	0030-5A3-4-00/L	0040-5A3-4-00/L
Part number		08279578	08279586	08279594	08279608
		18400132	18400140	18400159	18400167
MDX61B application version		0015-5A3-4-0T	0022-5A3-4-0T	0030-5A3-4-0T	0040-5A3-4-0T
Design with coated printed circuit boards		0015-5A3-4-0T/L	0022-5A3-4-0T/L	0030-5A3-4-0T/L	0040-5A3-4-0T/L
Part number		08279756	08279764	08279772	08279780
		18400310	18400329	18400337	18400345
Recommended motor power					
Constant load	P_{Mot}	1.5 kW	2.2 kW	3.0 kW	4.0 kW
Variable torque load or constant load without overload	P_{Mot}	2.2 kW	3.0 kW	4.0 kW	5.5 kW
Recommended motor power		→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 🗎 352)			

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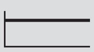
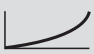
2.3.3 MOVIDRIVE® MDX61B0055/0075/0110 size 2S, 2 (AC 400/500 V devices)

MOVIDRIVE® MDX61B		**0055-5A3-4-0_**	**0075-5A3-4-0_**	**0110-5A3-4-0_**
Size		2S		2
INPUT				
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V		
Line frequency	f_{line}	50 Hz – 60 Hz ±5%		
Nominal line current[1] I_{line}	100%	AC 11.3 A	AC 14.4 A	AC 21.6 A
(at V_{line} = 3 × AC 400 V)	125%	AC 14.1 A	AC 18.0 A	AC 27.0 A
OUTPUT				
Apparent output power[2] (at V_{line} = 3 × AC 380 – 500 V)	S_N	8.7 kVA	11.2 kVA	16.8 kVA
Nominal output current[1] (at V_{line} = 3 × AC 400 V)	I_N	AC 12.5 A	AC 16 A	AC 24 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 15.6 A	AC 20 A	AC 30 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 8 kHz)	I_D	AC 12.5 A	AC 16 A	AC 24 A
Max. output frequency	f_{max}	599 Hz		
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization		
Internal current limit		I_{max} = 0 – 150% adjustable		
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	47 Ω		22 Ω
Output voltage	V_O	Max. V_{line}		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range		
GENERAL				
Power loss at S_N[2]	P_{Vmax}	180 W	230 W	400 W
Cooling air consumption		80 m^3/h		
Mass		6.6 kg		
Dimensions	W × H × D	105 mm × 335 mm × 294 mm		130 mm × 315 mm × 285 mm
Cross section of device terminals X1, X2, X3, X4		Terminal strips 4 mm^2 conductor end sleeve DIN 46228		M4 screw and washer assembly with terminal clip 4 mm^2 conductor end sleeve DIN 46228 6 mm^2 crimp cable lug DIN 46234
Tightening torque		0.6 Nm		1.5 Nm

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.

2) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0055-5A3-4-00	0075-5A3-4-00	0110-5A3-4-00
Design with coated printed circuit boards		0055-5A3-4-00/L	0075-5A3-4-00/L	0110-5A3-4-00/L
Part number		08279616	08279624	08279632
		18400175	18400183	18400191
MDX61B application version		0055-5A3-4-0T	0075-5A3-4-0T	0110-5A3-4-0T
Design with coated printed circuit boards		0055-5A3-4-0T/L	0075-5A3-4-0T/L	0110-5A3-4-0T/L
Part number		08279799	08279802	08279810
		18400353	18400361	18400388
Recommended motor power				
 Constant load	P_{Mot}	5.5 kW	7.5 kW	11 kW
 Variable torque load or constant load without overload	P_{Mot}	7.5 kW	11 kW	15 kW

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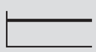
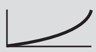
Recommended motor power	→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 🗎 352)

2.3.4 MOVIDRIVE® MDX61B0150/0220/0300 size 3 (AC 400/500 V devices)

MOVIDRIVE® MDX61B		**0150-503-4-0_**	**0220-503-4-0_**	**0300-503-4-0_**
INPUT				
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V		
Line frequency	f_{line}	50 Hz – 60 Hz ±5%		
Nominal line current[1] I_{line}	100%	AC 28.8 A	AC 41.4 A	AC 54 A
(at V_{line} = 3 × AC 400 V)	125%	AC 36 A	AC 51.7 A	AC 67.5 A
OUTPUT				
Apparent output power[2] (at V_{line} = 3 × AC 380 – 500 V)	S_N	22.2 kVA	31.9 kVA	41.6 kVA
Nominal output current[1] (at V_{line} = 3 × AC 400 V)	I_N	AC 32 A	AC 46 A	AC 60 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 40 A	AC 57.5 A	AC 75 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 8 kHz)	I_D	AC 32 A	AC 46 A	AC 60 A
Max. output frequency	f_{max}	599 Hz		
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization		
Internal current limit		I_{max} = 0 – 150% adjustable		
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	15 Ω	12 Ω	
Output voltage	V_O	Max. V_{line}		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range		
GENERAL				
Power loss at S_N[2]	P_{Vmax}	550 W	750 W	950 W
Cooling air consumption		180 m^3/h		
Mass		15.0 kg		
Dimensions	W × H × D	200 mm × 465 mm × 308 mm		
Cross section of device terminals X1, X2, X3, X4		M6 bolt with nut, max. 25 mm^2, crimp cable lug DIN 46235		
Tightening torque		3.5 Nm		

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.
2) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0150-503-4-00	0220-503-4-00	0300-503-4-00
Design with coated printed circuit boards		0150-503-4-00/L	0220-503-4-00/L	0300-503-4-00/L
Part number		08279640	08279659	08279667
		18400205	18400213	18400221
MDX61B application version		0150-503-4-0T	0220-503-4-0T	0300-503-4-0T
Design with coated printed circuit boards		0150-503-4-0T/L	0220-503-4-0T/L	0300-503-4-0T/L
Part number		08279829	08279837	08279845
		18400396	18400418	18400426
Recommended motor power				
 Constant load	P_{Mot}	15 kW	22 kW	30 kW
 Variable torque load or constant load without overload	P_{Mot}	22 kW	30 kW	37 kW
Recommended motor power		→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 🗎 352)		

2.3.5 MOVIDRIVE® MDX61B0370/0450 size 4 (AC 400/500 V devices)

MOVIDRIVE® MDX61B		0370-503-4-0_	0450-503-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V	
Line frequency	f_{line}	50 Hz – 60 Hz ±5%	
Nominal line current[1)] I_{line}	100%	AC 65.7 A	AC 80.1 A
(at V_{line} = 3 × AC 400 V)	125%	AC 81.9 A	AC 100.1 A
OUTPUT			
Apparent output power[2)] (at V_{line} = 3 × AC 380 – 500 V)	S_N	51.1 kVA	62.3 kVA
Nominal output current[1)] (at V_{line} = 3 × AC 400 V)	I_N	AC 73 A	AC 89 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 91 A	AC 111 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 8 kHz)	I_D	AC 73 A	AC 89 A
Max. output frequency	f_{max}	599 Hz	
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization	
Internal current limit		I_{max} = 0 – 150 % adjustable	
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	6 Ω	
Output voltage	V_O	Max. V_{line}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range	
GENERAL			
Power loss at S_N[2)]	P_{Vmax}	1200 W	1450 W
Cooling air consumption		180 m^3/h	
Mass		27 kg	
Dimensions	W × H × D	280 mm × 522 mm × 307 mm	
Cross section of device terminals X1, X2, X3, X4		M10 bolt with nut Max. 70 mm^2 Press cable lug DIN 46235	
Tightening torque		14 Nm	

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.

2) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0370-503-4-00	0450-503-4-00
Design with coated printed circuit boards		0370-503-4-00/L	0450-503-4-00/L
Part number		08279675	08279683
		18400248	18400256
MDX61B application version		0370-503-4-0T	0450-503-4-0T
Design with coated printed circuit boards		0370-503-4-0T/L	0450-503-4-0T/L
Part number		08279853	08279861
		18400434	18400442
Recommended motor power			
Constant load	P_{Mot}	37 kW	45 kW
Variable torque load or constant load without overload	P_{Mot}	45 kW	55 kW
Recommended motor power		→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 🗎 352)	

2.3.6 MOVIDRIVE® MDX61B0550/0750 size 5 (AC 400/500 V devices)

MOVIDRIVE® MDX61B		**0550-503-4-0_**	**0750-503-4-0_**
INPUT			
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V	
Line frequency	f_{line}	50 Hz – 60 Hz ±5%	
Nominal line current[1)] I_{line}	100%	AC 94.5 A	AC 117 A
(at V_{line} = 3 × AC 400 V)	125%	AC 118.1 A	AC 146.3 A
OUTPUT			
Apparent output power[2)] (at V_{line} = 3 × AC 380 – 500 V)	S_N	73.5 kVA	91.0 kVA
Nominal output current[1)] (at V_{line} = 3 × AC 400 V)	I_N	AC 105 A	AC 130 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 4 kHz)	I_D	AC 131 A	AC 162 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 8 kHz)	I_D	AC 105 A	AC 130 A
Max. output frequency	f_{max}	599 Hz	
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization	
Internal current limit		I_{max} = 0 – 150% adjustable	
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	6 Ω	4 Ω
Output voltage	V_O	Max. V_{line}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range	
GENERAL			
Power loss at S_N[2)]	P_{Vmax}	1700 W	2000 W
Cooling air consumption		360 m^3/h	
Mass		35 kg	
Dimensions	W × H × D	280 mm × 610 mm × 330 mm	
Cross section of device terminals X1, X2, X3, X4		M10 bolt with nut Max. 70 mm^2 Press cable lug DIN 46235	
Tightening torque		14 Nm	

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.

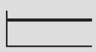
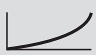
2) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0550-503-4-00	0750-503-4-00
Design with coated printed circuit boards		0550-503-4-00/L	0750-503-4-00/L
Part number		08279691	08279705
		18400264	18400272
MDX61B application version		0550-503-4-0T	0750-503-4-0T
Design with coated printed circuit boards		0550-503-4-0T/L	0750-503-4-0T/L
Part number		08279888	08279896
		18400450	18400469
Recommended motor power			
Constant load	P_{Mot}	55 kW	75 kW
Variable torque load or constant load without overload	P_{Mot}	75 kW	90 kW
Recommended motor power		→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 🗎 352)	

2.3.7 MOVIDRIVE® MDX61B0900/1100/1320 size 6 (AC 400/500 V devices)

MOVIDRIVE® MDX61B		**0900-503-4-0_**	**1100-503-4-0_**	**1320-503-4-0_**
INPUT				
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V		
Line frequency	f_{line}	50 Hz – 60 Hz ±5%		
Nominal line current[1] I_{line}	100%	AC 153 A	AC 180 A	AC 225 A
(at V_{line} = 3 × AC 400 V)	125%	AC 191 A	AC 225 A	AC 281 A
OUTPUT				
Apparent output power[2] (at V_{line} = 3 × AC 380 – 500 V)	S_N	118 kVA	139 kVA	174 kVA
Nominal output current[1] (at V_{line} = 3 × AC 400 V)	I_N	AC 170 A	AC 200 A	AC 250 A
Continuous output current (= 125 % I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 4 kHz) Temperature range 0 °C – +40 °C	I_D	AC 212 A	AC 250 A	AC 312 A
Continuous output current (= 100% I_N) I_D (at V_{line} = 3 × AC 400 V with f_{PWM} = 8 kHz) Temperature range 0 °C – +50 °C	I_D	AC 170 A	AC 200 A	AC 250 A
Max. output frequency	f_{max}	599 Hz		
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization		
Internal current limit		I_{max} = 0 – 150% adjustable		
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	2.7 Ω		
Output voltage	V_O	Max. V_{line}		
PWM frequency	f_{PWM}	Adjustable: 4 oder 8 kHz		
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range		
GENERAL				
Power loss at S_N[2]	P_{Vmax}	1983 W	2240 W	2700 W
Cooling air consumption		600 m^3/h		
Mass		60 kg		
Dimensions	W × H × D	280 mm × 1000 mm × 382 mm		
Cross section of device terminals X1, X2, X3, X4		M12 bolt with nut Max. 185 mm^2 Press cable lug DIN 46235		
Tightening torque		20 Nm		

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.
2) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0900-503-4-00	1100-503-4-00	1320-503-4-00
Design with coated printed circuit boards		0900-503-4-00/L	1100-503-4-00/L	1320-503-4-00/L
Part number		08279713	08279721	08279748
		18400280	18400299	18400302
MDX61B application version		0900-503-4-0T	1100-503-4-0T	1320-503-4-0T
Design with coated printed circuit boards		0900-503-4-0T/L	1100-503-4-0T/L	1320-503-4-0T/L
Part number		08279918	08279926	08279934
		18400477	18400485	18400493
Recommended motor power				
 Constant load	P_{Mot}	90 kW	110 kW	132 kW
 Variable torque load or constant load without overload	P_{Mot}	110 kW	132 kW	160 kW
Recommended motor power		→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 352)		

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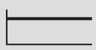
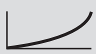
2.3.8 MOVIDRIVE® MDX61B1600/2000/2500 size 7 (AC 400/500 V devices)

MOVIDRIVE® MDX61B		**1600-503-2-0T/L 1600-503-4-0T/L**	**2000-503-2-0T/L 2000-503-4-0T/L**	**2500-503-2-0T/L 2500-503-4-0T/L**
INPUT				
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 380 V – 500 V		
Line frequency	f_{line}	50 Hz – 60 Hz ±5%		
Nominal line current[1)] I_{line}	100%	AC 280 A	AC 340 A	AC 435 A
(at V_{line} = 3 × AC 400 V)	125%	AC 340 A	AC 425 A	AC 535 A
OUTPUT				
Maximum output voltage		599 Hz	599 Hz	599 Hz
Apparent output power[2)] (at V_{line} = 3 × AC 380 – 500 V)	S_N	208 kVA	263 kVA	326 kVA
Nominal output current[1)] (at V_{line} = 3 × AC 400 V)	I_N	AC 300 A	AC 380 A	AC 470 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 2.5 kHz) Temperature range 0 °C – +40 °C	I_D	AC 375 A	AC 475 A	AC 588 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 2.5 kHz) Temperature range 0 °C – +50 °C	I_D	AC 300 A	AC 380 A	AC 470 A
Max. output frequency	f_{max}	599 Hz		
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization		
Internal current limit		I_{max} = 0 – 150% adjustable		
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	1.1 Ω		
Output voltage	V_O	Max. V_{line}		
PWM frequency	f_{PWM}	Adjustable: 2.5 or 4 kHz possible		
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range		
GENERAL				
Power loss at S_N[2)]	P_{Vmax}	2691 W	3182 W	3880 W
Cooling air consumption		1200 m^3/h		
Mass		2Q design: 260 kg 4Q variant: 280 kg		
Dimensions	W × H × D	700 mm × 1490 mm × 470 mm		
Conductor rails X1, X2, X3		Connection rail with bore for M12 Max. 2 × 240 mm^2 Press cable lug DIN 46235		
Tightening torque		70 Nm		
Connections of the DC 24 V power supply unit (PE L1 L2 L3)		Cross section: 6 mm^2 Tightening torque ≤ 4 mm^2 = 0.5 Nm Tightening torque > 4 mm^2 = 0.7 Nm – 0.8 Nm		

1) The system and output currents must be reduced by 20% from the nominal values for V line = 3 × AC 500 V.

2) The performance data applies to f PWM = 2.5 kHz.

MDX61B application version		1600-503-2-0T/L	2000-503-2-0T/L	2500-503-2-0T/L
With coated printed circuit boards		1600-503-4-0T/L	2000-503-4-0T/L	2500-503-4-0T/L
Part number		08299765	08299773	08299781
		08299803	08299811	08299838
Recommended motor power				
 Constant load	P_{Mot}	160 kW	200 kW	250 kW
 Variable torque load or constant load without overload	P_{Mot}	200 kW	250 kW	315 kW
Recommended motor power		→ MOVIDRIVE® B system manual or catalog, chapter "Basic recommendations for motor selection" (→ 🗎 352)		

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

2.4.1 MOVIDRIVE® MDX61B0015/0022/0037 size 1 (AC 230 V devices)

MOVIDRIVE® MDX61B		**0015-2A3-4-0_**	**0022-2A3-4-0_**	**0037-2A3-4-0_**
INPUT				
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 200 V - 240 V		
Line frequency	f_{line}	50 Hz – 60 Hz ±5%		
Nominal supply current I_{line}	100%	AC 6.7 A	AC 7.8 A	AC 12.9 A
(at V_{line} = 3 × AC 230 V)	125%	AC 8.4 A	AC 9.8 A	AC 16.1 A
OUTPUT				
Apparent output power[1)] (at V_{line} = 3 × AC 380 – 240 V)	S_N	2.7 kVA	3.4 kVA	5.8 kVA
Nominal output current (at V_{line} = 3 × AC 230 V)	I_N	AC 7.3 A	AC 8.6 A	AC 14.5 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 9.1 A	AC 10.8 A	AC 18.1 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 8 kHz)	I_D	AC 7.3 A	AC 8.6 A	AC 14.5 A
Max. output frequency	f_{max}	599 Hz		
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization		
Internal current limit		I_{max} = 0 – 150% adjustable		
Minimum permitted braking resistor value (4Q operation)	R_{BWmin}	27 Ω		
Output voltage	V_O	Max. V_{line}		
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz		
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range		
GENERAL				
Power loss at S_N[1)]	P_{Vmax}	126 W	142 W	210 W
Cooling air consumption		40 m^3/h		
Mass		2.8 kg		
Dimensions	W × H × D	105 mm × 314 mm × 234 mm		
Cross section of device terminals X1, X2, X3, X4		Separable terminal strip 4 mm^2 conductor end sleeve DIN 46228		
Tightening torque		0.6 Nm		

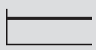
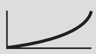
1) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0015-2A3-4-00	0022-2A3-4-00	0037-2A3-4-00
Part number		08279942	08279950	08279969
MDX61B application version		0015-2A3-4-0T	0022-2A3-4-0T	0037-2A3-4-0T
Part number		08280037	08280045	08280053
Recommended motor power				
Constant load	P_{Mot}	1.5 kW	2.2 kW	3.7 kW
Variable torque load or constant load without overload	P_{Mot}	2.2 kW	3.7 kW	5.0 kW
Recommended motor power		→ MOVIDRIVE® B system manual, chapter "Basic recommendations for motor selection" (→ 352)		

2.4.2 MOVIDRIVE® MDX61B0055/0075 size 2 (AC 230 V devices)

MOVIDRIVE® MDX61B		0055-2A3-4-0_	0075-2A3-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 200 V - 240 V	
Line frequency	f_{line}	50 Hz – 60 Hz ±5%	
Nominal supply current I_{line}	100%	AC 19.5 A	AC 27.4 A
(at V_{line} = 3 × AC 230 V)	125%	AC 24.4 A	AC 34.3 A
OUTPUT			
Apparent output power[1)] (at V_{line} = 3 × AC 380 – 240 V)	S_N	8.8 kVA	11.6 kVA
Nominal output current (at V_{line} = 3 × AC 230 V)	I_N	AC 22 A	AC 29 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 27.5 A	AC 36.3 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 8 kHz)	I_D	AC 22 A	AC 29 A
Max. output frequency	f_{max}	599 Hz	
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization	
Internal current limit		I_{max} = 0 – 150% adjustable	
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	12 Ω	
Output voltage	V_O	Max. V_{line}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range	
GENERAL			
Power loss at S_N[1)]	P_{Vmax}	330 W	423 W
Cooling air consumption		80 m^3/h	
Mass		5.9 kg	
Dimensions	W × H × D	130 mm × 315 mm × 285 mm	
Cross section of device terminals X1, X2, X3, X4		M4 screw and washer assembly with terminal clip 4 mm^2 conductor end sleeve DIN 46228 6 mm^2 crimp cable lug DIN 46234	
Tightening torque		1.5 Nm	

1) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0055-2A3-4-00	0075-2A3-4-00
Part number		08279977	08279985
MDX61B application version		0055-2A3-4-0T	0075-2A3-4-0T
Part number		08280061	08280088
Recommended motor power			
 Constant load	P_{Mot}	5.5 kW	7.5 kW
 Variable torque load or constant load without overload	P_{Mot}	7.5 kW	11 kW
Recommended motor power		→ MOVIDRIVE® B system manual, chapter "Basic recommendations for motor selection" (→ 352)	

2.4.3 MOVIDRIVE® MDX61B0110/0150 size 3 (AC 230 V devices)

MOVIDRIVE® MDX61B		**0110-203-4-0_**	**0150-203-4-0_**
INPUT			
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 200 V - 240 V	
Line frequency	f_{line}	50 Hz – 60 Hz ±5%	
Nominal supply current I_{line}	100%	AC 40 A	AC 49 A
(at V_{line} = 3 × AC 230 V)	125%	AC 50 A	AC 61 A
OUTPUT			
Apparent output power[1] (at V_{line} = 3 × AC 380 – 240 V)	S_N	17.1 kVA	21.5 kVA
Nominal output current (at V_{line} = 3 × AC 230 V)	I_N	AC 42 A	AC 54 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 52.5 A	AC 67.5 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 8 kHz)	I_D	AC 42 A	AC 54 A
Max. output frequency	f_{max}	599 Hz	
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization	
Internal current limit		I_{max} = 0 – 150% adjustable	
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	7.5 Ω	5.6 Ω
Output voltage	V_O	Max. V_{line}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range	
GENERAL			
Power loss at S_N[1]	P_{Vmax}	580 W	760 W
Cooling air consumption		180 m^3/h	
Mass		14.3 kg	
Dimensions	W × H × D	200 mm × 465 mm × 308 mm	
Cross section of device terminals X1, X2, X3, X4		M6 bolt with nut, max. 25 mm^2, crimp cable lug DIN 46235	
Tightening torque		3.5 Nm	

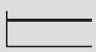
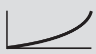
1) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0110-203-4-00	0150-203-4-00
Part number		08279993	08280002
MDX61B application version		0110-203-4-0T	0150-203-4-0T
Part number		08280096	08280118
Recommended motor power			
Constant load	P_{Mot}	11 kW	15 kW
Variable torque load or constant load without overload	P_{Mot}	15 kW	22 kW
Recommended motor power		→ MOVIDRIVE® B system manual, chapter "Basic recommendations for motor selection" (→ 352)	

2.4.4 MOVIDRIVE® MDX61B0220/0300 size 4 (AC 230 V devices)

MOVIDRIVE® MDX61B		0220-203-4-0_	0300-203-4-0_
INPUT			
Nominal supply voltage (to EN 50160)	V_{line}	3 × AC 200 V - 240 V	
Line frequency	f_{line}	50 Hz – 60 Hz ±5%	
Nominal supply current I_{line}	100%	AC 72 A	AC 86 A
(at V_{line} = 3 × AC 230 V)	125%	AC 90 A	AC 107 A
OUTPUT			
Apparent output power[1)] (at V_{line} = 3 × AC 380 – 240 V)	S_N	31.9 kVA	37.8 kVA
Nominal output current (at V_{line} = 3 × AC 230 V)	I_N	AC 80 A	AC 95 A
Continuous output current (= 125 % I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 4 kHz)	I_D	AC 100 A	AC 118 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 230 V with f_{PWM} = 8 kHz)	I_D	AC 80 A	AC 95 A
Max. output frequency	f_{max}	599 Hz	
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization	
Internal current limit		I_{max} = 0 – 150% adjustable	
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	3 Ω	
Output voltage	V_O	Max. V_{line}	
PWM frequency	f_{PWM}	Adjustable: 4/8/12/16 kHz	
Speed range/resolution	n_R / Δn_R	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range	
GENERAL			
Power loss at S_N[1)]	P_{Vmax}	1100 W	1300 W
Cooling air consumption		180 m^3/h	
Mass		26.3 kg	
Dimensions	W × H × D	280 mm × 522 mm × 307 mm	
Cross section of device terminals X1, X2, X3, X4		M10 bolt with nut max. 70 mm^2 Press cable lug DIN 46235	
Tightening torque		3.5 Nm	

1) The performance data applies to f PWM = 4 kHz.

MDX61B standard design		0220-203-4-00	0300-203-4-00
Part number		08280010	08280029
MDX61B application version		0220-203-4-0T	0300-203-4-0T
Part number		08280126	08280134
Recommended motor power			
 Constant load	P_{Mot}	22 kW	30 kW
 Variable torque load or constant load without overload	P_{Mot}	30 kW	37 kW
Recommended motor power		→ MOVIDRIVE® B system manual, chapter "Basic recommendations for motor selection" (→ 352)	

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2.5 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 cycle 1 ms			
(differential input)		Voltage input:		Current input:	
Operating mode AI11/AI12		n1 = DC 0 – +10 V or DC -10 V – 0 – +10 V		n1 = DC 0 – 20 mA or DC 4 – 20 mA	
Resolution		12-bit		11-bit	
Accuracy		±0.2% (40 mV)		±0.2% (40 mV)	
Internal resistance		R_i 40 kΩ (external voltage supply) R_i = 20 kΩ (supply of REF1/REF2)		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 with Δn = 3000 min^{-1}		1. Ramp	t11/t21	Up: 0 – 2000 s	Down: 0 – 2000 s
		2. Ramp	t12/t22	Up = Down: 0 – 2000 s	
		Stop ramp	t13/t23	Down: 0 – 20 s	
		Emergency stop ramp	t14/t24	Down: 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: V = DC 24 V -15%/+20% to EN 61131-2 With size 7, connect 24 V backup voltage via the DC power supply unit. No connection at the control unit			
Digital inputs		Isolated (optocoupler), PLC-compatible (EN 61131 type 2), sampling cycle 1 ms			
X13:1 – X13:6 and X16:1/X16:2		DIØØ – DIØ5 and DIØ6/DIØ7			
Internal resistance		R_i ≈ 3 kΩ, IE ≈ DC 10 mA			
Signal level		DC +13 V – +30 V = "1" = contact closed DC -3 V – +5 V = "0" = contact open		According to EN 61131	
Function	X13:1	DIØØ: With fixed assignment "/Controller inhibit"			
	X13:2 – X13:6, X16:1/X16:2	DIØ1 – DIØ5, DIØ6/DIØ7: Selection option → Parameter menu P60_			
Digital output[1)]		PLC-compatible (EN 61131-2), response time 1 ms			
X10:3/X10:7 and X16:3 – X16:5		DBØØ/DOØ2 and DOØ3 – DOØ5			
Signal level		"0" = DC 0 V "1" = DC +24 V **Important**: Do not apply external voltage!			
Function	X10:3	DBØØ: With fixed assignment "/Brake", I_{max} = DC 150 mA, short-circuit proof, protected against external voltage to DC 30 V			
	X10:7, X16:3 – X16:5	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: Current-carrying capacity of the relay contacts V_{max} = DC 30 V, I_{max} = DC 800 mA			
Function	X10:4	DOØ1-C: Shared relay contact		Selection option → Parameter menu P62_	
	X10:5	DOØ1-NO: NO contact			
	X10:6	DOØ1-NC: NC contact			
System bus (SBus)	X12:1	DGND: Reference potential	CAN bus to CAN specification 2.0, parts A and B, transmission technology to ISO 11898, max. 64 participants, terminating resistor (120 Ω) can be activated using DIP switches		
	X12:2	SC11: SBus high			
	X12:3	SC12: SBus low			
RS485 interface	X13:10	ST11: RS485 +	EIA standard, 9.6 kBaud, max. 32 stations Max. cable length 200 m Dynamic terminating resistor with fixed installation		
	X13:11	ST12: RS485 -			
TF/TH/KTY/PK input	X10:1	TF1: Response threshold at R_{TF} ≥ 2.9 kΩ ±10%			

1) The device provides a current of Imax = DC 400 mA for the DC+24 V outputs (VO24, digital outputs). If this value is insufficient, a DC 24 V voltage supply must be connected to X10:9 (VI24).

MOVIDRIVE® MDX60/61B		General electronics data
Reference terminals	X11:4	AGND: Reference potential for analog signals and terminals X11:1 and X11:5 (REF1/REF2)
X12:1/X13:9/X16:6/X10:2/X10:10		DGND: Reference potential for binary signals, system bus, RS485 interface and TF/TH

MOVIDRIVE® MDX60/61B		General electronics data	
	X13:7	DCOM: Reference potential of digital inputs X13:1 – X13:6 and X16:1/X16:2 (DIØØ – DIØ5 and DIØ6/DIØ7)	
Permitted cable cross section		One core per terminal:	0.20 – 2.5 mm² (AWG 24 – 12)
		Two cores per terminal:	0.25 – 1 mm² (AWG 22 – 17)
		Tightening torque:	0.6 Nm
Safety contact	X17:1	DGND: Reference potential for X17:2	
Input capacitance	X17:2	VO24: V_{OUT} = DC 24 V, only to supply X17:4 of the same device plus maximally 1 BST; **must not be used** to supply other devices	
	X17:3	SOV24: Reference potential for DC +24 V "STO" input (safety contact)	
	X17:4	SVI24: DC+24 V "STO" input (safety contact)	
Permitted cable cross section		One core per terminal:	0.08 – 1.5 mm² (AWG28 – 16)
		Two cores per terminal:	0.25 – 1.0 mm² (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	
		Size 7: 6 W	
Input capacitance	X17:4	Size 0: 27 µF	
		Sizes 1 – 7: 270 µF	
Time for restart		t_A = 200 ms	
Time to inhibit output stage		t_S ≤ 100 ms	

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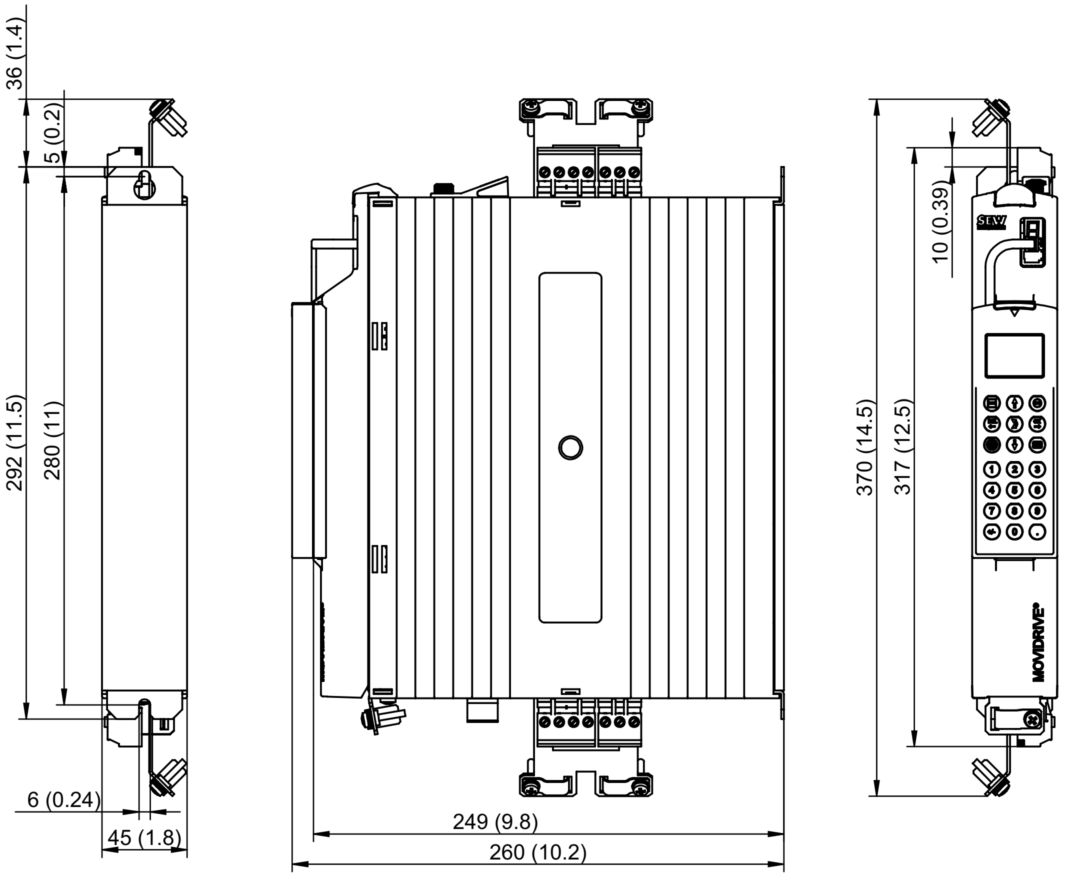
2.6 MOVIDRIVE® MDX60B dimension drawings

2.6.1 MOVIDRIVE® MDX60B size 0S

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



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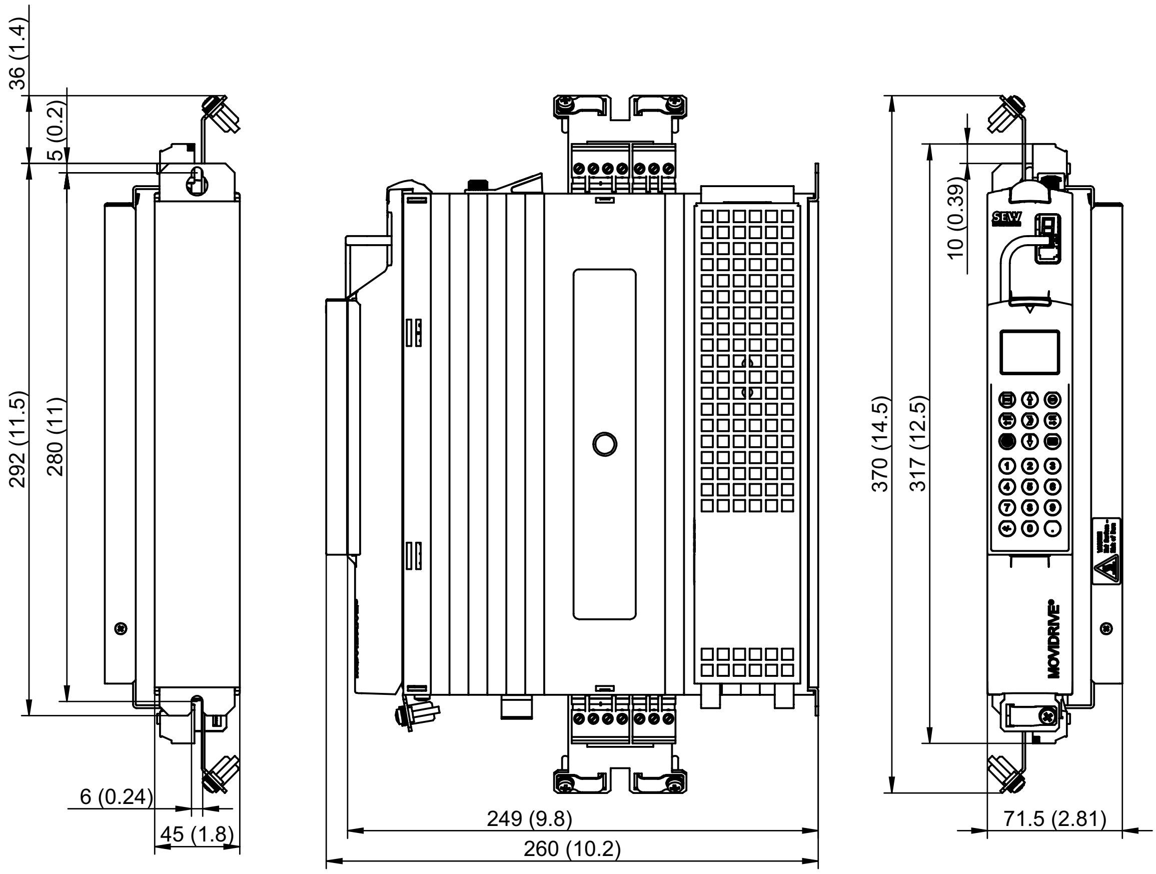
2.6.2 MOVIDRIVE® MDX60B, size 0S with mounted braking resistor

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



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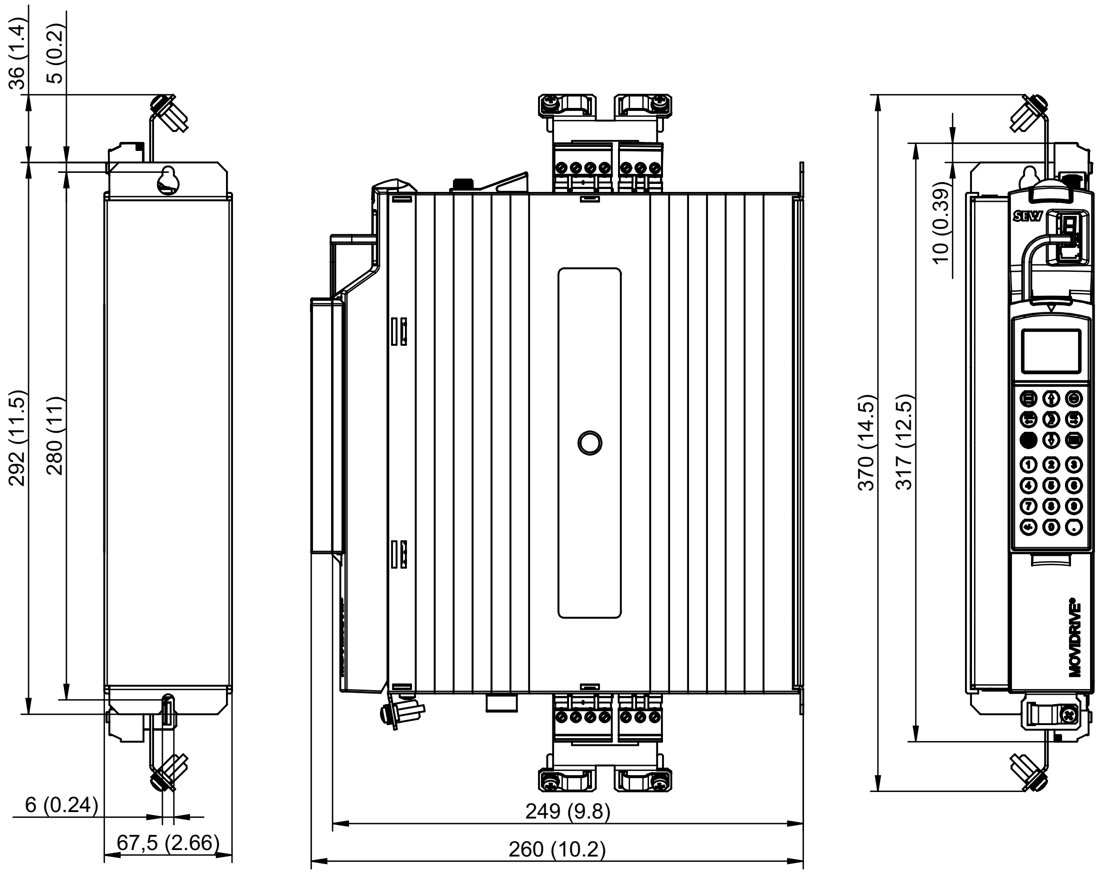
2.6.3 MOVIDRIVE® MDX60B size 0M

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



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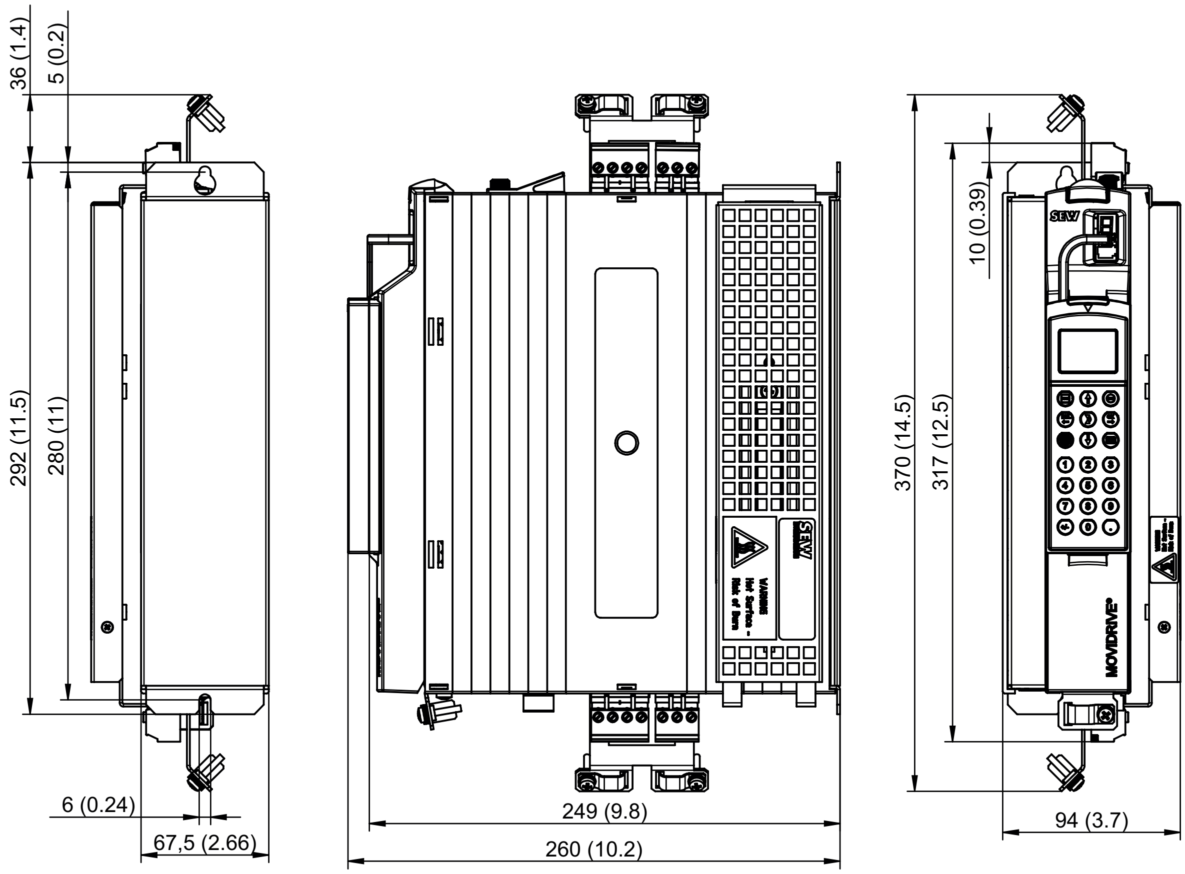
2.6.4 MOVIDRIVE® MDX60B size 0M with mounted braking resistor

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



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2.7 MOVIDRIVE® MDX61B dimension drawings

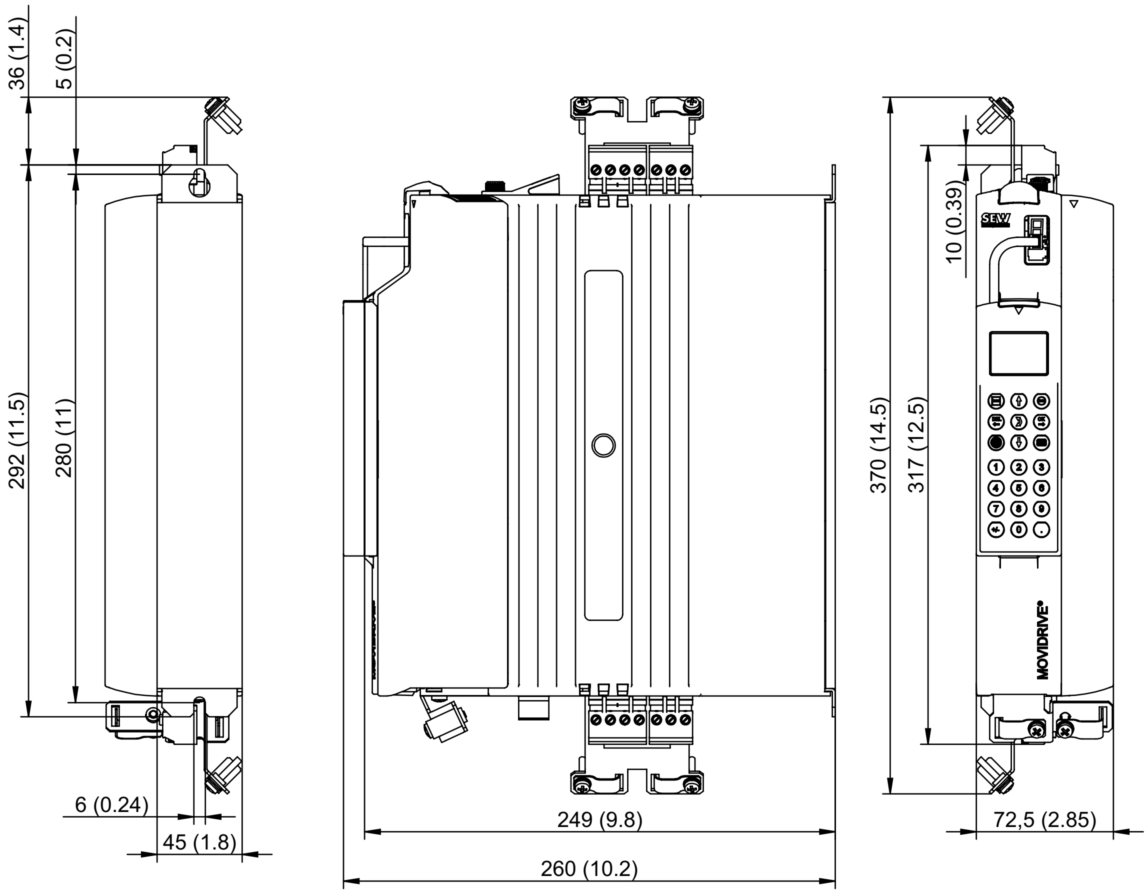
INFORMATION

With MOVIDRIVE®

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.

2.7.1 MOVIDRIVE® MDX61B size 0S

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



9007201195592331

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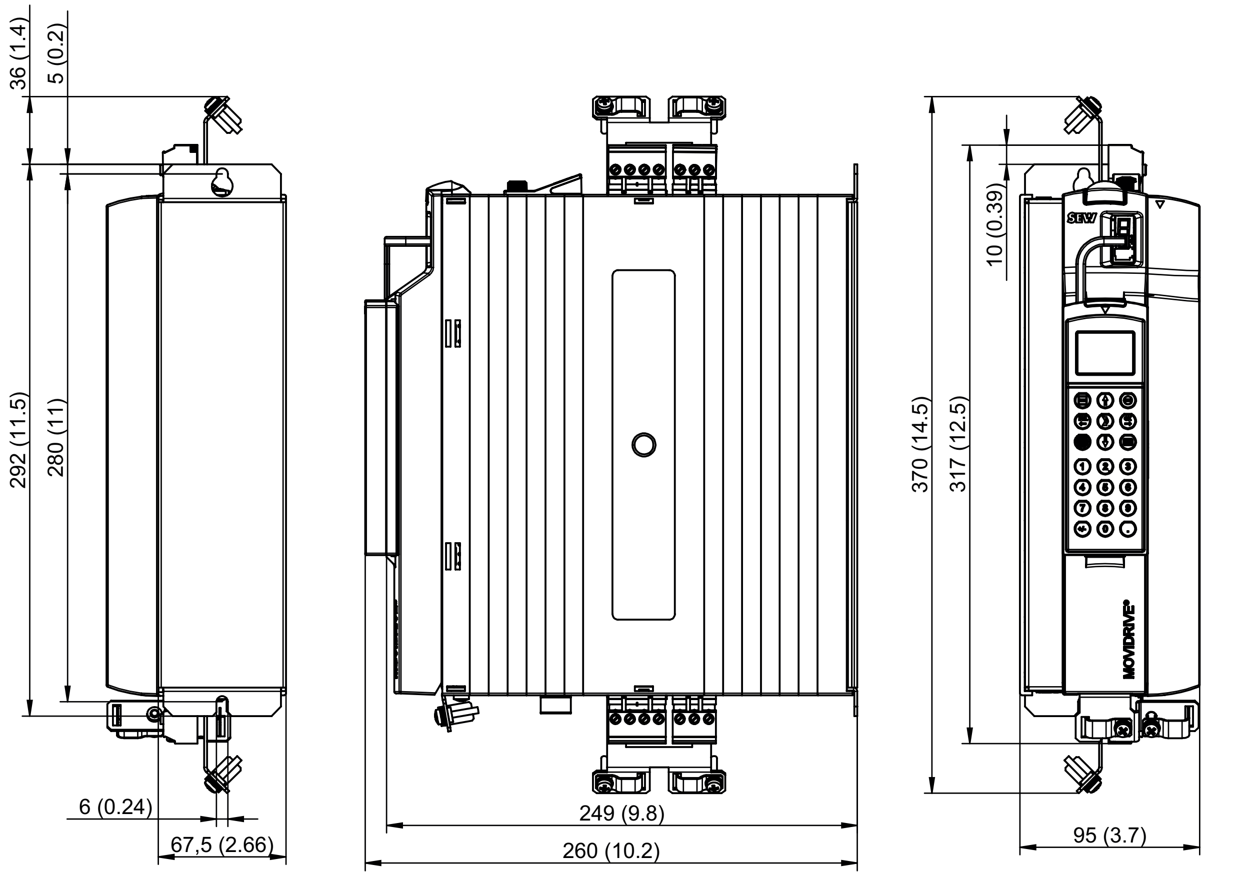
2.7.2 MOVIDRIVE® MDX61B size 0M

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



9007201313669643

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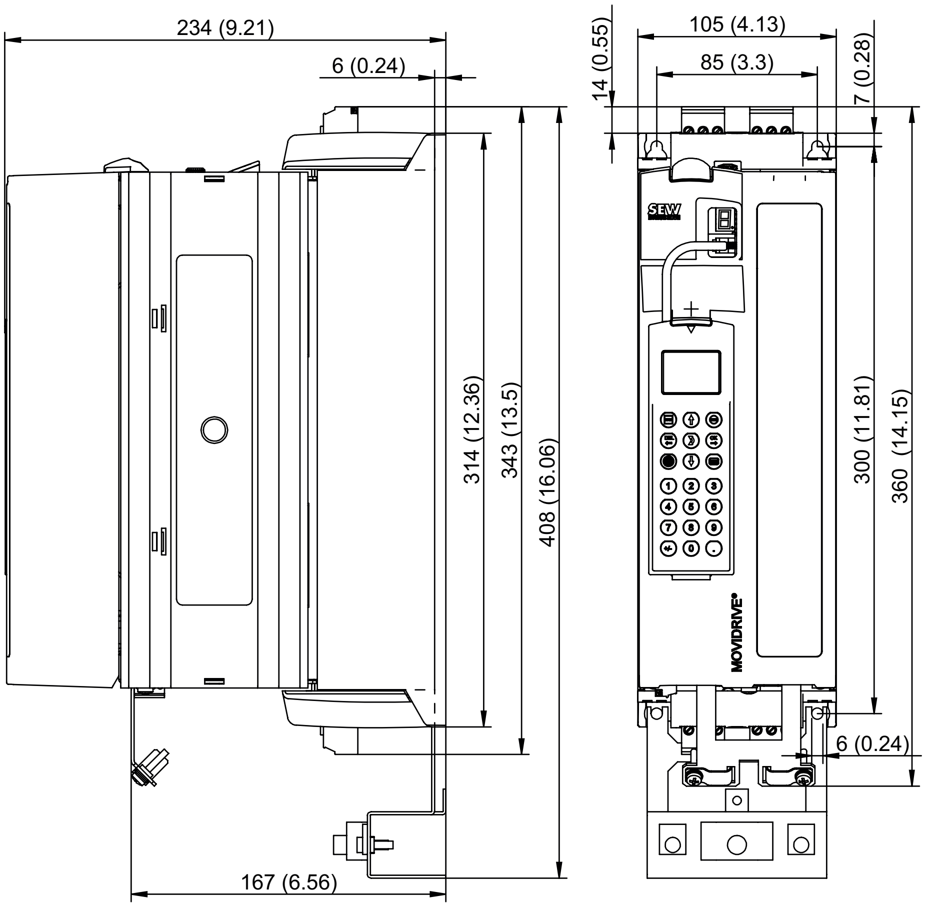
2.7.3 MOVIDRIVE® MDX61B size 1

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



9007201313674123

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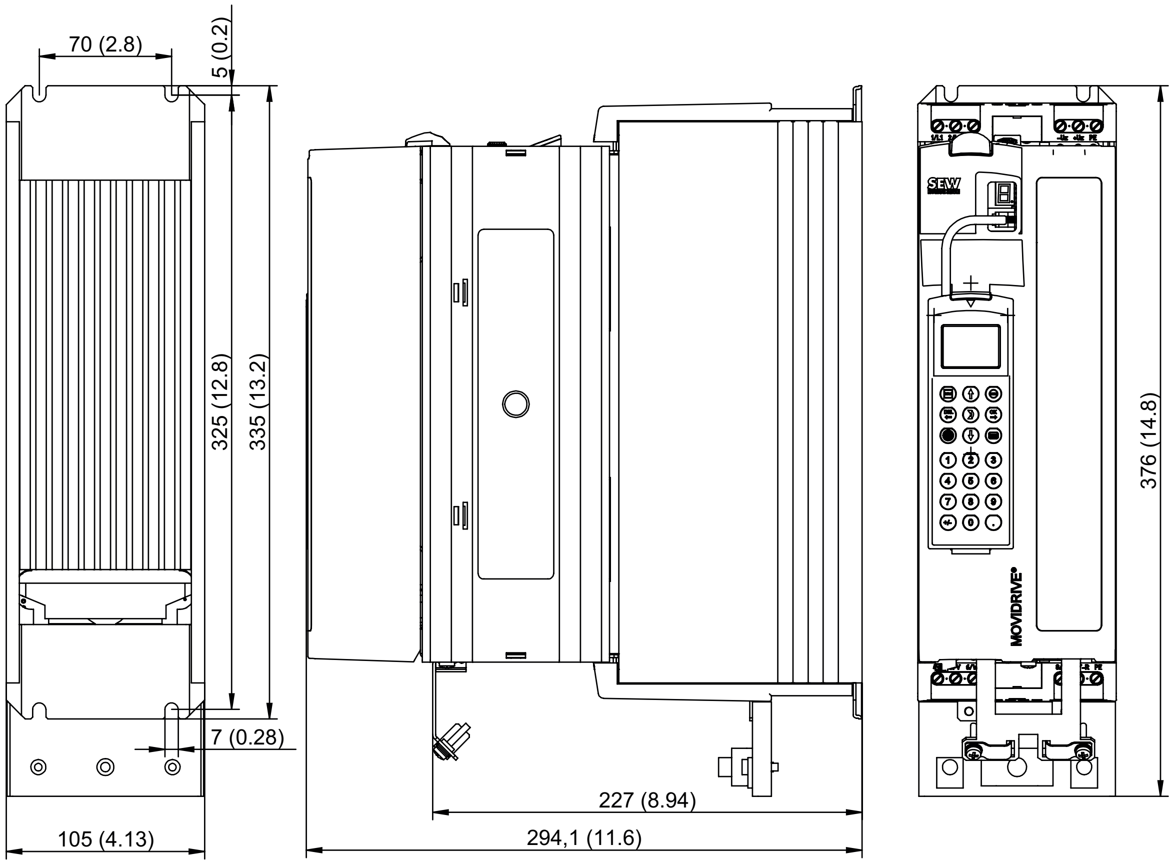
2.7.4 MOVIDRIVE® MDX61B size 2S

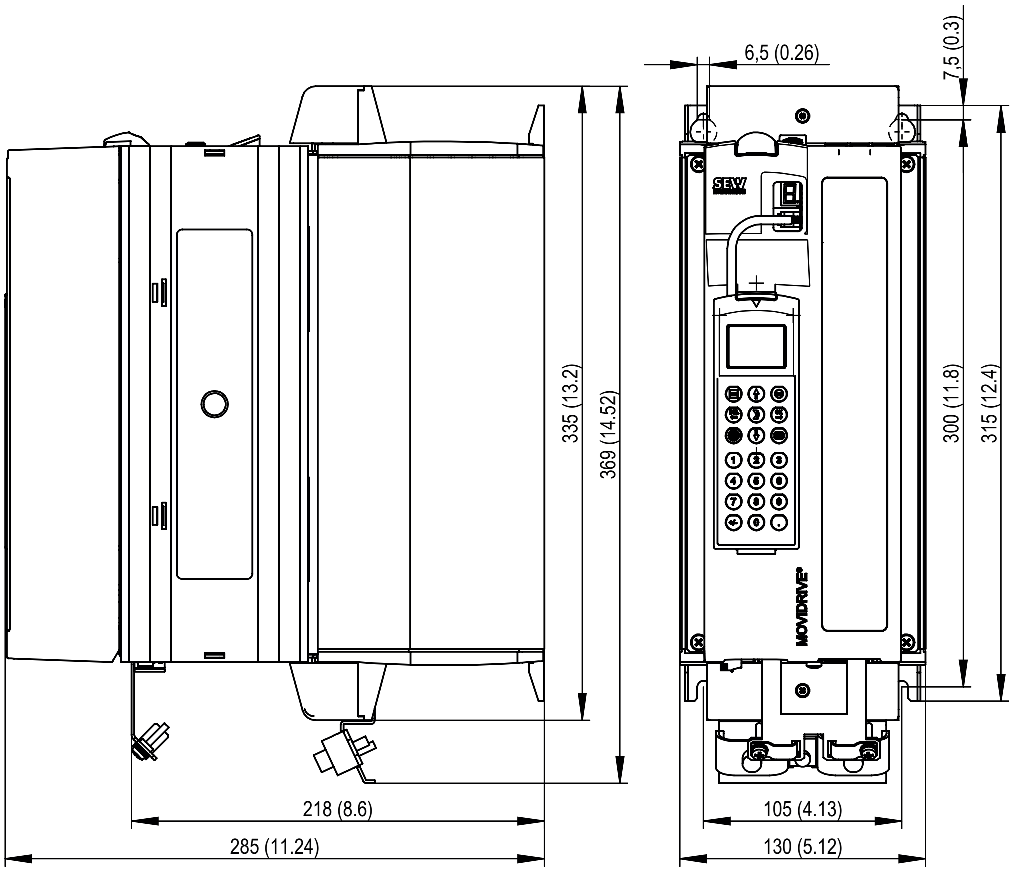
The following dimension drawing shows MDX61B size 2S, dimensions in mm (in)



9007201313689995

2.7.5 MOVIDRIVE® MDX61B size 2

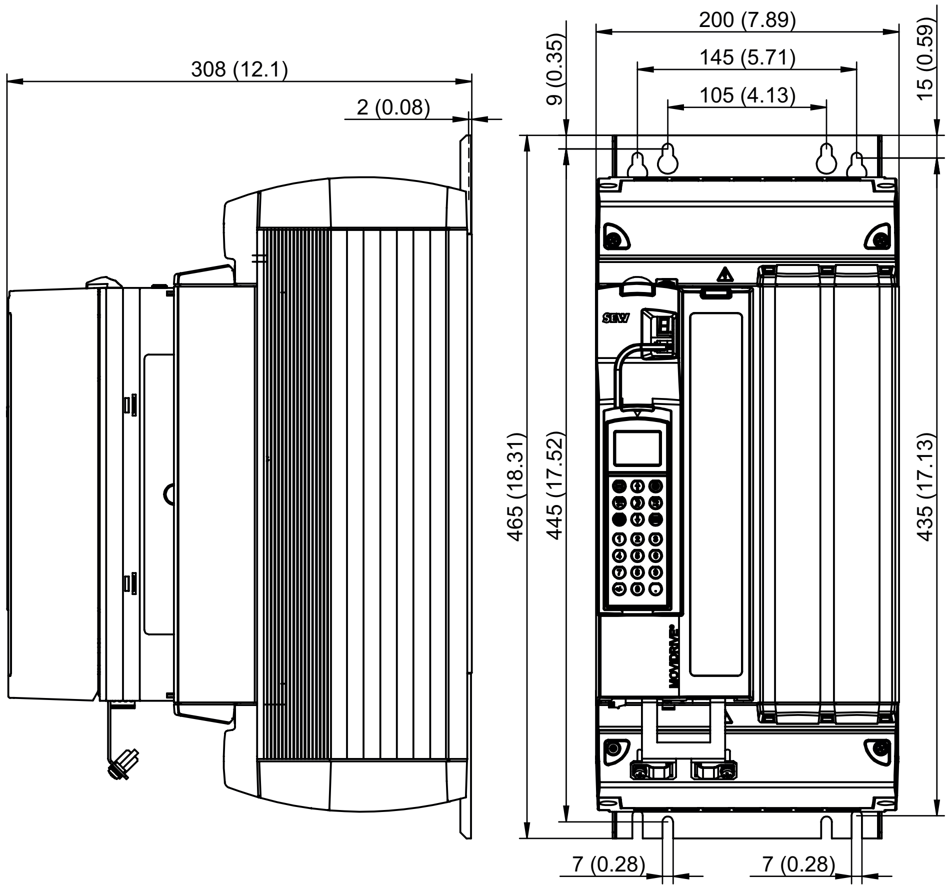
The following dimension drawing shows MDX61B size 2, dimensions in mm (in)



9007201313694091

2.7.6 MOVIDRIVE® MDX61B size 3

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



9007201313697675

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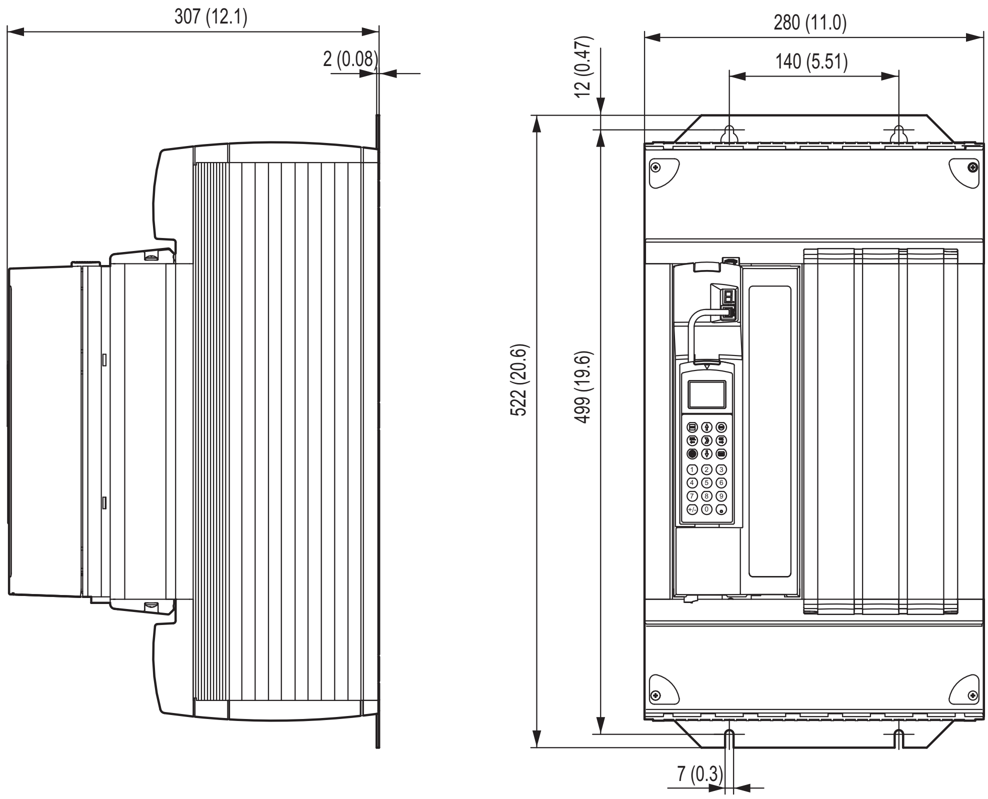
2.7.7 MOVIDRIVE® MDX61B size 4

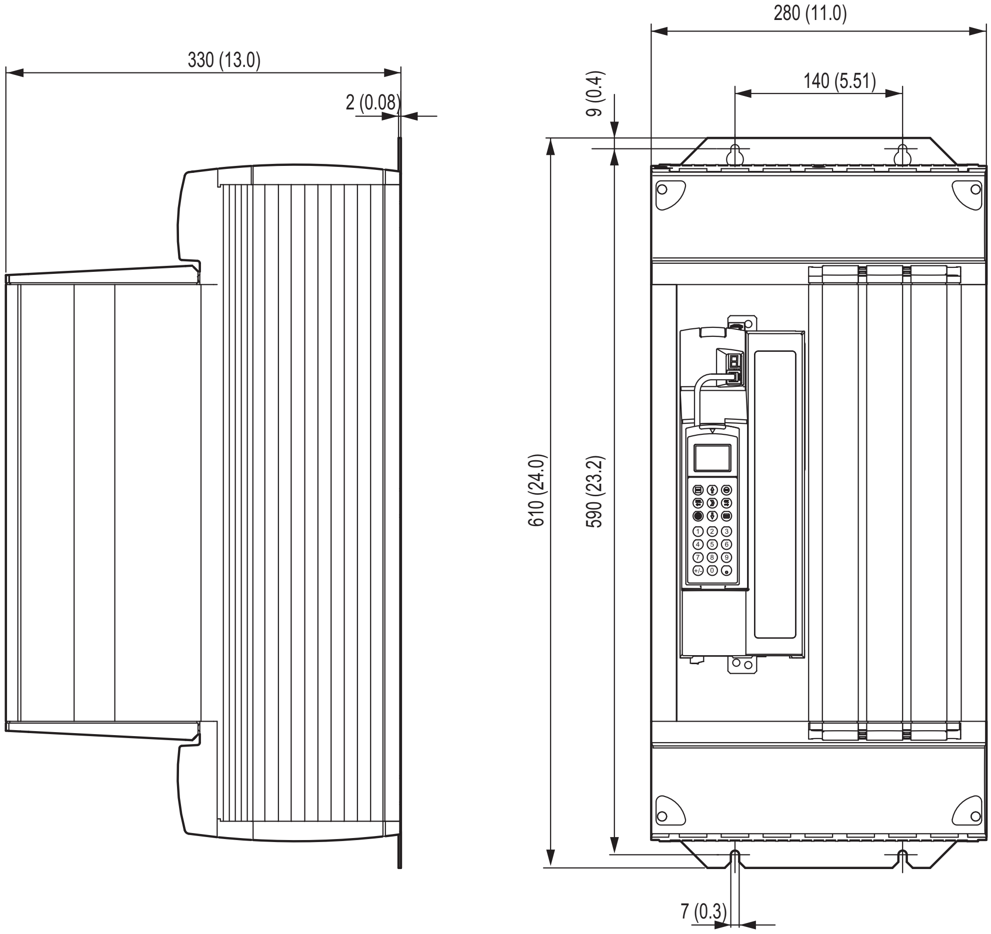
The following dimension drawing shows MDX61B size 4, dimensions in mm (in)



2058960267

2.7.8 MOVIDRIVE® MDX61B size 5

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



2058963851

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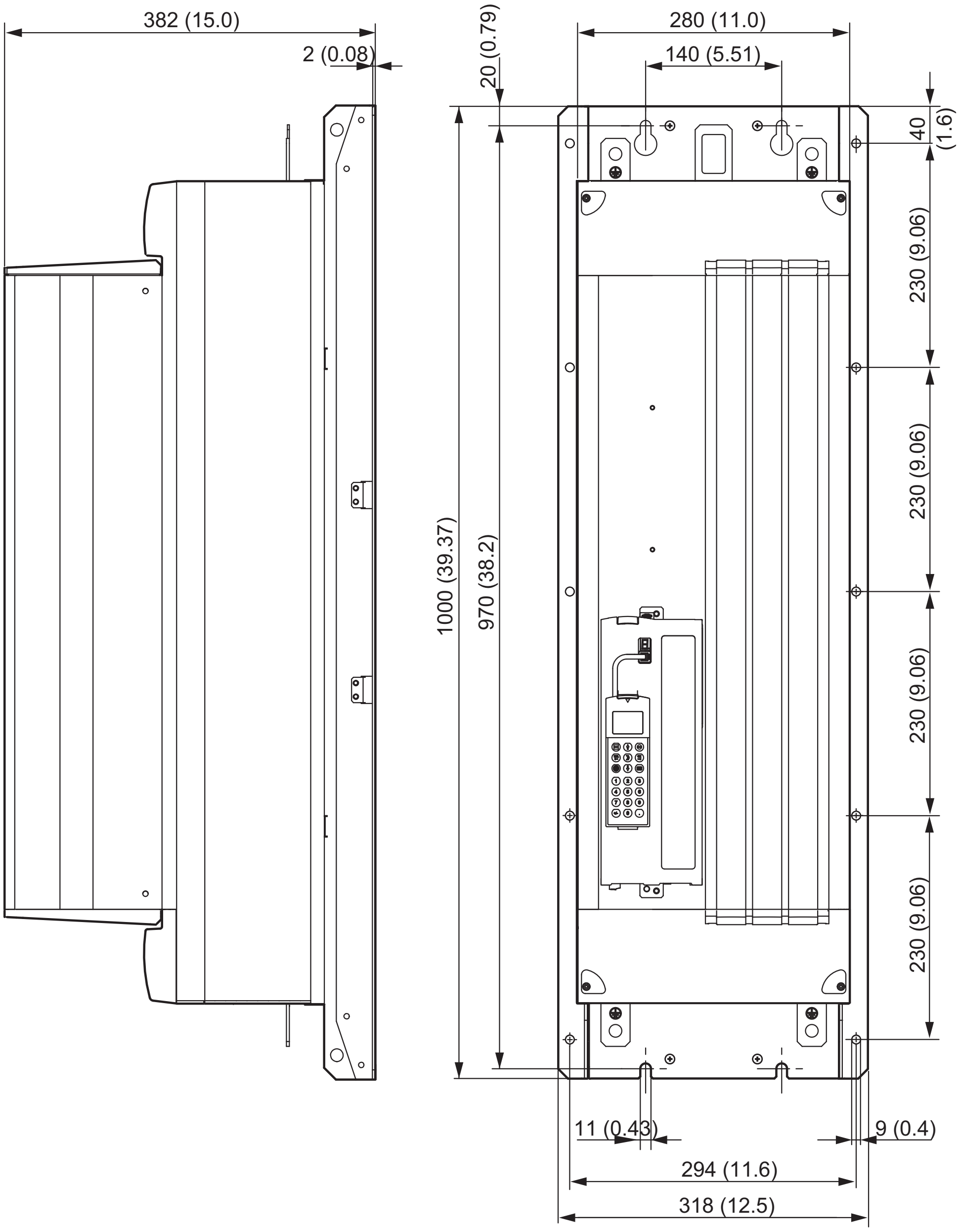
2.7.9 MOVIDRIVE® MDX61B size 6

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



2058967435

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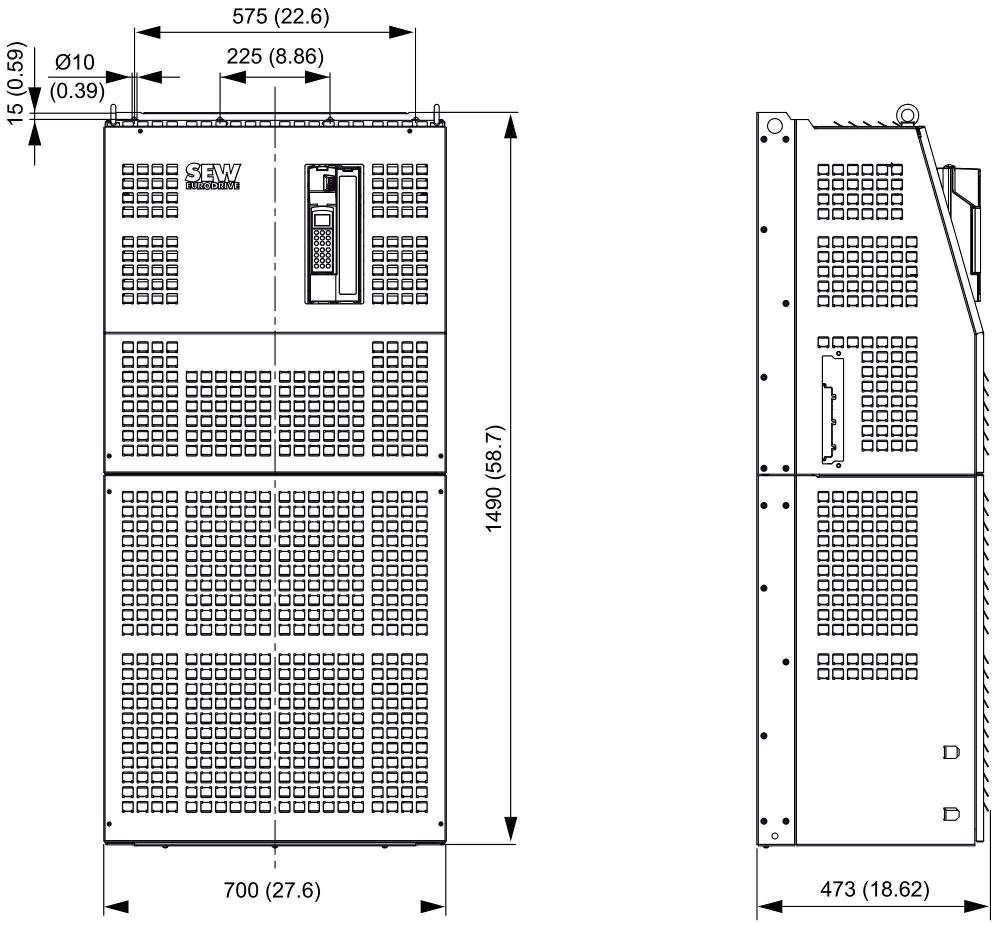
2.7.10 MOVIDRIVE® MDX61B size 7

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



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2.8 IPOS$^{PLUS®}$

2.8.1 Description

IPOS$^{PLUS®}$ positioning and sequence control is integrated into every MOVIDRIVE® inverter as standard. With IPOS$^{PLUS®}$ control functions and positioning tasks can be performed either simultaneously or independently of one another.

The IPOS$^{PLUS®}$ sequence control system makes it possible to run a user program, regardless of any encoder feedback or the selected control mode (VFC, CFC, SERVO). In conjunction with encoder feedback, the IPOS$^{PLUS®}$ positioning control provides a high-performance point-to-point positioning capability. The IPOS$^{PLUS®}$ program is written using the MOVITOOLS® engineering software. Starting up the inverter, accessing parameters and editing variables are all possible either with the software or the DBG60B keypad (startup in VFC mode only).

2.8.2 Properties

- Program execution independent of encoder feedback and operating mode
- The user program is continued even if a device malfunction occurs (troubleshooting is possible in the user program)
- Three user programs can be run in parallel and independently of one another (task 1, task 2 and task 3, each of them interrupt-capable)
- The user programs programmed in assembler can contain up to 3200 program lines
- User-friendly and comprehensive control options for the inverter
- Access to all available options
- Extensive options for communication via system bus (SBus), RS485, and fieldbus (direct communication with MOVIMOT® is possible)
- Processing of digital and analog input/output signals

With encoder feedback only

- Positioning with selectable travel speed, positioning ramp and jerk limitation
- Precontrol for position, speed and torque control loops with minimized lag error
- Two touch probe inputs
- Ramp types: Linear, jerk limited, sine, and square
- Status and monitoring functions: Lag error monitoring, position signal, software and hardware limit switches
- 9 types of reference travel
- Possibility of changing the target position, travel speed, positioning ramp and torque while movement is in progress
- "Endless positioning" is possible
- Override function
- Cam switch
- Synchronous operation and electronic cam

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Max. program length of task 1, task 2 and task 3	Total of ca. 3200 program lines
Command processing time per program line	Task 1: 1 – 10 commands/ms can be configured Task 2: 2 – 11 commands/ms can be configured Task 3: at least 1 command/ms (typical is 40 commands/ms)
Variables	1024, of which 128 (0 – 127) can be stored to non-volatile memory; range of values: -2^{31} – $+(2^{31}-1)$
Touch probe inputs	2 inputs, processing time < 100 µs
Sampling cycle of digital and analog inputs	1 ms
Digital inputs/outputs	8 inputs/5 outputs
Analog inputs/outputs	1 input (DC 0 – 10 V, DC±10 V, DC 0 – 20 mA, DC 4 – 20 mA) 1 input (DC 0 – 10 V, DC±10 V) 2 outputs (DC 0 – 20 mA, DC 4 – 20 mA, DC±10 V)

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2.9 DBG60B keypad

2.9.1 Description

The basic version of MOVIDRIVE® does not have a DBG60B keypad, but can be upgraded to include the keypad as an option.

Keypad		Language variants	Part no.
	DBG60B-10	DE/EN/FR/IT/ES/PT/NL/FI/SV/DA/TR/RU/PL/CS/ZH (German/English/French/Italian/Spanish/Portuguese/Dutch/Finnish/Swedish/Danish/Turkish/Russian/Polish/Czech/Chinese)	28229150
	Door installation set[1]	Description (= scope of delivery)	Part no.
	DBM60B	• Housing for DBG60B (IP65) • DKG60B extension cable, length 5 m	08248532
	Extension cable	Description (= scope of delivery)	Part no.
	DKG60B	• length 5 m • 4-core, shielded cable	08175837

1) The DBG60B keypad is not included in the scope of delivery and must be ordered separately.

Functions

- Display process values and status
- Status displays of digital inputs/outputs
- Fault memory and error reset queries
- Option to display and set the operating parameters and service parameters
- Data backup and transfer of parameter sets to other MOVIDRIVE® devices
- User-friendly startup menu for VFC mode
- Manual control of MOVIDRIVE® B and MOVITRAC® B
- Manual operation of MOVIMOT® (→ Decentralized technology documentation)

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Features

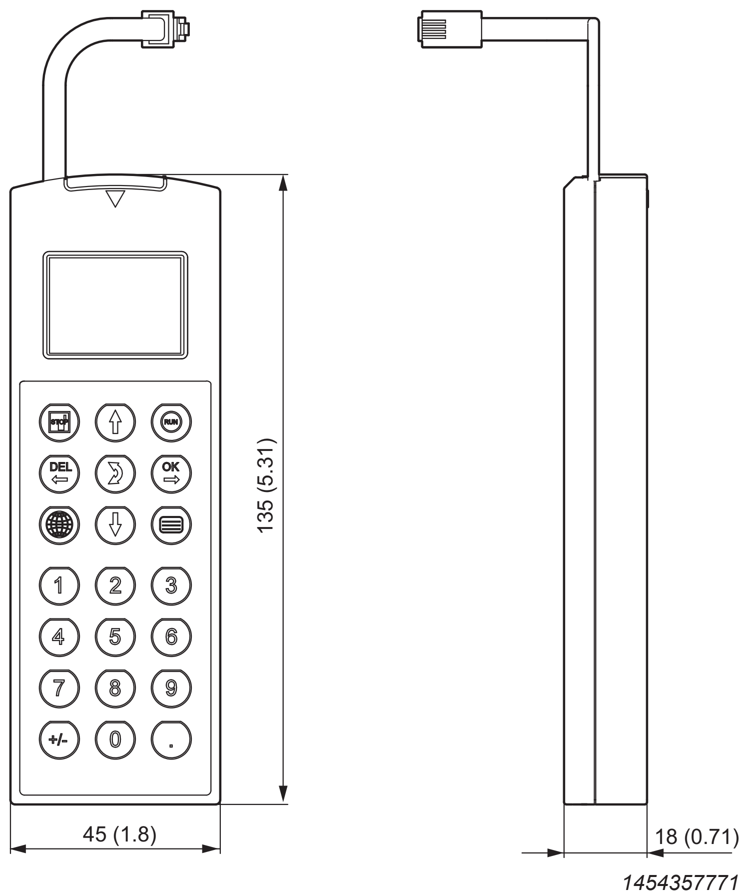
- Illuminated text display, range of languages
- Keypad with 21 keys
- Selection between user menu, detailed parameter menu and startup menu in VFC mode (CFC and SERVO startup is not possible with the DBG60B)
- Can be plugged into MOVIDRIVE®
- Can be connected via extension cable DKG60B (5 m)
- Degree of protection IP40 (EN 60529)

INFORMATION

The DBG60B keypad option and the interface adapter are plugged into the same inverter slot (XT) and therefore cannot be used at the same time.

2.9.2 Dimension drawing for DBG60B

The following figure shows the mechanical dimensions in mm (in).



All dimensions in mm (in)

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SEW EURODRIVE

2.10 DBM60B/DKG60B housing for DBG60B

2.10.1 Description

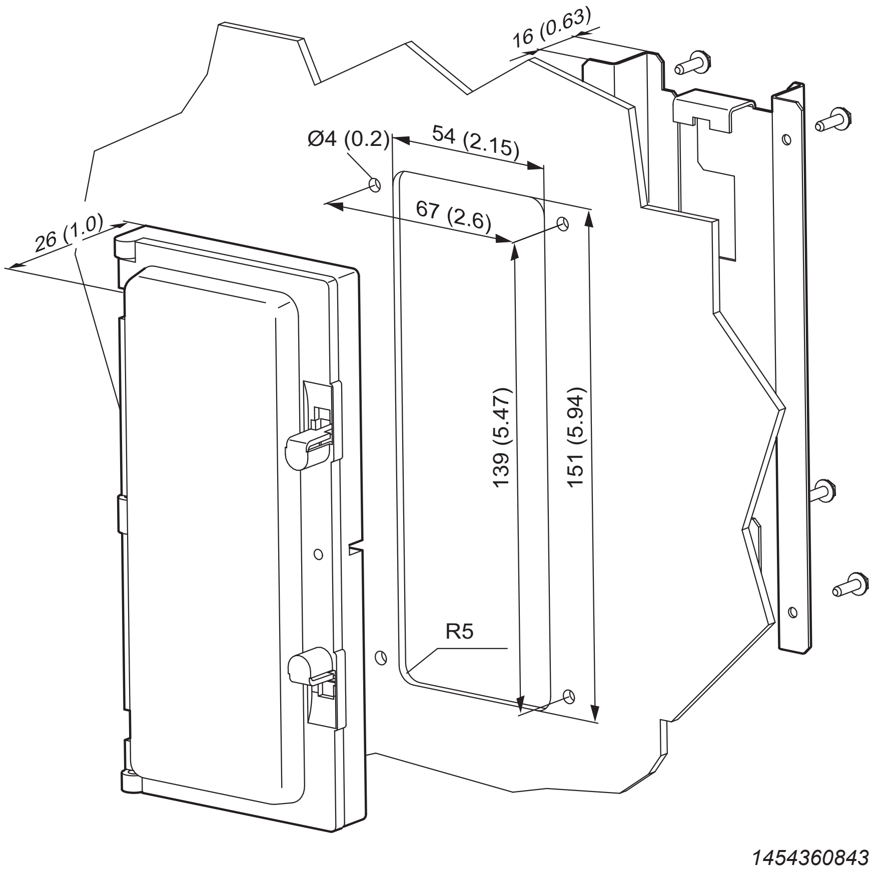
The DBM60B option can be used to mount the keypad close to the inverter (e.g. in the control cabinet door). The DBM60B option consists of a housing in IP65 degree of protection, and a 5 m DKG60B extension cable.

Part numbers

- DBM60B: 08248532
- DKG60B: 08175837

2.10.2 Dimension drawing DBM60B/DKG60B

The following figure shows the mechanical dimensions in mm (in).



All dimensions in mm (in)

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3 Technical data of regenerative power supply unit

3.1 MOVIDRIVE® MDR60A/61B regenerative power supply unit

MOVIDRIVE® drive inverters operating in regenerative mode (4Q operation) can use the MOVIDRIVE® MDR60A/61B regenerative power supply unit as an alternative to braking resistors. The prerequisite is a powerful supply system. For more detailed information, refer to the "MOVIDRIVE® MDR60A/61B Regenerative Power Supply Unit" system manual. This manual can be ordered from SEW-EURODRIVE.

MOVIDRIVE® MDR60A/61B supplies the DC link circuit of the connected MOVIDRIVE® drive inverters with electrical power from the supply system in motor operation and returns regenerative power to the supply system in regenerative operation.

3.1.1 UL approval

UL and cUL approval has been granted for MOVIDRIVE® MDR60A0150-503-00, MDR60A0370-503-00, MDR60A0750-503-00, MDR61B1600-503-00, and MDR61B2500-503-00 devices. cUL is equivalent to CSA approval. The MOVIDRIVE® MDR60A1320-503-00 does not have UL or cUL approval.

3.1.2 Protection and monitoring functions

- Monitoring and protection against thermal overload.
- Detection of power failure within one supply system half-wave.
- Overvoltage protection.

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3.1.3 Features of a regenerative power supply unit compared to an inverter with braking resistors

- Energy balance: Regenerative power is fed back into the supply system instead of being converted into waste heat.
- Reduced complexity of installation when there are several inverters (mains and braking resistor connections). However, a braking resistor is required for bringing the drive to a controlled stop even when there is a disruption in the supply system.
- Reduction in use of control cabinet space and fan power if the braking resistor was previously installed in the control cabinet.

3.1.4 General technical data

MOVIDRIVE® MDR60A regenerative power supply unit

MOVIDRIVE® MDR60A	0150-503-00 (size 2) 0370-503-00 (size 3) 0750-503-00 (size 4)	1320-503-00 (size 6)
Interference immunity	Meets EN 61800-3	Meets EN 61000-6-1 and EN 61000-6-2
Interference emission with EMC-compliant installation	Meets EN 61800-3: • With line filter NF035-503 (MDR60A0150-503-00) • With line filter NF048-503 (MDR60A0150-503-00) • With line filter NF085-503 (MDR60A0370-503-00) • With line filter NF150-503 (MDR60A0750-503-00)	Meets EN 61000-6-4 with line filter NF300-503
Ambient temperature ϑ_{amb} Ambient temperature derating	0 °C – +40 °C I_N reduction: 3% I_N per K up to 60 °C	0 °C – +40°C I_N reduction: 3% I_N per K up to 55 °C
Climate class	EN 60721-3-3, class 3K3	
Storage temperature[1] ϑ_F	-25 °C – +70 °C (EN 60721-3-3, class 3K3)	-25 °C – +55 °C (EN 60721-3-3, class 3K3)
Cooling types (DIN 51751)	External cooling (temperature-controlled fan, response threshold 50 °C)	External cooling (temperature-controlled fan, response threshold 45 °C)
Degree of protection EN 60529 (NEMA1) Size 2 Size 3 Size 4	IP20 IP20 IP00 IP10 • With fitted plexiglass cover supplied as standard • With fitted heat shrink tubing (not included in delivery) IP20 • With fitted DLB11B touch guard	IP20
Operating mode	Continuous duty	
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)	
Installation altitude	At h ≤ 1000 m without restrictions At h ≥ 1000 m, the following restrictions apply: • From 1000 m to max. 4000 m: – I_N reduction by 1% per 100 m • From 2000 m to max. 4000 m: – The protective separation of power and electronics connections can no longer be assured above 2000 m. This requires external measures (IEC 60664-1/EN 61800-5-1) – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.	At h ≤ 1000 m: No limitation From 1000 m to max. 4000 m: I_N reduction: 0.5% per 100 m

1) In case of extended storage, connect the device to the power supply for at least 5 minutes every two years, otherwise the device's service life may be reduced.

MOVIDRIVE® MDR61B regenerative power supply unit

MOVIDRIVE® MDR61B	1600-503-00/L (size 7) 2500-503-00/L (size 7)
Interference immunity	Meets EN 61800-3
Interference emission with EMC-compliant installation	Meets EN 61800-3: • With NF600-503 line filter
Ambient temperature ϑ_{amb} Ambient temperature derating	0 °C – +50 °C at I_D = 100% I_{DC} 0 °C – +40 °C at I_D = 125% I_{DC} 2.5% I_{DC} per K at 40 °C – +50 °C 3% I_{DC} per K at 50 °C – +60 °C
Climate class	EN 60721-3-3, class 3K3
Storage temperature[1)] ϑ_F	-25 °C – +70 °C (EN 60721-3-3, class 3K3)
Cooling types (DIN 51751)	External cooling (temperature-controlled fan, response threshold 50 °C)
Degree of protection EN 60529 (NEMA1)	IP00 IP20 • With fitted DLB31B touch guard
Operating mode	Continuous duty
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Installation altitude	At h ≤ 1000 m without restrictions The following restrictions apply at h ≥ 1000 m: • From 1000 m to max. 4000 m – I_N reduction by 1% per 100 m • From 2000 m to max. 4000 m – Above an installation altitude of 2000 m the protective separation of power and electronic connections is not ensured. In this case, external measures are required: (IEC 60664-1/EN 61800-5-1) – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.

1) In case of extended storage, connect the device to the power supply for at least 5 minutes every two years, otherwise the device's service life may be reduced.

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3.1.5 Technical data of MOVIDRIVE® MDR60A/61B and MDX62B

MOVIDRIVE® MDR60A0150/0370 size 2 and size 3

MOVIDRIVE® MDR60A **Standard design** **Design with coated printed circuit boards**		**Size 2** **0150-503-00** **0150-503-00/L**	**Size 3** **0370-503-00** **0370-503-00/L**
Part number		18252710 18252729	08266581 08296723
INPUT			
Nominal voltage (according to EN 50160)	V_{line}	3 × AC 380 V – 500 V	
Line frequency	f_{line}	50 Hz – 60 Hz ± 5%	
Rated connected load	P_N	15 kW	37 kW
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line}	AC 29 A	AC 66 A
ELECTRONICS TERMINALS			
Digital inputs Internal resistance		PLC-compatible (EN 61131), sampling cycle 1 ms R_I ≈ 3.0 kΩ, I_E ≈ 10 mA	
Signal level		+13 V – +30 V = "1" = contact closed -3 V – +5 V = "0" = contact open	
Digital outputs		PLC-compatible (EN 61131-2), response time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level		"0" = 0 V, "1" = +24 V, **Important: Do not apply external voltage**	
DC LINK			
Apparent output power (at V_{line} = 3 × AC 380 – 500 V)	S_A	25 kVA	50 kVA
DC link voltage (at nominal supply current I_{line})	$V_{DC\ link}$	DC 560 V – 780 V	
Nominal DC link current (at nominal current I_{line})	$I_{DC\ link}$	DC 35 A	DC 70 A
Max. DC link current	I_{DClink_max}	DC 53 A	DC 105 A
GENERAL			
Power loss at P_N	P_{Vmax}	120 W	950 W
Cooling air consumption		100 m³/h	180 m³/h
Connection for power terminals	X1, X2	Separable terminal strips Conductor end sleeve DIN 46228	Screw and washer assembly M6
Permitted tightening torque		1.8 Nm	3.5 Nm
Permitted cable cross section		6 mm² (AWG9) PE: M4 with 1.5 Nm	25 mm²
Electronics terminals connection	X3	Permitted cable cross section • One conductor per terminal: 0.20 – 2.5 mm² (AWG 24 – 13) • Two conductors per terminal: 0.25 – 1 mm² (AWG 23 – 17) Tightening torque 0.6 Nm	
Mass		4 kg	16 kg
Dimensions	W × H × D	118 mm × 320 mm × 127 mm	200 mm × 465 mm × 221 mm
Line choke (always required)		ND045-013, L_N = 0.1 mH Part number 08260133	ND085-013 L_N = 0.1 mH Part number 08260141
Line filter (optional)		NF035-503 up to 15 kW Part number 8271283 NF048-503 up to 22 kW (15 kW × 125%) Part number 08271178	NF085-503, Part number 08274150
For MOVIDRIVE® MDX60B/61B...-5_3		0005 – 0150	0005 – 0370
Recommended line fuse		63 A	100 A

MOVIDRIVE® MDR60A0750/1320 size 4 and size 6

MOVIDRIVE® MDR60A		Size 4	Size 6
Standard design		**0750-503-00**	**1320-503-00**[1)]
Design with coated printed circuit boards		**0750-503-00/L**	**–**
Part number		08265569 08296731	08279527
INPUT			
Nominal voltage (according to EN 50160)	V_{line}	3 × AC 380 V – 500 V	
Line frequency	f_{line}	50 Hz – 60 Hz ± 5%	40 Hz – 60 Hz ± 10%
Rated connected load	P_N	75 kW	160 kW
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line}	AC 117 A	AC 260 A
ELECTRONICS TERMINALS			
Digital inputs Internal resistance		Isolated (optocoupler), PLC-compatible (EN 61131), sampling cycle 1 ms R_I ≈ 3.0 kΩ, I_E ≈ 10 mA	–
Signal level		+13 V – +30 V = "1" = Contact closed -3 V – +5 V = "0" = Contact open	
Digital outputs		PLC-compatible (EN 61131-2), response time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level		"0" = 0 V, "1" = +24 V, **Important: Do not apply external voltage.**	
DC LINK			
Apparent output power (at V_{line} = 3 × AC 380 – 500 V)	S_A	90 kVA	175 kVA
DC link voltage	$V_{DC\ link}$	DC 560 V – 780 V	
Nominal DC link current (at nominal line current I_{line})	$I_{DC\ link}$	DC 141 A	DC 324 A
Max. DC link current (at nominal line current I_{line})	I_{DClink_max}	DC 212 A	Motor: • DC 486 A regenerative: • DC 410 A
GENERAL			
Power loss at P_N	P_{Vmax}	1700 W	2400 W
Cooling air consumption		360 m^3/h	880 m^3/h
Connection for power terminals (L1, L2, L3 for size 6)	X1, X2	M10 terminal studs	M10 terminal studs
Permitted tightening torque		14 Nm	25 – 30 Nm[2)]
Permitted cable cross section		70 mm^2 (AWG2/0)	185 mm^2 (AWG6/0)
Connection for power terminals SKS 1 – 3		–	Terminals not connected
Connection for electronics terminals (X2 with size 6)	X3	Permitted cable cross-section: • One conductor per terminal: 0.20 – 2.5 mm^2 (AWG 24 – 13) • Two conductors per terminal: 0.25 – 1 mm^2 (AWG 23 – 17) Tightening torque 0.6 Nm	Permitted cable cross-section: • 0.75 – 2.5 mm^2 (AWG18 – 14) Terminals A1/A2: • 0.75 – 4 mm^2 (AWG18 – 12) Tightening torque 0.6 Nm
Mass		24 kg	100 kg
Dimensions	W × H × D	280 mm × 522 mm × 205 mm	378 mm × 942 mm × 389.5 mm
Line choke (always required)		ND200-0033 L_N = 0.03 mH Part number 08265798	Installed in the basic device
Line filter (optional)		NF150-503, Part number 08274177	NF300-503, Part number 08274193
For MOVIDRIVE® MDX60B/61B..-5 3		0005 – 0750	0005 – 1600

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MOVIDRIVE® MDR60A	Size 4	Size 6
Standard design	**0750-503-00**	**1320-503-00**[1]
Design with coated printed circuit boards	**0750-503-00/L**	**–**
Recommended line fuse	175 A	500 A

1) The listed technical data applies to devices with serial no. DCV200xxx. For devices of the previous series with no. DCV185xxx, refer to the provided documentation and the data on the nameplate
2) Note: Do not apply tightening torque directly at terminals L1, L2, L3 and ±UG; use a second wrench.

MOVIDRIVE® MDR61B1600/2500 size 7

MOVIDRIVE® MDR61B		Size 7	
		1600-503-00/L	2500-503-00/L
Part number		18250955	18250963
INPUT			
Nominal voltage (according to EN 50160)	V_{line}	3 × AC 380 V – 500 V	
Line frequency	f_{line}	50 Hz – 60 Hz ± 5%	
Rated connected load	P_N	160 kW	250 kW
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line}	AC 250 A	AC 400 A
ELECTRONICS TERMINALS			
Digital inputs Internal resistance		Isolated (optocoupler), PLC-compatible (EN 61131), sampling cycle 1 ms R_I ≈ 3.0 kΩ, I_E Ω 10 mA	
Signal level		+13 V – +30 V = "1" = Contact closed -3 V – +5V = "0" = Contact open	
3 digital outputs		PLC-compatible (EN 61131-2), response time 1 ms, short-circuit proof, I_{max} = 50 mA	
Signal level		"0" = 0 V, "1" = +24 V, **Important: Do not apply external voltage.**	
1 isolated relay contact		max. load capacity of relay contacts DC 30 V, DC 0.08 A	
DC LINK			
Apparent output power (at V_{line} = 3 × AC 380 – 500 V)	S_A	173 kVA	271 kVA
DC link voltage	$V_{DC\ link}$	DC 620 V – 780 V	
Nominal DC link current (at nominal line current I_{line})	$I_{DC\ link}$	DC 255 A	DC 407 A
Max. DC link current (at nominal line current I_{line})	I_{DClink_max}	DC 382 A	DC 610 A
Max. continuous DC link current (at nominal line current I_{line})	I_{DClink_Dmax}	DC 318 A	DC 508 A
GENERAL			
Power loss at P_N	P_{Vmax}	5000 W	6600 W
Cooling air consumption		1400 m³/h	
Connection for power terminals	L1, L2, L3	Connection rail with bore for M12 Max. 2 × 240 mm² Press cable lug DIN 46235	
Tightening torque		70 Nm	
DC link coupling option		• DLZ11B/100 mm (part number: 18231934) • DLZ11B/200 mm (part number: 18235662) • DLZ11B/300 mm (part number: 18235670)	
Electronics terminals connection X2		Permitted cable cross-section: • One conductor per terminal: 0.20 – 2.5 mm² (AWG 24 – 12) • Two conductors per terminal: 0.25 – 1 mm² (AWG 22 – 17) Tightening torque: 0.6 Nm	
External voltage supply		Connect 24 V backup voltage via the DC power supply unit. No connection at the control unit.	
Mass		385 kg	475 kg
Dimensions	W × H × D	899 mm × 1490 mm × 473 mm	
Choke		Installed in the basic device	
Line filter (optional)		NF600-503 Part number 17963389	
For MOVIDRIVE® MDX60B/61B...-5_3		0005 – 2500	
Recommended line fuse		315 A (gS)	500 A (gS)

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MOVIDRIVE® MDX62B1600/2000/2500 size 7

MOVIDRIVE® MDX62B		**Size 7**		
2-Q devices (without brake chopper) **4-Q devices (with brake chopper)**		**1600-503-2-0T/L** **1600-503-4-0T/L**	**2000-503-2-0T/L** **2000-503-4-0T/L**	**2500-503-2-0T/L** **2500-503-4-0T/L**
Part number		18250459 18250483	18250467 18250491	18250475 18250505
INPUT				
DC link voltage	$V_{DC\ link}$	Supply via DC link connection DC 537 V – 780 V		
OUTPUT				
Apparent output power[1)] (at V_{line} = 3 × AC 380 – 500 V)	S_N	208 kVA	263 kVA	326 kVA
Nominal output current[1)] (at V_{line} = 3 × AC 400 V)	I_N	AC 300 A	AC 380 A	AC 470 A
Continuous output current (= 125% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 2.5 kHz	I_D	AC 375 A	AC 475 A	AC 588 A
Continuous output current (= 100% I_N) (at V_{line} = 3 × AC 400 V with f_{PWM} = 2.5 kHz Temperature range 0 °C – +50 °C	I_D	AC 300 A	AC 380 A	AC 470 A
Current limiting	I_{max}	Motor and generator mode 150% I_N, duration depending on the capacity utilization		
Internal current limiting		I_{max} = 0 – 150% adjustable		
Permitted minimum braking resistance value (4Q operation)	R_{BWmin}	1.1 Ω		
Output voltage	V_O	Max. V_{line}		
PWM frequency	f_{PWM}	Adjustable: 2.5 or 4 kHz possible		
Speed range/resolution	$n_A/\Delta n_A$	-6000 – 0 – +6000 min^{-1} / 0.2 min^{-1} over the entire range		
GENERAL				
Power loss at S_N[1)]	P_{Vmax}	3000 W	3600 W	4400 W
Cooling air consumption		1200 m^3/h		
Mass		2Q design: 180 kg 4Q variant: 200 kg		
Dimensions	W × H × D	700 mm × 1490 mm × 470 mm		
Conductor rails X1, X2, X3		Connection rail with bore for M12 Max. 2 × 240 mm^2 Press cable lug DIN 46235		
Tightening torque		70 Nm		
Constant load Recommended motor power	P_{Mot}	160 kW	200 kW	250 kW
Variable torque load or constant load without overload Recommended motor power	P_{Mot}	200 kW	250 kW	315 kW

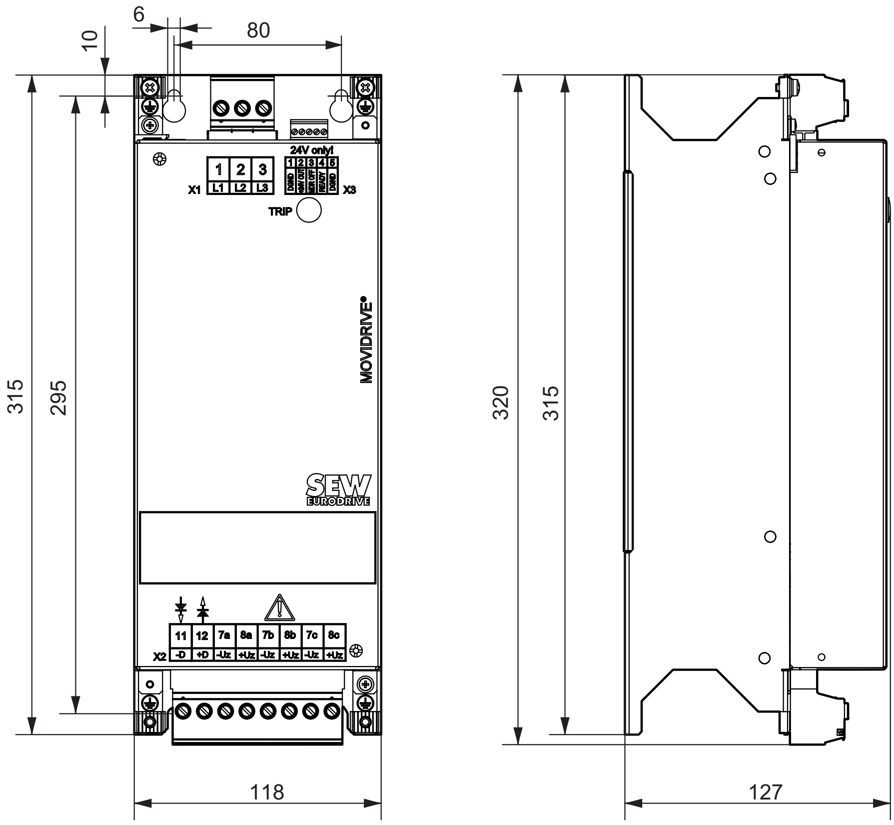
1) The performance data applies to f PWM = 2.5 kHz

3.1.6 Dimension drawings

MOVIDRIVE® MDR60A0150 size 2

Observe the following minimum clearance for control cabinet installation:

- 100 mm above and below
- No clearance required on the side



3349923979

All dimensions in mm (in)

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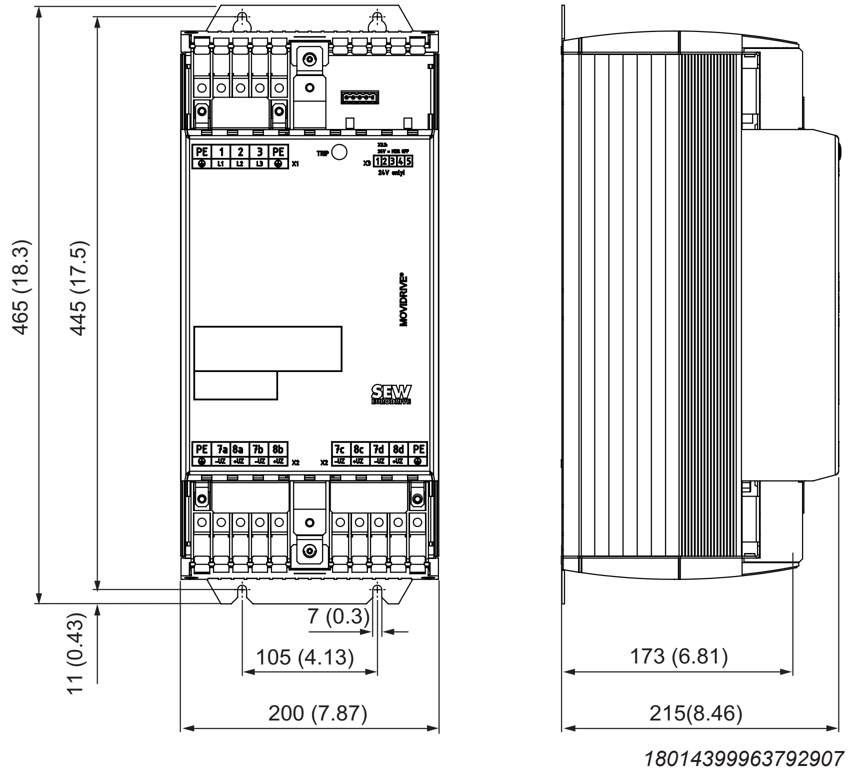
MOVIDRIVE® MDR60A0370 size 3

Observe the following minimum clearance for control cabinet installation:

- 100 mm above and below
- No clearance required on the side

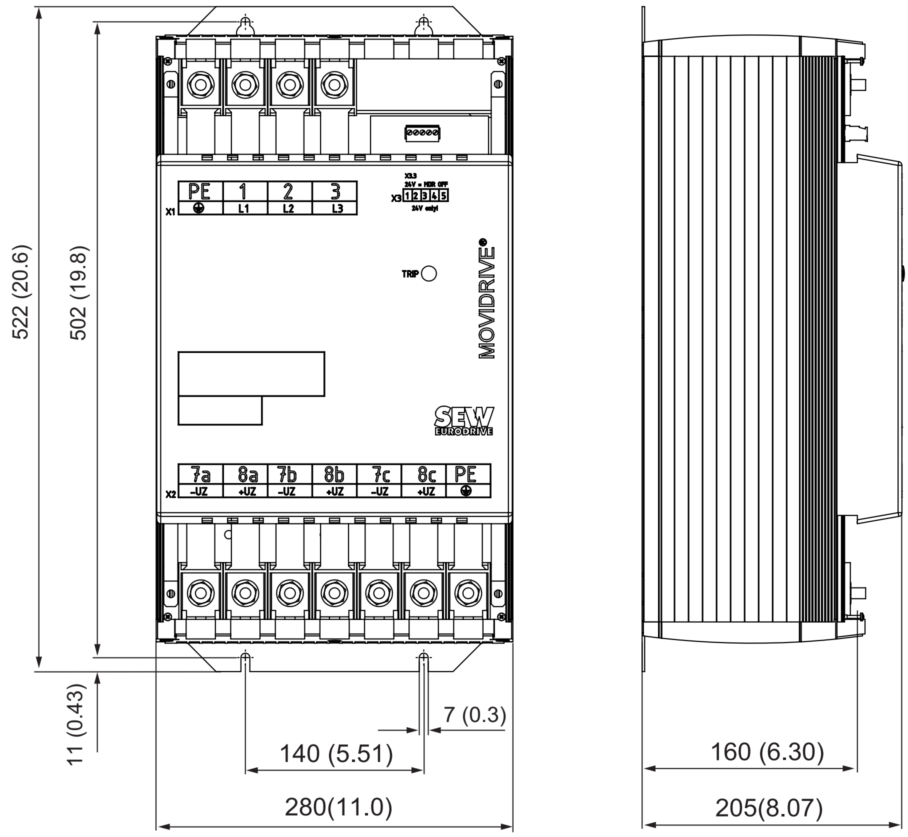


All dimensions in mm (in)

MOVIDRIVE® MDR60A0750 size 4

Observe the following minimum clearance for control cabinet installation:

- 100 mm above and below
- The minimum distance above the inverter for installing temperature-sensitive components, such as contactors or fuses, is 300 mm
- No clearance required on the side



18014399963821579

All dimensions in mm (in)

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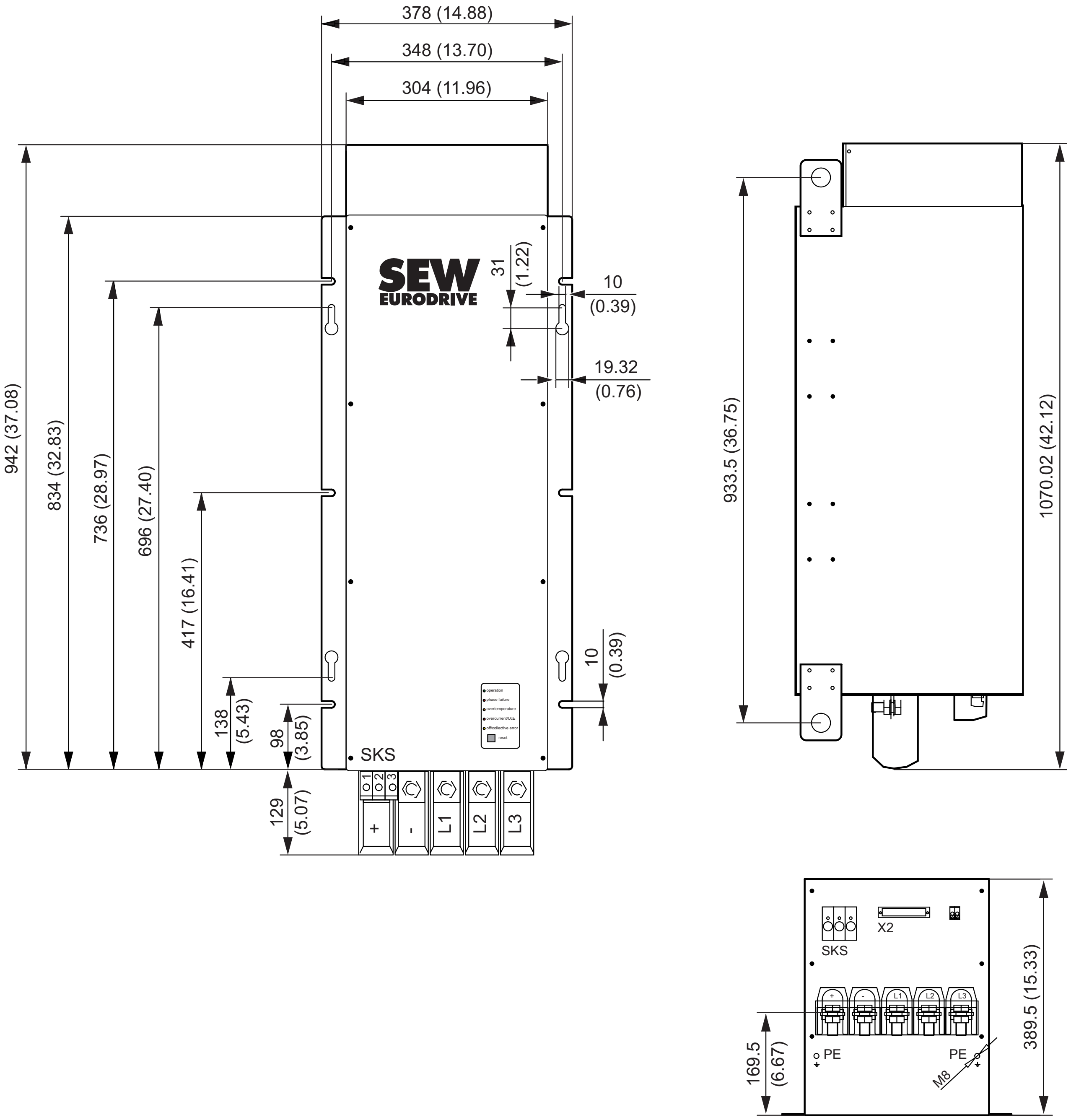
MOVIDRIVE® MDR60A1320 size 6

Observe the following minimum clearance for control cabinet installation:

- 100 mm above
- Do not install any components that are sensitive to high temperatures within 300 mm above the device, for example contactors or fuses
- No clearance required below
- 70 mm on the side



18014399963824907

All dimensions in mm (in)

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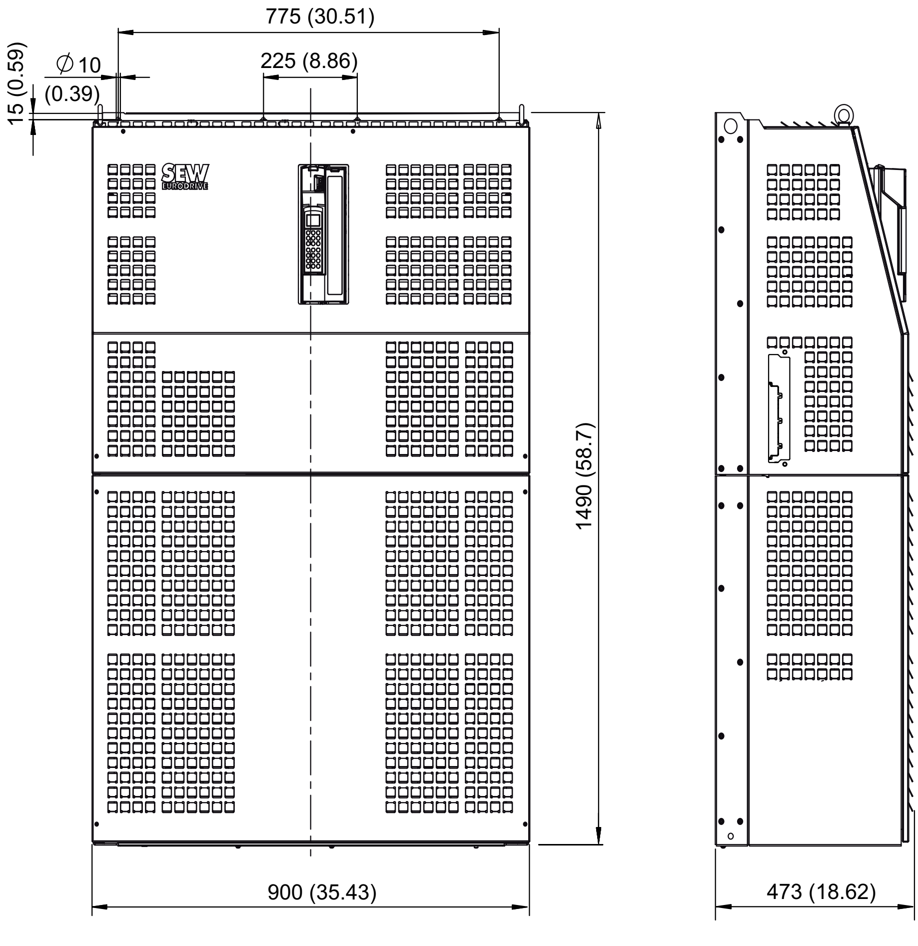
MOVIDRIVE® MDR61B1600/2500 size 7

Observe the following minimum clearance for control cabinet installation:

- 100 mm above
- Do not install any components that are sensitive to high temperatures within 300 mm above the device, for example contactors or fuses
- Mounting on a base (e.g. DLS31B mounting base) is recommended due to the choke ventilation
- No clearance required on the side



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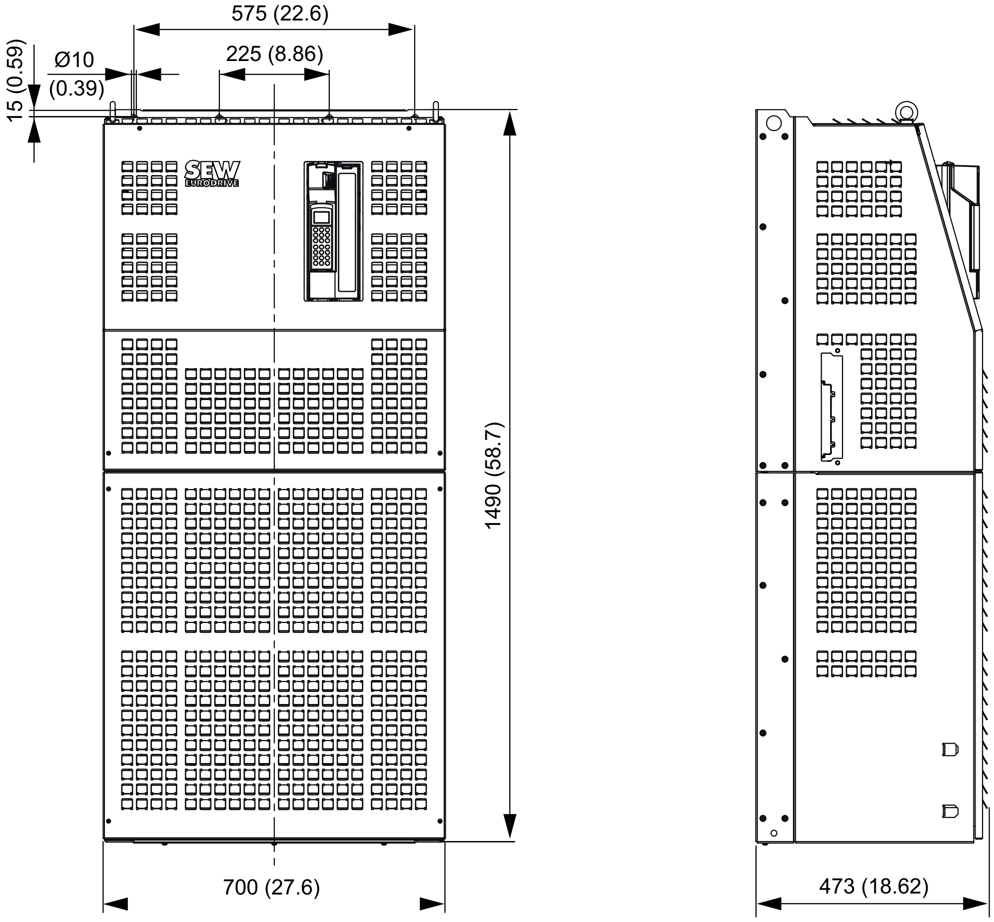
MOVIDRIVE® MDX62B1600/2000/2500 size 7

Observe the following minimum clearance for control cabinet installation:

- 100 mm above
- Do not install any components that are sensitive to high temperatures within 300 mm above the device, for example contactors or fuses
- No clearance required below
- No clearance required on the side



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3.1.7 DC link connection

SEW-EURODRIVE recommends using the following cable sets for the DC link connection. These cable sets offer the appropriate dielectric strength and are also color-coded. Color coding is necessary because cross-polarity and ground faults could cause irreparable damage to the connected equipment.

The length of the cables restricts the DC link connection to the permitted length of 5 m. They can also be cut to length by the customer for connecting several devices. The cable lugs for connection to the regenerative power supply unit and an inverter are supplied with the cable set. Use commercially available cable lugs for connecting additional inverters. The inverters must then be connected to the regenerative power supply unit in star configuration.

Cable set type	DCP12A	DCP13A	DCP15A	DCP16A
Part number	08145679	08142505	08142513	08175934
For connecting MOVIDRIVE®	0005 – 0110	0150 – 0370	0450 – 0750	0900 – 1320

INFORMATION

Refer to the "MOVIDRIVE® MDR60A/61B Regenerative Power Supply Unit and MDX62B Motor Inverter" system manual for information on the DC link connection. This system manual can be ordered from SEW-EURODRIVE.

4 Technical data of options

4.1 HIPERFACE® encoder card DEH11B

4.1.1 Part number

08243107

4.1.2 Description

Option-capable MOVIDRIVE® MDX61B devices can be equipped with the HIPERFACE® encoder card type DEH11B. The encoder card offers one input for motor encoder and one input for external encoder, also referred to as a distance encoder. The input for the external encoder can also be used as an output for incremental encoder simulation.

4.1.3 Electronics data

Option DEH11B			
	Output for incremental encoder simulation or External encoder input X14:	Output for incremental encoder simulation: • Signal level to RS422 • The number of pulses is the same as on X15 motor encoder input	External encoder input (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder • Sin/cos encoder V_{SS} = AC 1 V • TTL encoder with negated tracks • Encoder with signal level to RS422 Encoder voltage supply: • DC +12 V (tolerance range DC 10.5 – 13 V) • I_{max} = DC 650 mA[1)]
	Motor encoder input X15:	Permitted encoder types: • HIPERFACE® encoder • Sin/cos encoder V_{SS} = AC 1 V • TTL encoder with negated tracks • Encoder with signal level to RS422 • Permitted pulses per resolution: 128/256/512/1024/2018 increments Encoder voltage supply: • DC +12 V (tolerance range DC 10.5 – 13 V) • I_{max} = DC 650 mA	

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

4.2 Resolver card DER11B

4.2.1 Part number

08243077

4.2.2 Description

Option-capable MOVIDRIVE® MDX61B devices can be equipped with resolver card type DER11B. The resolver card offers one input for the resolver as motor encoder and one input for external encoder, also referred to as a distance encoder. The input for the external encoder can also be used as an output for incremental encoder simulation.

4.2.3 Electronics data

DER11B option			
	Output for incremental encoder simulation or External encoder input X14:	Output for incremental encoder simulation: • Signal level to RS422 • The number of pulses is 1024 pulses/revolution	External encoder input (max. 200 kHz): Permitted encoder types: • HIPERFACE® encoder • Sin/cos encoder V_{SS} = AC 1 V • TTL encoder with negated tracks • Encoder with signal level to RS422 Encoder voltage supply: • DC +12 V (tolerance range DC 10.5 – 13 V) • I_{max} = DC 650 mA
	Motor encoder input X15:	Resolvers 2-pole, V_{ref} = AC 7 V, 7 kHz V_{in}/V_{ref} = 0.5 ± 10%	
	Maximum cable length	100 m	

4.3 DEU21B multi-encoder card

4.3.1 Part number

18221696

4.3.2 Description

Option-capable MOVIDRIVE® MDX61B units can be equipped with a DEU21B multi-encoder card. The encoder card provides one input for the motor encoder and one input for an external encoder, also referred to as a distance encoder.

Both encoder inputs can evaluate incremental and absolute encoders. The input for the external encoder can also be used as an output for incremental encoder simulation.

4.3.3 Electronics data

Option DEU21B[1)]		
	External encoder connection X14: Output for incremental encoder simulation: • Signal level to RS422 • The number of pulses is the same as on X15 motor encoder input	Permitted encoder types: • HIPERFACE® encoder • Sin/cos encoder V_{SS} = AC 1 V • CANopen encoder • TTL encoder with negated tracks • HTL encoder • SSI encoder • SSI Combi encoder • EnDat encoder • Encoder with signal level to RS422 • Permitted pulses per resolution: 2-4096 Increments Encoder voltage supply: • DC 24 V encoder supply • DC 12 V encoder supply[2)]
	Motor encoder connection X15:	Permitted encoder types: • HIPERFACE® encoder • Sin/cos encoder V_{SS} = AC 1 V • TTL encoder with negated tracks • HTL encoder • SSI encoder (not for speed control) • SSI Combi encoder • EnDat encoder • Encoder with signal level to RS422 • Permitted pulses per resolution: 2-4096 Increments Encoder voltage supply: • DC 24 V encoder supply[3)] • DC 12 V encoder supply[2)]

1) The card has a fixed DGND-PE connection. Removing the EMC screw at the basic device has no effect.
2) The maximum load on X14:15 and X15:15 is DC 650 mA in total.
3) If the overall device load on the 24 V level exceeds 400 mA, you must connect an external DC 24 V supply to X10:9/X10:10. Observe the "Project planning" chapter in the "MOVIDRIVE® MDX60B/61B" system manual

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4.4 DEH21B/DIP11B absolute encoder card

4.4.1 Part numbers

- DEH21B: 18208185
- DIP11B: 08249695

4.4.2 Description

The DEH21B and DIP11B options extend the MOVIDRIVE® B system to include an SSI interface for absolute encoders. This enables the following options for IPOS$^{PLUS®}$ positioning:

- No reference travel required when the system is started or after a power failure
- Positioning can take place either with the absolute encoder or the incremental encoder/resolver installed on the motor
- No position switch needed on the travel path, even without motor encoder feedback
- Free processing of the absolute position is possible via the IPOS$^{PLUS®}$ program
- In addition to the basic device, 8 digital inputs and 8 digital outputs are available with the DIP11B option
- The absolute encoder can be mounted either on the motor or along the track (e.g. high-bay warehouse)
- Simple encoder adjustment with user-guided startup
- Endless positioning in combination with activated modulo function

4.4.3 Electronics data for DEH21B

DEH21B option			
	Motor encoder connection	X15:	Permitted encoder types: • HIPERFACE® encoder • Sin/cos encoder V_{SS} = AC 1 V • TTL encoder with negated tracks • Encoder with signal level to RS422 • Permitted pulses per resolution: 128/256/512/1024/2048 increments Encoder voltage supply: • DC +12 V (tolerance range 10.5 – 13 V) • I_{max} = DC 650 mA
	Encoder connection	X62:	SSI encoder input
	Connection Voltage supply	X60:1	24VIN: DC 24 V supply voltage for encoder connected to X62
	Reference terminal	X60:2	Reference potential 24VIN

4.4.4 Electronics data for DIP11B

DIP11B option			
	Digital input connection	X60:1 – 8	DI10 – DI17 isolated via optocoupler, PLC-compatible (EN 61131), sampling cycle 1 ms
	Internal resistance		$R_I \approx 3\ k\Omega$, $I_E \approx DC\ 10\ mA$
	Signal level (EN 61131)		DC +13 V – +30 V = "1" / DC-3 V – +5 V = "0"
	Function	X60:1 – 8	DI10 – DI17; Selection option → Parameter menu P61_
	Digital input connection	X61:1 – 8	D01 – DO17, PLC-compatible (EN 61131), short-circuit proof and protected against external voltage to DC 30 V Response time 1 ms
	Signal level (EN 61131)		DC +24 V = "1", DC 0 V = "0" **Important**: Do not apply external voltage!
	Function	X61:1 – 8	DO10 – DO17: Selection option → Parameter menu P63_
	Encoder connection	X62:	SSI encoder input
	Reference terminals	X60:9	DCOM: Reference potential for digital inputs (DI10 – DI17)
		X60:10	DGND: Reference potential for binary signals and 24VIN • Without jumper X60:9 – X60:10 (DCOM-DGND) isolated digital inputs • With jumper X60:9 – X60:10 (DCOM-DGND) non-isolated digital inputs
	Permitted cable cross section		One core per terminal: 0.08 – 1.5 mm^2 (AWG28 – 16) Two cores per terminal: 0.25 – 1 mm^2 (AWG22 – 17) Tightening torque 0.6 Nm
	Voltage input	X61:9	24VIN: Supply voltage DC +24 V for digital outputs DO10 – DO17 and en-coder (mandatory)

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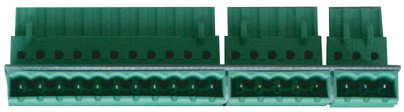
4.5 Connector adapter for device replacement MD_60A - MDX60B/61B

The following adapters are available for quick replacement of a MOVIDRIVE® A with a MOVIDRIVE® B during system operation.

- DAT11B: Terminal adapter, part number 08246718

  If the TF/TH option is connected to X10 when using MOVIDRIVE® MD_A, then X10 can be directly replugged. The jumper between X10:1 and X10:2 must be removed if a TF/TH option is connected to encoder input X15. Three connectors 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 (digital inputs).

DAT11B



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- DAE15B: Encoder adapter X15, part number 08176299

  If a motor with encoder on X15 is in operation on an MDV or MCV, the encoder is connected via a 9-pin 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 have to be connected to MOVIDRIVE® B with the option DWE11B/12B (→ chapter "DWE11B/12B interface adapter option").

DAE15B

1454699659

- Length of DAE15B: 200 mm ± 20 mm

  Cable cross section: 6 x 2 x 0.25 mm² (AWG 23)
- DAE14B: Encoder adapter X14, part number 08176302

  If a distance encoder at X14 is operated on a MOVIDRIVE® MDV, MDS, MCV, or MCS, connection is made using a 9-pin socket. Since the DEH11B and DER11B options for MOVIDRIVE® MDX61B come equipped with a 15-pin connector, you will either have to rework the encoder cable or use the DAE14B encoder adapter. The DAE14B encoder adapter can be plugged directly between the existing encoder cable with 9-pin socket and the 15-pin connector on the DEH11B//DER11B option. This step makes for fail-safe and fast connection of existing drives.

DAE14B

1454702731

- Length of DAE14B: 200 mm ± 20 mm
  Cable cross section: 6 x 2 x 0.25 mm^2 (AWG 23)

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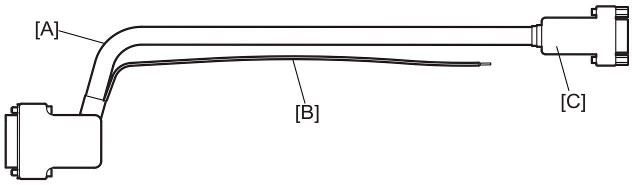
4.6 DWE11B/12B interface adapter

4.6.1 Part number and description

DWE11B, part number 01881876

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



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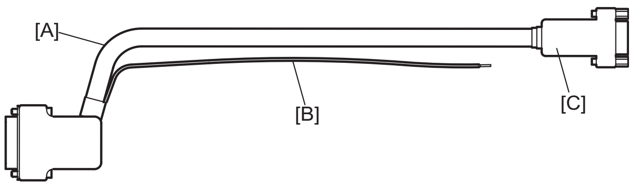
[A] 5 x 2 x 0.25 mm² (AWG 23) / length 1000 mm / max. cable length inverter – encoder: 100 m
[B] DC 24 V connection for HTL encoder; 1 x 0.5 mm² (AWG 20) / length 250 mm

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

DWE12B, part number 01881809

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



1805896331

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

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

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4.7 UWS11A interface adapter

4.7.1 Part number

0822689X

4.7.2 Description

The UWS11A option converts RS232 signals, for example from the PC, into RS485 signals. These RS485 signals can then be routed to the RS485 interface of the inverter.

The UWS11A option requires a DC 24 V voltage supply.

4.7.3 RS232 interface

The connection between UWS11A and PC is made using a commercially available serial interface cable (shielded!).

4.7.4 RS485 interface

Max. 32 inverters can be networked for communication (max. line length 200 m) via the RS485 interface of the UWS11A. Do not connect external terminating resistors as dynamic terminating resistors are already installed.

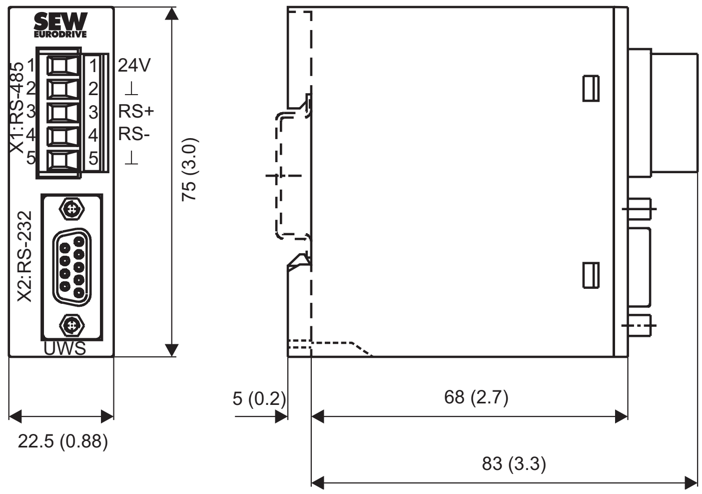
Permitted cable cross-section: 1 core per terminal 0.20 – 2.5 mm^2 (AWG 24 - 12)

2 cores per terminal 0.20 – 1 mm^2 (AWG 24 – 17)

4.7.5 Technical data

UWS11A		
Part number		0822689X
Ambient temperature		0 °C to 40 °C
Storage temperature		-25 °C – +70 °C (according to EN 60721-3-3, class 3K3)
Degree of protection		IP20
Voltage supply		DC 24 V (I_{max} = 50 mA)
Current consumption		max. DC 50 mA
Mass		150 g
Dimensions		83 mm × 75 mm × 22.5 mm
Terminal assignment		
X1: RS485	1 / 24 V	DC +24 V voltage input
	2 / ⊥	Reference potential
	3 / RS+	RS485+
	4 / RS-	RS485-
	5 / ⊥	Reference potential
X2: RS232	1	No function
	2	TxD
	3	RxD
	4	No function
	5	Reference potential
	6 – 9	No function

Dimension drawing of UWS11A



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All dimensions in mm (in)

The UWS11A option is mounted on a mounting rail (EN 50022-35 × 7.5) in the control cabinet.

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4.8 UWS21B interface adapter

4.8.1 Part number

18204562

4.8.2 Description

The UWS21B option converts RS232 signals, for example from the PC, into RS485 signals. These RS485 signals can then be routed to the XT slot of the inverter.

4.8.3 RS232 interface

The connection between UWS21B and PC is made using a commercially available serial interface cable (shielded!).

4.8.4 RS485 interface

UWS21B and inverter are connected using a serial interface cable with RJ10 connectors.

4.8.5 Scope of delivery

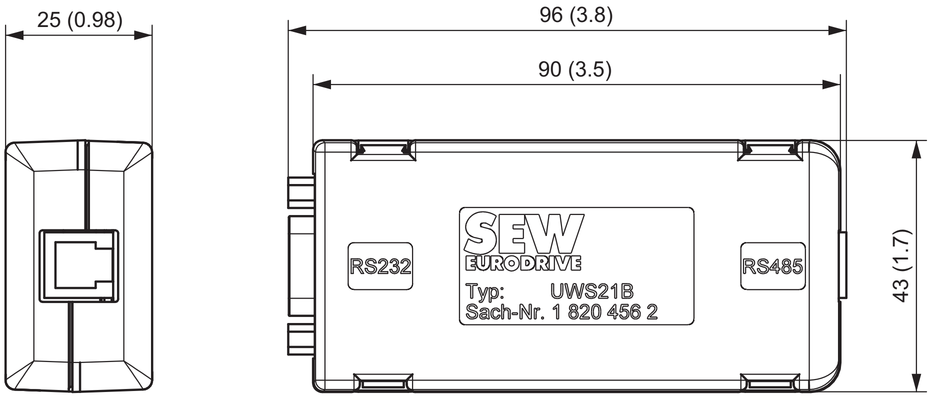
The scope of delivery for the UWS21B option includes:

- UWS21B
- Serial interface cable with 9-pin D-sub socket and 9-pin D-sub connector for the UWS21B – PC connection.
- Serial interface cable with two RJ10 plugs to connect UWS21B and inverter.
- CD-ROM with MOVITOOLS® MotionStudio engineering software

4.8.6 Technical data

UWS21B	
Part number	18204562
Ambient temperature	0 °C to 40 °C
Storage temperature	–25 °C to +70 °C (according to EN 60721-3-3, class 3K3)
Degree of protection	IP20
Mass	300 g
Dimensions	96 mm × 43 mm × 25 mm

Dimension drawing for UWS21B



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All dimensions in mm (in)

4.9 USB11A interface adapter

4.9.1 Part number

08248311

4.9.2 Description

Option USB11A enables a PC or laptop with a USB interface to be connected to the XT slot of the inverter. The USB11A interface adapter supports USB 1.1 and USB 2.0.

4.9.3 USB11A – PC

USB11A is connected to the PC using a commercially available, shielded USB connection cable type USB A-B.

4.9.4 MOVIDRIVE® – USB11A

The inverter and USB11A are connected using a serial interface cable with RJ10 connectors.

4.9.5 Scope of delivery

The scope of delivery for the USB11A option includes:

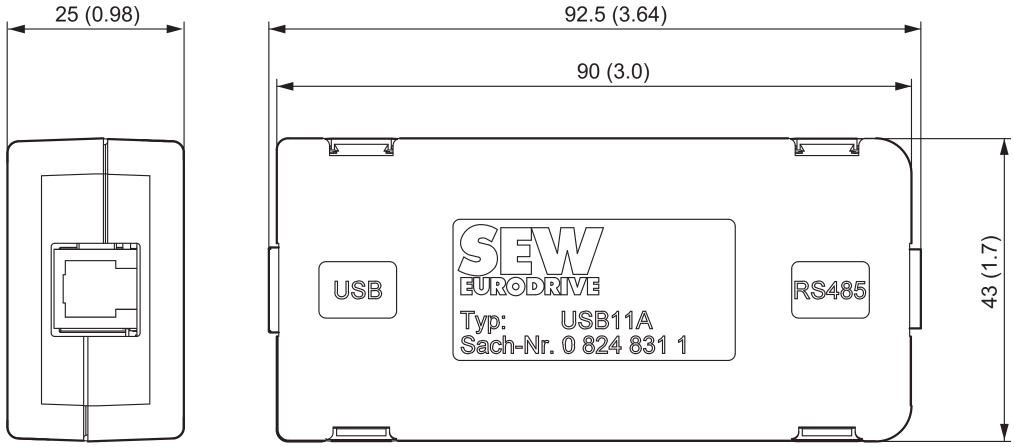
- USB11A interface adapter
- USB connection cable to connect USB11A – PC
- Serial interface cable with two RJ10 plugs to connect inverter and USB11A
- CD-ROM with drivers and MOVITOOLS® MotionStudio engineering software

4.9.6 Technical data

USB11A	
Part number	08248311
Ambient temperature	0 – 40 °C
Storage temperature	–25 °C to +70 °C (according to EN 60721-3-3, class 3K3)
Degree of protection	IP20
Mass	300 g
Dimensions	92.5 mm × 43 mm × 25 mm

Dimension drawing

All dimensions in mm (in)



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4.10 DWI11A DC 5 V encoder supply

4.10.1 Part number

08227594

4.10.2 Description

If you are using an incremental encoder with a DC 5 V encoder supply, install the DC 5 V encoder supply option type DWI11A between the inverter and the incremental encoder. This option provides a regulated DC 5 V power supply for the encoder. For this purpose, the DC 12 V power supply for the encoder inputs is converted to DC 5 V by means of a voltage controller. A sensor line is used to measure the supply voltage at the encoder and compensate the voltage drop along the encoder cable.

Incremental encoders with DC 5 V encoder supply must not be connected directly to the encoder inputs X14: and X15:. This would cause irreparable damage to the encoder.

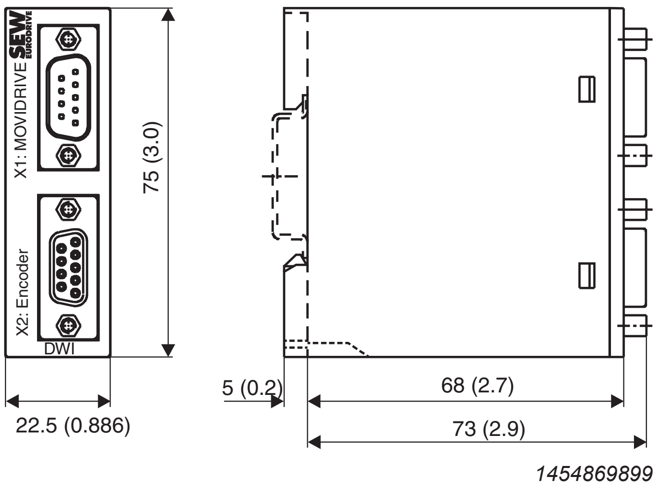
INFORMATION

If a short circuit occurs in the sensor cable, the connected encoder may be exposed to a voltage higher than permitted.

4.10.3 Recommendation

Use prefabricated cables from SEW-EURODRIVE for the encoder connection.

4.10.4 Dimension drawing



All dimensions in mm (in)

The DWI11A option is mounted on a support rail (EN 50022-35 × 7.5) in the control cabinet.

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4.10.5 Technical data

DC 5 V encoder supply option type DWI11A	
Part number	08227594
Voltage input	DC 10 – 30 V, I_{max} = DC 120 mA
Encoder voltage supply	DC +5 V (to V_{max} ≈ +10 V), I_{max} = DC 300 mA
Max. line length that can be connected	100 m total Use a shielded twisted-pair cable (A and **A**, B and **B**, C and **C**) for connecting the encoder to the DWI11A and the DWI11A to MOVIDRIVE®.
Encoder types that can be connected	• sin/cos encoder VSS = AC 1 V • TTL encoder with negated tracks • Encoder with signal level to RS422

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4.11 DIO11B input/output board

4.11.1 Part number

08243085

4.11.2 Description

The number of inputs/outputs of the basic MOVIDRIVE® B device can be expanded with the DIO11B option. The DIO11B option is plugged into the fieldbus slot. If the fieldbus slot is not available, you can plug the DIO11B option into the expansion slot. The programmable signal types of the additional digital inputs/outputs are the same as the basic device (→ parameter group P6__, terminal assignment).

4.11.3 Electronics data

Option DIO11B

Setpoint input n2	X20:1/X20:2	AI21/AI22: Voltage input	
		Differential input or input with AGND reference potential	
Operating mode AI21/AI22		n2 = DC 0 V – +10 V or DC -10 V – +10 V	
Resolution		12 bit, sampling cycle 1 ms	
Internal resistance		R_i = 40 kΩ	
Accuracy		+/- 100 mV (≙ 0.5% of 20 V)	
Analog outputs	X21:1/X21:4	AOV1/AOV2: Voltage outputs DC-10 V to 0 to +10 V, I_{max} = DC 10 mA, short-circuit proof and protected against external voltage to DC 30 V, selection option → parameter menu P64_	
	X21:2/X21:5	AOC1/AOC2: Current outputs DC 0(4) – 20 mA, max. output voltage DC 15 V, short-circuit proof and protected against external voltages up to DC 30 V, selection option → parameter menu P64_	
Response time		5 ms	
Resolution		10 Bit	
Accuracy of the analog input		0.5% of 20 V ≙ 100 mV	
Accuracy of the analog output		0.2% of 20 V ≙ 40 mV	
Digital inputs		Isolated (optocoupler), PLC-compatible (EN 61131)	
X22:1 – X22:8		DIØ – DI17	
Internal resistance		R_i ≈ 3 kΩ, I_E ≈ DC 10 mA Sampling cycle 1 ms	
Signal level		DC +13 V – +30 V = "1" = contact closed DC -3 V – +5 V = "0" = contact open	According to EN 61131
Function	X22:1 – X22:8	DI10 – DI17: Selection option → Parameter menu P61_	
Digital outputs	X23:1 – X23:8	DO1Ø – DO17: PLC-compatible (EN 61131-2), response time 1 ms	
Signal level		"0" = DC 0 V "1" = DC +24 V	
Function	X23:1 – X23:8	DO10 – DO17: Selection option → Parameter menu P63_ I_{max} = DC 50 mA, short-circuit proof, and protected against external voltage to DC 30 V	
Reference terminal	X20:3/X21:3/X21:6	ANGND: Reference potential for analog signals (AI21/AI22/AO_1/AO_2)	
	X22:9	DCOM: Reference potential for digital inputs X22:1 – X22:8 (DI1Ø – DI17)	
	X22:10	DGND: Reference potential for binary signals, reference potential for DC 24 V power supply	
Voltage input	X23:9	24VIN: DC +24 V supply voltage for digital outputs D01Ø – DO17	
Permitted cable cross section		One core per terminal:	0.08 – 1.5 mm² (AWG 28 – 16)
		Two cores per terminal:	0.25 – 1 mm² (AWG 22 – 17)
		Tightening torque:	0.6 Nm

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4.11.4 Functions

- 8 digital inputs
- 8 digital outputs
- 1 analog differential input (DC 0 – 10 V, DC -10 V – +10 V, DC 0 – 20 mA with corresponding load)
- 2 analog outputs (DC -10 V – +10 V, DC 0 – 20 mA, DC 4 – 20 mA)

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4.12 PROFIBUS DFP21B fieldbus interface

4.12.1 Part number

08242402

4.12.2 Description

MOVIDRIVE® B can be equipped with a 12 Mbaud fieldbus interface for the PROFIBUS-DP serial bus system. The device master data (GSD) and type files for MOVIDRIVE® B are available from the SEW website (http://www.sew-eurodrive.de) to help with project planning and facilitate startup.

PROFIBUS-DP (Decentralized Periphery) is primarily used at the sensor/actuator level where fast response times are required. The principal task of PROFIBUS-DP is to exchange data, e.g. setpoints or binary commands, in rapid cycles between central automation equipment (PROFIBUS master) and decentralized peripheral devices (e.g. drive inverters). The DFP21B option supports PROFIBUS-DP and DP-V1. Consequently, MOVIDRIVE® B can be controlled via PLC and PROFIBUS-DP/DP-V1.

4.12.3 Electronics data

DFP21B option		
	Protocol variant	PROFIBUS-DP and DPV1 to IEC 61158
	Baud rate	Automatic detection of baud rate from 9.6 kbaud to 12 Mbaud
	Connection technology	9-pin D-sub socket, pin assignment to IEC 61158
	Bus termination	Not integrated, implement using suitable PROFIBUS connector with terminating resistors that can be activated
	station address	1 – 125, can be set via DIP switches
	GSD file name	DP: SEW_6003.GSD DP-V1: SEWA6003.GSD
	DP ID number	6003_{hex} (24579_{dec})
	Max. number of process data	10 process data entries

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4.13 INTERBUS fieldbus interface DFI11B

4.13.1 Part number

08243093

4.13.2 Description

MOVIDRIVE® B can be equipped with a fieldbus interface for the non-proprietary and standardized INTERBUS sensor/actuator bus system.

INTERBUS is defined in EN 50254/DIN 19258 and, as far as its function is concerned, it consists of a process data channel and a parameter data channel. Intelligent actuators such as the MOVIDRIVE® B drive inverters can be controlled and configured in a user-friendly way.

4.13.3 Electronics data

DFI11B option		
	Supported baud rates	500 kBaud and 2 MBaud, can be selected via DIP switch
	Connection technology	Fieldbus input: 9-pin D-sub connector Fieldbus output: 9-pin D-sub socket RS485 transmission technology, 6-core shielded and twisted-pair cable
	DP identity numbers	$E3_{hex}$ = 227_{dec} (1 PCP word) $E0_{hex}$ = 224_{dec} (2 PCP words) $E1_{hex}$ = 225_{dec} (4 PCP words) 38_{hex} = 56_{dec} (microprocessor not ready) 03_{hex} = 3_{dec} (no PCP word)
	Max. number of process data	6 process data entries

4.14 INTERBUS FOC fieldbus interface DFI21B

4.14.1 Part number

08243115

4.14.2 Description

MOVIDRIVE® B can be equipped with a fieldbus interface for the non-proprietary and standardized sensor/actuator bus system INTERBUS/INTERBUS with optical fibers (INTERBUS FOC).

INTERBUS is defined in EN 50254/DIN 19258 and, as far as its function is concerned, it consists of a process data channel and a parameter data channel. Intelligent actuators such as the MOVIDRIVE® B drive inverters can be controlled and configured in a user-friendly way.

4.14.3 Electronics data

DFI21B option		
	Supported baud rates	500 kBaud and 2 MBaud, can be selected via DIP switch
	Connection technology	F-SMA connector
	DP identity numbers	$E3_{hex} = 227_{dec}$ (1 PCP word) $E0_{hex} = 224_{dec}$ (2 PCP words) $E1_{hex} = 225_{dec}$ (4 PCP words) $38_{hex} = 56_{dec}$ (microprocessor not ready) $03_{hex} = 3_{dec}$ (no PCP word)
	Max. number of process data	6 process data entries

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4.15 Fieldbus interface PROFINET IO RT DFE32B

4.15.1 Part number

18213456

4.15.2 Description

The MOVIDRIVE® MDX61B drive inverter enables you to use the DFE32B option to connect to higher-level automation, project planning and visualization systems via Ethernet (PROFINET IO protocol) thanks to its powerful, universal fieldbus interface. You can use option DFS32B to communicate directly with the inverters via Ethernet and operate the MOVITOOLS® MotionStudio engineering software to change parameters and IPOS$^{PLUS®}$ programs. An integrated Web server makes it possible for the user to access diagnostic values quickly and easily using a standard browser (e.g. Internet Explorer).

4.15.3 Electronics data

DFE32B option		
	Application protocols	• **PROFINET IO** (Ethernet frames with frame identification 8892$_{hex}$) to control and set parameters for the drive inverter. • **HTTP** (Hypertext Transfer Protocol) for diagnostics using a web browser. • **SMLP** (Simple MOVILINK® Protocol), protocol used by MOVITOOLS® MotionStudio.
	Port numbers used	• 300 (SMLP) • 80 (HTTP)
	Ethernet services	• ARP • ICMP (ping)
	ISO / OSI layer 2	Ethernet II
	Baud rate	100 Mbaud in full duplex process
	Connection technology	Two RJ45 plug connectors with integrated switch and auto-crossing
	Addressing	4 byte IP address or MAC-ID (00:0F:69:xx:xx:xx)
	Manufacturer ID (Vendor ID)	010A$_{hex}$
	Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad
	Maximum number of process data:	10

4.15.4 Functions

- PROFINET IO protocol
- Two RJ45 plug connectors for star or line type cabling
- Up to 10 process data and PROFINET diagnostic parameter data items can be transferred at the same time
- The PROFINET IO controller assigns the IP address
- Engineering access using MOVITOOLS® MotionStudio via Ethernet TCP/IP
- Inverter diagnostics using a standard browser (e.g. Internet Explorer) via the integrated Web server:
  - Transfer display values
  - DFE32B configuration (after login)

4.16 DFE33B fieldbus interface for EtherNet/IP™ and Modbus TCP

4.16.1 Part number

18213464

4.16.2 Description

The MOVIDRIVE® MDX61B drive inverter enables you to use the DFE33B option to connect to higher-level automation, project planning and visualization systems via Ethernet (EtherNet/IP™ and Modbus TCP protocol) thanks to its powerful, universal fieldbus interface. You can use option DFS33B to communicate directly with the inverters via Ethernet and operate the MOVITOOLS® MotionStudio engineering software to change parameters and IPOS$^{PLUS®}$ programs. An integrated Web server makes it possible for the user to access diagnostic values quickly and easily using a standard browser (e.g. Internet Explorer).

4.16.3 Electronics data

DFE33B option		
	Application protocols	• **EtherNet/IP™** (Ethernet Industrial Protocol) or **Modbus TCP** to control and parameterize the drive inverter. • **HTTP** (Hypertext Transfer Protocol) for diagnostics using a Web browser. • **SMLP** (Simple MOVILINK® Protocol), protocol used by MOVITOOLS® MotionStudio. • **DHCP** (Dynamic Host Configuration Protocol) to assign address parameter automatically.
	Port numbers used	• 44818 EtherNet/IP™ (TCP) • 2222 EtherNet/IP™ (UDP) • 502 Modbus TCP • 300 SMLP (TCP, UDP) • 80 HTTP • 67 / 68 DHCP
	Ethernet services	• ARP • ICMP (ping)
	ISO / OSI layer 1/2 ISO / OSI layer 4/5	Ethernet II TCP/IP and UDP/IP
	Automatic baud rate detection	10 MBaud / 100 MBaud
	Connection technology	2 x RJ45 with integrated switch and autocrossing
	Addressing	4 byte IP address or MAC-ID (00-0F-69-xx-xx-xx)
	Manufacturer ID (Vendor ID)	• $013B_{hex}$ (EtherNet/IP™) • "SEW-EURODRIVE" (Modbus TCP)
	Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad
	Maximum number of process data:	10

4.16.4 Functions

- EtherNet/IP™ protocol
- Two RJ45 plug connectors for star or line type cabling
- Up to 10 process data and parameter data items can be transferred at the same time
- Two ways to allocate the IP address:

1. Setting via DBG60B keypad and MOVITOOLS® MotionStudio
2. Use the DHCP server to assign the IP address

- Engineering access using MOVITOOLS® MotionStudio via Ethernet TCP/IP
- Inverter diagnostics using a standard browser (e.g. Internet Explorer) via the integrated Web server:
  – Transfer display values
  – DFE33B configuration (after login)

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4.17 EtherCAT® DFE24B fieldbus interface

4.17.1 Part number

18211267

4.17.2 Description

The MOVIDRIVE® MDX61B drive inverter enables you to use the DFE24B option to connect to higher-level automation, project planning and visualization systems via EtherCAT® thanks to its powerful, universal fieldbus interface. You can use the DFE24B option to communicate with the inverters via the EtherCAT® master and operate the MOVITOOLS® MotionStudio engineering software via EtherCAT® to change parameters and IPOS^PLUS® programs.

4.17.3 Electronics data

DFE24B option

Standards	IEC 61158, IEC 61784-2
Baud rate	100 MBaud full duplex
Connection technology	Two RJ45 plug connectors
Bus termination	Not integrated because bus termination is automatically activated.
OSI layer	Ethernet II
station address	Setting via EtherCAT® master (→ Display with P093)
XML file name	SEW_DFE24B.xml
Vendor ID	0x59 (CANopenVendor ID)
EtherCAT® services	• CoE (CANopen over EtherCAT®) • VoE (Simple MOVILINK® protocol over EtherCAT®)
Maximum number of process data:	10
Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad

4.17.4 Functions

- EtherCAT®
- Two RJ45 plug connectors for line type cabling
- Simultaneous communication of up to 10 process data and parameter data as well as access (Rx, Tx) to 8 IPOS^PLUS® variables
- Automatic addressing via EtherCAT® master
- Engineering access using MOVITOOLS® MotionStudio via EtherCAT®

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4.18 DeviceNet™ DFD11B fieldbus interface

4.18.1 Part number

08249725

4.18.2 Description

The MOVIDRIVE® MDX61B drive inverter enables you to use the DFD11B option to connect to higher-level automation, project planning and visualization systems via the non-proprietary and standardized DeviceNet™ fieldbus system.

The type DFD11B DeviceNet™ fieldbus interface can be plugged into the fieldbus slot. The DFD11B option enables communication with the higher-level controller for a maximum of 10 process data. You need an EDS file to be able to integrate the DFD11B in the higher-level control. You can download this file from the SEW-EURODRIVE website.

4.18.3 Electronics data

Option DFD11B		
	Communication protocol	Master/slave connection set acc. to DeviceNet™ specification version 2.0
	Number of process data words	Adjustable via DIP switches: • 1 – 10 process data words • 1 – 4 process data words with bit-strobe I/O
	Baud rate	125, 250 or 500 kBaud, to be set via DIP switches
	Bus cable length	For thick cable according to DeviceNet™ specification 2.0 appendix B: • 500 m at 125 kbaud • 250 m at 250 kbaud • 100 m at 500 kBaud
	Transmission level	ISO 11 98 - 24 V
	Connection technology	• 2-wire bus and 2-wire supply voltage DC 24 V with 5-pin Phoenix terminal • Pin assignment according to DeviceNet™ specification
	MAC ID	0 – 63, can be set via DIP switch Max. 64 stations
	Supported services	• Polled I/O: 1 – 10 words • Bit strobe I/O: 1 – 4 words • Explicit messages: – Get_Attribute_Single – Set_Attribute_Single – Reset – Allocate_MS_Connection_Set – Release_MS_Connection_Set
	Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad

4.19 CAN/CANopen DFC11B fieldbus interface

4.19.1 Part number

08243174

4.19.2 Description

The MOVIDRIVE® MDX61B drive inverter in conjunction with the DFC11B option allows connection to higher-level automation, project planning and visualization systems via the open and standardized CANopen fieldbus system thanks to the option's high-performance universal fieldbus interface. You can also access parameters and process data using the MOVILINK® protocol designed especially for devices from SEW-EURODRIVE.

The DFC11B fieldbus interface can be plugged into the fieldbus slot. in this way, a second system bus (CAN) on MOVIDRIVE® is made available. The DFC11B option enables communication with the higher-level controller for a maximum of 10 process data. You need an EDS file to be able to integrate the DFC11B in the higher-level CANopen control. You can download this file from the SEW-EURODRIVE website.

4.19.3 Electronics data

DFC11B option		
	Communication profile	• SEW-MOVILINK® • CANopen • CAN Layer 2
	Number of process data words	1 – 10 process data words
	Baud rate	Setting using parameter P894: 125 kBaud/250 kBaud/500 kBaud/1 MBaud
	Connection technology	9-pole D-sub connector X30 (pin assigned to CIA standard) or terminal X31
	Permitted cable cross section X31 (CAN bus connection)	One core per terminal: 0.20 – 2.5 mm^2 (AWG24 – 12) Two cores per terminal: 0.25 – 1 mm^2 (AWG22 – 17)
	Terminating resistor	120 Ω (set using DIP switch S1-R)
	Addressing	Setting via parameter P891 (SBus MOVILINK®) or P896 (CANopen)
	Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad

4.19.4 Functions

- CAN Layer 2 and communication profile MOVILINK® or CANopen
- Electrical isolation via optocoupler

INFORMATION

If electrical isolation is not required, the CAN-Bus can be connected directly to the basic device at X12:SC11/SC12 without the DFC11B option. This does not effect the functionality.

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4.20 Synchronous operation card DRS11B

4.20.1 Part number

08246726

4.20.2 Description

The DSR11B option allows for a group of motors to be operated in phase-synchronous operation in relation to one another, or with an adjustable proportional relationship. For detailed information, refer to the "DRS11B Synchronous Operation Card" manual, which can be ordered from SEW-EURODRIVE. The basis for synchronous operation is the continuous comparison of the rotor angle positions of the master and the slave motors. Therefore, the motors must be equipped with encoders. The DRS11B option is plugged into the expansion slot.

4.20.3 Electronics data

Option DRS11B			
	Digital inputs	X40:1 – X40:6	EINGØ – EING5: isolated (optocoupler) PLC-compatible (EN 61131)
	Internal resistance		$R_i \approx 3$ kΩ, $I_E \approx$ DC 10 mA Sampling cycle 5 ms
	Signal level		DC +13 V – +30 V = "1" = contact closed DC -3 V – +5 V = "0" = contact open
	Function		Fixed assignment with: • EINGØ = Free-running • EING1 = offset 1 • EING2 = offset 2 • EING3 = offset 3 • EING4 = IPOS$^{PLUS®}$ variable H477.0 • EING5 = IPOS$^{PLUS®}$ variable H477.1
	Digital outputs	X40:9/X40/10	OUTPØ/OUTP1: PLC-compatible (EN 61131-2) Response time 5 ms
	Signal level		"0" = DC 0 V 1" = DC +24 V **Important:** Do not apply external voltage!
	Function		Fixed assignment with: • AUSGØ = IPOS$^{PLUS®}$ variable H476.0 • AUSG1 = IPOS$^{PLUS®}$ variable H476.1 I_{max} = DC 50 mA, short-circuit proof, protected against external voltage to DC 30 V
	Reference terminals	X40:11	DGND: Reference potential for binary signals
		X40:7	DCOM: Reference potential of digital inputs X40:1 – X40:6 (EINGØ – EING5)
	Voltage output	X40:8	VO24: Voltage output DC +24 V, max. DC 100 mA
	Distance encoder input	X41:	Max. 200 kHz, signal level according to RS422 or sin/cos
	Encoder voltage supply		DC +24 V, I_{max} = 650 mA[1)] 9-pin D-sub socket
	Master encoder input	X42:	Max. 200 kHz, signal level according to RS422 or sin/cos
	Encoder voltage supply		DC +24 V, I_{max} = DC 650 mA 9-pin D-sub socket
	Encoder simulation output	X43:	Signal level to RS422 9-pin D-sub connector
	Voltage input	X44:1	GND
		X44:2	DC +24 V supply voltage for digital outputs X40:9/X40:10 and encoder
		X44:3	GND
	Permitted cable cross section		One core per terminal: 0.08 – 1.5 mm^2 (AWG28 – 16) Two cores per terminal: 0.25 – 1 mm^2 (AWG22 – 16) Tightening torque: 0.6 Nm

1) Total current load (X41 and X42) of the DC 24 V encoder supply ≤ DC 650 mA

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4.21 Fieldbus interface PROFIBUS DP-V1 with PROFIsafe DFS11B

4.21.1 Part number

18238408

4.21.2 Description

MOVIDRIVE® B can be equipped with the 12 Mbaud fieldbus interface DFS11B for the serial bus system PROFIBUS DP-V1 with PROFIsafe. In addition to cyclical and acyclical data exchange, safety-related communication takes place that allows to switch a safe F-DO output. The device master data (GSD) and type files for MOVIDRIVE® B are available from the SEW website (http://www.sew-eurodrive.de) to help with project planning and facilitate startup.

For more detailed information, refer to the "DFS11B Fieldbus Interface PROFIBUS DP-V1 with PROFIsafe" manual. You can order this manual from SEW-EURODRIVE.

4.21.3 Electronics data

DFS11B option		
	PROFIBUS protocol variants	PROFIBUS-DP and DP-V1 to IEC 61158
	Automatic baud rate detection	9.6 kBaud – 12 MBaud
	Connection technology	• 9-pin D-sub socket • Pin assignment acc. to IEC 61158
	Bus termination	Not integrated, implement using suitable PROFIBUS connector with terminating resistors that can be activated.
	Station address	1 – 125, can be set via DIP switches
	GSD file name	SEW_600C.GSD
	DP ID number	600C = 24588_{hex}
	Diagnostics data	• Max. 8 bytes • Standard diagnostics: 6 bytes
	Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad
	F address	1 – 1022 DIP switch for setting the failsafe address
	Ambient temperature	0 – 55 °C

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4.21.4 Safety section

Safety characteristics	
Maximum possible safety class	• SIL 3 according to EN 61508 • Performance level e according to EN ISO 13849-1
System structure	2 channels with diagnostics (1002D)
Operating mode selection	"High demand" rate according to EN 61508
Probability of dangerous failure per hour (PFH value)	< 1.00E-09 (1 FIT)
Proof test interval (EN 61508)	20 years, after which the component must be replaced with a new one
Repair time	100 hours
Safe state	Value "0" for all safety-related F-DO process values (output disabled)

Safe output	
Sourcing/sinking (from load voltage supply)	DC 24 V output according to EN 61131-2, protected against short circuits and overloads
Rated current	1A
Leakage current (for "0" signal)	Typically -2 mA (with 2 V / 1 kΩ load resistance) (Information: Current flows from F-DO_M to F-DO_P)
Internal voltage drop (P and M output)	max. 3 V
Short-circuit protection	Electronic, response value: 2.8 A – 9 A
Overload protection	Trigger value: 1.4 A – 1.6 A
Load resistance range	24 kΩ – 1 kΩ
Voltage limitation when switching off inductive loads	Typically -70 V
Response time (command via PROFIsafe → the output switches)	≤ 25 ms
Maximum line length	30 m

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4.22 Fieldbus interface PROFIBUS DP-V1 with PROFIsafe DFS12B

4.22.1 Part number

28204239

4.22.2 Description

MOVIDRIVE® B can be equipped with the 12 Mbaud fieldbus interface DFS12B for the serial bus system PROFIBUS DP-V1 with PROFIsafe. In addition to cyclical and acyclical data exchange, safety-related communication takes place in conjunction with the DCS21B/22B option. The device master data (GSD) and type files for MOVIDRIVE® B are available from the SEW website (http://www.sew-eurodrive.de) to help with project planning and facilitate startup.

For more detailed information, refer to the "DFS12B Fieldbus Interface PROFIBUS DP-V1 with PROFIsafe" manual. You can order this manual from SEW-EURODRIVE.

4.22.3 Electronics data

DFS12B option		
	PROFIBUS protocol variants	PROFIBUS-DP and DP-V1 to IEC 61158
	Automatic baud rate detection	9.6 kBaud – 12 MBaud
	Connection technology	• 9-pin D-sub socket • Pin assignment acc. to IEC 61158
	Bus termination	Not integrated, implement using suitable PROFIBUS connector with terminating resistors that can be activated.
	station address	1 – 125, can be set via DIP switches
	GSD file name	SEW_600C.GSD
	DP ID number	600C = 24588_{hex}
	Diagnostics data	• Max. 8 bytes • Standard diagnostics: 6 bytes
	Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad
	F address	The failsafe address is set using the DCS21B/22B option
	Ambient temperature	0 – 55 °C

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4.23 PROFINET IO fieldbus interface with PROFIsafe DFS21B

4.23.1 Part number

18238637

4.23.2 Description

The MOVIDRIVE® MDX61B drive inverter enables you to use the DFE21B option to connect to higher-level automation, project planning and visualization systems via Ethernet (PROFINET IO protocol) thanks to its powerful, universal fieldbus interface. In addition to cyclical and acyclical data exchange, safety-related communication takes place that allows to switch a safe F-DO output. You can use option DFS21B to communicate directly with the inverters via Ethernet and operate the MOVITOOLS® MotionStudio engineering software to change parameters and IPOS$^{PLUS®}$ programs. An integrated Web server makes it possible for the user to access diagnostic values quickly and easily using a standard browser (e.g. Internet Explorer).

For more detailed information, refer to the "DFS21B Fieldbus Interface PROFINET IO with PROFIsafe" manual. You can order this manual from SEW-EURODRIVE.

4.23.3 Electronics data

DFS21B option	
Application protocols	• **PROFINET IO** (Ethernet frames with frame identification 8892_{hex}) to control and set parameters for the drive inverter. • **HTTP** (Hypertext Transfer Protocol) for diagnostics using a Web browser. • **SMLP** (Simple MOVILINK® Protocol), protocol used by MOVITOOLS® MotionStudio.
Port numbers used	• 300 (SMLP) • 80 (HTTP)
Ethernet services	• ARP • ICMP (ping)
ISO/OSI layer 2	Ethernet II
Baud rate	100 Mbaud in full duplex process
Connection technology	Two RJ45 plug connectors with integrated switch and auto-crossing
Addressing	4 byte IP address or MAC-ID (00:0F:69:xx:xx:xx)
Manufacturer ID (Vendor ID)	$010A_{hex}$
Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad
F address	1 – 1022 DIP switch for setting the failsafe address
Ambient temperature	0 – 55 °C

4.23.4 Safety section

Safety characteristics	
Maximum possible safety class	• SIL 3 according to EN 61508 • Performance level e according to EN ISO 13849-1
System structure	2 channels with diagnostics (1oo2D)
Operating mode selection	"High demand" rate according to EN 61508
Probability of dangerous failure per hour (PFH value)	< 1.00E-09 (1 FIT)
Proof test interval (EN 61508)	20 years, after which the component must be replaced with a new one
Repair time	100 hours
Safe state	Value "0" for all safety-related F-DO process values (output disabled)

Safe output	
Sourcing/sinking (from load voltage supply)	DC 24 V output according to EN 61131-2, protected against short circuits and overloads
Rated current	1A
Leakage current (for "0" signal)	Typically -2 mA (with 2 V / 1 kΩ load resistance) (Information: Current flows from F-DO_M to F-DO_P)
Internal voltage drop (P and M output)	max. 3 V
Short-circuit protection	Electronic, response value: 2.8 A – 9 A
Overload protection	Trigger value: 1.4 A – 1.6 A
Load resistance range	24 kΩ – 1 kΩ
Voltage limitation when switching off inductive loads	Typically -70 V
Response time (command via PROFIsafe → the output switches)	≤ 25 ms
Maximum line length	30 m

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4.24 PROFINET IO fieldbus interface with PROFIsafe DFS22B

4.24.1 Part number

28204247

4.24.2 Description

The MOVIDRIVE® MDX61B drive inverter enables you to use the DFS22B option to connect to higher-level automation, project planning and visualization systems via Ethernet (PROFINET IO RT protocol) thanks to its powerful, universal fieldbus interface. In addition to cyclical and acyclical data exchange, safety-oriented communication takes place in conjunction with the DCS21/22B option. You can use option DFS22B to communicate directly with the inverters via Ethernet and operate the MOVITOOLS® MotionStudio engineering software to change parameters and IPOS$^{PLUS®}$ programs. An integrated Web server makes it possible for the user to access diagnostic values quickly and easily using a standard browser (e.g. Internet Explorer).

For more detailed information, refer to the "DFS22B Fieldbus Interface PROFINET IO with PROFIsafe" manual. You can order this manual from SEW-EURODRIVE.

4.24.3 Electronics data

DFS22B option		
	Application protocols	• **PROFINET IO** (Ethernet frames with frame identification 8892$_{hex}$) to control and set parameters for the drive inverter. • **HTTP** (Hypertext Transfer Protocol) for diagnostics using a web browser. • **SMLP** (Simple MOVILINK® Protocol), protocol used by MOVITOOLS® MotionStudio.
	Port numbers used	• 300 (SMLP) • 80 (HTTP)
	Ethernet services	• ARP • ICMP (ping)
	ISO/OSI layer 2	Ethernet II
	Baud rate	100 Mbaud in full duplex process
	Connection technology	Two RJ45 plug connectors with integrated switch and auto-crossing
	Addressing	4 byte IP address or MAC-ID (00:0F:69:xx:xx:xx)
	Manufacturer ID (Vendor ID)	010A$_{hex}$
	Tools for startup	• MOVITOOLS® MotionStudio engineering software • DBG60B keypad
	F address	The failsafe address is set using the DCS21B/22B option
	Ambient temperature	0 – 55 °C

4.25 MOVISAFE® DCS21B/22B/31B/32B safety module

4.25.1 Part numbers

- DCS21B safety module with prefabricated DAE34B cable: 28200993
- DCS21B safety module for replacement (without DAE34B): 28200977
- DCS22B safety module with prefabricated DAE34B cable: 28207572
- DCS22B safety module for replacement (without DAE34B): 18247369
- DCS31B safety module: 28200985
- DCS32B safety module: 18247377

4.25.2 Description

The DCS21B/22B and DCS31B/32B options of the MOVISAFE® series are designed as expansion options for functional safety. They are capable of performing various drive monitoring functions, such as standstill, speed, direction of rotation or position monitoring. Additionally, sensor signals can be processed via safe inputs and outputs and MOVIDRIVE® B can be switched off according to stop categories 0, 1, or 2.

To being able to communicate with a higher-level safety controller in a safety-related manner, the DCS21B/22B option must be used together with the DFS12B fieldbus interface (PROFIBUS DP-V1) or DFS21B (PROFINET IO). The DCS2.B/3.B option is plugged into the expansion slot.

For more detailed information refer to the manual "MOVIDRIVE® MDX61B Safety Module Option MOVISAFE® DCS21B/22B/31B/32B" that can be ordered from SEW-EURODRIVE or downloaded from the official website.

INFORMATION

EMC screw

Removing the EMC screw is without effect as this card has a fixed DGND-PE connection.

For more detailed information on prefabricated cables for connecting MOVIDRIVE® B, refer to the manual "MOVIDRIVE® MDX61B Safety Module Option MOVISAFE® DCS21B/22B/31B/32B" that can be ordered from SEW-EURODRIVE or downloaded from the official website.

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4.25.3 Electronics data

Option DCS21B/22B/31B/32B		
		LED alarm/error LED watchdog LED system B LED system A
		X80: Voltage supply connection
		X81: Digital input connection
		X82: Connection of digital outputs DO0, DO1
		X83: Connection of digital output DO2
		X84: Connection of incremental, sin/cos, HTL, or absolute encoder (encoder 1)
		X85: Connection of incremental, sin/cos, HTL, or absolute encoder (encoder 2)
		X86: CAN bus connection (only for DCS21B/22B)
		X87: Connection for service interface

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4.26 MOVI-PLC® basic DHP11B controller

4.26.1 Part numbers

The MOVI-PLC® *basic* controller DHP11B.. is available in 3 versions, which differ in the modules available from a range of libraries.

Part number	MOVI-PLC® basic DHP11B device design	Description
18204724	DHP11B-T0	MOVI-PLC® *basic* controller
18208223	DHP11B-T1	Application version I (in addition to version T0, enables additional functions including electronic cam and synchronous operation)
18208231	DHP11B-T2	Application version II (in addition to version T1, enables additional functions including handling)

4.26.2 Description

MOVI-PLC® is a series of controllers available from SEW-EURODRIVE. MOVI-PLC® can be programmed by users according to IEC 61131-3 and PLCopen.

The MOVI-PLC® *basic* controller DHP11B is equipped with a PROFIBUS DP-V1 slave interface, two SBus interfaces (CAN), RS485 and eight digital inputs/outputs, five of which are interrupt-capable. MOVI-PLC® *basic* DHP11B can control 12 devices at the same time (MOVIDRIVE® B/compact, MOVITRAC® B, MOVIAXIS®, MOVIMOT®).

4.26.3 Electronics data

MOVI-PLC® basic DHP11B option		
	Status displays	LEDs for the voltage supply to the I/Os, firmware, program, PROFIBUS, system bus
	Fieldbus	• PROFIBUS DP and DP-V1 acc. to IEC 61158 • Automatic detection of baud rate from 9.6 kbaud to 12 Mbaud • Bus connection implemented with suitable connector • GSD file SEW_6007.GSD • DP ID number 6007_{hex} (24579_{dec}) • Maximum 32 process data
	System bus	• 2 system buses (CAN) to control 12 inverters and CANopen I/O modules • CAN layer 2 (SCOM cyclic, acyclic) or via the SEW MOVILINK® protocol • Baud rate: 125 kBaud – 1 MBaud • External bus terminator • Address range: 0 – 127
	Engineering	Via RS485, PROFIBUS and the system buses
	Panel operation	via RS485
	Connection technology	• PROFIBUS: 9-pole D-sub connector according to IEC 61158 • System buses and I/Os: Plug-in terminals • RS485: RJ10
	Digital inputs/outputs	• 8 I/Os to IEC 61131-2; can be configured as inputs or outputs. Five are interrupt-capable
	Memory	• Program: 512 kByte • Data: 128 kB • Retain: 24 kB
	Tools for startup	MOVITOOLS® MotionStudio with integrated PLC Editor (programming languages IL, ST, LD, FBD, CFC, SFC; libraries for optimized inverter control)

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4.27 OST11B

4.27.1 Part number

18205445

4.27.2 Description

Option OST11B provides an additional RS485 interface (COM2) for MOVI-PLC® *basic* DHP11B in terminal design or as an engineering interface. Only use option OST11B in conjunction with the MOVI-PLC® *basic* controller DHP11B.

When the MOVI-PLC® *basic* DHP11B option is plugged into the fieldbus slot, option OST11B is plugged into the encoder slot. When the MOVI-PLC® *basic* DHP11B option is plugged into the expansion slot, option OST11B is installed in the expansion slot above the option MOVI-PLC® *basic* DHP11B.

4.27.3 Electronics data

OST11B option		
	RS485 interface COM2 X35:1 – X35:4 X36:1 – X36:3	• For connection of an Engineering PC, a DOP11A/B operator terminal or a gearmotor with integrated frequency inverter MOVIMOT® • I/O standard, 57.6 kBd, max. total cable length 200 m, integrated dynamic terminating resistor permanently installed
	Potential level	COM2 is galvanically isolated from the MOVI-PLC® *basic* DHP11B controller.

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4.28 DHE/DHF/DHR21 and DHE/DHF/DHR41B controller

Three types of DH.21B/41B controllers are available, which differ in the fieldbus interfaces:

DH.21B/41B design	Fieldbus interfaces
DHE21B/41B	Ethernet TCP/IP, UDP
DHF21B/41B	Ethernet TCP/IP, UDP, PROFIBUS DP-V1, DeviceNet™
DHR21B/41B	Ethernet TCP/IP, UDP, PROFINET, EtherNet/IP™, ModbusTCP/IP

4.28.1 Description

Freely programmable motion and logic controller (MOVI-PLC®)

The controller can be operated as freely programmable motion and logic controller MOVI-PLC® when using SD memory cards of the type OMH41B. MOVI-PLC® is a series of programmable motion and logic controllers. It allows drive solutions, logic processes and sequence controls to be automated simply and efficiently using IEC 61131-3 compliant programming languages.

- MOVI-PLC® is a **universal** solution because it is able to control the entire portfolio of SEW inverters and offers a simple upgrade to a more powerful MOVI-PLC® version thanks to the universal execution of the programs.
- MOVI-PLC® is **scalable** due to several different hardware platforms (standard, advanced, etc.) and modular software concepts (libraries for numerous applications).
- MOVI-PLC® is **powerful** due to extensive technologies (such as electronic cam, synchronous operation) and the control of demanding applications (such as material handling).

MOVI-PLC® standard performance class

- DH.21B controllers enable coordinated single axis movements and integration of external inputs/outputs as well as Drive Operator Panels (DOP). The DH.21B.. option is therefore suitable for use as a module controller or stand-alone controller for machines of medium complexity.

MOVI-PLC® advanced performance class

- The DH.41B controller is characterized by a greater variety of interfaces and a higher performance level, which allows complex calculations and interpolated movements, for example. The DH.41B option is therefore suitable for the automation of cells and machines. The integrated Ethernet interface enables direct connection of the DH.41B controller to the control level.

Configurable application controller (CCU)

The controller can be used as configurable application controller (CCU) by using SD memory cards of the type OMC41B. Only standardized application modules created by SEW-EURODRIVE can be executed. The application modules can be started up quickly and conveniently by graphical configuration. A defined process data interface provides this functionality to a higher-level controller. A process data monitor with control mode is available to support the startup procedure.

CCU standard performance class

The "CCU standard" performance class is intended for application modules with single-axis functionality and medium response times. A maximum of 16 axes can be connected to a configurable application controller. The following application modules are available and can be started up using the *AxisConfigurator* tool.

- Velocity control
- Cam positioning
- Bus positioning with 6 process data
- Single-axis universal module

CCU advanced performance class

The "CCU advanced" performance class is intended for application modules with single-axis and multi-axis functionality and fast response times. The following application modules are available:

- Single-axis functionality:
  - Velocity control
  - Cam positioning
  - Bus positioning with 6 process data words
  - Single-axis universal module
- Multi-axis functionality:
  - SyncCrane
  - Energy-efficient SRS

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4.28.2 DHE21B/41B electronics data

DHE21B/41B option

DHE21B/41B option	
Part number	DHE21B option: 18236073 DHE41B option: 18211607
Potential levels	Option DHE21B/41B has the following potential levels: • Potential control / CAN 1 / COM1 • Potential COM2 • Potential digital inputs and outputs • Potential system bus CAN 2
Memory	• Retain data: 32 kB • System variables (retain): 8 kB Program memory: • DHE21B: 2 MB (for user program, incl. IEC libraries) • DHE41B: 6 MB (for user program, incl. IEC libraries) Data memory: • DHE21B: 4 MByte (for IEC application) • DHE41B: 8 MB (for IEC application)
CAN 2 system bus X32:1 – X32:3 System bus CAN 1 X33:1 – X33:3	• System bus CAN 1 and CAN 2 to CAN specification 2.0, part A and B, transmission technology to ISO 11898 • The CAN 2 system bus is electrically isolated • Max. 64 stations per CAN system bus • Max. 64 SCOM transmit objects / 32 receive objects per CAN system bus • Address range 0 – 127 • Baud rate: 125 kBaud – 1 MBaud • If X32 or X33 is the bus terminator, you must connect a terminating resistor (120 Ω) externally • You can remove connector X32 or X33 without interrupting the system bus • The system bus can be run in layer 2 (SCOM cyclic, acyclic) or in accordance with the SEW MOVILINK® protocol
Ethernet 1 X36	System bus, reserved
Ethernet 2 X37	• TCP/IP • Possible connections: engineering PC, other control, intranet
USB	USB 1.0 to connect an engineering PC (in preparation)
RS485 Interface COM1/2 X34:1 – C34:4	• For connection of a DOP11A/B operator terminal or a gearmotor with integrated MOVIMOT® frequency inverter • E/A standard, 57.6 / 9.6 kBaud, max. cable length 200 m • Dynamic terminating resistor with fixed installation
SD memory card	• PC-readable • Contents – Firmware – IEC program – Data • At least 128 MB memory
Engineering	Engineering takes place via one of the following interfaces: • Ethernet 2 (X37) • USB (X35) Engineering for all SEW-EURODRIVE components connected to the MOVI-PLC® *advanced* DHE41B control card can be performed using the MOVI-PLC® *advanced* DHE41B control card. Engineering of the MOVI-PLC® *advanced* DHE41B controller cannot be performed via the inverters. • MOVITOOLS® engineering software MotionStudio with PLC Editor

4.28.3 DHF21B/41B electronics data

INFORMATION

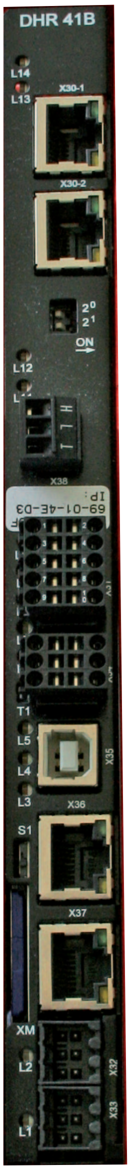
For connections identical with DHE41B, refer to the "DHE41B electronics data" section.

<table>
<tr><th colspan="3">DHF21B/41B option</th></tr>
<tr><td rowspan="6">
</td><td>Part number</td><td>• DHF21B: 18236081
• DHF41B: 18211615</td></tr>
<tr><td>Potential levels</td><td>Option DHF21B/41B has the following potential levels:
• Potential control / CAN 1 / COM1
• Potential COM2
• Potential digital inputs and outputs
• Potential system bus CAN 2
• Potential PROFIBUS</td></tr>
<tr><td>PROFIBUS connection X30P:1 - X30P:9</td><td>Via 9-pin D-sub connector, pin assignment according to IEC 61158</td></tr>
<tr><td>Automatic baud rate detection</td><td>9.6 kBaud - 12 MBaud</td></tr>
<tr><td>SD memory card</td><td>• PC-readable
• Contents
– Firmware
– IEC program
– Data
• At least 128 MB memory</td></tr>
<tr><td>DeviceNet™ connection X30D:1 – X30D:5</td><td>• 2-wire bus and 2-wire supply voltage DC 24 V with 5-pole Phoenix terminal
• Pin assignment according to DeviceNet™ specification</td></tr>
</table>

4.28.4 DHR21B/41B electronics data

INFORMATION

Connections identical with those of the DHE21B/41B and DHF21B/41B options are described chapters "DHE21B/41B option" and "DHF21B/41B option".

DHR21B/41B option		
	Part number	• DHR21B: 18236103 • DHR41B: 18216323
	Electrical supply	Installed in MOVIDRIVE® MDX61B: • Power consumption: P_{max} = 9.5 W Installed in the MOVIAXIS® master module (MXM): • Power consumption: P_{max} = 12 W
	Ethernet connection X30-1, X30-2	Via RJ45 socket, pin assignment according to IEC 11801 Integrated Ethernet switch with auto-crossing and auto-negotiation functionality.
	SD memory card	• PC-readable • Contents – Firmware – IEC program – Data • At least 128 MB memory
	Engineering	Additional engineering access via PROFINET, EtherNet/IP™ and Modbus TCP/IP interface (X30:1/2)

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4.29 Safety-related BST brake module

4.29.1 Part numbers

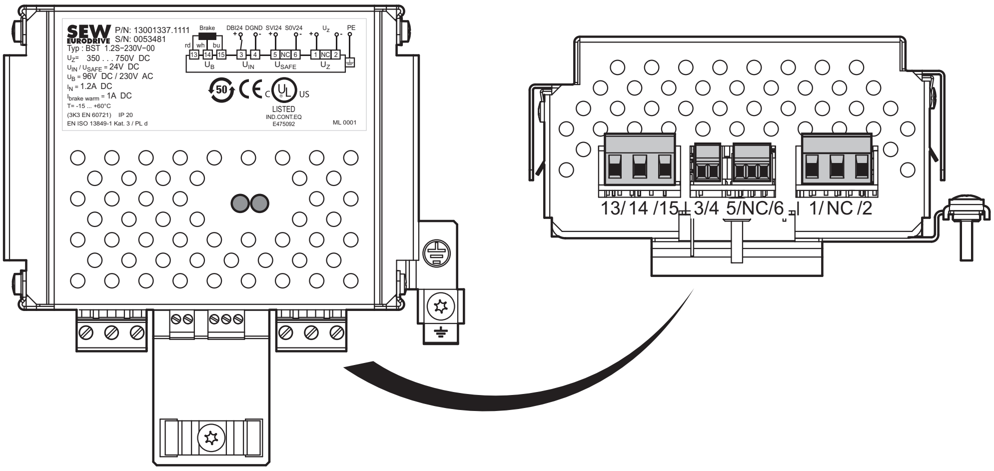
The safety-related brake module is available in three variants:

Type designation	Part number	Approved SEW disk brakes
BST 0.6S-460V-00	08299714	All brake coils with a brake coil voltage of AC 460 V and a coil power ≤ 120 W. Several brake coils can be connected for redundant systems. In this case, the total power must not exceed 120 W.
BST 0.7S-400V-00	13000772	All brake coils with a brake coil voltage of AC 400 V and a coil power ≤ 120 W. Several brake coils can be connected for redundant systems. In this case, the total power must not exceed 120 W.
BST 1.2S-230V-00	13001337	All brake coils with a brake coil voltage of AC 230 V and a coil power ≤ 120 W. Several brake coils can be connected for redundant systems. In this case, the total power must not exceed 120 W.

4.29.2 Description

- The safety-related BST brake module enables the connection of an external fail-safe safety switching device/safety controller. The safety switching device disconnects the safety-related control voltage V_{safe} when a connected control device (e.g. emergency stop device) is activated.
- UL approved
- Disconnecting the safety-related control voltage V_{safe} means the connected brake is disconnected from the power supply. The power supply required for releasing the connected brake is interrupted safely.
- Instead of separating the brake control galvanically from the power supply using contactors or switches, the disconnection procedure described here prevents the power semiconductors in the safety-related BST brake module from being activated, in this way ensuring safe disconnection. This means that all connected brakes are de-energized although the supply voltage is still present at the safety-related BST brake module.

4.29.3 Electronics data



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Terminal		Function
1	$+U_Z$	DC link voltage input +
2	$+U_Z$	DC link voltage input -
5	SVI24	Input for safety-related control voltage V_{safe}
6	S0V24	Reference potential for safety-related control voltage V_{safe}
3	DBI24	Functional control voltage V_{IN} input
4	DGND	Reference potential for functional control voltage V_{IN}
13	RD	Brake output
14	WH	
15	BU	
⏚		Ground connection

5 Technical data of external accessories

5.1 DMP11B mounting panel

5.1.1 Part number

08183988

5.1.2 Description

DMP11B

1454393867

If a MOVIDRIVE® MD_60A size 2 device is to be replaced by MOVIDRIVE® MDX61B size 2S, the MDX61B size 2S can be fitted on the existing mounting plate with the DM-P11B mounting panel. New retaining holes do not have to be drilled.

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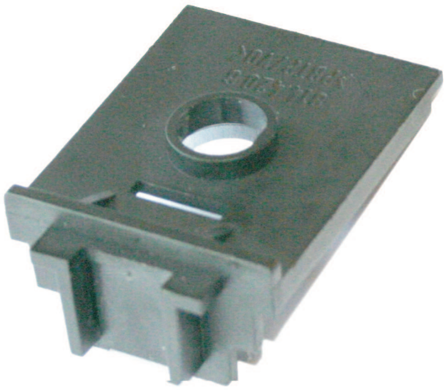
5.2 DLB11B touch guard

5.2.1 Part number

08231117 (Scope of delivery 12 pieces)

5.2.2 Description



1454399115

Degree of protection IP20 can be achieved for the following devices with DLB11B touch guard:

- MOVIDRIVE® MDX61B size 4 (AC 500 V devices: MDX61B0370/0450; AC 230 V devices: MDX61B0220/0300)
- MOVIDRIVE® MDX61B size 5 (AC 500 V devices: MDX61B0550/0750)
- Regenerative power supply MOVIDRIVE® MDR60A size 4 (MDR600750-503-00)

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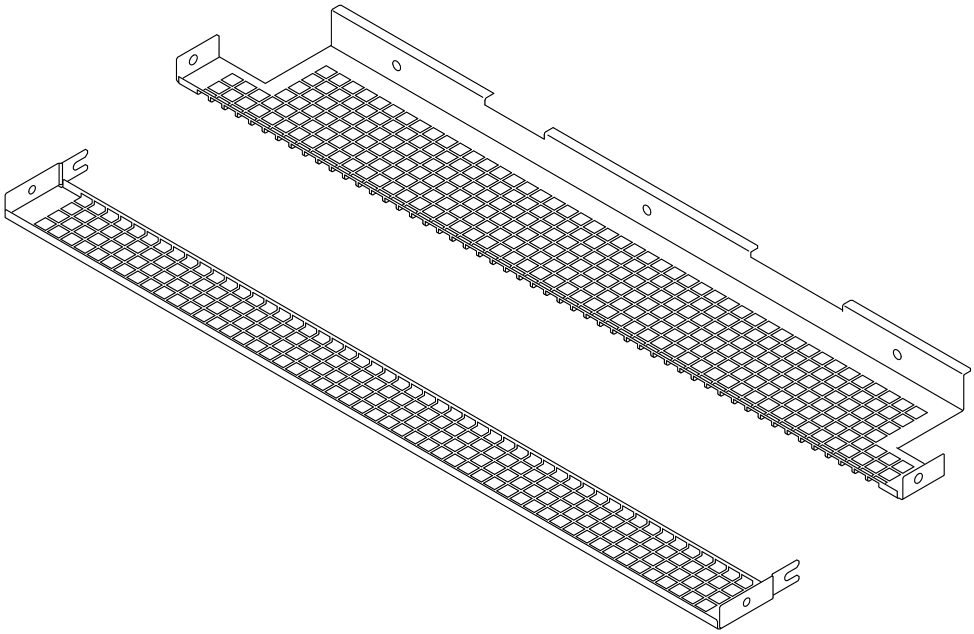
5.3 DLB21B touch guard (for size 7)

5.3.1 Part number

18226086

5.3.2 Description



2422310283

You can use the DLB21B touch guard to achieve degree of protection IP20 for the following devices:

- MOVIDRIVE® MDX61B size 7

  (AC 500 V devices: MDX61B1600/2000/2500)

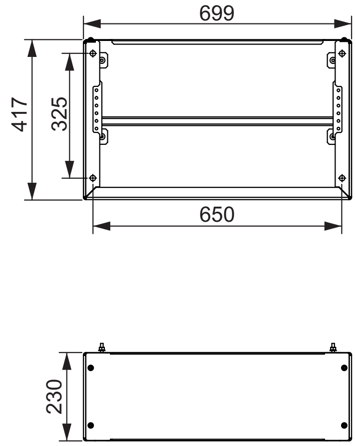
Fixing material for the touch guard is included in the scope of delivery. The customer must adapt the touch guard to the individual cable routing (cutting the hole matrix for supply system and motor cables).

5.4 DLS11B mounting base (for size 7)

5.4.1 Part number

18226027

5.4.2 Description



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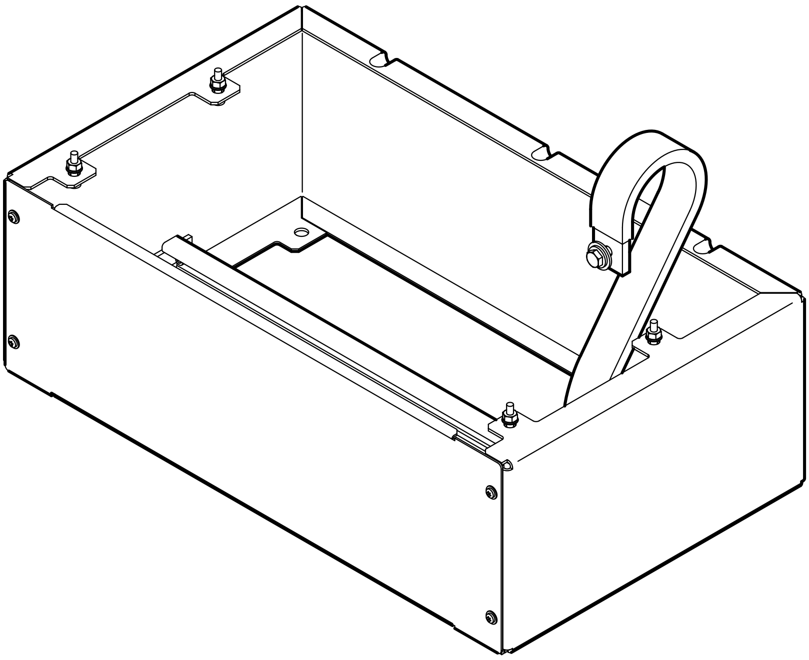

2422224267

The mounting base is designed specifically for installation of MOVIDRIVE® B size 7 (MDX61B1600/2000/2500) in the control cabinet. The base is equipped with an integrated cable clamping rail. It ensures sufficient space for connecting the supply system and motor cables. The front cover can be removed for installation work. Fixing material for mounting the inverter to the mounting base is included in the scope of delivery.

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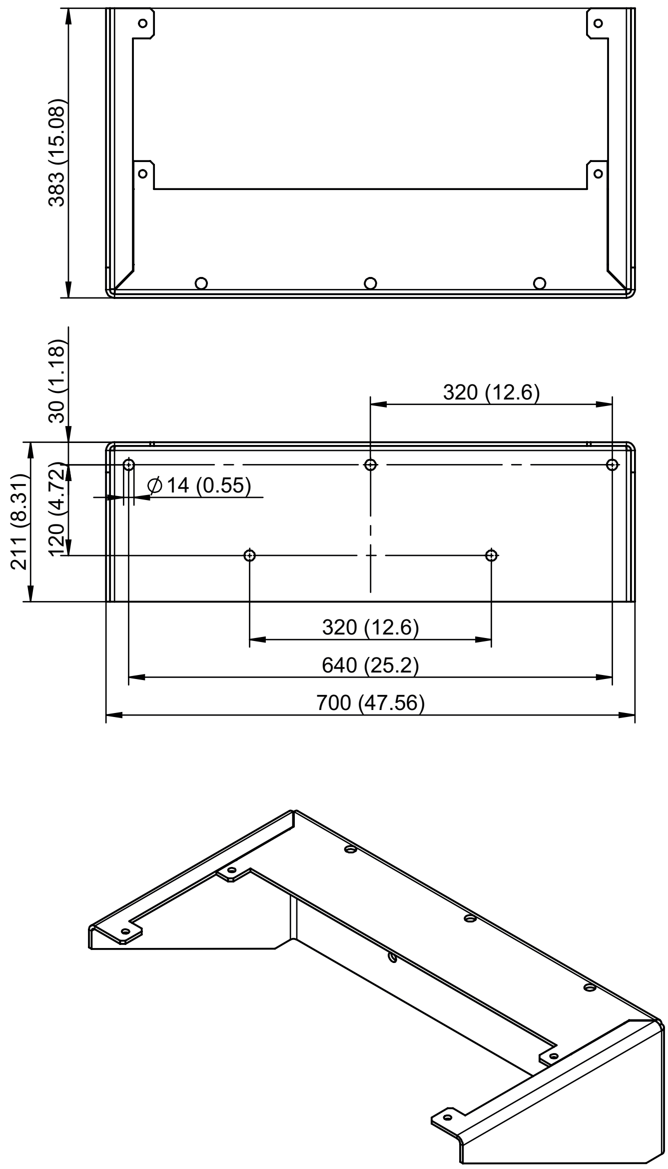
5.5 DLH11B wall bracket (for size 7)

5.5.1 Part number

18226108

5

5.5.2 Description



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The wall bracket is used for attaching MOVIDRIVE® B size 7 (MDX61B1600/2000/2500) to a wall. The fixing material for mounting the inverter to the wall bracket is included in the scope of delivery. The fixing material for mounting the bracket to the wall is not included in the scope of delivery.

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5.6 DLA11B connection kit (for size 7)

5.6.1 Part number

18223125

5.6.2 Description

Connection material for connecting supply system and motor cables with cross sections up to 240 mm² to the following devices:

- MOVIDRIVE® MDX61B size 7

  (AC 500 V devices: MDX61B1600/2000/2500)

The connection kit includes the following material:

- 9 × bolts M12×30
- 9 × M12 nuts
- Lock washers
- Washers
- 3 × PE terminals for PE busbar (up to 240 mm²)

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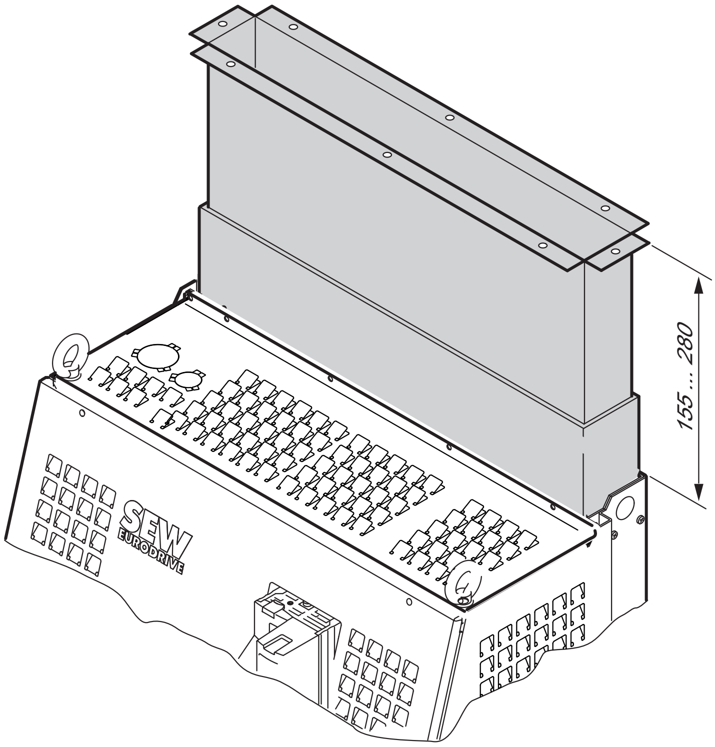
5.7 DLK11B air duct (for size 7)

5.7.1 Part number

18226035

5.7.2 Description

The following figure shows the air duct for dissipating heat from MOVIDRIVE® B size 7 (MDX61B1600/2000/2500):



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The air duct extends the integrated device air duct of size 7 to the control cabinet roof to dissipate heat from the control cabinet. It improves the temperature management. A prerequisite is that air can be dissipated via the control cabinet roof (dust protection, etc.).

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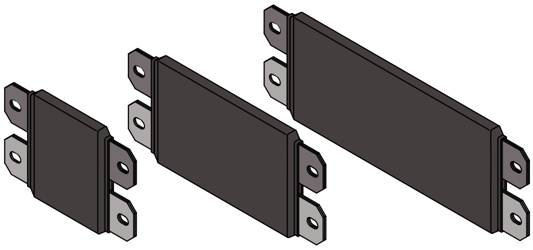
5.8 DLZ11B DC link coupling (for size 7)

5.8.1 Part number

The DLZ11B DC link coupling is available in three different lengths:

Type	Part number
DLZ11B / 100 mm	18231934
DLZ11B / 200 mm	18235662
DLZ11B / 300 mm	18235670

5.8.2 Description



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DC link connection to connect inverters and size 7 regenerative power supply unit side by side.

- MOVIDRIVE® MDX61B size 7
  (MDX61B1600/2000/2500)
- MOVIDRIVE® MDR61B regenerative power supply size 7
  (MDR61B1600/2500)
- MOVIDRIVE® MDX62B motor inverter size 7

The DC link connection ($+U_z$; $-U_z$) of size 7 can be connected on the side as standard. The DLZ11B DC link coupling can be used to connect two size 7 MOVIDRIVE® B devices. Depending on the DC link coupling, the devices must be installed at a distance of 100 mm, 200 mm, or 300 mm; tolerance range: approx. 4 mm. Two insulated conductor rails and fixing material are included in the delivery.

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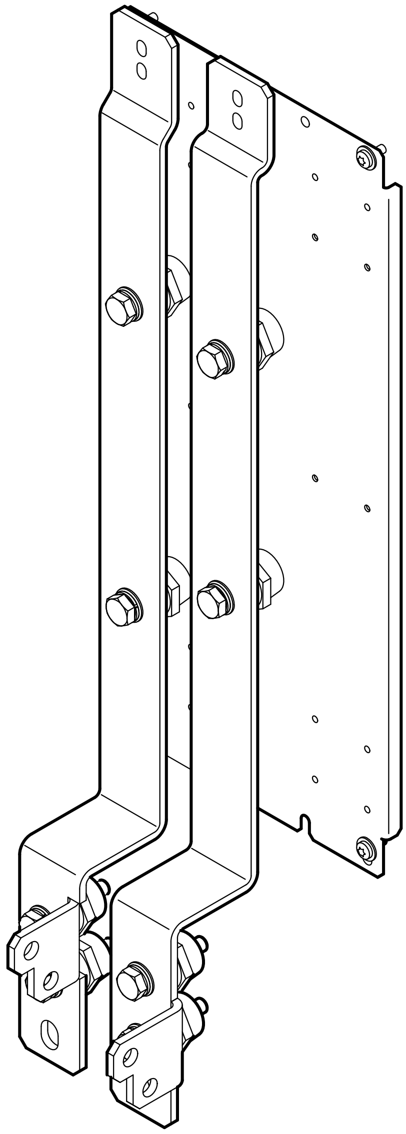
5.9 2Q DLZ12B DC link adapter (for size 7)

5.9.1 Part number

18227295

5.9.2 Description



2422222347

DC link adapter for routing the DC link connection to the bottom of the device.

For devices:

- MDX61B1600-503-2-0T/L
- MDX61B2000-503-2-0T/L
- MDX61B2500-503-2-0T/L

and

- MDX62B1600-503-2-0T/L

- MDX62B2000-503-2-0T/L
- MDX62B2500-503-2-0T/L

The DC link connection (+U_z; -U_z) of size 7 can be connected on the side as standard. The 2Q DC link adapter provides a connection option for +U_z and -U_z at the bottom of the device.

The DC link adapter can be used for DC link coupling with MOVIDRIVE® B sizes 0 – 6.

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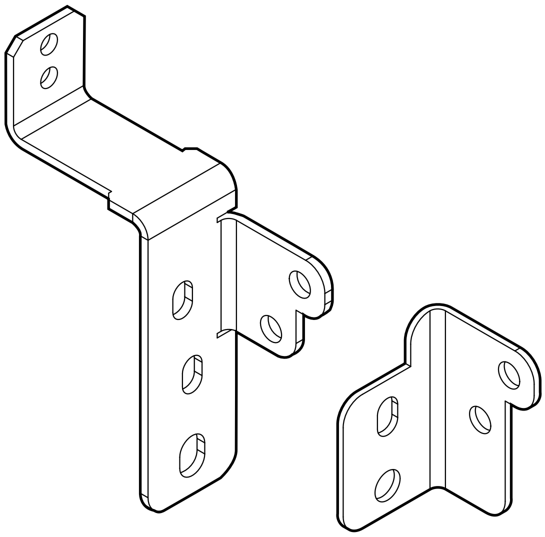
5.10 4Q DLZ14B DC link adapter (for size 7)

5.10.1 Part number

18227287

5.10.2 Description



2435823499

DC link adapter for routing the DC link connection to the bottom of the device.

For devices:

- MDX61B1600-503-4-0T/L
- MDX61B2000-503-4-0T/L
- MDX61B2500-503-4-0T/L

and

- MDX62B1600-503-4-0T/L
- MDX62B2000-503-4-0T/L
- MDX62B2500-503-4-0T/L

The DC link connection ($+U_z$; $-U_z$) of size 7 can be connected on the side as standard. The 4Q DC link adapter provides a connection option for $+U_z$ and $-U_z$ at the bottom of the device. The DC link adapter should be used for DC link coupling with MOVIDRIVE® B sizes 0 – 6.

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6 Technical data of braking resistors, chokes and filters

6.1 Braking resistors BW.. / BW...-T / BW...-P

6.1.1 General information

- Braking resistors BW... / BW...-T and BW...-P match the technical features of the MOVIDRIVE® drive inverters.
- Take account of a power reduction of 4% per 10 K from an ambient temperature of 40 °C. Do not exceed a maximum ambient temperature of 80 °C.

PTC resistor BW090-P52B

- Direct installation on MOVIDRIVE® MDX60B/61B size 0 (0005 – 0014) (→ chapter "Dimensions drawings for MOVIDRIVE® MDX60B")
- The MOVIDRIVE® devices can be lined up even with mounted braking resistor BW090-P52B.
- The resistor protects itself (reversible) against regenerative overload by changing abruptly to high resistance and no longer consuming any more energy. The inverter then switches off and signals a brake chopper fault (F04).

Flatpack resistors

- Protection against contact (IP54)
- In the documented assignments of drive inverters and flat-design resistors, flat-design resistors have an internal thermal protection (non-replaceable fuse) that interrupts the current circuit in the event of overload. The project planning guidelines and the documented assignments of drive inverter and braking resistor must be adhered to.
- Touch guard and mounting rail attachment available from SEW-EURODRIVE as accessories

Wire and grid resistors

- Perforated sheet cover (IP20) open to mounting surface
- The short-term load capacity of the wire and grid resistors is higher than in the flat-type braking resistors (→ MOVIDRIVE® MDX60B/61B system manual, chapter "Braking resistor selection")
- A temperature switch is integrated in the BW...-T braking resistor
- A thermal overcurrent relay is integrated in the BW...-P braking resistor

SEW-EURODRIVE recommends implementing additional protection against overload for the wire and grid resistors by using a bimetallic relay with trip characteristics of trip class 10 or 10 A (in accordance with EN 60947-4-1). Set the tripping current to the value I_F (→ following tables). Do not use electronic or electromagnetic fuses because these can be triggered even in case of short-term excess currents that are still within the tolerance range.

For braking resistors in the BW..-T / BW...-P series, you can connect the integrated temperature sensor / overcurrent relay using a 2-core, shielded cable as an alternative to a bimetallic relay. The cable entry for the BW...-T and BW...-P braking resistors can be run from the front or the back (→ dimension drawing for BW... / BW...-T / BW...-P braking resistors). Use filler plugs for tapped holes that are not connected.

The surfaces of the resistors get very hot if loaded with P_N. Make sure that you select an installation site that will accommodate these high temperatures. For this reason, braking resistors are usually mounted on top of the control cabinet.

The performance data listed in the tables below show the load capacity of the braking resistors according to their cyclic duration factor (cyclic duration factor = cdf of the braking resistor in % in relation to a cycle duration ≤ 120 s).

6.1.2 UL and cUL approval

Type BW... braking resistors are UL and cUL approved in conjunction with MOVIDRIVE® B drive inverters. SEW-EURODRIVE will provide certification on request. The BW...T and BW...-P braking resistors have cRUus approval independent of the MOVIDRIVE® inverter.

6.1.3 Parallel connection

Two braking resistors with the same value must be connected in parallel for some inverter/resistor combinations. In this case, the tripping current must be set on the bimetallic relay to twice the value of I_F entered in the table. For the BW...-T BW...-P braking resistors, the temperature switch/overcurrent relay must be connected in series.

6.1.4 Mounting position

Only horizontal mounting positions are permitted for BW braking resistors, with the exception of flatpack design.

Make sure to provide a clearance of 20 cm on the sides and 30 cm above the braking resistors.

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6.1.5 Assignment to AC 400/500 V devices (...-5_3)

Braking resistor type BW...	BW090-P52B	BW100-005	BW100-006	BW072-003	BW072-005	BW168	BW268
Part number	08245630	08262691	08217017	08260583	08260605	0820604X	08207151
Braking resistor type BW...-T			BW100-006-T			BW168-T	BW268-T
Part number			18204198			18201334	18204171
Continuous braking power (= 100% cdf)	0.10 kW	0.45 kW	0.6 kW	0.23 kW	0.45 kW	0.8 kW	1.2 kW
Load capacity 50% cdf[1)]	0.15 kW	0.60 kW	1.1 kW	0.31 kW	0.60 kW	1.4 kW	2.2 kW
At 25% cdf	0.2 kW	0.83 kW	1.9 kW	0.42 kW	0.83 kW	2.6 kW	3.8 kW
12% cdf	0.4 kW	1.11 kW	3.6 kW	0.58 kW	1.11 kW	4.8 kW	7.2 kW
6% cdf	0.7 kW	2.00 kW	5.7 kW	1.00 kW	2.00 kW	7.6 kW	11 kW
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)						
Resistance value R_{BW}	90 Ω ±35%	100 Ω ±10%		72 Ω ±10%		68 Ω ±10%	
Tripping current (of F16) I_F	-	1 A	2.4 A	0.6 A	1 A	3.4 A	4.2 A
Design	PTC	Flat design	Wire resistor on ceramic core	Flat design		Wire resistor on ceramic core	
Connections / Tightening torque	Cables	Cables	Ceramic terminals 2.5 mm² (AWG13) 0.5 Nm	Cables		Ceramic terminals 2.5 mm² (AWG13) 0.5 Nm	
Degree of protection	IP20	IP54	IP20 (when installed)	IP54		IP20 (when installed)	
Ambient temperature ϑ_{amb}	-20 – +40 °C						
Type of cooling	KS = self-cooling						
For MOVIDRIVE® (recommended)	0005 – 0014	0005 – 0022	0015 – 0040	0005 – 0014		0005 – 0040	0015 – 0040

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.

Braking resistor type BW...	BW147	BW247	BW347	BW039-012		
Part number	08207135	08207143	08207984	08216894		
Braking resistor type BW...-T	BW147-T	BW247-T	BW347-T	BW039-012-T	BW039-026-T	BW039-050-T
Part number	18201342	18200842	18201350	18201369	18204155	18201377
Continuous braking power (= 100% cdf)	1.2 kW	2.0 kW	4.0 kW	1.2 kW	2.6 kW	5.0 kW
Load capacity 50% cdf[1)]	2.2 kW	3.6 kW	7.2 kW	2.1 kW	4.7 kW	8.5 kW
At 25% cdf	3.8 kW	6.4 kW	12.8 kW	3.8 kW	8.3 kW	15.0 kW
12% cdf	7.2 kW	12 kW	20 kW[2)] .	7.2 kW	15.6 kW	24.0 kW[2)]
6% cdf	11 kW	19 kW	20 kW[2)]	11.4 kW	24.0 kW	24.0 kW[2)]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)					
Resistance value R_{BW}	47 Ω ±10%			39 Ω ±10%		
Tripping current (of F16) I_F	5 A	6.5 A	9.2 A	5.5 A	8.1 A	11.3 A
Design	Wire resistor on ceramic core					Grid resistor
Connections / Tightening torque	Ceramic terminals 2.5 mm² (AWG13) / 0.5 Nm BW347-T: Ceramic terminals 10 mm² (AWG8) / 1.6 Nm					M8 stud / 6 Nm
Degree of protection	IP20 (when installed)					
Ambient temperature ϑ_{amb}	-20 – +40 °C					
Type of cooling	KS = self-cooling					
For MOVIDRIVE® (recommended)	0055/0075			0110		

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value

Braking resistor type BW...	BW018-015			
Part number	08216843			
Braking resistor type BW...-T/-P	BW018-015-P	BW018-035-T	BW018-075-T	BW915-T
Part number	18204163	18201385	18201393	18204139
Continuous braking power (= 100% cdf)	1.5 kW	3.5 kW	7.5 kW	16 kW

Braking resistor type BW...	BW018-015			
Load capacity 50% cdf[1]	2.5 kW	5.9 kW	12.7 kW	27.2 kW
At 25% cdf	4.5 kW	10.5 kW	22.5 kW	48 kW
12% cdf	6.7 kW	15.7 kW	33.7 kW	62.7 kW[2]
6% cdf	11.4 kW	26.6 kW	52.2 kW[2]	62.7 kW[2]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)			
Resistance value R_{BW}	18 Ω ±10%			15 Ω ±10%
Tripping current (of F16) I_F	9.1 A	13.9 A	20.4 A	32.6 A
Design	Wire resistor on ceramic core	Grid resistor		
Connections / Tightening torque	BW018-015: -Ceramic terminals 2.5 mm² (AWG13) / 0.5 Nm BW018-015-P: Terminal 2.5 mm² (AWG13) / 1 Nm	M8 bolts/6 Nm		
Degree of protection	IP20 (when installed)			
Ambient temperature ϑ_{amb}	-20 – +40 °C			
Type of cooling	KS = self-cooling			
For MOVIDRIVE® (recommended)	0150/0220 and 2 × parallel with 0370/0450[3]			0220

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value
3) When connected in parallel, the load capacity and trip current are doubled.

Braking resistor type BW...-	BW012-025		
Part number	08216800		
Braking resistor type BW...-T/-P	BW012-025-P	BW012-050-T	BW012-100-T
Part number	18204147	18201407	18201415
Continuous braking power (= 100% cdf)	2.5 kW	5.0 kW	10 kW
Load capacity 50% cdf[1]	4.2 kW	8.5 kW	17 kW
At 25% cdf	7.5 kW	15.0 kW	30 kW
12% cdf	11.2 kW	22.5 kW	45 kW
6% cdf	19.0 kW	38.0 kW	76 kW
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)		
Resistance value R_{BW}	12 Ω ±10%		
Tripping current (of F16) I_F	14.4 A	20.4 A	28.8 A
Design	Grid resistor		
Connections / Tightening torque	M8 bolts/6 Nm		
Degree of protection	IP20 (when installed)		
Ambient temperature ϑ_{amb}	-20 – +40 °C		
Type of cooling	KS = self-cooling		
For MOVIDRIVE® (recommended)	0300		

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.

Braking resistor type BW..-T/-P	BW106-T	BW206-T	BW1.4-170	BW003-420-T
Part number	18200834	18204120	13301527	13302345
Continuous braking power (= 100% cdf)	13.5 kW	18 kW	17 kW	42 kW
Load capacity 50% cdf[1]	23 kW	30.6 kW	29 kW	71 kW
At 25% cdf	40 kW	54 kW	51 kW	126 kW
12% cdf	61 kW	81 kW	76 kW	189 kW
6% cdf	102 kW	136.8 kW	129 kW	319 kW
Resistance value R_{BW}	6 Ω ± 10%		1.4 Ω ± 10%	2.5 Ω ± 10%

Braking resistor type BW..-T/-P	BW106-T	BW206-T	BW1.4-170	BW003-420-T
Tripping current (of F16) I_F	47.4 A	54.7 A	110 A	129 A
Design	Grid resistor			
Connections / Tightening torque	M8 bolts/6 Nm		Bolt M12 / 15.5 Nm	
Degree of protection	IP20 (when installed)			
Ambient temperature ϑ_{amb}	-20 °C – +40 °C			
Type of cooling	KS = self-cooling			
For MOVIDRIVE® (recommended)	0370 – 0750 and 2 × parallel with 0900/1100/1320[2)]		1600/2000/2500	

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s
2) When connected in parallel, the load capacity and tripping current are doubled.

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6.1.6 Assignment to AC 230 V devices (...-2_3)

Braking resistor type BW...	**BW039-003**	**BW039-006**	**BW039-012**		**BW027-006**	**BW027-012**		
Part number	08216878	08216886	0821689 4		8224226	8224234		
Braking resistor type BW...-T			BW039-012-T	BW039-026-T			BW018-015-P	BW018-035-T
Part number			18201369	18204155			18204163	18201385
Continuous braking power (= 100% cdf)	0.3 kW	0.6 kW	1.2 kW	2.6 kW	0.6 kW	1.2 kW	1.5 kW	3.5 kW
Load capacity 50% cdf[1)]	0.5 kW	1.1 kW	2.1 kW	4.6 kW	1.1 kW	2.1 kW	2.5 kW	5.9 kW
At 25% cdf	1.0 kW	1.9 kW	3.8 kW	6.0 kW[2)]	1.9 kW	3.8 kW	4.5 kW	10.5 kW
12% cdf	1.8 kW	3.6 kW	6.0 kW[2)] .	6.0 kW[2)]	3.6 kW	7.2 kW	6.7 kW	13.0 kW[2)]
6% cdf	2.8 kW	5.7 kW	6.0 kW	6.0 kW[2)]	5.7 kW	8.7 kW	11.4 kW	13.0 kW[2)]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)							
Resistance value R_{BW}	39 Ω ±10%				27 Ω ±10%		18 Ω ±10%	
Tripping current (of F16) I_F	2.7 A	3.9 A	5.5 A	8.1 A	4.7 A	6.6 A	9.1 A	13.9 A
Design	Wire resistor						Grid resistor	
Connections / Tightening torque	Ceramic terminals 2.5 mm^2 (AWG12) / 0.5 Nm							M8 stud / 6 Nm
Degree of protection	IP20 (when installed)							
Ambient temperature ϑ_{amb}	-20 – +40 °C							
Type of cooling	KS = self-cooling							
For MOVIDRIVE® (recommended)	0015/0022				0015 – 0037		2 × parallel with 0110[3)]	

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration of TD ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value
3) When connected in parallel, the load capacity and trip current are doubled.

Braking resistor type BW...-T/-P	BW018-075-T	BW915-T	BW012-025-P	BW012-050-T	BW012-100-T	BW106-T	BW206-T
Part number	18201393	18204139	18204147	18201407	18201415	18200834	18204120
Continuous braking power (= 100% cdf)	7.5 kW	15.6 kW	2.5 kW	5.0 kW	10 kW	13.5 kW	18 kW
Load capacity 50% cdf[1)]	12.7 kW	15.6 kW[2)]	4.2 kW	8.5 kW	17 kW	23 kW	30.6 kW
At 25% cdf	13.0 kW	15.6 kW[2)]	7.5 kW	15.0 kW	19.6 kW[2)]	39.2 kW[2)]	39.2 kW[2)]
12% cdf	13.0 kW[2)] .	15.6 kW[2)]	11.2 kW	19.6 kW	19.6 kW[2)]	39.2 kW[2)]	39.2 kW[2)]
6% cdf	13.0 kW[2)]	15.6 kW[2)]	19.0 kW	19.6 kW[2)]	19.6 kW[2)]	39.2 kW[2)]	39.2 kW[2)]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)						
Resistance value R_{BW}	18 Ω ±10%	15 Ω ±10%	12 Ω ±10%			6 Ω ±10%	
Tripping current (of F16) I_F	20.4 A	32.6 A	14.4 A	20.4 A	28.8 A	47.4 A	54.7 A
Design	Grid resistor						
Connections / Tightening torque	M8 stud / 6 Nm						
Degree of protection	IP20 (when installed)						
Ambient temperature ϑ_{amb}	-20 – +40 °C						
Type of cooling	KS = self-cooling						
For MOVIDRIVE® (recommended)	2 × parallel with 0110		0055/0075			0150 and 2 × parallel with 0220/0300[3)]	

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value
3) When connected in parallel, the load capacity and tripping current are doubled.

6.1.7 Technical data of BW...-T / BW...-P braking resistors

BW...-T / BW...-P	
Connection cross section for signal contact/tightening torque	1 x 2.5 mm^2/ 1 Nm
Switching capacity of the temperature switch signal contact	• DC 2 A / DC 24 V (DC11) • AC 2 A / AC 230 V (AC11)
Switch contact (NC contact)	According to EN 60730

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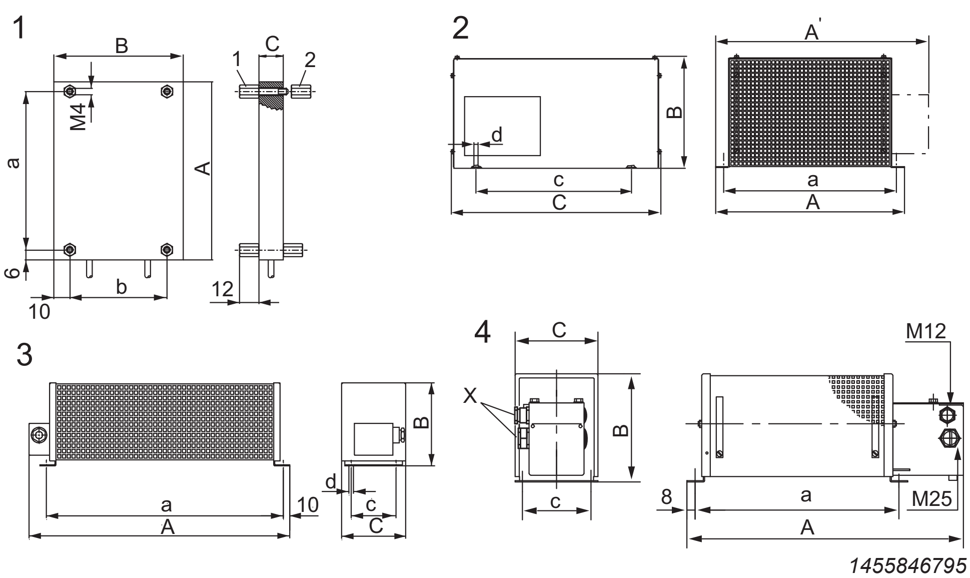
6.1.8 Dimension drawing of BW.../BW...-T/BW...-P braking resistors

The following figure shows the mechanical dimensions in mm (in).



BW... :
- 1 = Flat design
  The connection lead is 500 mm long. The scope of delivery includes 4 M4 stud bolts each of type 1 and 2.
- 2 = Grid resistor
- 3 = Wire resistor
- 4 = Wire resistor with temperature switch (-T/-P)
  Cable entry (X) is possible from both sides.

Mounting position 1

BW... type	Main dimensions in mm			Fastening parts mm			Cable gland	Mass kg
BW..-T/BW...-P	A/A'	B	C	a	b/c	d		
BW072-003	110	80	15	98	60	–	–	0.3
BW072-005	216	80	15	204	60	–	–	0.6
BW100-005	216	80	15	204	60	–	–	0.6
BW047-005	216	80	15	204	60	–	–	0.6

Mounting position 2

BW... type	Main dimensions in mm			Fastening parts mm			Cable gland	Mass kg
BW..-T/BW...-P	A/A'	B	C	a	b/c	d		
BW106-T	795	270	490	770	380	10.5	–	32
BW206-T	995	270	490	970	380	10.5	–	40
BW012-025	295	260	490	270	380	10.5	M12 + M25	8.0
BW012-025-P	295/355	260	490	270	380	10.5	M12 + M25	8.0
BW012-050-T	395	260	490	370	380	10.5	–	12
BW012-100-T	595	270	490	570	380	10.5	–	21
BW915-T	795	270	490	770	380	10.5	–	30
BW018-035-T	295	270	490	270	380	10.5	–	9.0
BW018-075-T	595	270	490	570	380	10.5	–	18.5
BW039-050-T	395	260	490	370	380	10.5	–	12
BW206-120-T	595	270	490	570	380	10.5	2×2×M8	22.0

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Mounting position 3

BW... type	Main dimensions in mm			Fastening parts mm			Cable gland	Mass kg
BW..-T/BW...-P	A/A'	B	C	a	b/c	d		
BW018-015	620	120	92	544	64	6.5	PG11	4.0
BW027-006	486	120	92	430	64	6.5	PG11	2.2
BW027-012	486	120	185	426	150	6.5	PG11	4.3
BW039-003	286	120	92	230	64	6.5	PG11	1.5
BW039-006	486	120	92	430	64	6.5	PG11	2.2
BW039-012	486	120	185	426	150	6.5	PG11	4.3
BW147	465	120	185	426	150	6.5	PG13.5	4.3
BW247	665	120	185	626	150	6.5	PG13.5	6.1
BW347	670	145	340	630	300	6.5	PG13.5	13.2
BW168	365	120	185	326	150	6.5	PG13.5	3.5
BW268	465	120	185	426	150	6.5	PG13.5	4.3

Mounting position 4

BW... type	Main dimensions in mm			Fastening parts mm			Cable gland	Mass kg
BW..-T/BW...-P	A/A'	B	C	a	b/c	d		
BW018-015-P	649	120	185	530	150	6.5	M12 + M25	5.8
BW039-012-T	549	120	185	426	150	6.5	M12 + M25	4.9
BW039-026-T	649	120	275	530	240	6.5	M12 + M25	7.5
BW147-T	549	120	185	426	150	6.5	M12 + M25	4.9
BW247-T	749	120	185	626	150	6.5	M12 + M25	9.2
BW347-T	749	210	185	630	150	6.5	M12 + M25	12.4
BW168-T	449	120	185	326	150	6.5	M12 + M25	3.6
BW268-T	549	120	185	426	150	6.5	M12 + M25	4.9
BW100-006	486	120	92	430	64	6.5	PG11	2.2
BW100-006-T	549	120	92	430	80	6.5	M12 + M25	3.0

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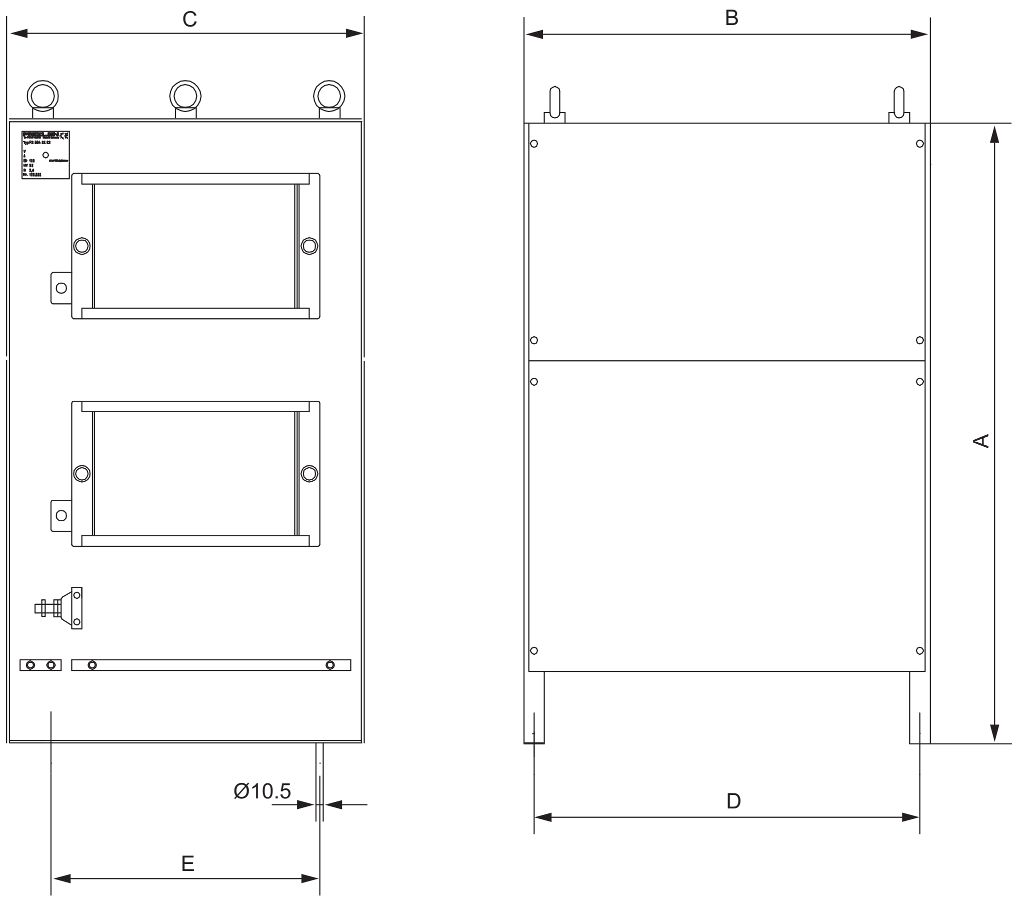
6.1.9 Dimension drawings of BW1.4-170 and BW003-420-T braking resistors

The following figure shows the mechanical dimensions in mm.



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BW... type	Main dimensions in mm					Mass kg
BW..-T/BW...-P	A	B	C	D	E	
BW1.4-170	460	795	490	770	380	51
BW003-420-T	710	995	490	970	380	93

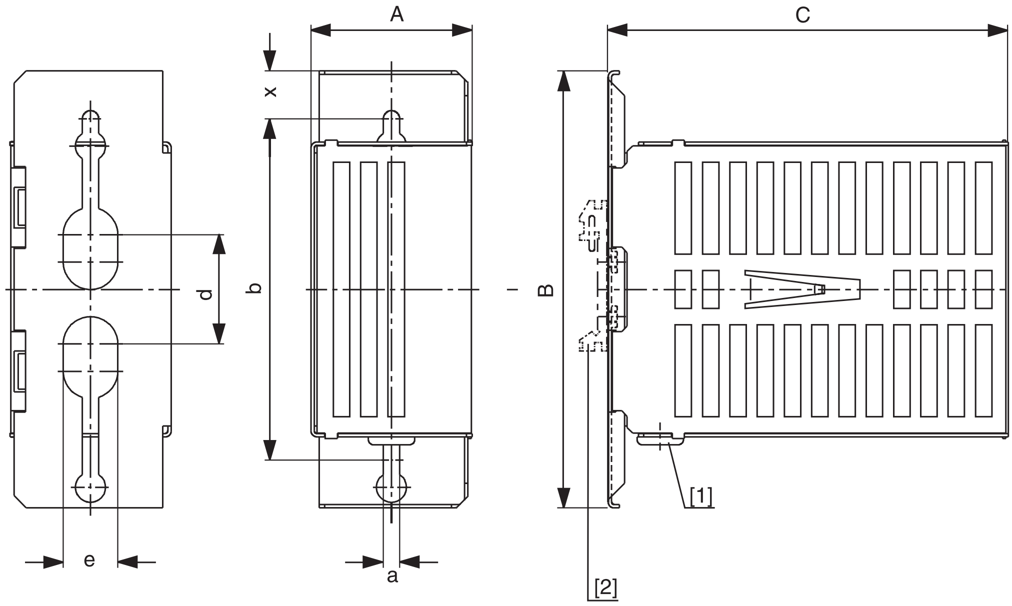
6.1.10 BS... touch guard

Description

A BS.. touch guard is available for braking resistors in flat design.

Touch guard	BS003	BS005
Part number	08131511	0813152X
for braking resistor	BW027-003 BW072-003	BW027-005 BW072-005 BW100-005

Dimension drawing for BS...



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[1] Grommet
[2] Support rail mounting

Type	Main dimensions in mm			Mounting dimensions mm					Mass kg
	A	B	C	b	d	e	a	x	
BS-003	60	160	146	125	40	20	6	17.5	0.35
BS-005	60	160	252	125	4	20	6	17.5	0.5

Mounting rail installation

A mounting rail attachment HS001 is available from SEW-EURODRIVE, part number 8221944, for mounting the touch guard on a mounting rail.

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6.1.11 DKB11A heat sink for braking resistors in flatpack design

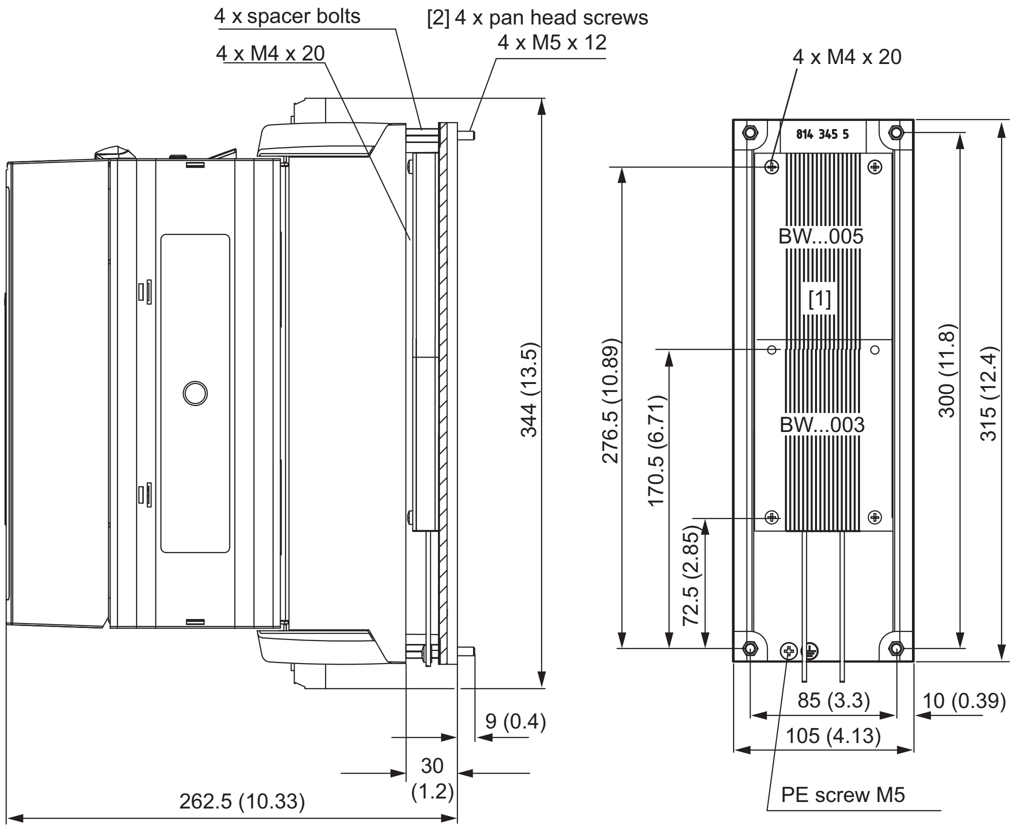
Part number

08143455

Description

The DKB11A heat sink for braking resistors in flatpack design provides a compact means for mounting the braking resistors (BW072-005, BW100 – 005) beneath MOVIDRIVE® B size 1 (400/500 V devices: 0015 – 0040; 230 V devices: 0015 – 0037). The resistor is inserted into the heat sink and attached using the supplied screws (M4 × 20).

Dimension drawing



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All dimensions in mm (in)

[1] Mounting surface for the braking resistor

[2] You need 4 × M5 × 12 screws to mount the device on the heat sink. These screws are not included in the scope of delivery.

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6.2 ND.. line chokes

Using line chokes is optional:

- To support overvoltage protection
- To smoothen the line current, to reduce harmonics
- For protection in the event of distorted line voltage
- To limit the charging current when several inverters are connected together in parallel on the input end with a shared line contactor (nominal current of line choke = total of inverter currents).

ND.. line chokes have cRUus approval independent of the inverter.

Use is required under the following circumstances:

- When operating 5 or more inverters that are switched on simultaneously. The line choke limits overvoltages caused by the switching.

The following use is recommended:

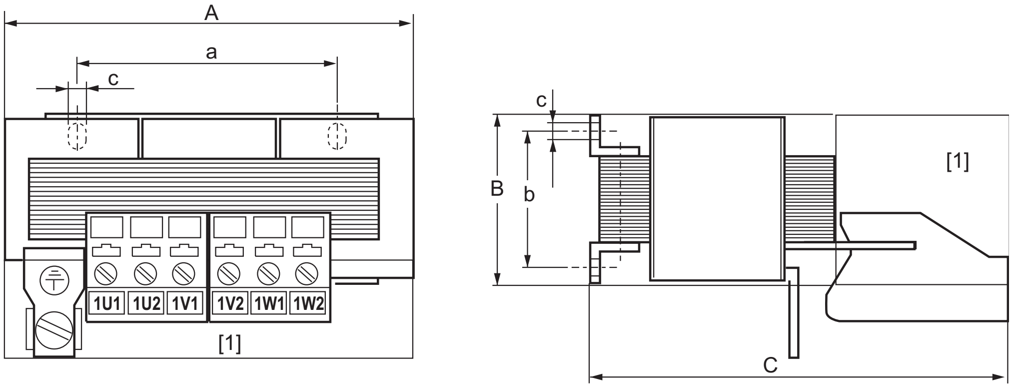
- In supply systems with many switching elements such as regenerative power supply units or thyristor controllers

Line choke type	ND020-013	ND030-023[1]	ND045-013	ND085-013	ND150-013	ND200-0033	ND300-0053
Part number	08260125	08271518	08260133	08260141	08255482	08265798	08277214
Nominal line voltage V_N (according to EN 50160)	3 × AC 380 V – 500 V, 50/60 Hz						
Rated current[2] I_N	AC 20 A	AC 30 A	AC 45 A	AC 85 A	AC 150 A	AC 200 A	AC 300 A
Power loss at I_N P_V	10 W	30 W	15 W	25 W	65 W	100 W	280 W
Inductance L_N	0.1 mH	0.2 mH	0.1 mH	0.1 mH	0.1 mH	0.03 mH	0.05 mH
Ambient temperature ϑ_{amb}	-25 – +45 °C						
Degree of protection	IP00 (EN 60529)						
Connections	Terminal strips 4 mm² (AWG12)	Terminal strips 2.5 mm² – 10 mm² (AWG13 – AWG8)	Terminal strips 10 mm² (AWG8)	Terminal strips 35 mm² (AWG2)	M10 stud PE: M8 stud		M12 stud PE: 2 × M10
Tightening torque	0.6 – 0.8 Nm	max. 2.5 Nm		3.2 – 3.7 Nm	M10 stud: 10 Nm PE: 6 Nm		M12 stud: 15.5 Nm PE: 10 Nm
Assignment to AC 400/500 V devices (MDX60/61B...-5_3)							
Nominal operation (100%)	0005 – 0075	0110/0150	0110 – 0220 and MDR60A0150	0300 – 0450 and MDR60A0370	0550/0750	MDR60A 0750	0900 – 1320
Increased power (125%)	0005 – 0075	0110	0110/0150	0220 – 0370	0450 – 0750		
Assignment to AC 230 V devices (MDX61B...-2_3)							
Nominal operation (100%)	0015 – 0055	-	0075/0110	0150/0220	0300	-	-
Increased power (125%)	0015 – 0037	-	0055/0075	0110/0150	0220/0300	-	-

1) Use ND030-023 for DC link connection without regenerative power supply unit with connection type A or B

2) If more than one MOVIDRIVE® device is connected to a line choke, the total value of the rated currents of the connected devices must not exceed the nominal current of the line choke.

6.2.1 Dimension drawing for line chokes ND020.. / ND030.. / ND045.. / ND085..



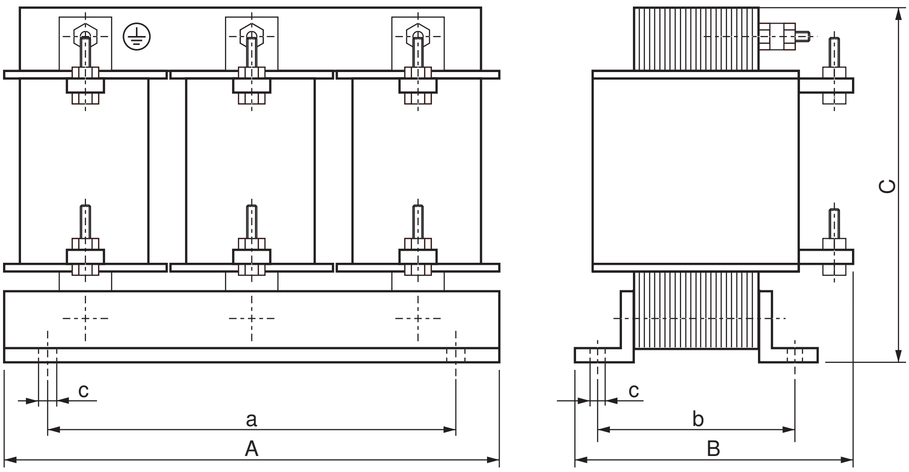
1455926923

[1] Space for installation terminals
Any mounting position

Input: 1U1, 1V1, 1W1
Output: 1U1, 1V2, 1W2

Line choke type	Main dimensions in mm			Mounting dimensions mm		Hole dimension mm	Mass
	A	B	C	a	b	c	kg
ND020-013	85	60	120	50	31 - 42	5 - 10	0.5
ND030-023 ND045-013	125	95	170	84	55-75	6	2.5
ND085-013	185	115	235	136	56 - 88	7	7

6.2.2 Dimension drawing for line chokes ND150.. / ND200.. / ND300..



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Line choke type	Connection screws	Main dimensions in mm			Mounting dimensions mm		Hole dimension mm	Mass
		A	B	C	a	b	c	kg
ND150-013	M10 × 40	255	140	230	170	77	8	17
ND200-0033	M10 × 40	250	160	230	180	98	8	15
ND300-0053	M12 × 40[1)]	300	190	295	255	145	11	35

1) Except PE: M10 × 30

6.3 NF...-... line filters

- To suppress interference emission on the line side of inverters.
- Do not switch between the NF... line filter and inverter.
- NF.. line filters have cRUus approval independent of inverter.

Line filter type	NF009-503	NF014-503	NF018-503	NF035-503	NF048-503
Part number	08274126	0827116X	08274134	08271283	08271178
Nominal line voltage V_N (according to EN 50160)	3 × AC 200 V – 500 V, 50/60 Hz				
Nominal current I_N	AC 9 A	AC 14 A	AC 18 A	AC 35 A	AC 48 A
Power loss at I_N P_V	6 W	9 W	12 W	15 W	22 W
Leakage current at V_N	< 25 mA	< 25 mA	< 25 mA	< 25 mA	< 40 mA
Ambient temperature ϑ_{amb}	-25 – +40 °C				
Degree of protection	IP20 (EN 60529)				
Connections L1-L3/L1'-L3'	4 mm² (AWG 10)			10 mm² (AWG 8)	10 mm² (AWG 8)
Tightening torque L1-L3/L1'-L3'	0.8 Nm			1.8 Nm	1.8 Nm
Connection PE	M5 stud			M5 stud	M6 stud
Tightening torque PE	3.4 Nm			3.4 Nm	5.5 Nm
Assignment to AC 400/500 V devices (MDX60/61B...-5_3)					
Nominal operation (100%)	0005 – 0040	0055/0075	-	0110/0150	0220
Increased power (125%)	0005 – 0030	0040/0055	0075	0110	0150
Assignment to AC 230 V devices (MDX61B...-2_3)					
Nominal operation (100%)	0015/0022	0037	-	0055/0075	0110
Increased power (125%)	0015	0022	0037	0055/0075	-

Line filter type	NF063-503	NF085-503	NF115-503	NF150-503	NF210-503
Part number	08274142	08274150	08274169	08274177	08274185
Nominal line voltage V_N (according to EN 50160)	3 × AC 200 V – 500 V, 50/60 Hz				
Nominal current I_N	AC 63 A	AC 85 A	AC 115 A	AC 150 A	AC 210 A
Power loss at I_N P_V	30 W	35 W	60 W	90 W	150 W
Leakage current at V_N	< 30 mA	< 30 mA	< 30 mA	< 30 mA	< 40 mA
Ambient temperature ϑ_{amb}	-25 – +40 °C				
Degree of protection	IP20 (EN 60529)				
Connections L1-L3/L1'-L3'	16 mm² (AWG 6)	35 mm² (AWG 2)	50 mm² (AWG1/0)	50 mm² (AWG1/0)	95 mm² (AWG4/0)
Tightening torque L1-L3/L1'-L3'	4 Nm	4.5 Nm	6 Nm	6 Nm	12 Nm
Connection PE	M6	M8	M10	M10	M10
Tightening torque PE	3.9 Nm	9 Nm	17 Nm	17 Nm	17 Nm
Assignment to AC 400/500 V devices (MDX60/61B...-5_3)					
Nominal operation (100%)	0300	0370/0450	0550	0750	0900/1100
Increased power (125%)	0220	0300/0370	0450	0550/0750	0750/0900
Assignment to AC 230 V devices (MDX61B...-2_3)					
Nominal operation (100%)	0150	0220	0300	-	-
Increased power (125%)	0110/0150	-	0220/0300	-	-

Line filter type	NF300-503	NF600-503
Part number	08274193	17963389
Nominal line voltage V_N (according to EN 50160)	3 × AC 380 V – 500 V, 50/60 Hz	
Nominal current I_N	AC 300 A	AC 600 A
Power loss at I_N P_V	180 W	44 W
Leakage current at V_N	< 45 mA	< 6 mA
Ambient temperature ϑ_{amb}	-25 – +40 °C	
Degree of protection	IP20 (EN 60529)	IP00 (EN 60529)

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Line filter type	NF300-503	NF600-503
Connections L1-L3/L1'-L3'	150 mm^2 (AWG300-2)	Connection rail with bore for M12 Max. 2 × 240 mm^2
Tightening torque L1-L3/L1'-L3'	20 Nm	70 Nm
Connection PE	M12	M12
Tightening torque PE	17 Nm	36 Nm
Assignment to AC 400/500 V devices (MDX60/61B...-5_3)		
Nominal operation (100%)	1320/1600	2000/2500
Increased power (125%)	1100/1320	1600/2000/2500
Assignment to AC 230 V devices (MDX61B...-2_3)		
Nominal operation (100%)	-	-
Increased power (125%)	-	-

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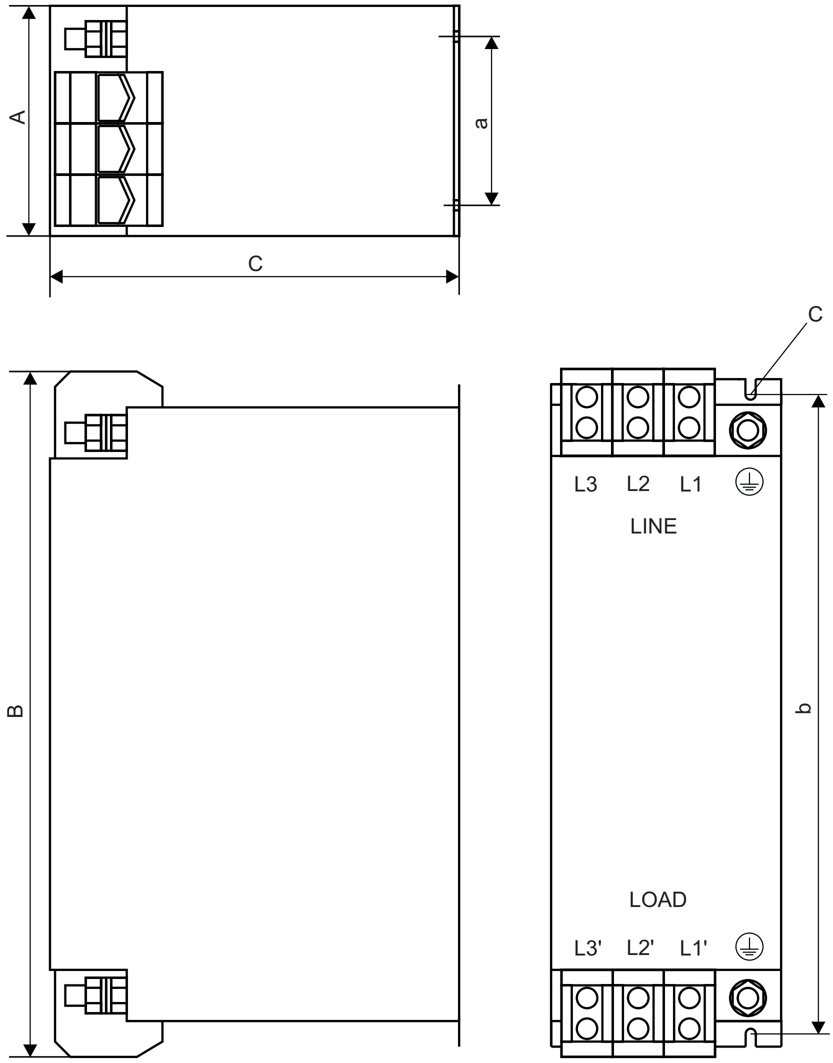
6.3.1 Dimension drawing of NF009-503 – NF300-503 line filter



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Any mounting position

<table>
<tr><th rowspan="2">Line filter type</th><th colspan="3">Main dimensions in mm</th><th colspan="2">Mounting dimensions mm</th><th>Hole dimension mm</th><th rowspan="2">PE connection</th><th>Mass</th></tr>
<tr><th>A</th><th>B</th><th>C</th><th>a</th><th>b</th><th>c</th><th>kg</th></tr>
<tr><td>NF009-503</td><td rowspan="2">55</td><td>195</td><td rowspan="3">80</td><td rowspan="3">20</td><td>180</td><td rowspan="5">5.5</td><td rowspan="4">M5</td><td>0.8</td></tr>
<tr><td>NF014-503</td><td>225</td><td>210</td><td>0.9</td></tr>
<tr><td>NF018-503</td><td>50</td><td>255</td><td>240</td><td>1.1</td></tr>
<tr><td>NF035-503</td><td rowspan="2">60</td><td>275</td><td rowspan="3">100</td><td rowspan="2">30</td><td>255</td><td>1.7</td></tr>
<tr><td>NF048-503</td><td>315</td><td>295</td><td rowspan="2">M6</td><td>2.1</td></tr>
<tr><td>NF063-503</td><td rowspan="2">90</td><td>260</td><td rowspan="2">60</td><td>235</td><td rowspan="5">6.5</td><td>2.4</td></tr>
<tr><td>NF085-503</td><td>320</td><td>140</td><td rowspan="3">255</td><td>M8</td><td>3.5</td></tr>
<tr><td>NF115-503</td><td rowspan="2">100</td><td rowspan="2">330</td><td rowspan="2">155</td><td rowspan="2">65</td><td rowspan="3">M10</td><td>4.8</td></tr>
<tr><td>NF150-503</td><td>5.6</td></tr>
<tr><td>NF210-503</td><td>140</td><td>450</td><td>190</td><td>102</td><td>365</td><td>8.9</td></tr>
<tr><td>NF300-503</td><td>170</td><td>540</td><td>230</td><td>125</td><td>435</td><td>M12</td><td>12.2</td></tr>
</table>

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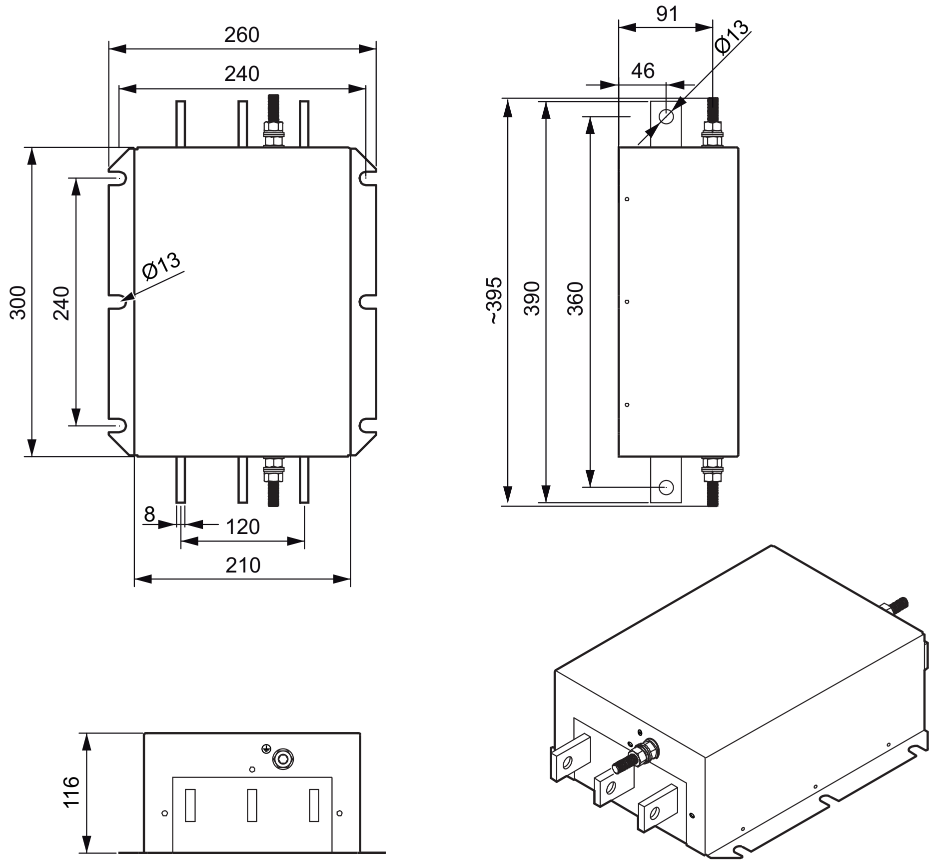
6.3.2 Dimension drawing of NF600-503 line filter



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Any mounting position

Line filter type	PE connection	Mass
		kg
NF600-503	M12	16.8

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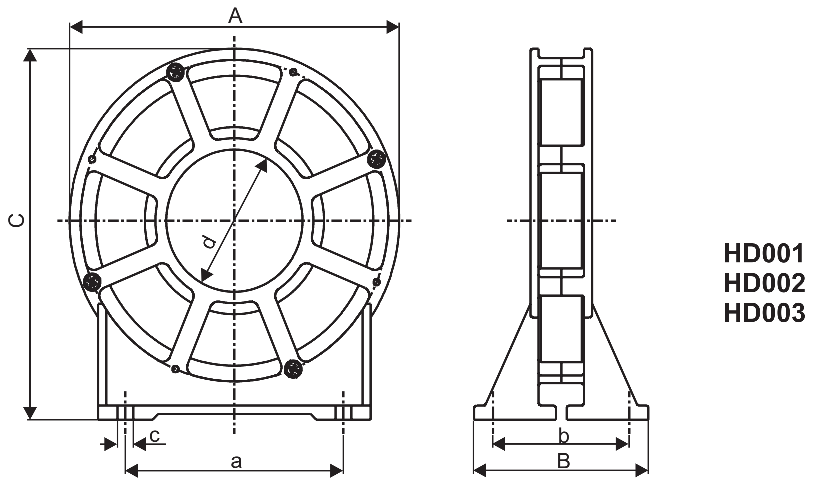
6.4 HD... output chokes

- For suppression of interference from the unshielded motor cable. For HD001 to HD003 we recommend routing the motor cable through the output choke with 5 loops. Less than 5 loops are possible if the cable has a large diameter. To make up for this, 2 or 3 output chokes should be connected in series. If you use 4 loops, connect 2 output chokes in series, and if you use 3 loops, connect 3 output chokes.
- Output chokes HD001 to HD003 are allocated using the cable cross sections of the motor cables. Consequently, there is no separate assignment table for the AC 230 V devices.
- The HD004 output choke is assigned to size 6 devices (0900 – 1320).
- The HD005 output choke is assigned to size 7 devices (1600 – 2500).

Output choke type	HD001	HD002	HD003	HD004	HD005
Part number	08133255	08135576	08135584	08168857	17963362
Maximum power loss Power loss P_{Vmax}	15 W	8 W	30 W	100 W	162
For cable cross sections/connections/ Tightening torque	1.5 – 16 mm² (AWG 16 – 6)	≤ 1.5 mm² (AWG 16)	≥ 16 mm² (AWG 6)	Terminal stud M12 36 Nm	M12 cable lugs 70 Nm PE connection M12 36 Nm
Degree of protection	-	-	-	IP10	IP00
UL/cUL approval	No UL/cUL relevant component			Yes	Yes

6.4.1 Dimension drawing HD001 – HD003

The following figure shows the mechanical dimensions in mm (in):



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Output choke type	Main dimensions in mm			Mounting dimensions mm		Inner diameter in mm	Hole dimension mm	Weight
	A	B	C	a	b	d	c	kg
HD001	121	64	131	80	50	50	5.8	0.5
HD002	66	49	73	44	38	23		0.2
HD003	170	64	185	120	50	88	7.0	1.1

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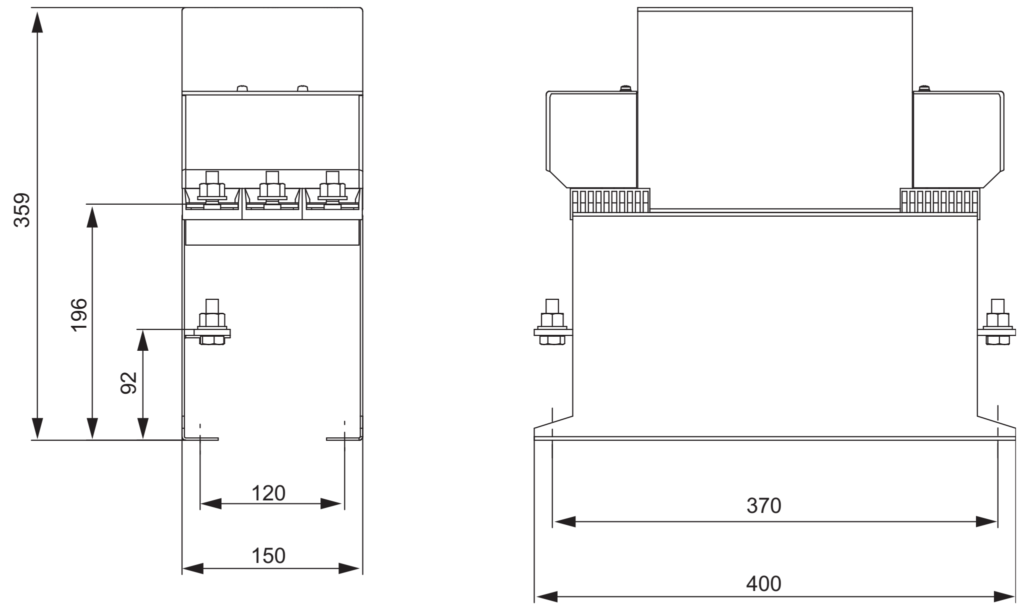
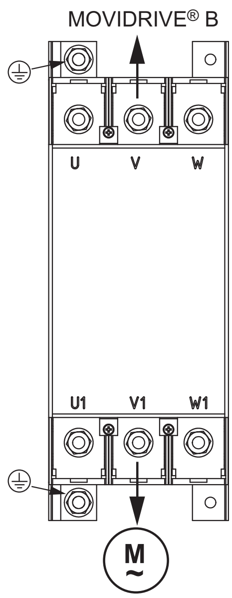
6.4.2 Dimension drawing of HD004

The following figure shows the mechanical dimensions in mm (in):





HD004

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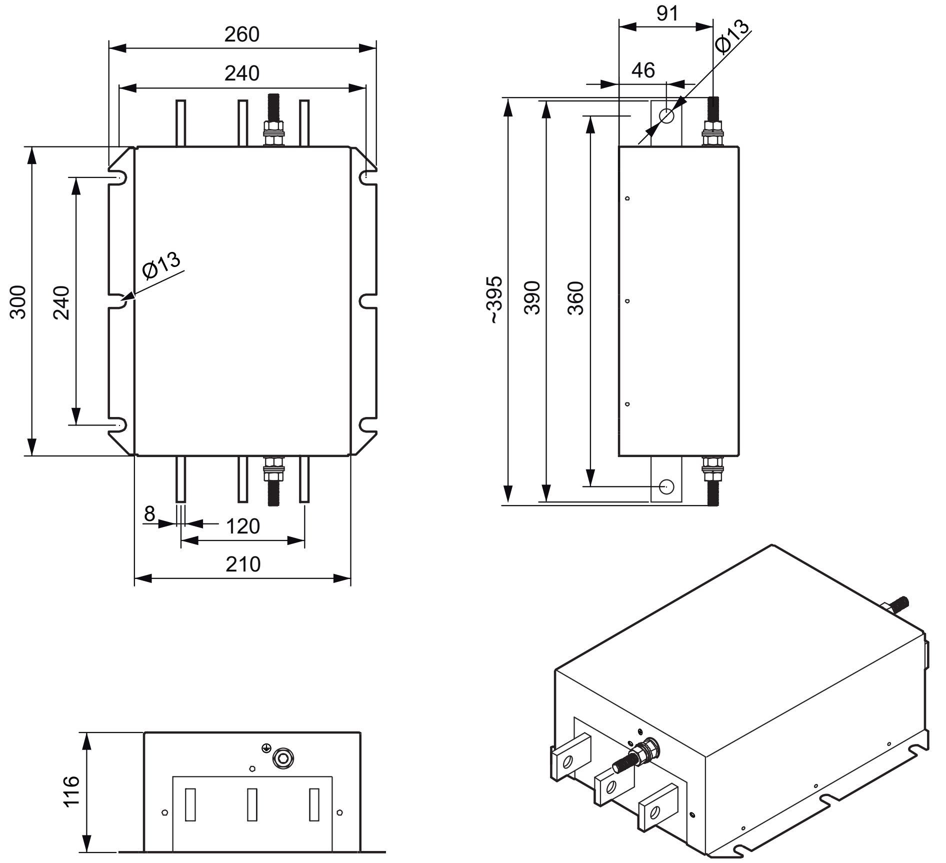
Output choke type	Main dimensions in mm			Mounting dimensions mm		Inner diameter in mm	Hole dimension mm	Mass
	A	B	C	a	b	d	c	kg
HD004	150	400	360	120	370	–	9.0	12.5

6.4.3 Dimension drawing of HD005

The following figure shows the mechanical dimensions in mm (in).



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Output choke type	PE connection	Mass
		kg
HD005	M12	16

6.5 HF... output filter

HF... output filters are sine filters used to smooth output voltage of inverters. HF... output filters (with the exception of HF450-503, HF180-403, HF325-403) are approved to UL/cUL in combination inverters.

HF... output filters are used in the following cases:

- In group drives (several motor leads in parallel); the discharge currents in the motor cables are suppressed.
- To protect the motor winding insulation of third-party motors which are not suitable for inverters.
- For protection against overvoltage peaks in long motor cables (> 100 m).

Observe the following notes:

INFORMATION

- Output filters must only be operated in V/f and VFC operating modes.
- Do not use output filters in hoist applications.
- During project planning of the drive, take the voltage drop in the output filter into account and the reduced motor torque that results. This applies particularly to AC 230 V devices with output filters.

Output filter type	**HF008-503**[1)]	**HF015-503**[1)]	**HF022-503**[1)]	**HF030-503**[1)]	**HF040-503**[1)]	**HF055-503**[1)]
Part number	0826029X	08260303	08260311	0826032X	08263116	08263124
Nominal voltage V_N	3 × AC 230 V – 500 V, 50/60 Hz[2)]					
Leakage current at V_N ΔI	0 mA					
Power loss at I_N P_V	25 W	35 W	55 W	65 W	90 W	115 W
Interference emission via unshielded motor cable	According to limit value class C1/C2 in accordance with EN 61800-3[3)]					
Ambient temperature ϑ_{amb}	0 – +45 °C (reduction: 3% I_N per K to max. 60 °C)					
Degree of protection (EN 60529)	IP20					
Connections / Tightening torque	M4 terminal stud 1.6 Nm ± 20%					
Mass	3.1 kg	4.4 kg			10.8 kg	
Assignment to AC 400/500 V devices (MDX60/61B...-5_3)						
Voltage drop at I_N ΔU	< 6.5% (7.5%) at AC 400 V / < 4% (5%) at AC 500 V with f_{Amax} = 50 Hz (60 Hz)					
Nominal through current[4)] $I_{N\ 400\ V}$ (at V_{line} = 3 × AC 400 V)	AC 2.5 A	AC 4 A	AC 6 A	AC 8 A	AC 10 A	AC 12 A
Nominal throughput current $I_{N\ 500\ V}$ (at V_{line} = 3 × AC 500 V)	AC 2 A	AC 3 A	AC 5 A	AC 6 A	AC 8 A	AC 10 A
Nominal operation (100%)[3)]	0005 – 0011	0014 / 0015	0022	0030	0040	0055
Increased power (125%)[3)]	0005	0008 / 0011	0014 / 0015	0022	0030	0040
Assignment to AC 230 V devices (MDX61B...-2_3)						
Voltage drop at I_N ΔU	-	< 18.5 % (19 %) at AC 230 V with f_{Amax} = 50 Hz (60 Hz)				
Nominal throughput current $I_{N\ 230\ V}$ (at V_{line} = 3 × AC 230 V)	AC 4.3 A	AC 6.5 A	AC 10.8 A	AC 13 A	AC 17.3 A	AC 22 A
Nominal operation (100%)[3)]	–	–	0015/0022	–	0037	0055
Increased power (125%)[3)]	–	–	0015/0022	–	–	0037

1) UL/cUL approved in combination with MOVIDRIVE® drive inverters. SEW-EURODRIVE will provide certification on request.
2) A reduction of 6% I N per 10 Hz applies above f A = 60 Hz for the nominal through current IN.
3) Observe the chapter on EMC-compliant installation according to EN 61800-3 in the SEW documentation
4) Only applies for operation without VDC link connection. For operating the inverter with VDC link connection, observe the project planning notes in the system manual of the respective inverter.

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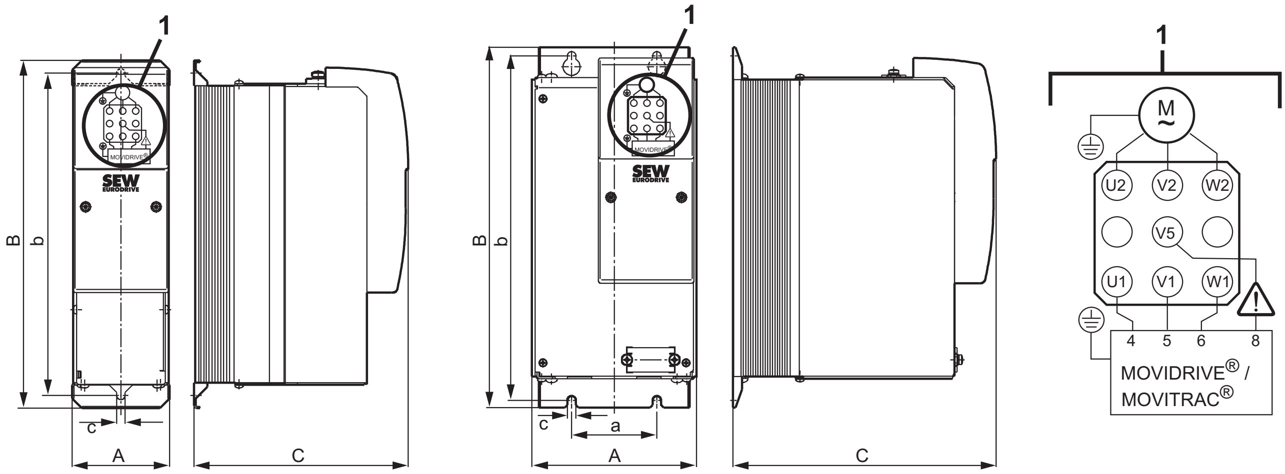
Output filter type	HF075-503[1]	HF023-403[1]	HF033-403[1]	HF047-403[1]	HF450-503	HF180-403	HF325-403
Part number	08263132	08257841	0825785X	08257868	08269483	08299099	08299102
Nominal voltage V_N	3 × AC 230 V – 500 V, 50/60 Hz[2]						
Leakage current at V_N ΔI	0 mA						
Power loss at I_N P_V	135 W	90 W	120 W	200 W	400 W	860 W	1430 W
Interference emission via unshielded motor cable	According to limit value class C1/C2 in accordance with EN 61800-3[3]						
Ambient temperature ϑ_{amb}	0 – +45 °C (reduction: 3% I_N per K to max. 60 °C)					-25 – +85 °C	
Degree of protection (EN 60529)	IP 20	IP20			IP 10	IP00	IP00
Connections / Tightening torque	M4 terminal stud 1.6 Nm ± 20 %	35 mm² (AWG 2) 3.2 Nm				M10 terminal studs / 70 mm² (AWG 3/0)30 Nm	
Mass	10.8 kg	15.9 kg	16.5 kg	23 kg	32 kg	85.3 kg	170 kg
Assignment to AC 400/500 V devices (MDX60/61B...-5_3)							
Voltage drop at I_N ΔU	< 6.5% (7.5%) at AC 400 V / < 4% (5%) at AC 500 V with f_{Amax} = 50 Hz (60 Hz)						
Nominal through current[4] $I_{N\ 400\ V}$ (at V_{line} = 3 × AC 400 V)	AC 16 A	AC 23 A	AC 33 A	AC 47 A	AC 90 A	AC 180 A	AC 325 A
(at V_{line} = 3 × AC 400 V) Nominal throughput current $I_{N\ 500\ V}$ (at V_{line} = 3 × AC 500 V)	AC 13 A	AC 19 A	AC 26 A	AC 38 A	AC 72 A	AC 180 A	AC 325 A
Nominal operation (100%)[3]	0075	0110	0150/0300[5]	0220	0370/0450/ 0550[5]/0750[5] / 0900[5]	0550/0750/0 900	1100/1320
Increased power (125%)[3]	0055	0075	0110/0220[5]	0150	0300/0370/0 450 /0550[5]/0750[5]	0550/0750	0900/1100/1 320
Assignment to AC 230 V devices (MDX61B...-2_3)							
Voltage drop at I_N ΔU	< 18.5% (19%) at AC 230 V with f_{Amax} = 50 Hz (60 Hz)						
Nominal throughput current $I_{N\ 230\ V}$ (at V_{line} = 3 × AC 230 V)	AC 29 A	AC 42 A	AC 56.5 A	AC 82.6 A	AC 156 A	–	–
Nominal operation (100%)[3]	0075	0110	0150/0300[5]	0220	0300	–	–
Increased power (125%)[3]	0055	0075	0110/0220[5]	0150	0220/0300	–	–

1) Approved to UL/cUL in combination with MOVIDRIVE® drive inverters. SEW-EURODRIVE will provide certification on request.
2) A reduction of 6% I N per 10 Hz applies above f A = 60 Hz for the nominal through current IN.
3) Observe the chapter on EMC-compliant installation according to EN 61800-3 in the SEW documentation
4) Only applies for operation without Uz connection. For operation with Uz connection, observe the project planning notes in the MOVIDRIVE® MDX60/61B system manual, section "Project Planning/Connecting the optional power components".
5) Connect two HF...-... output filters in parallel for operation with these MOVIDRIVE® devices.

6.5.1 Dimension drawings of HF...-503 output filters

The following figures show the mechanical dimensions in mm (in).

HF008/015/022/030-503 HF040/055/075-503



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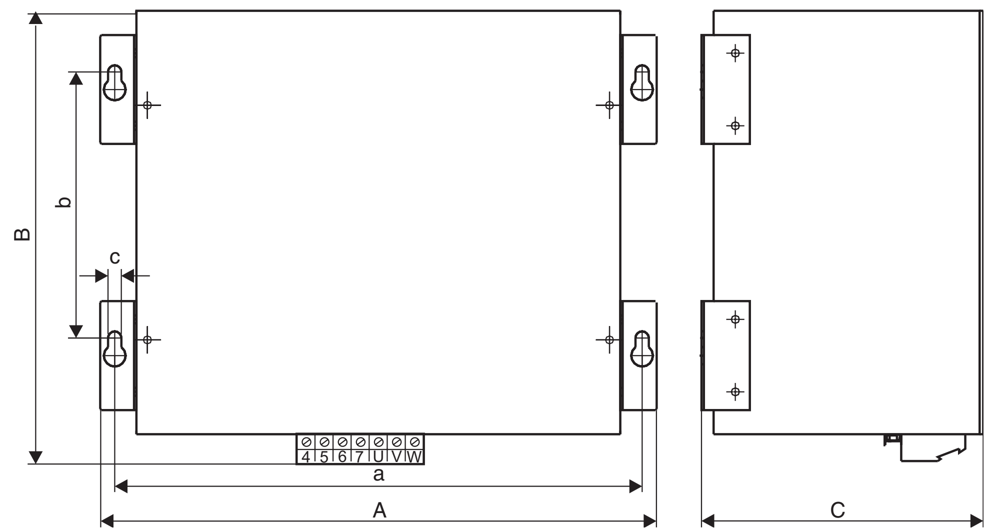
Only the mounting position shown in the dimension drawing is permitted.

Output filter type	Main dimensions in mm			Mounting dimensions mm		Hole dimension mm	Ventilation clearances[1] mm	
	A	B	C	a	b	c	Top	Bottom
HF008/015/022/030-503	80	286	176	–	265	7	100	100
HF040/055/075-503	135	296	216	70	283			

1) There is no need for clearance at the sides. You can line up the devices next to one another.

HF450-503



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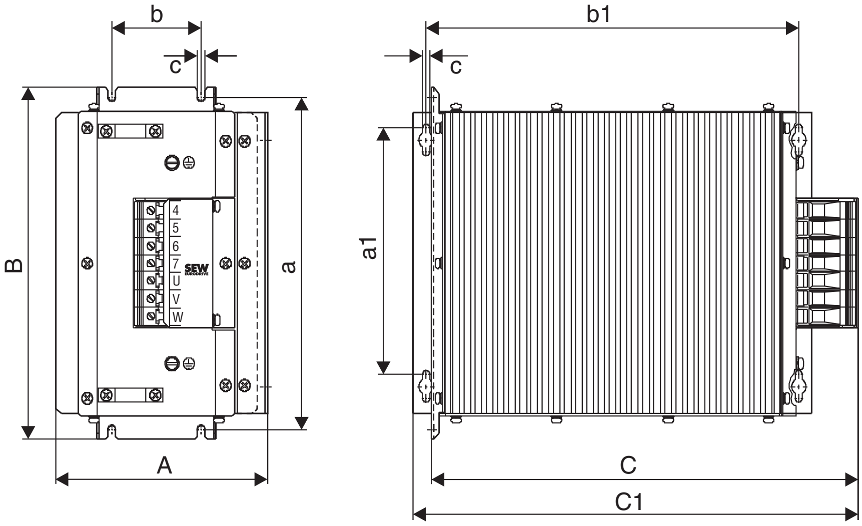
Only the mounting position shown in the dimension drawing is permitted.

Output filter type	Main dimensions in mm			Mounting dimensions mm		Hole dimension mm	Ventilation clearances mm	
	A	B	C	a	b	c	Top	Bottom
HF450-503	465	385	240	436	220	8.5	100	100

6.5.2 Dimension drawings of HF...-403 output filters

The following figures show the mechanical dimensions in mm (in).



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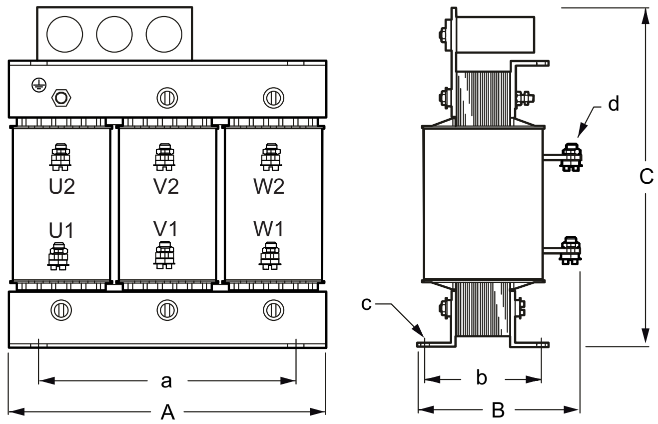
Type	Main dimensions in mm			Mounting dimensions mm				Hole dimension mm	Ventilation clearances mm		
				Standard installation		Horizontal mounting position					
	A	B	C/C1	a	b	a1	b1	c	On the side	Top	Bottom
HF023-403	145	284	365/390	268	60	210	334	6.5	30 each	150	150
HF033-403											
HF047-403	190	300	385/400	284	80						



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The ring cable lug must be attached directly to the copper clip.
Only the mounting positions depicted in the dimension drawing are permitted

Output filter type	Main dimensions in mm			Mounting dimensions mm		Hole dimension mm		Ventilation clearances mm		
	A	B	C	a	b	c	d	On the side	Top	Bottom
HF180-403	480	260	510	430	180	18 x 13	11	192 each	510	510
HF325-403	480	300	730	430	230	18 x 13	11	192 each	730	730

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7 Prefabricated cables

7.1 Overview

SEW-EURODRIVE offers cable sets and prefabricated cables for straightforward and error-free connection of various system components to MOVIDRIVE®. The cables are prefabricated in 1 m steps to the required length.

Cables from SEW-EURODRIVE can be distinguished as follows:

1. Cable sets for DC link connection
2. Motor cables and extension cables for connecting CM.. motors
3. Motor cables and extension cables for connecting CMP.. motors.
4. Connection to encoder interfaces: Encoder cable and extension cable in connector and terminal box design for motors

Depending on the cable installation, cables are available for fixed installation or cable carrier installation.

7.2 DC link connection

7.2.1 Description

SEW-EURODRIVE strongly recommends using the accessories listed in the table below. The cable sets, DC link couplings and DC link adapters provide the required dielectric strength. In addition, the cable sets are color-coded as reverse polarity and ground fault may damage the connected devices.

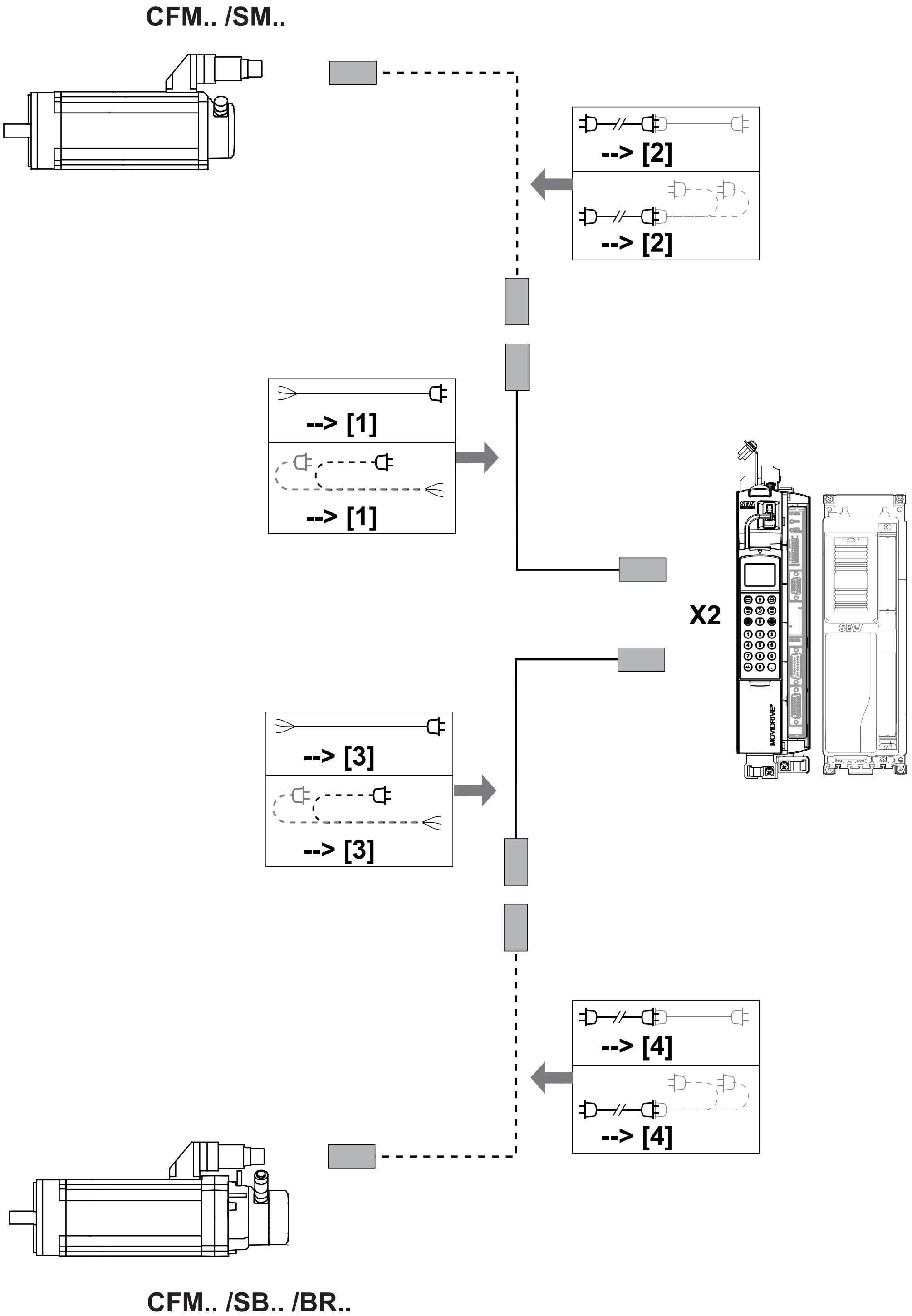
7.2.2 Assignment

The following table shows the recommended accessories for the DC link connection. Only fixed installation.

For the connection of MOVIDRIVE® MDX60B/61B/62B	Regenerative power supply units	
	MOVIDRIVE® MDR60A	MOVIDRIVE® MDR61B
0015 – 0110	DCP12A cable set Part number 08145679	DLZ31B DC link adapter Part number 18236286
0110 – 0300	DCP21A cable set Part number 18131778	
0150 – 0370	DCP13A cable set Part number 08142505	
0450 – 0750	DCP15A cable set Part number 08142513	
0900 – 1320	DCP16A cable set Part number 08175934	
1600 – 2500		DLZ11B DC link coupling "Part numbers" (→ 🗎 146)

7.3 Power cables for CFM.. motors

7.3.1 Overview



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[1] Motor cable ../SM.. (→ 🗎 178)

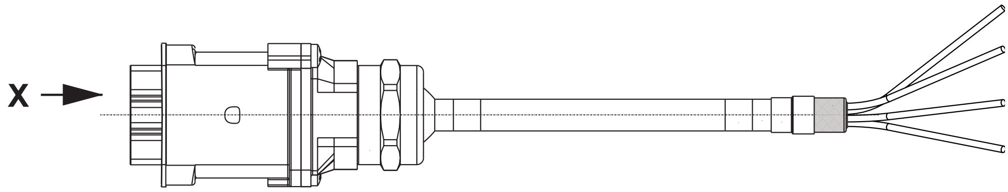
[2] Motor extension cable ../SM.. (→ 🗎 179)

[3] Brakemotor cable ../SB.. /BR (→ 🗎 180)

[4] Brakemotor extension cable ../SB.. /BR (→ 🗎 181)

7.3.2 Motor cable

Motor cable illustration



4836649099

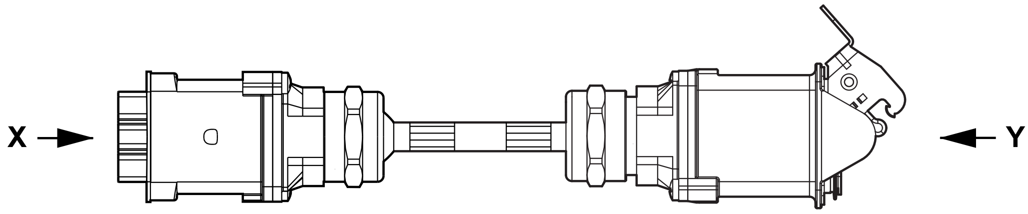
Motor cable types

The cables are equipped with a connector for motor connection and conductor end sleeves for inverter connection.

Plug connector	Number of cores and cable cross section	Part number	Installation type
SM51/SM61	4 × 1.5 mm²	01991795	Fixed installation
SM51/SM61	4 × 1.5 mm²	13331140	Cable carrier installation
SM52/SM62	4 × 2.5 mm²	01991817	Fixed installation
SM52/SM62	4 × 2.5 mm²	13331159	Cable carrier installation
SM54/SM64	4 × 4 mm²	01991833	Fixed installation
SM54/SM64	4 × 4 mm²	01991841	Cable carrier installation
SM56/SM66	4 × 6 mm²	0199185X	Fixed installation
SM56/SM66	4 × 6 mm²	01991868	Cable carrier installation
SM59/SM69	4 × 10 mm²	01991876	Fixed installation
SM59/SM69	4 × 10 mm²	01991884	Cable carrier installation

7.3.3 Motor extension cable

Illustration of motor extension cable



4838345099

Types of motor extension cables

The cables are equipped with a connector and adapter for extending the CFM.. motor cable.

Plug connector	Number of cores and cable cross section	Part number	Installation type
SM51/SM61	4 × 1.5 mm²	01995499	Fixed installation
SM51/SM61	4 × 1.5 mm²	13331183	Cable carrier installation
SM52/SM62	4 × 2.5 mm²	01995510	Fixed installation
SM52/SM62	4 × 2.5 mm²	13331191	Cable carrier installation
SM54/SM64	4 × 4 mm²	01995537	Fixed installation
SM54/SM64	4 × 4 mm²	01995545	Cable carrier installation
SM56/SM66	4 × 6 mm²	01995553	Fixed installation
SM56/SM66	4 × 6 mm²	01995561	Cable carrier installation
SM59/SM69	4 × 10 mm²	0199557X	Fixed installation
SM59/SM69	4 × 10 mm²	01995588	Cable carrier installation

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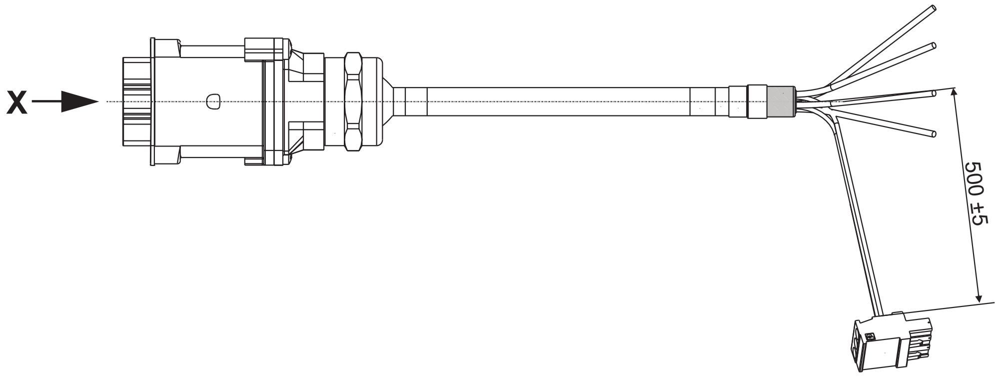
7.3.4 Brakemotor cable

Illustration of brakemotor cable



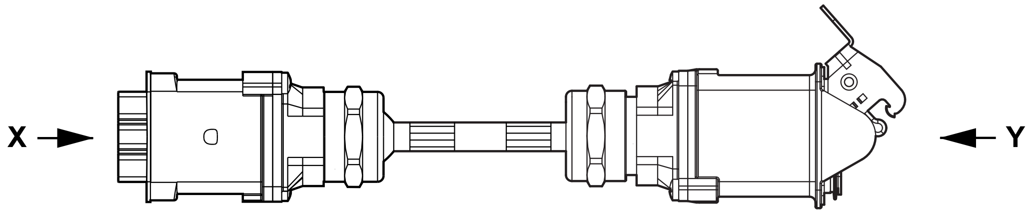
4838352907

Types of brakemotor cables

Plug connector	Number of cores and cable cross section	Part number	Installation type
SB51/SB61	4 × 1.5 mm² + 3 × 1.0 mm²	01991892	Fixed installation
SB51/SB61	4 × 1.5 mm² + 3 × 1.0 mm²	13331167	Cable carrier installation
SB52/SB62	4 × 2.5 mm² + 3 × 1.0 mm²	01991914	Fixed installation
SB52/SB62	4 × 2.5 mm² + 3 × 1.0 mm²	13331175	Cable carrier installation
SB54/SB64	4 × 4 mm² + 3 × 1.0 mm²	01991930	Fixed installation
SB54/SB64	4 × 4 mm² + 3 × 1.0 mm²	01991949	Cable carrier installation
SB56/SB66	4 × 6 mm² + 3 × 1.5 mm²	01991957	Fixed installation
SB56/SB66	4 × 6 mm² + 3 × 1.5 mm²	01991965	Cable carrier installation
SB59/SB69	4 × 10 mm² + 3 × 1.5 mm²	01991973	Fixed installation
SB59/SB69	4 × 10 mm² + 3 × 1.5 mm²	01991981	Cable carrier installation

7.3.5 Brakemotor extension cables

Illustration of brakemotor extension cable



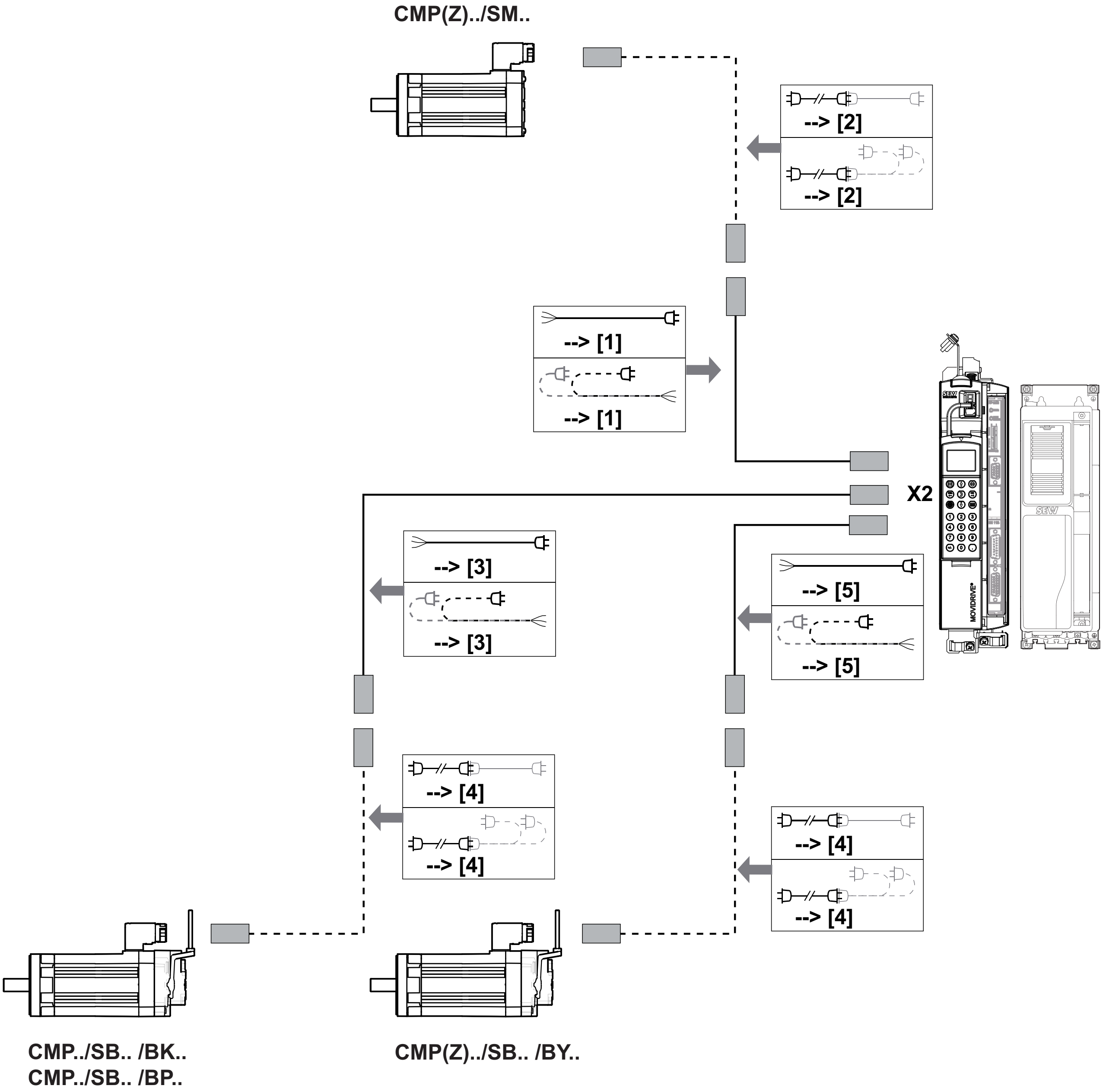
4838345099

Types of brakemotor extension cables

Plug connector	Number of cores and cable cross section	Part number	Installation type
SK51/SK61	$4 \times 1.5\ mm^2 + 3 \times 1.0\ mm^2$	0199199X	Fixed installation
SK51/SK61	$4 \times 1.5\ mm^2 + 3 \times 1.0\ mm^2$	13331205	Cable carrier installation
SK52/SK62	$4 \times 2.5\ mm^2 + 3 \times 1.0\ mm^2$	01992015	Fixed installation
SK52/SK62	$4 \times 2.5\ mm^2 + 3 \times 1.0\ mm^2$	13331213	Cable carrier installation
SK54/SK64	$4 \times 4\ mm^2 + 3 \times 1.0\ mm^2$	01992031	Fixed installation
SK54/SK64	$4 \times 4\ mm^2 + 3 \times 1.0\ mm^2$	0199204X	Cable carrier installation
SK56/SK66	$4 \times 6\ mm^2 + 3 \times 1.5\ mm^2$	01992058	Fixed installation
SK56/SK66	$4 \times 6\ mm^2 + 3 \times 1.5\ mm^2$	01992066	Cable carrier installation
SK59/SK69	$4 \times 10\ mm^2 + 3 \times 1.5\ mm^2$	01992074	Fixed installation
SK59/SK69	$4 \times 10\ mm^2 + 3 \times 1.5\ mm^2$	01992082	Cable carrier installation

7.4 Power cables for CMP.. motors

7.4.1 Overview



20705866251

[1] Motor cable ../SM.. (→ 🗎 178)

[2] Motor extension cable ../SM.. (→ 🗎 179)

[3] Brakemotor cable ../SB.. /BR (→ 🗎 180)

[4] Brakemotor extension cable ../SB.. /BR (→ 🗎 181)

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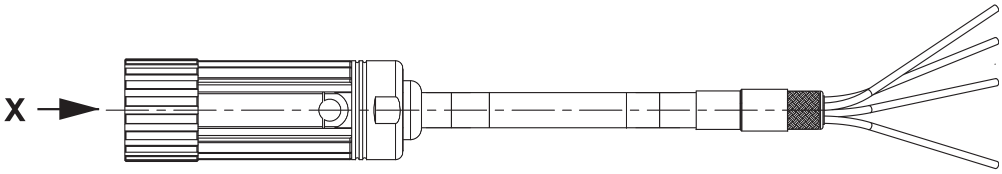
7.4.2 Motor cable with connector on motor end

Motor cable illustration

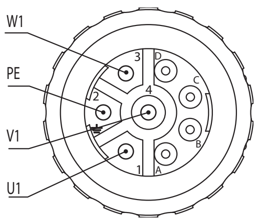


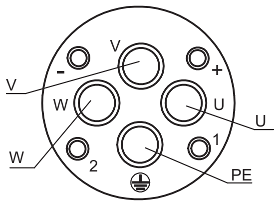
4818831115

Types of CMP.. motor cables

Plug connector	Number of cores and cable cross section	Part number	Installation type
SM11	4 × 1.5 mm²	05904544	Fixed installation
SM11	4 × 1.5 mm²	05906245	Cable carrier installation
SM12	4 × 2.5 mm²	05904552	Fixed installation
SM12	4 × 2.5 mm²	05906253	Cable carrier installation
SM14	4 × 4 mm²	05904560	Fixed installation
SM14	4 × 4 mm²	05904803	Cable carrier installation
SMB6	4 × 6 mm²	13350269	Fixed installation
SMB6	4 × 6 mm²	13350293	Cable carrier installation
SMB10	4 × 10 mm²	13350277	Fixed installation
SMB10	4 × 10 mm²	13350307	Cable carrier installation
SMB16	4 × 16 mm²	13350285	Fixed installation
SMB16	4 × 16 mm²	13350315	Cable carrier installation
SMC16	4 × 16 mm²	18148476	Fixed installation
SMC16	4 × 16 mm²	18148484	Cable carrier installation
SMC25	4 × 25 mm²	18148581	Cable carrier installation
SMC35	4 × 35 mm²	18148697	Cable carrier installation

Pin assignment of the CMP.. motor cable

Plug connector view X	Contact	Description	Core color	Core marking
SM1 	1	V	Black (BK)	
	2	Protective earth	Green-yellow (GNYE)	
	3	W	Black (BK)	
	4	V	Black (BK)	

Plug connector view X	Contact	Description	Core color	Core marking
SMB 	V	V	Black (BKWH)	V
	V	V		V
	W	W		W
	PE	Protective earth	Green-yellow (GNYE)	

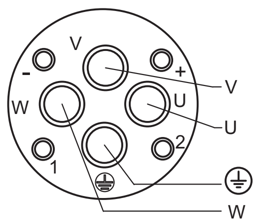
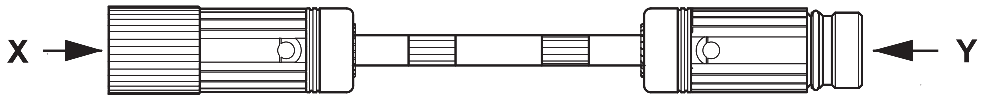
Plug connector view X	Contact	Description	Core color	Core marking
SMC 	V	V	Black (BKWH)	V
	V	V		V
	W	W		W
	PE	Protective earth	Green-yellow (GNYE)	

Illustration of motor extension cable



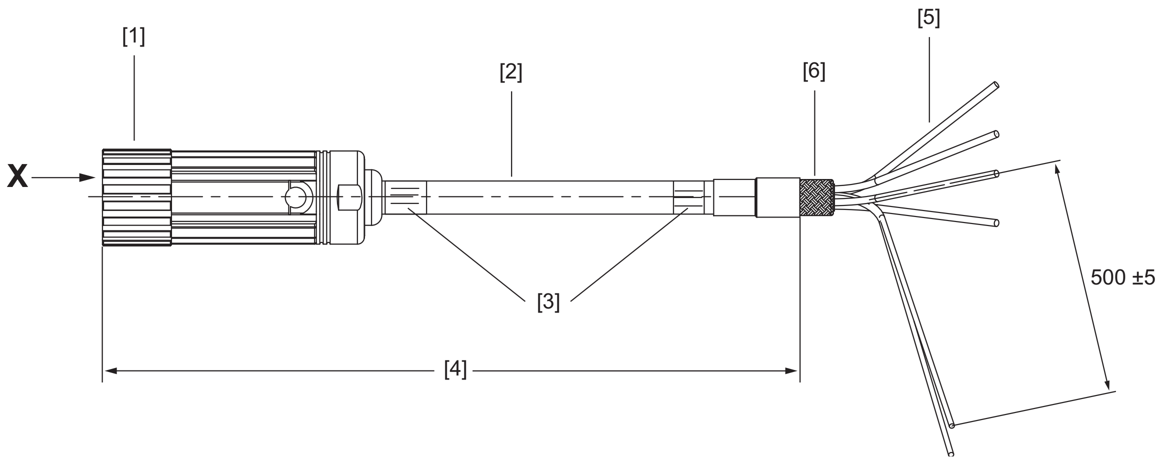
4818839179

Types of CMP.. motor extension cables

Plug connector	Number of cores and cable cross section	Part number	Installation type
SM11	4 × 1.5 mm^2	13332457	Cable carrier installation
SM12	4 × 2.5 mm^2	13332465	Cable carrier installation
SM14	4 × 4 mm^2	13332473	Cable carrier installation
SMB6	4 × 6 mm^2	13350021	Cable carrier installation
SMB10	4 × 10 mm^2	13350048	Cable carrier installation
SMB16	4 × 16 mm^2	13350056	Cable carrier installation
SMC16	4 × 16 mm^2	18156819	Cable carrier installation
SMC25	4 x 25 mm^2	18156827	Cable carrier installation
SMC35	4 x 35 mm^2	18156835	Cable carrier installation

7.4.3 Brakemotor cables for BP/BK brake with connector at motor end

Figure of CMP.. brakemotor cables



4818640779

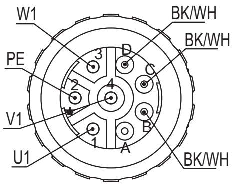
Types of CMP.. brakemotor cables

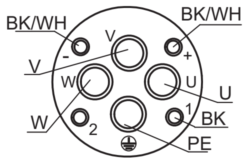
Plug connector	Number of cores and cable cross section	Part number	Installation type
SB11	4 × 1.5 mm^2 + 3 × 1 mm^2	13354345	Fixed installation
SB11	4 × 1.5 mm^2 + 3 × 1 mm^2	13354388	Cable carrier installation
SB12	4 × 2.5 mm^2 + 3 × 1 mm^2	13354353	Fixed installation
SB12	4 × 2.5 mm^2 + 3 × 1 mm^2	13354396	Cable carrier installation
SB14	4 × 4 mm^2 + 3 × 1 mm^2	13354361	Fixed installation
SB14	4 × 4 mm^2 + 3 × 1 mm^2	13421603	Cable carrier installation
SBB6	4 × 6 mm^2 + 3 × 1.5 mm^2	13350196	Fixed installation
SBB6	4 × 6 mm^2 + 3 × 1.5 mm^2	13350234	Cable carrier installation
SBB10	4 × 10 mm^2 + 3 × 1.5 mm^2	13350218	Fixed installation
SBB10	4 × 10 mm^2 + 3 × 1.5 mm^2	13350242	Cable carrier installation
SBB16	4 × 16 mm^2 + 3 × 1.5 mm^2	13350226	Fixed installation
SBB16	4 × 16 mm^2 + 3 × 1.5 mm^2	13350250	Cable carrier installation

INFORMATION

As for the power cables for brakemotors with BP/BK brake only two signal cables are required, the third signal core is cut off during cable assembly.

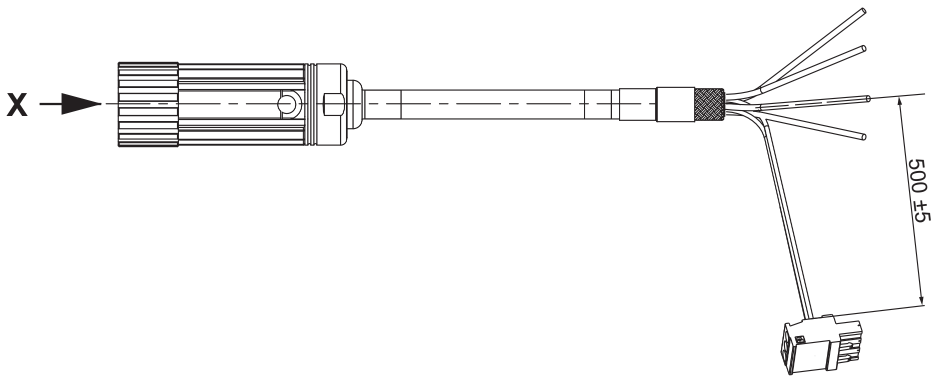
Pin assignment of CMP.. brakemotor cables

Plug connector view X	Contact	Description	Core color	Core marking
SB1 	1	V		V
	4	V	Black (BKWH)	V
	3	W		W
	2	Protective earth	Green-yellow (GNYE)	
	A	n. c.	–	
	B	n. c.	–	
	C	+	Black (BKWH)	1
	D	–		3

Plug connector view X	Contact	Description	Core color	Core marking
SBB 	V	V		V
	V	V	Black (BKWH)	V
	W	W		W
	PE	Protective earth	Green-yellow (GNYE)	
	–	–	Black (BKWH)	3
	+	+		1
	1	n. c.	–	
	2	n. c.	–	

7.4.4 Brakemotor cables for BY brake with connector at motor end

Figure of CMP.. brakemotor cables



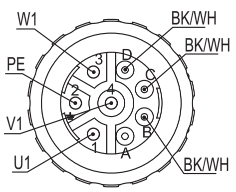
14824163467

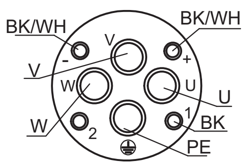
Types of CMP.. brakemotor cables

Plug connector	Number of cores and cable cross section	Part number	Installation type
SB11	4 × 1.5 mm^2 + 3 × 1 mm^2	13354272	Fixed installation
SB11	4 × 1.5 mm^2 + 3 × 1 mm^2	13354302	Cable carrier installation
SB12	4 × 2.5 mm^2 + 3 × 1 mm^2	13354280	Fixed installation

Plug connector	Number of cores and cable cross section	Part number	Installation type
SB12	4 × 2.5 mm² + 3 × 1 mm²	13354310	Cable carrier installation
SB14	4 × 4 mm² + 3 × 1 mm²	13354299	Fixed installation
SB14	4 × 4 mm² + 3 × 1 mm²	13354329	Cable carrier installation
SBB6	4 × 6 mm² + 3 × 1.5 mm²	13350129	Fixed installation
SBB6	4 × 6 mm² + 3 × 1.5 mm²	13350153	Cable carrier installation
SBB10	4 × 10 mm² + 3 × 1.5 mm²	13350137	Fixed installation
SBB10	4 × 10 mm² + 3 × 1.5 mm²	13350161	Cable carrier installation
SBB16	4 × 16 mm² + 3 × 1.5 mm²	13350145	Fixed installation
SBB16	4 × 16 mm² + 3 × 1.5 mm²	13350188	Cable carrier installation
SBC16	4 × 16 mm² + 3 × 1.5 mm²	18148514	Fixed installation
SBC16	4 × 16 mm² + 3 × 1.5 mm²	18148522	Cable carrier installation

Pin assignment of CMP.. brakemotor cables

Plug connector view X	Contact	Description	Core color	Core marking
SB1 	1	V	Black (BKWH)	V
	4	V		V
	3	W		W
	2	Protective earth	Green-yellow (GNYE)	
	A	n. c.	–	
	B	2	Black (BKWH)	2
	C	1		1
	D	3		3

Plug connector view X	Contact	Description	Core color	Core marking
SBB 	V	V	Black (BKWH)	V
	V	V		V
	W	W		W
	PE	Protective earth	Green-yellow (GNYE)	
	–	15	Black (BKWH)	15
	+	13		13
	1	14		14
	2	n.c.	–	

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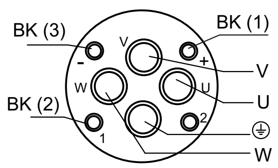
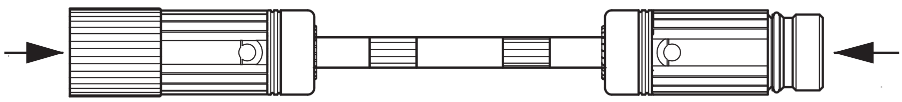
Plug connector view X	Contact	Description	Core color	Core marking
	V	V	Black (BKWH)	V
	V	V		V
	W	W		W
	PE	Protective earth	Green-yellow (GNYE)	
	–	15	Black (BKWH)	15
	+	13		13
	1	14		14
	2	n.c.	–	

7.4.5 Extension cables BP/BK and BY brakes

Illustration of brakemotor extension cable



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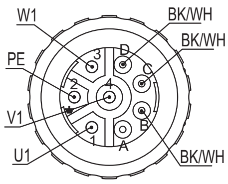
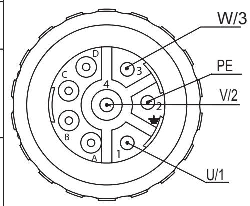
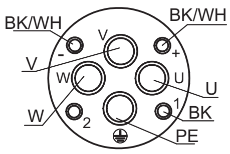
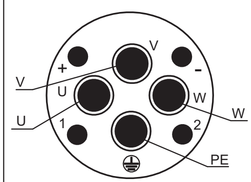
Types of CMP.. brakemotor extension cables

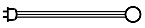
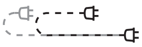
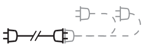
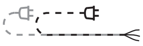
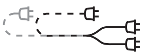
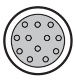
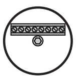
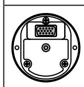
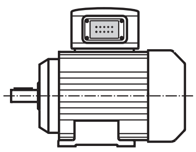
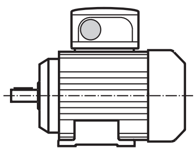
Plug connector	Number of cores and cable cross section	Part number	Installation type
SB11	4 × 1.5 mm^2 + 3 × 1 mm^2	13354221	Cable carrier installation
SB12	4 × 2.5 mm^2 + 3 × 1 mm^2	13354248	Cable carrier installation
SB14	4 × 4 mm^2 + 3 × 1 mm^2	13354337	Cable carrier installation
SBB6	4 × 6 mm^2 + 3 × 1.5 mm^2	13350099	Cable carrier installation
SBB10	4 × 10 mm^2 + 3 × 1.5 mm^2	13350102	Cable carrier installation
SBB16	4 × 16 mm^2 + 3 × 1.5 mm^2	13350110	Cable carrier installation
SBC16	4 × 16 mm^2 + 3 × 1.5 mm^2	18156843	Cable carrier installation

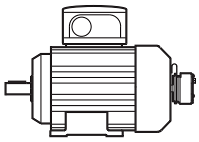
Pin assignment of the CMP.. brakemotor extension cable

<table>
<tr><th>Plug connector view X</th><th>Con-tact</th><th>Cable core color</th><th>As-signed</th><th>Con-tact</th><th>Plug connector view Y</th></tr>
<tr><td rowspan="8">BSTA 078
SB1

</td><td>1</td><td rowspan="3">(BKWH)
Black with
white lettering
U, V, W</td><td>V</td><td>1</td><td rowspan="8">BKUA 199

</td></tr>
<tr><td>4</td><td>V</td><td>4</td></tr>
<tr><td>3</td><td>W</td><td>3</td></tr>
<tr><td>2</td><td>(GNYE) green/ yellow</td><td>PE</td><td>2</td></tr>
<tr><td>A</td><td>–</td><td>n. c.</td><td>A</td></tr>
<tr><td>B</td><td rowspan="3">(BKWH) Black with white letter-ing</td><td>2.</td><td>B</td></tr>
<tr><td>C</td><td>1</td><td>C</td></tr>
<tr><td>D</td><td>3</td><td>D</td></tr>
<tr><td>CSTA 264
SBB

</td><td colspan="4"></td><td>CKUA 268

</td></tr>
</table>

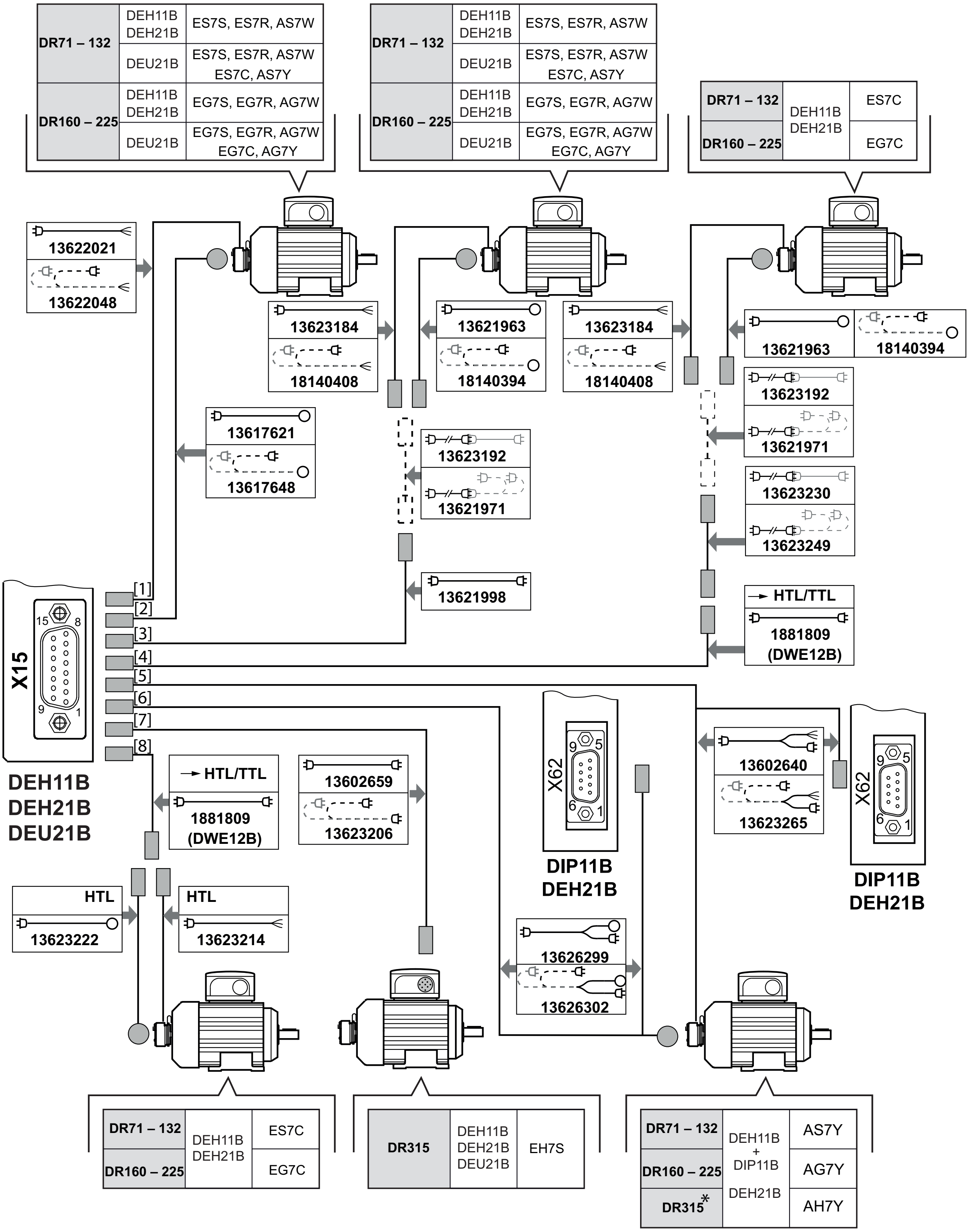
7.5 Encoder cable selection: Meaning of the icons

The connection cables are assigned a part number and an icon. The icons have the following meaning:

Icon	Meaning
	Connection cable connector → connector for fixed installation
	Extension connection cable connector → connector for fixed installation
	Connection cable (litz wire) connector → encoder connection cover for fixed installation
	Connection cable connector → connector for cable carrier installation
	Extension connection cable connector → connector for cable carrier installation
	Connection cable connector → terminal box for fixed installation
	Connection cable connector → terminal box for cable carrier installation
	Connection cable connector → Y connector for fixed installation
	Connection cable connector → Y connector for cable carrier installation
	Connection cable connector → connector with crossed A/B track for reversing the direction of rotation (for fixed installation)
	Connection cable connector → encoder connection cover for fixed installation
	Connection cable connector → encoder connection cover for cable carrier installation
	Encoder connection via plug connector
	Encoder connection via encoder terminal strip
	Encoder connection via encoder connection cover
	Connection via plug connector on the motor side
	Connection via terminal box on the motor side

Icon	Meaning
	Connection via encoder connection cover on the motor side

7.6 Encoder cable for DR.. motors on X15 DEH11B/DEH21B/DEU21B



18014401211105035

*)Only use encoder cables with litz wires 13602640 or 13623265.

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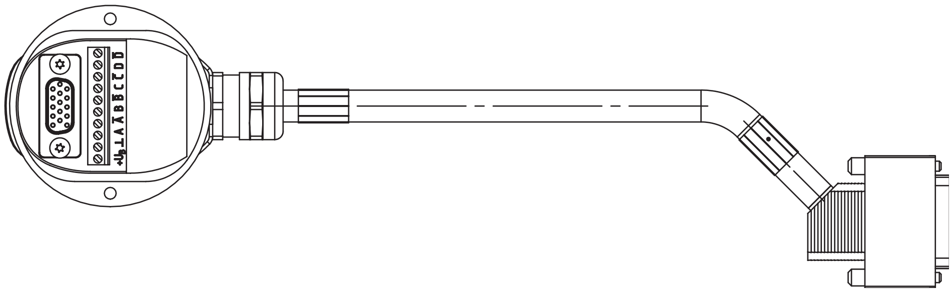
For the individual wiring diagrams, refer to chapter "Installation" in the "MOVIDRIVE® MDX60B/61B" operating instructions.

7.6.1 Required prefabricated cables

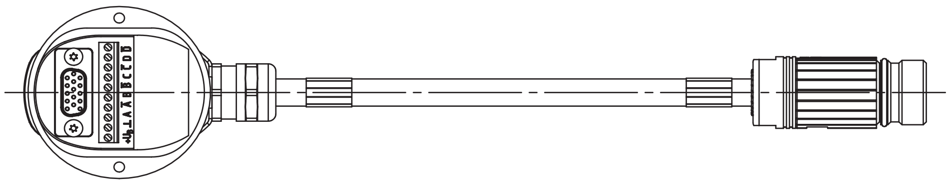
- Part number: 13617621 or 13617648
- Cable with D-sub 15 plug connector and encoder connection cover



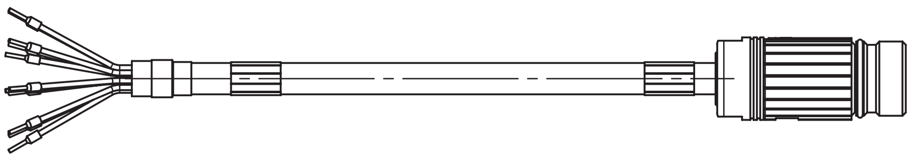
2047431819

- Part number 13622021 or 13622048
- Cable with D-sub 15 plug connector and conductor end sleeves:

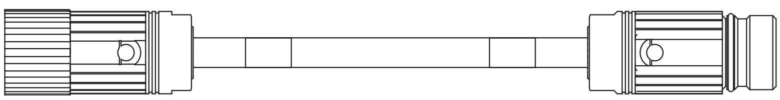
- Part number: 13621963
- Cable with encoder connection cover and M23 plug connector:



- Part number: 13623184
- Cable with conductor end sleeves and M23 plug connector:



- Part number: 13623192 or 13621971
- Optional: Extension cable with M23 plug connector on both sides:



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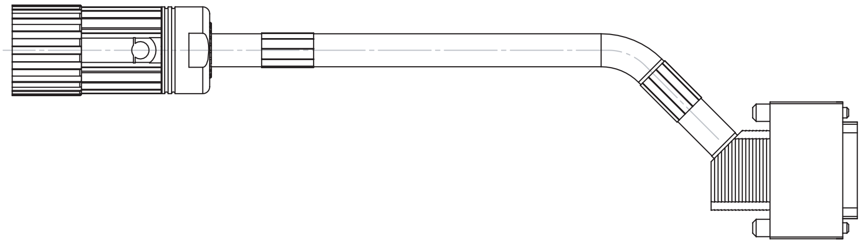
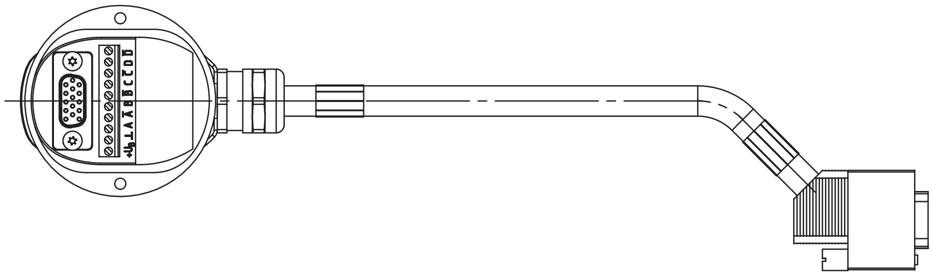
- Part number: 13621998
- Cable with M23 plug connector and D-sub 15 plug connector:



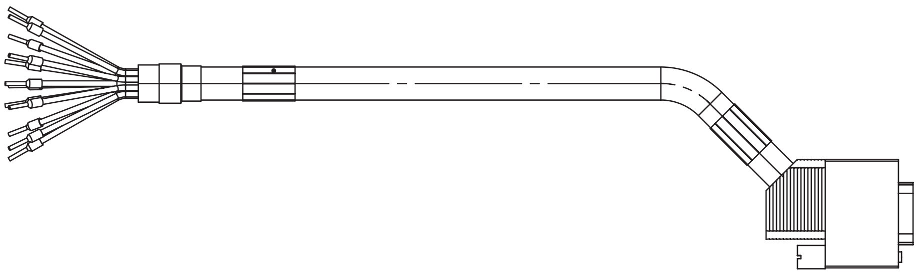
2047504139

- Part number: 13623222
- Cable with D-sub 9 plug connector and encoder connection cover:



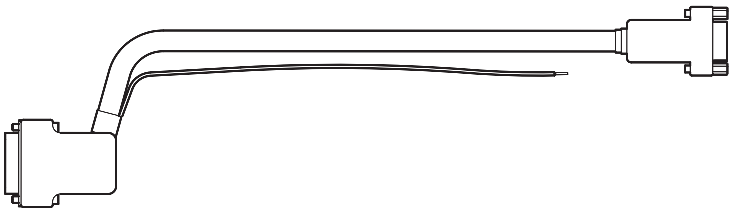
2047505803

- Part number: 13623214
- Cable with D-sub 9 plug connector and conductor end sleeves:



2047507467

- Part number 01881809
- DWE12B option, interface adapter HTL→ TTL (length: 1 m):



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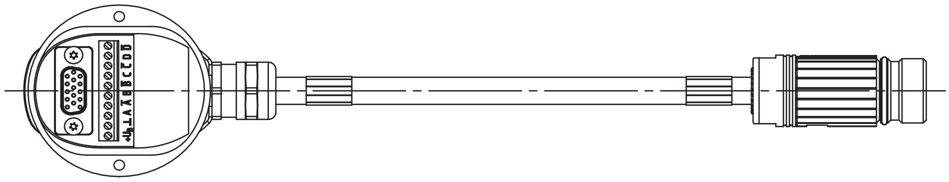
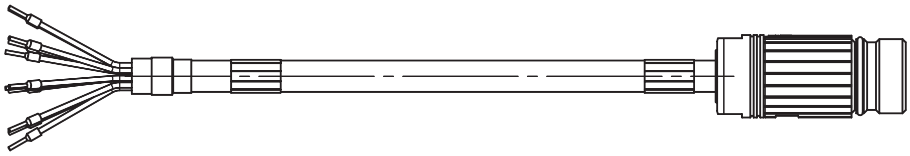
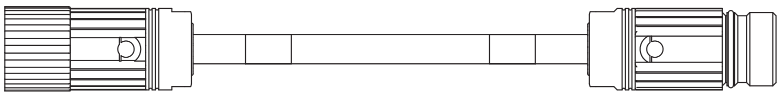
- Part number: 13621963
- Option 1: Cable with encoder connection cover and M23 plug connector:



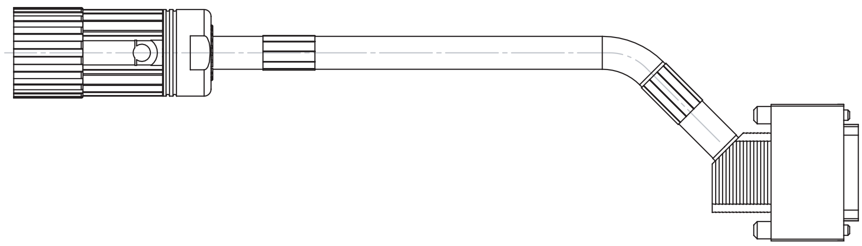
- Part number: 13623184
- Cable with M23 plug connector and conductor end sleeves:



- Part number: 13621971
- Extension cable with M23 plug connector on both sides:

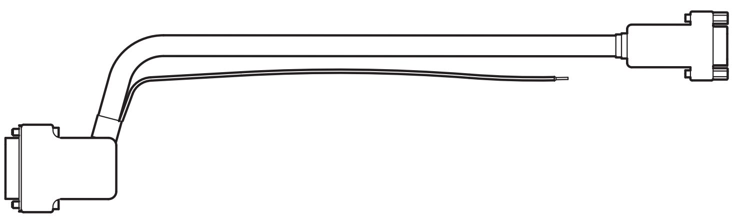


- Part number: 13623230 or 13623249
- Extension cable with M23 plug connector and D-sub 9 plug connector:

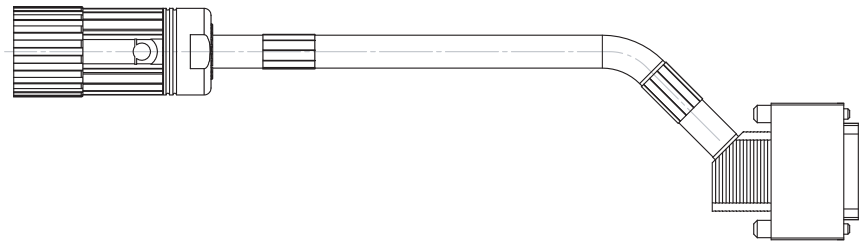


2047504139

- Part number: 01881809
- DWE12B option, interface adapter HTL→ TTL (length: 1 m):

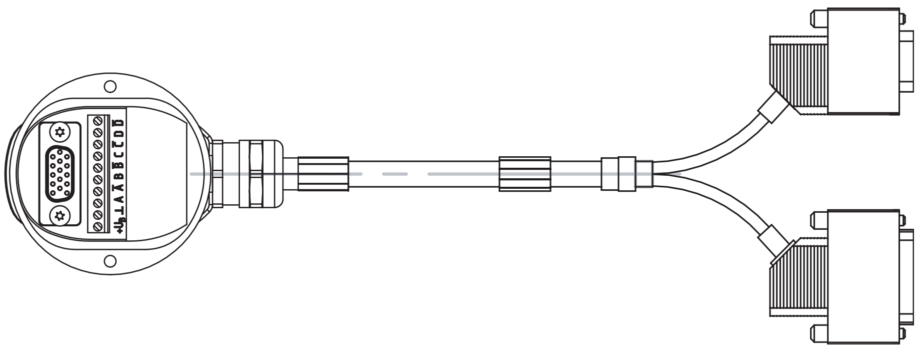


- Part number: 13602659 or 13623206
- Cable with M23 plug connector and D-sub 15 plug connector:



2047504139

- Part number: 13626299 or 13626302
- Option 1: Y-cable with D-sub 15 plug connector, D-sub 9 plug connector and encoder connection cover:



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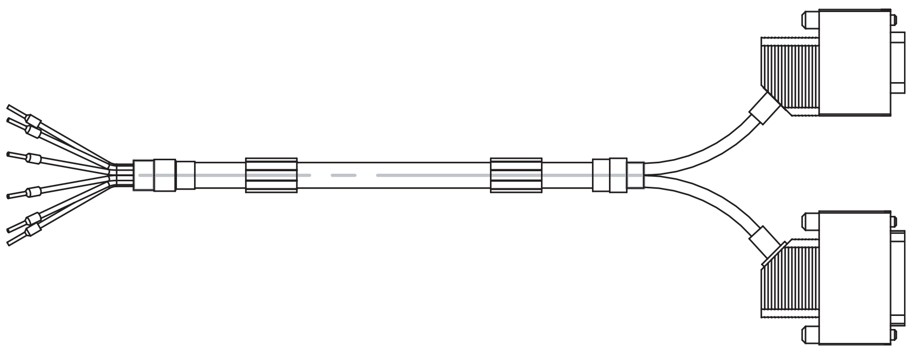
- Part number: 13602640 or 13623265
- Option 2: Y-cable with D-sub 15 plug connector, D-sub 9 plug connector and conductor end sleeves:



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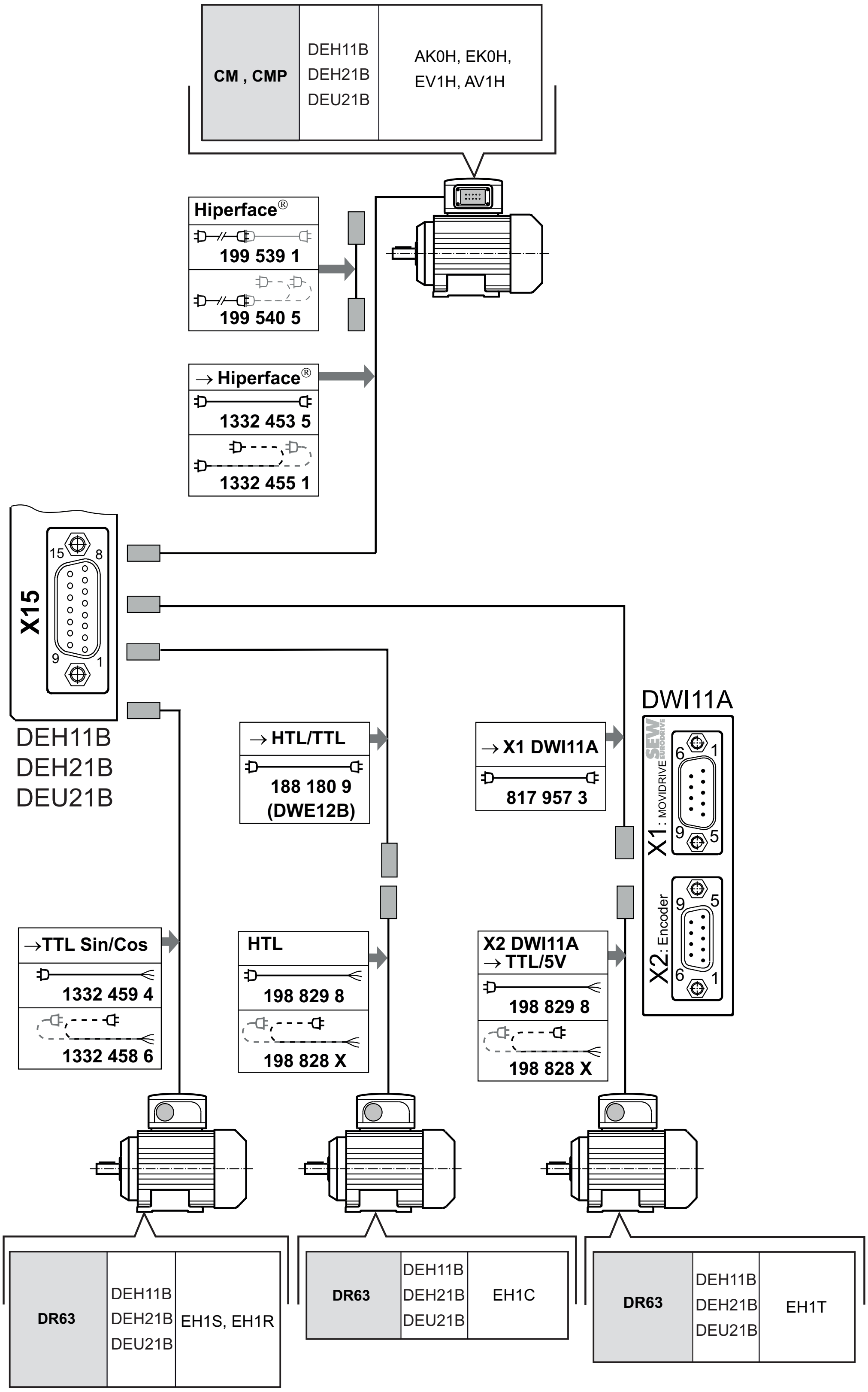
7.7 Encoder cable for CMP.., CM.., motors on X15 DEH11B/DEH21B and DEU21B



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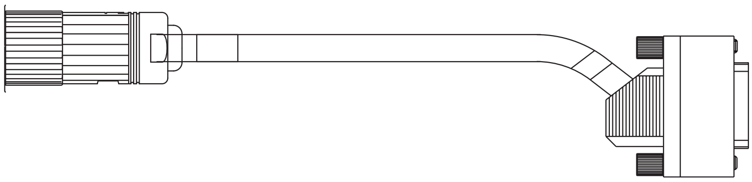
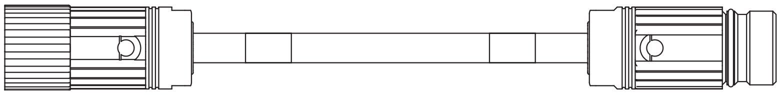
For the individual wiring diagrams, refer to chapter "Installation" in the "MOVIDRIVE® MDX60B/61B" operating instructions. When combining SSI or HTL encoders with the DEU21B multi-encoder card, refer to the "MOVIDRIVE® DEU21B Multi-Encoder Card" manual.

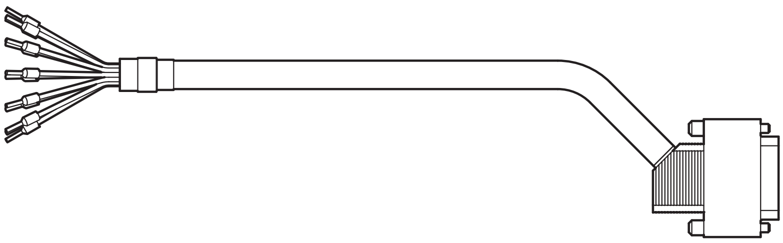
- Part number: 13324535 or 13324551
- Cable for encoder connection with plug connector on motor side.



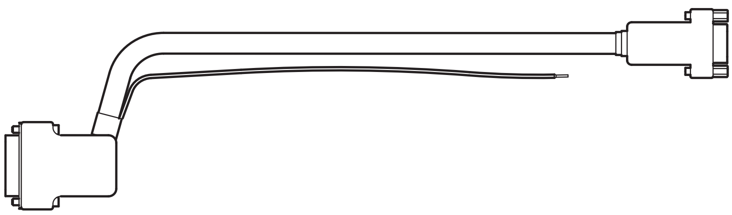
- Part number: 01995391 or 01995405
- Extension cable for encoder connection with plug connector on motor side.



- Part number: 13324594 or 13324586
- Cable for encoder connection with terminal box connection on the motor side.



- Part number: 01881809
- Cable (option DWE12B, interface adapter HTL → TTL) to connect push-pull HTL encoders at X15 of the DEH11B/21B option (→ chapter "DWE11B/12B interface adapter option").



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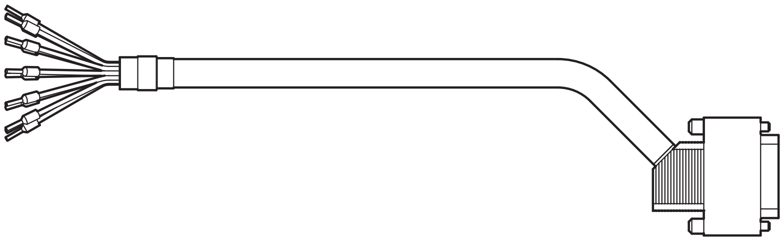
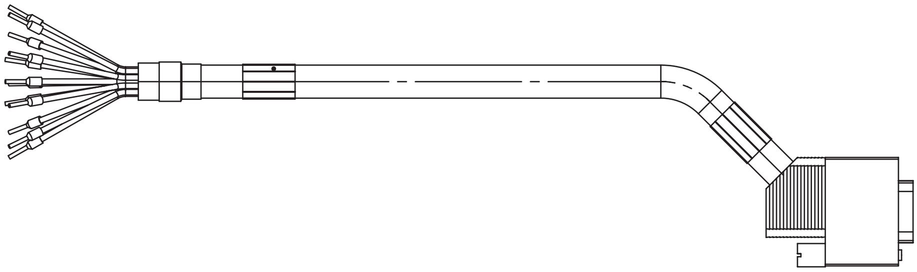
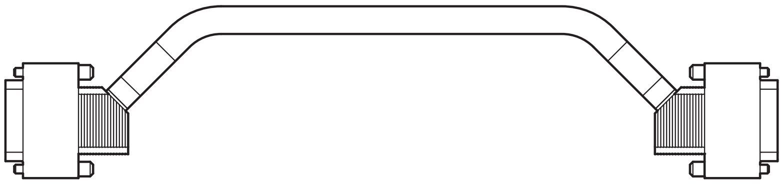
- Part number: 01988298 or 0198828X
- Cable for push-pull HTL encoder connection with terminal box connection on motor side.



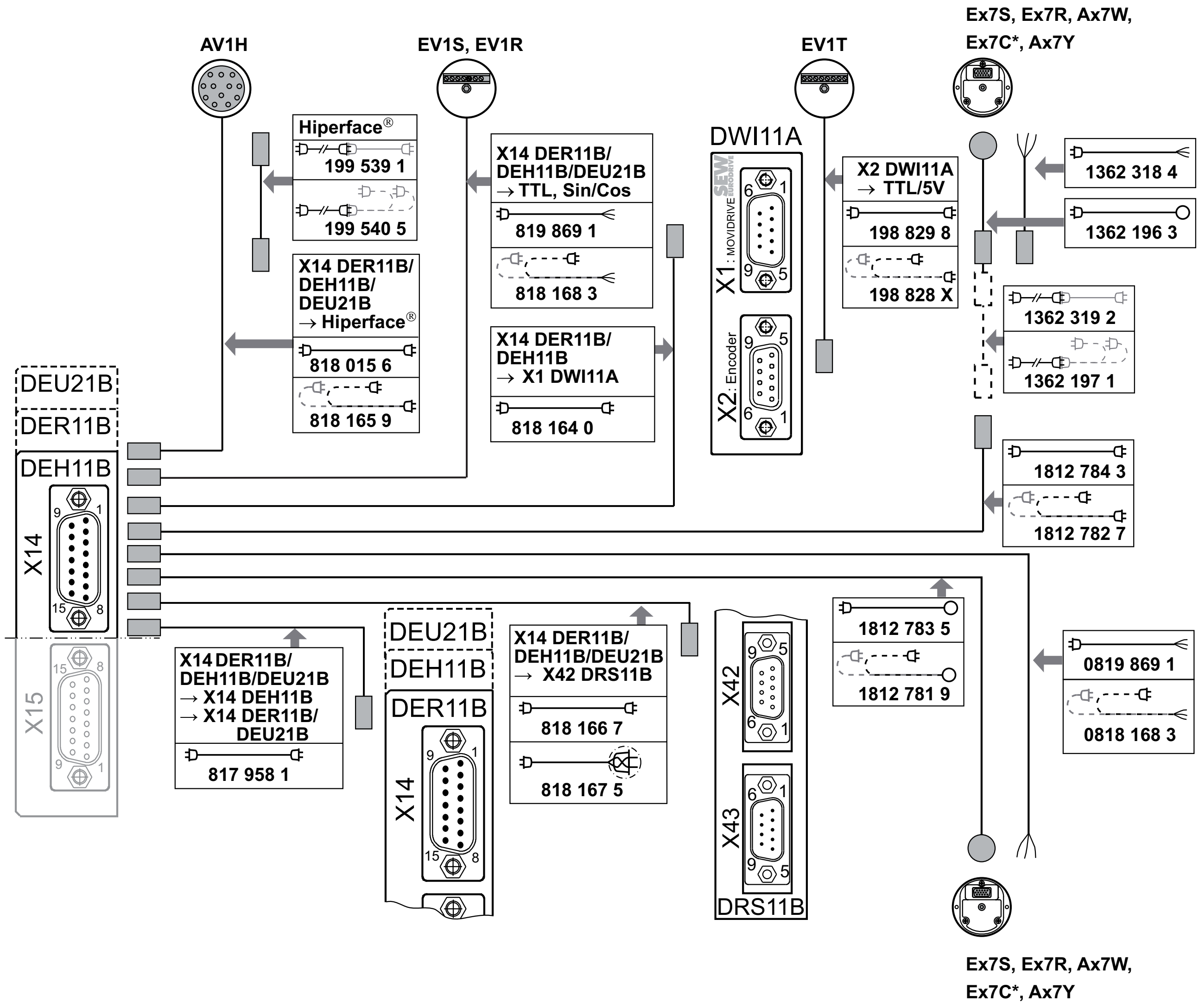
- Part number: 01988298 or 0198828X
- Cable to connect an external DC 5 V TTL encoder with terminal box connection on the motor side to the DC 5 V encoder power supply DWI11A.



- Part number: 08179573
- Cable to connect the DC 5 V encoder power supply type DWI11A via plug connector.



7.8 Encoder cable for distance encoders on X14, DEH11B/DER11B/DEU21B



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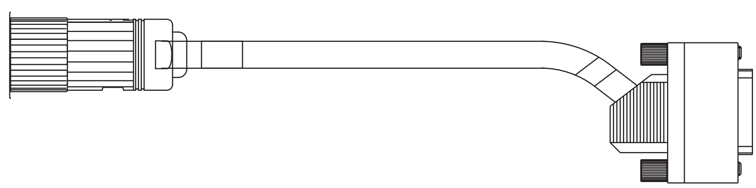
INFORMATION

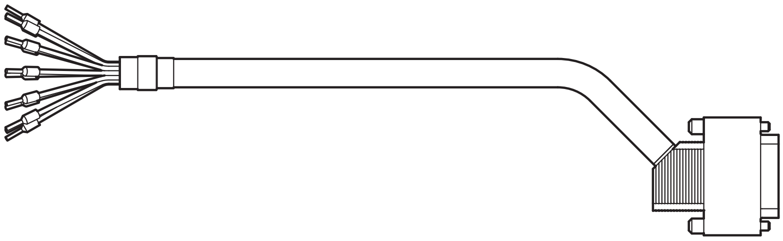
* ES7C and EG7C may only be used in connection with the DEU21B multi-encoder card. For the individual wiring diagrams, refer to chapter "Installation" in the "MOVIDRIVE® MDX60B/61B" operating instructions.

- Part number: 08180156 or 08181659
- Cable to connect external encoders via plug connectors.



- Part number: 01995391 or 01995405
- Extension cable to connect external encoders via plug connectors.

- Part number: 08198691 or 08181683
- Cable to connect external encoders via encoder terminal strip.



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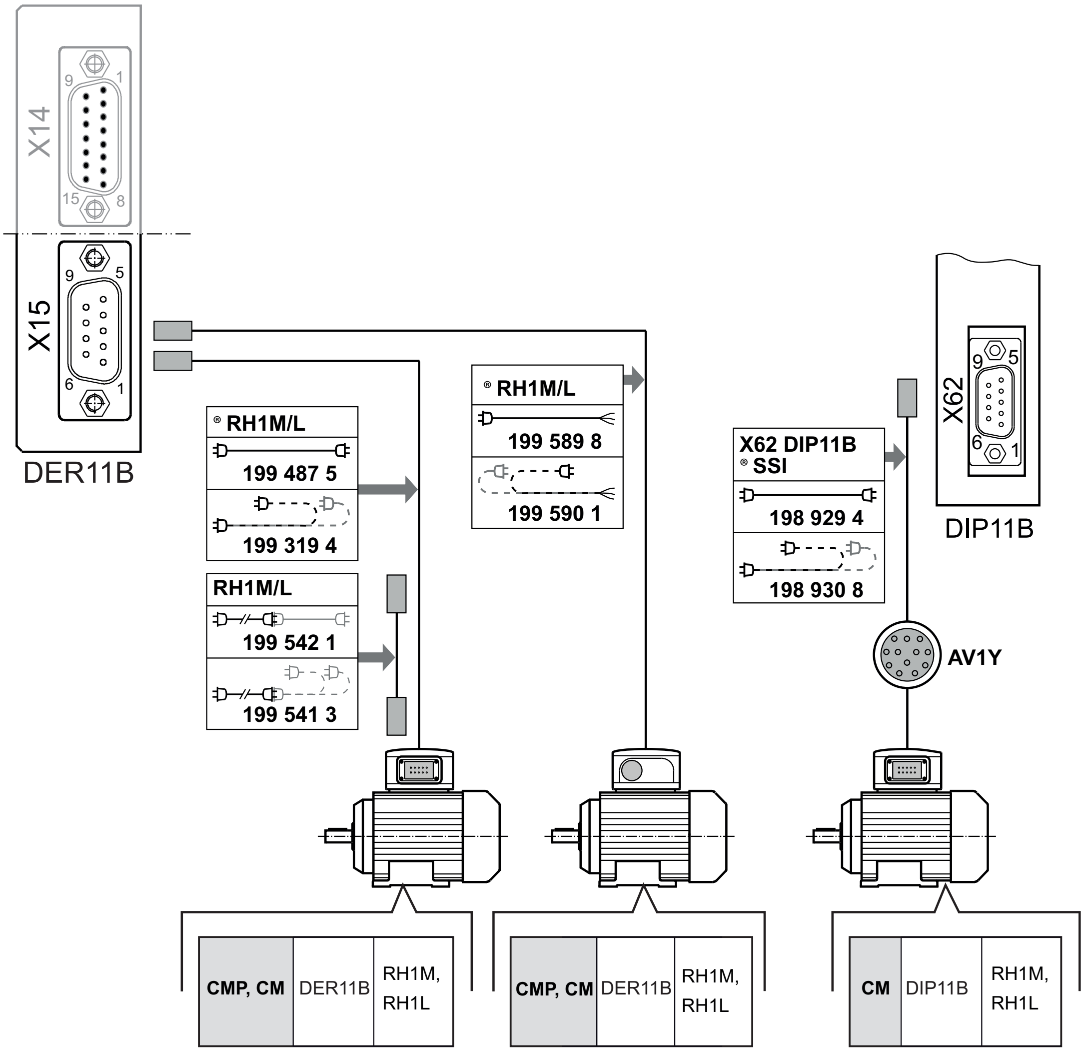
7.9 Encoder cable for resolvers on X15 DER11B



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For the individual wiring diagrams, refer to chapter "Installation" in the "MOVIDRIVE® MDX60B/61B" operating instructions.

- Part number: 01994875 or 01993194
- Cable to connect resolvers RH1M / RH1L with plug connector connection on the motor side to CM.. or CMP.. motors.

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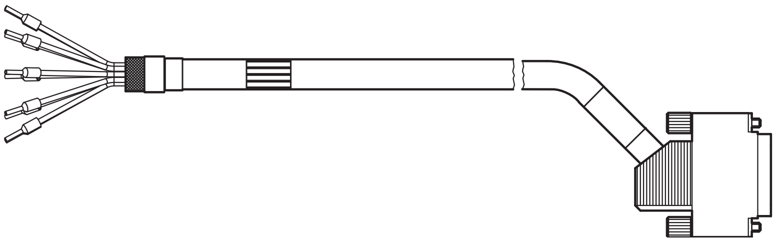
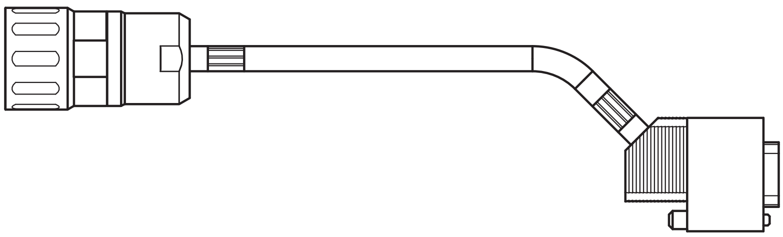
- Part number: 01995421 or 01995413
- Extension cable to connect resolvers RH1M / RH1L with plug connector connection on the motor side to DS.., CM.., CMD.. or CMP.. motors.

- Part numbers:
  – For CM.. motors: 01995898 or 01995901



1475692811

- Part number: 01989294 or 01989308
- CM.. motors with integrated resolver: Additional cable to connect the AV1Y absolute encoder with plug connector connection on the motor side to DIP11B X62.



8 Parameters

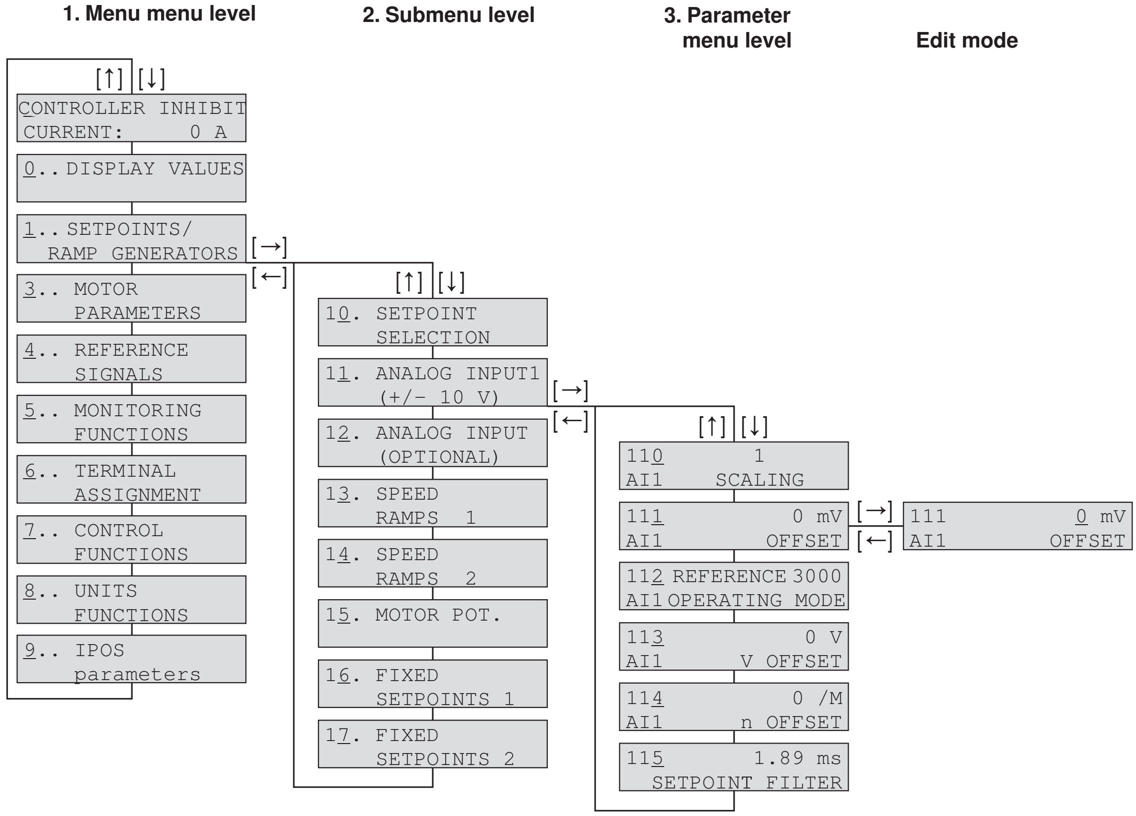
The parameter menu is usually only required for startup and servicing. For this reason, MOVIDRIVE® is designed as a basic device without keypad. If required, you can equip the MOVIDRIVE® with a PC connection or a keypad.

You can set the MOVIDRIVE® parameters in various ways:

- Using the optional DBG60B keypad.
- Using the MOVITOOLS® MotionStudio engineering software (includes SHELL, SCOPE and IPOS$^{PLUS®}$ programming).
- Using the serial interfaces.
- Using the fieldbus interfaces.
- Via IPOS$^{PLUS®}$.

You can download the latest version of the MOVITOOLS® MotionStudio engineering software from the SEW homepage (www.sew-eurodrive.com).

8.1 Structure of the DBG60B menu



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8.2 Overview of parameters

The following table lists all parameters together with their factory settings (indicated in bold). Numerical values are displayed with the complete setting range.

"Parameter group 0: Display values" (→ 🗎 216)	
"P00. Process values" (→ 🗎 216)	
"P000 Speed" (→ 🗎 216)	
"P001 User display" (→ 🗎 216)	
"P002 Frequency" (→ 🗎 216)	
"P003 Actual position" (→ 🗎 216)	
"P004 Output current" (→ 🗎 217)	
"P005 Active current" (→ 🗎 217)	
"P006/P007 Motor utilization 1/2" (→ 🗎 217)	
"P008 DC link voltage" (→ 🗎 217)	
"P009 Output current" (→ 🗎 217)	
"P01. Status displays" (→ 🗎 218)	
"P010 Inverter status" (→ 🗎 218)	
"P011 Operating state" (→ 🗎 218)	
"P012 Fault status" (→ 🗎 218)	
"P013 Current parameter set" (→ 🗎 218)	
"P014 Heat sink temperature" (→ 🗎 218)	
"P015 Power-applied hours" (→ 🗎 218)	
"P016 Enable hours" (→ 🗎 219)	
"P017 Work" (→ 🗎 219)	
"P018/P019 KTY utilization 1/2" (→ 🗎 219)	
"P02. Analog setpoints" (→ 🗎 219)	
"P020/P021 Analog input AI1/AI2" (→ 🗎 219)	
"P022 External current limiting" (→ 🗎 219)	
"P03. Digital inputs of basic device" (→ 🗎 219)	
"P030 – P037 Digital inputs DI00 – DI07" (→ 🗎 219)	
"P039 Digital inputs DI00 – DI07" (→ 🗎 219)	
"P04. Digital inputs option" (→ 🗎 219)	
"P040 – P047 Digital inputs DI10 – DI17" (→ 🗎 219)	
"P048 Digital inputs DI10 – DI17" (→ 🗎 219)	
"P05. Digital outputs basic device" (→ 🗎 220)	
"P050 – P055 Digital outputs DB00, DO01 – DO05" (→ 🗎 220)	
"P059 Digital outputs DB00, DO01 – DO05" (→ 🗎 220)	

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"P06. Digital outputs option" (→ 🗎 220)	
"P060 – P067 Digital outputs DO10 – DO17" (→ 🗎 220)	
"P068 Digital outputs DO10 – DO17" (→ 🗎 220)	
"P07. Device data" (→ 🗎 220)	
"P070 Device type" (→ 🗎 220)	
"P071 Nominal output current" (→ 🗎 220)	
"P072 Option/firmware encoder slot" (→ 🗎 220)	
"P073 Option/firmware fieldbus option slot" (→ 🗎 220)	
"P074 Option/firmware expansion slot" (→ 🗎 220)	
"P076 Firmware basic device" (→ 🗎 220)	
"P077 Firmware digital operator panel" (→ 🗎 220)	
"P078 Technology function" (→ 🗎 221)	
"P079 Device design" (→ 🗎 221)	
"P08. Fault memory" (→ 🗎 222)	
"P080 – P084 Faults t-0 – t-4" (→ 🗎 222)	
"P09. Bus diagnostics" (→ 🗎 222)	
"P090 PD configuration" (→ 🗎 222)	
"P091 Fieldbus type" (→ 🗎 222)	
"P092 Fieldbus baud rate" (→ 🗎 222)	
"P093 Fieldbus address" (→ 🗎 222)	
"P094 – P096 PO1 – PO3 setpoint" (→ 🗎 222)	
"P097 – P099 PI1 – PI3 actual value" (→ 🗎 223)	

"Parameter group 1: Setpoints/ramp generators" (→ 🗎 224)	
"P10. Setpoint selection" (→ 🗎 224)	
"P100 Setpoint source" (→ 🗎 224)	**Unipolar/fixed setpoint**
"P101 Control signal source" (→ 🗎 225)	**Terminals**
"P102 Frequency scaling" (→ 🗎 226)	0.1 – **10** – 65 kHz
"P105 Error response to wire break AI1" (→ 🗎 226)	**No response**
"P11. Analog input AI1" (→ 🗎 227)	
"P110 AI1 scaling" (→ 🗎 227)	-10 – **1** – 10
"P111 AI1 Offset" (→ 🗎 227)	-500 – **0** – 500 mV
"P112 AI1 operating mode" (→ 🗎 228)	**10V, reference potential maximum speed**
"P113 AI1 voltage offset" (→ 🗎 229)	-10 – **0** – 10 V
"P114 AI1 speed offset" (→ 🗎 230)	-6000 – **0** – 6000 min^{-1}

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"P115 Filter setpoint" (→ 🗎 231)	0 – **5** – 100 ms, (0 = setpoint filter off)
"P12. Analog inputs option" (→ 🗎 235)	
"P120 AI2 operating mode (optional)" (→ 🗎 235)	**No function**
"P13./P14. Speed ramps 1/2" (→ 🗎 235)	
"P130 – P133 / P140 – P143 Ramp t11 / t21 up/ down CW/CCW" (→ 🗎 235)	0 – **2** – 2000 s
"P134/P144 Ramp t12/t22 UP = DOWN" (→ 🗎 235)	0 – **10** – 2000 s
"P135/P145 S pattern t12/t22" (→ 🗎 236)	**0** – 3
"P136/P146 Stop ramp t13/t23" (→ 🗎 236)	0 – **2** – 20 s
"P137/P147 Emergency stop ramp t14/ t24" (→ 🗎 236)	0 – **2** – 20 s
"P138 Ramp limit VFC" (→ 🗎 237)	**Yes**
"P139/P149 Ramp monitoring 1/2" (→ 🗎 237)	**Off**
"P15. Motor potentiometer" (→ 🗎 237)	
"P150/P151 Ramp t3 up / down" (→ 🗎 237)	0.2 – **20** – 50 s
"P152 Save last setpoint" (→ 🗎 238)	**No**
"P16./P17. Fixed setpoints 1/2" (→ 🗎 239)	

"Parameter group 2: Controller paramet- ers" (→ 🗎 240)	
"P20. Speed Control" (→ 🗎 240)	
"P200 P gain n controller" (→ 🗎 240)	0.01 – **2** – 32
"P201 Time constant n-controller" (→ 🗎 241)	0 – **10** – 3000 ms
"P202 Gain acceleration precontrol" (→ 🗎 241)	**0** – 65
"P203 Filter acceleration precontrol" (→ 🗎 241)	**0** – 100 ms
"P204 Actual speed value filter" (→ 🗎 241)	**0** – 32 ms
"P205 Load precontrol CFC" (→ 🗎 241)	-150 – **0** – +150%
"P206 Sampling cycle n-controller" (→ 🗎 241)	**1 ms** 0.5 ms
"P207 Load precontrol VFC" (→ 🗎 242)	-150 – **Off** – 150%
"P21. Hold controller" (→ 🗎 242)	
"P210 P-gain hold controller" (→ 🗎 242)	0.1 – **0.5** – 32
"P22. Synchronous operation control" (→ 🗎 242)	
"P220 P-gain DRS" (→ 🗎 242)	1 – **10** – 200
"P221 – P222 Master gear ratio factor / Slave gear ratio factor" (→ 🗎 243)	**1** – 3 999 999 999
"P223 Mode selection" (→ 🗎 243)	**Mode 1**
"P224 Slave counter" (→ 🗎 245)	-99 999 999 – **10** – 99 999 999
"P225/P226/P227 Offset 1/2/3" (→ 🗎 245)	-32767 – **10** – 32767
"P228 Precontrol filter DRS" (→ 🗎 245)	**0** – 100 ms

"P23. Synchronous operation with distance encoder" (→ 🗎 245)	
"P230 Distance encoder" (→ 🗎 245)	**Off**
"P231/P232 Factor slave encoder / Factor slave distance encoder" (→ 🗎 245)	**1** – 1000
"P233 Distance encoder resolution" (→ 🗎 246)	**1024**
"P234 Master encoder resolution" (→ 🗎 246)	**1024**
"P24. Synchronous operation with catch up" (→ 🗎 246)	
"P240 Synchronous speed" (→ 🗎 246)	0 – **1500** – 6000 min^{-1}
"P241 Synchronization ramp" (→ 🗎 246)	0 – **2** – 50 s
"P26. Process controller parameter" (→ 🗎 246)	
"P260 Operating mode" (→ 🗎 246)	**Controller off**
"P261 Cycle time" (→ 🗎 246)	**5** ms
"P262 Interruption" (→ 🗎 247)	**No response**
"P263 Factor KP" (→ 🗎 247)	0 – **1** – 32.767
"P264 Integral time TN" (→ 🗎 247)	**0** – 65535 ms
"P265 Derivative time TV" (→ 🗎 247)	**0** – 30 ms
"P266 Precontrol" (→ 🗎 247)	-32767 – **0** – 32767
"P27. Process controller input values" (→ 🗎 248)	
"P270 Setpoint source" (→ 🗎 248)	**Parameter**
"P271 Setpoint" (→ 🗎 248)	-32767 – **0** – 32767
"P272 IPOS setpoint address" (→ 🗎 248)	**0** – 1023
"P273 Time constant" (→ 🗎 248)	**0** – 0.01 – 2000 s
"P274 Scaling setpoint" (→ 🗎 248)	-32,767 – **1** – 32,767
"P275 Actual value source" (→ 🗎 248)	**Analog 1**
"P276 IPOS actual value address" (→ 🗎 248)	**0** – 1023
"P277 Scaling actual value" (→ 🗎 248)	-32.767 – **1** – 32.767
"P278 Offset actual value" (→ 🗎 249)	-32767 – **0** – 32767
"P279 Time constant actual value" (→ 🗎 249)	**0** – 500 ms
"P28. Process controller limits" (→ 🗎 249)	
"P280 Minimum offset + actual value" (→ 🗎 249)	-32767 – **0** – 32767
"P281 Maximum offset + actual value" (→ 🗎 249)	-32767 – **10000** – 32767
"P282 PID controller minimum output" (→ 🗎 249)	-32767 – **-1000** – 32767
"P283 PID controller maximum output" (→ 🗎 249)	-32767 – **10000** – 32767
"P284 Process controller minimum output" (→ 🗎 249)	-32767 – **0** – 32767
"P285 Process controller maximum output" (→ 🗎 249)	-32767 – **7500** – 32767

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"Parameter group 3: Motor parameters" (→ 🗎 250)	
"P30./P31. Limits 1 / 2" (→ 🗎 250)	
"P300 / P310 Start/stop speed 1/2" (→ 🗎 250)	0 – 150 min^{-1}
"P301/P311 Minimum speed 1/2" (→ 🗎 250)	0 – **15** – 6100 min^{-1}
"P302/P312 Maximum speed 1/2" (→ 🗎 250)	0 – **1500** – 6100 min^{-1}
"P303/P313 Current limit 1/2" (→ 🗎 251)	0 – 150% of the nominal motor current I_N
"P304 Torque limit" (→ 🗎 251)	**0** – 150% (size 0: 0 – 200%)
"P32./P33. Motor compensation 1/2 (synchronous)" (→ 🗎 251)	
"P320/P330 Automatic adjustment 1/2" (→ 🗎 251)	**On**
"P321/P331 Boost 1/2" (→ 🗎 252)	**0** – 100%
"P322/P332 IxR adjustment 1/2" (→ 🗎 252)	0 – 100%
"P323/P333 Premagnetization time 1/2" (→ 🗎 252)	0 – 20 s
"P324/P334 Slip compensation 1/2" (→ 🗎 252)	0 – 500 min^{-1}
"P34. Motor protection" (→ 🗎 253)	
"P340/P342 Motor protection 1/2" (→ 🗎 253)	**Off**
"P341/P343 Type of cooling 1/2" (→ 🗎 255)	**Fan cooled**
"P344 Motor protection interval" (→ 🗎 255)	0.1 – **4** – 20 s
"P345/P346 IN/UL monitoring" (→ 🗎 255)	0.1 – 500 A
"P35. Direction of motor rotation" (→ 🗎 256)	
"P350/P351 Direction of rotation reversal 1/2" (→ 🗎 256)	**Off**
"P36. Startup" (→ 🗎 256)	
"P360 Startup" (→ 🗎 256)	**No**

"Parameter group 4: Reference signals" (→ 🗎 257)	
"P40. Speed reference message" (→ 🗎 257)	
"P400 Speed reference value" (→ 🗎 257)	0 – **1500** – 6000 min^{-1}
"P401 Hysteresis" (→ 🗎 257)	0 – **100** – 500 min^{-1}
"P402 Delay time" (→ 🗎 257)	0 – **1** – 9 s
"P403 Signal = “1” when:" (→ 🗎 257)	**$n < n_{ref}$** / $n > n_{ref}$
"P41. Speed window signal" (→ 🗎 258)	
"P410 Window center" (→ 🗎 258)	0 – **1500** – 6000 min^{-1}
"P411 Range width" (→ 🗎 258)	**0** – 6000 min^{-1}
"P412 Deceleration time" (→ 🗎 258)	0 – **1** – 9 s
"P413 Signal = "1" if:" (→ 🗎 258)	**Internal**
"P42. Speed setpoint/actual value comparison" (→ 🗎 259)	
"P420 Hysteresis" (→ 🗎 259)	1 – **100** – 300 min^{-1}

"P421 Deceleration time" (→ 🗎 259)	0 – **1** – 9 s
"P422 Signal = "1" if:" (→ 🗎 259)	**$n = n_{setpoint}$**
"P43. Current reference signal" (→ 🗎 260)	
"P430 Current reference value" (→ 🗎 260)	0 – **100** – 150% I_N
"P431 Hysteresis" (→ 🗎 260)	0 – **5** – 30% I_N
"P432 Deceleration time" (→ 🗎 260)	0 – **1** – 9 s
"P433 Signal = "1" if:" (→ 🗎 260)	**$I < I_{ref}$**
"P44. Imax signal" (→ 🗎 260)	
"P440 Hysteresis" (→ 🗎 260)	**5** – 50% I_N
"P441 Deceleration time" (→ 🗎 260)	0 – **1** – 9 s
"P442 Signal = "1" if:" (→ 🗎 260)	**$I < I_{max}$**

"Parameter group 5: Monitoring functions" (→ 🗎 261)	
"P50. Speed monitoring" (→ 🗎 261)	
"P500/P502 Speed monitoring 1/2" (→ 🗎 261)	**Motoring/regenerative**
"P501/P503 Delay time 1/2" (→ 🗎 261)	0 – **1** – 10 s
"P504 Encoder monitoring motor" (→ 🗎 261)	**Off**
"P505 Distance encoder monitoring" (→ 🗎 262)	**Off**
"P51. Synchronous operation monitoring" (→ 🗎 262)	
"P510 Positional tolerance slave" (→ 🗎 262)	10 – **25** – 32 768 Inc.
"P511 Lag error prewarning" (→ 🗎 262)	**50** – 99 999 999 Inc.
"P512 lag error limit" (→ 🗎 262)	100 – **4000** – 99 999 999 Inc.
"P513 Delay time error signal" (→ 🗎 262)	0 – **1** – 99 s
"P514 Counter LED display" (→ 🗎 263)	10 – **100** – 32 768 Inc.
"P515 Delay in-position signal" (→ 🗎 263)	5 – **10** – 2000 ms
"P516 X41 Encoder monitoring" (→ 🗎 263)	**Off**
"P517 X41 Pulse count monitoring" (→ 🗎 263)	**Off**
"P518 X42 Encoder monitoring" (→ 🗎 264)	**Off**
"P519 X42 Pulse count monitoring" (→ 🗎 264)	**Off**
"P52. Power off monitoring" (→ 🗎 264)	
"P520 Power off response time" (→ 🗎 264)	**0** – 5 s
"P521 Power off response" (→ 🗎 264)	**Controller inhibit**
"P522 Phase failure monitoring" (→ 🗎 265)	**On**
"P53. Motor temperature protection" (→ 🗎 265)	
"P530 Sensor type 1" (→ 🗎 265)	**No sensor**
"P531 Sensor type 2" (→ 🗎 265)	**No sensor**
"P54. Gear unit/motor monitoring" (→ 🗎 266)	
"P540 Drive vibration response/warning" (→ 🗎 267)	**Display error**
"P541 Drive vibration response/fault" (→ 🗎 267)	**Rapid stop/warning**

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"P542 Response oil aging / warning" (→ 🗎 267)	**Display error**
"P543 Response oil aging / fault" (→ 🗎 267)	**Display error**
"P544 Oil aging/overtemperature" (→ 🗎 267)	**Display error**
"P545 Oil aging/ready signal" (→ 🗎 268)	**Display error**
"P549 Response to brake wear" (→ 🗎 268)	**Display error**
"P55. DCS safety module" (→ 🗎 268)	
"P550 DCS safety module status" (→ 🗎 268)	Display value
"P551 Digital inputs DCS DI1 – DI8" (→ 🗎 268)	Display value
"P552 Digital outputs DCS DO0_P – DO2_M" (→ 🗎 269)	Display value
"P553 Serial number DCS" (→ 🗎 269)	Display value
"P554 CRC DCS" (→ 🗎 269)	Display value
"P555 DCS error response" (→ 🗎 269)	**Immediate stop/Fault**
"P556 DCS alarm response" (→ 🗎 269)	**Rapid stop/warning**
"P557 DCS source actual position" (→ 🗎 269)	**Motor encoder (X15)**
"P56. Ex-e motor current limiting" (→ 🗎 270)	
"P560 Current limiting Ex-e motor" (→ 🗎 270)	**Off**
"P561 Frequency A" (→ 🗎 271)	0 – **5** – 60 Hz
"P562 Current limit A" (→ 🗎 271)	0 – **50** – 150%
"P563 Frequency B" (→ 🗎 271)	0 – **10** – 104 Hz
"P564 Current limit B" (→ 🗎 271)	0 – **80** – 200%
"P565 Frequency C" (→ 🗎 271)	0 – **25** – 104 Hz
"P566 Current limit C" (→ 🗎 271)	0 – **100** – 200%

"Parameter group 6: Terminal assignment" (→ 🗎 272)	
"P60. Digital inputs of basic device" (→ 🗎 272)	
"P600 – P606 Digital input DIØ1 – DIØ7" (→ 🗎 272)	
"P61. Digital inputs option" (→ 🗎 273)	
"P610 – P617 Digital inputs DI1Ø – DI17" (→ 🗎 273)	**No function**
"P62. Digital outputs basic device" (→ 🗎 274)	
"P620 – P624 Digital outputs DOØ1 – DOØ5" (→ 🗎 274)	
"P63. Digital outputs option" (→ 🗎 275)	
"P630 – P637 Digital outputs DO1Ø – DO17" (→ 🗎 275)	**No function**
"P64x Analog outputs optional" (→ 🗎 277)	
"P640/P643 Analog output AO1/AO2" (→ 🗎 277)	**Actual speed/output current**
"P641/P644 Scaling AO1/AO2" (→ 🗎 278)	-10 – 0 – **1** – 10
"P642/P645 Operating mode AO1/AO2" (→ 🗎 278)	**-10 V.–.10 V**

"Parameter group 7: Control functions" (→ 🗎 280)	
"P70. Duty types" (→ 🗎 280)	
"P700/P701 Operating mode 1/2" (→ 🗎 280)	**VFC 1/2**
"P702 Motor category" (→ 🗎 281)	**Rotatory**
"P703 Dynamic response" (→ 🗎 281)	**Standard**
"P704 VFC-n with output filter" (→ 🗎 281)	**No**
"P705 Premagnetization time lower limit" (→ 🗎 281)	**No**
"P706 Flux model: Yrq = 0" (→ 🗎 281)	**Yes**
"P71. Standstill current" (→ 🗎 282)	
"P710/P711 Standstill current 1/2" (→ 🗎 282)	**0** – 50% I_{Mot}
"P72. Setpoint stop function" (→ 🗎 283)	
"P720/P723 Stop by setpoint function 1/2" (→ 🗎 283)	**Off**
"P721/P724 Stop setpoint 1/2" (→ 🗎 283)	0 – **30** – 500 min^{-1}
"P722/P725 Start offset 1/2" (→ 🗎 284)	0 – **30** – 500 min^{-1}
"P73. Brake function" (→ 🗎 284)	
"P730/P733 Brake function 1/2" (→ 🗎 284)	**On**
"P731/P734 Brake release time 1/2" (→ 🗎 285)	0 – 2 s
"P732/P735 Brake application time 1/2" (→ 🗎 285)	0 – 2 s
"P74. Speed skip function" (→ 🗎 285)	
"P740/P742 Skip center 1/2" (→ 🗎 286)	0 – **1500** – 6000 min^{-1}
"P741/P743 Skip bandwidth 1/2" (→ 🗎 286)	**0** – 300 min^{-1}
"P75. Master/slave function" (→ 🗎 286)	
"P750 Slave setpoint" (→ 🗎 292)	**Master/slave off**
"P751 Scaling of slave setpoint" (→ 🗎 293)	-10 – **1** – 10
"P76. Manual operation" (→ 🗎 293)	
"P760 Interlocking run/stop keys" (→ 🗎 293)	**Off**
"P77. Energy-saving function" (→ 🗎 293)	
"P770 Energy-saving function" (→ 🗎 293)	**Off**
"P78. Ethernet configuration" (→ 🗎 293)	
"P780 IP address" (→ 🗎 293)	**192.168.10.4**
"P781 Subnet mask" (→ 🗎 293)	**255.255.255.0**
"P782 Standard gateway" (→ 🗎 293)	**000,000,000,000**
"P783 Baud rate" (→ 🗎 294)	
"P784 MAC address" (→ 🗎 294)	
"P785 Ethernet/IP configuration" (→ 🗎 294)	**DHCP**

"Parameter group 8: Device functions" (→ 🗎 295)	
"P80. Setup" (→ 🗎 295)	
"P800 User menu" (→ 🗎 295)	**On** (only in DBG60B)

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"P801 Language" (→ 🗎 295)	Dependent on DBG60B design
"P802 Factory setting" (→ 🗎 295)	**No**
"P803 Parameter lock" (→ 🗎 296)	**Off**
"P804 Reset statistic data" (→ 🗎 296)	**No action**
"P806 Copy DBG -> MDX" (→ 🗎 296)	**No** (only in DBG60B)
"P807 Copy MDX - DBG" (→ 🗎 297)	**No** (only in DBG60B)
"P81. Serial communication" (→ 🗎 297)	
"P810 RS485 Address" (→ 🗎 297)	**0** – 99
"P811 RS485 group address" (→ 🗎 297)	**100** – 199
"P812 RS485 timeout interval" (→ 🗎 297)	**0** – 650 s
"P819 Fieldbus timeout interval" (→ 🗎 298)	0 – **0.5** – 650 s
"P82. Braking operation" (→ 🗎 298)	
"P820/P821 4-Quadrant operation 1/2" (→ 🗎 298)	**On**
"P83. Fault responses" (→ 🗎 299)	
"P830 Response to "External fault"" (→ 🗎 300)	**Emergency stop/malfunction**
"P831 'Fieldbus timeout' response" (→ 🗎 300)	**Rapid stop/warning**
"P832 Response to "Motor overload"" (→ 🗎 300)	**Emergency stop/malfunction**
"P833 'RS485 timeout' response" (→ 🗎 300)	**Rapid stop/warning**
"P834 Response to "Lag error"" (→ 🗎 300)	**Emergency stop/malfunction**
"P835 'TF signal' response" (→ 🗎 301)	**No response**
"P836 'Timeout SBus 1/2' response" (→ 🗎 301)	**Emergency stop/malfunction**
"P838 'SW limit switch' response" (→ 🗎 301)	**Emergency stop/malfunction**
"P839 Response to "Positioning interruption"" (→ 🗎 301)	**Emergency stop/Warning**
"P84. Reset behavior" (→ 🗎 301)	
"P840 Manual reset" (→ 🗎 301)	**No**
"P841 Auto reset" (→ 🗎 302)	**No**
"P842 Restart time" (→ 🗎 302)	1 – **3** – 30 s
"P85. Scaling actual speed value" (→ 🗎 303)	
"P850 Scaling factor numerator" (→ 🗎 303)	**1** – 65535
"P851 Scaling factor denominator" (→ 🗎 303)	**1** – 65535
"P852 User unit" (→ 🗎 303)	**1/min**
"P86. Modulation" (→ 🗎 303)	
"P860/P861 PWM frequency 1/2 VFC" (→ 🗎 303)	**2.5 kHz (size 7) /4 kHz**

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"P862/P863 PWM fix 1/2" (→ 🗎 304)	**Off**
"P864 PWM frequency CFC" (→ 🗎 304)	**2.5 kHz (size 7) /4 kHz**
"P87. Process data description" (→ 🗎 305)	
"P870/P871/P872 Setpoint description PO1/PO2/PO3" (→ 🗎 305)	
"P873/P874/P875 Actual value description PI1/PI2/PI3" (→ 🗎 306)	
"P876 PO data enable" (→ 🗎 306)	**On**
"P88./P89. Serial communication SBus 1/2" (→ 🗎 307)	
"P880/P890 Protocol SBus 1/2" (→ 🗎 307)	**SBus MOVILINK®**
"P881/P891 Address SBus 1/2" (→ 🗎 307)	**0** – 63
"P882/P892 SBus group address 1/2" (→ 🗎 307)	**0** – 63
"P883/P893 SBus timeout delay 1/2" (→ 🗎 307)	**0** – 650 s
"P884/P894 SBus baud rate 1/2" (→ 🗎 307)	**500 kBd**
"P885/P895 Synchronization ID SBus 1/2" (→ 🗎 307)	**0** – 2047
"P886/P896 CANopen address 1/2" (→ 🗎 308)	1 – **127**
"P887 Synchronization ext. controller 1/2" (→ 🗎 308)	**Off**
"P888 Synchronization time" (→ 🗎 308)	1 – **5** – 10 ms
"P889/P899 Parameter channel 2" (→ 🗎 308)	**Off**

"Parameter group 9: IPOS parameters" (→ 🗎 309)	
"P90. IPOS reference travel" (→ 🗎 309)	
"P900 Reference offset" (→ 🗎 310)	-(2^{31} - 1) – **0** – (2^{31} - 1) Inc.
"P901 Reference speed 1" (→ 🗎 310)	0 – **200** – 6000 min^{-1}
"P902 Reference speed 2" (→ 🗎 310)	0 – **50** – 6000 min^{-1}
"P903 Reference travel type" (→ 🗎 311)	**0** – 8
"P904 Reference travel to zero pulse" (→ 🗎 312)	**Yes**
"P905 Hiperface Offset X15" (→ 🗎 312)	-(2^{31} - 1) – **0** – (2^{31} - 1) Inc.
"P906 Cam distance" (→ 🗎 312)	Display value
"P91. IPOS Travel parameters" (→ 🗎 313)	
"P910 Gain X controller" (→ 🗎 313)	0.1 – **0.5** – 32
"P911/P912 Positioning ramp 1/2" (→ 🗎 313)	0.01 – **1** – 20 s
"P913/P914 Travel speed CW/CCW" (→ 🗎 313)	0 – **1500** – 6000 min^{-1}
"P915 Velocity precontrol" (→ 🗎 313)	-199.99 – 0 – **100** – 199.99%
"P916 Ramp type" (→ 🗎 314)	**Linear**
"P917 Ramp mode" (→ 🗎 317)	**Mode 1**
"P918 bus setpoint source" (→ 🗎 317)	0 – **499** – 1023
"P92. IPOS monitoring" (→ 🗎 317)	
"P920 / P921 SW limit switch CW / CCW" (→ 🗎 317)	-(2^{31} - 1) – **0** – (2^{31} - 1) Inc.

"P922 Position window" (→ 🗎 318)	0 – **50** – 32767 Inc.
"P923 Lag error window" (→ 🗎 318)	0 – **5000** – (2^{31} - 1) Inc.
"P924 Positioning interruption detection" (→ 🗎 318)	**Off**
"P93. Special IPOS functions" (→ 🗎 319)	
"P930 Override" (→ 🗎 319)	**Off**
"P931 IPOS CTRL word Task 1" (→ 🗎 319)	**Stop** (only with DBG60B)
"P932 IPOS CTRL word Task 2" (→ 🗎 319)	**Stop** (only with DBG60B)
"P933 Jerk time" (→ 🗎 319)	**0.005** – 2 s
"P938/P939 Speed task 1/task 2" (→ 🗎 319)	**0** – 9 additional assembler commands/ms
"P94. IPOS encoder" (→ 🗎 320)	
"P940 IPOS variables edit" (→ 🗎 320)	**Off** (Only DBG)
"P941 Actual position source" (→ 🗎 320)	**Motor encoder (X15)**
"P942/P943 Encoder factor numerator/denominator" (→ 🗎 320)	**1** – 32767
"P944 Encoder scaling ext. Encoder" (→ 🗎 321)	**x1**
"P945 Distance encoder type (X14)" (→ 🗎 322)	**TTL**
"P946 Distance encoder counting direction (X14)" (→ 🗎 322)	**Standard**
"P947 Hiperface offset X14" (→ 🗎 323)	-(2^{31} - 1) – **0** – (2^{31} - 1) Inc.
"P948 Automatic encoder replacement detection" (→ 🗎 323)	**On**
"P95. Absolute encoder" (→ 🗎 324)	
"P950 Encoder type" (→ 🗎 324)	**No encoder**
"P951 Counting direction" (→ 🗎 324)	**Standard**
"P952 Clock frequency" (→ 🗎 324)	**1** – 200%
"P953 Position offset" (→ 🗎 324)	-(2^{31} - 1) – **0** – (2^{31} - 1) Inc.
"P954 Zero offset" (→ 🗎 325)	-(2^{31} - 1) – **0** – (2^{31} - 1) Inc.
"P955 Encoder scaling" (→ 🗎 325)	**x1**
"P96. IPOSplus® modulo function" (→ 🗎 326)	
"P960 Modulo function" (→ 🗎 326)	**Off**
"P961 Modulo numerator" (→ 🗎 326)	**1** – (2^{31} - 1)
"P962 Modulo denominator" (→ 🗎 326)	**1** – (2^{31} - 1)
"P963 Modulo encoder resolution" (→ 🗎 326)	1 – **4096** – 65535
"P97. IPOS synchronization" (→ 🗎 328)	
"P970 DPRAM synchronization" (→ 🗎 328)	**No**
"P971 Synchronization phase" (→ 🗎 328)	-2 – **0** – 2 ms

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8.3 Explanation of the parameters

The parameters are explained below. The parameters are divided into 10 groups. The parameter names correspond to their representation in the parameter tree. The factory setting is indicated by **bold**.

8.3.1 Icons

The following icons explain the parameters:

1 2	These parameters are switch-selectable and available in parameter sets 1 and 2.
	These parameters can only be changed with INHIBITED inverter status (= output stage at high resistance).
AUTO	The startup function automatically changes this parameter.

8.3.2 Parameter group 0: Display values

This parameter group contains the following information:

- Process values and states of the basic device
- Process values and states of the installed options
- Fault memory
- Fieldbus parameters

P00. Process values

P000 Speed

Resolution with DBG60B: ± 1 min^{-1}; with MOVITOOLS® MotionStudio: ± 0.2 min^{-1}

The speed is determined by taking the setpoint speed and the set slip compensation in VFC or V/f mode without an encoder connection. The speed is established from the encoder or resolver signals and displayed when there is an encoder connection.

P001 User display

Determined by the following parameters:

- *P850 Scaling factor numerator* (→ 🗎 303)
- *P851 Scaling factor denominator* (→ 🗎 303)
- *P852 User unit* (→ 🗎 303)

P002 Frequency

Output frequency of the device (signed).

P003 Actual position

With encoder connection, position of the drive as a value in increments observing the signs in the range 0 – ± (2^{31}-1) increments. Without encoder connection, the value is zero.

P004 Output current

Apparent current in the range 0 – 200% of the nominal device current I_N (Size 0: 250%).

P005 Active current

Active current in the range 0 – 200% of the nominal device current I_N (signed) (Size 0: 250%).

The display value is positive when torque is applied in the positive direction of rotation; negative when torque is applied in the negative direction of rotation.

P006/P007 Motor utilization 1/2

Current thermal motor utilization of the connected motor in the range 0 – 200%.

The motor utilization is calculated using the motor temperature emulation in the device. The synchronous motor with KTY and the asynchronous motor is turned off when 110% motor utilization is reached.

P008 DC link voltage

Voltage in V measured in the DC link circuit.

P009 Output current

Apparent current in AC A.

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P01. Status displays

P010 Inverter status

The output stage can have the following states:

- Disabled
- Enabled

P011 Operating state

The following operating states are possible (7 segment display):

- 0: 24 V operation (inverter not ready for operation)
- 1: Controller inhibit
- 2: No enable
- 3: Standstill current
- 4: Enable (VFC)
- 5: Enab. (N-control)
- 6: Torque control
- 7: Position hold control
- 8: Factory setting
- 9: Limit switch
- A: Technology option
- c: Reference mode
- d: Flying start in progress
- E: Encoder calibration
- F: Fault
- H: Manual mode
- t: Waiting for data
- U: STO

P012 Fault status

Error number and error in text form.

P013 Current parameter set

Parameter set 1 or 2.

P014 Heat sink temperature

Heat sink temperature of the device in the range -40 – 125 °C.

P015 Power-applied hours

The total of hours in which the device was connected to the supply system or an external DC 24 V supply.

Storage cycle: 15 min

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P016 Enable hours

Total number of hours for which the device was in "enable".

Storage cycle: 15 min

P017 Work

Total of the active energy the motor has consumed.

Storage cycle: 15 min

P018/P019 KTY utilization 1/2

Display 0%: Motor is not in operation at max. ambient temperature.

Display 110%: Switch-off point of motor

P02. Analog setpoints

P020/P021 Analog input AI1/AI2

Voltage (-10 V – +10 V) at analog input AI1 (020) and at the optional analog input AI2 (021).

If *P112 AI1 Operating mode* = N-MAX, 0(4) – 20 mA and S11 = ON, then *P020* displays 0(1) – 5 V ≙ 0(4) – 20 mA.

P022 External current limiting

If *P120 AI2 operating mode (optional)* = 0 – 10 V I-limit, then *P022* is used to display the active external current limiting.

P03. Digital inputs of basic device

P030 – P037 Digital inputs DI00 – DI07

Current state of the input terminals DI00 – DI07 and the current function assignment.

Observe that digital input DI00 is always assigned with the controller inhibit.

Refer to *P60* for the menu selection. *Digital inputs of basic device* (→ 🗎 272)

P039 Digital inputs DI00 – DI07

Standard digital inputs DI00 – DI07.

P04. Digital inputs option

P040 – P047 Digital inputs DI10 – DI17

Current status of the digital input on an option card (e.g. DIO) with the current function assignment.

If the option is not installed, the display will show "–".

Refer to *P61* for the menu selection. *Digital inputs option* (→ 🗎 273).

P048 Digital inputs DI10 – DI17

Optional digital inputs DO10 – DO17

P05. Digital outputs basic device

P050 – P055 Digital outputs DB00, DO01 – DO05

Current status of the digital output in the basic device, and current function assignment.

The output DB00 is always programmed to the "/Brake" function.

Refer to *P62* for the menu selection. *Digital outputs basic device* (→ 🗎 274).

P059 Digital outputs DB00, DO01 – DO05

Digital outputs DB00 and DO01 – DO05

P06. Digital outputs option

P060 – P067 Digital outputs DO10 – DO17

Current status of the digital output in the option (e.g. DIO), and current function assignment.

If the option is not installed, the display will show "–".

Refer to *P63* for the menu selection. *Digital outputs option* (→ 🗎 275).

P068 Digital outputs DO10 – DO17

Optional digital outputs DO10 – DO17

P07. Device data

P070 Device type

Device designation, e.g. MDX60B0014-5A3.

P071 Nominal output current

Rms value of nominal output current in A.

P072 Option/firmware encoder slot

Installed encoder card and its program version.

P073 Option/firmware fieldbus option slot

Installed fieldbus interface and its program version.

P074 Option/firmware expansion slot

Installed option cards and their program version, in case the option has a program memory

P076 Firmware basic device

Part number and version of the program for the firmware used in the basic device.

P077 Firmware digital operator panel

Part number and version of the program for the firmware used in the operator panel. Only displayed in the digital operator panel.

P078 Technology function

Setting in the technology function

- Standard: Operating settings for the drive inverter with the functions described in the system manual (positioning, speed control, etc.).
- Electronic cam: Setting for using the technology function "Electronic cam" to coordinate the operation of several drives. Requirements:
  – Motor with encoder feedback
  – Inverter in "Technology" design
- Int. synchronous operation: Setting for using the technology function "Electronic synchronous operation" to synchronize the operation of several drives with accurate positioning. Prerequisites are:
  – Motor with encoder feedback
  – Inverter in "Technology" design
- Auto ASR: Special solution for optimum load distribution of the drive power for running gear with multi-axis drive.
- SBUS / TP: A special solution for event controlled data transmission depending on the touchprobe result.
- Cross cutter: Special solution for synchronizing a slave that follows the master using a certain travel profile.

P079 Device design

Indication of the device design.

Technology: Application modules and technology functions can be used.

Standard: Application modules and technology functions cannot be used.

P08. Fault memory

P080 – P084 Faults t-0 – t-4

The device has 5 fault memories (t-0 to t4-). The faults are saved in chronological sequence. The last fault result is stored in the fault memory t-0. In the case of more than 5 faults, the oldest fault result is deleted from the fault memory t-4.

The following information is stored and displayed when an error occurs:

- Status ("0" or "1") of the digital inputs/outputs
- Operating state of the inverter
- Inverter status
- Heat sink temperature
- Speed
- Output current
- Active current
- Device utilization
- DC link voltage
- Operating hours
- Enable hours
- Parameter set
- Motor utilization 1 and 2

P09. Bus diagnostics

P090 PD configuration

Set process data word configuration.

P091 Fieldbus type

Installed fieldbus type:

- PROFIBUS DP
- INTERBUS
- INTERBUS with FOC
- Ethernet
- DeviceNet™
- NO FIELDBUS

P092 Fieldbus baud rate

Active baud rate.

P093 Fieldbus address

Address of the inverter on the fieldbus.

P094 – P096 PO1 – PO3 setpoint

Currently transferred value of the process output data words (→ 🗎 305) in hexadecimal form.

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P097 – P099 PI1 – PI3 actual value

Currently transferred value of the process output data words (→ 🗎 306) in hexadecimal form.

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8.3.3 Parameter group 1: Setpoints/ramp generators

P10. Setpoint selection

P100 (→ 🗎 224) and *P101* (→ 🗎 225) can also be used for selecting a communication interface as the setpoint or control signal source. However, the interfaces are not automatically deactivated with these parameters because the drive inverter must remain ready to receive via all interfaces at any time.

Fixed setpoint always have a higher priority than other setpoints.

If the drive inverter is in the sate "t = Waiting for data", check the timeout intervals of parameter *P812* (→ 🗎 297), *P819* (→ 🗎 298) and, if necessary, switch off timeout monitoring by entering 0 s or 650 s.

P100 Setpoint source

This parameter is used for setting from where the inverter obtains its setpoint.

- Bipolar/fixed setpoint: The setpoint is provided by the analog inputs (AI1/AI2) or by *P16. Fixed setpoints 1* (→ 🗎 239), if selected via *P60. Digital inputs basic device* (→ 🗎 272) / *P61. Digital inputs option* (→ 🗎 273). The setpoints are processed according to their signs. A positive setpoint causes CW rotation; a negative setpoint produces CCW rotation.
- **Unipolar/fixed setpoint**: The setpoint is provided by the analog inputs or the fixed setpoints. Negative analog setpoints result in a setpoint of zero. The fixed setpoints are processed in accordance to their values. The direction of rotation is specified via *P60. Digital inputs basic device* (→ 🗎 272) / *P61. Digital inputs option* (→ 🗎 273).
- RS485/fixed setpoint: The setpoint is obtained from the RS485 interface.
- Fieldbus: The setpoint is obtained from the fieldbus interface.
- Motor potentiometer/fixed setpoint: The setpoint is generated by the internal motor potentiometer. For this purpose, one digital input must be programmed to *Motor potentiometer up*, and another digital input to *Motor potentiometer down*. The digital inputs must be activated accordingly. The direction of rotation is specified by the digital inputs CW/stop and CCW/stop. Refer to *P15. Motor potentiometer* (→ 🗎 237).
- Motor potentiometer + analog setpoint: The setpoint is defined by the total of the motor potentiometer and the setpoint selection at analog input AI1. The analog setpoint is processed as a signed setpoint. If the sum is negative, n_{min} applies. The direction of rotation is specified via digital inputs. In addition, the settings of *P112 AI1 operating mode* apply (→ 🗎 228). Refer to *P15. Motor potentiometer* (→ 🗎 237).
- Fixed setpoint + AI01: The setpoint is defined by the total of the selected fixed setpoint and the setpoint selection at analog input AI1. The fixed setpoint is processed without sign (= according to its value) and the analog setpoint is processed as a signed setpoint. If the total is negative or if a fixed setpoint has not been selected, n_{min} applies. The direction of rotation is specified via digital inputs. Refer to *P16. Fixed setpoints 1* (→ 🗎 239).
- Fixed setpoint * AI01: The value at analog input AI1 serves as evaluation factor (0 – 10 V ≙ 0 – 100%) for the selected fixed setpoint. The fixed setpoint is processed without sign (= according to the value). If the voltage at analog input AI1 is negative or if no fixed setpoint is selected n_{min} applies. The direction of rotation is specified via digital inputs. Refer to *P16. Fixed setpoints 1* (→ 🗎 239).
- Master SBus 1: The setpoint is provided by the master in master/slave operation via system bus 1. Refer to *P75. Master/slave function* (→ 🗎 286).

- Master RS485: The setpoint comes from the master in master/slave operation via the RS485 interface. Refer to *P75. Master/slave function* (→ 🗎 286).
- SBus 1/fixed setpoint: The setpoint is selected via the system bus 1. Refer to the IPOS^PLUS® manual.
- Frequency setpoint input/fixed setpoint: Setting *P100 Setpoint source* to the function "Frequency input" causes the setpoint speed to be set via digital input DI04 in form of a frequency. For this purpose, digital input DI04 (→ 🗎 272) must be set to "No function" and DIP switch S14 must be set to "ON" position. The digital input works with PLC-compatible input signals that are specified as follows:
  – 0 – 7 V -> low level
  – 7 – 24 V -> high level
  – This means an HTL rotary encoder can for example be connected to the digital input to serve as a reference input variable encoder. The pulses from this encoder are then counted via digital input DI04 and a setpoint is calculated for the device. The pulse duty factor (pulse width of the high and low signal) should be about 1 : 1. The factor determines the rising edge and the falling edge of the input signal. Use *P102 Frequency scaling* (→ 🗎 226) to determine at which input frequency the system setpoint (torque or speed) reaches 100%. The reference of the system setpoint is set via" P112 AI1 Operation mode" (→ 🗎 228) (→ 🗎 228). The direction of rotation is specified by the digital inputs CW/stop and CCW/stop.

Frequency scaling	Minimum response time (delay)	Frequency input resolution
25 – 120 kHz	20 ms	50 Hz
125 – 24.99 kHz	40 ms	25 Hz
10 – 12.94 kHz	60 ms	16.7 Hz
1 – 9.99 kHz	500 ms	2 Hz

  – The number of pulses detected at digital input DI04 is mapped to the IPOS variable H508. The maximum input frequency is 65 kHz.

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IPOS variable H508 is also used when *P916 Ramp type* (→ 🗎 314) is set to "Position interpolation 16 bit".

IPOS variable H508 only provides meaningful values when

- DIP switch S14 = "ON" or
- P916 Ramp type = "Position interpolation 16 bit"

- SBus 2/fixed setpoint: The setpoint is selected via the system bus 2. Refer to the IPOS^PLUS® manual.
- IPOS: The actual value of variable H524 is used as setpoint.

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P101 Control signal source

This parameter is used to set the source of the control commands for the inverter (controller inhibit, enable, CW, CCW, ...). Control via IPOS^PLUS® is taken into account disregarding of *P101*.

- **Terminals**: Controlled via digital inputs.

- RS485: Controlled via the RS485 interface and the digital inputs.
- Fieldbus: Controlled via the fieldbus and the digital inputs.
- SBus: Controlled via the system bus and the digital inputs.

P102 Frequency scaling

Setting range: 0.1 – **10** – 65 kHz

Only effective, if *P100* (→ 224) is set to "Frequency input". Is set to determine at which input frequency the system setpoint (torque or speed) of 100% is reached.

P105 Error response to wire break AI1

Setting range: **No response**/Immediate stop/Fault/Rapid stop/Fault/Rapid stop/Warning

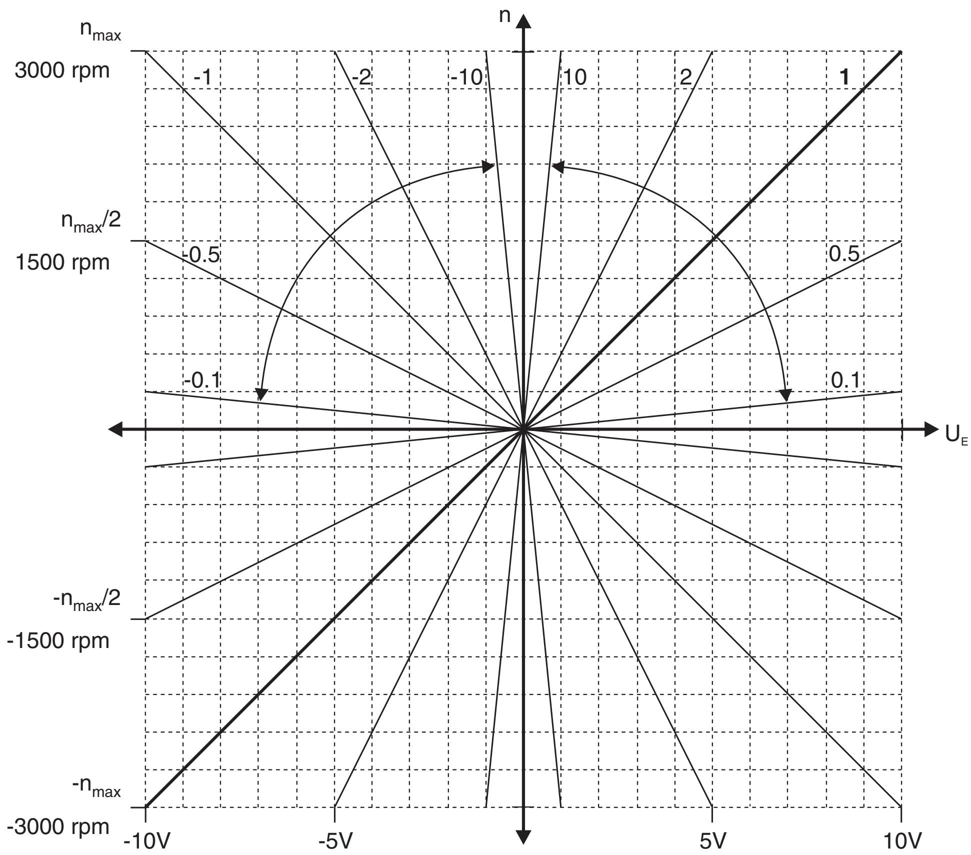
Only effective if *P112 AI1 Operating mode* (→ 228) is set to "4 – 20 mA, reference maximum speed". If analog input AI1 is used as current input 4 – 20 mA, the set response will be triggered in the event of a wire break (measured current < 2 mA). If a response is set, error message F113 will be issued.

P11. Analog input AI1

P110 AI1 scaling

Setting range: -10 – 0 – **1** – 10

The slope of the setpoint characteristic curve is defined. Depending on *P112 AI1 operating mode* (→ 🗎 228), with AI1 scaling = 1 and an input voltage V_I of ±10 V, the setpoint ±3000 min^{-1} or $\pm n_{max}$ is set.



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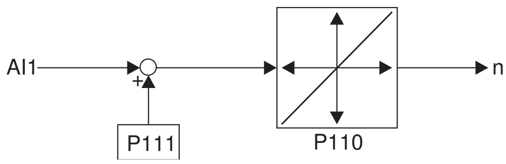
With *P100 Setpoint source* (→ 🗎 224) = *unipolar/fixed setpoint*, only the first quadrant can be used. Negative setpoint selections create the setpoint zero. If a current input is set in *P112 AI1 Operating mode* (→ 🗎 228), *P110 AI1 Scaling* is ineffective.

P111 AI1 Offset

Setting range: -500 – **0** – 500 mV

When the setpoint is selected by an external controller, it is possible to compensate for a voltage offset present at analog input AI1 when the setpoint selection is zero. Setting this parameter causes calibration of the coordinate basic origin. This setting takes effect in all AI1 operating modes.



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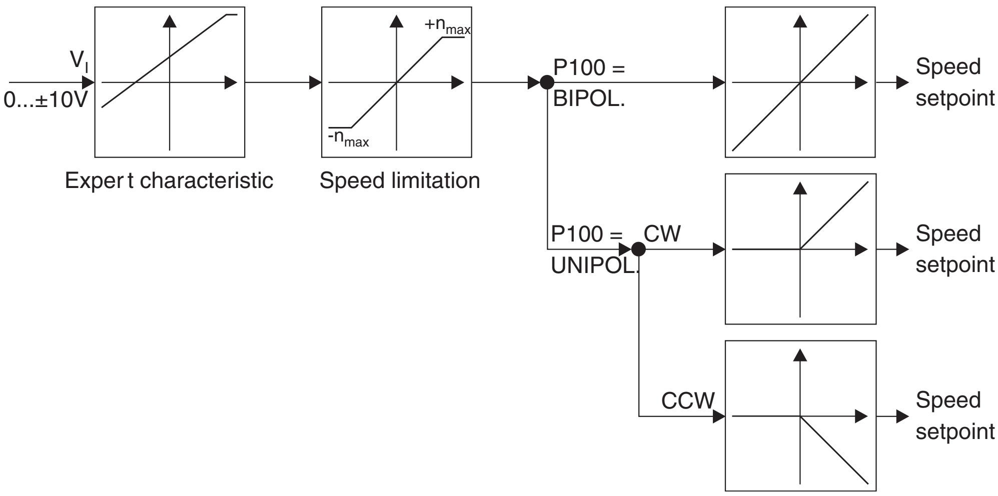
P112 AI1 operating mode

The selection for the AI1 operating mode differentiates between various characteristic curves and voltage/current input.

- **10 V, reference potential maximum speed**: Voltage input with reference n_{max} (*P302/P312 Maximum speed 1/2* (→ 🗎 250)). The characteristic can be adapted using P110 AI1 scaling (→ 🗎 227). *P113 AI1 voltage offset* (→ 🗎 229) and *P114 AI1 speed offset* (→ 🗎 230)are ineffective.
- 10 V, reference 3000 1/min: Voltage input with reference 3000 min^{-1}. The characteristic can be adapted using *P110 AI1 scaling* (→ 🗎 227). *P113 AI1 voltage offset* (→ 🗎 229) and *P114 AI1 speed offset* (→ 🗎 230)are ineffective.
- Voltage offset, reference maximum speed: Voltage input with reference n_{max}. The characteristic can be adapted using *P113 AI1 voltage offset* (→ 🗎 229). *P110 AI1 scaling* (→ 🗎 227) and *P114 AI1 speed offset* (→ 🗎 230) are ineffective.
- Speed offset, reference maximum speed: Voltage input with reference n_{max}. The characteristic can be adapted using *P114 AI1 speed offset* (→ 🗎 230). *P110 AI1 Scaling* (→ 🗎 227) and *P113 AI1 Voltage offset* (→ 🗎 229) are ineffective.
- Expert characteristic: Free choice of reference between setpoint voltage and speed. The characteristic can be adapted using *P110 AI1 scaling* (→ 🗎 227) (reference 3000 min^{-1}), *P113 AI1 voltage offset* (→ 🗎 229) and *P114 AI1 speed offset* (→ 🗎 230). The following structural diagram shows how a speed setpoint is created from an expert characteristic curve.
- 0 – 20 mA, reference maximum speed: Current input 0 – 20 mA = 0 – n_{max}, no setting options (*P110 AI1 scaling* (→ 🗎 227) ineffective). Set the internal resistance (250 Ω) "S11 = ON".
- 4 – 20 mA, reference maximum speed: Current input 4 – 20 mA = 0 – n_{max}, no setting options (*P110 AI1 scaling* (→ 🗎 227) ineffective). Set the internal resistance (250 Ω) "S11 = ON". This setting means that analog input AI1 is monitored for wire break (see *P105* (→ 🗎 226)).



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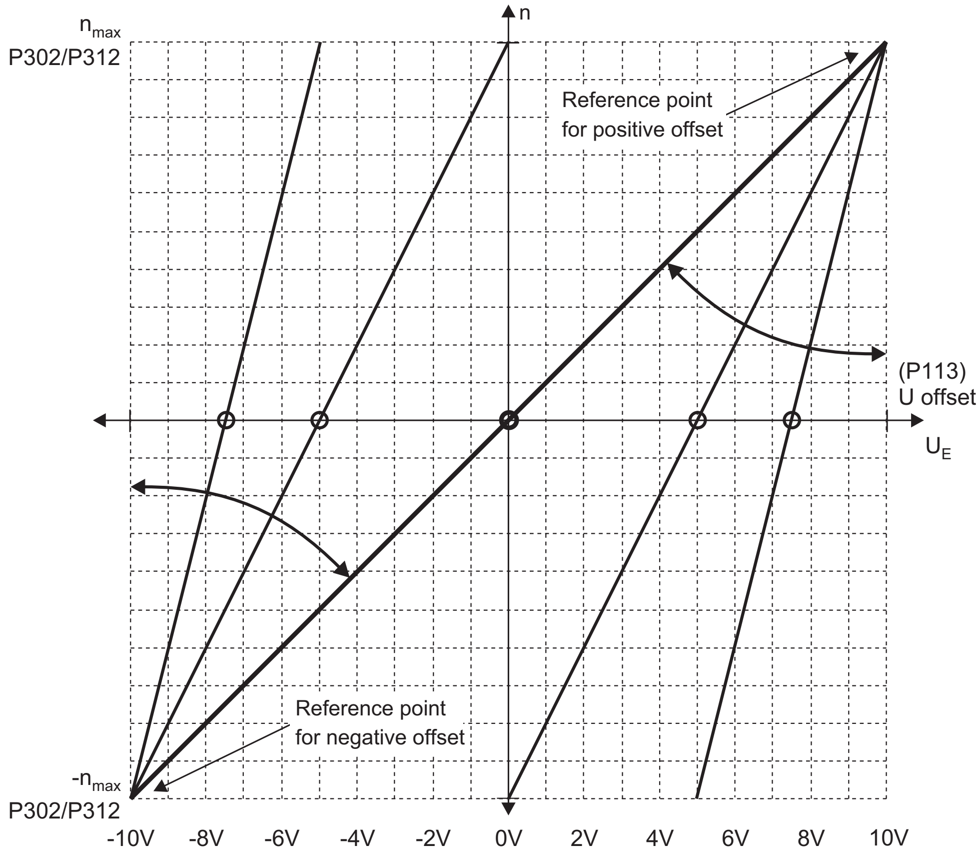
P113 AI1 voltage offset

Setting range: -10 – **0** – 10 V

The zero crossing of the setpoint characteristic curve can be moved along the U_E axis.



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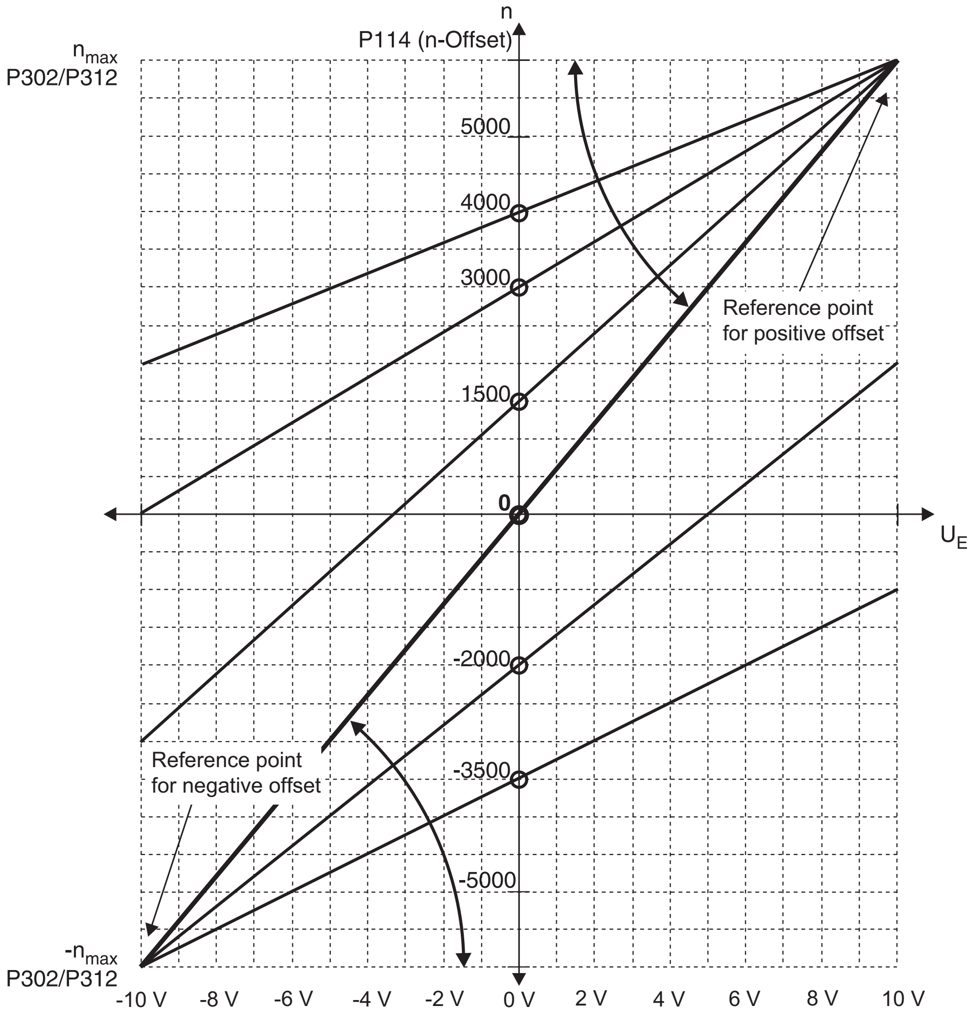
P114 AI1 speed offset

Setting range: -6000 – **0** – 6000 min^{-1}

The zero crossing of the setpoint characteristic curve can be moved along the n-axis.



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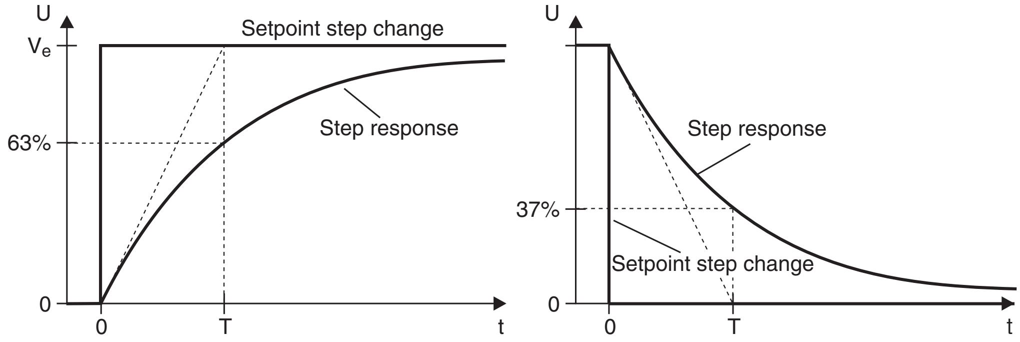
P115 Filter setpoint

Setting range: T = 0 – **5** – 100 ms (0 = setpoint filter off)

The speed ramp is filtered. The filter can be used for dampening stepped setpoint selections, e.g. from external controllers or interference pulses at the analog input. Also applies to torque control.



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Sample expert characteristics

(*P112 AI1 Operating mode* (→ 🗎 228) = Expert characteristics)

There is a free choice of reference between setpoint voltage and speed in the expert characteristic. Set parameter *P100 Setpoint source* (→ 🗎 224) = *Bipolar/fixed setpoint* to make full use of the possibilities of the expert characteristic.

One point in the characteristic curve (in the following figure indicated with a circle) will be determined with *P113 AI1 voltage offset* (→ 🗎 229) and *P114 AI1 speed offset* (→ 🗎 230); the slope will then be set with *P110 AI1 Scaling* (→ 🗎 227). Reference 3000 min^{-1} always applies to scaling with the expert characteristic.

The speed range is restricted by *P302/P312 Maximum speed 1/2* (→ 🗎 250). In the following figure, *P302 Maximum speed 1* (→ 🗎 250) is set to 4000 min^{-1}. Setting the maximum speed does not change the slope.

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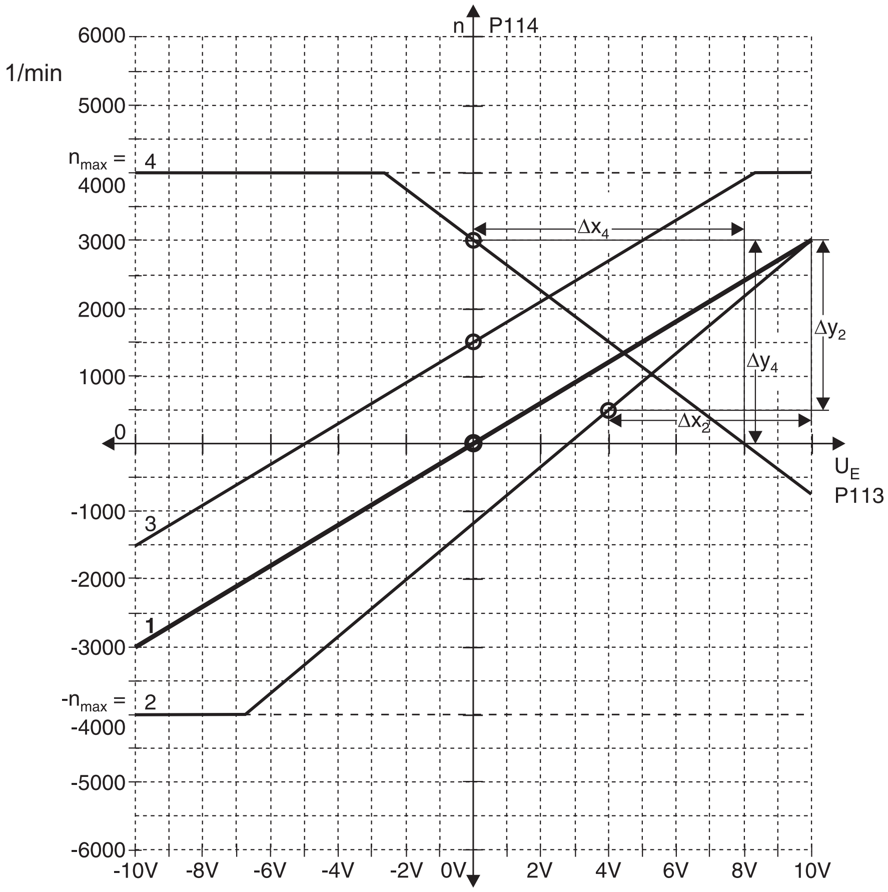
The voltage value of the x-axis must be converted to a speed value for calculating the slope triangle Δy/Δx = slope = setting value for *P110 AI1 scaling* (→ 🗎 227). The following applies: 10 V ≙ 3000 min^{-1}.



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The following slope triangles are calculated for characteristic curves 2 and 4 in the previous figure. This determines the settings for *P110 AI1 scaling* (→ 🗎 227).

Characteristic 2: Δy_2 = 2500 min^{-1}, Δx_2 = 6 V ≙ 1800 min^{-1}, $\Delta y_2/\Delta x_2$ = 2500/1800 = 1.39

Characteristic 4: Δy_4 = -3000 min^{-1}, Δx_4 = 8 V ≙ 2400 min^{-1}, $\Delta y_4/\Delta x_4$ = -3000/2400 = -1.25

The shown expert characteristics are created as follows:

Characteristic curve	P113 AI1 voltage offset (→ 🗎 229) V	P114 AI1 speed offset (→ 🗎 230) min^{-1}	P110 AI1 scaling (→ 🗎 227) (slope)
1	0	0	1
2	4	500	1.39
3	0	1500	1
4	0	3000	-1.25

The expert characteristic can also be used with *P100 Setpoint source* (→ 🗎 224) = *unipolar/fixed setpoint*. The direction of rotation is then specified via digital inputs. The expert characteristic curve is reflected on the x-axis. The section below the x-axis results in a speed setpoint = 0. If the direction of rotation "CW" is specified, then move-

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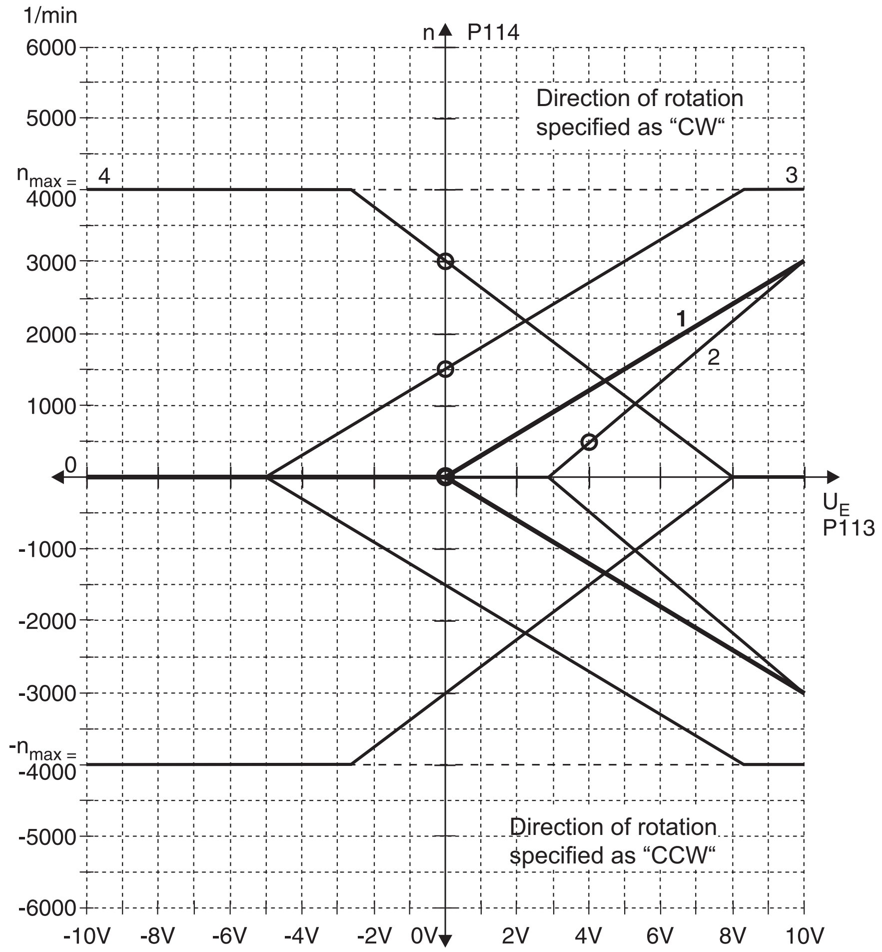
ment is only possible at speeds in the range 0 – n_{max}, while the range 0 – $-n_{max}$ applies if the direction of rotation "CCW" is specified. The following figure shows the expert characteristic curve from the previous figure with the setting *P100 Setpoint source* (→ 🗎 224) = *Unipolar/fixed setpoint*.



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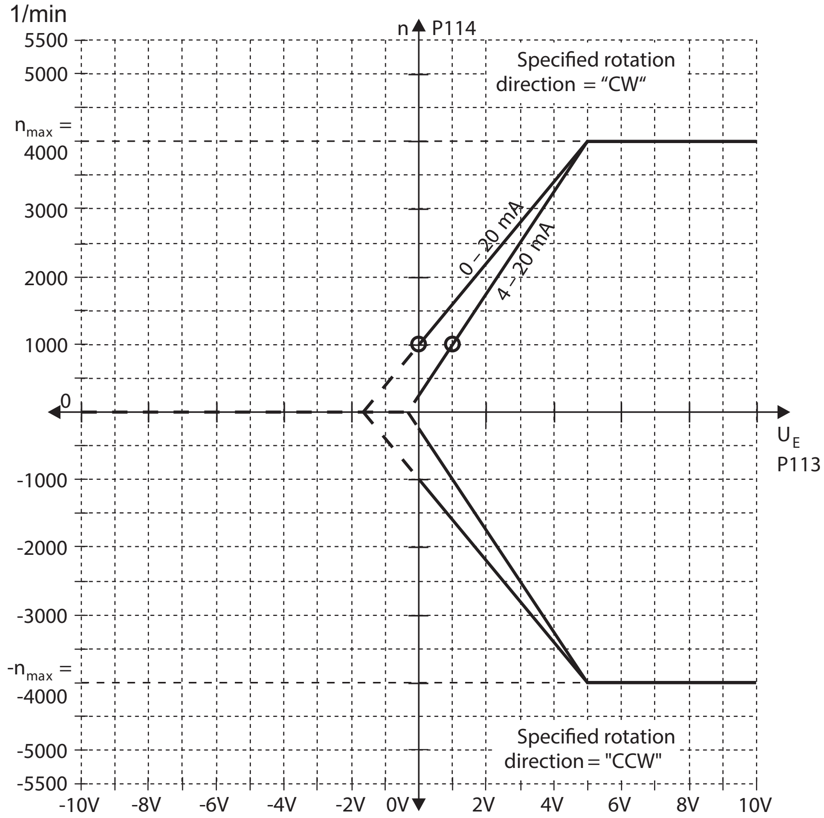
The shown expert characteristics are created as follows:

Char-acter-istic curve	P113 AI1 voltage off-set (→ 🗎 229) V	P114 AI1 speed offset (→ 🗎 230) min^{-1}	P110 AI1 scaling (→ 🗎 227) (slope)
1	0	0	1
2	4	500	1.39
3	0	1500	1
4	0	3000	-1.25

Expert characteristic curve with current setpoints

Voltage signals are required at the analog input AI11/AI12 for the expert characteristic to function. Switch S11 (changeover I-signal/U-signal) must be set to ON and the current signal routed to X11:2 AI11 if an impressed current of 0(4) – 20 mA is available as the setpoint. The internal resistance (250 Ω) converts the 0(4) – 20 mA setpoints into 0 (1) – 5 V voltage signals.



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Set the expert characteristic as follows to achieve speeds of 1000 – 4000 min^{-1}, for example, with 0 (4) – 20 mA:

for 0 – 20 mA:	*P110* = 2	*P113* = 0 V	*P114* = 1000 min^{-1}	*P302* (n_{max}) = 4000 min^{-1}
for 4 – 20 mA:	*P110* = 2.5	*P113* = 1 V	*P114* = 1000 min^{-1}	*P302* (n_{max}) = 4000 min^{-1}

Set *P100 Setpoint source* (→ 🖹 224) = *Unipolar/fixed setpoint*. The direction of rotation is then specified via digital inputs.

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P12. Analog inputs option

P120 AI2 operating mode (optional)

Analog input AI2 is only available with the optional input/output card (DIO11B).

- **No function**: The setpoint on AI2 is not used.
- 0 – ±10 V + setpoint: The setpoint at AI2 is added to setpoint 1 (= AI1) observing the signs. ±10 V ≙ $\pm n_{max}$ (reference n_{max}).
- 0 – 10 V current limiting: The input serves as external current limiting. 0 – 10 V ≙ 0 – 100% of the internally set current limiting:
  - In V/f and VFC operating modes: *P303/P312 Current limit 1/2* (→ 🗎 251)
  - In CFC and SERVO operating modes: *P304 Torque limit* (→ 🗎 251)
- Actual value PID controller: Feedback of actual value for process controller (→ 🗎 248)

P13./P14. Speed ramps 1/2

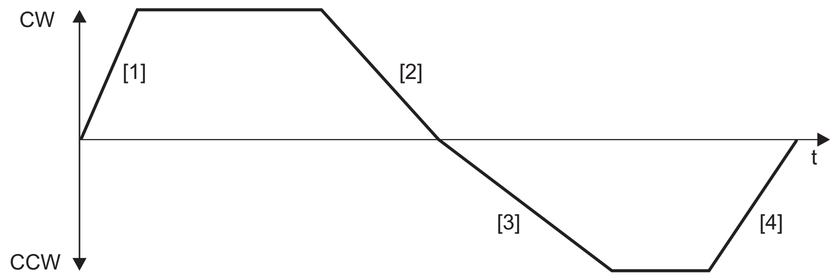
P130 – P133 / P140 – P143 ramp t11 / t21 up/down CW/CCW 1 2

Setting range: 0 – **2** – 2000 s

Specifically, the parameters are:

- *P130 Ramp t11 up CW* / *P140 Ramp t21 up CW*
- *P131 Ramp t11 down CW* / *P141 Ramp t21 down CW*
- *P132 Ramp t11 up CCW* / *P142 Ramp t21 up CCW*
- *P133 Ramp t11 down CCW* / *P143 Ramp t21 down CCW*

The ramp times refer to a setpoint step change of $\Delta n = 3000\ min^{-1}$. The ramp takes effect when the speed setpoint is changed and the enable signal is revoked via the CW/CCW terminal.



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[1] Ramp up CW
[2] Ramp down CW
[3] Ramp up CCW
[4] Ramp down CCW

P134/P144 Ramp t12/t22 UP = DOWN 1 2

Setting range: 0 – **10** – 2000 s

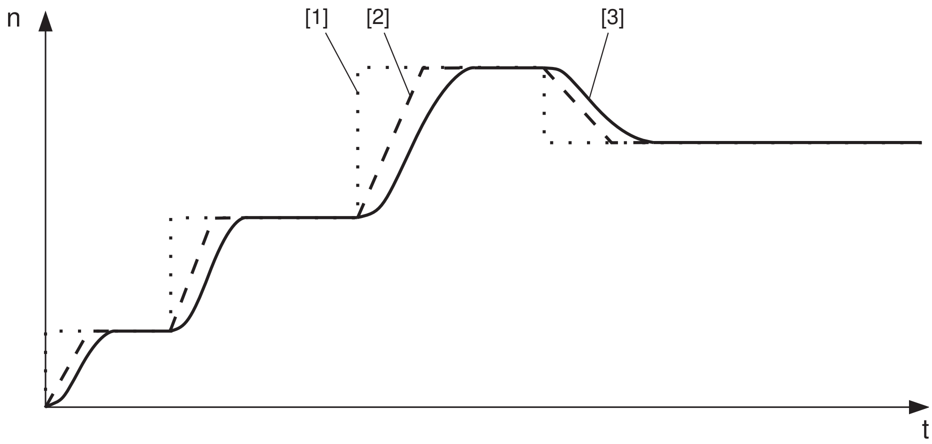
The following applies to this ramp: UP = DOWN and CW = CCW.

Ramps t12/t22 are activated via a digital input (→ 🗎 272), which is programmed with the function "Speed ramp switchover".

P135/P145 S pattern t12/t22

Setting range: **0** – 3 (**0 = Off**, 1 = weak, 2 = medium, 3 = strong)

In order to achieve gentler drive acceleration, the 2nd ramp (t12/t22) can be rounded with 3 pattern grades.



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[1] Setpoint input
[2] Speed without S pattern
[3] Speed with S pattern

A started S pattern is interrupted by the stop ramp t13/t23 and a changeover to ramp t11/t21. Revoking the setpoint or a stop via the input terminals causes the started S curve to be completed. This allows the drive to continue to accelerate despite the fact that the setpoint has been withdrawn.

P136/P146 Stop ramp t13/t23

Setting range: 0 – **2** – 20 s

Activated by withdrawing the "Enable" terminal or by an error (→ 🗎 299).

P137/P147 Emergency stop ramp t14/t24 AUTO

Setting range: 0 – **2** – 20 s

Activated by a fault (→ 🗎 299).

The function monitors whether the drive reaches zero speed within the set time. After the set time expires, the output stage is inhibited and the brake applied even if zero drive speed has not yet been reached.

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P138 Ramp limit VFC 1 2

Setting range: **Yes**/No

The ramp limit restricts the smallest possible ramp time to 100 ms in the VFC and V/F operating modes (→ 🗎 280) (reference: Δn = 3000 min^{-1}). Settings shorter than 10 ms are ignored. In this case, the ramp time is 100 ms. The ramp limitation limits the maximum output current to the value set in *P303/P312* (→ 🗎 251). Active stall protection is implemented for the connected motor using the current limiting controller when ramp limit is activated.

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There is no active stall protection for the connected motor when ramp limit is deactivated and ramp times of less than 100 ms are used. Parameters *P303/P313 Current limit 1/2* (→ 🗎 251) will be ineffective. If a maximum output current of 185% of the nominal output current is exceeded (applies to sizes 1 to 6; 225% apply to size 0) for more than 60 ms, the inverter will switch off indicating fault F01 Overcurrent and according to the "Immediate switch-off" fault response.

P139/P149 Ramp monitoring 1/2 1 2

Setting range: On/**off**

If you set the deceleration ramps to a value that is much shorter than can be physically achieved in the system, the turning drive will be stopped once the monitoring time has expired. In addition to the error message, this also leads to increased brake wear.

Even if the ramp timeout clearly occurs due to an impossible specification ramp, the adjustment of the respective ramp must be increased.

The parameter is an additional monitoring function for speed monitoring, but only applies for the downward ramp. It can be used to monitor the deceleration ramp, stop ramp or emergency stop ramp if speed monitoring is not desired.

P15. Motor potentiometer

The ramp times refer to a setpoint change of Δn = 3000 min^{-1}.

P150/P151 Ramp t3 up/down 1 2

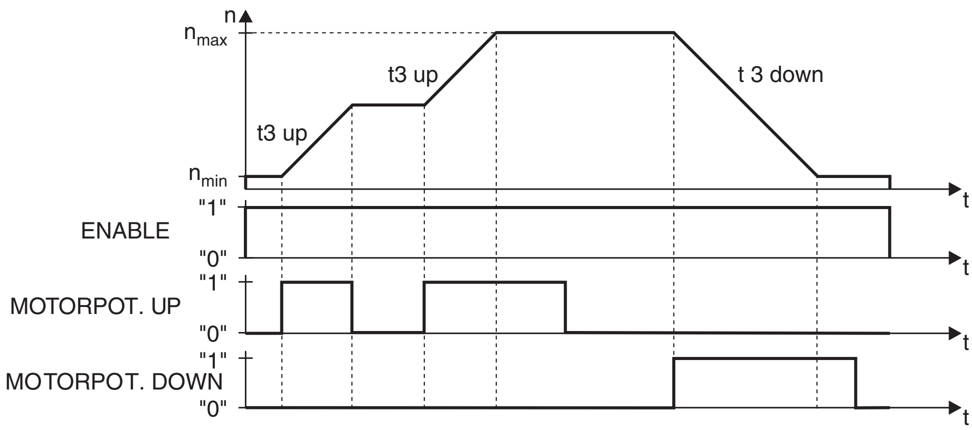
Setting range: 0.2 – **20** – 50 s

The ramp is active when the setpoint source (→ 🗎 224) is set to *Motor potentiometer/fixed setpoint* or *Motor potentiometer + analog setpoint*, and if an input terminal (→ 🗎 272) programmed to *Motor potentiometer up* or *Motor potentiometer down* has a "1" signal.

P152 Save last setpoint 1 2

Setting range: Yes/**No**

- Yes: If *motor potentiometer up* and *motor potentiometer down* = "0," the last applicable motor potentiometer setpoint is stored in the non-volatile memory 2 s afterwards. The last motor potentiometer setpoint takes effect again after power off and power on.
- **No**: The inverter starts with *P301/P311 Minimum speed 1/2* (→ 🗎 250) following power off/on or after withdrawal of the enable.



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P16./P17. Fixed setpoints 1/2

Setting range: -6000 – +6000 min^{-1}

3 internal speed setpoints, so-called fixed setpoints, can be set separately for parameter sets 1 and 2. The internal setpoints are active when an input terminal programmed to n11/n21 or n12/n22 has a "1" signal.

In the setting range of 0 – +6000 min^{-1}, the parameters have the following factory settings:

Parameter	Factory setting
P160/P170 Internal setpoint n11/n21	n11/n21 = 150 min^{-1}
P161/P171 Internal setpoint n12/n22	n12/n22 = 750 min^{-1}
P162/P172 Internal setpoint n13/n23	n13/n23 = 1500 min^{-1}

The following table shows the programming of the input terminals:

Response	Input terminal			
	n11/n21	n12/n22	Enable/stop	Parameter set 1/2
Stop with t13/t23	–	–	"0"	–
Fixed setpoint not active	"0"	"0"	"1"	"0"
n11 effective	"1"	"0"	"1"	"0"
n12 effective	"0"	"1"	"1"	"0"
n13 effective	"1"	"1"	"1"	"0"
n21 effective	"1"	"0"	"1"	"1"
n22 effective	"0"	"1"	"1"	"1"
n23 effective	"1"	"1"	"1"	"1"

The fixed setpoints of the currently inactive parameter set come into effect when this terminal is actuated ("1"-signal) if an input terminal is programmed to "Fixed setpoint switch-over".

The changeover to fixed setpoints is possible both in the inhibited and the released device state.

8.3.4 Parameter group 2: Controller parameters

P20. Speed Control

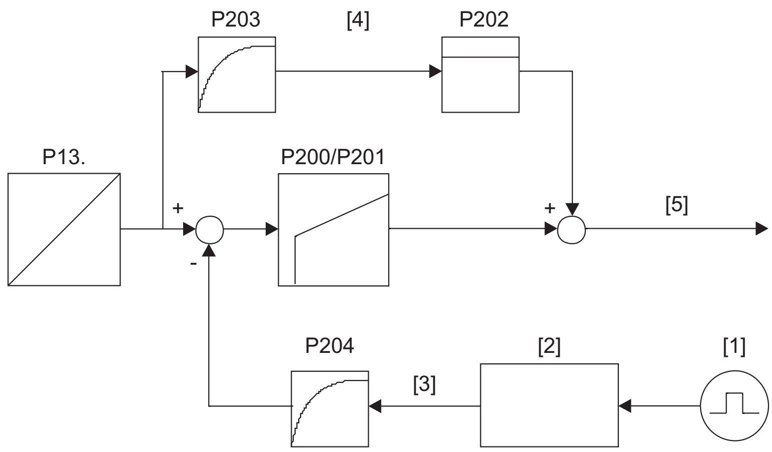
The speed control function is available only in parameter set 1.

The speed controller of MOVIDRIVE® B is a PI controller. The speed control works in the following operating modes:

- All operating modes with VFC-n control
- CFC operating modes: The speed controller is active in "CFC & Torque control" only when speed limitation is active.
- Servo operating modes: The speed controller is only active in "Servo & Torque control" when speed limitation is active.

The startup functions of the MOVITOOLS® MotionStudio engineering software support the adjustment of all relevant parameters for speed control. Direct changes to individual parameters should be made only by specialists.

The following figure shows the controller structure of the parameters for speed control:



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[1]	Incremental encoder/resolver
[2]	Signal processor
[3]	Actual speed value
[4]	Acceleration precontrol
[5]	Torque setpoint
P13.	Parameters of speed ramp
P200/P201	PI-controller
P203	Filter acceleration precontrol
P202	Gain acceleration precontrol
P204	Filter actual speed value

P200 P gain n controller AUTO

Setting range: 0.01 – **2** – 32

Gain factor of the P component of the speed controller

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P201 Time constant n-controller AUTO

Setting range: 0 – **10** – 3000 ms

Integration time constant of the speed controller

The I component reacts inversely proportionate to the time constant: A large numerical value results in a small I component. However, a zero value means "no I component".

P202 Gain acceleration precontrol AUTO

Setting range: **0** – 65

Gain factor of acceleration precontrol which improves the guide behavior of the speed controller.

P203 Filter acceleration precontrol AUTO

Setting range: **0** – 100 ms

Filter time constant of acceleration precontrol which improves the guide behavior of the speed controller. The differentiator is programmed and cannot be changed.

P204 Actual speed value filter AUTO

Setting range: **0** – 32 ms

Filter time constant of the actual speed value filter

P205 Load precontrol CFC

The parameter is only effective in "CFC and "Servo" operating modes.

Setting range: -150% – **0** – +150%

Determines the initial value of the torque setpoint upon enable. The parameter must be set if increased starting torque is required when the drive is enabled. For example, a parameter value greater than 0% makes it possible to prevent the unwanted sagging of hoists when the brake is released. This function should only be used in hoists without counterweight.

Recommended setting: Value of the active current (→ 🗎 217) at speed zero (n = 0)

P206 Sampling cycle n-controller

The parameter is only effective in "CFC and "Servo" operating modes.

Setting range: **1 ms**/0.5 ms

Setting the time to 0.5 ms improves speed control for dynamic drives with low moment of inertia.

P207 Load precontrol VFC

The parameter is effective only in the operating modes with "VFC n-control".

Setting range: -150% – **Off** – 150%

Determines the initial value of slip control upon enable.

If the parameter value is greater than 0%, the slip control is pre-stressed and the motor develops more torque upon enable. This setting can, for example, prevent the unwanted sagging of hoists when the brake is released. This function should only be used in hoists without counterweight.

Parameter values greater than 150% switch off the function (no pre-stressing). In the "VFC & Hoist" operating mode, the preload 0.5 x s_N is effective with a parameter value of greater than 150% (s_N = nominal slip of the connected motor).

Recommended setting: Value of the active current (→ 🗎 217) at minimal speed

P21. Hold controller

The position hold control function is only available in parameter set 1.

Serves for drift-free standstill control of the drive. The position hold control can only be activated in operating modes with speed control (encoder feedback).

Position hold control is active when an input terminal (→ 🗎 272) programmed to /Position hold control has a "0" signal. The device then performs a stop using the "t11 up" or "t21 down" ramp. If the drive reaches speed zero, it is held in the position that is valid at this point.

The startup function of the speed controller in the MOVITOOLS® MotionStudio engineering software supports adjustment of the gain factor.

The 7-segment display of the device shows the status "A1.7" when position hold control is active.

P210 P-gain hold controller AUTO

Setting range: 0.1 – **0.5** – 32

Corresponds to the proportional gain of a position controller. The parameter is only effective when the "position hold control" function is activated.

P22. Synchronous operation control

Synchronous operation control only in parameter set 1 and with the DRS11B option.

Refer to the “MDX61B - Synchronous Operation Card DRS11B“ manual for a detailed description.

P220 P-gain DRS

Setting range: 1 – **10** – 200

Gain of the synchronous operation controller in the slave drive. This determines the control response of the slave drive depending on the angle differentials in relation to the master drive.

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P221/P222 Master gear ratio factor / Slave gear ratio factor

Setting range: **1** – 3 999 999 999

These settings are only required with the slave inverter. These parameters are used to set the position measurement ratio between master drive and slave drive. The ratio is entered as the quotient of master to slave drive to include non-integer ratios.

Note that position measurement of the master and slave drives can only occur using the motor encoders **if there is positive power transmission (without slip)**. Position measurement has to be via an **additional encoder (external encoder)** in all applications in which power transmission between motor shaft and machine is **non-positive** and thus slip is to be expected. Install the encoder on the moving machine component with a positive connection.

P223 Mode selection

Setting range: **Mode 1**/Mode 2/Mode 3/Mode 4/Mode 5/Mode 6/Mode 7/Mode 8

Mode selection determines how the slave drive responds to a free-running signal.

- **Mode 1**: Free-running unlimited, new reference point
  - Free-running is active when a "1" signal is set at X40:1.
  - The input terminals and setpoints of the slave drive are effective in free-running mode.
  - An angular offset generated in free-running mode is not processed when synchronization is started again.
- Mode 2: Free-running unlimited, offset is processed
  - Free-running is active when a "1" signal is set at X40:1.
  - The input terminals and setpoints of the slave drive are effective in free-running mode.
  - An angular offset generated during free-running mode is reduced to zero when synchronization is started again.
- Mode 3: Free-running unlimited, offset generated is processed + *P224* (→ 🗎 245)
  - Free-running is active when a "1" signal is set at X40:1.
  - The input terminals and setpoints of the slave drive are effective in free-running mode.
  - During resynchronization, in addition to the offset, the old synchronous position of the signed position offset in *P224* (→ 🗎 245) is also reduced to zero.
- Mode 4: Free-running limited by *P224 Slave counter* (→ 🗎 245), generated offset is processed
  - Free-running is activated via a "1" signal (> 100 ms) at X40:1.
  - The input terminals and setpoints of the slave drive are effective during free-running.
  - Free-running ends when the angle differential entered in *P224* (→ 🗎 245) has been reached. The angular offset is then reduced to zero.
- Mode 5: Free-running limited by *P224 Slave counter* (→ 🗎 245), new reference point
  - Free-running is activated via a "1" signal (> 100 ms) at X40:1.
  - The input terminals and setpoints of the slave drive are effective during free-running.

  - Free-running ends when the angle differential entered in *P224* (→ 🗎 245) has been reached.
  - If another "1" signal is applied at X40:1 before free-running has ended, the value at which free-running is to end increases to the value entered in *P224* (→ 🗎 245).
  - The slave drive synchronizes with the new angle differential.
- Mode 6: Temporary angular offset, new reference point
  - Free-running is active when a "1" signal is set at X40:1.
  - The input terminals and setpoints of the slave drive are effective in free-running mode.
  - An angular offset generated in free-running mode is not processed when synchronization is started again.
  - A "1" signal at X40:2, X40:3 or X40:4 on DRS11B activates an angular misalignment. Each angular offset is stored in parameters *P225/P226/P227 Offset 1/2/3* (→ 🗎 245).
  - If a "0" signal is applied again at one of the input terminals X40:2, X40:3 or X40:4, the angular misalignment is eliminated again.
- Mode 7: Permanent angular offset (phase trimming), new reference point
  - Free-running is active when a "1" signal is set at X40:1.
  - The input terminals and setpoints of the slave drive are effective in free-running mode.
  - An angular offset generated in free-running mode is not processed when synchronization is started again.
  - A "1" signal at X40:2, X40:3 or X40:4 on DRS11B activates an angular misalignment. Each angular offset is stored in parameters *P225/P226/P227 Offset 1/2/3* (→ 🗎 245).
  - If a "0" signal is applied again at one of the input terminals X40:2, X40:3 or X40:4, the angular misalignment is maintained.
  - If the input signal lasts longer than 3 seconds, the value is corrected at 4 steps per second.
- Mode 8: Free-running unlimited, new reference point + *P224* (→ 🗎 245)
  - Free-running is active when a "1" signal is set at X40:1.
  - The input terminals and setpoints of the slave drive are effective in free-running mode.
  - If a "0" signal is applied at input terminal X40:1, the slave drive synchronizes with the current position of the master drive plus the position offset stored in *P224* (→ 🗎 245).

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P224 Slave counter

Setting range: -99 999 999 – **10** – 99 999 999 increments

The angular misalignment in relation to the master drive, which can be activated in mode 3, 4, 5 and 8, is referred to as the slave counter. In contrast to the offset, this angular misalignment can be set using the "Teach In" function. Depending on the mode, this value functions as a limit value for free running or specifies a permanent angular misalignment for the slave drive in relation to the master drive (= new reference point).

P225/P226/P227 Offset 1/2/3

Setting range: -32767 – **10** – 32767 increments (only effective in mode 6 or 7)

Three separately adjustable angle differentials to which the slave drive sets itself for the duration of the "1" signal at X40:2 / X40:3 / X40:4.

P228 Precontrol filter DRS

Setting range: **0** – 100 ms

Setpoint filter for precontrol of the DRS11B synchronous operation control. The master speed (determined on the DRS..) must be filtered for optimum acceleration precontrol of the slave drive. Filtering requires the filter time constant. Value 0 indicates an unfiltered master speed.

P23. Synchronous operation with distance encoder

Synchronous operation with distance encoder only in parameter set 1 and with the DRS11B option (not in size 0).

Refer to the “MDX61B - Synchronous Operation Card DRS11B“ manual for a detailed description.

Position measurement has to be performed via an external encoder (= distance encoder) in all applications in which power transmission between the motor shaft and the machine is non-positive, which means that slip is to be expected.

P230 Distance encoder

Setting range: **Off**/equal-ranking/chain

- **Off**: Synchronous operation control with the signals on X15: "Motor encoder". *P231/P232 Factor slave encoder / Factor slave distance encoder* (→ 🗎 245) are ineffective.
- Equal-ranked: Forwarding of X42 signals: "Master encoder" at X43: "Incremental encoder output". Evaluation of *P231/P232 Factor slave encoder / Factor slave distance encoder* (→ 🗎 245).
- Chain: Forwarding of X41 signals: "Input distance encoder" at X43: "Incremental encoder output". Evaluation of *P231/P232 Factor slave encoder / Factor slave distance encoder* (→ 🗎 245).

P231/P232 Factor slave encoder / Factor slave distance encoder

Setting range: **1** – 1000

In most cases there is a mechanical gear ratio between both encoders. This gear ratio must be set using these parameters.

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P233 Distance encoder resolution

Setting range: 128/256/512/**1024**/2048

Setting the resolution of the connected distance encoder.

P234 Master encoder resolution

Setting range: 128/256/512/**1024**/2048

Setting the resolution of the connected master encoder.

P24. Synchronous operation with catch up

Synchronous operation with catch up only in parameter set 1 and with the DRS11B option.

Refer to the “MDX61B - Synchronous Operation Card DRS11B“ manual for a detailed description.

When the slave drive is switched to synchronous operation, the current angular misalignment in relation to the master is reduced to zero, depending on the operation mode selected. For this catch up procedure to be performed in a controlled manner, it is possible to set parameters for both the synchronization speed and the synchronization ramp.

P240 synchronous speed

Setting range: 0 – **1500** – 6000 min^{-1}

This parameter determines the speed of the synchronization process.

P241 Synchronization ramp

Setting range: 0 – **2** – 50 s

Value of the acceleration ramp for synchronizing the slave with the master. A value of 0 means maximum possible acceleration.

P26. Process controller parameter

P260 Operating mode

Setting range: **Controller off**/control/step response

- **Controller off**: The PID controller is deactivated.
- Control: The PID controller is active and determines the required motor speed using the control deviation and its parameters.
- Step response: A step can be specified via the setpoint (→ 🗎 248). The filtered and scaled actual value can be included for purposes of evaluation.
- *P260* and the IPOS variable H543 are identical.

P261 Cycle time

Setting range: 1/**5**/10 ms

This parameter sets the cycle time of the PID controller.

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P262 Interruption

Setting range: **No response**/Move closer to setpoint

This parameter specifies how the PID controller responds to an interruption (controller inhibit).

- **No response:** The PID controller is not affected and continues to operate as usual.
- Move closer to setpoint: After an interruption, the setpoint is set to the actual value. The PID controller then moves closer to the set value again via the setpoint ramp.

P263 Factor K_P

Setting range: 0 – **1** – 32.767

Proportional factor of the proportional share of the PID controller with 3 decimal positions. The proportional factor takes the sign (+/-) of the parameter "Direction of rotation" into account. *P263* and the IPOS variable H541 are identical.

P264 Integral time T_N

Setting range: **0** – 65535 ms

This parameter is used to set the integral time (time constant) of the integrating part of the PID controller:

- 1 ms ≤ T_N ≤ 65535 ms
- T_N = 0 → no I component

P265 Derivative time T_V

Setting range: **0** – 30 ms

This parameter is used to set the derivative time (time constant) of the differential part of the PID controller:

- 1 ms ≤ T_V ≤ 30 ms
- T_V = 0 → no D component

P266 Precontrol

Setting range: -32767 – **0** – 32767

The precontrol value is added to the result of the PID controller. *P266* and the IPOS variable H545 are identical.

P27. Process controller input values

P270 Setpoint source

Setting range: **Parameters**/IPOS variable/Analog 1/Analog 2

This parameter is used to set the source from which the setpoint should be read.

P271 Setpoint

Setting range: -32767 – **0** – 32767

If *P270* (→ 🗎 248) is set to "Parameter", the value of the parameter *P271* is used as the setpoint. *P271* and the IPOS variable H546 are identical.

P272 IPOS setpoint address

Setting range: **0** – 1023

If *P270* (→ 🗎 248) is set to "IPOS variable", the address of the variable to be used is stored in *P271* (→ 🗎 248). *P272* and the IPOS variable H547 are identical.

P273 Time constant

Setting range: **0** – 0.01 – 2000 s

This parameter is used to set the ramp for the setpoint ramp generator (reference 15000 units).

- Time constant $T_{setpoint}$ = 0 → ramp is deactivated.

P274 Scaling setpoint

Setting range: -32,767 – **1** – 32,767

Factor for scaling the setpoint. *P274* and the IPOS variable H548 are identical.

P275 Actual value source

Setting range: **Analog 1**/analog 2/IPOS variable

This parameter is used to set the source from which the actual value should be read.

P276 IPOS actual value address

Setting range: **0** – 1023

If *P275* (→ 🗎 248) is set to "IPOS variable", the address of the variable to be used is stored in *P276*. *P276* and the IPOS variable H549 are identical.

P277 Scaling actual value

Setting range: -32,767 – **1** – 32,767

Scaling factor of the filtered actual value. *P277* and the IPOS variable H550 are identical.

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P278 Offset actual value

Setting range: -32767 – **0** – 32767

This parameter is used to set an integer, permanent offset of the actual value. *P278* and the IPOS variable H552 are identical.

P279 Time constant actual value

Setting range: **0** – 500 ms

This parameter is used to set the time constant of the actual value filter. When the parameter is set to "0", the filter is deactivated.

P28. Process controller limits

The output value of the process controller is stored in the IPOS variable H524. To use the output value of the process controller as setpoint for MOVIDRIVE® B, *P100 Setpoint source* (→ 🗎 224) must be set to "IPOS setpoint".

P280 Minimum offset + actual value

Setting range: -32767 – **0** – 32767

Minimum value for the offset. *P280* and the IPOS variable H553 are identical.

P281 Maximum offset + actual value

Setting range: -32767 – **10000** – 32767

Maximum value for offset. *P281* and the IPOS variable H554 are identical.

P282 PID controller minimum output

Setting range: -32767 – **-1000** – 32767

Minimum output value of the P, I and D components. *P282* and the IPOS variable H555 are identical. For PI and PID controllers, you have to enter a negative value for enabling downward integration.

P283 PID controller maximum output

Setting range: -32767 – **10000** – 32767

Maximum output value of the P, I and D components. *P283* and the IPOS variable H556 are identical.

P284 Process controller minimum output

Setting range: -32767 – **0** – 32767

Minimum output value of the process controller (PID controller + precontrol (→ 🗎 247)). *P284* and the IPOS variable H557 are identical.

P285 Process controller maximum output

Setting range: -32767 – **7500** – 32767

Maximum output value of the process controller (PID controller + precontrol (→ 🗎 247)). *P285* and the IPOS variable H558 are identical.

8.3.5 Parameter group 3: Motor parameters

This parameter group is used to adjust the device to the motor. The parameters can be set separately for parameter set 1 and 2. Thus, 2 different motors can be operated alternately on the same device without requiring a new setting.

P30./P31. Limits 1/2

P300 / P310 Start/stop speed 1/2

The parameter is only effective in "VFC and "V/f" operating modes. The parameter has no function in "CFC" and "Servo" operating modes.

Setting range: 0 – 150 min^{-1}

Defines the smallest speed request which the device sends to the motor when enabled. The transition to the setpoint speed (determined by the setpoint selection) is made using the active acceleration ramp.

At startup without encoder, 0.5 × the nominal slip of the connected motor is set. At startup with encoder, 15 min^{-1} is set.

When a stop command is executed, this setting also determines the lowest speed at which the motor power is switched off or the post-magnetization triggered and, if applicable, the brake applied.

P301/P311 Minimum speed 1/2

Setting range: 0 – **15** – 6100 min^{-1}

The value below which the speed may not fall, even if zero is selected as the setpoint. Even if the minimum speed is less than the start-stop speed ($n_{min} < n_{start/stop}$), the minimum speed is valid.

Important:

- With hoist function activated, the smallest speed is 15 min^{-1}, regardless of the set minimum speed value.
- To enable the drive to move clear of the limit switches even at low speeds, minimum speed is not active for the hardware limit switch with which the drive has come into contact.
- The minimum speed does not apply in the IPOS operating modes.

P302/P312 Maximum speed 1/2

Setting range: 0 – **1500** – 6100 min^{-1}

Speed value which is not exceeded by a speed setpoint. If the minimum speed is greater than the maximum speed ($n_{min} > n_{max}$), the maximum speed is valid.

The maximum speed depends on the set operating mode .

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P303/P313 Current limit 1/2 1 2 AUTO

Setting range: 0 – 150% of the nominal motor current I_N

The factory setting for the current limitation is set to 150% I_N of the matching motor.

The internal current limiting is based on the apparent current. In the operating modes "V/f" and "VFC" without speed control, the current limit is automatically reduced in field weakening mode above the frequency of 1.15 × f_{base}. This implements stall protection for the connected motor. The current limit effective in the field weakening range is calculated using the following formula:

$$Current\ limit = (1{,}15 \times \frac{f_{base}}{f_{actual}}) \times setting\ value\ P303/P313$$

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f_{base} Base frequency
f_{actual} Current rotational frequency

P304 Torque limit 1 2 AUTO

The parameter is only effective in "CFC and "Servo" operating modes.

Setting range: **0** – 150% (size 0: 0 – 200%)

Limits the maximum torque of the motor. The entry acts on the setpoint of the motor torque (k_T × I_N(device)). In order to ensure secure triggering of the speed monitoring, the parameter value must always be less than or equal to the current limit (→ 🗎 251).

P32./P33. Motor compensation 1/2 (asynchronous)

P320/P330 Automatic adjustment 1/2 1 2

The parameter is only effective in "VFC and "V/f" operating modes. The function is only useful for single-motor operation.

Setting range: **On**/Off

When the parameter is activated, the device automatically adjusts the parameter *P322/P332 IxR adjustment 1/2* (→ 🗎 252) with every enable and saves the value. The device thereby determines a basic setting that is adequate for a great number of drive applications. The connected motor is calibrated in the last 20 ms of the premagnetization phase, except if:

- The parameter is deactivated.
- The operating modes "VFC & Group" or "VFC & flying start function" are set.
- The premagnetization time (→ 🗎 252) has been reduced by more than 30 ms in relation to the proposed value.
- In the operating mode "VFC n-control," the parameter *P730/P733 brake function 1/2* (→ 🗎 284) is deactivated.

In such cases, the set IxR value is used for calculating the winding resistance.

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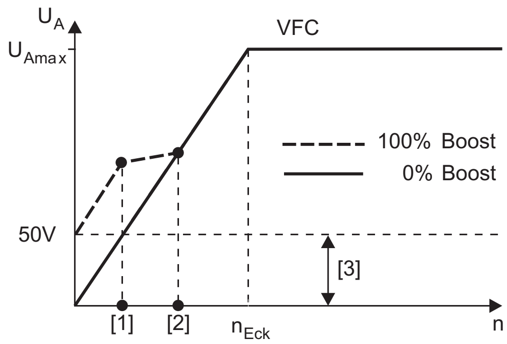
P321/P331 Boost 1/2 1 2

Setting range: **0** – 100%

In operating modes "V/f" and "VFC & Group": Manual adjustment of the parameters is required in order to increase the starting torque by raising the output voltage in the range below the base speed.

In operating mode "VFC ": Manual adjustment of the parameter is normally not required. In exceptional cases, manual setting may be necessary to increase the breakaway torque. In this case, set max. 10%.

The following figure shows the phase-zero phase-to-phase voltage (not the voltage difference between the outer conductors).



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[1] n_{slip}
[2] $2 \times n_{slip}$
[3] Boost setting range

P322/P332 IxR adjustment 1/2 1 2 AUTO

Setting range: 0 – 100%

The IxR value of the matching motor is set as the factory setting.

In operating mode "VFC", this parameter acts on the parameters of the calculated motor model which establish the torque. When the automatic motor adjustment is activated the device sets the parameter automatically. If set to 100%, the output voltage of the device is increased by 50 V when the nominal current of the motor flows.

Direct changes to this parameter should be made only by specialists.

P323/P333 Premagnetization time 1/2 1 2 AUTO

Setting range: 0 – 20 s

The premagnetization value of the matching motor is set as the factory setting.

Premagnetization serves to establish a high motor torque and starts when the device is enabled.

P324/P334 Slip compensation 1/2 1 2 AUTO

The parameter is only effective in "VFC," "VFC n-control" and "V/f" operating modes.

Setting range: 0 – 500 min^{-1}

The value of the matching motor is set as the factory setting.

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Increases the speed accuracy of the motor. If values are entered manually, the nominal slip of the connected motor must be entered. A setting range of ± 20% of the nominal slip is permitted if a value other than the nominal slip is entered to compensate for fluctuations between various motors.

P34. Motor protection

P340/P342 Motor protection 1/2

Setting range: **Off**/On asynchronous motor/On servomotor

Depending on the motor connected (synchronous or asynchronous motor) this function can have the following effects.

Off: The function is not active.

On asynchronous motor: MOVIDRIVE® B takes over the thermal protection of the connected motor electronically. In most cases, the motor protection function is comparable to standard thermal protection (motor protection switch) but, in addition, it takes account of speed-dependent cooling by the integrated fan. The motor utilization is calculated on the basis of:

- Inverter output current
- Type of cooling
- Motor speed
- Time

The thermal motor model is based on the motor data entered in the MOVITOOLS® MotionStudio engineering software and the operating conditions specified for the motor.

INFORMATION

If the motor also has to be protected against failure of the ventilation, blockage of air ducts, etc., it is also necessary to employ protection in the form of a TF positive temperature coefficient thermistor or TH bimetallic switch.

The following signal and display functions are available in conjunction with motor protection:

Parameter	Signal and display function
P006/P007 Motor utilization 1/2 (→ 🗎 217)	Motor utilization for parameter set 1/2
P832 Response to "Motor overload" (→ 🗎 300)	Error response of the device when the motor utilization reaches the value 110%. Factory setting: Emergency stop/Fault.

The following parameters must be set:

Parameter	Setting / Description
P341/P343 Type of cooling 1/2 (→ 🗎 255)	Self-cooling or external cooling
Digital output programmed to the response: "/Motor utilization 1/2"	Prewarning if motor utilization exceeds a value of 100%. In this case, the programmed digital output is set to zero (0 V).

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INFORMATION

Deactivating the device (line and external DC 24 V supply) always sets the motor utilization to zero. After reactivation, already existing motor heating is not considered.

The motor protection function processes the utilization of the connected motors separately for both parameter sets. The motor protection function may **not** be used in the following cases:

- if only one motor is permanently connected to the device and the "parameter set changeover" function is only used for control technology purposes.
- in the case of group drives. In this case, not every individual motor can be reliably protected.

On servomotor:

- Motor **without** KTY temperature sensor:

  MOVIDRIVE® B calculates the motor utilization based on the nominal motor current. The aim is to determine after only a few cycles or during startup whether the drive will switch off due to an overload, with the error message "A1.F31" (TF/TH trip). In order to determine the capacity utilization at which the connected motor drives the machine cycle as precisely as possible, the duration of the machine cycle must be entered.

  This setting is only possible for parameter set 1.

The following signal and display functions are available in conjunction with motor protection:

Parameter	Signal and display function
P006 Motor utilization 1	Display of the motor utilization for parameter set 1. Valid after about 10 to 20 cycles, or after about 2 s. Can be evaluated using IPOS^PLUS® or by a PLC.
P007 Motor utilization 2	In setting *P340 = On servomotor* without function
P832 Response to "Motor overload" (→ 🗎 300)	In setting *P340 = On servomotor* without function

The following parameters must be set:

Parameter	Meaning
P344 Motor protection interval (→ 🗎 255)	Corresponds to the machine cycle of the application. Range: 0.1 s – 20 s

INFORMATION

Activating the function does not trigger monitoring or protection of the connected motor. The programming of a digital output to "/Motor utilization 1/2" is also ineffective.

The motor protection must be guaranteed via TF/TH.

- Motor from SEW-EURODRIVE **with** KTY temperature sensor:

  MOVIDRIVE® B calculates the motor utilization based on an internal motor model that uses the parameters *P006 Motor utilization 1* (→ 🗎 217) and *P018 KTY utilization 1* (→ 🗎 219) as reference parameters.

  When the motor-dependent shut-down limit is reached, the device is shut down with the response set in the parameter *P832 'Motor overload' response* (→ 🗎 300). In this case, the settings in Parameters *P341 Type of cooling 1* (→ 🗎 255) and *P344 Interval for motor protection* (→ 🗎 255) are not relevant.

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P341/P343 Type of cooling 1/2

Setting range: **Self-ventilation**/Forced air cooling

Knowledge of the cooling type of the motor is required for precise calculation of the thermal load of the motor (→ 🗎 253).

P344 Motor protection interval

Setting range: 0.1 – **4** – 20 s

This parameter is not effective for asynchronous motors.

Corresponds to the cycle time of the movement in the case of synchronous motors without KTY temperature sensor. The parameter is used as a reference parameter for calculating the parameter *P006/P007 motor utilization 1/2* (→ 🗎 217).

Always set the time for forward and backward movement.

P345 / 346 I_N/U_L monitoring 1/2 AUTO

Setting range: 0.1 – 500 A

The function cannot be switched off.

The factory setting depends on the rated power of MOVIDRIVE® B and is set to the nominal current of the SEW-EURODRIVE motor with the same rating. In devices with resolver input, the factory setting of the parameter is the value zero.

At 150% nominal motor current I_N, the device switches off after 5 minutes. The error message "F84" (motor protection) is displayed.

At 500% nominal motor current I_N, the device switches off after 20 seconds. The error message "F84" (motor protection) is displayed.

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P35. Direction of motor rotation

SEW-EURODRIVE specifies the direction of rotation as seen onto the A-side of the motor. Clockwise (positive) is defined as rotation to the right and counterclockwise as rotation to the left. This definition is implemented when the motor is connected according to the description from SEW EURODRIVE.

P350/P351 Direction of rotation reversal 1/2 1 2 AUTO

Setting range: On/**Off**/terminal (only in parameter set 1)

Direction of rotation reversal	Positive setpoint (positive direction of travel)	Negative setpoint (negative direction of travel)
Off	Motor turns clockwise	Motor turns counterclockwise
On	Motor turns counterclockwise	Motor turns clockwise

- On: The definition from SEW-EURODRIVE is reversed for the motor rotation direction. The assignment of limit switches is maintained: When the motor turns in CLOCKWISE direction, the drive will be properly stopped once it hits the right limit switch.

  After changing the parameter, note the correct connection of the limit switch and the definition of the reference point and the travel positions.

INFORMATION

If the parameter is changed, the system loses its reference point for the position without withdrawal of the reference bit. The result may be undesirable movements of the axis.

Referencing is also mandatory after the parameter change (including after activation of the binary terminal).

- **Off**: The motor rotation direction corresponds to the definition from SEW-EURODRIVE.
- Terminal: A terminal parameterized to "Direction of rotation reversal" will activate the function.

P36. Startup

Startup (only available in the DBG60B keypad).

P360 Startup

Setting range: Yes / **No**

- Yes: Begins the startup function with the DBG60B keypad.

INFORMATION

With *P360*, MOVIDRIVE® B can only be started up in VFC operating modes. Startup in CFC and SERVO operating modes must be performed using MOVITOOLS® MotionStudio.

- **No**: The startup function is not begun.

8.3.6 Parameter group 4: Reference signals

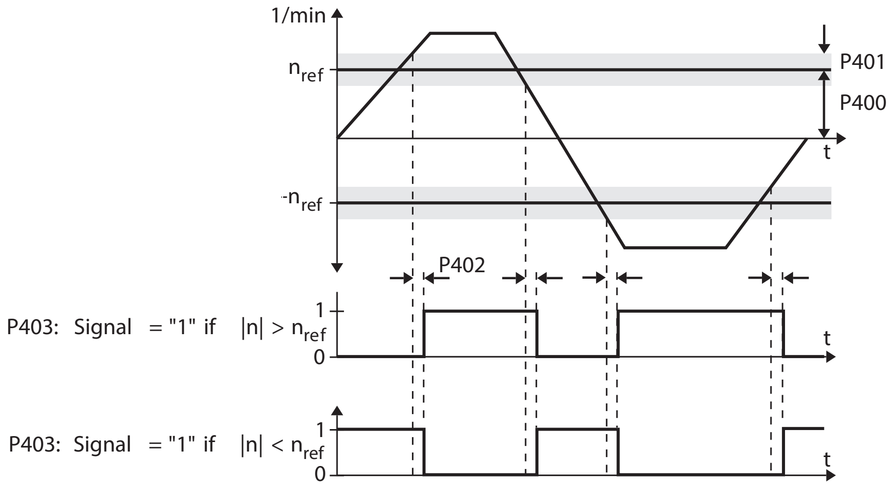
The following reference values are used for detecting and reporting certain operating states. All signals in parameter group 4 can be output via digital outputs (*P62. Digital outputs basic device* (→ 🗎 274) / *P63. Digital outputs option* (→ 🗎 275)).

INFORMATION

The signals are only valid if the inverter has signaled "ready" after switch-on and there is no error display.

P40. Speed reference message

Signal if the speed is less than or greater than the set reference speed.



278436619

P400 Speed reference value

Setting range: 0 – **1500** – 6000 min^{-1}

P401 Hysteresis

Setting range: 0 – **100** – 500 min^{-1}

P402 Delay time

Setting range: 0 – **1** – 9 s

P403 Signal = “1“ when:

n < n $_{ref}$ / n > n_{ref}

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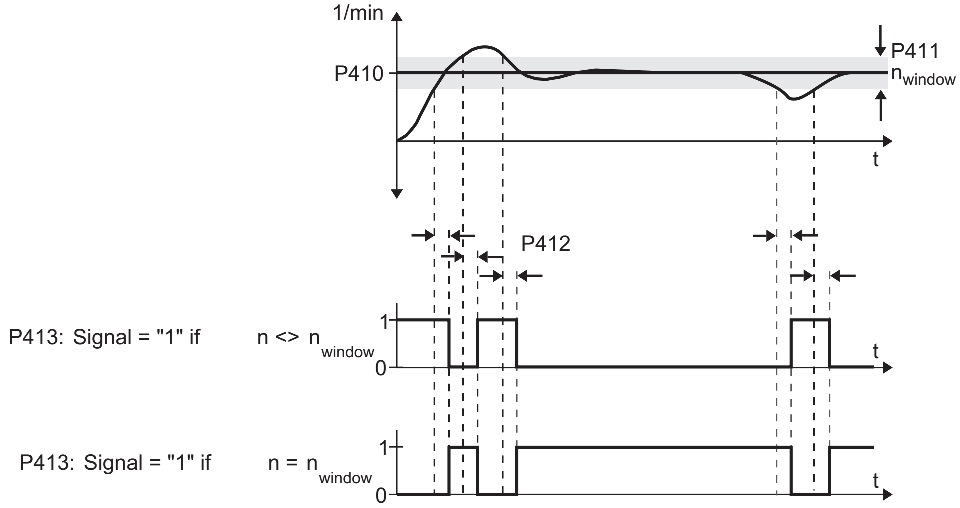
P41. Speed window signal

Signals whether the speed is within or outside the set window range.



278439947

P410 Window center

Setting range: 0 – **1500** – 6000 min^{-1}

P411 Range width

Setting range: **0** – 6000 min^{-1}

P412 Deceleration time

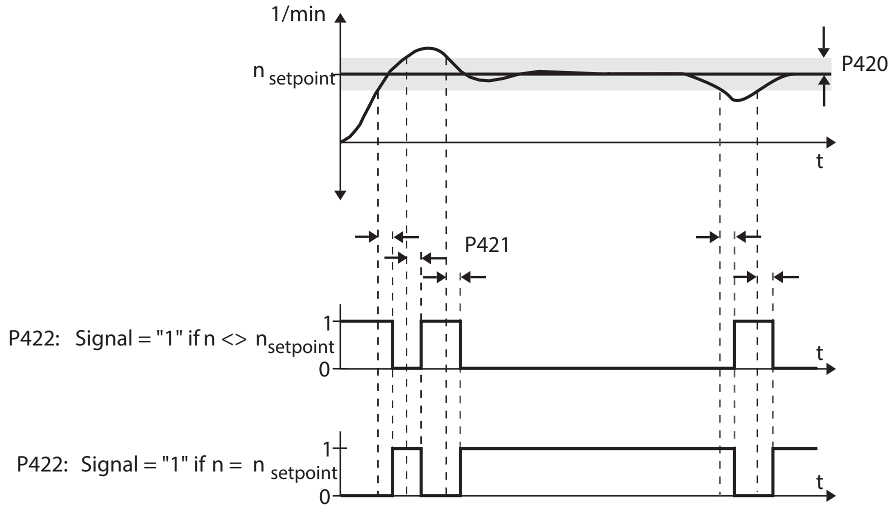
Setting range: 0 – **1** – 9 s

P413 Signal = "1" if:

Setting range: **Inside**/outside

P42. Speed setpoint / actual value comparison

Signal if the speed is equal to or not equal to the setpoint speed.



278443275

P420 Hysteresis

Setting range: 1 – **100** – 300 min^{-1}

P421 Deceleration time

Setting range: 0 – **1** – 9 s

P422 Signal = "1" if:

Setting range: **n = n**$_{setpoint}$ / n <> $n_{setpoint}$

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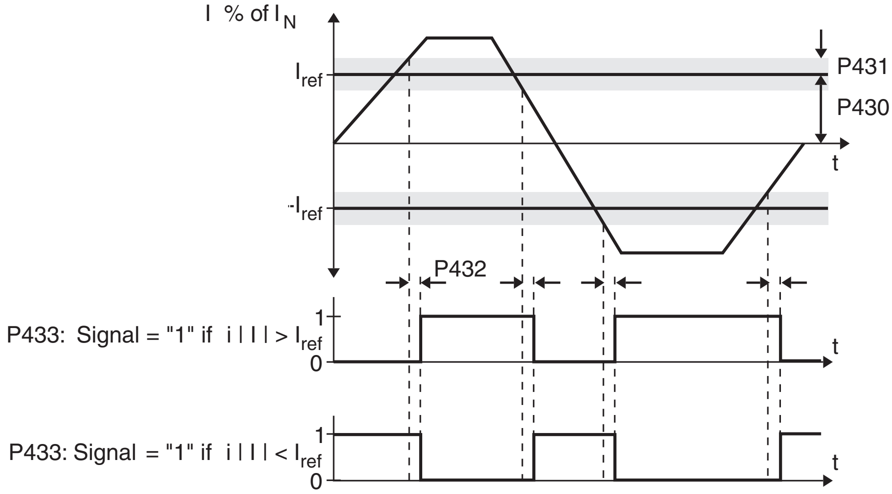
P43. Current reference signal

Signal if the output current is greater than or less than the reference value.



278446603

P430 Current reference value

Setting range: 0 – **100** – 150% I_N (size 0: 200% I_N)

P431 Hysteresis

Setting range: 0 – **5** – 30% I_N

P432 Deceleration time

Setting range: 0 – **1** – 9 s

P433 Signal = “1“ if:

$I < I_{ref}$ / $I > I_{ref}$

P44. I_{max} signal

Signal if the inverter has reached the current limiting.

P440 Hysteresis

Setting range: **5** – 50% I_N

P441 Deceleration time

Setting range: 0 – **1** – 9 s

P442 Signal = "1" if:

$I < I_{max}$ / $I = I_{max}$

8.3.7 Parameter group 5: Monitoring functions

The following monitoring functions have been implemented to monitor what happens to drive-specific parameters in the specific application and to be able to react in case of impermissible deviations. Some of the monitoring functions are available separately in both parameter sets. The response to the triggering of the monitoring functions can be set using *P83. Error responses* (→ 🗎 299).

P50. Speed monitoring

P500/P502 Speed monitoring 1/2 1 2

Setting range: Off/motor/regenerative/**motor/regenerative**

The speed setpoint can only be achieved if there is sufficient torque available to meet the load requirements. If the internal current limit (→ 🗎 251) reaches the external current limit, MOVIDRIVE® assumes that the torque has reached its maximum and the desired speed cannot be attained. If this state persists for the duration of the deceleration time (→ 🗎 261), the speed monitoring trips.

In the case of a hoist, activate the speed monitoring and set the deceleration time to as small a value as possible. Speed monitoring is not that important for safety since an incorrect movement of the hoist does not necessarily mean operation in the current limiting.

P501/P503 Delay time 1/2 1 2

Setting range: 0 – **1** – 10 s

The set current internal limit can be reached briefly during acceleration, deceleration, or load peaks. Corresponding setting of the deceleration time can prevent unintentional, sensitive activation of the speed monitoring. The speed monitoring should only trip when the current limit is reached permanently for the duration of the set deceleration time (→ 🗎 261).

P504 Encoder monitoring motor

Setting range: On/**Off**

- On: A wire break between the device and motor encoder will be detected directly when using sin/cos encoders and TTL encoders. An error is displayed in case of a defective connection. The error message is also generated in the inhibited state of the device. With the DEU card, F57 is issued for TTL encoders, and F58 for sin/cos encoders. With DEH×1B F14 is issues independently of the encoder type.
- **Off**: A wire break between the device and motor encoder is not detected directly. If the speed monitoring is not deactivated, the error message "F08" (speed monitoring) is displayed in the case of a defective connection. The error message is only generated in the enabled state of the device.

INFORMATION

Encoder monitoring is not a safety function. If you use a HIPERFACE® encoder, encoder monitoring is always active (including for the track) regardless of the parameter setting.

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P505 Distance encoder monitoring

Setting range: On/**Off**

- On: A wire break between the device and distance encoder will be detected directly when using sin/cos encoders and TTL encoders. In the case of a defective connection, the error message "F14" (encoder fault) is displayed. The error message is also generated in the inhibited state of the device.
- **Off**: A wire break between the device and distance encoder is not detected directly. If the speed monitoring is not deactivated, the error message "F08" (speed monitoring) is displayed in the case of a defective connection. The error message is only generated in the enabled state of the device.

P51. Synchronous operation monitoring

Synchronous operation monitoring only in parameter set 1 and when the DRS11B option is used.

Refer to the “MDX61B - Synchronous Operation Card DRS11B“ manual for a detailed description.

P510 Positional tolerance slave

Setting range: 10 – **25** – 32 768 inc.

Various conditions must be met to allow for precise positioning of the slave drive. The brake of the slave drive is applied if all of the following conditions are met:

- Brake function of the slave drive is activated.
- Master drive at a standstill.
- Master drive is de-energized (inverter status = inhibited).
- Slave drive is at standstill and is located within the positioning window.

P511 Lag error prewarning

Setting range: **50** – 99 999 999 inc.

A prewarning is issued regardless of the operating mode of the slave drive if the angular offset exceeds the set value.

P512 lag error limit

Setting range: **4000** – 99 999 999 inc.

Error message F42 "Lag error" is issued if the angular misalignment exceeds the value set here. The error message is issued regardless of whether the slave drive is operating in free running or synchronous operation.

P513 Delay time lag error signal

Setting range: 0 – **1** – 99 s

It is possible to suppress the "Prewarning lag error" and "Lag error limit" signals from being output as an error message or onto a digital output for an adjustable skip time when switching over from free running to synchronous operation.

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P514 Counter LED display

Setting range: 10 – **100** – 32 768 inc.

The LED V1 (green) lights up if the angular misalignment exceeds the value set here. This permits an immediate visual display of the maximum differential between the master and slave drives during operation. This is helpful during startup.

P515 Delay time position signal

Setting range: 5 – **10** – 2000 ms

The "Synchronous operation slave in position" digital output signal is not issued unless the master and slave drive are located within the *P510 Positioning tol. slave* (→ 🗎 262) for the time set here.

P516 X41 Encoder monitoring

Setting range: **Off**/On

- **Off**: Wire break between the frequency inverter and a TTL encoder connected at X41 is not recognized directly. In case of a defective connection, fault F42 "Lag error" will be issued in enabled state unless it has been deactivated.
- On: Wire break between the frequency inverter and a TTL encoder connected at X41 is recognized directly. The fault message F48 "Hardware DRS" will be issued in case of a fault. This error will also be generated in inhibited state.

INFORMATION

Encoder monitoring is not a safety function.

P517 X41 Pulse count monitoring

Setting range: **Off**/On

The number of pulses of the encoder connected at X41 is checked using the resolution set in P233 (→ 🗎 246) through evaluation of the C track. If increments are lost, the fault message F48 "Hardware DRS" is generated.

- **Off**: Pulse counter monitoring is not active.
- On: Pulse counter monitoring is active.

P518 X42 Encoder monitoring

Setting range: **Off**/On

- **Off**: Wire break between the frequency inverter and a TTL encoder connected at X42 is not recognized directly. In case of a defective connection, fault F42 "Lag error" will be issued in enabled state unless it has been deactivated.
- On: Wire break between the frequency inverter and a TTL encoder connected at X42 is recognized directly. The fault message F48 "Hardware DRS" will be issued in case of a fault. This error will also be generated in inhibited state.

INFORMATION

Encoder monitoring is not a safety function.

P519 X42 Pulse count monitoring

Setting range: **Off**/On

The number of pulses of the encoder connected at X42 is checked using the resolution set in *P233* (→ 🗎 246) through evaluation of the C track. If increments are lost, the fault message F48 "Hardware DRS" is generated.

- **Off**: Pulse counter monitoring is not active.
- On: Pulse counter monitoring is active.

P52. Power off monitoring

The setting of *P520 Power off response time* (→ 🗎 264) / *P521 Power off response* (→ 🗎 264) is important when programming a digital input to “Power on recognition” and using MOVIDRIVE® regenerative power supply (refer to the regenerative power supply unit and DC link connection system manual).

P520 Power off response time

Setting range: **0** – 5 s

Time that the power off must be present for the parameterized power off response to be triggered.

P521 Power off response

Setting range: **Controller inhibit**/emergency stop

If a digital input is programmed to "Power on recognition" and as soon as it receives a "0" signal, the response set here is triggered. The 7-segment display of MOVIDRIVE® B indicates "0" (device status 24 V operation).

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P522 Phase failure monitoring

Setting range: Off/**On**

On: Phase failure is monitored

Off: No phase failure monitoring

With MOVIDRIVE® the line input phases are monitored for failure as follows:

For size 7, the line input phases are directly measured.

Since the line input phases cannot be monitored directly for sizes 1 – 6, monitoring has to be done indirectly via the DC link ripple. If one phase fails, the ripple increases drastically.

The DC link voltage is monitored at a time interval Δt = 1 ms for dropping below a minimum voltage level that depends on the rated supply voltage of the device.

A phase failure is recognized by the following nominal guide value:

- In a 50 Hz supply system: The voltage level has been underrun approx. t_{max} = 3.0 s.
- In a 60 Hz supply system: The voltage level has been underrun approx. t_{max} = 2.5 s.

If a line phase failure is detected, the output stage is immediately inhibited and the brake is applied. The error message "F06" (phase failure) is displayed and the error response "Immediate switch-off with interlocking" is carried out. The error can only be reset by a device reset.

P53. Motor temperature protection

P530 Sensor type 1 AUTO

Setting range: **No sensor** / TF/TH / KTY / TF/TH DEU / KTY DEU / PK / PK DEU

(KTY and PK only for SEW-EURODRIVE synchronous motors)

(PK stands for the PT1000 temperature sensor)

Selection of the sensor used for motor protection in parameter set 1. When the multi-encoder card DEU is used, select "TF/TH DEU" or "KTY DEU" or "PK DEU".

- Setting "TF/TH": Set the response using *P835 Response 'TF-Message'* (→ 301).
- Setting "KTY" or "PK": Can only be selected for synchronous motors from SEW-EURODRIVE. Activate the motor model with the setting "One servomotor" of the parameter *P340 motor protection 1* (→ 253). Set the response using parameter *P832 Response 'Motor overload'* (→ 300).

P531 Sensor type 2 AUTO

Setting range: **No sensor**/TF-TH

Selection of the sensor used for motor protection in parameter set 2.

INFORMATION

If you select the setting "KTY" or "PK" (for SEW-EURODRIVE synchronous motors only), you have to repeat startup, else fault F84 will be triggered.

P54. Gear unit/motor monitoring

These parameters are used to set the response to be triggered in the event of a motor or gear unit problem. The digital inputs must be programmed with the corresponding function. The error responses are also be triggered in the "controller inhibit" device status.

The following table shows possible error responses:

Response	Description
No response	An error is not displayed, nor is an error response performed. The signaled error is ignored.
Display error	Display of error on the 7-segment display of the device and in the MOVITOOLS® MotionStudio engineering software. The device performs no other error responses. The device can be reset by a device reset (terminal, fieldbus, auto reset).
Immediate stop/malfunction	Immediate switch-off of the device with error message. The output stage is inhibited and the brake is applied. The ready signal is revoked. A restart is only possible after a fault reset has been performed during which the device is reinitialized.
Emergency stop/malfunction	The drive is braked with the emergency stop ramp t14/t24 . Once the stop speed is reached, the output stage is inhibited and the brake is applied. The error is signaled immediately. The ready signal is revoked. A restart is only possible after a fault reset has been performed during which the device is reinitialized.
Rapid stop/malfunction	The drive is braked with the stop ramp t13/t23 . Once the stop speed is reached, the output stage is inhibited and the brake is applied. The error is signaled immediately. The ready signal is revoked. A restart is only possible after a fault reset has been performed during which the device is reinitialized.
Immediate stop/Warning	Immediate switch-off of the device with error message. The output stage is inhibited and the brake is applied. The ready signal is not revoked. The drive restarts without device re-initialization if the error is rectified by an internal procedure or by an error reset.

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Response	Description
Emergency stop/Warning	The drive is braked with the emergency stop ramp t14/t24 . Once the stop speed is reached, the output stage is inhibited and the brake applied. The error is signaled immediately. The ready signal is not revoked. The drive restarts without device re-initialization if the error is rectified by an internal procedure or by an error reset.
Rapid stop/Warning	The drive is braked with the stop ramp t13/t23 . Once the stop speed is reached, the output stage is inhibited and the brake applied. The error is signaled immediately. The ready signal is not revoked. The drive restarts without device re-initialization if the error is rectified by an internal procedure or by an error reset.

P540 Drive vibration response/warning

Factory setting: **Display fault**

If the drive vibration sensor signals a warning, the device carries out the set response.

P541 Drive vibration response/fault

Factory setting: **Rapid stop/warning**

If the drive vibration sensor signals an error, the device carries out the set response.

P542 Response oil aging/warning

Factory setting: **Display fault**

If the oil aging sensor signals a warning, the device carries out the set response.

P543 Response oil aging/fault

Factory setting: **Display fault**

If the oil aging sensor signals a fault, the device carries out the set response.

P544 Oil aging/overtemperature

Factory setting: **Display fault**

If the oil aging sensor signals an overtemperature, the device performs the set response.

P545 Oil aging/ready signal

Factory setting: **Display fault**

If the oil aging sensor withdraws the ready signal, the device carries out the set response.

P549 Response to brake wear

Factory setting: **Display fault**

If the brake wear sensor trips, the device carries out the set response.

P55. DCS safety module

Parameter group *P55.* The *DCS safety module* includes display and setting values that are specific to the option DCS21B/22B/31B/32B. For more detailed information, refer to the "MOVIDRIVE® MDX 61B Safety Module DCS21B/22B/31B/32B Option" manual.

P550 DCS safety module status

Display value that cannot be changed.

Parameter *P550* shows the current status of the option DCS21B/22B/31B/32B.

- RUN: Normal operation.
- STOP: Operation of option DCS21B/22B/31B/32B was stopped via programming interface.
- ALARM: Option DCS21B/22B/31B/32B has issued an alarm.
- ERROR: Option DCS21B/22B/31B/32B has issued a fault.

  You have the following options to read the corresponding fault or alarm message from the fault memory of the DCS21B/22B/31B/32B option:

  – Using the X87 service interface of the MOVISAFE® Config DCS/Assist DCS parameter setting software

  – Using the DBG60B keypad (if *P555 Fault response DCS / P556 Alarm response DCS* (→ 🗎 269) is not set to "No response")

  – Fault memory MOVIDRIVE® B (if *P555 Fault response DCS / P556 Alarm response DCS* (→ 🗎 269) is not set to "No response")

P551 Digital inputs DCS DI1 – DI8

Display value that cannot be changed.

Parameter *P551* shows the present status of the digital inputs of option DCS21B/22B/31B/32B in the order DI1 – DI8.

P552 Digital outputs DCS DO0_P – DO2_M

Display value that cannot be changed.

Parameter *P552* shows the present status of the digital outputs of option DCS21B/22B/31B/32B in the following order:

- DO0_P
- DO0_M
- DO1_P
- DO1_M
- DO2_P
- DO2_M

P553 Serial number DCS

Display value that cannot be changed.

Parameter *P553* shows the serial number of option DCS21B/22B/31B/32B. The displayed serial number must be identical with the serial number on the nameplate of the DCS21B/31B option, which is attached to MOVIDRIVE® MDX61B. You have to enter the serial number in the validation report.

P554 CRC DCS

Display value that cannot be changed.

The parameter *P554* shows the CRC (cyclic redundancy check) of the program stored on the DCS21B/22B/31B/32B option. You have to enter the CRC in the validation report.

P555 Fault response DCS / P556 Alarm response DCS

Setting range *P555*: No response / **Display fault** / Rapid stop/Fault / Emergency stop/Fault / Rapid stop/Fault / Immediate stop/Warning / Emergency stop/Warning / Rapid stop/Warning

Setting range *P556*: No response / **Display fault** / Rapid stop/Fault / Emergency stop/Fault / Rapid stop/Fault / Immediate stop/Warning / Emergency stop/Warning / Rapid stop/Warning

If option DCS21B/22B/31B/32B signals a fault (*P555*) or an alarm (*P556*), the inverter performs the set response. As the safety-related switching off is performed by the DCS21B/22B/31B/32B option or a higher-level safety controller, SEW-EURODRIVE recommends to set *P555* and *P556* to "Display fault".

P557 DCS actual position source

Setting range: **Motor encoder (X15)**/Ext. Encoder (X14)/Absolute encoder (X62)

If the option "Inverter encoder" is set as encoder 1 in the MOVISAFE® Config DCS/Assist DCS parameter setting software, the setting in *P557* determines which encoder signal is evaluated by the DCS21B/22B/31B/32B option.

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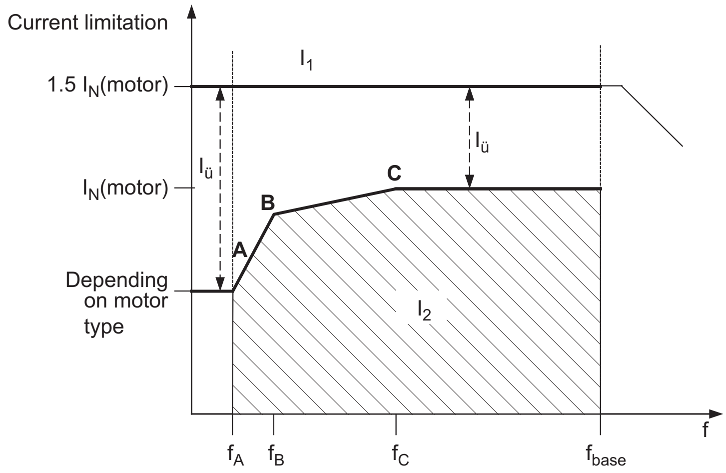
P56. Ex-e motor current limiting

Display and setting values that are specific to the "Current limiting in the Ex-e motor on the inverter" function.



18379642507

I_N	Nominal motor current in A
I_1	Maximum permitted current in A
I_2	Permitted continuous current range in A
I_O	Overload current in A
f_{base}	Base frequency in Hz
A, B, C	Limiting points

- Frequencies below f_A are only permitted to a limited extent.
- Frequencies higher than the rated motor frequency are not permitted.
- Frequency A < frequency B < frequency C < rated motor frequency
- Current limit A < current limit B < current limit C

Refer to the "Explosion-Proof AC Motors" operating instructions for more information.

INFORMATION

For third-party EX motors, you have to perform all settings manually.

P560 Current limitation Ex-e motor AUTO

Setting range: On/**Off**

- On: Current limiting for Ex-e motors is active. The current limiting is already activated during startup for the Ex-e operation selected and approved motors. The current limit (→ 🗎 251) can no longer be changed when the protection function is active.
- **Off**: Current limiting for Ex-e motors is not active.

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P561 Frequency A AUTO

Setting range: 0 – **5** – 60 Hz

Value for minimum operating frequency f_A. The device is operated independently of the current amount for 60 s at the operating frequency f_A. After this time elapses, the device switches off and displays the error message "F110" (Ex e protection) .

P562 Current limit A AUTO

Setting range: 0 – **50** – 150%

Current limitation that is permitted with operating frequency f_A. There is a linear gradient between current limits A and B.

P563 Frequency B AUTO

Setting range: 0 – **10** – 104 Hz

Value for operating frequency f_B.

P564 Current limit B AUTO

Setting range: 0 – **80** – 200%

Current limitation that is permitted with operating frequency f_B. There is a linear gradient between current limits B and C.

P565 Frequency C AUTO

Setting range: 0 – **25** – 104 Hz

Value for operating frequency f_C.

P566 Current limit C AUTO

Setting range: 0 – **100** – 200%

Current limit that is permitted between operating frequency f_C and rated motor frequency. The rated motor frequency is 50 Hz for star connection and 87 Hz for delta connection. After startup with an Ex-e motor, the current limit C is approximately equal to the rated motor current I_N.

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8.3.8 Parameter group 6: Terminal assignment

P60. Digital inputs of basic device

Digital input DIØØ, with fixed assignment "/Controller inhibit".

If this terminal is revoked, the output stage is immediately inhibited and the brake is applied.

P600 – P606 Digital input DIØ1 – DIØ7

The digital inputs of the basic device can be set to the same functions as the digital inputs of the option (→ 273).

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P61. Digital inputs option

P610 – P617 Digital inputs DI1Ø – DI17

The digital inputs can be programmed to the following functions:

Function	Effect in case of "0" signal	Effect in case of "1" signal	Effective in Inverter status: Inhibited	Effective in Inverter status: Enabled	Factory set to	See also
No function	–	–	–	–	DIØ6 DIØ7	
Enable / stop	Stop on t13/t23	Enabled	No	Yes	DIØ3	*P13x / P14x*
CW / stop	Stop at t11/t21 or t12/t22	Enable CW	No	Yes	DIØ1	
CCW/stop	Stop at t11/t21 or t12/t22	Enable CCW	No	Yes	DIØ2	
n11 / n21 n13 / n23	External setpoints only	n11 / n21 n13 / n23	No	Yes	DIØ4	*P16x / P17x*
n12 / n22	External setpoints only	n12 / n22	No	Yes	DIØ5	
Fixed setpoint changeover	Fixed setpoints of the active parameter set selected	Fixed setpoints of the active parameter set selected	Yes	Yes		
Parameter set changeover[1)]	Parameter set 1	Parameter set 2	Yes	No		
Speed ramp switchover	1. Ramp (t11/t21) active	2. Ramp (t12/t22) active	Yes	Yes		*P13x / P14x*
Motor potentiometer up	–	Increase setpoint	No	Yes		*P15x*
Motor potentiometer down	–	Decrease setpoint	No	Yes		
/External error	External fault	–	No	Yes		
Fault reset	Reset on positive edge ("0" to "1")		Yes	Yes		
/Position hold control	Hold control active	–	No	Yes		*P210*
/Limit switch right	Right limit switch reached	Not reached	No	Yes		
/Limit switch left	Left limit switch reached	Not reached	No	Yes		
IPOS input	Function depends on IPOS function					IPOS$^{PLUS®}$ manual
Reference cam	Not activated	Activated	No	Yes		
Start reference travel	–	Start referencing for IPOS	No	Yes		
Slave free running	Master/slave operation	Slave free running	Yes	Yes		
Setpoint acceptance active	Do not accept	Accept setpoint	No	Yes		
Mains On detection	see *P521* (→ 🗎 264)	Ext. POWER ON signal	Yes	Yes		*P52x*
Synchronous operation set zero point	"1" to "0": sets new zero point	Delete angular offset	Yes	Yes		Synchronous operation manual
Synchronous operation slave start	No enable	Enabled	No	Yes		
Synchronous operation teach-in	–	Adopt angular offset in *P224* (→ 🗎 245)	Yes	Yes		
Synchronous operation master stopped	Master drive turns	Master drive at a standstill	Yes	Yes		
/Vibration warning	Vibration sensor signals warning	Vibration sensor does not signal warning	Yes	Yes		
/Vibration fault	Vibration sensor reports fault	Vibration sensor does not report fault	Yes	Yes		
/Oil aging warning	Oil aging sensor signals warning	Oil aging sensor does not signal warning	Yes	Yes		
/Oil aging fault	Oil aging sensor signals fault	Oil aging sensor does not signal fault	Yes	Yes		
/Oil aging overtemperature	Oil aging sensor signals overtemperature	Oil aging sensor does not signal overtemperature	Yes	Yes		
Oil aging/ready	Oil aging sensor is not ready for operation	Oil aging sensor is ready for operation	Yes	Yes		
Brake wear signal	Brake is worn	Brake is OK	Yes	Yes		

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Function	Effect in case of		Effective in Inverter status		Factory set to	See also
	"0" signal	"1" signal	Inhibited	Enabled		
Direction of rotation reversal	Off	On	Yes	No		*P350/351*

1) With operating modes with encoder feedback, observe the following: The parameter set must not be changed more often than every two seconds.

P62. Digital outputs basic device

Use digital output DBØØ for controlling the brake. This digital output has the fixed assignment of the "/Brake" function. The "Brake released" and "Brake applied" signals are intended to be passed on to a higher-level controller.

INFORMATION

The binary signals are only valid if the inverter has signaled "ready" after it has been switched on and if no error message has been issued. Binary signals have "0" status while MOVIDRIVE® is being initialized.

Several terminals can be assigned the same function.

P620 – P624 Digital outputs DOØ1 – DOØ5

The digital outputs of the basic device can be set to the same functions as the digital outputs of the option (→ 🗎 275).

P63. Digital outputs option

P630 – P637 Digital outputs DO1Ø – DO17

The following functions can be assigned to the digital outputs:

Function	Digital output has		Factory set to	See also
	"0" signal	"1" signal		
No function	Always "0" signal	–		
/Failure	Collective fault signal	–	DOØ2	
Ready for operation	Not ready	Ready	DOØ1	
Output stage ON	Device inhibited	Device enabled and motor energized		
Rotating field on	No rotating field	Rotating field		
Brake released[1]	Brake applied	Brake released		
Brake applied [1]	Brake released	Brake applied		
Motor standstill	Motor running	Motor at standstill		
Parameter set	Parameter set 1 active	Parameter set 2 active		
Speed reference signal *P403* (→ 🗎 257) = n < n_{ref} (n > n_{ref})	n > n_{ref} (n < n_{ref})	n < n_{ref} (n > n_{ref})		*P40x*
Speed window signal *P413* (→ 🗎 258) = Inside (outside)	Speed is outside (within) speed window	Speed is within (outside) speed window		*P41x*
Comparison message setpoint/ actual value *P422* (→ 🗎 259) = n = $n_{setpoint}$ (n <> $n_{setpoint}$)	n <> $n_{setpoint}$ (n = $n_{setpoint}$)	n = $n_{setpoint}$ (n <> $n_{setpoint}$)		*P42x*
Current reference message *P433* (→ 🗎 260) = I < I_{ref} (I > I_{ref})	I > I_{ref} (I < I_{ref})	I < Iref (I > I_{ref})		*P43x*
Imax signal *P442* (→ 🗎 260) = I = I_{max} (I < I_{max})	I < I_{max} (I = I_{max})	I = I_{max} (I < I_{max})		*P44x*
/Warning motor utilization 1	100% prewarning of motor protection in parameter set 1	–		*P34x*
/Warning motor utilization 2	100% prewarning of motor protection in parameter set 2	–		
/Synchronous operation prewarning	Value for lag error prewarning (→ 🗎 262) exceeded	–		Synchronous operation manual
/Synchronous operation lag error	Lag error limit (→ 🗎 262) exceeded	–		
Synchronous operation slave in position	Position not reached	Position reached		
IPOS in position	Position not reached	Position reached		IPOS[PLUS®] manual
IPOS referenced	No referencing	Referencing finished		
IPOS output	Depends on IPOS program		DOØ3 DOØ4 DOØ5	
/IPOS fault	IPOS program fault message	–		
Ex-e current limit active	Not active	Active	-	*P56x*
LSM commutation finished	Not commutated	Commutated	-	-
S-pattern profile is generated	S pattern is not calculated	S pattern is calculated	-	*P135/145*
STO safety function	Not active	Active	-	-

1) Use digital output DBØØ to control the brake. This digital output has the fixed assignment of the "/Brake" function. The "Brake released" and "Brake applied" signals are intended to be passed on to a higher-level controller.

INFORMATION

The binary signals are only valid if the inverter has signaled "ready" after switch-on. Binary signals have "0" status while MOVIDRIVE® is being initialized.

Several terminals can be assigned the same function.

P64. Analog outputs optional

P640/P643 Analog output AO1/AO2

Depending on *P642/P645 Operating mode AO1/AO2* (→ 278), the signal range is -10 – 0 – 10 V (AOV1/AOV2) and 0 (4) – 20 mA (AOC1/AOC2).

The following functions can be assigned to the analog outputs:

Function	Scaling (when *P641/P644 Scaling AO1/AO2* (→ 278) = 1)		Explanation	Factory setting
	Reference value	Output value		
No function	always 0 V or 0 mA		–	
Ramp generator input	±3000 min^{-1}	±10 V / 20 mA	Setpoint speed at the input of the internal ramp generator	
Setpoint speed	±3000 min^{-1}	±10 V / 20 mA	Valid setpoint speed (output ramp generator or manipulated value of the higher-level controller)	
Actual speed	±3000 min^{-1}	±10 V / 20 mA	Actual speed	AO1
Actual frequency	±100 Hz	±10 V / 20 mA	Rotating field frequency	
Output current	150% I_N) (Size 0: 200% I_N)	10 V or 20 mA	Apparent current	AO2
Active current	±150% I_N (Size 0: ±200% I_N)	±10 V / 20 mA	Active current, positive when torque is in positive sense of rotation; negative when torque is in negative sense of rotation.	
Relative torque	±150% I_N (Size 0: ±200% I_N	±10 V / 20 mA	Active current that forms the torque; the value "0" is always output in VFC operating modes.	
Device utilization	150 % (Size 0: 200%)	10 V or 20 mA	Current device utilization	
IPOS output 1	±10000 digits	±10 V / 20 mA	Internal IPOS values (see IPOS$^{PLUS®}$ manual)	
IPOS output 2	±10000 digits	±10 V / 20 mA	Internal IPOS values (see IPOS$^{PLUS®}$ manual)	

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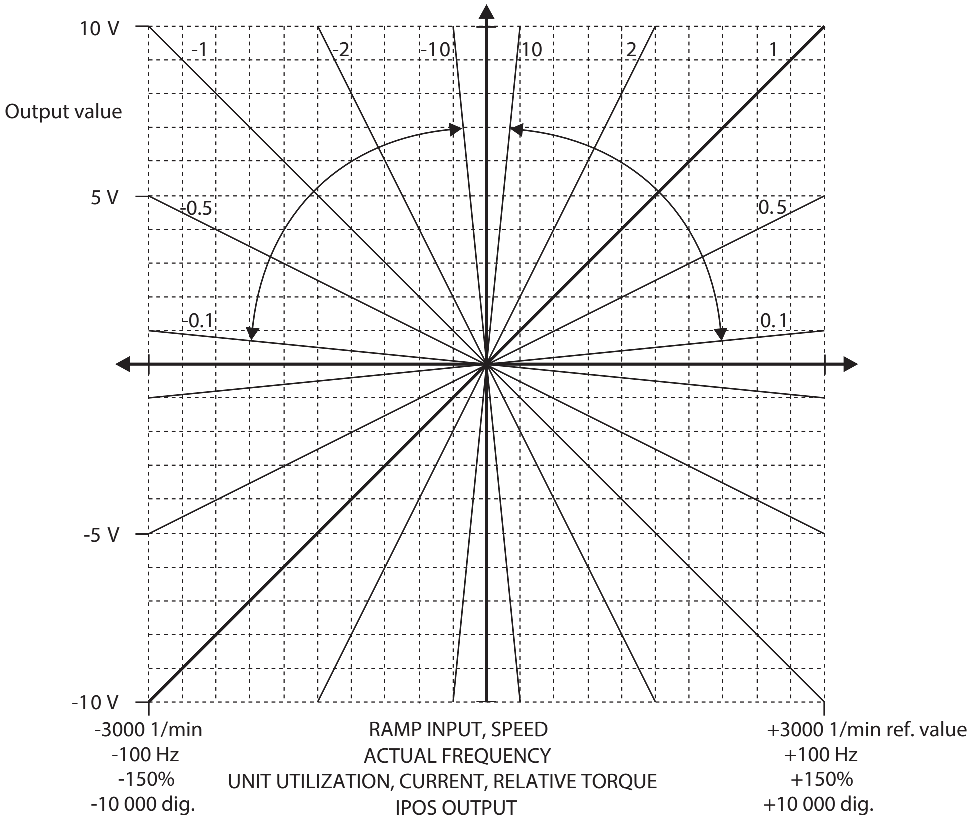
P641/P644 Scaling AO1/AO2

Setting range: -10 – 0 – **1** – 10

The slope of the characteristic for the analog outputs is defined. The value for device utilization, current and relative torque is 200% for each in size 0.



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P642/P645 Operating mode AO1/AO2

Here you can set the operating mode of the analog output. The following operating modes are available:

- No function: The value zero is always output.
- **-10 V – 10 V**: Output of the reference value with the correct signs as voltage values on AOV1/AOV2; the current outputs AOC1/AOC2 are not valid.
- 0 – 20 mA: Output of the value of the reference value as current value 0 – 20 mA on AOC1/AOC2, the voltage output AOV1/AOV2 is not valid. *P641/P644 Scaling AO1/AO2* (→ 🗎 278) is evaluated on the basis of the value.
- 4 – 20 mA: Output of the value of the reference value as current value 4 – 20 mA on AOC1/AOC2, the voltage output AOV1/AOV2 is not valid. The slope of the characteristics is flatter than in 0 – 20 mA operating mode. The characteristic has an offset of 4 mA and the value of *P641/P644 Scaling AO1/AO2* (→ 🗎 278) refers to the value range of 16 mA. The value for device utilization, current and relative torque is 200% for each in size 0.

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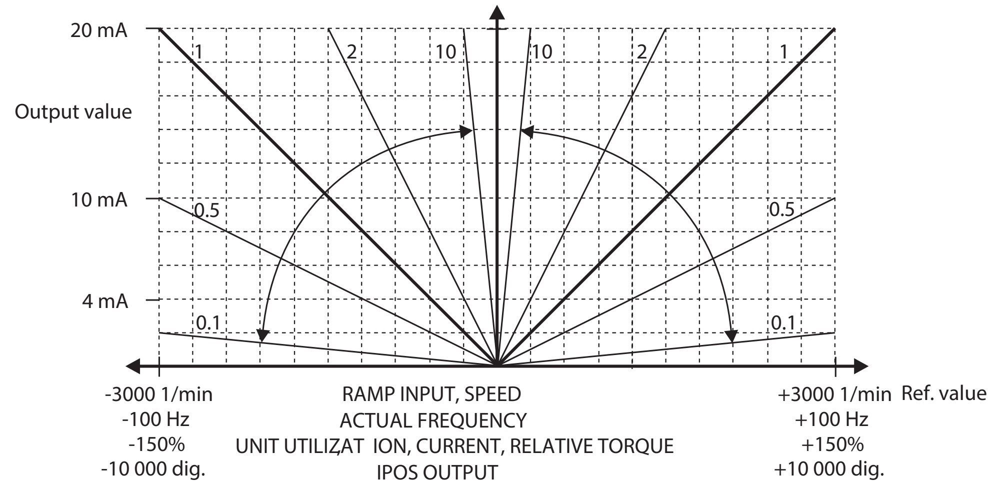

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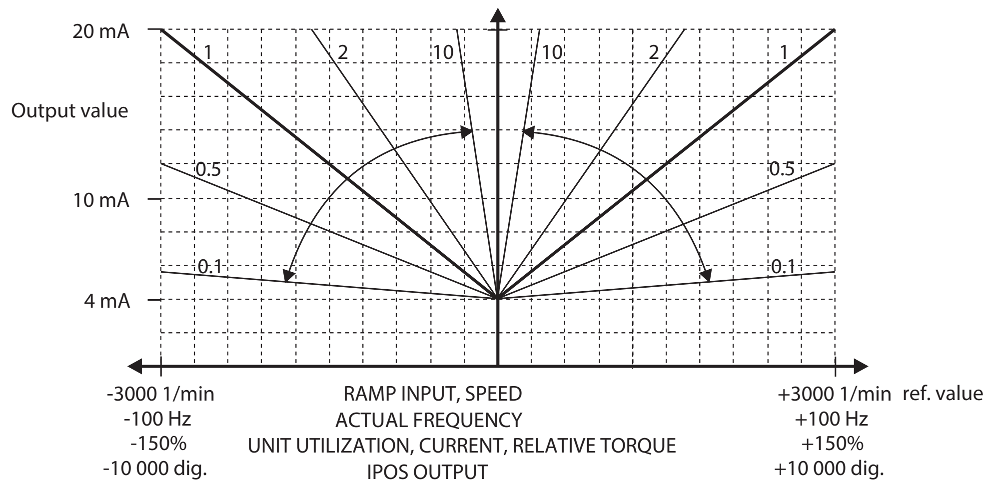

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8.3.9 Parameter group 7: Control functions

The fundamental control properties of the device are programmed with this parameter group. These functions are carried out automatically upon activation of the device and influence its behavior in certain operating modes.

INFORMATION

When using incremental encoders (resolver, push-pull TTL, RS422, sin/cos, HIPERFACE® single-turn), changing the parameter set invalidates the IPOS variables *H510 Actual position* and *H511 Actual position*. A position is only retained after switching over the parameter sets if an absolute encoder (SSI, HIPERFACE® Multi-Turn) is used.

P70. Operating modes

P700/P701 Operating mode 1/2

This parameter is used to set the basic operating mode of the inverter for parameter sets 1 and 2. This includes in particular the definition of the motor system, encoder feedback and corresponding control functions. When MOVIDRIVE® inverters are delivered, their parameters are set to the specific motor which matches the power of the motor.

All operating modes can be set for parameter set 1. Only operating modes without encoder feedback can be set for parameter set 2 (see group 1). Without new startup, the operating mode may only be changed within a group.

Group	Parameter set 1/2 P700 Operating mode 1 P701 Operating mode 2	Device type and option	Motor
1	VFC 1/2 (factory setting) VFC 1/2 & group VFC 1/2 & hoist VFC 1/2 & DC braking VFC 1/2 & flying start function V/f characteristic curve V/f & DC braking	MDX, no option required	Asynchronous motor without incremental encoder
2	VFC n-control VFC n-control & group VFC n-control & hoist	MDX + DEH11B	Asynchronous motor with incremental encoder or HIPERFACE® encoder
	VFC n-control & synchronous operation	MDX + DRS11B + DEH11B	
	VFC n-control & IPOS	MDX + DEH11B	
3	CFC CFC & torque control CFC & IPOS	MDX + DEH11B	DR.. with incremental encoder or HIPERFACE® encoder or DRL (incremental encoder installed as standard)
	CFC & synchronous operation	MDX + DRS11B + DEH11B	
4	Servo Servo & torque control Servo & IPOS	MDX with option DER11B or DEH11B	CM/CMP With Hiperface® encoder or resolver
	Servo & synchronous operation	MDX + DRS11B + DEH11B/DER11B	

You will find detailed information about the individual operating modes in the "Operating modes" chapter.

P702 Motor category AUTO

Setting range: **Rotatory**/linear

Automatically set during startup. Displays the connected motor type.

Parameter set 2 is not available when operating a linear motor.

P703 Dynamic response

Setting range: **Standard**/increased

This parameter only applies to *P700* (→ 🗎 280) = "VFC n-control & ..." or "VFC & hoist".

For *P700* = "VFC-n-control & ...":

- Increased: The controller can be set dynamically (speed controller)
- **Standard**: Standard control

Activating this parameter may require reducing the stiffness under certain conditions.

For *P700* = "VFC & hoist":

- Increased: The internal filters are initialized by the nominal motor data.
- **Standard**: The internal filters are initialized by 0.

P704 VFC-n with output filter AUTO

Setting range: Yes/**no**

- Yes: An output filter is used in operating mode VFC n-control

  To suppress current oscillations , the premagnetization strategy is adjusted.
- **No**: No output filter connected

P705 Premagnetization time lower limit

Setting range: Yes/**no**

- Yes: The premagnetization time is limited device internally to the lowest possible value. Ensures that the motor always starts up with nominal magnetization. Setting the parameter *P323/P333* below this value will be ignored.
- **No**: The premagnetization time can be shortened as desired. The motor may eventually start up unmagnetized.

P706 Flux model: Yrq = 0

Setting range: **Yes**/no

- **Yes**: With low speeds the flux model is supported by additional observers. This enhances the control for low speeds.
- No: A standard flux model is applied.

Only valid with VFC operating modes without encoder feedback.

P71. Standstill current

P710/P711 Standstill current 1/2 1 2

Setting range: **0** – 50% of the nominal motor current I_N

Imprints an adjustable current (in % of the nominal motor current I_N) into the motor during motor standstill and closed brake. The standstill current can be switched off by "/controller inhibit = 0".

The standstill current fulfills the following functions:

- Prevents the risk of condensation at the motor and freezing of the brake when the ambient temperature is low.

  Set the amount of current in such a way that the motor does not overheat. SEW-EURODRIVE recommends a current level at which the motor housing is warm to the touch.
- Enables rapid start of the motor without complying with the premagnetization time.

  SEW-EURODRIVE recommends setting the standstill current to 45 – 50% of the nominal motor current I_N in hoists.

The standstill current function is deactivated at a value of 0% of the nominal motor current I_N. The standstill current is monitored for current limit in any case (→ 🗎 251).

- At least the magnetizing current is always imprinted in the operating mode "CFC," which is required according to the motor model.
- No current is imprinted in the operating mode "Servo".
- The nominal magnetizing current is always imprinted in the operating modes "VFC & Hoist" and "VFC-n-control & Hoist" and activated standstill current.
- In the other operating modes, a rapid start will take place only if the set standstill current is greater than or equal to the rated magnetizing current.

If, in the standstill current phase, the set premagnetization time of the standstill current is constant and greater than or equal to the rated magnetizing current of the motor in time intervals of the set premagnetization time, the motor resistance is calibrated. If an enable is issued again during the measurement interval, the resistance value is not calculated. In this case, the existing resistance value continues to be used.

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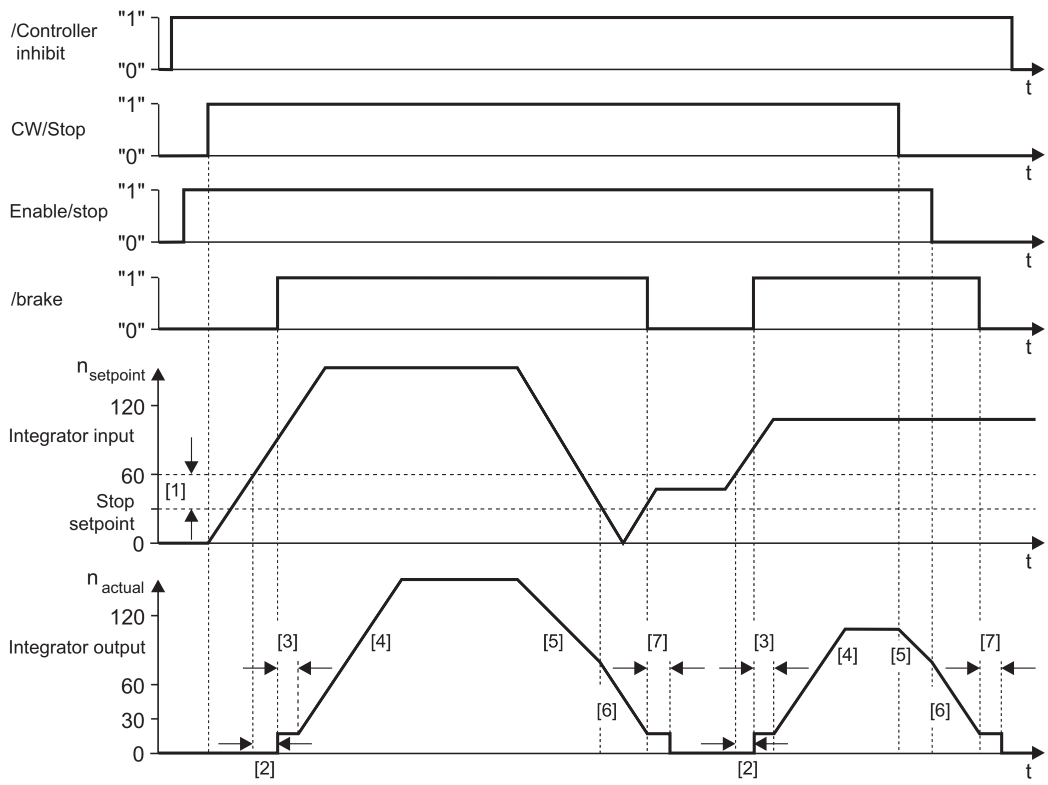
P72. Stop by setpoint function

With activated stop by setpoint function, the device automatically generates an enable in dependence on the main setpoint. All required functions such as premagnetization, brake control, etc. are enabled. An additional enable via terminals must still occur in any case, however.



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[1] Start offset
[2] Premagnetization time
[3] Brake release time
[4] t11 up CW
[5] t11 down CW
[6] t13 Stop ramp
[7] Brake application time

P720/P723 Stop by setpoint function 1/2

Setting range: On/**off**

P721/P724 Stop setpoint 1/2

Setting range: 0 – **30** – 500 min^{-1}

In the "VFC & hoist" operating mode, the minimum stop setpoint is internally limited to 16 min^{-1}.

P722/P725 Start offset 1/2 1 2

Setting range: 0 – **30** – 500 min^{-1}

- If the start setpoint (stop setpoint + start offset) is greater than the maximum speed, no enable occurs.
- If the stop setpoint is greater than the minimum speed, the minimum speed can never be run.

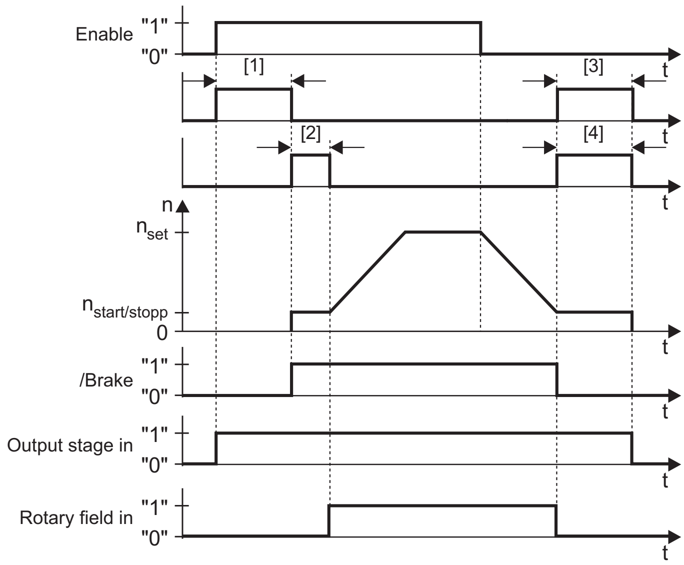
P73. Brake function

MOVIDRIVE® B is capable of controlling a brake installed on the motor. The brake function takes effect on the digital output DB00, which is permanently assigned the function "/Brake" (24 V = brake released).

In a drive with encoder feedback (speed control), it is possible to select between electrical holding of the load and mechanical application of the brake in halt condition.

INFORMATION

- With controller inhibit active (controller inhibit = "0") the brake is **always** applied.
- When the drive safety function "STO" is activated at X17:4 = DC 0 V the brake is **always** applied.



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[1] Premagnetization time
[2] Brake release time
[3] Post-magnetization time
[4] Brake application time

P730/P733 Brake function 1/2 1 2 AUTO

Setting range: **On**/Off

On: The brake is applied when the enable command is withdrawn (Enabled = “0”).

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Off: The brake remains released when the enable command is withdrawn. For operating modes with encoder feedback (VFC n-control&..., CFC, SERVO) the drive is held in position electrically, drives without encoder feedback are no longer energized and thus do not generate torque.

INFORMATION

Drives without encoder feedback may drift away when the brake function is deactivated.

With hoists in controlled operation (VFC&Hoist) the brake function is always active regardless of the parameter settings.

P731/P734 Brake release time 1/2 1 2 AUTO

Setting range: 0 – 2 s

The brake release time of the matching motor is set as the factory setting.

Specifies how long the motor will remain at a standstill after expiration of the premagnetization time and how much time the brake has to release.

P732/P735 Brake application time 1/2 1 2 AUTO

Setting range: 0 – 2 s

The brake application time of the matching motor is set as the factory setting.

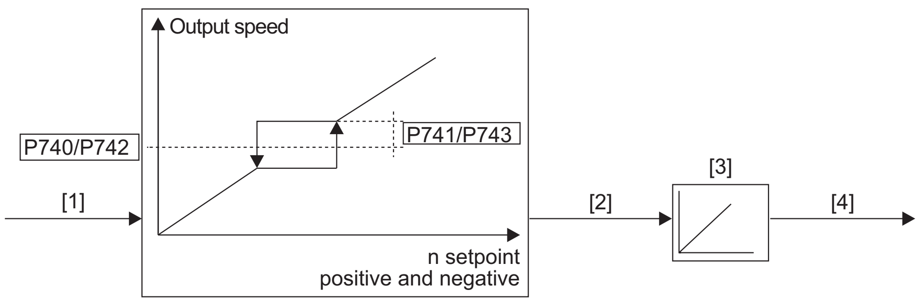
Specifies the time required for the mechanical brake to apply. This parameter prevents a sagging of the drive.

P74. Speed skip function

With these parameters, the motor speed can be prevented from persisting within a certain speed window. This function is particularly useful for machines with strong mechanical resonance because the skip function helps suppress vibrations and noise.

The parameters automatically have effect on positive and negative setpoints when activated. In the factory setting, the function is deactivated (*P741/P743 Skip bandwidth 1/2* = 0).

The following figure shows the mechanism of the parameters:



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[1] n setpoint
[2] n setpoint on the integrator input
[3] Ramps t11/t12
[4] n setpoint on the integrator output

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P740/P742 Skip center 1/2

Setting range: 0 – **1500** – 6000 min^{-1}

P741/P743 Skip bandwidth 1/2

Setting range: **0** – 300 min^{-1}

P75. Master/slave function

The master/slave function allows for implementing automatic functions such as speed synchronization, shared load and torque control (slave). The RS485 interface (ST11/ST12) or the system bus interface (SC11/SC12) can be used as the communication link. *P100 Setpoint source* (→ 🗎 224) = Master SBus or *P100 Setpoint source* (→ 🗎 224) = Master RS485 must be set at the slave. The process output data PO1 – PO3 (*P870/P871/P872 Setpoint description 1/2/3* (→ 🗎 305)) are automatically set by the firmware. A programmable terminal function "Slave free running" *P60. Digital inputs basic device* (→ 🗎 272) / *P61. Digital inputs option* (→ 🗎 273), allows for separating the slave from the master setpoint and switch to local control mode, with exception of the operating mode torque control.

INFORMATION

The process data *P87.* (→ 🗎 305) of the slave are automatically assigned as follows:

PO1 = Control word

PO2 = Speed or current in M-control

PO3 = IPOS PO data

PI1 = Status word 1

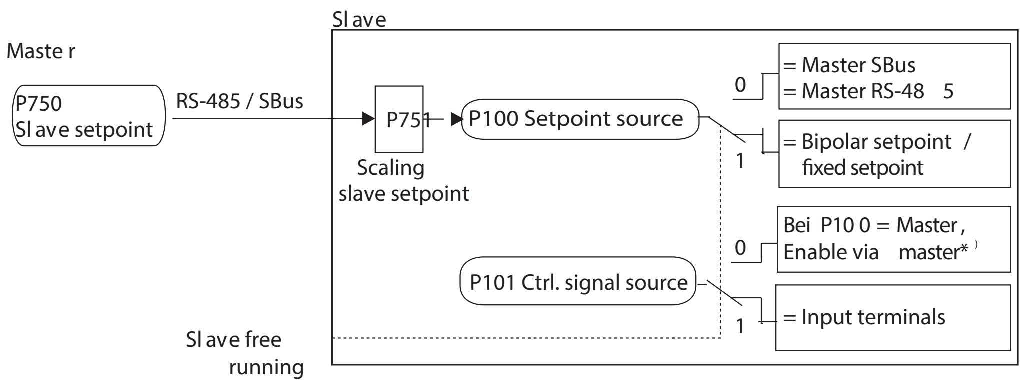
PI2 = Speed

PI3 = IPOS PI data

PI3 and PO3 are not used and are available in IPOS$^{PLUS®}$ as required.

The function slave free running resets the PA and PE data to the value previously set.

DIØØ "/Controller inhibit" and the programmed digital inputs Enable, CW, and CCW must also receive a "1" signal.



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INFORMATION

P811 RS485 group address (→ 🗎 297) or *P882 SBus group address* (→ 🗎 307) must be set to the same value in master and slave. For master/slave operation via RS485 interface, set *P811 RS485 Group address* (→ 🗎 297) to a value greater than 100. For operation via system bus (e.g. master/slave operation), the bus terminating resistors at the start and end of the system bus must be activated (S12 = ON).

Connection check

- System bus (SBus): *P883 SBus timeout interval* (→ 🗎 307) is effective when there is a communication link via the SBus. If *P883 SBus timeout interval* (→ 🗎 307) = 0, data transmission via SBus will not be monitored.
- RS485 interface: A connection check is always in effect if the communication link takes place via the RS485 interface. *P812 RS485 timeout delay* (→ 🗎 297) does not have any function. The slave inverters must receive a valid RS485 telegram within the fixed time interval of t = 500 ms. If the time is exceeded, the slave drives will stop at the emergency stop ramp and fault message F43 "RS485 timeout" will be issued.
- In case of communication via SBus 2, parameter *P893 Timeout interval SBus* (→ 🗎 307) should be set to ≥ 10 ms (recommendation: 100 ms).

INFORMATION

The error is automatically reset and the drives are enabled when the slave inverters once again receive a valid telegram.

The connection check is effective at both RS485 interfaces. If you have connected a PC using XT and the UWS21B or USB11A option, every telegram from the PC will reset the error.

Overview of functions of master/slave operation

Function	Master		Slave	
	P750 Slave setpoint **(→ 🗎 292)**	***P700 Operating mode 1*** **(→ 🗎 280)**	***P100 Setpoint source*** **(→ 🗎 224)**	***P700 Operating mode 1*** **(→ 🗎 280)**
Speed synchronism: • Master controlled • Slave controlled	Speed RS485 + SBus Speed RS485 Speed SBus	VFC VFC & Group VFC & Hoist V/f characteristic curve V/f & DC braking	Master SBus 1 Master RS485	VFC VFC & Group VFC & Hoist V/f characteristic curve V/f & DC braking
Speed synchronism: • Master speed controlled • Slave controlled	Speed RS485 + SBus Speed RS485 Speed SBus	VFC n-control VFC n-control & ... CFC CFC/Servo & IPOS CFC/Servo & Syn-chronous operation	Master SBus 1 Master RS485	VFC VFC & Group VFC & Hoist
Speed synchronism: • Master speed controlled • Slave controlled • Drives do not have a rigid mechanical connection.	Speed RS485 + SBus Speed RS485 Speed SBus	VFC n-control VFC n-control & ... CFC/Servo CFC/Servo & IPOS CFC/Servo & Syn-chronous operation	Master SBus 1 Master RS485	VFC n-control VFC n-control & group VFC n-control & hoist CFC Servo
Speed synchronism: • Master controlled • Slave controlled • Drives do not have a rigid mechanical connection.	Speed RS485 + SBus Speed RS485 Speed SBus	VFC VFC & Group VFC & Hoist	Master SBus 1 Master RS485	VFC n-control VFC n-control & group VFC n-control & hoist CFC Servo
Load distribution: • Master controlled • Slave controlled	Load distribution RS485 + SBus Load distribution RS485 Load distribution SBus	VFC VFC & Group VFC & Hoist	Master SBus 1 Master RS485	VFC VFC & Group VFC & Hoist
Load distribution: • Master speed controlled • Slave controlled	Load distribution RS485 + SBus Load distribution RS485 Load distribution SBus	VFC n-control VFC n-control & ... CFC/Servo CFC/Servo & IPOS CFC/Servo & Syn-chronous operation	Master SBus 1 Master RS485	VFC VFC & Group VFC & Hoist VFC & flying start func-tion
Load distribution: • Master speed controlled • Slave controlled	Not possible			
Load distribution: • Master controlled • Slave controlled	Not possible			
Torque control of the slave: • Master speed controlled • Slave torque controlled	Torque RS485 + SBus Torque RS485 Torque SBus	CFC/Servo CFC/Servo & IPOS CFC/Servo & Syn-chronous operation	Master SBus 1 Master RS485	CFC/Servo & Torque control

Speed synchronism

Speed synchronism (speed RS485/speed SBus/speed RS485 + SBus):

The actual speed of the master is transferred to the slave. Set the torque ratio for the slave inverter using *P751 Scaling slave setpoint* (→ 🗎 293). Leave *P324/P334 Slip compensation 1/2* (→ 🗎 252) of the slave at the value as the startup setting. Example:

Parameters	Setting on the master	Setting on the slave
P100 Setpoint source (→ 🗎 224)	Such as unipolar/fixed set-point	Master SBus
P101 setpoint source (→ 🗎 225)	Such as terminals	Not in effect
P700 Operating mode 1 (→ 🗎 280)	VFC n-control	VFC 1
P750 Slave setpoint (→ 🗎 292)	Speed (SBus)	Master/slave off
P751 Scaling of slave set-point (→ 🗎 293)	Not in effect	1 (then 1 : 1)
P810 RS485 Address (→ 🗎 297)	Set different values	
P811 RS485 group address (→ 🗎 297)	Not in effect	
P881 Address SBus 1 (→ 🗎 307)	Set different values	
P882/P892 SBus Group ad-dress (→ 🗎 307)	Set the same value (0 – 63)	
P884/P894 SBus baud rate (→ 🗎 307)	Set the same value (125, 250, 500, or 1000 kBaud)	

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Load distribution

Load distribution (load distribution RS485/load distribution SBus/load distribution RS485 + SBus):

This function allows for 2 inverters to control the same load. The rotating field frequency of the master is transferred to the slave. It is assumed in this case that the shafts of the motors corresponding to the master and the slave are rigidly connected together. You are recommended to use the same motors with the same gear ratios, otherwise different delays may result during starting/stopping due to the premagnetization time and the brake release/application time. *P751 Scaling slave setpoint* (→ 🗎 293) must be set to the value "1".

INFORMATION

P324/P334 Slip compensation 1/2 (→ 🗎 252) of the slave must be set to 0.

Better behavior can be accomplished by setting the slave as follows:

- *P138 Ramp limit VFC* (→ 🗎 237): Off
- *P115 Filter setpoint* (→ 🗎 231): 0 s
- Ramps *P130* / *P131* / *P132* / *P133*: 0 s
- *P301/P311 Minimum speed 1/2* (→ 🗎 250): 0 min^{-1}

Example:

Parameters	Setting on the master	Setting on the slave
P100 Setpoint source (→ 🗎 224)	Such as bipolar/fixed setpoint	Master RS485
P101 Control signal source (→ 🗎 225)	Such as terminals	Not in effect
P324 Slip compensation 1 (→ 🗎 252)	Do not change	0
P700 Operating mode 1 (→ 🗎 280)	VFC 1	VFC 1
P750 Slave setpoint (→ 🗎 292)	Load distribution (RS485)	Master/slave off
P751 Scaling slave setpoint (→ 🗎 293)	Not in effect	1 (then 1 : 1)
P810 RS485 Address (→ 🗎 297)	Set different values	
P811 RS485 group address (→ 🗎 297)	Set the same value (101 – 199)	
P881 Address SBus 1 (→ 🗎 307)	Set different values	
P882/P892 SBus Group address (→ 🗎 307)	Not in effect	
P884/P894 SBus baud rate (→ 🗎 307)	Not in effect	

Torque control

Torque control of the slave (torque RS485/torque SBus/torque Rs485 + SBus):

The slave inverter receives the torque setpoint of the master directly (the manipulated value of the speed controller). This also enables high quality load distribution to be achieved, for example. This setting should be preferred over load sharing if the drive configuration permits it. Set the torque ratio using *P751 Scaling slave setpoint* (→ 🗎 293). Example:

Parameters	Setting on the master	Setting on the slave
P100 Setpoint source (→ 🗎 224)	Such as unipolar/fixed setpoint	Master RS485
P101 Control signal source (→ 🗎 225)	Such as terminals	Not in effect
P700 Operating mode 1 (→ 🗎 280)	CFC	CFC + torque control
P750 Slave setpoint (→ 🗎 292)	Torque RS485	Master/slave off
P751 Scaling slave setpoint (→ 🗎 293)	Not in effect	1 (then 1 : 1)
P810 RS485 Address (→ 🗎 297)	Set different values	
P811 RS485 group address (→ 🗎 297)	Set the same value (101 – 199)	
P881 Address SBus 1 (→ 🗎 307)	Set different values	
P882/P892 SBus Group address (→ 🗎 307)	Not in effect	
P884/P894 SBus baud rate (→ 🗎 307)	Not in effect	

P750 Slave setpoint

The master is used to determine the setpoint transmitted to the slave. The "master/slave off" setting must be retained on the slave.

- **Master/slave off**
- Speed RS485
- Speed SBus1
- Speed 485 + SBus1
- Torque RS485
- Torque SBus1
- Torque 485 + SBus1
- Load distribution RS485
- Load distribution SBus1
- Load distribution 485 + SBus1

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P751 Scaling of slave setpoint

Setting range: -10 – **1** – 10

When this setting is made in the slave, the setpoint transferred from the master is multiplied by this factor.

P76. Manual operation

P760 Lock run/stop keys

Setting range: On/**off**

Off: Run/stop keys of the DBG60B keypad are active and can be used for starting and stopping the motor.

On: Run/stop keys of the DBG60B keypad are locked and therefore without function.

P77. Energy-saving function

Energy can be saved in the operation of pumps, fans, conveyor belts etc. In this procedure, the magnetization of the asynchronous motor is controlled depending on the load by adapting the voltage-frequency ratio; the motor is under-magnetized.

P770 Energy-saving function

Setting range: On/**off**

The parameter is only effective in "VFC," "VFC & Group," "VFC & flying start function" and "V/f characteristic curve" operating modes.

During no-load operation, the power consumption of the inverter can be reduced by up to 70%. Note the following limitations:

- The energy-saving function only offers advantages in the part-load range.
- No large step changes in load should occur during operation.

P78. Ethernet configuration

The parameter group P78. includes display and setting values that are specific to the DFE33B option card.

P780 IP address

Setting range: 000.000.000.000 – **192.168.10.4** – 223.255.255.255

Use *P780* to set the IP address for linking MOVIDRIVE® B via Ethernet. The IP address consists of 4 bytes in decimal form separated by dots. If the value is set via the DIP switch of the DHCP (Dynamic Host Configuration Protocol) option, the value specified by the DHCP server will be displayed.

P781 Subnet mask

Setting range: 000.000.000.000 – **255.255.255.0** – 255.255.255.255

Factory setting at delivery is a class C network.

The subnet mask divides the network into subnets. The set bits determine which part of the IP address represents the address of the (sub)net. If the DHCP option is activated via the DIP switch, the value specified by the DHCP server will be displayed.

P782 Standard gateway

Setting range: **000.000.000.000** – 255.255.255.255

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The standard gateway is addressed if the desired communication partner is not within the actual network. The standard gateway will have to be part of the actual network. If the DHCP option is activated via the DIP switch, the value specified by the DHCP server will be displayed.

P783 Baud rate

Display value, cannot be altered. Shows the current baud rate of the Ethernet connection. During the initialization phase of the DFE32/33, the value "0" is displayed for approximately 35 s.

P784 MAC address

Display value, cannot be altered. Displays the MAC address, i.e. the unique layer-2 Ethernet address of the interface.

P785 EtherNet/IP™ Startup Configuration

Setting range: **DHCP**/Saved IP parameters

Only available with EtherNet/IP™ option.

- **DHCP**: The DFE13B option is assigned its IP parameters (P780 (→ 🗎 293) – *P782* (→ 🗎 293)) by a DHCP server when the supply voltage is switched on.
- Saved IP parameters: The option is started with the saved IP parameters when the supply voltage is switched on.

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8.3.10 Parameter group 8: Device functions

P80. Setup

P800 User menu

User menu only for DBG60B keypad.

Setting range: On/**off**

P800 enables the DBG60B keypad to be switched between the individual user menu and the detailed parameter menu. A slash following the parameter number indicates that the user menu is activated. The parameters in the factory set user menu are indicated by a "\" in the parameter list. The previously selected menu is active after the MOVIDRIVE® B device has been switched off and on again.

P801 Language

Language selection only for DBG60B keypad.

Use *P801* to set different languages in the DBG60B keypad. The language setting is not changed by the factory setting of MOVIDRIVE® MDX60B/61B.

P802 Factory setting

Setting range: **No**/standard/delivery state

Reestablishes the factory setting for the parameter saved in EEPROM.

INFORMATION

Before you reset the parameter, save the set parameter values using the MOVITOOLS® MotionStudio engineering software. After the reset, you must readjust the parameter values and terminal assignments in accordance with the requirements.

- "Standard" setting: nearly all parameter values are overwritten. The following data is **not** reset:
  - *P20. Speed control* .(→ 🗎 240)
  - *P210 P-gain hold controller* (→ 🗎 242)
  - *P26. Process controller parameter* (→ 🗎 246)
  - *P27. Process controller input values* (→ 🗎 248)
  - *P28. Process controller limits* (→ 🗎 249)
  - *P30./P31. Limits 1 / 2* (→ 🗎 250)
  - *P32./P33. Motor compensation 1/2 (asynchronous)* (→ 🗎 251)
  - *P345/346 IN/UL monitoring 1/2* (→ 🗎 255)
  - *P557 DCS actual position source* (→ 🗎 269)
  - *P70. Operating modes* (→ 🗎 280)
  - *P73. Brake function* (→ 🗎 284)
  - *P78. Ethernet configuration* (→ 🗎 293)
  - *P810 RS485 Address* (→ 🗎 297)
  - *P811 RS485 group address* (→ 🗎 297)
  - *P88. Serial communication SBus 1* (→ 🗎 307) (except *P883 Timeout interval SBus 1* (→ 🗎 307), *P885 Synchronization ID SBus 1* (→ 🗎 307), *P884 Baud rate SBus 1* (→ 🗎 307), *P888 Synchronization time* (→ 🗎 308))

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- *P89. Serial communication SBus 2* (→ 🗎 307) (except *P883 Timeout interval SBus 2* (→ 🗎 307), *P885 Synchronization ID SBus 2* (→ 🗎 307))
- *P905 HIPERFACE offset X15* (→ 🗎 312)
- *P910 Gain X controller* (→ 🗎 313)
- *P938 Speed task 1* (→ 🗎 319)/*P939 Speed task 2* (→ 🗎 319)
- *P94. IPOS encoder* (→ 🗎 320) (except *P944 Encoder scaling ext. Encoder* (→ 🗎 321))
- *P95. Absolute encoder* (→ 🗎 324) (except *P955 Encoder scaling* (→ 🗎 325))
- Fault memory
- Statistical data
- PROFINET device name

• Setting "Delivery state": All parameter values are overwritten.

The 7-segment display of the device shows the status "8" during the reset. The parameter automatically returns to the "No" setting.

P803 Parameter lock

Setting range: On/**off**

• On: The device can **not** be started. Any adjustment to the parameters is prevented. The following parameters are excluded from the inhibit:
  - *P780 IP address* (→ 🗎 293)
  - *P781 Subnet mask* (→ 🗎 293)
  - *P782 Standard gateway* (→ 🗎 293)
  - *P785 EtherNet/IP™ Startup configuration* (→ 🗎 294)
  - *P803 Parameter lock*
  - *P819 Fieldbus timeout interval* (→ 🗎 298)
  - *P840 Manual reset* (→ 🗎 301)
  - *P876 PO data enable* (→ 🗎 306)
  - *P931 IPOS control word task 1* (→ 🗎 319)

  A parameter lock is useful, for example, after an optimized setting of MOVIDRIVE® B.
• **Off**: Parameter adjustments are possible.

P804 Reset statistic data

Setting range: **No**/fault memory/kWh counter/operating hours

Resets the statistical data, error memory, kilowatt-hour meter, and operating hours counter stored in EEPROM.

This data is not reset when selecting the "Standard" of the parameter *P802 Factory setting* (→ 🗎 295).

P806 Copy DBG → MDX

Setting range: Yes/**no**

The parameter data in the DBG60B are transmitted to MOVIDRIVE®.

P807 Copy MDX → DBG

Setting range: Yes/**no**

The parameter data set in MOVIDRIVE® are transmitted to the DBG60B keypad.

P81. Serial communication

P810 RS485 Address

Setting range: **0** – 99

P810 sets the address by means of which communication can take place with MOVIDRIVE® B via the serial interfaces. A maximum of 32 stations can be interconnected.

INFORMATION

On delivery, the MOVIDRIVE® B address is always set to 0. You are recommended not to use the 0 address in order to avoid collisions during data transmission when several inverters are involved in serial communication.

P811 RS485 group address

Setting range: **100** – 199

P811 allows for grouping several MOVIDRIVE® B devices for communication via the serial interface. All MOVIDRIVE® B devices with the same RS485 group address can thus be addressed using a multicast telegram via this address. The data received via the group address is not acknowledged by MOVIDRIVE® B. For example, the RS485 group address makes it possible to send setpoint selections to a group of MOVIDRIVE® B inverters simultaneously. Group address 100 means that no group is assigned to the inverter.

P812 RS485 timeout interval

Setting range: **0** – 650 s

P812 sets the monitoring time for data transmission via the serial interface. MOVIDRIVE® B performs the error response set in *P833 'RS485 timeout' response* (→ 🗎 300) if there is no cyclical process data exchange via the serial interface for the period set in *P812*. Serial data transmission is not monitored when *P812* is set to 0. Monitoring is activated with the first cyclical data exchange.

P819 Fieldbus timeout interval

Setting range: 0 – **0.5** – 650 s

P819 sets the monitoring time for data transmission via the implemented fieldbus (DFx). MOVIDRIVE® B performs the fault response set in *P831 'Fieldbus timeout' response* (→ 300) if there is no data traffic via the fieldbus for the period set in *P819*. When *P819* is set to the value 0 or 650, data transmission via fieldbus is not monitored. The timeout time is specified automatically by the DP master with PROFIBUS-DP and DeviceNet. Changing this parameter does not have any effect and is overwritten whenever the PROFIBUS-DP is started up again.

P82. Braking operation

P820/P821 4-Quadrant operation 1/2

Setting range: **On**/Off

The parameter is only effective in operating modes without encoder feedback (VFC and V/f). 4-quadrant operation is assumed in all other operating modes.

- If a braking resistor is connected to the device, the following 4-quadrant operating modes are possible:
  - CCW / CW
  - Motor/regenerative
- Parameter must be set to "OFF" if there is no braking resistor connected to device, which means regenerative operation is not possible.

  In these operating modes, the device attempts to extend the deceleration ramp so the generated power is not too great and the DC link voltage remains below the switch-off threshold.

  Despite the fact that the deceleration ramps are automatically extended by device, it is possible that the regenerated power during braking may be too great, leading to device switching itself off and issuing error message "F07 "(DC link overvoltage). In this case you have to extend the deceleration ramps manually.

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P83. Fault responses

With these parameters, you set the response for occurring errors and faults.

The following table shows possible error responses:

Response	Description
No response	An error is not displayed, nor is an error response performed. The signaled error is ignored.
Display error	Display of error on the 7-segment display of the device and in the MOVITOOLS® MotionStudio engineering software. The device performs no other error responses. The device can be reset by a device reset (terminal, fieldbus, auto reset).
Immediate stop/malfunction	Immediate switch-off of the device with error message. The output stage is inhibited and the brake is applied. The ready signal is revoked. A restart is only possible after a fault reset has been performed during which the device is reinitialized.
Emergency stop/malfunction	The drive is braked with the emergency stop ramp t14/t24 . Once the stop speed is reached, the output stage is inhibited and the brake is applied. The error is signaled immediately. The ready signal is revoked. A restart is only possible after a fault reset has been performed during which the device is reinitialized.
Rapid stop/malfunction	The drive is braked with the stop ramp t13/t23 . Once the stop speed is reached, the output stage is inhibited and the brake is applied. The error is signaled immediately. The ready signal is revoked. A restart is only possible after a fault reset has been performed during which the device is reinitialized.
Immediate stop/Warning	Immediate switch-off of the device with error message. The output stage is inhibited and the brake is applied. The ready signal is not revoked. The drive restarts without device re-initialization if the error is rectified by an internal procedure or by an error reset.
Emergency stop/Warning	The drive is braked with the emergency stop ramp t14/t24 . Once the stop speed is reached, the output stage is inhibited and the brake applied. The error is signaled immediately. The ready signal is not revoked. The drive restarts without device re-initialization if the error is rectified by an internal procedure or by an error reset.

Response	Description
Rapid stop/Warning	The drive is braked with the stop ramp t13/t23 . Once the stop speed is reached, the output stage is inhibited and the brake applied. The error is signaled immediately. The ready signal is not revoked. The drive restarts without device re-initialization if the error is rectified by an internal procedure or by an error reset.

P830 Response to "External fault"

Factory setting: **Emergency stop/malfunction**

Triggered only in the inverter status "Enabled" via an input terminal programmed to "/External fault".

P831 'Fieldbus timeout' response

Factory setting: **Rapid stop/warning**

The error is only triggered in the ENABLED inverter status. *P831* programs the fault response which is triggered by fieldbus timeout monitoring. The response time of the monitoring process can be set with *P819 Fieldbus timeout interval* (→ 🗎 298) (see "Fieldbus device profile" manual for a more detailed description).

P832 Response to "Motor overload"

Factory setting: **Emergency stop/malfunction**

Triggered in case of a motor overload. Make one of the following settings to monitor the motor overload:

- In parameter *P340 Motor protection 1* (→ 🗎 253), the setting "One asynchronous motor"
- In parameter *P340 Motor protection 1* (→ 🗎 253), the setting "One servomotor" and in parameter *P530 Sensor type 1* (→ 🗎 265) the setting "KTY"

P833 'RS485 timeout' response

Factory setting: **Rapid stop/warning**

P833 is used to program the fault response that is triggered by the RS485 timeout monitoring. The response time of the monitoring process can be set using *P812 RS485 timeout interval* (→ 🗎 297).

P834 Response to "Lag error"

The response is only possible with DRS11B or IPOS$^{PLUS®}$.

Factory setting: **Emergency stop/malfunction**

P834 is used to program the fault response that is triggered by lag error monitoring of the "synchronous operation card DRS11B" option and of positioning mode with IPOS$^{PLUS®}$. Different settings are available in *P51. Synchronous operation monitoring* (→ 🗎 262).

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P835 'TF signal' response AUTO

Factory setting: **No response**

Triggered via the temperature sensor monitoring of the temperature sensor TF or TH in the motor winding, as applicable.

P836 'Timeout SBus 1/2' response

Factory setting: **Emergency stop/malfunction**

P836/P837 are used to program the fault response that is triggered by the system bus timeout monitoring. The response time of the monitoring process can be set with *P883/P893 Timeout interval SBus 1/2* (→ 🗎 307).

Important: If the DCS21B/22B/31B/32B option is plugged in, *P837* is automatically set to "Emergency stop/Warning" after each restart.

P838 'SW limit switch' response

Factory setting: **Emergency stop/malfunction**

This response is triggered if a target position outside the software limit switch is specified in the referenced drive. The software limit switches are set using parameters *P920/P921 SW limit switch CW/CCW* (→ 🗎 317).

P839 Response to "Positioning interruption"

Factory setting: **Emergency stop/Warning**

If the parameter *P924 'Position interruption' detection* (→ 🗎 318) is activated, this response is triggered upon interrupting a positioning process.

P84. Reset behavior

P840 Manual reset

Setting range: Yes/**no**

- Yes: Resets the fault in MOVIDRIVE® B. As soon as the reset is carried out, the parameter automatically resets to the setting "**No**". Activating the manual reset does not have any effect if there is no error present. In case of a fault, you can press the [← / Del] key on the DBG60B to access *P840* directly.
- **No**: No reset is performed.

P841 Auto reset

Setting range: Yes/**no**

⚠ DANGER

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

Fatal or severe injuries and damage to property.

- Do not use the auto-reset function with drives where an automatic restart could represent a danger to people or devices.
- Perform a manual reset.

- Yes: Automatically performs a device reset in case of error after an adjustable wait period. The wait period is adjusted via the parameter *P842 Restart time* (→ 🗎 302).

  A maximum of 5 auto resets are possible during an auto reset phase. If 5 errors occur that are reset by an auto-reset, no more auto-resets are possible until one of the following situations occurs:

  – a manual reset is performed using the input terminal,

  – A manual reset is performed via the serial interface (with the MOVITOOLS® MotionStudio engineering software or via the PLC)

  – There is a transition to 24 V backup mode, or the device is switched off completely

  Five auto resets are then possible again.
- **No**: No auto reset is performed.

P842 Restart time

Setting range: 1 – **3** – 30 s

Wait time that should occur between the moment an error occurs and the execution of an auto reset.

P85. Scaling actual speed value

Specifies a user-specific display parameter. The display parameter is shown in the parameter *P001 User display* (→ 🗎 216).

Example

A scaling factor of 1/60 is required to display the actual speed value in s^{-1}. The following settings must be specified for the display parameter:

Parameters	Setting
P850 Scaling factor numerator	1
P851 Scaling factor denominator	60
P852 User unit	s^{-1}

With these settings, an actual speed value of 1500 min^{-1} in the parameter *P001 User display* is shown as 25 s^{-1}.

P850 Scaling factor numerator

Setting range: **1** – 65535

P851 Scaling factor denominator

Setting range: **1** – 65535

P852 User unit

Factory setting: **1/min** (can only be set via MotionStudio)

The user unit can comprise a maximum of 8 ASCII characters. The user unit is shown in the parameter *P001 User display* (→ 🗎 216).

P86. Modulation

P860/P861 PWM frequency 1/2 VFC 1 2

The parameter is only effective in "VFC & ..." and "V/f ..." operating modes.

Setting range for sizes 0 – 5: **4**/8/12/16 kHz

Setting range for size 6: **4**/8 kHz

Setting range for size 7: **2.5**/4 kHz

Sets the clock frequency on the device output for parameter set 1/2. The set clock frequency can be permanently fixed with the parameter *P862/P863 PWM fix 1/2* (→ 🗎 304).

If the clock frequency is not permanently fixed to the set value, the device automatically switches back to lower clock frequencies when the device utilization reaches a specific level. The modulation frequency reduces switching losses in the output stage and, consequently, device utilization.

P862/P863 PWM fix 1/2

Setting range: On/**off**

- On: Fixes the clock frequency set in parameter *P860/P861 PWM-frequency 1/2* (→ 303) for parameter set 1/2. This prevents an automatic reduction of the clock frequency (e.g. when using output filters).
- **Off**: The device automatically reduces the set output frequency (down to minimum 4 kHz) when there is a high level of thermal load on the output stage. This is to avoid a switch-off of the device with the error message "Device utilization".

P864 PWM frequency CFC

The parameter is effective only in "CFC & ..." and "Servo & ..." operating modes.

Setting range for sizes 0 – 5: **4**/8/16 kHz

Setting range for size 6: **4**/8 kHz

Setting range for size 7: **2.5**/4 kHz

Sets the clock frequency on the device output for parameter set 1. The cycle frequency is set to a fixed value and is not automatically reduced with high device utilization.

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P87. Process data description

P870/P871/P872 Setpoint description PO1/PO2/PO3

Defines the content of the process output data words PO1/PO2/PO3. MOVIDRIVE® B can only allocate the corresponding setpoint according to this specification.

Specifically, the parameters are:

Parameters	Factory setting
P870 Setpoint description PO1	Control word 1
P871 Setpoint description PO2	Setpoint speed
P872 Setpoint description PO3	Ramp

The process output data words can be allocated as follows:

Assignment	Description
No function	The content of the process output word is ignored.
Setpoint speed	Setpoint speed in min^{-1}
Setpoint current	Current setpoint input with torque control
Setpoint position low	Setpoint position low word
Setpoint position high	Setpoint position high word
Max. speed	Maximum system speed
Max. current	Current limiting in % of I_N of the device
Slip speed	Slip compensation
Ramp	Ramp time for setpoint selection
Control word 1	Control signals for start/stop, etc.
Control word 2	Control signals for start/stop, etc.
Setpoint speed [%]	Speed setpoint input in % of n_{max}
IPOS PO data	Response of a 16-bit encoded value for an IPOS^PLUS® application module

For more detailed information, refer to the "Fieldbus Device Profile with List of Parameters" manual.

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P873/P874/P875 Actual value description PI1/PI2/PI3

Defines the content of the process input data words PI1/PI2/PI3. MOVIDRIVE® B can only allocate the corresponding actual values according to this specification.

Specifically, the parameters are:

Parameters	Factory setting
P873 Actual value description PI1	Status word 1
P874 Actual value description PI2	Actual speed
P875 Actual value description PI3	Output current

The process input data words can be allocated as follows:

Assignment	Description
No function	The content of the process input data word is 0000_{hex}
Actual speed	Current speed actual value of the drive in min^{-1}
Output current	Present output current of the system in % of I_N
Active current	Present active current of the system in % of the nominal device current I_N • Positive algebraic sign corresponds to a positive torque. • Negative algebraic sign corresponds to a negative torque.
Actual position low [1)]	Current actual position low word
Actual position high[1)]	Current actual position high word
Status word 1	Status information of the device
Status word 2	Status information of the device
Actual speed [%]	Present actual speed value in % of the maximum speed n_{max}
IPOS PE data	Response of a 16-bit encoded value for an IPOS^PLUS® application module
Status word 3	Status information of the device

1) The actual position is read in from the parameter P941 Source actual position. Both the low word and the high word must be set.

For more detailed information, refer to the "Fieldbus Device Profile with List of Parameters" manual.

P876 PO data enable

Setting range: **Yes**/no

- **Yes**: The process output data that was last sent from the PLC becomes effective.
- No: The last valid process output data remain in effect.

INFORMATION

If the process data assignment is changed, the parameter is automatically set to "No". This only occurs if *P100* or *P101* is set to "Fieldbus". In case a bus card is plugged in, the parameter is immediately set to "Yes" in the RAM after booting, even if the value "No" is set in EEPROM. But the EEPROM value will be adopted after a fault reset.

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P88./P89. Serial communication SBus 1/2

P880/P890 Protocol SBus 1/2

Setting range: **SBus MOVILINK®**/CANopen/Protocol DCS

P881/P891 Address SBus 1/2

Setting range: **0** – 63

Use *P881/P891* to set the system bus address of MOVIDRIVE® B. The MOVIDRIVE® B device can communicate with other MOVIDRIVE® B devices using the system bus (SC11/SC12) by means of the address set here.

P882/P892 SBus group address 1/2

Setting range: **0** – 63

P882/P892 is used to set the system bus group address for multicast telegrams of MOVIDRIVE® B.

P883/P893 SBus timeout delay 1/2

Setting range: **0** – 650 s

P883/P893 is used to set the monitoring time for data transmission via system bus. If there is no data traffic via the system bus during the time period set in *P883/P893*, MOVIDRIVE® will execute the error response set in *P836/P837 'Timeout SBus 1/2' response* (→ 🗎 301). Data transmission via the system bus is not monitored when *P883/P893* are set to the value 0.

P884/P894 SBus baud rate 1/2

Setting range: 125/250/**500**/1000 kBaud

P884/P894 is used to set the transmission speed of the system bus. The total of the baud rates specified in *P884/P894* must not exceed 1125 kBaud.

P885/P895 Synchronization ID SBus 1/2

Setting range: **0** – 2047

The drives can be synchronized for transmitting process data and parameter data via the optional CAN bus. For this purpose, the master controller must send a synchronization message to the connected inverter at certain intervals. In this way, the inverters synchronize themselves to the master controller. *P885/P895* is used for setting the identifier (address) of the synchronization message in the inverter for the optional CAN bus. Make sure there is no overlap between the identifiers for the process data or parameter data telegrams.

INFORMATION

The inverters may either be synchronized by SBus 1 or SBus 2 or by DPRAM (*P970* (→ 🗎 328)). The inverters must **not** be synchronized **from several interfaces at the same time**.

P886/P896 CANopen address 1/2

Setting range: 1 – **127**

P886/*P896* is used to set the serial communication with the SBus.

P887 Synchronization ext. controller

Setting range: On/**off**

If a MOVIDRIVE® B receives cyclical setpoints from a higher-level controller via SBus 1 or SBus 2 (e.g. position setpoint or master axis position) it is necessary that the MOVIDRIVE® B processor works synchronously with the control processor so that the internal time dial for the position controller is an integer divisor of the synchronization time (the cycle time for the new setpoints from the control).

This setting prevents information from being processed twice and ensures that setpoint jumps do not occur due to beat effects or long-term drift.

The synchronization of MOVIDRIVE® B and control takes place via *P885/P895 Synchronization ID SBus 1/2* (→ 🗎 307), the time dial is set using *P887*.

You will have to set *P916 Ramp type* (→ 🗎 314) to "Bus ramp" for cyclical presetting of the position setpoint.

On: the internal time dial for position control will have to be set to exactly 1 ms.

Off: The internal time dial for position control is set to the standard SEW time base (ca. 1 ms).

If several MOVIDRIVE® B devices are synchronized via SBus without control, *P887* has to be set to OFF in all inverters.

Information: For technical reasons, the setting *P887* = On is available for field-oriented operating modes with CFC or SERVO only. VFC operating modes always work with the standard SEW time base.

P888 Synchronization time

Setting range: 1 – **5** – 10 ms

Cycle time for new setpoints of a higher-level controller.

See also *P885/P895 Synchronization ID SBus 1/2* (→ 🗎 307) / *P887 Synchronization ext. Controller 1/2* (→ 🗎 308).

P889/P899 Parameter channel 2

Setting range: On/**off**

On: The second parameter channel is active

Off: The second parameter channel remains inactive

8.3.11 Parameter group 9: IPOS parameters

These parameters can only be used in connection with IPOS$^{PLUS®}$ application modules.

⚠ DANGER

Risk of crushing if the motor starts up unintentionally.

Fatal or severe injuries and damage to property.

- Ensure that the motor cannot start unintentionally.
- Note that modifying these parameters without knowledge of the IPOS$^{PLUS®}$ application module which may be active can cause unexpected movements and place unwanted loads on the mechanical drive train. It is essential that you are familiar with the "Positioning and process control with IPOS$^{PLUS®}$" manual to make the setting for these parameters.

P90. IPOS reference travel

Reference travel is used to establish a machine zero to which all absolute positioning commands refer.

The parameter *P903 Reference travel type* (→ 🗎 311) specifies various reference travel strategies which define the corresponding travel modes. For example, if a reference travel is carried out with a reference cam, the machine zero is calculated as follows:

Machine zero = reference position + reference offset

The reference position is determined in the reference travel and the reference offset in the parameter *P900 Reference offset* (→ 🗎 310).

The speeds of the travel movements required on the basis of the reference travel type are set using *P901 Reference speed 1* (→ 🗎 310) and *P902 Reference speed 2* (→ 🗎 310).

P900 reference offset

Setting range: $-(2^{31}-1)$ – **0** – $(2^{31}-1)$

Zero position correction for calculating the machine zero

All absolute positioning commands refer to the machine zero.

The machine zero is calculated as follows:

Machine zero = reference position + reference offset

The reference position is determined in the reference travel.

The reference offset always refers to the encoder. This encoder can be a motor encoder, an external encoder or a DIP encoder. Select the encoder in the parameter *P941 Source actual position* (→ 🗎 320).

The actual positions are displayed in the following IPOS^PLUS® variables:

- The DIP encoder in the IPOS^PLUS® variable *H509 Actual position.*
- The external encoder in the IPOS^PLUS® variable *H510 Actual position*.
- The motor encoder in the IPOS^PLUS® variable *H511 Actual position*.

The reference offset becomes active after reference travel has been completed successfully.

INFORMATION

In the case of a reference travel with HIPERFACE® encoder, the value of the parameter *P905 HIPERFACE® offset (motor)* is recalculated and overwritten as follows:

HIPERFACE® offset = encoder value - reference offset

P901 Reference speed 1

Setting range: 0 – **200** – 6000 min^{-1}

Specifies the travel speed for the first part of the reference travel until reaching the reference cam.

Stop ramp t13   is always used to change the speed. The search directions during reference travel are determined by the respective reference travel type.

P902 Reference speed 2

Setting range: 0 – **50** – 6000 min^{-1}

Specifies the travel speed for the second part of the reference travel from leaving the reference cam until reaching the first zero pulse.

Stop ramp t13   is always used to change the speed. The search directions during reference travel are determined by the respective reference travel type.

P903 Reference travel type

Setting range: **0** – 8

Reference travel strategy with which the machine zero of a system is specified. This defines a travel mode for searching for a reference cam, for example.

This parameter also specifies the search direction for the reference cam in the individual referencing phases.

Use parameter *P904 Referencing to zero pulse* (→ 🗎 312) to determine if the reference travel takes place to the edge change of the reference cam or the next zero pulse of the encoder.

An operationally ready and enabled drive is prerequisite for carrying out the reference travel. The reference travel type 8 is an exception.

The following reference travel types are possible:

- Type 0: Left zero pulse
  - First search direction: CCW
  - Reference point: CCW zero pulse from current position
  - Machine zero: Reference position + reference offset
- Type 1: Left end of the reference cam
  - First search direction: CCW
  - Reference point: First zero pulse or falling edge to the left of the reference cam
  - Machine zero: Reference position + reference offset
- Type 2: Right end of the reference cam
  - First search direction: CW
  - Reference point: First zero pulse or falling edge to the right of the reference cam
  - Machine zero: Reference position + reference offset
- Type 3: Limit switch right
  - First search direction: CW
  - Reference point: First zero pulse or falling edge to the left of the right limit switch
  - Machine zero: Reference position + reference offset
  - Reference travel should take place to zero pulse.
- Type 4: Limit switch left
  - First search direction: CCW
  - Reference point: First zero pulse or falling edge to the right of the left limit switch
  - Machine zero: Reference position + reference offset
  - Reference travel should take place to zero pulse.
- Type 5: No reference travel
  - Reference point: Current position (referencing with drive enable)
  - Machine zero: Reference offset
- Type 6: Reference cam flush with right limit switch
  - First search direction: CW
  - Reference point: First zero pulse or falling edge to the left of the reference cam

  - Machine zero: Reference position + reference offset
  - Reference cam and limit switches must be flush.
- Type 7: Reference cam flush with left limit switch
  - First search direction: CCW
  - Reference point: First zero pulse or falling edge to the right of the reference cam
  - Machine zero: Reference position + reference offset
  - Reference cam and limit switches must be flush.
- Type 8: Resetting of encoder position without enable
  - Reference point: Current position (referencing with drive enable)
  - Machine zero: Reference offset
  - Reference travel can take place when the drive is not ready for operation.

P904 Reference travel to zero pulse

Setting range: **Yes**/No

- **Yes**: The drive is referenced to the zero pulse of the selected IPOS$^{PLUS®}$ encoder.
- No: Reference travel takes place to the falling edge of the reference cam.

P905 Hiperface offset X15

Setting range: $-(2^{31} - 1)$ – **0** – $(2^{31} - 1)$

Specifies the zero point of the encoder display.

Use this parameter to define the machine zero without reference travel. It adds or subtracts the offset from the encoder value. The IPOS$^{PLUS®}$ variable *H511 Actual position* of the motor encoder is calculated directly after input of values as follows:

H511 = Encoder value - HIPERFACE® offset

A HIPERFACE® multi-turn encoder must be referenced once, a HIPERFACE® single-turn encoder must always be referenced.

INFORMATION

In the case of a reference travel with HIPERFACE® encoder, the value of the parameter *P905 HIPERFACE® offset (motor)* is recalculated and overwritten as follows:

HIPERFACE® offset = encoder value - reference offset

P906 Cam distance

Contains the number of increments from leaving the reference cam to the zero pulse of the motor encoder. The parameter is displayed following successfully completed reference travel.

Ideally, the cam distance is half the encoder resolution after 4x evaluation. In order to approach the ideal case, you may have to adjust the cam.

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P91. IPOS Travel parameters

P910 Gain X controller

Setting range: 0.1 – **0.5** – 32

Setting value for the P controller of the position control loop in the IPOS$^{PLUS®}$ application module

In the basic setting, the value of the parameter *P210 P-gain hold controller* (→ 🗎 242) is accepted.

P911/P912 Positioning ramp 1/2

Setting range: 0.01 – **1** – 20 s

Value set for the ramp used depending on *P916* (→ 🗎 314) during the positioning operation.

- The positioning ramp 1 is always used in the case of a sinusoidal or square ramp for acceleration and brake deceleration.
- With a linear ramp (P916 = "Linear" or "Jerk limited"), the braking deceleration is set depending on the ramp mode *P917* (→ 🗎 317).
  - If the ramp mode "Mode 1" is set, braking deceleration for travel to target position (spot braking) only takes place with positioning ramp 2. Positioning ramp 1 is used for all other positioning operations.
  - If the ramp mode "Mode 2" is set, positioning ramp 2 is always used during travel for brake deceleration when changing the travel speed. Positioning ramp 1 is used for acceleration.

P913/P914 Travel speed CW/CCW

Setting range: 0 – **1500** – 6000 min^{-1}

Speed used for positioning. It is limited by the maximum speed of the motor.

INFORMATION

In order to prevent a lag error, always set the maximum speed about 10% greater than the travel speed.

P915 Velocity precontrol

Setting range: -199.99 – 0 – **100** – 199.99%

Parameter is only in effect with the "linear" and "jerk limited" ramp types. The function has no effect for the ramp types "Sine" and "Squared".

Setting range: -199.99 – 0 – **100** – 199.99%

- Setting "**100%**": The drive runs optimally with regard to time using the linear velocity profile.
- If a value less than 100% is specified, a larger gap between position setpoint and actual position occurs (lag distance) during a positioning operation. This results in a "soft" run-in to the target position for the acceleration procedure.

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P916 Ramp type

Specifies the type of positioning ramp. This influences the speed or acceleration characteristics during positioning.

INFORMATION

The following ramp types are not supported when *P702 Motor category* (→ 281) is set to "linear":

- Velocity interpolation
- Position interpolation 12 bit
- Position interpolation 16 bit

The following ramp types are possible:

Ramp type	Positioning performance
Linear	Optimum time, however block-shaped acceleration characteristic
Square	Softer acceleration, but higher torque demand than Ramp type "linear"
Sine	Very soft acceleration profile, but required torque higher than with "Squared" acceleration profile
Bus ramp	Setting for operation of the device with a PLC. The PLC generates a cyclical position setpoint that is written directly to the position controller. The ramp generator is deactivated. The position specifications sent cyclically by the PLC are interpolated linearly. For configuration, one process output data word must be set to "position high" and another one to "position low".
Jerk-limited	Based on the principle of the linear ramp, the torque and, therefore, the acceleration is trapezoidal. During acceleration, the torque is increased over time in linear form to the maximum value. In the same way, the torque is reduced again over time in linear form to zero. Consequently, the system experiences almost no vibration. If a jerk time is set, the positioning time extends relative to the linear ramp by the set jerk time. The acceleration and torque do not increase in comparison with the linear ramp.
Cam	Activating the technology function "Electronic cam".
I-synchronous operation	Activating the technology function "Electronic synchronous operation".
Cross Cutter	Activating the technology function "Cross cutter".

Ramp type	Positioning performance
Velocity interpolation	The speed values sent cyclically by the external controller are interpolated linearly. • Speed specification via process data: – Set *P888 Synchronization time SBus* " " (→ 🗎 308) to 5 ms or 10 ms – Set *P100 Setpoint source* (→ 🗎 224) to "SBus" or "Fieldbus" – You have to set a process output data word to "Speed". • Speed specification via SBus/SCOM object: – Set *P888 Synchronization time SBus* (→ 🗎 308) to 1 – 10 ms – Set the *P100 Setpoint source* (→ 🗎 224) to "Bipolar/fixed setpoint" – You must not set a process output data word to "Speed" – Create a SCOM receive object (using the SCOM receive command → IPOS$^{PLUS®}$ manual) with the target variable *SetPosBus* (H499)
Position interpolation 12 bit	The position specifications sent cyclically by the external controller are interpolated. Position resolution: 1 revolution corresponds to 4096 increments (12 bit). • Position specification using process data: – Set *P888 Synchronization time SBus* to 5 ms or 10 ms – Set *P100 Setpoint source* to "SBus" or "Fieldbus" – Set one process output data word to "position HIGH" and another one to "position LOW". • Position specification via SBus/SCOM object: – Set *P888 Synchronization time SBus* to 1 – 10 ms – Set *P100 Setpoint source* to "Bipolar/fixed setpoint" – Do not set a process output data word to "position HIGH" or "position LOW". – Create a SCOM receive object (using the SCOM receive command → IPOS$^{PLUS®}$ manual) with the target variable *SetPosBus* (H599)

Ramp type	Positioning performance
Position interpolation 16 bit	The position specifications sent cyclically by the external controller are interpolated. Position resolution: 1 revolution corresponds to 65536 increments (16 bit). • Position specification using process data – Set *P888 Synchronization time SBus* to 5 ms or 10 ms – Set *P100 Setpoint source* to "SBus" or "Fieldbus" – Set one process output data word to "position HIGH" and another one to "position LOW". **Notice**: Position resolution via PI data assignment is 4096 increments per revolution (= 12 bit) IPOS^PLUS® variable H508 provides the motor position, extended to 16 bits. The IPOS^PLUS® variable *ActPos_Mot* (H511) has a position resolution of 4096 increments per revolution (= 12 bit) • Position specification via SBus/SCOM object: – Set *P888 Synchronization time SBus* to 1 – 10 ms – Set *P100 Setpoint source* to "BIPOL./FIXED SETPT". – Do not set a process output data word to "position HIGH" or "position LOW". – Create a SCOM receive object (using the SCOM receive command → IPOS^PLUS® manual) with the target variable *SetPosBus* (H499) **Notice**: Position resolution via PI data assignment is 4096 increments per revolution (= 12 bit) The position resolution of 4096 increments per revolution (= 12 bit) expanded to 16 bit is available on IPOS^PLUS® variable H508 The IPOS^PLUS® variable *ActPos_Mot* (H511) has a position resolution of 4096 increments per revolution (= 12 bit)

INFORMATION

Note the following for the "Position interpolation 16 Bit" ramp type:

- IPOS variable H508 is also used when S14 is set to ON. IPOS variable H508 only provides meaningful values when
  - DIP switch S14 = "On" **or**
  - *P916 Ramp type* = "Position interpolation 16 bit"

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P917 Ramp mode

Setting range: **Mode 1**/Mode 2/Mode 3

Determines use of the positioning ramp 2 (→ 🗎 313).

- **Mode 1**: Braking deceleration for travel to target position (spot braking) takes place only with positioning ramp 2. Positioning ramp 1 is used for all other positioning operations.

  If 12 bit or 16 bit position interpolation is active, it runs in mode 1 without dead time compensation.
- Mode 2: If the travel speed changes during travel, the positioning ramp 2 is always used for brake deceleration. Positioning ramp 1 is used for acceleration.

  If 12 bit or 16 bit position interpolation is active, it runs in mode 2 without dead time compensation.
- Mode 3: This bus position interpolator is based on the bus setpoint.

P918 bus setpoint source

Setting range: 0 – **499** – 1023

Sets the source for the setpoint in the IPOS$^{PLUS®}$ application module when operating with EtherCAT®.

P92. IPOS monitoring

P920/P921 SW limit switch CW/CCW

The software limit switches are only monitored in IPOS$^{PLUS®}$ Operating modes.

Setting range: -(2^{31}-1) – **0** – (2^{31}-1)

Specifies the limits of the target range in the software in which the travel commands are still accepted. However, the drive can move past the target specified due to the mass moment of inertia of the machine or if the parameter settings are set incorrectly in the controller. Software limit switches cannot prevent this from happening.

If *P941 Source actual position* (→ 🗎 320) is set to "motor encoder" or "external encoder", then the software limit switches do not take effect until after performance of a reference travel.

If the target position *H492* of the current travel command is outside of the active software limit switch, the travel command is not executed. The drive responds accordingly to the error response set in the parameter *P838 Response 'SW limit switch'* (→ 🗎 301). If the error responses "../warning" or ".../error" are set, then error message "F78" (IPOS SW limit switch) is displayed:

- Setting ".../error": After an error reset, the drive is no longer referenced with the incremental encoder. The software limit switches have no effect. They are only activated again after the drive has been referenced. A drive with absolute encoder, by contrast, remains referenced even after a fault reset.
- Setting ".../Warning": The drive remains referenced after an error reset.

For deactivation, both limit switches must be set to "0" (e.g. for continuous travel).

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P922 Position window

Setting range: 0 – **50** – 32767 inc.

Defines a distance range (position window) around the target position of a travel or stop command. The "Axis in position = Yes" condition applies if a drive is inside the position window around the current target position (*H492*). The "Axis in position" information is used as a final condition for waiting positioning commands.

P923 Lag error window

Setting range: 0 – **5000** – 2 inc.

Defines a permitted difference between the setpoint and actual position value. The lag error response that is set in the parameter *P834 Response to 'lag error'* (→ 🗎 300) is triggered upon exceeding.

The setting "0" deactivates the lag error monitoring.

P924 Positioning interruption detection

Setting range: On/**off**

Adjusts whether an interruption of the positioning process (withdrawal of enable) is monitored. The error response is set in the parameter *P839 Response to 'Positioning interruption'* (→ 🗎 318).

Target monitoring is in effect for the ramp types linear, sine, squared ,and jerk limited.

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P93. Special IPOS functions

P930 Override

Setting range: On/**off**

Enables the change to the travel speed of the positioning processes programmed in the IPOS$^{PLUS®}$ application module. The change occurs in the range from 0 – 150% of the respectively programmed velocity. This requires an analog input, with 0 – 150% corresponding to 0 – 10 V at the analog input. The maximum speed value is limited by the maximum speed of motor (→ 250).

P931 IPOS CTRL word Task 1

Setting range: **Stop**/start/hold

IPOS CTRL.W Task 1 in the DBG60B keypad only, not in MOVITOOLS® MotionStudio.

Stop: Task 1 of the IPOS$^{PLUS®}$ program is stopped.

Start: Task 1 of the IPOS$^{PLUS®}$ program is started.

Stop: Tasks 1, 2 and 3 of the IPOS$^{PLUS®}$ program are stopped.

P932 IPOS CTRL word Task 2

Display range: Start/**Stop**

IPOS CTRL.W Task 2 in the DBG60B keypad only, not in MOVITOOLS® MotionStudio.

Display parameter, cannot be set using DBG60B.

Start = Task 2 of the IPOS$^{PLUS®}$ program is currently being processed.

Stop = Task 2 of the IPOS$^{PLUS®}$ program is stopped.

P933 Jerk time

Setting range: **0.005** – 2 s

Duration of the torque build-up

If the jerk time is less than or equal to the positioning ramp 1 and 2 (→ 313), the positioning time extends relative to the linear ramp by the set jerk time. Otherwise, the torque build-up continues to be trapezoidal and the set jerk time does not correspond to the duration of the torque build-up.

P938/P939 Speed task 1/task 2

Setting range: **0** – 9 additional assembler commands/ms

Increases the speed by up to 9 additional assembler commands per millisecond. The resources for the speed increase are divided between task 1 and task 2: Task 1 and task 2 may be assigned together with 9 additional assembler commands per millisecond.

The default setting for task1 is "1" and "2" for task 2. For example, a possible speed increase is:

Task 1 + 2 additional assembler commands/ms = 3 assembler commands/ms

Task 2 + 7 additional assembler commands/ms = 9 assembler commands/ms

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P939 Speed for task 2

Setting range: **0** – 9 additional assembler commands/ms

The standard setting for task 2 is 2 assembler commands/ms. The speed can be increased by up to 9 additional assembler commands/ms with *P939*. *P939* and "P938" (→ 🗎 319) share the resources for the speed increase; that is, task 1 and task 2 **together** can be assigned a total of 9 additional assembler commands/ms. Example:

Task 1 **+ 2 additional assembler commands/ms** = 3 assembler commands/ms

Task 2 **+ 7 additional assembler commands/ms** = 9 assembler commands/ms

P94. IPOS encoder

P940 IPOS variables edit

Setting range: On/**off**

IPOS^PLUS®^ variables can only be edited with DBG60B keypad, not in MOVITOOLS® MotionStudio.

The IPOS^PLUS®^ variables can be altered when *P940* = "ON".

P941 Actual position source

Setting range: **Motor encoder (X15)**/ external encoder (X14)/ absolute encoder (X62)

Defines the encoder to which the IPOS^PLUS®^ application module positions.

P942/P943 Encoder factor numerator/denominator

Setting range: **1** – 32767

This parameter must remain set to 1 when the multi-encoder card DEU21B is used.

First set *P944 Encoder scaling ext. encoder (X14)*" " (→ 🗎 321) or *P955 Encoder scaling* (→ 🗎 325) (when using option DIP11B or DEH21B). Then continue with the settings for *P942*/*P943*.

In the event of positioning to an external encoder (X14) or an absolute encoder (X62), then these two parameters are used for adapting the resolution to the motor encoder (X15).

Proceed as follows:

- Write down the values of variables H509 absolute position (H510 with external encoder) and H511 Current motor position.
- Move the drive by about 30 000 increments (H511).
- Calculate the difference between the values you wrote down and the new values of the variables:
  - H509 new – H509 old = H509 difference
  - H511 new – H511 old = H511 difference
- The values must not differ by more than 32 767 (2^{15} - 1). If the values are greater, divide both differentials by the same number to obtain correspondingly smaller values. Alternatively, repeat the procedure with a shorter travel distance.
- Enter the result H511 difference in *P942* Encoder factor numerator and H509 in P943 Encoder factor denominator.

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P944 Encoder scaling ext. Encoder (X14)

Setting range: **x1**/x2/x4/x8/x16/x32/x64

This parameter does not apply to the DEU21B multi-encoder card.

Parameter *P944* is only effective on the encoder connected to X14.

Before setting *P944*, make sure that *P942* and *P943* are set to "1".

The significance of the travel resolution of the motor encoder and external encoder is adapted. The parameter is set so the travel information ratio between the motor encoder and the external encoder is as close to "1" as possible. First set the parameter to "x1". To do this, note the values in variables H510 and H511.

- Move the drive by about 1000 increments (H511).
- Calculate the difference between the values you wrote down and the current values:
  - H510 new – H510 old = H510 difference
  - H511 new – H511 old = H511 difference
- Calculate the quotient from H511 difference divided by H509 difference. Set the parameter P944 Encoder scaling ext. encoder to the value that is closest to the calculated quotient.

Notice: Encoder scaling directly affects the parameters *P900 Reference offset* (→ 🗎 310), *P942/P943 Encoder factor numerator/denominator* (→ 🗎 320) as well as the parameter group *P92. IIPOS monitoring* (→ 🗎 317). All positions of the IPOS^PLUS®^ program have to be adjusted when using the external encoder. The setting of all listed parameters has to be adjusted every time the encoder scaling is changed.

The number of pulses detected at X14 is multiplied by *P944* and then mapped to H510. The external encoder must always provide fewer pulses than the motor encoder. If this is not possible, contact SEW-EURODRIVE.

P945 Distance encoder type (X14)

Setting range: **TTL**/Sin/Cos/HIPERFACE®/RS485

This parameter does not apply to the DEU21B multi-encoder card.

Enter the used encoder type here. Possible encoder types are:

- **TTL**: Encoder with digital, rectangular output signal (TTL level 0 V, 5 V, with negated tracks, encoder with signal level according to RS422)
- Sin/cos: Encoder with analog, sinusodial output signal (1 V_{SS})
- HIPERFACE®/RS485: Encoder with designation AV1H, AS1H, ES1H, EV1H
- SSI: Encoder with SSI protocol

SEW encoder type	Startup parameters encoder type/PPR count
ES1S/ES2S/EV1S/EH1S	SINE ENCODER/1024
AV1Y	SINE ENCODER/512
ES1R/ES2R/EV1R/EH1R	INCREM. ENCODER TTL/1024
ES1T[1)]/ES2T[1)]/EV1T[1)]/EH1T[1)]	INCREM. ENCODER TTL/1024
AV1H/AS1H/ES1H/EV1H	HIPERFACE®
AS7W/AG7W	RS485
AV7Y/AG7Y/AH7Y	SINE ENCODER/2048

1) Only via DWI11A

P946 Distance encoder counting direction (X14)

Setting range: **Normal**/inverted

This parameter does not apply to the DEU21B multi-encoder card.

Defines the counting direction of the distance encoder. The setting must be made so the counting direction of the motor encoder (X15) and the distance encoder (X14) match.

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P947 HIPERFACE® offset X14

Setting range: $-(2^{31}-1)$ – **0** – $(2^{31}-1)$

This parameter is used to specify the zero point of the motor encoder display.

Use this parameter to define the machine zero without reference travel. It adds or subtracts the offset from the encoder value.

- *P905 HIPERFACE® offset (X15)* (→ 🗎 312) has an effect on the actual position of the motor encoder H511.

H511 = Encoder value – *P905* (→ 🗎 312)

- *P947 Hiperface ® offset X14* has an effect on the actual position of the external encoder H510.

H510 = Encoder value – P947

The actual position is determined directly after the values have been entered. Performing a reference travel is not required.

Information:

When reference travel of a drive system takes place with a HIPERFACE® encoder, the HIPERFACE® offsets (*P905* (→ 🗎 312) or *P947*) are recalculated and overwritten due to the reference travel depending on the set actual position source.

The following applies:

- *P905* (→ 🗎 312) = Encoder value - *P900* (→ 🗎 310)
- *P947* = Encoder value - *P900* (→ 🗎 310)

P948 Automatic encoder replacement detection

The parameter is only effective with HIPERFACE® encoders.

Setting range: **On**/Off

This parameter is only effective with HIPERFACE® multi-turn encoders.

- **On:** The replaced HIPERFACE® encoder is detected. Reference travel is required before the "IPOS referenced" bit is set.
- Off: The HIPERFACE® encoder is always referenced. The "IPOS referenced" bit is set.

INFORMATION

If the parameter is switched off and on again, the "IPOS referenced" bit is set to "0" once you have restarted the device. Reference travel is necessary to reset the "IPOS referenced" bit to "1".

P95. Absolute encoder

The DIP parameters are described in detail in the "MOVIDRIVE® MDX61B Absolute Encoder Card DIP11B/DEH21B" manual. The DIP11B option cannot be used with MOVIDRIVE® MDX61B size 0.

These parameters apply only to encoders that are connected to X62 (DIP11B or DEH21B).

P950 Encoder type

The absolute encoder connected to the DEH21B/DIP11B option (X62) is selected. At present, encoders can be selected from the following list:

- VISOLUX: EDM
- TR: CE58, CE65, CE100MSSI, ZE65M, LA41KSSI, LA66KSSI
- TR: LE100 SSI, LE200
- HEIDENHAIN: AV1Y / ROQ424
- SICK/STEGMANN: ATM60, DME 3000, DME 4000, DME 5000
- SICK/STEGMANN: AG100MSSI, AG626, Pomux KH53
- STAHL: WCS2, WCS3
- IVO: GM401, GXMMW
- LEUZE: BPS37, OMS1, OMS2, AMS200
- KÜBLER: 9081
- MTS: Temposonics RP, RH, RF, RD3
- HÜBNER: AH7Y / HMG161-S24 H2048
- HÜBNER: AS7Y, AG7Y
- ELGO: LIMAX2-00-030-0125-SSG1-D9M3
- BALLUF: BTL5-S112-M1500-P-S32
- Pepperl & Fuchs: AVM58X1212, WCS2A, WCS3A, EDM, VDM100

P951 Counting direction

Setting range: **Normal**/inverted

Defines the counting direction of the absolute encoder. The setting must be made so the counting direction of the motor encoder (X15) and the absolute encoder (X62) match.

P952 Clock frequency

Setting range: **1** – 200%

Defines the clock frequency at which absolute encoder information is transmitted from the encoder to the inverter. A clock frequency of 100% corresponds to the nominal frequency of the encoder in relation to a 100 m cable length.

P953 Position offset

Setting range: $-(2^{31}-1)$ – **0** – $(2^{31}-1)$

The position offset *P953* only needs to be set on rotary encoders; it should be set to 0 for other encoders.

Information: The position value will be recalculated and overwritten automatically after successful completion of the reference travel.

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P954 Zero offset

Setting range: -(2^{31} - 1) – **0** – (2^{31} - 1)

Zero offset is used for assigning the value you want to a specific position. The range of values can adopt positive or negative position values. The maximum valid parameter must not be exceeded. The limit is determined by the range of values of the numerator (2^{31}) and the range of values of the absolute encoder. Move the drive to a known position. Read the value of variable H509 ACT.POS.ABS and enter the following value in parameter *P954 Zero offset*: *P954* = Variable H509 – required value.

The required value is the display value you wish to have for the current position.

P955 Encoder scaling

Setting range: **x1**/x2/x4/x8/x16/x32/x64

Before setting *P955*, make sure that *P942* and *P943* are set to "1".

The significance of the travel resolution of the motor encoder and absolute encoder is adapted. The parameter is set so the travel information ratio between the motor encoder and the absolute encoder is as close to "1" as possible. First set the parameter to "x1". To do this, note the values in variables H509 and H511.

- Move the drive by about 1000 increments (H511).
- Calculate the difference between the values you wrote down and the current values:
  - H509 new – H509 old = H509 difference
  - H511 new – H511 old = H511 difference
- Calculate the quotient from H511 difference divided by H509 difference. Set parameter *P955 Encoder scaling* to the value that is closest to the calculated quotient.

Notice: Encoder scaling directly influences parameters *P900 Reference offset* (→ 🗎 310), *P942/P943 Encoder factor numerator/denominator* (→ 🗎 320), *P954 Zero offset* (→ 🗎 325) and the parameter group *P92.. IPOS monitoring* (→ 🗎 317). All positions of the IPOS[PLUS®] program have to be adjusted when using the external encoder. The setting of all listed parameters has to be adjusted every time the encoder scaling is changed.

P96. IPOS^PLUS® modulo function

These parameters serve for continuous positioning, such as in the case of rotary tables or chain conveyors. For further information, refer to the manual "MOVIDRIVE® MDX60B / 61B application "Modulo positioning"" and in the "IPOS^PLUS®" manual.

Note that the following prerequisite must be met:

$$\text{Maximum target position} < \frac{2^{31}}{P963 \times P961}$$

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P960 Modulo function

Setting range: **Off**/short/CW/CCW

- **Off**: The modulo function is deactivated.
- In short: The "short travel" modulo function is active. The drive moves from the actual position to the target position taking the shortest possible route. Both directions of rotation are possible.
- Clockwise: The "CW" modulo function is active. The drives moves from its actual position to the target position with a CW direction of rotation, even if this means moving a longer distance. The "CCW" direction of rotation is not possible.
- Counterclockwise: The "CCW" modulo function is active. The drives moves from its actual position to the target position with a "CCW" direction of rotation, even if this means moving a longer distance. The "CW" direction of rotation is not possible.

P961 Modulo numerator

Setting range: **1** – (2^{31} - 1)

Simulation of the gear unit

The modulo numerator is calculated with the tooth numbers of gear unit and additional transmission as follows:

Modulo numerator = Numerator gear unit i × numerator additional transmission i

P962 Modulo denominator

Setting range: **1** – (2^{31} - 1)

Simulation of the gear unit

The modulo denominator is calculated with the tooth numbers of gear unit and additional transmission as follows:

Modulo denominator = Denominator gear unit i × denominator additional transmission i

P963 Modulo encoder resolution

Setting range: 1 – **4096** – 65535

Resolution of the selected IPOS^PLUS® encoder system in increments.

The IPOS^PLUS® encoder resolution for positioning to the motor encoder is set to 4096 increments (prerequisite is an encoder resolution of 512 to 2048).

INFORMATION

If F14 occurs, the axis must be referenced again independent of the used encoder when the modulo function is used.

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P97. IPOS synchronization

P970 DPRAM synchronization

Setting range: Yes/**no**

MOVIDRIVE® B allows for synchronized operation with option cards (e.g. DHP11B, DFE24B).

Yes: Synchronized operation with option card is activated.

Please note: The inverters may either be synchronized by SBus1, SBus2 or by DPRAM. The inverters must **not** be synchronized **from several interfaces at the same time**. SEW-EURODRIVE recommends to set *P885* / *P895* to an identifier that is not used in the entire CAN network. You need parameters *P888* and *P916* to implement synchronization with interpolating setpoint processing.

No: Synchronized operation with the option card is not activated.

P971 Synchronization phase

Setting range: -2 – **0** – 2 ms

Time interval between clock signal and data transfer

8.4 Operating modes

INFORMATION

- For operating modes with encoder feedback, parameters must not be changed in cycles faster than 2 seconds. This makes sure that the encoders can be initialized.
- The maximum output frequency in the VFC operating modes without encoder feedback is 150 Hz.
- The maximum output frequency in the V/f operating mode and all operating modes with encoder feedback is 599 Hz.
- If the maximum output frequency is exceeded, error 08 "Speed monitoring" is displayed.

8.4.1 VFC and V/f characteristic curves

Default setting for asynchronous motors without encoder feedback. Suitable for general applications, such as conveyor belts, horizontal drives, and hoists with counterweight. A flux-oriented motor model is used (not for V/f characteristic operating mode). This model is optimally adapted to the motor after the startup function in MOVITOOLS® MotionStudio or in the DBG60B keypad has been carried out. It is necessary to enter the motor type (SEW motor) or the nameplate data (third-party motor) as part of the startup function. The following parameters are preset (parameter set 1/2):

Settings after the startup function	
"P303 / P313" (→ 🗎 251)	I_{max} (inverter) = 150% I_{N_Mot}
"P302 / P312" (→ 🗎 250)	Depends on number of poles and rated motor frequency e.g. 2-pole / 50 Hz -> 3000 min^{-1} e.g. 4-pole / 60 Hz -> 1800 min^{-1}
"P301 / P311" (→ 🗎 250)	15 min^{-1}
"P130 – P133 / P140 – P143" (→ 🗎 235)	2 s
"P136 / P146" (→ 🗎 236)	2 s
"P137 / P147" (→ 🗎 236)	2 s
"P500 / P502" (→ 🗎 261)	Motor/generator mode
"P501 / P503" (→ 🗎 261)	1 s
"P100" (→ 🗎 224)	Unipolar / fixed setpoint
"P101" (→ 🗎 225)	Terminals
"P730 / P733" (→ 🗎 284)	ON
"P731 / P734" (→ 🗎 285)	For SEW motors: Setting in accordance with motor data. **For third-party motors: Set the correct value manually!**
"P732 / P73" (→ 🗎 285)	

Settings after the startup function	
"P300 / P310" (→ 🗎 250)	15 min^{-1}
"P820 / P821" (→ 🗎 298)	ON
"P324 / PP334" (→ 🗎 252)	Setting in accordance with specified motor data
"P321 / P331" (→ 🗎 252)	0
"P322 / P332" (→ 🗎 252)	Setting in accordance with specified motor data
"P320 / P330" (→ 🗎 251)	ON
"P323 / P333" (→ 🗎 252)	Setting in accordance with specified motor data

INFORMATION

- SEW-EURODRIVE recommends using the "P320/P330 Automatic adjustment 1/2" (→ 🗎 251) parameter activated in the factory setting. This means the parameter "P322/P332 IxR compensation 1/2" (→ 🗎 252) is set automatically during the premagnetization time through the calibration of the motor.
- SEW-EURODRIVE recommends not changing the parameter "P321/P331 Boost 1/2" (→ 🗎 252) from its factory setting (=0).

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8.4.2 VFC & Group

Select this mode if a group of asynchronous motors is to be operated on one inverter. All motors of the group must have the same nominal voltage and nominal frequency. The brake is controlled according to "P730/P733 Brake function 1/2" (→ 🗎 284). Set the data for the largest motor in the group during startup. Once startup is finished, adapt "P303/P313 Current limit 1/2" (→ 🗎 251) to the total current of all connected motors. We recommend a basic setting of "P321/P331 Boost 1/2" (→ 🗎 252) to the same value as "P322/P332 IxR compensation 1/2" (→ 🗎 252).

Settings after the startup function	
"P303 / P313 Current limit 1/2 " (→ 🗎 251)	I_{max} (inverter) = 150% ΣI_{N_Mot}
"P302 / P312 Maximum speed 1 / 2 " (→ 🗎 250)	Depends on number of poles and rated motor frequency e.g. 2-pole / 50 Hz -> 3000 min^{-1} e.g. 4-pole / 60 Hz -> 1800 min^{-1}
"P301/311 Minimum speed 1/2 " (→ 🗎 250)	15 min^{-1}
"P130 – P133/P140 – P143 Ramp t11/ t21" (→ 🗎 235)	2 s
"P136/P146 Stop ramp t13 / t23 " (→ 🗎 236)	2 s
"P137/P147 Emergency ramp t14/t24 " (→ 🗎 236)	2 s
"P500 / P502 speed monitoring 1 / 2" (→ 🗎 261)	Motor/generator mode
"P501 / P503 deceleration time 1 / 2" (→ 🗎 261)	1 s
"P100 Setpoint source" (→ 🗎 224)	Unipolar / fixed setpoint
"P101 Control signal source" (→ 🗎 225)	Terminals
"P730 / P733 Brake function 1/2" (→ 🗎 284)	ON
"P731/P734 Brake release time 1/2" (→ 🗎 285)	For SEW motors: Setting in accordance with motor data. **For third-party motors: Set the correct value manually!**
"P732/P735 Brake application time 1/2 " (→ 🗎 285)	
"P300 / P310 Start/stop speed 1/2" (→ 🗎 250)	Setting in accordance with specified motor data
"P820/P821 4-quadrant operation 1 / 2 " (→ 🗎 298)	ON

INFORMATION

- Do not use this operating mode for lifting applications!
- The premagnetization current is adapted to the largest motor in the group during startup.
- If motors are removed from the group by switching them off, it may be necessary to reduce the current limit to a current that matches the actual combination of motors.
- Slip compensation is not effective. Motor speeds are therefore dependent on the load.

8.4.3 VFC & hoist / VFC n-control & hoist

VFC-n-control & Hoist in parameter set 1 only. Disabling 4-quadrant operation ("P820" (→ 🗎 298)) is ignored.

In VFC&Hoist operating mode, the start/stop speed (P300 / P310) is set to the slip speed of the motor; in the VFC n-control & hoist operating mode it is set to 15 min^{-1}.

The minimum rotational speed ("P301/P311" (→ 🗎 250)) in operating mode VFC & hoist is internally limited to 15 min^{-1}.

The hoist function automatically provides all functions necessary for operating an unbalanced hoist. In particular, monitoring functions are activated for safety reasons. The following functions may prevent the drive from starting:

- Monitoring the output current during the premagnetization phase.
- Avoid sagging when the brake is released by load precontrol.

Faulty constellations	Triggered fault
2 or 3-phase motor phase failure	F82 = Output open
Premagnetization time too short or incorrect motor/inverter combination.	F81 = Start condition fault
Motor phase failure due to active rotational speed monitoring (factory setting) "P500/P502 Speed monitoring 1/2" (→ 🗎 261), "P501/P503 Delay time 1/2" (→ 🗎 261)	F08 = n-monitoring fault

INFORMATION

- A single-phase motor phase failure cannot always be detected reliably.
- SEW-EURODRIVE strongly recommends activating speed monitoring (factory setting).
- Correct performance of the hoist function requires the motor brake to be controlled via the inverter.
- In VFC mode without encoder feedback, the control must be designed in such a way that the direction of rotation of the drive can only be changed when it is at a standstill. Only enable the opposing direction of rotation after the brake is applied (DB00 = 0). This restriction does not apply to the other operating modes.

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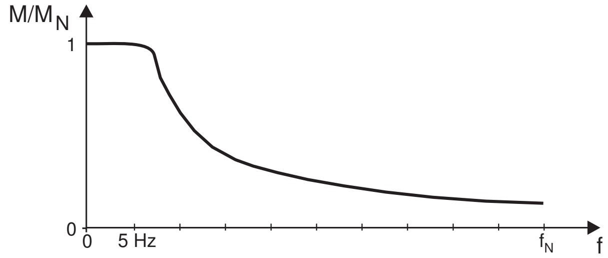
8.4.4 VFC & DC braking and V/f & DC braking

The DC braking function allows an asynchronous motor to be braked using a current injection. The motor can be braked without a braking resistor using the inverter.



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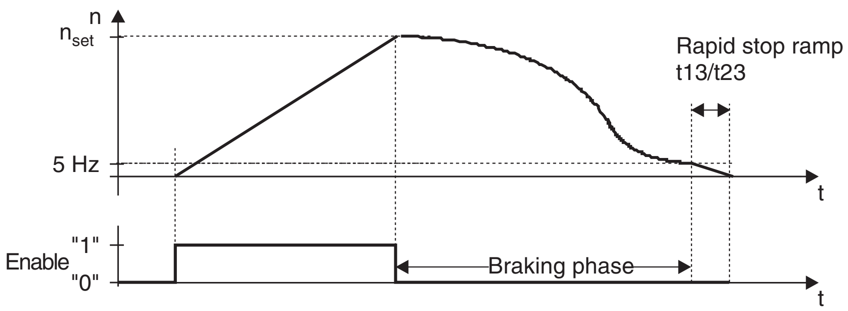
A constant current with a rotating field frequency of 5 Hz is supplied during the braking process. The braking torque = 0 at standstill. At a low speed, the braking torque is high, at higher speeds, the braking torque decreases. The braking time and consequently the duration of the braking current depends on the load connected to the motor. DC braking is stopped once the rotating field frequency of the motor reaches 5 Hz and the motor is stopped using the rapid stop ramp. The current injection is performed with the nominal motor current according to the startup function. In general, the inverter limits the current to max. 125% I_N. For controlling the brake, see the brake function.

⚠ CAUTION

No guided stop.

Can cause damage to the system.



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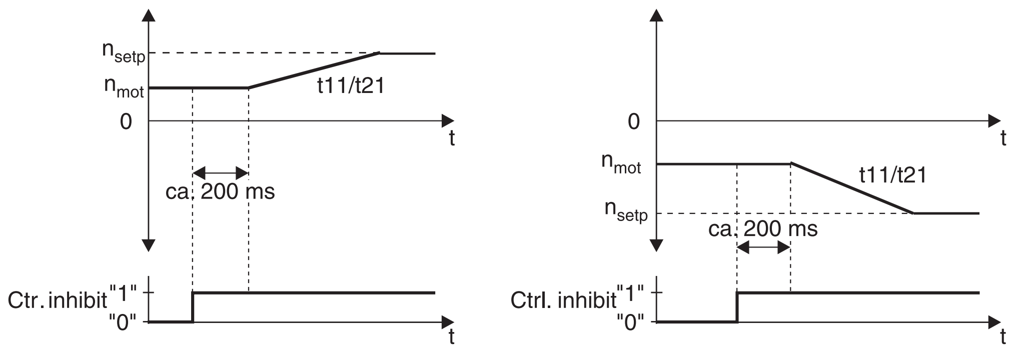
INFORMATION

- The **braking procedure is not interrupted** if the digital input "Enable" receives a "1" signal again during the braking phase. DC braking is completed before the drive is accelerated again.
- The drive stops with ramp t11/t21 or t12/t22 if a digital input is programmed to the function "CW/Stop (CCW/Stop)" in "VFC & DC braking" operating mode and "CW/Stop (CCW/Stop)" receives a "0" signal. The stop is continued and **no DC braking initiated** if then digital input "Enable" is switched from "1" to "0" during the ramp time. To start **DC braking**, you must **first switch "Enable" from "1" to "0"**. This must happen at least 10 ms before switching "CW/Stop (CCW/Stop)" from "1" to "0".

8.4.5 VFC & flying start function

The flying start function lets you synchronize the inverter to a motor that is already in operation. This function is used in particular with drives that are not braked actively, run on for a long time or are turned by a flowing medium, e.g. pumps and fans. The maximum flying start time is approx. 200 ms.



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If the inverter fails to detect a "flying start point", it assumes that the motor is at a standstill and commences the integrator start from n = 0. Consequently, the motor decelerates to n = 0 followed by a run up to $n_{setpoint}$. This behavior may arise in particular with very low-impedance motors in the speed range below n = 300 min^{-1} (4-pole motor).

⚠ DANGER

Risk of crushing if the motor starts up unintentionally in lifting applications.

Severe or fatal injuries.

- **Do not use the flying start function in lifting applications!**
- Ensure that the motor cannot start unintentionally.

INFORMATION

- The flying start function does not function if there is an output filter connected to the inverter.
- Due to exact motor data, the proper function of the flying start function has only been tested with SEW-EURODRIVE motors.

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8.4.6 VFC n-control

VFC n-control in parameter set 1 only.

Based on VFC operating mode, the VFC n-control operating mode allows for speed controlled operation with an encoder installed on the motor shaft. The following encoders can be used:

- HIPERFACE® encoder
- TTL encoders with negated tracks, encoders with signal level to RS422
- High-resolution incremental encoder with sinusoidal tracks 1 V_{SS}
- HTL encoder with DWE12B option

SEW-EURODRIVE recommends the use of encoders with 1024 increments/revolution as standard. Speed control results in the following characteristics:

- Increased static control accuracy and higher dynamic response.
- Position hold control: By programming a digital input to "/Position hold control" ("P60x Digital inputs of basic device" (→ 🗎 272) / "P61x Digital inputs on option" (→ 🗎 273)) a position-controlled standstill of the motor can be accomplished under load. Set position hold control with "P210 P-gain position hold control" (→ 🗎 242).
- Synchronous operation is possible with DRS11B.

The startup function of MOVITOOLS® MotionStudio not only supports motor startup (VFC) but also the additional controller setting of the speed controller. The following parameters relevant for n-control are set:

Settings after the startup function	
"P303 Current limit 1" (→ 🗎 251)	I_{max} (inverter) = 150% I_{motor}
"P302 Maximum speed 1" (→ 🗎 250)	Depending on number of poles and rated motor frequency e.g. 2-pole / 50 Hz -> 3000 min^{-1} e.g. 4-pole / 60 Hz -> 1800 min^{-1}
"P301 Minimum speed 1" (→ 🗎 250)	0 min^{-1}
"P500 Speed monitoring 1" (→ 🗎 261)	Motor/generator mode
"P501 / P503 deceleration time 1 / 2" (→ 🗎 261)	0.1 s
"P100 Setpoint source" (→ 🗎 224)	Unipolar / fixed setpoint
"P101 Control signal source" (→ 🗎 225)	Terminals
"P730 Brake function 1" (→ 🗎 284)	ON
"P731 Brake release time 1" (→ 🗎 285) "P732 Brake application time 1" (→ 🗎 285)	For SEW motors: Setting in accordance with motor data. **For third-party motors: Set the correct value manually!**
"P323 Premagnetization time 1" (→ 🗎 252)	Setting in accordance with specified motor data

Settings after the startup function of the speed controller	
"P200 P gain n controller" (→ 🗎 240)	Setting in accordance with specified data
"P201 Time constant n-controller" (→ 🗎 241)	
"P202 Gain acceleration precontrol" (→ 🗎 241)	
"P204 Actual speed value filter" (→ 🗎 241)	
"P115 Filter setpoint" (→ 🗎 231)	
"P203 Filter acceleration precontrol" (→ 🗎 241)	
"P210 P-gain position hold controller" (→ 🗎 242)	Position controller gain for the position hold control function
"P910 Gain X controller" (→ 🗎 313)	Position controller gain for IPOS$^{PLUS®}$ (positioning mode)
"P130 – P133 Ramp t11" (→ 🗎 235)	Setting in accordance with specified data
"P136 Stop ramp t13" (→ 🗎 236)	
"P137 Emergency stop ramp t14" (→ 🗎 236)	

Setting of "P820 4-quadrant operation 1" (→ 🗎 298) is ignored; 4-Q operation is always active.

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8.4.7 VFC n-control & group

VFC-n-control & group in parameter set 1 only.

Select this mode if a group of asynchronous motors is to be operated on one inverter. All motors of the group must have the same nominal voltage, nominal frequency and nominal power. One motor of the group must be operated with speed control and be equipped with an incremental encoder that is connected to X15. The other motors of the group follow the speed controlled motor depending on the slip. The following encoders can be used as incremental encoder:

- HIPERFACE® encoder
- TTL encoders with negated tracks, encoders with signal level to RS422
- High-resolution incremental encoder with sinusoidal tracks 1 V_{SS}
- HTL encoder with DWE12B option

SEW-EURODRIVE recommends the use of encoders with 1024 increments/revolution as standard.

The startup function of MOVITOOLS® MotionStudio not only supports motor startup (VFC) but also the additional controller setting of the speed controller. The following parameters relevant for n-control are set:

Settings after the startup function	
"P303 Current limit 1" (→ 🗎 251)	I_{max} (inverter) = 150% ΣI_{N_Mot}
"P302 Maximum speed 1" (→ 🗎 250)	Depends on number of poles and rated motor frequency e.g. 2-pole / 50 Hz -> 3000 min^{-1} e.g. 4-pole / 60 Hz -> 1800 min^{-1}
"P301 Minimum speed 1" (→ 🗎 250)	0 min^{-1}
"P500 Speed monitoring 1" (→ 🗎 261)	Motor/generator mode
"P501 Delay time 1" (→ 🗎 261)	0.1 s
"P100 Setpoint source" (→ 🗎 224)	Unipolar / fixed setpoint
"P101 Control signal source" (→ 🗎 225)	Terminals
"P730 Brake function 1" (→ 🗎 284)	ON
"P731 Brake release time 1" (→ 🗎 285)	For SEW motors: Setting in accordance with motor data. **For third-party motors: Set the correct value manually!**
"P732 Brake application time 1" (→ 🗎 285)	
"P323 Premagnetization time 1" (→ 🗎 252)	Setting in accordance with specified motor data

Settings after the startup function of the speed controller	
"P200 P gain n controller" (→ 🗎 240)	Setting in accordance with specified data
"P201 Time constant n-controller" (→ 🗎 241)	
"P202 Gain acceleration precontrol" (→ 🗎 241)	
"P204 Actual speed value filter" (→ 🗎 241)	
"P115 Filter setpoint" (→ 🗎 231)	
"P203 Filter acceleration precontrol" (→ 🗎 241)	

Settings after the startup function of the speed controller	
"P210 P-gain position hold controller" (→ 🗎 242)	Position controller gain for the position hold control function
"P910 Gain X controller" (→ 🗎 313)	Position controller gain for IPOS$^{PLUS®}$ (positioning mode)
"P130 – P133 Ramp t11" (→ 🗎 235)	Setting in accordance with specified data
"P136 Stop ramp t13" (→ 🗎 236)	
"P137 Emergency stop ramp t14" (→ 🗎 236)	

Setting of "P820 4-quadrant operation 1" (→ 🗎 298) is ignored; 4-Q operation is always active.

8.4.8 VFC n-control & synchronous operation

VFC-n-control & synchronous operation in parameter set 1 only.

Set on the slave drives if a group of asynchronous motors should be operated at a synchronous angle in relation to one another or with an adjustable proportional ratio. Refer to the "MDX61B - Synchronous Operation Card DRS11B" manual for a detailed description of synchronous operation. This manual is available from SEW-EURODRIVE.

8.4.9 VFC n-control & IPOS

VFC-n-control & IPOS in parameter set 1 only.

Must be set if IPOS$^{PLUS®}$ positioning commands are to be processed. Refer to the "IPOS$^{PLUS®}$ Positioning and Sequence Control System" manual for detailed descriptions of IPOS$^{PLUS®}$. This manual can be obtained from SEW-EURODRIVE.

8.4.10 CFC

CFC in parameter set 1 only.

The CFC operating mode allows for operating an asynchronous motor with real servo characteristics, which means high dynamic response, excellent concentric running characteristics and controlled operation even at standstill. It is achieved because the CFC procedure enables direct control over the magnetic flux in the motor and, therefore, over the torque. Speed feedback via encoder is mandatory for this operating mode. The following encoders can be used:

- HIPERFACE® encoder
- TTL encoders with negated tracks, encoders with signal level to RS422
- High-resolution incremental encoder with sinusoidal tracks 1 V_{SS}
- HTL encoder with DWE12B option

SEW-EURODRIVE recommends high-resolution incremental encoders with a PPR count of 1024. Optimum control characteristics are achieved with these encoders.

"P324 Slip compensation 1" (→ 🗎 252), "P321 Boost 1" (→ 🗎 252) and "P322 IxR compensation" (→ 🗎 252) are ineffective.

The MOVITOOLS® MotionStudio startup function requires the motor type to be entered (SEW-EURODRIVE motor). No startup can be performed with the DBG60B keypad in CFC mode. The following parameters are preset (parameter set 1):

Settings after the startup function	
"P303 Current limit 1" (→ 🗎 251)	I_{max} (inverter) = 150% I_{motor}
"P302 Maximum speed 1" (→ 🗎 250)	Depends on number of poles and rated motor frequency e.g. 2-pole / 50 Hz -> 3000 min^{-1} e.g. 4-pole / 60 Hz -> 1800 min^{-1}
"P301 Minimum speed 1" (→ 🗎 250)	0 min^{-1}
"P500 Speed monitoring 1" (→ 🗎 261)	Motor/generator mode
"P501 Delay time 1" (→ 🗎 261)	0.1 s
"P100 Setpoint source" (→ 🗎 224)	Unipolar / fixed setpoint
"P101 Control signal source" (→ 🗎 225)	Terminals
"P730 Brake function 1" (→ 🗎 284)	ON
"P731 Brake release time 1" (→ 🗎 285)	Setting in accordance with specified motor data
"P732 Brake application time 1" (→ 🗎 285)	
"P323 Premagnetization time 1" (→ 🗎 252)	Setting in accordance with specified motor data

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CFC always requires to startup the speed controller.

Settings after the startup function of the speed controller	
"P200 P gain n controller" (→ 🗎 240)	Setting in accordance with specified data
"P201 Time constant n-controller" (→ 🗎 241)	
"P202 Gain acceleration precontrol" (→ 🗎 241)	
"P204 Actual speed value filter" (→ 🗎 241)	
"P115 Filter setpoint" (→ 🗎 231)	
"P203 Filter acceleration precontrol" (→ 🗎 241)	
"P210 P-gain position hold controller" (→ 🗎 242)	Position controller gain for the position hold control function
"P910 Gain X controller" (→ 🗎 313)	Position controller gain for IPOS$^{PLUS®}$ (positioning mode)
"P130 – P133 Ramp t11" (→ 🗎 235)	Setting in accordance with specified data
"P136 Stop ramp t13" (→ 🗎 236)	
"P137 Emergency stop ramp t14" (→ 🗎 236)	

Setting of "P820 4-quadrant operation 1" (→ 🗎 298) is ignored; 4-Q operation is always active.

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8.4.11 CFC & torque control

CFC & torque control in parameter set 1 only.

This operating mode enables the asynchronous motor to be controlled directly with torque control. The setpoint is standardized on the torque as follows:

3000 min^{-1} ≙ 150% output current x torque constant.

In "P16x Fixed setpoints 1" (→ 🗎 239), the torques have to be entered directly in % I_N. The set processing "P11x Analog input AI1" (→ 🗎 227) also applies to the torque control if the setpoint selection is made by way of an analog input.

The torque constant (motor-specific parameter) is defined by: $k_T = M_N / I_{q\_n}$

INFORMATION

- If "P500 Speed monitoring 1" (→ 🗎 261) is active, the drive is monitored according to the "P500" (→ 🗎 261) parameter description.
- If "P500 Speed monitoring 1" (→ 🗎 261) = OFF, the drive responds as follows if its speed exceeds or drops below "P302 Maximum speed 1" (→ 🗎 250):
  - Motor operation: The available motor torque is reduced to zero with a linear function above n_{max} and below $-n_{max}$. There is no active speed control.
  - Regenerative operation: No response; the master drive must prevent the drive losing position.
- M-control is also in effect in the range $-n_{min} \leq n \leq n_{min}$.
- The current is always limited to "P303 Current limit 1" (→ 🗎 251).
- At a stop ramp, the drive inverter switches to speed control and the drive is decelerated along the relevant stop ramp.

Settings after the startup function	
"P303 Current limit 1" (→ 🗎 251)	I_{max} (inverter) = 150% I_{motor}
"P302 Maximum speed 1" (→ 🗎 250)	Depends on number of poles and rated motor frequency e.g. 2-pole / 50 Hz -> 3000 min^{-1} e.g. 4-pole / 60 Hz -> 1800 min^{-1}
"P301 Minimum speed 1" (→ 🗎 250)	0 min^{-1}
"P500 Speed monitoring 1" (→ 🗎 261)	Motor/generator mode
"P501 Delay time 1" (→ 🗎 261)	0.1 s
"P100 Setpoint source" (→ 🗎 224)	Unipolar / fixed setpoint
"P101 Control signal source" (→ 🗎 225)	Terminals
"P730 Brake function 1" (→ 🗎 284)	ON
"P731 Brake release time 1" (→ 🗎 285)	Setting in accordance with specified motor data.
"P732 Brake application time 1" (→ 🗎 285)	
"P323 Premagnetization time 1" (→ 🗎 252)	Setting in accordance with specified motor data

Settings after the startup function of the torque controller	
"P200 P gain n controller" (→ 🗎 240)	Setting in accordance with specified data
"P201 Time constant n-controller" (→ 🗎 241)	
"P202 Gain acceleration precontrol" (→ 🗎 241)	
"P204 Actual speed value filter" (→ 🗎 241)	
"P115 Filter setpoint" (→ 🗎 231)	
"P203 Filter acceleration precontrol" (→ 🗎 241)	
"P210 P-gain position hold controller" (→ 🗎 242)	Position controller gain for the position hold control function
"P910 Gain X controller" (→ 🗎 313)	Position controller gain for IPOS$^{PLUS®}$ (positioning mode)
"P130 – P133 Ramp t11" (→ 🗎 235)	Setting in accordance with specified data
"P136 Stop ramp t13" (→ 🗎 236)	
"P137 Emergency stop ramp t14" (→ 🗎 236)	

Setting of "P820 4-quadrant operation 1" (→ 🗎 298) is ignored; 4-Q operation is always active.

8.4.12 CFC & IPOS

CFC & IPOS in parameter set 1 only.

Must be set if IPOS$^{PLUS®}$ positioning commands are to be processed. Refer to the "IPOS$^{PLUS®}$ Positioning and Sequence Control System" manual for detailed descriptions of IPOS$^{PLUS®}$. This manual can be obtained from SEW-EURODRIVE.

8.4.13 CFC & synchronous operation

CFC & synchronous operation in parameter set 1 only.

Set on the slave drives if a group of asynchronous motors should be operated at a synchronous angle in relation to one another or with an adjustable proportional ratio. Refer to the "MDX61B - Synchronous Operation Card DRS11B" manual for a detailed description of synchronous operation. This manual is available from SEW-EURODRIVE.

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8.4.14 SERVO

SERVO in parameter set 1 only.

The SERVO operating mode allows for operating a permanent-field synchronous motor (servomotor). The motor must be equipped with a resolver or a HIPERFACE® encoder.

The MOVITOOLS® MotionStudio startup function requires the motor type to be entered (SEW-EURODRIVE motor). Startup cannot be performed with the DBG60B keypad in SERVO mode. The following parameters are preset (parameter set 1):

Settings after the startup function	
"P303 Current limit 1" (→ 🗎 251)	I_{max} (inverter) = maximum motor standstill current
Torque limit	The value of the motor torque can be limited. The maximum value is determined by the motor type. Do not alter "P303 Current limit 1" (→ 🗎 251).
"P302 Maximum speed 1" (→ 🗎 250)	Nominal motor speed (2000 min^{-1}, 3000 min^{-1}, 4500 min^{-1})
"P301 Minimum speed 1" (→ 🗎 250)	0 min^{-1}
"P500 Speed monitoring 1" (→ 🗎 261)	Motor/generator mode
"P501 Delay time 1" (→ 🗎 261)	0.1 s
"P100 Setpoint source" (→ 🗎 224)	Unipolar / fixed setpoint
"P101 Control signal source" (→ 🗎 225)	Terminals
"P730 Brake function 1" (→ 🗎 284)	ON
"P731 Brake release time 1" (→ 🗎 285)	Setting in accordance with specified motor data
"P732 Brake application time 1" (→ 🗎 285)	

SERVO always requires to startup the speed controller.

Settings after the startup function of the speed controller	
"P200 P gain n controller" (→ 🗎 240)	Setting in accordance with specified data
"P201 Time constant n-controller" (→ 🗎 241)	
"P202 Gain acceleration precontrol" (→ 🗎 241)	
"P204 Actual speed value filter" (→ 🗎 241)	
"P115 Filter setpoint" (→ 🗎 231)	
"P203 Filter acceleration precontrol" (→ 🗎 241)	
"P210 P-gain position hold controller" (→ 🗎 242)	Position controller gain for the position hold control function
"P910 Gain X controller" (→ 🗎 313)	Position controller gain for IPOS^PLUS® (positioning mode)

Settings after the startup function of the speed controller	
"P130 – P133 Ramp t11" (→ 🗎 235)	Setting in accordance with specified data
"P136 Stop ramp t13" (→ 🗎 236)	
"P137 Emergency stop ramp t14" (→ 🗎 236)	

Setting of "P820 4-quadrant operation 1" (→ 🗎 298) is ignored; 4-Q operation is always active.

8.4.15 SERVO & torque control

SERVO & torque control in parameter set 1 only.

This operating mode enables the servomotor to be controlled directly with torque control. The setpoint is standardized on the following torque:

3000 min^{-1} ≙ 150% output current x torque constant.

As fixed setpoints, the torque values must be entered directly in the unit % I_N ("P16x Fixed setpoints 1" (→ 🗎 239)). The set processing ("P11x Analog input AI1" (→ 🗎 227)) also applies to the torque control if the setpoint selection is made by way of an analog input.

The torque constant (motor-specific parameter) is defined by: $k_e = M_0 / I_0$

INFORMATION

- If "P500 Speed monitoring 1" (→ 🗎 261) is active, the drive is monitored according to the "P500" (→ 🗎 261) parameter description.
- If "P500 Speed monitoring 1" (→ 🗎 261) = Off, the drive responds as follows if its speed exceeds or drops below "P302 Maximum speed 1" (→ 🗎 250):
  - Motor operation: The available motor torque is reduced to zero with a linear function above n_{max} and below $-n_{max}$. There is no active speed control.
  - Regenerative operation: No response; the master drive must prevent the drive losing position.
- M-control is also in effect in the range $-n_{min} \leq n \leq n_{min}$.
- The current is always limited to "P303 Current limit 1" (→ 🗎 251).
- At a stop ramp, the drive inverter switches to speed control and the drive is decelerated along the relevant stop ramp.

8.4.16 SERVO & IPOS

SERVO & IPOS in parameter set 1 only.

Must be set if IPOS^PLUS® positioning commands are to be processed. Refer to the "IPOS^PLUS® Positioning and Sequence Control System" manual for detailed descriptions of IPOS^PLUS®. This manual can be obtained from SEW-EURODRIVE.

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8.4.17 SERVO & synchronous operation

SERVO & synchronous operation in parameter set 1 only.

Set on the slave drives if a group of servomotors should be operated at a synchronous angle in relation to one another or with an adjustable proportional ratio. Refer to the "MDX61B - Synchronous Operation Card DRS11B" manual for a detailed description of synchronous operation. This manual is available from SEW-EURODRIVE.

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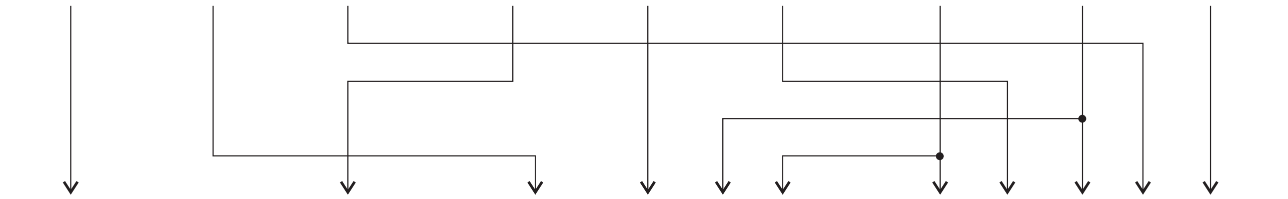
9 Project planning

9.1 Schematic procedure

9.1.1 Drive properties

The required drive properties are the main factors determining the selection of the inverter. The following figure provides assistance.

System selection								
Positioning accuracy of the motor shaft			Setting range (reference 3000 min^{-1})			Control		
< ±360°	< ±5° – 45°	< ±1°	1:200	1:800	> 1:800	Pos-Reg.	n-Reg.	M-control



Voltage-controlled flux vector control (VFC) without encoder.	Voltage-controlled flux vector control (VFC) with encoder.	Current-controlled flux vector control (CFC or SERVO) with encoder or resolver
MOVIDRIVE® MDX60/61B with asynchronous AC motor (DR..) without speed feedback	MOVIDRIVE® MDX61B with asynchronous AC motor (DR..) with speed feedback	• MOVIDRIVE® MDX61B with asynchronous servomotor (DRL..) • MOVIDRIVE® MDX61B with synchronous servomotor (CM.., CMP..)

↓

Motor selection for VFC
- Max. torque < 150% M_{Motor_max}
- Max. speed < 140% n_{base}
- Thermal load (setting range, cyclic duration factor)
- Selection of the encoder (if necessary)

Motor selection for CFC and SERVO
- Max. torque < 300% M_{Motor_max}
- Rms torque < M_N at average speed
- Torque curves
- Encoder selection

↓

MOVIDRIVE® selection
- Unit which can have options installed (MDX61B) or unit which cannot have options installed (MDX60B)
- Select the correct encoder option for operation with encoder feedback or with servomotor
- Select option card, if necessary
- Standard version or application version
- Motor/inverter assignment
- Continuous power and peak power in voltage-controlled flux vector control (VFC)
- Continuous current and peak current in current-controlled flux vector control (CFC or SERVO)

↓

Braking resistor selection
- On the basis of the calculated regenerative power and the cyclic duration factor cdf

↓

Options
- EMC measures (NF, HD, shielded motor cable)
- Operation/communication (DBG60B keypad, USB11A, UWS11A, UWS21B interface adapters)

Pos-Reg.	= Positioning control	VFC	= Voltage controlled flux vector control (Voltage Mode Flux Control)
n-Reg.	= Speed control		
M-control	= Torque control	CFC	= current-controlled flux vector control for asynchronous servomotors (Current Mode Flux Control)
M_N	= Nominal motor torque		
n_{base}	= Rated speed (base speed) of the motor	SERVO	= current-controlled flux vector control for synchronous servomotors

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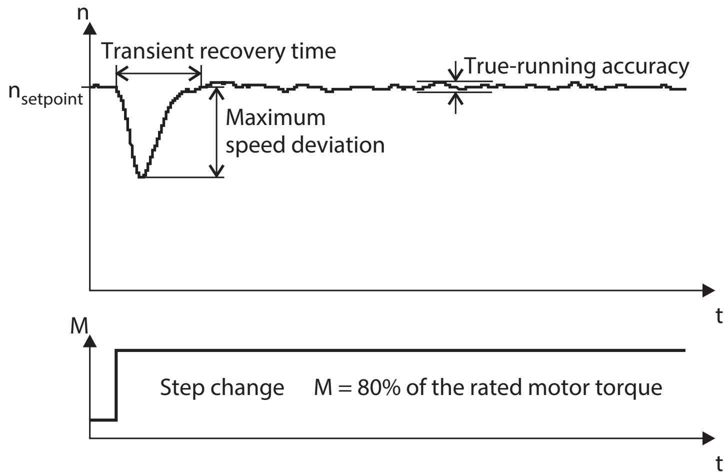
9.2 Control characteristics

9.2.1 Characteristic values

MOVIDRIVE® drive inverters achieve excellent control characteristics thanks to their optimally adapted control algorithms. The following characteristic features apply to operation with 4-pole motors and synchronous servomotors from SEW-EURODRIVE.



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The following values apply to MOVIDRIVE® inverters in combination with motors of the same power:

MOVIDRIVE® type	Continuous setting range n_{max} = 3000 min^{-1}	Stationary control accuracy[1)] based on n_{max} = 3000 min^{-1}
MDX60/61B, VFC without encoder	1:200	0.30%
MDX61B, VFC with TTL encoder (1024 inc.)	1:800	0.01%
MDX61B, CFC with TTL encoder (1024 inc.)	1:3000	0.01%
MDX61B, CFC with sin/cos encoder	1:5000	0.01%
MDX61B, SERVO with resolver	> 1:3000	0.01%
MDX61B, CFC/SERVO with HIPERFACE® encoder	1:5000	0.01%

1) = Deviation from speed mean value to setpoint speed

The defined control characteristics are maintained in the specified setting range.

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9.2.2 Control characteristics

⚠ DANGER

Motor overheat due to repeated resets over a short time.

Damage to property.

- Do not perform repeated resets if the motor is already overheated.
- Only acknowledge the fault after the cause has been found and eliminated.

INFORMATION

Due to the higher output frequency, the following motors must be operated with a PWM frequency of at least 8 kHz (P864):

- CMP 40 – 63 for speed class 6000 min^{-1}
- CMP 71 – 100 for speed classes 4500 min^{-1} and 6000 min^{-1}

INFORMATION

The following project planning guidelines apply to the operation of CMP71-100 motors:

- The motor load must not exceed a maximum of 4 times the nominal motor current I_0.
- The current of MOVIDRIVE® B must be limited to the following values:
  – For size 0 to 166% I_N
  – For size 1 – 6 to 125% I_N
- The following motor selection tables and the startup adhere to these project planning guidelines.

The following table shows the differences in control characteristics between VFC without encoder, VFC with encoder, and CFC (always with encoder) operating modes.

Specification

- Setpoint speed $n_{setpoint}$ = 1000 min^{-1}
- Step change in load DM = 80% of nominal motor torque
- Torsion-free load with mass moment of inertia J_L/J_M = 1.8

MOVIDRIVE® MDX60/61B	Transient recovery time in relation to the value of VFC without encoder	Max. speed deviation at DM = 80%, Refers to n = 3000 min^{-1}	True-running accuracy at M = const., refers to n = 3000 min^{-1}
VFC without encoder	100%	1.8%	≤ 0.20%
VFC with TTL encoder (1024 inc.)	90%	1.5%	≤ 0.17%
CFC with TTL encoder (1024 inc.)	35%	1.0%	≤ 0.07%
CFC with sin/cos encoder	25%	0.7%	≤ 0.03%

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9.3 Description of the applications

9.3.1 Description of the applications

Selecting the inverter

The large number of different drive applications can be divided into 5 categories. The 5 categories are listed below together with the recommended SEW-EURODRIVE inverter. The assignment is based on the required setting range and the resulting control process.

1. Drives with a base load and a speed dependent load, such as conveyor drives.
   - Low requirements on the setting range (motor without encoder)
     – MOVIDRIVE® MDX60/61B without option in VFC operating mode
   - High requirements on the setting range
     – MOVIDRIVE® MDX61B with in the VFC n-control operating mode
2. Dynamic load, e.g. horizontal drives; brief high torque demand for acceleration followed by low load.
   - Low requirements on the setting range (motor without encoder)
     – MOVIDRIVE® MDX60/61B without option in VFC operating mode
   - High requirements on the setting range
     – MOVIDRIVE® MDX61B with in the VFC n-control operating mode
   - High dynamic properties required (asynchronous or synchronous servomotor)
     – Asynchronous or synchronous servomotor with encoder feedback: MOVIDRIVE® MDX61B in CFC or SERVO operating mode
3. Stationary load, e.g. hoists; mainly steady high stationary load with overload peaks.
   - Low requirements on the setting range (motor without encoder)
     – MOVIDRIVE® MDX60/61B in VFC operating mode
   - High requirements on the setting range (motor with encoder)
     – Motor with encoder: MOVIDRIVE® MDX61B in VFC-n-control, CFC or SERVO operating mode
4. Load falling in inverse proportion to speed, e.g. winding or coil drives.
   - Torque control (asynchronous or synchronous servomotor)
     – Asynchronous or synchronous servomotor with encoder: MOVIDRIVE® MDX61B in operating modes CFC & torque control or SERVO & torque control
5. Variable torque load, e.g. fans and pumps.
   - Low load at low speeds and no load peaks, 125% utilization (I_D = 125% I_N)
     – Asynchronous servomotor without encoder: MOVIDRIVE® MDX60/61B in VFC or V/f operating mode.

Project planning for hoists

In practice, hoists are dimensioned by taking account of special thermal and safety-relevant criteria.

Thermal considerations

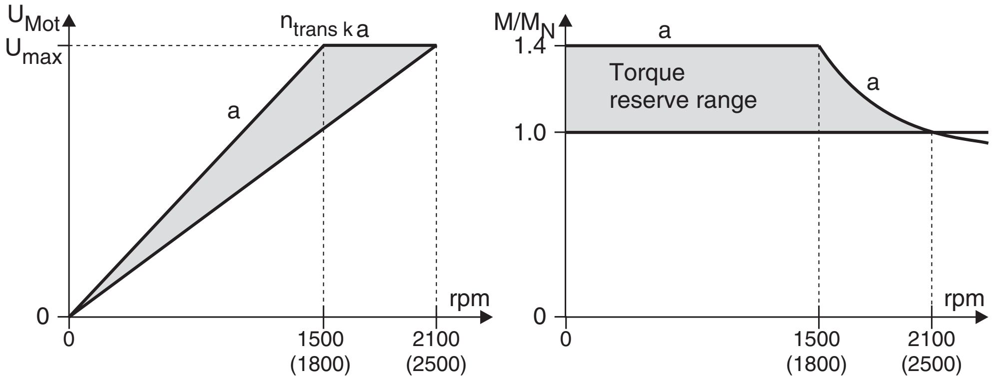
In contrast to trolleys, horizontal drives require approx. 70 – 90% of the nominal motor torque assuming constant speed upwards or downwards and the standard configuration.

Starting torque

The highest operating torque is required for acceleration with maximum load in the upwards hoisting direction.

VFC & hoist

The 4-pole gearmotor should always be designed for a maximum speed of 2100 min^{-1} (70 Hz) with a base speed of 1500 min^{-1} (50 Hz) and 2500 min^{-1} (83 Hz) at a base speed of 1800 min^{-1} (60 Hz). This means the input speed of the gear unit is approx. 1.4 times higher. Consequently, it is also necessary to choose a gear unit ratio which is higher by a factor of 1.4. This measure means that no torque is lost on the output shaft in the field weakening range (50 – 70 Hz or 60 – 83 Hz), because the higher gear ratio compensates for the inversely proportionate fall in torque in relation to speed (frequency). Furthermore, the start-up torque is 1.4 times greater in the range from 0 – 1500 min^{-1} (0 – 50 Hz) or 0 – 1800 min^{-1} (0 – 60 Hz). Further advantages are that the setting range is greater and the self-cooling of the motor more powerful.



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a = Recommended voltage/speed characteristic curve and resultant torque profile

The motor power for hoists is selected according to the load type.

- S1 (100% cdf): Motor power 1 level higher than the selected inverter power, e.g. for lengthy upwards travel or continuous vertical conveyors.
- S3 (40% cdf): Motor power in accordance with the selected inverter power.

The hoist function must be activated on the inverter regardless of the above guidelines. See also "Examples for motor selection" (→ 🗎 357).

Encoder monitoring

MOVIDRIVE® has encoder monitoring for RS422, TTL, sin/cos and HIPERFACE® encoders.

INFORMATION

For speed controlled hoist drives, SEW-EURODRIVE recommends using RS422, TTL, sin/cos, or HIPERFACE® encoders, and activating encoder monitoring.

Controller

The control for the hoist without encoder feedback must be designed so that the direction of rotation of the drive can only be changed when it is at a standstill (DB00 = 0).

Variable torque load (pumps, fans)

Thermal overload of the motor at low speeds can be ruled out in these applications. Maximum load occurs at the maximum speed; overload peaks do not occur. This is why the dimensions of MOVIDRIVE® and the motor can be selected so that the continuous motor current is less than or equal to the continuous output current (VFC operating mode, 125% of the nominal output current at f_{PWM} = 4 kHz) of MOVIDRIVE®. This means MOVIDRIVE® can operate a motor with the power of the next higher motor type. See also "Examples for motor selection" (→ 🗎 357).

9.4 Basic recommendations for motor selection

- Only use motors with at least thermal class 155 (F).
- Use TF thermistors or TH winding thermostats. TH should be preferred for group drives on one inverter. The series connection of the TH contacts (normally closed) is not subject to limitation when both monitoring functions are used.
- For group drives, we recommend that the motors should not differ from one another by more than 3 motor types.
- Use 4-pole motors if possible. This particularly applies to gearmotors which are operated with a high oil filling level as a result of their vertical mounting position.
- Generally speaking, the motor can be operated at its listed power without external cooling if the operating conditions differ from S1 operation, e.g. positioning drive with 1:20 setting range in S3 operation.
- Do not select a motor that is too big, particularly for delta connection. Otherwise, the inverter may trigger a short circuit fault.
- A MOVIDRIVE® MDX61B with DEH11B, DEH21B, DEU21B HIPERFACE® encoder card option or with DER11B resolver card option is required for speed control. In this case, the motor must be equipped with an encoder (HIPERFACE®, sin/cos, or TTL) or resolver.

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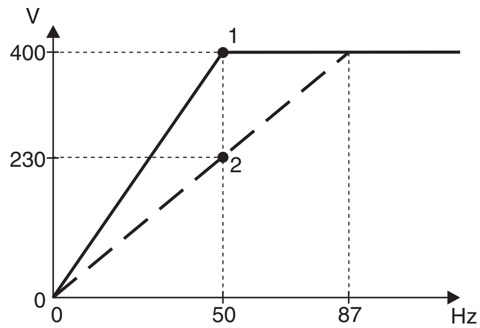
9.5 Motor selection for asynchronous AC motors (VFC)

9.5.1 Voltage/frequency characteristic

The asynchronous motor follows a load-dependent voltage/frequency characteristic in VFC operating mode. The continuous calculation of the motor model enables the full motor torque to be utilized right down to the lowest speeds. This characteristic curve is set by entering the nominal motor voltage and the nominal motor frequency in the startup function. The setting determines the speed-dependent torque and power characteristics of the asynchronous motor.

The following figure shows an example of the voltage/frequency characteristic curves of an asynchronous AC motor 230/400 V, 50 Hz.



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1 Star connection; 400 V, 50 Hz

2 Delta connection: 230 V, 50 Hz

The inverter output voltage V_O is limited by the connected supply voltage. The "nominal supply voltage" input value in the startup function limits the rms value of the maximum output voltage. This restriction is used whenever the connected motor has a lower rated voltage than the power supply of the inverter. Enter the maximum permitted motor voltage. Furthermore, make sure that the "nominal supply voltage" input value is less than or equal to the supply voltage of the inverter.

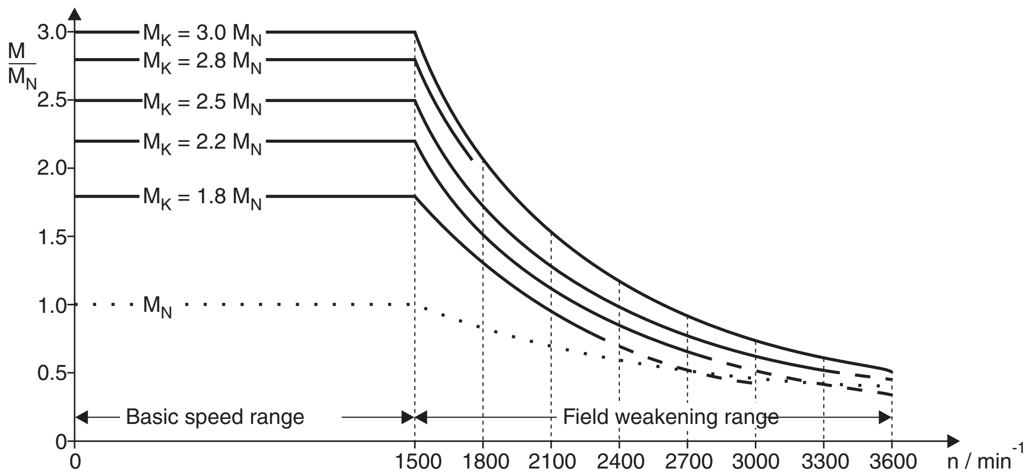
9.5.2 Speed/torque characteristics

The field weakening range starts when the set maximum output voltage of the inverter is reached. Consequently, the speed range of the motor is divided into two ranges:

- Basic speed range → constant torque with increasing power
- Field weakening range → constant power with an inversely proportionate decrease in torque.

When determining the maximum rotational speed in the field weakening range, note that the nominal torque M_N (in relation to the nominal rotational speed, e.g. n_N = 1500 min^{-1}) falls in inverse proportion and the breakdown torque M_K is reduced in an inverse quadratic relationship. The M_K/M_N ratio is a motor-specific parameter. The MOVIDRIVE® stall protection limits the speed when the maximum possible torque is reached.

The following figure shows an example of different motor characteristic curves in the basic speed range and in the field weakening range.



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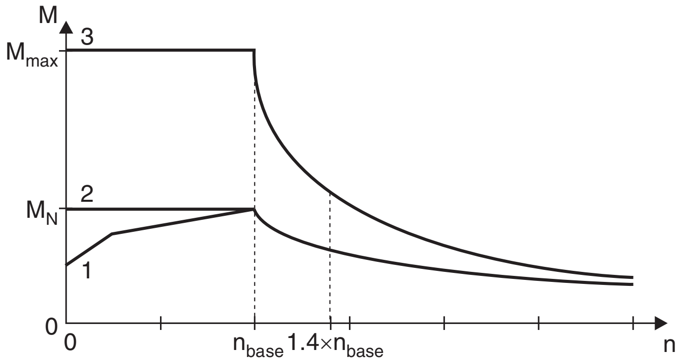
With gearmotors, the maximum motor speed is dependent on the size and mounting position of the gear unit. The speed should not exceed 3000 min^{-1} due to the resulting noise and oil churning losses.

Typical speed-torque characteristics

M_N is determined by the motor. M_{max} and n_{base} depend on the motor/inverter combination. Refer to the motor selection tables for the CFC mode for the values of n_{base}, M_N and M_{max}.



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[1] With self-cooling

[2] With external cooling

[3] Maximum torque

9.5.3 Dynamic applications ($P_{inverter} > P_{motor}$)

Observe the following notes for dynamic applications in which the inverter power is significantly greater than the motor power:

- The startup function sets the current limit of the inverter (P303/P313) to 150% of the nominal motor current. The value of the current limit is based on the nominal inverter current. As a result, 150% of the nominal motor current is less than 150% of the nominal inverter current (value of P303/P313). For dynamic applications, this parameter must be set manually to a higher value.
- The startup function sets the slip compensation parameter (P324/P334) to the nominal slip of the motor. In the case of VFC-n control, the internal slip limiting function allows the slip to reach max. 150% of this setting. Consequently, the motor develops maximally 150% of the nominal motor torque. For higher torque ratings, the slip compensation parameter (P324) must be increased accordingly.

INFORMATION

Set parameter P324 "Slip compensation" to max. 130% of the rated slip of the motor for stable operation.

Combinations with $P_{inverter} > 4 \times P_{motor}$

For inverter/motor combinations in which the inverter power is greater than four times the motor power, special measures must be taken during project planning and startup. The reason for this is the large difference between the rated inverter current and the rated motor current.

Therefore, note the following measures:

- Perform project planning for connecting the motor in a delta connection. This increases the motor current by a factor of √**3** and lowers the unfavorable ratio.
- If this measure does not suffice, start up the motor in VFC & group or V/f operating mode. In these operating modes, the inverter simulates a supply system with constant voltage and frequency with a constant V/f ratio.

9.5.4 Examples for motor selection delta/star AC 230/400 V

Trolley drive

- P_{travel} = 1.3 kW
- P_{max} = 13 kW
- n_{min} = 270 min^{-1}, setting range 1:10
- n_{max} = 2610 min^{-1}

In inverter mode with adapted power (P = $P_{n)}$, the motor can output 150% of its listed power during the acceleration phase. The following applies:

P_{mot} = P_{max}: 1.5 = 13 kW: 1.5 = 8.67 kW

A DRS132M4 motor with delta connection (P_n = 9.2 kW) is selected.

According to the selection table, a MOVIDRIVE® MDX61B0110 (P = P_n) should be selected.

Hoist drive

High constant load with short-term overload (acceleration):

- P_{max} = 26 kW
- $P_{duration}$ = 20 kW
- Setting range 1:15, low speed only for positioning
- Brake applied when the drive is at a standstill
- Load type S3 (40% cdf)

The inverter can yield 150% of its nominal current during acceleration. Consequently, a MOVIDRIVE® MDX61B0220 is selected.

In view of the duty type (S3, 40% cdf), the selection table allocates motor type DRS180L4 (P_n = 22 kW) in star connection.

For more information, see → Sec. Project planning for hoists

Fan/pump

Variable torque load with the following power values:

- P_{max} = 4.8 kW
- n_{max} = 1400 min^{-1}, continuous duty with n_{max}

The motor can be operated at its listed power (P = P_n) even without external cooling due to the quadratically falling torque. Therefore, the motor type DRS132S4 in star connection (P_n = 5.5 kW) is sufficient.

According to the selection table, a MOVIDRIVE® MDX61B0055 (P = P_n) should be selected. However, as there is a variable torque load without overload, the inverter can be operated with increased output power. Consequently, a MOVIDRIVE® MDX61B0040 is sufficient.

9.6 Motor selection for asynchronous AC and servomotors (CFC)

INFORMATION

The torque limit *P304* is set automatically by the startup function of the MOVITOOLS® MotionStudio engineering software. Do not increase this automatically set value!

SEW-EURODRIVE recommends always using the latest version of MOVITOOLS® MotionStudio for startup. The latest MOVITOOLS® MotionStudio version can be downloaded from our homepage (www.sew-eurodrive.de).

9.6.1 Motor characteristics

In operating mode CFC the drive is characterized by controlling the torque directly and quickly. This means they achieve a highly dynamic overload capacity (up to 3 × M_N) and a very high speed and control range (up to 1:5000). Stable speed and positioning accuracy meet the high requirements of servo technology. Achieve this behavior via a field-oriented control. The current components for magnetization (I_d) and torque generation (I_q) are controlled separately. A prerequisite of the CFC operating modes is that there must always be an encoder on the motor.

The inverter needs to know exact data about the connected motor to calculate the motor model. This data is made available by the MOVITOOLS® MotionStudio engineering software with the startup function. The CFC operating modes are only possible with the SEW motors listed in the following chapters. They cannot be used with other SEW motors or third-party motor. The necessary motor data for the CFC operating modes are stored on the operator panel for the 2-, 4-, and 6-pole SEW motors.

9.6.2 Magnetizing current

Dynamic drives that have to accelerate without a delay are also energized at standstill without load. The magnetizing current I_d flows at standstill. The inverter must be able to supply this current constantly in applications in which the output stage is permanently enabled, for example in CFC & torque control mode. In particular in the case of large motors with a slip frequency ≤ 2 Hz, you must refer to the diagrams in chapter "Load capacity of the devices at low output frequencies" to check whether the inverter can supply the current. Also check whether the thermal characteristics of the motor are suitable (external cooling fan) for this. For the magnetizing current I_d, refer to the motor tables.

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9.6.3 CFC mode with speed control

There is no need to differentiate between the load types quadratic, dynamic and static when performing project planning for the CFC operating mode. Project planning for an asynchronous motor in CFC mode is carried out in accordance with the following requirements:

First Effective torque requirement at average application speed.

$M_{rms} < M_{N\_Mot}$

The operating point must lie below the characteristic curve for the continuous torque. No external cooling is required if this operating point lies below the characteristic curve for self-cooling.

Second Maximum torque needed across the speed curve.

$M_{max} < M_{dyn\_Mot}$

This operating point must lie below the characteristic curve for the maximum torque of the motor/MOVIDRIVE® combination.

3. Maximum speed

Do not configure the maximum speed of the motor higher than 1.4 times the base speed. The maximum torque available will then still be approx. 110% of the continuous nominal torque of the motor. Observe the maximum input speed of the gear unit.

$n_{max} < 1.4 \times n_{base}$

9.6.4 Cooling the motor

Self-cooling of asynchronous motors is based on the integrated fan, which means self-cooling depends on the speed. The integrated fan does not provide cooling for the motor at low speeds and standstill. External cooling may be necessary in case of a high static load or a high effective torque.

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9.6.5 CFC mode with torque control

This operating mode permits direct torque control of the asynchronous motor in the basic speed range ($n \leq n_{base}$). The setpoint sources of the speed-controlled CFC mode can also be used for torque control. All speed setpoint sources (except for bus setpoints) are interpreted as current setpoint sources. Assign "Current" to a process data word for fieldbus control. The settings for evaluating the analog input (→ P11_, parameter description) also remain in effect. The fixed setpoints (P16_, P17_) can be entered either in the device (min^{-1}) or ($\%I_{N\_inverter}$) (→ MOVITOOLS® MotionStudio).

The following relationship exists between the units:

3000 min^{-1} ≙ 150% nominal inverter current

The torque on the output shaft of the motor can be calculated for the basic speed range ($n \leq n_{base}$) using the following formulae:

Specification of a setpoint for the motor torque in $\%I_{N\_inverter}$:

$$M = k_T \times I_{N\_inverter} \times \text{setpoint}$$

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Specification of a setpoint for the motor torque in min^{-1}:

$$M = k_T \times 1.5 \times I_{N\_inverter} \times \frac{\text{setpoint}}{3000\ 1/\text{min}}$$

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$I_{N\_inverter}$	= Nominal output current of the inverter
c_T	= Torque constant = M_n / I_{q_n}
	M_n and I_{q_n} are motor-specific values. For the values of the torque constants k_T and the motor-specific parameters M_n and I_{q_n}, refer to the motor tables.

In addition to the torque-generating current I_q, the inverter must also provide the magnetizing current I_d. The actual inverter output current I_{tot} can be calculated using the following formulae:

Specification of a setpoint for the motor torque in $\%I_{N\_inverter}$:

$$I_{total} = \sqrt{\left(\text{setpoint} \times I_{N\_inverter}\right)^2 + I_{d\_N}^2}$$

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Specification of a setpoint for the motor torque in min^{-1}:

$$I_{total} = \sqrt{\left(\text{setpoint} \times 1.5 \times I_{N\_inverter} \times \frac{1}{3000\ 1/\text{min}}\right)^2 + I_{d\_N}^2}$$

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I_{q_n}	= Nominal value of the torque-generating current according to the motor table
I_{d_n}	= Nominal value of the magnetizing current, according to the motor table

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9.6.6 DRL.. motor table

Asynchronous DRL.. servomotors

4-pole DRL.. servomotors for 400 V, 50 Hz

n_N	Motor type	M_N	I_N	I_{q_n}	I_{d_n}	c_T	M_{pk} D1	M_{pk} D2	m	J_{mot}
		Nm	A	A	A	Nm/A	Nm	Nm	kg	10^{-4} kgm^2
1200	DRL71S4	2.7	1.18	1.02	0.62	2.66	5	8.5	8.6	4.9
	DRL71M4	4	1.6	1.36	0.80	2.93	7	14	10	7.1
	DRL80S4	6.5	2.15	1.95	0.88	3.33	10	25	11.5	14.9
	DRL80M4	9.5	2.9	2.64	1.10	3.60	14	30	15.2	21.5
	DRL90L4	15	4.8	4.14	2.21	3.63	25	46	22.5	43.5
	DRL100L4	26	8.5	8.05	2.68	3.23	40	85	30	68
	DRL132S4	42	12.6	11.9	4.07	3.52	80	150	45.5	190
	DRL132MC4	56	17.6	15.4	7.50	3.63	130	200	65	340
	DRL160M4	85	25.5	24.2	8.05	3.51	165	280	93	450
	DRL160MC4	90	28	25.1	10.9	3.58	185	320	95	590
	DRL180S4	120	34.5	33.2	10.8	3.62	210	380	122	900
	DRL180M4	135	38	36.1	11.3	3.74	250	430	143	1110
	DRL180L4	165	47	44.9	14.8	3.67	320	520	154	1300
	DRL180LC4	175	52	46.8	17.1	3.74	420	600	163	1680
	DRL200L4	200	58.5	56.0	17.8	3.57	475	680	260	2360
	DRL225S4	250	72	68.1	23.4	3.67	520	770	295	2930
	DRL225MC4	290	89	78.6	29.2	3.69	770	1100	330	4330
1700	DRL71S4	2.7	1.63	1.40	0.86	1.92	5	8.5	8.6	4.9
	DRL71M4	4	2.2	1.90	1.11	2.11	7	14	10	7.1
	DRL80S4	6.5	2.96	2.71	1.22	2.40	10	25	11.5	14.9
	DRL80M4	9.5	4	3.65	1.52	2.60	14	30	15.2	21.5
	DRL90L4	15	6.6	5.67	3.02	2.65	25	46	22.5	43.5
	DRL100L4	26	11.4	11.00	3.66	2.36	40	85	30	68
	DRL132S4	42	17.8	16.9	5.75	2.49	80	150	45.5	190
	DRL132MC4	56	24.9	21.9	10.6	2.56	130	200	65	340
	DRL160M4	85	35	33.5	11.1	2.54	165	280	93	450
	DRL160MC4	90	36	32.3	14.0	2.78	185	320	95	590
	DRL180S4	120	47.5	45.6	14.8	2.63	210	380	122	900
	DRL180M4	135	52	50.1	15.7	2.70	250	430	143	1110
	DRL180L4	165	63	61.3	20.2	2.69	320	520	154	1300
	DRL180LC4	175	72	65.7	24.1	2.66	420	600	163	1680
	DRL200L4	200	80.6	78.4	25.0	2.55	475	680	260	2360
	DRL225S4	245	97	92	32.2	2.66	520	770	295	2930
	DRL225MC4	280	130	114	43.9	2.45	770	1100	330	4330

n_N	Motor type	M_N	I_N	I_{q_n}	I_{d_n}	c_T	M_{pk} D1	M_{pk} D2	m	J_{mot}
		Nm	A	A	A	Nm/A	Nm	Nm	kg	10^{-4} kgm^2
2100	DRL71S4	2.6	2	1.70	1.08	1.53	5	8.5	8.6	4.9
	DRL71M4	3.8	2.7	2.25	1.39	1.69	7	14	10	7.1
	DRL80S4	6.2	3.59	3.22	1.52	1.92	10	25	11.5	14.9
	DRL80M4	9.5	5	4.60	1.91	2.07	14	30	15.2	21.5
	DRL90L4	15	8.4	7.21	3.84	2.08	25	46	22.5	43.5
	DRL100L4	25	14	13.4	4.63	1.87	40	85	30	68
	DRL132S4	41	21.4	20.3	7.07	2.02	80	150	45.5	190
	DRL132MC4	52	28.8	25.0	13.0	2.08	130	200	65	340
	DRL160M4	85	44	42.1	14.0	2.02	165	280	93	450
	DRL160MC4	88	48	42.8	18.9	2.06	185	320	95	590
	DRL180S4	110	55.3	52.7	18.7	2.09	210	380	122	900
	DRL180M4	130	64	60.4	19.6	2.15	250	430	143	1110
	DRL180L4	160	78	75.8	25.8	2.11	320	520	154	1300
	DRL180LC4	170	87	79.1	29.8	2.15	420	600	163	1680
	DRL200L4	195	99	94.6	30.9	2.06	475	680	260	2360
	DRL225S4	235	119	111	40.6	2.11	520	770	295	2930
	DRL225MC4	265	142	125	50.8	2.12	770	1100	330	4330
3000	DRL71S4	2.5	2.68	2.26	1.49	1.11	5	8.5	8.6	4.9
	DRL71M4	3.6	3.55	2.96	1.93	1.21	7	14	10	7.1
	DRL80S4	6	4.82	4.32	2.10	1.39	10	25	11.5	14.9
	DRL80M4	8.8	6.5	5.86	2.63	1.50	14	30	15.2	21.5
	DRL90L4	14	11	9.19	5.25	1.52	25	46	22.5	43.5
	DRL100L4	21	16.6	15.4	6.35	1.36	40	85	30	68
	DRL132S4	35	25.5	24.4	10.0	1.43	80	150	45.5	190
	DRL132MC4	42	34.8	28.4	18.4	1.48	130	200	65	340
	DRL160M4	79	57	53.9	19.3	1.47	165	280	93	450
	DRL160MC4	83	59	51.8	24.3	1.60	185	320	95	590
	DRL180S4	100	70.1	65.9	25.7	1.52	210	380	122	900
	DRL180M4	105	73	67.6	27.2	1.55	250	430	143	1110
	DRL180L4	130	90	83.8	35.0	1.55	320	520	154	1300
	DRL180LC4	140	105	91	41.8	1.53	420	600	163	1680
	DRL200L4	165	118	112	43.3	1.47	475	680	260	2360
	DRL225S4	195	139	127	56.0	1.53	520	770	295	2930
	DRL225MC4	220	188	156	76	1.41	770	1100	330	4330

4-pole DRL.. servomotors/brakemotors for 400 V, 50 Hz

n_N	Motor type	M_N	I_N	BE..	M_B	M_B	m_B	J_{Mot_BE}
					D1	D2		
		Nm	A		Nm	Nm	kg[1)]	10^{-4} kgm²
1200	DRL71S4	2.7	1.18	BE05	5	5	11	6.2
	DRL71M4	4	1.6	BE1	7	10	12.6	8.4
	DRL80S4	6.5	2.15	BE2	10	20	15.2	19.4
	DRL80M4	9.5	2.9	BE2	14	20	18.9	26
	DRL90L4	15	4.8	BE5	20	40	28.5	49.5
	DRL100L4	26	8.5	BE5	40	55	36	74
	DRL132S4	42	12.6	BE11	80	110	60	200
	DRL132MC4	56	17.6	BE11	110	110	79	355
	DRL160M4	85	25.5	BE20	150	200	120	500
	DRL160MC4	90	28	BE20	150	200	122	640
	DRL180S4	120	34.5	BE30	200	300	162	1030
	DRL180M4	135	38	BE30	200	300	183	1250
	DRL180L4	165	47	BE30	300	300	194	1440
	DRL180LC4	175	52	BE32	400	400	210	1910
	DRL200L4	200	58.5	BE32	400	600	315	2590
	DRL225S4	250	72	BE32	500	500	350	3160
	DRL225MC4	290	89	BE32	600	600	385	4560
1700	DRL71S4	2.7	1.63	BE05	5	5	11	6.2
	DRL71M4	4	2.2	BE1	7	10	12.6	8.4
	DRL80S4	6.5	2.96	BE2	10	20	15.2	19.4
	DRL80M4	9.5	4	BE2	14	20	18.9	26
	DRL90L4	15	6.6	BE5	20	40	28.5	49.5
	DRL100L4	26	11.4	BE5	40	55	36	74
	DRL132S4	42	17.8	BE11	80	110	60	200
	DRL132MC4	56	24.9	BE11	110	110	79	355
	DRL160M4	85	35	BE20	150	200	120	500
	DRL160MC4	90	36	BE20	150	200	122	640
	DRL180S4	120	47.5	BE30	200	300	162	1030
	DRL180M4	135	52	BE30	200	300	183	1250
	DRL180L4	165	63	BE30	300	300	194	1440
	DRL180LC4	175	72	BE32	400	400	210	1910
	DRL200L4	200	80.6	BE32	400	600	315	2590
	DRL225S4	245	97	BE32	500	500	350	3160
	DRL225MC4	280	130	BE32	600	600	385	4560
2100	DRL71S4	2.6	2	BE05	5	5	11	6.2
	DRL71M4	3.8	2.7	BE1	7	10	12.6	8.4
	DRL80S4	6.2	3.59	BE2	10	20	15.2	19.4
	DRL80M4	9.5	5	BE2	14	20	18.9	26
	DRL90L4	15	8.4	BE5	20	40	28.5	49.5
	DRL100L4	25	14	BE5	40	55	36	74
	DRL132S4	41	21.4	BE11	80	110	60	200
	DRL132MC4	52	28.8	BE11	110	110	79	355
	DRL160M4	85	44	BE20	150	200	120	500
	DRL160MC4	88	48	BE20	150	200	122	640
	DRL180S4	110	55.3	BE30	200	300	162	1030
	DRL180M4	130	64	BE30	200	300	183	1250
	DRL180L4	160	78	BE30	300	300	194	1440
	DRL180LC4	170	87	BE32	400	400	210	1910
	DRL200L4	195	99	BE32	400	600	315	2590
	DRL225S4	235	119	BE32	500	500	350	3160
	DRL225MC4	265	142	BE32	600	600	385	4560

n_N	Motor type	M_N	I_N	BE..	M_B D1	M_B D2	m_B	J_{Mot_BE}
		Nm	A		Nm	Nm	kg[1)]	10^{-4} kgm²
3000	DRL71S4	2.5	2.68	BE05	5	5	11	6.2
	DRL71M4	3.6	3.55	BE1	7	10	12.6	8.4
	DRL80S4	6	4.82	BE2	10	20	15.2	19.4
	DRL80M4	8.8	6.5	BE2	14	20	18.9	26
	DRL90L4	14	11	BE5	20	40	28.5	49.5
	DRL100L4	21	16.6	BE5	40	55	36	74
	DRL132S4	35	25.5	BE11	80	110	60	200
	DRL132MC4	42	34.8	BE11	110	110	79	355
	DRL160M4	79	57	BE20	150	200	120	500
	DRL160MC4	83	59	BE20	150	200	122	640
	DRL180S4	100	70.1	BE30	200	300	162	1030
	DRL180M4	105	73	BE30	200	300	183	1250
	DRL180L4	130	90	BE30	300	300	194	1440
	DRL180LC4	140	105	BE32	400	400	210	1910
	DRL200L4	165	118	BE32	400	600	315	2590
	DRL225S4	195	139	BE32	500	500	350	3160
	DRL225MC4	220	188	BE32	600	600	385	4560

1) Applies for foot-mounted motor with brake (DRL...BE../FI..)

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9.6.7 DRL.. asynchronous servomotors

SEW-EURODRIVE offers DRL.. series asynchronous servomotors especially for operation with MOVIDRIVE® in CFC operating modes. These motors have the following characteristics:

High power yield

The optimum winding of DRL.. motors permits a high power yield.

Division into speed classes

DRL.. motors are available in four speed classes. This assures an optimum utilization of torques and speeds.

With sin/cos encoder as standard

As standard, DRL.. motors are equipped with a high-resolution sin/cos encoder (ES7S, EG7S).

TF or TH motor protection as standard

The winding temperature of the 3 motor phases is monitored using thermistors (TF). The thermistor can be connected to the TF/TH input of MOVIDRIVE®. The temperature is then monitored by MOVIDRIVE®, no additional monitoring unit is required.

Bimetallic switches (TH) can also be used instead of thermistors. The bimetallic switches are also connected to the TF/TH input.

Thermal class 155 (F) as standard

DRL.. motors are built using material of thermal class 155 (F) as standard.

Dynamics packages 1 and 2

DRL.. motors are available in 2 dynamics packages. The motors differ in their overload capacity related to the nominal motor torque.

- Dynamics package 1: 190% – 220% nominal motor torque
- Dynamics package 2: 300% – 350% nominal motor torque

DRN.., DRS.., DRE. motors or DRL.. motors can be used in CFC mode. SEW-EURODRIVE recommends using DRL.. motors to achieve optimum benefit from the advantages of CFC mode.

	Advantage	Disadvantage
CFC mode with DRN.., DRS.., DRE.. motor selection	Standard motor version	Slower base speed than the DRL.. motor.
		The power yield of the motor is less than the rated motor power.
		In terms of the power yield, the mass inertia is greater than that of the DRL.. motors.
		The maximum torque is limited for some of the inverter/motor combinations due to mechanical rigidity.
CFC mode with DRL.. motor Motor Selection	Higher base speed As DRN.., DRS.., DRE..motor.	No IEC standard motor
	Usually with a power yield one motor type higher.	
	Based on the power yield of a lower mass moment of inertia.	Higher current demand due to higher power yield; therefore a larger inverter has to be assigned.
	Motor is designed for dynamic operation.	

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9.6.8 Combination overview for DRL.. motors with MOVIDRIVE® B (line voltage 400 V)

Nominal speed n_N = 1200 min^{-1}, dynamics package 1

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm	5										
	n_{base} min^{-1}	942										
DRL71M4	M_{max} Nm	7				7						
	n_{base} min^{-1}	991				1034						
DRL80S4	M_{max} Nm	10				10						
	n_{base} min^{-1}	963				977						
DRL80M4	M_{max} Nm	13.3	14	14		14						
	n_{base} min^{-1}	991	1020	1055		1055						
DRL100L4	M_{max} Nm						24.8	32.3	40			
	n_{base} min^{-1}						1238	1188	1181			
DRL90L4	M_{max} Nm				25	19.3	25	25				
	n_{base} min^{-1}				1062	1097	1083	1195				
DRL132S4	M_{max} Nm								47.1	63.2	80	80
	n_{base} min^{-1}								1090	1031	973	1066
DRL132MC4	M_{max} Nm										78.5	121
	n_{base} min^{-1}										1125	1049
DRL160M4	M_{max} Nm										79.4	123
	n_{base} min^{-1}										1150	1092
DRL160MC4	M_{max} Nm											118
	n_{base} min^{-1}											1150

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B1320-503 (sizes 3 – 6):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)									
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
DRL132MC4	M_{max} Nm	130									
	n_{base} min^{-1}	1166									
DRL160M4	M_{max} Nm	165	165								
	n_{base} min^{-1}	1018	1144								
DRL160MC4	M_{max} Nm	162	185								
	n_{base} min^{-1}	1097	1208								
DRL180S4	M_{max} Nm	171	210								
	n_{base} min^{-1}	1092	1134								
DRL180M4	M_{max} Nm	172	250	250							
	n_{base} min^{-1}	1155	1076	1213							
DRL180L4	M_{max} Nm	170	251	320	320						
	n_{base} min^{-1}	1171	1107	1076	1181						
DRL180LC4	M_{max} Nm		241	318	390	420					
	n_{base} min^{-1}		1139	1086	1039	1076					
DRL200L4	M_{max} Nm		239	317	388	475					
	n_{base} min^{-1}		1161	1120	1083	1038					
DRL225S4	M_{max} Nm			318	391	480	520				
	n_{base} min^{-1}			1161	1132	1095	1136				
DRL225MC4	M_{max} Nm				368	455	540	673	770		
	n_{base} min^{-1}				1177	1153	1124	1083	1116		

Nominal speed n_N = 1200 min^{-1}, dynamics package 2

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm	8.5										
	n_{base} min^{-1}	548										
DRL71M4	M_{max} Nm	11.4	13.8	14.0	14.0	14						
	n_{base} min^{-1}	647	506	506	520	506						
DRL80S4	M_{max} Nm	13	15.7	20.4	25	19.8	25					
	n_{base} min^{-1}	773	647	429	225	457	225					
DRL80M4	M_{max} Nm		16.2	21.1	27.4	20.4	28.3	30.0				
	n_{base} min^{-1}		907	759	577	780	555	506				
DRL100L4	M_{max} Nm							32.3	44.5	59	75.8	85
	n_{base} min^{-1}							1188	1083	963	823	752
DRL90L4	M_{max} Nm				26.6	19.3	27.5	35.5	46			
	n_{base} min^{-1}				1005	1097	998	900	773			
DRL132S4	M_{max} Nm								47.1	63.2	81.6	124
	n_{base} min^{-1}								1090	1031	961	803
DRL132MC4	M_{max} Nm										78.5	121
	n_{base} min^{-1}										1125	1049
DRL160M4	M_{max} Nm											123
	n_{base} min^{-1}											1092
DRL160MC4	M_{max} Nm											118
	n_{base} min^{-1}											1150

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B1320-503 (sizes 3 – 6):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)									
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
DRL132S4	M_{max} Nm	150									
	n_{base} min^{-1}	709									
DRL132MC4	M_{max} Nm	163	200								
	n_{base} min^{-1}	973	955								
DRL160M4	M_{max} Nm	166	241	280							
	n_{base} min^{-1}	1018	902	854							
DRL160MC4	M_{max} Nm	162	236	310	320						
	n_{base} min^{-1}	1097	1007	918	912						
DRL180S4	M_{max} Nm	171	249	326	380						
	n_{base} min^{-1}	1092	997	902	833						
DRL180M4	M_{max} Nm	172	251	329	402	430					
	n_{base} min^{-1}	1155	1076	1002	928	918					
DRL180L4	M_{max} Nm		251	331	404	495	520				
	n_{base} min^{-1}		1107	1049	991	923	912				
DRL180LC4	M_{max} Nm		241	318	390	477	564	600			
	n_{base} min^{-1}		1139	1086	1039	981	923	907			
DRL200L4	M_{max} Nm		239	317	388	475	562	680			
	n_{base} min^{-1}		1161	1120	1083	1038	988	931			
DRL225S4	M_{max} Nm			318	391	480	569	708	770		
	n_{base} min^{-1}			1161	1132	1095	1062	1005	1025		
DRL225MC4	M_{max} Nm				368	455	540	673	884	1042	1100
	n_{base} min^{-1}				1177	1153	1124	1083	1017	968	964

Nominal speed n_N = 1700 min^{-1}, dynamics package 1

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm	5				5						
	n_{base} min^{-1}	1512				1582						
DRL71M4	M_{max} Nm	7				7						
	n_{base} min^{-1}	1498				1617						
DRL80S4	M_{max} Nm		10	10		10						
	n_{base} min^{-1}		1505	1603		1603						
DRL80M4	M_{max} Nm			14	14	14	14					
	n_{base} min^{-1}			1519	1680	1491	1695					
DRL100L4	M_{max} Nm								32	40	40	
	n_{base} min^{-1}								1702	1688	1920	
DRL90L4	M_{max} Nm						19.4	25	25			
	n_{base} min^{-1}						1575	1505	1793			
DRL132S4	M_{max} Nm									43.5	56.9	80
	n_{base} min^{-1}									1605	1547	1500
DRL132MC4	M_{max} Nm											83.5
	n_{base} min^{-1}											1623
DRL160M4	M_{max} Nm											86.8
	n_{base} min^{-1}											1619

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B1320-503 (sizes 3 – 6):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)									
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
DRL132MC4	M_{max} Nm	114	130								
	n_{base} min^{-1}	1559	1752								
DRL160M4	M_{max} Nm	118	165								
	n_{base} min^{-1}	1556	1498								
DRL160MC4	M_{max} Nm	123	182	185							
	n_{base} min^{-1}	1492	1408	1598							
DRL180S4	M_{max} Nm	121	178	210							
	n_{base} min^{-1}	1619	1535	1582							
DRL180M4	M_{max} Nm		178	235	250	250					
	n_{base} min^{-1}		1624	1556	1661	1788					
DRL180L4	M_{max} Nm		180	239	294	320	320				
	n_{base} min^{-1}		1608	1561	1508	1582	1698				
DRL180LC4	M_{max} Nm		166	223	274	337	400	420			
	n_{base} min^{-1}		1677	1640	1598	1545	1492	1577			
DRL200L4	M_{max} Nm				273	336	398	475			
	n_{base} min^{-1}				1628	1587	1542	1513			
DRL225S4	M_{max} Nm				277	343	409	510	520		
	n_{base} min^{-1}				1637	1608	1575	1526	1727		
DRL225MC4	M_{max} Nm						351	441	583	689	770
	n_{base} min^{-1}						1801	1764	1702	1657	1706

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Nominal speed n_N = 1700 min^{-1}, dynamics package 2

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm	7.56	8.5			8.5						
	n_{base} min^{-1}	1104	1005			1027						
DRL71M4	M_{max} Nm	8.06	9.79	12.8	14	12.3	14					
	n_{base} min^{-1}	1343	1223	1034	977	1062	977					
DRL80S4	M_{max} Nm		11.1	14.6	19	14.1	19.6	25				
	n_{base} min^{-1}		1378	1202	977	1223	949	682				
DRL80M4	M_{max} Nm			15.1	19.7	14.6	20.3	26	30			
	n_{base} min^{-1}			1434	1287	1448	1266	1083	963			
DRL100L4	M_{max} Nm								32	42.8	55.2	83.3
	n_{base} min^{-1}								1702	1603	1491	1238
DRL90L4	M_{max} Nm						19.4	25.4	35.2	46		
	n_{base} min^{-1}						1575	1491	1364	1223		
DRL132S4	M_{max} Nm										56.9	86.8
	n_{base} min^{-1}										1547	1412
DRL132MC4	M_{max} Nm											83.5
	n_{base} min^{-1}											1623

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B1600-503 (sizes 3 - 7):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)											
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320	1600	2000
DRL100L4	M_{max} Nm	85											
	n_{base} min^{-1}	1238											
DRL132S4	M_{max} Nm	116	150										
	n_{base} min^{-1}	1277	1137										
DRL132MC4	M_{max} Nm	114	166	200									
	n_{base} min^{-1}	1559	1453	1424									
DRL160M4	M_{max} Nm	118	173	226	276	280							
	n_{base} min^{-1}	1556	1455	1350	1260	1281							
DRL160MC4	M_{max} Nm	123	182	240	293	320							
	n_{base} min^{-1}	1492	1408	1324	1245	1234							
DRL180S4	M_{max} Nm		178	235	287	351	380						
	n_{base} min^{-1}		1535	1450	1371	1276	1234						
DRL180M4	M_{max} Nm		178	235	288	352	416	430					
	n_{base} min^{-1}		1624	1556	1498	1419	1339	1350					
DRL180L4	M_{max} Nm			239	294	360	426	520					
	n_{base} min^{-1}			1561	1508	1450	1387	1297					
DRL180LC4	M_{max} Nm			223	274	337	400	497	600				
	n_{base} min^{-1}			1640	1598	1545	1492	1408	1324				
DRL200L4	M_{max} Nm				273	336	398	495	650	680			
	n_{base} min^{-1}				1628	1587	1542	1481	1374	1366			
DRL225S4	M_{max} Nm				277	343	409	510	670	770	770		
	n_{base} min^{-1}				1637	1608	1575	1526	1448	1403	1468		
DRL225MC4	M_{max} Nm						351	441	583	689	864	1039	1100
	n_{base} min^{-1}						1801	1764	1702	1657	1579	1505	1522

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Nominal speed n_N = 2100 min^{-1}, dynamics package 1

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm	5	5			5	5					
	n_{base} min^{-1}	1969	2081			2130	2215					
DRL71M4	M_{max} Nm		7	7		7	7					
	n_{base} min^{-1}		1948	2102		2095	2215					
DRL80S4	M_{max} Nm			10	10	10	10					
	n_{base} min^{-1}			2039	2180	2004	2187					
DRL80M4	M_{max} Nm				14	11.3	14	14				
	n_{base} min^{-1}				2039	2025	2081	2299				
DRL100L4	M_{max} Nm								24.8	33.4	40	40
	n_{base} min^{-1}								2285	2201	2229	2651
DRL90L4	M_{max} Nm							19.4	25	25		
	n_{base} min^{-1}							2046	2074	2426		
DRL132S4	M_{max} Nm										45.5	70
	n_{base} min^{-1}										1992	1869

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B1600-503 (sizes 3 - 7):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in CFC operating modes (P700)											
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320	1600	2000
DRL132S4	M_{max} Nm	80											
	n_{base} min^{-1}	1969											
DRL132MC4	M_{max} Nm	91.5	130	130									
	n_{base} min^{-1}	1992	1928	2250									
DRL160M4	M_{max} Nm		136	165									
	n_{base} min^{-1}		1946	1956									
DRL160MC4	M_{max} Nm		132	175	185								
	n_{base} min^{-1}		2025	1946	2104								
DRL180S4	M_{max} Nm		139	185	210								
	n_{base} min^{-1}		2030	1956	1983								
DRL180M4	M_{max} Nm		140	186	228	250	250						
	n_{base} min^{-1}		2104	2046	1988	2078	2241						
DRL180L4	M_{max} Nm			185	228	281	320	320					
	n_{base} min^{-1}			2062	2020	1967	1956	2188					
DRL180LC4	M_{max} Nm				218	270	320	399	420				
	n_{base} min^{-1}				2051	1999	1951	1872	2004				
DRL200L4	M_{max} Nm				217	268	319	398	475	475	475		
	n_{base} min^{-1}				2071	2034	1993	1932	1952	2047	2125		
DRL225S4	M_{max} Nm					267	320	401	520	520	520	520	
	n_{base} min^{-1}					2084	2055	2010	1936	2137	2268	2305	
DRL225MC4	M_{max} Nm							378	501	593	746	770	770
	n_{base} min^{-1}							2075	2018	1973	1899	2018	2108

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Nominal speed n_N = 2100 min^{-1}, dynamics package 2

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm	5.91	7.18	8.5		8.5						
	n_{base} min^{-1}	1723	1589	1462		1455						
DRL71M4	M_{max} Nm		7.69	10.1	13.2	9.78	13.6	14				
	n_{base} min^{-1}		1807	1638	1427	1659	1399	1406				
DRL80S4	M_{max} Nm			11.5	15	11.1	15.5	19.9	25			
	n_{base} min^{-1}			1814	1617	1842	1596	1357	1090			
DRL80M4	M_{max} Nm				15.4	11.3	16	20.5	28.1	30		
	n_{base} min^{-1}				1884	2025	1870	1716	1455	1399		
DRL100L4	M_{max} Nm									33.4	43.3	65.6
	n_{base} min^{-1}									2201	2102	1884
DRL90L4	M_{max} Nm							19.4	27.3	36.5	46	46
	n_{base} min^{-1}							2046	1934	1800	1673	1800
DRL132S4	M_{max} Nm											70
	n_{base} min^{-1}											1869
DRL132MC4	M_{max} Nm											66.4
	n_{base} min^{-1}											2051

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B2000-503 (sizes 3 – 7):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)											
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320	1600	2000
DRL100L4	M_{max} Nm	85											
	n_{base} min^{-1}	1695											
DRL132S4	M_{max} Nm	94.2	136	150									
	n_{base} min^{-1}	1746	1535	1482									
DRL132MC4	M_{max} Nm	91.5	134	176	200								
	n_{base} min^{-1}	1992	1893	1793	1793								
DRL160M4	M_{max} Nm		136	179	219	268	280						
	n_{base} min^{-1}		1946	1851	1761	1661	1651						
DRL160MC4	M_{max} Nm		132	175	215	264	312	320					
	n_{base} min^{-1}		2025	1946	1877	1788	1698	1724					
DRL180S4	M_{max} Nm		139	185	227	278	329	380					
	n_{base} min^{-1}		2030	1956	1883	1788	1698	1603					
DRL180M4	M_{max} Nm			186	228	280	331	411	430				
	n_{base} min^{-1}			2046	1988	1914	1840	1730	1756				
DRL180L4	M_{max} Nm			185	228	281	333	414	520				
	n_{base} min^{-1}			2062	2020	1967	1909	1819	1714				
DRL180LC4	M_{max} Nm				218	270	320	399	525	600			
	n_{base} min^{-1}				2051	1999	1951	1872	1746	1661			
DRL200L4	M_{max} Nm				217	268	319	398	523	617	680		
	n_{base} min^{-1}				2071	2034	1993	1932	1833	1760	1747		
DRL225S4	M_{max} Nm					267	320	401	529	625	770	770	
	n_{base} min^{-1}					2084	2055	2010	1932	1879	1784	1866	
DRL225MC4	M_{max} Nm							378	501	593	746	897	1100
	n_{base} min^{-1}							2075	2018	1973	1899	1825	1735

Nominal speed n_N = 3000 min^{-1}, dynamics package 1

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm		5	5	5	5	5					
	n_{base} min^{-1}		2665	3073	3213	3023	3227					
DRL71M4	M_{max} Nm			7	7	6.87	7	7				
	n_{base} min^{-1}			2707	3101	2728	3136	3291				
DRL80S4	M_{max} Nm				10	7.76	10	10				
	n_{base} min^{-1}				2876	2925	2932	3291				
DRL80M4	M_{max} Nm						11.3	14	14	14		
	n_{base} min^{-1}						2897	2848	3389	3516		
DRL100L4	M_{max} Nm									23.6	31	40
	n_{base} min^{-1}									3206	3129	3361
DRL90L4	M_{max} Nm								19.2	25	25	25
	n_{base} min^{-1}								2869	2834	3368	3755
DRL132S4	M_{max} Nm											48.6
	n_{base} min^{-1}											2836

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B2500-503 (sizes 3 – 7):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)												
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320	1600	2000	2500
DRL100L4	M_{max} Nm	40	40											
	n_{base} min^{-1}	3860	4050											
DRL132S4	M_{max} Nm	66	80	80										
	n_{base} min^{-1}	2730	2895	3070										
DRL132MC4	M_{max} Nm	62.2	93.3	124	130	130								
	n_{base} min^{-1}	2936	2848	2760	3006	3328								
DRL160M4	M_{max} Nm		97.1	129	158	165	165							
	n_{base} min^{-1}		2832	2742	2663	2863	3027							
DRL160MC4	M_{max} Nm		99.2	134	165	185	185							
	n_{base} min^{-1}		2684	2616	2547	2642	2874							
DRL180S4	M_{max} Nm			131	162	200	210	210						
	n_{base} min^{-1}			2848	2784	2700	2848	3111						
DRL180M4	M_{max} Nm			131	162	200	237	250	250					
	n_{base} min^{-1}			2953	2906	2842	2779	3006	3243					
DRL180L4	M_{max} Nm				163	203	242	302	320	320				
	n_{base} min^{-1}				2858	2811	2763	2684	2979	3106				
DRL180LC4	M_{max} Nm					187	224	281	372	420	420			
	n_{base} min^{-1}					2932	2890	2821	2700	2668	2890			
DRL200L4	M_{max} Nm						223	280	370	437	475	475		
	n_{base} min^{-1}						2916	2863	2773	2703	2830	2961		
DRL225S4	M_{max} Nm							285	380	450	520	520	520	
	n_{base} min^{-1}							2871	2805	2752	2805	3084	3203	
DRL225MC4	M_{max} Nm								325	387	490	592	754	770
	n_{base} min^{-1}								3171	3134	3064	2998	2888	3117

Nominal speed n_N = 3000 min^{-1}, dynamics package 2

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRL71S4	M_{max} Nm		5.09	6.71	8.5	6.48	8.5	8.5				
	n_{base} min^{-1}		2658	2461	2250	2489	2278	2370				
DRL71M4	M_{max} Nm			7.12	9.39	6.87	9.7	12.5	14			
	n_{base} min^{-1}			2700	2517	2728	2489	2278	2229			
DRL80S4	M_{max} Nm				10.7	7.76	11	14.2	19.5	25		
	n_{base} min^{-1}				2749	2925	2721	2524	2194	1849		
DRL80M4	M_{max} Nm						11.3	14.7	20.2	26.8	30	
	n_{base} min^{-1}						2897	2770	2552	2299	2194	
DRL100L4	M_{max} Nm										31	47.5
	n_{base} min^{-1}										3129	2946
DRL90L4	M_{max} Nm								19.2	26.1	34	46
	n_{base} min^{-1}								2869	2756	2630	2552
DRL132S4	M_{max} Nm											48.6
	n_{base} min^{-1}											2836

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B2500-503 (sizes 3 – 7):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)												
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320	1600	2000	2500
DRL100L4	M_{max} Nm	63.8	85											
	n_{base} min^{-1}	2763	2566											
DRL132S4	M_{max} Nm	66	96	126	150									
	n_{base} min^{-1}	2730	2543	2355	2197									
DRL132MC4	M_{max} Nm		93.3	124	152	186								
	n_{base} min^{-1}		2848	2760	2678	2578								
DRL160M4	M_{max} Nm		97.1	129	158	194	229	280	280					
	n_{base} min^{-1}		2832	2742	2663	2563	2468	2326	2421					
DRL160MC4	M_{max} Nm		99.2	134	165	204	242	301	320					
	n_{base} min^{-1}		2684	2616	2547	2463	2378	2246	2278					
DRL180S4	M_{max} Nm			131	162	200	237	295	380	380				
	n_{base} min^{-1}			2848	2784	2700	2616	2484	2278	2310				
DRL180M4	M_{max} Nm			131	162	200	237	296	388	430				
	n_{base} min^{-1}			2953	2906	2842	2779	2674	2505	2452				
DRL180L4	M_{max} Nm				163	203	242	302	398	469	520			
	n_{base} min^{-1}				2858	2811	2763	2684	2552	2452	2421			
DRL180LC4	M_{max} Nm					187	224	281	372	439	551	600		
	n_{base} min^{-1}					2932	2890	2821	2700	2610	2463	2410		
DRL200L4	M_{max} Nm						223	280	370	437	549	660		
	n_{base} min^{-1}						2916	2863	2773	2703	2588	2473		
DRL225S4	M_{max} Nm							285	380	450	566	681	770	
	n_{base} min^{-1}							2871	2805	2752	2666	2576	2596	
DRL225MC4	M_{max} Nm								325	387	490	592	754	936
	n_{base} min^{-1}								3171	3134	3064	2998	2888	2760

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9.6.9 DRN.. motor table (50 Hz) (Characteristic values for delta/star AC 230/400 V / 50 Hz)

Motor	P_m	M_N	Mass moment of inertia J_M		Star ⅄ (AC 400 V)				Delta △ (AC 230 V)			
			Without brake	with brake	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T
	kW	Nm	10^{-4} kgm²		A	A	A	Nm/A	A	A	A	Nm/A
DRN80M4	0.75	4.95	24.7	26.2	1.74	1.38	1.06	3.60	3.03	2.40	1.84	2.07
DRN90S4	1.1	7.2	54	58.7	2.55	2.10	1.44	3.44	4.43	3.65	2.51	1.98
DRN90L4	1.5	9.8	67.2	71.9	3.40	2.80	1.94	3.50	5.92	4.87	3.37	2.01
DRN100LS4	2.2	14.5	81.4	87.4	4.94	4.25	2.53	3.41	8.60	7.39	4.39	1.96
DRN100L4	3	19.7	112	118	6.35	5.28	3.54	3.73	11.0	9.18	6.16	2.14
DRN112M4	4	26	178	183	8.14	7.31	3.58	3.57	14.2	12.7	6.23	2.05
DRN132S4	5.5	36	241	251	10.7	9.87	4.07	3.64	18.6	17.2	7.09	2.09
DRN132M4	7.5	49	381	403	15.3	13.7	6.70	3.55	26.6	23.9	11.7	2.04
DRN132L4	9.2	60	439	490	18.7	16.3	9.29	3.67	32.6	28.3	16.2	2.11
DRN160M4	11	71	817	877	21.1	19.2	8.86	3.72	36.7	33.3	15.4	2.14
DRN160L4	15	97	1040	1100	28.9	25.7	13.1	3.78	50.2	44.7	22.8	2.17
DRN180M4	18.5	120	1630	1770	33.5	31.4	11.7	3.80	58.3	54.7	20.3	2.19
DRN180L4	22	142	1950	2090	38.7	37.1	11.1	3.84	67.3	64.5	19.3	2.21
DRN200L4	30	194	2660	2890	55.8	52.7	18.5	3.68	97.1	91.6	32.2	2.11
DRN225S4	37	240	4350	4580	64.0	61.9	16.5	3.85	111	108	28.8	2.22
DRN225M4	45	290	4350	4580	80.9	75.7	28.6	3.83	141	132	49.8	2.20
DRN250M4	55	355	7360	7960	106	92.3	51.4	3.84	184	161	89.4	2.21
DRN280S4	75	485	8940	9530	143	121	75.8	3.99	249	211	132	2.29
DRN280M4	90	580	12000	12600	161	153	49.9	3.80	280	266	86.9	2.21
DRN315S4	110	710	23400	24400	189	181	56.3	3.90	330	315	98.0	2.24
DRN315M4	132	850	24800	25800	228	218	67.6	3.89	397	379	118	2.24
DRN315L4	160	1030	28600	29600	273	262	76.6	3.93	474	455	133	2.26
DRN315H4	200	1280	35200	36200	357	336	120	3.82	621	585	209	2.19

1) Applies in the basic speed range up to n base.

9.6.10 DRN.. motor selection with delta/star connection type (line AC 400 V / 50 Hz)

AC 230/400 V / 50 Hz motors in star connection or AC 400/690 V / 50 Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 400 / 50Hz		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRN80M4 750 W	M_{max} Nm	13.9	16.8	16.9		16.9						
	n_{base} min^{-1}	921	837	851		851						
DRN90S4 1.1 kW	M_{max} Nm		15.8	20.7	23.8	20	23.8					
	n_{base} min^{-1}		1041	956	949	963	956					
DRN90L4 1.5 kW	M_{max} Nm			20.6	27.2	19.9	28.1	32.4				
	n_{base} min^{-1}			1062	991	1076	984	991				
DRN100LS4 2.2 kW	M_{max} Nm				25.9	18.5	26.8	34.7	47.8			
	n_{base} min^{-1}				1085	1146	1072	1005	896			
DRN100L4 3.0 kW	M_{max} Nm						27.8	36.9	51.5	68.7	72.8	
	n_{base} min^{-1}						1146	1097	1024	938	969	
DRN112M4 4.0 kW	M_{max} Nm							35.2	49.3	65.7	84.7	
	n_{base} min^{-1}							1154	1102	1037	961	
DRN132S4 5.5 kW	M_{max} Nm								49.7	66.7	86.1	126
	n_{base} min^{-1}								1148	1096	1043	932
DRN132M4 7.5 kW	M_{max} Nm									62.1	81.8	126
	n_{base} min^{-1}									1155	1113	1023
DRN132L4 9.2 kW	M_{max} Nm										81.2	128
	n_{base} min^{-1}										1150	1081
DRN160M4 11.0 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 400 V.										130
	n_{base} min^{-1}											1118
DRN160L4 15.0 kW	M_{max} Nm											127
	n_{base} min^{-1}											1171

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
AC 400 / 50Hz		**0150**	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**
DRN132M4	M_{max} Nm	161						
7.5 kW	n_{base} min^{-1}	970						
DRN132L4	M_{max} Nm	173	221		**Notice:** The data is based on a supply voltage of AC 400 V.			
9.2 kW	n_{base} min^{-1}	1018	997					
DRN160M4	M_{max} Nm	176	214					
11.0 kW	n_{base} min^{-1}	1060	1065					
DRN160L4	M_{max} Nm	174	256	330				
15.0 kW	n_{base} min^{-1}	1134	1060	997				
DRN180M4	M_{max} Nm	177	259	339	414	430		
18.5 kW	n_{base} min^{-1}	1168	1105	1047	990	1019		
DRN180L4	M_{max} Nm	179	261	343	418	504		
22.0 kW	n_{base} min^{-1}	1177	1124	1067	1014	956		
DRN200L4	M_{max} Nm		244	324	397	486	575	639
30.0 kW	n_{base} min^{-1}		1169	1132	1095	1050	1005	997
DRN225S4	M_{max} Nm			341	417	511	604	718
37.0 kW	n_{base} min^{-1}			1170	1141	1101	1057	1014
DRN225M4	M_{max} Nm				405	500	593	739
45.0 kW	n_{base} min^{-1}				1166	1144	1119	1079
DRN250M4	M_{max} Nm					473	572	722
55.0 kW	n_{base} min^{-1}					1182	1167	1143
DRN280S4	M_{max} Nm							716
75.0 kW	n_{base} min^{-1}							1170
DRN280M4	M_{max} Nm							716
90.0 kW	n_{base} min^{-1}							1194

Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
AC 400 / 50Hz		**0900**	**1100**	**1320**	**1600**	**2000**	**2500**
DRN225M4	M_{max} Nm	870	870				
45.0 kW	n_{base} 1/min	1093	1144				
DRN250M4	M_{max} Nm	959	1135	1400			
55.0 kW	n_{base} 1/min	1100	1066	1021			
DRN280S4	M_{max} Nm	970	1157	1464	1768	1790	
75.0 kW	n_{base} 1/min	1143	1118	1082	1042	1140	
DRN280M4	M_{max} Nm	950	1124	1412	1699	2090	
90.0 kW	n_{base} 1/min	1161	1133	1085	1039	975	
DRN315S4	M_{max} Nm	970	1150	1447	1600		
110.0 kW	n_{base} 1/min	1187	1166	1128	1157		
DRN315M4	M_{max} Nm	956	1137	1435	1600		
132.0 kW	n_{base} 1/min	1213	1198	1169	1210		
DRN315L4	M_{max} Nm			1442	1742	2219	2400
160.0 kW	n_{base} 1/min			1189	1166	1122	1184
DRN315H4	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 400 V.			1654	2126	2400
200.0 kW	n_{base} 1/min				1201	1181	1257

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AC 230/400 V / 50 Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 230 V / 50Hz		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRN80M4	M_{max} Nm			12.2	16.1	11.8	16.6	16.9				
750 W	n_{base} min^{-1}			1891	1765	1912	1744	1898				
DRN90S4	M_{max} Nm				15	10.8	15.5	20.2	23.8			
1.1 kW	n_{base} min^{-1}				1976	2060	1969	1877	1962			
DRN90L4	M_{max} Nm						15.2	20	27.9	32.4		
1.5 kW	n_{base} min^{-1}						2060	1997	1905	2011		
DRN100LS4	M_{max} Nm							18.7	26.6	35.7	46.2	
2.2 kW	n_{base} min^{-1}							2084	1999	1913	1810	
DRN100L4	M_{max} Nm								27.6	38	49.7	72.8
3.0 kW	n_{base} min^{-1}								2072	2011	1938	1822
DRN112M4	M_{max} Nm									36.3	47.6	72.8
4.0 kW	n_{base} min^{-1}									2074	2021	1898
DRN132S4	M_{max} Nm										48	73.9
5.5 kW	n_{base} min^{-1}										2080	1980
DRN132M4	M_{max} Nm											69.5
7.5 kW	n_{base} min^{-1}											2041

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
AC 230 V / 50Hz		0150	0220	0300	0370	0450	0550	0750
DRN112M4	M_{max} Nm	93.9						
4.0 kW	n_{base} min^{-1}	1822						
DRN132S4	M_{max} Nm	99.4	126					
5.5 kW	n_{base} min^{-1}	1887	1893					
DRN132M4	M_{max} Nm	95	139	161				
7.5 kW	n_{base} min^{-1}	1972	1851	1883				
DRN132L4	M_{max} Nm	95.4	142	187	221			
9.2 kW	n_{base} min^{-1}	2020	1925	1840	1798			
DRN160M4	M_{max} Nm	97.3	144	190	214			
11.0 kW	n_{base} min^{-1}	2062	1978	1888	1904			
DRN160L4	M_{max} Nm		142	189	233	286	330	
15.0 kW	n_{base} min^{-1}		2057	2004	1951	1883	1830	
DRN180M4	M_{max} Nm		144	192	235	289	342	424
18.5 kW	n_{base} min^{-1}		2104	2056	2013	1956	1898	1807
DRN180L4	M_{max} Nm			194	238	291	1898	428
22.0 kW	n_{base} min^{-1}			2076	2032	1980	1927	1845
DRN200L4	M_{max} Nm				221	274	326	406
30.0 kW	n_{base} min^{-1}				2088	2051	2014	1952
DRN225S4	M_{max} Nm					289	343	427
37.0 kW	n_{base} min^{-1}					2100	2071	2016
DRN225M4	M_{max} Nm							415
45.0 kW	n_{base} min^{-1}							2056

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Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**					
AC 230 V / 50Hz		**0900**	**1100**	**1320**	**1600**	**2000**	**2500**
DRN180M4 18.5 kW	M_{max} Nm	430					
	n_{base} min^{-1}	1927					
DRN180L4 22.0 kW	M_{max} Nm	504					
	n_{base} min^{-1}	1826					
DRN200L4 30.0 kW	M_{max} Nm	535	630	639			
	n_{base} min^{-1}	1854	1776	1833			
DRN225S4 37.0 kW	M_{max} Nm	562	662	718			
	n_{base} min^{-1}	1925	1853	1856			
DRN225M4 45.0 kW	M_{max} Nm	551	652	819	870	870	
	n_{base} min^{-1}	2002	1962	1893	1976	2078	
DRN250M4 55.0 kW	M_{max} Nm	527	632	804	974	1243	
	n_{base} min^{-1}	2069	2044	1999	1956	1883	
DRN280S4 75.0 kW	M_{max} Nm			805	986	1271	1587
	n_{base} min^{-1}			2044	2014	1965	1904
DRN280M4 90.0 kW	M_{max} Nm			797	964	1230	1528
	n_{base} min^{-1}			2087	2051	1987	1910
DRN315S4 110.0 kW	M_{max} Nm			812	985	1260	1566
	n_{base} min^{-1}			2109	2080	2027	1966
DRN315M4 132.0 kW	M_{max} Nm				972	1248	1555
	n_{base} min^{-1}				2127	2086	2039
DRN315L4 160.0 kW	M_{max} Nm					1252	1564
	n_{base} min^{-1}					2115	2077
DRN315H4 200.0 kW	M_{max} Nm						1477
	n_{base} min^{-1}						2115

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9.6.11 DRN.. motor selection with delta connection type (line AC 230 V / 50 Hz)

AC 230/400 V / 50 Hz motors in delta connection

Motor voltage		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in CFC operating modes (P700)								
AC 230 V / 50 Hz		**0015**	**0022**	**0037**	**0055**	**0075**	**0110**	**0150**	**0220**	**0300**
DRN80M4 750 W	M_{max} Nm	16.9			**Notice:** The data is based on a supply voltage of AC 230 V.					
	n_{base} min^{-1}	851								
DRN90S4 1.1 kW	M_{max} Nm	21.1	23.8							
	n_{base} min^{-1}	949	921							
DRN90L4 1.5 kW	M_{max} Nm	21	25.1	32.4						
	n_{base} min^{-1}	1062	1020	1055						
DRN100LS4 2.2 kW	M_{max} Nm	19.7	23.8	41.7	47.8					
	n_{base} min^{-1}	1133	1103	951	957					
DRN100L4 3.0 kW	M_{max} Nm		24.3	44.7	69.5					
	n_{base} min^{-1}		1164	1060	932					
DRN112M4 4.0 kW	M_{max} Nm			42.8	66.5	88.4				
	n_{base} min^{-1}			1125	1031	949				
DRN132S4 5.5 kW	M_{max} Nm			43.1	67.5	89.9	126			
	n_{base} min^{-1}			1166	1096	1031	938			
DRN132M4 7.5 kW	M_{max} Nm				63	85.5	126	161		
	n_{base} min^{-1}				1155	1107	1023	954		
DRN132L4 9.2 kW	M_{max} Nm					85.3	129	168	221	
	n_{base} min^{-1}					1144	1081	1023	997	
DRN160M4 11.0 kW	M_{max} Nm					87	131	170	214	
	n_{base} min^{-1}					1171	1118	1065	1065	
DRN160L4 15.0 kW	M_{max} Nm						128	169	256	306
	n_{base} min^{-1}						1171	1139	1060	1018
DRN180M4 18.5 kW	M_{max} Nm							171	259	308
	n_{base} min^{-1}							1172	1105	1071
DRN180L4 22.0 kW	M_{max} Nm							174	261	312
	n_{base} min^{-1}							1182	1124	1091
DRN200L4 30.0 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 230 V.							244	293
	n_{base} min^{-1}								1169	1148
DRN225S4 37.0 kW	M_{max} Nm									309
	n_{base} min^{-1}									1184

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9.6.12 DRN.. motor table (60 Hz) (Characteristic values for double-star/star AC 230/460 V / 60 Hz)

Motor	P_m	M_N	Mass moment of inertia J_M		Star ⅄ (AC 460 V)				Double-star ⅄⅄ (AC 230 V)			
			Without brake	with brake	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)
	kW	Nm	10^{-4} kgm²		A	A	A	Nm/A	A	A	A	Nm/A
DRN80M4	0.75	4.1	24.7	26.2	1.63	1.28	1.00	3.19	3.26	2.57	2.01	1.59
DRN90S4	1.1	6	54	58.7	2.31	1.86	1.36	3.20	4.62	3.72	2.73	1.60
DRN90L4	1.5	8.1	67.2	71.9	3.01	2.39	1.83	3.39	6.02	4.79	3.66	1.69
DRN100L4	2.2	11.9	112	118	4.17	3.46	2.32	3.44	8.34	6.93	4.64	1.72
DRN100L4	3	16.2	112	118	5.55	4.42	3.37	3.68	11.1	8.83	6.74	1.84
DRN100L4	3.7	20	112	118	7.19	5.86	4.17	3.43	14.4	11.7	8.35	1.72
DRN112M4	4	21.5	178	183	7.10	6.27	3.34	3.45	14.2	12.5	6.68	1.72
DRN132S4	5.5	29.5	241	251	9.34	8.44	4.01	3.52	18.7	16.9	8.01	1.76
DRN132M4	7.5	40.5	381	403	13.4	11.8	6.17	3.41	26.7	23.7	12.3	1.70
DRN132L4	9.2	49.5	439	461	16.5	14.3	8.33	3.46	33.1	28.6	16.7	1.73
DRN160M4	11	59	817	877	18.6	16.7	8.26	3.54	37.3	33.4	16.5	1.77
DRN160L4	15	81	1040	1100	25.0	22.0	11.9	3.66	50.1	44.0	23.8	1.83
DRN180M4	18.5	99	1630	1690	29.4	27.3	10.7	3.63	58.8	54.7	21.5	1.81
DRN180L4	22	118	1950	2090	33.9	32.4	10.2	3.64	67.9	64.7	20.5	1.82
DRN200L4	30	161	2660	2890	48.8	45.6	17.4	3.52	97.6	91.2	34.8	1.76
DRN225S4	37	198	4350	4580	55.8	53.5	15.9	3.70	112	107	31.8	1.85
DRN225M4	45	240	4350	4580	69.8	64.9	25.9	3.71	140	130	51.8	1.86
DRN250ME4	55	295	8940	9280	86.3	80.2	31.7	3.67	173	160	63.4	1.83
DRN280S4	75	400	8940	9530	125	105	67.9	3.83	250	210	136	1.91
DRN280M4	90	480	12000	12600	141	132	48.1	3.65	281	264	96.1	1.82
DRN315S4	110	590	23400	24400	165	157	52.6	3.74	331	314	105	1.87
DRN315ME4	132	700	28300	29400	200	186	72.5	3.78	400	373	145	1.89
DRN315L4	160	850	28600	29600	237	226	71.9	3.78	474	452	144	1.89
DRN315H4	185	990	35200	36200	291	271	107	3.64	582	541	214	1.82
DRN315H4	200	1070	35200	36200	311	292	107	3.65	622	584	213	1.83

1) Applies in the basic speed range up to n base.

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9.6.13 DRN.. motor selection with double-star/star connection type (line AC 460 V / 60 Hz)

AC 230/460 V / 60 Hz motors in star connection or AC 460 V / 60 Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 460 V / 60 Hz		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRN80M4 750 W	M_{max} Nm	12.3	15	17.2		17.2						
	n_{base} min^{-1}	1146	1055	984		984						
DRN90S4 1.1 kW	M_{max} Nm	12	14.7	19.4	23.8	18.7	23.8					
	n_{base} min^{-1}	1315	1266	1181	1125	1195	1139					
DRN90L4 1.5 kW	M_{max} Nm			20.1	26.4	19.4	27.2	32.4				
	n_{base} min^{-1}			1294	1223	1301	1209	1202				
DRN100L4 2.2 kW	M_{max} Nm				26.3	19	27.2	35.2	48.3			
	n_{base} min^{-1}				1316	1377	1310	1249	1140			
DRN100L4 3.0 kW	M_{max} Nm						27.7	36.6	50.9	67.9		
	n_{base} min^{-1}						1371	1322	1243	1152		
DRN100L4 3.7 kW	M_{max} Nm						24.4	33.1	46.7	62.7	81.1	
	n_{base} min^{-1}						1414	1371	1310	1231	1146	
DRN112M4 4.0 kW	M_{max} Nm						26	34.3	47.7	63.6	81.9	
	n_{base} min^{-1}						1418	1383	1324	1254	1172	
DRN132S4 5.5 kW	M_{max} Nm							34.2	48.1	64.5	83.3	126
	n_{base} min^{-1}							1436	1389	1342	1283	1154
DRN132M4 7.5 kW	M_{max} Nm									60.3	79	121
	n_{base} min^{-1}									1387	1339	1239
DRN132L4 9.2 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 460 V.									78	121
	n_{base} min^{-1}										1382	1303
DRN160M4 11.0 kW	M_{max} Nm										79.7	124
	n_{base} min^{-1}										1413	1345
DRN160L4 15.0 kW	M_{max} Nm											124
	n_{base} min^{-1}											1413
DRN180M4 18.5 kW	M_{max} Nm											125
	n_{base} min^{-1}											1441

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
AC 460 V / 60 Hz		**0150**	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**
DRN132M4 7.5 kW	M_{max} Nm	149						
	n_{base} min^{-1}	1202						
DRN132L4 9.2 kW	M_{max} Nm	164	213		**Notice:** The data is based on a supply voltage of AC 460 V.			
	n_{base} min^{-1}	1223	1160					
DRN160M4 11.0 kW	M_{max} Nm	167	183					
	n_{base} min^{-1}	1276	1387					
DRN160L4 15.0 kW	M_{max} Nm	170	249	306				
	n_{base} min^{-1}	1371	1292	1260				
DRN180M4 18.5 kW	M_{max} Nm	170	247	324	395	407		
	n_{base} min^{-1}	1403	1336	1264	1196	1230		
DRN180L4 22.0 kW	M_{max} Nm	171	249	326	397	485	490	
	n_{base} min^{-1}	1417	1355	1292	1235	1158	1172	
DRN200L4 30.0 kW	M_{max} Nm		235	311	381	466	552	562
	n_{base} min^{-1}		1411	1370	1333	1284	1230	1292
DRN225S4 37.0 kW	M_{max} Nm		249	328	401	491	580	679
	n_{base} min^{-1}		1435	1395	1359	1308	1257	1213
DRN225M4 45.0 kW	M_{max} Nm			320	395	486	577	717
	n_{base} min^{-1}			1428	1406	1373	1341	1282
DRN250ME4 55.0 kW	M_{max} Nm				384	476	566	706
	n_{base} min^{-1}				1444	1420	1392	1353
DRN280S4 75.0 kW	M_{max} Nm						544	700
	n_{base} min^{-1}						1426	1408
DRN280M4 90.0 kW	M_{max} Nm						547	689
	n_{base} min^{-1}						1453	1429
DRN315S4 110.0 kW	M_{max} Nm							703
	n_{base} min^{-1}							1436

Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**					
AC 460 V / 60 Hz		**0900**	**1100**	**1320**	**1600**	**2000**	**2500**
DRN225M4 45.0 kW	M_{max} Nm	867	867				
	n_{base} 1/min	1257	1279				
DRN250ME4 55.0 kW	M_{max} Nm	928	1094				
	n_{base} 1/min	1283	1231				
DRN280S4 75.0 kW	M_{max} Nm	941	1119	1412	1703		
	n_{base} 1/min	1377	1353	1313	1274		
DRN280M4 90.0 kW	M_{max} Nm	913	1080	1356	1631		
	n_{base} 1/min	1386	1356	1301	1243		
DRN315S4 110.0 kW	M_{max} Nm	934	1105	1389	1600		
	n_{base} 1/min	1406	1383	1339	1327		
DRN315ME4 132.0 kW	M_{max} Nm	923	1099	1389	1600		
	n_{base} 1/min	1456	1441	1415	1433		
DRN315L4 150.0 kW	M_{max} Nm	926	1102	1393	1682	2141	2400
	n_{base} 1/min	1456	1441	1415	1386	1333	1368
DRN315L4 160.0 kW	M_{max} Nm		1101	1391	1679	2137	2400
	n_{base} 1/min		1444	1418	1386	1336	1368
DRN315H4 185.0 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 460 V.		1310	1593	2040	2400
	n_{base} 1/min			1462	1447	1424	1450
DRN315H4 200.0 kW	M_{max} Nm			1313	1597	2045	2400
	n_{base} 1/min			1465	1450	1424	1456
DRN315H4 225.0 kW	M_{max} Nm				1600	2049	2400
	n_{base} 1/min				1453	1427	1462

AC 230/460 V / 60 Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**										
AC 230 V / 60 Hz		**0005**	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**
DRN80M4 750 W	M_{max} Nm			9.34	12.3	9	12.7	16.4				
	n_{base} min^{-1}			2749	2623	2763	2602	2440				
DRN90S4 1.1 kW	M_{max} Nm				12	8.56	12.5	16.2	22.4			
	n_{base} min^{-1}				2812	2890	2805	2721	2588			
DRN90L4 1.5 kW	M_{max} Nm						12.5	16.7	23.3	31.1		
	n_{base} min^{-1}						2890	2827	2735	2637		
DRN100L4 2.2 kW	M_{max} Nm							16.2	23.1	31.2	40.4	
	n_{base} min^{-1}							2901	2828	2742	2645	
DRN100L4 3.0 kW	M_{max} Nm								23.1	32.2	42.4	65.1
	n_{base} min^{-1}								2882	2821	2748	2596
DRN100L4 3.7 kW	M_{max} Nm									28.8	38.6	60.1
	n_{base} min^{-1}									2888	2828	2700
DRN112M4 4.0 kW	M_{max} Nm									30.2	39.7	61
	n_{base} min^{-1}									2889	2830	2701
DRN132S4 5.5 kW	M_{max} Nm										39.8	61.8
	n_{base} min^{-1}										2906	2812
DRN132M4 7.5 kW	M_{max} Nm											57.6
	n_{base} min^{-1}											2858

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
AC 230 V / 60 Hz		0150	0220	0300	0370	0450	0550	0750
DRN100L4 3.7 kW	M_{max} Nm	81.1						
	n_{base} min^{-1}	2578						
DRN112M4 4.0 kW	M_{max} Nm	81.9						
	n_{base} min^{-1}	2578						
DRN132S4 5.5 kW	M_{max} Nm	83.3	121					
	n_{base} min^{-1}	2719	2561					
DRN132M4 7.5 kW	M_{max} Nm	79	116	149				
	n_{base} min^{-1}	2779	2642	2500				
DRN132L4 9.2 kW	M_{max} Nm	78	116	153	187	213		
	n_{base} min^{-1}	2832	2721	2610	2510	2484		
DRN160M4 11.0 kW	M_{max} Nm	79.7	118	156	183			
	n_{base} min^{-1}	2879	2790	2695	2658			
DRN160L4 15.0 kW	M_{max} Nm		119	159	196	240	285	306
	n_{base} min^{-1}		2890	2832	2774	2700	2626	2753
DRN180M4 18.5 kW	M_{max} Nm		119	159	195	239	283	352
	n_{base} min^{-1}		2940	2888	2835	2768	2700	2599
DRN180L4 22.0 kW	M_{max} Nm			160	196	240	285	353
	n_{base} min^{-1}			2902	2859	2801	2743	2647
DRN200L4 30.0 kW	M_{max} Nm				183	227	271	338
	n_{base} min^{-1}				2920	2879	2842	2781
DRN225S4 37.0 kW	M_{max} Nm					240	286	356
	n_{base} min^{-1}					2914	2874	2812
DRN225M4 45.0 kW	M_{max} Nm						276	349
	n_{base} min^{-1}						2914	2877

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Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
		0900	1100	1320	1600	2000	2500
DRN180M4 18.5 kW	M_{max} Nm	407					
	n_{base} min^{-1}	2614					
DRN180L4 22.0 kW	M_{max} Nm	463	490				
	n_{base} min^{-1}	2489	2513				
DRN200L4 30.0 kW	M_{max} Nm	445	525	562			
	n_{base} min^{-1}	2678	2596	2691			
DRN225S4 37.0 kW	M_{max} Nm	468	552	679			
	n_{base} min^{-1}	2706	2619	2474			
DRN225M4 45.0 kW	M_{max} Nm	463	548	689	830	867	
	n_{base} min^{-1}	2808	2754	2659	2558	2634	
DRN250ME4 55.0 kW	M_{max} Nm	453	538	678	817	1039	
	n_{base} min^{-1}	2600	2600	2600	2600	2575	
DRN280S4 75.0 kW	M_{max} Nm			668	820	1060	1324
	n_{base} min^{-1}			2600	2600	2600	2600
DRN280M4 90.0 kW	M_{max} Nm			660	801	1024	1273
	n_{base} min^{-1}			2600	2600	2600	2600
DRN315S4 110.0 kW	M_{max} Nm			673	818	1048	1304
	n_{base} min^{-1}			2500	2500	2500	2500
DRN315ME4 132.0 kW	M_{max} Nm				804	1041	1302
	n_{base} min^{-1}				2500	2500	2500
DRN315L4 150.0 kW	M_{max} Nm					1043	1306
	n_{base} min^{-1}					2500	2500
DRN315L4 160.0 kW	M_{max} Nm					1042	1304
	n_{base} min^{-1}					2500	2500
DRN315H4 185.0 kW	M_{max} Nm						1223
	n_{base} min^{-1}						2500
DRN315H4 200.0 kW	M_{max} Nm						1227
	n_{base} min^{-1}						2500

9.6.14 DRN.. motor selection with double-star connection type (line AC 230 V / 60 Hz)

AC 230/460 V / 60 Hz motors in delta connection

Motor voltage		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in CFC operating modes (P700)								
AC 230 V / 60 Hz		**0015**	**0022**	**0037**	**0055**	**0075**	**0110**	**0150**	**0220**	**0300**
DRN80M4 750 W	M_{max} Nm	17.1			**Notice:** The data is based on a supply voltage of AC 230 V.					
	n_{base} min^{-1}	977								
DRN90S4 1.1 kW	M_{max} Nm	17	20.2							
	n_{base} min^{-1}	1223	1167							
DRN90L4 1.5 kW	M_{max} Nm	17.5	20.9	32.4						
	n_{base} min^{-1}	1322	1287	1223						
DRN100L4 2.2 kW	M_{max} Nm	17	20.7	36.5						
	n_{base} min^{-1}	1395	1365	1237						
DRN100L4 3.0 kW	M_{max} Nm			38	59.4	71.5				
	n_{base} min^{-1}			1316	1200	1182				
DRN100L4 3.7 kW	M_{max} Nm			34.4	54.8	73.2				
	n_{base} min^{-1}			1365	1268	1182				
DRN112M4 4.0 kW	M_{max} Nm			35.7	55.7	74.1				
	n_{base} min^{-1}			1377	1289	1207				
DRN132S4 5.5 kW	M_{max} Nm			35.6	56.3	75.3	110	128		
	n_{base} min^{-1}			1430	1365	1307	1201	1189		
DRN132M4 7.5 kW	M_{max} Nm				52.1	71.1	105	136		
	n_{base} min^{-1}				1408	1361	1276	1197		
DRN132L4 9.2 kW	M_{max} Nm					69.6	105	137	206	
	n_{base} min^{-1}					1397	1329	1271	1144	
DRN160M4 11.0 kW	M_{max} Nm					71.2	108	140	183	
	n_{base} min^{-1}					1424	1371	1318	1334	
DRN160L4 15.0 kW	M_{max} Nm						107	142	215	257
	n_{base} min^{-1}						1429	1397	1324	1281
DRN180M4 18.5 kW	M_{max} Nm							142	214	255
	n_{base} min^{-1}							1427	1365	1326
DRN180L4 22.0 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 230 V.						143	215	257
	n_{base} min^{-1}							1437	1384	1350
DRN200L4 30.0 kW	M_{max} Nm								202	243
	n_{base} min^{-1}								1431	1407
DRN225S4 37.0 kW	M_{max} Nm									257
	n_{base} min^{-1}									1431

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9.6.15 Motor table DRE.. series AC motors (characteristic values with delta/star connection AC 230/400 V / 50 Hz)

Motor	P_m	M_N	Mass moment of inertia J_M		Star ⅄ (AC 400 V)				Delta △ (AC 230 V)			
			Without brake	with brake	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)
	kW	Nm	10^{-4} kgm²		A	A	A	Nm/A	A	A	A	Nm/A
DRE80M4	0.75	5	21.5	23	1.68	1.37	0.98	3.66	2.91	2.37	1.69	2.11
DRE90M4	1.1	7.4	35.5	40	2.45	2.15	1.18	3.45	4.24	3.72	2.04	1.99
DRE90L4	1.5	10	43.5	48.5	3.35	2.64	2.06	3.78	5.80	4.58	3.56	2.18
DRE100M4	2.2	14.7	56	62	4.6	4.16	1.96	3.53	8.0	7.21	3.40	2.04
DRE100LC4	3	19.7	90	96	6.2	5.52	2.81	3.57	10.7	9.57	4.87	2.06
DRE112M4	3	19.7	146	151	6	5.51	2.38	3.58	10.4	9.54	4.12	2.07
DRE132S4	4	26	190	195	8	7.35	3.17	3.54	13.9	12.7	5.5	2.04
DRE132M4	5.5	36	255	265	10.5	9.91	3.48	3.63	18.2	17.2	6.0	2.10
DRE132MC4	7.5	48.5	340	355	14.8	13.4	6.31	3.62	25.6	23.2	10.9	2.09
DRE160S4	7.5	49	370	390	14.7	13.3	6.29	3.68	25.5	23.0	10.9	2.13
DRE160M4	9.2	60	450	500	18.3	16.2	8.41	3.70	31.7	28.1	14.6	2.13
DRE160MC4	11	71	590	640	21.5	20.1	8.10	3.53	37	34.9	14.0	2.04
DRE180S4	11	71	895	955	21	18.7	9.26	3.79	36	32.5	16.0	2.19
DRE180M4	15	97	1110	1170	28	25.9	10.4	3.75	48	44.8	18.1	2.17
DRE180L4	18.5	120	1300	1440	34	31.2	14.1	3.85	59	54.0	24.4	2.22
DRE180LC4	22	142	1680	1815	42	36.3	20.8	3.91	73	62.8	36.0	2.26
DRE200L4	30	194	2360	2500	57	53.6	19.4	3.62	99	92.8	33.6	2.09
DRE225S4	37	240	2930	3160	70	65.1	25.7	3.69	121	113	44.5	2.13
DRE225M4	45	290	3430	3660	84	78.3	30.5	3.70	145	136	52.9	2.14
DRE315K4	110	708	18400	19500	196	183	69.6	3.86	340	317	121	2.23
DRE315S4	132	850	22500	23600	230	208	95.6	4.08	425	360	166	2.36
DRE315M4	160	1030	27900	29000	275	260	88.8	3.96	480	451	154	2.28
DRE315L4	200	1289	31900	33000	345	328	106	3.93	–	–	–	–

1) Applies in the basic speed range up to n base.

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9.6.16 DRE.. motor selection with delta/star connection type (line AC 400 V / 50 Hz)

AC 230/400 V / 50 Hz motors in star connection or AC 400/690 V / 50 Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 400 / 50Hz		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRE80S4 370 W	M_{max} Nm	7.14										
	n_{base} min^{-1}	879										
DRE80M4 550 W	M_{max} Nm	12.4										
	n_{base} min^{-1}	851										
DRE80M4 750 W	M_{max} Nm	13.7	15.5			15.5						
	n_{base} min^{-1}	872	816			823						
DRE90M4 1.1 kW	M_{max} Nm	13.3	16.2	21.2		20.5						
	n_{base} min^{-1}	1027	956	851		865						
DRE90L4 1.5 kW	M_{max} Nm			21	27.6	20.3	28.5	34.1				
	n_{base} min^{-1}			1020	928	1027	914	844				
DRE100M4 2.2 kW	M_{max} Nm				27.5	20	28.4	36.7	48.7			
	n_{base} min^{-1}				1027	1111	1012	928	795			
DRE112M4 2.2 kW	M_{max} Nm				27.8	20.3	28.7	36.9	50.5	51.6		
	n_{base} min^{-1}				1061	1119	1055	990	885	902		
DRE100LC4 3.0 kW	M_{max} Nm						27.6	36.0	49.6	65.0		
	n_{base} min^{-1}						1139	1083	998	907		
DRE112M4 3.0 kW	M_{max} Nm						27.9	36.1	49.5			
	n_{base} min^{-1}						1084	1025	932			
DRE132S4 4.0 kW	M_{max} Nm							35.5	49.2	65.3	83.7	
	n_{base} min^{-1}							1125	1072	1002	926	
DRE132M4 5.5 kW	M_{max} Nm								49.7	66.2	85.2	112
	n_{base} min^{-1}								1137	1072	996	914
DRE132MC4 7.5 kW	M_{max} Nm									62.6	81.9	125
	n_{base} min^{-1}									1143	1102	1014
DRE160S4 7.5 kW	M_{max} Nm									63.8	82.8	122
	n_{base} min^{-1}									1139	1092	1002
DRE160M4 9.2 kW	M_{max} Nm										81.3	125
	n_{base} min^{-1}										1139	1065
DRE160MC4 11.0 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 400 V.										125
	n_{base} min^{-1}											1107
DRE180S4 11.0 kW	M_{max} Nm										83.2	129
	n_{base} min^{-1}										1187	1123
DRE180M4 15.0 kW	M_{max} Nm											130
	n_{base} min^{-1}											1171

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage AC 400 / 50Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
		0150	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**
DRE132MC4 7.5 kW	M_{max} Nm	156						
	n_{base} min^{-1}	973						
DRE160S4 7.5 kW	M_{max} Nm	122						
	n_{base} min^{-1}	1071						
DRE160M4 9.2 kW	M_{max} Nm	169	179					
	n_{base} min^{-1}	991	1060					
DRE160MC4 11.0 kW	M_{max} Nm	168	199		**Notice:** The data is based on a supply voltage of AC 400 V.			
	n_{base} min^{-1}	1049	1086					
DRE180S4 11.0 kW	M_{max} Nm	174	207					
	n_{base} min^{-1}	1055	1065					
DRE180M4 15.0 kW	M_{max} Nm	176	255					
	n_{base} min^{-1}	1123	1039					
DRE180L4 18.5 kW	M_{max} Nm	174	254	334	361			
	n_{base} min^{-1}	1155	1086	1018	1034			
DRE180LC4 22.0 kW	M_{max} Nm	166	244	320	391	397		
	n_{base} min^{-1}	1181	1123	1060	1007	1044		
DRE200L4 30.0 kW	M_{max} Nm		239	317	388	475	505	505
	n_{base} min^{-1}		1157	1120	1079	1034	1062	1099
DRE225S4 37.0 kW	M_{max} Nm			315	388	477	565	702
	n_{base} min^{-1}			1161	1132	1095	1062	1005
DRE225M4 45.0 kW	M_{max} Nm				391	484	576	718
	n_{base} min^{-1}				1161	1136	1103	1058
DRE250M4 55.0 kW	M_{max} Nm					476	572	719
	n_{base} min^{-1}					1170	1149	1118
DRE280S4 75.0 kW	M_{max} Nm						562	709
	n_{base} min^{-1}						1191	1170

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Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage AC 400 / 50Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
		0900	**1100**	**1320**	**1600**	**2000**	**2500**
DRE225M4 45.0 kW	M_{max} Nm	843					
	n_{base} min^{-1}	1062					
DRE250M4 55.0 kW	M_{max} Nm	952	1125	1200			
	n_{base} min^{-1}	1060	1018	1051			
DRE280S4 75.0 kW	M_{max} Nm	942	1115	1200	1200		
	n_{base} min^{-1}	1136	1109	1194	1280		
DRE280M4 90.0 kW	M_{max} Nm	945	1129	1200	1200	1200	
	n_{base} min^{-1}	1155	1133	1277	1411	1472	
DRE315K4 110.0 kW	M_{max} Nm	936	1107	1392	1600	1600	
	n_{base} min^{-1}	1160	1140	1102	1093	1184	
DRE315S4 132.0 kW	M_{max} Nm	955	1136	1433	1600	1600	
	n_{base} min^{-1}	1189	1175	1148	1192	1362	
DRE315M4 160.0 kW	M_{max} Nm		1128	1423	1715	2181	2400
	n_{base} min^{-1}		1198	1169	1143	1096	1128
DRE315L4 200.0 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 400 V.		1432	1731	2205	2400
	n_{base} min^{-1}			1204	1181	1137	1195

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AC 230/400 V / 50Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0008-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 230 V / 50Hz		**0005**	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**
DRE80S4	M_{max} Nm	5.14										
250 W	n_{base} min^{-1}	1934										
DRE80S4	M_{max} Nm	7.14	7.14	7.14		7.14						
370 W	n_{base} min^{-1}	1849	1976	2011		2011						
DRE80M4	M_{max} Nm	8.00	9.76	12.4	12.4	12.4	12.4					
550 W	n_{base} min^{-1}	1941	1863	1758	1934	1744	1941					
DRE80M4	M_{max} Nm		9.16	12.1	15.5	11.7	15.5	15.5				
750 W	n_{base} min^{-1}		1976	1863	1737	1877	1765	1884				
DRE90M4	M_{max} Nm				15.5	11.3	16	20.7				
1.1 kW	n_{base} min^{-1}				1898	2011	1884	1765				
DRE90L4	M_{max} Nm						15.6	20.4	28.3	34.1		
1.5 kW	n_{base} min^{-1}						2039	1955	1821	1793		
DRE100M4	M_{max} Nm							20.2	28.2	37.7	48.6	
2.2 kW	n_{base} min^{-1}							2053	1948	1828	1688	
DRE112M4	M_{max} Nm							20.5	28.5	38	48.9	
2.2 kW	n_{base} min^{-1}							2016	1928	1828	1717	
DRE100LC4	M_{max} Nm								27.4	37	48	65.0
3.0 kW	n_{base} min^{-1}								2081	2004	1927	1905
DRE112M4	M_{max} Nm								27.7	37.1	47.9	59.1
3.0 kW	n_{base} min^{-1}								1975	1881	1781	1734
DRE132S4	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 400 V.								36.5	47.5	72.3
4.0 kW	n_{base} min^{-1}									2021	1963	1828
DRE132M4	M_{max} Nm										48.1	73.2
5.5 kW	n_{base} min^{-1}										2068	1934
DRE132MC4	M_{max} Nm											69.8
7.5 kW	n_{base} min^{-1}											2021
DRE160S4	M_{max} Nm											70.9
7.5 kW	n_{base} min^{-1}											2020

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**						
AC 230 V / 50Hz		**0150**	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**
DRE132S4 4.0 kW	M_{max} Nm	83.7						
	n_{base} min^{-1}	1863						
DRE132M4 5.5 kW	M_{max} Nm	98.2	112					
	n_{base} min^{-1}	1805	1816					
DRE132MC4 7.5 kW	M_{max} Nm	94.9	138	156	**Notice:** The data is based on a supply voltage of AC 400 V.			
	n_{base} min^{-1}	1951	1828	1887				
DRE160S4 7.5 kW	M_{max} Nm	95.7	122	122				
	n_{base} min^{-1}	1935	1946	2062				
DRE160M4 9.2 kW	M_{max} Nm	94.6	139	179	179	179		
	n_{base} min^{-1}	2009	1904	1809	1983	2025		
DRE160MC4 11.0 kW	M_{max} Nm	93.5	138	182	199	199		
	n_{base} min^{-1}	2036	1951	1867	1925	2004		
DRE180S4 11.0 kW	M_{max} Nm	97.1	143	188	207	207		
	n_{base} min^{-1}	2083	1993	1893	1935	2030		
DRE180M4 15.0 kW	M_{max} Nm		144	190	232	284		
	n_{base} min^{-1}		2062	1993	1930	1851		
DRE180L4 18.5 kW	M_{max} Nm		141	188	231	284	336	361
	n_{base} min^{-1}		2104	2046	1999	1930	1867	1935
DRE180LC4 22.0 kW	M_{max} Nm			180	222	272	322	397
	n_{base} min^{-1}			2078	2030	1972	1914	1819
DRE200L4 30.0 kW	M_{max} Nm				217	268	319	397
	n_{base} min^{-1}				2067	2030	1993	1932
DRE225S4 37.0 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 400 V.					317	398
	n_{base} min^{-1}						2051	2006
DRE225M4 45.0 kW	M_{max} Nm							402
	n_{base} min^{-1}							2051

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Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage AC 230 V / 50Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
		0900	**1100**	**1320**	**1600**	**2000**	**2500**
DRE180L4 18.5 kW	M_{max} Nm	361					
	n_{base} min^{-1}	1999					
DRE180LC4 22.0 kW	M_{max} Nm	397					
	n_{base} min^{-1}	1956					
DRE200L4 30.0 kW	M_{max} Nm	505	505	505			
	n_{base} min^{-1}	1858	1977	2051			
DRE225S4 37.0 kW	M_{max} Nm	525	620	718			
	n_{base} min^{-1}	1932	1874	1866			
DRE225M4 45.0 kW	M_{max} Nm	534	633	796			
	n_{base} min^{-1}	1989	1940	1862			
DRE250M4 55.0 kW	M_{max} Nm	529	631	800	966	1200	1200
	n_{base} min^{-1}	2051	2017	1959	1898	1807	1916
DRE280S4 75.0 kW	M_{max} Nm		621	790	956	1200	1200
	n_{base} min^{-1}		2081	2048	2011	1950	2218
DRE280M4 90.0 kW	M_{max} Nm			780	960	1200	1200
	n_{base} min^{-1}			2066	2038	2023	2377
DRE315K4 110.0 kW	M_{max} Nm			784	950	1213	1507
	n_{base} min^{-1}			2071	2039	1986	1922
DRE315S4 132.0 kW	M_{max} Nm				970	1246	1553
	n_{base} min^{-1}				2083	2048	2007
DRE315M4 160.0 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 400 V.				1238	1542
	n_{base} min^{-1}					2086	2042
DRE315L4 200.0 kW	M_{max} Nm						1554
	n_{base} min^{-1}						2098

9.6.17 DRE.. motor selection in delta connection type (line AC 230 V / 50 Hz)

AC 230/400 V / 50 Hz motors in delta connection

Motor voltage		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in CFC operating modes (P700)								
AC 230 V / 50 Hz		0015	0022	0037	0055	0075	0110	0150	0220	0300
DRE80M4 750 W	M_{max} Nm	15.5								
	n_{base} min^{-1}	823								
DRE90M4 1.1 kW	M_{max} Nm	21.6								
	n_{base} min^{-1}	844								
DRE90L4 1.5 kW	M_{max} Nm	21.4	25.5	34.1						
	n_{base} min^{-1}	1012	956	858						
DRE100M4 2.2 kW	M_{max} Nm	21.2	25.4	43.9						
	n_{base} min^{-1}	1097	1048	844						
DRE112M4 2.2 kW	M_{max} Nm	21.4	25.6	44.2	51.6					
	n_{base} min^{-1}	1113	1078	932	902					
DRE100LC4 3.0 kW	M_{max} Nm		24.4	43.3	65					
	n_{base} min^{-1}		1160	1041	914					
DRE112M4 3.0 kW	M_{max} Nm		24.9	43.2	59.1					
	n_{base} min^{-1}		1107	973	879					
DRE132S4 4.0 kW	M_{max} Nm			42.8	66.1	83.7				
	n_{base} min^{-1}			1096	996	938				
DRE132M4 5.5 kW	M_{max} Nm			43.3	67	88.8	112			
	n_{base} min^{-1}			1160	1066	984	914			
DRE132MC4 7.5 kW	M_{max} Nm				63.4	85.6	126	156		
	n_{base} min^{-1}				1143	1096	1008	961		
DRE160S4 7.5 kW	M_{max} Nm				64.7	86.5	122	122		
	n_{base} min^{-1}				1139	1081	1002	1065		
DRE160M4 9.2 kW	M_{max} Nm					85	126	163	179	
	n_{base} min^{-1}					1134	1065	1002	1060	
DRE160MC4 11.0 kW	M_{max} Nm					83.8	126	163	199	
	n_{base} min^{-1}					1160	1107	1055	1086	
DRE180S4 11.0 kW	M_{max} Nm					87.2	130	169	207	
	n_{base} min^{-1}					1181	1123	1065	1065	
DRE180M4 15.0 kW	M_{max} Nm						130	170	255	
	n_{base} min^{-1}						1171	1129	1039	
DRE180L4 18.5 kW	M_{max} Nm	**Notice:** The data is based on a supply voltage of AC 230 V.						168	254	303
	n_{base} min^{-1}							1160	1086	1044
DRE180LC4 22.0 kW	M_{max} Nm							161	244	291
	n_{base} min^{-1}							1187	1123	1086
DRE200L4 30.0 kW	M_{max} Nm								239	287
	n_{base} min^{-1}								1157	1132
DRE225S4 37.0 kW	M_{max} Nm									285
	n_{base} min^{-1}									1169

9.6.18 Motor table DRE.. series AC motors (characteristic values with delta/star connection AC 230/460 V / 60 Hz)

Motor	P_m	M_N	Mass moment of inertia J_M		Star ⅄ (AC 460 V)				Double-star ⅄ (AC 230 V)			
			Without brake	with brake	I_n	I_{q_n} [1)]	I_{d_n} [1)]	c_T [1)]	I_n	I_{q_n} [1)]	I_{d_n} [1)]	c_T [1)]
	kW	Nm	10^{-4} kgm^2		A	A	A	Nm/A	A	A	A	Nm/A
DRE80M4	0.75	4.1	21.5	23	1.44	1.15	0.86	3.56	2.88	2.31	1.73	1.78
DRE90M4	1.1	6	35.5	40	2.30	1.83	1.39	3.27	4.60	3.67	2.77	1.63
DRE90L4	1.5	8.2	43.5	48.5	2.80	2.14	1.80	3.83	5.60	4.28	3.61	1.91
DRE100L4	2.2	12.1	68	74	4.00	3.39	2.12	3.57	8.0	6.8	4.25	1.78
DRE100LC4	3	16.3	89.8	95.8	5.40	5.14	2.58	3.17	10.8	10.3	5.16	1.59
DRE100LC4	3.7	20	89.8	95.8	6.40	5.85	2.60	3.42	12.8	11.7	5.20	1.71
DRE112M4	3.7	20	146	151	6.30	5.96	2.04	3.35	12.6	11.9	4.07	1.68
DRE132S4	4	21.6	190	195	7.90	6.36	2.79	3.39	15.8	12.7	5.59	1.70
DRE132M4	5.5	30	255	265	9.00	8.57	2.74	3.50	18.0	17.1	5.49	1.75
DRE132MC4	7.5	40.5	340	355	12.9	11.5	5.93	3.54	25.8	22.9	11.9	1.77
DRE160S4	7.5	40.5	370	390	12.7	11.4	5.66	3.56	25.4	22.7	11.3	1.78
DRE160M4	9.2	49.5	450	500	15.4	14.0	6.52	3.55	30.8	27.9	13.0	1.77
DRE160MC4	11	59	590	640	18.3	16.8	7.28	3.51	36.6	33.6	14.6	1.76
DRE180S4	11	59	900	960	17.9	16.3	7.36	3.62	35.8	32.6	14.7	1.81
DRE180M4	15	81	1110	1170	24.0	22.1	8.86	3.67	48.0	44.2	17.7	1.83
DRE180L4	18.5	100	1300	1440	30.0	27.0	12.7	3.71	60.0	54.0	25.3	1.85
DRE180LC4	22	118	1790	1930	35.5	33.2	12.6	3.56	71.0	66.4	25.2	1.78
DRE200L4	30	161	2360	2500	49.5	45.4	19.0	3.54	99.0	90.9	38.0	1.77
DRE225S4	37	199	2930	3160	59.0	57.2	15.1	3.48	118	114	30.3	1.74
DRE225M4	45	240	3430	3660	71.0	66.5	24.4	3.61	142	133	48.7	1.80
DRE315K4	110	590	18400	19500	169	157	63.2	3.76	338	314	126	1.88
DRE315S4	132	707	22500	23600	205	202	43.4	3.49	410	405	87	1.75
DRE315S4	150	900	22500	23600	225	218	61.2	4.14	450	435	122	2.07
DRE315M4	160	856	27900	29000	240	232	60.7	3.69	480	464	121	1.84
DRE315M4	185	990	27900	29000	275	264	81.0	3.75	550	528	162	1.87
DRE315L4	200	1070	31900	33000	295	287	74	3.73	–	–	–	–
DRE315L4	225	1205	31900	33000	335	325	73	3.71	–	–	–	–

1) Applies in the basic speed range up to n base.

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9.6.19 DRE.. motor selection in double-star/star connection type (line AC 460 V / 60 Hz)

AC 230/460 V / 60 Hz motors in star connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**										
AC 460 V / 60 Hz		**0005**	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**
DRE80M4 550 W	M_{max} Nm	11.7										
	n_{base} min^{-1}	1012										
DRE80M4 750 W	M_{max} Nm	13.2	14.4			14.4	**Notice:** The data is based on a line voltage of AC 460 V.					
	n_{base} min^{-1}	1034	991			991						
DRE80S4 750 W	M_{max} Nm	11.3	11.3			11.3						
	n_{base} min^{-1}	1020	1020			1034						
DRE80M4 1.1 kW	M_{max} Nm	13	15.8	19.4		19.4						
	n_{base} min^{-1}	1188	1104	998		998						
DRE90M4 1.1 kW	M_{max} Nm	12.5	15.2	20	22.9	19.3	22.9					
	n_{base} min^{-1}	1273	1209	1097	1062	1111	1062					
DRE90L4 1.5 kW	M_{max} Nm		15.5	20.4	26.6	19.7	27.5					
	n_{base} min^{-1}		1294	1209	1097	1223	1083					
DRE90M4 1.5 kW	M_{max} Nm		15.4	20.1	25.1	19.5	25.1	25.1				
	n_{base} min^{-1}		1230	1118	1005	1132	1012	1034				
DRE100L4 2.2 kW	M_{max} Nm			20.3	26.6	19.6	27.5	35.4				
	n_{base} min^{-1}			1329	1252	1336	1245	1153				
DRE90L4 2.2 kW	M_{max} Nm				26.4	19.4	27.3	35				
	n_{base} min^{-1}				1195	1301	1181	1069				
DRE100LC4 3 kW	M_{max} Nm						27	35	48.3	64		
	n_{base} min^{-1}						1357	1301	1209	1104		
DRE100M4 3 kW	M_{max} Nm						26.2	34	46.8			
	n_{base} min^{-1}						1308	1223	1090			
DRE112M4 3 kW	M_{max} Nm						27.5	35.5	48.6	56.6		
	n_{base} min^{-1}						1301	1230	1125	1084		
DRE100L4 3.7 kW	M_{max} Nm						27.1	36	50.2	67	74.2	
	n_{base} min^{-1}						1364	1308	1223	1118	1125	
DRE100LC4 3.7 kW	M_{max} Nm						26.9	35	48.1	62.6	62.6	
	n_{base} min^{-1}						1371	1315	1223	1132	1216	
DRE112M4 3.7 kW	M_{max} Nm						27.9	36.2	49.9	56.5	56.5	
	n_{base} min^{-1}						1324	1266	1172	1172	1219	
DRE132S4 3.7 kW	M_{max} Nm						28	36.2	49.6	65.6	76.1	
	n_{base} min^{-1}						1389	1342	1266	1172	1143	
DRE132S4 4 kW	M_{max} Nm						26.4	34.5	47.6	63.1	81.1	
	n_{base} min^{-1}						1395	1354	1289	1213	1125	
DRE112M4 4.5 kW	M_{max} Nm							31.7	43.8	58.1	64.2	64.2
	n_{base} min^{-1}							1295	1207	1102	1084	1119
DRE132M4 5.5 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 460 V.						35.1	48.7	64.7	83.3	89.8
	n_{base} min^{-1}							1418	1354	1283	1201	1248
DRE132S4 5.5 kW	M_{max} Nm								46.9	62.7	80.9	93
	n_{base} min^{-1}								1330	1266	1189	1225
DRE132M4 7.5 kW	M_{max} Nm								46.2	62.5	81.2	123
	n_{base} min^{-1}								1389	1336	1277	1154
DRE132MC4 7.5 kW	M_{max} Nm								46.2	62.6	81.5	124
	n_{base} min^{-1}								1400	1365	1324	1225
DRE160S4 7.5 kW	M_{max} Nm								46	61.9	80.2	117
	n_{base} min^{-1}								1403	1355	1303	1208
DRE132MC4 9.2 kW	M_{max} Nm									60.9	80.1	123
	n_{base} min^{-1}									1389	1348	1260

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Motor voltage AC 460 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRE160M4 9.2 kW	M_{max} Nm									61.7	80.4	122
	n_{base} min^{-1}									1397	1350	1250
DRE160S4 9.2 kW	M_{max} Nm									60.9	79.3	121
	n_{base} min^{-1}									1387	1339	1229
DRE160M4 11 kW	M_{max} Nm										79.1	121
	n_{base} min^{-1}										1376	1292
DRE160MC4 11 kW	M_{max} Nm										79.5	122
	n_{base} min^{-1}										1387	1313
DRE180S4 11 kW	M_{max} Nm										81.9	126
	n_{base} min^{-1}										1397	1313
DRE160MC4 15 kW	M_{max} Nm											117
	n_{base} min^{-1}											1366
DRE180M4 15 kW	M_{max} Nm											126
	n_{base} min^{-1}											1387
DRE180S4 15 kW	M_{max} Nm											123
	n_{base} min^{-1}											1376
DRE180L4 18.5 kW	M_{max} Nm											123
	n_{base} min^{-1}											1434
DRE180M4 18.5 kW	M_{max} Nm											123
	n_{base} min^{-1}											1419

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**						
AC 460 V / 60 Hz		**0150**	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**
DRE132M4 7.5 kW	M_{max} Nm	139						
	n_{base} min^{-1}	1154						
DRE132MC4 7.5 kW	M_{max} Nm	149						
	n_{base} min^{-1}	1225						
DRE160S4 7.5 kW	M_{max} Nm	117			**Notice:** The data is based on a line voltage of AC 460 V.			
	n_{base} min^{-1}	1287						
DRE132MC4 9.2 kW	M_{max} Nm	165	169					
	n_{base} min^{-1}	1178	1289					
DRE160M4 9.2 kW	M_{max} Nm	149	149					
	n_{base} min^{-1}	1229	1313					
DRE160S4 9.2 kW	M_{max} Nm	130	130					
	n_{base} min^{-1}	1287	1350					
DRE160M4 11 kW	M_{max} Nm	163	173					
	n_{base} min^{-1}	1208	1276					
DRE160MC4 11 kW	M_{max} Nm	164	177					
	n_{base} min^{-1}	1239	1303					
DRE180S4 11 kW	M_{max} Nm	169	178					
	n_{base} min^{-1}	1229	1313					
DRE160MC4 15 kW	M_{max} Nm	159	226	226	226			
	n_{base} min^{-1}	1308	1213	1308	1324			
DRE180M4 15 kW	M_{max} Nm	170	242					
	n_{base} min^{-1}	1324	1223					
DRE180S4 15 kW	M_{max} Nm	166	219					
	n_{base} min^{-1}	1308	1260					
DRE180L4 18.5 kW	M_{max} Nm	168	245	321	338	338		
	n_{base} min^{-1}	1392	1313	1229	1271	1287		
DRE180M4 18.5 kW	M_{max} Nm	167	244	309	309			
	n_{base} min^{-1}	1366	1281	1218	1276			
DRE180L4 22 kW	M_{max} Nm	168	245	321	344	344		
	n_{base} min^{-1}	1397	1318	1234	1260	1287		
DRE180LC4 22 kW	M_{max} Nm	165	242	317	342	342		
	n_{base} min^{-1}	1397	1329	1260	1303	1334		
DRE180LC4 30 kW	M_{max} Nm		234	309	377	387		
	n_{base} min^{-1}		1366	1308	1250	1329		
DRE200L4 30 kW	M_{max} Nm		232	307	375	459	467	467
	n_{base} min^{-1}		1386	1341	1296	1243	1312	1345
DRE225S4 37 kW	M_{max} Nm		236	315	387	475	537	537
	n_{base} min^{-1}		1411	1374	1341	1300	1300	1431
DRE225M4 45 kW	M_{max} Nm			311	382	468	554	676
	n_{base} min^{-1}			1411	1374	1329	1284	1218
DRE250M4 55 kW	M_{max} Nm				366	459	549	689
	n_{base} min^{-1}				1426	1402	1377	1338
DRE280S4 75 kW	M_{max} Nm					468	558	697
	n_{base} min^{-1}					1435	1414	1380
DRE280M4 90 kW	M_{max} Nm							683
	n_{base} min^{-1}							1414
DRE315K4 110 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 460 V.						686
	n_{base} min^{-1}							1424

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 6 – 7):

Motor voltage AC 460 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700) 0900	1100	1320	1600	2000	2500
DRE225S4 37 kW	M_{max} Nm	537					
	n_{base} min^{-1}	1464					
DRE250M4 55 kW	M_{max} Nm	910	1074	1200			
	n_{base} min^{-1}	1271	1222	1219			
DRE280S4 75 kW	M_{max} Nm	918	1083	1200			
	n_{base} min^{-1}	1328	1289	1322			
DRE280M4 90 kW	M_{max} Nm	905	1070	1200	1200		
	n_{base} min^{-1}	1371	1338	1386	1472		
DRE315K4 110 kW	M_{max} Nm	909	1075	1350	1600	1600	1600
	n_{base} min^{-1}	1389	1362	1315	1271	1380	1400
DRE315S4 132 kW	M_{max} Nm	877	1036	1300	1563	1600	1600
	n_{base} min^{-1}	1418	1392	1348	1304	1383	1433
DRE315S4 150 kW	M_{max} Nm	913	1083	1364	1600	1600	1600
	n_{base} min^{-1}	1436	1418	1386	1374	1570	1638
DRE315M4 160 kW	M_{max} Nm		1083	1364	1644	2089	2400
	n_{base} min^{-1}		1433	1397	1365	1307	1301
DRE315M4 185 kW	M_{max} Nm		1080	1360	1639	2083	2400
	n_{base} min^{-1}		1436	1403	1368	1310	1304
DRE315L4 200 kW	M_{max} Nm			1372	1657	2110	2400
	n_{base} min^{-1}			1438	1409	1356	1374
DRE315L4 225 kW	M_{max} Nm			1365	1648	2098	2400
	n_{base} min^{-1}			1444	1415	1365	1377

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AC 230/460 V / 60 Hz motors in double-star connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**										
AC 230 V / 60 Hz		**0005**	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**
DRE80S4 250 W	M_{max} Nm	5.18	5.18									
	n_{base} min^{-1}	2665	2707									
DRE80S4 370 W	M_{max} Nm	6.69	7.47	7.47								
	n_{base} min^{-1}	2545	2566	2791								
DRE80M4 550 W	M_{max} Nm	6.35	7.76	10.2	11.7	9.83	11.7					
	n_{base} min^{-1}	2763	2679	2524	2559	2545	2588					
DRE80M4 750 W	M_{max} Nm		7.63	10.1	13.2	9.72	13.6	14.4				
	n_{base} min^{-1}		2784	2658	2496	2679	2475	2602				
DRE80S4 750 W	M_{max} Nm		7.5	9.9	11.3	9.56	11.3	11.3				
	n_{base} min^{-1}		2749	2588	2630	2609	2665	2756				
DRE80M4 1.1 kW	M_{max} Nm				13	9.46	13.5	17.4	19.4			
	n_{base} min^{-1}				2707	2841	2693	2538	2658			
DRE90M4 1.1 kW	M_{max} Nm				12.5	8.91	12.9	16.8	22.9			
	n_{base} min^{-1}				2770	2869	2756	2644	2461			
DRE90L4 1.5 kW	M_{max} Nm						13	17.1	23.6	30.5	30.5	
	n_{base} min^{-1}						2848	2756	2609	2461	2665	
DRE90M4 1.5 kW	M_{max} Nm						13	16.9	23.3	25.1	25.1	
	n_{base} min^{-1}						2805	2686	2503	2644	2742	
DRE100L4 2.2 kW	M_{max} Nm							16.8	23.6	31.5	40.6	
	n_{base} min^{-1}							2876	2777	2665	2538	
DRE90L4 2.2 kW	M_{max} Nm							16.7	23.4	31.2	35.6	
	n_{base} min^{-1}							2869	2742	2595	2637	
DRE100LC4 3 kW	M_{max} Nm								22.8	31	40.4	61.4
	n_{base} min^{-1}								2890	2812	2728	2545
DRE100M4 3 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 460 V.							22.3	30.1	39.2	59.5
	n_{base} min^{-1}								2869	2763	2644	2377
DRE112M4 3 kW	M_{max} Nm								23.5	31.5	40.7	56.6
	n_{base} min^{-1}								2771	2666	2549	2408
DRE100L4 3.7 kW	M_{max} Nm									31.6	41.7	64.2
	n_{base} min^{-1}									2827	2749	2580
DRE100LC4 3.7 kW	M_{max} Nm									31	40.2	61.2
	n_{base} min^{-1}									2848	2763	2573
DRE112M4 3.7 kW	M_{max} Nm								23.6	32	41.7	56.5
	n_{base} min^{-1}								2801	2713	2613	2566
DRE132S4 3.7 kW	M_{max} Nm								23.9	32.1	41.6	62.9
	n_{base} min^{-1}								2900	2830	2754	2572
DRE132S4 4 kW	M_{max} Nm									30.5	39.7	60.5
	n_{base} min^{-1}									2836	2766	2619
DRE112M4 4.5 kW	M_{max} Nm									28	36.6	55.8
	n_{base} min^{-1}									2766	2666	2455
DRE132M4 5.5 kW	M_{max} Nm										40.6	62.1
	n_{base} min^{-1}										2877	2730
DRE132S4 5.5 kW	M_{max} Nm										38.9	60.1
	n_{base} min^{-1}										2818	2695
DRE132M4 7.5 kW	M_{max} Nm											59.8
	n_{base} min^{-1}											2789
DRE132MC4 7.5 kW	M_{max} Nm											59.9
	n_{base} min^{-1}											2818
DRE160S4 7.5 kW	M_{max} Nm											59.3
	n_{base} min^{-1}											2811

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRE160M4 9.2 kW	M_{max} Nm											59
	n_{base} min^{-1}											2874
DRE160S4 9.2 kW	M_{max} Nm											58.3
	n_{base} min^{-1}											2869

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
		0150	0220	0300	0370	0450	0550	0750
DRE100M4 3 kW	M_{max} Nm	60.1						
	n_{base} min^{-1}	2524						
DRE100L4 3.7 kW	M_{max} Nm	74.2			**Notice:** The data is based on a line voltage of AC 460 V.			
	n_{base} min^{-1}	2707						
DRE100LC4 3.7 kW	M_{max} Nm	62.6						
	n_{base} min^{-1}	2911						
DRE112M4 3.7 kW	M_{max} Nm	56.5						
	n_{base} min^{-1}	2701						
DRE132S4 3.7 kW	M_{max} Nm	76.1						
	n_{base} min^{-1}	2531						
DRE132S4 4 kW	M_{max} Nm	81.1						
	n_{base} min^{-1}	2467						
DRE112M4 4.5 kW	M_{max} Nm	64.2	64.2					
	n_{base} min^{-1}	2432	2566					
DRE132M4 5.5 kW	M_{max} Nm	83.3	89.8					
	n_{base} min^{-1}	2590	2771					
DRE132S4 5.5 kW	M_{max} Nm	80.9	93					
	n_{base} min^{-1}	2572	2713					
DRE132M4 7.5 kW	M_{max} Nm	81.2	118	139	139			
	n_{base} min^{-1}	2695	2525	2525	2602			
DRE132MC4 7.5 kW	M_{max} Nm	81.5	119	149	149			
	n_{base} min^{-1}	2748	2625	2555	2783			
DRE160S4 7.5 kW	M_{max} Nm	80.2	116	117	117			
	n_{base} min^{-1}	2716	2552	2758	2858			
DRE132MC4 9.2 kW	M_{max} Nm	80.1	118	155	169	169		
	n_{base} min^{-1}	2783	2678	2566	2660	2848		
DRE160M4 9.2 kW	M_{max} Nm	80.4	117	149	149	149		
	n_{base} min^{-1}	2790	2653	2542	2758	2827		
DRE160S4 9.2 kW	M_{max} Nm	79.3	115	130	130	130		
	n_{base} min^{-1}	2784	2631	2737	2853	2906		
DRE160M4 11 kW	M_{max} Nm	79.1	116	152	173	173	173	
	n_{base} min^{-1}	2832	2716	2600	2600	2747	2837	
DRE160MC4 11 kW	M_{max} Nm	79.5	117	153	177	177	177	
	n_{base} min^{-1}	2832	2721	2616	2584	2769	2805	
DRE180S4 11 kW	M_{max} Nm	81.9	120	158	178	178	178	
	n_{base} min^{-1}	2858	2747	2631	2647	2800	2827	
DRE160MC4 15 kW	M_{max} Nm		111	148	182	223	226	226
	n_{base} min^{-1}		2805	2721	2642	2537	2695	2769
DRE180M4 15 kW	M_{max} Nm		121	159	194	238	242	242
	n_{base} min^{-1}		2863	2774	2689	2589	2726	2821
DRE180S4 15 kW	M_{max} Nm		118	156	191	219	219	219
	n_{base} min^{-1}		2858	2758	2663	2637	2790	2827
DRE180L4 18.5 kW	M_{max} Nm		117	157	193	237	280	338
	n_{base} min^{-1}		2937	2879	2821	2747	2668	2573

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
		0150	0220	0300	0370	0450	0550	0750
DRE180M4 18.5 kW	M_{max} Nm		117	156	192	236	279	309
	n_{base} min^{-1}		2900	2837	2774	2695	2610	2668
DRE180L4 22 kW	M_{max} Nm			157	193	236	280	344
	n_{base} min^{-1}			2895	2837	2763	2684	2563
DRE180LC4 22 kW	M_{max} Nm			154	190	233	277	342
	n_{base} min^{-1}			2869	2816	2753	2684	2573
DRE180LC4 30 kW	M_{max} Nm				183	226	269	335
	n_{base} min^{-1}				2869	2811	2753	2663
DRE200L4 30 kW	M_{max} Nm				181	224	267	333
	n_{base} min^{-1}				2879	2838	2793	2723
DRE225S4 37 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 460 V.				227	273	343
	n_{base} min^{-1}					2863	2830	2781
DRE225M4 45 kW	M_{max} Nm						270	339
	n_{base} min^{-1}						2900	2842

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 6 – 7):

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
		0900	1100	1320	1600	2000	2500
DRE180L4 18.5 kW	M_{max} Nm	338					
	n_{base} min^{-1}	2774					
DRE180M4 18.5 kW	M_{max} Nm	309			**Notice:** The data is based on a line voltage of AC 460 V.		
	n_{base} min^{-1}	2784					
DRE180L4 22 kW	M_{max} Nm	344	344				
	n_{base} min^{-1}	2742	2769				
DRE180LC4 22 kW	M_{max} Nm	342	342				
	n_{base} min^{-1}	2821	2853				
DRE180LC4 30 kW	M_{max} Nm	387	387	387	387		
	n_{base} min^{-1}	2732	2821	2858	2943		
DRE200L4 30 kW	M_{max} Nm	438	467	467	467		
	n_{base} min^{-1}	2609	2670	2793	2883		
DRE225S4 37 kW	M_{max} Nm	453	535	537	537		
	n_{base} min^{-1}	2695	2629	2916	3011		
DRE225M4 45 kW	M_{max} Nm	447	527	661	676	676	
	n_{base} min^{-1}	2748	2674	2547	2629	2670	
DRE250M4 55 kW	M_{max} Nm	436	521	661	800	1019	1200
	n_{base} min^{-1}	2600	2600	2600	2600	2562	2477
DRE280S4 75 kW	M_{max} Nm		529	669	807	1028	1200
	n_{base} min^{-1}		2600	2600	2600	2600	2600
DRE280M4 90 kW	M_{max} Nm			654	794	1014	1200
	n_{base} min^{-1}			2600	2600	2600	2600
DRE315K4 110 kW	M_{max} Nm			657	797	1019	1267
	n_{base} min^{-1}			2500	2500	2500	2500
DRE315S4 132 kW	M_{max} Nm				770	983	1220
	n_{base} min^{-1}				2500	2500	2500
DRE315S4 150 kW	M_{max} Nm					1025	1279
	n_{base} min^{-1}					2500	2500
DRE315M4 160 kW	M_{max} Nm					1026	1280
	n_{base} min^{-1}					2500	2500
DRE315M4 185 kW	M_{max} Nm						1276
	n_{base} min^{-1}						2500
DRE315L4 200 kW	M_{max} Nm						1286
	n_{base} min^{-1}						2500

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9.6.20 DRE.. motor selection in double-star connection type (line AC 230 V / 60 Hz)

AC 230/460 V / 60 Hz motors in double-star connection

Motor voltage		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in CFC operating modes (P700)								
AC 230 V / 60 Hz		0015	0022	0037	0055	0075	0110	0150	0220	0300
DRE80M4 750 W	M_{max} Nm	14.4								
	n_{base} min^{-1}	998								
DRE80S4 750 W	M_{max} Nm	11.3								
	n_{base} min^{-1}	1027								
DRE80M4 1.1 kW	M_{max} Nm	18.2			**Notice:** The data is based on a line voltage of AC 230 V.					
	n_{base} min^{-1}	1034								
DRE90M4 1.1 kW	M_{max} Nm	17.5	20.8							
	n_{base} min^{-1}	1153	1076							
DRE90L4 1.5 kW	M_{max} Nm	17.8	21.2	30.5						
	n_{base} min^{-1}	1252	1195	1062						
DRE90M4 1.5 kW	M_{max} Nm	17.7	21	25.1						
	n_{base} min^{-1}	1174	1097	1034						
DRE100L4 2.2 kW	M_{max} Nm	17.7	21.2	36.7	49.6					
	n_{base} min^{-1}	1357	1315	1139	1012					
DRE90L4 2.2 kW	M_{max} Nm	17.5	21	35.6						
	n_{base} min^{-1}	1329	1280	1062						
DRE100LC4 3 kW	M_{max} Nm		20.3	36.4	56.1	65.1				
	n_{base} min^{-1}		1406	1294	1153	1153				
DRE100M4 3 kW	M_{max} Nm		19.8	35.3	54.4					
	n_{base} min^{-1}		19.8	1209	1012					
DRE112M4 3 kW	M_{max} Nm			36.8	56.4					
	n_{base} min^{-1}			1219	1061					
DRE100L4 3.7 kW	M_{max} Nm			37.4	58.6	74.2				
	n_{base} min^{-1}			1301	1167	1090				
DRE100LC4 3.7 kW	M_{max} Nm			36.3	56	62.6				
	n_{base} min^{-1}			1308	1167	1195				
DRE112M4 3.7 kW	M_{max} Nm			37.6	56.5	56.5				
	n_{base} min^{-1}			1254	1131	1207				
DRE132S4 3.7 kW	M_{max} Nm			37.5	57.6	76.1				
	n_{base} min^{-1}			1336	1219	1113				
DRE132S4 4 kW	M_{max} Nm			35.8	55.4	73.4				
	n_{base} min^{-1}			1348	1254	1166				
DRE112M4 4.5 kW	M_{max} Nm			32.9	51	64.2				
	n_{base} min^{-1}			1289	1154	1066				
DRE132M4 5.5 kW	M_{max} Nm			36.5	56.7	75.4	89.8			
	n_{base} min^{-1}			1412	1318	1236	1236			
DRE132S4 5.5 kW	M_{max} Nm			34.9	54.9	73.1	93	93		
	n_{base} min^{-1}			1383	1301	1225	1195	1236		
DRE132M4 7.5 kW	M_{max} Nm				54.4	73.2	108	139		
	n_{base} min^{-1}				1359	1307	1201	1107		
DRE132MC4 7.5 kW	M_{max} Nm				54.5	73.4	108	140		
	n_{base} min^{-1}				1383	1342	1266	1195		
DRE160S4 7.5 kW	M_{max} Nm				54	72.4	106	117		
	n_{base} min^{-1}				1376	1324	1223	1260		
DRE132MC4 9.2 kW	M_{max} Nm					71.9	107	139	169	
	n_{base} min^{-1}					1365	1295	1230	1271	
DRE160M4 9.2 kW	M_{max} Nm					72.4	107	138	149	
	n_{base} min^{-1}					1371	1287	1213	1276	
DRE160S4 9.2 kW	M_{max} Nm					71.4	105	130	130	
	n_{base} min^{-1}					1361	1271	1223	1329	

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in CFC operating modes (P700)								
		0015	0022	0037	0055	0075	0110	0150	0220	0300
DRE160M4 11 kW	M_{max} Nm					71	106	137	173	
	n_{base} min^{-1}					1397	1324	1260	1260	
DRE160MC4 11 kW	M_{max} Nm					71.4	106	138	177	177
	n_{base} min^{-1}					1403	1345	1287	1287	1308
DRE180S4 11 kW	M_{max} Nm					73.6	109	142	178	178
	n_{base} min^{-1}					1413	1345	1281	1287	1313
DRE160MC4 15 kW	M_{max} Nm						101	132	200	226
	n_{base} min^{-1}						1387	1345	1245	1234
DRE180M4 15 kW	M_{max} Nm						109	143	213	242
	n_{base} min^{-1}						1408	1366	1260	1239
DRE180S4 15 kW	M_{max} Nm						107	140	209	219
	n_{base} min^{-1}						1403	1350	1234	1271
DRE180L4 18.5 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 230 V.						140	212	253
	n_{base} min^{-1}							1419	1345	1303
DRE180M4 18.5 kW	M_{max} Nm							140	211	252
	n_{base} min^{-1}							1397	1318	1271
DRE180L4 22 kW	M_{max} Nm							140	212	253
	n_{base} min^{-1}							1429	1355	1308
DRE180LC4 22 kW	M_{max} Nm							137	209	250
	n_{base} min^{-1}							1424	1361	1324
DRE180LC4 30 kW	M_{max} Nm								202	242
	n_{base} min^{-1}								1392	1361
DRE200L4 30 kW	M_{max} Nm								200	240
	n_{base} min^{-1}								1407	1382
DRE225S4 37 kW	M_{max} Nm									244
	n_{base} min^{-1}									1407

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9.6.21 Motor table DRS.. series AC motors (characteristic value with delta/star connection AC 230/400 V / 50 Hz)

Motor	P_m	M_N	Mass moment of inertia J_M		Star ⅄ (AC 400 V)				Delta △ (AC 230 V)			
			Without brake	with brake	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T
	kW	Nm	10^{-4} kgm²		A	A	A	Nm/A	A	A	A	Nm/A
DRS71S4	0.37	2.55	4.9	6.2	1.14	0.91	0.68	2.79	1.97	1.58	1.18	1.61
DRS71M4	0.55	3.8	7.1	8.4	1.55	1.23	0.95	3.10	2.68	2.12	1.64	1.79
DRS80S4	0.75	5.1	14.9	16.4	1.8	1.54	0.93	3.31	3.1	2.67	1.61	1.91
DRS80M4	1.1	7.4	21.5	26	2.4	2.09	1.19	3.55	4.2	3.6	2.1	2.05
DRS90M4	1.5	10.3	35.5	40	3.3	3.00	1.39	3.44	5.7	5.2	2.4	1.99
DRS90L4	2.2	15	43.5	49.5	4.85	4.11	2.57	3.65	8.4	7.1	4.4	2.10
DRS100M4	3	20.5	56	62	6.4	5.91	2.45	3.47	11.1	10.2	4.2	2.00
DRS100LC4	4	26.5	90	96	8.4	7.55	3.67	3.51	14.5	13.1	6.4	2.03
DRS112M4	4	26.5	146	151	8.1	7.71	2.49	3.44	14.0	13.4	4.3	1.98
DRS132S4	5.5	36.5	190	200	11.1	10.3	4.18	3.55	19.2	17.8	7.2	2.05
DRS132M4	7.5	49.5	255	265	14.4	13.6	4.64	3.63	24.9	23.6	8.0	2.10
DRS132MC4	9.2	60	340	355	18.6	16.6	8.29	3.60	32.2	28.8	14.4	2.08
DRS160S4	9.2	60	370	420	18.9	16.8	8.75	3.58	32.7	29.1	15.2	2.07
DRS160M4	11	72	450	500	22	20.1	8.94	3.58	38.1	34.8	15.5	2.07
DRS160MC4	15	94	590	640	30	27.8	11.8	3.38	52.0	48.1	20.5	1.95
DRS180S4	15	98	900	960	29	26.4	11.7	3.71	50.2	45.7	20.3	2.14
DRS180M4	18.5	121	1110	1250	34.5	32.0	12.7	3.78	59.8	55.4	21.9	2.18
DRS180L4	22	143	1300	1440	41.5	37.5	17.3	3.81	71.9	64.9	29.9	2.20
DRS180LC4	30	195	1680	1910	57	52.6	21.2	3.71	98.7	91.1	36.7	2.14
DRS200L4	30	194	2360	2590	57	53.2	20.6	3.64	98.7	92.2	35.7	2.10
DRS225S4	37	240	2930	3160	70	64.8	25.2	3.70	121	112	43.7	2.14
DRS225M4	45	290	3430	3660	84	76.2	35.1	3.80	145	132	60.8	2.20
DRS225MC4	55	355	4330	4560	105	97.6	38.7	3.64	182	169	67.1	2.10
DRS315K4	110	710	18400	19500	200	185	75.9	3.84	345	321	131	2.22
DRS315S4	132	850	22500	23600	245 2)	212	94.7	4.01	425	367	164	2.32
DRS315M4	160	1030	27900	29000	280	262	97.4	3.92	485	455	169	2.27
DRS315L4	200	1290	31900	33000	350	330	117	3.91	–	–	–	–

1) Applies in the basic speed range up to n base.

2) Current ratings for 230/400 V winding. Due to the number of turns, the current of the 400/690 V winding is 235 A.

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9.6.22 DRS.. motor selection with delta/star connection type (line AC 400 V / 50 Hz)

AC 230/400 V / 50 Hz motors in star connection or AC 400/690 V / 50 Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 400 / 50Hz		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRS71M4 370 W	M_{max} Nm	5.63										
	n_{base} min^{-1}	844										
DRS71S4 370 W	M_{max} Nm	5.38										
	n_{base} min^{-1}	865										
DRS80S4 370 W	M_{max} Nm	6.22										
	n_{base} min^{-1}	830										
DRS71M4 550 W	M_{max} Nm	8.50				8.50						
	n_{base} min^{-1}	844				872						
DRS80M4 550 W	M_{max} Nm	9.54										
	n_{base} min^{-1}	907										
DRS80M4 750 W	M_{max} Nm	11.7				11.7						
	n_{base} min^{-1}	865				879						
DRS80S4 750 W	M_{max} Nm	11.3	11.3			11.3						
	n_{base} min^{-1}	872	872			872						
DRS80M4 1.1 kW	M_{max} Nm	13.4	16.2			17.1	17.1					
	n_{base} min^{-1}	977	893			893	907					
DRS90M4 1.5 kW	M_{max} Nm			20.7	25.7	20	25.7	25.7				
	n_{base} min^{-1}			935	844	949	851	865				
DRS90L4 2.2 kW	M_{max} Nm				26.6	19.3	27.5	35.5	37.5			
	n_{base} min^{-1}				1005	1097	998	900	907			
DRS100LC4 2.6 kW	M_{max} Nm						27.4	35.4	48.6	56.7		
	n_{base} min^{-1}						1118	1062	963	935		
DRS100M4 3.0 kW	M_{max} Nm						27.4	35.6	49.1			
	n_{base} min^{-1}						1083	1005	879			
DRS100LC4 4.0 kW	M_{max} Nm							32.2	45.2	60.5	78.1	
	n_{base} min^{-1}							1146	1076	998	907	
DRS112M4 4.0 kW	M_{max} Nm							35.7	49.6	66.1		
	n_{base} min^{-1}							1055	979	885		
DRS132S4 5.5 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 400 V.							47.1	63.3	81.8	102
	n_{base} min^{-1}								1084	1025	955	908
DRS132M4 7.5 kW	M_{max} Nm									64.2	83	126
	n_{base} min^{-1}									1113	1055	920
DRS132MC4 9.2 kW	M_{max} Nm										78.5	121
	n_{base} min^{-1}										1125	1049
DRS160S4 9.2 kW	M_{max} Nm										78.9	122
	n_{base} min^{-1}										1134	1049
DRS160M4 11.0 kW	M_{max} Nm											123
	n_{base} min^{-1}											1086
DRS160MC4 15.0 kW	M_{max} Nm											118
	n_{base} min^{-1}											1150
DRS180S4 15.0 kW	M_{max} Nm											126
	n_{base} min^{-1}											1144

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage AC 400 / 50Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
		0150	0220	0300	0370	0450	0550	0750
DRS132MC4 9.2 kW	M_{max} Nm	163	174					
	n_{base} min^{-1}	973	1049					
DRS160S4 9.2 kW	M_{max} Nm	156	156		**Notice:** The data is based on a line voltage of AC 400 V.			
	n_{base} min^{-1}	997	1076					
DRS160M4 11.0 kW	M_{max} Nm	166	201					
	n_{base} min^{-1}	1018	1012					
DRS160MC4 15.0 kW	M_{max} Nm	162	234	234				
	n_{base} min^{-1}	1097	1012	1102				
DRS180S4 15.0 kW	M_{max} Nm	171	249					
	n_{base} min^{-1}	1092	997					
DRS180M4 18.5 kW	M_{max} Nm	172	251	326	326			
	n_{base} min^{-1}	1150	1076	1002	1055			
DRS180L4 22.0 kW	M_{max} Nm	170	251	331	402	402		
	n_{base} min^{-1}	1176	1118	1055	1002	1065		
DRS180LC4 30.0 kW	M_{max} Nm		241	318	390	429	429	429
	n_{base} min^{-1}		1139	1086	1039	1060	1086	1097
DRS200L4 30.0 kW	M_{max} Nm		240	317	388	476	505	505
	n_{base} min^{-1}		1157	1120	1079	1034	1062	1099
DRS225S4 37.0 kW	M_{max} Nm			318	391	481	570	708
	n_{base} min^{-1}			1157	1132	1095	1058	1005
DRS225M4 45.0 kW	M_{max} Nm				391	484	575	717
	n_{base} min^{-1}				1161	1136	1103	1058
DRS225MC4 55.0 kW	M_{max} Nm					455	540	673
	n_{base} min^{-1}					1153	1124	1083
DRS250M4 55.0 kW	M_{max} Nm					469	564	709
	n_{base} min^{-1}					1173	1152	1118
DRS280S4 75.0 kW	M_{max} Nm						554	699
	n_{base} min^{-1}						1191	1170

Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage AC 400 / 50Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
		0900	1100	1320	1600	2000	2500
DRS225M4 45.0 kW	M_{max} Nm	842					
	n_{base} 1/min	1062					
DRS225MC4 55.0 kW	M_{max} Nm	852	852	852			
	n_{base} 1/min	1038	1083	1124			
DRS250M4 55.0 kW	M_{max} Nm	938	1108	1200			
	n_{base} 1/min	1063	1021	1045			
DRS280S4 75.0 kW	M_{max} Nm	929	1099	1200	1200		
	n_{base} 1/min	1136	1109	1182	1271		
DRS280M4 90.0 kW	M_{max} Nm	945	1129	1200	1200	1200	
	n_{base} 1/min	1155	1133	1277	1411	1472	
DRS315K4 110.0 kW	M_{max} Nm	916	1084	1362	1600	1600	
	n_{base} 1/min	1166	1143	1104	1078	1175	
DRS315S4 132.0 kW	M_{max} Nm	941	1119	1412	1600	1600	1600
	n_{base} 1/min	1192	1178	1151	1178	1351	1403
DRS315M4 160.0 kW	M_{max} Nm			1425	1719	2185	2400
	n_{base} 1/min			1169	1143	1096	1131
DRS315L4 200.0 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 400 V.			1675	2134	2400
	n_{base} 1/min				1184	1143	1172

AC 230/400 V / 50 Hz motors in delta connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 230 V / 50Hz		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DR63M4 180 W	M_{max} Nm	2.34										
	n_{base} min^{-1}	2184										
DRS71S4 180 W	M_{max} Nm	2.81										
	n_{base} min^{-1}	2088										
DR63L4 250 W	M_{max} Nm	3.31										
	n_{base} min^{-1}	2100										
DRS71S4 250 W	M_{max} Nm	3.95	3.95	3.95								
	n_{base} min^{-1}	1983	2025	2088								
DRS71M4 370 W	M_{max} Nm	5.63	5.63	5.63		5.63						
	n_{base} min^{-1}	1765	1821	1884		1877						
DRS71S4 370 W	M_{max} Nm	5.38	5.38	5.38	5.38	5.38						
	n_{base} min^{-1}	1849	1962	2032	2081	2025						
DRS80S4 370 W	M_{max} Nm	6.22				6.22						
	n_{base} min^{-1}	1821				1912						
DRS71M4 550 W	M_{max} Nm		7.76	8.50	8.50	8.5	8.5					
	n_{base} min^{-1}		1793	1856	1941	1835	1948					
DRS80M4 550 W	M_{max} Nm	7.88	9.54	9.54	9.54	9.54						
	n_{base} min^{-1}	1884	1793	1997	2039	1976						
DRS80M4 750 W	M_{max} Nm		9.16	11.7	11.7	11.6	11.7					
	n_{base} min^{-1}		1920	1800	1976	1800	1976					
DRS80S4 750 W	M_{max} Nm			11.3	11.3	11.2	11.3					
	n_{base} min^{-1}			1821	2004	1814	2018					
DRS80M4 1.1 kW	M_{max} Nm				15.5	11.3	16	17.1				
	n_{base} min^{-1}				1863	2004	1849	1969				
DRS90M4 1.5 kW	M_{max} Nm						15.5	20.1	25.7	25.7		
	n_{base} min^{-1}						1990	1884	1807	1941		
DRS90L4 2.2 kW	M_{max} Nm							19.4	27.3	36.5	37.5	37.5
	n_{base} min^{-1}							2039	1927	1793	1955	2053
DRS100LC4 2.6 kW	M_{max} Nm								27.2	36.4	47	56.7
	n_{base} min^{-1}								2067	1983	1884	1983
DRS100M4 3.0 kW	M_{max} Nm								27.2	36.6	47.5	57.3
	n_{base} min^{-1}								2032	1927	1807	1814
DRS100LC4 4.0 kW	M_{max} Nm									33.2	43.7	67.1
	n_{base} min^{-1}									2088	2018	1877
DRS112M4 4.0 kW	M_{max} Nm									36.7	48	66.5
	n_{base} min^{-1}									1916	1834	1758
DRS132S4 5.5 kW	M_{max} Nm										45.5	70.2
	n_{base} min^{-1}										1980	1857
DRS132M4 7.5 kW	M_{max} Nm											71.2
	n_{base} min^{-1}											1992

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Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
AC 230 V / 50Hz		**0150**	**0220**	**0300**	**0370**	**0450**	**0550**	**0750**
DRS100LC4 4.0 kW	M_{max} Nm	82.2						
	n_{base} min^{-1}	1870						
DRS112M4 4.0 kW	M_{max} Nm	66.5						
	n_{base} min^{-1}	1852						
DRS132S4 5.5 kW	M_{max} Nm	94.5	102					
	n_{base} min^{-1}	1740	1828					
DRS132M4 7.5 kW	M_{max} Nm	95.8	134					
	n_{base} min^{-1}	1887	1746					
DRS132MC4 9.2 kW	M_{max} Nm	91.5	134	174	174	174		
	n_{base} min^{-1}	1992	1893	1799	1980	2033		
DRS160S4 9.2 kW	M_{max} Nm	91.9	135	156	156			
	n_{base} min^{-1}	1999	1883	1925	2020			
DRS160M4 11.0 kW	M_{max} Nm	92.7	136	180	201	201		
	n_{base} min^{-1}	2036	1941	1846	1862	1962		
DRS160MC4 15.0 kW	M_{max} Nm		132	175	215	234		
	n_{base} min^{-1}		2025	1946	1877	1941		
DRS180S4 15.0 kW	M_{max} Nm		140	185	227	255		
	n_{base} min^{-1}		2025	1951	1877	1893		
DRS180M4 18.5 kW	M_{max} Nm		140	186	229	280	326	326
	n_{base} min^{-1}		2099	2041	1983	1909	1846	1999
DRS180L4 22.0 kW	M_{max} Nm			185	228	281	333	402
	n_{base} min^{-1}			2078	2036	1983	1925	1862
DRS180LC4 30.0 kW	M_{max} Nm				218	270	320	399
	n_{base} min^{-1}				2051	2004	1951	1872
DRS200L4 30.0 kW	M_{max} Nm				217	268	319	398
	n_{base} min^{-1}				2067	2030	1993	1932
DRS225S4 37.0 kW	M_{max} Nm						320	401
	n_{base} min^{-1}						2051	2006
DRS225M4 45.0 kW	M_{max} Nm							401
	n_{base} min^{-1}							2051

Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage AC 230 V / 50Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
		0900	1100	1320	1600	2000	2500
DRS180M4 18.5 kW	M_{max} Nm	326					
	n_{base} min^{-1}	2036					
DRS180L4 22.0 kW	M_{max} Nm	402					
	n_{base} min^{-1}	1999					
DRS180LC4 30.0 kW	M_{max} Nm	429	429				
	n_{base} min^{-1}	1978	2030				
DRS200L4 30.0 kW	M_{max} Nm	505	505	505			
	n_{base} min^{-1}	1862	1977	2051			
DRS225S4 37.0 kW	M_{max} Nm	529	625	719			
	n_{base} min^{-1}	1932	1874	1874			
DRS225M4 45.0 kW	M_{max} Nm	534	632	795			
	n_{base} min^{-1}	1989	1940	1862			
DRS225MC4 55.0 kW	M_{max} Nm	501	593	746	852	852	852
	n_{base} min^{-1}	2018	1973	1899	1879	2006	2043
DRS250M4 55.0 kW	M_{max} Nm	521	622	788	952	1200	1200
	n_{base} min^{-1}	2054	2020	1962	1901	1801	1907
DRS280S4 75.0 kW	M_{max} Nm		612	779	943	1200	1200
	n_{base} min^{-1}		2084	2051	2014	1953	2197
DRS280M4 90.0 kW	M_{max} Nm			780	960	1200	1200
	n_{base} min^{-1}			2066	2038	2023	2377
DRS315K4 110.0 kW	M_{max} Nm				930	1187	1475
	n_{base} min^{-1}				2045	1992	1928
DRS315S4 132.0 kW	M_{max} Nm				956	1227	1530
	n_{base} min^{-1}				2089	2054	2013
DRS315M4 160.0 kW	M_{max} Nm					1240	1544
	n_{base} min^{-1}					2086	2042
DRS315L4 200.0 kW	M_{max} Nm						1503
	n_{base} min^{-1}						2106

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9.6.23 DRS.. motor selection in delta connection type (line AC 230 V / 50 Hz)

AC 230/400 V / 50 Hz motors in delta connection

Motor voltage		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in CFC operating modes (P700)								
AC 230 V / 50 Hz		0015	0022	0037	0055	0075	0110	0150	0220	0300
DRS71M4 550 W	M_{max} Nm	8.5								
	n_{base} min^{-1}	872								
DRS80M4 750 W	M_{max} Nm	11.7			**Notice:** The data is based on a line voltage of AC 230 V.					
	n_{base} min^{-1}	879								
DRS80S4 750 W	M_{max} Nm	11.3								
	n_{base} min^{-1}	879								
DRS80M4 1.1 kW	M_{max} Nm	17.1								
	n_{base} min^{-1}	893								
DRS90M4 1.5 kW	M_{max} Nm	21	24.9	25.7						
	n_{base} min^{-1}	928	858	872						
DRS90L4 2.2 kW	M_{max} Nm	20.4	24.5	37.5						
	n_{base} min^{-1}	1083	1034	900						
DRS100LC4 2.6 kW	M_{max} Nm	20.3	24.4	42.5	56.7					
	n_{base} min^{-1}	1174	1146	1005	942					
DRS100M4 3.0 kW	M_{max} Nm		24.3	42.8	57.3					
	n_{base} min^{-1}		1111	935	809					
DRS100LC4 4.0 kW	M_{max} Nm			39.2	61.3	81.5				
	n_{base} min^{-1}			1111	998	893				
DRS112M4 4.0 kW	M_{max} Nm			43.2	66.5					
	n_{base} min^{-1}			1014	885					
DRS132S4 5.5 kW	M_{max} Nm				64.1	85.4	102			
	n_{base} min^{-1}				1020	938	908			
DRS132M4 7.5 kW	M_{max} Nm				65	86.6	126			
	n_{base} min^{-1}				1107	1043	920			
DRS132MC4 9.2 kW	M_{max} Nm					82.2	122	158	174	
	n_{base} min^{-1}					1119	1049	984	1049	
DRS160S4 9.2 kW	M_{max} Nm					82.6	122	156	156	
	n_{base} min^{-1}					1129	1044	981	1076	
DRS160M4 11.0 kW	M_{max} Nm					83.1	124	161	201	
	n_{base} min^{-1}					1150	1086	1023	1012	
DRS160MC4 15.0 kW	M_{max} Nm						119	157	234	234
	n_{base} min^{-1}						1150	1107	1012	1086
DRS180S4 15.0 kW	M_{max} Nm						126	166	249	255
	n_{base} min^{-1}						1144	1097	997	1044
DRS180M4 18.5 kW	M_{max} Nm							167	251	300
	n_{base} min^{-1}							1155	1076	1028
DRS180L4 22.0 kW	M_{max} Nm							165	251	301
	n_{base} min^{-1}							1181	1118	1081
DRS180LC4 30.0 kW	M_{max} Nm								241	289
	n_{base} min^{-1}								1139	1107
DRS200L4 30.0 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 230 V.							240	287
	n_{base} min^{-1}								1157	1132
DRS225S4 37.0 kW	M_{max} Nm									287
	n_{base} min^{-1}									1169

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9.6.24 Motor table DRS.. series AC motors (characteristic value with double-star/star connection AC 230/460 V / 60 Hz)

Motor	P_m	M_N	Mass moment of inertia J_M		Star ⅄ (AC 460 V)				Double-star ⅄ (AC 230 V)			
			Without brake	with brake	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)	I_n	I_{q_n} 1)	I_{d_n} 1)	c_T 1)
	kW	Nm	10^{-4} kgm²		A	A	A	Nm/A	A	A	A	Nm/A
DRS71S4	0.37	2.1	4.9	6.2	0.92	0.72	0.58	2.93	1.84	1.43	1.16	1.47
DRS71M4	0.55	3.1	7.1	8.4	1.25	1.00	0.75	3.09	2.50	2.00	1.49	1.55
DRS80S4	0.75	4.2	14.9	16.4	1.66	1.23	1.12	3.43	3.32	2.45	2.24	1.71
DRS80M4	1.1	6.1	21.5	26	2.14	1.75	1.23	3.48	4.28	3.50	2.46	1.74
DRS90M4	1.5	8.4	35.5	40	2.87	2.52	1.38	3.34	5.74	5.03	2.76	1.67
DRS90L4	2.2	12.2	43.5	49.5	4.1	3.33	2.37	3.66	8.20	6.66	4.75	1.83
DRS100M4	3	16.7	56	62	5.5	4.92	2.45	3.39	11.0	9.85	4.90	1.70
DRS100M4	3.7	21	56	62	6.65	6.19	2.42	3.39	13.3	12.4	4.84	1.70
DRS100L4	4	22.5	68.3	74.3	7.3	6.25	3.78	3.60	14.6	12.5	7.56	1.80
DRS112M4	4	22	146	151	6.8	6.41	2.26	3.43	13.6	12.8	4.52	1.71
DRS132S4	5.5	30	190	200	9.4	8.8	3.36	3.42	18.8	17.6	6.72	1.71
DRS132M4	7.5	41	255	265	12.4	11.7	4.01	3.50	24.8	23.5	8.02	1.75
DRS132MC4	9.2	50	342	355	16	14.7	6.33	3.40	32.0	29.4	12.7	1.70
DRS160S4	9.2	50	370	420	15.9	14.2	7.2	3.53	31.8	28.4	14.4	1.76
DRS160M4	11	60	450	500	18.8	17.5	6.99	3.44	37.6	34.9	14.0	1.72
DRS160MC4	15	81	590	640	26.5	24.7	9.57	3.28	53.0	49.4	19.1	1.64
DRS180S4	15	81	895	955	25.5	23.6	9.68	3.43	51.0	47.2	19.4	1.72
DRS180M4	18.5	100	1110	1250	30.5	27.0	14.1	3.70	61.0	54.1	28.2	1.85
DRS180L4	22	119	1300	1440	35.9	32.1	16.0	3.70	71.8	64.2	32.0	1.85
DRS180LC4	30	161	1680	1910	48.5	45.5	16.9	3.54	97.0	90.9	33.8	1.77
DRS200L4	30	161	2360	2590	51	47.9	17.6	3.36	102	95.8	35.1	1.68
DRS225S4	37	198	2930	3160	61	56.6	22.6	3.50	122	113	45.3	1.75
DRS225M4	45	240	3430	3660	72	68.7	21.7	3.50	144	137	43.4	1.75
DRS225MC4	55	295	4330	4560	87.9	84.5	24.2	3.49	176	169	48.4	1.75
DRS315K4	110	589	18400	19500	172	165	47.4	3.56	–	–	–	–
DRS315S4	132	707	22500	23600	205	202	43.4	3.49	–	–	–	–
DRS315S4	150	802	22500	23600	230	222	60.7	3.62	–	–	–	–
DRS315M4	160	856	27900	29000	245	237	60.3	3.60	–	–	–	–
DRS315M4	185	991	27900	29000	280	274	59.9	3.62	–	–	–	–
DRS315L4	200	1072	31900	33000	304	295	73.4	3.63	–	–	–	–
DRS315L4	225	1205	31900	33000	335	328	72.8	3.67	–	–	–	–

1) Applies in the basic speed range up to n base.

9.6.25 DRS.. motor selection with double-star/star connection type (line AC 460 V / 60 Hz)

AC 230/460 V / 60 Hz motors in star connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**										
AC 460 / 60 Hz		**0005**	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**	**0055**	**0075**	**0110**
DRS71M4 370 W	M_{max} Nm	5.02										
	n_{base} min^{-1}	1139										
DRS71S4 370 W	M_{max} Nm	5.20				**Notice:** The data is based on a line voltage of AC 460 V.						
	n_{base} min^{-1}	1048										
DRS80S4 370 W	M_{max} Nm	5.14										
	n_{base} min^{-1}	1097										
DRS71M4 400 W	M_{max} Nm	5.24										
	n_{base} min^{-1}	1097										
DRS71M4 550 W	M_{max} Nm	7.46	7.46									
	n_{base} min^{-1}	1118	1139									
DRS80S4 550 W	M_{max} Nm	9.41										
	n_{base} min^{-1}	970										
DRS90M4 550 W	M_{max} Nm	10.9										
	n_{base} min^{-1}	1020										
DRS80S4 750 W	M_{max} Nm	12.5	12.8			12.8						
	n_{base} min^{-1}	1012	1027			1041						
DRS80M4 1.1 kW	M_{max} Nm	13.1	15.9	18.9	18.9	18.9	18.9					
	n_{base} min^{-1}	1188	1104	1027	1034	1020	1041					
DRS90M4 1.5 kW	M_{max} Nm		15.4	20.1	25.1	19.5	25.1	25.1				
	n_{base} min^{-1}		1230	1118	1005	1132	1012	1034				
DRS90L4 2.2 kW	M_{max} Nm				26.3	19.3	27.2	34.9	35.5			
	n_{base} min^{-1}				1195	1301	1181	1069	1111			
DRS100M4 3kW	M_{max} Nm						27	34.9	47.9			
	n_{base} min^{-1}						1294	1209	1069			
DRS100LC4 3.7 kW	M_{max} Nm						26.8	35.2	48.9	65.1	74.5	
	n_{base} min^{-1}						1399	1350	1266	1174	1174	
DRS100M4 3.7kW	M_{max} Nm						26.3	34.2	47.2	62.7		
	n_{base} min^{-1}						1336	1252	1125	977		
DRS112M4 3.7 kW	M_{max} Nm						27.8	36.1	49.7	60.4	60.4	
	n_{base} min^{-1}						1324	1266	1172	1125	1166	
DRS100L4 4 kW	M_{max} Nm							33.3	46.1	61.3		
	n_{base} min^{-1}							1329	1230	1111		
DRS100LC4 4 kW	M_{max} Nm						26.7	35.2	48.8	64.9	74.2	
	n_{base} min^{-1}						1406	1357	1273	1181	1181	
DRS112M4 4 kW	M_{max} Nm						27.1	35.1	48.4	54.7	54.7	
	n_{base} min^{-1}						1342	1277	1184	1189	1225	
DRS132S4 5.5 kW	M_{max} Nm								46.3	61.9	79.8	89.8
	n_{base} min^{-1}								1312	1242	1160	1189
DRS132M4 7.5 kW	M_{max} Nm									62.4	81.1	123
	n_{base} min^{-1}									1330	1277	1148
DRS132MC4 9.2 kW	M_{max} Nm									61.1	80.3	123
	n_{base} min^{-1}									1389	1348	1260
DRS160S4 9.2 kW	M_{max} Nm									60.7	79	120
	n_{base} min^{-1}									1387	1339	1229
DRS160M4 11 kW	M_{max} Nm										79.3	122
	n_{base} min^{-1}										1376	1292
DRS160MC4 15 kW	M_{max} Nm											117
	n_{base} min^{-1}											1366

Motor voltage AC 460 / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DRS180S4 15 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 460 V.										124
	n_{base} min^{-1}											1376
DRS180M4 18.5 kW	M_{max} Nm											123
	n_{base} min^{-1}											1419

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage AC 460 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
		0150	0220	0300	0370	0450	0550	0750
DRS132M4 7.5 kW	M_{max} Nm	131		**Notice:** The data is based on a line voltage of AC 460 V.				
	n_{base} min^{-1}	1195						
DRS132MC4 9.2 kW	M_{max} Nm	166	169					
	n_{base} min^{-1}	1178	1289					
DRS160S4 9.2 kW	M_{max} Nm	129	129					
	n_{base} min^{-1}	1287	1350					
DRS160M4 11 kW	M_{max} Nm	163	173					
	n_{base} min^{-1}	1208	1281					
DRS160MC4 15 kW	M_{max} Nm	159	227	227				
	n_{base} min^{-1}	1308	1213	1308				
DRS180S4 15 kW	M_{max} Nm	167	220					
	n_{base} min^{-1}	1308	1255					
DRS180M4 18.5 kW	M_{max} Nm	167	243	309	309	309		
	n_{base} min^{-1}	1366	1281	1218	1271	1308		
DRS180L4 22 kW	M_{max} Nm	166	244	321	392	392		
	n_{base} min^{-1}	1403	1334	1266	1197	1266		
DRS180LC4 30 kW	M_{max} Nm		235	310	378	388	388	388
	n_{base} min^{-1}		1366	1308	1250	1329	1350	1371
DRS200L4 30 kW	M_{max} Nm		233	308	376	461	468	468
	n_{base} min^{-1}		1386	1341	1296	1243	1312	1345
DRS225S4 37 kW	M_{max} Nm		237	316	388	476	536	536
	n_{base} min^{-1}		1411	1374	1341	1300	1304	1436
DRS225M4 45 kW	M_{max} Nm			312	383	470	556	678
	n_{base} min^{-1}			1411	1374	1329	1284	1218
DRS225MC4 55 kW	M_{max} Nm				374	461	547	681
	n_{base} min^{-1}				1403	1370	1337	1288
DRS250M4 55 kW	M_{max} Nm				364	456	546	685
	n_{base} min^{-1}				1426	1402	1377	1338
DRS280S4 75 kW	M_{max} Nm					461	549	687
	n_{base} min^{-1}					1435	1417	1383
DRS280M4 90 kW	M_{max} Nm							679
	n_{base} min^{-1}							1417
DRS315K4 110 kW	M_{max} Nm							674
	n_{base} min^{-1}							1430

Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage AC 460 V / 60 Hz		**MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)**					
		0900	**1100**	**1320**	**1600**	**2000**	**2500**
DRS225MC4 55 kW	M_{max} Nm	708	708	708	**Notice:** The data is based on a line voltage of AC 460 V.		
	n_{base} min^{-1}	1403	1423	1477			
DRS250M4 55 kW	M_{max} Nm	904	1068	1200			
	n_{base} min^{-1}	1271	1222	1216			
DRS280S4 75 kW	M_{max} Nm	904	1067	1200			
	n_{base} min^{-1}	1331	1289	1310			
DRS280M4 90 kW	M_{max} Nm	900	1064	1200	1200		
	n_{base} min^{-1}	1371	1338	1383	1469		
DRS315K4 110 kW	M_{max} Nm	892	1055	1325	1594	1600	
	n_{base} min^{-1}	1395	1368	1321	1274	1374	
DRS315S4 132 kW	M_{max} Nm	877	1036	1300	1563	1600	1600
	n_{base} min^{-1}	1418	1392	1348	1304	1383	1433
DRS315S4 150 kW	M_{max} Nm	895	1062	1338	1600	1600	
	n_{base} min^{-1}	1441	1421	1389	1356	1553	
DRS315M4 160 kW	M_{max} Nm		1059	1334	1607	2043	2400
	n_{base} min^{-1}		1438	1403	1371	1312	1286
DRS315M4 185 kW	M_{max} Nm			1339	1614	2051	2400
	n_{base} min^{-1}			1409	1374	1315	1292
DRS315L4 200 kW	M_{max} Nm			1337	1614	2055	2400
	n_{base} min^{-1}			1444	1415	1362	1354
DRS315L4 225 kW	M_{max} Nm			1351	1631	2077	2400
	n_{base} min^{-1}			1453	1421	1368	1368

AC 230/460 V / 60 Hz motors in double-star connection

Assignment of MOVIDRIVE® MDX61B0005-5A3 – MDX61B0110-503 (sizes 0 – 2):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)										
AC 230 V / 60 Hz		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
DR63M4 180 W	M_{max} Nm	2.34			**Notice:** The data is based on a line voltage of AC 460 V.							
	n_{base} min^{-1}	2677										
DRS71S4 200 W	M_{max} Nm	3.22	3.22									
	n_{base} min^{-1}	2714	2798									
DR63L4 250 W	M_{max} Nm	3.31	3.31	3.31								
	n_{base} min^{-1}	2770	2770	2770								
DRS71M4 370 W	M_{max} Nm	5.02				5.02						
	n_{base} min^{-1}	2552				2791						
DRS71S4 370 W	M_{max} Nm	5.14	5.20	5.2	5.2	5.2						
	n_{base} min^{-1}	2482	2651	2777	2890	2770						
DRS80S4 370 W	M_{max} Nm	5.14				5.14						
	n_{base} min^{-1}	2665				2876						
DRS71M4 400 W	M_{max} Nm	5.24	5.24	5.24	5.24	5.24						
	n_{base} min^{-1}	2475	2588	2728	2862	2714						
DRS71M4 550 W	M_{max} Nm		6.67	7.46	7.46	7.46	7.46	7.46				
	n_{base} min^{-1}		2566	2672	2834	2630	2848	2981				
DRS80S4 550 W	M_{max} Nm	5.55	6.79	8.91	9.41	8.61	9.41					
	n_{base} min^{-1}	2777	2672	2489	2623	2510	2637					
DRS90M4 550 W	M_{max} Nm	6.15	7.48	9.78	10.9	9.45	10.9					
	n_{base} min^{-1}	2700	2609	2461	2531	2482	2545					
DRS80S4 750 W	M_{max} Nm			9.46	12.5	9.11	12.8	12.8				
	n_{base} min^{-1}			2665	2496	2686	2468	2763				
DRS80M4 1.1 kW	M_{max} Nm				13.1	9.49	13.5	17.4	18.9			
	n_{base} min^{-1}				2707	2841	2693	2538	2714			
DRS90M4 1.5 kW	M_{max} Nm						13	16.9	23.3	25.1	25.1	
	n_{base} min^{-1}						2805	2686	2503	2644	2742	
DRS90L4 2.2 kW	M_{max} Nm							16.7	23.3	31.1	35.5	
	n_{base} min^{-1}							2869	2742	2595	2637	
DRS100M4 3 kW	M_{max} Nm								23	31	40.1	55
	n_{base} min^{-1}								2869	2756	2623	2503
DRS100LC4 3.7 kW	M_{max} Nm									31	40.7	62.4
	n_{base} min^{-1}									2876	2805	2644
DRS100M4 3.7 kW	M_{max} Nm									30.3	39.5	60.1
	n_{base} min^{-1}									2812	2693	2440
DRS112M4 3.7 kW	M_{max} Nm									31.9	41.6	60.4
	n_{base} min^{-1}									2713	2607	2438
DRS100L4 4 kW	M_{max} Nm									29.4	38.5	58.8
	n_{base} min^{-1}									2897	2812	2616
DRS100LC4 4 kW	M_{max} Nm									31	40.7	62.3
	n_{base} min^{-1}									2890	2812	2658
DRS112M4 4 kW	M_{max} Nm									31.1	40.5	54.7
	n_{base} min^{-1}									2742	2637	2590
DRS132S4 5.5 kW	M_{max} Nm										38.4	59.3
	n_{base} min^{-1}										2789	2654
DRS132M4 7.5 kW	M_{max} Nm											59.8
	n_{base} min^{-1}											2783
DRS160S4 9.2 kW	M_{max} Nm											58.1
	n_{base} min^{-1}											2869

Assignment of MOVIDRIVE® MDX61B0150-503 – MDX61B0750-503 (sizes 3 – 5):

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)						
		0150	0220	0300	0370	0450	0550	0750
DRS100LC4 3.7 kW	M_{max} Nm	74.5			**Notice:** The data is based on a line voltage of AC 460 V.			
	n_{base} min^{-1}	2721						
DRS100M4 3.7 kW	M_{max} Nm	64.6						
	n_{base} min^{-1}	2538						
DRS112M4 3.7 kW	M_{max} Nm	60.4						
	n_{base} min^{-1}	2596						
DRS100L4 4 kW	M_{max} Nm	78						
	n_{base} min^{-1}	2419						
DRS100LC4 4 kW	M_{max} Nm	74.2						
	n_{base} min^{-1}	2735						
DRS112M4 4 kW	M_{max} Nm	54.7						
	n_{base} min^{-1}	2719						
DRS132S4 5.5 kW	M_{max} Nm	79.8	89.8					
	n_{base} min^{-1}	2525	2678					
DRS132M4 7.5 kW	M_{max} Nm	81.1	118	131				
	n_{base} min^{-1}	2684	2520	2625				
DRS132MC4 9.2 kW	M_{max} Nm	80.3	118	155	169	169		
	n_{base} min^{-1}	2783	2678	2566	2666	2854		
DRS160S4 9.2 kW	M_{max} Nm	79	115	129	129	129		
	n_{base} min^{-1}	2784	2637	2747	2858	2916		
DRS160M4 11 kW	M_{max} Nm	79.3	116	153	173	173		
	n_{base} min^{-1}	2832	2716	2600	2605	2747		
DRS160MC4 15 kW	M_{max} Nm		112	149	182	224	227	
	n_{base} min^{-1}		2805	2721	2642	2537	2689	
DRS180S4 15 kW	M_{max} Nm		118	156	191	220	220	
	n_{base} min^{-1}		2858	2758	2663	2631	2784	
DRS180M4 18.5 kW	M_{max} Nm		117	156	192	235	278	309
	n_{base} min^{-1}		2900	2837	2774	2695	2610	2663
DRS180L4 22 kW	M_{max} Nm			155	191	236	280	349
	n_{base} min^{-1}			2879	2832	2774	2711	2610
DRS180LC4 30 kW	M_{max} Nm				183	227	270	336
	n_{base} min^{-1}				2869	2811	2753	2663
DRS200L4 30 kW	M_{max} Nm				182	225	268	334
	n_{base} min^{-1}				2879	2838	2793	2723
DRS225S4 37 kW	M_{max} Nm					228	274	344
	n_{base} min^{-1}					2863	2830	2781
DRS225M4 45 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 460 V.					271	340
	n_{base} min^{-1}						2900	2842
DRS225MC4 55 kW	M_{max} Nm							331
	n_{base} min^{-1}							2871

Assignment of MOVIDRIVE® MDX61B0900-503 – MDX61B2500-503 (sizes 6 – 7):

Motor voltage AC 230 V / 60 Hz		MOVIDRIVE® MDX61B...-5_3 (AC -400/500 V devices) in CFC operating modes (P700)					
		0900	**1100**	**1320**	**1600**	**2000**	**2500**
DRS180M4 18.5 kW	M_{max} Nm	309					
	n_{base} min^{-1}	2784					
DRS180L4 22 kW	M_{max} Nm	392			**Notice:** The data is based on a line voltage of AC 460 V.		
	n_{base} min^{-1}	2695					
DRS180LC4 30 kW	M_{max} Nm	388	388	388			
	n_{base} min^{-1}	2732	2821	2858			
DRS200L4 30 kW	M_{max} Nm	440	468	468			
	n_{base} min^{-1}	2609	2674	2793			
DRS225S4 37 kW	M_{max} Nm	454	536	536	536		
	n_{base} min^{-1}	2695	2629	2929	3015		
DRS225M4 45 kW	M_{max} Nm	448	529	663	678		
	n_{base} min^{-1}	2748	2674	2547	2629		
DRS225MC4 55 kW	M_{max} Nm	440	521	655	708	708	708
	n_{base} min^{-1}	2801	2752	2666	2756	2965	3027
DRS250M4 55 kW	M_{max} Nm	433	518	657	795	1014	1200
	n_{base} min^{-1}	2600	2600	2600	2600	2565	2468
DRS280S4 75 kW	M_{max} Nm		521	659	796	1013	1200
	n_{base} min^{-1}		2600	2600	2600	2600	2600
DRS280M4 90 kW	M_{max} Nm			651	789	1009	1200
	n_{base} min^{-1}			2600	2600	2600	2600
DRS315K4 110 kW	M_{max} Nm				783	1000	1243
	n_{base} min^{-1}				2500	2500	2500
DRS315S4 132 kW	M_{max} Nm				770	982	1220
	n_{base} min^{-1}				2500	2500	2500
DRS315S4 150 kW	M_{max} Nm					1006	1255
	n_{base} min^{-1}					2500	2500
DRS315M4 160 kW	M_{max} Nm					1003	1252
	n_{base} min^{-1}					2500	2500
DRS315M4 185 kW	M_{max} Nm						1256
	n_{base} min^{-1}						2500
DRS315L4 200 kW	M_{max} Nm						1253
	n_{base} min^{-1}						2500

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9.6.26 DRS.. motor selection in double-star connection (line AC 230 V / 60 Hz)

AC 230/460 V / 60 Hz motors in double-star connection

Assignment of MOVIDRIVE® MDX61B0015-2A3 – MDX61B0300-203 (sizes 1 – 4):

Motor voltage		MOVIDRIVE® MDX61B...-5_3 (AC 230 V devices) in CFC operating modes (P700)								
AC 230 V / 60 Hz		0015	0022	0037	0055	0075	0110	0150	0220	0300
DRS80S4 750 W	M_{max} Nm	12.8								
	n_{base} min^{-1}	1034								
DRS80M4 1.1 kW	M_{max} Nm	18.2	18.9				**Notice:** The data is based on a line voltage of AC 230 V.			
	n_{base} min^{-1}	1034	1027							
DRS90M4 1.5 kW	M_{max} Nm	17.7	21	25.1						
	n_{base} min^{-1}	1174	1097	1034						
DRS90L4 2.2 kW	M_{max} Nm	17.5	20.9	35.5	35.5					
	n_{base} min^{-1}	1329	1280	1062	1118					
DRS100M4 3 kW	M_{max} Nm		20.5	36.2	55					
	n_{base} min^{-1}		1364	1195	991					
DRS100LC4 3.7 kW	M_{max} Nm			36.6	57	74.5				
	n_{base} min^{-1}			1343	1223	1125				
DRS100M4 3.7 kW	M_{max} Nm			35.6	55					
	n_{base} min^{-1}			1245	1055					
DRS112M4 3.7 kW	M_{max} Nm			37.5	57.8	60.4				
	n_{base} min^{-1}			1254	1113	1154				
DRS100L4 4 kW	M_{max} Nm			34.6	53.7	71.3				
	n_{base} min^{-1}			1322	1167	1034				
DRS100LC4 4 kW	M_{max} Nm			36.5	56.9	74.2				
	n_{base} min^{-1}			1343	1223	1132				
DRS112M4 4 kW	M_{max} Nm			36.5	54.7	54.7				
	n_{base} min^{-1}			1266	1143	1213				
DRS132S4 5.5 kW	M_{max} Nm				54.1	72.1	89.8	89.8		
	n_{base} min^{-1}				1277	1195	1172	1195		
DRS132M4 7.5 kW	M_{max} Nm				54.3	73.1	107	131		
	n_{base} min^{-1}				1359	1301	1195	1148		
DRS132MC4 9.2 kW	M_{max} Nm					72.1	107	139	169	
	n_{base} min^{-1}					1365	1295	1230	1277	
DRS160S4 9.2 kW	M_{max} Nm					71.2	105	129	129	
	n_{base} min^{-1}					1361	1271	1229	1334	
DRS160M4 11 kW	M_{max} Nm					71.2	106	137	173	173
	n_{base} min^{-1}					1397	1324	1260	1260	1287
DRS160MC4 15 kW	M_{max} Nm						101	133	200	227
	n_{base} min^{-1}						1387	1345	1245	1234
DRS180S4 15 kW	M_{max} Nm						107	140	210	220
	n_{base} min^{-1}						1403	1350	1234	1271
DRS180M4 18.5 kW	M_{max} Nm	**Notice:** The data is based on a line voltage of AC 230 V.						139	211	251
	n_{base} min^{-1}							1397	1318	1271
DRS180L4 22 kW	M_{max} Nm							138	211	253
	n_{base} min^{-1}							1424	1361	1324
DRS180LC4 30 kW	M_{max} Nm								202	243
	n_{base} min^{-1}								1392	1361
DRS200L4 30 kW	M_{max} Nm								201	241
	n_{base} min^{-1}								1407	1382
DRS225S4 37 kW	M_{max} Nm									245
	n_{base} min^{-1}									1407

9.7 Motor selection for synchronous servomotors (SERVO)

INFORMATION

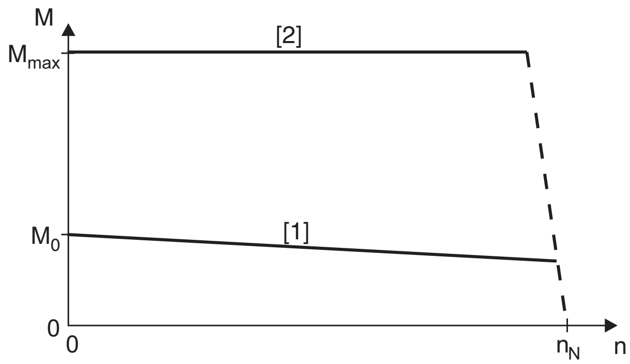
The torque limit *P304* is set automatically by the startup function of the MOVITOOLS® MotionStudio engineering software. Do not increase this automatically set value!

We recommend always using the latest version of MOVITOOLS® MotionStudio for startup. The latest MOVITOOLS® MotionStudio version can be downloaded from our homepage (www.sew-eurodrive.de).

9.7.1 Motor characteristics

The requirements to a servo drive include speed dynamics, stable speed and positioning accuracy. CM../CMP.. motors with MOVIDRIVE® meet these requirements.

Technically speaking, these are synchronous motors with permanent magnets on the rotor and a mounted resolver. The required characteristics, namely a constant torque over a wide speed range (up to min^{-1}), a high speed and control range and a high overload capacity, are achieved using control with MOVIDRIVE®. The mass moment of inertia of the servomotor is lower than that of the asynchronous motor. This means it is ideally suited to applications requiring dynamic speeds. The following figures shows the speed-torque characteristic curve of CM../CMP.. servomotors.



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[1] continuous torque

[2] Maximum torque

M_0 und M_{max} are determined by the motor. The attainable M_{max} can also be less, depending on the inverter.

Refer to the motor selection tables (CM../CMP..) the values for M_0.

Refer to the motor selection tables (CM../CMP..) for the values for M_{max}.

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9.7.2 Basic recommendations

For SEW-EURODRIVE motors, the motor data required for the SERVO operating modes is stored in MOVIDRIVE®.

Speed is the correcting variable in the SERVO operating modes with speed control. Torque is the correcting variable in the SERVO operating modes with torque control.

SERVO operation with speed control

There is no need to differentiate between the load types quadratic, dynamic and static when performing project planning for the SERVO operating mode. Project planning for a synchronous motor is carried out in accordance with the following requirements:

1. Effective torque requirement at average application speed.

$M_{eff} < M_0$

The point must lie below the characteristic curve for the continuous torque (figure 37, curve 1). The continuous torque of the CM.. series can be increased by 40% by forced air cooling if this operating point lies above the characteristic curve for self-cooling.

2. Maximum torque needed across the speed curve.

$M_{max} < M_{dyn\_mot}$

This operating point must lie below the characteristic curve for the maximum torque of the motor/MOVIDRIVE® combination (figure 37, curve 2).

3. Maximum speed

The maximum speed must not be configured higher than the nominal speed of the motor. Planetary gear units should be used for speeds greater than 3000 min^{-1} as a result of the high input speed.

$n_{max} \leq n_N$

SERVO operation with torque control

This operating mode enables the servomotor to be controlled directly with torque control. The setpoint sources of the speed-controlled SERVO mode can also be used for torque control. All speed setpoint sources (except for bus setpoints) are interpreted as current setpoint sources. Assign "Current" to a process data word for fieldbus control. The settings for evaluating the analog input (→ P11_, parameter description) also remain in effect. The fixed setpoints (P16_, P17_) can be entered either in the unit [min^{-1}] or [$\%I_{N\_inverter}$] (→ MOVITOOLS® MotionStudio).

The following relationship exists between the devices:

3000 min^{-1} ≙ 150% nominal inverter current

The torque at the output shaft of the servomotor can be calculated using the following formula:

$$M = \frac{M_0}{I_0} \times \frac{150\% \times I_{N\_inverter} \times n_{setpoint}}{3000\ 1/min}$$

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M_0	Continuous standstill torque according to motor tables
I_0	Continuous standstill current according to motor tables

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9.7.3 Motor table CM..

Characteristic values at U_{max} = AC 230 V / AC 400 V

		Without forced cooling fan			With forced cooling fan VR					Mass moment of inertia J_M	
n_N	Motor	M_0	I_0 1)	I_0 2)	M_{0_VR}	I_{0_VR} 1)	I_{0_VR} 2)	I_{max} 1)	I_{max} 2)	Without brake	with brake
min^{-1}		Nm	A	A	Nm	A	A	A	A	10^{-4} kgm²	
2000	CM71S	5.0	2.2	3.95	7.3	3.2	5.7	8.8	15.8	4.85	6.89
	CM71M	6.5	3.0	5.3	9.4	4.2	7.7	12.0	21.0	6.27	8.31
	CM71L	9.5	4.2	7.4	13.8	6.1	10.7	16.8	29.5	9.1	11.1
	CM90S	11.0	4.9	8.7	16.0	7.1	12.6	19.6	35.0	14.3	19.8
	CM90M	14.5	6.9	12.1	21.0	10.0	17.5	28.0	48.5	18.6	24.1
	CM90L	21.0	9.9	17.1	30.5	14.4	25.0	40.0	68.0	27.1	32.6
	CM112S	23.5	10.0	18.0	34.0	14.5	26.0	40.0	72	67.4	87.5
	CM112M	31.0	13.5	24.5	45.0	19.6	35.5	54.0	98	87.4	108
	CM112L	45.0	20.0	35.5	65.0	29.0	51.0	80.0	142	128	148
	CM112H	68.0	30.5	52.0	95.0	42.5	73.0	122	208	189	209
3000	CM71S	5.0	3.3	5.9	7.3	4.8	8.6	13.2	23.5	4.85	6.89
	CM71M	6.5	4.3	7.6	9.4	6.2	11.0	17.2	30.5	6.27	8.31
	CM71L	9.5	6.2	11.1	13.8	9.0	16.1	25.0	44.5	9.1	11.1
	CM90S	11.0	7.3	12.7	16.0	10.6	18.4	30.0	51	14.3	19.8
	CM90M	14.5	10.1	17.4	21.0	14.6	25.0	40.0	70	18.6	24.1
	CM90L	21.0	14.4	25.5	30.5	21.0	37.0	58.0	102	27.1	32.6
	CM112S	23.5	15.0	27.0	34.0	22.0	39.0	60.0	108	67.4	87.5
	CM112M	31.0	20.5	35.0	45.0	30.0	51.0	82.0	140	87.4	108
	CM112L	45.0	30.0	48.0	65.0	44.0	70.0	120	192	128	148
	CM112H	68.0	43.0	73.0	95.0	60.0	102	172	292	189	209
4500	CM71S	5.0	4.9	8.5	7.3	7.2	12.3	20.0	34	4.85	6.89
	CM71M	6.5	6.6	11.3	9.4	9.6	16.4	26.0	45	6.27	8.31
	CM71L	9.5	9.6	17.1	13.8	14.0	25.0	38.0	68	9.1	11.1
	CM90S	11.0	11.1	18.9	16.0	16.2	27.5	44.0	76	14.3	19.8
	CM90M	14.5	14.7	26.0	21.0	21.5	37.5	59.0	104	18.6	24.1
	CM90L	21.0	21.6	39.0	30.5	31.5	57	86.0	156	27.1	32.6
	CM112S	23.5	22.5	38.5	34.0	32.5	56	90.0	154	67.4	87.5
	CM112M	31.0	30.0	54.0	45.0	44.0	78	120	216	87.4	108
	CM112L	45.0	46.0	78.0	65.0	67.0	113	184	312	128	148
	CM112H	68.0	66.0	–	95.0	92.0	–	264	–	189	209
6000	CM71S	5.0	6.5	11.6	7.3	7.2	16.8	26.0	46.5	4.85	6.89
	CM71M	6.5	8.6	14.1	9.4	9.6	20.5	34.0	56	6.27	8.31
	CM71L	9.5	12.5	21.5	13.8	14.0	31.0	50.0	86	9.1	11.1
	CM90S	11.0	14.5	23.5	16.0	16.2	34.0	58.0	94	14.3	19.8
	CM90M	14.5	19.8	37.0	21.0	21.5	54	79.0	148	18.6	24.1
	CM90L	21.0	29.5	51.0	30.5	31.5	74	118.0	204	27.1	32.6

1) For DS../CM.. synchronous servomotors with AC 400 V system voltage
2) with AC 230 V system voltage

INFORMATION

Additional project planning notes and information on the DS../CM.. synchronous servomotors can be found in the "Servo Gearmotors" catalog, which can be ordered from SEW-EURODRIVE.

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9.7.4 CM.. motor selection (line AC 400 V / 50 Hz)

1. Nominal speed n_N= 2000 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in the SERVO operating modes (P700)															
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450
CM71S	M_{max} Nm	8.97	10.6	13.1	15.7	12.8	16	16.5									
CM71M	M_{max} Nm	8.88	10.6	13.4	16.6	13	17	20.2	21.5								
CM71L	M_{max} Nm		10.8	13.9	17.7	13.5	18.2	22.5	28.4	31.4							
CM90S	M_{max} Nm			13.9	17.9	13.5	18.5	23.3	30.8	38.3	39.6						
CM90M	M_{max} Nm				17	12.7	17.5	22.2	29.8	38.4	47.3	52.2					
CM90L	M_{max} Nm						17.6	22.4	30.3	39.5	49.9	70.6	75.6				
CM112S	M_{max} Nm						19.3	24.6	33.4	43.6	54.8	76.2	82.3				
CM112M	M_{max} Nm							24.1	32.8	43.2	54.9	79.6	100	108			
CM112L	M_{max} Nm									42	53.8	80.2	105	141	158		
CM112H	M_{max} Nm										53.3	80.3	107	151	190	220	238

2. Nominal speed n_N= 3000 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in the SERVO operating modes (P700)								
		0005	0008	0011	0014	0015	0022	0030	0040	0055
CM71S	M_{max} Nm	6.07	7.26	9.25	11.6	8.97	11.9	14.3	16.5	
CM71M	M_{max} Nm		7.46	9.58	12.2	9.28	12.5	15.5	19.5	21.5
CM71L	M_{max} Nm			9.49	12.2	9.19	12.6	15.9	21	26.2
CM90S	M_{max} Nm				12.1	9.07	12.5	15.8	21.3	27.5
CM90M	M_{max} Nm						12	15.2	20.6	26.9
CM90L	M_{max} Nm								20.9	27.4
CM112S	M_{max} Nm								22.2	29.3
CM112M	M_{max} Nm									28.4

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in the SERVO operating modes (P700)								
		0075	0110	0150	0220	0300	0370	0450	0550	0750
CM71L	M_{max} Nm	30.8	31.4							
CM90S	M_{max} Nm	34.1	39.6							
CM90M	M_{max} Nm	34	48.2	52.2						
CM90L	M_{max} Nm	34.9	51.3	65.9	75.6					
CM112S	M_{max} Nm	37.4	54.8	69.8	82.3					
CM112M	M_{max} Nm	36.4	54.3	71	96	108				
CM112L	M_{max} Nm	35.7	53.8	71.5	101	127	147	158		
CM112H	M_{max} Nm		56.8	75.9	109	140	167	198	224	238

3. Nominal speed n_N= 4500 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in the SERVO operating modes (P700)							
		0005	0008	0011	0014	0015	0022	0030	0040
CM71S	M_{max} Nm			6.34	8.11	6.13	8.35	10.4	13.4
CM71M	M_{max} Nm				8.09	6.08	8.34	10.5	13.9
CM71L	M_{max} Nm						8.15	10.4	14
CM90S	M_{max} Nm							10.4	14.1
CM90M	M_{max} Nm								14.2

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in the SERVO operating modes (P700)											
		0055	0075	0110	0150	0220	0300	0370	0450	0550	0750	0900	1100
CM71S	M_{max} Nm	16.2	16.5										
CM71M	M_{max} Nm	17.5	20.7	21.5									
CM71L	M_{max} Nm	18.1	22.5	30.3	31.4								
CM90S	M_{max} Nm	18.5	23.5	33.7	39.6								
CM90M	M_{max} Nm	18.6	23.8	35	45	52.2							
CM90L	M_{max} Nm	18.3	23.4	34.9	46	63.7	75.6						
CM112S	M_{max} Nm	19.5	25	37.4	49.2	67.5	82.3	82.3					
CM112M	M_{max} Nm		24.8	37.3	49.6	69.6	87.8	102	108.0				
CM112L	M_{max} Nm			34.9	46.8	67.2	86.8	104	123	141	158		
CM112H	M_{max} Nm					71.1	92.7	112	136	158	190	232	238

4. Nominal speed n_N= 6000 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400/500 V devices) in the SERVO operating modes (P700)															
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450
CM71S	M_{max} Nm				6.17	4.63	6.36	8.03	10.6	13.3	15.8	16.5					
CM71M	M_{max} Nm						6.41	8.15	10.9	14.1	17.2	21.5					
CM71L	M_{max} Nm							7.97	10.8	14.1	17.9	25.2	30.7	31.4			
CM90S	M_{max} Nm								10.8	14.2	18.2	26.7	34.3	39.6			
CM90M	M_{max} Nm									13.9	17.7	26.4	34.6	47.4	52.2		
CM90L	M_{max} Nm										17.2	25.7	34.1	48.3	61.3	71.7	75.6

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9.7.5 CM.. motor selection (line AC 230 V)

Nominal speed n_N= 2000 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in the SERVO operating modes (P700)								
		0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max} Nm	12.9	14.6	16.5						
CM71M	M_{max} Nm	13.4	15.4	21.5						
CM71L	M_{max} Nm	14	16.3	25.6	31.4					
CM90S	M_{max} Nm	13.9	16.3	26.9	38.1	39.6				
CM90M	M_{max} Nm	13.2	15.6	26.1	38.5	48.5	52.2			
CM90L	M_{max} Nm		15.9	26.8	40.3	52.2	71.3	75.6		
CM112S	M_{max} Nm			28.3	42.7	55.1	74.7	82.3		
CM112M	M_{max} Nm			27.5	41.9	54.9	77.1	94.8	108	
CM112L	M_{max} Nm				41.6	54.9	79.1	100	139	158
CM112H	M_{max} Nm					56.7	82.4	106	153	178

Nominal speed n_N= 3000 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in the SERVO operating modes (P700)								
		0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max} Nm	9.15	10.6	15.8	16.5					
CM71M	M_{max} Nm	9.58	11.2	17.6	21.5					
CM71L	M_{max} Nm	9.36	11.0	18.2	25.8	31	31.4			
CM90S	M_{max} Nm	9.51	11.2	18.8	27.8	35.3	39.6			
CM90M	M_{max} Nm			18.3	27.5	35.6	48.8	52.2		
CM90L	M_{max} Nm			18	27.2	35.7	50.8	63.4	75.6	
CM112S	M_{max} Nm			18.8	28.7	37.7	53.4	66.3	82.3	
CM112M	M_{max} Nm				29.3	38.6	55.6	70.3	97.4	108
CM112L	M_{max} Nm					40.5	58.8	75.4	109	126
CM112H	M_{max} Nm						58.5	75.5	111	131

Nominal speed n_N= 4500 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in the SERVO operating modes (P700)								
		0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max} Nm	6.45	7.56	12.1	16.3	16.5				
CM71M	M_{max} Nm	6.48	7.63	12.6	17.8	21.4	21.5			
CM71L	M_{max} Nm		7.15	12.1	17.9	22.8	29.9	31.4		
CM90S	M_{max} Nm			12.7	19.1	24.9	34.5	39.6		
CM90M	M_{max} Nm			12.2	18.6	24.3	34.6	43.2	52.2	
CM90L	M_{max} Nm				17.8	23.5	33.9	43.2	61.7	70.8
CM112S	M_{max} Nm				20	26.5	38.2	48.6	68.3	77.7
CM112M	M_{max} Nm					24.9	36.3	46.6	67.7	78.9

Nominal speed n_N= 6000 min^{-1}:

Motor		MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in the SERVO operating modes (P700)								
		0015	0022	0037	0055	0075	0110	0150	0220	0300
CM71S	M_{max} Nm	4.74	5.58	9.23	13.2	16	16.5			
CM71M	M_{max} Nm	5.19	6.12	10.2	14.9	18.6	21.5			
CM71L	M_{max} Nm			9.6	14.5	18.7	25.6	30.3	31.4	
CM90S	M_{max} Nm			10.2	15.5	20.2	28.6	35.4	39.6	
CM90M	M_{max} Nm				13.1	17.2	24.8	31.5	44.7	51
CM90L	M_{max} Nm					18	26	33.3	48.6	56.8

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9.7.6 CMP.. motor table

Key to the technical data

n_N	Rated speed
M_0	Standstill torque (thermal continuous torque at low speeds)
I_0	Standstill current
M_{pk}	Dynamic limit torque
I_{max}	Maximum permitted motor current
M_{0VR}	Standstill torque with forced cooling fan
I_{0VR}	Standstill current with forced cooling fan
J_{mot}	Mass moment of inertia of the motor
J_{bmot}	Mass moment of inertia of the brakemotor
$M_{1m,100°C}$	Maximum dynamic braking torque in case of emergency off
M_{1max}	Minimal averaged dynamic braking torque in case of emergency off at 100 °C
$M_{2,\ 20\ °C}$	Nominal torque for slipping brake disk (relative speed between brake disk and friction surface: 1 m/s) at 20 °C
$M_{4,100\ °C}$	Minimum holding torque at 100 °C
W_{max1}	Maximum permitted braking work per braking operation
W_{max2}	Maximum permitted braking work per braking operation with optional braking torque
L_1	Inductance between connection phase and star point
R_1	Resistance between connection phase and star point
V_{p0} cold	Internal voltage at 1000 min^{-1}
m_{mot}	Mass of the motor
m_{bmot}	Mass of the brakemotor

CMP40 – CMP112, 400 V

Information on motors

n_N min^{-1}	Motor	M_0 Nm	I_0 A	M_{pk} Nm	I_{max} A	M_{0VR} Nm	I_{0VR} A	m kg	J_{mot} $10^{-4}kgm^2$	L_1 mH	R_1 Ω	V_{p0} cold V
2000	CMP71S	6.4	3.4	19.2	17	8.7	4.6	7	3.13	33.5	3.48	128
	CMP71M	9.4	5	30.8	26	13.7	7.3	8.4	4.17	21.6	1.87	127
	CMP71L	13.1	6.3	46.9	39	21	10.1	11.4	6.27	16.2	1.2	142
	CMP80S	13.4	6.9	42.1	33	18.5	9.5	12.8	9	15.3	1.1	133
	CMP80M	18.7	9.3	62.6	48	27	13.4	16.5	12.1	10.5	0.689	136
	CMP80L	27.5	12.5	107	72	44	20	21.4	18.3	7.58	0.438	149
	CMP100S	25.5	13.3	68.3	49	36	18.8	19.8	20.3	8.51	0.439	130
	CMP100M	31	14.7	108	69	47	22.3	24.8	27.2	6.63	0.302	141
	CMP100L	47	21.8	178.8	113	70	32.5	34.6	40.9	4.17	0.169	145
	CMP112S	30	14.3	88	51	43	21	38.4	74	8.63	0.38	143
	CMP112M	45	21	136	74	68	32	46.2	103	5.82	0.212	147
	CMP112L	69	33	225	124	109	52	62.6	163	3.33	0.105	145
	CMP112H	83	38	270	148	123	57	70.4	193	2.85	0.0846	149
	CMP112E	95	44.5	320	175	150	71	78.2	222	2.34	0.066	146

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n_N min^{-1}	Motor	M_0 Nm	I_0 A	M_{pk} Nm	I_{max} A	M_{0VR} Nm	I_{0VR} A	m kg	J_{mot} $10^{-4}kgm^2$	L_1 mH	R_1 Ω	V_{p0} cold V
3000	CMP40S	0.5	1.2	1.9	6.1	—	—	1.3	0.1	23	11.9	27.5
	CMP40M	0.8	0.95	3.8	6	—	—	1.6	0.15	45.9	19.9	56.3
	CMP50S	1.3	0.96	5.2	5.1	1.7	1.25	2.3	0.42	71.2	22.5	86.3
	CMP50M	2.4	1.68	10.3	9.6	3.5	2.45	3.3	0.67	38.3	9.96	90.3
	CMP50L	3.3	2.2	15.4	13.6	4.8	3.2	4.1	0.92	30.4	7.42	98.2
	CMP63S	2.9	2.15	11.1	12.9	4	3	4	1.15	36.4	6.8	90.1
	CMP63M	5.3	3.6	21.4	21.6	7.5	5.1	5.7	1.92	21.8	3.56	100
	CMP63L	7.1	4.95	30.4	29.7	10.3	7.2	7.5	2.69	14.2	2.07	99.9
	CMP71S	6.4	4.9	19.2	25	8.7	6.7	7	3.13	15.7	1.48	87.5
	CMP71M	9.4	7.5	30.8	39	13.7	10.9	8.4	4.17	9.72	0.809	85.3
	CMP71L	13.1	9.4	46.9	58	21	15.1	11.4	6.27	7.34	0.559	95.7
	CMP80S	13.4	10	42.1	47	18.5	13.8	12.8	9	7.2	0.544	91.1
	CMP80M	18.7	13.4	62.6	69	27	19.3	16.5	12.1	5.03	0.344	94.3
	CMP80L	27.5	18.7	107	107	44	30	21.4	18.3	3.37	0.21	99.2
	CMP100S	25.5	19.6	68.3	73	36	27.5	19.8	20.3	3.91	0.214	88
	CMP100M	31	21.8	108	102	47	33	24.8	27.2	3.04	0.142	95.5
	CMP100L	47	32.3	178.8	167	70	48	34.6	40.9	1.9	0.0809	98
	CMP112S	30	21	88	74	43	30.5	38.4	74	4.04	0.177	97.5
	CMP112M	45	32	136	113	68	49	46.2	103	2.49	0.0896	96.1
	CMP112L	69	49	225	183	109	77	62.6	163	1.53	0.048	98
	CMP112H	83	57	270	220	123	84	70.4	193	1.29	0.0388	100
	CMP112E	95	65	320	255	150	104	78.2	222	1.09	0.031	99.8
4500	CMP40S	0.5	1.2	1.9	6.1	—	—	1.3	0.1	23	11.9	27.5
	CMP40M	0.8	0.95	3.8	6	—	—	1.6	0.15	45.9	19.9	56.3
	CMP50S	1.3	1.32	5.2	7	1.7	1.7	2.3	0.42	37.2	11.6	62.4
	CMP50M	2.4	2.3	10.3	13.1	3.5	3.35	3.3	0.67	20.7	5.29	66.3
	CMP50L	3.3	3.15	15.4	19.5	4.8	4.6	4.1	0.92	14.6	3.57	68
	CMP63S	2.9	3.05	11.1	18.3	4	4.2	4	1.15	18.3	3.35	63.9
	CMP63M	5.3	5.4	21.4	32.4	7.5	7.6	5.7	1.92	9.79	1.48	67
	CMP63L	7.1	6.9	30.4	41.4	10.3	10	7.5	2.69	7.21	1.07	71.1
	CMP71S	6.4	7.3	19.2	38	8.7	9.9	7	3.13	7.07	0.719	58.7
	CMP71M	9.4	10.9	30.8	57	13.7	15.9	8.4	4.17	4.54	0.384	58.3
	CMP71L	13.1	14.1	46.9	87	21	22.5	11.4	6.27	3.26	0.241	63.8
	CMP80S	13.4	15.3	42.1	73	18.5	21	12.8	9	3.06	0.221	59.4
	CMP80M	18.7	20.1	62.6	103	27	29	16.5	12.1	2.24	0.148	62.9
	CMP80L	27.5	27.8	107	159	44	44.5	21.4	18.3	1.54	0.0855	67
	CMP100S	25.5	30	68.3	111	36	42.5	19.8	20.3	1.68	0.0857	57.7
	CMP100M	31	33.1	108	154	47	50	24.8	27.2	1.32	0.065	62.9
	CMP100L	47	48.4	178.8	251	70	72	34.6	40.9	0.844	0.038	65.3
	CMP112S	30	31.5	88	112	43	45.5	38.4	74	1.78	0.0801	64.7
	CMP112M	45	47	136	168	68	72	46.2	103	1.14	0.0412	65
	CMP112L	69	73	225	275	107	114	62.6	163	0.68	0.0213	65.3
	CMP112H	83	86	270	335	123	128	70.4	193	0.557	0.0165	65.9
	CMP112E	95	98	320	385	150	156	78.2	222	0.484	0.0134	66.5

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n_N min^{-1}	Motor	M_0 Nm	I_0 A	M_{pk} Nm	I_{max} A	M_{0VR} Nm	I_{0VR} A	m kg	J_{mot} $10^{-4}kgm^2$	L_1 mH	R_1 Ω	V_{p0} cold V
6000	CMP40S	0.5	1.2	1.9	6.1	—	—	1.3	0.1	23	11.9	27.5
	CMP40M	0.8	1.1	3.8	6.9	—	—	1.6	0.15	34	15	48.5
	CMP50S	1.3	1.7	5.2	9	1.7	2.2	2.3	0.42	22.5	7.11	48.5
	CMP50M	2.4	3	10.3	17.1	3.5	4.4	3.3	0.67	12	3.21	50.5
	CMP50L	3.3	4.2	15.4	26	4.8	6.1	4.1	0.92	8.2	1.91	51
	CMP63S	2.9	3.9	11.1	23.4	4	5.4	4	1.15	11.2	2.1	50
	CMP63M	5.3	6.9	21.4	41.4	7.5	9.8	5.7	1.92	5.9	0.92	52
	CMP63L	7.1	9.3	30.4	55.8	10.3	13.5	7.5	2.69	4	0.62	53
	CMP71S	6.4	9.6	19.2	50	8.7	13.1	7	3.13	4.13	0.395	44.9
	CMP71M	9.4	14.7	30.8	76	13.7	21.5	8.4	4.17	2.53	0.206	43.5
	CMP71L	13.1	18.8	46.9	115	21	30	11.4	6.27	1.84	0.145	47.9
	CMP80S	13.4	20	42.1	95	18.5	27.5	12.8	9	1.8	0.136	45.6
	CMP80M	18.7	26.4	62.6	135	27	38	16.5	12.1	1.3	0.0873	47.9
	CMP80L	27.5	37.6	107	215	44	60	21.4	18.3	0.843	0.0507	49.6

CMP40 – CMP100, 230 V

Information on motors

n_N min^{-1}	Motor	M_0 Nm	I_0 A	M_{pk} Nm	I_{max} A	M_{0VR} Nm	I_{0VR} A	m kg	J_{mot} $10^{-4}kgm^2$	L_1 mH	R_1 Ω	V_{p0} cold V
3000	CMP40S	0.5	1.2	1.9	6.1	—	—	1.3	0.1	23	11.9	27.5
	CMP40M	0.8	1.5	3.8	9	—	—	1.6	0.15	18.4	7.85	35.7
	CMP50S	1.3	1.64	5.2	9.8	—	—	2.3	0.42	24.3	7.39	50.4
	CMP50M	2.4	2.84	10.3	17.05	—	—	3.3	0.67	13.5	3.41	53.7
	CMP50L	3.3	3.84	15.4	23.1	—	—	4.1	0.92	9.79	2.34	55.7
	CMP63S	2.9	3.61	11.1	21.65	—	—	4	1.15	13	2.56	54
	CMP63M	5.3	6.35	21.4	38.1	—	—	5.7	1.92	7.09	1.12	57
	CMP63L	7.1	8.76	30.4	52.59	—	—	7.5	2.69	4.47	0.655	56
	CMP71S	6.4	8.7	19.2	44	8.7	11.8	7	3.13	5.03	0.483	49.5
	CMP71M	9.4	13.1	30.8	68	13.7	19.1	8.4	4.17	3.17	0.26	48.7
	CMP71L	13.1	16.8	46.9	103	21	27	11.4	6.27	2.31	0.163	53.7
	CMP80S	13.4	17.7	42.1	83	18.5	24.5	12.8	9	2.3	0.166	51.5
	CMP80M	18.7	23.5	62.6	121	27	34	16.5	12.1	1.64	0.113	53.9
	CMP80L	27.5	32.5	107	186	44	52	21.4	18.3	1.11	0.0728	57
	CMP100S	25.5	34.2	68.3	127	—	—	19.8	20.3	1.29	0.0664	50.5
	CMP100M	31	40	108	187	—	—	24.8	27.2	0.904	0.0445	52.1
	CMP100L	47	58.1	178.8	300	—	—	34.6	40.9	0.586	0.025	54.4
4500	CMP40S	0.5	1.2	1.9	6.1	—	—	1.3	0.1	23	11.9	27.5
	CMP40M	0.8	1.5	3.8	9	—	—	1.6	0.15	18.4	7.85	35.7
	CMP50S	1.3	2.29	5.2	13.75	—	—	2.3	0.42	12.3	3.73	35.9
	CMP50M	2.4	4.025	10.3	24.2	—	—	3.3	0.67	6.75	1.68	37.9
	CMP50L	3.3	5.53	15.4	33.2	—	—	4.1	0.92	4.73	1.14	38.7
	CMP63S	2.9	5.25	11.1	31.5	—	—	4	1.15	6.18	1.09	37.1
	CMP63M	5.3	9.78	21.4	58.7	—	—	5.7	1.92	2.99	0.462	37
	CMP63L	7.1	12.01	30.4	72.07	—	—	7.5	2.69	2.38	0.339	40.9
	CMP71S	6.4	12.8	19.2	67	8.7	17.4	7	3.13	2.29	0.226	33.4
	CMP71M	9.4	19.2	30.8	101	13.7	28	8.4	4.17	1.46	0.127	33.1
	CMP71L	13.1	25.6	46.9	158	—	—	11.4	6.27	1.05	0.0762	36.3
	CMP80S	13.4	27	42.1	129	18.5	37	12.8	9	0.983	0.0698	33.7
	CMP80M	18.7	35	62.6	180	27	51	16.5	12.1	0.73	0.051	35.9
	CMP80L	27.5	49.9	107	285	—	—	21.4	18.3	0.474	0.0305	37.2
	CMP100S	25.5	54.5	68.3	200	—	—	19.8	20.3	0.509	0.0268	31.7
	CMP100M	31	60	108	279	—	—	24.8	27.2	0.402	0.0179	34.7

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n_N min^{-1}	Motor	M_0 Nm	I_0 A	M_{pk} Nm	I_{max} A	M_{0VR} Nm	I_{0VR} A	m kg	J_{mot} $10^{-4}kgm^2$	L_1 mH	R_1 Ω	V_{p0} cold V
6000	CMP40S	0.5	1.36	1.9	6.8	—	—	1.3	0.1	17.9	9.19	24.3
	CMP40M	0.8	1.91	3.8	11.5	—	—	1.6	0.15	11.2	4.83	27.8
	CMP50S	1.3	3.07	5.2	18.45	—	—	2.3	0.42	6.85	2	26.8
	CMP50M	2.4	5.25	10.3	31.5	—	—	3.3	0.67	3.97	1.03	29
	CMP50L	3.3	7.6	15.4	45.4	—	—	4.1	0.92	2.53	0.596	28.3
	CMP63S	2.9	6.78	11.1	40.7	—	—	4	1.15	3.69	0.668	28.7
	CMP63M	5.3	12.06	21.4	72.36	7.5	17.04	5.7	1.92	1.96	0.296	30
	CMP71S	6.4	17	19.2	89	8.7	23	7	3.13	1.32	0.124	25.3
	CMP71M	9.4	26.3	30.8	136	—	—	8.4	4.17	0.793	0.0663	24.4
	CMP80S	13.4	35.5	42.1	168	18.5	48.5	12.8	9	0.575	0.0416	25.7
	CMP80M	18.7	46.9	62.6	240	—	—	16.5	12.1	0.411	0.0282	26.9
	CMP80L	27.5	68	107	389	—	—	21.4	18.3	0.255	0.0155	27.3

9.7.7 CMP.. motor selection (line AC 400 V)

Nominal speed n_N= 2000 min^{-1}

Assignment of MOVIDRIVE® MDX61B0005-5_3 – MDX61B0110-5_3 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
CMP71S	M_{max} Nm	6.47	7.64	9.58	11.8	9.34	12.1	14.4	17.1	18		
CMP71M	M_{max} Nm			9.63	12.3	9.37	12.7	15.7	20.1	24.2	27.4	
CMP71L	M_{max} Nm				13.6	10.2	14.1	17.8	23.7	30	36.1	41.1
CMP80S	M_{max} Nm				12.7	9.48	13.2	16.9	22.7	28.7	34	39.3
CMP80M	M_{max} Nm						13.9	17.7	23.8	30.8	38.2	51.1
CMP100S	M_{max} Nm							17	23	30	37.6	52.2
CMP80L	M_{max} Nm							19.1	25.9	33.7	42.6	61.3
CMP100M	M_{max} Nm								25	32.9	42	61.4
CMP100L	M_{max} Nm									34	43.5	64.8

Assignment of MOVIDRIVE® MDX61B0150-5_3 - MDX61B1320-5_3 (sizes 3 – 6):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)									
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
CMP80M	M_{max} Nm	57									
CMP100S	M_{max} Nm	62.2	68.3								
CMP80L	M_{max} Nm	77	89.4								
CMP100M	M_{max} Nm	78	98.8	100							
CMP100L	M_{max} Nm	85.1	117	142	156						

Nominal speed n_N= 3000 min^{-1}

Assignment of MOVIDRIVE® MDX61B0005-5_3 - MDX61B0110-5_3 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
CMP40S	M_{max} Nm	1.46	1.65	1.90								
CMP40M	M_{max} Nm	2.96	3.35	3.8								
CMP50S	M_{max} Nm	4.47	5.01	5.2								
CMP50M	M_{max} Nm	5.44	6.35	7.78	9.29							
CMP63S	M_{max} Nm	5.15	5.97	7.25	8.62							
CMP50L	M_{max} Nm	5.86	6.93	8.68	10.7	8.44	11	13.1	14			
CMP63M	M_{max} Nm	6.08	7.18	8.99	11.1							
CMP63L	M_{max} Nm			8.93	11.3							
CMP71S	M_{max} Nm			6.92	8.7	6.74	8.97	11	13.9	16.4	18	
CMP71M	M_{max} Nm				8.33	6.32	8.62	10.9	14.4	18.2	21.9	27.4
CMP71L	M_{max} Nm						9.44	12	16.2	21.1	26.4	36.2
CMP80S	M_{max} Nm						8.98	11.5	15.8	20.7	25.9	34.7
CMP80M	M_{max} Nm							12.3	16.7	21.8	27.6	39.5
CMP100S	M_{max} Nm									20.5	26.2	38.2
CMP80L	M_{max} Nm								17.4	22.8	29	42.8
CMP100M	M_{max} Nm									22.2	28.4	42.5
CMP100L	M_{max} Nm											44

Assignment of MOVIDRIVE® MDX61B0150-5_3 - MDX61B1320-5_3 (sizes 3 – 6):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)									
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
CMP71L	M_{max} Nm	41.1									
CMP80S	M_{max} Nm	39.3									
CMP80M	M_{max} Nm	48.8	57								
CMP100S	M_{max} Nm	48.5	61.4	68.3							
CMP80L	M_{max} Nm	55.5	74.8	89.4							
CMP100M	M_{max} Nm	55.8	76.1	91.8	100						
CMP100L	M_{max} Nm	58.5	82.7	105	123	142	156				

Nominal speed n_N= 4500 min^{-1}

Assignment of MOVIDRIVE® MDX61B0005-5_3 – MDX61B0110-5_3 (sizes 0 – 2):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
CMP40S	M_{max} Nm	1.46	1.65	1.9		1.89						
CMP40M	M_{max} Nm	2.96	3.35	3.8		3.8						
CMP50S	M_{max} Nm	3.54	4.07	4.83	5.2	4.73	5.2					
CMP50M	M_{max} Nm	4.11	4.85	6.05	7.43	5.88	7.61	9.04	10.3			
CMP63S	M_{max} Nm	3.82	4.48	5.54	6.76	5.4	6.92	8.19	9.85	11.1		
CMP50L	M_{max} Nm	4.18	4.97	6.31	7.93	6.12	8.15	10	12.6	15.1		
CMP63M	M_{max} Nm			6.27	7.88	6.08	8.1	9.97	12.8	15.7	18.4	21.4
CMP63L	M_{max} Nm				8.31	6.33	8.55	10.7	14	17.7	21.5	28.2
CMP71S[1)]	M_{max} Nm				6.06	4.63	6.26	7.8	10.2	12.7	15	18
CMP71M[1)]	M_{max} Nm						5.98	7.58	10.2	13.1	16.3	22.4
CMP71L[1)]	M_{max} Nm								10.9	14.3	18.2	26.4
CMP80S[1)]	M_{max} Nm								10.2	13.5	17.4	25.5
CMP80M[1)]	M_{max} Nm									14.6	18.7	27.6
CMP100S[1)]	M_{max} Nm										17.2	25.7
CMP80L[1)]	M_{max} Nm										19.7	29.3
CMP100M[1)]	M_{max} Nm											28.1

1) Due to the high output frequency, the motors must be operated with a PWM frequency of at least 8 kHz (P864).

Assignment of MOVIDRIVE® MDX61B0150-5_3 - MDX61B1320-5_3 (sizes 3 – 6):

Motor		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)									
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
CMP63L	M_{max} Nm	30.4									
CMP71S[1)]	M_{max} Nm										
CMP71M[1)]	M_{max} Nm	26.4	27.4								
CMP71L[1)]	M_{max} Nm	33.3	41.1								
CMP80S[1)]	M_{max} Nm	31.8	38.4	39.3							
CMP80M[1)]	M_{max} Nm	35.8	47.4	55.3	57						
CMP100S[1)]	M_{max} Nm	33.7	46.2	56	62.5	68.3					
CMP80L[1)]	M_{max} Nm	38.6	53.9	67.5	78.5	89.4					
CMP100M[1)]	M_{max} Nm	37.4	53	67.2	78.8	90.4	99.5	100			
CMP100L[1)]	M_{max} Nm	39.2	56.2	72.6	87.2	104	119	140	156		

1) Due to the high output frequency, the motors must be operated with a PWM frequency of at least 8 kHz (P864).

Nominal speed n_N= 6000 min^{-1}

Assignment of MOVIDRIVE® MDX61B0005-5_3 – MDX61B0110-5_3 (sizes 0 – 2):

Motor[1)]		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)										
		0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110
CMP40S	M_{max} Nm	1.46	1.65	1.9		1.73	1.9					
CMP40M	M_{max} Nm	2.64	3.04	3.58	3.8	3.19	3.8					
CMP50S	M_{max} Nm	2.88	3.35	4.08	4.83	3.55	4.48	5.2	5.2			
CMP50M	M_{max} Nm	3.22	3.81	4.8	5.99	4.07	5.41	6.63	8.37	10	10.3	
CMP63S	M_{max} Nm	3.07	3.61	4.52	5.58	3.85	5.06	6.14	7.7	9.19	10.5	11.1
CMP50L	M_{max} Nm		3.78	4.82	6.12	4.05	5.47	6.84	8.95	11.2	13.4	15.4
CMP63M	M_{max} Nm				6.32	4.21	5.66	7.06	9.23	11.6	14.1	18.5
CMP63L	M_{max} Nm						5.58	7.03	9.36	12	14.9	20.8
CMP71S	M_{max} Nm						4.83	6.07	8.03	10.2	12.4	16.2
CMP71M	M_{max} Nm								7.62	9.94	12.5	17.9
CMP71L	M_{max} Nm								8.14	10.7	13.7	20.3
CMP80S	M_{max} Nm									10.3	13.3	19.9
CMP80M	M_{max} Nm										14.3	21.3
CMP80L	M_{max} Nm											21.8

1) At a nominal speed of nN= 6000 1/min, the motors must be operated with a minimum PWM frequency (P864) of 8 kHz due to the high output frequency.

Assignment of MOVIDRIVE® MDX61B0150-5_3 - MDX61B1320-5_3 (sizes 3 – 6):

Motor[1)]		MOVIDRIVE® MDX61B...-5_3 (AC 400 V devices) in the SERVO operating modes (P700)									
		0150	0220	0300	0370	0450	0550	0750	0900	1100	1320
CMP63M	M_{max} Nm	21.4	21.4								
CMP63L	M_{max} Nm	25.5	30.4	30.4							
CMP71S	M_{max} Nm	18.0									
CMP71M	M_{max} Nm	22.2	27.2	27.4							
CMP71L	M_{max} Nm	26.4	35.2	41.1	41.1						
CMP80S	M_{max} Nm	25.9	33.8	38.4	39.3						
CMP80M	M_{max} Nm	28	38.6	47.2	53.2	57.0					
CMP80L	M_{max} Nm	28.9	40.9	52.2	61.9	72.6	81.9	89.4			

1) At a nominal speed of nN= 6000 1/min, the motors must be operated with a minimum PWM frequency (P864) of 8 kHz due to the high output frequency.

9.7.8 CMP.. motor selection (line AC 230 V)

Nominal speed n_N= 3000 min^{-1}

Motor			MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in the SERVO operating modes (P700)								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
CMP40S	M_{max}	Nm	1.9								
CMP40M	M_{max}	Nm	3.8								
CMP50S	M_{max}	Nm	5.2								
CMP50M	M_{max}	Nm	8.03	9.01	10.3						
CMP63S	M_{max}	Nm	7.51	8.4	11.1						
CMP50L	M_{max}	Nm	8.77	10.1	14.6	15.4					
CMP63M	M_{max}	Nm	9	10.3	15.5	20	21.4				
CMP63L	M_{max}	Nm	8.91	10.4	16.4	22.8	27.4	30.4			
CMP71S	M_{max}	Nm	6.91	8.02	12.4	16.3	18				
CMP71M	M_{max}	Nm	6.59	7.74	12.7	18.3	22.4	27.4			
CMP71L	M_{max}	Nm		8.25	13.9	20.8	26.7	35.7	41.1		
CMP80S	M_{max}	Nm			13.6	20.6	26.4	34.4	38.6	39.3	
CMP80M	M_{max}	Nm			14.5	21.9	28.5	39.4	47.5	57	
CMP100S	M_{max}	Nm				20.7	27.2	38.3	47.3	61.3	66.4
CMP80L	M_{max}	Nm				23.1	30.2	43	54.1	74.8	84.5
CMP100M	M_{max}	Nm				21.2	28.1	40.6	51.6	72.9	83.2

Nominal speed n_N= 4500 min^{-1}

Motor			MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in the SERVO operating modes (P700)								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
CMP50L	M_{max}	Nm	6.34	7.36	11.4	14					
CMP71S[1)]	M_{max}	Nm	4.81	5.62	9.04	12.7	15.3	18			
CMP71M[1)]	M_{max}	Nm			8.87	13.1	16.7	22.3	25.8	27.4	
CMP80S[1)]	M_{max}	Nm			8.75	13.5	17.9	25.3	30.9	38.2	
CMP80M[1)]	M_{max}	Nm				14.8	19.4	27.8	34.8	47.4	52.6
CMP100S[1)]	M_{max}	Nm					17.1	24.8	31.5	44.6	51

1) Due to the high output frequency, the motors must be operated with a PWM frequency of at least 8 kHz (P864).

Nominal speed n_N= 6000 min^{-1}

Motor[1)]			MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) in the SERVO operating modes (P700)								
			0015	0022	0037	0055	0075	0110	0150	0220	0300
CMP40S	M_{max}	Nm	1.9								
CMP40M	M_{max}	Nm	3.3	3.65							
CMP50S	M_{max}	Nm	3.58	4.05	5.2						
CMP50M	M_{max}	Nm	4.23	4.90	7.57	10	10.3				
CMP63S	M_{max}	Nm	4.02	4.63	7.02	9.26	10.7	11.1			
CMP50L	M_{max}	Nm	4.08	4.77	7.72	11.0	13.4	15.4			
CMP63M	M_{max}	Nm	4.38	5.11	8.21	11.7	14.5	18.5	21.1	21.4	
CMP71S	M_{max}	Nm		4.29	7.02	10.1	12.6	16.1	18		
CMP80S	M_{max}	Nm				10.2	13.5	19.6	24.8	33.4	36.6

1) At a nominal speed of nN= 6000 1/min, the motors must be operated with a minimum PWM frequency (P864) of 8 kHz due to the high output frequency.

9.8 SL2 synchronous linear motors

INFORMATION

For detailed information on SL2 synchronous linear motors, refer to the operating instructions and the catalog "SL2 Synchronous Linear Motors". The documents are available for download from the homepage of SEW-EURODRIVE.

9.9 Overload capacity of the inverter

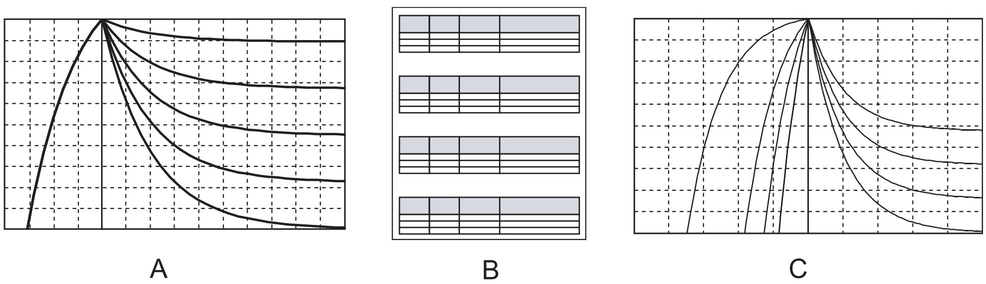
MOVIDRIVE® drive inverters calculate the load on the inverter output stage permanently (device utilization). Consequently, they enable the maximum possible power to be produced in each operating status. The heat sink constant T of the inverter is used as the time unit. The heat sink time constant T is different for every size (see section "Heat sink time constant")

9.9.1 Determining the overload capacity

The project planning software SEW-Workbench supports the inverter dimensioning with the function "detailed calculation" in the electronics selection for MOVIDRIVE® B. Use this function for correct dimensioning, especially for applications with output frequencies f_O < 2 Hz.

Three steps are required to determine the overload capacity:

1. Determine the continuous output current I_{out} depending on the output frequency (especially < 2 Hz) and the PWM frequency.
2. Characterize the duration of the overload:
   - Minutes: $t_{overload} \geq 0.25$ T (e.g. fans)
   - Seconds: $t_{overload} \geq 0.25$ T (e.g. roller conveyors)
   - Fraction of a second: $t_{overload} \leq 1$ s (e.g. dynamic servo applications)
3. Determine the overload capacity in the characterized time range (→ following figure):
   - Minutes: "Overload diagrams (A)" (→ 🗎 443)
   - Seconds: "Tables and formulas (B)" (→ 🗎 465)
   - Fraction of a second: "Overload diagrams (C)" (→ 🗎 468)



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Heat sink time constant T

Heat sink time constant T for inverter size									
0S	0M	1	2	2S	3	4	5	6	7
9.3 min = 560 s	6 min = 360 s	3.5 min = 210 s	5 min = 300 s	4 min = 240 s	4 min = 240 s	9 min = 540 s	5 min = 300 s	4.5 min = 270 s	1.2 min = 72 s

9.9.2 Load cycle

The required load cycle is the basis for determining the overload capacity of the inverter. The following conditions must be fulfilled for periodic repetition of a load cycle:

- At the end of the overload time t_1, the value is just below the critical heat sink temperature.
- During the following low-load time t_2, the heat sink temperature drops to such a degree that another overload is possible for the duration t_1.

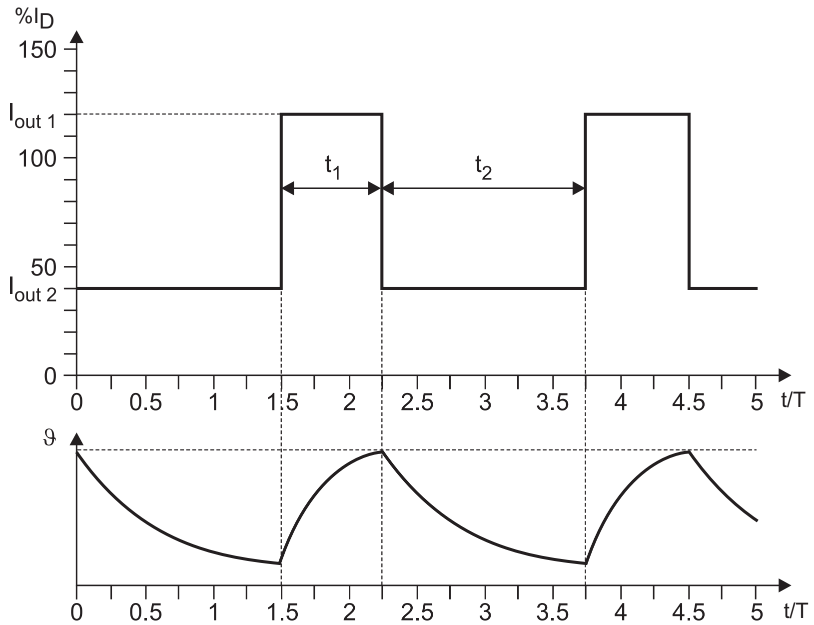
The following figure gives an example of such a load cycle. The temperature profiles of the heat sink for the overload time t_1 and the low-load time t_2 are shown under the load cycle. If you arrange the temperature profiles as shown in the following figure, you can check whether the overload limit is being exceeded.

Example

Sample load cycle:

- Overload current $I_{out\ 1}$ = 120% I_D
- Low-load current $I_{out\ 2}$ = 40% I_D
- Overload time t_1 = 0.75 × T
- Low-load time t_2 = 1.5 × T

The following figure gives an example of a load cycle.



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9.9.3 Continuous output current

The thermal model of MOVIDRIVE® is monitored. The maximum continuous output current I_D is dependent on the PWM cycle frequency, the ambient temperature ϑ_{amb} and the output frequency f_A.

The project planning software SEW-Workbench supports the inverter dimensioning with the function "detailed calculation" in the electronics selection for MOVIDRIVE® B. Use this function for correct dimensioning, especially for applications with output frequencies f_O < 2 Hz.

It is particularly important to consider output frequencies f_{Output} < 2 Hz for:

- Electrically stopping hoists
- Torque control at low speeds or at a standstill

INFORMATION

The output frequency of the inverter when used with asynchronous motors is based on the speed, number of pole pairs, and slip. With synchronous motors the output frequency of the inverter is based only on speed and number of pole pairs.

NOTICE

With low rotational field frequencies (< 2 Hz) the output stage of the inverter is subject to disproportionate load. This must be taken into account during configuration.

- Select the lowest possible PWM frequency in *P860/P861* or *P864*
- Set parameter *P862/P863 PWM fixed* to Off (Not effective for operating modes CFC and SERVO)

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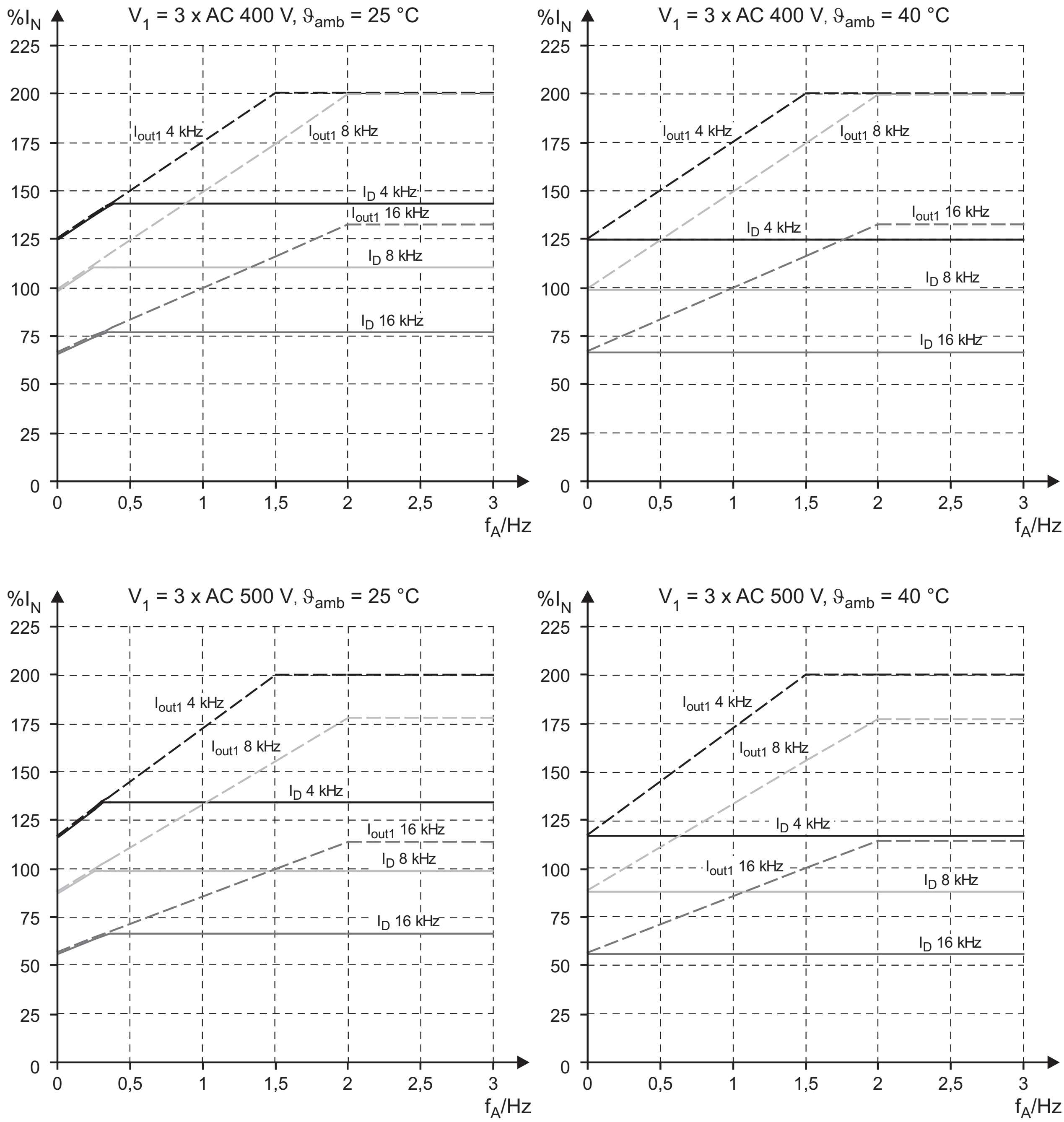
MDX60B / 61B, size 0: Guaranteed continuous output currents I_D depending on the output frequency f_A



2932189963

ϑ_{amb}	= Ambient temperature	I_D	= Continuous output current of the inverter
V_1	= Line voltage	$I_{out\,1}$	= Temporary overload current of the inverter
f_O	= Output frequency of the inverter	I_N	= Nominal output current of the inverter according to the technical data

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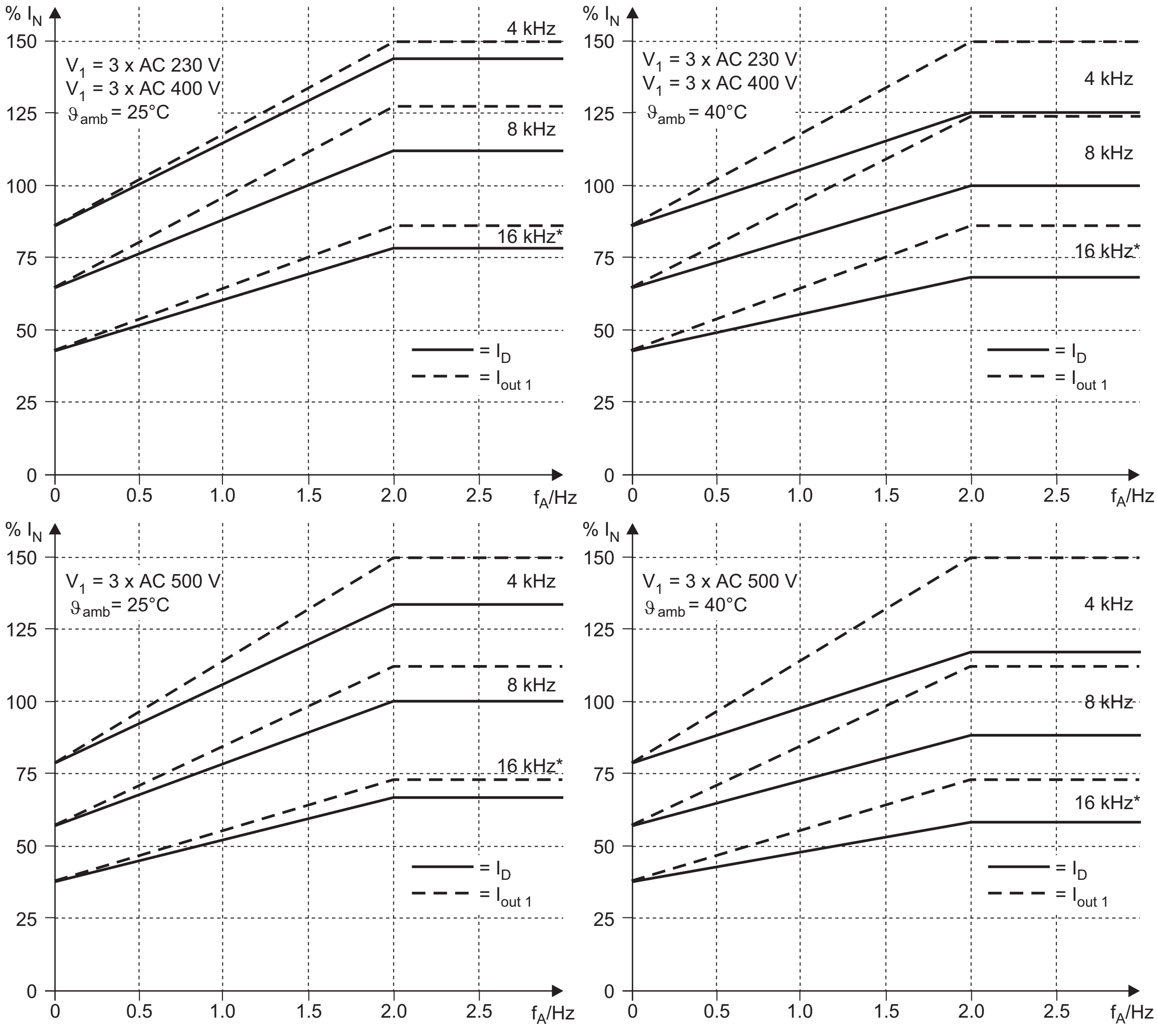
MDX61B, sizes 1 – 6: Guaranteed continuous output currents I_D depending on the output frequency f_A



2932192651

ϑ_{amb}	= Ambient temperature	I_D	= Continuous output current of the inverter
V_1	= Line voltage	$I_{out\ 1}$	= Temporary overload current of the inverter
f_O	= Output frequency of the inverter	I_N	= Nominal output current of the inverter according to the technical data
f_{PWM}	= PWM frequency (P860, P861)		

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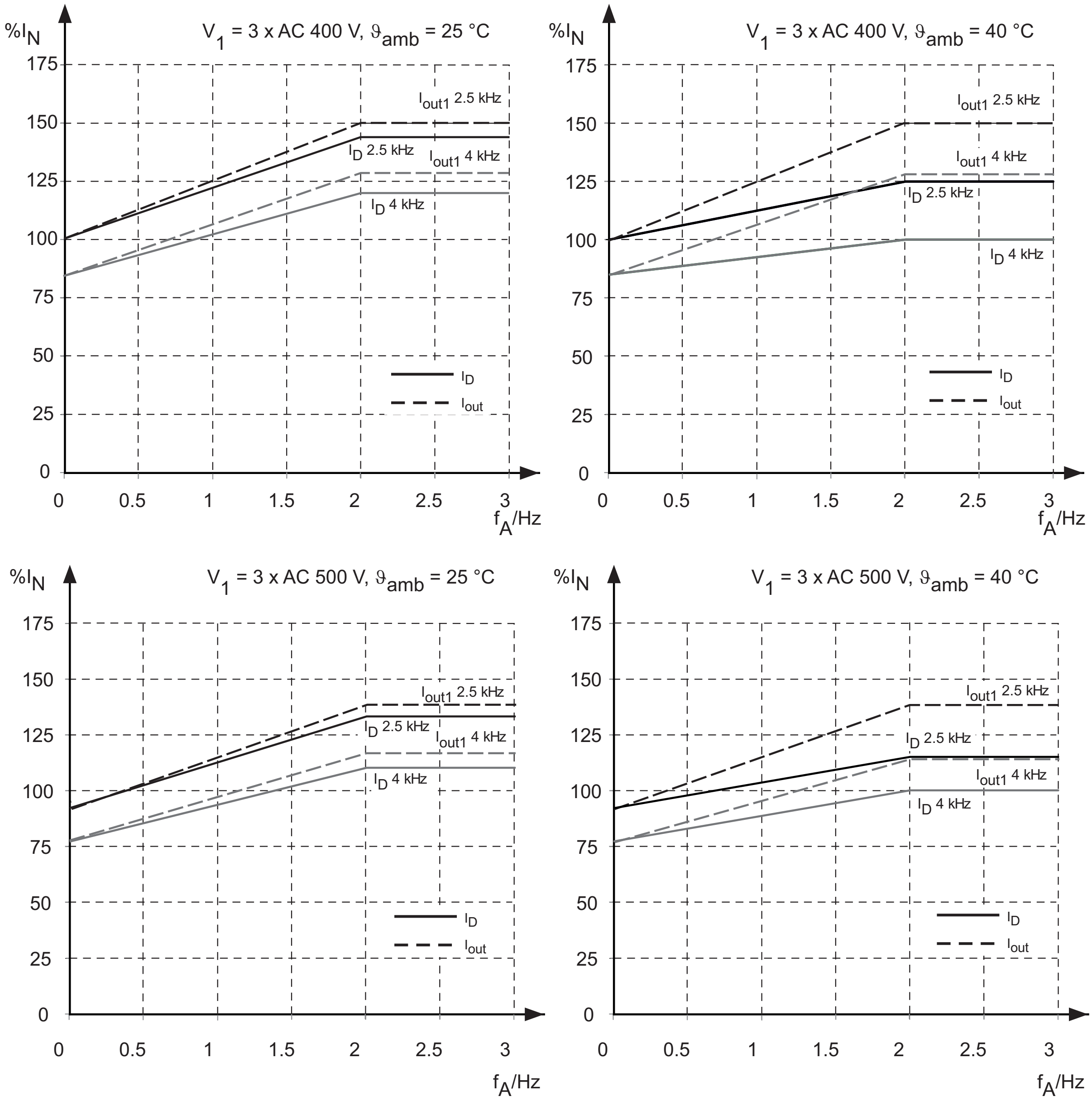
MDX61B size 7: Guaranteed continuous output currents I_D depending on the output frequency f_A



9007201897782923

ϑ_{amb}	= Ambient temperature	I_D	= Continuous output current of the inverter
V_1	= Line voltage	$I_{out\ 1}$	= Temporary overload current of the inverter
f_O	= Output frequency of the inverter	I_N	= Nominal output current of the inverter according to the technical data

Device utilization

If "P860/P861 PWM frequency 1/2" > 4 kHz is set in the VFC and F/f modes and "P862/P863 PWM fix 1/2" is set to off, the inverter automatically reduces the PWM frequency in the event of a device overload. In the CFC and SERVO operating modes, the PWM frequency remains at the same setting and the inverter does not reduce the PWM frequency in the event of a device overload. If the inverter is subjected to a higher than permitted load, it issues the fault message "F44 Device utilization" and switches off immediately. The behavior must be taken into account during configuration.

Temperature-controlled fan

The fans of the power section heat sink are subject to temperature-control. The fan is not switched on until above a heat sink temperature of ϑ = 45 °C.

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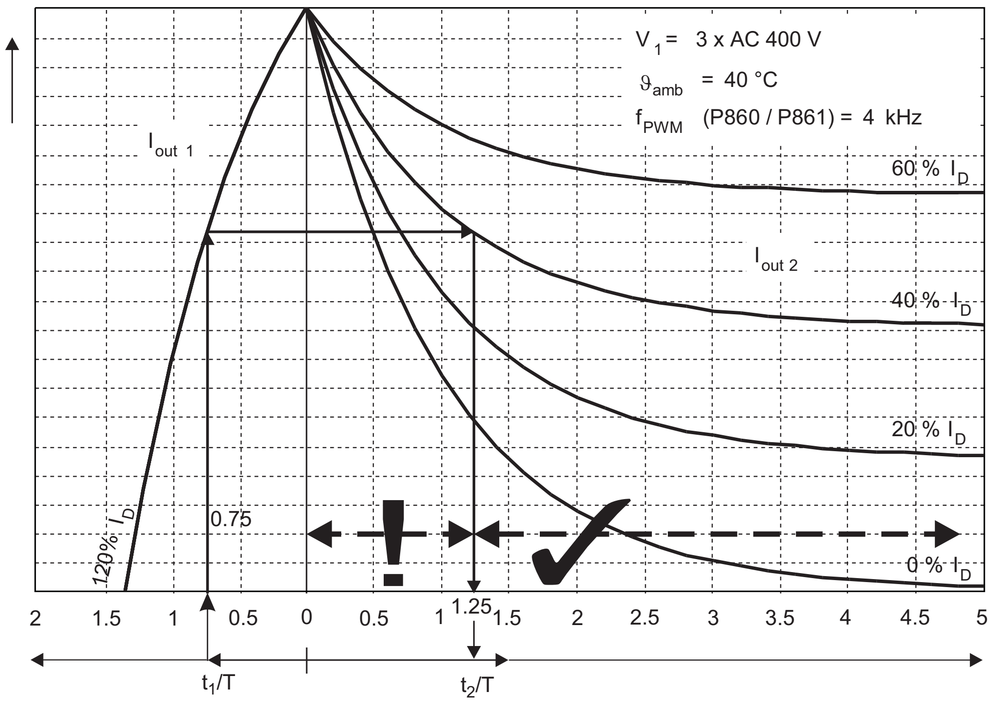
9.9.4 Overload capacity in the minute range

This is the overload capacity that corresponds to at least a quarter of the heat sink time constant (0.25 T). The overload usually lasts a few minutes. The overload capacity can be determined as follows:

Overload time $t_1 \geq 0.25 \times T \rightarrow$ determine using the diagrams

Example

Overload times $t_1 \geq 0.25 \times T$:



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Sample overload diagram

The time axis is separate. The left part shows the overload time t_1 and the right part the low-load time t_2. The temperature profile of the maximum permitted overload current $I_{out\ 1}$ is shown above t_1 for the corresponding peripheral conditions. The temperature profiles of the various low-load currents $I_{out\ 2}$ are shown in a series of curves above t_2.

Using the sample data above and the load cycle, the overload capacity (see figure) is determined as follows:

- When overload time $t_1 = 0.75 \times T$ vertically upwards until the intersection with $I_{out\ 1}$.
- Horizontally to the right up to the intersection with $I_{out\ 2} = 0.4 \times I_D$.
- Move vertically downwards and read the minimum low-load time $t_2 \rightarrow t_2 = 1.25 \times T$.

All times t_2 to the right of the point of intersection with I_{out2} are permitted (√); all times t_2 to the left are not permitted (!).

In the load cycle from $t_2 = 1.5 \times T$, which means the overload capacity is given.

For overload times $t_1 < 0.25 \times T$, the reading accuracy of the diagrams is inadequate. The curves in this area are almost linear. This means you can use a linear formula for overload times $t_1 < 0.25 \times T$ instead of the diagrams.

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For **overload times $t_1 \geq 0.25 \times T$** use the following diagrams to determine the overload capacity. Note the dependencies of I_D on I_N.

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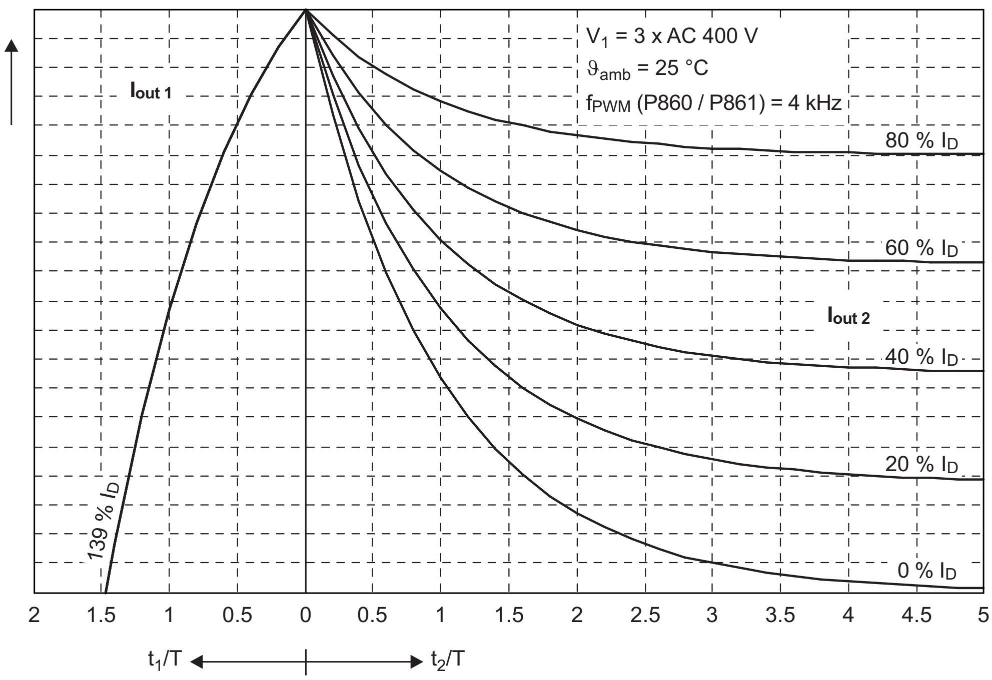
MDX60B/61B, size 0 overload capacity at 400 V / 25 °C

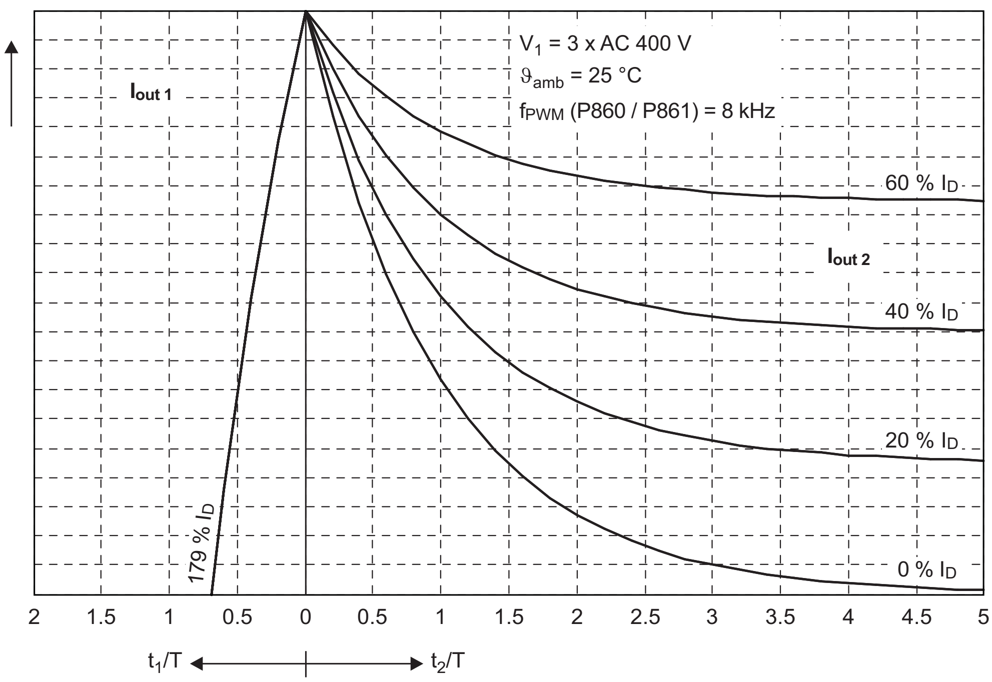
Clock frequency f_{PWM} = 4 kHz:



2932213899

Overload capacity at f_{PWM} = 4 kHz (400 V / 25 °C)

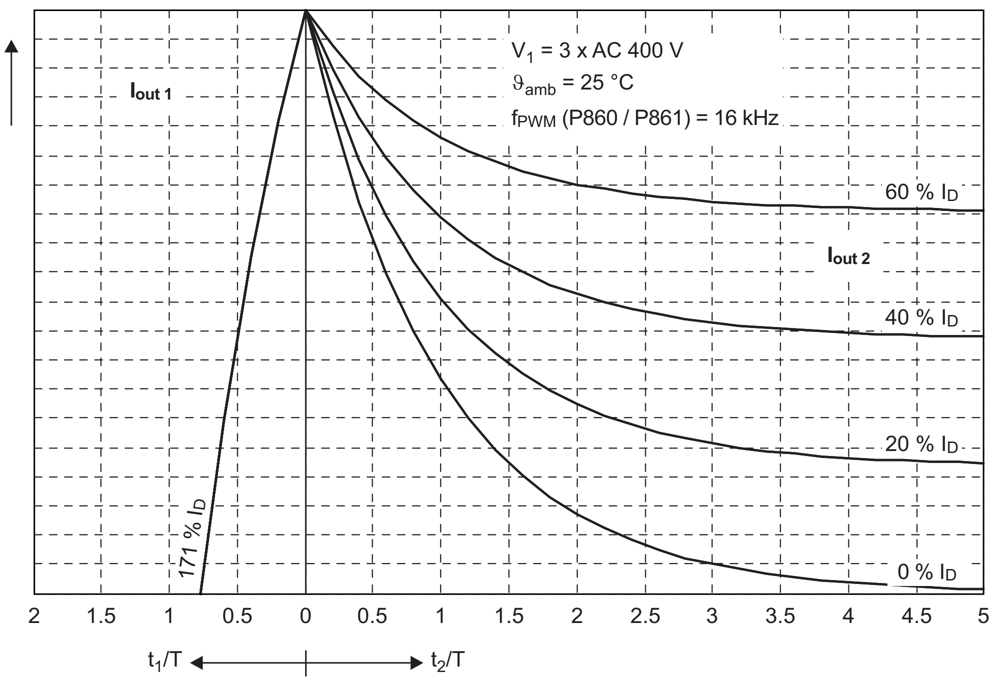
Clock frequency f_{PWM} = 8 kHz:



2932215563

Overload capacity at f_{PWM} = 8 kHz (400 V / 25 °C)

Clock frequency f_{PWM} = 16 kHz:



2932217227

Overload capacity at f_{PWM} = 16 kHz (400 V / 25 °C)

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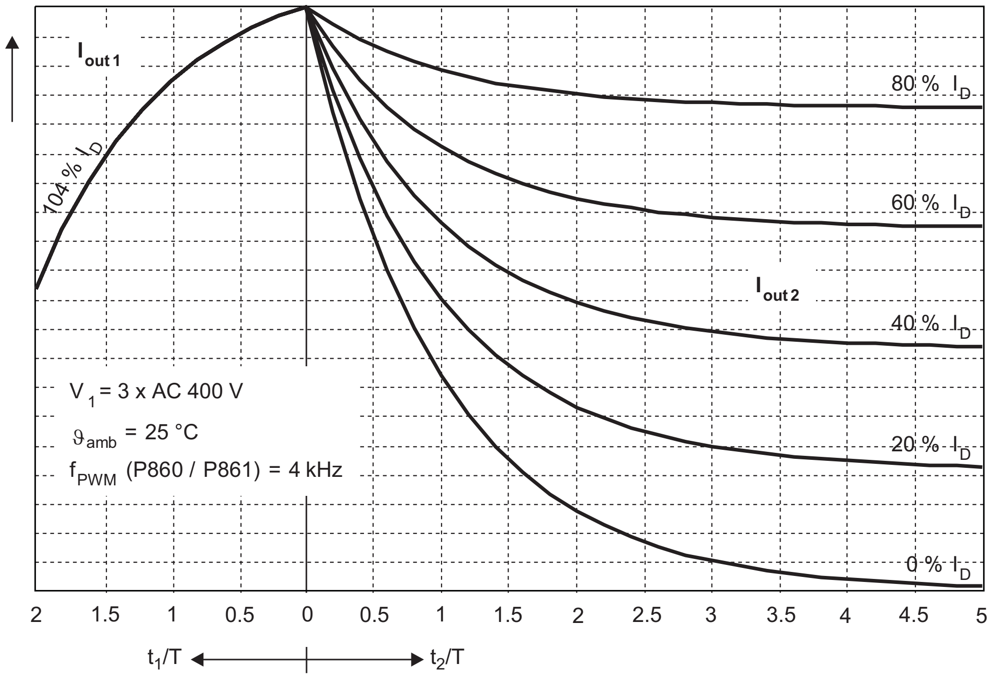
MDX61B, size 1 – 6 overload capacity at 400 V / 25 °C

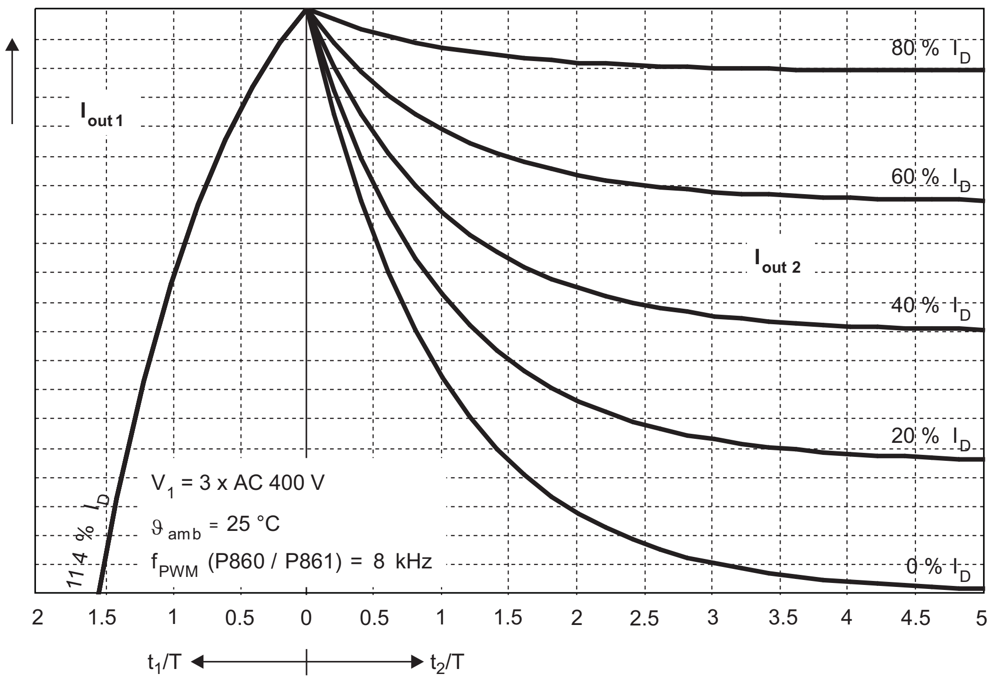
Clock frequency f_{PWM} = 4 kHz:



2932219915

Overload capacity at f_{PWM} = 4 kHz (400 V / 25 °C)

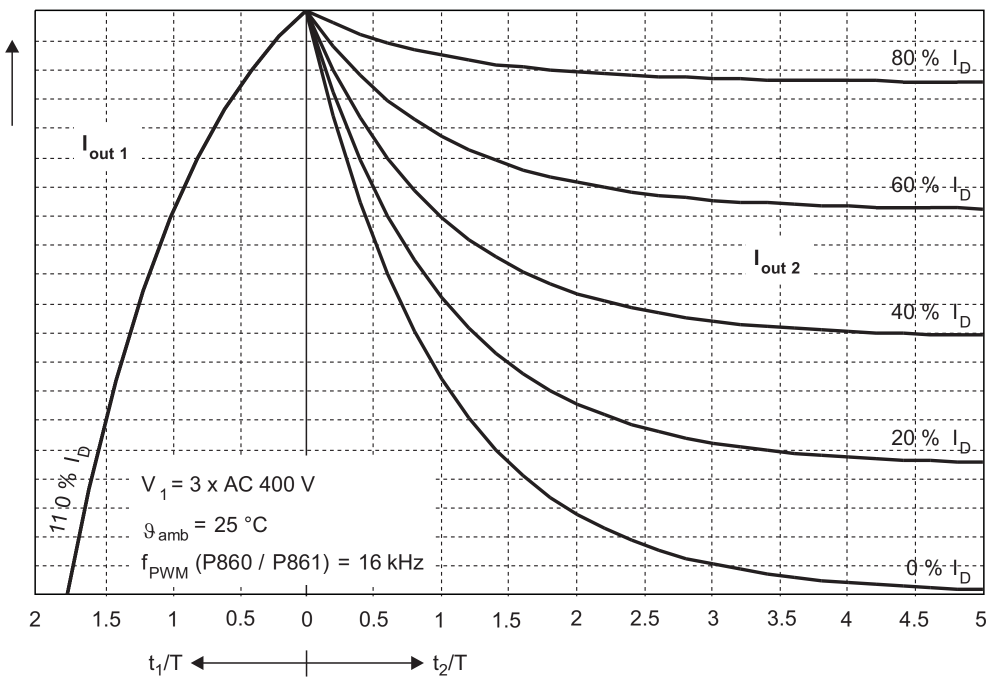
Clock frequency f_{PWM} = 8 kHz:



2932221579

Overload capacity at f_{PWM} = 8 kHz (400 V / 25 °C)

Clock frequency f_{PWM} = 16 kHz:

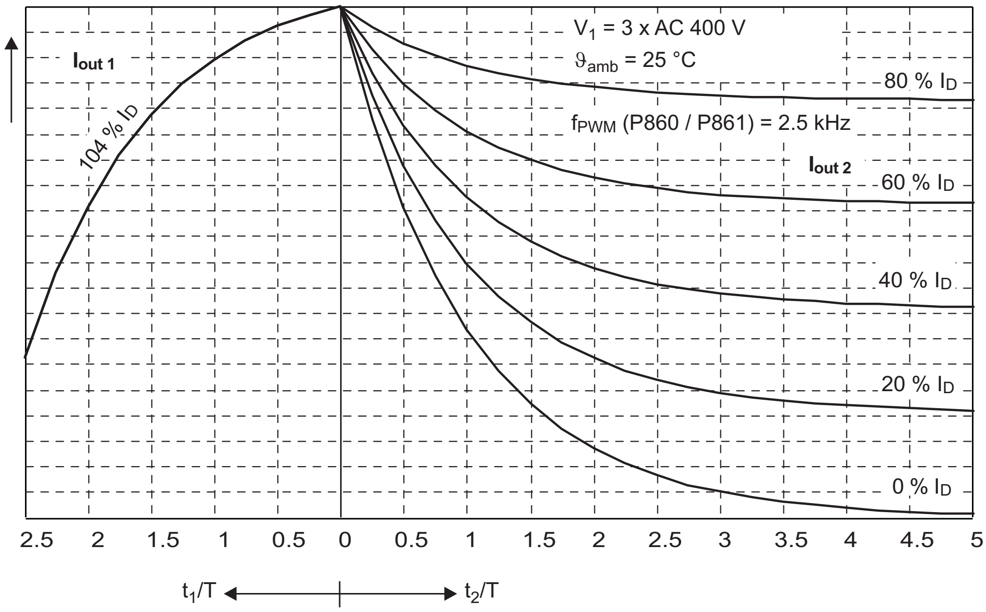


2932223243

Overload capacity at f_{PWM} = 16 kHz (400 V / 25 °C)

MDX61B, size 7 overload capacity at 400 V / 25 °C

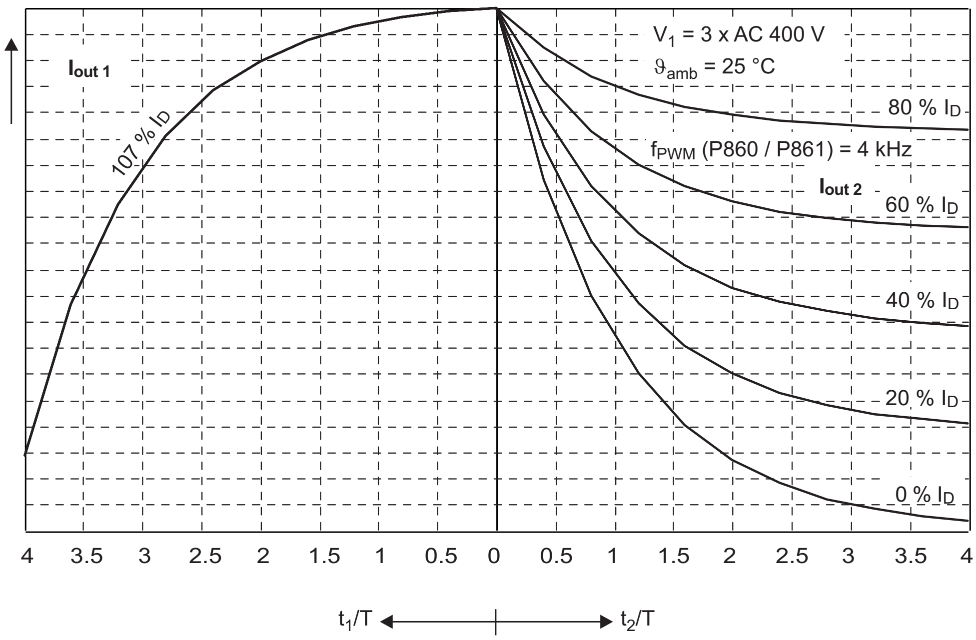
Clock frequency f_{PWM} = 2.5 kHz:



3171324171

Overload capacity at f_{PWM} = 2.5 kHz (400 V / 25 °C)

Clock frequency f_{PWM} = 4 kHz:



3171403403

Overload capacity at f_{PWM} = 4 kHz (400 V / 25 °C)

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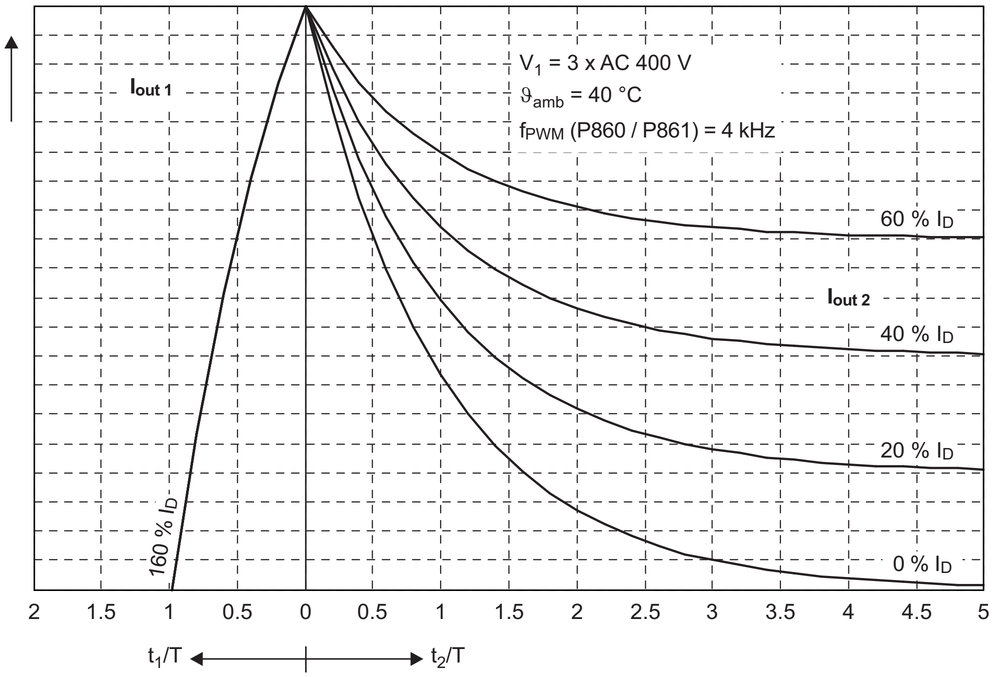
MDX60B/61B, size 0 overload capacity at 400 V / 40 °C

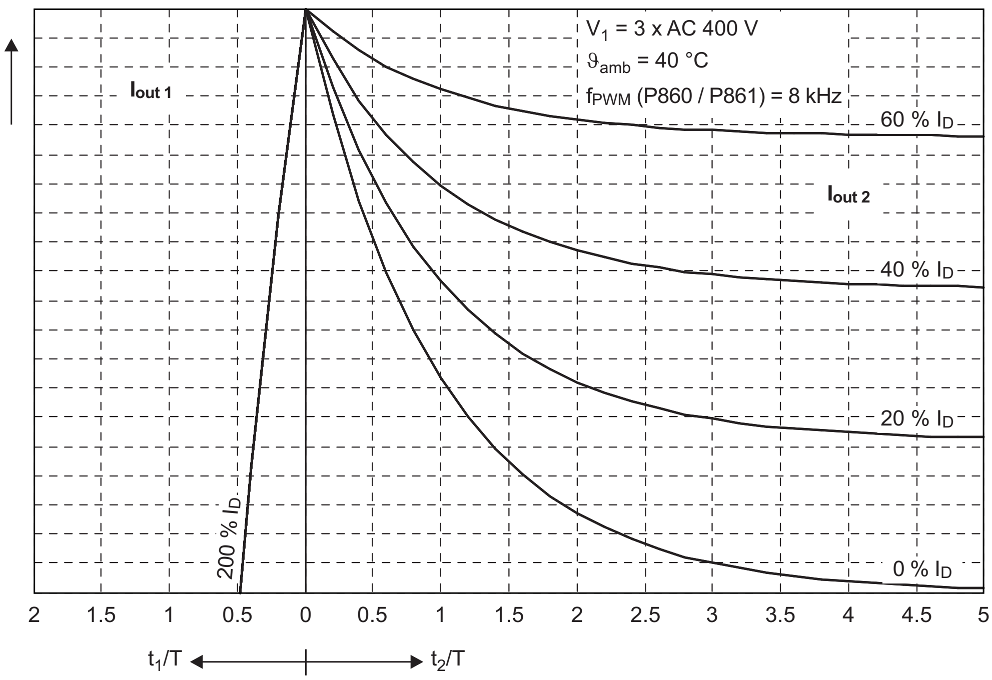
Clock frequency f_{PWM} = 4 kHz:



2932225931

Overload capacity at f_{PWM} = 4 kHz (400 V / 40 °C)

Clock frequency f_{PWM} = 8 kHz:



2932227595

Overload capacity at f_{PWM} = 8 kHz (400 V / 40 °C)

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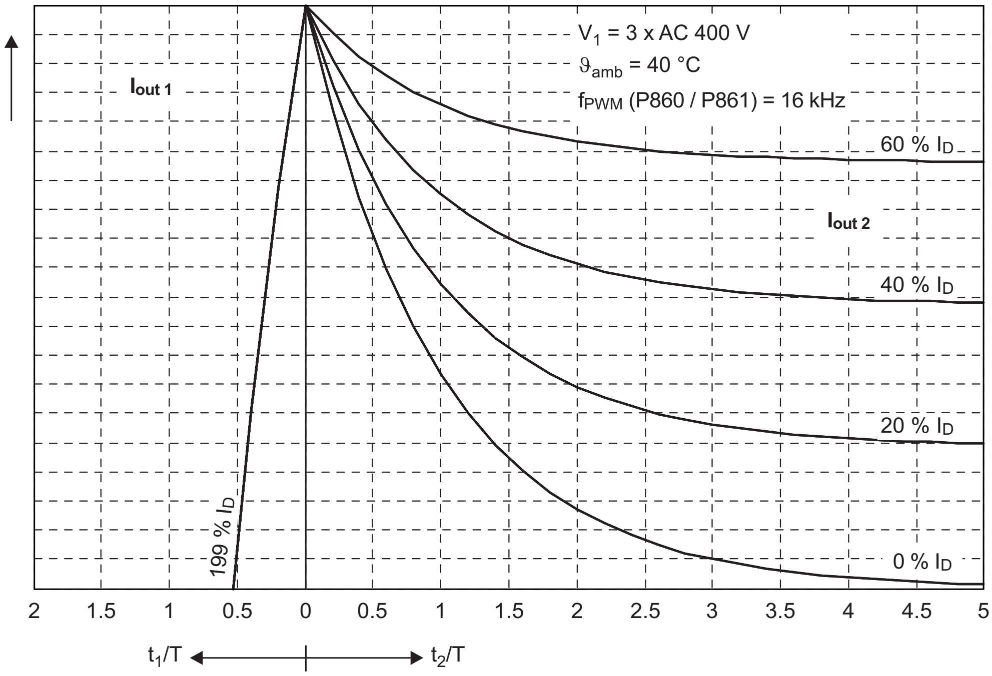
Clock frequency f_{PWM} = 16 kHz:

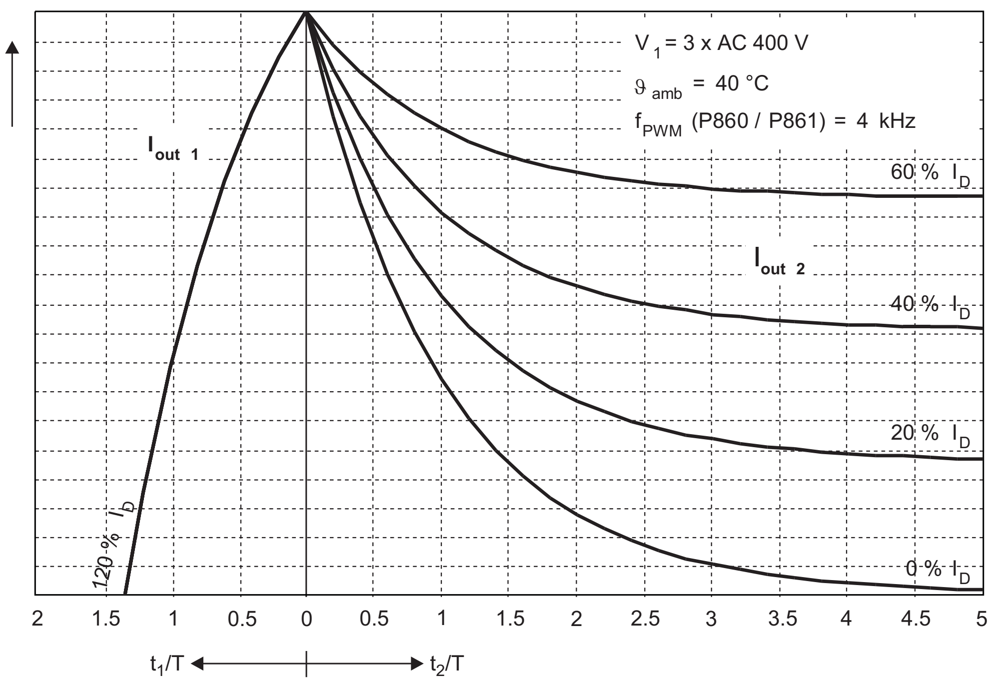


2932229259

Overload capacity at f_{PWM} = 16 kHz (400 V / 40 °C)

MDX61B,size 1 – 6 overload capacity at 400 V / 40 °C

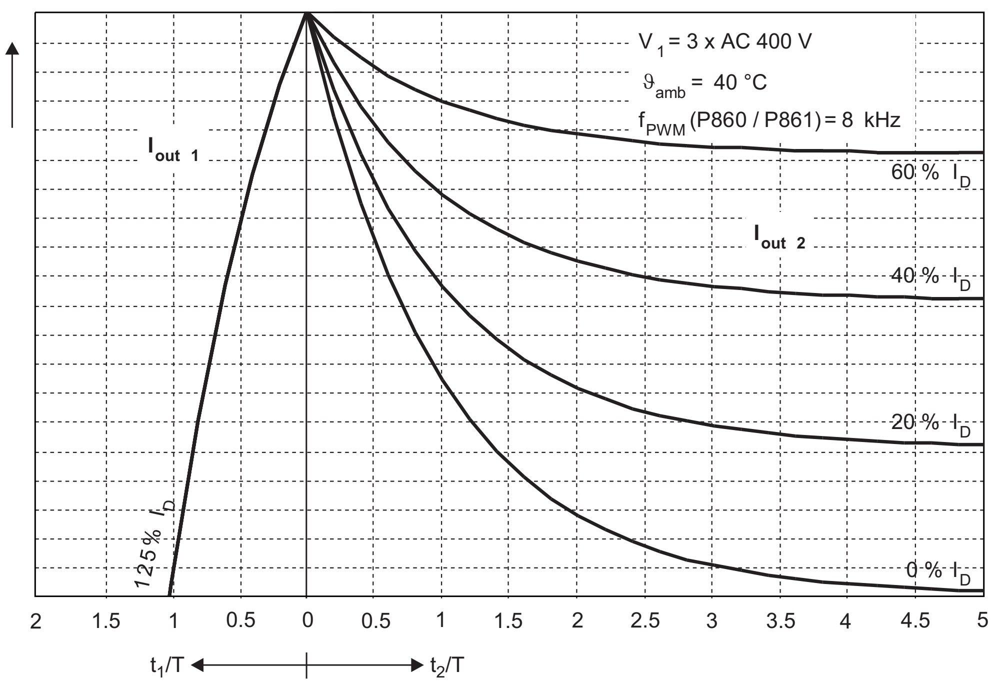
Clock frequency f_{PWM} = 4 kHz:



2932231947

Overload capacity at f_{PWM} = 4 kHz (400 V / 40 °C)

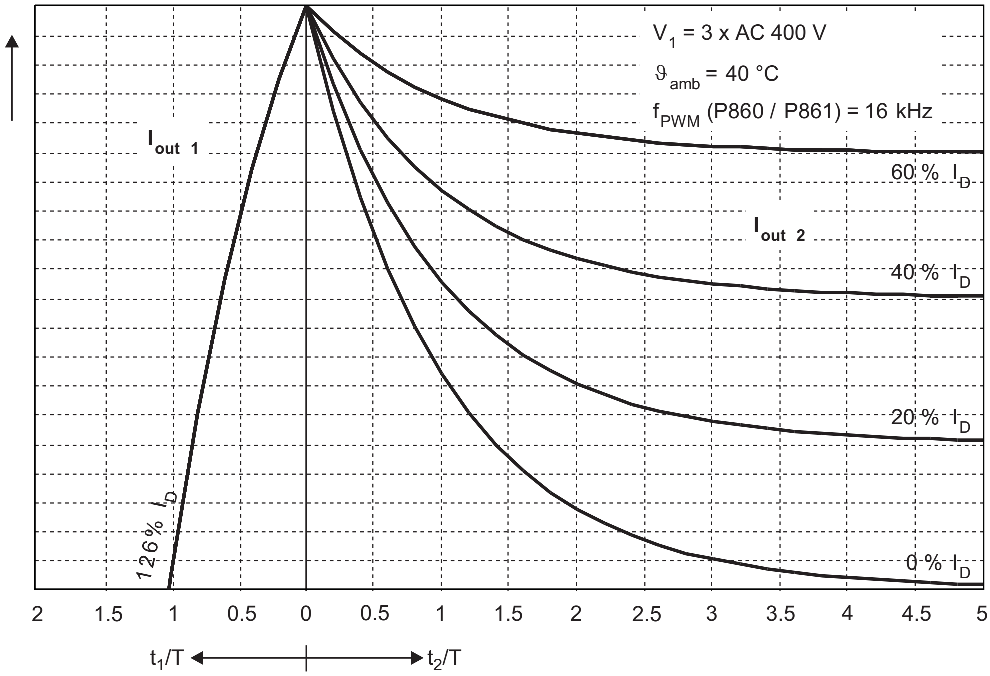
Clock frequency f_{PWM} = 8 kHz:



2933351307

Overload capacity at f_{PWM} = 8 kHz (400 V / 40 °C)

Clock frequency f_{PWM} = 16 kHz:

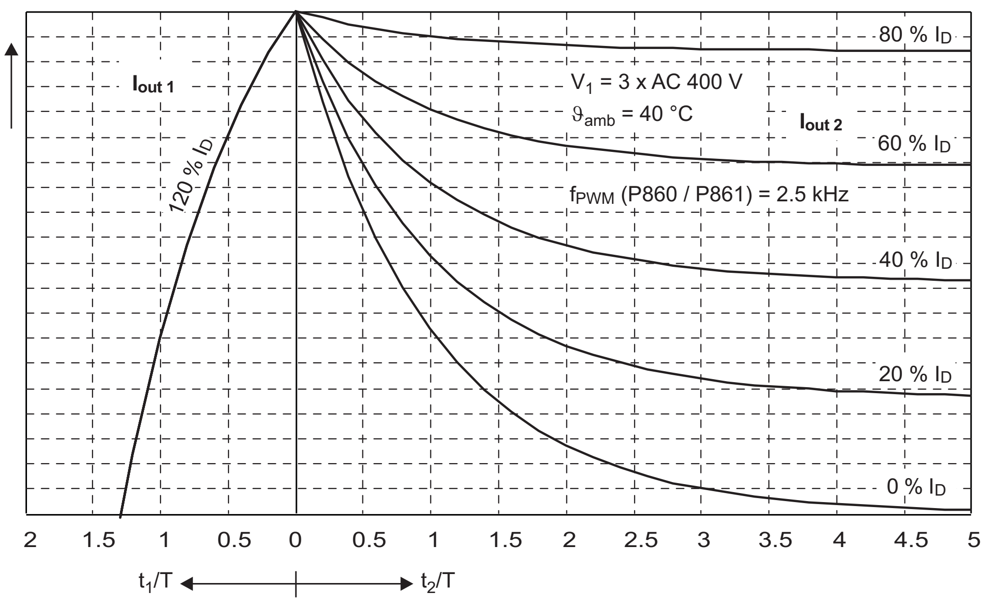


2933353227

Overload capacity at f_{PWM} = 16 kHz (400 V / 40 °C)

MDX61B, size 7 overload capacity at 400 V / 40 °C

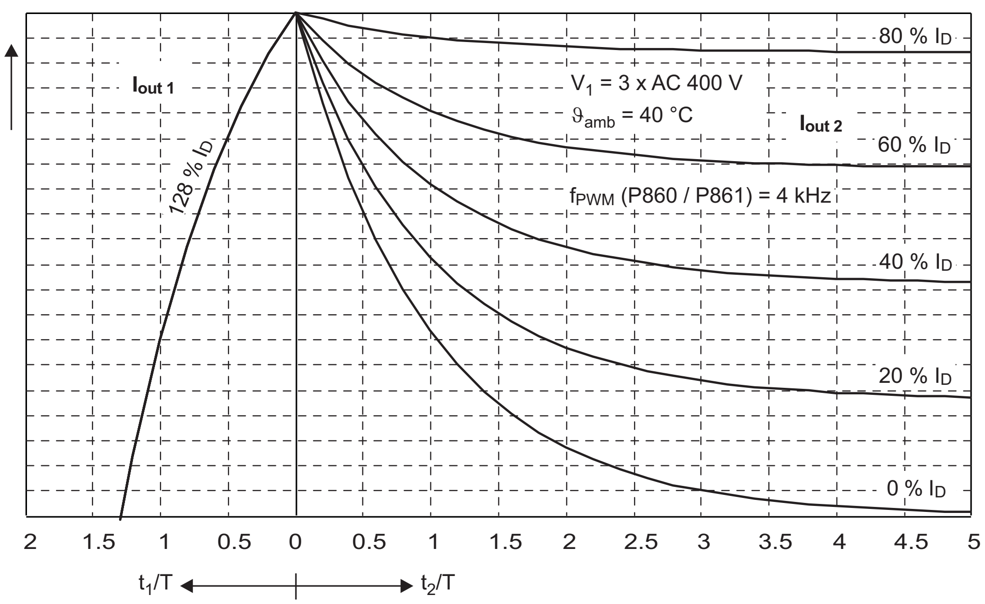
Clock frequency f_{PWM} = 2.5 kHz:



3171408267

Overload capacity at f_{PWM} = 2.5 kHz (400 V / 40 °C)

Clock frequency f_{PWM} = 4 kHz:



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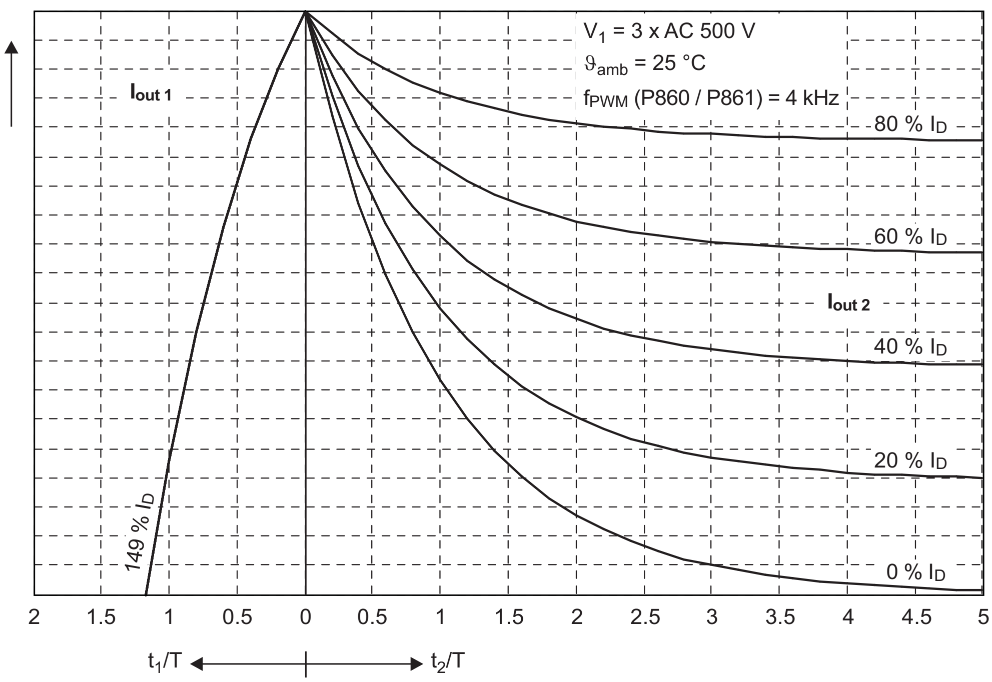
Overload capacity at f_{PWM} = 4 kHz (400 V / 40 °C)

MDX60B/61B, size 0 overload capacity at 500 V / 25 °C

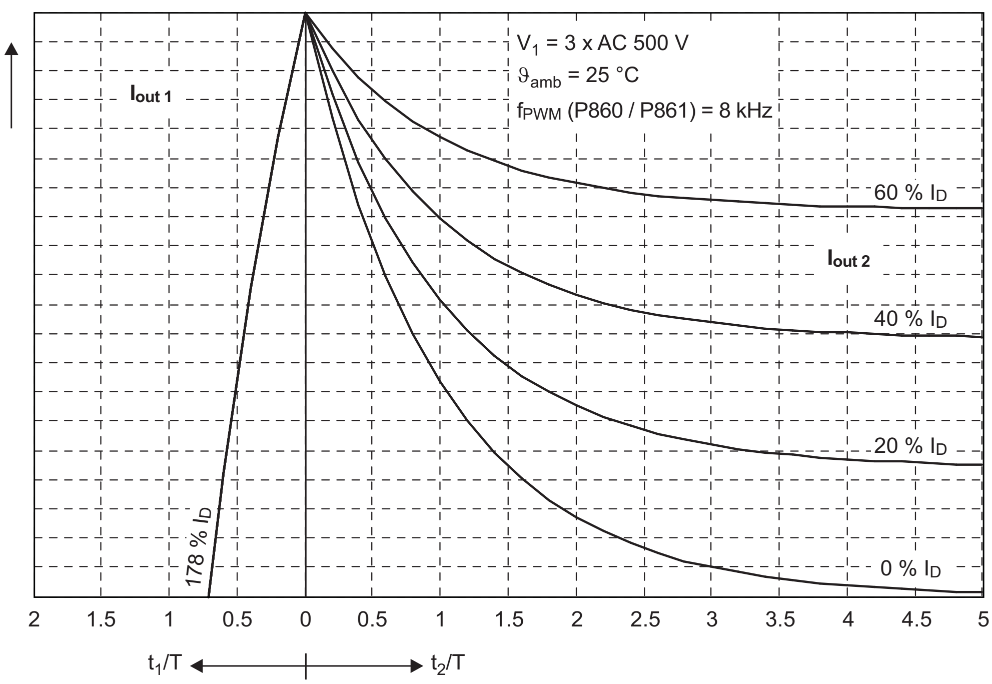
Clock frequency f_{PWM} = 4 kHz:



2932234635

Overload capacity at f_{PWM} = 4 kHz (500 V / 25 °C)

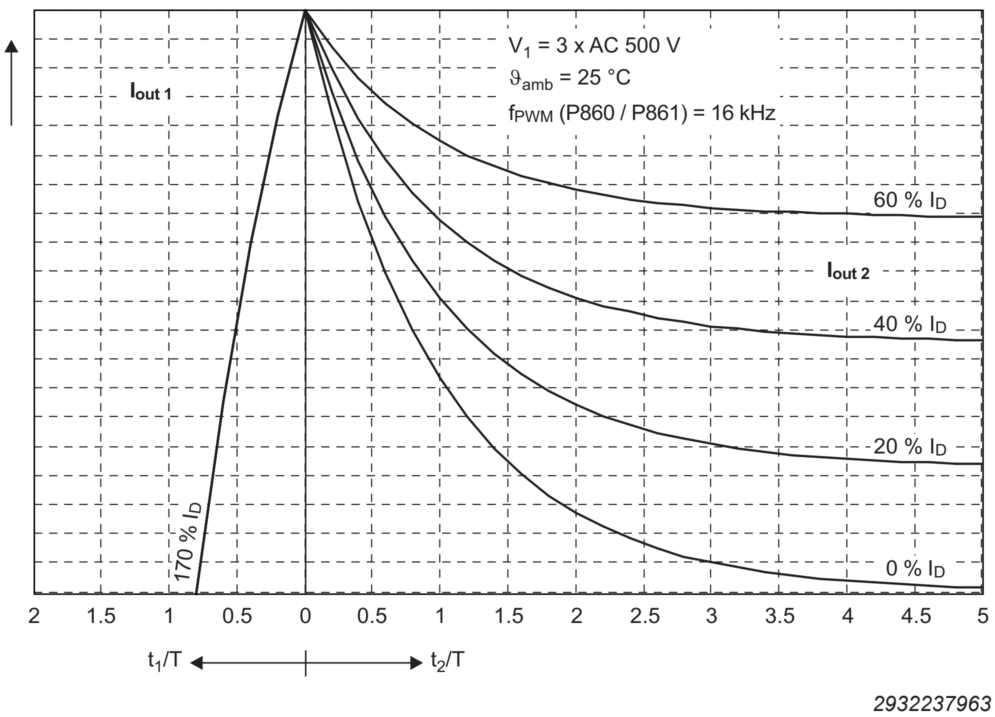
Clock frequency f_{PWM} = 8 kHz:



2932236299

Overload capacity at f_{PWM} = 8 kHz (500 V / 25 °C)

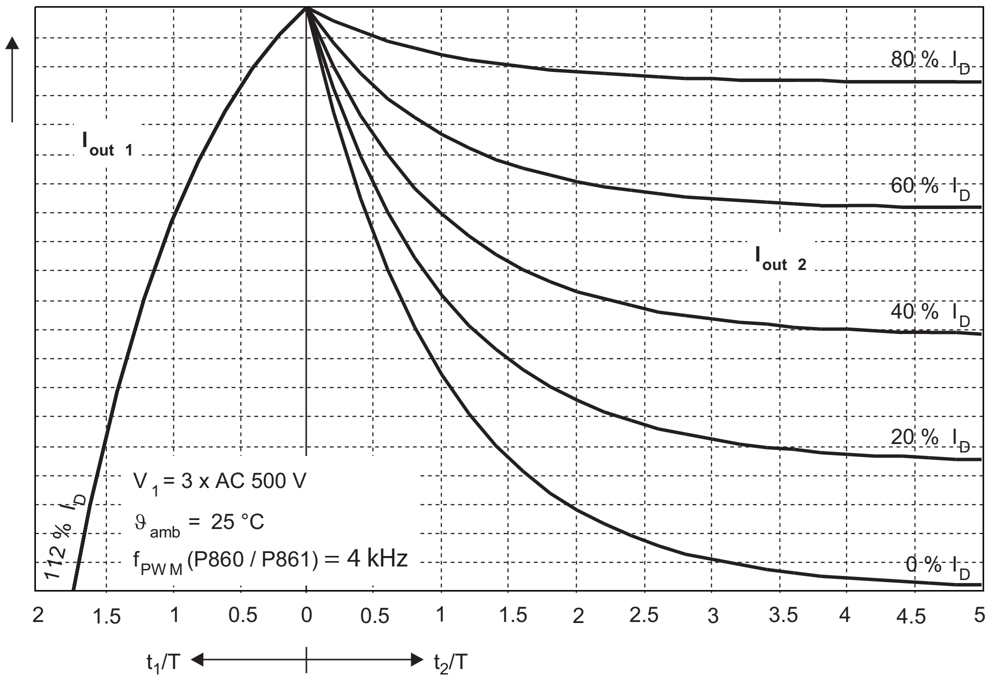
Clock frequency f_{PWM} = 16 kHz:



Overload capacity at f_{PWM} = 16 kHz (500 V / 25 °C)

MDX61B, size 1 – 6 overload capacity at 500 V / 25 °C

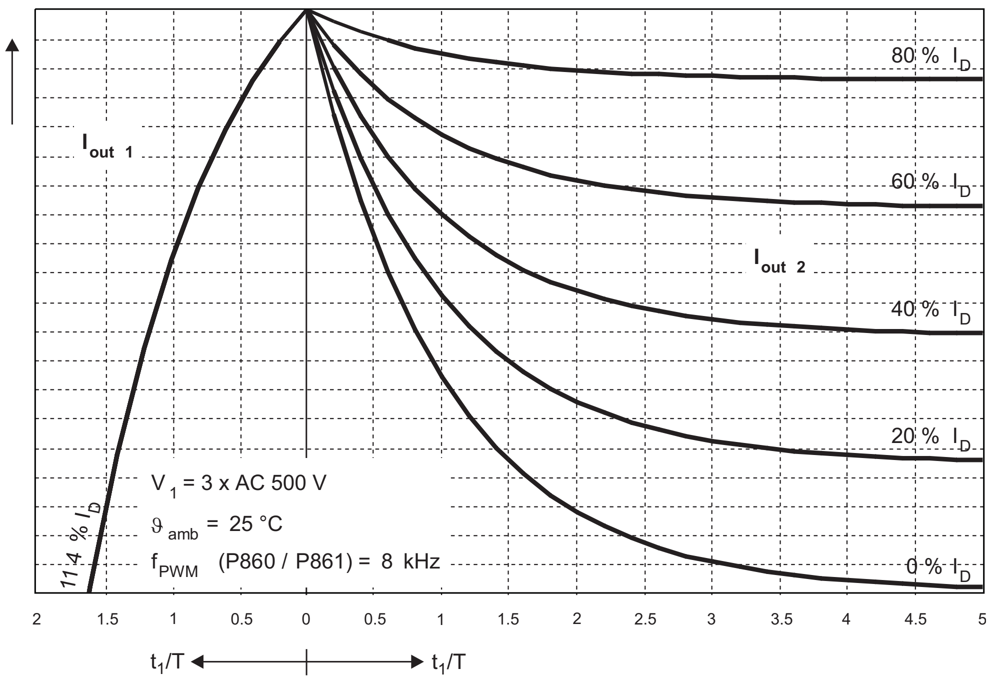
Clock frequency f_{PWM} = 4 kHz:



2932240651

Overload capacity at f_{PWM} = 4 kHz (500 V / 25 °C)

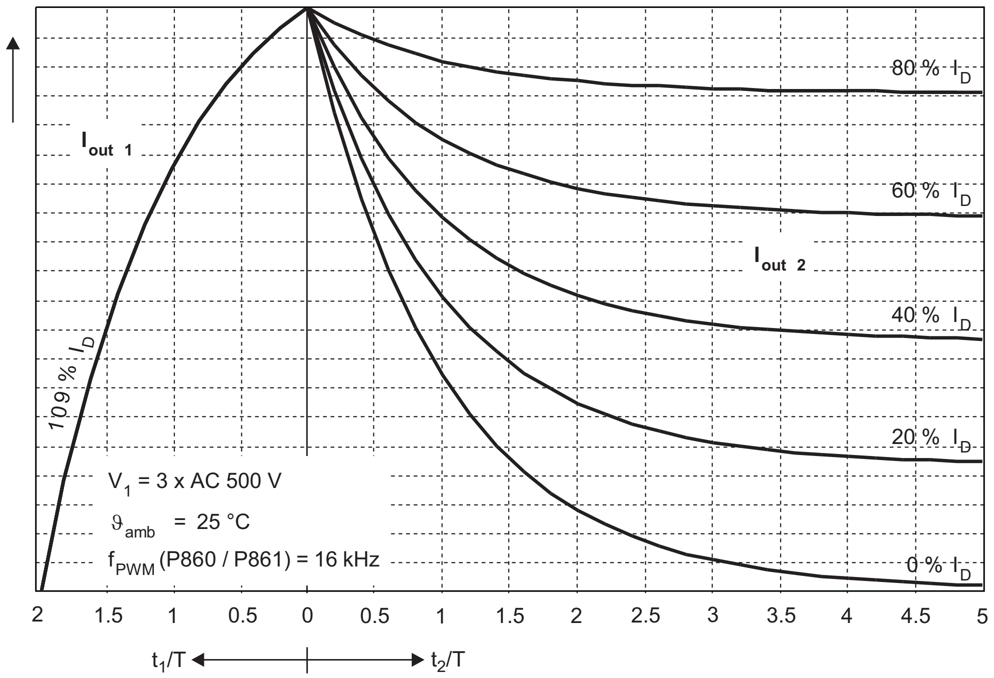
Clock frequency f_{PWM} = 8 kHz:



2932242315

Overload capacity at f_{PWM} = 8 kHz (500 V / 25 °C)

Clock frequency f_{PWM} = 16 kHz:



2932243979

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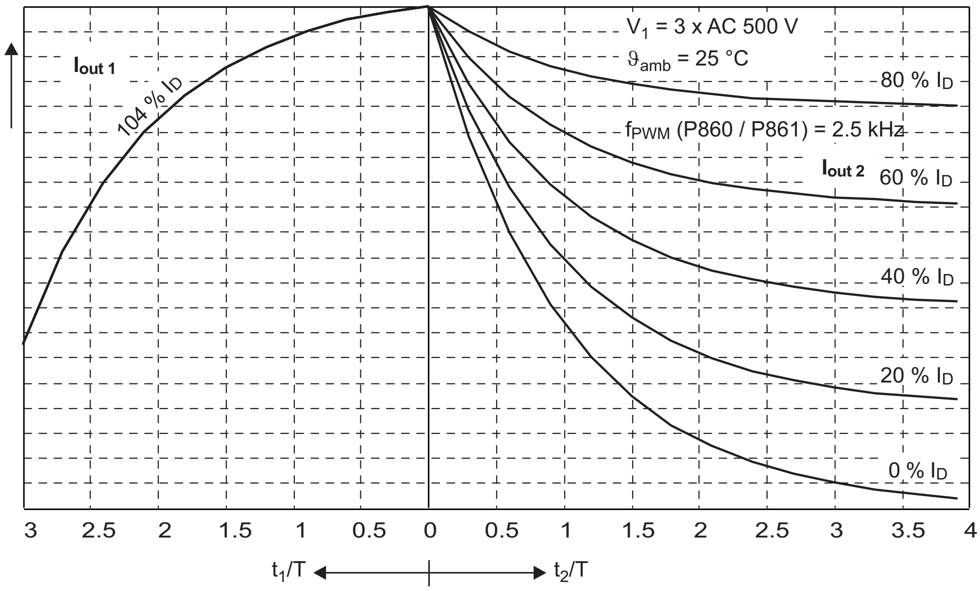
MDX61B, size 7 overload capacity at 500 V / 25 °C

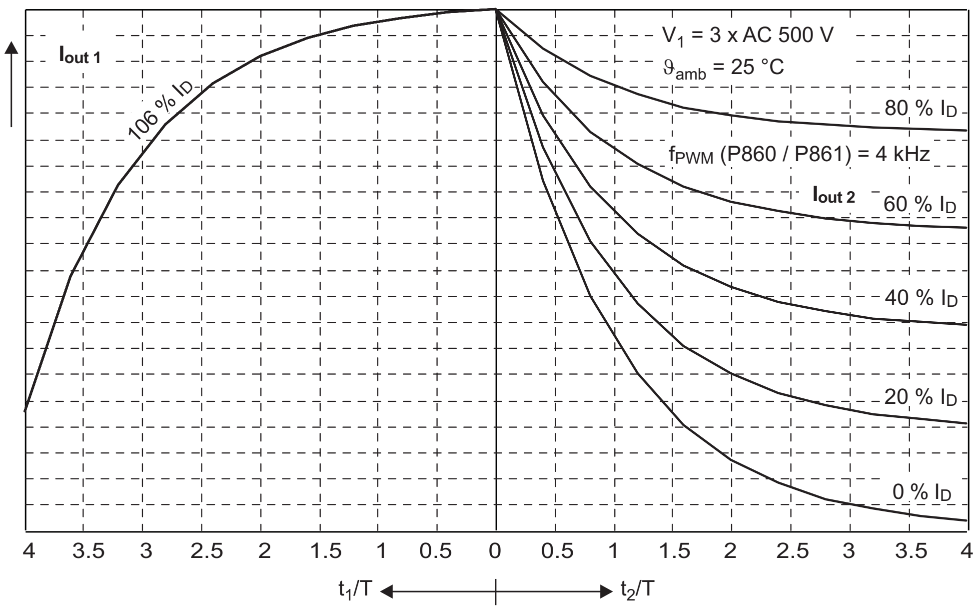
Clock frequency f_{PWM} = 2.5 kHz:



3171415179

Overload capacity at f_{PWM} = 2.5 kHz (500 V / 25 °C)

Clock frequency f_{PWM} = 4 kHz:



3171417099

Overload capacity at f_{PWM} = 4 kHz (500 V / 25 °C)

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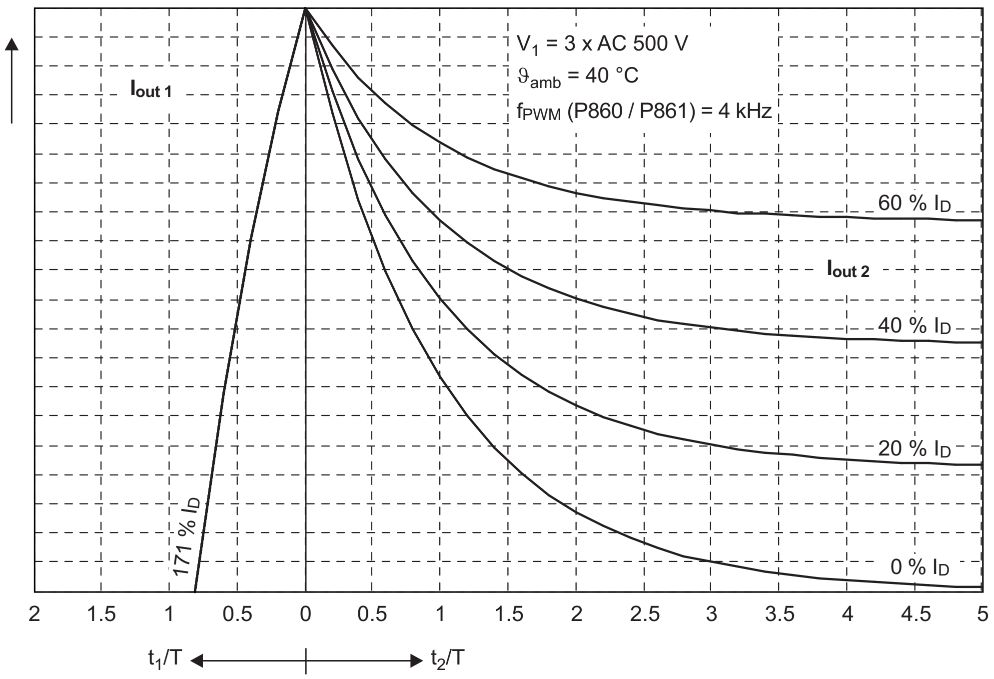
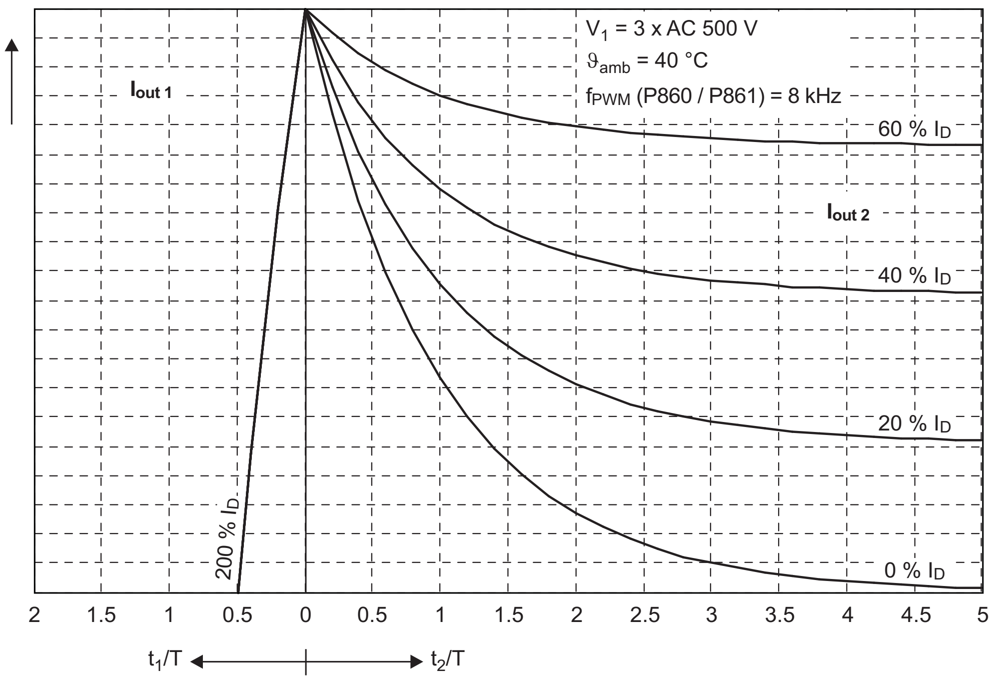
MDX60B/61B, size 0 overload capacity at 500 V / 40 °C

Clock frequency f_{PWM} = 4 kHz:



2932246667

Clock frequency f_{PWM} = 8 kHz:



2932248331

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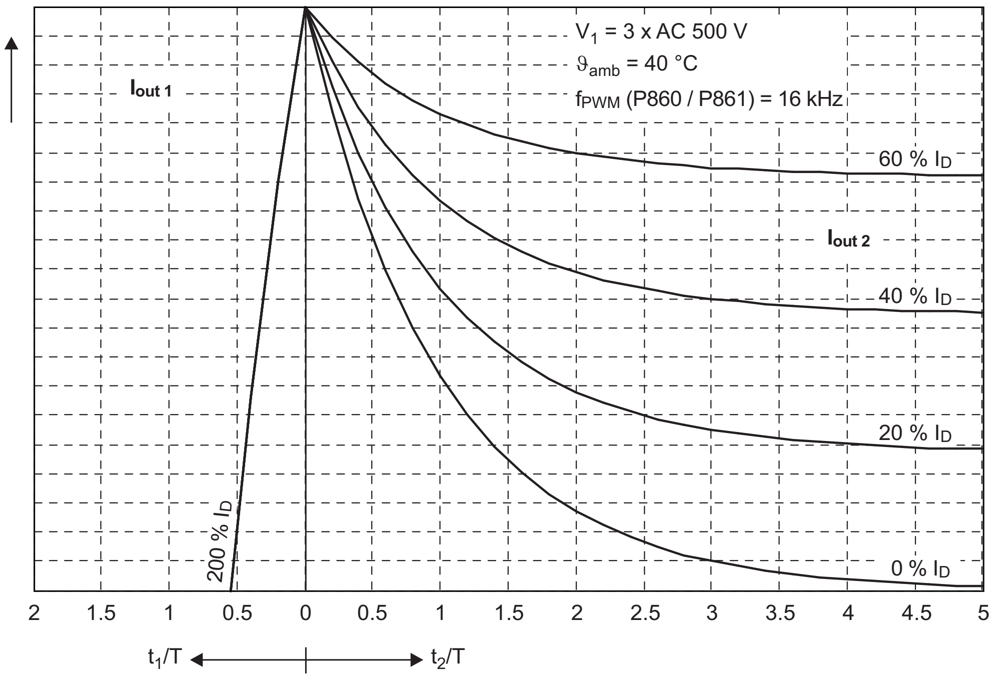
Clock frequency f_{PWM} = 16 kHz:

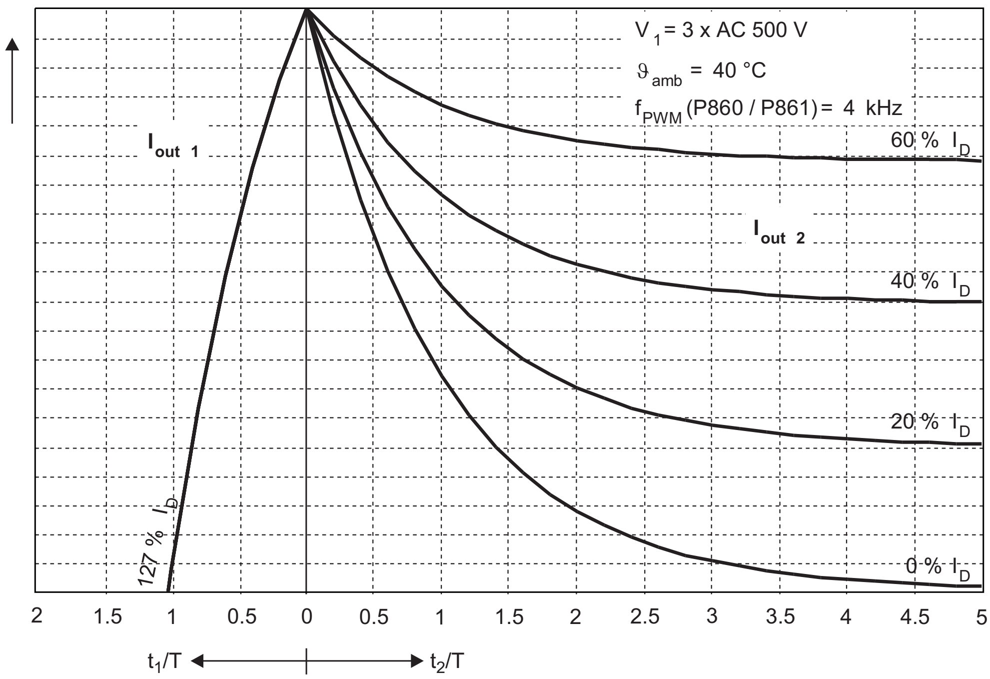


2932249995

Overload capacity at f_{PWM} = 16 kHz (500 V / 40 °C)

MDX61B, size 1 – 6 overload capacity at 500 V / 40°C

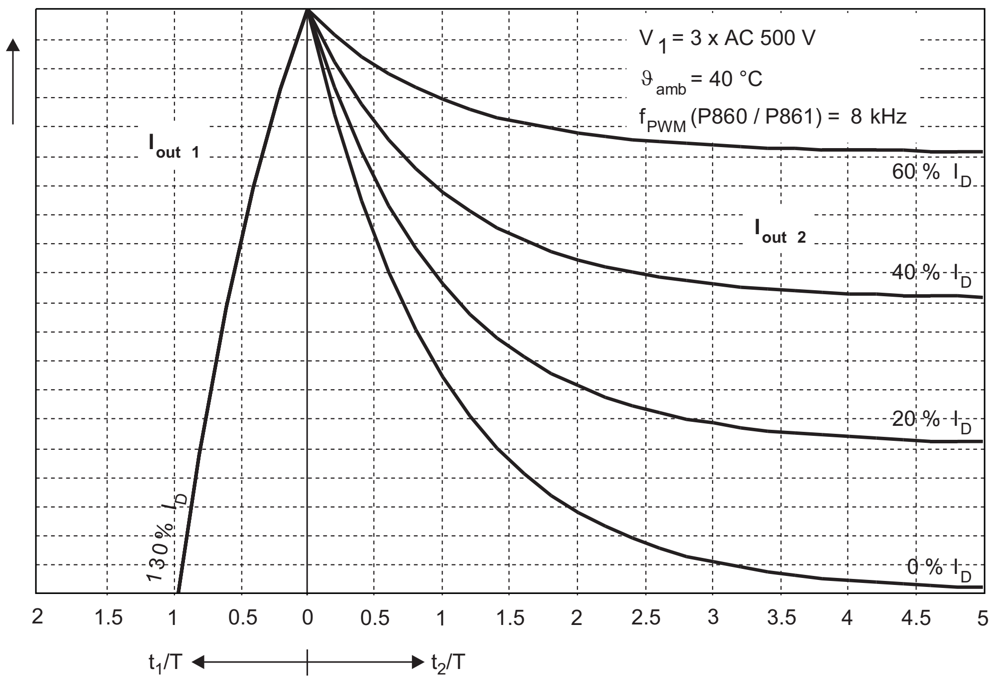
Clock frequency f_{PWM} = 4 kHz:



2933792139

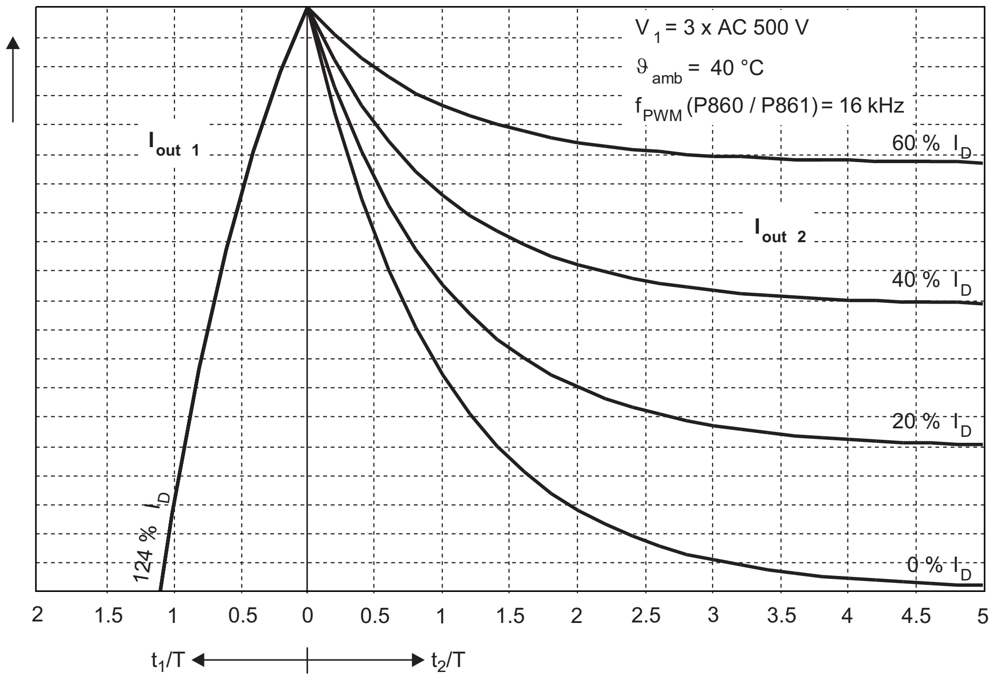
Overload capacity at f_{PWM} = 4 kHz (500 V / 40 °C)

Clock frequency f_{PWM} = 8 kHz:



2932265483

Clock frequency f_{PWM} = 16 kHz:



2932267147

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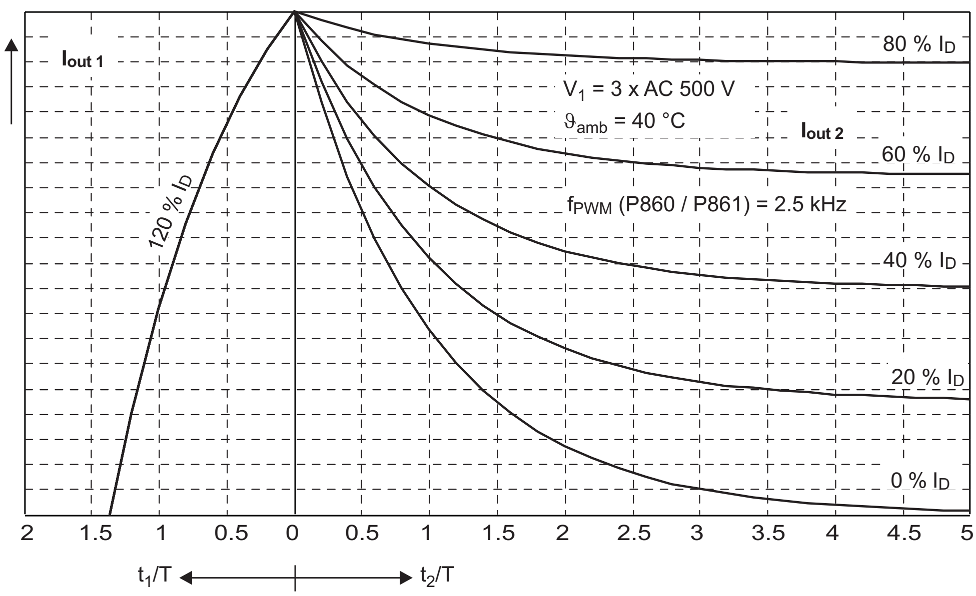
MDX61B, size 7 overload capacity at 500 V / 40 °C

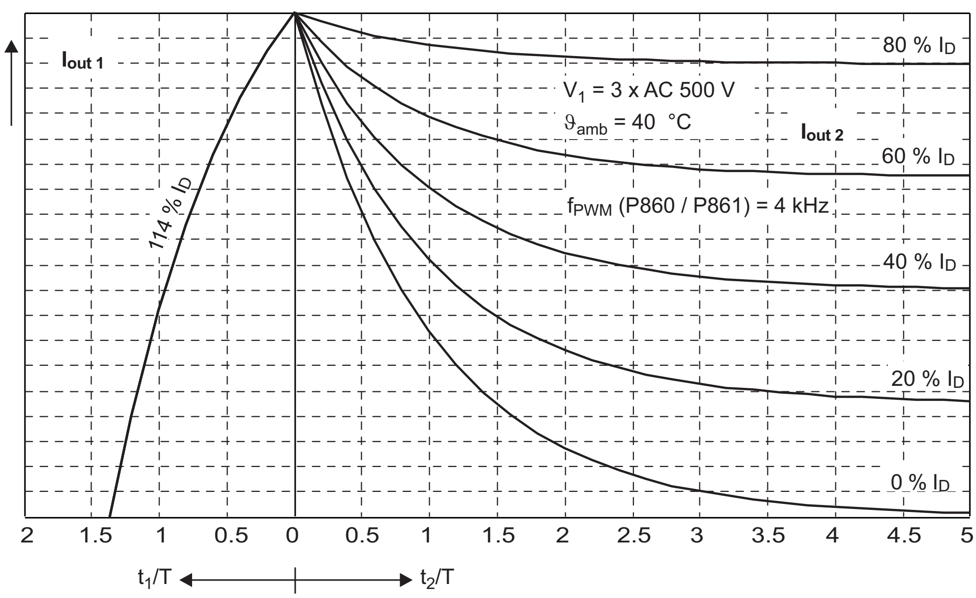
Clock frequency f_{PWM} = 2.5 kHz:



3171420555

Overload capacity at f_{PWM} = 2.5 kHz (500 V / 40 °C)

Clock frequency f_{PWM} = 4 kHz:



3171422475

Overload capacity at f_{PWM} = 4 kHz (500 V / 40 °C)

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9.9.5 Overload capacity in the second range

This is the overload capacity that corresponds at the most to a quarter of the heat sink time constant (0.25 T). The overload usually lasts a few seconds. In this time range, the characteristic curve is almost linear and the overload capacity can be determined as follows:

Overload time $t_1 < 0.25 \times T$ → determine using a formula

Equation

At overload times $t_1 < 0.25 \times T$, the overload capacity can be calculated using the following formula:

$t_2 > k \times t_1$ k = overload factor

Example

The values for overload factors k are given in the following tables, depending on the line voltage V_1, ambient temperature ϑ and cycle frequency f_{PWM}.

Example with MOVIDRIVE® MDX61B0055 (size 2):

- Operation with line voltage V_1 = 3 × AC 400 V, ambient temperature ϑ = 40°C and clock frequency f_{PWM} = 4 kHz.
- Nominal device current I_N = AC 12.5 A and continuous output current I_D = 125% × I_N = AC 15.6 A
- Overload time t_1 = 30 s = 0.1 × T
- Low-load current $I_{out\,2}$ = 6 A = 0.4 × I_D → k = 0.778

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =			
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D
4 kHz	125% I_N	120% I_D (= 150% I_N)	0.411	0.538	0.778	1.407

- The low-load time must be $t_2 > k \times t_1$ > 0.778 × 30 s > 23.34 s.

For **overload times t_1 < 0.25 × T** use the formula $t_2 > k \times t_1$ to determine the overload capacity. The following tables show the overload factor k for various low-load currents. For additional information,the following tables include the value depending on I_N (at f_A > 2 Hz) in addition to the overload current.

MDX60B/61B, size 0 overload capacity at 400 V / 25 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
4 kHz	144% I_N	139% I_D (= 200% I_N)	0.368	0.456	0.588	0.838	1.456
8 kHz	112% I_N	179% I_D (= 200% I_N)	1.182	1.545	2.091	3.545	14.364
16 kHz	78% I_N	171% I_D (= 133% I_N)	1.000	1.313	1.813	2.938	9.250

MDX61B, size 1 – 6 overload capacity at 400 V / 25 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
4 kHz	144% I_N	104% I_D (= 150% I_N)	0.085	0.107	0.145	0.226	0.508
8 kHz	112% I_N	114% I_D (= 128% I_N)	0.314	0.408	0.582	1.016	4.160
16 kHz	78% I_N	110% I_D (= 86% I_N)	0.235	0.303	0.427	0.720	2.324

MDX61B, size 7 overload capacity at 400 V / 25 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
2.5 kHz	144% I_N	104% I_D (= 150% I_N)	0.068	0.096	0.123	0.192	0.411
4 kHz	120% I_N	107% I_D (= 128% I_N)	0.018	0.024	0.029	0.047	0.082

MDX60B/61B, size 0 overload capacity at 400 V / 40 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =			
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D
4 kHz	125% I_N	160% I_D (= 200% I_N)	0.727	0.909	1.212	1.818
8 kHz	100% I_N	200% I_D (= 200% I_N)	1.931	2.690	4.069	9.448
16 kHz	67% I_N	199% I_D (= 133% I_N)	0.737	0.912	1.211	1.825

MDX61B, size 1 – 6 overload capacity at 400 V / 40 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =			
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D
4 kHz	125% I_N	120% I_D (= 150% I_N)	0.411	0.538	0.778	1.407
8 kHz	100% I_N	125% I_D (= 125% I_N)	0.678	0.928	1.473	3.639
16 kHz	68% I_N	126% I_D (= 86% I_N)	0.676	0.922	1.448	3.438

MDX61B, size 7 overload capacity at 400 V / 40 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
2.5 kHz	125% I_N	120% I_D (= 150% I_N)	0.458	0.625	0.833	1.458	5.833
4 kHz	100% I_N	128% I_D (= 128% I_N)	0.297	0.378	0.486	0.757	1.514

MDX60B/61B, size 0 overload capacity at 500 V / 25 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
4 kHz	134% I_N	149% I_D (= 200% I_N)	0.558	0.674	0.907	1.326	2.674
8 kHz	100% I_N	178% I_D (= 178% I_N)	1.154	1.538	2.077	3.462	11.615
16 kHz	67% I_N	170% I_D (= 114% I_N)	1.000	1.278	1.778	2.778	7.944

MDX61B, size 1 – 6 overload capacity at 500 V / 25 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
4 kHz	134% I_N	112% I_D (= 150% I_N)	0.245	0.316	0.443	0.741	2.287
8 kHz	100% I_N	114% I_D (= 114% I_N)	0.286	0.369	0.522	0.888	3.040
16 kHz	67% I_N	109% I_D (= 73% I_N)	0.182	0.232	0.321	0.521	1.385

MDX61B, size 7 overload capacity at 500 V / 25 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
2.5 kHz	133% I_N	104% I_D (= 138% I_N)	0.040	0.053	0.067	0.107	0.220
4 kHz	110% I_N	106% I_D (= 117% I_N)	0.016	0.024	0.032	0.040	0.072

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MDX60B/61B, size 0 overload capacity at 500 V / 40 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =			
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D
4 kHz	117% I_N	171% I_D (= 200% I_N)	1.000	1.268	1.805	3.049
8 kHz	89% I_N	200% I_D (= 178% I_N)	1.882	2.529	3.824	8.412
16 kHz	57% I_N	200% I_D (= 114% I_N)	1.667	2.208	3.167	5.792

MDX61B, size 1 – 6 overload capacity at 500 V / 40 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =			
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D
4 kHz	117% I_N	128% I_D (= 150% I_N)	0.662	0.897	1.395	3.176
8 kHz	89% I_N	126% I_D (= 112% I_N)	0.745	1.022	1.627	4.103
16 kHz	59% I_N	123% I_D (= 73% I_N)	0.595	0.803	1.234	2.695

MDX61B, size 7 overload capacity at 500 V / 40 °C

Clock frequency f_{PWM}	Continuous output current I_D (f_A > 2 Hz)	Overload current $I_{out\,1}$ (at f_A > 2 Hz)	Overload factor k at low-load current $I_{out\,2}$ =				
			0	0.2 × I_D	0.4 × I_D	0.6 × I_D	0.8 × I_D
2.5 kHz	115% I_N	120% I_D (= 138% I_N)	0.385	0.538	0.769	1.308	3.846
4 kHz	100% I_N	114% I_D (= 114% I_N)	0.314	0.400	0.571	0.914	2.657

9.9.6 Overload capacity for an overload time < 1 s

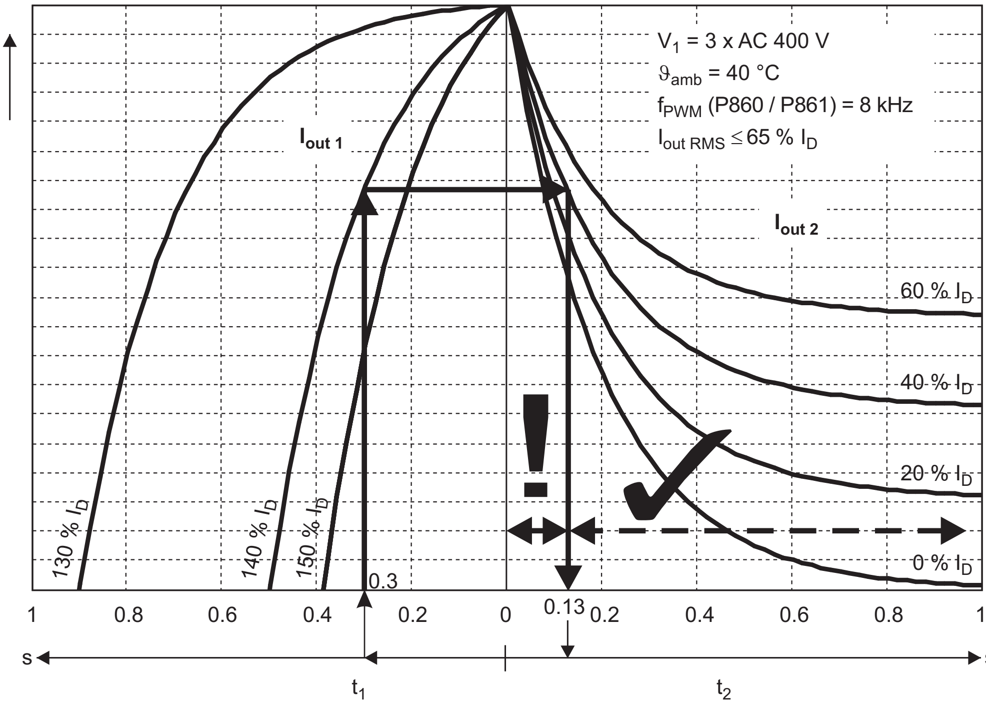
Determining the overload capacity

The inverter dimensioning is supported by the SEW-Workbench project planning software.

The overload capacity for the short overload time (t_1 < 1 s) is determined as follows:

- For MDX61B sizes 1 – 6 using the diagrams (→ following figure)
- For MDX60B/61B sizes 0 and 7 according to the chapter "Overload capacity in the second range" (→ 🗎 465).

The mean inverter output current $I_{out\ RMS}$ during the load cycle must not exceed a certain value.



2932282123

The time axis is separate. The left part shows the overload time t_1 and the right part the low-load time t_2. The temperature profiles of the various overload currents $I_{out\ 1}$ are shown in a series of curves above t_1. The temperature profiles of the various low-load currents $I_{out\ 2}$ are shown in a series of curves above t_2.

Example:

- Following specifications:
  - Overload current $I_{out\ 1}$ = 140% I_D
  - Overload time t_1 = 0.3 s
  - Low-load current $I_{out\ 2}$ = 40% I_D
  - Low-load time t_2 = 1.0 s
- At an overload time of t_1 = 0.3 s move vertically upwards until the point of intersection with $I_{out\ 1}$ = 140% I_D.
- Move horizontally to the right until the point of intersection with $I_{out\ 2}$ = 0.4 × I_D.
- Move vertically downward and then read the minimum low-load time t_2 → t_2 = 0.13 s

All times t_2 to the right of the point of intersection with I_{out2} are permitted (√); all times t_2 to the left are not permitted (!).

According to the diagram, the overload capacity is given. In addition to the diagram, you now have to check that the permitted mean inverter output current $I_{out\ RMS}$ is not exceeded:

$$I_{out\ 1} \times \frac{t_1}{t_1 + t_2} + I_{out\ 2} \times \frac{t_2}{t_1 + t_2} \leq I_{out\ RMS}$$

$$140\%\ I_D \times \frac{0.3\ s}{1.3\ s} + 40\%\ I_D \times \frac{1.0\ s}{1.3\ s} \leq 65\%\ I_D$$

$$32.31\%\ I_D + 30.77\%\ I_D = 63.08\%\ I_D \leq 65\%\ I_D$$

2932283787

The permitted mean inverter output current is $I_{out\ RMS} \leq 65\%\ I_D$. In the specified load cycle, $I_{out\ RMS} = 63.08\%\ I_D$. Therefore, the load cycle is permitted.

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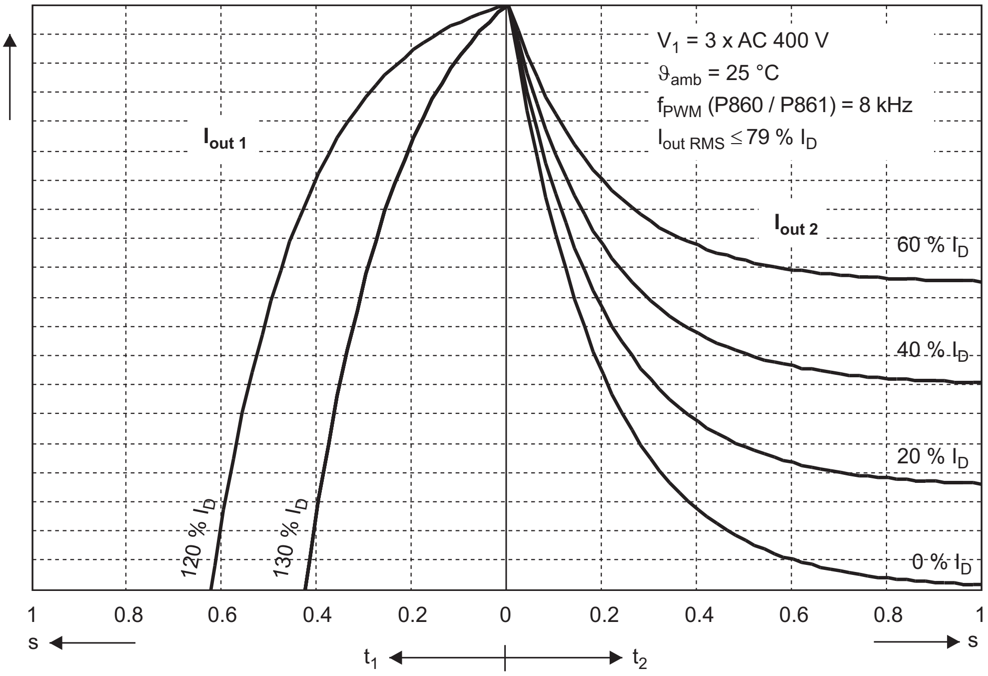
MDX61B, size 1 – 6 overload capacity at 400 V / 25 °C

Clock frequency f_{PWM} = 8 kHz:

The permitted mean inverter output current is $I_{out\ RMS} \leq 79\%\ I_D$.

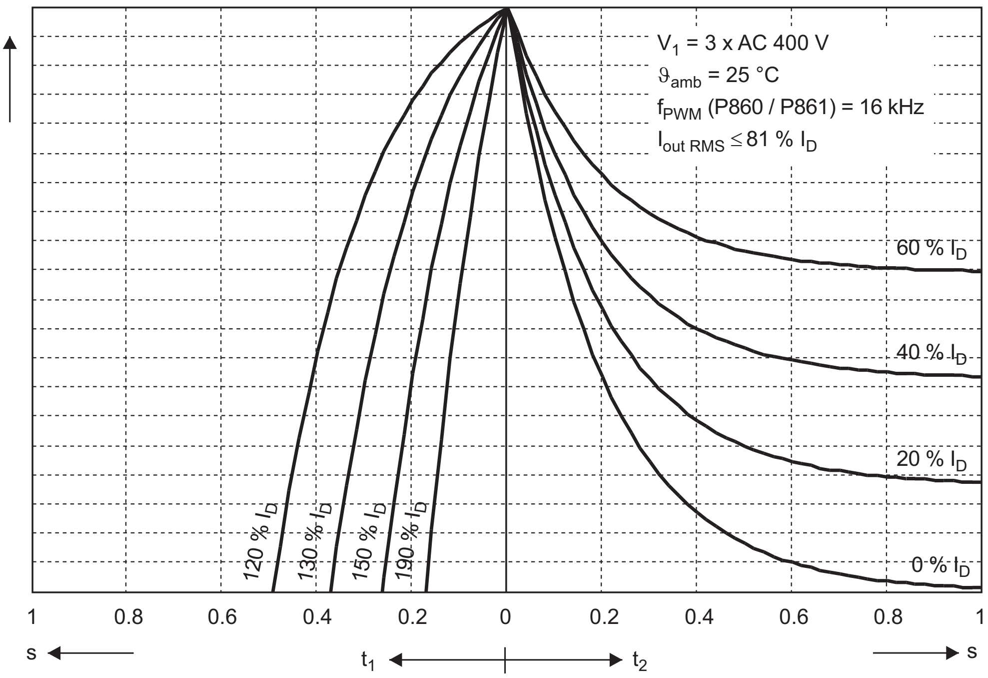


2932286475

Short-time overload capacity at f_{PWM} = 8 kHz (400 V / 25 °C)

Clock frequency f_{PWM} = 16 kHz:

The permitted mean inverter output current is $I_{out\ RMS} \leq 81\%\ I_D$.



2932288139

Short-time overload capacity at f_{PWM} = 16 kHz (400 V / 25 °C)

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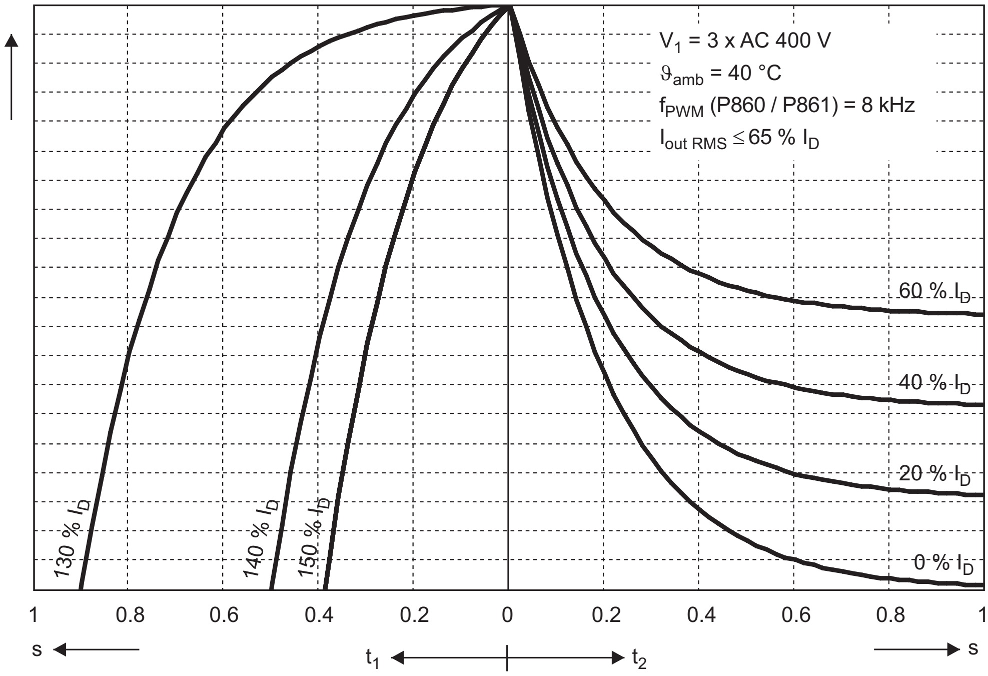
MDX61B, size 1 – 6 overload capacity at 400 V / 40 °C

Clock frequency f_{PWM} = 8 kHz:

The permitted mean inverter output current is $I_{out\ RMS} \leq 65\%\ I_D$.

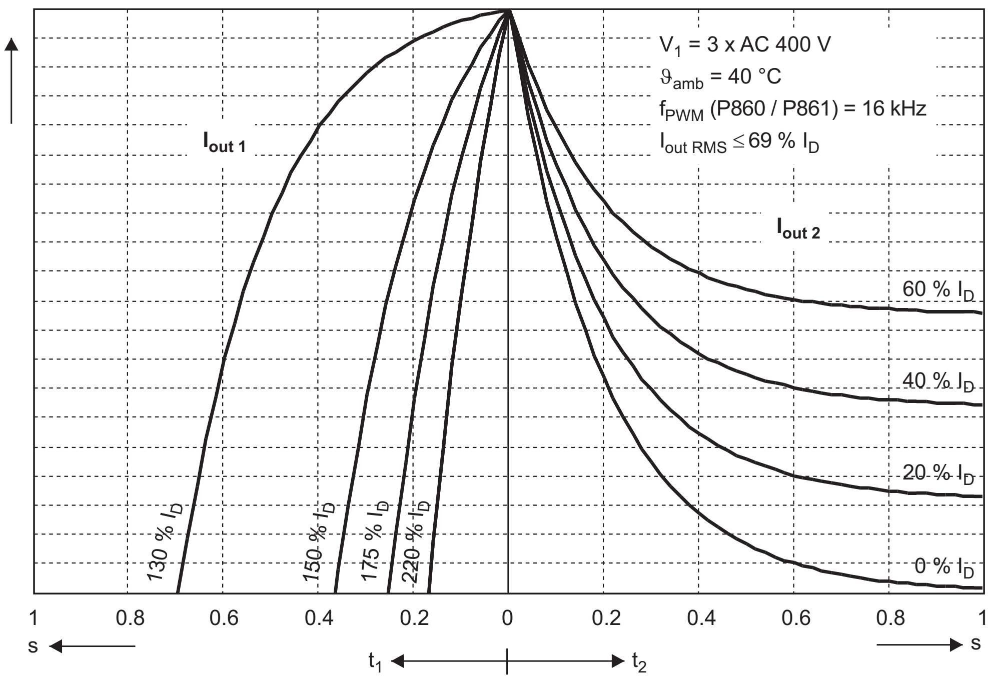


2932290827

Short-time overload capacity at f_{PWM} = 8 kHz (400 V / 40 °C)

Clock frequency f_{PWM} = 16 kHz:

The permitted mean inverter output current is $I_{out\ RMS} \leq 69\%\ I_D$.



2932292491

Short-time overload capacity at f_{PWM} = 16 kHz (400 V / 40 °C)

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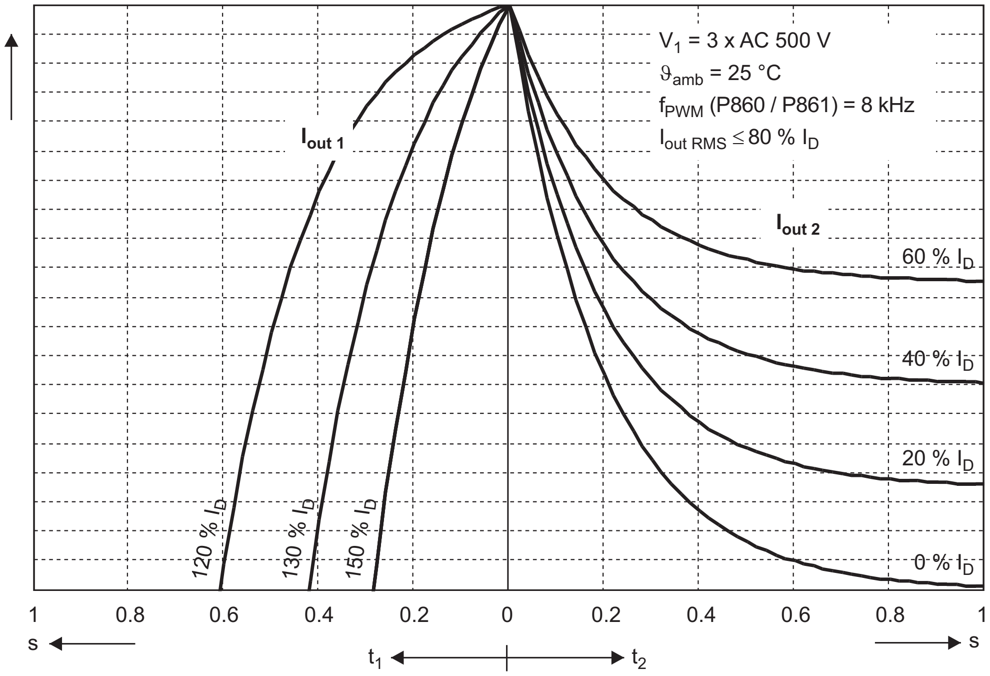
MDX61B, size 1 – 6 overload capacity at 500 V / 25 °C

Clock frequency f_{PWM} = 8 kHz:

The permitted mean inverter output current is $I_{out\ RMS} \leq 80\%\ I_D$.

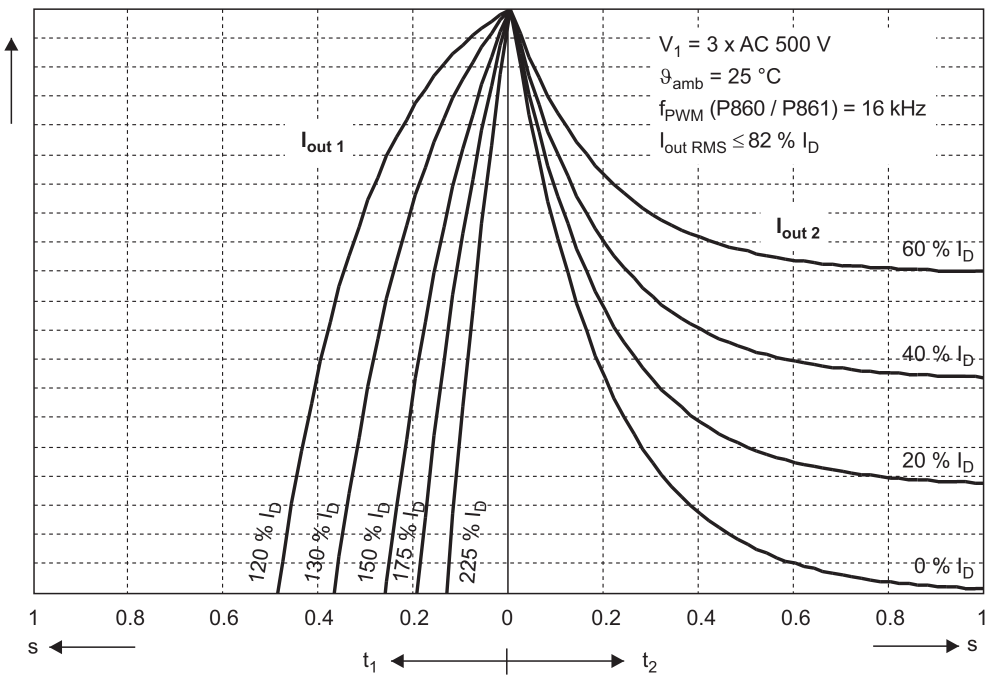


2932295179

Short-time overload capacity at f_{PWM} = 8 kHz (500 V / 25 °C)

Clock frequency f_{PWM} = 16 kHz:

The permitted mean inverter output current is $I_{out\ RMS} \leq 82\%\ I_D$.



2932296843

Short-time overload capacity at f_{PWM} = 16 kHz (500 V / 25 °C)

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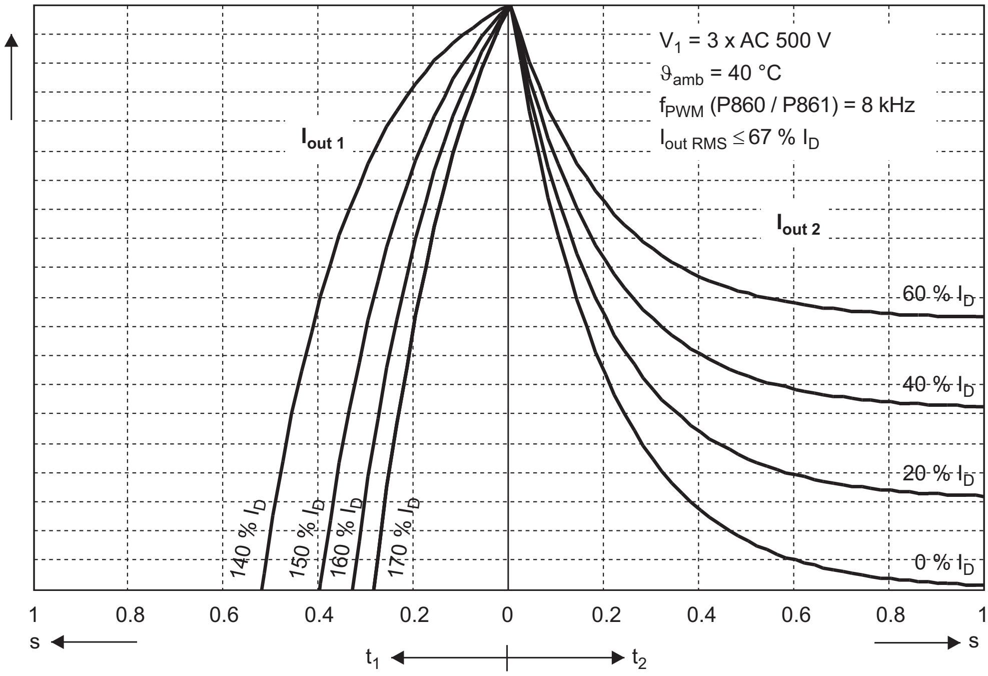
MDX61B, size 1 – 6 overload capacity at 500 V / 40 °C

Clock frequency f_{PWM} = 8 kHz:

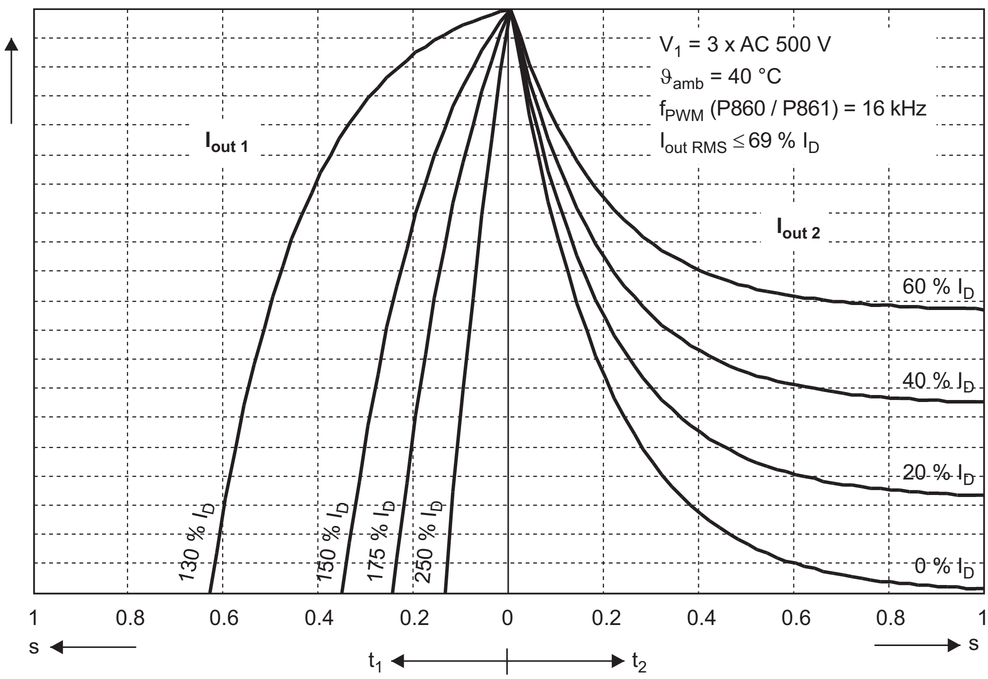
The permitted mean inverter output current is $I_{out\ RMS} \leq 67\%\ I_D$.



Short-time overload capacity at f_{PWM} = 8 kHz (500 V / 40 °C)

Clock frequency f_{PWM} = 16 kHz:

The permitted mean inverter output current is $I_{out\ RMS} \leq 69\%\ I_D$.



Short-time overload capacity at f_{PWM} = 16 kHz (500 V / 40 °C)

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9.10 Braking resistor selection

⚠ WARNING

The The supply cables to the braking resistor carry a high DC voltage (ca. DC 900 V).

- The braking resistor cables must be suitable for this high DC voltage.
- Install the braking resistor cables according to the regulations.

⚠ CAUTION

The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_N.

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.

INFORMATION

- The data applies to BW..., BW...-T and BW...-P braking resistors.
- For BW..., BW...-T and BW...-P braking resistors, plan for a load derating of 4% per 10 K from an ambient temperature of 40 °C. Do not exceed a maximum ambient temperature of 80 °C.
- The overload factor of the BW..-T and BW...-P braking resistors is limited by using an integrated temperature relay:
  – BW...-T up to overload factor 12
  – BW...-P up to overload factor 40
- The **maximum permitted line length** between **MOVIDRIVE®** and the braking resistor is **100 m**.
- Use **two tightly twisted leads or a 2-core shielded power cable**. Cable cross section according to tripping current I_F of F16. The nominal voltage of the cable must amount to at least V0/V = 300 V/500 V (in accordance with DIN VDE 0298).
- In the documented assignments of drive inverters and flat-design resistors, flat-design resistors have an internal thermal protection (non-replaceable fuse) that interrupts the current circuit in the event of overload. The project planning guidelines and the documented assignments of drive inverter and braking resistor must be adhered to.

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9.10.1 Parallel connection

Two braking resistors with the same value must be connected in parallel for some inverter/resistor combinations. In this case, the tripping current must be set on the bimetallic relay to twice the value of I_F entered in the table. For the BW...-T BW...-P braking resistors, the temperature switch/overcurrent relay must be connected in series.

9.10.2 Peak braking power

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

$$P_{max} = \frac{U^2_{DC}}{R}$$

3172394379

V_{DCL} is the maximum permitted DC link voltage. Its value is

- for MOVIDRIVE® MDX60/61B...-5_3 (AC 400/500 V devices) V_{DCL} = DC 970 V and
- for MOVIDRIVE® MDX61B...-2_3 (AC 230 V devices) V_{DCL} = DC 485 V.

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

Resistance value	Peak braking power	
	MDX60/61B...-5_3 (AC 400/500 V devices)	MDX61B...-2_3 (AC 230 V devices)
100 Ω	9.4 kW	2.3 kW
72 Ω	13.0 kW	3.2 kW
68 Ω	13.8 kW	3.2 kW
47 Ω	20.0 kW	5.0 kW
39 Ω	24.0 kW	6.0 kW
27 Ω	34.8 kW	8.7 kW
18 Ω	52.2 kW	13.0 kW
15 Ω	62.7 kW	15.6 kW
12 Ω	78.4 kW	19.6 kW
9 Ω (2 X BW018 parallel)	104 kW	26.1 kW
7.5 Ω (2 × BW915 parallel)	125 kW	31.3 kW
6 Ω	156 kW	39.2 kW
3 Ω (2 × BW106/206 parallel)	313 kW	78.4 kW
2.5 Ω	376 kW	–
1.4 Ω	670 kW	–

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Technical data of BW...-T / BW...-P braking resistors

BW...-T / BW...-P	
Connection cross section for signal contact/tightening torque	1 x 2.5 mm^2/ 1 Nm
Switching capacity of the temperature switch signal contact	• DC 2 A / DC 24 V (DC11) • AC 2 A / AC 230 V (AC11)
Switch contact (NC contact)	According to EN 60730

9.10.3 Assignment to AC 400/500 V devices (...-5_3)

Braking resistor type BW...	**BW090-P52B**	**BW100-005**	**BW100-006**	**BW072-003**	**BW072-005**	**BW168**	**BW268**
Part number	08245630	08262691	08217017	08260583	08260605	0820604X	08207151
Braking resistor type BW...-T			BW100-006-T			BW168-T	BW268-T
Part number			18204198			18201334	18204171
Continuous braking power (= 100% cdf)	0.10 kW	0.45 kW	0.6 kW	0.23 kW	0.45 kW	0.8 kW	1.2 kW
Load capacity 50% cdf[1]	0.15 kW	0.60 kW	1.1 kW	0.31 kW	0.60 kW	1.4 kW	2.2 kW
At 25% cdf	0.2 kW	0.83 kW	1.9 kW	0.42 kW	0.83 kW	2.6 kW	3.8 kW
12% cdf	0.4 kW	1.11 kW	3.6 kW	0.58 kW	1.11 kW	4.8 kW	7.2 kW
6% cdf	0.7 kW	2.00 kW	5.7 kW	1.00 kW	2.00 kW	7.6 kW	11 kW
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)						
Resistance value R_{BW}	90 Ω ±35%	100 Ω ±10%		72 Ω ±10%		68 Ω ±10%	
Tripping current (of F16) I_F	-	1 A	2.4 A	0.6 A	1 A	3.4 A	4.2 A
Design	PTC	Flat design	Wire resistor on ceramic core	Flat design		Wire resistor on ceramic core	
Connections / Tightening torque	Cables	Cables	Ceramic terminals 2.5 mm^2 (AWG13) 0.5 Nm	Cables		Ceramic terminals 2.5 mm^2 (AWG13) 0.5 Nm	
Degree of protection	IP20	IP54	IP20 (when installed)	IP54		IP20 (when installed)	
Ambient temperature ϑ_{amb}	-20 – +40 °C						
Type of cooling	KS = self-cooling						
For MOVIDRIVE® (recommended)	0005 – 0014	0005 – 0022	0015 – 0040	0005 – 0014		0005 – 0040	0015 – 0040

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.

Braking resistor type BW...	**BW147**	**BW247**	**BW347**	**BW039-012**		
Part number	08207135	08207143	08207984	08216894		
Braking resistor type BW...-T	BW147-T	BW247-T	BW347-T	BW039-012-T	BW039-026-T	BW039-050-T
Part number	18201342	18200842	18201350	18201369	18204155	18201377
Continuous braking power (= 100% cdf)	1.2 kW	2.0 kW	4.0 kW	1.2 kW	2.6 kW	5.0 kW
Load capacity 50% cdf[1]	2.2 kW	3.6 kW	7.2 kW	2.1 kW	4.7 kW	8.5 kW
At 25% cdf	3.8 kW	6.4 kW	12.8 kW	3.8 kW	8.3 kW	15.0 kW
12% cdf	7.2 kW	12 kW	20 kW[2] .	7.2 kW	15.6 kW	24.0 kW[2]
6% cdf	11 kW	19 kW	20 kW[2]	11.4 kW	24.0 kW	24.0 kW[2]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)					
Resistance value R_{BW}	47 Ω ±10%			39 Ω ±10%		
Tripping current (of F16) I_F	5 A	6.5 A	9.2 A	5.5 A	8.1 A	11.3 A
Design	Wire resistor on ceramic core					Grid resistor
Connections / Tightening torque	Ceramic terminals 2.5 mm^2 (AWG13) / 0.5 Nm BW347-T: Ceramic terminals 10 mm^2 (AWG8) / 1.6 Nm					M8 stud / 6 Nm
Degree of protection	IP20 (when installed)					
Ambient temperature ϑ_{amb}	-20 – +40 °C					
Type of cooling	KS = self-cooling					
For MOVIDRIVE® (recommended)	0055/0075			0110		

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value

Braking resistor type BW...	**BW018-015**			
Part number	08216843			
Braking resistor type BW...-T/-P	BW018-015-P	BW018-035-T	BW018-075-T	BW915-T
Part number	18204163	18201385	18201393	18204139
Continuous braking power (= 100% cdf)	1.5 kW	3.5 kW	7.5 kW	16 kW

Braking resistor type BW...	BW018-015			
Load capacity 50% cdf[1]	2.5 kW	5.9 kW	12.7 kW	27.2 kW
At 25% cdf	4.5 kW	10.5 kW	22.5 kW	48 kW
12% cdf	6.7 kW	15.7 kW	33.7 kW	62.7 kW[2]
6% cdf	11.4 kW	26.6 kW	52.2 kW[2]	62.7 kW[2]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)			
Resistance value R_{BW}	18 Ω ±10%			15 Ω ±10%
Tripping current (of F16) I_F	9.1 A	13.9 A	20.4 A	32.6 A
Design	Wire resistor on ceramic core	Grid resistor		
Connections / Tightening torque	BW018-015: -Ceramic terminals 2.5 mm² (AWG13) / 0.5 Nm BW018-015-P: Terminal 2.5 mm² (AWG13) / 1 Nm	M8 bolts/6 Nm		
Degree of protection	IP20 (when installed)			
Ambient temperature ϑ_{amb}	-20 – +40 °C			
Type of cooling	KS = self-cooling			
For MOVIDRIVE® (recommended)	0150/0220 and 2 × parallel with 0370/0450 [3]			0220

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value
3) When connected in parallel, the load capacity and trip current are doubled.

Braking resistor type BW...-	BW012-025		
Part number	08216800		
Braking resistor type BW...-T/-P	BW012-025-P	BW012-050-T	BW012-100-T
Part number	18204147	18201407	18201415
Continuous braking power (= 100% cdf)	2.5 kW	5.0 kW	10 kW
Load capacity 50% cdf[1]	4.2 kW	8.5 kW	17 kW
At 25% cdf	7.5 kW	15.0 kW	30 kW
12% cdf	11.2 kW	22.5 kW	45 kW
6% cdf	19.0 kW	38.0 kW	76 kW
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)		
Resistance value R_{BW}	12 Ω ±10%		
Tripping current (of F16) I_F	14.4 A	20.4 A	28.8 A
Design	Grid resistor		
Connections / Tightening torque	M8 bolts/6 Nm		
Degree of protection	IP20 (when installed)		
Ambient temperature ϑ_{amb}	-20 – +40 °C		
Type of cooling	KS = self-cooling		
For MOVIDRIVE® (recommended)	0300		

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.

Braking resistor type BW..-T/-P	BW106-T	BW206-T	BW1.4-170	BW003-420-T
Part number	18200834	18204120	13301527	13302345
Continuous braking power (= 100% cdf)	13.5 kW	18 kW	17 kW	42 kW
Load capacity 50% cdf[1]	23 kW	30.6 kW	29 kW	71 kW
At 25% cdf	40 kW	54 kW	51 kW	126 kW
12% cdf	61 kW	81 kW	76 kW	189 kW
6% cdf	102 kW	136.8 kW	129 kW	319 kW
Resistance value R_{BW}	6 Ω ± 10%		1.4 Ω ± 10%	2.5 Ω ± 10%

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Braking resistor type BW..-T/-P	BW106-T	BW206-T	BW1.4-170	BW003-420-T
Tripping current (of F16) I_F	47.4 A	54.7 A	110 A	129 A
Design	Grid resistor			
Connections / Tightening torque	M8 bolts/6 Nm		Bolt M12 / 15.5 Nm	
Degree of protection	IP20 (when installed)			
Ambient temperature ϑ_{amb}	-20 °C – +40 °C			
Type of cooling	KS = self-cooling			
For MOVIDRIVE® (recommended)	0370 – 0750 and 2 × parallel with 0900/1100/1320[2)]		1600/2000/2500	

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s

2) When connected in parallel, the load capacity and tripping current are doubled.

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9.10.4 Assignment to AC 230 V devices (...-2_3)

Braking resistor type BW...	**BW039-003**	**BW039-006**	**BW039-012**		**BW027-006**	**BW027-012**		
Part number	08216878	08216886	0821689 4		8224226	8224234		
Braking resistor type BW...-T			BW039-012-T	BW039-026-T			BW018-015-P	BW018-035-T
Part number			18201369	18204155			18204163	18201385
Continuous braking power (= 100% cdf)	0.3 kW	0.6 kW	1.2 kW	2.6 kW	0.6 kW	1.2 kW	1.5 kW	3.5 kW
Load capacity 50% cdf[1]	0.5 kW	1.1 kW	2.1 kW	4.6 kW	1.1 kW	2.1 kW	2.5 kW	5.9 kW
At 25% cdf	1.0 kW	1.9 kW	3.8 kW	6.0 kW[2]	1.9 kW	3.8 kW	4.5 kW	10.5 kW
12% cdf	1.8 kW	3.6 kW	6.0 kW[2] .	6.0 kW[2]	3.6 kW	7.2 kW	6.7 kW	13.0 kW[2]
6% cdf	2.8 kW	5.7 kW	6.0 kW	6.0 kW[2]	5.7 kW	8.7 kW	11.4 kW	13.0 kW[2]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)							
Resistance value R_{BW}	39 Ω ±10%				27 Ω ±10%		18 Ω ±10%	
Tripping current (of F16) I_F	2.7 A	3.9 A	5.5 A	8.1 A	4.7 A	6.6 A	9.1 A	13.9 A
Design	Wire resistor						Grid resistor	
Connections / Tightening torque	Ceramic terminals 2.5 mm² (AWG12) / 0.5 Nm							M8 stud / 6 Nm
Degree of protection	IP20 (when installed)							
Ambient temperature ϑ_{amb}	-20 – +40 °C							
Type of cooling	KS = self-cooling							
For MOVIDRIVE® (recommended)	0015/0022				0015 – 0037		2 × parallel with 0110 [3]	

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration of TD ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value
3) When connected in parallel, the load capacity and trip current are doubled.

Braking resistor type BW...-T/-P	BW018-075-T	BW915-T	BW012-025-P	BW012-050-T	BW012-100-T	BW106-T	BW206-T
Part number	18201393	18204139	18204147	18201407	18201415	18200834	18204120
Continuous braking power (= 100% cdf)	7.5 kW	15.6 kW	2.5 kW	5.0 kW	10 kW	13.5 kW	18 kW
Load capacity 50% cdf[1]	12.7 kW	15.6 kW[2]	4.2 kW	8.5 kW	17 kW	23 kW	30.6 kW
At 25% cdf	13.0 kW	15.6 kW[2]	7.5 kW	15.0 kW	19.6 kW[2]	39.2 kW[2]	39.2 kW[2]
12% cdf	13.0 kW[2] .	15.6 kW[2]	11.2 kW	19.6 kW	19.6 kW[2]	39.2 kW[2]	39.2 kW[2]
6% cdf	13.0 kW[2]	15.6 kW[2]	19.0 kW	19.6 kW[2]	19.6 kW[2]	39.2 kW[2]	39.2 kW[2]
	Observe the **regenerative power limit** of the inverter. (= 150% of the recommended motor power → Technical Data)						
Resistance value R_{BW}	18 Ω ±10%	15 Ω ±10%	12 Ω ±10%			6 Ω ±10%	
Tripping current (of F16) I_F	20.4 A	32.6 A	14.4 A	20.4 A	28.8 A	47.4 A	54.7 A
Design	Grid resistor						
Connections / Tightening torque	M8 stud / 6 Nm						
Degree of protection	IP20 (when installed)						
Ambient temperature ϑ_{amb}	-20 – +40 °C						
Type of cooling	KS = self-cooling						
For MOVIDRIVE® (recommended)	2 × parallel with 0110		0055/0075			0150 and 2 × parallel with 0220/0300[3]	

1) cdf = Cyclic duration factor of the braking resistor in relation to a cycle duration T D ≤ 120 s.
2) Physical power limit due to DC link voltage and resistance value
3) When connected in parallel, the load capacity and tripping current are doubled.

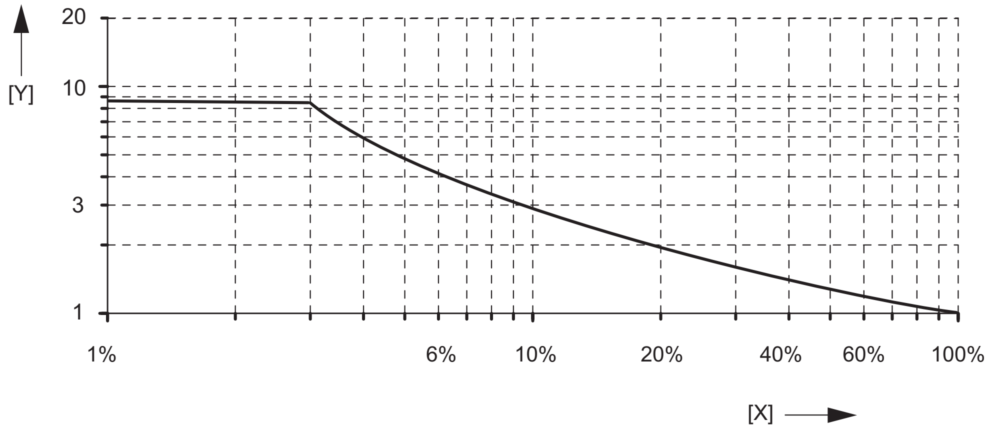
9.10.5 Overload factor for braking resistors

In braking operations within the cycle duration T_D (standard: $T_D \leq 120$ s), the resulting cdf braking power can be determined using the overload factor (see following diagrams). Observe the conditional peak braking power due to the DC link voltage when determining the load capacity.

The cdf braking power is calculated using the following formula:

CDF braking power = continuous braking power × overload factor

Overload factor for flat-type braking resistors



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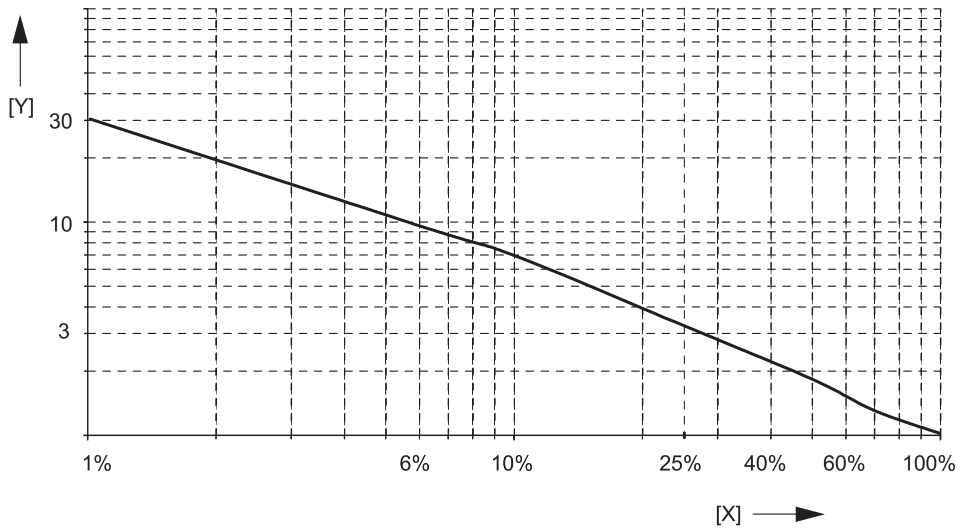
[X] Cyclic duration factor (cdf)	1%	3%	6%	15%	25%	40%	60%	80%	100%
[Y] Overload factor	8.7	8.6	4	2.6	1.83	1.5	1.2	1.12	1

Overload factor for wire resistors on ceramic core



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[X] Cyclic duration factor (cdf)	1%	3%	6%	15%	25%	40%	60%	80%	100%
[Y] Overload factor	30	15	9.5	5	3.2	2.2	1.5	1.12	1

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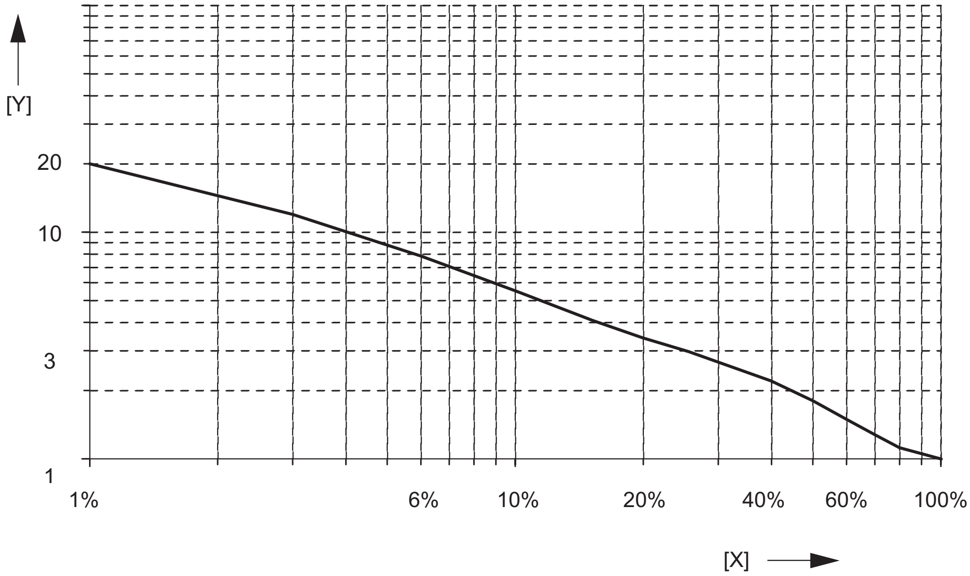
Overload factor for grid resistors



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[X] Cyclic duration factor (cdf)	1%	3%	6%	15%	25%	40%	60%	80%	100%
[Y] Overload factor	20	12	7.6	4	3	2.2	1.5	1.12	1

Calculation example

Given:

- Peak braking power 13 kW
- Average braking power during the braking time 6.5 kW
- Cyclic duration factor cdf 6%

Required:

- BW.. braking resistor

Procedure

1. **Determine the overload capacity.**

   First, determine the overload factor for a cyclic duration factor cdf of 6% from the respective diagrams.

2. **Calculate the continuous braking power.**

   Calculate the continuous braking power (= 100% cdf braking power) using the following formula: Mean braking power / overload factor

   Results:

   100% cdf braking power for wire resistors: 685 W.

   100% cdf braking power for grid resistors: 856 W.

3. **Determine the maximum braking resistor value depending on MOVIDRIVE® B.**

   The **maximum braking resistance value is 72 Ω** for a peak braking power of 13 kW when using a **MDX60B/61B...-5_3 (AC -400/500 V device)** (→ Peak braking power table).

   The **maximum braking resistance value is 18 Ω** for a peak braking power of 13 kW when using a **MDX60B/61B...-2_3 (AC -230 V device)** (→ Peak braking power table).

4. **Select the matching braking resistor:**

   Select the matching braking resistor from the assignment tables (AC -400/500 V devices or AC 230V devices) on the basis of the following aspects:

   - Maximum braking resistance value
   - MOVIDRIVE® B device used

   Result when using, for example, MDX61B0110-5_3: BW039-012 (or braking resistor with higher power)

   Result when using, for example, MDX61B0110-2_3: BW018-015-T (or braking resistor with higher power)

9.11 Connecting AC brakemotors

For detailed information about the SEW brake system, refer to the Gearmotors catalog, which you can order from SEW-EURODRIVE.

SEW-EURODRIVE brake systems are disk brakes with a DC coil that release electrically and brake using spring force. A brake rectifier supplies the brake with DC voltage.

INFORMATION

The brake rectifier must have a separate supply system cable for inverter operation; it must not be powered using the motor voltage!

9.11.1 Disconnecting the brake rectifier

The brake rectifier can be switched off, causing the brake to be applied, in two ways:

1. Cut-off in the AC circuit
2. Cut-off in the DC and AC circuit (faster disconnection)

Always use the cut-off in the DC and AC circuit of the brake:

- All hoist applications
- The CFC and SERVO operating modes

9.11.2 Activating the brake

Always activate the brake via digital output DBØØ "/Brake", do not use the PLC!

The digital output DOØ2 "/Brake" is configured as an output for operating a relay with free-wheeling diode and a control voltage of DC +24 V / max. 150 mA / 3.6 W. A power contactor can be controlled directly with a DC 24 V coil voltage or the BMK brake rectifier. This power contactor is used for switching the brake.

The startup function in the DBG60B keypad and in the MOVITOOLS® MotionStudio engineering software sets the brake parameters for the 2 and 4-pole motors from SEW-EURODRIVE. The brake parameters (P73_) must be set manually when using SEW-EURODRIVE motors with a higher number of poles and third-party motors.

9.11.3 Brake parameters

INFORMATION

The brake parameters are adapted to the brake activation arrangement shown in the wiring diagram. If the values set for the brake release and application times are too short, e.g. for long response times in the brake control system, hoists, for example, may sag.

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9.12 Permitted voltage systems for MOVIDRIVE® B

INFORMATION

MOVIDRIVE® B is intended for operation on TN and TT supply systems with directly grounded star point. Operation on voltage supply systems with a non-grounded star point (for example IT power systems) is also permitted. SEW-EURODRIVE recommends using suitable insulation monitors that may create ground capacitance. Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter.

The line voltage tolerance (short-term overvoltage or undervoltage) must not exceed 10%.

Only operate the inverters on supply systems with a maximum line-to-ground voltage of AC 300 V.

9.13 Line contactors and line fuses

9.13.1 Line contactor

- Only use line contactors of utilization category AC-3 (EN 60947-4-1).

NOTICE

- Do not use the **line contactor K11** (→ MOVIDRIVE® MDX60B/61B operating instructions, chapter "Wiring diagram for basic device") for jog mode but **only to switch the inverter on and off**. For jog mode, use the the commands "Enable/ stop", "CW/stop" or "CCW/stop".
- Observe a minimum switch-off time of 10 s for the line contactor K11.

9.13.2 Line fuses, fuse types

Sizes 0 – 6

Line protection types in utilization category gL, gG:

- Nominal fusing voltage ≥ nominal line voltage
- Nominal fusing current must be designed for 100% or 125% of the nominal inverter current depending on the inverter utilization.

Miniature circuit breaker with characteristics B, C>

- Nominal circuit breaker voltage ≥ nominal line voltage
- The nominal current of the line protection circuit breaker must be 10% above the nominal inverter current.

Size 7

Line fuses type gS are recommended for protecting the device. This is a combination of semiconductor and line protection fuse and is required for protecting the input rectifier.

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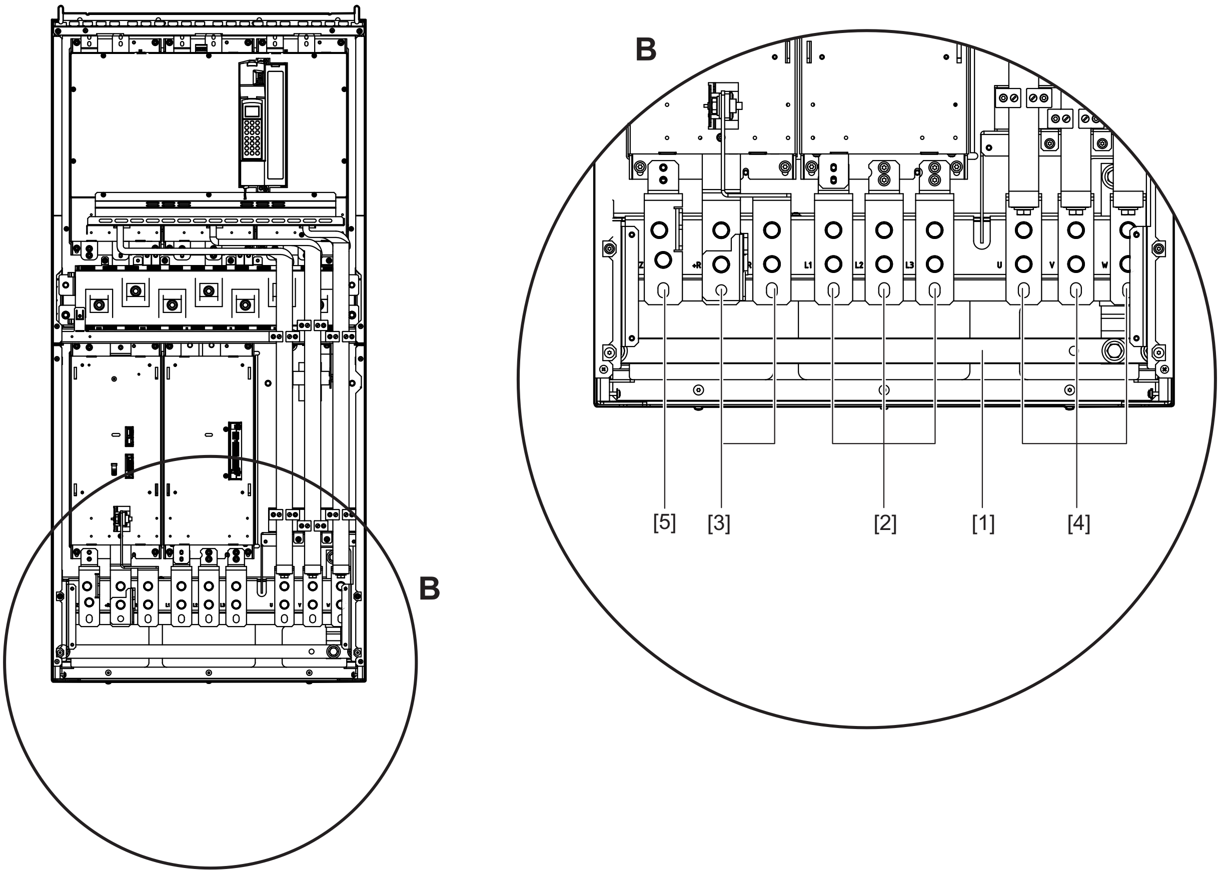
9.14 Power connection for size 7

9.14.1 Power connections

MOVIDRIVE® B in size 7 has other connections than sizes 0 – 6. All power connections are made from underneath via M12 cable lugs.

PE is connected with specific shield terminal on the PE busbar. This is where also the motor shields can be applied.



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[1] PE connection rail (thickness = 10 mm)

[2] X1: Line connection 1/L1, 2/L2, 3/L3

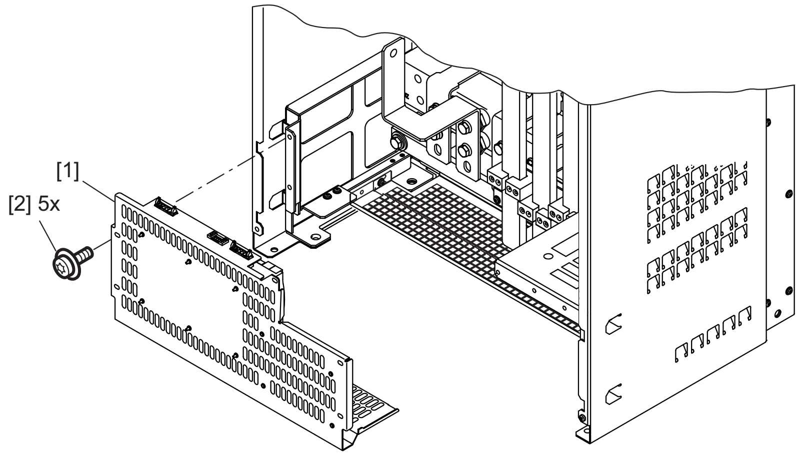
[3] X3: Braking resistor connection 8/+R, 9/–R

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

[5] -U_Z: Only with DC link adapter DLZ12B or DLZ14B accessories:

9.14.2 Auxiliary supply

Unlike sizes 0 to 6, size 7 has a switched-mode power supply unit that is not supplied from the DC link but requires its own AC 3 × 400 V supply. This voltage can be derived from the mains or (even better) from an auxiliary supply in the control circuit. The device cannot be taken into operation without connecting this power supply unit.



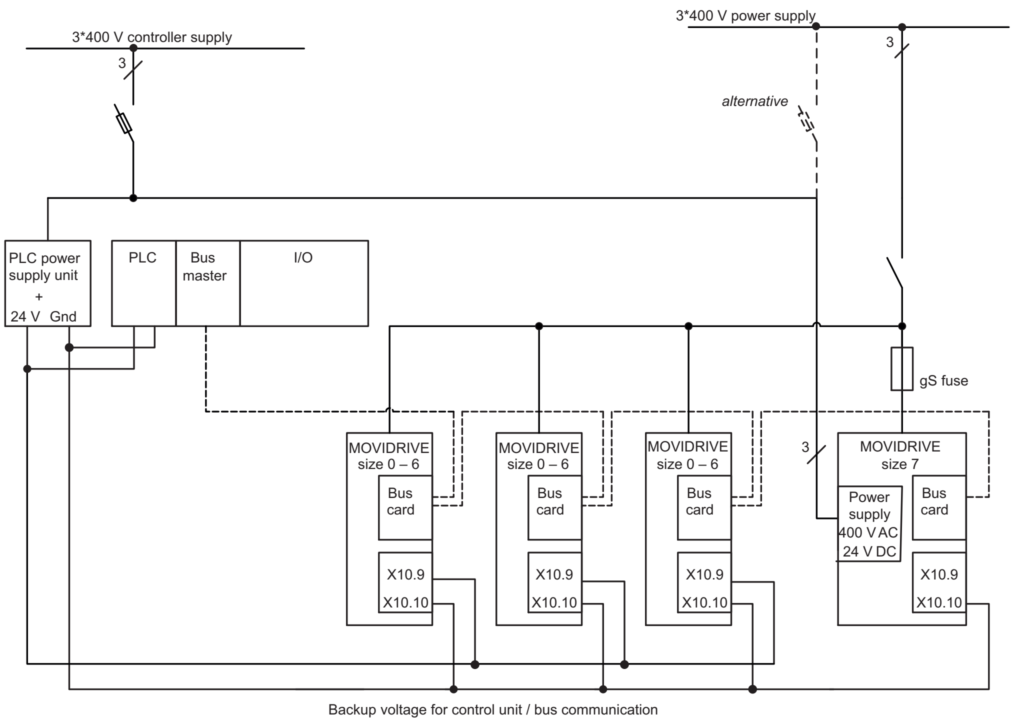
MDX61B size 7 power supply unit *20089692683*

[1] DC power supply unit

[2] Screw

INFORMATION

Do not apply external 24 V to X10.9. The power supply unit must be supplied with 400 V.



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Auxiliary supply X10.9/10 on the control unit only supplies the control unit, not the power electronics and internal device communication of MOVIDRIVE® B size 7. This is why the device must be supplied as shown in the following figure.

For connecting the digital inputs and outputs, refer to the wiring diagram of the signal terminals.

INFORMATION

- The power supply unit has a nominal line current of 2.4 A.
- The inrush current is max. 30 A (time-lag fuses required)

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9.15 Line and motor cables

9.15.1 Special regulations

Comply with the **regulations issued by specific countries and for specific machines** regarding fusing and the selection of cable cross sections. If required, also adhere to the notes on **UL compliant installation** (→ chapter "UL compliant installation").

9.15.2 Cable cross sections and fusing

If single-core copper cables with PVC insulation routed in cable ducts are used, SEW-EURODRIVE suggests the following cable cross-sections and fuses for an ambient temperature of 25 °C and rated line currents of 100% of the rated inverter current:

9.15.3 AC 400/500 V devices SI devices, V_{line} = 3 × AC 400 V:

MDX60/61B...-5A3	**0005**	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**
Size	0S		0M		1			
Fuses F11/F12/F13 I_N	16 A				16 A			
Supply system cable L1/L2/L3	1.5 mm^2				1.5 mm^2			
PE conductor	2 × 1.5 mm^2 or 1 × 10 mm^2				2 × 1.5 mm^2 or 1 × 10 mm^2			
Motor cable U/V/W	1.5 mm^2				1.5 mm^2			
Device terminal cross section of the power section	Separable terminal strip 4 mm^2 conductor end sleeve DIN 46228				Separable terminal strip 4 mm^2 conductor end sleeve DIN 46228			
Tightening torque	0.6 Nm							

MDX61B...-503	**0055**	**0075**	**0110**	**0150**	**0220**	**0300**
Size	2S		2	3		
Fuses F11/F12/F13 I_N	16 A		25 A	35 A	50 A	63 A
Supply system cable L1/L2/L3	2.5 mm^2		4 mm^2	6 mm^2	10 mm^2	16 mm^2
PE conductor	2 × 2.5 mm^2 or 1 × 10 mm^2	2 × 4 mm^2 or 1 × 10 mm^2		2 × 6 mm^2 or 1 × 10 mm^2	1 × 10 mm^2	1 × 16 mm^2
Motor cable U/V/W	2.5 mm^2		4 mm^2	6 mm^2	10 mm^2	16 mm^2 [1)]
Device terminal cross section of the power section	Terminal strips 4 mm^2 conductor end sleeve DIN 46228		M4 screw and washer assembly with terminal clip 4 mm^2 conductor end sleeve DIN 46228 6 mm^2 crimp cable lug DIN 46234	M6 screw and washer assembly with washer Max. 25 mm^2 Crimp cable lug DIN 46234		
Tightening torque	1.5 Nm			3.5 Nm		

1) For synchronous servo drives: Use motor with terminal box!

MDX61B...-503	0370	0450	0550	0750	0900	1100	1320
Size	4		5		6		
Fuses F11/F12/F13 I_N	80 A	100 A		125 A	160 A	200 A	250 A
Supply system cable L1/L2/L3	25 mm^2	35 mm^2		50 mm^2	70 mm^2	95 mm^2	150 mm^2
PE conductor	1 × 16 mm^2			25 mm^2	35 mm^2	50 mm^2	70 mm^2
Motor cable U/V/W	25 mm^2 [1)]	35 mm^2		50 mm^2	70 mm^2	95 mm^2	150 mm^2
Device terminal cross section of the power section	M10 bolt with nut Max. 70 mm^2 Press cable lug DIN 46235				M12 bolt with nut Max. 185 mm^2 Press cable lug DIN 46235		
Tightening torque	14 Nm				20 Nm		

1) For synchronous servo drives: Use motor with terminal box!

Size 7

The fuse value depends on the application and must be adjusted when the device is operated in 125% mode.

MDX61B...-503	1600	2000	2500	2500 in 125% mode
Size	7			
Fuses	315A gS	400A gS	500A gS	630A gS
Supply system cable L1/L2/L3	150 mm² / 2 × 50 mm²	240 mm² / 2 × 70 mm²	2 × 95 mm²	2 × 150 mm²
PE conductor	70 mm² / 2 × 25 mm²	120 mm² / 2 × 35 mm²	150 mm² / 2 × 50 mm²	150 mm²/ 2 × 70 mm²
Motor cable U/V/W	150 mm² / 2 × 50 mm²	240 mm² / 2×70 mm²	2 × 95 mm²	2 × 150 mm²
Device terminal cross section of the power section	Connection bar with bore for M12 max. 2 × 240 mm² Press cable lug DIN 46235			
Tightening torque	70 Nm			

9.15.4 AC 230 V devices SI units, V_{line} = 3 × AC 230 V:

MDX61B...-2_3	0015	0022	0037	0055	0075
Size	1			2	
Fuses F11/F12/F13 I_N	16 A		25 A	25 A	35 A
Supply system cable L1/L2/L3	1.5 mm²		4 mm²	4 mm²	6 mm²
PE conductor	2 × 1.5 mm² 1 × 10 mm²		2 × 4 mm² 1 × 10 mm²	2 × 4 mm² 1 × 10 mm²	2 × 6 mm² 1 × 10 mm²
Motor cable U/V/W	1.5 mm²		4 mm²	4 mm²	6 mm²
Device terminal cross section of the power section	Separable terminal strip 4 mm² conductor end sleeve DIN 46228			M4 screw and washer assembly with terminal clip 4 mm² conductor end sleeve DIN 46228 6 mm² crimp cable lug DIN 46234	
Tightening torque	0.6 Nm				

MDX61B...-2_3	0110	0150	0220	0300
Size	3		4	
Fuses F11/F12/F13 I_N	50 A	63 A	80 A	100 A
Supply system cable L1/L2/L3	10 mm²	16 mm²	25 mm²	35 mm²
PE conductor	1 × 10 mm²	1 × 16 mm²	1 × 16 mm²	1 × 16 mm²
Motor cable U/V/W	10 mm²	16 mm²	25 mm²	35 mm²
Device terminal cross section of the power section	M6 screw and washer assembly with washer Max. 25 mm² Crimp cable lug DIN 46234		M10 bolt with nut Max. 70 mm² Press cable lug DIN 46235	
Tightening torque	3.5 Nm		14 Nm	

9.15.5 Smallest wire bending space (EN 61800-5-1)

As stipulated in EN 61800-5-1, the distance between a power connection terminal and an obstruction toward which the wire is directed on leaving the terminal must correspond with the minimum values given in the table below.

Cable cross section in mm^2	Smallest wire bending space in mm		
	Wires per connection terminal		
	1	2	3
10 – 16	40	–	–
25	50	–	–
35	65	–	–
50	125	125	180
70	150	150	190
95	180	180	205
120	205	205	230
150	255	255	280
185	305	305	330
240	305	305	380

9.15.6 AC 400/500 V devices according to USA NEC, V_{line} = 3 × AC 460 V:

MDX61B...-5A3	**0005**	**0008**	**0011**	**0014**	**0015**	**0022**	**0030**	**0040**
Size	0S		0M		1			
Fuses F11/F12/F13 I_N	6 A	6 A		6 A	6 A	10A		15 A
Supply system cable L1/L2/L3	AWG14				AWG14			
PE conductor	AWG14				AWG14			
Motor cable U/V/W	AWG14				AWG14			
Device terminal cross section of the power section	Separable terminal strip AWG10 conductor end sleeve				Separable terminal strip AWG10 conductor end sleeve			
Tightening torque	0.6 Nm							

MDX61B...-503	**0055**	**0075**	**0110**	**0150**	**0220**	**0300**
Size	2S		2	3		
Fuses F11/F12/F13 I_N	20 A		30 A	40 A	60 A	80 A
Supply system cable L1/L2/L3	AWG12		AWG10	AWG8	AWG6	AWG4
PE conductor	AWG12		AWG10	AWG10		AWG8
Motor cable U/V/W	AWG12		AWG10	AWG8	AWG6 1)	AWG4 1)
Device terminal cross section of the power section	Terminal strips 4 mm² conductor end sleeve DIN 46228		M4 screw and washer assembly with terminal clip AWG10 conductor end sleeve AWG10 crimp cable lug	M6 screw and washer assembly with washer max. AWG4 crimp cable lug		
Tightening torque	1.5 Nm			3.5 Nm		

1) For synchronous servo drives: Use motor with terminal box!

MDX61B...-503	0370	0450	0550	0750	0900	1100	1320
Size	4		5		6		
Fuses F11/F12/F13 I_N	90 A	110 A	150 A	175 A	175 A	200 A	230 A
Supply system cable L1/L2/L3	AWG4	AWG3	AWG1	AWG2/0	AWG2/0	AWG3/0	AWG4/0
PE conductor	AWG8	AWG6	AWG6		AWG6	AWG6	AWG4
Motor cable U/V/W	AWG4 1)	AWG3	AWG1	AWG2/0	AWG2/0	AWG3/0	Kcmil 250
Device terminal cross section of the power section	M10 bolt with nut Max. AWG2/0 crimp cable lug				M12 bolt with nut max. Kcmil 350 Crimp cable lug		
Tightening torque	14 Nm				20 Nm		

1) For synchronous servo drives: Use motor with terminal box!

MDX61B...-503	**1600**	**2000**	**2500**
Size	7		
Fuses	315 A	400 A	500 A
Supply system cable L1/L2/L3	400 kcmil 2 × AWG2/0	2 × AWG3/0	2 × 250 Kcmil
PE conductor	AWG3	AWG3	AWG2
Motor cable U/V/W	400 kcmil 2 × AWG2/0	2 × AWG3/0	2 × 250 Kcmil
Device terminal cross section of the power section	Connection rail with bore for M12 max. 2 × 450 Kcmil Crimp cable lug		
Tightening torque	70 Nm		

9.15.7 AC 230 V devices according to USA NEC, V_{line} = 3 × AC 230 V:

MDX61B...-2_3	0015	0022	0037	0055	0075
Size	1			2	
Fuses F11/F12/F13 I_N	16 A		25 A	25 A	35 A
Supply system cable L1/L2/L3	AWG14		AWG12	AWG10	
PE conductor	AWG14		AWG12	AWG10	
Motor cable U/V/W	AWG14		AWG12	AWG10	
Device terminal cross section of the power section	Separable terminal strip AWG10 conductor end sleeve			M4 screw and washer assembly with terminal clip AWG10 conductor end sleeve AWG10 crimp cable lug	
Tightening torque	0.6 Nm				

MDX61B...-2_3	0110	0150	0220	0300
Size	3		4	
Fuses F11/F12/F13 I_N	50 A	60 A	80 A	90 A
Supply system cable L1/L2/L3	AWG6	AWG4	AWG4	AWG3
PE conductor	AWG10	AWG8	AWG8	AWG6
Motor cable U/V/W	AWG6	AWG4	AWG4	AWG3
Device terminal cross section of the power section	M6 screw and washer assembly with washer max. AWG4 crimp cable lug		M10 bolt with nut Max. AWG2/0 crimp cable lug	
Tightening torque	3.5 Nm		14 Nm	

9

9.15.8 Permitted motor cable lengths

The **maximum motor cable length** is depending on:

- Cable type
- Voltage drop in the cable
- Set PWM frequency P860/P861.
- The connection of an output filter.
  – An output filter is only permitted in VFC operating mode.
  – If an HF... output filter is connected, the cable length is not restricted by these limiting values, but exclusively by the voltage drop along the motor cable.
- The encoder type.
  – For encoder connection (VFC-n control, CFC, SERVO): Maximum cable length for the encoder connection is 100 m at a capacitance per unit length ≤ 120 nF/km (exception: 200 m for HTL encoders with interface adapter DWE12B, and 300 m with DEU21B and HTL encoder by SEW-EURODRIVE)

MOVIDRIVE® MDX60/61B...-5_3:

MDX60/61B...-5_3 (at V_{line} = 3 × AC 400 V)	0005–0014	0015	0022	0030	0040	0055	0075–1320	1600–2500
	Maximum motor cable length in m							
	Shielded cable							
PWM frequency 2.5 kHz	–	–	–	–	–	–	–	400
(P860/P861) 4 kHz	120	120	200	250	300	300	400	300
8 kHz	80	80	120	150	250	250	300	–
12 kHz	50	50	80	120	200	200	250[1)]	–
16 kHz	40	40	60	100	150	150	200[1)]	–
	Unshielded line							
PWM frequency 2.5 kHz	–	–	–	–	–	–	–	1200
(P860/P861) 4 kHz	360	360	600	750	900	900	1200	900
8 kHz	240	240	360	450	750	750	900	–
12 kHz	150	150	240	360	600	600	750[1)]	–
16 kHz	120	120	180	300	450	450	600[1)]	–

1) Not valid for size 6

MOVIDRIVE® MDX61B...-2_3:

MDX61B...-2_3 (at V_{line} = 3 × AC 230 V)	0015	0022	0037	0055	0075	0110–0300
	Maximum motor cable length in m					
	Shielded cable					
PWM frequency 4 kHz (P860/P861) 8 kHz 12 kHz 16 kHz	120 80 50 40	200 120 80 60	250 150 120 100	300 250 200 150	300 250 200 150	400 300 250 200
	Unshielded line					
PWM frequency 4 kHz (P860/P861) 8 kHz 12 kHz 16 kHz	360 240 150 120	600 360 240 180	750 450 360 300	900 750 600 450	900 750 600 450	1200 900 750 600

INFORMATION

SEW-EURODRIVE recommends not to use a residual current device. Leakage currents caused by cable capacitances can lead to false tripping.

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9.15.9 Voltage drop

The cable cross section of the motor cable should be selected so the **voltage drop is as small as possible**. An excessively large voltage drop means that the full motor torque is not achieved.

The expected voltage drop can be determined using the following tables (the voltage drop can be calculated in proportion to the length if the cables are shorter or longer):

Line Cross section	**Load with I in A =**																				
	4	**6**	**8**	**10**	**13**	**16**	**20**	**25**	**30**	**40**	**50**	**63**	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**400**
Copper	Voltage drop ΔV in V with length = 100 m and ϑ = 70 °C																				
1.5 mm²	5.3	8	10.6	13.3	17.3	21.3	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
2.5 mm²	3.2	4.8	6.4	8.1	10.4	12.8	16	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
4 mm²	1.9	2.8	3.8	4.7	6.5	8.0	10	12.5	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
6 mm²					4.4	5.3	6.4	8.3	9.9	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
10 mm²						3.2	4.0	5.0	6.0	8.2	10.2	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
16 mm²								3.3	3.9	5.2	6.5	7.9	10.0	1)	1)	1)	1)	1)	1)	1)	1)
25 mm²									2.5	3.3	4.1	5.1	6.4	8.0	1)	1)	1)	1)	1)	1)	1)
35 mm²											2.9	3.6	4.6	5.7	7.2	8.6	1)	1)	1)	1)	1)
50 mm²														4.0	5.0	6.0	1)	1)	1)	1)	1)
70 mm²																	5.8	1)	1)	1)	1)
95 mm²																	4.2	5.3	1)	1)	1)
150 mm²																		3.3	4.0	1)	1)
185 mm²																			3.2	3.8	1)
240 mm²																			2.5	2.9	3.3

1) Load not permitted according to IEC 60364-5-52.

Line Cross section	**Load with I in A =**																				
	4	**6**	**8**	**10**	**13**	**16**	**20**	**25**	**30**	**40**	**50**	**63**	**80**	**100**	**125**	**150**	**200**	**250**	**300**	**350**	**350**
Copper	Voltage drop ΔV in V with length = 100 m and ϑ = 70 °C																				
AWG16	7.0	10.5	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG14	4.2	6.3	8.4	10.5	13.6	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG12	2.6	3.9	5.2	6.4	8.4	10.3	12.9	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG10					5.6	6.9	8.7	10.8	13.0	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG8						4.5	5.6	7.0	8.4	11.2	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
AWG6								4.3	5.1	6.9	8.6	10.8	13.7	1)	1)	1)	1)	1)	1)	1)	1)
AWG4									3.2	4.3	5.4	6.8	8.7	10.8	13.5	1)	1)	1)	1)	1)	1)
AWG3									2.6	3.4	4.3	5.1	6.9	8.6	10.7	12.8	13.7	1)	1)	1)	1)
AWG2											3.4	4.2	5.4	6.8	8.5	10.2	10.9	13.6	1)	1)	1)
AWG1												3.4	4.3	5.4	6.8	8.1	8.6	10.8	13.5	1)	1)
AWG1/0												2.6	3.4	4.3	5.4	6.4	6.7	8.6	10.7	13.2	1)
AWG2/0													2.7	3.4	4.3	5.1	5.4	6.8	8.5	10.5	12.0
AWG3/0														2.6	3.3	4.0	4.1	5.2	6.5	8.3	9.5
AWG4/0															3.1	3.8	4.0	5.0	6.2	6.6	7.5
Kcmil 250																3.0	3.2	4.0	5.0	5.6	6.4
Kcmil 300																	2.6	3.3	4.0	4.6	5.3
Kcmil 350																		2.8	3.4	4.0	4.5
Kcmil 400																			3.0	3.5	4.0
Kcmil 450																				3.1	3.5

1) More than 3% voltage drop in relation to Vline = AC 460 V. Observe the applicable guidelines regarding the load of the cables.

9.16 Group drive in VFC mode

In VFC & group operating mode, a group of asynchronous motors can be operated on one inverter. In this operating mode, the inverter operates without slip compensation and with a constant V/f ratio. The motors are operated without encoder feedback.

INFORMATION

The parameter settings apply to all connected motors.

9.16.1 Motor currents

The total of the nominal motor currents must not exceed the nominal output current of the inverter.

For group drives, schedule a reserve of 20%.

9.16.2 Motor cables and fusing

Comply with the regulations issued by specific countries and for specific machines regarding fusing and the selection of supply system leads and motor cables.

Determine the permitted length of all motor cables connected in parallel as follows:

$$l_{tot} \leq \frac{l_{max}}{n}$$

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l_{tot}	=	Total length of the motor cables connected in parallel
l_{max}	=	Recommended maximum motor cable length
n	=	Number of motors connected in parallel

No additional fusing is required if the cross section of the motor cable corresponds to the cross section of the supply system lead. If the cross section of the motor cable is smaller than the cross section of the supply system lead, you must protect the motor cable against a short circuit for the corresponding cross section. Motor protection switches are suited to this purpose.

9.16.3 Motor size

The motors in a group must not be more than three motor types apart.

9.16.4 Output filter

An HF... output filter is required if the maximum motor cable length (l_{max}) given in the table "Permitted motor cable lengths" is exceeded. This may be the case in large groups (n) or when there are long motor cable lengths connected in parallel (l_{tot}). In this case, the maximum motor cable length is not limited by the limit value given in the table but by the voltage drop on the motor cable. The total value of the rated motor currents must not exceed the rated throughput current of the output filter.

9.17 Connecting explosion-proof AC motors

Observe the following instructions when connecting explosion-proof AC motors to MOVIDRIVE® B drive inverters:

- The inverter must be installed outside of the potentially explosive atmosphere.
- Observe industry and country-specific regulations.
- Observe the regulations and information of the motor manufacturer with regard to operation on a frequency inverter, e.g. mandatory sine filter.
- All operating resources in the potentially explosive atmosphere must comply with directive 94/9/EC (ATEX 100a).
- The TF/TH input of MOVIDRIVE® B must not be used for thermal monitoring of the motor. Use a TF/TH trip switch for thermal monitoring that is approved for use in potentially explosive atmospheres.
- In case of motors with speed feedback the speed sensor must also be approved for potentially explosive atmospheres. The speed sensor can be directly connected to MOVIDRIVE® B.

INFORMATION

For more information on the operation of explosion-proof AC motors, refer to the "Explosion-Proof AC Motors, Asynchronous Servomotors" operating instructions. You can order the operating instructions from SEW-EURODRIVE.

9.18 EMC-compliant installation in accordance with EN 61800-3

Drive systems with MOVIDRIVE® are designed as components for installation in machinery and systems. They comply with the EMC product standard EN 61800-3 "Variable-speed electrical drives". Provided the information relating to EMC-compliant installation is observed, products from SEW-EURODRIVE meet the appropriate requirements for CE marking on the basis of the EMC Directive 2014/30/EU.

MOVIDRIVE® MDX60/61B drive inverters of size 0, 1, and 2 are equipped with a line filter as standard. The line filter on the supply system end complies with limit class C2 to EN 61800-3 without further measures.

9.18.1 Interference immunity

MOVIDRIVE® meets **all** the requirements stipulated in EN 61800-3 with regard to interference immunity.

9.18.2 Interference emission

Higher levels of interference are permitted in industrial environments. In such an environment, it may be possible to dispense with the measures described below depending on the situation of the supply system and the machine configuration.

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Limit class C3

EMC-compliant installation according to EN 61800-3, **limit class C3**, is achieved as follows for size 7:

Limit class C3	Motor end	Line end
	Size 7	Size 7
1. Option	Output choke HD005	No measure required
2. Option	Shielded motor cable	No measure required

Limit class C2

Three options are available for EMC-compliant installation of sizes 0 – 6 in accordance with EN 61800-3, **limit class C2**, depending on the system configuration:

Limit class C2	Motor end	Line end	
	Size 0 to 6	Size 0 to 2	Size 3 to 6
1. Option	HD... output choke	No measure required	NF...-... line filter
2. Option	Shielded motor cable	No measure required	NF...-... line filter
3. Option	HF... output filter	No measure required	NF...-... line filter

EMC-compliant installation according to EN 61800-3, **limit class C2**, is achieved as follows for size 7:

Limit class C2	Motor end	Line end
	Size 7	Size 7
	Output choke HD005	NF600-503 line filter

Limit class C1

Three options are available for EMC-compliant installation in accordance with EN 61800-3, **limit class C1**, depending on the system configuration:

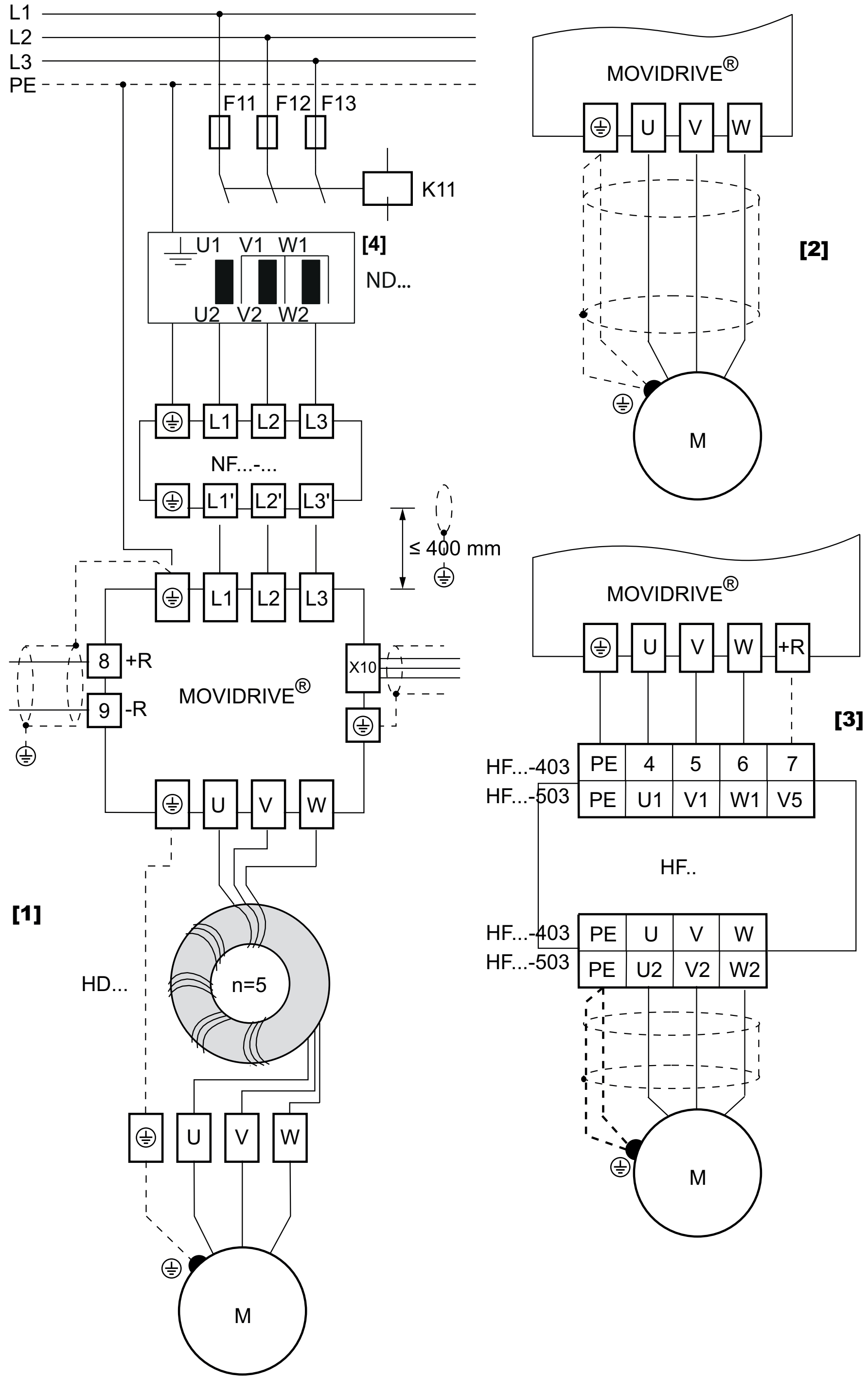
Limit class C1	Motor end	Line end
	Size 0 to 5	Size 0 to 5
1. Option	HD... output choke	NF...-... line filter
2. Option	Shielded motor cable	NF...-... line filter
3. Option	HF... output filter	NF...-... line filter

9.18.3 IT systems

INFORMATION

No EMC limits are specified for interference emission in voltage supply systems without a grounded star point (IT systems).

9.18.4 Block diagram of class C1 limit



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EMC-compliant installation according to class C1 limit

[1] = First possible solution with HD... output choke

[2] = Second possible solution with shielded motor cable

[3] = Third possible solution with HF... output filter (See chapter "HF output filter")

[4] = Optional line choke

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For more information, refer to the publication entitled Drive Engineering – Practical Implementation, Electromagnetic Compatibility. You can order the publication from SEW-EURODRIVE.

9.19 HF… output filter type

9.19.1 Important information

Observe the following instructions when using output filters:

- Operate output filters in V/f and VFC operating modes only. Output filters may not be used in CFC and SERVO operating modes.
- Do not use output filters in hoist applications.
- During project planning of the drive, take the voltage drop in the output filter into account and the reduced motor torque that results. This applies particularly to AC 230 V devices with output filters.
- Flying start function is not possible with HF.. output filter.
- Observe the increased noise level during operation when output filters are used.

Installation, connection and operation

INFORMATION

- Install output filters next to the corresponding inverter. Leave a ventilation space of at least 100 mm below and above the output filter.
- Limit the connection cable between the inverter and output filter to the absolute minimum length required. Maximum 1 m with an unshielded cable and 10 m for a shielded cable.
- An unshielded motor line is sufficient when using an output filter. **Note the following information when you use an output filter together with a shielded motor cable:**
  – The maximum permitted motor cable length for operation without U_Z connection is 20 m.
  – Observe the notes "Operation with U_Z connection" on the next page.
  – Operation with U_Z connection is required if the motor cable is longer than 20 m.
- The rated through current of the output filter must be higher than or equal to the output current of the inverter. Note whether the projected output current of the inverter is 100% I_N (= rated output current) or 125% I_N (= continuous output current).
- Several motors can be connected to one output filter when operating a motor group from one inverter. The sum of the rated motor currents must not exceed the rated through current of the output filter.
- It is possible to connect two output filters of the same type to one inverter output to increase the rated through current. All like connections must be connected in parallel on the output filters.
- Considerable noise (magnetostriction) may occur in the output filter especially if operating with f_{PWM} = 4 kHz. In environments susceptible to noise, SEW-EURODRIVE recommends operation with f_{PWM} = 12 kHz (or 16 kHz) and U_Z connection. Observe the notes regarding U_Z connection.
- When the inverter is operated with f_{PWM} = 4 or 8 kHz, the output filter connection V5 (with HF…-503) or 7 (with HF…-403) must **not** be connected (no U_Z connection).
- For HF450-503, please note that an I_N reduction always has to be considered depending on the PWM frequency.

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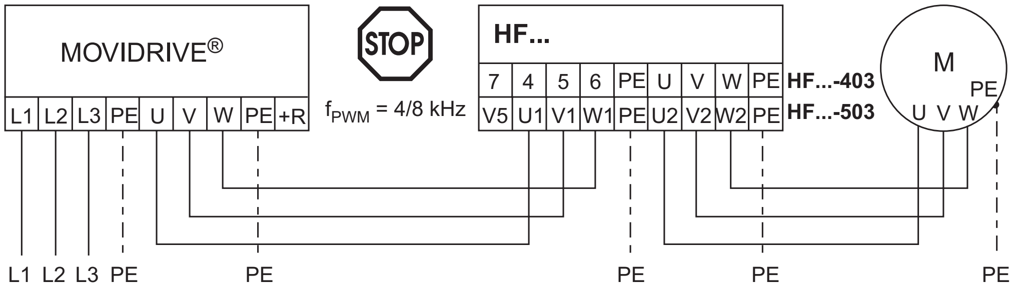
U_Z connection

Operation without U_Z connection:

- Approved only for PWM frequency 4 kHz or 8 kHz.



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HF...-... output filter connection without U_Z connection

INFORMATION

Operation with U_Z connection:

(Connection of inverter terminal + R with HF…-503 terminal V5 or HF…-403 terminal 7):

- Only approved for PWM frequency 12 kHz or 16 kHz. Take into account that increased losses (= power reduction) occur in the inverter when operating the inverter with 12 or 16 kHz.
- Optimized grounded filter effect.
- Improved filter effect in the low-frequency range (≤ 150 kHz).
- Set PMW fix = on; the inverter must not be able to reduce the PWM frequency automatically.
- The U_Z connection increases the inverter load. The DC link connection increases the required inverter output current in relation to the rated output current of the inverter as shown in the following table.
- HF180 and HF325 output filters can only be operated without U_Z connection.

f_{PWM}	(at V_{line} = 3 × AC 230 V)	(at V_{line} = 3 × AC 400 V)	(at V_{line} = 3 × AC 500 V)
12 kHz	4%	12%	15%
16 kHz	3%	8%	12%

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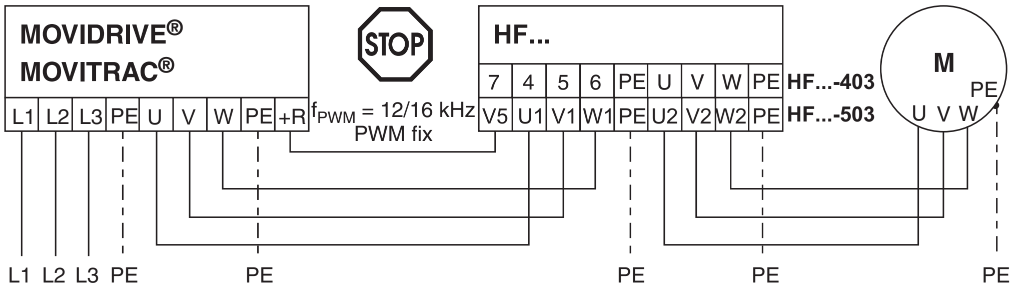
The increased power requirement causes an additional load on the inverter. Take this aspect into account during project planning of the drive. Failure to comply with this aspect may cause the inverter to shut down due to overload.



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HF...-... output filter connection with U_Z connection

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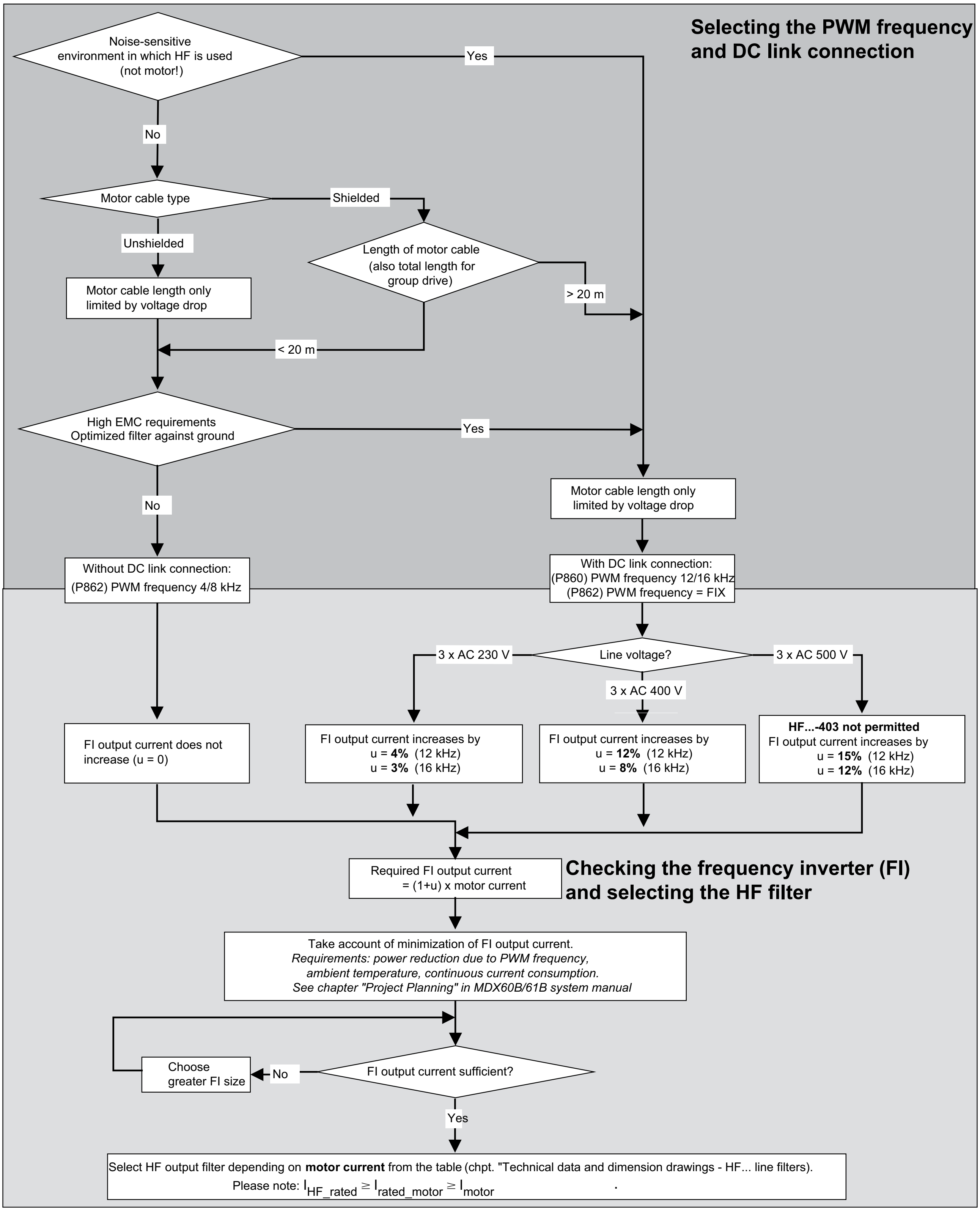
The procedure for selecting the PWM frequency and checking the inverter is summarized in the following figure.



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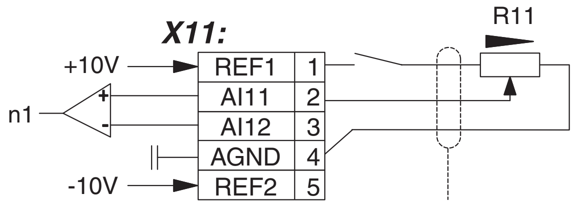
9.20 Electronics Cables and Signal Generation

- The electronics terminals of the basic device are suitable for the following cross sections:
  – For single core 0.20 – 2.5 mm² (AWG24 – 12)
  – For double core 0.20 – 1 mm² (AWG24 – 17)

Route electronics cables separately from power cables, contactor control cables or braking resistor cables. If you use shielded electronics cables, ground the shield at both ends.

- Use setpoint potentiometer with R ≥ 5 kΩ.
- If necessary, potentiometer setpoints are switched using the 10 V voltage rather than via the wiper lead.



Switch potentiometer setpoint

- Never connect 0 V cables (AGND, DGND, DCOM) for generating signals. The 0 V cables of several electrical units which are connected should not be looped from device to device, but rather wired up in a star configuration. This means:
  – Install the units in adjacent control cabinet compartments rather than distributing them widely.
  – Lay the 0 V cables with 1.5 mm² (AWG16) cross section from a central point to each individual device by the shortest possible route.
- If coupling relays are used, they should always have encapsulated, dust-proof electronics contacts suitable for switching small voltages and currents (5 – 20 V, 0.1 – 20 mA).
- Digital inputs/outputs

The digital inputs are electrically isolated by optocouplers. Digital input commands can also be issued directly as a 0/1 command from the PLC instead of using a coupling relay (signal level → electronics data).

The digital outputs are short-circuit proof and protected against external voltage up to DC 30 V.

- The inverter starts a self-test (ca. 3 s) when the power supply or 24 V supply is connected. All signal outputs have the level "0" throughout the self-test.
- DC 24 V voltage supply VI24:

According to EN 61131-2, V_N = +24 V -15% / +20%. A total AC voltage component with a peak value of 5% of the rated voltage (+24 V) is permitted in addition to the specified voltage tolerances.

- Max. line length inverter – encoder/resolver:
  – 50 m at 70 nF/km < capacitance per unit length ≤ 120 nF/km
  – 100 m at capacitance per unit length ≤ 70 nF/km with DER11B, DEH11B, DEH21B, 300 m with DEU21B

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9.21 External voltage supply DC 24 V

9.21.1 General information

The internal switched-mode power supply of MOVIDRIVE® B has a maximum power of 29 W. An external DC 24 V power supply unit must be connected if a higher power is needed due to installed options. **In this case, switch on the external DC 24 V power supply unit prior to the input contactor or simultaneously with the line contactor.**

The following tables show the power demand of the MOVIDRIVE® B devices with no options and the power demand of the individual options. MOVIDRIVE® B without option does not require external DC 24 V supply.

The following conditions apply to the information about the power demand without option:

- The DC 24 V outputs (VO24) are not subject to load.
- The digital outputs DBØØ and DOØ2 – DOØ5 are not subject to load.

The following conditions apply to the information about the DEH11B and DER11B options:

- The motor encoder/resolver is supplied from MOVIDRIVE® B.
- An external encoder (synchronous encoder) is not connected to X14. Observe the power ratings of the manufacturer when connecting an external encoder (ca. 4 W with SEW encoder).
- Use only certified devices with a **limited output voltage** (U_{max} = DC 30 V) and **limited output current** (I_{max} = 8 A) as an **external DC 24 V voltage source**.

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9.21.2 Power demand

The power values of the options are basic values **without** load on the inputs and outputs.

INFORMATION

- The load of the outputs depends on the connected consumer.
- The digital inputs have an internal resistance of 3 kΩ. This results in a power demand of 0.2 W per terminal. You have to take this power into account when you supply terminals via the DC 24 V output of MOVIDRIVE® B.
- The power ratings of the DIP11B, DEH21B, DIO11 and DRS11B options do not include the voltage supply of the encoder. The encoders and digital outputs of these option cards are only supplied when DC 24 V is connected to the card. You have to take the additional power into account when MOVIDRIVE® B is to provide the voltage supply for these options. Note that MOVIDRIVE® B delivers a maximum total current of DC 400 mA for the DC 24 V outputs.

- DC 24 V power demand of MOVIDRIVE® MDX60/61B **without option**:

Size MDX60B/61B	DC 24 V power demand without option	Power consumption X17:4
0	15.6 W	4 W
1	17.6 W	5 W
2, 2S		6 W
3	23.6 W	7.5 W
4	25.6 W	8 W
5		10 W
6		6 W
7	–	6 W

- Additional DC 24 V power demand of MOVIDRIVE® MDX60/61B with option (size 0: only available with option-capable MDX61B units):

Additional DC 24 V power demand with installed option					
DEU21B	DEH11B, DEH21B	DER11B	Fieldbus options[1)]	DIO11B	DRS11B, DIP11B
6 W	5 W	6 W	3 W	6 W	2.5 W

1) Fieldbus options are: DFP21B, DFI11B, DFI21B, DFE32B, DFE33B, DFE24B, DFD11B, DFC11B, DFS..B

Additional DC 24 V power demand with installed option				
DHP11B	OST11B	DHE21/41B	DHF21/41B	DHR21/41B
4.5 W	1.5 W	6.5 W	8 W	9.5 W

- The safety monitor options DCS21B/22B/31B32B always require external DC 24 V voltage supply.

Example 1

MOVIDRIVE® MDX61B0022-5A3-4-00 (size 1) with fieldbus interface option type DFI11B. MOVIDRIVE® B supplies the digital inputs DI00 (controller inhibit), DI01 (CW/Stop), DI02 (CCW/Stop), DI03 (Enable/Stop) with voltage. The motor brake is controlled via DB00. The coil of the brake relay requires DC 100 mA at DC 24 V.

- Calculating the total power demand:
  - Power demand of the basic device: 17.6 W
  - Power demand of the DFI11B option: 3 W
  - Power demand of the digital inputs: 4 x 0.2 W = 0.8 W
  - Power demand of the brake coil on DB00; 24 V x 0.1 A = 2.4 W

  The total power demand is 23.8 W. No external DC 24 V voltage supply is required in this case.

Example 2

MOVIDRIVE® MDX61B0110-5A3-4-00 (size 2) with the options HIPERFACE® encoder card DEH11B, fieldbus interface DFP21B and input/output card DIO11B. Four inputs of the basic device and four inputs of the DIO11B option are used. The motor brake is controlled via terminal DB00. The coil of the brake relay requires DC 100 mA at DC 24V. Additionally, six outputs of the DIO11B option are subject to a load of DC 25 mA.

- Calculating the total power demand:
  - Power demand of the basic device: 17.6 W
  - Power demand of the DEH11B option: 5 W
  - Power demand of the DFP21B option: 3 W
  - Power demand of the DIO11B option without terminals: 6 W
  - Power demand of the inputs (basic device + DIO11B): 8 x 0.2 W = 1.6 W
  - Power demand of the brake coil on DB00; 24 V x 0.1 A = 2.4 W
  - Power demand of the digital outputs: 6 x 24 V x 0.025 A = 3.6 W

  The total power demand is 39.2 W. An external DC 24 V voltage supply is required in this case.

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9.22 Parameter set switchover

This function serves for operating two motors on one inverter using two different parameter sets.

The parameter set changeover is performed via a digital input or fieldbus. A digital input must be programmed to the "Parameter set switchover" function (→ P60_/P61_) for this purpose. You can then change from parameter set 1 to 2 and vice versa in "Inhibited" inverter status.

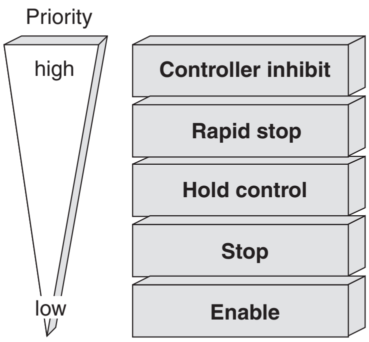
Function	Effect in case of	
	"0" signal	"1" signal
Parameter set switchover	Parameter set 1 active	Parameter set 2 active

INFORMATION

- In operation with encoder feedback, switching between the parameter sets must not be faster than every 2 seconds. This makes sure that the encoders can be initialized.
- A changeover contactor should be provided for each of the two motor cables when two motors are operated alternately on the same inverter with the parameter set switchover function in use (→ P60_/P61_ parameter set switchover). Only switch changeover contactors when the device is inhibited.
- Parameter set 2 allows for VFC operating modes without speed control only. Speed control or CFC and SERVO operating modes are not possible.

9.23 Priority of the operating states and link between control signals

9.23.1 Priority of the operating states



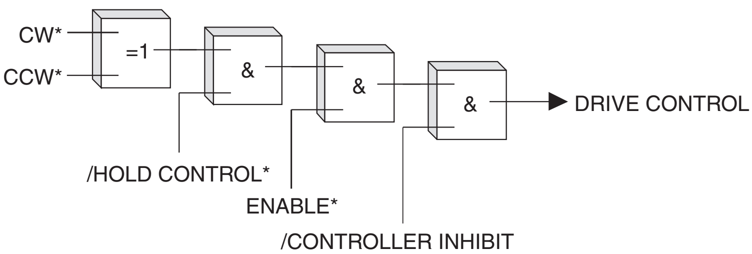
Priority of the operating states

9.23.2 Interrelation between control signals

The following table shows the interrelation between control signals. “/Controller inhibit” is programmed to digital input DIØØ and cannot be changed. The other control signals are only in effect if a digital input is programmed to this function (→ parameter P60_).

/Controller inhibit (DIØØ)	The digital input is programmed to				Inverter status
	Enable/stop	/Position hold control	CW/stop	CCW/stop	
"0"	1)	1)	1)	1)	Inhibited
"1"	"0"	2)	2)	2)	
"1"	"1"	"0"	2)	2)	
"1"	"1"	"1"	"1"	"0"	CW enabled
"1"	"1"	"1"	"0"	"1"	CCW en-abled

1) Not relevant if "/Controller inhibit (DIØØ)" = "0"
2) Not relevant if "Enable/stop" = "0"



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Interrelation between control signals

* If a digital input is programmed to this function.

9.24 Limit switches

9.24.1 Limit switch processing

Limit switch processing makes sure that the travel range of a drive is observed. To do this, it is possible to program the digital inputs to the functions "/limit switch positive" and "/limit switch negative". The limit switches are connected to these digital inputs. The limit switches must be "0" active and continuously actuated in the limit switch area (= movement up to limit switch).

“0” active means:

- Limit switch not contacted (= not activated) → 24 V signal
- Limit switch contacted (= actuated) → 0 V signal
- The limit switches must supply a "1" signal continuously in the travel range.

9.24.2 Limit switch hit (“0” signal)

- The drive is stopped at the emergency ramp t14/t24.
- When brake function is activated, the brake is applied.
- In IPOS$^{PLUS®}$ operating modes, contacting a limit switch generates a fault message. A reset is then required in order to move clear from the limit switch (→ IPOS$^{PLUS®}$ manual).

9.24.3 Clearing from limit switch

- The inverter must be enabled via the digital inputs.
- Hold control must be inactive.
- The inverter receives a setpoint value from the setpoint source that guides it in the right direction.
- With activated setpoint stop function: Setpoint > start setpoint

9.24.4 Behavior of the drive when moving clear

- Once a limit switch is hit, the drive can be moved clear of the limit switch in the other direction.
- When the brake function is activated, the brake is first released and then the drive is moved clear ("0" → "1" signal). on the Intranet.

If the drive leaves the limit switch range without having been moved clear of the switch automatically, for example when the drive is moved manually, the drive can still be moved afterwards in the standard operating mode.

9.24.5 Limit switch monitoring

- The inverter monitors whether the limit switches are missing, whether there is a break in a wire or whether the limit switches have been mixed up.
- If this is the case, the inverter triggers an emergency stop and displays fault F27 “Limit switches missing.”

10 General information

10.1 About this documentation

The current version of the documentation is the original.

This documentation is an integral part of the product. The documentation is written for all employees who assemble, install, start up, and service this product.

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

10.2 Structure of the safety notes

10.2.1 Meaning of signal words

The following table shows the grading and meaning of the signal words for safety notes.

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

10.2.2 Structure of section-related safety notes

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

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

SIGNAL WORD

Type and source of hazard.

Possible consequence(s) if disregarded.

- Measure(s) to prevent the hazard.

Meaning of the hazard symbols

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

Hazard symbol	Meaning
	General hazard

Hazard symbol	Meaning
	Warning of dangerous electrical voltage
	Warning of hot surfaces
	Warning of risk of crushing
	Warning of suspended load
	Warning of automatic restart

10.2.3 Structure of embedded safety notes

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

This is the formal structure of an embedded safety note:

▲ **SIGNAL WORD** Type and source of hazard. Possible consequence(s) if disregarded. Measure(s) to prevent the hazard.

10.3 Rights to claim under limited warranty

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

10.4 Exclusion of liability

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

10.5 Other applicable documentation

Observe the corresponding documentation for all further components.

10.6 Product names and trademarks

The brands and product names in this documentation are trademarks or registered trademarks of their respective titleholders.

10.7 Copyright notice

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11 Safety notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and adhered to. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the device, 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.

11.1 General

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

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

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

Refer to the documentation for additional information.

11.2 Target group

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

Skilled persons (electrically) in the context of these basic safety notes are all persons familiar with the installation, assembly, startup and operation of the product who possess the necessary qualifications.

All persons involved in any other work, such as transportation, storage, operation and waste disposal, must be trained appropriately.

11.3 Designated use

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

In case of installation in machines, startup of the inverters (meaning the start of designated use) is prohibited until it is determined that the machine meets the requirements stipulated in the Machinery Directive 2006/42/EC; EN 60204 must be observed.

Startup (i.e. the start of designated use) is only permitted under observance of the EMC Directive (2014/30/EU).

The drive inverters meet the requirements stipulated in low voltage guideline 2014/35/EU. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these inverters.

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

11.3.1 Safety Functions

MOVIDRIVE® MDX60/61B 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, observe the specifications in the "MOVIDRIVE® MDX60B/61B Functional Safety" manual.

11.4 Transportation and storage

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

11.5 Setup

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

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

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

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

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

11.6 Electrical connection

Observe the applicable national accident prevention guidelines when working on live inverters (e.g. BGV A3).

Electrical installation must be carried out in compliance with pertinent regulations (e.g. cable cross sections, fusing, protective conductor connection). For any additional information, refer to the applicable documentation.

⚠ WARNING

Electric shock due to charged capacitors. Dangerous voltage levels may still be present inside the device and at the terminals up to 10 minutes after disconnection from the power supply.

Severe or fatal injuries.

- Wait for 10 minutes after the frequency inverter has been separated from the voltage supply. Make sure that the device is de-energized. Only then must you commence any work on the device.
- Observe the corresponding information signs on the frequency inverter.

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 inverters bearing the CE marking. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

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

Required preventive measure: Grounding the device.

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

11.7 Protective separation

The device meets all requirements for reliable isolation of power and electronics connections in accordance with EN 61800-5-1. All connected circuits must also satisfy the requirements for safe disconnection to ensure reliable isolation.

11.8 Operation

Systems into which the drive inverters are installed must be equipped with additional monitoring and protection devices, if necessary, according to applicable safety regulations; e.g. the German law governing technical equipment (Gesetz über technische Arbeitsmittel), accident prevention regulations, etc. The operating software may be used to make changes to the drive inverter.

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⚠ WARNING

Electric shock due to charged capacitors. Dangerous voltage levels may still be present inside the device and at the terminals up to 10 minutes after disconnection from the power supply.

Severe or fatal injuries.

- Wait for 10 minutes after the frequency inverter has been separated from the voltage supply. Make sure that the device is de-energized. Only then must you commence any work on the device.
- Observe the corresponding information signs on the frequency inverter.

Keep all covers and doors closed during operation.

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

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

Mechanical blocking or internal safety functions of the device can cause a motor standstill. Eliminating the cause of the problem or performing a reset may result in the drive re-starting automatically. If, for safety reasons, this is not permitted for the drive-controlled machine, disconnect the device from the supply system before you start troubleshooting.

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12 Device structure

12.1 Type designation, nameplates and scope of delivery

12.1.1 Type designation

The following diagram shows the type designation of the MOVIDRIVE® MDX60/61B inverter:

MDX60 B 0011 - 5 A 3 - 4 00

Design	00 = Standard 0T = Application XX = Special device XX/L = Coated pcbs
Quadrants	4 = 4Q (with brake chopper) 2 = 2Q
Connection type	3 = 3-phase
Radio interference suppression on the line side	B = Radio interference suppression C1 A = Radio interference suppression C2 0 = No radio interference suppression
Connection 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

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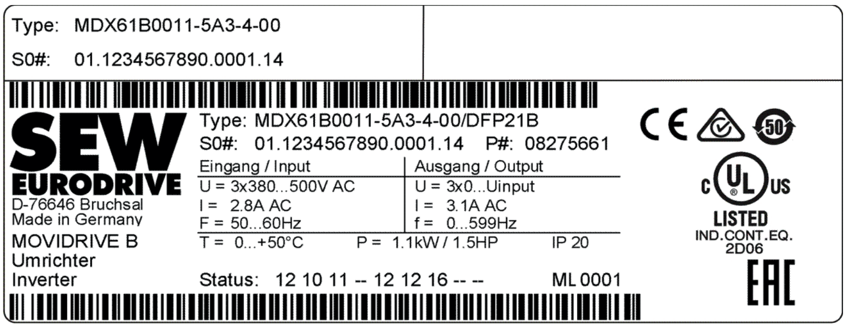
12.1.2 System nameplate size 0

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



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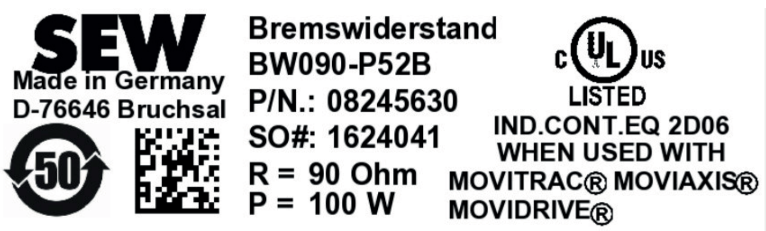
12.1.3 Nameplate for BW090-P52B braking resistor

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



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12.1.4 System nameplate for sizes 1 – 7

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

- On the side of the device in size 1 – 6
- On the upper front cover of size 7

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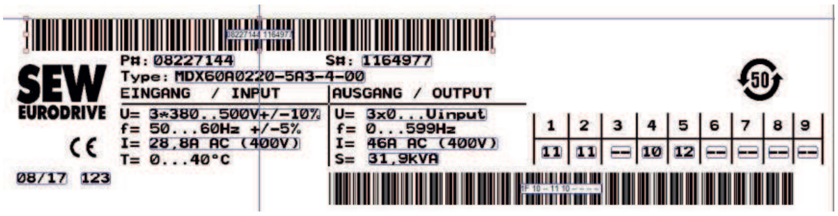
12.1.5 Power section nameplate for sizes 1 – 7

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

- On the side of the device in size 1 – 2
- On the front of the device in size 3 – 6
- Top left inside the size 7 device



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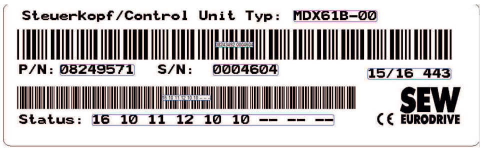
12.1.6 Control unit nameplate for sizes 1 – 7

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



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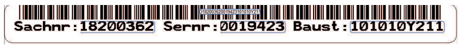
12.1.7 Option card nameplate



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12.2 Scope of Delivery

12.2.1 Sizes 0 – 7

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

12.2.2 Size 0

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

12.2.3 Sizes 1 – 7

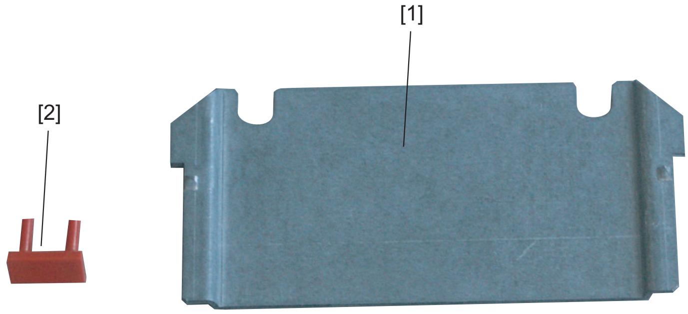
- 1 set of shield clamps for signal cable, not installed. The set of shield clamps comprises:
  - 1 shield clamp for signal cable (1 contact clip)
  - 2 contact clips
  - 2 screws for attaching the contact clips
  - 1 screw for attaching the shield clamp to the device
- Only for size 6: Carrying bar and 2 split pins
- For size 7, you can order the connection set DLA11B (part no. 18223125) with connection screws and 3 PE terminals.
- Sizes 2S and 2:
  - Shield terminal of the power connection ("Shield clamp for power section, sizes 2S and 2" (→ 🗎 590))

12.2.4 Size 2S

- Accessories set, not installed. The accessories set (→ 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).

  Degree of protection IP20 is achieved as soon as one of the following conditions is fulfilled:
  - Touch guard [2] mounted to X3/X4 (→ section "Touch guard")
  - An adequately prefabricated cable is connected to X3/X4

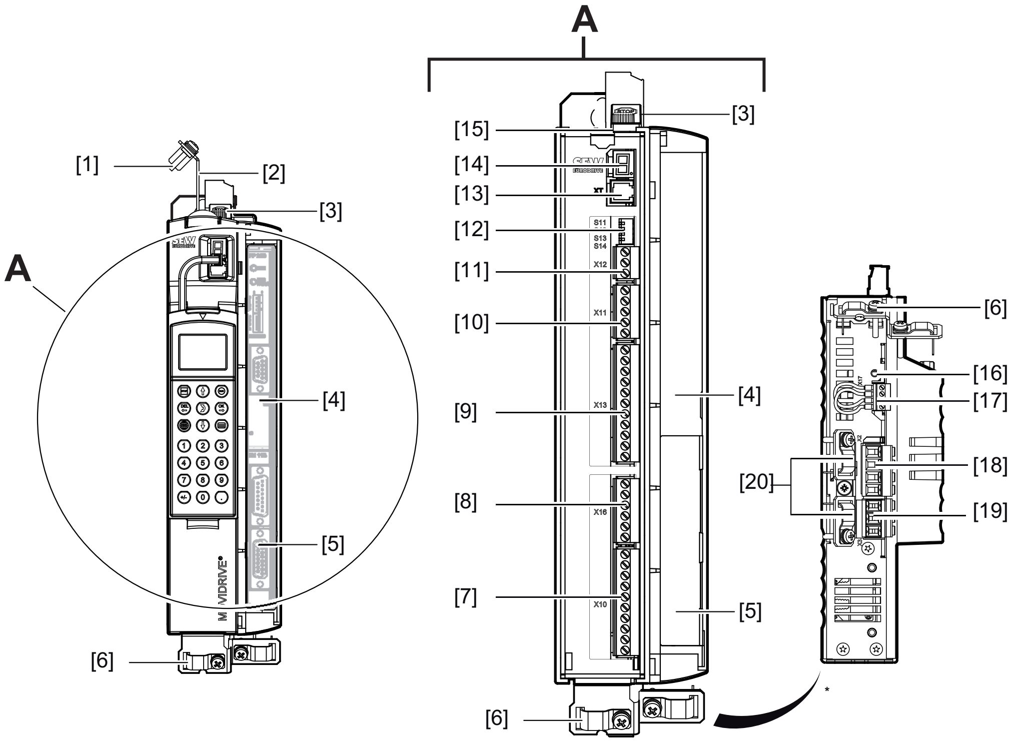
    If neither of the two conditions is fulfilled, the degree of protection is IP10.



2059029259

12.3 Size 0

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



2205806347

*View of the bottom of the device

[1] Power shield clamp for supply system connection and DC link connection
[2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection, separable
[3] X1: Power supply connection L1, L2, L3 and PE connection, separable
[4] Only with MDX61B: Fieldbus slot
[5] Only with MDX61B: Encoder slot
[6] Shield clamp for signal cables MDX61B size 0
[7] X10: Signal terminal strip for digital outputs and TF/TH input
[8] X16: Signal terminal strip digital inputs and outputs
[9] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface
[10] X11: Signal terminal strip for setpoint input AI1 and 10 V reference voltage
[11] X12: Signal terminal strip system bus (SBus)
[12] DIP switches S11 – S14
[13] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface
[14] 7-segment display
[15] Memory card
[16] Grounding screw M4 × 14
[17] X17: Signal terminal block for safety contacts of drive safety function STO
[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

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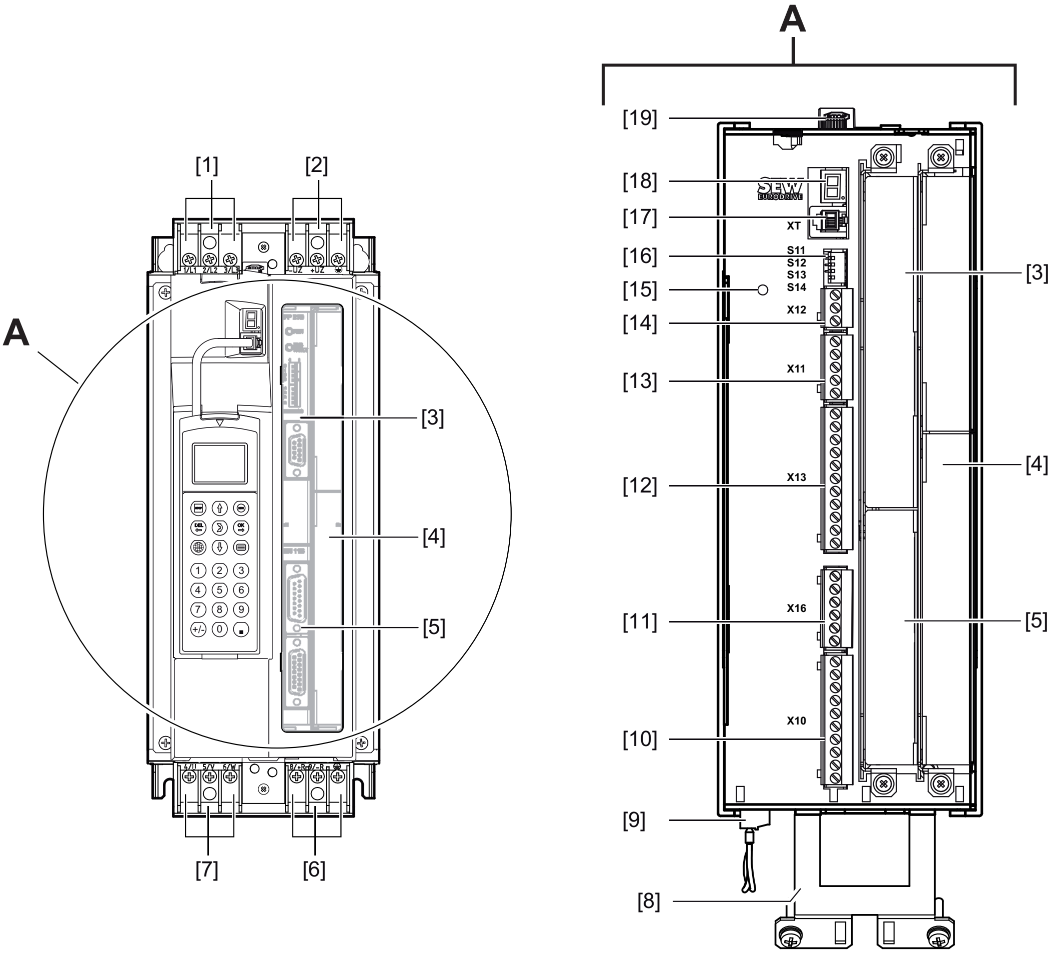
12.4 Size 1

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

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



2205808267

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

[2] X4: Connection for DC link coupling -U_Z +U_Z, separable

[3] Fieldbus slot

[4] Expansion slot

[5] Encoder slot

[6] X3: Braking resistor connection 8/+R, 9/–R and PE connection, separable

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

[8] Shield clamp for signal cables and PE connection

[9] X17: Signal terminal block for safety contacts of drive safety function STO

[10] X10: Signal terminal strip for digital outputs and TF/TH input

[11] X16: Signal terminal strip digital inputs and outputs

[12] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

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[15] Grounding screw M4 × 14

[16] DIP switches S11 – S14

[17] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

[18] 7-segment display

[19] Memory card

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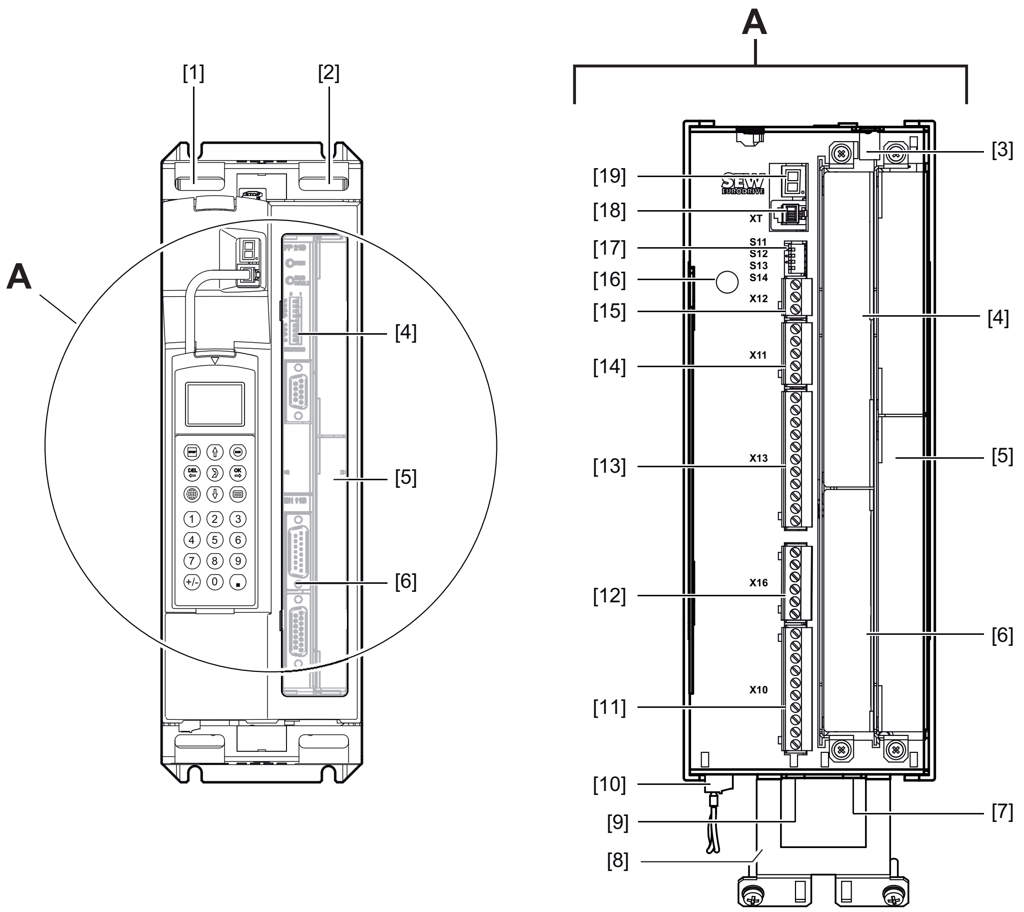
12.5 Size 2S

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



2205796747

[1] X1: Line connection 1/L1, 2/L2, 3/L3

[2] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection

[3] Memory card

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] X3: Braking resistor connection 8/+R, 9/–R and PE connection

[8] Shield clamp for signal cables and PE connection

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

[10] X17: Signal terminal block for safety contacts of drive safety function STO

[11] X10: Signal terminal strip for digital outputs and TF/TH input

[12] X16: Signal terminal strip digital inputs and outputs

[13] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

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[16] Grounding screw M4 × 14

[17] DIP switches S11 – S14

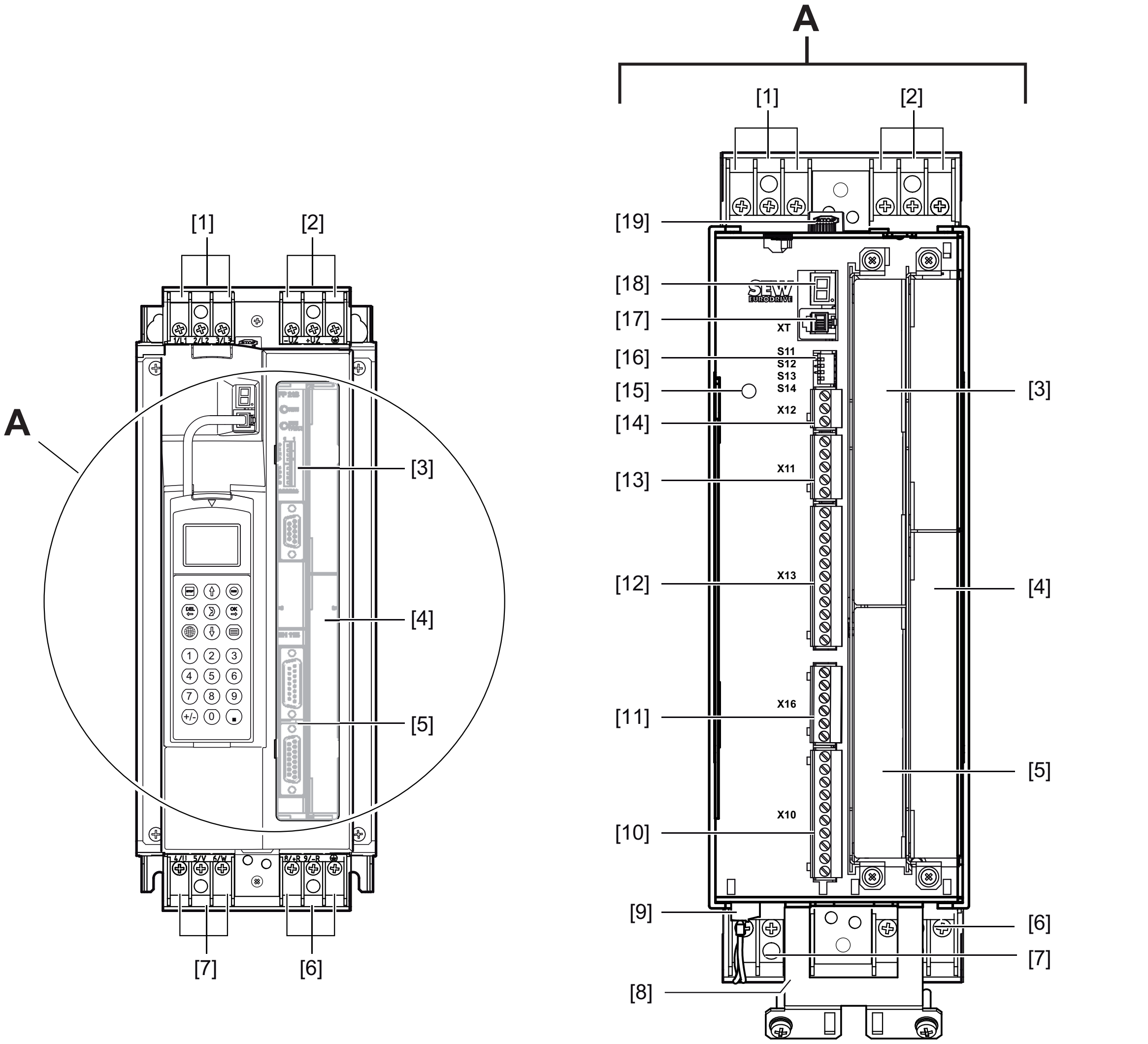
[18] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

[19] 7-segment display

12.6 Size 2

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

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



2205794827

[1] X1: Line connection 1/L1, 2/L2, 3/L3

[2] X4: Connection for DC link coupling $–U_Z$ $+U_Z$ and PE connection

[3] Fieldbus slot

[4] Expansion slot

[5] Encoder slot

[6] X3: Braking resistor connection 8/+R, 9/–R and PE connection

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

[8] Shield clamp for signal cables and PE connection

[9] X17: Signal terminal block for safety contacts of drive safety function STO

[10] X10: Signal terminal strip for digital outputs and TF/TH input

[11] X16: Signal terminal strip digital inputs and outputs

[12] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

[15] Grounding screw M4 × 14

[16] DIP switches S11 – S14

[17] XT: Slot for DBG60B keypad or USB/11AUWS21B serial interface

[18] 7-segment display

[19] Memory card

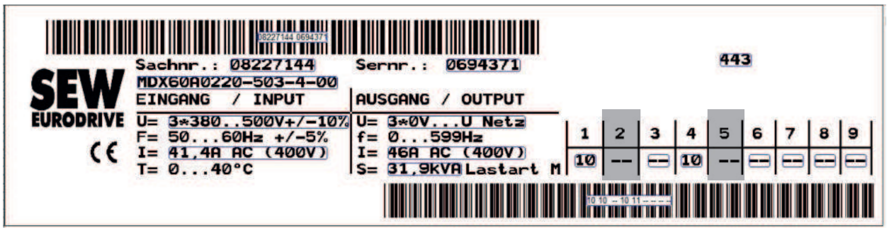
12.7 Size 3

Size 3 is available in 2 hardware designs that can be distinguished using the nameplate.

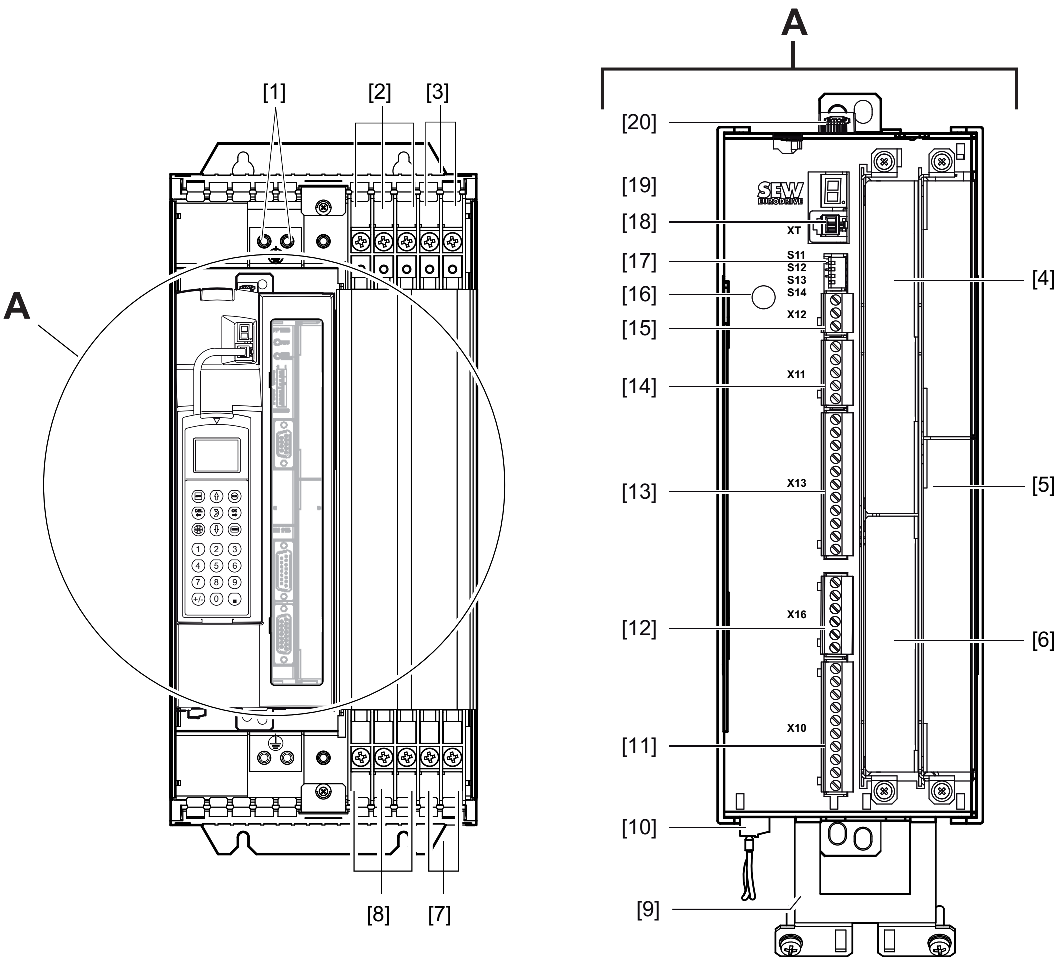
MDX61B-503 (AC 400/500 V devices): 0150/0220/0300

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

The version before the redesign does not have entries in the status fields **2** and **5** of the nameplate.



19517356811



2205798667

[1] PE connection

[2] X1: Line connection 1/L1, 2/L2, 3/L3

[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] X3: Braking resistor connection 8/+R, 9/–R

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

[9] Shield clamp for signal cables and PE connection

[10] X17: Signal terminal block for safety contacts of drive safety function STO

[11] X10: Signal terminal strip for digital outputs and TF/TH input

[12] X16: Signal terminal strip digital inputs and outputs

[13] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

[16] Grounding screw M4 × 14

[17] DIP switches S11 – S14

[18] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

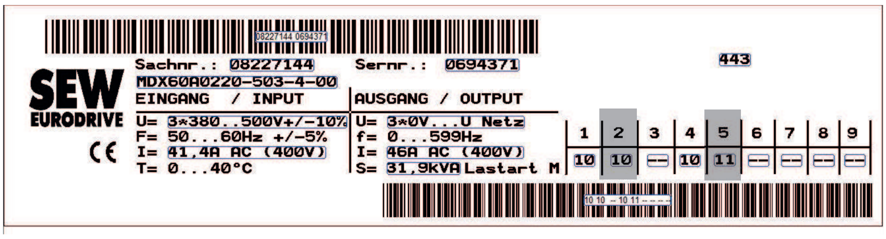
[19] 7-segment display

[20] Memory card

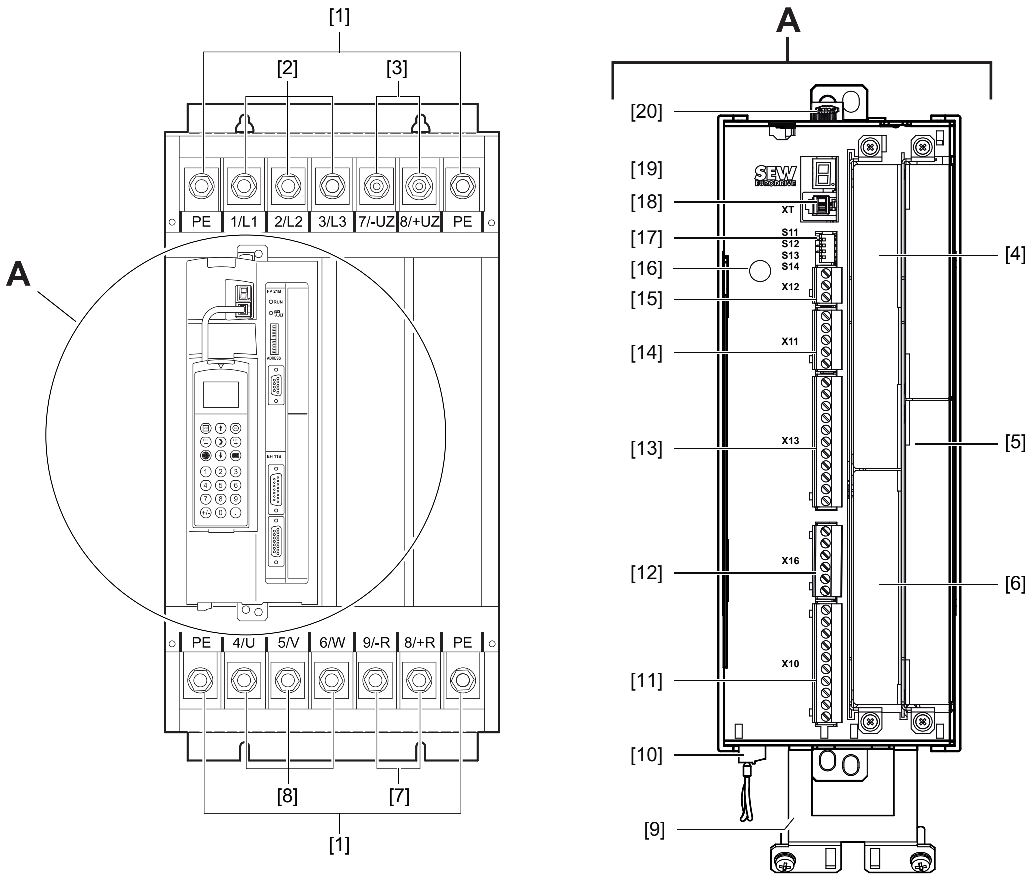
MDX61B-503 (AC 400/500 V units): 0150/0220/0300

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

The redesigned version has entries in the status fields **2** and **5** of the nameplate



19517360395



19300062475

[1] PE connection

[2] X1: Line connection 1/L1, 2/L2, 3/L3

[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] X3: Braking resistor connection 8/+R, 9/–R

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

[9] Shield clamp for signal cables and PE connection

[10] X17: Signal terminal block for safety contacts of drive safety function STO

[11] X10: Signal terminal strip for digital outputs and TF/TH input

[12] X16: Signal terminal strip digital inputs and outputs

[13] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

[16] Grounding screw M4 × 14

[17] DIP switches S11 – S14

[18] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

[19] 7-segment display

[20] Memory card

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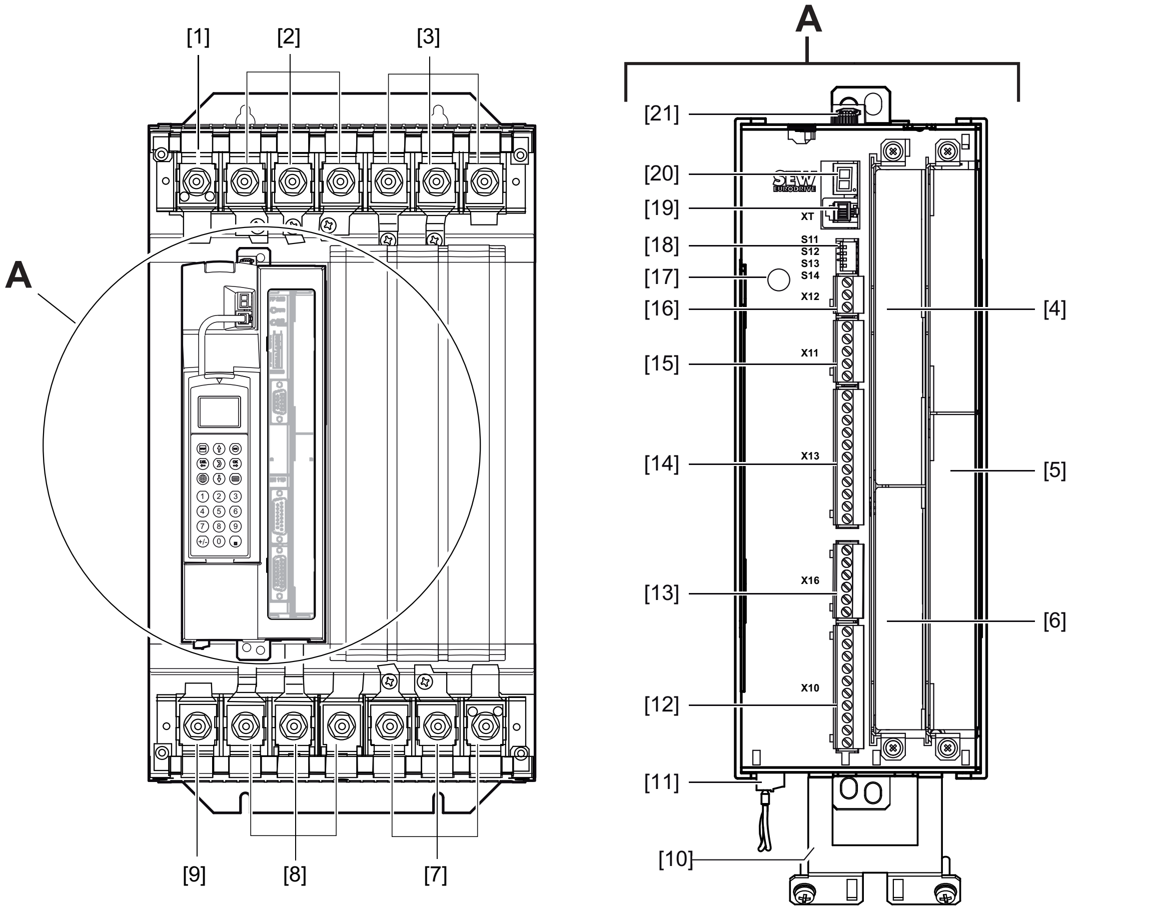
12.8 Size 4

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

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



2205800587

[1] PE connection

[2] X1: Line connection 1/L1, 2/L2, 3/L3

[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$ and PE connection

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] X3: Braking resistor connection 8/+R, 9/–R and PE connection

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

[9] PE connection

[10] Shield clamp for signal cables

[11] X17: Signal terminal block for safety contacts of drive safety function STO

[12] X10: Signal terminal strip for digital outputs and TF/TH input

[13] X16: Signal terminal strip digital inputs and outputs

[14] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

[17] Grounding screw M4 × 14

[18] DIP switches S11 – S14

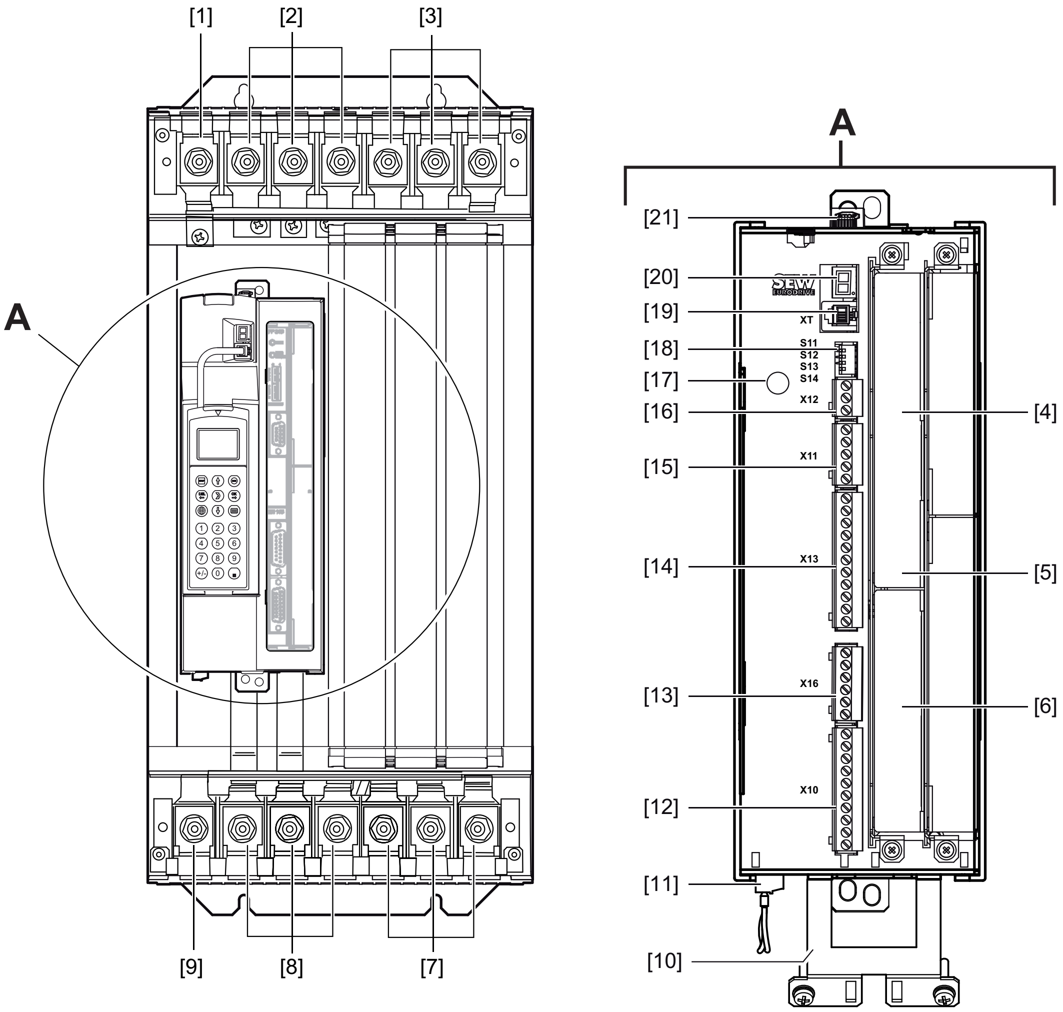
[19] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

[20] 7-segment display

[21] Memory card

12.9 Size 5

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



2205802507

[1] PE connection

[2] X1: Line connection 1/L1, 2/L2, 3/L3

[3] X4: Connection for DC link coupling $–U_Z$ $+U_Z$ and PE connection

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] X3: Braking resistor connection 8/+R, 9/–R and PE connection

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

[9] PE connection

[10] Shield clamp for signal cables

[11] X17: Signal terminal block for safety contacts of drive safety function STO

[12] X10: Signal terminal strip for digital outputs and TF/TH input

[13] X16: Signal terminal strip digital inputs and outputs

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[14] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

[17] Grounding screw M4 × 14

[18] DIP switches S11 – S14

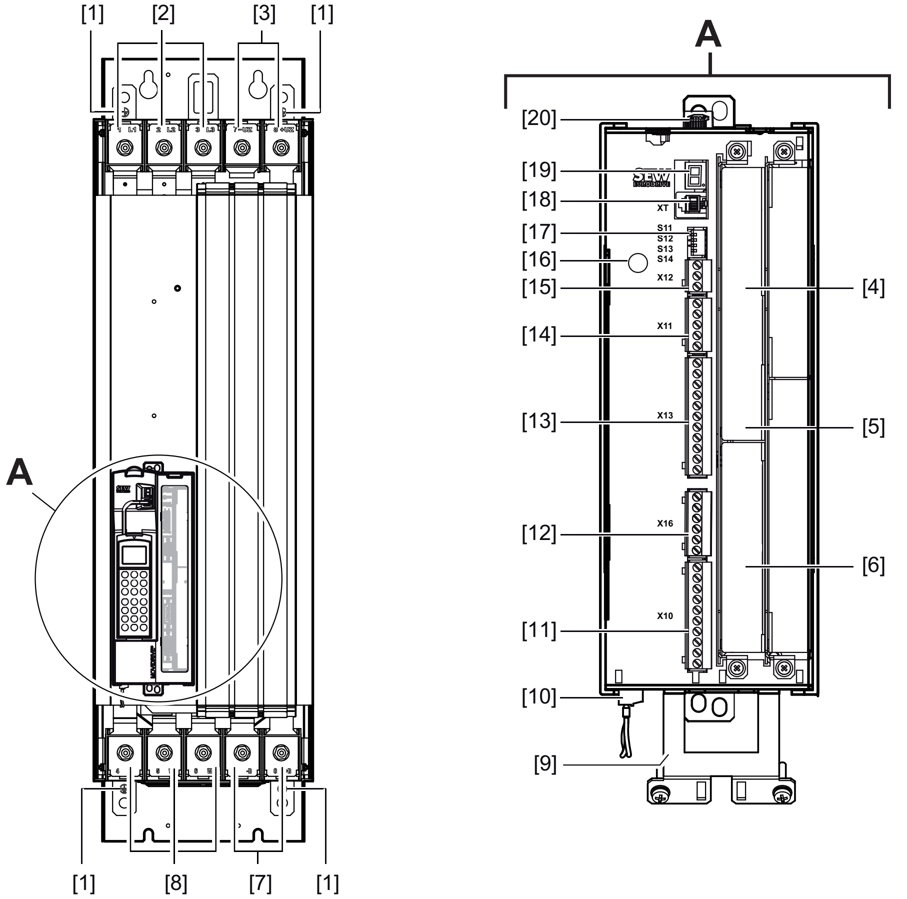
[19] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

[20] 7-segment display

[21] Memory card

12.10 Size 6

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



2205804427

[1] PE connection

[2] X1: Line connection 1/L1, 2/L2, 3/L3

[3] X4: Connection for DC link coupling $-U_Z$ $+U_Z$

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] X3: Braking resistor connection 8/+R, 9/–R

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

[9] Shield clamp for signal cables

[10] X17: Signal terminal block for safety contacts of drive safety function STO

[11] X10: Signal terminal strip for digital outputs and TF/TH input

[12] X16: Signal terminal strip digital inputs and outputs

[13] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

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

[16] Threaded hole for grounding screw M4 × 8 or M4 × 10

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[17] DIP switches S11 – S14

[18] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

[19] 7-segment display

[20] Memory card

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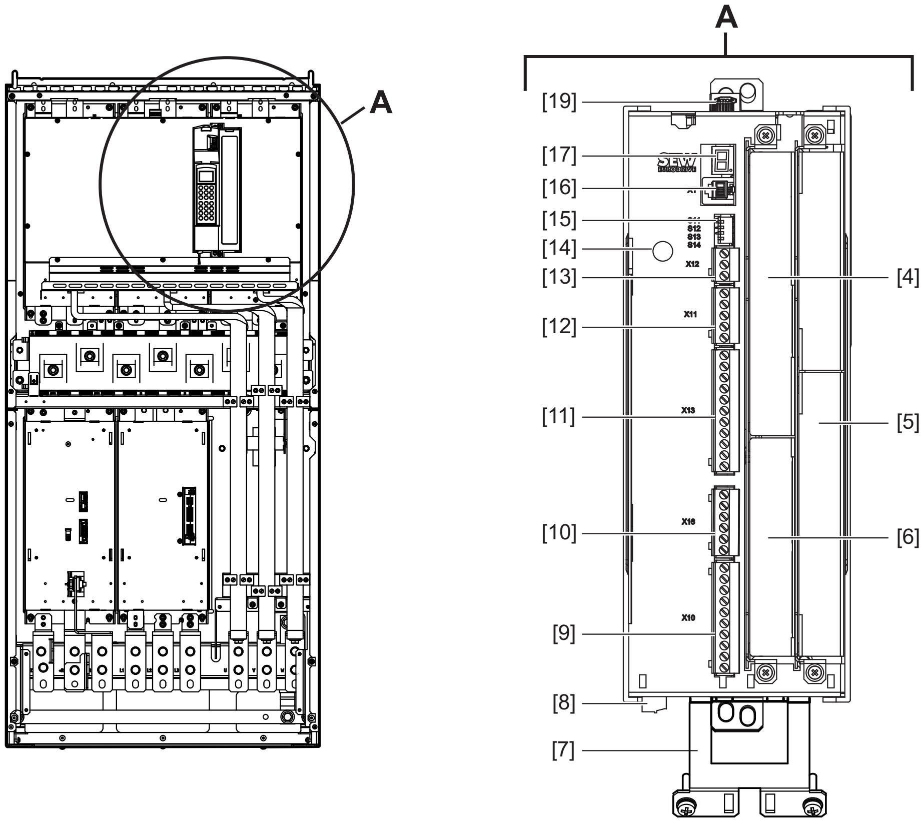
12.11 Size 7

12.11.1 Control unit

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



2077051275

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] Shield clamp for signal cables

[8] X17: Signal terminal block for safety contacts of drive safety function STO

[9] X10: Signal terminal strip for digital outputs and TF/TH input

[10] X16: Signal terminal strip digital inputs and outputs

[11] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

[13] X12: Signal terminal strip system bus (SBus)

[14] Grounding screw M4 × 14

[15] DIP switches S11 – S14

[16] XT: Slot for DBG60B keypad or USB11A/UWS21B serial interface

[17] 7-segment display

[19] Memory card

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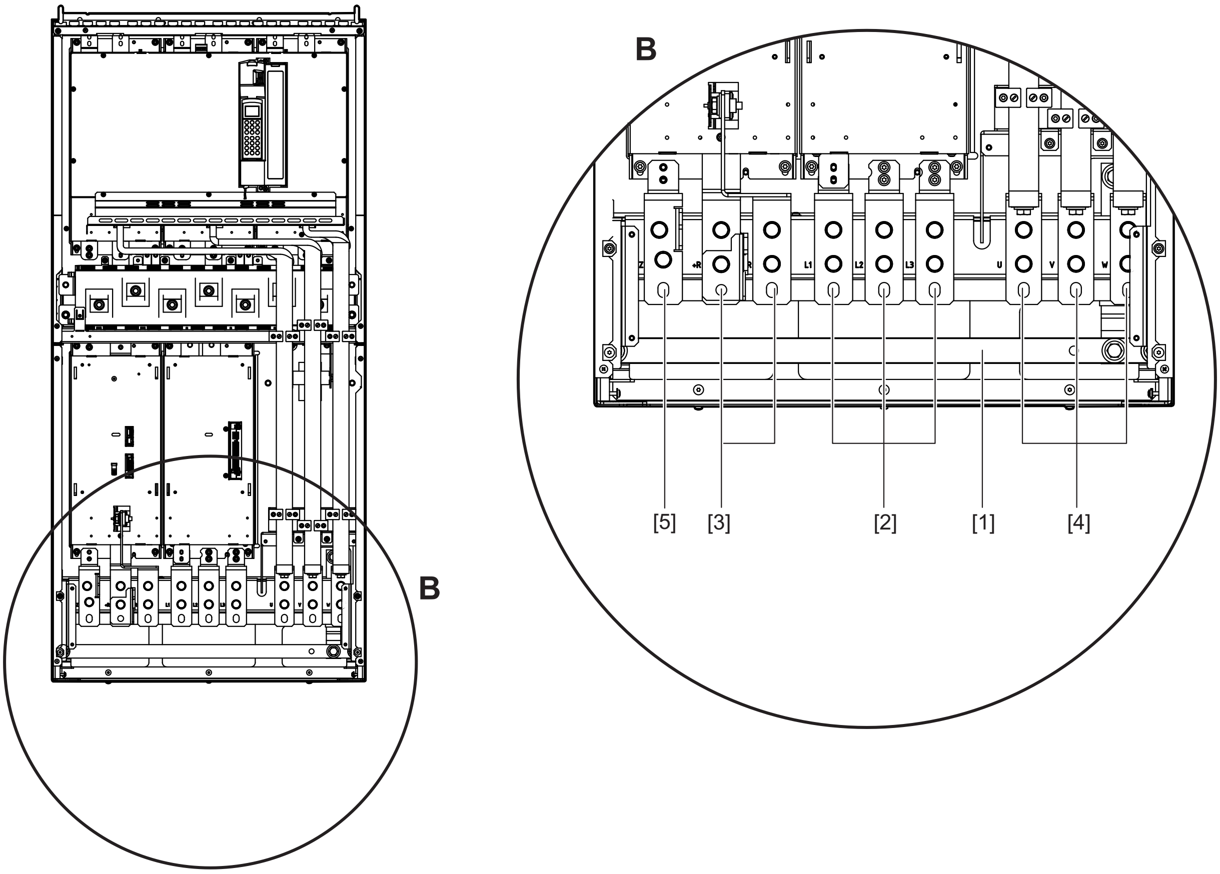
12.11.2 Power section

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



2077053963

[1] PE connection rail (thickness = 10 mm)

[2] X1: Line connection 1/L1, 2/L2, 3/L3

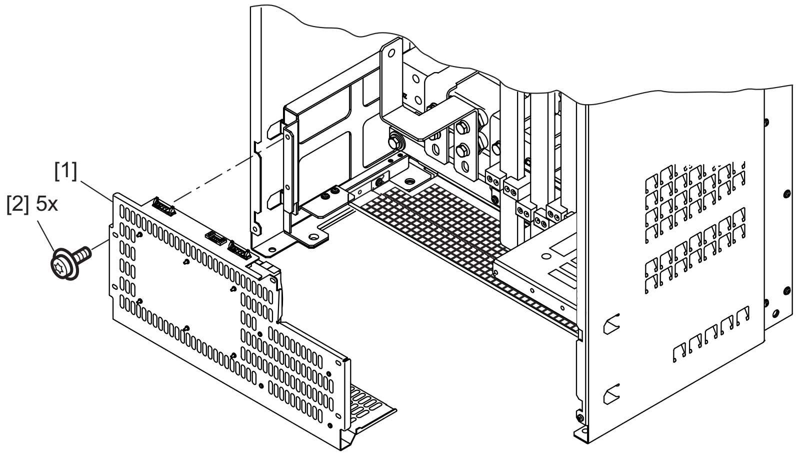
[3] X3: Braking resistor connection 8/+R, 9/–R

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

[5] -U_Z: Only with DC link adapter accessory

12.11.3 DC power supply unit

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



20089692683

[1] DC power supply unit

[2] Screw

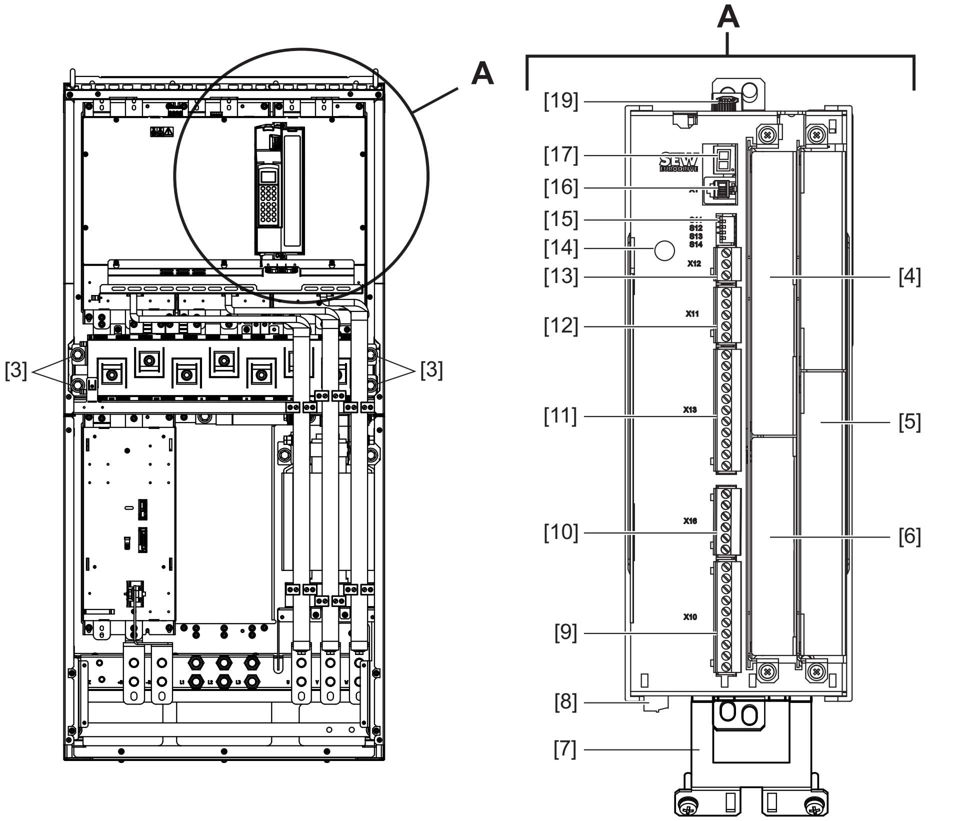
Connections for power supply unit (PE L1 L2 L3)

- Cross section: 6 mm^2
- Tightening torque ≤ 4 mm^2 = 0.5 Nm
- Tightening torque > 4 mm^2 = 0.7 Nm – 0.8 Nm

12.12 MOVIDRIVE® MDX62B motor inverter size 7

12.12.1 Control unit

MDX62B-503 (AC 400/500 V devices): 1600 / 2000 / 2500



3956574091

[3] Connection for DC link coupling $-U_Z$ $+U_Z$

[4] Fieldbus slot

[5] Expansion slot

[6] Encoder slot

[7] Shield clamp for signal cables

[8] X17: Signal terminal block for safety contacts of drive safety function STO

[9] X10: Signal terminal strip for digital outputs and TF/TH input

[10] X16: Signal terminal strip digital inputs and outputs

[11] X13: Signal terminal strip terminal strip for digital inputs and RS485 interface

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

[13] X12: Signal terminal strip system bus (SBus)

[14] Grounding screw M4 × 14

[15] DIP switches S11 – S14

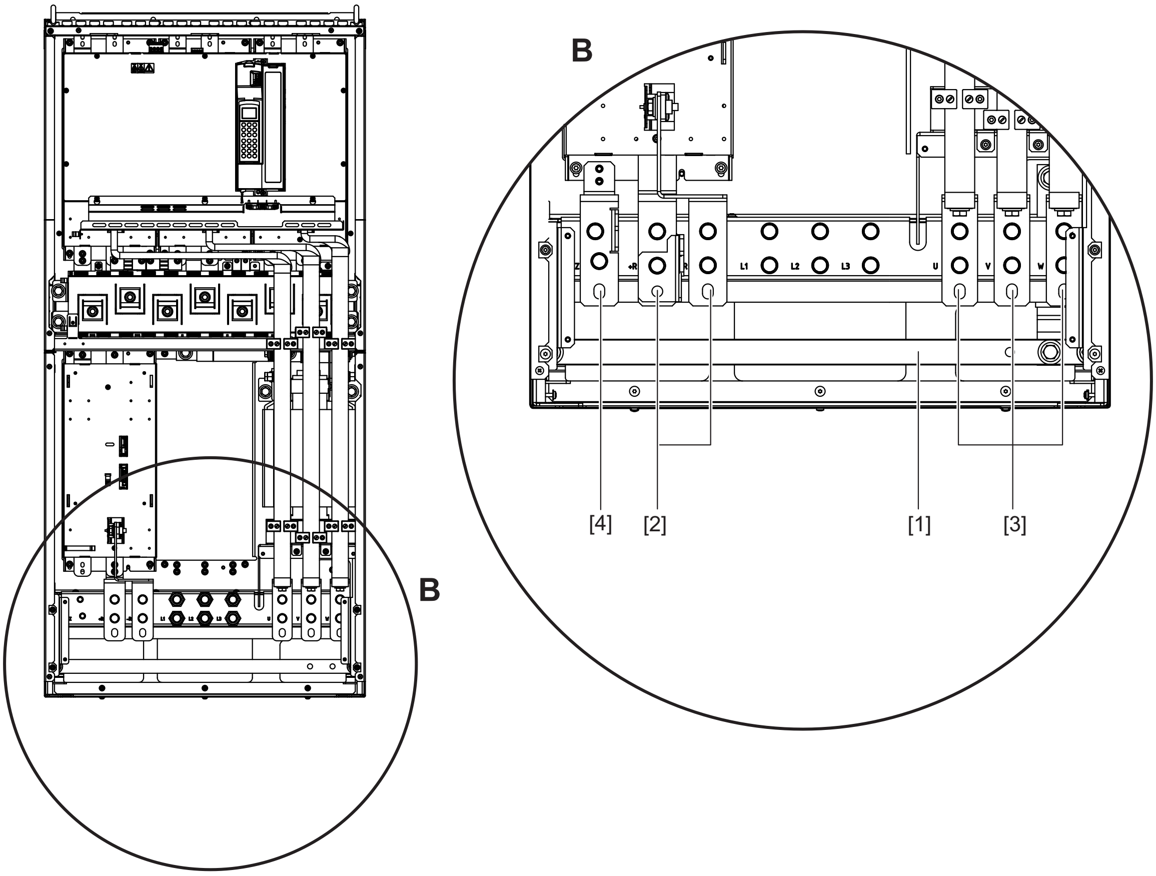
[16] XT: Slot for DBG60B keypad or UWS21B serial interface

[17] 7-segment display

[19] Memory card

12.12.2 Power section

MDX62B-503 (AC 400/500 V devices): 1600 / 2000 / 2500



3956576011

[1] PE connection rail (thickness = 10 mm)

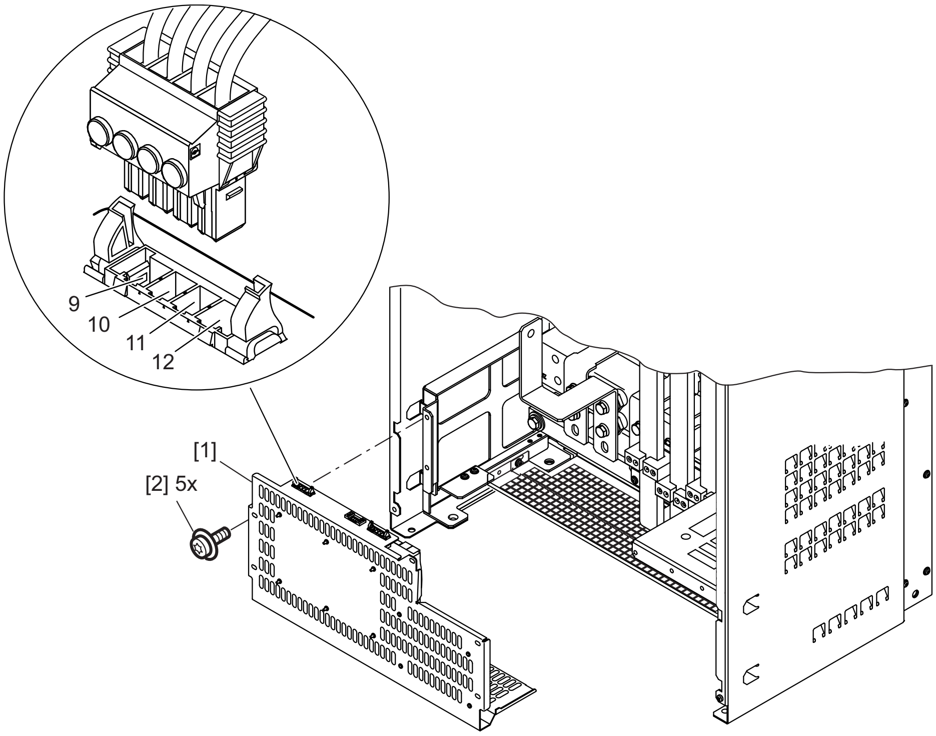
[2] X3: Braking resistor connection 8/+R, 9/–R

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

[4] -U_Z: Only with DC link adapter accessory

12.12.3 DC power supply unit

MDX62B-503 (AC 400/500 V devices): 1600 / 2000 / 2500



9007201561717259

[1] DC power supply unit

[2] Screw

13 Installation

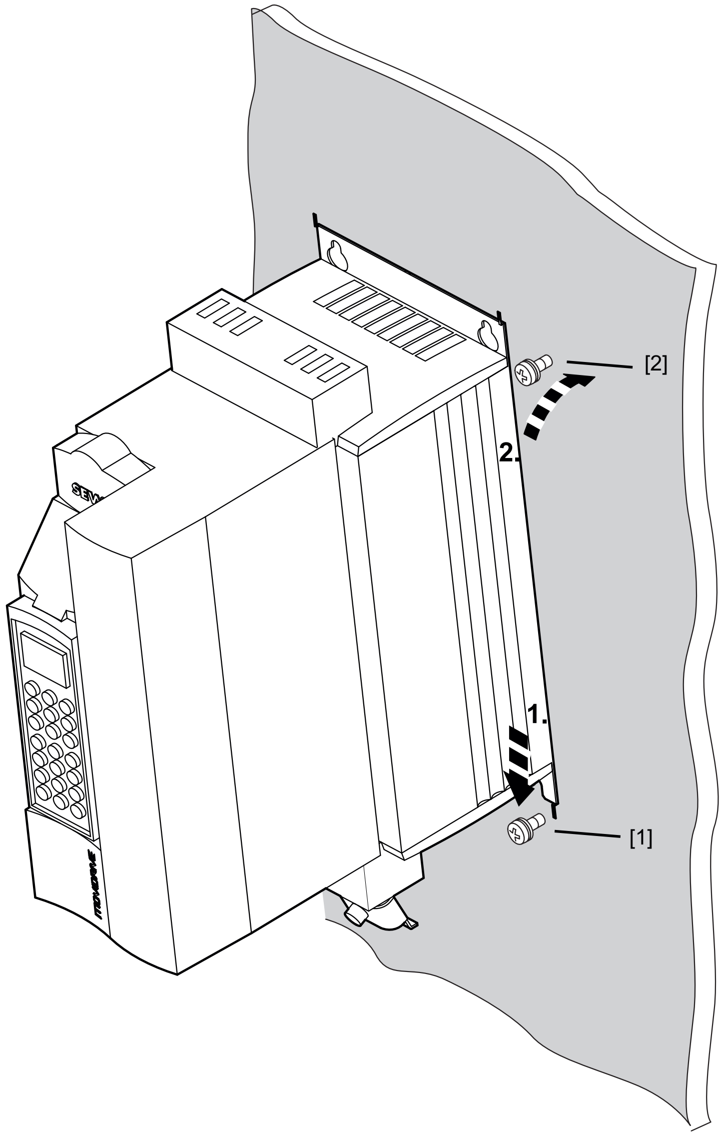
MOVIDRIVE® B application inverters are exclusively suitable for control cabinet installation according to the degree of protection.

13.1 Installation instructions for the basic unit

13.1.1 General installation notes for size 0 – 6

The retaining screws [1] and [2] are screwed into the prepared mounting grid in the control cabinet but not tightened.

1. Place the module with the slotted holes on the device base plate onto the retaining screws [1] from the top.



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2. Push the module backwards to insert the retaining screws [2] into the upper holes in the device base plate.
3. Lower the module.

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4. Tighten the retaining screws [1] and [2].

Installation notes for size 7

SEW-EURODRIVE recommends the following SEW accessories for control cabinet installation of MOVIDRIVE® size 7:

- **Mounting base** to be installed under the basic device
  - Fastening the device
  - Integrated grounded cable clamping rail
  - Extended connection space facilitates installation
- **Air duct** for dissipating heat from the control cabinet
  - No increased heating of the control cabinet
  - Reduction of air conditioner power

MOVIDRIVE®	Mounting base	Air duct
MDX61B1600/2000/2500	DLS11B Part number: 18226027	DLK11B Part number: 18226035

13.1.2 Tightening torques

Power terminal tightening torques

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

Size	Tightening torque
	Nm
0, 1 and 2S	0.6
2	1.5
3	3.5
4 and 5	14.0
6	20.0
7	70.0

- The permitted tightening torque of the **signal terminals** is 0.6 Nm.

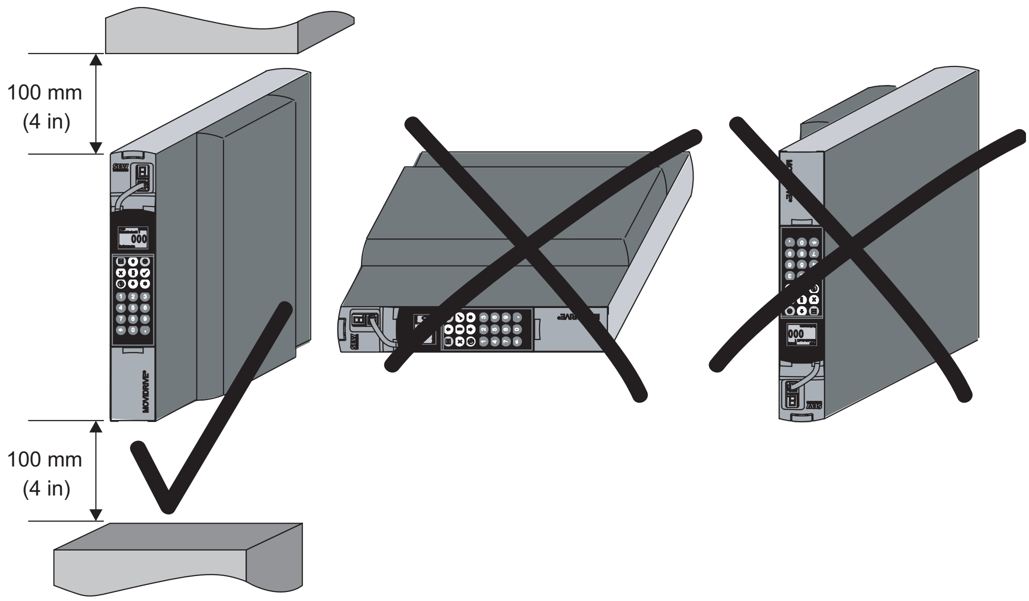
General tightening torques

Note the permitted tightening torques:

Component	Screws	Tightening torque
		Nm
Cover screws	M5 x 25	1.4 – 1.7
Screws with integral disk	M4	1.7
	M5	3.4
	M6	5.7
Conductor rail screws	M10	20

13.1.3 Minimum clearance and mounting position

- Leave at least 100 mm clearance **above and below** the device 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 device.
- 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 device. You may line up the units directly next to each other.
- Only install the devices **vertically**. Do not install them horizontally, tilted or upside down (→ following figure, applies to all sizes).



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13.1.4 Separate cable ducts

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

NOTICE

Hot surfaces

The heat sink temperature may rise above 70 °C.

⚠ WARNING

Electric shock due to charged capacitors. Dangerous voltage levels may still be present inside the device and at the terminals up to 10 minutes after disconnection from the power supply.

Severe or fatal injuries.

- Wait for 10 minutes after the frequency inverter has been separated from the voltage supply. Make sure that the device is de-energized. Only then must you commence any work on the device.
- Observe the corresponding information signs on the frequency inverter.

13.1.5 Fuses and residual current devices

- Install the fuses at the **beginning** of the supply system lead after the supply bus junction (observe the wiring diagram for basic device, power section and brake).
- SEW-EURODRIVE recommends not to use earth-leakage circuit breakers in plants with frequency inverters as an earth-leakage circuit breaker reduces the plant availability.

⚠ WARNING

No protection against electric shock if an incorrect type of residual current device is used.

Severe or fatal injuries.

- The product can cause direct current in the PE conductor. If a residual current device (RCD) or a residual current monitoring device (RCM) is used for protection in the event of a direct or indirect contact, only a type B RCD or RCM is permitted on the supply end of the product.

13.1.6 Supply system and brake contactors

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

INFORMATION

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

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13.1.7 PE connection (EN 61800-5-1)

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

- **Supply system lead < 10 mm²:**

  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 mm²**.
- **Supply system cable 10 mm² – 16 mm²**:

  Route a copper PE conductor with the same cable cross section as the supply system cable.
- **Supply system cable 16 mm² – 35 mm²**:

  Route a copper PE conductor with a cable cross section of 16 mm².
- **Supply system cable > 35 mm²**:

  Route a copper PE conductor with half the cross section of the supply system cable.

13.1.8 IT systems

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

13.1.9 Cable cross sections

- Line cable: **Core cross section according to nominal input current I_{line}** at nominal load.
- Motor cable: **Cable cross section according to rated output current I_N.**
- Signal cables of basic device (terminals X10, X11, X12, X13, X16):
  - 1 core per terminal 0.20 – 2.5 mm² (AWG 24 – 13)
  - 2 cores per terminal 0.25 – 1 mm² (AWG 23 – 17)
- Signal cables of terminal X17 and DIO11B terminal expansion board (terminals X20, X21, X22):
  - 1 core per terminal 0.08 – 1.5 mm² (AWG 28 – 16)
  - 2 cores per terminal 0.25 – 1 mm² (AWG 23 – 17)

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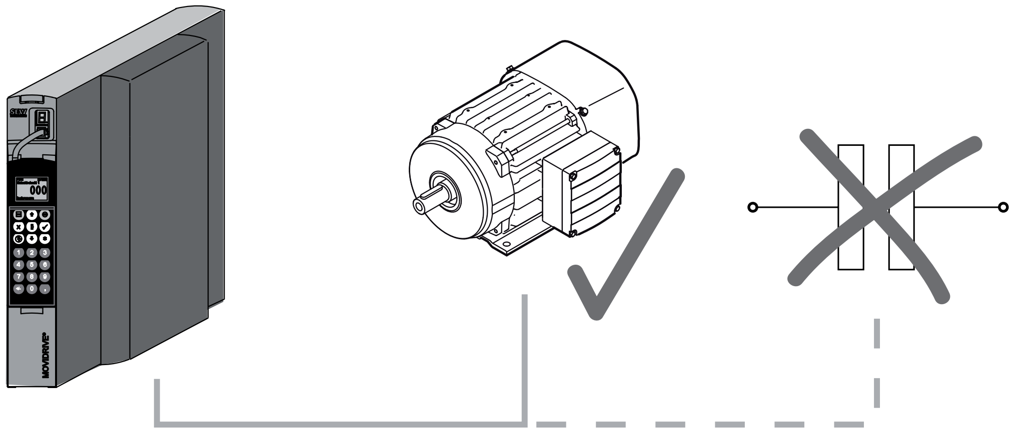
13.1.10 Unit output

NOTICE

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

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



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13.1.11 Permitted mounting the braking resistors

⚠ WARNING

Non-permissible installation might lead to an accumulation of heat in the braking resistor due to reduced convection. A tripping temperature contact or an overheated braking resistor can lead to a system standstill.

Adhere to the following minimum clearances:

- About 200 mm to adjacent components and walls
- About 300 mm to above components/ceilings

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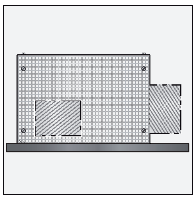
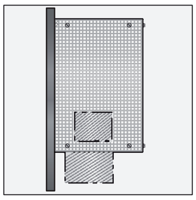
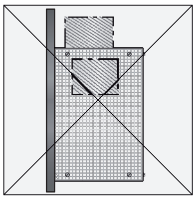
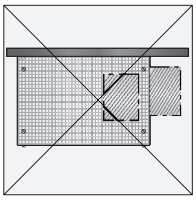
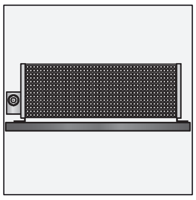
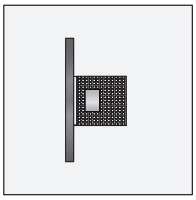
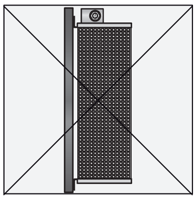
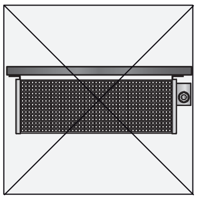
Grid resistors

You must fulfill the following requirements for mounting the grid resistors:

-  **Permitted**: Mounting on horizontal surfaces.
-  **Permitted**: Mounting on vertical surfaces with terminals pointing downwards when there is a perforated sheet at the top.
-  **Not permitted**: Mounting on vertical surfaces with terminals pointing upwards, to the right or left. (The connection terminals can be placed within the steel grid, where appropriate. Ensure the proper position of connection terminals also in this case).
-  **Not permitted**: Mounting on vertical surfaces with the terminals facing downwards. (The connection terminals can be placed within the steel grid, where appropriate. Ensure the proper position of connection terminals also in this case).

Wire resistors

You must fulfill the following requirements for mounting the wire resistors:

-  **Permitted**: Mounting on horizontal surfaces.
-  **Permitted**: Mounting on vertical surfaces when there is a perforated sheet at the top or connection terminals at the bottom
-  **Not permitted**: Mounting on vertical surfaces when the connection terminals are at the top.
-  **Not permitted**: Mounting on horizontal surfaces when the connection terminals are at the bottom.

13.1.12 Connecting braking resistors

- **Use two tightly twisted leads or a 2-core shielded power cable**. Cable cross section according to tripping current I_F of F16. The nominal voltage of the cable must amount to at least V_0/V = 300 V/500 V (according to DIN VDE 0298).
- Protect the braking resistor (except for BW90-P52B) using a **bimetallic relay** (→ wiring diagram for basic device, 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.
- In the documented assignments of drive inverters and **flat-type resistors**, flat-design resistors have an internal thermal protection (non-replaceable fuse) that interrupts the current circuit in the event of overload. Install the flat-type braking resistors together with the appropriate **touch guard**.

13.1.13 Braking resistor operation

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

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⚠ WARNING

The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_N.

Risk of burns and fire.

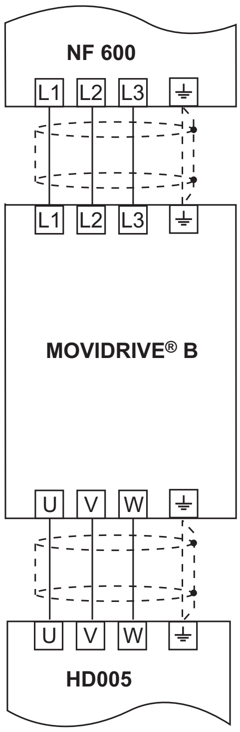
- Choose a suitable installation location. Braking resistors are usually mounted on top of the control cabinet.
- Do not touch the braking resistors.

13.1.14 Binary inputs / binary outputs

- The **digital inputs** are electrically isolated by **optocouplers**.
- The digital outputs are **short-circuit proof** and **external-voltage proof up to DC 30 V**. External voltages > DC 30 V can destroy the digital outputs.

13.1.15 EMC-compliant installation

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



Shielded cables

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

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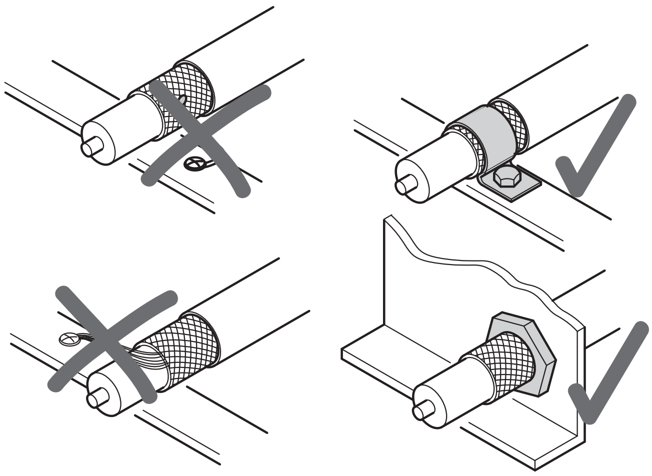

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Correct shield connection using metal clamp (shield clamp) or cable gland

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

INFORMATION

- For detailed information on EMC compliant installation, refer to the documentation "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

NF.. line filter

- The NF.. line filter option can be used to maintain the class C1 limit for MOVIDRIVE® MDX60B/61B in size 0 – 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 the application 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 C1 and C2 limits**:
  - Shielded motor cable
  - HD... output choke option
  - HF.. output filter option (in operating modes VFC and V/f)

Interference emission category

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

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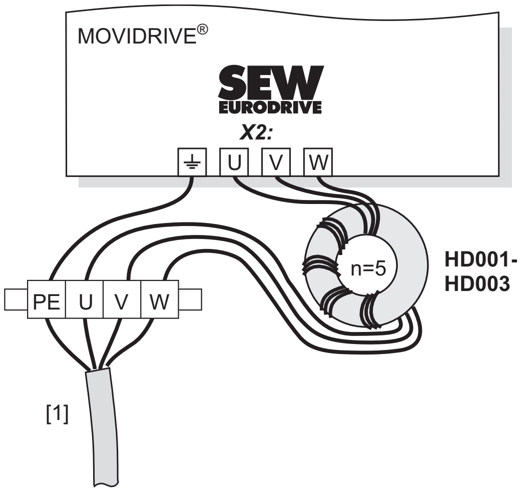
HD... output choke

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



Connection of output choke HD001 – HD003

[1] Motor cable

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13.1.16 Installation notes for size 6

MOVIDRIVE® devices in size 6 (0900 – 1320) have one fixed lifting eye [1]. Use a crane and the lifting eye [1] to install the device.

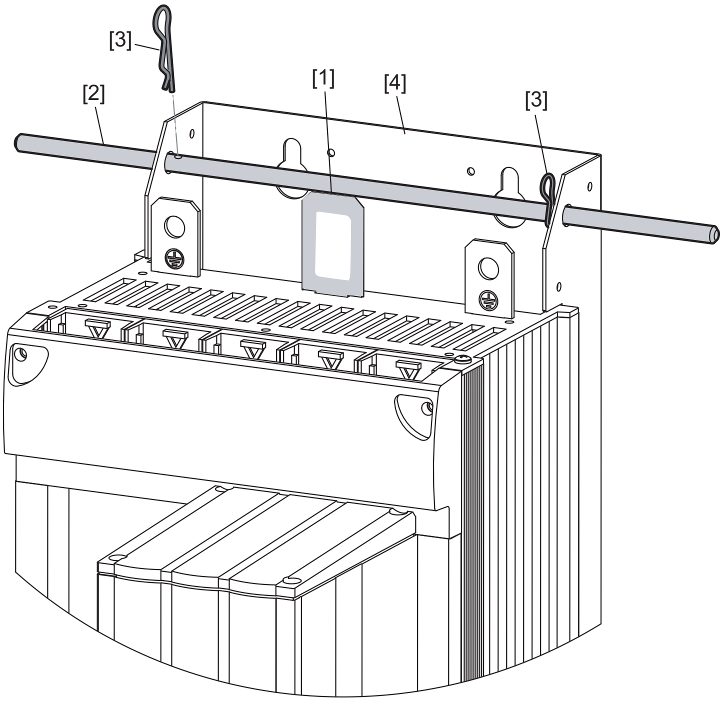
⚠ WARNING

Suspended load.

Danger of fatal injury if the load falls.

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

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



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[1] Fixed lifting eye

[2] Carrying bar (included in the delivery of size 6)

[3] 2 Split pins (included in the delivery of size 6)

[4] Rear panel

13.1.17 Installation notes for size 7

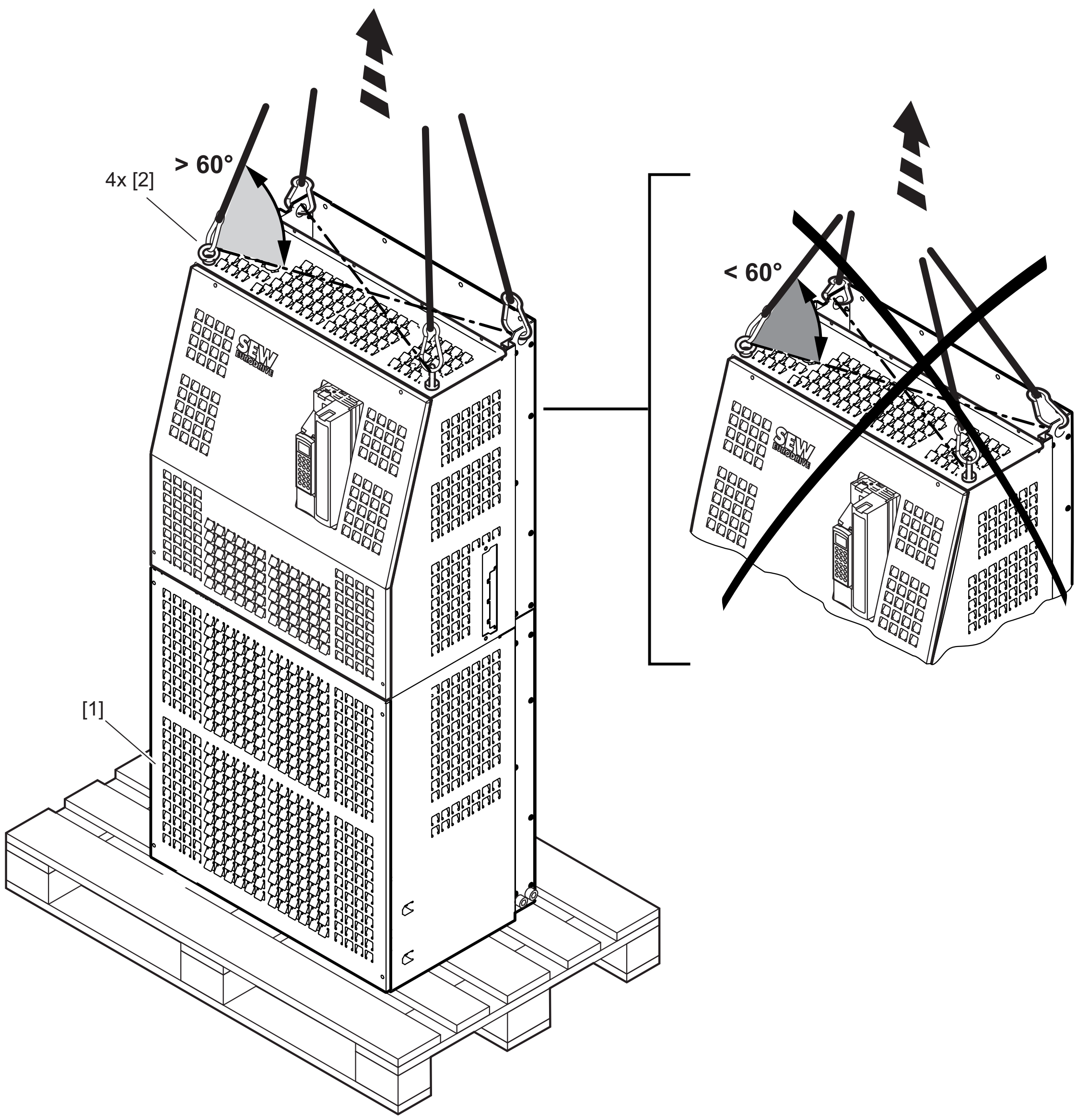
MOVIDRIVE® devices in size 7 (1600 – 2500) have 4 fixed lifting eyes [2] for transport. You may only use these four lifting eyes [2] for installation.

▲ WARNING

Suspended load.

Danger of fatal injury if the load falls.

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



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[1] Installed front cover

[2] 4 lifting eyes

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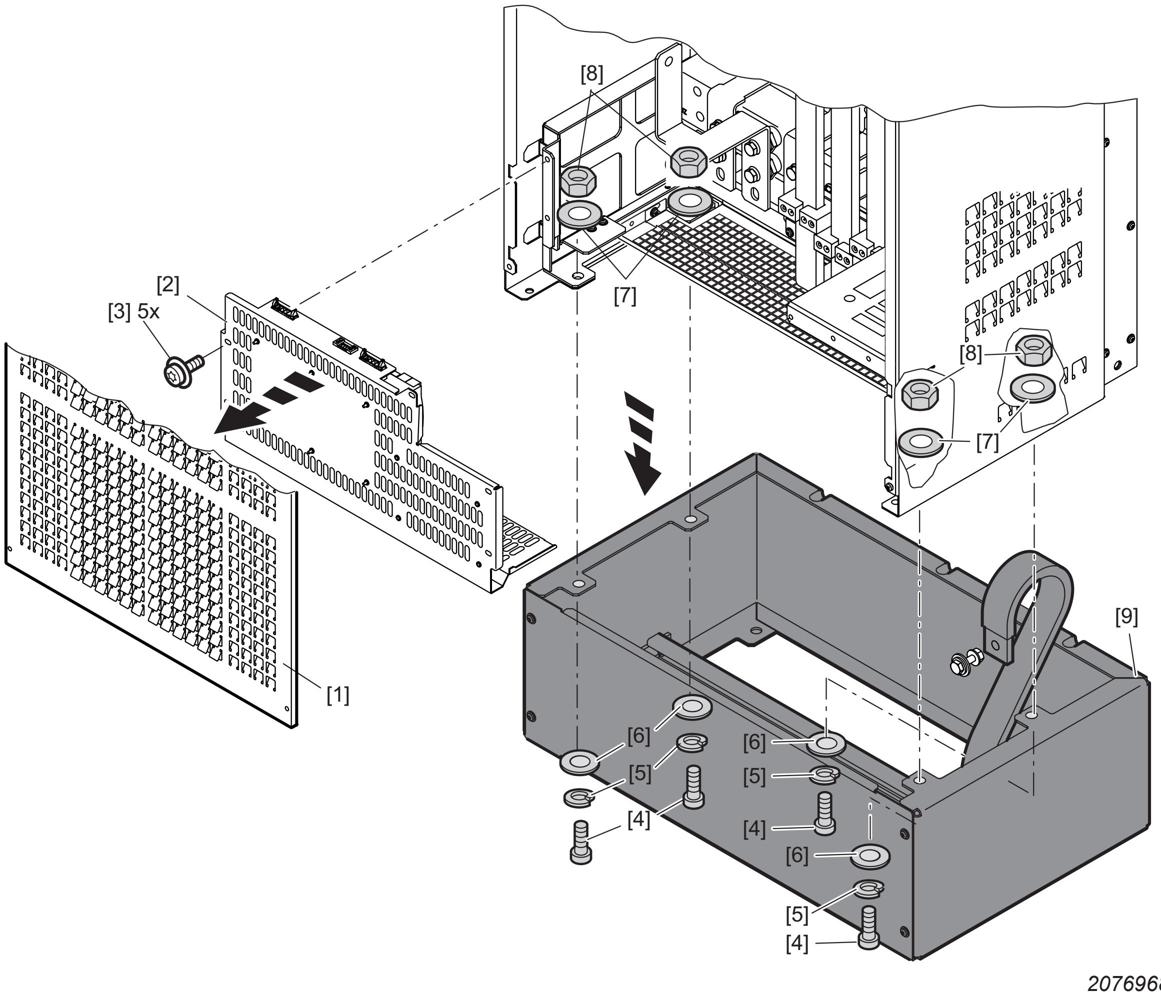
13.1.18 Optional scope of delivery for size 7

DLS11B mounting base

The **mounting base DLS11B** with mounting material [9] (part no.: 18226027) is used to install MOVIDRIVE® B, size 7 **on the floor of the control cabinet**. MOVIDRIVE® B size 7 must be screwed onto the mounting base immediately after installation (see following figure). Do not take MOVIDRIVE® B size 7 into operation until the mounting base has been completely mounted.



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

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

Proceed as follows to install the mounting base [9] to MOVIDRIVE® B, size 7:

1. Loosen (not unscrew!) the 4 retaining screws of the front cover [1] until you can lift it off. Remove the front cover [1].
2. Remove the insert [2]. Loosen the 5 retaining screws [5] to do so.
3. The following steps apply to each of the 4 mounting holes.
   - Position the washer [7] centrically between inverter and mounting base [9].

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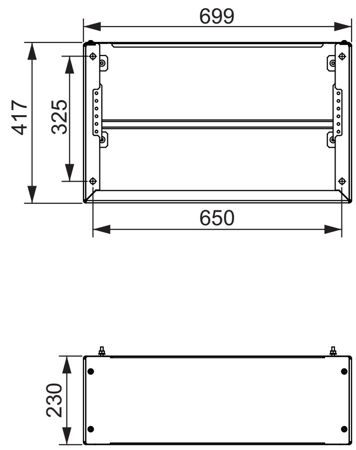
- Place the lock washer [5] and the washer [6] onto the socket head screw [4] M8×30.
- Insert the preassembled socket head screw through the mounting hole.
- Screw the M8 nut [8] onto the socket head screw. Tightening torque 20 Nm. Apply thread locking compound.

4. Replace the insert [2] into the device and fasten it using the 5 retaining screws.
5. Place the front cover [1] onto the device and fasten it using the 4 retaining screws.

DLS11B mounting base wiring diagram

The following figure shows the dimensions of the DLS11B mounting base.



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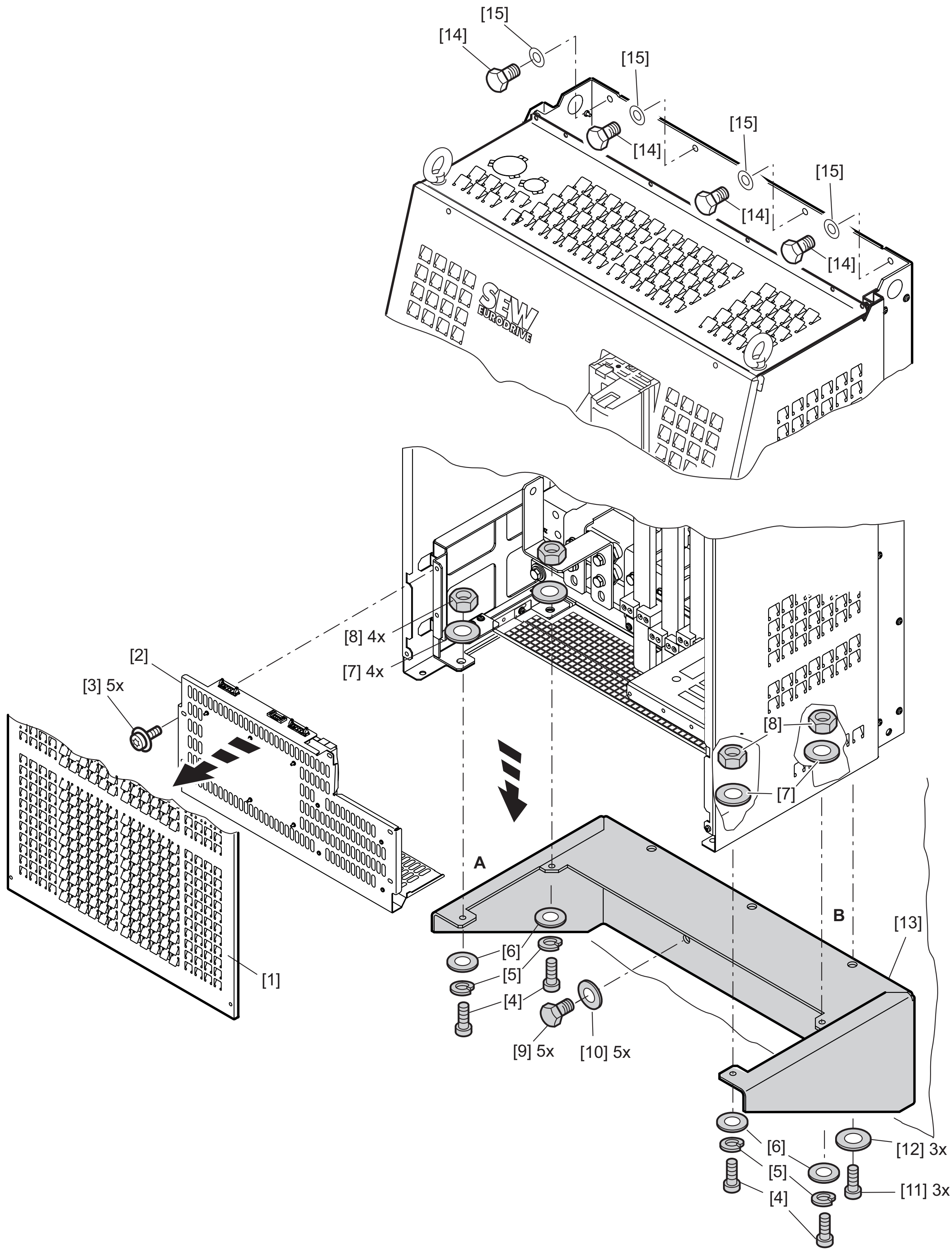
DLH11B wall bracket

The **wall bracket DLH11B** [13] (part no: 18226108) is used to attach MOVIDRIVE® B size 7 to the wall (see following figure). Do not take MOVIDRIVE® B size 7 into operation until the installation of the device is complete.



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

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

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

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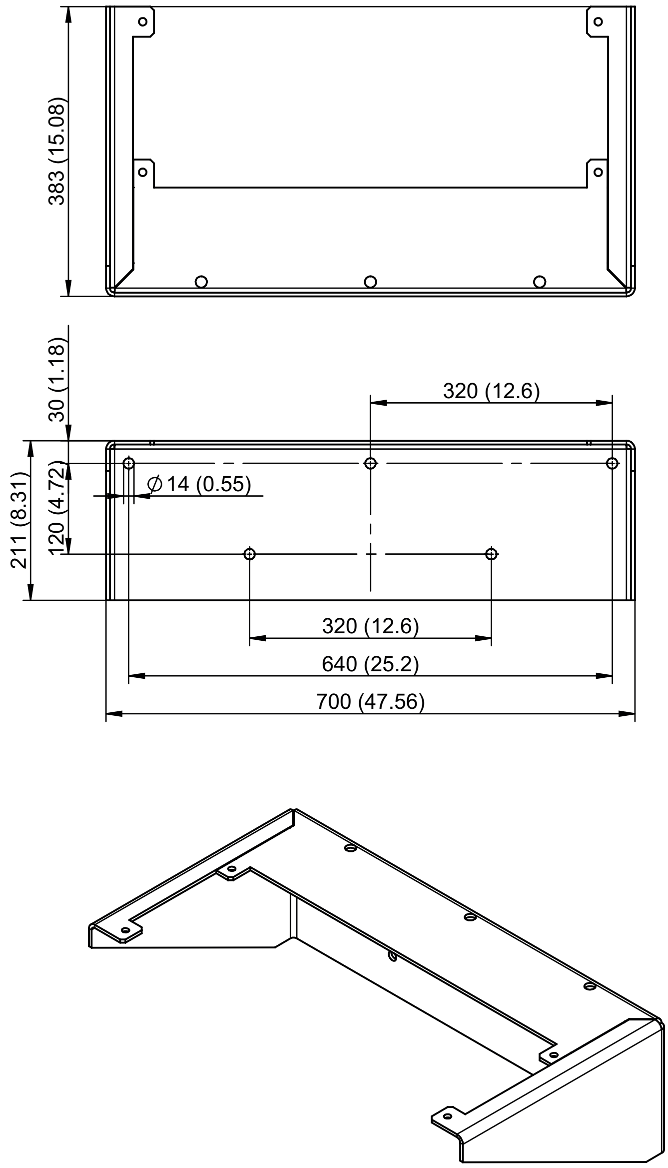
Dimension drawing for DLH11B wall bracket



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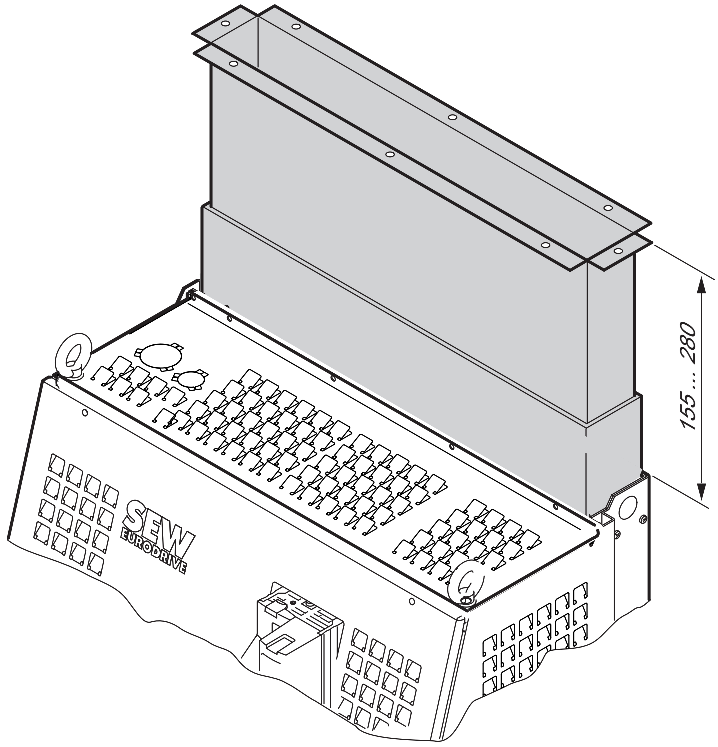
DLK11B air duct

An optional **DLK11B air duct** (part no.: 18226035) is available to dissipate heat of MOVIDRIVE® B size 7. Install the air duct in such a way that it points vertically upwards (see figure below).



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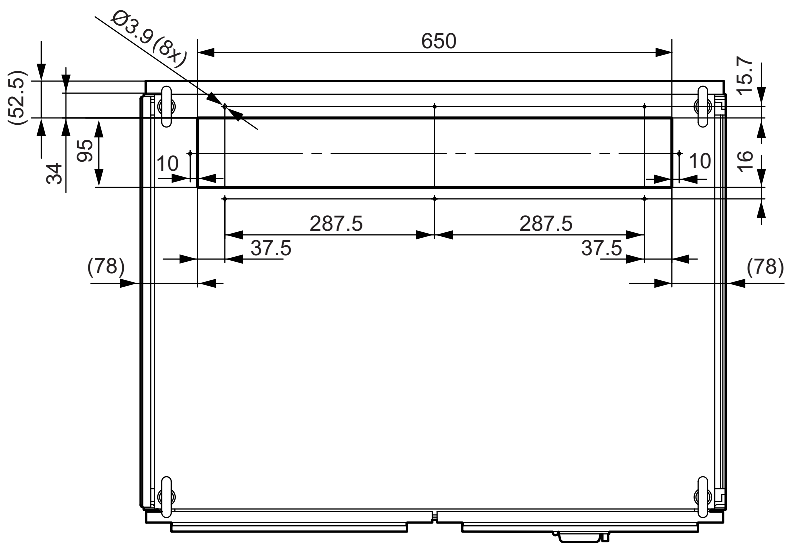
Roof cut-out for DLK11B air duct

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



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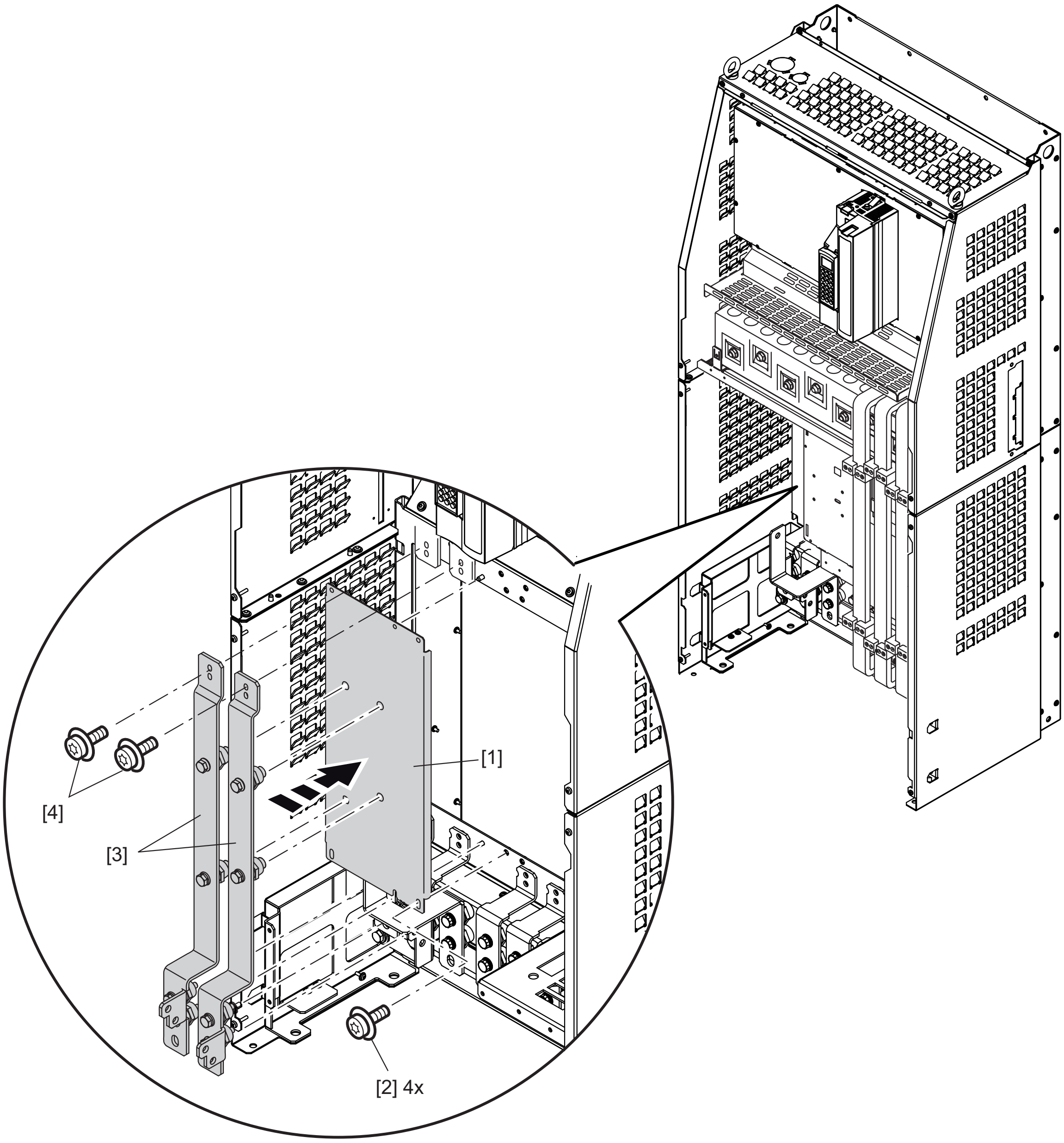
2Q DLZ12B DC link adapter

The DC link adapter **2Q DLZ12B** (part no.: 18227295) can be used to provide a DC link connection at the bottom of the device:



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

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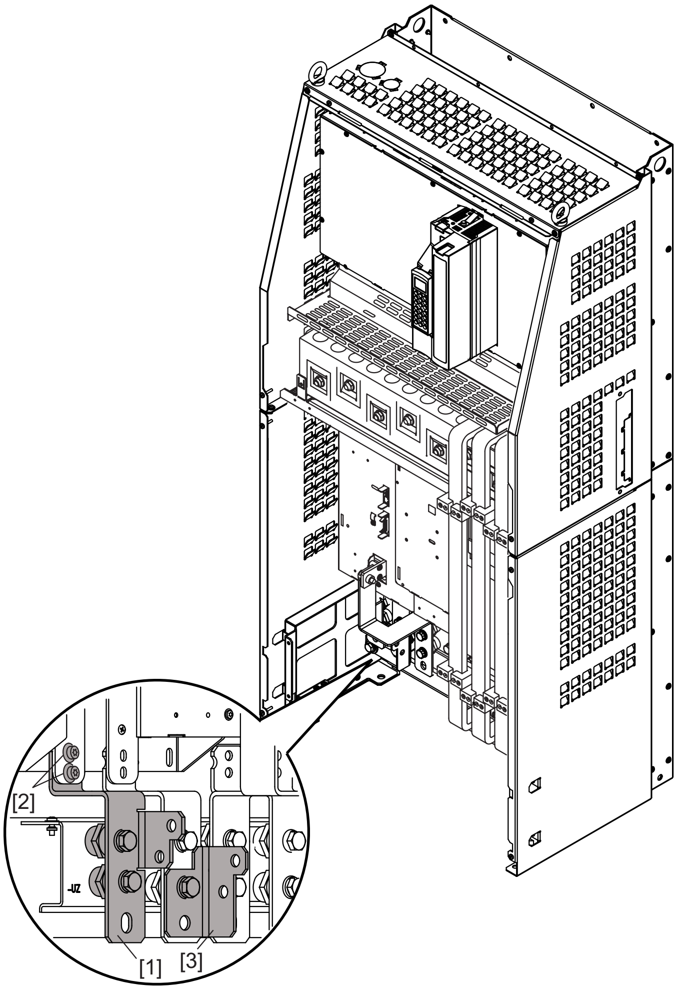
9. Position the 4 screws of the mounting lug -U_z and +U_z on the insulating spacer.
10. Tighten all screws of the mounting lug -U_z and +U_z.
11. Replace the covers.

4Q DLZ14B DC link adapter

The DC link adapter **4Q DLZ14B** (part no.: 18227287) can be used to provide a DC link connection at the bottom of the device:



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

Side panel for DC link coupling

To connect 2 devices via the DLZ11B or DLZ31B DC link coupling side by side, the side panel of MOVIDRIVE® must be opened.

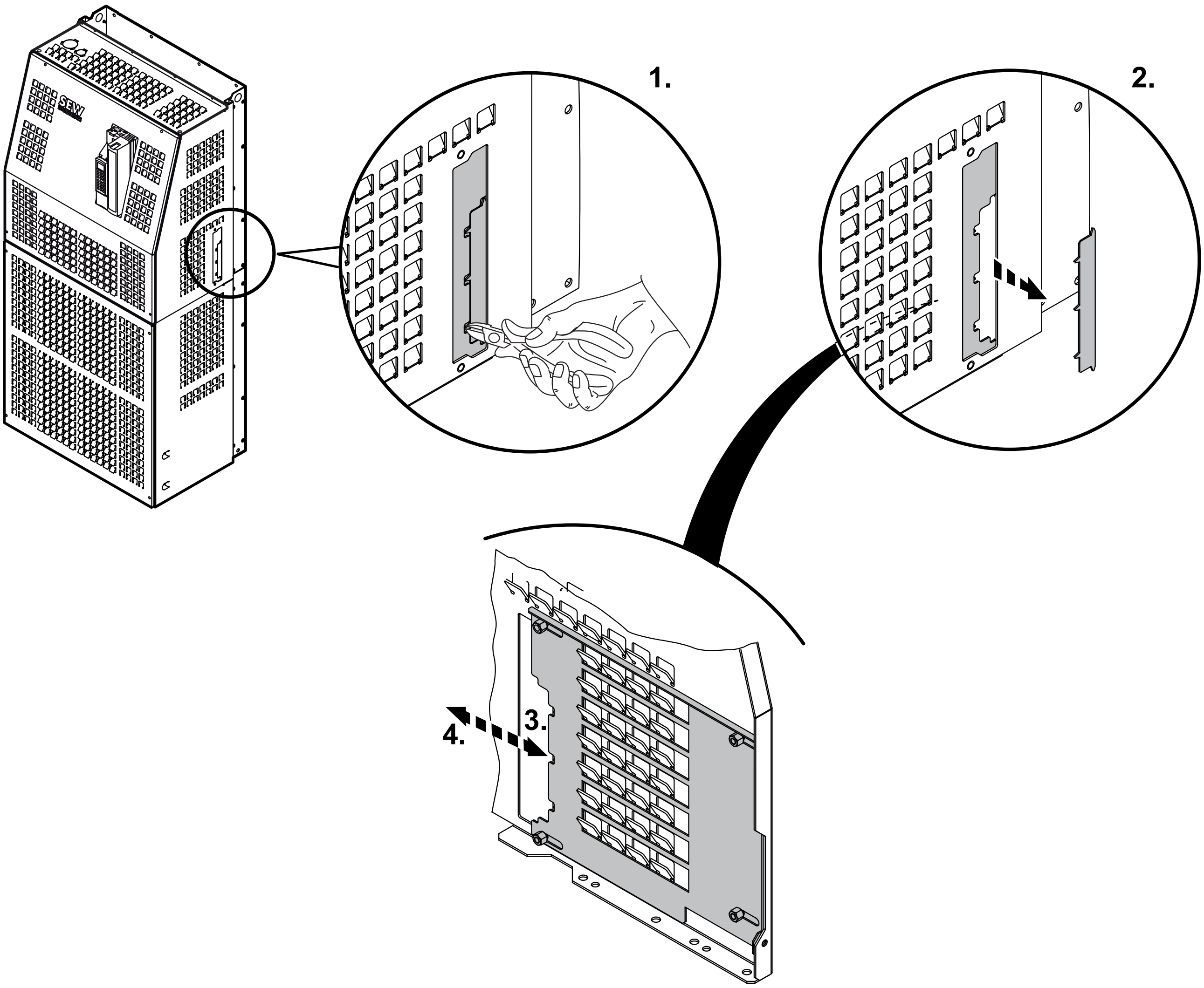
Proceed as follows to prepare MOVIDRIVE® for the side-by-side connection:

⚠ CAUTION

Sharp edges

Minor injuries.

- Wear suitable protective gloves when cutting.



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1. Use cutting pliers to cut an opening according to the figure.
2. Remove the metal you have cut out.
3. When the front cover is open, the sliding door to the DC link connection can be moved.
4. When you screw on the front cover, the sliding door to the DC link connection is closed and fixed.

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DLZ11B DC link coupling

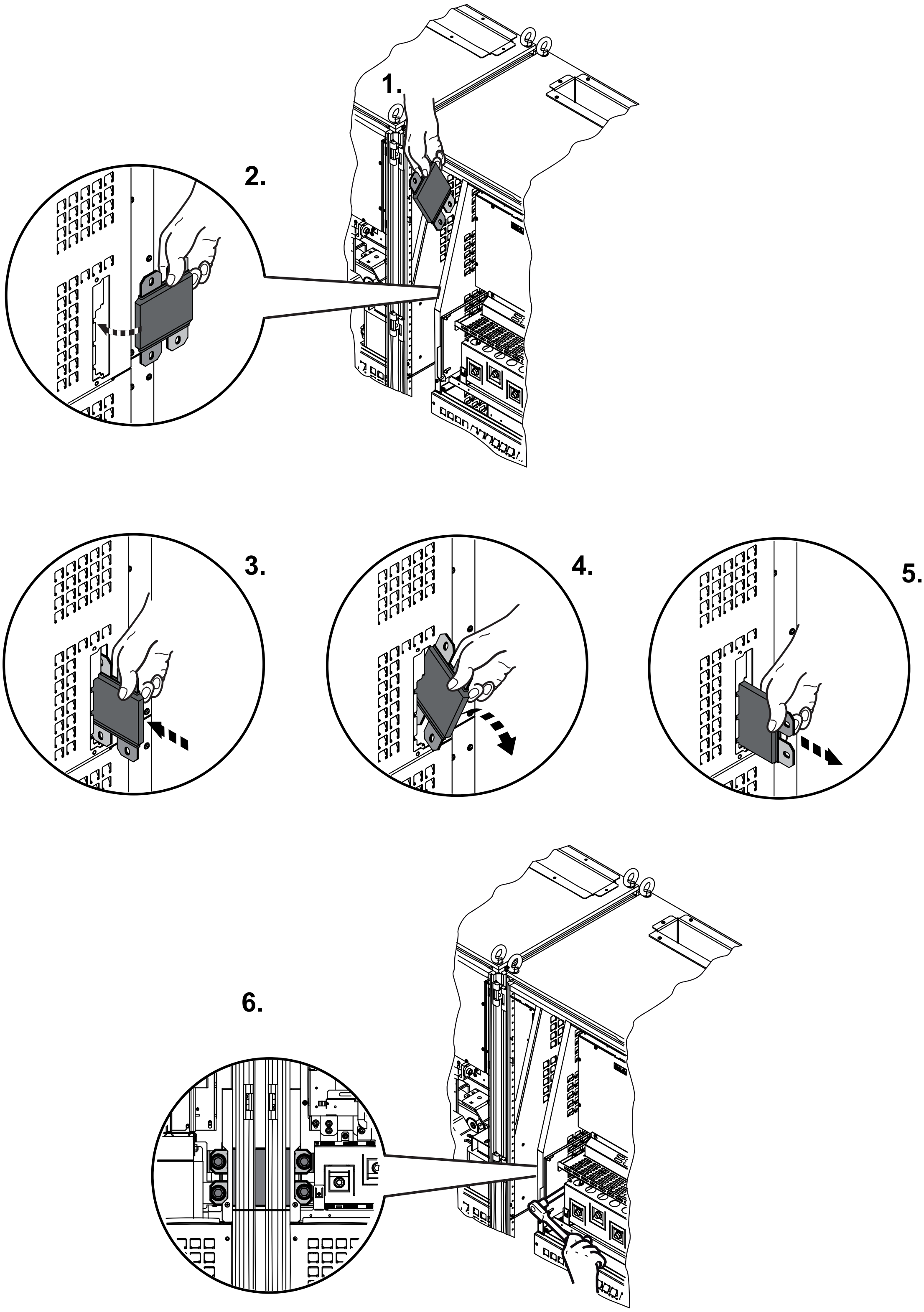
You can use the **DLZ11B DC link coupling** to connect 2 size 7 devices side by side. The DLZ11B DC link coupling is available in three different lengths:

- 100 mm (part number: 18231934)
- 200 mm (part number: 18235662)
- 300 mm (part number: 18235670)

Proceed as follows to connect 2 devices:

1. Depending on the DC link coupling, the units that you want to connect must be installed at ground level and 100 mm, 200 mm or 300 mm apart from each other.
2. Loosen the 4 screws of the upper cover and remove it.
3. Loosen the 4 screws of the lower cover and remove it.
4. Cut the opening in the side panel according to chapter "Side panel for DC link coupling" (→ 🗎 570).
5. Insert the DC link connections into the devices.
    - Insert the **100 mm DC link connection** vertically into the device.
    - Turn the 100 mm DC link connection in the device by 90°.
    - Insert the **200 mm and 300 mm DC link connection** into the one device skewed up to the stop.

- Tip the DC link connection into the second device from above



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- Insert the **200 mm and 300 mm DC link connection** into the one device skewed up to the stop.

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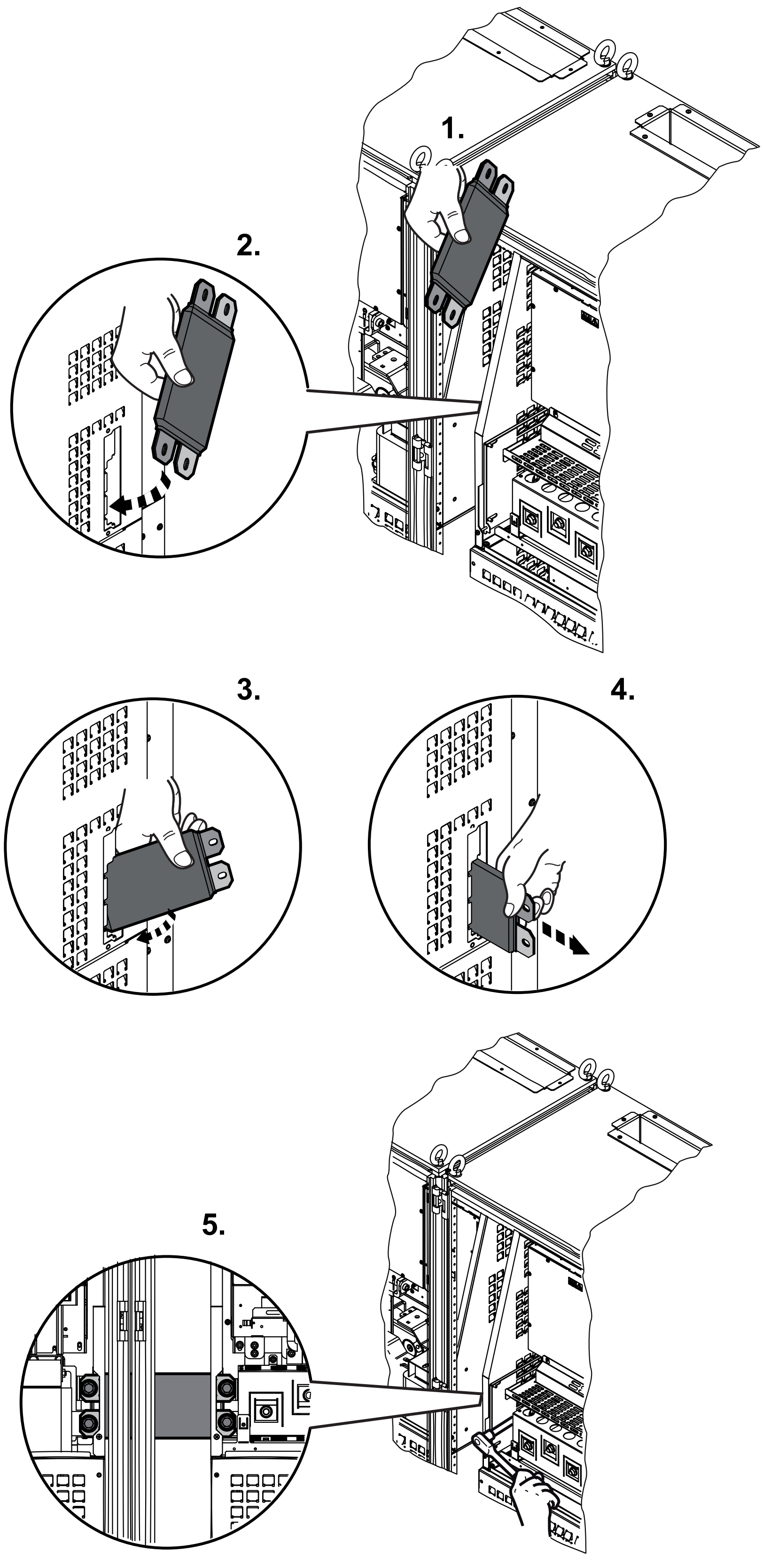
- Tip the DC link connection into the second device from above



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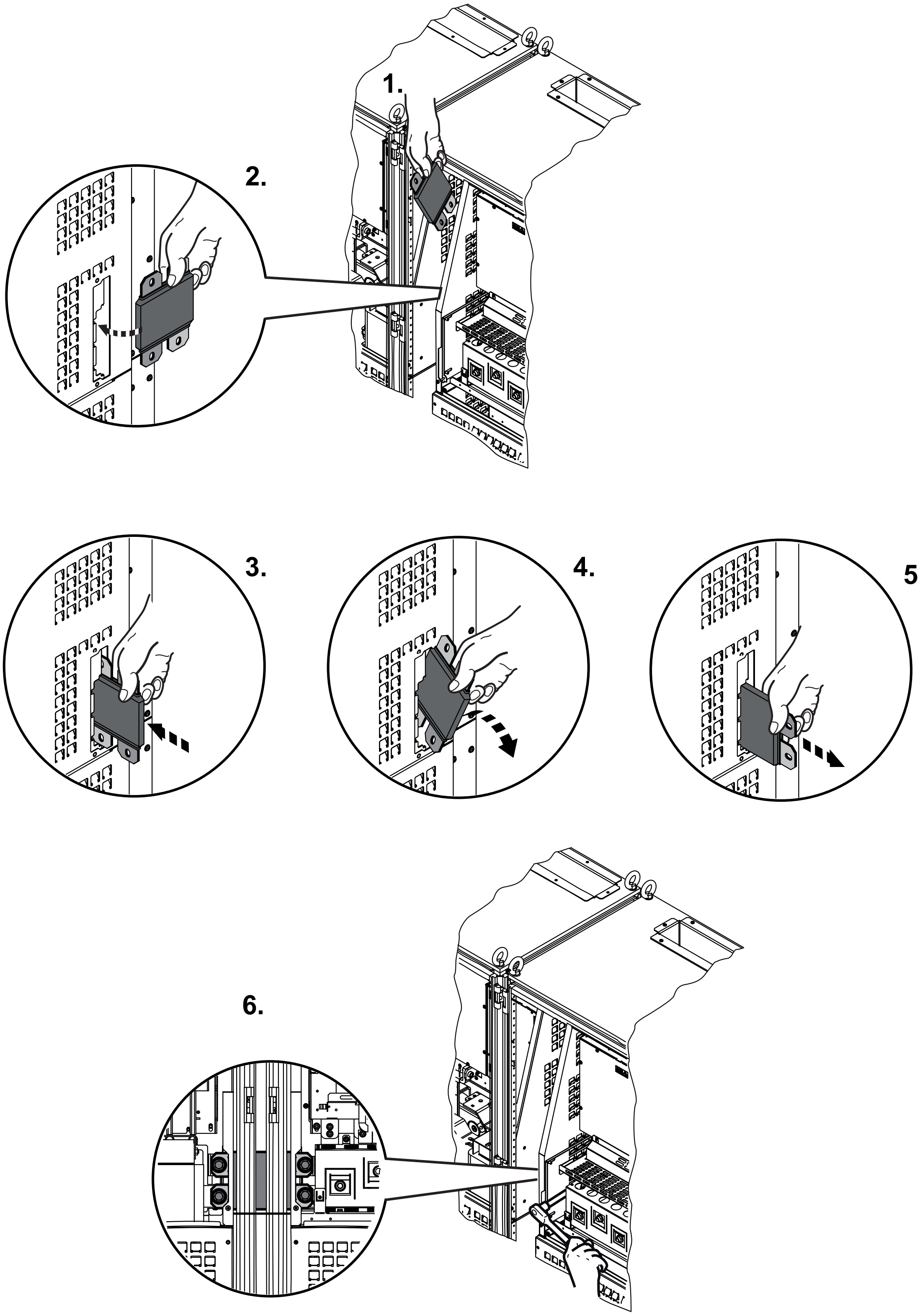
- Screw the DC link coupling to one device first. Then attach it to the other devices.
- Tighten the screws.
- Replace the covers.

6. Screw the DC link coupling to one device first. Then attach it to the other devices.
7. Tighten the screws.

8. Replace the covers.



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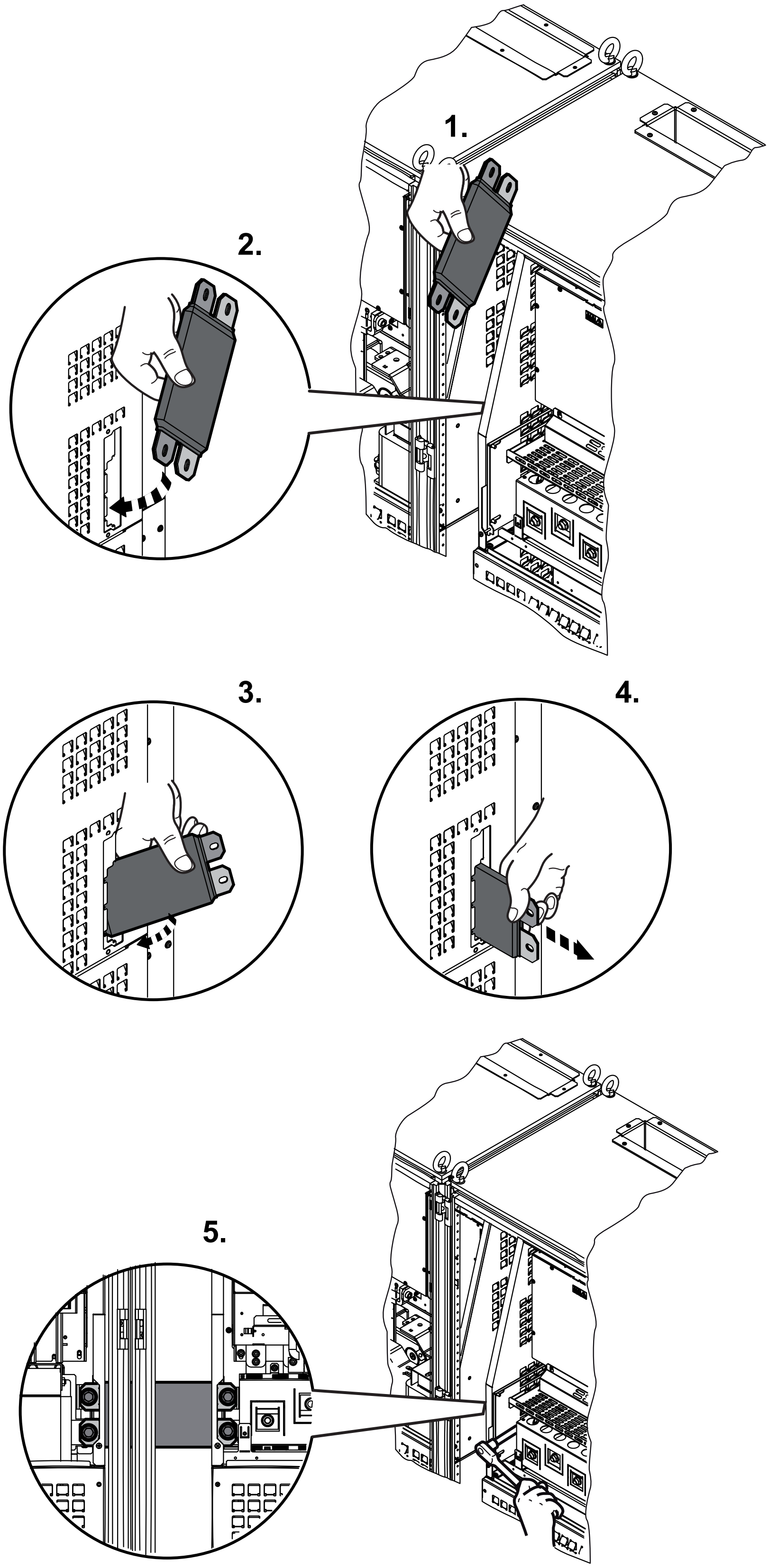
9. Insert the **200 mm and 300 mm DC link connection** into the one device skewed up to the stop.

10. Tip the DC link connection into the second device from above



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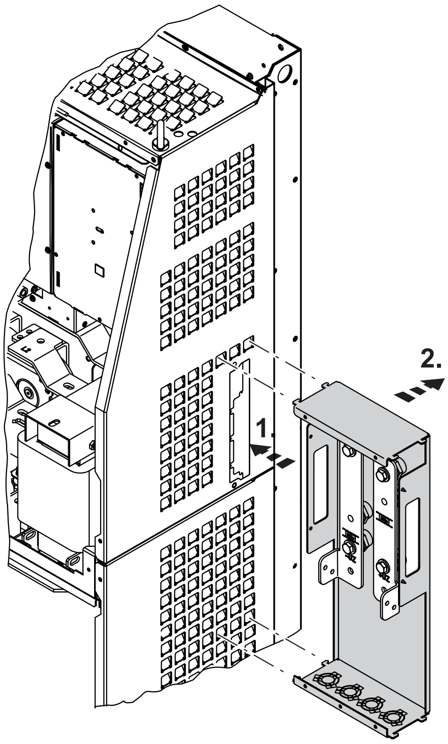
11. Screw the DC link coupling to one device first. Then attach it to the other devices.
12. Tighten the screws.

13. Replace the covers.

DLZ31B DC link coupling

To connect a device in size 7 and a smaller size side by side, you can use the **DLZ31B DC link coupling** (part number: 18236286):



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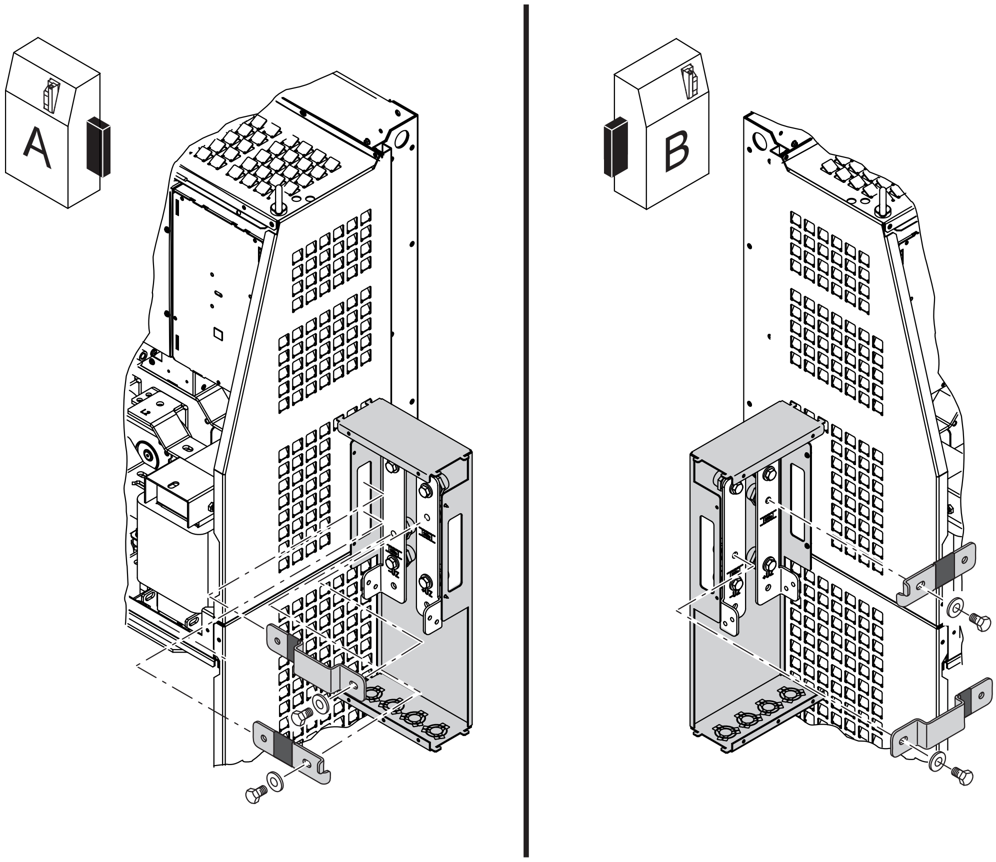
1. Loosen the 4 screws of the upper cover and remove it.
2. Loosen the 5 screws of the cover of the DC link coupling and remove the cover.
3. Cut the opening in the side panel according to chapter "Side panel for DC link coupling" (→ 🗎 570).
4. Mount the DC link coupling to the side panel of the size 7 device.

5. Mount the DC link coupling to the side panel of the size 7 device with 2 tapping screws.



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Insert the DC link connections into the devices. Observe the arrangement of the conductor rails depending on the mounting position.

- Mounting position A: Long conductor rail with bracket at the top, short conductor rail at the bottom
- Mounting position B: Short conductor rail at the top, long conductor rail with bracket at the bottom
- Fasten the DC link connections with screws in the size 7 device first, then in the DC link coupling.
- Tighten the screws.
- Replace the covers.
- Insert the DC link connections into the devices. Observe the arrangement of the conductor rails depending on the mounting position.
  – Mounting position A: Long conductor rail with bracket at the top, short conductor rail at the bottom
  – Mounting position B: Short conductor rail at the top, long conductor rail with bracket at the bottom
- Fasten the DC link connections with screws in the size 7 device first, then in the DC link coupling.
- Tighten the screws.
- Replace the covers.

Connection options per conductor rail

You have the following options to connect the conductor rail:

- 2 bores with a 7 mm diameter
- 1 bore with an 11 mm diameter

Observe the following installation notes in addition:

- Connection of max 2 × 150 mm^2 per conductor rail
- Provide the cable lugs with heat shrink tubing
- Provide for sufficient voltage distance between the screw ends and the metal parts
- There are 4 optional positions for M20 or M32 cable openings
- Use the provided edge protection for cables ≥ 150 mm^2.

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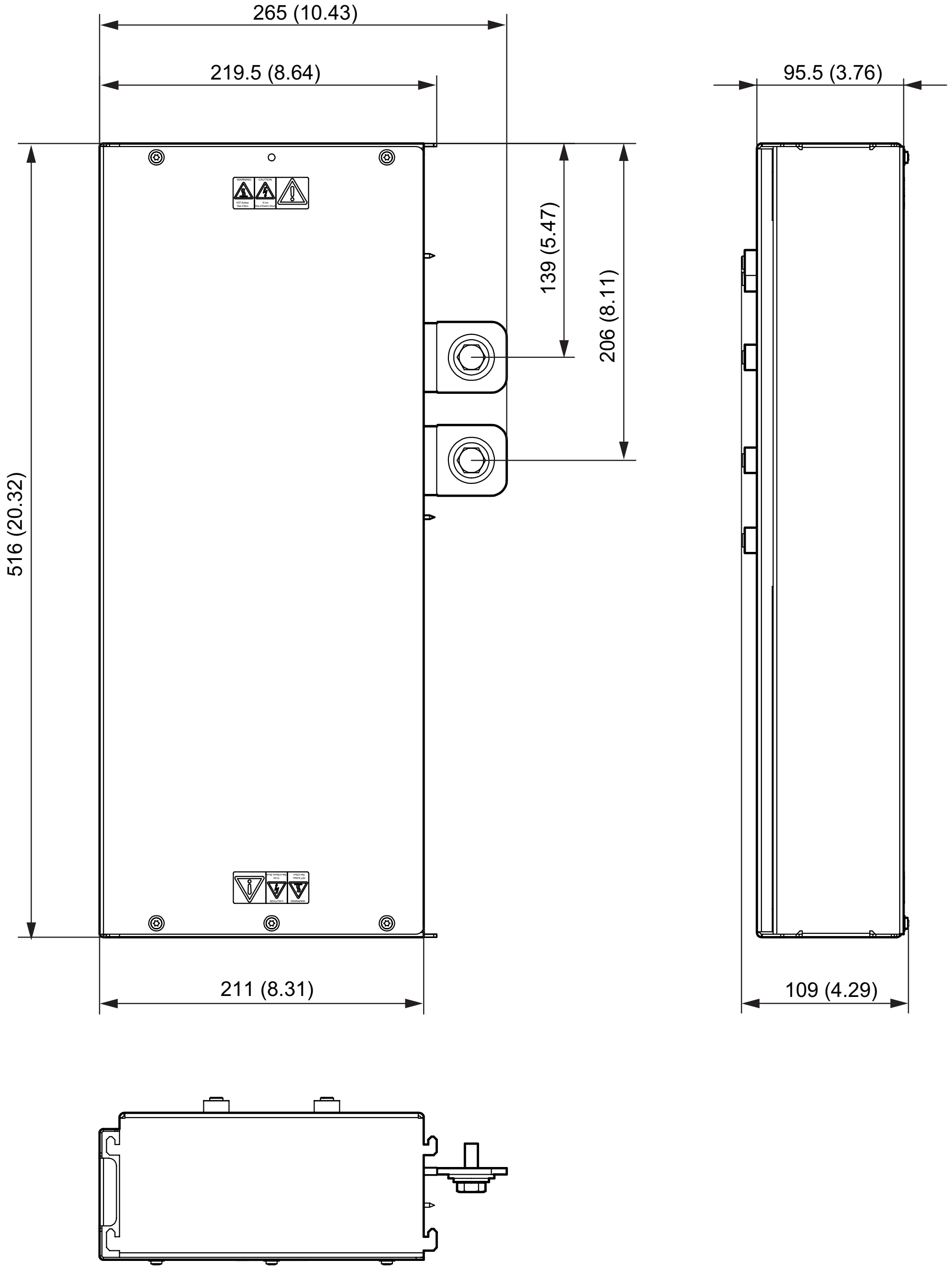
DLZ31B DC link coupling dimension drawing

The following figure shows the dimensions of the DLZ31B DC link coupling.



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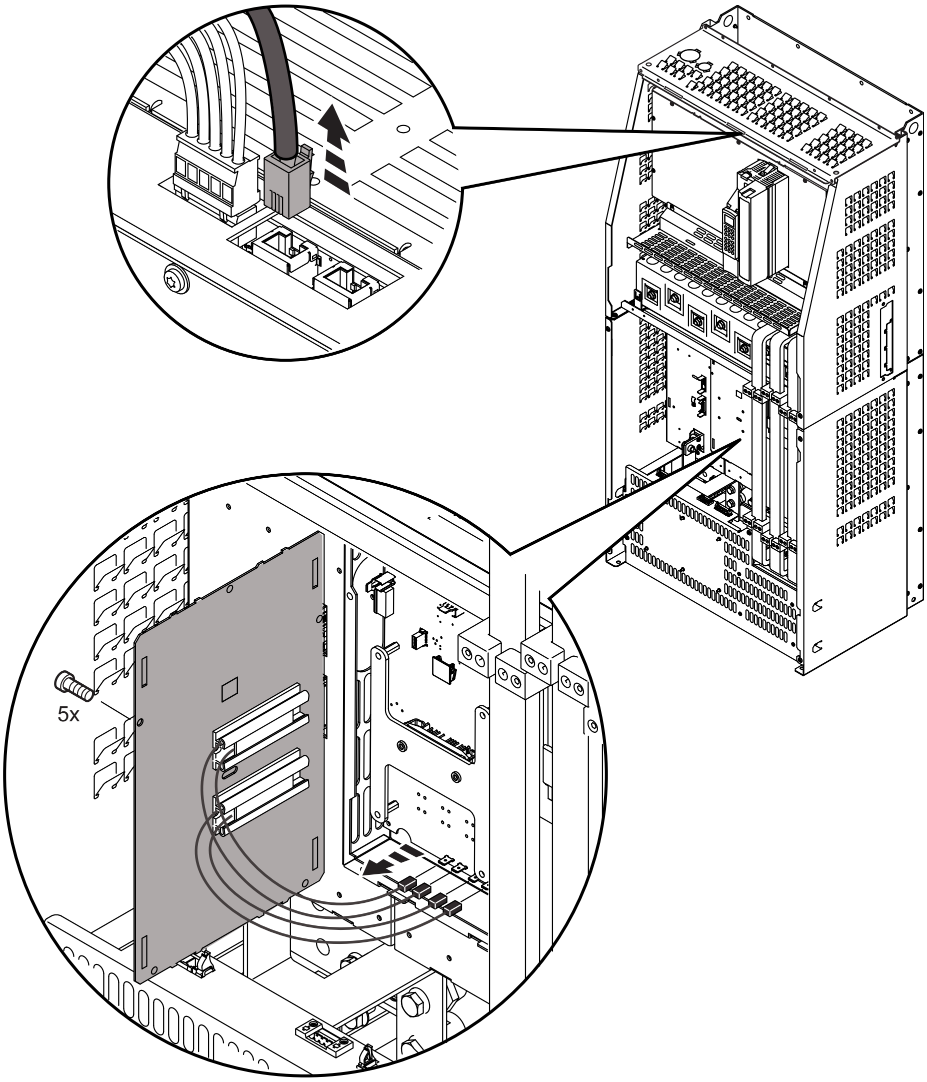
Conversion to motor inverter

A MOVIDRIVE® MDX61B inverter can be used as MDR62B motor inverter. The following applications can be considered:

- Supply via MDR61B regenerative power supply
- Supply via MOVIDRIVE® MDX61B connection type B

Proceed as follow to operate an inverter as MDX62B motor inverter:



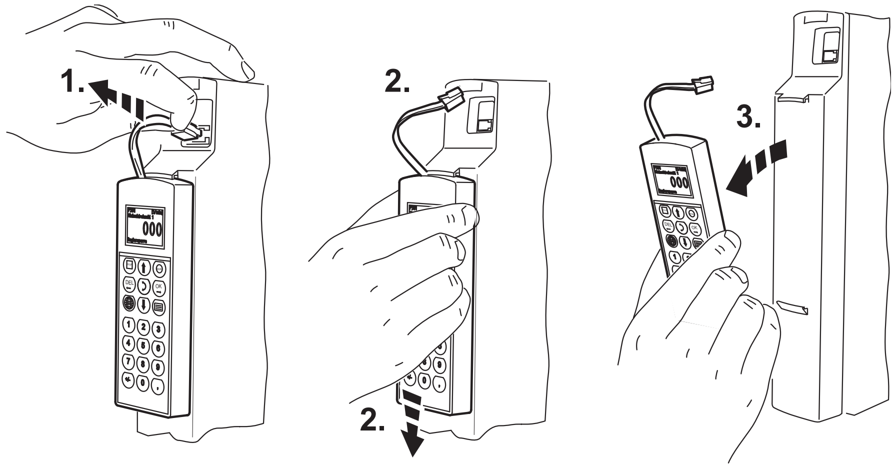
3437047051

- Loosen the 4 screws of the upper cover and remove it.
- Loosen the 4 screws of the lower cover and remove it.
- Pull the CAN bus plug (RJ45) at the top of the inverter.
- Loosen the 5 screws of the cover of the precharge and discharge control and remove the cover.
- Pull the 4 flat plugs of the discharge resistors from the board.
- Fasten the loose cables.
- Replace the covers.

13.2 Removing/installing the keypad

13.2.1 Removing the keypad

Proceed as follows:

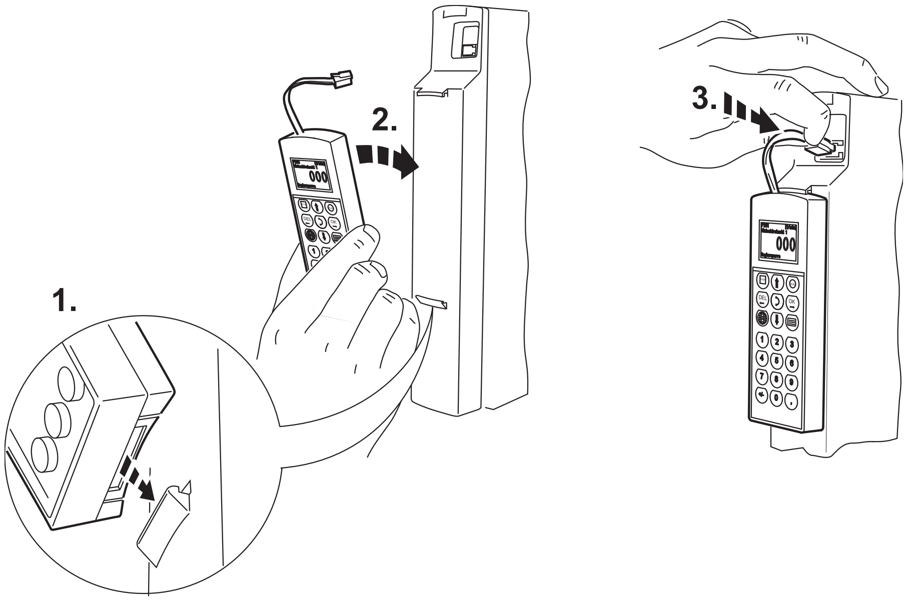


1804920715

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!).

13.2.2 Installing the keypad

Proceed as follows:



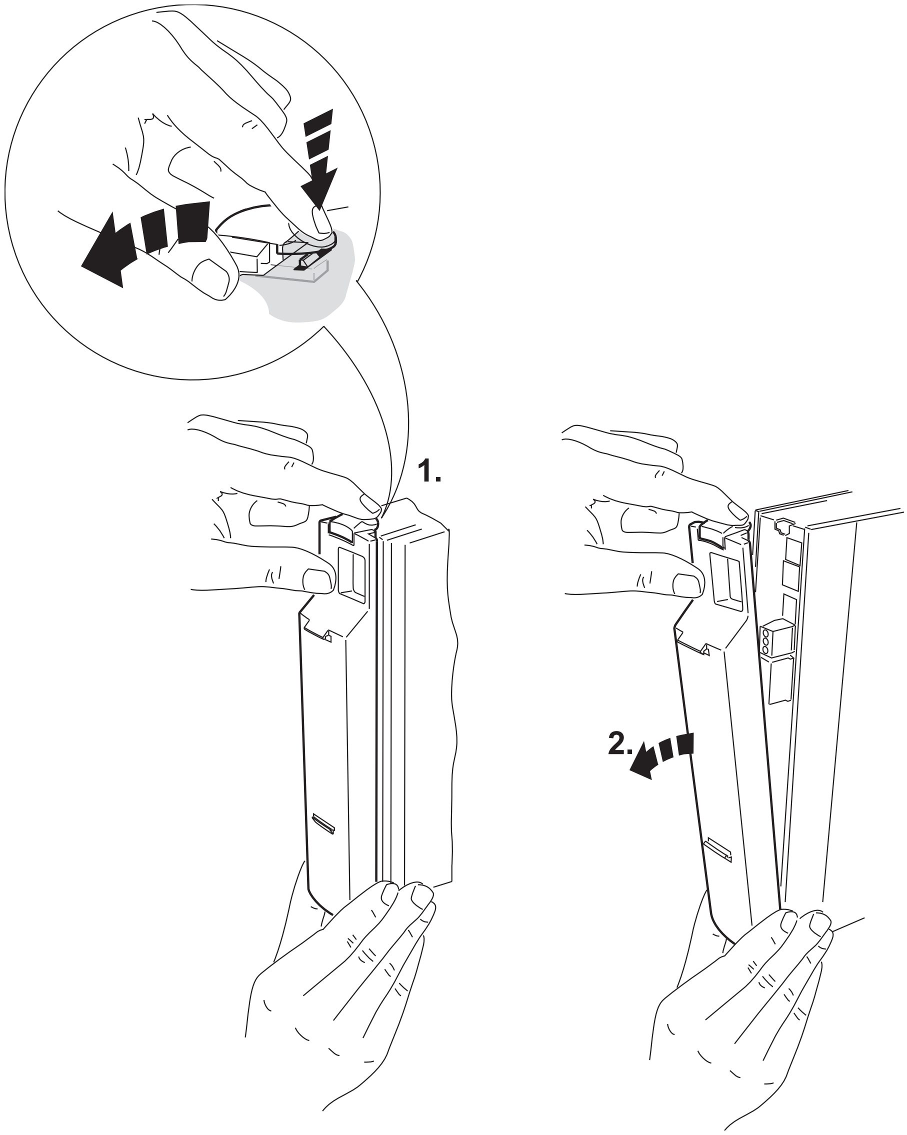
1804922635

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.

13.3 Removing/installing the front cover

13.3.1 Removing the front cover

Proceed as follows to remove the front cover:



1804955147

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

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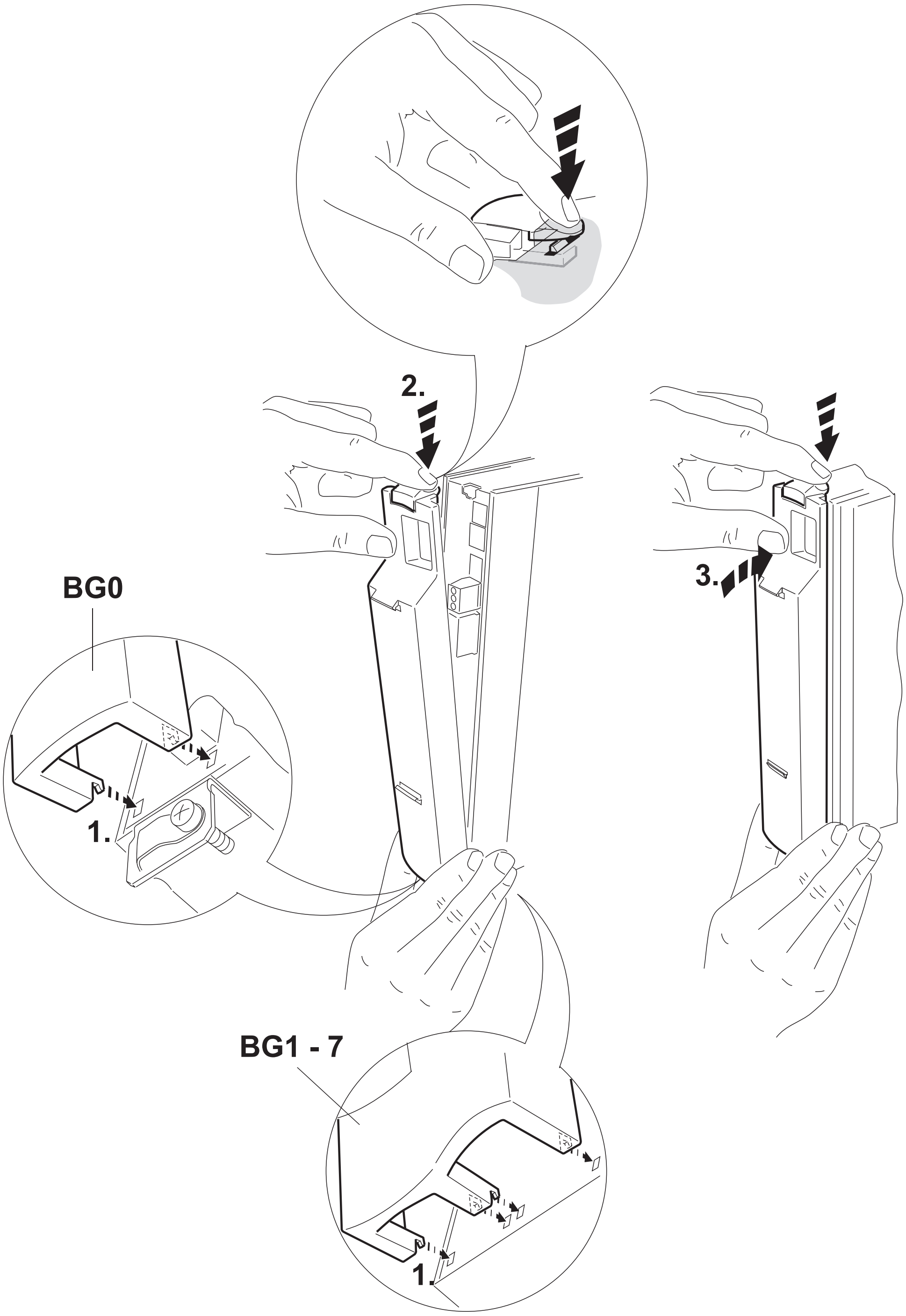
13.3.2 Installing the front cover

Proceed as follows to install the front cover:



1804958219

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 device.

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13.4 Information regarding UL

INFORMATION

Due to UL requirements, the following chapter is always printed in English independent of the language of the documentation.

13.4.1 Field wiring power terminals

- Use 75 °C copper wire only - models with suffix 0075, 0110, 0370, 0450, 0550, 0750, 0900, 1100, 1320, 1600, 2000, 2500.

  Use 60/75 °C copper wire only - models with suffix 0005, 0008, 0011, 0014, 0015, 0022, 0030, 0037, 0040, 0055, 0150, 0220, 0300.
- Tighten terminals to in-lbs (Nm) as follows:

Series	Size	in-lbs	Nm
MOVIDRIVE® MDX 60B/61B	0XS, 0S, 0L	5	0.6
	1, 2S	5	0.6
	2	13	1.5
	3	31	3.5
	4, 5	120	14
	6	180	20
	7	620	70

Field wiring is to be made using listed ZMVV Lugs - models size 2, 3, 5.

13.4.2 Short circuit current rating

Suitable for use on a circuit capable of delivering not more than

- 200,000 rms symmetrical amperes when protected by fuses and circuit breakers as described in the tables below.
- 65,000 rms symmetrical amperes when protected by ABB and Rockwell Type E Combination Motor controllers as described in the tables below.
- MOVIDRIVE® MDX60B/61B 0005 - 2500 (400 V units only).

  Max. voltage is limited to 500 V.
- MOVIDRIVE® MDX60B/61B 0015 - 0300 (230 V units only).

  Max. voltage is limited to 240 V.

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13.4.3 Branch circuit protection

Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the National Electrical Code and any additional local codes.

AC 400/500 V devices

Three Phase 380 V – 500 V Voltage Range				
	SCCR: 200 kA/ 500 V when protected by:	**SCCR: 200 kA/ 500 V when protected by**	**SCCR: 65 kA/ 480 V: when protected by[1] :**	**SCCR: 65 kA/ 460 V when protected by:**
Model	**Non Semiconductor Fuses (currents are maximum values)**	**Inverse-Time Circuit Breaker (currents are maximum values)**	**Type E Combination Motor Controller**	
MOVIDRIVE® MODEL, 0005 (Size 0S)	15 A / 600 V	25 A/ 500 V	ABB, Model MS132-2.5 Rated 480 V, 1 HP	Rockwell Automation Model 140M-C2E-B25, Rated 460 V, 1.5 HP
MOVIDRIVE® MODEL, 0008 (Size 0S)	15 A / 600 V	25 A / 500 V	ABB, Model MS132-4.0 Rated 480 V, 2 HP	Rockwell Automation Model 140M-C2E-B40, Rated 460 V, 3 HP
MOVIDRIVE® MODEL, 0011 (Size 0M)	15 A / 600 V	25 A / 500 V	ABB, Model MS132-4.0 Rated 480 V, 2 HP	Rockwell Automation Model 140M-C2E-B40, Rated 460 V, 3 HP
MOVIDRIVE® MODEL, 0014 (Size 0M)	15 A / 600 V	25 A / 500 V	ABB, Model MS132-6.3 Rated 480 V, 3 HP	Rockwell Automation Model 140M-C2E-B63, Rated 460 V, 5 HP
MOVIDRIVE® MODEL, 0015 (Size 1)	35 A / 600 V	25 A / 500 V	ABB, Model MS132-6.3 Rated 480 V, 3 HP	Rockwell Automation Model 140M-C2E-B63, Rated 460 V, 5 HP
MOVIDRIVE® MODEL, 0022 (Size 1)	35 A / 600 V	25 A / 500 V	ABB, Model MS132-6.3 Rated 480 V, 3 HP	Rockwell Automation Model 140M-C2E-B63, Rated 460 V, 5 HP
MOVIDRIVE® MODEL, 0030 (Size 1)	35 A / 600 V	25 A / 500 V	ABB, Model MS132-10 Rated 480 V, 5 HP	Rockwell Automation Model 140M-C2E-C10, Rated 460 V, 7.5 HP
MOVIDRIVE® MODEL, 0040 (Size 1)	35 A / 600 V	25 A / 500 V	ABB, Model MS132-12 Rated 480 V, 7.5 HP	Rockwell Automation Model 140M-D8E-C16, Rated 460 V, 10 HP
MOVIDRIVE® MODEL, 0055 (Size 2S)	60 A / 600 V	25 A / 500 V	ABB, Model MS132-16 Rated 480 V, 10 HP	Rockwell Automation Model 140M-D8E-C16, Rated 460 V, 10 HP
MOVIDRIVE® MODEL, 0075 (Size 2S)	60 A / 600 V	25 A / 500 V	ABB, Model MS132-20 Rated 480 V, 10 HP	Rockwell Automation Model 140M- D8E-C20, Rated 460 V, 15 HP
MOVIDRIVE® MODEL, 0110 (Size 2)	60 A / 600 V	-	ABB, Model MS132-32 Rated 480 V, 20 HP	Rockwell Automation Model 140M-F8E-C32, Rated 460 V, 25 HP
MOVIDRIVE® MODEL, 0150 (Size 3)	175 A / 600 V	90 A / 500 V	ABB, Model MS450-40E Rated 480 V, 30 HP	Rockwell Automation Model 140M-F8E-C45, Rated 460 V, 30 HP
MOVIDRIVE® MODEL, 0220 (Size 3)	175 A / 600 V	90 A / 500 V	ABB, Model MS495-63E Rated 480 V, 50 HP	-
MOVIDRIVE® MODEL, 0300 (Size 3)	175 A / 600 V	90 A / 500 V	ABB, Model MS495-75E Rated 480 V, 60 HP	-
MOVIDRIVE® MODEL, 0370 (Size 4)	350 A / 600 V	175 A / 500 V	ABB, Model MS495-90E Rated 480 V, 75 HP	-
MOVIDRIVE® MODEL, 0450 (Size 4)	350 A / 600 V	175 A / 500 V	-	-
MOVIDRIVE® MODEL, 0550 (Size 5)	225 A / 600 V	175 A / 500 V	-	-
MOVIDRIVE® MODEL, 0750 (Size 5)	225 A / 600 V	175 A / 500 V	-	-
MOVIDRIVE® MODEL, 0900 (Size 6)	250 A / 600 V	300 A / 500 V	-	-

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Three Phase 380 V – 500 V Voltage Range				
	SCCR: 200 kA/ 500 V when protected by:	SCCR: 200 kA/ 500 V when protected by	SCCR: 65 kA/ 480 V: when protected by[1] :	SCCR: 65 kA/ 460 V when protected by:
Model	Non Semiconductor Fuses (currents are maximum values)	Inverse-Time Circuit Breaker (currents are maximum values)	Type E Combination Motor Controller	
MOVIDRIVE® MODEL, 1100 (Size 6)	300 A / 600 V	300 A / 500 V	-	-
MOVIDRIVE® MODEL, 1320 (Size6)	400 A / 600 V	300 A / 500 V	-	-
MOVIDRIVE® MODEL, 1600 (Size 7)	400 A / 600 V	600 A / 500 V	-	-
MOVIDRIVE® MODEL, 2000 (Size 7)	500 A / 600 V	600 A / 500 V	-	-
MOVIDRIVE® MODEL, 2500 (Size 7)	600 A / 600 V	600 A / 500 V	-	-

1) Drives employing Type E Combination Motor Controller model MS132-12, -16, -20, -25, -32 must be installed with Current Limiter Series S803W-SCLxxx-SR manufactured by ABB, otherwise SCCR rated 30kA/ 480 Vrms.

13

AC 230 V devices

Three Phase 200 V – 240 V Voltage Range				
	SCCR: 200 kA/ 240 V when protected by:	SCCR: 200 kA/ 240 V when protected by:	SCCR: 65 kA/ 240 V when protected by:[1]	SCCR: 65 kA/ 240 V when protected by:
Model	Non Semiconductor Fuses (currents are maximum values)	Inverse-Time Circuit Breaker (currents are maximum values)	Type E Combination Motor Controller	
MOVIDRIVE® MODEL, 0015 (Size 1)	30 A / 250 V	25 A / 240 V	ABB, Model MS132-10 Rated 480 V, 5 HP	Rockwell Automation Model 140M-C2E-C10, Rated 460 V, 7.5 HP
MOVIDRIVE® MODEL, 0022 (Size 1)	30 A / 250 V	25 A / 240 V	ABB, Model MS132-10 Rated 480 V, 5 HP	Rockwell Automation Model 140M-C2E-C10, Rated 460 V, 7.5 HP
MOVIDRIVE® MODEL, 0037 (Size 1)	30 A / 250 V	25 A / 240 V	ABB, Model MS132-20 Rated 480 V, 10 HP	Rockwell Automation Model 140M-D8E-C20, Rated 460 V, 15 HP
MOVIDRIVE® MODEL, 0055 (Size 2)	60 A / 250 V	40 A / 240 V	ABB, Model MS132-25 Rated 480 V, 15 HP	Rockwell Automation Model 140M-F8E-C25, Rated 460 V, 20 HP
MOVIDRIVE® MODEL, 0075 (Size 2)	60 A / 250 V	40 A / 240 V	ABB, Model MS450-40E Rated 480 V, 30 HP	Rockwell Automation Model 140M-F8E-C45, Rated 460 V, 30 HP
MOVIDRIVE® MODEL, 0110 (Size 3)	175 A / 250 V	90 A / 240 V	ABB, Model MS450-50E Rated 480 V, 40 HP	-
MOVIDRIVE® MODEL, 0150 (Size 3)	175 A / 250 V	90 A / 240 V	ABB, Model MS495-63E Rated 480 V, 50 HP	-
MOVIDRIVE® MODEL, 0220 (Size 4)	350 A / 250 V	175 A / 240 V	ABB, Model MS495-90E Rated 480 V, 75 HP	-
MOVIDRIVE® MODEL, 0300 (Size 4)	350 A / 250 V	175 A / 240 V	-	-

1) Drives employing Type E Combination Motor Controller model MS132-12, -16, -20, -25, -32 must be installed with Current Limiter Series S803W-SCLxxx-SR manufactured by ABB, otherwise SCCR rated 30kA/ 480 Vrms.

13.4.4 Motor overload protection

The units are provided with load and speed-sensitive overload protection and thermal memory retention upon shutdown or power loss.

The trip current is adjusted to 150 % of the rated motor current.

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13.4.5 Ambient temperature

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

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

INFORMATION

- Use only tested units with a **limited output voltage** (V_{max} = DC 30 V) and **limited output current** (I_{max} = 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).

13.4.6 Environmental Conditions

The units are for use in pollution degree 2 environments.

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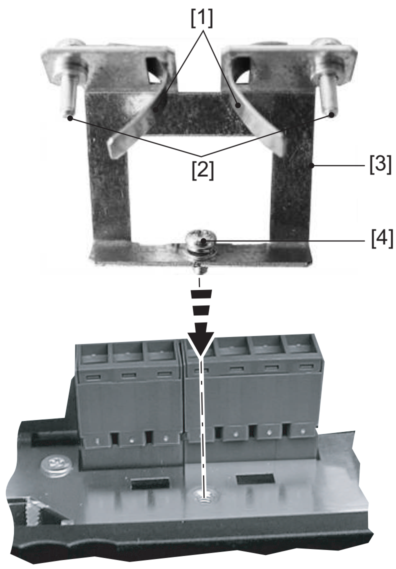
13.5 Shield clamps

13.5.1 Shield clamp for power section, size 0

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

Install the shield clamps for the power section as follows:

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



1805286795

[1] Contact clips

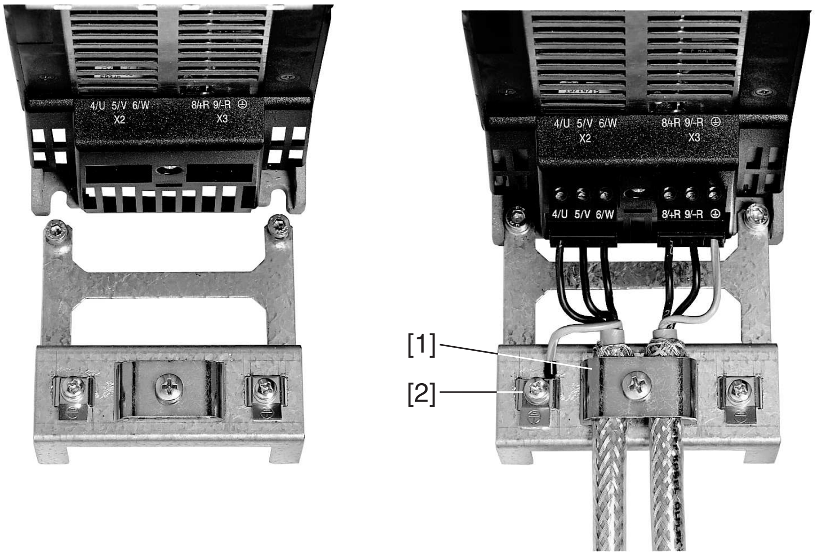
[2] Retaining screws for contact clip

[3] Shield plate

[4] Retaining screw for shield clamp

13.5.2 Shield clamp for power section, size 1

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

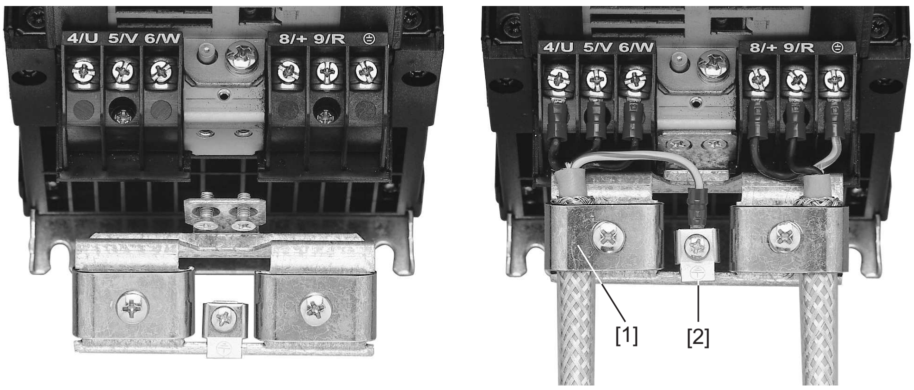


1805289867

[1] Power section shield clamp [2] PE connection

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

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



1805291787

[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 cable and braking resistor cable. Apply the shield and PE conductor as shown in the figures below.

13.5.4 Shield clamp for power section, sizes 3 to 7

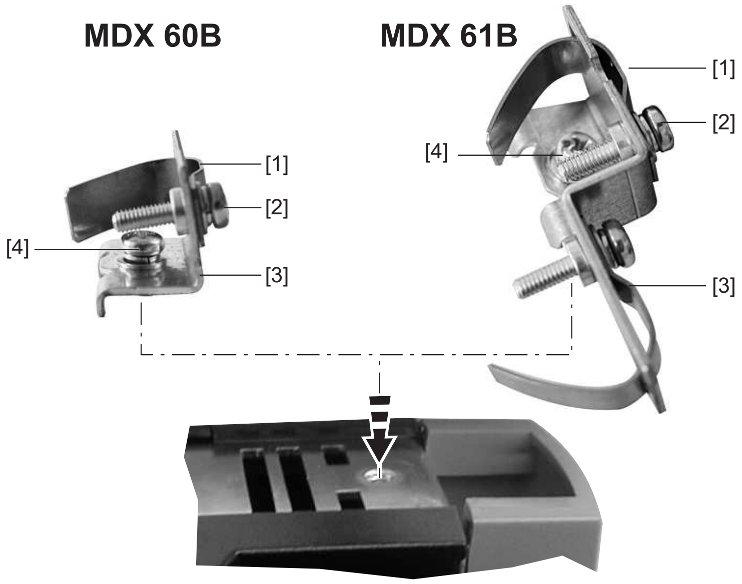
No shield clamps for the power section are supplied with MOVIDRIVE® MDX61B sizes 3 – 7. Use commercially available shield clamps for installing the shielding of motor and brake cables. Apply the shield as closely as possible to the inverter.

13.5.5 Shield clamp for signal cables

Install the shield clamp for the signal cable as follows:

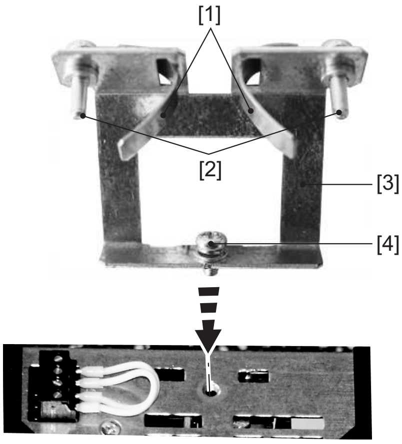
- If installed, remove the keypad and the front cover.
- Size 0: Attach the shield clamp on the bottom of the device.
- Sizes 1 to 7: Attach the shield clamp on the bottom of the control device.

Size 0



1805296011

Size 1 to 7



1805401483

[1] Contact clip(s)

[2] Retaining screw(s) for contact clips

[3] Shield plate

[4] Retaining screw for shield terminal

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13.6 Touch guard for power terminals

⚠ WARNING

Uncovered power connections.

Severe or fatal injuries from electric shock.

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

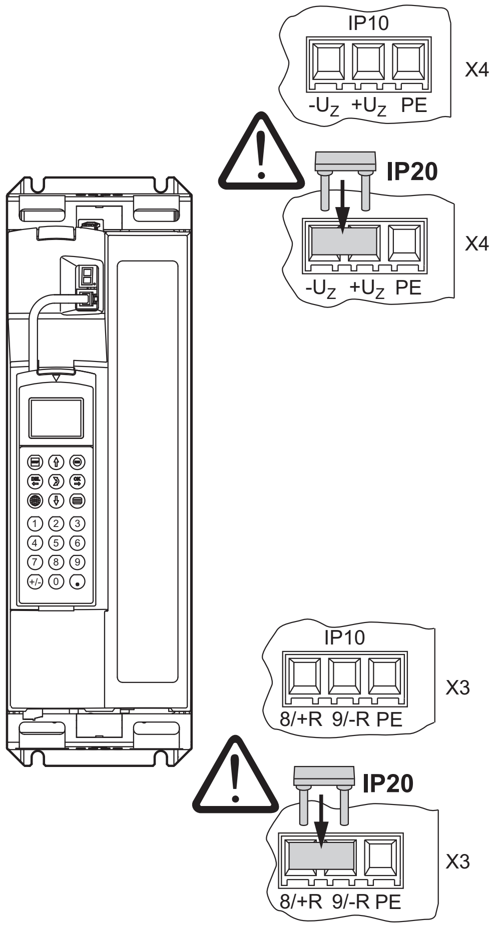
13.6.1 Size 2S

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

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

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

The following figure shows the touch guard for MOVIDRIVE® MDX61B size 2S.



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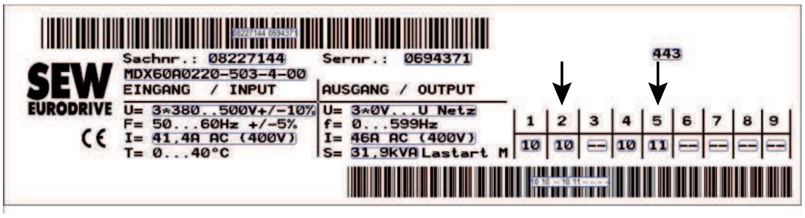
13.6.2 Size 3

The new hardware versions of size 3 can be recognized by the entries in the status fields 2 and 5 on the nameplate of the power section. Older hardware versions do not have entries in the status fields 2 and 5.

As an example for the current hardware version, the entry in status field 2 is "10" and the entry in status field 5 is "11" in the nameplate shown below.

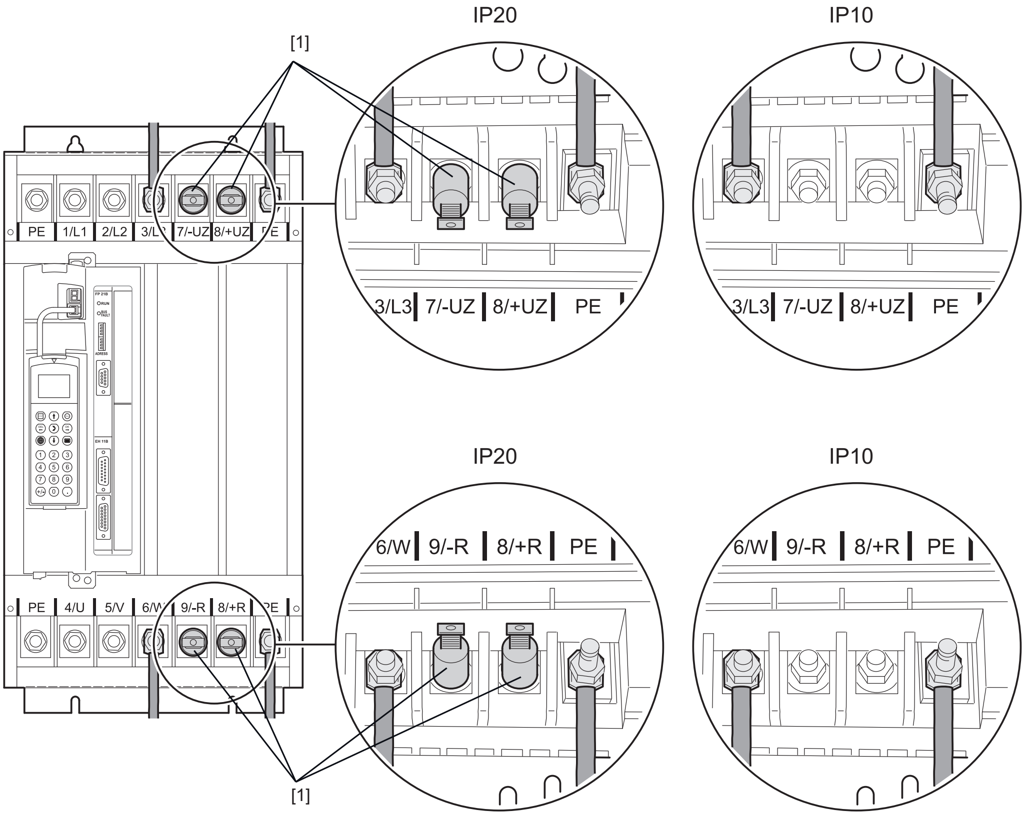


At the factory, the power connections 7/-UZ, 8/+UZ, 9/-R and 8/+R of inverters of size 3 are equipped with insulation caps for protection against contact, see figure. If the insulation caps are removed without connecting cables with insulating tubing, the inverters only have degree of protection IP10.

INFORMATION

- Unused clamping points/connection points (except PE) must be equipped with the depicted insulation caps in order to achieve the degree of protection IP20.

The following figure shows the touch guard for MOVIDRIVE® MDX61B size 3.

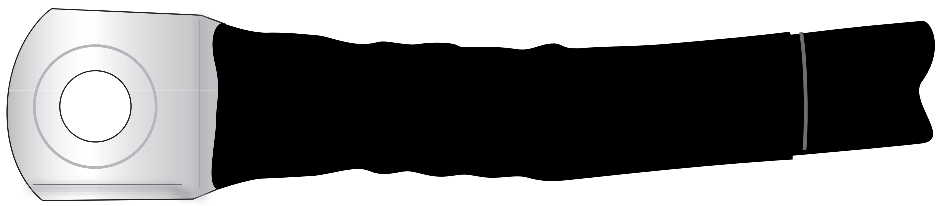


9007217248752011

[1] Insulation caps

Heat shrink tubing

The size 3 inverters have degree of protection IP20 if all power cables (connections X1, X2, X3, X4) are covered with a heat shrink tubing as shown in the following illustration.



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13.6.3 Sizes 4 and 5

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

- Power cables with heat shrink tubing and a cable cross section of ≥ 35 mm² (AWG2) are connected to X1, X2, X3, X4. The additional DLB11B touch guard does not have to be installed.
- Power cables with heat shrink tubing and a cable cross section of < 35 mm² (AWG2) are connected to X1, X2, X3, X4. The DLB11B touch guard must be installed properly (see section "Installing the DLB11B touch guard").
- The DLB11B touch guard must be connected to power terminals that are not connected. The DLB11B touch guard does not have to be connected to the PE terminals.

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

Installing the DLB11B touch guard

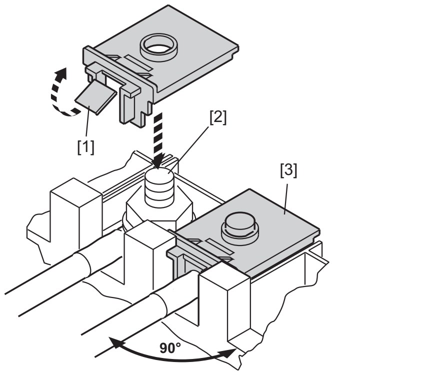
Proceed as follows when installing the **DLB11B touch guard**:

- Figure I: Power terminal with connected power cable with a cable cross section of < 35 mm² (AWG2):

  Remove the plastic lug [1] and push the DLB11B touch guard [3] on the respective terminal stud [2] of the power terminal. Make sure that the cable output is straight. Install the safety cover for the power terminals.
- Figure II: Power terminal without connected power cable:

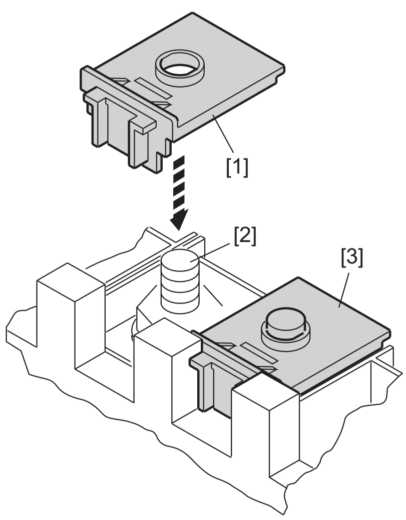
  Push the DLB11B touch guard [1] on the respective terminal stud [2]. Install the safety cover for the power terminals.

I



1805413643

II



1805519115

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

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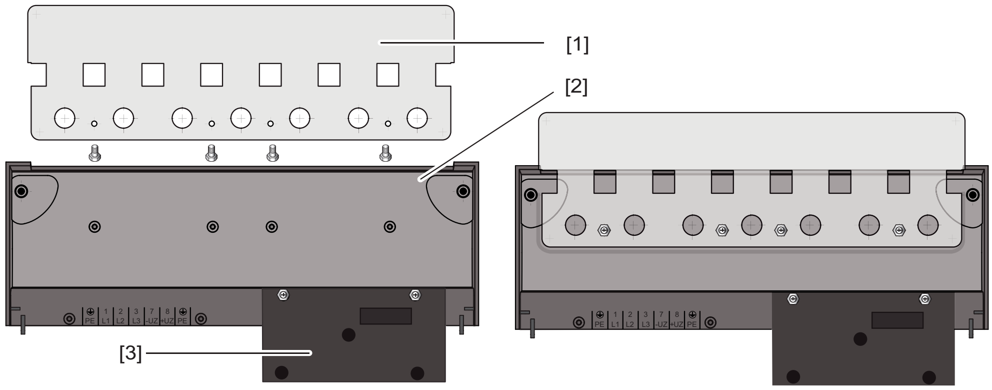
For additional information on the X1, X2, X3 and X4 power terminals, refer to chapter "Technical data".

13.6.4 Sizes 4 – 6

MOVIDRIVE® size 4 (AC 500 V devices: MDX61B0370/0450; AC 230 V devices: 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 safety covers of the power terminals.

The following figure shows the touch guard for MOVIDRIVE® MDX61B sizes 4, 5, and 6.



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The touch guard comprises the following parts:

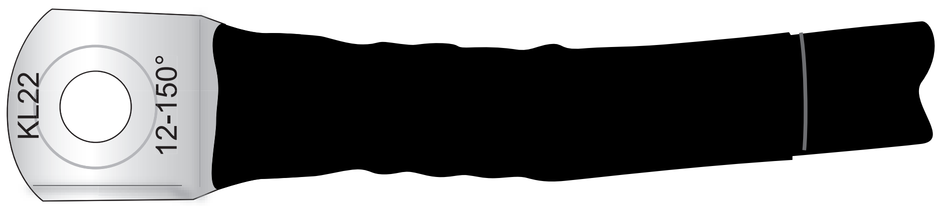
[1] Cover plate

[2] Connection plate

[3] Screen (only for size 5)

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

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



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INFORMATION

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

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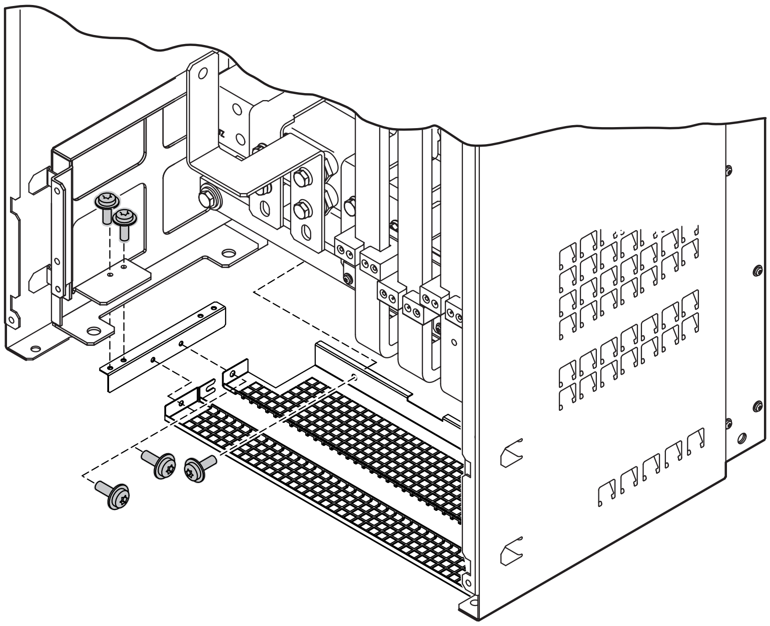
13.6.5 Size 7

Installing the touch guard DLB21B

Degree of protection IP20 is achieved for MOVIDRIVE® MDX61B size 7 when the touch guard DLB21B (part no 18226086) is trimmed to size by the customer and mounted in front and behind the power connections.



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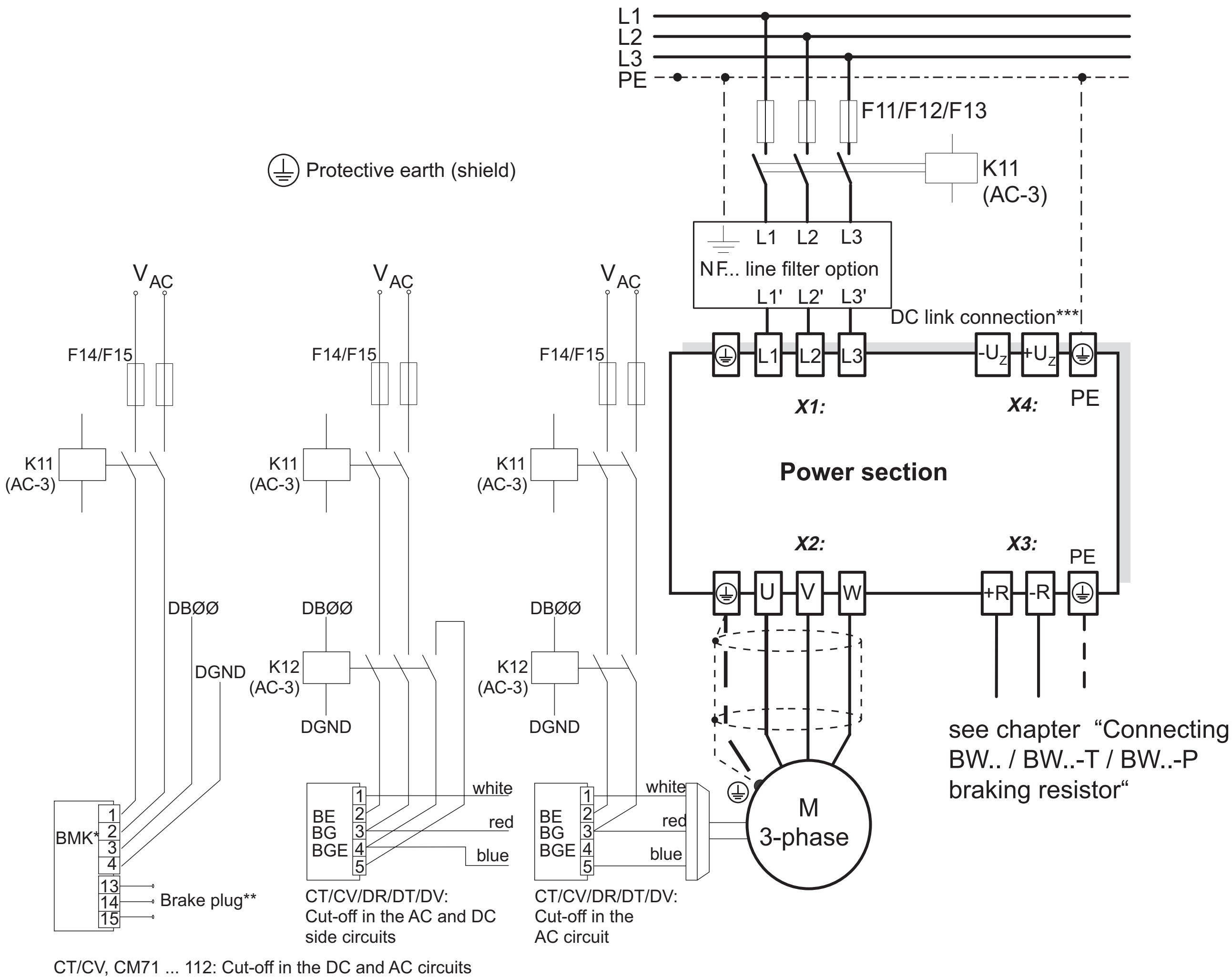
INFORMATION

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

13.7 Wiring diagrams for basic device

13.7.1 Power section (sizes 0 – 6) and brake



9007201060300683

** **Strictly adhere to the connection sequence of the brake connector.** Incorrect connection will cause irreparable damage to the brake. **Observe the operating instructions of the used motors** when connecting the brake using the terminal box.

*** 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).

INFORMATION

Folgen

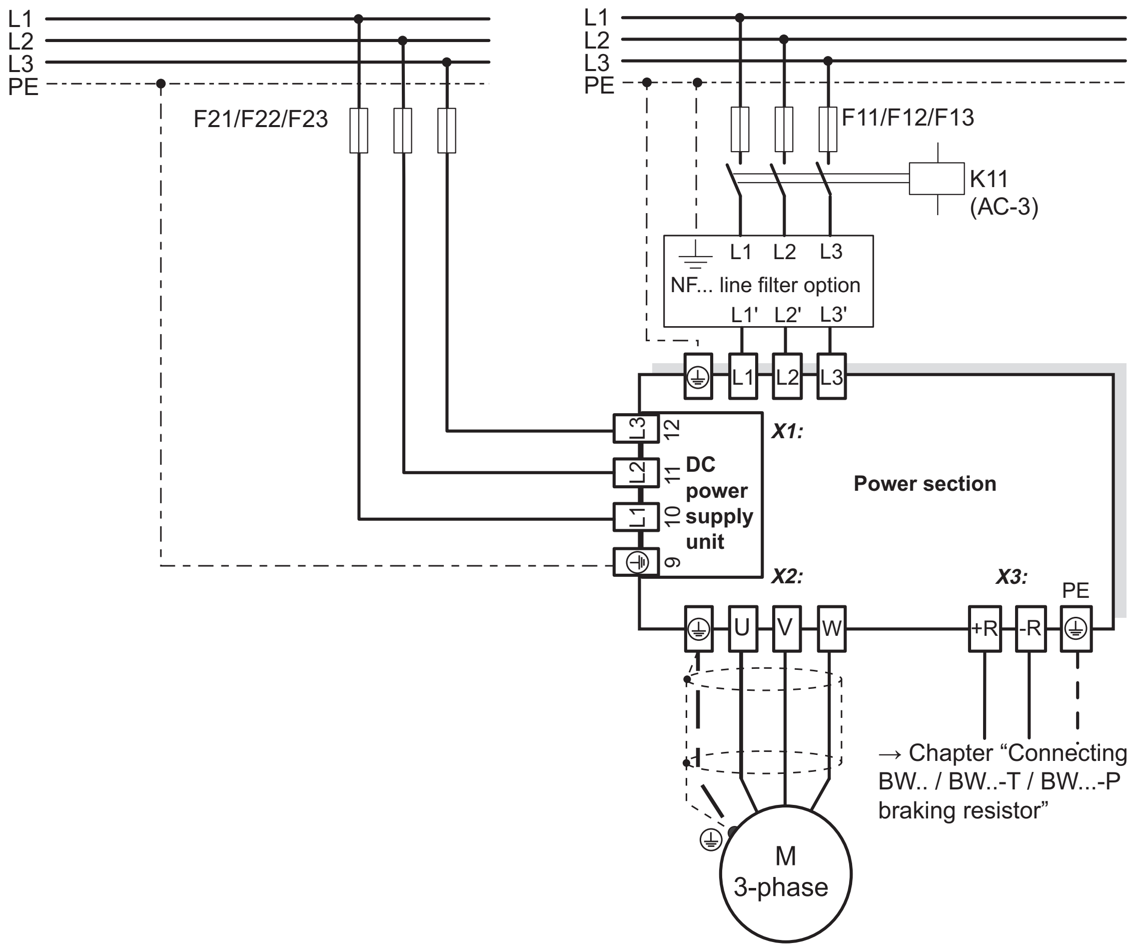
- Connect the brake rectifier using a separate supply system lead.
- **Supply via the motor voltage is not permitted.**

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

- All lifting applications,
- Drives that require a rapid brake response time
- CFC and SERVO operating modes.

13.7.2 Power section and DC power supply unit (size 7)

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



9007201440755083

Technical data of DC power supply unit:

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

INFORMATION

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

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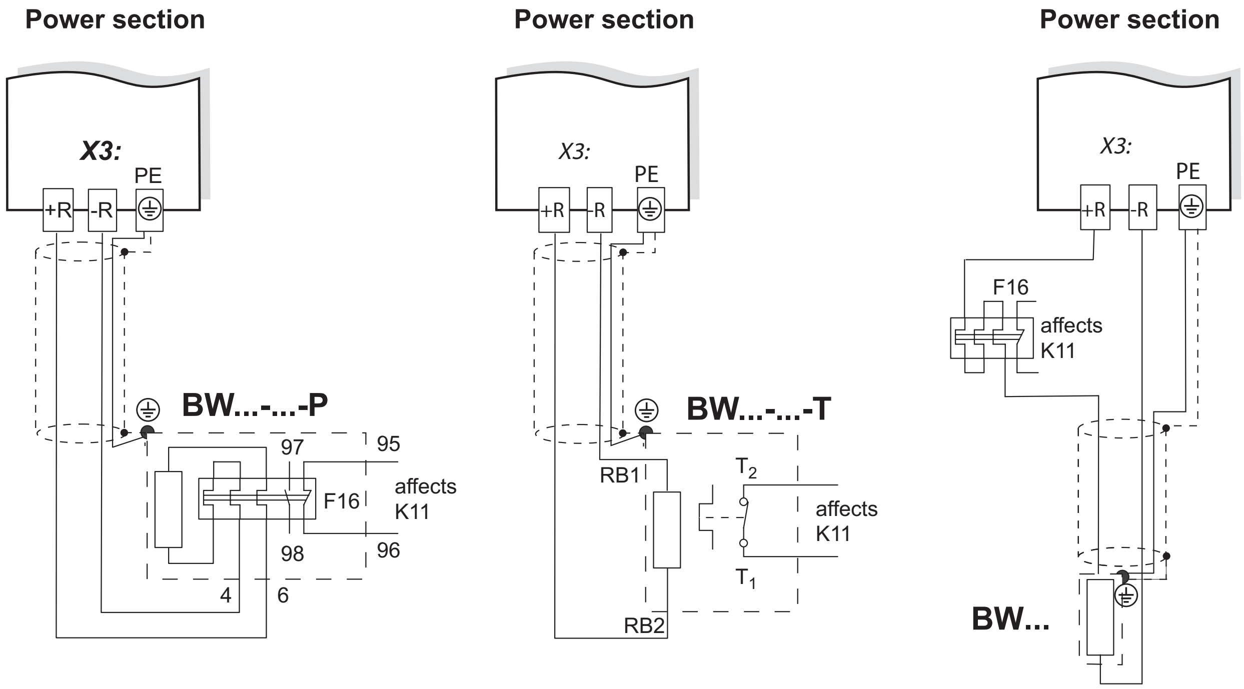
13.7.3 Brake rectifier in control cabinet

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.

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



9007201060304139

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

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

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

	Overload protection		
Braking resistor type	**Design specified**	**Internal temperature switch (..T), (..P)**	**External bimetallic relay (F16)**
BW...	-	-	Required
BW...-...-T / P	-	One of the 2 options must be selected (internal temperature switch / external bimetallic relay).	
BW...-003 / BW...-005	Adequate	-	Permitted
BW090-P52B	Adequate	-	-

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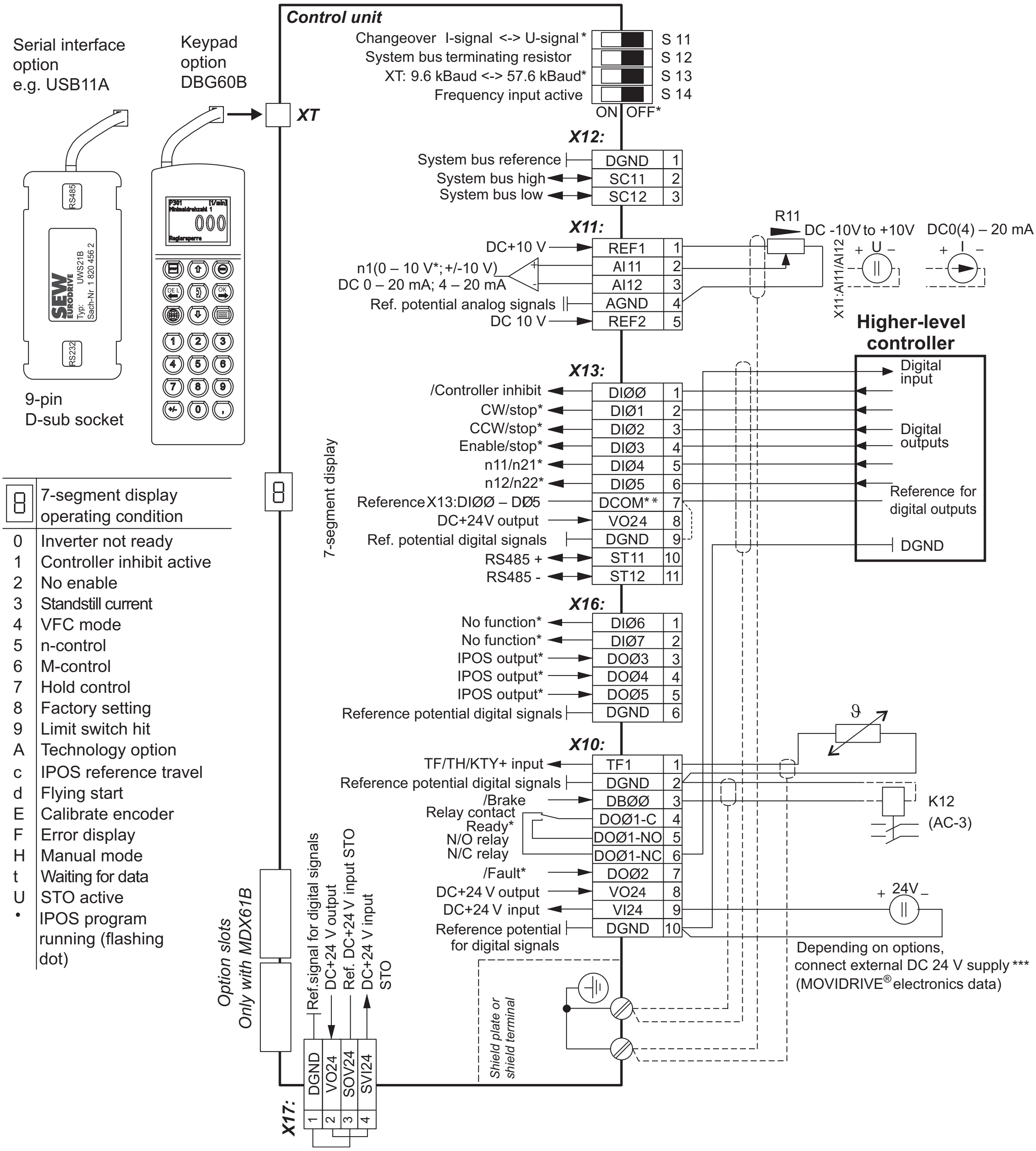
13.7.5 MDX60B/61B signal terminals



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* Factory setting

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

DGND (X10, X12, X13, X16, X17) is connected with PE as standard (tapped hole, see chapter "Device structure"). You can establish electrical isolation by removing the M4 × 14 grounding screw. When using a DCS21B/22B/S31B/32B and DEU21B option card, electrical isolation is not possible.

*** External voltage supply via X:10 only for sizes 0 – 6. For size 7, the 24 V backup voltage is realized via the DC power supply.

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

Terminal		Function	
X1:1/2/3	L1/L2/L3 (PE)	Line connection	
X2:4/5/6	U/V/W (PE)	Motor connection	
X3:8/9	+R/-R (PE)	Braking resistor connection	
X4:	$+U_Z/-U_Z$ (PE)	DC link connection	
9,10,11,12	**L1/L2/L3/PE**	Connection of switched-mode power supply (only for size 7)	
S11:		Changeover I signal DC(0(4) – 20 mA) ↔ U signal DC(-10 V – 0 – 10 V, 0 – 10 V), factory set to U signal.	
S12:		Switching system bus terminating resistor on/off; factory setting: OFF.	
S13:		Set baud rate for the RS485 interface XT. Either 9.6 or 57.6 baud, factory set to 57.6 baud.	
S14:		Switch frequency input on or off, factory setting: switched off.	
X12:1	DGND	Reference potential system bus	
X12:2	SC11	System bus high	
X12:3	SC12	System bus low	
X11:1	REF1	DC+10 V (max. DC 3 mA) for setpoint potentiometer	
X11:2/3	AI11/12	Setpoint input n1 (differential input or input with AGND reference potential), signal form → P11_/ S11	
X11:4	AGND	Reference potential for analog signals (REF1, REF2, AI.., AO..)	
X11:5	REF2	DC–10 V (max. DC 3 mA) for setpoint potentiometer	
X13:1	DIØØ	Digital , with fixed assignment "/Controller inhibit"	• The digital inputs are electrically isolated by opto-couplers. • Selection options for digital inputs 2 – 6 (DIØ1 – DIØ5) → Parameter menu P60_
X13:2	DIØ1	Digital input 2, factory set to "CW/stop"	
X13:3	DIØ2	Digital input 3, factory set to "CCW/stop"	
X13:4	DIØ3	Digital input 4, factory set to "Enable/stop"	
X13:5	DIØ4	Digital input 5, factory set to "n11/n21"	
X13:6	DIØ5	Digital input 6, factory set to "n12/n22"	
X13:7	DCOM	Reference for digital inputs X13:1 – X13:6 (DIØØ – DIØ5) and X16:1/X16:2 (DIØ6 – DIØ7) • Switching digital 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 digital inputs – With jumper X13:7-X13:9 (DCOM-DGND) → Non-isolated digital inputs • The digital 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	VO24	Auxiliary voltage output DC+24 V (max. load X13:8 **and** X10:8 = 400 mA) for external command switches	
X13:9	DGND	Reference potential for binary signals	
X13:10	ST11	RS485+ (baud rate has a fixed setting of 9.6 kBaud)	
X13:11	ST12	RS485-	
X16:1	DIØ6	Digital input 7, factory set to "No function"	• The digital inputs are electrically isolated by opto-couplers. • Selection options for digital inputs 7 to 8 (DIØ6/ DIØ7) → Parameter menu P60_ • Selection options for digital outputs 3 to 5 (DOØ3 – DOØ5) → Parameter menu P62_
X16:2	DIØ7	Digital input 8, factory set to "No function"	
X16:3	DOØ3	Digital output 3, factory set to "IPOS output"	
X16:4	DOØ4	Digital output 4, factory set to "IPOS output"	
X16:5	DOØ5	Digital output 5, factory set to "IPOS output" **Do not connect external voltage to digital outputs X16:3 (DOØ3) and X16:5 (DOØ5)!**	
X16:6	DGND	Reference potential for binary signals	
X10:1	TF1	KTY+/TF-/TH connection (connect to X10:2 via TF/TH), factory set to "No response" (→ P835)	
X10:2	DGND	Reference potential for binary signals / KTY–	
X10:3	DBØØ	Digital output DBØØ with fixed assignment "/Brake", load capacity max DC 150 mA (short-circuit proof, protected against external voltage to DC 30 V)	
X10:4	DOØ1-C	Shared contact digital output 1, factory set to "Ready"	
X10:5	DOØ1-NO	Normally open contact digital output 1, max. load capacity of relay contacts DC 30 V and DC 0.8 A	
X10:6	DOØ1-NC	NC contact digital output 1	
X10:7	DOØ2	Digital output DBØ2, factory set to "/Fault", max. load capacity DC 50 mA (short-circuit proof, protected against external voltage to DC 30 V). Selection options for digital outputs 1 and 2 (DOØ1 and DOØ2) → Parameter menu P62_. Do not apply external voltage to digital outputs X10:3 (DBØØ) and X10:7 (DOØ2).	
X10:8	VO24	Auxiliary voltage output DC+24 V (max. additional load X13:8 **and** X10:8 = 400 mA) for external command switches	

Terminal		Function
X10:9	VI24	Input DC+24 V voltage supply (backup voltage depending on options, unit diagnosis when supply system off)
X10:10	DGND	Reference potential for binary signals **Information on X:10.9: Only connect external backup voltage DC +24 V to sizes 0 – 6. With size 7, the DC power supply unit must be connected to the supply system. Refer to chapter** "Power section and DC power supply unit (size 7)" (→ 601)**.**
X17:1	DGND	Reference potential for X17:2
X17:2	VO24	Auxiliary voltage output DC+24 V, **only to supply X17:4 on the same device. Maximally 1 additional BST may be connected**
X17:3	SOV24	Reference potential for DC +24 V "STO" input (safety contact)
X17:4	SVI24	DC+24 V "STO" input (safety contact)
XT		Only service interface. Option slot: DBG60B / UWS21B / USB11A

13.8 Assignment of braking resistors, chokes and filters

13.8.1 AC 400/500 V devices, size 0

MOVIDRIVE® MDX60/61B...-5A3				**0005**	**0008**	**0011**	**0014**
Size				**0**			
Braking resistors BW... / BW..-..-T	Tripping current	Part number BW...	Part number BW...-...-T				
BW090-P52B[1]	-	08245630					
BW072-003	I_F = 0.8 A	08260583					
BW072-005	I_F = 1.2 A	08260605					
BW168/BW168-T	I_F = 3.6 A	0820604X	18201334				
BW100-006 BW100-006-T	I_F = 2.4 A	08217017	18204198				
Line chokes		Part number					
ND020-013	Total current = AC 20 A	08260125					
Line filter		Part number					
NF009-503		08274126					
Output chokes	Inner diameter	Part number					
HD001	d = 50 mm	08133255		For cable cross sections 1.5 – 16 mm² (AWG 16 – 6)			
HD002	d = 23 mm	08135576		For cable cross sections ≤ 1.5 mm² (AWG 16)			
Output filter (only in operating modes VFC or V/f)		Part number					
HF008-503		0826029X			A		
HF015-503		08260303			B		A
HF022-503		08260311					B

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

A **In nominal operation (100%)**

B **With variable torque load (125%)**

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13.8.2 AC 400/500 V devices, sizes 1, 2S, and 2

MOVIDRIVE® MDX61B...-5A3				0015	0022	0030	0040	0055	0075	0110
Size				1				2S		2
Braking resistors BW... / BW..-..-T	Tripping current	Part number BW...	Part number BW...-...-T							
BW100-005	I_F = 1.0 A	08262691								
BW100-006/ **BW100-006-T**	I_F = 2.4 A	08217017	18204198							
BW168/BW168-T	I_F = 3.6 A	0820604X	18201334							
BW268/BW268-T	I_F = 4.2 A	08207151	18204171							
BW147/BW147-T	I_F = 5.1 A	08207135	18201342							
BW247/BW247-T	I_F = 6.5 A	08207143	18200842							
BW347/BW347-T	I_F = 9.2 A	08207984	18201350							
BW039-012/ **BW039-012-T**	I_F = 5.5 A	08216894	18201369							
BW039-026-T	I_F = 8.2 A		18204155							
BW039-050-T	I_F = 11.3 A		18201377							
Line chokes		Part number								
ND020-013	Total current = AC 20 A	08260125								
ND045-013	Total current = AC 45 A	08260133								
Line filter		Part number								
NF009-503		08274126					A			
NF014-503		0827116X					B		A	
NF018-503		08274134							B	
NF035-503		08271283								
Output chokes	Inner diameter	Part number								
HD001	d = 50 mm	08133255		For cable cross sections 1.5 – 16 mm² (AWG 16 – 26)						
HD002	d = 23 mm	08135576		For cable cross sections ≤ 1.5 mm² (AWG 16)						
HD003	d = 88 mm	08135584		For cable cross sections > 16 mm² (AWG 6)						
Output filter (only in operating modes VFC or V/f)		Part number								
HF015-503		08260303		A						
HF022-503		08260311		B	A					
HF030-503		0826032X			B	A				
HF040-503		08263116				B	A			
HF055-503		08263124					B	A		
HF075-503		08263132						B	A	
HF023-403		08257841							B	A
HF033-403		0825785X								B

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

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13.8.3 AC 400/500 V devices, sizes 3 and 4

MOVIDRIVE® MDX61B...-503					**0150**	**0220**	**0300**	**0370**	**0450**
Size						**3**		**4**	
Braking resistors BW... / BW...-...-T BW...-...-P	Tripping current	Part number BW...	Part number BW...-...-T	Part number BW...-...-P					
BW018-015/ BW018-015-P	I_F = 9.1 A	08216843		18204163				**C**	**C**
BW018-035-T	I_F = 13.9 A		18201385					**C**	**C**
BW018-075-T	I_F = 20.4 A		18201393					**C**	**C**
BW915-T	I_F = 32.7 A		18204139						
BW012-025/ BW012-025-P	I_F = 14.4A	08216800		18204147					
BW012-050-T	I_F = 20.4 A		18201407						
BW012-100-T	I_F = 28.9 A		18201415						
BW106-T	I_F = 47.4 A		18200834						
BW206-T	I_F = 54.8 A		18204120						
Line chokes		Part number							
ND045-013	Total current = AC 45 A	08260133				**A**			
ND085-013	Total current = AC 85 A	08260141				**B**			**A**
ND150-013	Total current = AC 150 A	08255482							**B**
ND300-0053	Total current = AC 300 A	08277214							
Line filter		Part number							
NF035-503		08271283			**A**				
NF048-503		08271178			**B**	**A**			
NF063-503		08274142				**B**	**A**		
NF085-503		08274150					**B**		**A**
NF115-503		08274169							**B**
Output chokes	Inner diameter	Part number							
HD001	d = 50 mm	08133255	For cable cross sections 1.5 – 16 mm² (AWG 16 – 6)						
HD003	d = 88 mm	08135584	For cable cross sections > 16 mm² (AWG 6)						
Output filter (only in operating modes VFC or V/f)		Part number							
HF033-403		0825785X			**A**	**B / H**	**A / H**		
HF047-403		08257868			**B**	**A**			
HF450-503		08269483					**B**		**A/H**

A In nominal operation (100%)

B With variable torque load (125%)

C Connect two braking resistors in parallel and set twice the tripping current on F16 (2 × I_F)

D Connect three braking resistors in parallel and set three times the tripping current on F16 (3 × I_F)

E Connect four braking resistors in parallel and set four times the tripping current on F16 (4 × I_F)

H Two filter in parallel

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13.8.4 AC 400/500 V devices, sizes 5 – 7

MOVIDRIVE® MDX61B...-503			**0550**	**0750**	**0900**	**1100**	**1320**	**1600**	**2000**	**2500**
Size			**5**		**6**			**7**		
Braking resistors BW...-...-T	Tripping current	Part number BW...-...-T								
BW106-T	I_F = 47.4 A	18200834			**C**	**C**	**C**	D	E	F
BW206-T	I_F = 54.8 A	18204120			**C**	**C**	**C**	D	E	F
BW1.4-170	I_F = 110 A	13301527								
BW003-420-T	I_F = 129 A	13302345						C	C	C
Line filter		Part number								
NF115-503		08274169	**A**							
NF150-503		08274177	**B**	**A**						
NF210-503		08274185		**B**		**A**				
NF300-503		08274193				**B**				
NF600-503		17963389						B	**B**	B
Output chokes	Inner diameter	Part number								
HD001	d = 50 mm	08133255	For cable cross sections 1.5 – 16 mm² (AWG 16 – 6)							
HD003	d = 88 mm	08135584	For cable cross sections > 16 mm² (AWG 6)							
HD004	Connection with M12 bolt	08168857								
HD005	Connection With M12 cable lug, M10 PE connection	17963362						B	**B**	B
Output filter (only in V/f and VFC operating mode)		Part number								
HF450-503		08269483	**H**	**H**						
HF180-403		08299099								
HF325-403		08299483								

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

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13.8.5 AC 230 V devices, sizes 1 – 4

MOVIDRIVE® MDX61B...-2_3				**0015**	**0022**	**0037**	**0055**	**0075**	**0110**	**0150**	**0220**	**0300**
Size				**1**			**2**		**3**		**4**	
Braking resistors BW...-.../ BW...-...-T BW...-...-P	Tripping current	Part number BW...	Part number BW...-...-T									
BW039-003	I_F = 2.7 A	08216878										
BW039-006	I_F = 3.9 A	08216886										
BW039-012 BW039-012-T	I_F = 5.5 A	08216894	18201369									
BW039-026-T	I_F = 8.1 A		18204155									
BW027-006	I_F = 4.7 A	08224226										
BW027-012	I_F = 6.6 A	08224234										
BW018-015-T	I_F = 9.1 A		18204163						C	C	C	C
BW018-035-T	I_F = 13.9 A		18201385						C	C	C	C
BW018-075-T	I_F = 20.4 A		18201393						C	C	C	C
BW915-T	I_F = 32.6 A		18204139						C	C	C	C
BW012-025-P	I_F = 14.4 A		18204147									
BW012-050-T	I_F = 20.4 A		18201407									
BW012-100-T	I_F = 28.8 A		18201415									
BW106-T	I_F = 47.4 A		18200834								C	C
BW206-T	I_F = 54.7 A		18204120								C	C
Line chokes		Part number										
ND020-013	Total current = AC 20 A	08260125					A					
ND045-013	Total current = AC 45 A	08260133					B		A			
ND085-013	Total current = AC 85 A	0826014							B		A	
ND150-013	Total current = AC 150 A	08255482									B	
Line filter		Part number										
NF009-503		08274126			A							
NF014-503		0827116X			B	A						
NF018-503		08274134				B						
NF035-503		08271283										
NF048-503		08271178							A			
NF063-503		08274142							B			
NF085-503		08274150									A	
NF115-503		08274169									B	
Output chokes	Inner diameter	Part number										
HD001	d = 50 mm	08133255		For cable cross sections 1.5 – 16 mm² (AWG 16 – 6)								
HD002	d = 23 mm	08135576		For cable cross sections ≤ 1.5 mm² (AWG 16)								
HD003	d = 88 mm	08135584		For cable cross sections > 16 mm² (AWG 6)								

A In nominal operation (100%)

B With variable torque load (125%)

C Connect two braking resistors in parallel and set twice the tripping current on F16 (2 × I_F)

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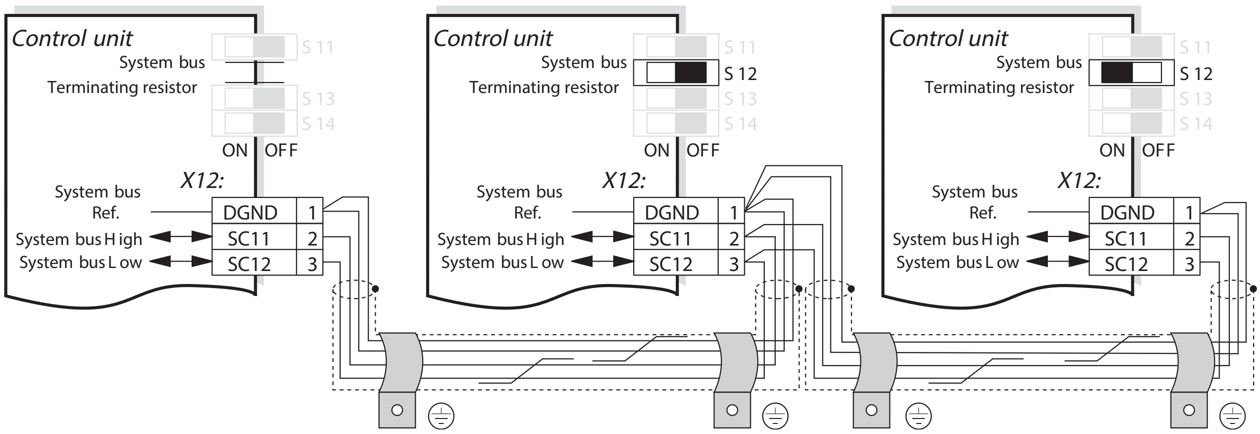
13.9 Connecting the system bus (SBus 1)

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

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

13.9.1 SBus wiring diagram



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Cable specification

- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  - Cable cross section 0.25 – 0.75 mm^2 (AWG 23 – AWG 19)
  - Line resistance 120 Ω at 1 MHz
  - Capacitance per unit length ≤ 40 pF/m at 1 kHz

Suitable cables include CAN bus or DeviceNet™ cables.

Connecting the shield

- Connect the shield to the electronics shield clamp on the inverter or the 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 → 500 m
  – 250 kBaud → 250 m
  – **500 kBaud → 100 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).

NOTICE

There must not be any potential shift between the devices which are connected together using the SBus. This can restrict the functionality of the device.

Take suitable measures to avoid potential shift, e.g. by connecting the unit ground connectors using a separate cable.

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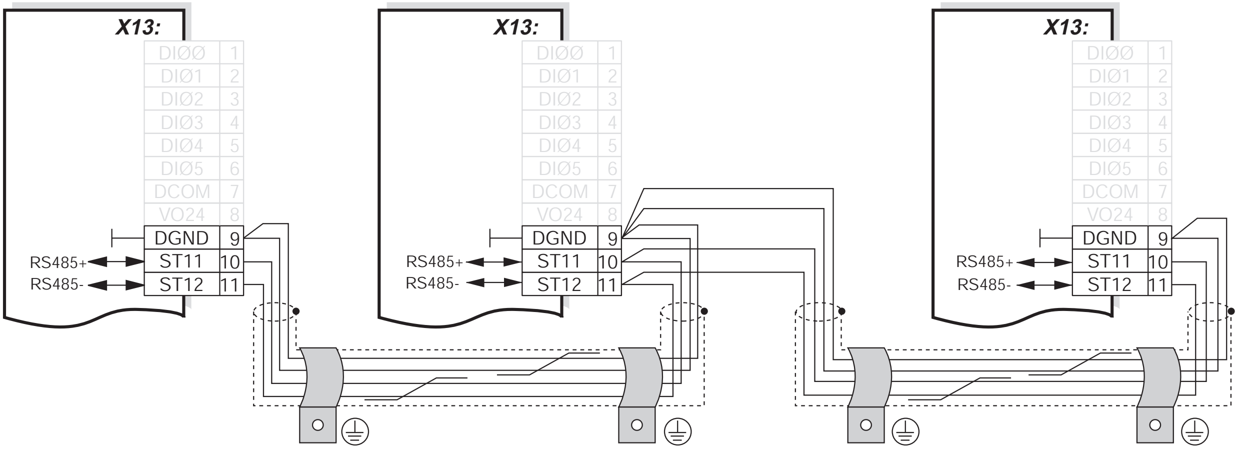
13.10 Connecting the RS485 interface

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

13.10.1 Wiring diagram of the RS485 interface (X13)



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Cable specification

- Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:
  – Cable cross section 0.5 mm² – 0.75 mm² (AWG 23 – AWG 19)
  – Line resistance 100 – 150 Ω at 1 MHz
  – Capacitance per unit length ≤ 40 pF/m at 1 kHz

Shield contact

- 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.**

NOTICE

There must not be any difference of potential between the devices which are connected together using the RS485. This can restrict the functionality of the device.

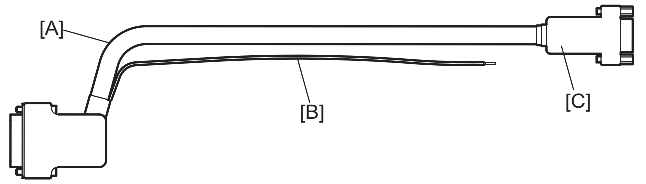
Take suitable measures to avoid potential shift, e.g. by connecting the device ground connectors using a separate cable.

13.11 Connecting the DWE11B/12B interface adapter

13.11.1 Part number and description

- DWE11B, part number 01881876

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



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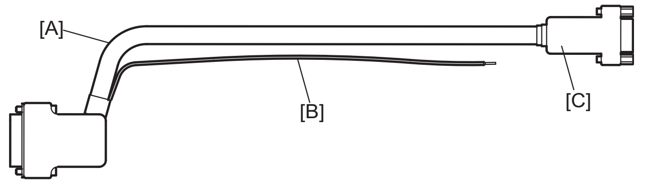
- DWE12B, part number 01881809

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



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13.12 Connecting the UWS21B interface adapter (RS232 ↔ RS485)

13.12.1 Part number

Interface adapter option UWS21B: 18204562

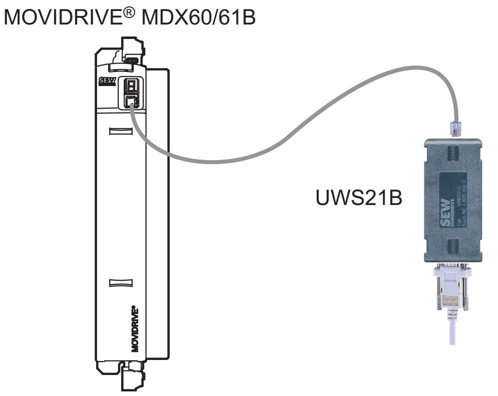
13.12.2 Scope of Delivery

The scope of delivery for the UWS21B option includes:

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

13.12.3 MOVIDRIVE® – UWS21B connection

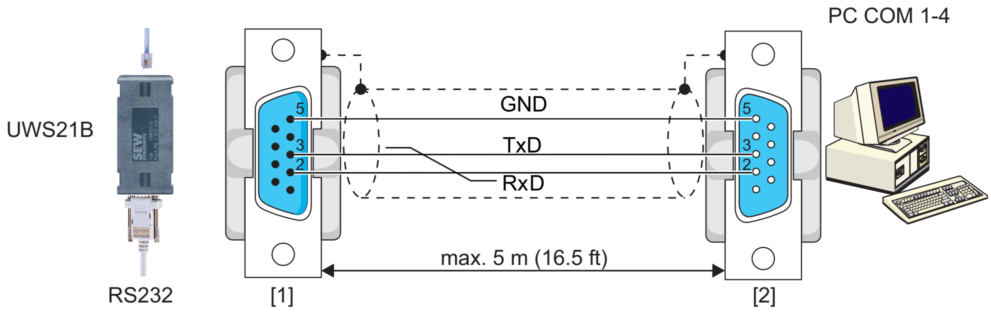
- Use the connection cable included in the delivery to connect the UWS21B option to MOVIDRIVE®.
- Plug the connection cable into the XT terminal socket of MOVIDRIVE®.
- Note that the DBG60B keypad and the UWS21B serial interface cannot be connected to the MOVIDRIVE® at the same time.
- The following figure shows the connection cable between MOVIDRIVE® and UWS21B.



1805915915

13.12.4 Connecting UWS21B to PC

- Use the connection cable supplied (shielded RS232 standard interface cable) to connect the UWS21B option to the PC.
- The following figure shows the connection cable between UWS21B and PC (1:1 connection).



1805918987

[1] 9-pin D-sub connector

[2] 9-pin D-sub socket

13.13 Connecting the USB11A interface adapter

13.13.1 Part number

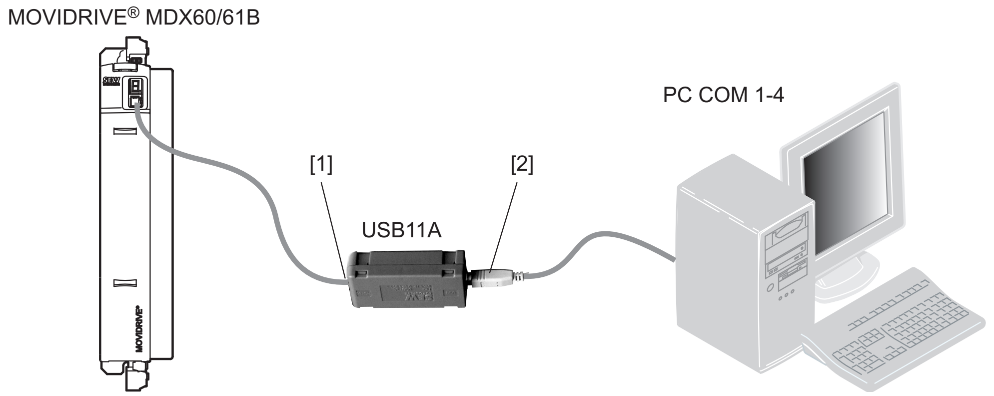
Interface adapter option USB11A: 08248311

13.13.2 Scope of Delivery

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

13.13.3 Connecting MOVIDRIVE®-USB11A – PC

- Use the connection cable [1] (RJ10 – RJ10) supplied to connect the USB11A option to MOVIDRIVE®.
- 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 supplied USB connection cable [2] (type USB A-B) to connect the USB11A to the PC.
- The following figure shows the connection cable between MOVIDRIVE MDX60B/61B and USB11A.



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13.13.4 Installation

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

13.13.5 Operation with MOVITOOLS® MotionStudio

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

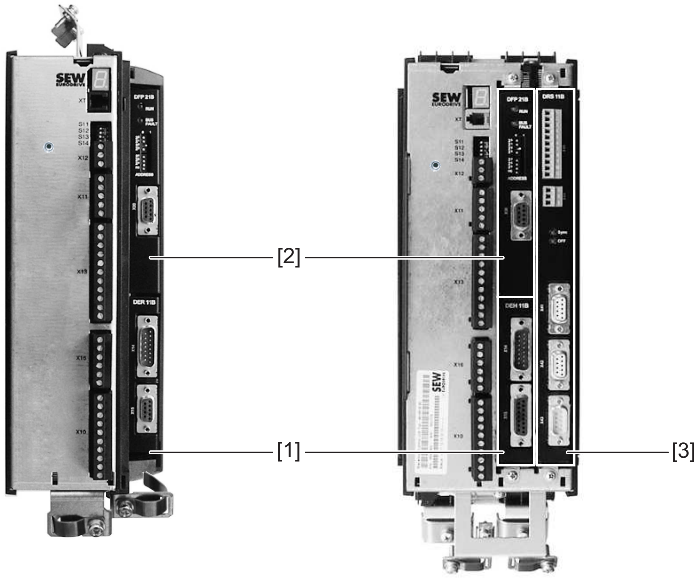
INFORMATION

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

13.14 Option combinations for MDX61B

13.14.1 Configuration of option slots

Size 0 (0005 – 0014) Size 1 – 6 (0015 – 1320)



1806023691

[1] Encoder slot for encoder options

[2] Fieldbus option slot for communication options

[3] Expansion slot for communication options (only sizes 1 – 6)

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13.14.2 Option card combinations for MDX61B

The option cards are different sizes and can only be installed in the matching option slots. Fieldbus interfaces including DHx cannot be combined with one another. The following list shows the possible combinations of option cards for MOVIDRIVE® MDX61B.

Option card	Designation	MOVIDRIVE® MDX61B		
		Encoder slot Size 0 – size 7	Fieldbus slot Size 0 – size 7	Expansion slot Size 1 – size 7
DEH11B	Encoder input incr. / HIPERFACE®	X		
DEH21B[1)]	Encoder input absolute encoder	X		
DEU21B[2)]	Encoder input absolute encoder	X		
DER11B	Encoder input resolver / HIPERFACE®	X		
DFP21B	PROFIBUS fieldbus interface		X	
DFI11B	Interbus fieldbus interface		X	
DFI21B	Interbus FOC fieldbus interface		X	
DFD11B	DeviceNet™ fieldbus interface		X	
DFC11B	CAN/CANopen fieldbus interface		X	
DFE11B DFE12B DFE13B	Ethernet fieldbus interface		X	
DFE32B	PROFINET IO fieldbus interface		X	
DFE33B	EtherNet/IP™ fieldbus interface		X	
DFE24B	EtherCAT® fieldbus interface		X	
DFS11B	PROFIBUS fieldbus interface with PROFIsafe (STO)		X	
DFS12B	PROFIBUS fieldbus interface with PROFIsafe		X	
DFS21B	PROFINET IO fieldbus interface with PROFIsafe (STO)		X	
DCS21B/ 22B/ 31B/ 32B	Safety monitor			X
DIO11B	I/O expansion		X	X[3)]
DRS11B[2)]	Phase-synchronous operation			X
DIP11B[1)]	SSI encoder interface			
DHP11B	User-programmable MOVI-PLC® *basic* controller		X	X[3)]
DHE41B	User-programmable MOVI-PLC® *advanced* controller		X	X[3)]
DHF41B	User-programmable MOVI-PLC® *advanced* controller			X

Option card	Designation	MOVIDRIVE® MDX61B		
		Encoder slot Size 0 – size 7	Fieldbus slot Size 0 – size 7	Expansion slot Size 1 – size 7
DHR41B	User-programmable MOVI-PLC® *advanced* controller			X
DHP11B + OST11B	DHP11B + OST11B (RS485 interface, only in combination with DHP11B)	OST11B	DHP11B	DHP11B + OST11B[4)]

1) The option cards DEH21B and DIP11B cannot be combined.
2) The option cards DEU21B and DRS11B cannot be combined.
3) When fieldbus option slot is not available
4) When encoder slot is not available

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13.15 Installing and removing option cards

INFORMATION

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

13.15.1 Before you start

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

NOTICE

Electrostatic discharge.

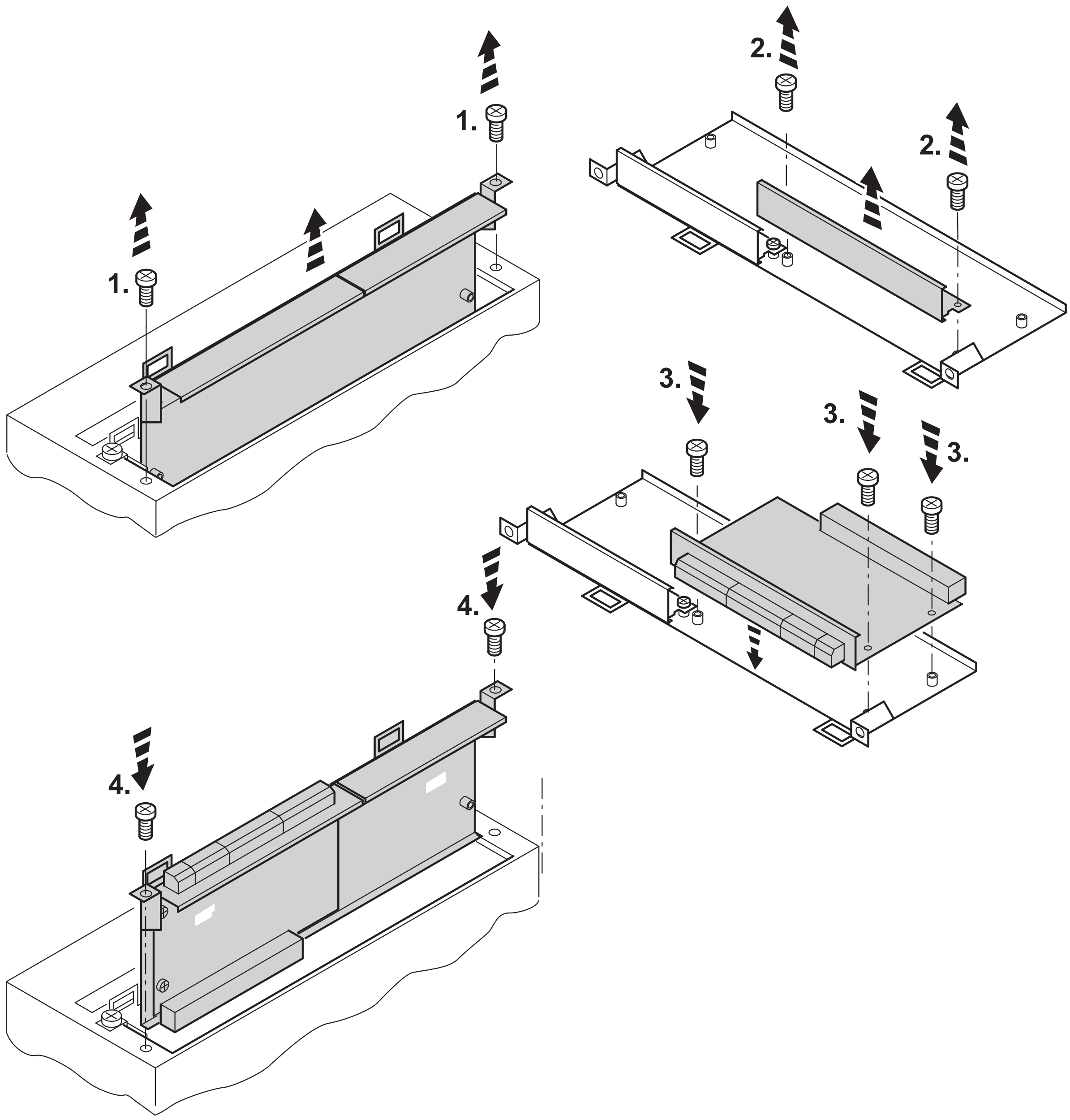
Damage to electronic components.

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

13.15.2 Basic procedure for installing/removing an option card

The following figure shows the installation of an option card in MOVIDRIVE® MDX61B sizes 1 – 7.



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

13.16 Connecting encoders and resolvers

INFORMATION

Folgen

- The following wiring diagrams do not show the view onto the cable end but the view onto the connection to motor or MOVIDRIVE®.
- The core colors specified in the wiring diagrams are in accordance with IEC 757 and correspond to the core colors used in the prefabricated cables from SEW-EURODRIVE.

13.16.1 General installation notes

- The D-sub connectors shown in the wiring diagrams have a 4/40 UNC thread.
- Max. line length inverter – encoder/resolver:
  - 50 m at 70 nF < capacitance per unit length ≤ 120 nF/km
  - 100 m at capacitance per unit length ≤ 70 nF/km with DER11B, DEH11B, DEH21B, 300 m with DEU21B
- Cable cross section: 0.20 – 0.5 mm^2 (AWG 24 – 20)
- If you cut a core of the encoder/resolver cable, insulate the cut-off end of the core.
- Use shielded cables with twisted pair conductors and make sure they are grounded on both ends over a large surface area:
  - At the encoder in the cable gland or in the encoder plug
  - At the inverter in the housing of the D-sub connector
- Route the encoder/resolver cables separately from the power cables.

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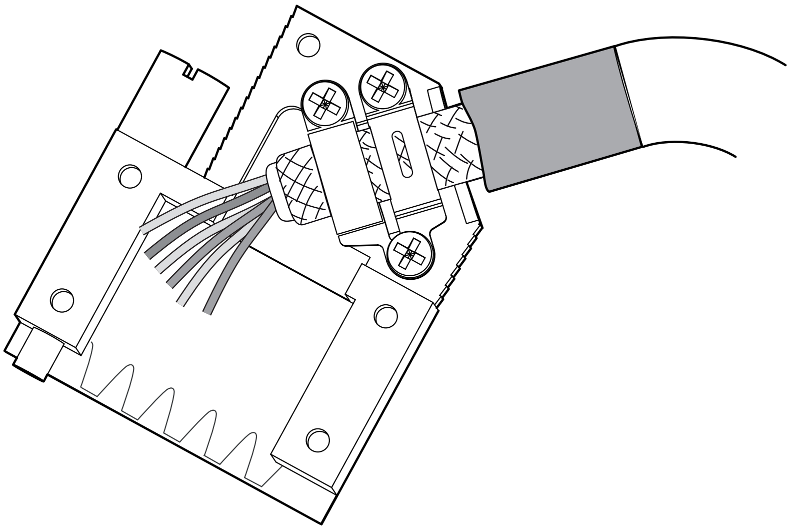
13.16.2 Shield contact

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

On the inverter

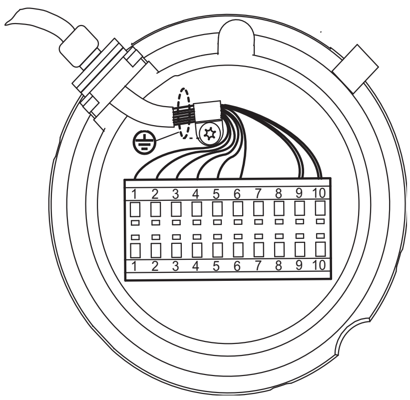
Connect the shield on the inverter end in the housing of the D-sub connector (→ following figure).



2286956939

On the encoder/resolver

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



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13.16.3 Prefabricated cables

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

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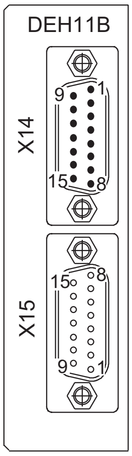
13.17 Connection and terminal description of the DEH11B option (HIPERFACE®)

13.17.1 Part number

Option HIPERFACE® encoder card type DEH11B: 08243107

INFORMATION

- The DEH11B option can be installed in MOVIDRIVE® MDX61B sizes 0 – 7. Only SEW-EURODRIVE may install or remove the DEH11B option for MOVIDRIVE® MDX61B size 0.
- The DEH11B option must be plugged into the encoder slot.

Front view of DE-H11B	Description	Terminal	Function
	X14: Input for external encoder or output for incremental encoder simulation Number of pulses of the incremental encoder simulation: • As 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 Switch between Reference potential DGND (COS–) Signal track **A** (**K1**) (SIN–) Signal track **B** (**K2**) Signal track **C** (**K0**) DATA- Reserved DC+12 V (tolerance range DC 10.5 – 13 V) (max. load 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–/PK Reserved Reference potential DGND (COS–) Signal track **A** (**K1**) (SIN–) Signal track **B** (**K2**) Signal track **C** (**K0**) DATA- Reserved TF/TH/KTY+/PK connection DC+12 V (tolerance range DC 10.5 – 13 V) (max. load X14:15 **and** X15:15 = DC 650 mA)

INFORMATION

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

NOTICE

Do not directly connect HTL encoders to X15 of option DEH11B.

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

- Use the DWE11/12 interface adapter

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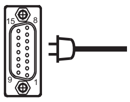
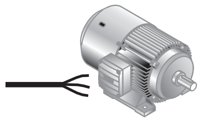
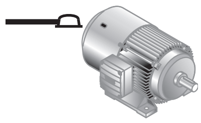
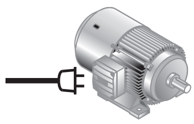
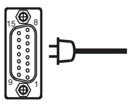
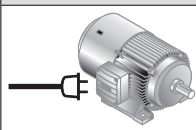
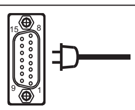
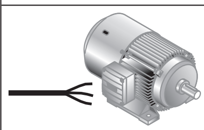
13.17.2 Permissible encoders at X:14

Refer to chapter "Connecting external encoders to X:14" (→ 🗎 634).

13.17.3 Permissible encoders at X:15

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

Encoder on DR.. series AC motors – MOVIDRIVE®				
Motor type	Encoder	MOVIDRIVE® drive inverters	Motor	Cable
DR71 – DR132	ES7S ES7R AS7W	X15 		 13622021 13622048
DR160 – DR225	EG7S EG7R AG7W			
DR71 – DR132	ES7S ES7R AS7W			 13617621 13617648
DR160 – DR225	EG7S EG7R AG7W			
DR315	EH7S			 13602659 13623206

Encoders on DT../DV.. and CM.. series motors – MOVIDRIVE®				
Motor type	Encoder	MOVIDRIVE® drive inverters	Motor	Cable
CM71 – 112 CMP	AS1H ES1H AK0H EK0H AV1H AF1H EG7C			 13324535 13324551
CM71 – 112	AS1H ES1H AV1H AF1H EG7C			 13324578 13324543

13.18 Connection and terminal description of the DEH21B option

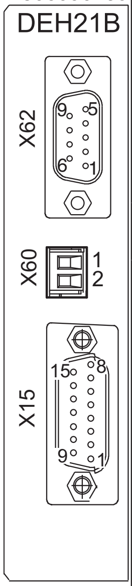
13.18.1 Part number

Encoder card option DEH21B: 18208185

INFORMATION

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

13

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

INFORMATION

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

NOTICE

Do not directly connect HTL encoders to X15 of option DEH21B.

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

- Use the DEW11/12 interface adapter

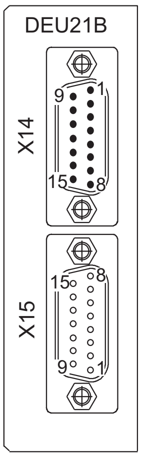
13.19 Connection and terminal description of the DEU21B option

13.19.1 Part number

Multi-encoder card option type DEU21B: 01822696

INFORMATION

- For detailed information on the DEU21B option, refer to the "MOVIDRIVE® MDX61B multi-encoder card DEU21B" manual.
- The DEU21B option can be installed in MOVIDRIVE® MDX61B sizes 0 – 7. Only SEW-EURODRIVE staff may install or remove the DEU21B option for MOVIDRIVE® MDX61B size 0.
- The DEU21B option card must be plugged into the encoder slot.

Front view of DEU21B	Description	Terminal	Function
	X14: Input for external encoder or output for incremental encoder simulation Output for incremental encoder simulation: • Signal level to RS422 • The number of pulses is the same as on X15 motor encoder input	X14:1 X14:2 X14:3 X14:4 X14:5/6 X14:7 X14:8 X14:9 X14:10 X14:11 X14:12 X14:13 X14:14 X14:15	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) / pulse + DATA+ CANHigh Reserved Switch between Reference potential DGND (COS–) Signal track **A** (**K1**) (SIN–) Signal track **B** (**K2**) Signal track **C** (**K0**) / pulse – DATA- CANLow DC 24 V encoder supply[1)] Reserved DC 12 V encoder supply[2)]
	X15: Motor encoder input	X15:1 X15:2 X15:3 X15:4 X15:5 X15:6 X15:7 X15:8 X15:9 X15:10 X15:11 X15:12 X15:13 X15:14 X15:15	(COS+) signal track A (K1) (SIN+) signal track B (K2) Signal track C (K0) / pulse + DATA+ Reserved Reference potential TF/TH/KTY–/PK Reserved Reference potential DGND (COS–) Signal track **A** (**K1**) (SIN–) Signal track **B** (**K2**) Signal track **C** (**K0**) / pulse – DATA- DC 24 V encoder supply[1)] TF/TH/KTY+/PK connection DC 12 V (tolerance range DC 10.5 – 13 V)[2)]

1) If the overall unit load on the 24 V level exceeds 400 mA, you must connect an external DC 24 V supply to X10:9/X10:10. Observe the "Project planning" chapter in the MOVIDRIVE® MDX60B/61B system manual
2) The maximum load on X14:15 and X15:15 is DC 650 mA in total.

NOTICE

The connections on X14 and X15 must not be installed or removed during operation.

Electrical components in the encoder or on the encoder card could be destroyed.

INFORMATION

- If X14 is used as an incremental encoder simulation output, the switchover (X14:7) must be jumpered with DGND (X14:8).
- The 24 V encoders from SEW-EURODRIVE (except HTL and HIPERFACE®) have a wide voltage range (DC 10 V – 30 V) and can be supplied alternatively with DC 24 V (PIN13) or DC 12 V (PIN15).
- If these option cards are used, electrical isolation between DGND and PE is not possible.

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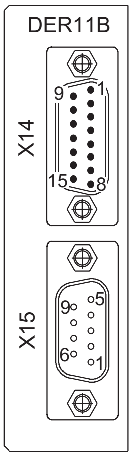
13.20 Connection and terminal description of the DER11B (resolver) option

13.20.1 Part number

Resolver card option type DER11B: 08243077

INFORMATION

- The DEU21B, DER11B option can be installed in MOVIDRIVE® MDX61B sizes 0 – 7. Only SEW-EURODRIVE may install or remove the DEUU21B, DER11B option for MOVIDRIVE® MDX61B size 0.
- The "Resolver card type DER11B" option can only be used with MOVIDRIVE® MDX61B, not with MDX60B.
- The DER11B option must be plugged into the encoder slot.

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

INFORMATION

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

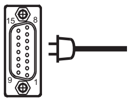
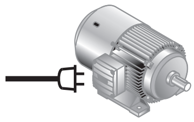
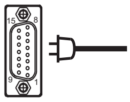
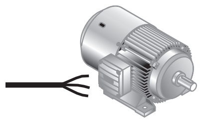
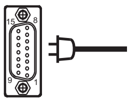
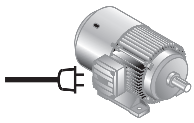
13.20.2 Permissible encoders at X:14

Refer to chapter "Connecting external encoders to X:14" (→ 🗎 634).

13.20.3 Resolver at X:15

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

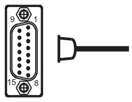
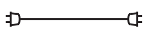
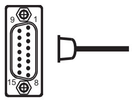
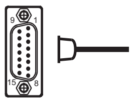
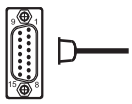
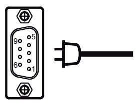
SEW-EURODRIVE offers the following prefabricated cables for connecting resolvers to DER11B:

Encoders on DT../DV.. and CM.. series motors – MOVIDRIVE®				
Motor type	Encoder	MOVIDRIVE® drive inverters	Motor	Cable
CM71 – 112	Resolver			 01994875 01993194
CM71 – 112	Resolver			 01995898 01995901
CMP	Resolver			 01994875 01993194

13.21 Connecting external encoders to X:14

13.21.1 External encoder at DEH11B, DEU21B and DER11B (X:14)

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

External encoder at DEH11B and DER11B - MOVIDRIVE® (X:14)			
Encoder	MOVIDRIVE® drive inverters	Cable	Details
AS1H ES1H AV1H		 08180156 08181659	
AS1H ES1H AV1H		 18106951 18106978	
EH1S ES1S ES2S EV1S ES1R ES2R EV1R EH1R		 08198691 08181683	
ES1T ES2T EV1T EH1T	 DWI11A X2: 	 01988298 0198828X 081816403	

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13.22 Connection of encoder options

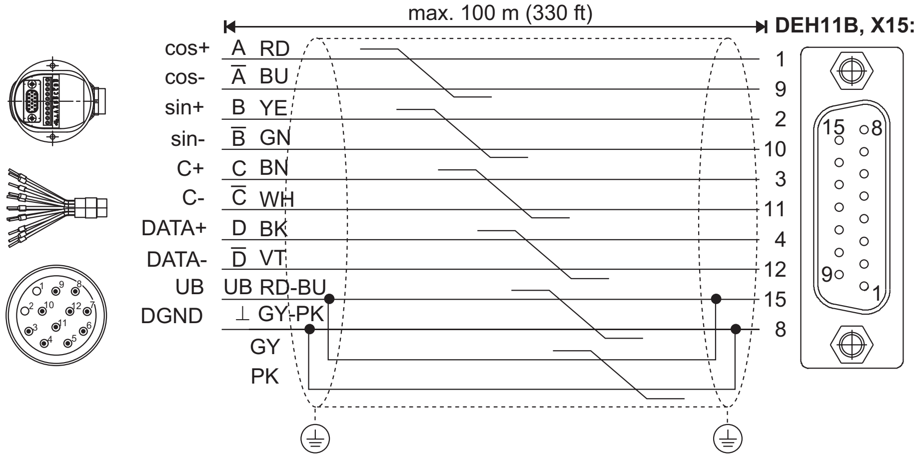
13.22.1 Connection of DEH11B option

Encoder connection at X:15

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

DR71 – 315

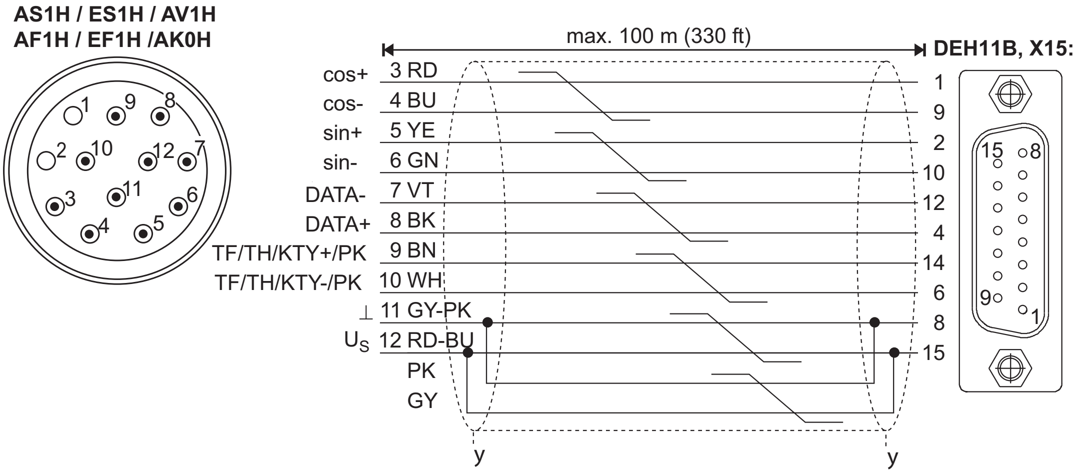
Connect the encoder to the option DEH11B as follows:



18014400817423627

CM71 – 112/CMP with plug connector

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



18014400315547531

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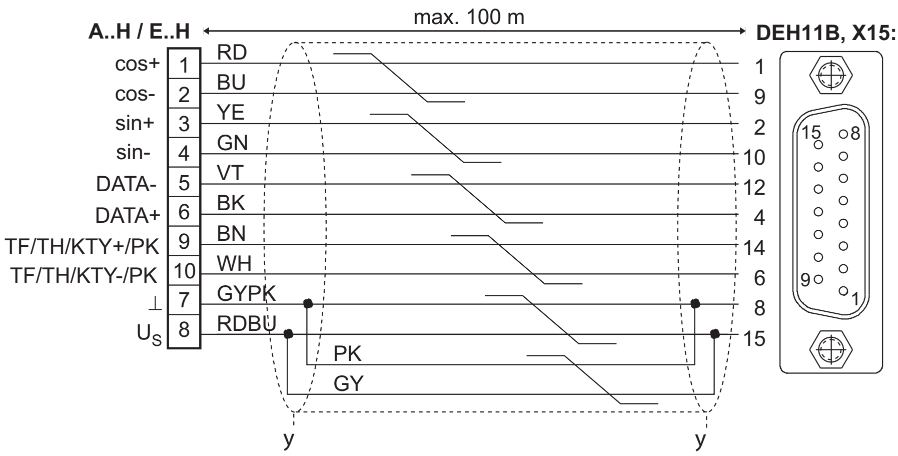
CM71 – 112 with terminal box

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



9007201060812171

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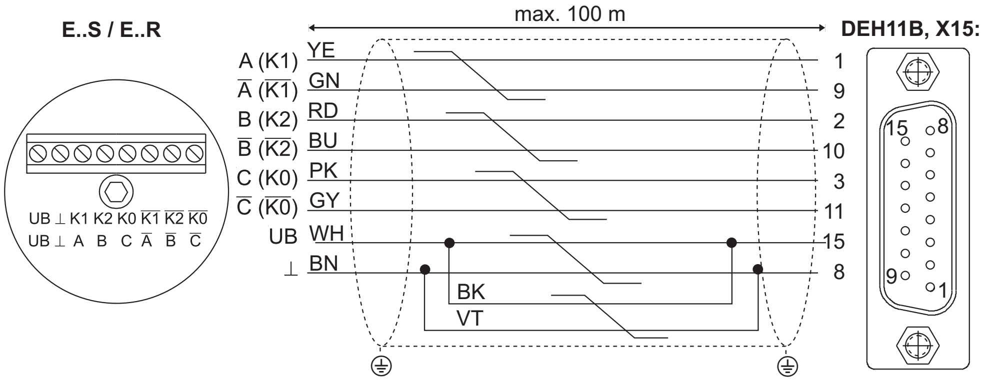
Connection of sin/cos and TTL encoders (DC 24 V)

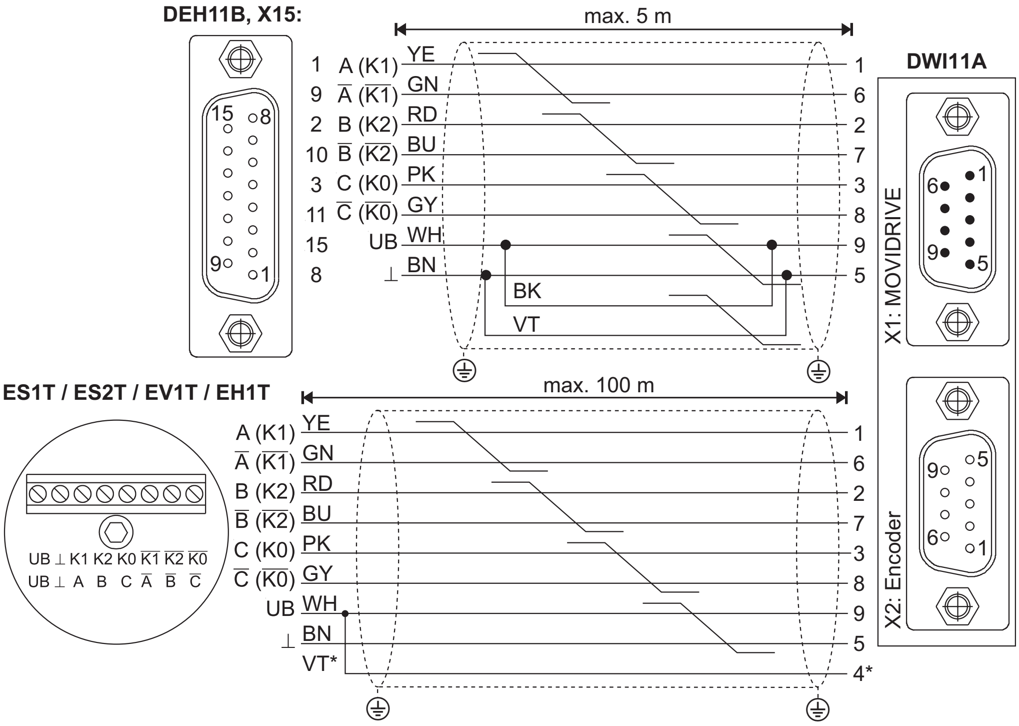
The high resolution sin/cos encoders and TTL encoders with DC 24 V supply can also be connected to DEH11B. Proceed as follows to connect sin/cos encoders and TTL encoders with DC 24 V supply to the DEH11B option:



1806074507

Connection of TTL encoder (DC 5 V)

Connect the TTL encoders with a DC 5 V voltage supply via the "DC 5 V encoder supply type DWI11A" option (part no. 08227594). The sensor cable must also be connected to correct the supply voltage of the encoder. Connect this encoder as follows:



1806077579

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

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

Terminal assignment/pin assignment

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

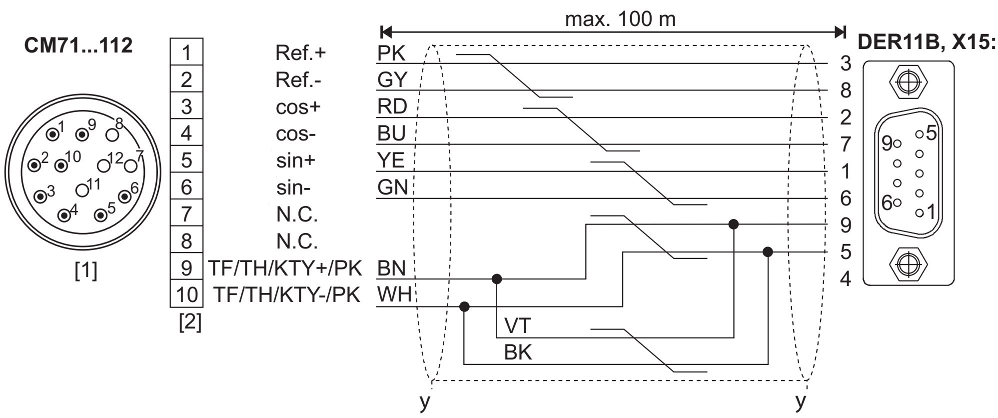
Plug connector CM..: Intercontec, type ASTA021NN00 10 000 5 000

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 +/PK	Motor protection	Brown (BN) / violet (VT)
10	TF/TH/KTY–/PK		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:



9007201060861323

[1] Plug connector

[2] Terminal strip

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13.22.3 Connection of external encoders to the DEH11B and DER11B options

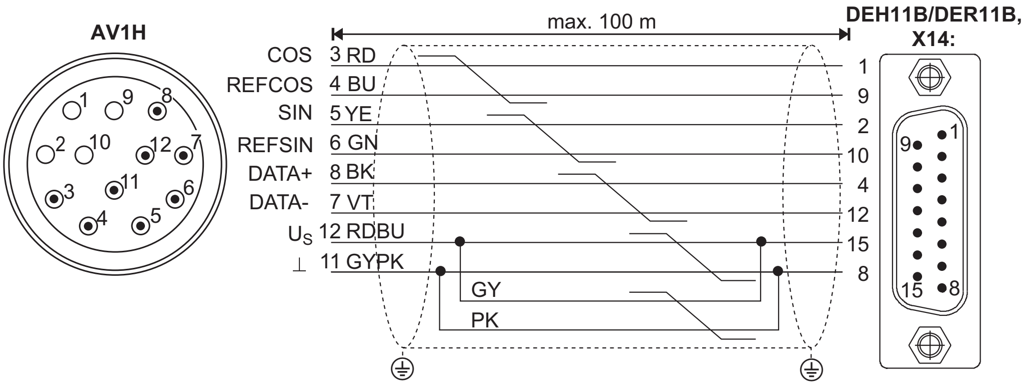
Voltage supply

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

SEW-EURODRIVE encoders with a DC 5 V voltage supply must be connected via the "DC 5 V encoder supply type DWI11A" option (part no. 08227594).

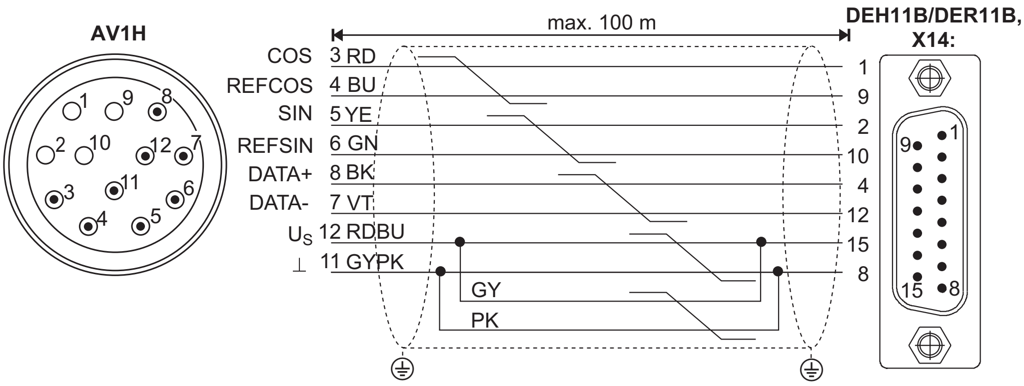
HIPERFACE® encoder connection

Connect the HIPERFACE® encoder AV1H as follows:



1806128523

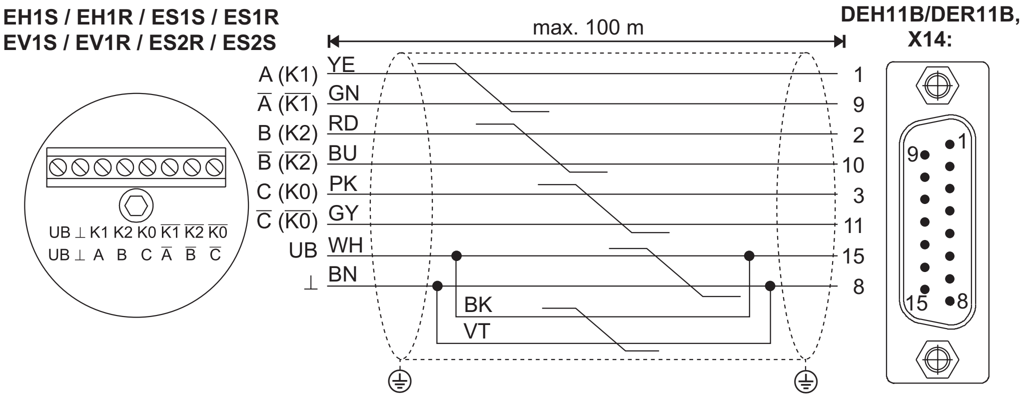
You can still connect HIPERFACE® encoders via a prefabricated cable with conductor end sleeves.



1806128523

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

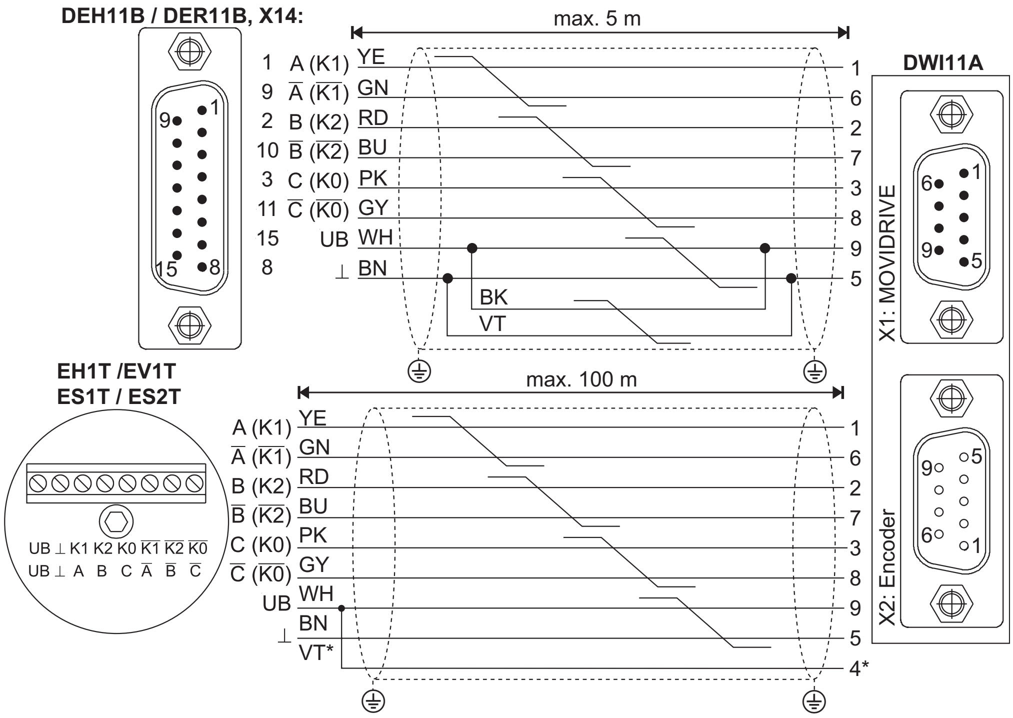
Proceed as follows to connect sin/cos encoders and TTL encoders with DC 24 V supply:



1806336395

Connection of TTL encoder (DC 5 V)

DC 5 V encoders with a DC 5 V voltage supply EV1T, EH1T, ES1T, and ES2T must be connected via the "DC 5 V encoder power supply type DWI11A" option (part number 08227594). The sensor cable must also be connected to correct the supply voltage of the encoder. Connect this encoder as follows:



1806339467

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

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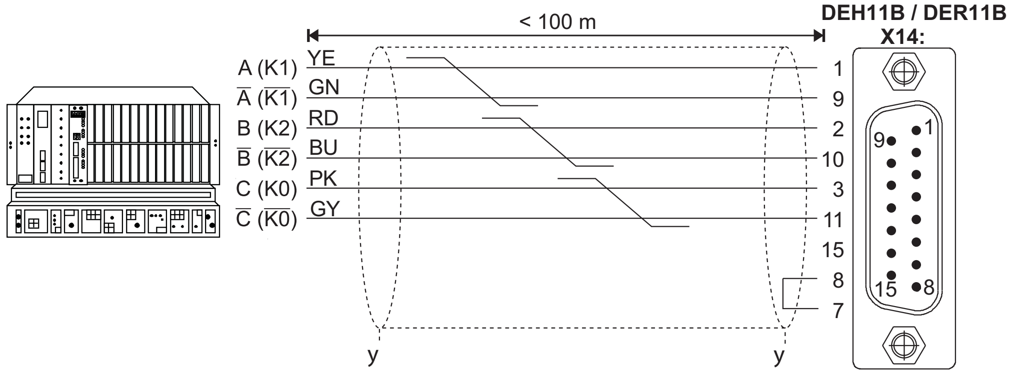
13.23 Connection of incremental encoder simulation

13.23.1 Incremental encoder emulation

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



9007201061090699

Part number of the prefabricated cable:

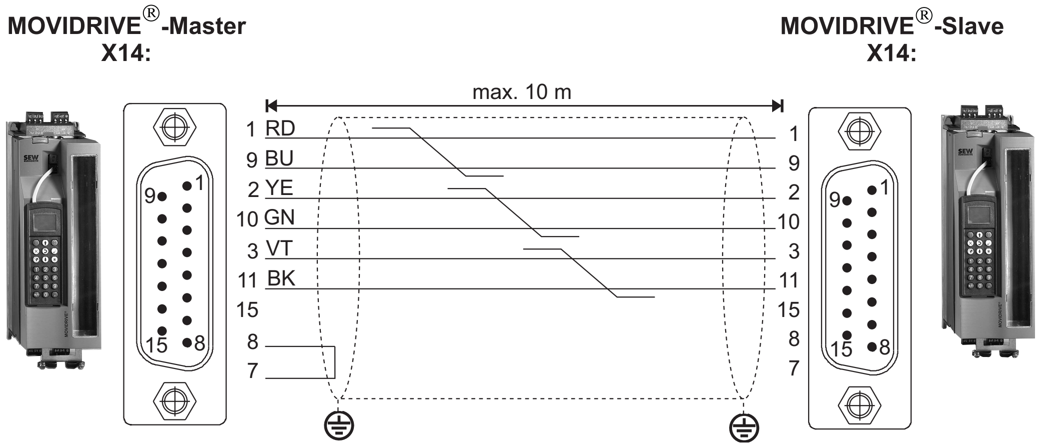
- Option type DEH/DER11B X14: → Incremental encoder simulation
  – For fixed installation: 08197687

13.24 Master/slave connection

13.24.1 Master/slave connection

Connector X14 of the DEH11B, DEU21B or DER11B option can also be used for the "internal synchronous operation" application (master/slave connection of several MOVIDRIVE® devices). 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® devices.



1806354443

Part number of the prefabricated cable:

- For fixed installation: 08179581

INFORMATION

- **A maximum of 3 slaves can be connected to the MOVIDRIVE® master**.
- Notice: 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**.

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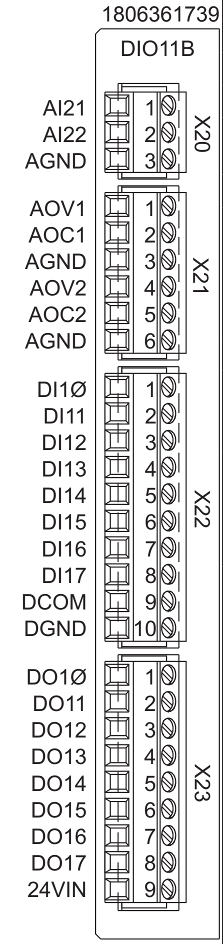
13.25 Connection and terminal description of the DIO11B option

13.25.1 Part number

Option input/output card type DIO11B: 08243085

INFORMATION

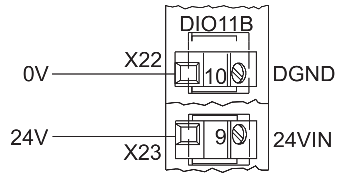
- The "input/output card type DIO11B" option is only possible in conjunction with MOVIDRIVE® MDX61B, not with MDX60B.
- The DIO11B option must be plugged into the fieldbus option slot. If the fieldbus option slot is not available, you can plug the DIO11B input/output card into the expansion slot.
- The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

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

13.25.2 Voltage input 24VIN

The 24VIN (X23:9) voltage input serves as DC+24 V supply voltage for the digital outputs DO1Ø – DO17. Reference potential is DGND (X22:10). The digital 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 device if the load does not exceed DC 400 mA (current limitation in X10:8).

The following figure shows voltage input 24VIN (X23:9) and reference potential DGND (X22:10).



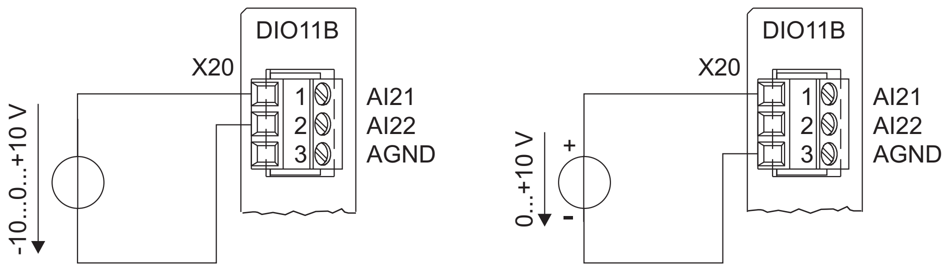
1806364811

13.25.3 Voltage input n2

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

The following figure shows the n2 setpoint input.

Differential input Input with AGND reference potential



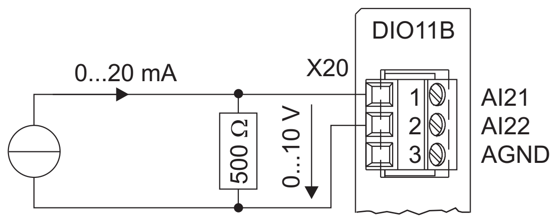
1806367883

13.25.4 Current input n2

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

For example R_B = 500 Ω → DC 0 – 20 mA = DC 0 – 10 V

The following figure shows the current input with external load.



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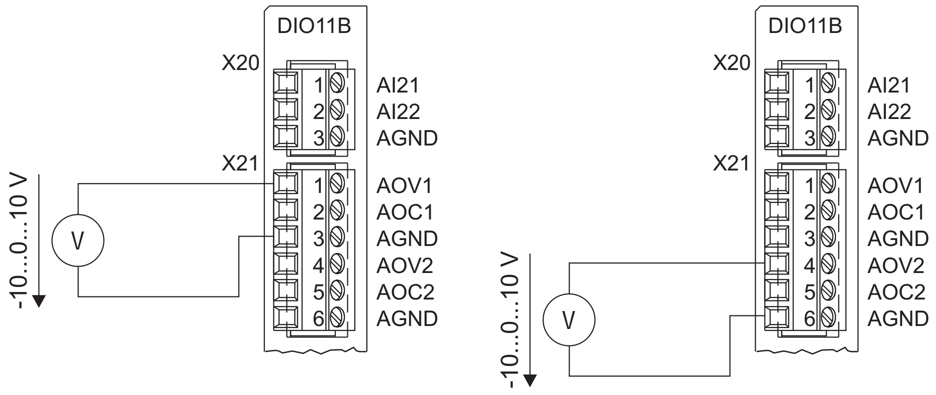
13.25.5 Voltage outputs AOV1 and AOV2

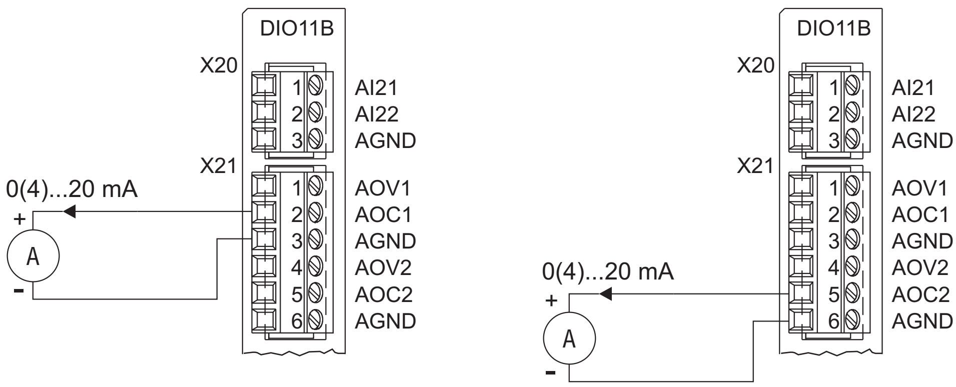
Assign the analog voltage outputs AOV1 and AOV2 in accordance with the following figure:



1806376075

13.25.6 Current outputs AOC1 and AOC2

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



1806377995

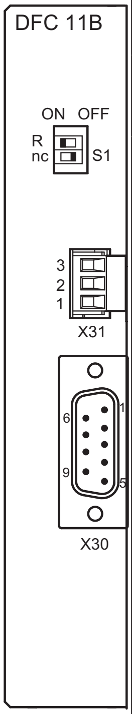
13.26 Connection and terminal description of the DFC11B option

13.26.1 Part number

CAN-Bus interface option type DFC11B: 08243174

INFORMATION

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

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

1) DGND of the CAN bus interface is independent from DGND of the basic device

13.26.2 Connection of MOVIDRIVE® – CAN

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

14 Startup

14.1 General startup instructions

⚠ WARNING

Uncovered power connections.

Severe or fatal injuries from electric shock.

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

14.1.1 Prerequisite

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

14.1.2 Parameters of third-party motors

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

14.1.3 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 chapter "Starting the motor" (→ 🗎 665).

INFORMATION

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

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14.1.4 Motor/inverter combinations

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

400/500 V devices

MOVIDRIVE® MDX60/61B In operating mode VFC	SEW-EURODRIVE motor
0005-5A3-4	DRN80M4
0008-5A3-4	DRN80M4
0011-5A3-4	DRN90S4
0014-5A3-4	DRN90L4
0015-5A3-4	DRN90L4
0022-5A3-4	DRN100LS4
0030-5A3-4	DRN100L4
0040-5A3-4	DRN112M4
0055-5A3-4	DRN132S4
0075-5A3-4	DRN132M4
0110-5A3-4	DRN160M4
0150-503-4	DRN160L4
0220-503-4	DRN180L4
0300-503-4	DRN200L4
0370-503-4	DRN225S4
0450-503-4	DRN225M4
0550-503-4	DRN250M4
0750-503-4	DRN280S4
0900-503-4	DRN280M4
1100-503-4	DRN315S4
1320-503-4	DRN315M4
1600-503-4	DRN315L4
2000-503-4	DRN315H4
2500-503-4	DRN315H4

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230 V devices

MOVIDRIVE® MDX60/61B In operating mode VFC	SEW-EURODRIVE motor
0015-2A3-4	DRN90L4
0022-2A3-4	DRN100LS4
0037-2A3-4	DRN112M4
0055-2A3-4	DRN132S4
0075-2A3-4	DRN132M4
0110-203-4	DRN160M4
0150-203-4	DRN160L4
0220-203-4	DRN180L4
0300-203-4	DRN200L4

14.1.5 Lifting applications

⚠ WARNING

Danger of fatal injury if the hoist falls.

Severe or fatal injuries.

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14.2 Preliminary work and resources

- Check the installation.
- **Performing startup with the DBG60B keypad:**

⚠ WARNING

Risk of crushing if the motor starts up unintentionally.

Severe or fatal injuries.

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

- **Performing startup with the DBG60B keypad:**

Plug the connector of the DBG60B keypad into the XT slot.

- **For startup using a PC and MOVITOOLS® MotionStudio:**

Plug an interface adapter (e.g. USB11A) into the XT slot and connect it to the PC with an interface cable (RS232). Install and start MOVITOOLS® MotionStudio on your PC.

- Switch on the supply voltage and, if necessary, the DC 24 V supply.
- Check that the default parameter settings are correct (e.g. factory setting).
- Check the set terminal assignment (→ P60_ / P61_).

INFORMATION

A group of **parameter values** is **changed automatically** at startup.

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14.3 Startup with DBG60B keypad

14.3.1 General information

Startup with the DBG60B keypad is only possible in operating modes VFC and V/f. Startup in CFC and SERVO operating modes is only possible using the MOVITOOLS® MotionStudio engineering software.

Required data

The following data is required to ensure startup is successful:

- Motor type (SEW-EURODRIVE or third-party motor)
- Motor data
  - Nominal voltage and nominal frequency.
  - Additionally for third-party motors: Nominal current, nominal power, power factor cos φ and nominal speed.
- Nominal line voltage

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

- Encoder type and encoder resolution:
- Motor data
  - SEW-EURODRIVE motor: Brake yes or no and flywheel fan (Z fan) yes or no.
  - Third-party motor: Mass moment of inertia of motor, brake and fan
- Stiffness of the closed-loop 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: 0.80 – 1 – 1.10 (factory setting = 1)

- Converted mass moment of inertia of the load (gear unit + driven machine) on the motor shaft.
- Time required for the shortest ramp

INFORMATION

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

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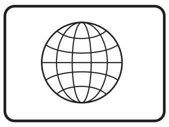
14.3.2 Choose the required language

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.



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Proceed as follows to select the language:

- Press the key. A list of available languages is displayed on the screen.
- Choose the desired language using the / keys.
- Confirm your language selection by pressing the key. The basic display is now shown in your chosen language.

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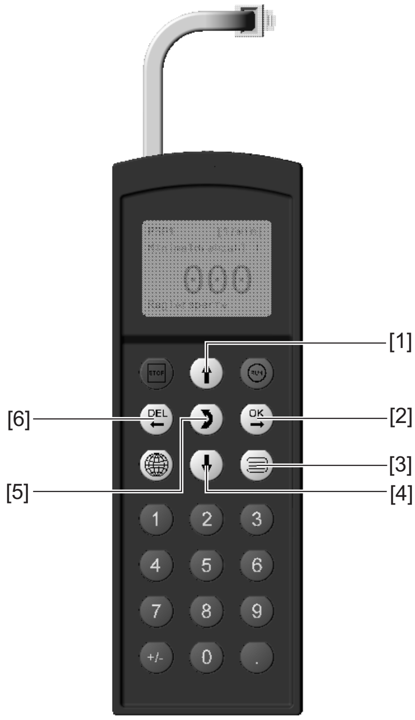
14.3.3 Startup

The figure below shows the keys required for startup.



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[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

14.3.4 Startup procedure

INFORMATION

This example refers to a 400 V device.

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. Press the key to activate the context menu.	**BASIC VIEW** PARAMETER MODE VARIABLE MODE
3. Scroll down using the key until you have selected the menu item "STARTUP".	MANUAL MODE **STARTUP** COPY TO DBG COPY TO MDX
4. To commence the startup, press the key. The first parameter appears. The flashing cursor under the parameter number indicates that the keypad is in display mode.	STARTUP PREPARE FOR STARTUP
• Use the key to switch to edit mode. The flashing cursor disappears. • Use the or key to select "PARAMETER SET 1" or "PARAMETER SET 2". • Press the key to confirm your selection. • Press the key to return to display mode. The flashing cursor appears again. • Press the key to choose the next parameter.	C0**0***STARTUP **PARAMETER SET 1** PARAMETER SET 2
5. Select either stand-alone motor or group drive. Press the key to choose the next parameter.	C22*MOTORS **SINGLE MOTOR** IDENT. MOTORS
6. Select the operating mode you require. Press the key to choose the next parameter.	C26*OPER. MODE 1 STANDARD V/F **VFC**
7. Select whether an encoder is to be evaluated. Press the key to choose the next parameter.	C29*encoder **NO** YES

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

C36*OPER.MODE
SPEED CONTROL
HOIST

9. Select the motor type. If the motor is not listed, select the list "THIRD-PARTY MOTOR".

   Press the ⇧ key to choose the next parameter.

C02*MOTOR TYPE 1
DRN80M42
DRN90S4
DRN90L4

C02*MOTOR TYPE 1
THIRD-PARTY MOTOR
DT63K4/DR63S4

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

    Example: Nameplate 230△ / 400⅄ 50 Hz

    ⅄Connection → Enter "400 V".

    △Connection → Enter "230 V".

    The full torque up to 87 Hz is available in△ connection, as voltage reserves are present (400 V device). After startup, first set parameter *P302 Maximum speed 1* to the value 87 Hz, then start the drive.

    Example: Nameplate 400△/690⅄ 50 Hz

    △Connection → Enter "400 V".

    ⅄Connection not useful. The motor would be subject to field weakening as of 28 Hz.

    Press the ⇧ key to choose the next parameter.

C03* V
MOT. RATED VOLT 1
400.000

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

    Example: 230△/400⅄ 50 Hz

    Enter "50 Hz" in ⅄ and △ connection.

    Press the ⇧ key to choose the next parameter.

C04* Hz
NOM. MOT. FREQ. 1
50.000

FOR MOTORS FROM SEW-EURODRIVE

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

FOR THIRD-PARTY MOTORS

12. Enter the following motor nameplate data:
    - C10* nominal motor current, note the connection type (⅄ or △).
    - C11* nominal motor power
    - C12* power factor cos φ
    - C13* nominal motor speed

13. Enter the nominal power supply voltage (C05* for motor from SEW-EURODRIVE, C14* for third-party motor).

C05* V
RATED MAINS VLTG
400.000

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

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

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

C06*CALCULA-TION
NO
YES

FOR MOTORS FROM SEW-EURODRIVE

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

C06*SAVE
NO
YES

FOR THIRD-PARTY MOTORS

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

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

STARTUP
DATA IS
BEING COPIED...

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

MANUAL MODE
STARTUP
COPY TO DBG
COPY TO MDX

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19. Press the [↓] key to scroll down until the menu item "EXIT" is selected.

SIGNATURE
QUIT
BASIC VIEW

20. Confirm your selection using the [OK] key. The basic display appears.

0.00rpm
0.000Amp
CONTROLLER INHIBIT

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14.3.5 Starting up the speed controller

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

1. 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**
2. Select the correct encoder type.	C15*ENCODER TYPE INCREM. ENCOD. TTL **SINE ENCODER** RESERVED
3. Set the correct encoder resolution.	C16*ENC. RESOLUT. 512 inc **1024 inc** 2048 inc
FOR MOTORS FROM SEW-EURODRIVE	
4. Enter whether the motor has a brake.	C17*BRAKE **WITHOUT** WITH
5. Set the stiffness of the closed-loop 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
6. Enter whether the motor has a flywheel fan (Z fan).	C19*Z FAN **WITHOUT** WITH
For THIRD-PARTY MOTORS	
4. Enter the moment of inertia of the motor.	D00* J0 OF THE MOTOR 4.600
5. Set the stiffness of the closed-loop 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

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6. Enter the moment of inertia of the brake and fan.	D00* J BRAKE+FAN 1.000
7. Enter the mass moment of inertia of the load (gear unit + driven machine) extrapolated for the motor shaft.	C20* 10e–4kgm^2 LOAD MOMENT OF INERTIA 0.200
8. Enter the time for the shortest ramp you want.	C21* s SHORTEST RAMP 0.100
9. Start the calculation for the startup data by choosing "YES". The process lasts a few seconds.	C06*CALCULA-TION **NO** YES
10. The calculation is performed. After calculation, the next menu item appears automatically.	C06*SAVE **NO** YES
11. Set "SAVE" to "YES". The data (motor parameters) are copied to the non-volatile memory of MOVIDRIVE®.	STARTUP DATA IS BEING COPIED...
12. The startup procedure is now complete. Use the DEL key to return to the context menu.	MANUAL MODE **STARTUP** COPY TO DBG COPY TO MDX
13. Press the ↓ key to scroll down until the menu item "EXIT" is selected.	SIGNATURE **QUIT** BASIC VIEW
14. Confirm your selection using the OK key. The basic display appears.	0.00rpm 0.000Amp CONTROLLER IN-HIBIT

- 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 menu item "COPY TO DBG". Confirm your selection using the OK key. The parameter set is copied from MOVIDRIVE® to the DBG60B.

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

⚠ WARNING

Parameter settings incorrect due to unsuitable data sets.

Severe or fatal injuries.

- In the case of third-party motors, set the correct brake application time (P732 / P735).
- Observe the notes for starting the motor in the section "Starting the Motor" (→ page 102).
- Activate encoder monitoring for TTL and sin/cos encoders (P504 = "ON"). **Encoder monitoring is not a safety function**.

14.3.6 Setting parameters

Proceed in this order to set the parameters:

- Use the key to call up the context menu. In the context menu, select the "PARAMETER MODE" menu item. Press the key to confirm your selection. The flashing cursor under the parameter number indicates that the keypad is in parameter mode.
- Use the key to switch to edit mode. The flashing cursor disappears.
- Pressing the or key, you can select or set the correct parameter value.
- Press the key to confirm the selection or setting.
- Press the key to switch back to parameter mode again. The flashing cursor appears again.
- Press the key to choose the next parameter.

14.4 Operation of MOVITOOLS® MotionStudio

14.4.1 About MOVITOOLS® MotionStudio

Jobs

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

- Establishing communication with devices
- Executing functions of the devices

Establishing communication with devices

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

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

MOVITOOLS® MotionStudio supports the following types of communication channels:

- Serial (RS485) via interface adapters
- System bus (SBus) via interface adapters
- Ethernet
- EtherCAT®
- Fieldbus (PROFIBUS DP/DP-V1)
- Tool Calling Interface

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

Executing functions of the devices

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

- Parameterization (e. g. in the parameter tree of the device)
- Startup
- Visualization and diagnostics
- Programming

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

- MotionStudio
- MOVITOOLS®

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

Technical support

SEW-EURODRIVE offers a 24-hour service hotline.

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

Online help

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

- The documentation is displayed in a help window after you start the software.

  If the help window does not appear at the start, deactivate the "Display" check box, in the menu under [Settings] / [Options] / [Help].

  If the help window appears again, activate the "Display" check box, in the menu under [Settings] / [Options] / [Help].
- Context-sensitive help is available for the fields which require you to enter values. For example, you can use the <F1> key to display the ranges of values for the device parameters.

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14.4.2 First steps

Starting the software and creating the project

To start MOVITOOLS® MotionStudio and create a project, proceed as follows:

1. Start the MOVITOOLS® MotionStudio from the Windows start menu via:

   [Start] / [Programs] / [SEW] / [MOVITOOLS MotionStudio] / [MOVITOOLS MotionStudio]
2. Create a project with a name and directory.

Establishing communication and scanning the network

To establish communication with MOVITOOLS® MotionStudio and to scan the network, proceed as follows:

1. Set up a communication channel to communicate with your units.

   For detailed information on how to configure a communication channel, see the section regarding the relevant communication type.
2. Scan your network (unit scan). Press the [Start network scan] button [1] in the toolbar.
3. Select the unit you want to configure.
4. Right-click to open the context menu.

   This will display unit-specific tools used for executing functions with the units.
5. Select the unit you want to configure.
6. Right-click to open the context menu.

   This will display unit-specific tools used for executing functions with the units.

Starting up the devices (online)

Do the following to start up the devices (online):

1. Switch to the network view.
2. In the toolbar, click on "Switch to online mode" [1].

[1] "Switch to online mode" icon

3. Select the unit you want to startup.
4. Open the context menu and select the [Startup] / [Startup] command.

   The Startup wizard opens.
5. Follow the instructions of the startup wizard and then load the startup data into your unit.

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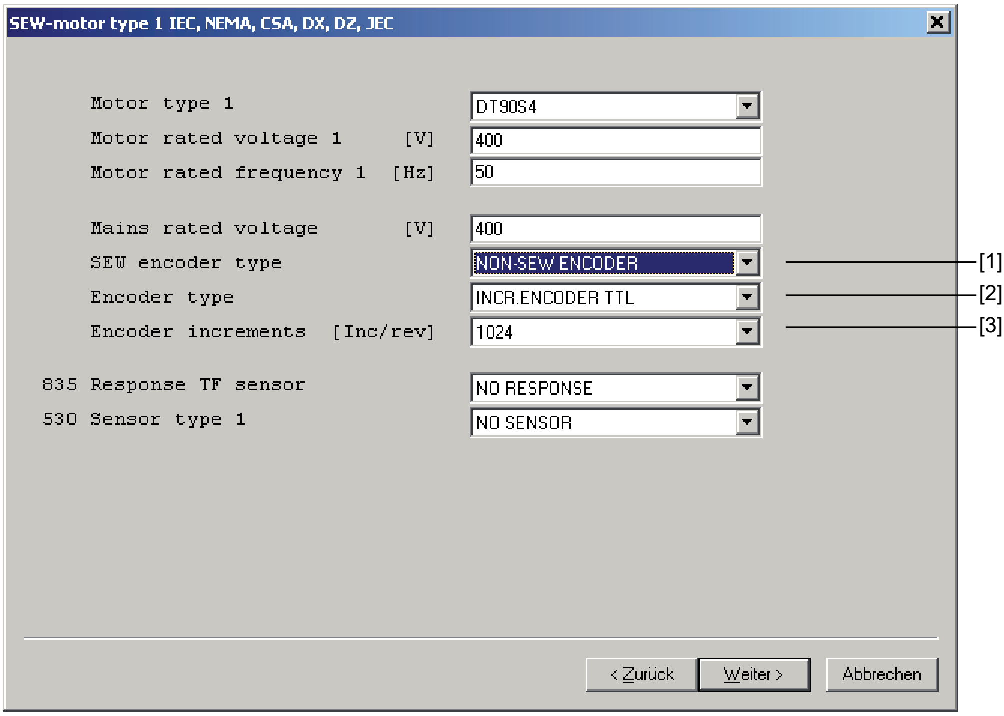
Startup for HTL motor encoders

Adhere to the following startup instructions with DEH11/21B for starting an HTL motor encoder (except DEU21B) on MOVIDRIVE® MDX61B.



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[1] "SEW encoder type" drop-down list

[2] "Encoder type" drop-down list

[3] "PPR count" drop-down list

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

14.5 Starting the motor

14.5.1 Analog setpoint input

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 input.

Function	X11:2 (AI11) Analog input n1	X13:1 (DIØØ) /Controller inhibit	X13:2 (DIØ1) CW/Stop	X13:3 (DIØ2) CCW/stop	X13:4 (DIØ3) Enable/stop	X13:5 (DIØ4) n11/n21	X13:6 (DIØ5) n12/n22
Controller inhibit	X	"0"	X	X	X	"0"	"0"
Stop	X	"1"	X	X	"0"	"0"	"0"
Enable and stop	X	"1"	"0"	"0"	"1"	"0"	"0"
Clockwise at 50% n_{max}	5 V	"1"	"1"	"0"	"1"	"0"	"0"
Clockwise at n_{max}	10 V	"1"	"1"	"0"	"1"	"0"	"0"
Counterclockwise at 50% n_{max}	5 V	"1"	"0"	"1"	"1"	"0"	"0"
Counterclockwise at n_{max}	10 V	"1"	"0"	"1"	"1"	"0"	"0"

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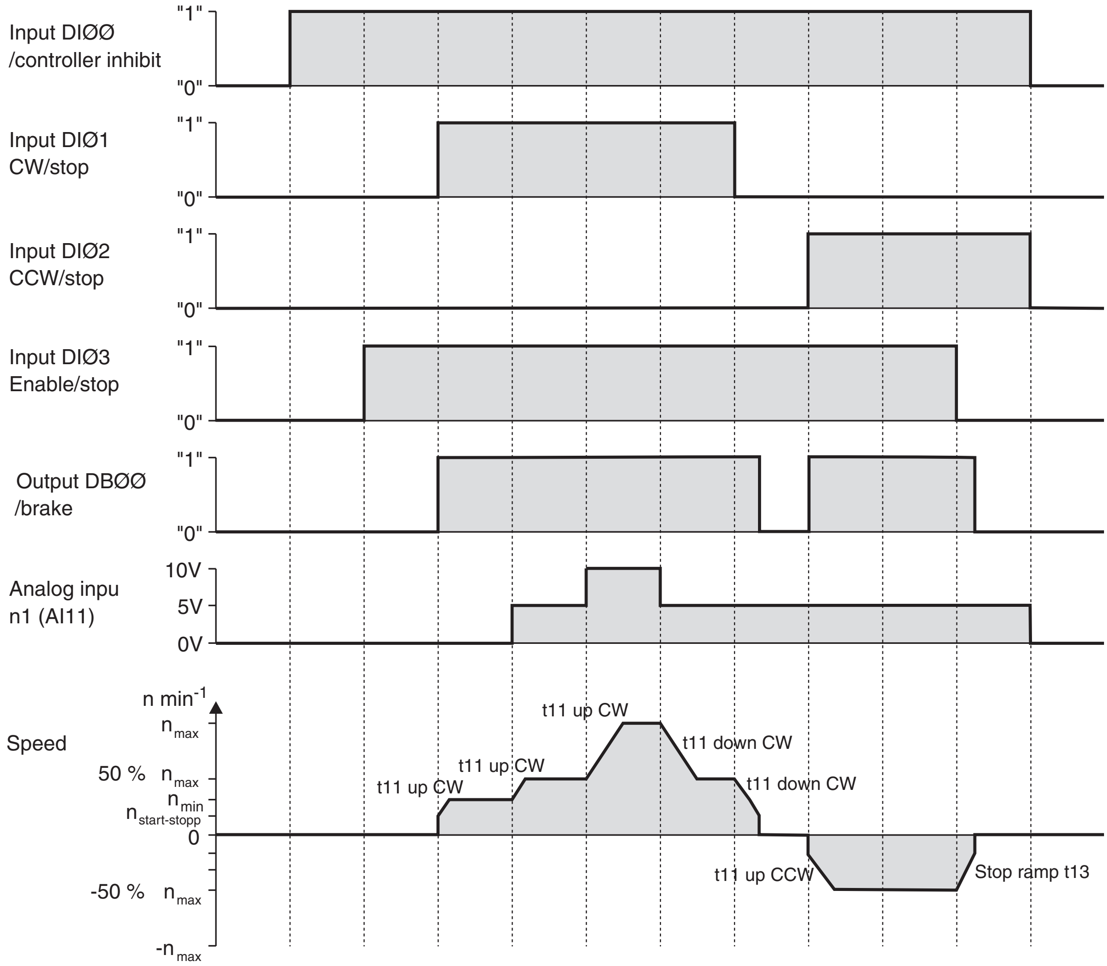
14.5.2 Travel diagram

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



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INFORMATION

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

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14.5.3 Fixed setpoints

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

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

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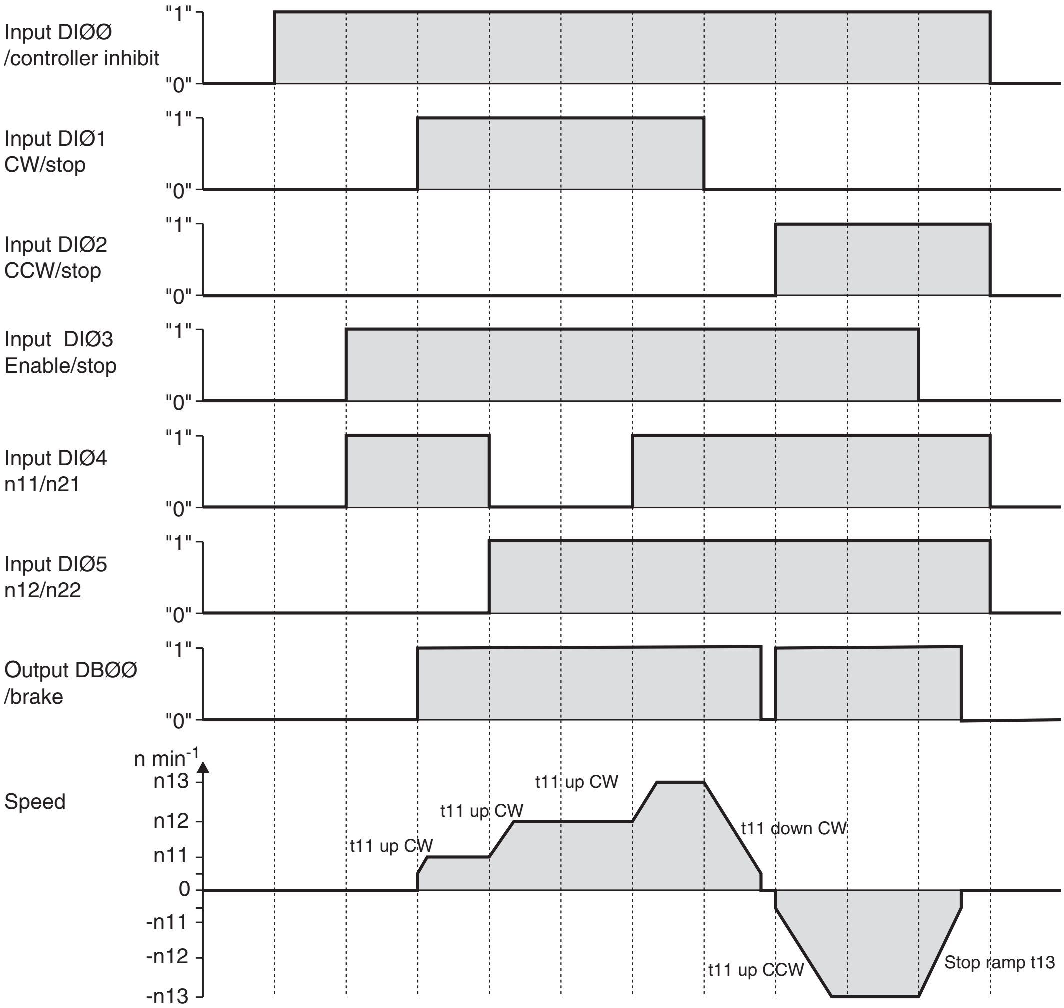
14.5.4 Travel diagram

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



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INFORMATION

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

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14.5.5 Manual operation

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

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

The direction of rotation is not determined by the "CW/stop" or "CCW/stop" digital inputs. Instead, you select the direction of rotation using the DBG60B keypad/ MotionStudio. 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.

INFORMATION

The signals at the digital inputs take effect as soon as manual operation is finished. Digital 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 digital inputs and the setpoint sources.

⚠ WARNING

Risk of crushing if the motor starts up unintentionally.

Severe or fatal injuries.

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

14.5.6 Startup in operating mode "VFC & flying start function"

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

INFORMATION

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

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

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

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

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

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

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15 Operation

15.1 Operating displays

15.1.1 7-segment display

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

7-segment display	Device 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	Approval
5	5	n-control (speed control)
6	6	M-control (torque control)
7	7	Position hold control
8	8	Factory setting
9	9	Limit switch hit
A	10	Technology option
c	12	IPOS^PLUS® reference travel
d	13	Flying start
E	14	Calibrate encoder
F	Error number	Fault indication (flashing)
H	Status display	Manual mode
t	16	Inverter is waiting for data
rev	17	"STO" active
• (blinking dot)	-	IPOS^PLUS® program is running
Flashing display	-	STOP via DBG60B
ꟻ	-	RAM defective

⚠ WARNING

Incorrect interpretation of display U = "STO" active.

Severe or fatal injuries.

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

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15.1.2 DC link voltage display of size 7

INFORMATION

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

15.1.3 DBG60B keypad

Basic displays:

0.00rpm 0.000Amp CONTROLLER IN-HIBIT	Display when X13:1 (DIØØ "/controller inhibit") = "0".
0.00rpm 0.000Amp NO ENABLE	Display when X13:1 (DIØØ "/controller inhibit") = "1" and inverter is not enabled ("enable/stop" = "0").
950.00rpm 0.990Amp ENABLE (VFC)	Display for enabled inverter.
INFORMATION 6: VALUE TOO HIGH	Information message
(DEL)=Quit ERROR 9 STARTUP	Error info

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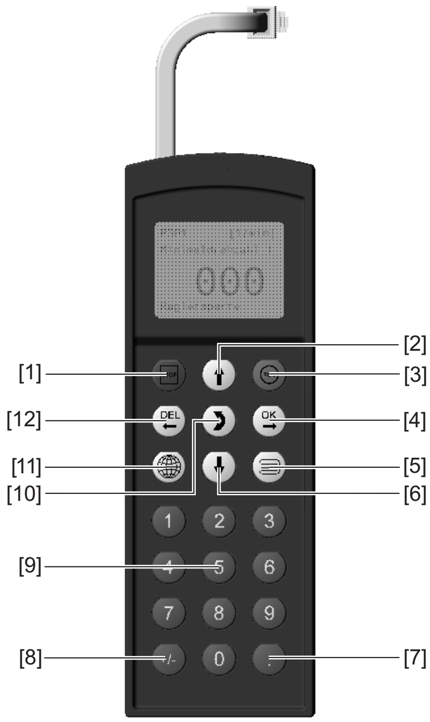
15.2 Information messages

Information messages on the DBG60B (ca. 2 s in duration) or in MOVITOOLS® MotionStudio (message that can be acknowledged):

No.	Text DBG60B/ MotionStudio	Description
1	ILLEGAL INDEX	Index addressed via interface not available.
2	NOT IMPLEMENT.	• Attempt to execute a non-implemented function. • An incorrect communication service has been selected. • Manual operation selected via invalid interface (e.g. fieldbus).
3	READ ONLY VALUE	Attempt to edit a read-only value.
4	PARAM. INHIBITED	Parameter lock P 803 = "ON", parameter cannot be altered.
5	SETUP ACTIVE	Attempt to alter parameters during active factory setting.
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 completed using X13:ST11/ST12 (RS485).
11	ONLY TERMINAL	Manual operation must be exited via TERMINAL (DBG60B or USB11/UWS21B).
12	NO ACCESS	Access to selected parameter denied.
13	REG. 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". • You tried to change to manual mode during live operation.

15.3 Functions of the DBG60B keypad

15.3.1 Key assignments for DBG60B



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[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	⤸	Change menu
[11]	Key	🌐	Select language
[12]	Key	DEL	Delete previous entry

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15.3.2 Copy function of the DBG60B

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

- In the context menu, select the menu item "COPY TO DBG". Confirm your selection using the [OK] key.
- After the copying process has finished, plug the keypad in the other inverter.
- In the context menu, select the menu item "COPY TO MDX". Confirm your selection using the [OK] key.

15.3.3 Parameter mode

Proceed as follows to set the parameters in parameter mode:

1. Press the [≡] key to activate the context menu.	BASIC VIEW **PARAMETER MODE** VARIABLE MODE WAKE UP PARA-METER
2. Press the [OK] key to start PARAMETER MODE. The first display parameter P000 "SPEED" is displayed. Use the [↑] or [↓] key to select main parameter groups 0 to 9.	P **0**00 1/min SPEED 0.0 CONTROLLER IN-HIBIT
3. Use the [↑] or [↓] key to select the desired main parameter group. The flashing cursor is positioned under the number of the main parameter group.	P **1**.. SETPOINTS/ RAMP GENERAT-ORS CONTROLLER IN-HIBIT
4. Press the [OK] key to activate the parameter subgroup selection in the required main parameter group. The flashing cursor moves one position to the right.	P 1**.**. SETPOINTS/ RAMP GENERAT-ORS CONTROLLER IN-HIBIT
5. Use the [↑] or [↓] key to select the desired parameter subgroup. The flashing cursor is positioned under the number of the parameter subgroup.	\ 1**3**. SPEED RAMPS 1 CONTROLLER IN-HIBIT
6. Press the [OK] key to activate the parameter selection in the required parameter subgroup. The flashing cursor moves one position to the right.	\ 13**.** SPEED RAMPS 1 CONTROLLER IN-HIBIT

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7. Use the ↑ or ↓ key to select the desired parameter. The flashing cursor is positioned under the third digit of the parameter number.	\ 13**2** s T11 UP CCW 0.13 CONTROLLER IN-HIBIT
8. Press the OK 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 IN-HIBIT
9. Use the ↑ or ↓ key to set the required parameter value.	\ 132 s T11 UP CCW 0.20_ CONTROLLER IN-HIBIT
10. Press the OK key to confirm the setting. To exit the setting mode, press the ⤵ key. The flashing cursor is positioned under the third digit of the parameter number again.	\ 13**2** s T11 UP CCW 0.20 CONTROLLER IN-HIBIT
11. Use the ↑ or ↓ key to select another parameter, or press the DEL key to switch to the menu of the parameter subgroups.	\ 13**.** SPEED RAMPS 1 CONTROLLER IN-HIBIT
12. Use the ↑ or ↓ key to select another parameter subgroup or press the DEL key to switch to the menu of the main parameter groups.	P **1**.. SETPOINTS/ RAMP GENERAT-ORS CONTROLLER IN-HIBIT
13. Use the ☰ key to return to the context menu.	BASIC VIEW **PARAMETER MODE** VARIABLE MODE WAKE UP PARA-METER

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15.3.4 Variable mode

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

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

15.3.5 User menu

The DBG60B keypad has a standard user menu containing the parameters that are used most often. The parameters in the user menu are displayed with a "\" before the parameter number (→ chapter "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.

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

Adding parameters to the user menu

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

- Press the key to call up the context menu. Select the "PARAMETER MODE" menu item.
- Select desired parameter and press the key to confirm.
- Use the key to return to the context menu. In the context menu, select the menu item "ADD Pxxx". "xxx" is the parameter you selected previously. Confirm your selection 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:

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

15.3.6 Wake-up parameter

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

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

Proceed as follows to save a wake-up parameter:

- First select the required parameter in parameter mode.
- In the context menu, select the "XXXX WAKE-UP PARAM." menu item. "XXXX" is the selected wake-up parameter. Confirm your selection using the OK key.

15.3.7 IPOS$^{PLUS®}$

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

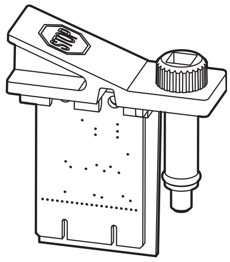
The IPOS$^{PLUS®}$ program is also stored in the DBG60B keypad when it is saved and is consequently also transferred when the parameter set is copied to another MOVIDRIVE® unit.

Parameter P931 can be used to start and stop the IPOS$^{PLUS®}$ program from the DBG60B keypad.

15.4 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.

The following figure shows the MDX60B/61B memory card.



1810728715

Part number: 08248834

15.4.1 Notes for replacing the memory card

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

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

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

  If this is not the case, the error message "79 HW configuration" (hardware configuration) is displayed. You can remedy the error by calling up the "DELIVERY CONDITION" menu item from the context menu (P802 factory setting). This resets the unit to its initial delivery state. You must then restart the unit.
- The counter status of the DRS11B option and the data of the DH..1B and DCS21B/22B/31B/32B options are not stored on the memory card. When you replace the memory card, you have to install the DRS11B, DH..1B and DCS21B/22B/31B/32B option cards from the original unit in the new inverter.

  If the original unit was a MOVIDRIVE® B size 0 unit with the option DHP11, you have to use a new DHP11B option card with the configuration data set (file name.sewcopy) that you saved previously.
- If an absolute encoder is used as a motor or distance encoder, you must reference the encoder after you have replaced the unit.
- When replacing an absolute encoder, you have to reference it again.

16 Service

16.1 Damages to the device

If necessary, all components of the device are replaced. Only SEW-EURODRIVE is authorized to perform repairs.

16.2 Fault information

16.2.1 Fault memory

The fault memory (P080) stores the last 5 fault messages (faults t-0 – t-4). The oldest fault message is deleted whenever more than 5 fault messages have occurred. The following information is stored when a fault occurs:

Fault that has occurred · Status of digital inputs/outputs · Operating state 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.

16.2.2 Switch-off responses

There are 3 switch-off responses depending on the fault; the inverter remains blocked during a failure:

Immediate disconnection

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

Rapid stop

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

Emergency stop

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

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16.2.3 Reset

A fault message can be acknowledged as follows:

- Switch the supply system off and on again
  - Observe a minimum switch-off time of 10 s for the line contactor K11
- Reset via input terminals, i.e. via an appropriately assigned digital input (DIØ1 – DIØ7 with the basic device, DI1Ø – DI17 with the DIO11B option)
- Manual reset in MOVITOOLS® MotionStudio (P840 = "YES").
- Manual reset using the DBG60B.
- Auto reset performs up to 5 device resets with an adjustable restart time.

⚠ WARNING

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.

16.2.4 Inverter is waiting for data

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

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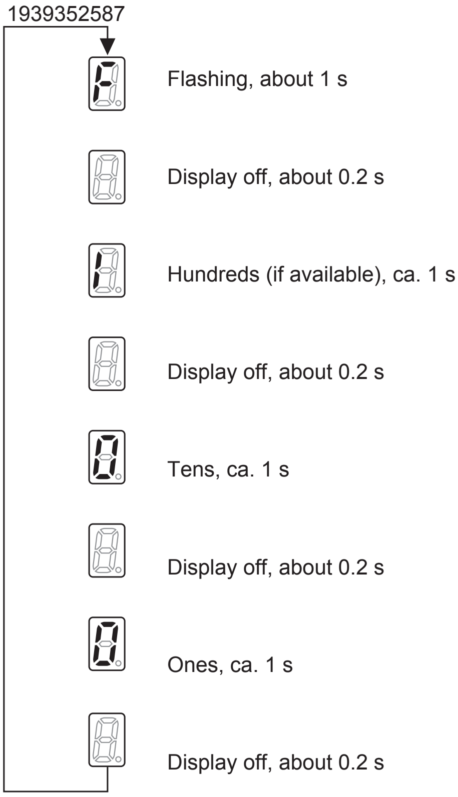
16.3 Fault messages and list of faults

16.3.1 Fault message via 7-segment display

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



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

16.3.2 Subfault code display

The subfault code is displayed in MOVITOOLS® MotionStudio or in the DBG60B keypad.

16.3.3 Fault list

The factory set fault response is listed in the "Response P" column. (P) indicates that the response is programmable (via *P83_fault response* or with IPOS$^{PLUS®}$). In the event of fault 108, (P) indicates that the response can be programmed via *P555 DCS fault response*. In the event of fault 109, (P) indicates that the response can be programmed via *P556 DCS alarm response*.

Fault			Subfault			
Code	**Designation**	**Response (P)**	**Code**	**Designation**	**Possible cause**	**Measure**
00	No fault					
01	Overcurrent	Immediate stop	0	Output stage	• Short circuit at output • Motor too large • Defective output stage • Current supply for current transformer • Ramp limit is deactivated and set ramp time is too short • Defective phase module • Supply voltage 24 V or 24 V generated from it is instable • Interruption or short circuit on the signal lines from the phase modules	• Rectify the short circuit • Connect a smaller motor • Contact the SEW Service if the output stage is defective • Activate P 138 and/or increase ramp time
			1	V_{CE} monitoring or undervoltage monitoring of the gate driver		
			5	Inverter remains in hardware current limit		
			6	V_{CE} monitoring or undervoltage monitoring of the gate driver or overcurrent of the current transformer. ..Phase U		
			7	..Phase V		
			8	..Phase W		
			9	..Phases U and V		
			10	..Phases U and W		
			11	..Phases V and W		
			12	..Phases U and V and W		
			13	Voltage supply of current transformer in line operation		
			14	MFE signal lines		
03	Ground fault	Immediate stop	0	Ground fault	Ground fault • in the motor lead • in the inverter • in the motor	• Eliminate ground fault • Consult SEW Service
04	Brake chopper	Immediate stop	0	DC link voltage too high in 4Q operation	• Too much regenerative power • Braking resistor circuit interrupted • Short circuit in the braking resistor circuit • Braking resistance too high • Brake chopper is defective	• Extend deceleration ramps • Check supply cable to braking resistor • Check technical data of braking resistor • Install a new MOVIDRIVE® if the brake chopper is defective
			1			
06	Line phase failure	Immediate stop	0	Voltage for adapting DC link is periodically too low	• Phase failure • Inadequate line voltage quality	• Check the supply system cable • Check configuration of the supply system • Check supply (fuses, contactor)
			3	Line voltage failure		
			4	Line frequency fault		
07	DC link overvoltage	Immediate stop	0	DC link voltage too high in 2Q operation	DC link voltage too high	• Extend deceleration ramps • Check supply cable to the braking resistor • Check technical data of braking resistor
			1			
			2	DC link voltage too high in 4Q operation .. ..Phase U		
			3	..Phase V		
			4	..Phase W		

Fault Code	Fault Designation	Response (P)	Subfault Code	Subfault Designation	Possible cause	Measure
08	Speed monitoring	Immediate stop (P)	0	Inverter in current limiting or in slip limit	• Speed controller or current controller (in VFC operating mode without encoder) operating at setting limit due to mechanical overload or phase failure in the power supply or motor • Encoder not connected correctly or incorrect direction of rotation • n_{max} is exceeded during torque control • In operating mode VFC: Output frequency ≥ 150 Hz • In operating mode V/f: Output frequency ≥ 599 Hz	• Reduce load • Increase deceleration time setting (P501 or P503) • Check encoder connection, swap A/A and B/B pairs if necessary • Check encoder voltage supply • Check current limiting • Extend ramps if necessary • Check motor cable and motor • Check line phases
			3	System limit "actual speed" exceeded. Speed difference between ramp setpoint and actual value for 2 × ramp time higher than expected slip		
			4	Maximum rotating field speed exceeded Maximum rotating field frequency (with VFC max 150 Hz and V/f max 599 Hz) exceeded		
09	Startup	Immediate stop	0	Startup missing	The inverter has not been taken into operation for the selected operating mode	Perform startup for the required operating mode
			1	Wrong operating mode selected		
			2	Wrong encoder type or defective encoder card		
10	IPOS-ILLOP	Emergency stop	0	Invalid IPOS$^{PLUS®}$ command	• Incorrect command detected during execution of the 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	Overtemperature	Emergency stop (P)	0	Heat sink temperature too high or temperature sensor defective	• Thermal overload of inverter • Temperature sensor of a phase module faulty (size 7)	• Reduce load and/or ensure adequate cooling • Check fan • If F-11 is issued even though the temperatures is obviously not too high, this indicates a faulty temperature sensor of the phase module. Replace the phase module (size 7)
			3	Overtemperature switched-mode power supply		
			6	Heat sink temperature too high or temperature sensor defective.. ..Phase U (size 7)		
			7	..Phase V (size 7)		
			8	..Phase W (size 7)		
13	Control signal source	Immediate stop	0	Control signal source not available, e.g. control signal source fieldbus without fieldbus interface	Control signal source not defined or defined incorrectly	Set correct control signal source (P101)

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Fault			Subfault			
Code	**Designation**	**Response (P)**	**Code**	**Designation**	**Possible cause**	**Measure**
14	Encoder	Immediate stop	0	Encoder not connected, defective encoder, defective encoder cable	• Encoder cable or shield not connected correctly. • Short circuit / broken wire in encoder cable • Encoder is defective. • When 2 inverters are connected via X14 and P505 is set to YES F14 SubC 27.	• Check encoder cable and shield for correct connection, short circuit and broken wire
			25	Encoder fault X15 – Speed range exceeded Encoder exceeds 6542 min^{-1}		
			26	Encoder fault X15 – Card is defective Fault in the quadrant evaluation.		
			27	Encoder fault – encoder connection or encoder is defective		
			28	Encoder fault X15 – Communication fault RS485 channel		
			29	Encoder fault X14 – Communication fault RS485 channel	• Encoder cable or shield not connected correctly. • Short circuit / broken wire in encoder cable • Encoder is defective. • When 2 inverters are connected via X14 and P505 is set to YES F14 SubC 27.	• Check encoder cable and shield for correct connection, short circuit and broken wire
			30	Unknown encoder type at X14/X15		
			31	Plausibility monitoring fault Hiperface® X14/X15 Increments have been lost		
			32	Encoder fault X15 Hiperface® Hiperface® encoder at X15 signals a fault		
			33	Encoder fault X14 Hiperface® Hiperface® encoder at X14 signals a fault		
			34	Encoder fault X15 resolver – Encoder connection or encoder is faulty		
17	System fault	Immediate stop	0	"Stack overflow" fault	Inverter electronics disrupted, possibly due to EMC influences	• Check grounding and shielding and improve, if necessary • Consult SEW Service if the fault occurs again.
18				"Stack underflow" fault		
19				"External NMI" fault		
20				"Undefined opcode" fault		
21				"Protection fault"		
22				"Illegal word operand access" fault		
23				"Illegal instruction access" fault		
24				"Illegal external bus access" fault		
25	EEPROM	for rapid stop	0	Read or write fault on EEPROM power section	Access to the EEPROM of the memory card has failed	• Restore factory settings, perform reset and reset parameters. • Consult SEW service if the fault reoccurs • Replace memory card
			11	NV memory read fault NV-RAM inside the unit		
			13	NV memory chip card memory module defective		
			14	NV memory chip card memory card defective		
			16	NV memory initialization fault		
26	External terminal	Emergency stop (P)	0	External terminal	Read external fault signal via programmable input	Eliminate respective cause; reprogram terminal if necessary

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
27	No limit switches	Emergency stop	0	Limit switches missing or wire break	• Wire break/both limit switches missing • Limit switches are swapped over in relation to direction of rotation of motor	• Check wiring of limit switches • Replace limit switch connections • Reprogram terminals
			2	Limit switches reversed		
			3	Both limit switches are active simultaneously		
28	Fieldbus timeout	Rapid stop (P)	0	"Fieldbus timeout" fault	No communication between master and slave within the configured response monitoring	• Check communications routine of the master • Extend fieldbus timeout time (P819)/deactivate monitoring
			2	Fieldbus interface does not boot		
29	Limit switch hit	Emergency stop	0	Hardware limit switch hit	A limit switch was hit in IPOS$^{PLUS®}$ operating mode	• Check travel range • Correct operator program
30	Emergency stop timeout	Immediate stop	0	Timeout stop emergency stop ramp	• Drive overloaded • Emergency stop ramp too short	• Project planning check • Extend emergency stop ramp
31	TF/TH trigger	No response (P)	0	Thermal motor protection fault	• 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	• The motor **must** cool off, then reset the fault • Check connections/link between MOVIDRIVE® and TF/TH • If no TF/TH is connected: Jumper X10:1 with X10:2 • Set P835 to "No response".
32	IPOS index overflow	Emergency stop	0	IPOS program defective	Programming principles violated leading to system-internal stack overflow	Check and correct the IPOS$^{PLUS®}$ user program (→ IPOS$^{PLUS®}$ manual)
33	Setpoint source	Immediate stop	0	"Setpoint source not available" For example, fieldbus control signal source without fieldbus interface	Setpoint source not defined or defined incorrectly	Set correct setpoint source (P100)
34	Ramp timeout	Immediate stop	0	Time violation rapid stop ramp	Downward ramps timeout, e.g. due to overload	• Extend the downwards ramps • Eliminate overload
35	Operating mode	Immediate stop	0	Operating mode not available	• Operating mode not defined or defined incorrectly • P916 was used to set a ramp type that requires a MOVIDRIVE® device in technology version • P916 was used to set a ramp type that does not match the selected technology function • P916 was used to set a ramp type that does not match the selected synchronization time (P888)	• Use P700 or P701 to set correct operating mode. • Use MOVIDRIVE® in technology version (..OT) • From the "Startup → Select technology function..." menu, select the technology function that matches P916 • Check the settings of P916 and P888
			1	Wrong assignment operating mode - hardware		
			2	Wrong assignment operating mode - technology function		
36	Option missing	Immediate stop	0	Hardware is missing or not permitted	• Type of option card not allowed • Setpoint source, control signal source or operating mode not permitted for this option card • Incorrect encoder type set for DIP11B	• Use correct option card • Set correct setpoint source (P100) • Set correct control signal source (P101) • Set correct operating mode (P700 or P701) • Set the correct encoder type
37	System watchdog	Immediate stop	0	"System watchdog overflow" fault	Fault while executing system software	Consult SEW Service
38	System software	Immediate stop	0	"System software" fault	System fault	Consult SEW Service

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
39	Reference travel	Immediate stop (P)	0	"Reference travel" fault	• 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 stop	0	Timeout at boot synchronization with option	• Fault during boot synchronization between inverter and option • Synchronization ID not/incorrectly transmitted	Install a new option card if this fault reoccurs
41	Watchdog option	Immediate stop	0	Fault – Watchdog timer from/to option	• Fault in communication between system software and option software • Watchdog in the IPOS$^{PLUS®}$ program	• Consult SEW Service
			17	Watchdog IPOS fault	• An application module has been loaded in a MOVIDRIVE® B unit without technology version • The wrong technology function has been set if an application module is used	• Check IPOS program • Check whether the unit has been activated for the application version (P079) • Check the selected technology function (P078)
42	Lag fault	Immediate stop (P)	0	Positioning lag fault	• Rotary encoder connected incorrectly • Acceleration ramps too short • P component of positioning controller too small • Incorrect speed controller parameters • Value of lag fault tolerance too small	• Check rotary encoder connection • Extend ramps • Set P component to higher value • Reset speed controller parameters • Increase lag fault tolerance • Check wiring of encoder, motor and line phase. • Check whether mechanical system components can move freely or if they are blocked
43	RS485 timeout	Rapid stop (P)	0	Communication timeout at RS485 interface	Fault during communication via interface RS485	Check RS485 connection (e.g. inverter – PC, inverter -– DBG60B). Contact SEW Service for advice if necessary
43	RS485 timeout	Rapid stop (P)	3	Manual mode timeout	Communication to source that controls manual operation interrupted. (Independent of the used user interface)	Check connection to control signal source
44	Device utilization	Immediate stop	0	Unit utilization fault	• Device utilization (I × t value) > 125%	• Decrease power output • Extend ramps • If suggested actions not possible, use larger inverter • Reduce load
			8	UL monitoring fault		

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
45	Initialization	Immediate stop	0	General fault during initialization	• No parameters set for EEPROM in power section set incorrectly • Option card not in contact with backplane bus	• Restore the factory settings. Contact the SEW Service for advice if the fault still cannot be reset • Insert the option card correctly
			3	Data bus fault during RAM check		
			6	CPU clock fault		
			7	Fault in the current detection		
			10	Fault when setting flash protection		
			11	Data bus fault during RAM check		
			12	Parameter setting fault synchronous operation (internal synchronous operation)		
46	System bus 2 timeout	Rapid stop (P)	0	Timeout system bus CAN2	Fault during communication via system bus 2	Check system bus connection
47	System bus 1 timeout	Rapid stop (P)	0	Timeout system bus CAN1	Fault during communication via system bus 1	Check system bus connection
48	Hardware DRS	Immediate stop	0	Hardware synchronous operation	Only with DRS11B: • Encoder signal from master/distance encoder faulty • Hardware required for synchronous operation is faulty	• Check encoder signals of master/distance encoder • Check encoder wiring • Install a new synchronous operation card
57	"TTL encoder"	Immediate stop	512	X15: Fault in amplitude control	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			16896	X14: Fault in amplitude control		
			514	X15: Incorrectly set numerator/denominator values	Incorrect numerator/denominator values	Correct the numerator/denominator values
			16898	X14: Incorrectly set numerator/denominator values		
58	"Sine-cosine encoder"	Immediate stop	512	X15: Fault in amplitude control	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			514	X15: Track signal fault		
			16896	X14: Fault in amplitude control		
			16897	X14: Initialization		
			16898	X14: Track signal fault		
			513	X15: Initialization	Encoder defective	Replace encoder
			515	C15: Incorrectly set numerator/denominator values	Incorrect numerator/denominator values	Correct the numerator/denominator values
			16899	X14: Incorrectly set numerator/denominator values		

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Fault			Subfault			
Code	**Designation**	**Response (P)**	**Code**	**Designation**	**Possible cause**	**Measure**
59	"Encoder communication"	for rapid stop	1	X15: Track signal fault	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection and broken wire • Replace encoder • Providing for EMC measures
			16	Data line fault		
			64 – 576	X15: RS485 communication		
			1088 – 1388	X15: EnDat communication		
			16385	X14: Track signal fault		
			16400	X14: Data line fault		
			16448 – 16832	X14: RS485 communication		
			17472 – 17772	X14: EnDat communication		
			2	X15: Incorrect calibration of encoder	Incorrect encoder calibration or mechanical offset to motor	Delivery state + new startup
			16386	X15: Incorrect calibration of encoder		
			1024	X15: Clocking and/or data line not connected	Clocking and/or data line not connected	Connect clocking and/or data line
			17408	X14: Clocking and/or data line not connected		
77	IPOS control word	No response (P)	0	Invalid control word IPOS	Only in IPOS$^{PLUS®}$ mode: • Attempt was made to set an invalid automatic mode (via external control) • P916 = BUS RAMP is set	• Check serial connection to external controller • Check write values of external controller • Set correct value for P916
78	IPOS SW limit switch	No response (P)	0	Software limit switch hit	Only in IPOS$^{PLUS®}$ mode: Programmed target position is outside travel range delimited by software limit switches	• Check user program • Check position of the software limit switches
79	Hardware configuration	Immediate stop	0	Deviating hardware configuration when replacing the memory card	The following values no longer match after memory card replacement: • Power • Nominal voltage • Variant ID • Device family • Design as Technology/ Standard unit • Option cards	Ensure identical hardware or restore delivery state (parameter = factory setting)
80	RAM test	Immediate stop	0	"RAM test" fault	Internal device fault, RAM defective.	Consult SEW Service
81	Start condition	Immediate stop	0	Start condition fault with VFC hoist	Only in "VFC hoist" mode: The motor could not be supplied with the correct amount of current during the pre-magnetizing time: • Nominal motor power too small in relation to rated inverter power • Motor cable cross section too small. Only for operation with a linear motor (as of firmware 18): • The drive has been set to "Enable" although the commutation offset between linear motor and linear encoder is not known. This means that the inverter cannot set the current indicator correctly.	• Check startup data and perform new startup, if necessary. • Check connection between inverter and motor • Check cross section of motor cable and increase if necessary • Perform commutation travel in the "No enable" state and then switch to "Enable" once the inverter has acknowledged in status word bit 25 that commutation was successful.

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
82	Open output	Immediate stop	0	Output open with "VFC hoist"	Only in "VFC hoist" mode: • Two or all output phases are interrupted. • Nominal 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 (P)	0	"Motor temperature emulation" fault	• Motor utilization too high. • I_N-U_L monitoring triggered • P530 set later to "KTY"	• The motor **must** cool off, then reset the fault • Reduce load • Extend ramps • Observe longer pause times • Check P345/346 • Select a larger motor
			2	Temperature sensor wire break		
			3	No thermal motor model available		
			4	UL monitoring fault		
			11	Temperature sensor short circuit		
86	Memory module	Immediate stop	0	Fault in connection with memory module	• No memory card • Memory card defective	• Tighten knurled screw • Insert and secure memory card • Replace memory card • Load delivery status and parameter set
87	Technology function	Immediate stop	0	Technology function selected with standard unit	A technology function was activated in a standard device	Disable technology function
88	Flying start	Immediate stop	0	"Flying start" fault	Only in VFC n-CTRL operating mode: Actual speed > 6000 rpm when inverter enabled	Only enable a actual speed ≤ 6000 min^{-1}
92	DIP encoder problem	Fault display (P)	1	Stahl WCS3 dirt problem	Encoder signals a fault	Possible cause: Encoder is dirty → clean encoder
93	DIP encoder fault	Emergency stop (P)	0	"Absolute encoder" fault	The encoder signals a fault, e.g. power failure • Connection cable between the encoder and DIP11B does not meet the requirements (twisted pair, shielded) • Clock frequency too high for cable length • Permitted max. speed/acceleration of encoder exceeded • Encoder defective	• Check absolute encoder connection • Check connection cables • Set correct clock frequency • Reduce maximum travel speed or ramp • Replacing absolute encoders.
94	EEPROM checksum	Immediate stop	0	Power section parameters	Inverter electronics disrupted. Possibly due to EMC influence or defect.	Sending in a device for repair
			5	Control unit data		
			6	Power section data		
			7	Invalid version of the configuration data set		
95	DIP plausibility fault	Emergency stop (P)	0	Plausibility monitoring of absolute position	No plausible position could be determined • Incorrect encoder type set • IPOS$^{PLUS®}$ travel parameter set incorrectly • Numerator/denominator factor set incorrectly • Zero adjustment performed • Encoder defective	• Set the correct encoder type • Check IPOS$^{PLUS®}$ travel parameters. • Check travel speed. • Correct numerator/denominator factor • Reset after zero adjustment • Replacing absolute encoders.
97	Copy fault	Immediate stop	0	Parameter set upload is/was faulty	• Memory card cannot be written or read • Fault during data transmission	• Repeat copying process • Restore delivery state (P802) and repeat copying process
			1	Download of parameter set to unit canceled.		
			2	Not possible to adopt parameters Not possible to adopt parameters from memory card		

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
98	CRC fault	Immediate stop	0	"CRC via internal flash" fault	Internal device fault flash memory defective.	Sending in a device for repair
99	IPOS ramp calculation	Immediate stop	0	"Ramp calculation" fault	Only in IPOS$^{PLUS®}$ mode: Positioning ramp is sinusoidal or square and an attempt is made to change ramp times and traveling velocities with enabled inverter.	Rewrite the IPOS$^{PLUS®}$ program so that ramp times and traveling velocities can only be altered when the inverter is inhibited.
100	Vibration – warning	Display fault (P)	0	Vibrations diagnostics warning	Vibration sensor warning (→ "DUV10A" operating instructions)	Determine cause of vibrations. Continue operation until F101 occurs.
101	Vibration fault	Rapid stop (P)	0	Vibration diagnostics fault	Vibration sensor signals fault	SEW-EURODRIVE recommends that you remedy the cause of the vibrations immediately
102	Oil aging warning	Display fault (P)	0	Oil aging warning	Warning signal from the oil aging sensor	Schedule oil change
103	Oil aging fault	Display fault (P)	0	Oil aging fault	Fault message from the oil aging sensor	SEW-EURODRIVE recommends that you change the gear unit oil immediately.
104	Oil aging – overtemperature	Display fault (P)	0	Oil aging overtemperature	Overtemperature signal from the oil aging sensor	• Let oil cool down • Check if the gear unit cools properly
105	Oil aging ready signal	Display fault (P)	0	Oil aging ready signal	Oil aging sensor is not ready for operation	• Check voltage supply of oil aging sensor • Check and, if necessary, replace the oil aging sensor
106	Brake wear	Display fault (P)	0	Brake wear fault	Brake lining worn	Replace brake lining (→ "Motors" operating instructions).
107	Line components	Immediate stop	1	For regenerative power supply only: No feedback signal from main contactor	Main contactor defective	• Check main contactor • Check control cables.
108	DCS fault	Display fault	0	DCS fault		
			1	Configuration data not loaded correctly to DCS..B option.	Connection interrupted while loading the program to the DCS..B option.	• Reload the configuration files. • Then switch the DCS..B option off and on again.
			2	Invalid configuration data for software version of the DCS..B option.	DCS..B option configured using a wrong software version.	• Configure the DCS..B option with the permitted MOVISAFE® software version. • Then switch the DCS..B option off and on again.
			3	Unit was programmed with incorrect software interface.	Program or configuration data was loaded into the unit with an incorrect MOVISAFE® software.	• Check the DCS..B version and parameterize it again using a valid MOVISAFE® software. • Then switch the DCS..B option off and on again.
			4 5	Incorrect reference voltage	• Incorrect reference voltage • Faulty supply voltage of the DCS..B option • Faulty component on the DCS..B option	• Check supply voltage of DCS..B option. • Switch DCS..B option off and on again.
			6 7	Faulty system voltage	• Faulty supply voltage of the DCS..B option • Faulty component on the DCS..B option	• Check supply voltage of DCS..B option. • Switch DCS..B option off and on again.
			10	Incorrect supply voltage.	• DC 24 V supply voltage of the DCS..B option is faulty. • Faulty component on the DCS..B option	• Check supply voltage of DCS..B option. • Switch DCS..B option off and on again.

Fault			Subfault			
Code	**Designation**	**Response (P)**	**Code**	**Designation**	**Possible cause**	**Measure**
108	DCS fault	Display fault	11	The unit's ambient temperature is not in the defined range	Temperature at the place of operation is not in the permitted range	Check the ambient temperature
			12	Plausibility fault for position changeover	For the position changeover, ZSC, JSS or DMC is permanently activated	• Check ZSC activation • Check JSS activation • Check DMC activation (only for monitoring via position)
			13	Faulty switching of the LOSIDE driver DO02_P / DO02_M	Short circuit of the output	Check wiring at output
			14	Faulty switching of the HISIDE driver DO02_P / DO02_M		
			15	Faulty switching of the LOSIDE driver DO0_M		
			16	Faulty switching of the HISIDE driver DO0_P		
			17	Faulty switching of the LOSIDE driver DO01_M		
			18	Faulty switching of the HISIDE driver DO01_P		
			19 20	Unit was programmed with incorrect software interface.	Program or configuration data was loaded into the unit with an incorrect MOVISAFE® software.	• Check the DCS..B version and parameterize it again using a valid MOVISAFE® software. • Then switch the DCS..B option off and on again.
			21 22	CRC of configuration data invalid.	Configuration data have not been uploaded correctly.	Upload configuration data into unit again.
108	DCS fault	Display fault	23 24	Fault during internal transmission of configuration data.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			25 26	Fault while calculating firmware configuration data.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			27 28	CRC of firmware configuration data invalid.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			29 30	Fault during internal transmission of firmware configuration data.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			31	The range check of the device description is faulty.	Faulty configuration data of the device description.	• Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	32	The range check of the access data is faulty.	Faulty configuration data of the device description.	• Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			33	EMU range check is faulty.	Faulty configuration data of the EMU function.	• Undo the changes in the EMU configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			34	PSC range check is faulty.	Faulty configuration data of the PSC function.	• Undo the changes in the PSC configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	35	ESS range check is faulty.	Faulty configuration data of the ESS function.	• Undo the changes in the ESS configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			36	ELC range check is faulty.	Faulty configuration data of the ELC function.	• Undo the changes in the ELC configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			37	OLC range check is faulty.	Faulty configuration data of the OLC function.	• Undo the changes in the OLC configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	38	ZSC range check is faulty.	Faulty configuration data of the ZSC function.	• Undo the changes in the ZSC configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			39	MSC range check is faulty.	Faulty configuration data of the MSC function.	• Undo the changes in the MSC configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			40	DMC range check is faulty.	Faulty configuration data of the DMC function.	• Undo the changes in the DMC configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	41	JSS range check is faulty.	Faulty configuration data of the JSS function.	• Undo the changes in the JSS configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			42	PLC range check is faulty.	Incorrect IL application program.	• Compile the application program again, load it, and switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			43	Shutdown channel range check is faulty.	Internal configuration data fault.	• Undo the changes in the disconnection (configuration) or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	44	Digital output range check is faulty.	Faulty configuration data of digital outputs.	• Undo the changes in the disconnection matrix of the digital outputs or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			45	Digital output range check is faulty.	Faulty configuration data of digital outputs.	• Undo the changes in the disconnection matrix of the digital outputs or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			46	Encoder type range check is faulty.	Incorrectly configured encoder type.	• Undo the changes in the encoder configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	47	Encoder scaling range check is faulty.	Incorrectly configured encoder distance.	• Undo changes made to the encoder distance (measuring length, resolution or max. speed) or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			48	Encoder position range check is faulty.	Incorrectly configured encoder distance.	• Undo changes made to the encoder distance (measuring length, resolution or max. speed) or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			49	PDM range check is faulty.	Faulty configuration of the PDM function.	• Undo the changes in the PDM configuration or enter new values. • Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	50 51	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			52 53	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			54 55	Internal program fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			56 57	Faulty watchdog test.	Faulty feedback of internal shutdown channel of the digital outputs.	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			58 59	Faulty process data.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			62 63	Internal processing fault in user program.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
108	DCS fault	Display fault	64 65	Internal processing fault in user program.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			66 67	Internal processing fault in user program.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			68 69	Internal processing fault of input element	-	• Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			70 71	Internal processing fault of input element	-	• Reload the configuration data. Next switch the DCS..B option off and on again. • If the fault occurs again, contact SEW-EURODRIVE Service for the proper MOVISAFE® software version.
			72 73	Internal processing fault in user program	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	74 75	Runtime fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			80	Runtime fault	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			82 83	Interrupt fault during time monitoring.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			85 86	Runtime fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			87 88	Program fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			89 90	Internal CPU fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
108	DCS fault	Display fault	91 92	Internal CPU fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			93 94	Internal CPU fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			95 96	Internal RAM fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			97 98	Internal flash fault.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			99 100	Internal CPU fault	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			101 102	Internal processing fault PROFIsafe.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
108	DCS fault	Display fault	103 104	Internal processing fault PROFIsafe.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			105 106	Internal processing fault PROFIsafe.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			107 108	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			109 110	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			111 112	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
108	DCS fault	Display fault	113 114	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			117 118	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			119	Fault during internal data transmission.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			140 141	Faulty core voltage DMP1.	• Incorrect core voltage of the DCS..B option. • Faulty component on the DCS..B option	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			142 143	Faulty core voltage DMPM.	• Incorrect core voltage of the DCS..B option. • Faulty component on the DCS..B option	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			156 157	Faulty RAM test.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
108	DCS fault	Display fault	160 161	Faulty test of static re-gisters.	-	• Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.

Fault Code	Fault Designation	Fault Response (P)	Subfault Code	Subfault Designation	Possible cause	Measure
109	DCS alarm	Display fault	0	DCS alarm		
			1	Communication fault backplane bus MOVIDRIVE® B.	The DCS..B option does not receive any valid data from MOVIDRIVE® B.	• Check hardware connection to MOVIDRIVE® B. • Check firmware version of MOVIDRIVE® B. • Apply braided shield of encoder cable, motor cable, and TF cable over a large area. • Establish equipotential bonding.
			2 3	Pulse 1 plausibility fault at digital input DI1.	The configured pulse 1 voltage is not present at digital input DI1 (X81:2).	• Check configuration of the DI1 digital input according to configuration and wiring diagram. • Check the wiring.
			4 5	Pulse 1 plausibility fault at digital input DI2.	The configured pulse 1 voltage is not present at digital input DI2 (X81:3).	• Check configuration of the DI2 digital input according to configuration and wiring diagram. • Check the wiring.
			6 7	Pulse 1 plausibility fault at digital input DI3.	The configured pulse 1 voltage is not present at digital input DI3 (X81:4).	• Check configuration of the DI3 digital input according to configuration and wiring diagram. • Check the wiring.
			8 9	Pulse 1 plausibility fault at digital input DI4.	The configured pulse 1 voltage is not present at digital input DI4 (X81:5).	• Check configuration of the DI4 digital input according to configuration and wiring diagram. • Check the wiring.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Display fault	10 11	Pulse 1 plausibility fault at digital input DI5.	The configured pulse 1 voltage is not present at digital input DI5 (X81:7).	• Check configuration of the DI5 digital input according to configuration and wiring diagram. • Check the wiring.
			12 13	Pulse 1 plausibility fault at digital input DI6.	The configured pulse 1 voltage is not present at digital input DI6 (X81:8).	• Check configuration digital input DI6 according to configuration and wiring diagram. • Check the wiring.
			14 15	Pulse 1 plausibility fault at digital input DI7.	The configured pulse 1 voltage is not present at digital input DI7 (X81:9).	• Check configuration of the DI7 digital input according to configuration and wiring diagram. • Check the wiring.
			16 17	Pulse 1 plausibility fault at digital input DI8.	The configured pulse 1 voltage is not present at digital input DI8 (X81:10).	• Check configuration of digital input DI8 according to configuration and wiring diagram. • Check the wiring.
			18 19	Pulse 2 plausibility fault at digital input DI1.	The configured pulse 2 voltage is not present at digital input DI1 (X81:2).	• Check configuration of the DI1 digital input according to configuration and wiring diagram. • Check the wiring.
			20 21	Pulse 2 plausibility fault at digital input DI2.	The configured pulse 2 voltage is not present at digital input DI2 (X81:3).	• Check configuration of the DI2 digital input according to configuration and wiring diagram. • Check the wiring.
			22 23	Pulse 2 plausibility fault at digital input DI3.	The configured pulse 2 voltage is not present at digital input DI3 (X81:4).	• Check configuration of the DI3 digital input according to configuration and wiring diagram. • Check the wiring.
			24 25	Pulse 2 plausibility fault at digital input DI4.	The configured pulse 2 voltage is not present at digital input DI4 (X81:5).	• Check configuration of the DI4 digital input according to configuration and wiring diagram. • Check the wiring.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Display fault	26 27	Pulse 2 plausibility fault at digital input DI5.	The configured pulse 2 voltage is not present at digital input DI5 (X81:7).	• Check configuration of the DI5 digital input according to configuration and wiring diagram. • Check the wiring.
			28 29	Pulse 2 plausibility fault at digital input DI6.	The configured pulse 2 voltage is not present at digital input DI6 (X81:8).	• Check configuration digital input DI6 according to configuration and wiring diagram. • Check the wiring.
			30 31	Pulse 2 plausibility fault at digital input DI7.	The configured pulse 2 voltage is not present at digital input DI7 (X81:9).	• Check configuration of the DI7 digital input according to configuration and wiring diagram. • Check the wiring.
			32 33	Pulse 2 plausibility fault at digital input DI8.	The configured pulse 2 voltage is not present at digital input DI8 (X81:10).	• Check configuration of digital input DI8 according to configuration and wiring diagram. • Check the wiring.
			34 35	Plausibility fault in the speed detection.	The difference between the two speed sensors is higher than the configured speed switch-off threshold.	• Check track again with the set data in the encoder configuration. • Check speed sensor. • Use the SCOPE function to set speed signals so that they are congruent.
109	DCS alarm	Display fault	36 37	Plausibility fault in the position detection.	The difference between the two position signals is higher than the configured increment switch-off threshold.	• Check track with the configured data of the encoder setting. • Check position signal. • Are all signals connected to the 9-pin encoder connector? • Check the encoder connector for correct connection. • Use the SCOPE function to set positions signals so that they are congruent. • If the absolute value is to be used via the backplane bus, it may be necessary to adapt the *Switch-off Threshold Incr.* parameter.
			38 39	Plausibility fault incorrect position range.	The current position is outside the configured measurement range.	• Check track with the configured data of the encoder setting. • Check position signal, correct offset if necessary. • Use the SCOPE function to set positions signals so that they are congruent.
			40 41	Plausibility fault incorrect speed.	The current speed exceeds the configured maximum speed.	• The drive moves outside the permitted and configured speed range. • Check the configuration (encoder screen: max. set speed). • Analyze the speed profile using the SCOPE function.

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Display fault	42 43	Plausibility fault incorrect acceleration.	The current acceleration exceeds the configured maximum acceleration.	• Check the configuration (encoder screen: max. set speed). • Analyze the speed/acceleration profile using the SCOPE function.
			44 45	Plausibility fault in encoder interface (A3401 = encoder 1 and A3402 = encoder 2).	The encoder interface does not match the configured data	• Check encoder type and configuration (SSI/incremental) • Check the encoder connection/wiring • Check the polarity of the encoder data • Check function of the encoder
			46 47	Voltage supply of encoder faulty (A3403 = encoder 1 and A3404 = encoder 2).	Encoder voltage supply not within defined range (min. DC 20 V / max. DC 29 V).	• Overload in the supply voltage of the encoder; internal polyswitch fuse has tripped. • Check supply voltage of DCS..B option.
			48 49	Fault in reference voltage	Reference voltage input of the encoder system is outside of the defined range	Check the reference voltage input of the encoder system
			50 51	Difference level RS485 driver 1. Fault Faulty "B" or "Cycle" signal.	• No encoder connection. • Incorrect encoder type connected.	• Check encoder connection. • Check encoder cabling.
			52 53	Difference level RS485 driver 2. Fault Faulty "A" or "DATA" signal.		
			54 55	Difference in incremental counter		
109	DCS alarm	Display fault	56 57	Plausibility fault in encoder interface (A3401 = encoder 1 and A3402 = encoder 2)	The encoder interface does not match the configured data	• Check encoder type and configuration (SSI/incremental) • Check the encoder connection/wiring • Check the polarity of the encoder data • Check function of the encoder
			58 59	Plausibility fault SIN/COS encoder connection.	Incorrect encoder type connected.	Check encoder connection and cabling.
			60 61 62 63	Plausibility fault in the incremental encoder connection	Phase fault of the incremental or SIN/COS encoder.	• Check encoder connection • Replace defective encoder
			64 65	Plausibility fault - SSI encoder connection (master mode).	Connected encoder type does not correspond to the configuration.	• Check configuration. • Check connected encoder.
			66 67	Plausibility fault SSI encoder connection (slave mode).	Connected encoder type does not correspond to the configuration.	• Check configuration. • Check connected encoder.
			68 69	Faulty switching behavior of the high-side driver DO0_P.	DC 24 V short circuit at digital output DO0_P (X82:1).	Check wiring at digital output.
			70 71	Faulty switching behavior of the low-side driver DO0_M.	DC 0 V short circuit at digital output DO0_M (X82:2).	Check wiring at digital output.
			72 73	Faulty switching behavior of the high-side driver DO1_P.	DC 24 V short circuit at digital output DO1_P (X82:3).	Check wiring at digital output.

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Display fault	74 75	Faulty switching behavior of the low-side driver DO1_M.	DC 0 V short circuit at digital output DO1_M (X82:4).	Check wiring at digital output.
			76 77	CCW and CW monitoring of DMC safety function activated simultaneously.	Multiple activation of the DMC safety function.	Make sure to activate only one "enable" in the control of the DMC safety function.
			78 79	CCW and CW monitoring range of the OLC safety function activated simultaneously.	Multiple activation of the OLC safety function.	Make sure to activate only one "enable" in the control of the OLC safety function.
			80 81	CCW and CW monitoring of JSS safety function activated simultaneously.	Multiple activation of the JSS safety function.	Make sure to activate only one "enable" in the control of the JSS safety function.
			82 83	Timeout fault MET.	Input element with time monitoring is faulty.	Check input element wiring.
			84 85	Timeout fault MEZ.	Two-hand control with time monitoring is faulty.	Check input element wiring.
			86 87	EMU1 monitoring fault.	• Faulty output control • Faulty feedback	Check wiring at digital output.
			88 89	EMU2 monitoring fault		
			90 91	Plausibility fault position changeover.	Position changeover during ZSC, JSS or DMC is permanently activated.	• Check ZSC (SOS) activation. • Check JSS (SDI) activation. • Check DMC (SDI) activation only for monitoring the position.
109	DCS alarm	Display fault	92 93	SSI encoder fault.	Encoder step SSI value within one cycle is too large.	• Check encoder configuration. • Check encoder cabling.
			94 95	SSI encoder fault.	Plausibility fault for position adjustment.	• Check encoder configuration. • Check encoder cabling.
			96 97	Plausibility fault of incremental encoder tracks.	• Different counting signals on A/B encoder tracks. • Defective component at RS485 interface. • Encoder operates outside tolerances of encoder interface.	• Check encoder configuration. • Check encoder cabling. • Check encoder signal levels. • Check maximum counting frequency of incremental encoder.
			98 99	Plausibility fault analog/digital comparison at Schmitt trigger output – encoder input X84.	• Connected encoder type does not correspond to the configuration. • Faulty encoder signals • Hardware defective	• Check configuration. • Check connected encoder. • Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			100 101	Plausibility fault analog/digital comparison at Schmitt trigger output – encoder input X85.	• Connected encoder type does not correspond to the configuration. • Faulty encoder signals • Hardware defective	• Check configuration. • Check connected encoder. • Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			110 111	Position processing range check for DCS22B/32B.	Position processing activated for DCS22B/32B options.	• Check configuration data. • Deactivate position processing.
			112 113	Faulty OSSD input check.	Faulty OSSD test.	• Check DC 24 V input voltage of all OSSD inputs. • Switch DCS..B option off and on again.

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
109	DCS alarm	Display fault	114 115	Faulty switching behavior of the high-side driver DO2_P.	DC 24 V short circuit at digital output DO2_P (X83:1).	Check wiring at digital output.
			116 117	Faulty switching behavior of the low-side driver DO2_M.	DC 0 V short circuit at digital output DO2_M (X83:2).	Check wiring at digital output.
			118	Dynamic test for high-side driver DO0_P.	DC 24 V short circuit at digital output DO0_P.	Check wiring at digital output.
			119	Dynamic test for low-side driver DO0_M.	DC 0 V short circuit at digital output DO0_M.	Check wiring at digital output.
			120	Dynamic test for high-side driver DO1_P.	DC 24 V short circuit at digital output DO1_P.	Check wiring at digital output.
			121	Dynamic test for low-side driver DO1_M.	DC 0 V short circuit at digital output DO1_M.	Check wiring at digital output.
			122	Dynamic test for high-side driver DO2_P.	DC 24 V short circuit at digital output DO2_P.	Check wiring at digital output.
			123	Dynamic test for low-side driver DO2_M.	DC 0 V short circuit at digital output DO2_M.	Check wiring at digital output.
			124 125	Deactivation of digital input test faulty	Digital inputs are still active after deactivation.	• Check digital input wiring. • Switch DCS..B option off and on again. • Replace DCS..B option.
			134 135	Plausibility fault in the speed recording	The difference between the two speed sensors is higher than the configured speed switch-off threshold.	• Check track again with the set data in the encoder configuration. • Check speed sensor. • Use the SCOPE function to set speed signals so that they are congruent.
109	DCS alarm	Display fault	136 137	Plausibility fault in the position detection.	The difference between the two position signals is higher than the configured increment switch-off threshold.	• Check track with the configured data of the encoder setting. • Check position signal. • Are all signals connected correctly to the 9-pin encoder connector? • Check encoder connector for correct connection. • Use the SCOPE function to set positions signals so that they are congruent.
			138 139	Plausibility fault incorrect position range.	The current position is outside the configured measurement range.	• Check track with the configured data of the encoder setting. • Check position signal, correct offset if necessary. • Use the SCOPE function to set positions signals so that they are congruent.
			140 141	Plausibility fault incorrect speed.	The current speed exceeds the configured maximum speed.	• The drive moves outside the permitted and configured speed range. • Check the configuration (encoder screen: max. set speed). • Analyze the speed profile using the SCOPE function.
			142 143	Plausibility fault incorrect acceleration.	The current acceleration is outside the configured acceleration range. The drive has exceeded the permitted acceleration range	• Check the configuration (encoder screen: max. set speed). • Analyze the speed/acceleration profile using the SCOPE function.

Fault Code	Designation	Response (P)	Subfault Code	Designation	Possible cause	Measure
109	DCS alarm	Display fault	146 147	Voltage supply of encoder faulty (E3405 = encoder 1 and E3406 = encoder 2).	The voltage supply of the encoder is not within the defined range (min. DC 20 V / max. DC 29 V).	• Overload in the supply voltage of the encoder; internal polyswitch fuse has tripped. • Check supply voltage of DCS..B option.
			150 151	Difference level RS485 driver. Fault Faulty "B" or "Cycle" signal.	• No encoder connection. • Incorrect encoder type connected.	• Check encoder connection. • Check encoder cabling.
			152 153	Difference level RS485 driver. Fault Faulty "A" or "DATA" signal.	• No encoder connection. • Incorrect encoder type connected.	• Check encoder connection. • Check encoder cabling.
			158 159	Plausibility fault SIN/COS encoder connection.	Incorrect encoder type connected.	Check encoder connection and cabling.
			164 165	Plausibility fault - SSI encoder connection (master mode).	Connected encoder type does not correspond to the configuration.	• Check encoder connection and cabling. • Check encoder.
			166 167	Plausibility fault SSI encoder connection (slave mode).	Connected encoder type does not correspond to the configuration	• Check encoder connection and cabling. • Check encoder.
			186 187	EMU1 monitoring fault.	Faulty monitoring of the external shutdown channel.	• Check hardware connections. • Pick-up or release time too short. • Check switch contacts.
			188 189	EMU2 monitoring fault.	Faulty monitoring of the external shutdown channel.	• Check hardware connections. • Pick-up or release time too short. • Check switch contacts.
109	DCS alarm	Display fault	190 191	Plausibility fault position changeover.	Position changeover during ZSC, JSS or DMC is permanently activated.	• Check ZSC (SOS) activation. • Check JSS (SDI) activation. • Check DMC (SDI) activation only for monitoring the position.
			192 193	SSI encoder fault.	Encoder step SSI value within one cycle is too large.	• Check encoder configuration. • Check encoder cabling.
			194 195	SSI encoder fault.	Plausibility fault for position adjustment.	• Check encoder configuration. • Check encoder cabling.
			196 197	Plausibility fault of incremental encoder tracks.	• Different counting signals on A/B encoder tracks. • Defective component at RS485 interface. • Encoder operates outside tolerances of encoder interface.	• Check encoder configuration. • Check encoder cabling. • Check encoder signal levels. • Check maximum counting frequency of incremental encoder.
			198 199	Plausibility fault analog/digital comparison at Schmitt trigger output – encoder input X84.	• Connected encoder type does not correspond to the configuration. • Faulty encoder signals • Hardware defective	• Check configuration. • Check connected encoder. • Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.
			200 201	Plausibility fault analog/digital comparison at Schmitt trigger output – encoder input X85.	• Connected encoder type does not correspond to the configuration. • Faulty encoder signals • Hardware defective	• Check configuration. • Check connected encoder. • Replace DCS..B option. • Send faulty DCS..B option with fault number to SEW-EURODRIVE for fault diagnostics.

Fault			Subfault			
Code	**Designation**	**Response (P)**	**Code**	**Designation**	**Possible cause**	**Measure**
110	"Ex-e protection" fault	Emergency stop	0	Duration of operation below 5 Hz exceeded	Duration of operation below 5 Hz exceeded	• Check configuration • Shorten duration of operation below 5 Hz
113	Analog input wire break	No response (P)	0	AI1 analog input wire break	AI1 analog input wire break	Check wiring
116	"Timeout MOVI-PLC" fault	Rapid stop/ warning	0	MOVI-PLC® communication timeout		• Check startup • Check wiring
122	"Absolute encoder option"	Immediate stop	2	X15: Unknown encoder type	Connected encoder type unknown	Replace encoder
			16386	X14: Unknown encoder type		
			1	X15: Plausibility monitoring	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			33	X15: Analog voltages not within tolerance		
			41 – 45	X15: RS485 communication		
			60	X15: Analog voltages not within tolerance		
			63	X15: Position fault, excessive speed, unable to generate position	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			256	X15: Voltage dip		
			257	X15: Interrupted clock or data line		
			258	X15: Change of position		
			261	X15: No high level present	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			513	X15: Plausibility monitoring		
			768	X15: PDO timeout		
			770	X15: Change of position		

Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
122	"Absolute encoder option"	Immediate stop	16385	X14: Plausibility monitoring	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			16417	X14: Analog voltages not within tolerance		
			16444	X14: Analog voltages not within tolerance		
			16447	X14: Position fault, excessive speed, unable to generate position		
			16425 – 16429	X14: RS485 communication	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			16640	X14: Encoder's fault bit is set		
			16641	X14: Interrupted clock or data line		
			16642	X14: Change of position		
			16645	X14: No high level present	• Encoder cable or shield not connected correctly • Short circuit / broken wire in encoder cable • Encoder defective • EMC interference	• Check encoder cable and shield for correct connection, short circuit and broken wire • Replace encoder • Providing for EMC measures
			16897	X14: Plausibility monitoring		
			17152	X14: PDO timeout		
			17154	X14: Change of position		
			34 – 40	X15: Internal encoder fault	Internal encoder fault	Replace encoder
			46 – 50			
			64 – 67			
			514 – 544			
			772 – 774			
122	"Absolute encoder option"	Immediate stop	16418 – 16424	X14: Internal encoder fault	Internal encoder fault	Replace encoder
			16430 – 16434	X14: Internal encoder fault		
			16448 – 16451	X14: Internal encoder fault		
			16898 – 16928	X14: Internal encoder fault		
			17156 – 17158	X14: Internal encoder fault		

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
122	"Absolute encoder option"	Immediate stop	61	X15: Critical transmitter current	Soiled, transmitter broken	Replace encoder
			16445	X14: Critical transmitter current		
			62	X15: Critical encoder temperature	Encoder temperature too high	Reduce motor and ambient temperature
			16446	X14: Critical encoder temperature		
			259	X15: Insufficient clock frequency	Incorrect encoder parameterization	Check encoder parameterization
			260	X15: Encoder signals programmable fault		
			576	X15: Internal encoder warning		
			769	X15: Encoder signals programmable fault		
			16643	X14: Insufficient clock frequency		
			16644	X14: Encoder signals programmable fault		
			16960	X14: Internal encoder warning		
			17153	X14: Encoder signals programmable fault		
			771	X15: Emergency signal		
			17155	X14: Emergency signal		
123	Positioning interruption	Emergency stop (P)	0	Fault "Positioning/Positioning interruption"	Target monitoring when interrupted positioning process is resumed. Target would be overrun.	Perform positioning process without interruption until it is complete
124	Ambient condition	Emergency stop (P)	1	Permitted ambient temperature exceeded	Ambient temperature > 60 °C	• Improve ventilation and cooling conditions • Improve air supply to the control cabinet; check filter mats

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Fault			Subfault			
Code	Designation	Response (P)	Code	Designation	Possible cause	Measure
196	Power section	Immediate stop	1	Discharge resistor	Discharge resistor overload	Observe waiting time for power on/off
			2	Hardware ID precharge/discharge control	Incorrect precharge/discharge controller variant	• Consult SEW Service • Replace precharge/discharge control
			3	Inverter coupling	Defective inverter coupling	• Consult SEW Service • Replace inverter coupling
			4	Inverter coupling reference voltage	Defective inverter coupling	• Consult SEW Service • Replace inverter coupling
			5	Power sections configuration	Different phase modules installed in the unit	• Inform the SEW Service • Check and replace phase modules
			6	Control unit configuration	Control unit line inverter or motor inverter incorrect	Replace or correctly assign the control unit of line and motor inverter
			7	Communication power section control unit	No communication	Check control unit installation
			8	Communication precharge/discharge control inverter coupling	No communication	• Check the cabling. • Consult SEW Service
			10	Communication power section control unit	The inverter coupling does not support protocol	Replace inverter coupling
			11	Communication power section control unit	Faulty communication with inverter coupling at power-up (CRC fault)	Replace inverter coupling
			12	Communication power section control unit	Inverter coupling uses protocol that does not match control unit	Replace inverter coupling
			13	Communication power section control unit	Faulty communication with inverter coupling during operation: more than 1 CRC fault per second	Replace inverter coupling
196	Power section	Immediate stop	14	Control unit configuration	Missing PLD functionality for EEPROM data set size 7	Replace control unit
			15	Inverter coupling fault	Inverter coupling processor has signaled internal fault	• Consult SEW Service if the fault occurs again. • Replace inverter coupling
			16	Inverter coupling fault: PLD version incompatible		Replace inverter coupling
			17	Precharge/discharge control fault	Precharge/discharge control processor has signaled internal fault	• Consult SEW Service if the fault occurs again. • Replace precharge/discharge controller
			18	Defective DC link fan	Faulty DC link fan	• Consult SEW Service • Check whether DC link choke fan is connected or faulty
			19	Communication power section control unit	Faulty communication with inverter coupling during operation: more than 1 internal fault per second	• Consult SEW Service if the fault occurs again. • Replace inverter coupling
			20	Communication power section control unit	The control unit has not sent any messages to the inverter coupling for a while	• Consult SEW Service if the fault occurs again. • Replace inverter coupling
			21	Uz measurement not plausible Phase R	Defective phase module	Consult SEW Service if the fault occurs again.
			22	Ur measurement not plausible Phase S		
			23	Uz measurement not plausible Phase T		

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

16.4 SEW-EURODRIVE electronics service

16.4.1 Sending a device in for repair

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

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

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

- Serial number (→ nameplate)
- Type 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, ⅄ or ⅄ connection)
- Nature of the fault
- Accompanying circumstances
- Your own presumptions as to what has happened
- Any unusual events preceding the problem, etc.

16.5 Extended storage

If the device is stored for a long time, connect it to the power supply for at least 5 minutes every 2 years. Otherwise, the device'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 de-energized. This effect can damage the capacitors if the device is connected using the rated voltage after a longer period of storage.

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

The following stages are recommended:

AC 400/500 V devices:

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

AC 230 V devices:

- 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 device can be used immediately or stored again for an extended period with maintenance.

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16.6 Waste disposal

Please follow the current instructions. Dispose of the following materials in accordance with the regulations in force:

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

17 Declarations of conformity

17.1 MOVIDRIVE®

17.1.1 Declaration of conformity

EU Declaration of Conformity

Translation of the original text **900230310/EN**

SEW-EURODRIVE GmbH & Co. KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the following products

Frequency inverters of the product family	**MOVIDRIVE® MDX6.B....-...-.-../.**	
in accordance with		
Machinery Directive	**2006/42/EC** **(L 157, 09.06.2006, 24-86)**	

This includes the fulfillment of the protection targets for "electrical power supply" in accordance with annex I No. 1.5.1 according to the Low Voltage Directive 73/23/EEC -- Note: 2014/35/EU is currently valid

EMC Directive	**2014/30/EU** **(L 96, March 29, 2014, 79-106)**	**4)**
RoHS Directive	**2011/65/EU** **(L 174, July 1, 2011, 88-110)**	
Applied harmonized standards:	**EN ISO 13849-1:2008/AC:2009** **EN 61800-5-1:2007** **EN 61800-3:2004/A1:2012** **EN 50581:2012**	

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. For the assessment, the product was installed in a typical plant configuration.

Bruchsal	**21.06.2017**		
Place	Date	Johann Soder Managing Director Technology	a) b)

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

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17.2 MOVIDRIVE® with DFS11B/DFS21B

17.2.1 Declaration of conformity

EU Declaration of Conformity

Translation of the original text **900010510/EN**

SEW-EURODRIVE GmbH & Co. KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the following products

Frequency inverters of the product family	**MOVIDRIVE® MDX6.B....-..3-.-../.**	
with built-in	**DFS11B PROFIBUS-DP-V1 with PROFIsafe** **DFS21B PROFINET IO with PROFIsafe**	
in accordance with		
Machinery Directive	**2006/42/EC** **(L 157, 09.06.2006, 24-86)**	

This includes the fulfillment of the protection targets for "electrical power supply" in accordance with annex I No. 1.5.1 according to the Low Voltage Directive 73/23/EEC -- Note: 2014/35/EU is currently valid.

EMC Directive	**2014/30/EU** **(L 96, March 29, 2014, 79-106)**	**4)**
RoHS Directive	**2011/65/EU** **(L 174, July 1, 2011, 88-110)**	
Applied harmonized standards:	**EN ISO 13849-1:2008/AC:2009** **EN 61800-5-1:2007** **EN 61800-3:2004/A1:2012** **EN 50581:2012**	
Other applied standards:	**EN 61508:2001 (part 1-7)** **EN 62061:2005**	

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. For the assessment, the product was installed in a typical plant configuration.

Bruchsal	**19.06.2017**		
Place	Date	Johann Soder Managing Director Technology	a) b)

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

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17.3 MOVIDRIVE® with DCS2.B/DCS3.B

17.3.1 Declaration of conformity

EU Declaration of Conformity

Translation of the original text **901920513/EN**

SEW-EURODRIVE GmbH & Co. KG
Ernst-Blickle-Straße 42, D-76646 Bruchsal
declares under sole responsibility that the following products

Frequency inverters of the product family	**MOVIDRIVE® MDX6.B....-..3-.-../.**	
with built-in	**DCS2.B with DFS12B PROFIBUS-DP-V1 with PROFIsafe** **DCS2.B with DFS22B PROFINET IO with PROFIsafe** **DCS3.B**	
in accordance with		
Machinery Directive	**2006/42/EC** **(L 157, 09.06.2006, 24-86)**	

This includes the fulfillment of the protection targets for "electrical power supply" in accordance with annex I No. 1.5.1 according to the Low Voltage Directive 73/23/EEC -- Note: 2014/35/EU is currently valid

EMC Directive	**2014/30/EU** **(L 96, March 29, 2014, 79-106)**	4)
RoHS Directive	**2011/65/EU** **(L 174, July 1, 2011, 88-110)**	
Applied harmonized standards:	**EN ISO 13849-1:2008/AC:2009** **EN 61800-3:2004/A1:2012** **EN 61800-5-1:2007** **EN 61800-5-2:2007** **EN 50581:2012**	
Other applied standards:	**EN 61508:2001 (part 1-7)** **EN 62061:2005**	

4) According to the EMC Directive, the listed products are not independently operable products. EMC assessment is only possible after these products have been integrated in an overall system. For the assessment, the product was installed in a typical plant configuration.

Freely programmable safety controller for monitoring drive systems, suitable for SIL 3 IEC 61508:2010 and PL e according to EN ISO 13849-1:2008. An EC type examination was carried out for the safety module by the following testing institute: TÜV Rheinland Industrie Service GmbH, Alboinstr. 56, 12103 Berlin, Germany. ID of notified body NB 0035

Bruchsal	**23.06.2017**		
Place	Date	Johann Soder Managing Director Technology	a) b)

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

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18 Address Directory

Germany			
Headquarters Production plant Sales	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 42 76646 Bruchsal, Germany P.O. box address Postfach 3023 • D-76642 Bruchsal, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.seweurodrive.com sew@sew-eurodrive.de
Production Plant / Industrial Gear Units	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 76646 Bruchsal, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Production plant	**Graben**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 1 76676 Graben-Neudorf, Germany P.O. box address Postfach 1220 • 76671 Graben-Neudorf, Germany	Tel. +49 7251 75-0 Fax +49 7251 75-2970
	Östringen	SEW-EURODRIVE GmbH & Co KG, Oestringen Plant Franz-Gurk-Strasse 2 76684 Oestringen, Germany	Tel. +49 7253 9254-0 Fax +49 7253 9254-90 oestringen@sew-eurodrive.de
Service Competence Centers	**Mechanical/ Mechatronic Components**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 1 76676 Graben-Neudorf, Germany	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	Electronics	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Strasse 42 76646 Bruchsal, Germany	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
Drive Technology Center	**North**	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Strasse 40-42 30823 Garbsen (near Hanover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	East	SEW-EURODRIVE GmbH & Co KG Daenkritzer Weg 1 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 85551 Kirchheim (near Munich)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstrasse 1 40764 Langenfeld (near Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Drive Service Hotline/24-hour availability		+49 800 SEWHELP +49 800 7394357
Technical offices	**Augsburg**	SEW-EURODRIVE GmbH & Co KG August-Wessels-Strasse 27 86156 Augsburg, Germany	Tel. +49 821 22779-10 Fax +49 821 22779-50 tb-augsburg@sew-eurodrive.de
	Berlin	SEW-EURODRIVE GmbH & Co KG Lilienthalstrasse 3a 12529 Schoenefeld, Germany	Tel. +49 306331131-30 Fax +49 306331131-36 tb-berlin@sew-eurodrive.de
	Lake Constance	SEW-EURODRIVE GmbH & Co KG Dornierstraße 4 88677 Markdorf, Germany	Tel. +49 7544 96590-90 Fax +49 7544 96590-99 tb-bodensee@sew-eurodrive.de
	Bremen	SEW-EURODRIVE GmbH & Co KG Bornstr.19 ... 22 28195 Bremen, Germany	Tel. +49 421 33918-10 Fax +49 421 33918-22 tb-bremen@sew-eurodrive.de
	Dortmund	SEW-EURODRIVE GmbH & Co KG Hildastraße 8 44145 Dortmund, Germany	Tel. +49 231 229028-10 Fax +49 231 229028-20 tb-dortmund@sew-eurodrive.de
	Dresden	SEW-EURODRIVE GmbH & Co KG Hauptstrasse 32 01445 Radebeul, Germany	Tel. +49 351 26338-0 Fax +49 351 26338-38 tb-dresden@sew-eurodrive.de
	Erfurt	SEW-EURODRIVE GmbH & Co KG Dubliner Strasse 12 99091 Erfurt, Germany	Tel. +49 361 21709-70 Fax +49 361 21709-79 tb-erfurt@sew-eurodrive.de
	Guestrow	SEW-EURODRIVE GmbH & Co KG Glasewitzer Chaussee 33 B 18273 Guestrow, Germany P.O. box address Postfach 1216 • 18262 Güstrow, Germany	Tel. +49 3843 8557-80 Fax +49 3843 8557-88 tb-guestrow@sew-eurodrive.de

Germany			
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	Hanover/Garbsen	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Str.40-42 30823 Garbsen, Germany P.O. box address Postfach 1104 53 • 30804 Garbsen, Germany	Tel. +49 5137 8798-10 Fax +49 5137 8798-50 tb-hannover@sew-eurodrive.de
	Heilbronn	SEW-EURODRIVE GmbH & Co KG Zeppelinstrasse 7 74357 Boennigheim, Germany	Tel. +49 7143 8738-0 Fax +49 7143 8738-25 tb-heilbronn@sew-eurodrive.de
	Herford	SEW-EURODRIVE GmbH & Co KG Göbenstraße 3 – 7 32052 Herford	Tel. +49 5221 9141-0 Fax +49 5221 9141-20 tb-herford@sew-eurodrive.de
	Karlsruhe	SEW-EURODRIVE GmbH & Co KG Ettlinger Weg 2 76467 Bietigheim, Germany P.O. box address Postfach 43 • 76463 Bietigheim, Germany	Tel. +49 7245 9190-10 Fax +49 7245 9190-20 tb-karlsruhe@sew-eurodrive.de
	Kassel	SEW-EURODRIVE GmbH & Co KG Lange Strasse 14 34253 Lohfelden, Germany	Tel. +49 561 95144-80 Fax +49 561 95144-90 tb-kassel@sew-eurodrive.de
	Koblenz	SEW-EURODRIVE GmbH & Co KG Bahnstrasse 17a 56743 Mendig, Germany	Tel. +49 2652 9713-30 Fax +49 2652 9713-40 tb-koblenz@sew-eurodrive.de
	Lahr	SEWEURODRIVE GmbH & Co KG Europastrasse 3/1 77933 Lahr/Schwarzwald, Germany	Tel. +49 7821 90999-60 Fax +49 7821 90999-79 tb-lahr@sew-eurodrive.de
	Langenfeld	SEW-EURODRIVE GmbH & Co KG Siemensstrasse 1 40764 Langenfeld, Germany	Tel. +49 2173 8507-10 Fax +49 2173 8507-50 tb-langenfeld@sew-eurodrive.de
	Magdeburg	SEW-EURODRIVE GmbH & Co KG Breiteweg 53 39179 Barleben, Germany	Tel. +49 39203 7577-1 Fax +49 39203 7577-9 tb-magdeburg@sew-eurodrive.de
	Mannheim	SEW-EURODRIVE GmbH & Co KG Besselstrasse 26 68219 Mannheim, Germany	Tel. +49 621 71683-10 Fax +49 621 71683-22 tb-mannheim@sew-eurodrive.de
	Munich	SEW-EURODRIVE GmbH & Co KG Domagkstrasse 5 85551 Kirchheim, Germany	Tel. +49 89 90955-110 Fax +49 89 90955-150 tb-muenchen@sew-eurodrive.de
	Muenster	SEW-EURODRIVE GmbH & Co KG Hafenplatz 4 48155 Muenster, Germany	Tel. +49 251 41475-11 Fax +49 251 41475-50 tb-muenster@sew-eurodrive.de
	Nuremberg	SEW-EURODRIVE GmbH & Co KG Plattenaeckerweg 6 90455 Nuremberg, Germany	Tel. +49 911 98884-50 Fax +49 911 98884-60 tb-nuernberg@sew-eurodrive.de
	Regensburg	SEW-EURODRIVE GmbH & Co KG Im Gewerbepark A15 93059 Regensburg, Germany	Tel. +49 941 46668-68 Fax +49 941 46668-66 tb-regensburg@sew-eurodrive.de
	Rhine-Main	SEW-EURODRIVE GmbH & Co KG Niederstedter Weg 5 61348 Bad Homburg, Germany	Tel. +49 6172 9617-0 Fax +49 6172 9617-50 tb-rheinmain@sew-eurodrive.de
	Stuttgart	SEW-EURODRIVE GmbH & Co KG Friedrich-List-Strasse 46 70771 Leinfelden-Echterdingen, Germany	Tel. +49 711 16072-0 Fax +49 711 16072-72 tb-stuttgart@sew-eurodrive.de
	Ulm	SEWEURODRIVE GmbH & Co KG Dieselstrasse 14 89160 Dornstadt, Germany	Tel. +49 7348 9885-0 Fax +49 7348 9885-90 tb-ulm@sew-eurodrive.de
	Drive Center Wuerzburg	SEW-EURODRIVE GmbH & Co KG Nuernbergerstrasse 118 97076 Wuerzburg-Lengfeld, Germany	Tel. +49 931 27886-60 Fax +49 931 27886-66 tb-wuerzburg@sew-eurodrive.de
	Zwickau / Meer-ane	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 08393 Meerane, Germany	Tel. +49 3764 7606-0 Fax +49 3764 7606-20 tb-zwickau@sew-eurodrive.de

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France			
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Production plant	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 57604 Forbach Cedex, France	Tel. +33 3 87 29 38 00
Assembly plant **Sales** **Service**	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 33607 Pessac Cedex, France	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin 77390 Verneuil l'Etang, France	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
Technical offices	**Alsace**	SEW-USOCOME 1 rue Auguste Gasser 68360 Soultz, France	Tel. +33 3 89 74 51 62 Fax +33 3 89 76 58 71
	Aquitaine/Char-ente	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B.P.182 33607 Pessac Cedex, France	Tel. +33 5 57 26 39 08 Fax +33 5 57 26 39 09
	Auvergne/Lim-ousin	SEW-USOCOME Farges 19600 Chasteaux, France	Tel. +33 5 55 20 12 10 Fax +33 5 55 20 12 11
	Lower Normandy	SEW-USOCOME 5 rue de la Limare 14250 Brouay, France	Tel. +33 2 31 37 92 86 Fax +33 2 31 74 68 15
	Burgundy	SEW-USOCOME 10 rue de la poste 71350 Saint Loup Géanges, France	Tel. +33 3 85 49 92 18 Fax +33 3 85 49 92 19
	Brittany	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 04 Fax +33 2 40 78 42 20
	Centre/Poitou	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 11 Fax +33 2 40 78 42 20
	Champagne-Ar-denne	SEW-USOCOME 25 bis rue Victor Hugo Appartement 7 10120 Saint André les Vergers, France	Tel. +33 3 25 79 63 24 Fax +33 3 25 79 63 25
	Franche-Comté	SEW-USOCOME 24 avenue Charles Boby 70000 Quincey, France	Tel. +33 3 81 60 20 47 Fax +33 3 81 87 75 93
	Île-de-France East/Aisne	SEW-USOCOME 20 rue Félix Faure 02100 Saint Quentin, France	Tel. +33 3 23 62 81 24 Fax +33 3 23 62 81 44
	Île-de-France North/Picardy	SEW-USOCOME 25bis rue Kléber 92300 Levallois Perret, France	Tel. +33 1 41 05 92 74 Fax +33 1 41 05 92 75
	Île-de-France South	SEW-USOCOME 6 chemin des bergers Lieu-dit Marchais 91410 Roinville sous Dourdan, France	Tel. +33 1 60 81 10 56 Fax +33 1 60 81 10 57

France			
	Lothringen/Northern Alsace	SEW-USOCOME 1 rue de la forêt 54250 Champigneulles, France	Tel. +33 3 83 96 28 04 Fax +33 3 83 96 28 07
	Midi-Pyrénées/ Roussillon	SEW-USOCOME 179 route de Grazac 31190 Caujac, France	Tel. +33 5 61 08 15 85 Fax +33 5 61 08 16 44
	Nord-Pas-de-Calais	SEW-USOCOME 209, route d'Hesdigneul 62360 Hesdin l'Abbé, France	Tel. +33 3 21 10 86 86 Fax +33 3 21 10 86 87
	Paris/Île-de-France West	SEW-USOCOME 42 avenue Jean Jaurès 78580 Maule, France	Tel. +33 1 30 90 89 86 Fax +33 1 30 90 93 15
	Pays de la Loire	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles 44140 Le Bignon, France	Tel. +33 2 40 78 42 03 Fax +33 2 40 78 42 20
	Provence-Alpes-Côte d'Azur	SEW-USOCOME Le Clos Montolivet 9 impasse Bounin – Bât. A 13012 Marseille, France	Tel. +33 4 91 18 00 11 Fax +33 4 91 18 00 12
	Rhône-Alpes East	SEW-USOCOME Montée de la Garenne 26750 Génissieux, France	Tel. +33 4 75 05 65 95 Fax +33 4 75 05 65 96
	Rhône-Alpes North	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 03 Fax +33 4 72 15 37 15
	Rhône-Alpes West	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati 69120 Vaulx en Velin, France	Tel. +33 4 72 15 37 04 Fax +33 4 72 15 37 15

Algeria			
Sales	**Algiers**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com

Argentina			
Assembly plant **Sales**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Ruta Panamericana Km 37.5, Lote 35 (B1619IEA) Centro Industrial Garín Prov. de Buenos Aires	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Córdoba	SEW EURODRIVE ARGENTINA S.A. Ruta Nacional 19, Manzana 97, Lote 5 (X5125) Malvinas Argentinas Prov. de Córdoba	Tel. +54 351-490-0010 sewcor@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Santa Fe	SEW EURODRIVE ARGENTINA S.A. Ruta Prov. 21 Km 7, Lote 41 Parque Industrial Alvear (2126) Gral. Alvear Prov. de Santa Fe	Tel. +54 341-317-7277 sewsfe@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Service	**Mendoza**	SEW EURODRIVE ARGENTINA S.A.	Tel. +54 261-430-0060 sewmen@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Technical offices	**Tucumán**	SEW EURODRIVE ARGENTINA S.A. Balcarce 609 (T4000IAM) S.M. de Tucumán Prov. de Tucumán	Tel. +54 381-400-4569 sewtuc@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Bahía Blanca	SEW EURODRIVE ARGENTINA S.A. O'Higgins 95, 1er Piso A (B8000IVA) Bahía Blanca Prov. de Buenos Aires	Tel. +54 291-451-7345 sewbb@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
	Comahue	SEW EURODRIVE ARGENTINA S.A. Puerto Rico 1885 (R8324IOE) Cipolletti Prov. de Río Negro	Tel. +54 299-478-1290 sewcomahue@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

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Argentina			
Mining	**Mendoza**	SEW EURODRIVE ARGENTINA S.A.	Tel. +54 261-430-0060 mineria@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar
Australia			
Assembly plants **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043, Australia	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, Australia	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au
Sales **Service**	**Adelaide**	SEW-EURODRIVE PTY. LTD. 9C Park Way Mawson Lakes, SA 5095, Australia	Tel. +61 8 8161 4000 Fax +61 8 8161 4002 enquires@sew-eurodrive.com.au
	Brisbane	SEW-EURODRIVE PTY.LTD. 1 /34 Collinsvale St Rocklea, Queensland, 4106, Australia	Tel. +61 7 3276 5100 Fax +61 7 3276 5102 enquires@sew-eurodrive.com.au
	Perth	SEW-EURODRIVE PTY. LTD. 10 Colin Jamieson Drive Welshpool, WA 6106, Australia	Tel. +61 8 9251-4900 Fax +61 8 9251-4903 enquires@sew-eurodrive.com.au
Sales	**Townsville**	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814, Australia	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au
Austria			
Assembly plant **Sales** **Service**	**Vienna**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 1230 Wien, Austria	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at
Technical offices	**Linz**	SEW-EURODRIVE Ges.m.b.H. Reuchlinstr. 6/3 4020 Linz, Austria	Tel. +43 732 655 109-0 Fax +43 732 655 109-20 tb-linz@sew-eurodrive.at
	Graz	SEW-EURODRIVE Ges.m.b.H. Grabenstraße 231 8045 Graz, Austria	Tel. +43 316 685 756-0 Fax +43 316 685 755 tb-graz@sew-eurodrive.at
	Dornbirn	SEW-EURODRIVE Ges.m.b.H. Lustenauerstraße 27/1 6850 Dornbirn, Austria	Tel. +43 5572 3725 99-0 Fax +43 5572 3725 99-20 tb-dornbirn@sew-eurodrive.at
Bangladesh			
Sales	**Bangladesh**	SEW-EURODRIVE INDIA PRIVATE LIMITED 345 DIT Road East Rampura Dhaka-1219, Bangladesh	Mobile +88 01729 097309 salesdhaka@seweurodrive-bangladesh.com
Belarus			
Sales	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 220033 Minsk, Belarus	Tel. +375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by
Belgium			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Competence Centers	**Industrial gear units**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 6900 Marche-en-Famenne, Belgium	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be
Brazil			
Production plant **Sales** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presidente Dutra Km 208 Guarulhos - 07251-250 - SP, Brazil SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Brazil			
Assembly plants **Sales** **Service**	**Rio Claro**	SEW-EURODRIVE Brasil Ltda. Rodovia Washington Luiz, Km 172 Condomínio Industrial Conpark Caixa Postal: 327 13501-600 – Rio Claro / SP	Tel. +55 19 3522-3100 Fax +55 19 3524-6653 montadora.rc@sew.com.br
	Joinville	SEW-EURODRIVE Brasil Ltda. Rua Dona Francisca, 12.346 – Pirabeiraba 89239-270 – Joinville / SC	Tel. +55 47 3027-6886 Fax +55 47 3027-6888 filial.sc@sew.com.br
	Indaiatuba	SEW-EURODRIVE Brasil Ltda. Estrada Municipal Jose Rubim, 205 Rodovia Santos Dumont Km 49 13347-510 – Indaiatuba / SP	Tel. +55 19 3835-8000 sew@sew.com.br

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 1606 Sofia, Bulgaria	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

Cameroon			
Sales	**Douala, Cameroon**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala, Cameroon	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr

Canada			
Assembly plants **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Please contact us for more addresses of service centers in Canada.		

Chile			
Assembly plant **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. box address Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Production plant **Assembly plant** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.cn
Assembly plant **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 51262581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530, China	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141, China	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn

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China			
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan, China	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
Colombia			
Assembly plant Sales Service	**Bogota**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá, Colombia	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sew@sew-eurodrive.com.co
Côte d'Ivoire			
Sales	**Abidjan**	SICA Société Industrielle & Commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1173 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci
Croatia			
Sales Service	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 10 000 Zagreb, Croatia	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr
Czech Republic			
Sales Assembly plant Service	**Hostivice**	SEW-EURODRIVE CZ S.R.O. Floriánova 2459 253 01 Hostivice	Tel. +420 255 709 601 Fax +420 235 350 613 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz
	Drive Service Hotline/24-hour availability	HOTLINE: +420 800 739 739 (800 SEW SEW)	**Service:** Tel. +420 255 709 632 Fax +420 235 358 218 servis@sew-eurodrive.cz
Assembly plant Service	**Plzeň**	SEW-EURODRIVE CZ S.R.O. Areal KRPA a.s. Zahradni 173/2 326 00 Plzeň	Tel. +420 378 775 320 Fax +420 377 970 710 sew@sew-eurodrive.cz
Technical offices	**Brno**	SEW-EURODRIVE CZ S.R.O. Křenová 52 60200 Brno	Tel. +420 543 254 174 Fax +420 543 256 845 radek.chmela@sew-eurodrive.cz
	Hradec Králové	SEW-EURODRIVE CZ S.R.O. Čechova 498 50202 Hradec Králové	Tel. +420 495 510 141 Fax +420 495 521 313 miroslav.moravec@sew-eurodrive.cz
	Ostrava	SEW-EURODRIVE CZ S.R.O. Studentská 6202/17 708 00 Ostrava-Poruba	Tel. +420 597 329 044 david.kenkus@sew-eurodrive.cz
	Klatovy	SEW-EURODRIVE CZ S.R.O. Vídeňská 841 33901 Klatovy	Tel. +420 376 331 634 Fax +420 376 331 634 viktor.kubernat@sew-eurodrive.cz
Service	**Horní Moštěnice**	SEW-EURODRIVE CZ S.R.O. Nám.Dr.M.Tyrše 14/64 751 17 Horní Moštěnice	Tel. +420 581 224 374 Fax +420 581 224 374 servis@sew-eurodrive.cz
Denmark			
Assembly plant Sales Service	**Copenhagen**	SEW-EURODRIVE A/S Geminivej 28-30 2670 Greve, Denmark	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk
Egypt			
Sales Service	**Cairo**	Copam Egypt for Engineering & Agencies 33 El Hegaz ST, Heliopolis, Cairo, Egypt	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Estonia			
Sales	**Tallinn**	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa, Estonia	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly plant **Sales** **Service**	**Hollola**	SEW-EURODRIVE OY Vesimäentie 4 15860 Hollola 2, Finland	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Service	**Hollola**	SEW-EURODRIVE OY Keskikankaantie 21 FIN-15860 Hollola	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Technical offices	**Helsinki**	SEW-EURODRIVE OY Luutnantintie 5 00410 Helsinki, Finland	Tel. +358 201 589-300 sew@sew.fi
	Vaasa	SEW-EURODRIVE OY Asemakatu 7 65100 Vaasa, Finland	Tel. +358 201 589-300 sew@sew.fi
	Kuopio	SEW-EURODRIVE OY Viestikatu 3 70600 Kuopio, Finland	Tel. +358 201 589-300 sew@sew.fi
Production plant **Assembly plant**	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabon			
Sales	**Libreville, Gabon**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabon	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Greece			
Sales	**Athens**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr
Technical office	**Thessaloniki**	Christ. Boznos & Son S.A. Asklipiou 26 562 24 Evosmos, Thessaloniki, Greece	Tel. +30 2 310 7054-00 Fax +30 2 310 7055-15 info@boznos.gr

Great Britain			
Assembly plant **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. DeVilliers Way Trident Park Normanton West Yorkshire WF6 1GX	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline/24-hour availability		Tel. +44 1924 896911
Service Competence Centers	**Southern England**	SEW-EURODRIVE Ltd. Unit 41 Easter Park Benyon Road Silchester Reading Berkshire RG7 2PQ	Tel. +44 1189 701-699 Fax +44 1189 701-021
Technical offices	**Midlands**	SEW-EURODRIVE Ltd. 5 Sugar Brook Court Aston Road Bromsgrove Worcs. B60 3EX	Tel. +44 1527 877-319 Fax +44 1527 575-245

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Great Britain			
	Scotland	SEW-EURODRIVE Ltd. No 37 Enterprise House Springkerse Business Park Stirling FK7 7UF	Tel. +44 17 8647-8730 Fax +44 17 8645-0223
Hong Kong			
Assembly plant **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk
Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. 1037 Budapest, Hungary Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 http://www.sew-eurodrive.hu office@sew-eurodrive.hu
India			
Company office **Assembly plant** **Sales** **Service**	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243, India Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodriveindia.com
Assembly plant **Sales** **Service**	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com
Technical offices	**Ahmedabad**	SEW-EURODRIVE India Private Limited 306, Shaan office complex, Behind Sakar-IV, Ellisebridge, Ashram Road Ahmedabad – Gujarat, India	Tel. +91 79 40072067/68 Fax +91 79 40072069 salesahmedabad@seweurodrivein- dia.com
	Aurangabad	SEW-EURODRIVE INDIA PRIVATE LIMITED	Tel. +91 86000 12333 salesaurangabad@seweurodrivein- dia.com
	Bangalore	SEW-EURODRIVE India Private Limited Sy.no:41-P3, Peenya1, Phase 1A, Peenya Vil- lage, Yeswanthapura Hobli, Bangalore North Taluk, Bangalore Dist, Karnataka	Tel. +91 80 22266565 Fax +91 80 22266569 salesbangalore@seweurodriveindia.com
		SEW-EURODRIVE India Private Limited # C-104, 3rd Block, KSSIDC Complex, Electronic City. Bangalore – 560100, Karnataka	Tel. +91 80 28522662 / 28522663 salesbangalore@seweurodriveindia.com
	Bangladesh	SEW-EURODRIVE INDIA PRIVATE LIMITED Genetic Udayanchal, House-96 (6th Floor), Road-23/A, Block-B, Banani, Dhaka-1213, Bangladesh	Mobile +88 01729 097309 salesdhaka@seweurodrive- bangladesh.com
	Bellary	SEW-EURODRIVE India Private Limited Door no-56/279 Ward No-16, Sindhigi com- pound, Near Raghavendra talkies, Bellary-583101 Karnataka	Tel. +91 77609 88668 salesbellary@seweurodriveindia.com
	Chandigarh	SEW-EURODRIVE India Private Limited # 72, Type- 4, Power Colony, Chandigarh - Rupnagar Highway Rupnagar- 140001, Punjab	Tel. +91 81462 67606 saleschandigarh@seweurodrivein- dia.com
	Chennai	SEW-EURODRIVE India Private Limited 2nd Floor, Josmans Complex, No. 5, McNichols Road, Chetpet Chennai - 600031 - Tamil Nadu, India	Tel. +91 44 42849813 Fax +91 44 42849816 saleschennai@seweurodriveindia.com
	Kochi	SEW-EURODRIVE India Private Limited CF7-(2), Block No 1, Vasanth Nagar, Opposite Jawahar Lal Nehru Stadium, Palarivattom – Cochin 682025	Tel. +91 98951 30375 salescochin@seweurodriveindia.com

India			
	Coimbatore	SEW-EURODRIVE INDIA PRIVATE LIMITED 687/2, SRI SAKTHIVEL TOWERS (NEAR DEEPAM HOSPITAL) TRICHY ROAD, RAMANATHAPURAM COIMBATORE - 641 045.Tamilnadu, India	Tel. +91 422 2322420 Fax +91 422 2323988 salescoimbatore@seweurodrivein-dia.com
	Cuttack	SEW-EURODRIVE India Private Limited Plot No. 1764, Nuasahi, Nayapalli Bhubaneswar-12 Orissa	Tel. +91 9937446333 salescuttack@seweurodriveindia.com
	Gandhidham	SEW-EURODRIVE India Private Limited TCX-S-28, FF, Ward 12/A, Gandhidham - Kutch - 370201	Tel. +91 81282 36850 salesgandhidham@seweurodrivein-dia.com
	Hyderabad	SEW-EURODRIVE India Private Limited 408, 4th Floor, Meridian Place Green Park Road Amerpeet Hyderabad - 500016 - Andhra Pradesh, India	Tel. +91 40 23414698 Fax +91 40 23413884 saleshyderabad@seweurodriveindia.com
	Jamshedpur	SEW-EURODRIVE India Private Limited Flat no.: S1 " Kashi Kunj",h. No. 60, New Rani Kudar Road No - 3 P.o. + P.s. - Kadma Jamshedpur - Pin - 831005 Jharkhand	Tel. +91 9934123671 salesjamshedpur@seweurodrivein-dia.com
	Kolhapur	SEW EURODRIVE India Private Limited	Tel. +91 86000 20846 saleskolhapur@seweurodriveindia.com
	Kolkata	SEW EURODRIVE India Private Limited 2nd floor, Room No. 35 Chowringhee Court 55, Chowringhee Road Kolkata - 700 071 - West Bengal, India	Tel. +91 33 22827457 Fax +91 33 22894204 saleskolkata@seweurodriveindia.com
	Lucknow	SEW-EURODRIVE India Private Limited 69, Shiv Vihar Colony Vikas Nagar-5 Lucknow 226022 - Uttar Pradesh	Tel. +91 9793627333 saleslucknow@seweurodriveindia.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza, J.B. Nagar, Andheri Kurla Road, Andheri (E) Mumbai - 400059 - Maharashtra, India	Tel. +91 22 28348440 Fax +91 22 28217858 salesmumbai@seweurodriveindia.com
	Nagpur	SEW-EURODRIVE India Private Limited Plot No 49, New Kailash Nager, Samta colony, Nagpur-440027	Tel. +91 95610 89525 salesnagpur@seweurodriveindia.com
	Nashik	SEW-EURODRIVE India Private Limited 107, "YOG" Bunglow, Mahatama Nagar, Trimbak Road, Nashik, Maharashtra – 422 007	Tel. +91 9665752978 salesnashik@seweurodriveindia.com
	New Delhi	SEW-EURODRIVE India Private Limited 1008, 10th Floor, 12th Level "Westend Mall" Tower Plot, District Centre Adjacent Hotel Hilton Janak Puri, New Delhi – 110058	Tel. +91 11 25544111 Fax +91 11 25544113 salesdelhi@seweurodriveindia.com
	Pune	SEW-EURODRIVE India Private Limited Jai Tulajabhavani Complex. Office No: 15 First Floor, Opp. Century Enka Company, MIDC Bhosari, Pune 411 026	Tel. +91 20-65118890 / 91 Fax +91 20 25380721 salespune@seweurodriveindia.com
		SEW-EURODRIVE India Private Limited LUNAWAT PRISM 4th Floor, S.No. 148 Opposite Wanaz Company, Besides Mega Mart At Neena Co-Operative Housing Society, Paud Road, Pune 411038 - Maharashtra, India	Tel. +91 20 25380730/735 Fax +91 20 25380721 salespune@seweurodriveindia.com praveen.hosur@seweurodriveindia.com
	Raipur	SEW-EURODRIVE India Private Limited A-42, Ashoka Millenium Complex, Ring Road-1, Raipur 492 001 - Chhattisgarh, India	Tel. +91 771 4090765 Fax +91 771 4090765 salesraipur@seweurodriveindia.com

India			
	Ranchi	SEW-EURODRIVE India Private Limited Flat No.: A - 101, Krishna Shree Apartment, Anantpur, P.O. Doranda – Ranchi 834002	Tel. +91 8294630772 salesranchi@seweurodriveindia.com
	Tiruchirappalli	SEW-EURODRIVE India Private Limited A-106,Trichy Towers, Chandrasekarapuram, Salai Road, Trichy – 620018.	Mobile +91 95009 88081 salestrichy@seweurodriveindia.com
	Vadodara	SEW-EURODRIVE India Private Limited Unit No. 301, Savorite Bldg, Plot No. 143, Vinayak Society, off old Padra Road, Vadodara - 390 007. Gujarat	Tel. +91 265 2325258 Fax +91 265 2325259 salesvadodara@seweurodriveindia.com
	Vijayawada	SEW-EURODRIVE India Private Limited Door No:40-5/3-10A, Syam Nagar, NGO's Colony, Tikkle Road, Vijayawada-520010	Tel. +91 99895 01748 Fax +91 8662475157 Mobile +91 9989501748 salesvijayawada@seweurodrivein-dia.com
Indonesia			
Sales	**Jakarta**	PT. Cahaya Sukses Abadi Komplek Rukan Puri Mutiara Blok A no 99, Sunter Jakarta 14350, Indonesia	Tel. +62 21 65310599 Fax +62 21 65310600 csajkt@cbn.net.id
		PT. Agrindo Putra Lestari Jl.Prof.DR.Latumenten no27/A Jakarta 11330	Tel. +62 21 63855588 Fax +62 21 63853789 aplindo@indosat.net.id
	Medan	PT. Serumpun Indah Lestari Pulau Solor no. 8, Kawasan Industri Medan II Medan 20252	Tel. +62 61 687 1221 Fax +62 61 6871429 / +62 61 6871458 / +62 61 30008041 sil@serumpunindah.com serumpunindah@yahoo.com
	Surabaya	PT. TRIAGRI JAYA ABADI Jl. Sukosemolo No. 63, Galaxi Bumi Permai G6 No. 11 Surabaya 60122	Tel. +62 31 5990128 Fax +62 31 5962666 triagri@indosat.net.id
		CV. Multi Mas Jl. Raden Saleh 43A Kav. 18 Surabaya 60174	Tel. +62 31 5458589 / +62 31 5317224 Fax +62 31 5317220 / +62 31 5994629 sianhwa@sby.centrin.net.id
Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11, Ireland	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie
Iceland			
Sales	**Reykjavik**	VARMA & VELAVERK EHF Dalshrauni 5 IS-220 Hafnarjördur	Tel. +354 585 1070 Fax +354 585 1071 varmaverk@varmaverk.is http://www.varmaverk.is
Israel			
Sales	**Tel Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon, Israel	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il
Italy			
Assembly plant **Sales** **Service**	**Solaro**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano), Italy	Tel. +39 02 96 9801 Fax +39 02 96 980 999 http://www.sew-eurodrive.it sewit@sew-eurodrive.it
Technical offices	**Bologna**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via della Grafica, 47 40064 Ozzano dell'Emilia (Bo), Italy	Tel. +39 051 65-23-801 Fax +39 02 96 980 499

Italy			
	Caserta	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Carlo III Km. 23,300 81020 S. Nicola la Strada (Caserta), Italy	Tel. +39 0823 219011 Fax +39 02 96 980 599
	Milan	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano), Italy	Tel. +39 02 96 980229 Fax +39 02 96 980 999
	Pescara	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Viale Europa,132 I-65010 Villa Raspa di Spoltore (PE)	Tel. +39 085 41-59-427 Fax +39 02 96 980 699
	Turin	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Filiale Torino c.so Unione Sovietica 612/15 - int. C 10135 Torino, Italy	Tel. +39 011 3473780 Fax +39 02 96 980 799
	Verona	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Antonio Meucci 5, I-37042 - Caldiero (VR)	Tel. +39 045 89-239-11 Fax +39 02 96 980 814
Japan			
Assembly plant Sales Service	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp
Technical offices	**Fukuoka**	SEW-EURODRIVE JAPAN CO., LTD. C-go, 5th-floor, Yakuin-Hiruzu-Bldg. 1-5-11, Yakuin, Chuo-ku Fukuoka, 810-0022, Japan	Tel. +81 92 713-6955 Fax +81 92 713-6860 sewkyushu@jasmine.ocn.ne.jp
	Osaka	SEW-EURODRIVE JAPAN CO., LTD. Higobashi Shimizu Bldg. 10th floor 1-3-7 Tosabori, Nishi-ku Osaka, 550-0001, Japan	Tel. +81 6 6444--8330 Fax +81 6 6444--8338 sewosaka@crocus.ocn.ne.jp
	Tokyo	SEW-EURODRIVE JAPAN CO., LTD. Omarimon Yusen Bldg. 13th floor 3-23-5 Nishinbashi, Minato-ku Tokyo 105-0003, Japan	Tel. +81 3 3239-0469 Fax +81 3 3239-0943 sewtokyo@basil.ocn.ne.jp
Kazakhstan			
Sales	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz
Kenya			
Sales	**Nairobi**	Barico Maintenances Ltd Kamutaga Place Commercial Street Industrial Area P.O.BOX 52217 - 00200 Nairobi	Tel. +254 20 6537094/5 Fax +254 20 6537096 info@barico.co.ke
Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C 1073 Riga, Latvia	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com
Lebanon			
Sales Lebanon	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut, Lebanon	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
		After Sales Service	service@medrives.com
Sales Jordan / Kuwait / Saudi Arabia / Syria	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com
		After Sales Service	service@medrives.com

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Lithuania			
Sales	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt
Luxembourg			
Assembly plant **Sales** **Service**	**Brussels**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be
Madagascar			
Sales	**Antananarivo**	Ocean Trade BP21bis. Andraharo Antananarivo. 101 Madagascar	Tel. +261 20 2330303 Fax +261 20 2330330 oceantrabp@moov.mg
Malaysia			
Assembly plant **Sales** **Service**	**Johor**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my
Technical offices	**Kuala Lumpur**	SEW-EURODRIVE Sdn. Bhd. No. 2, Jalan Anggerik Mokara 31/46 Kota Kemuning Seksyen 31 40460 Shah Alam Selangor Darul Ehsan	Tel. +60 3 51229633 Fax +60 3 51229622 sewsa@sew-eurodrive.com.my
	Kuching	SEW-EURODRIVE Sdn. Bhd. Lot 268, Section 9 KTLD Lorong 9, Jalan Satok 93400 Kuching, Sarawak East Malaysia	Tel. +60 82 232380 Fax +60 82 242380
	Penang	SEW-EURODRIVE Sdn. Bhd. No. 38, Jalan Bawal Kimsar Garden 13700 Prai, Penang	Tel. +60 4 3999349 Fax +60 4 3999348 sewpg@sew-eurodrive.com.my
Morocco			
Sales **Service**	**Mohammedia**	SEW-EURODRIVE SARL 2 bis, Rue Al Jahid 28810 Mohammedia	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma
Mauritania			
Sales	**Zouérat**	AFRICOM - SARL En Face Marché Dumez P.B. 88 Zouérate	Tel. +222 45 44 50 19 Fax +222 45 44 03 14 contact@africom-sarl.com
Macedonia			
Sales	**Skopje**	Boznos DOOEL Dime Anicin 2A/7A 1000 Skopje	Tel. +389 23256553 Fax +389 23256554 http://www.boznos.mk
Mexico			
Assembly plant **Sales** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, Mexico	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx
Mongolia			
Sales	**Ulan Bator**	SEW-EURODRIVE Representative Office Mongolia Olympic street 8, 2nd floor Juulchin corp bldg., Sukhbaatar district, Ulaanbaatar 14253	Tel. +976-70009997 Fax +976-70009997 http://www.sew-eurodrive.mn sew@sew-eurodrive.mn

Namibia			
Sales	**Swakopmund**	DB Mining & Industrial Services Einstein Street Strauss Industrial Park Unit1 Swakopmund	Tel. +264 64 462 738 Fax +264 64 462 734 sales@dbmining.in.na

New Zealand			
Assembly plants **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount Drive East Tamaki Auckland, New Zealand	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch, New Zealand	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch, New Zealand	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz
Technical offices	**Palmerston North**	SEW-EURODRIVE NEW ZEALAND LTD. C/-Grant Shearman, RD 5, Aronui Road Palmerston North	Tel. +64 6 355-2165 Fax +64 6 355-2316 sales@sew-eurodrive.co.nz

Netherlands			
Assembly plant **Sales** **Service**	**Rotterdam**	SEW-EURODRIVE B.V. Industrieweg 175 3044 AS Rotterdam, Netherlands Postbus 10085 3004 AB Rotterdam, Netherlands	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

Nigeria			
Sales	**Lagos**	EISNL Engineering Solutions and Drives Ltd Plot 9, Block A, Ikeja Industrial Estate (Ogba Scheme) Adeniyi Jones St. End Off ACME Road, Ogba, Ikeja, Lagos Nigeria	Tel. +234 1 217 4332 team.sew@eisnl.com http://www.eisnl.com

Norway			
Assembly plant **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 1599 Moss, Norway	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Pakistan			
Sales	**Karatschi**	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk

Paraguay			
Sales	**Fernando de la Mora**	SEW-EURODRIVE PARAGUAY S.R.L De la Victoria 112, Esquina nueva Asunción Departamento Central Fernando de la Mora, Barrio Bernardino	Tel. +595 991 519695 Fax +595 21 3285539 sew-py@sew-eurodrive.com.py

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

Philippines			
Sales	**Luzon**	Totaltech Corporation 5081-B C&L Mansion Filmore Ave. Cor. Fahrenheit St. 1235 Makati City	Tel. +63 2 551-9265 / +63 2 551-9271 / +63 2 551-9378 Fax +63 2 551-9273 totaltech89@gmail.com
	All Areas	P.T. Cerna Corporation 4137 Ponte St., Brgy. Santa Cruz, Makati City 1205	Tel. +63 2 519 6214 Fax +63 2 890 2802 mech_drive_sys@ptcerna.com

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Poland			
Assembly plant **Sales** **Service**	**Łódź**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 92-518 Łódź, Poland	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa 24 hour hotline Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl
Technical office	**Tychy**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Strzelecka 66 PL-43-109 Tychy	Tel. +48 32 32 32 610 Fax +48 32 32 32 648
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	Gdansk	SEW-EURODRIVE Polska Sp.z.o.o. ul. Galaktyczna 30A PL-80-299 Gdańsk	Tel. +48 58 762 70 00 Fax +48 58 762 70 09
	Poznan	SEW-EURODRIVE Polska Sp.z.o.o. ul. Romana Maya 1 61-371 Poznań, Poland	Tel. +48 61 6465500 Fax +48 61 6465519
	Radom	SEW-EURODRIVE Polska Sp.z.o.o. ul. Słowackiego 84 26-600 Radom, Poland	Tel. +48 48 365 40 50 Fax +48 48 365 40 52

Portugal			
Assembly plant **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 3050-901 Mealhada, Portugal	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt
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Technical office	**Porto**	SEW-EURODRIVE, LDA. Av. 25 de Abril, 68 4440-502 Valongo, Portugal	Tel. +351 229 350 383 Fax +351 229 350 384 Tel. +351 9 32559110 esc.porto@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucharest**	Sialco Trading SRL str. Brazilia nr. 36 011783 Bucuresti, Romania	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Assembly plant **Sales** **Service**	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 36 RUS-195220 St. Petersburg	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru
Technical office	**Ekaterinburg**	ZAO SEW-EURODRIVE Kominterna Str. 16 Office 614 620078 Ekaterinburg, Russia	Tel. +7 343 310 3977 Fax +7 343 310 3978 eso@sew-eurodrive.ru
	Irkutsk	ZAO SEW-EURODRIVE 5-Armii Str., 31 664011 Irkutsk, Russia	Tel. +7 3952 25 5880 Fax +7 3952 25 5881 iso@sew-eurodrive.ru
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	Perm	ZAO SEW-EURODRIVE Stakhanovskaya str., 45 Office 512 RUS-614066 Perm	Tel. +7 342 2219494 Fax +7 342 2219444 pso@sew-eurodrive.ru

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Serbia			
Sales	**Belgrade**	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd, Serbia	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs
Singapore			
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	Žilina	SEW-EURODRIVE SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 010 01 Žilina, Slovakia	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banska Bystrica	SEW-EURODRIVE SK s.r.o. Rudlovská cesta 85 974 11 Banská Bystrica, Slovakia	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-EURODRIVE SK s.r.o. Slovenská ulica 26 040 01 Košice, Slovakia	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk
Slovenia			
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	Madrid	Delegación Madrid Gran Via. 48-2° A-D 28220 Majadahonda (Madrid), Spain	Tel. +34 91 6342250 Fax +34 91 6340899
	Sevilla	MEB Pólogono Calonge, C/A Nave 2 - C E-41.077 Sevilla, Spain	Tel. +34 954 356 361 Fax +34 954 356 274 mebsa.sevilla@mebsa.com
	Valencia	MEB Músico Andreu i Piqueres, 4 E-46.900 Torrente (Valencia)	Tel. +34 961 565 493 Fax +34 961 566 688 mebsa.valencia@mebsa.com
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South Africa			
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	Durban, South Africa	SEW-EURODRIVE (PROPRIETARY) LIMITED 48 Prospecton Road Isipingo Durban, South Africa P.O. Box 10433, Ashwood 3605, South Africa	Tel. +27 31 902 3815 Fax +27 31 902 3826 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O. Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za
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South Korea			
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	Daejeon	SEW-EURODRIVE KOREA Co., Ltd. No. 1502, Hongin officetel 536-9, Bongmyung-dong, Yusung-ku Daejeon 305-301	Tel. +82 42 828-6461 Fax +82 42 828-6463
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	Seoul	SEW-EURODRIVE KOREA Co., Ltd. No.504 Sunkyung officetel 106-4 Kuro 6-dong, Kuro-ku Seoul 152-054, Korea	Tel. +82 2 862-8051 Fax +82 2 862-8199

Swaziland			
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Sweden			
Assembly plant **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 55303 Jönköping, Sweden Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

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	Malmö	SEW-EURODRIVE AB Borrgatan 5 21124 Malmö, Sweden	Tel. +46 40 68064 80 Fax +46 40 68064 93 malmo@sew.se
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	Bern / Solothurn	Rudolf Bühler Muntersweg 5 2540 Grenchen, Switzerland	Tel. +41 32 652 2339 Fax +41 32 652 2331
	Central Switzer- land, Aargau	Armin Pfister Stierenweid 4950 Huttwill, BE, Switzerland	Tel. +41 62 962 54 55 Fax +41 62 962 54 56
	Zurich, Tessin	Gian-Michele Muletta Fischerstrasse 61 8132 Egg bei Zürich, Switzerland	Tel. +41 44 994 81 15 Fax +41 44 994 81 16
	Lake Constance and Eastern Switzerland	Markus Künzle Eichweg 4 9403 Goldach, Switzerland	Tel. +41 71 845 2808 Fax +41 71 845 2809

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	Taipei	Ting Shou Trading Co., Ltd. 6F-3, No. 267, Sec. 2 Tung Hwa South Road, Taipei, Taiwan	Tel. +886 2 27383535 Fax +886 2 27368268 Telex 27 245 sewtwn@ms63.hinet.net

Tanzania			
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Technical offices	**Bangkok**	SEW-EURODRIVE (Thailand) Ltd. 6th floor, TPS Building 1023, Phattanakarn Road Suanluang Bangkok,10250	Tel. +66 2 7178149 Fax +66 2 7178152 sewthailand@sew-eurodrive.com
	Hat Yai	SEW-EURODRIVE (Thailand) Ltd. Hadyai Country Home Condominium 59/101 Soi.17/1 Rachas-Utid Road. Hadyai, Songkhla 90110, Thailand	Tel. +66 74 359441 Fax +66 74 359442 sewthailand@sew-eurodrive.com

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Turkey			
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	Bursa	SEW-EURODRİVE Üçevler Mah. Bayraktepe Sok. Akay İş Merkezi Kat:3 No: 7/6 Nilüfer / Bursa	Tel. +90 224 443 45 60 Fax +90 224 443 45 58
	Istanbul	SEW-EURODRİVE Tekstilkent Ticaret Merkezi B-13 Blok No:70 Esenler / İstanbul	Tel. +90-262-9991000-04 Fax +90-262-9991009
	Izmir	SEW-EURODRİVE 1203/11 Sok. No. 4/614 Kara Hasan Atlı İş Merkezi Kat :6 Yenişehir / İzmir	Tel. +90 232 469 62 64 Fax +90 232 433 61 05
Ukraine			
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Sales	**Kiev**	ООО «СЕВ-Евродрайв» ул.С.Олейника, 21 02068 Киев	Тел. +380 44 503 95 77 Факс. +380 44 503 95 78 kso@sew-eurodrive.ua
	Donetsk	ООО «СЕВ-Евродрайв» ул.25-летия РККА, 1-B, оф. 805 83000 Донецк	Тел. +380 62 38 80 545 Факс. +380 62 38 80 533 dso@sew-eurodrive.ua
	Ivano-Frankivsk	ООО «СЕВ-Евродрайв» ул.Независимости, 4, оф.303 83000 Ивано-Франковск	Тел. +380 342 725 190 Факс. +380 342 725 191 ifso@sew-eurodrive.ua
Uruguay			
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USA			
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USA			
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	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373, USA	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237, USA	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544, USA	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
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United Arab Emirates			
Sales **Service**	**Sharjah**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

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		Ports and offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn

Zambia			
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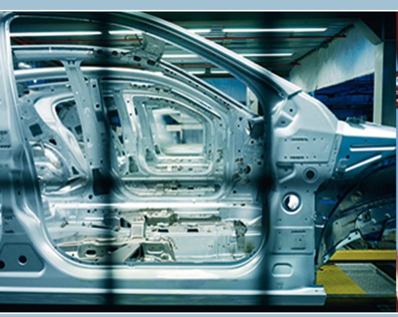

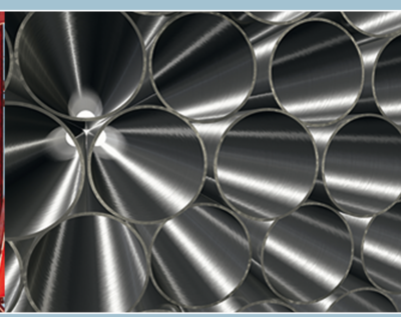


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