



SEW
EURODRIVE

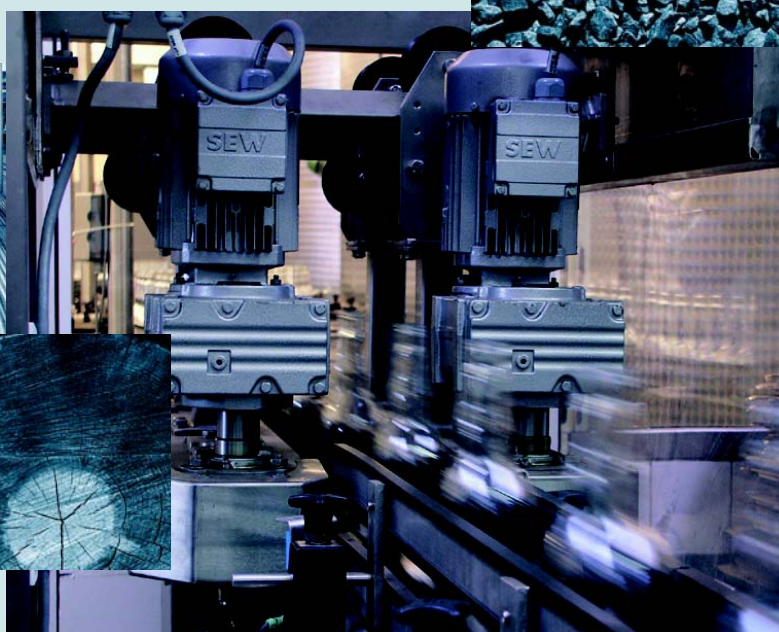


MOVITRAC[®] B

Edition 05/2009

16806026 / EN

System Manual





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1 Important Information

1.1 *How to use the operating instructions*

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

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

1.1.1 Text Conventions

- Texts in software user interfaces (menu items, buttons, etc.) in square brackets, e.g.: "Click the [Start] button."
- Parameter names are written in italics, e.g.: "Write down the values of variables *H509* *ACT.POS.ABS*."
- The display of the FBG11B keypad is indicated by a font with fixed character width, e.g.: "The display shows `Stop`."



1.2 Structure of the safety notes

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

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

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

1.3 Rights to claim under warranty

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

1.4 Exclusion of liability

You must comply with the information contained in these operating instructions to ensure safe operation of MOVITRAC® B frequency inverters and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE does not assume liability for injury to persons or damage to equipment or property resulting from non-observance of these operating instructions. In such cases, any liability for defects is excluded.



2 Safety Notes

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

2.1 Preliminary information

The following safety notes predominantly refer to the use of frequency inverters. Additionally, when using drives with motors or gearmotors, observe the corresponding safety notes in the respective operating instructions.

Also observe the supplementary safety notes in the individual sections of this publication.

2.2 General



DANGER

During operation, frequency inverters can have live, bare parts according to their degree of protection.

Severe or fatal injuries.

- All work related to transportation, storage, setup/mounting, connection, startup, maintenance and repair may only be carried out by qualified personnel, in strict observation of:
 - The relevant detailed operating instructions
 - The warning and safety signs on the motor/gearmotor
 - All other project planning documents, operating instructions and wiring diagrams related to the drive
 - The specific regulations and requirements for the system
 - The national/regional regulations governing safety and the prevention of accidents
- Never install damaged products.
- Immediately report any damages to the shipping company.

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

This document includes further information.



2.3 Target group

Any mechanical work may only be performed by adequately qualified personnel. Qualified personnel in this context are persons who are familiar with the setup, mechanical installation, trouble shooting and maintenance for this product. Further, they are qualified as follows:

- Training in mechanical engineering, e.g. as a mechanic or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

Any electronic work may only be performed by adequately qualified electricians. Qualified electricians in this context are persons who are familiar with the electronic installation, startup, trouble shooting and maintenance for this product. Further, they are qualified as follows:

- Training in electrical engineering, e.g. as an electrician or mechatronics technician (final examinations must have been passed).
- They are familiar with these operating instructions.

All work in further areas of transportation, storage, operation and waste disposal may be carried out only by persons who are trained appropriately.

2.4 Designated use

Frequency inverters are components for controlling asynchronous AC motors. Frequency inverters are components intended for installation in electrical systems or machines. Never connect capacitive loads. Operation with capacitive loads results in over voltages and may destroy the unit.

The following standards apply, if the frequency inverters are marketed in the EU/EFTA:

- In case of installation in machines, startup of the drive inverters (meaning the start of proper use) is prohibited until it is determined that the machine meets the requirements stipulated in the EC Directive 98/37/EC (machine directive); observe EN 60204.
- Startup (i.e. the start of designated use) is only permitted under observance of the EMC (2004/108/EC) directive.
- The frequency inverters comply with the requirements of the Low Voltage Directive 2006/95/EC. The harmonized standards of the EN 61800-5-1/DIN VDE T105 series in connection with EN 60439-1/VDE 0660 part 500 and EN 60146/VDE 0558 are applied to these frequency inverters.

Observe the technical data and the connection requirements specified on the nameplate and the operating instructions.

2.4.1 Safety functions

Frequency inverters from SEW-EURODRIVE must not perform any safety functions unless the inverters are subordinate to other safety systems.

Use higher-level safety systems to ensure protection of equipment and personnel.



2.5 Other applicable documentation

When using the "Safe stop" function, you must observe the following publications:

- MOVITRAC® B / Safe Disconnection – Conditions
- MOVITRAC® B / Safe Disconnection – Applications

These publications are available via **Documentation\Software\CAD** on the SEW-EURODRIVE homepage.

2.6 Transport

Immediately upon receipt, inspect the shipment for any damage that may have occurred during transportation. Inform the shipping company immediately in the event of damage. It may be necessary to preclude startup. Observe the climate conditions according to chapter "General technical data".

2.7 Extended storage

Observe the notes in section "Extended storage".

2.8 Installation/assembly

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

Protect the frequency inverters from excessive strain. Do not twist any components and do not modify the insulation spaces. Do not touch any electronic components or contacts.

Frequency inverters contain components that can easily be damaged by electrostatic energy and improper handling. Electric components must not be mechanically damaged or destroyed.

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

- Use in potentially explosive atmospheres.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation, etc. (frequency inverter may only be operated in climate class 3K3 to EN 60721-3-3)
- Use in non-stationary applications which are subject to mechanical vibration and impact loads in excess of the requirements in EN 61800-5-1.



2.9 Electrical connection

Observe the applicable national accident prevention guidelines when working on live frequency inverters (e.g. BGV A3 for Germany).

During installation, observe the specifications regarding cable cross sections, fusing and protective conductor connection. This publication contains additional information.

In this documentation, you will find notes on EMC compliant installation, such as shielding, grounding, arrangement of filters and routing of lines. The manufacturer of the system or machine is responsible for maintaining the limits established by EMC legislation.

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

Ground the unit.

2.10 Safe disconnection

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

2.11 Startup/operation

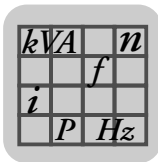
Systems with integrated frequency inverters must be equipped with additional monitoring and protection devices, as applicable, according to the relevant safety guidelines and regulations, such as legislation governing technical equipment, accident prevention regulations, etc.

Do not touch live components or power connections until 10 minutes after disconnecting the frequency inverters from the supply voltage because there may still be some charged capacitors. Observe the corresponding labels on the frequency inverter.

Keep all covers and doors closed during operation.

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

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



3 System Description MOVITRAC® B



Compact and economical: MOVITRAC® B – the next frequency inverter generation.

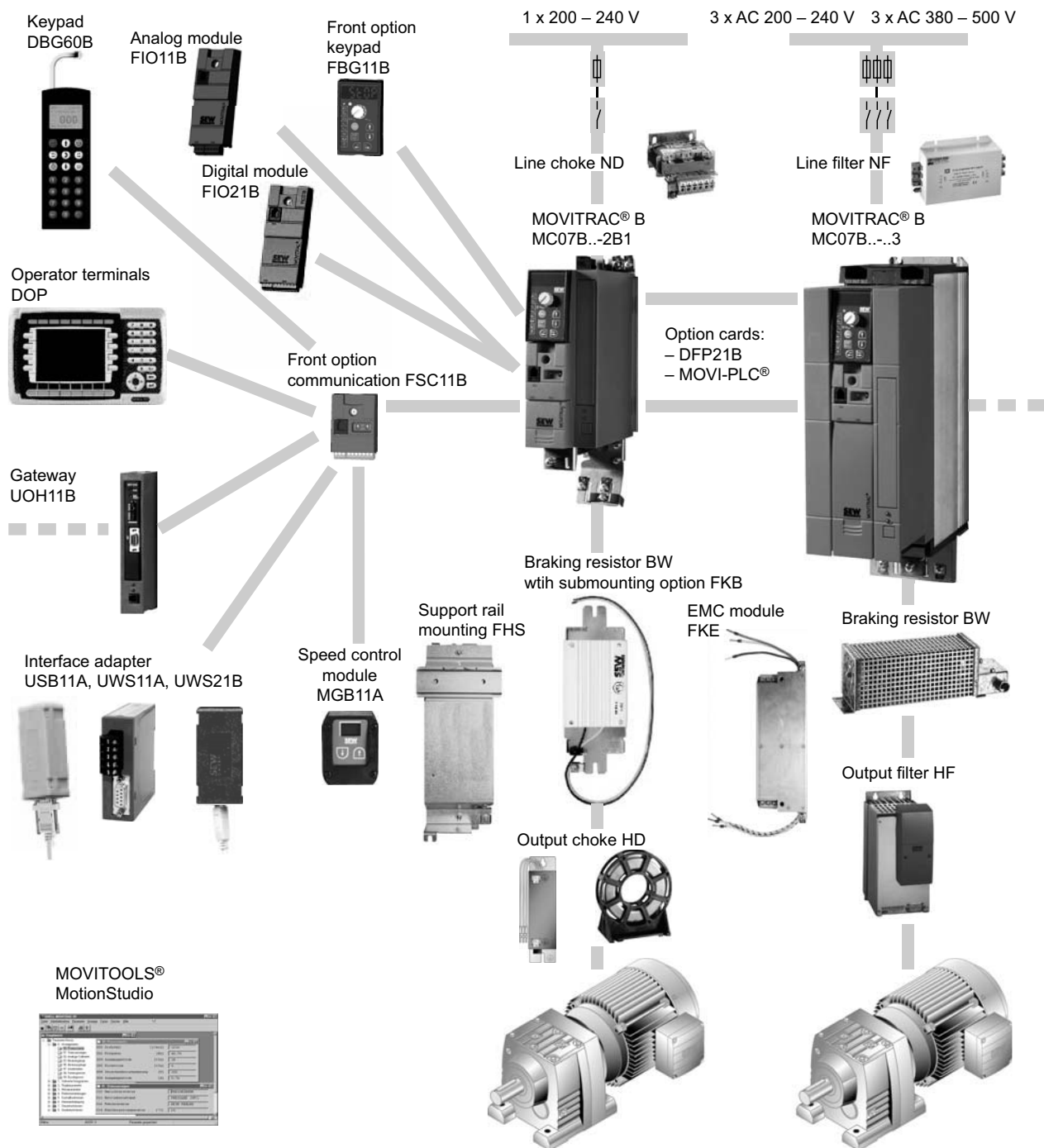
3.1 MOVITRAC® B – compact, versatile and universal

The percentage of speed-variable AC drives with inverter technology is constantly increasing, and these units offer all options to optimize system and machine concepts to the process sequences in addition to machine-conserving drive technology. The expanse of these different fields of application shows that it is difficult to meet the technological and economic requirements with one universal inverter class.

The drive electronics in asynchronous AC motors are separated into standard inverters, for simple applications, e.g. materials handling, and application inverters, for more complex technological applications, e.g. positioning and handling applications. This differentiation of the units allows scaling to different applications while staying with a certain budget.

Operation, parameter setting, diagnostics and integration in automation concepts must offer unit-comprehensive and therefore universal engineering and communication support. Engineering tools for project planning, parameter setting and startup as well as availability of communication interfaces (fieldbuses and Industrial Ethernet) offer users a solution-oriented and unit-independent user interface.

3.2 System overview MOVITRAC® B



Power supply connection

- ND line choke
- NF line filter

Power connection

- HF output filter
- HD output choke

BW braking resistor

Front options

- FBG11B keypad
- FIO11B analog module, or
- FIO21B digital module (in preparation), or
- FSC11B communication for connecting (only one option possible):
 - DBG60B keypad
 - Gateway UFX / UOH
 - UWS/USB interface adapter
 - SBus / RS-485
 - DOP operator terminals
 - MBG11A speed control module

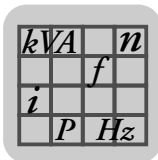
Option cards

- PROFIBUS
- MOVI-PLC® controller

Installation

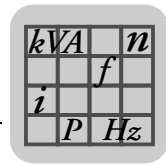
- FHS mounting rail attachment
- Submounting option for FKB braking resistor
- FKE EMC-module

MOVITOOLS® MotionStudio software



3.3 The units at a glance

Power supply connection	Motor power	Rated output current	MOVITRAC® B type	Size
230 V, 1-phase	0.25 kW / 0.34 HP	AC 1.7 A	MC07B0003-2B1-4-00	0XS
	0.37 kW / 0.50 HP	AC 2.5 A	MC07B0004-2B1-4-00	
	0.55 kW / 0.74 HP	AC 3.3 A	MC07B0005-2B1-4-00	0S
	0.75 kW / 1.0 HP	AC 4.2 A	MC07B0008-2B1-4-00	
	1.1 kW / 1.5 HP	AC 5.7 A	MC07B0011-2B1-4-00	0L
	1.5 kW / 2.0 HP	AC 7.3 A	MC07B0015-2B1-4-00	
	2.2 kW / 3.0 HP	AC 8.6 A	MC07B0022-2B1-4-00	
230 V, 3-phase	0.25 kW / 0.34 HP	AC 1.7 A	MC07B0003-2A3-4-00	0XS
	0.37 kW / 0.50 HP	AC 2.5 A	MC07B0004-2A3-4-00	
	0.55 kW / 0.74 HP	AC 3.3 A	MC07B0005-2A3-4-00/S0	0S
	0.75 kW / 1.0 HP	AC 4.2 A	MC07B0008-2A3-4-00/S0	
	1.1 kW / 1.5 HP	AC 5.7 A	MC07B0011-2A3-4-00/S0	0L
	1.5 kW / 2.0 HP	AC 7.3 A	MC07B0015-2A3-4-00/S0	
	2.2 kW / 3.0 HP	AC 8.6 A	MC07B0022-2A3-4-00/S0	
	3.7 kW / 5.0 HP	AC 14.5 A	MC07B0037-2A3-4-00	1
	5.5 kW / 7.4 HP	AC 22 A	MC07B0055-2A3-4-00	2
	7.5 kW / 10 HP	AC 29 A	MC07B0075-2A3-4-00	
	11 kW / 15 HP	AC 42 A	MC07B0110-203-4-00	3
	15 kW / 20 HP	AC 54 A	MC07B0150-203-4-00	
	22 kW / 30 HP	AC 80 A	MC07B0220-203-4-00	4
	30 kW / 40 HP	AC 95 A	MC07B0300-203-4-00	
400 V, 3-phase	0.25 kW / 0.34 HP	AC 1.0 A	MC07B0003-5A3-4-00	0XS
	0.37 kW / 0.50 HP	AC 1.6 A	MC07B0004-5A3-4-00	
	0.55 kW / 0.74 HP	AC 2.0 A	MC07B0005-5A3-4-00/S0	0S
	0.75 kW / 1.0 HP	AC 2.4 A	MC07B0008-5A3-4-00/S0	
	1.1 kW / 1.5 HP	AC 3.1 A	MC07B0011-5A3-4-00/S0	
	1.5 kW / 2.0 HP	AC 4.0 A	MC07B0015-5A3-4-00/S0	
	2.2 kW / 3.0 HP	AC 5.5 A	MC07B0022-5A3-4-00/S0	0L
	3.0 kW / 4.0 HP	AC 7.0 A	MC07B0030-5A3-4-00/S0	
	4.0 kW / 5.4 HP	AC 9.5 A	MC07B0040-5A3-4-00/S0	
	5.5 kW / 7.4 HP	AC 12.5 A	MC07B0055-5A3-4-00	2S
	7.5 kW / 10 HP	AC 16 A	MC07B0075-5A3-4-00	
	11 kW / 15 HP	AC 24 A	MC07B0110-5A3-4-00	2
	15 kW / 20 HP	AC 32 A	MC07B0150-503-4-00	3
	22 kW / 30 HP	AC 46 A	MC07B0220-503-4-00	
	30 kW / 40 HP	AC 60 A	MC07B0300-503-4-00	
	37 kW / 50 HP	AC 73 A	MC07B0370-503-4-00	4
	45 kW / 60 HP	AC 89 A	MC07B0450-503-4-00	
	55 kW / 74 HP	AC 105 A	MC07B0550-503-4-00	5
	75 kW / 100 HP	AC 130 A	MC07B0750-503-4-00	

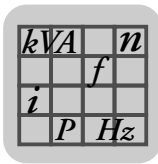


3.4 Functions / features

MOVITRAC® B frequency inverters are characterized by the following features:

3.4.1 Unit properties

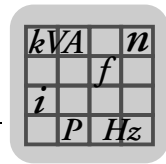
- Wide voltage range:
 - 230 V units for the voltage range 1 × AC 200 – 240 V, 50/60 Hz
 - 230 V units for the voltage range 3 × AC 200 – 240 V, 50/60 Hz
 - 400/500 V units for the voltage range 3 × AC 380 – 500 V, 50/60 Hz
- Overload capacity:
 - 125 % I_N continuous duty
 - 150 % I_N for at least 60 s
 - Maximum 200 % breakaway torque (size 0)
- Rated operation up to an ambient temperature $\vartheta = 50\text{ °C}$ (122 °F), operation up to an ambient temperature $\vartheta = 60\text{ °C}$ (140 °F) possible with current reduction.
- Speed range 0 – 5500 rpm.
- Output frequency range:
 - VFC: 0 – 150 Hz
 - V/f: 0 – 600 Hz
- 4-quadrant capable due to integrated brake chopper.
- Compact unit design for minimum control cabinet space requirement and optimum utilization of control cabinet volume.
- Units with "safe stop" function:
 - Unit variant (...S0):
 - 3 × AC 380 – 500 V, 0.55 – 4.0 kW (0.74 – 5.4 HP)
 - 3 × AC 200 – 240 V, 0.55 – 2.2 kW (0.74 – 3.0 HP)
 - Standard unit: 3 × AC 380 – 500 V, 5.5 – 75 kW (7.4 – 100 HP)
- Integrated EMC line filter to maintain the specified limit classes on the line side / C1/ C2 to EN 61800-3:
 - Sizes 0 to 2: C2 without further measures
 - Sizes 0 to 5: C1 with corresponding filters / folding ferrites
- Configurable inputs / outputs
 - 1 analog input
 - 6 binary inputs
 - 3 binary outputs, including 1 relay output
 - Optional: 1 additional analog input / 1 additional analog output
- Voltage supply and evaluation for TF (PTC temperature sensor) integrated for monitoring the motor temperature.
- Integrated evaluation of TH for monitoring the temperature of the motor.



- Optional keypad for displaying setpoints and setting parameters
 - 5-digit 7-segment display
 - 9 LEDs for displaying the selected symbols
 - 6 keys for operation
 - 1 setpoint generator for speed specification
 - Data backup parameter set
- Braking resistor can be submounted as an option for size 0.
- Separable signal terminals.
- Size 0:
 - Separable power terminals and signal terminals
 - EMC capacitor can be insulated for reduced earth-leakage currents and operation in IT system.
 - "Cold plate" installation possible.
 - Long motor cable length
- Up to size 2S: Operation on MDR regenerative power supply unit possible (see MOVIDRIVE® B documentation).

3.4.2 Controller

- V/f control or VFC control mode.
- Automatic brake rectifier control by the inverter.
- Standstill current function for:
 - Rapid start
 - Heating current for preventing condensation in the motor at low temperatures
- Flying start function for synchronizing the inverter to the running motor.
- Hoist capability.
- DC braking to decelerate the motor in 1Q mode.
- Slip compensation for high stationary speed accuracy.
- Motor stall protection by sliding current limitation in the field weakening range
- 2 complete motor parameter sets.
- Factory setting can be restored.
- Parameter lock for protection against changes to parameters.
- Protective functions for protection against
 - Overcurrent
 - Ground fault
 - Overload
 - Overtemperature of the inverter
 - Overtemperature of the motor (TF/TH)



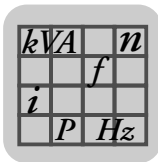
- Speed monitoring and monitoring of the motor and regenerative limit power.
- 5 fault memories with all relevant operating data at the moment of the fault.
- Standardized operation, parameter setting and identical unit connection technology across all units in the MOVITRAC® B range.
- Configurable signal range monitoring (speed).
- Energy-saving function for optimizing the magnetization current automatically.

3.4.3 Setpoint technology

- Motor potentiometer.
- External setpoint selections:
 - 0 – +10 V (unidirectional and bidirectional)
 - 0 – 20 mA
 - 4 – 20 mA
 - –10 V – +10 V bidirectional with FIO11B
- 6 fixed setpoints.
- Frequency input.

3.4.4 Optional communication / operation

- CAN based system bus (SBus) for networking max. 64 MOVITRAC® B units. SBus master can be a PC, PLC or MOVIDRIVE®.
- CANopen Protocol DS301 V4.
- RS-485 interface.
- Simple parameter setting and startup using optional keypad or MOVITOOLS® MotionStudio software.
- Fieldbus interfaces for
 - PROFIBUS®
 - DeviceNet®
 - INTERBUS®
 - CANopen®
 - Ethernet-based:
 - EtherCAT
 - PROFINET
 - Ethernet/IP



3.5 MOVITOOLS® MotionStudio

The MOVITOOLS® MotionStudio program includes:

- Parameter tree
- Startup
- SCOPE®
- Application Builder®
- Data management

MOVITRAC® B has the following functions:

- Startup
- Parameter setting
- Visualization / diagnostics

3.5.1 SCOPE

SCOPE for MOVITOOLS® MotionStudio is an oscilloscope program for SEW inverters. SCOPE allows you to optimize the drives yourself. The inverter records, for example, response functions to setpoint changes in real time. You can transfer this information to the PC and graphically display it. SCOPE shows up to four analog and digital measured variables in differently colored curves. You can scale both the x-axis and the y-axis as required.

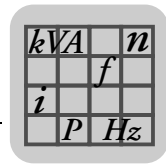
SCOPE also enables you to record digital input and output signals of the inverter. This means you can record complete program sequences of the higher-level controller and then evaluate them.

SCOPE supports simple documentation of the set parameters and the recorded measurement data by providing the following functions:

- Save
- Meta data
- Print

The online help functions enable you to quickly get familiar with how to use SCOPE.

SCOPE is a multi-document interface (MDI application). This interface lets you observe and analyze several data sets simultaneously. SCOPE displays every new data set in a new window. All settings made for displaying and editing the data record apply to the active window only.



4 Technical Data

4.1 CE marking, UL approval and C-Tick

4.1.1 CE-marking



MOVITRAC® B frequency inverters comply with the regulations of the Low Voltage Directive 73/23/EEC.

MOVITRAC® B frequency inverters are designed for use as components for installation in machines and systems. They comply with the EMC product standard EN 61800-3 *Variable-speed electrical drives*. Provided the installation instructions are complied with, they satisfy the relevant requirements for the CE marking for the entire machine/system in which they are installed, on the basis of the EMC Directive 89/336/EEC. For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

Compliance with limit classes C2 and C1 has been tested on a specified test setup. SEW-EURODRIVE can provide detailed information on request.

The CE mark on the nameplate indicates conformity with the low voltage directive 73/23/EEC. We can provide a declaration of conformity on request.

4.1.2 UL approval / CSA / GOST-R certificate / C-Tick



UL and cUL approval (USA) has been granted for the following MOVITRAC® B units:

- 230 V / single-phase
- 230 V / 3-phase
- 400/500 V / 3-phase (0.25 – 45 kW / 0.34 – 60 HP)

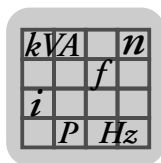


cUL approval has been applied for the other units. cUL is equivalent to CSA approval.

The GOST-R certificate (Russia) was granted for the MOVITRAC® B unit series.



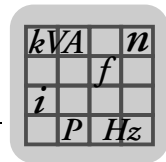
C-Tick approval was applied for the entire MOVITRAC® B series. C-Tick certifies conformity with ACMA (Australian Communications and Media Authority) standards.



4.2 General technical data

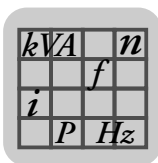
The following technical data applies to all MOVITRAC® B frequency inverters independent of size and power.

MOVITRAC® B	All sizes
Interference immunity	Meets EN 61800-3
Interference emission with EMC-compliant installation	According to limit value class ¹⁾ - Sizes 0 to 2: C2 without further measures - Sizes 0 to 5: C1 with corresponding filters / folding ferrites C1/C2 to EN 61800-3
Leakage current	> 3.5 mA
Ambient temperature ϑ_A (up to 60 °C with current reduction)	230 V, 0.25 – 2.2 kW (0.34 – 3.0 HP) / 400/500 V, 0.25 – 4.0 kW (0.34 – 5.4 HP) With overload capacity (max. 150% for 60 s): $I_D = 100\% I_N / f_{PWM} = 4 \text{ kHz}: -10\text{ °C} - +40\text{ °C} (14\text{ °F} - 104\text{ °F})$ Without overload capacity: $I_D = 100\% I_N / f_{PWM} = 4 \text{ kHz}: -10\text{ °C} - +50\text{ °C} (14\text{ °F} - 122\text{ °F})$ $I_D = 100\% I_N / f_{PWM} = 8 \text{ kHz}: -10\text{ °C} - +40\text{ °C} (14\text{ °F} - 104\text{ °F})$ $I_D = 125\% I_N / f_{PWM} = 4 \text{ kHz}: -10\text{ °C} - +40\text{ °C} (14\text{ °F} - 104\text{ °F})$ 3 × 230 V, 3.7 – 30 kW (5.0 – 40 HP) / 400/500 V, 5.5 – 75 kW (7.4 – 100 HP) With overload capacity (max. 150% for 60 s): $I_D = 100\% I_N / f_{PWM} = 4 \text{ kHz}: 0\text{ °C} - +40\text{ °C} (32\text{ °F} - 104\text{ °F})$ Without overload capacity: $I_D = 100\% I_N / f_{PWM} = 4 \text{ kHz}: 0\text{ °C} - +50\text{ °C} (32\text{ °F} - 122\text{ °F})$ $I_D = 100\% I_N / f_{PWM} = 8 \text{ kHz}: 0\text{ °C} - +40\text{ °C} (32\text{ °F} - 104\text{ °F})$ $I_D = 125\% I_N / f_{PWM} = 4 \text{ kHz}: 0\text{ °C} - +40\text{ °C} (32\text{ °F} - 104\text{ °F})$ - Mounting plate with "cold plate" < 70 °C (+158 °F)
Derating ambient temperature (current reduction)	2.5 % I_N per K at 40 °C – 50 °C (104 °F – 122 °F) 3 % I_N per K at 50 °C – 60 °C (122 °F – 140 °F)
Climate class	EN 60721-3-3, class 3K3
Storage temperature	–25 °C – +75 °C (–13 °F – 167 °F)
Transport temperature	–25 °C – +75 °C (–13 °F – 167 °F)
Type of cooling	Self-cooled: 230 V: ≤ 0.75 kW (1.0 HP) 400/500 V: ≤ 1.1 kW (1.5 HP) Forced cooling: 230 V: ≥ 1.1 kW (1.5 HP) (temperature controlled fan, 400/500 V: ≥ 1.5 kW (3.0 HP) Response threshold 45 °C (113 °F)
Degree of protection EN 60529 (NEMA1)	Sizes 0 to 3: IP20 Sizes 4 – 5 power connections: - IP00 - With the supplied Plexiglas cover mounted and shrinking tube mounted (not supplied) IP10
Duty cycle	Continuous duty
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Mains voltage tolerance	EN 50160: ±10 %
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)



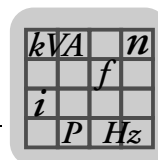
MOVITRAC® B	All sizes
Installation altitude	Up to $h \leq 1000$ m (3281 ft) without restrictions. The following restrictions apply at $h \geq 1000$ m (3281 ft): - from 1000 m (3281 ft) to max. 4000 m (13120 ft): I_N reduction by 1 % per 100 m (328 ft) - from 2000 m (6562 ft) to max. 4000 m (13120 ft): - AC 230 V units: Reduction of the rated mains voltage V_{mains} by AC 3 V per 100 m (328 ft) - AC 500 V units: Reduction of the rated mains voltage V_{mains} by AC 6 V per 100 m (328 ft) Over 2000 m (6562 ft) only overvoltage class 2, external measures are required for overvoltage class 3. Overvoltage classes according to DIN VDE 0110-1.
Dimensioning	According to DIN ISO 276-v
Size 0: Restrictions for continuous duty with 125 % I_N	- Maximum ambient temperature ϑ_A: 40 °C (104 °F) - Maximum rated mains voltage V_{mains}: 400 V - No DIN rail mounting / submounting resistor - At 1 × 230 V: Provide ND line choke

- 1) Electrical installation in compliance with applicable regulations is necessary for maintaining the EMC limit value class. Comply with the installation notes.



4.3 MOVITRAC® B electronics data

Function	Terminal	Designation	Default	Data
Setpoint input ¹⁾ (differential input)	X10:1 X10:2 X10:3 X10:4	REF1 AI11 (+) AI12 (-) GND		+10 V, $R_{Lmin} = 3 \text{ k}\Omega$ 0 – +10 V ($R_i > 200 \text{ k}\Omega$) 0 – 20 mA / 4 – 20 mA ($R_i = 250 \Omega$), 10 bit resolution, sampling time 1 ms GND = Reference potential for binary and analog signals, PE potential
Binary inputs	X12:1 X12:2 X12:3 X12:4 X12:5 X12:6	DI00 DI01 DI02 DI03 DI04 DI05TF	Fault reset CW/halt CCW/halt Enable/stop n11/n21 n12/n22	$R_i = 3 \text{ k}\Omega$, $I_E = 10 \text{ mA}$, sampling time 5 ms, PLC compatible Signal level according to EN 61131-2 type 1 or 3: +11 – +30 V → 1 / contact closed –3 – +5 V → 0 / contact open - X12:2 / DI01 with fixed assignment CW/halt - X12:5 / DI04 can be used as frequency input - X12:6 / DI05 can be used as TF input
Supply voltage for TF	X12:7	VOTF		Special characteristics for TF according to DIN EN 60947-8 / trigger value 3 kΩ
Auxiliary voltage output/external voltage supply ²⁾	X12:8	24VIO		Auxiliary supply output: V = DC 24 V, current carrying capacity $I_{max} = 50 \text{ mA}$ External voltage supply: V = DC 24 V –15% / +20% according to EN 61131-2 See the Project planning/external DC 24 V voltage supply section.
Reference terminal	X12:9	GND		Reference potential for binary and analog signals, PE potential
Binary outputs	X13:1 X13:2 X13:3 X13:4	GND DO02 DO03 GND	Brake released Ready	PLC compatible, response time 5 ms, $I_{max} \text{ DO02} = 150 \text{ mA}$, $I_{max} \text{ DO03} = 50 \text{ mA}$, short-circuit proof, protected against external voltage up to 30 V GND = Reference potential for binary and analog signals, PE potential
Relay output	X13:5 X13:6 X13:7	DO01-C DO01-NO DO01-NC		Shared relay contact NO contact NC contact Load capacity: $V_{max} = 30 \text{ V}$, $I_{max} = 800 \text{ mA}$



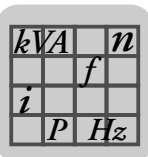
Function	Terminal	Designa- tion	Default	Data
Safety contact	X17:1	GND: Reference potential for X17:2		
	X17:2	VO24: U _{OUT} = DC 24 V, only to supply X17:4 of the same unit; it cannot be used to supply other units.		
	X17:3	SOV24: Reference potential for DC+24 V "safe stop" input (safety contact)		
	X17:4	SVI24: DC+24 V "safe stop" input (safety contact)		
	Permitted cable cross section		One core per terminal: 0.08 – 1.5 mm ² (AWG28 – 16) Two cores per terminal: 0.25 – 1.0 mm ² (AWG23 – 17)	
	Power consumption X17:4		Size 0: 3 W Size 1: 5 W Size 2, 2S: 6 W Size 3: 7.5 W Size 4: 8 W Size 5: 10 W	
	Input capacitance X17:4		Size 0: 27 µF Sizes 1 to 5: 270 µF	
	Time for restart Time to inhibit output stage		t _A = 200 ms t _S = 200 ms	
	Signal level		DC +19.2 V – +30 V = "1" = contact closed DC –30 V – +5 V = "0" = contact open	
Terminal response times	Binary input and output terminals are updated every 5 ms			
Max. cable cross-section	1.5 mm ² (AWG15) without conductor end sleeves 1.0 mm ² (AWG17) with conductor end sleeves			
Cable stripping length	X10 / X12 / X13: 5 mm FSC11B / FIO11B / FIO21B: 7 mm			
Tightening torque	X10 / X12 / X13: 0.25 Nm FSC11B / FIO11B / FIO21B: 0.22 – 0.25 Nm			

- 1) If the setpoint input is not used, it should be set to GND. Otherwise a measured input voltage of –1 V ... +1 V is set.
- 2) The MC07B...-S0 unit type must always be supplied with external voltage.

4.3.1 DC 24 V power demand for 24 V backup mode

Size	Basic unit power demand ¹⁾	DBG60B	FIO11B	Fieldbus option ²⁾³⁾	DHP11B ³⁾
0 MC07B...-00	5 W	1 W	2 W	3 W	4.5 W
0 MC07B...-S0	12 W				
1, 2S, 2	17 W				
3	23 W				
4, 5	25 W				

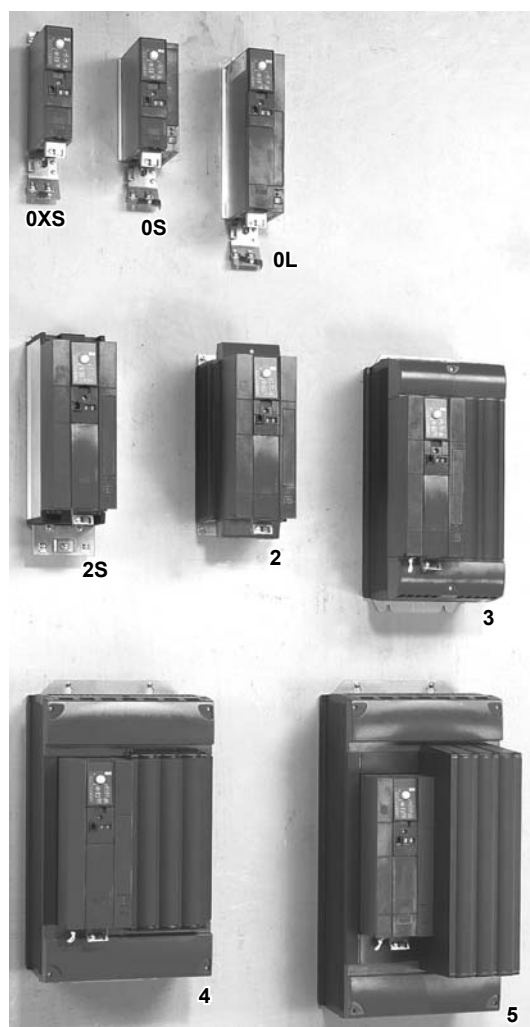
- 1) FBG11B, FSC11B (UWS11A/USB11A) included. Take account of the additional load of the binary inputs with 2.4 W per 100 mA.
- 2) Fieldbus options are: DFP21B, DFD11B, DFE11B, ...
- 3) These options must always be supplied externally.



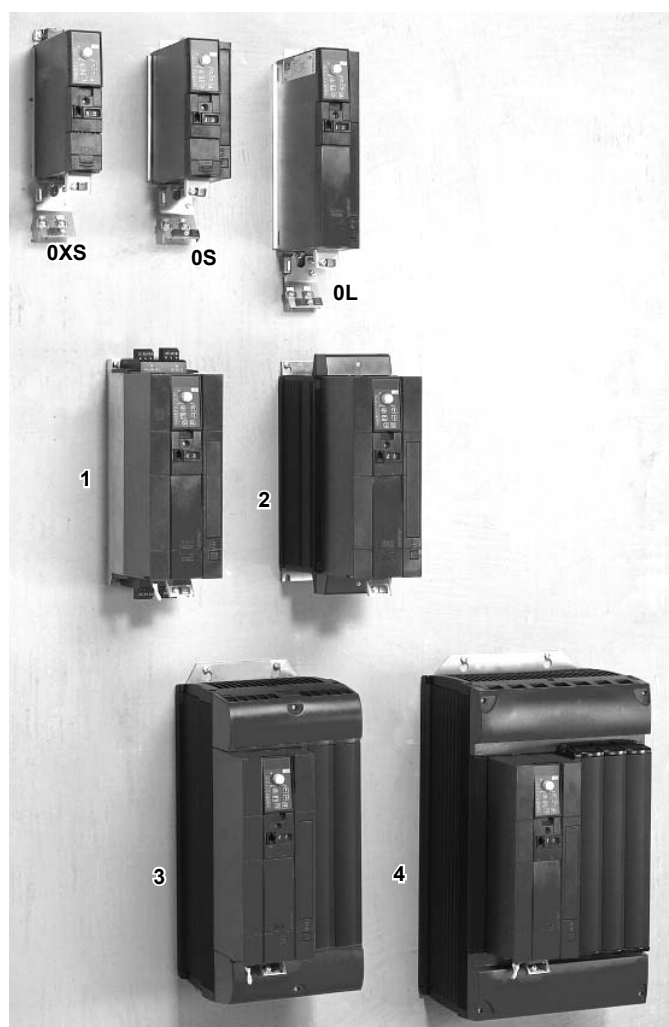
4.4 Technical data of MOVITRAC® B

4.4.1 Overview of MOVITRAC® B

400 / 500 V



230 V



Power supply connection 400 / 500 V / 3-phase

Size	0XS	0S	0L	2S	2	3	4	5
Power [kW / HP]	0.25 / 0.34 0.37 / 0.50	0.55 / 0.74 0.75 / 1.0 1.1 / 1.5 1.5 / 2.0	2.2 / 3.0 3.0 / 4.0 4.0 / 5.4	5.5 / 7.4 7.5 / 10	11 / 15	15 / 20 22 / 30 30 / 40	37 / 50 45 / 60	55 / 74 75 / 100

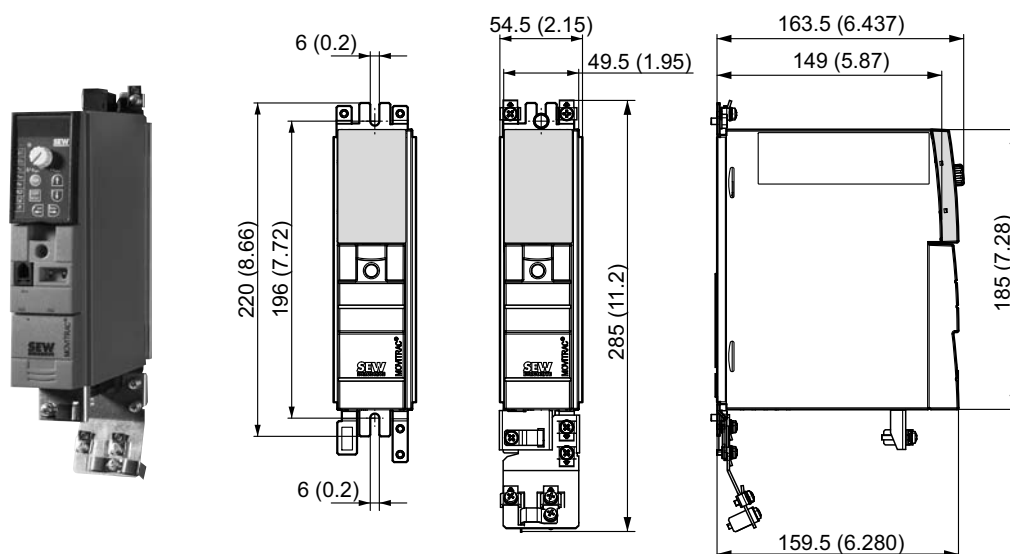
Power supply connection 230 V / 1-phase

Size	0XS	0S	0L
Power [kW / HP]	0.25 / 0.34 0.37 / 0.50	0.55 / 0.74 0.75 / 1.0	1.1 / 1.5 1.5 / 2.0 2.2 / 3.0

Power supply connection 230 V / 3-phase

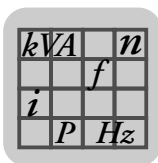
Size	0XS	0S	0L	1	2	3	4
Power [kW / HP]	0.25 / 0.34 0.37 / 0.50	0.55 / 0.74 0.75 / 1.0	1.1 / 1.5 1.5 / 2.0 2.2 / 3.0	3.7 / 5.0	5.5 / 7.4 7.5 / 10	11 / 15 15 / 20	22 / 30 30 / 40

4.4.2 AC 400 / 500 V / 3-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP

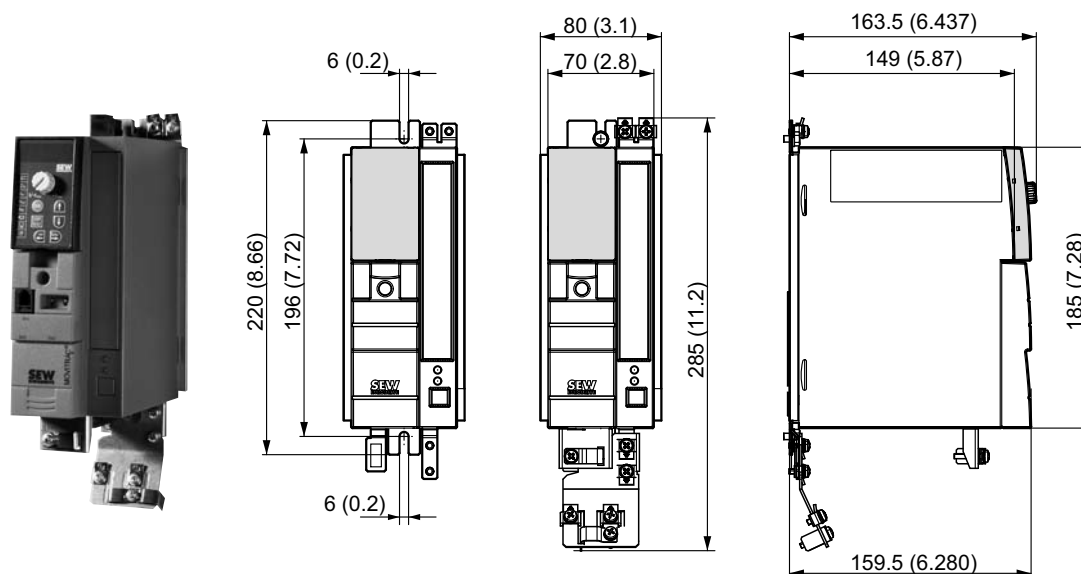


MOVITRAC® MC07B (3-phase power supply)		0003-5A3-4-00	0004-5A3-4-00
Part number		828 515 2	828 516 0
INPUT ¹⁾			
Rated mains voltage	V _{mains}	3 × AC 380 – 500 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 0.9 A	AC 1.4 A
Rated mains current, 125 % operation	I _{mains 125}	AC 1.1 A	AC 1.8 A
OUTPUT			
Output voltage	V _O	3 × 0 – U _{mains}	
Recommended motor power 100 % operation	P _{Mot}	0.25 kW / 0.34 HP	0.37 kW / 0.50 HP
Recommended motor power 125 % operation	P _{Mot 125}	0.37 kW / 0.50 HP	0.55 kW / 0.74 HP
Rated output current 100 % operation	I _N	AC 1.0 A	AC 1.6 A
Rated output current 125 % operation	I _{N 125}	AC 1.3 A	AC 2.0 A
Apparent output power 100 % operation	S _N	0.7 kVA	1.1 kVA
Apparent output power 125 % operation	S _{N 125}	0.9 kVA	1.4 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	68 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	30 W	35 W
Power loss 125 % operation	P _{V 125}	35 W	40 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	54.5 × 185 × 163.5 mm / 2.15 × 7.28 × 6.437 in	
Mass	m	1.3 kg / 2.9 lb	

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



4.4.3 AC 400 / 500 V / 3-phase / size 0S / 0.55 / 0.75 / 1.1 / 1.5 kW / 0.74 / 1.0 / 1.5 / 2.0 HP

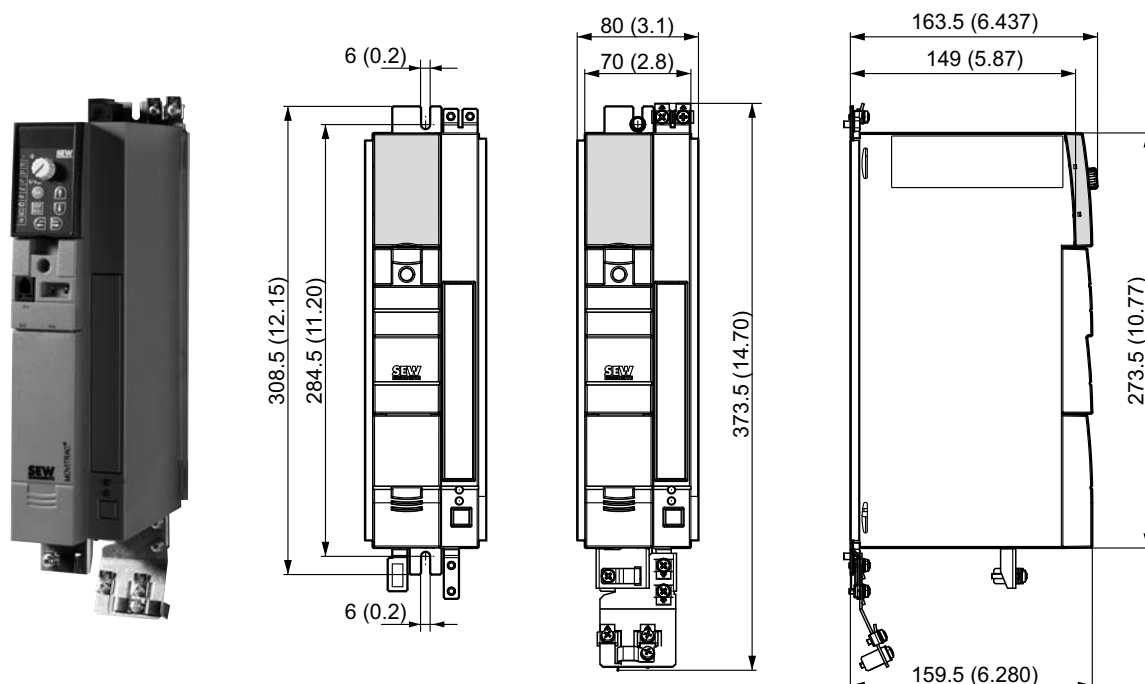


MOVITRAC® MC07B (3-phase power supply)		0005-5A3-4-x0	0008-5A3-4-x0	0011-5A3-4-x0	0015-5A3-4-x0
Part number, standard unit (-00)		828 517 9	828 518 7	828 519 5	828 520 9
Part number "Safe stop" (-S0) ¹⁾		828 995 6	828 996 4	828 997 2	828 998 0
INPUT ²⁾					
Rated mains voltage	V _{mains}	3 × AC 380 – 500 V			
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %			
Rated mains current, 100 % operation	I _{mains}	AC 1.8 A	AC 2.2 A	AC 2.8 A	AC 3.6 A
Rated mains current, 125 % operation	I _{mains 125}	AC 2.3 A	AC 2.6 A	AC 3.5 A	AC 4.5 A
OUTPUT					
Output voltage	V _O	3 × 0 – V _{mains}			
Recommended motor power 100 % operation	P _{Mot}	0.55 kW / 0.74 HP	0.75 kW / 1.0 HP	1.1 kW / 1.5 HP	1.5 kW / 2.0 HP
	P _{Mot 125}	0.75 kW / 1.0 HP	1.1 kW / 1.5 HP	1.5 kW / 2.0 HP	2.2 kW / 3.0 HP
Rated output current 100 % operation	I _N	AC 2.0 A	AC 2.4 A	AC 3.1 A	AC 4.0 A
Rated output current 125 % operation	I _{N 125}	AC 2.5 A	AC 3.0 A	AC 3.9 A	AC 5.0 A
Apparent output power 100 % operation	S _N	1.4 kVA	1.7 kVA	2.1 kVA	2.8 kVA
Apparent output power 125 % operation	S _{N 125}	1.7 kVA	2.1 kVA	2.7 kVA	3.5 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	68 Ω			
GENERAL INFORMATION					
Power loss 100 % operation	P _V	40 W	45 W	50 W	60 W
Power loss 125 % operation	P _{V 125}	45 W	50 W	60 W	75 W
Current limitation		150 % I _N for at least 60 seconds			
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in			
Dimensions	W × H × D	80 × 185 × 163.5 mm / 3.1 × 7.28 × 6.437 in			
Mass	m	1.5 kg / 3.3 lb			

1) The unit type MC07B...-S0 must always be supplied by an external DC 24 V power supply unit.

2) The mains and output currents must be reduced by 20 % from the nominal values for V_{mains} = 3 × AC 500 V.

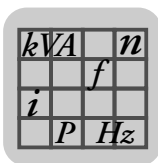
4.4.4 AC 400 / 500 V / 3-phase / size 0L / 2.2 / 3.0 / 4.0 kW / 3.0 / 4.0 / 5.4 HP



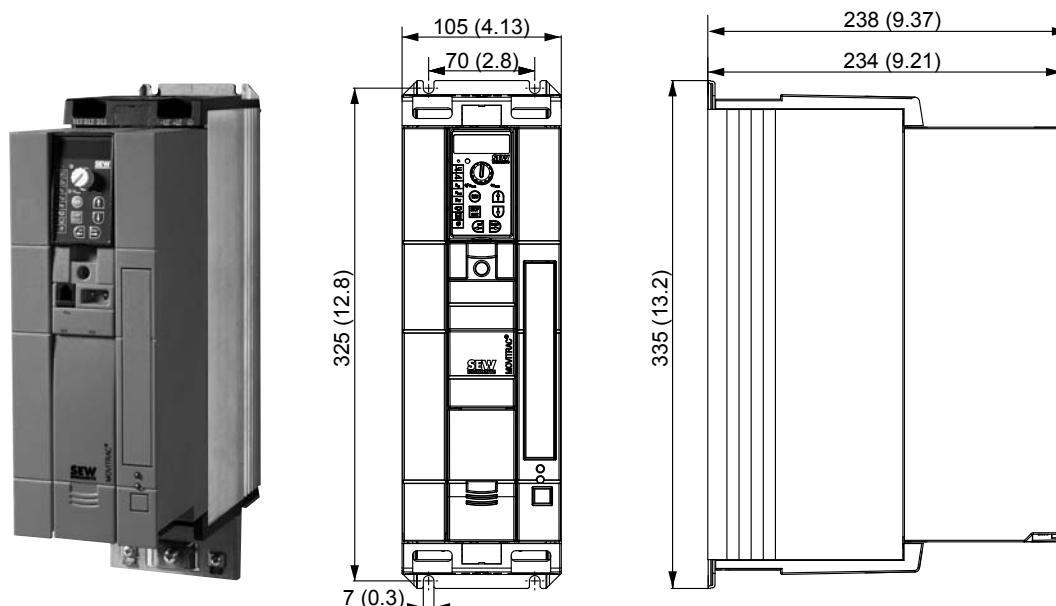
MOVITRAC® MC07B (3-phase power supply)		0022-5A3-4-x0	0030-5A3-4-x0	0040-5A3-4-x0
Part number, standard unit (-00)		828 521 7	828 522 5	828 523 3
Part number "Safe stop" (-S0) ¹⁾		828 999 9	829 000 8	829 001 6
INPUT ²⁾				
Rated mains voltage	V _{mains}	3 × AC 380 – 500 V		
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %		
Rated mains current, 100 % operation	I _{mains}	AC 5.0 A	AC 6.3 A	AC 8.6 A
Rated mains current, 125 % operation	I _{mains 125}	AC 6.2 A	AC 7.9 A	AC 10.7 A
OUTPUT				
Output voltage	V _O	3 × 0 – V _{mains}		
Recommended motor power 100 % operation	P _{Mot}	2.2 kW / 3.0 HP	3.0 kW / 4.0 HP	4.0 kW / 5.4 HP
Recommended motor power 125 % operation	P _{Mot 125}	3.0 kW / 4.0 HP	4.0 kW / 5.4 HP	5.5 kW / 7.4 HP
Rated output current 100 % operation	I _N	AC 5.5 A	AC 7.0 A	AC 9.5 A
Rated output current 125 % operation	I _{N 125}	AC 6.9 A	AC 8.8 A	AC 11.9 A
Apparent output power 100 % operation	S _N	3.8 kVA	4.8 kVA	6.6 kVA
Apparent output power 125 % operation	S _{N 125}	4.8 kVA	6.1 kVA	8.2 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	68 Ω		
GENERAL INFORMATION				
Power loss 100 % operation	P _V	80 W	95 W	125 W
Power loss 125 % operation	P _{V 125}	95 W	120 W	180 W
Current limitation		150 % I _N for at least 60 seconds		
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in		
Dimensions	W × H × D	80 × 273.5 × 163.5 mm / 3.1 × 10.77 × 6.437 in		
Mass	m	2.1 kg / 4.6 lb		

1) The unit type MC07B...-S0 must always be supplied by an external DC 24 V power supply unit.

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



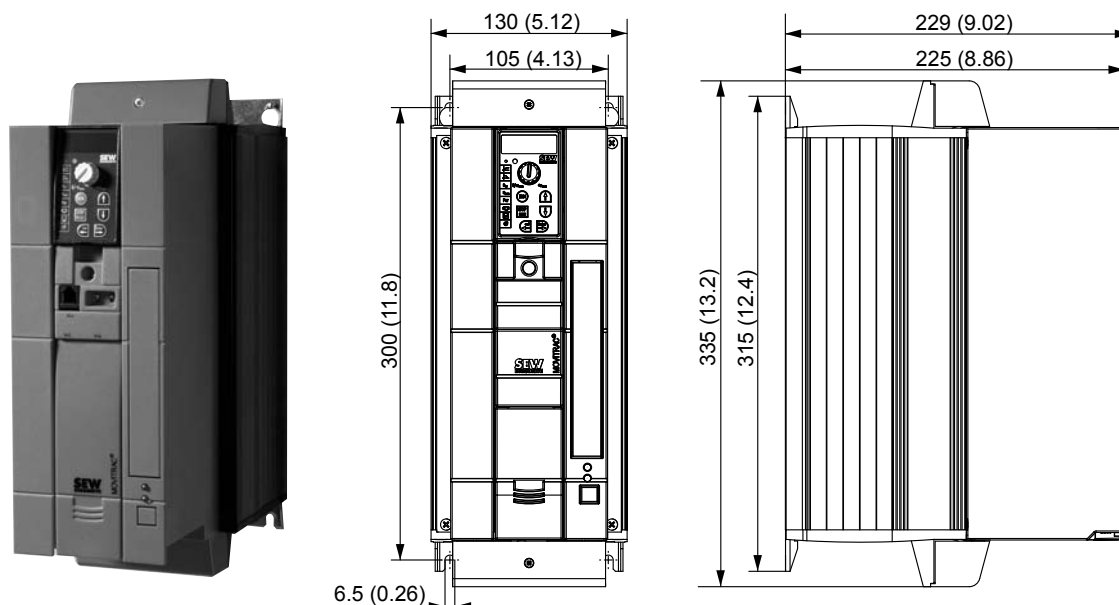
4.4.5 AC 400 / 500 V / 3-phase / size 2S / 5.5 / 7.5 kW / 7.4 / 10 HP



MOVITRAC® MC07B (3-phase power supply)		0055-5A3-4-00	0075-5A3-4-00
Part number		828 524 1	828 526 8
INPUT ¹⁾			
Rated mains voltage	V _{mains}	3 × AC 380 – 500 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 11.3 A	AC 14.4 A
Rated mains current, 125 % operation	I _{mains 125}	AC 14.1 A	AC 18.0 A
OUTPUT			
Output voltage	V _O	3 × 0 – U _{mains}	
Recommended motor power 100 % operation	P _{Mot}	5.5 kW / 7.4 HP	7.5 kW / 10 HP
Recommended motor power 125 % operation	P _{Mot 125}	7.5 kW / 10 HP	11 kW / 15 HP
Rated output current 100 % operation	I _N	AC 12.5 A	AC 16 A
Rated output current 125 % operation	I _{N 125}	AC 15.6 A	AC 20 A
Apparent output power 100 % operation	S _N	8.7 kVA	11.1 kVA
Apparent output power 125 % operation	S _{N 125}	10.8 kVA	13.9 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	47 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	220 W	290 W
Power loss 125 % operation	P _{V 125}	290 W	370 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.6 Nm / 5 lb in	
Dimensions	W × H × D	105 × 335 × 238 mm / 4.13 × 13.2 × 9.37 in	
Mass	m	5.0 kg / 11 lb	

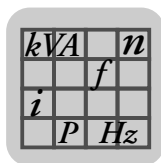
1) The mains and output currents must be reduced by 20 % from the nominal values for $V_{\text{mains}} = 3 \times \text{AC } 500 \text{ V}$.

4.4.6 AC 400 / 500 V / 3-phase / size 2 / 11 kW / 15 HP

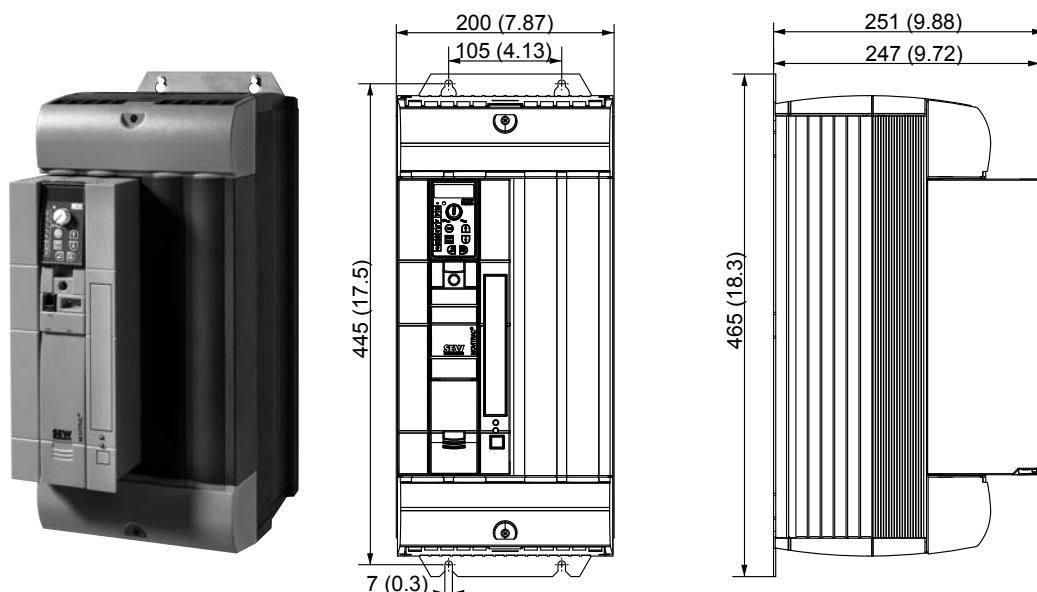


MOVITRAC® MC07B (3-phase power supply)		0110-5A3-4-00
Part number		828 527 6
INPUT ¹⁾		
Rated mains voltage	V_{mains}	3 × AC 380 – 500 V
Rated mains frequency	f_{mains}	50 / 60 Hz ± 5 %
Rated mains current, 100 % operation	I_{mains}	AC 21.6 A
Rated mains current, 125 % operation	$I_{\text{mains 125}}$	AC 27.0 A
OUTPUT		
Output voltage	V_O	3 × 0 – V_{mains}
Recommended motor power 100 % operation	P_{Mot}	11 kW / 15 HP
Recommended motor power 125 % operation	$P_{\text{Mot 125}}$	15 kW / 20 HP
Rated output current 100 % operation	I_N	AC 24 A
Rated output current 125 % operation	$I_{N 125}$	AC 30 A
Apparent output power 100 % operation	S_N	16.6 kVA
Apparent output power 125 % operation	$S_{N 125}$	20.8 kVA
Minimum permitted braking resistance value (4 quadrant operation)	$R_{\text{BW_min}}$	22 Ω
GENERAL INFORMATION		
Power loss 100 % operation	P_V	400 W
Power loss 125 % operation	$P_{V 125}$	500 W
Current limitation		150 % I_N for at least 60 seconds
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 1.5 Nm / 13 lb in
Dimensions	W × H × D	130 × 335 × 229 mm / 5.12 × 13.2 × 9.02 in
Mass	m	6.6 kg / 15 lb

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



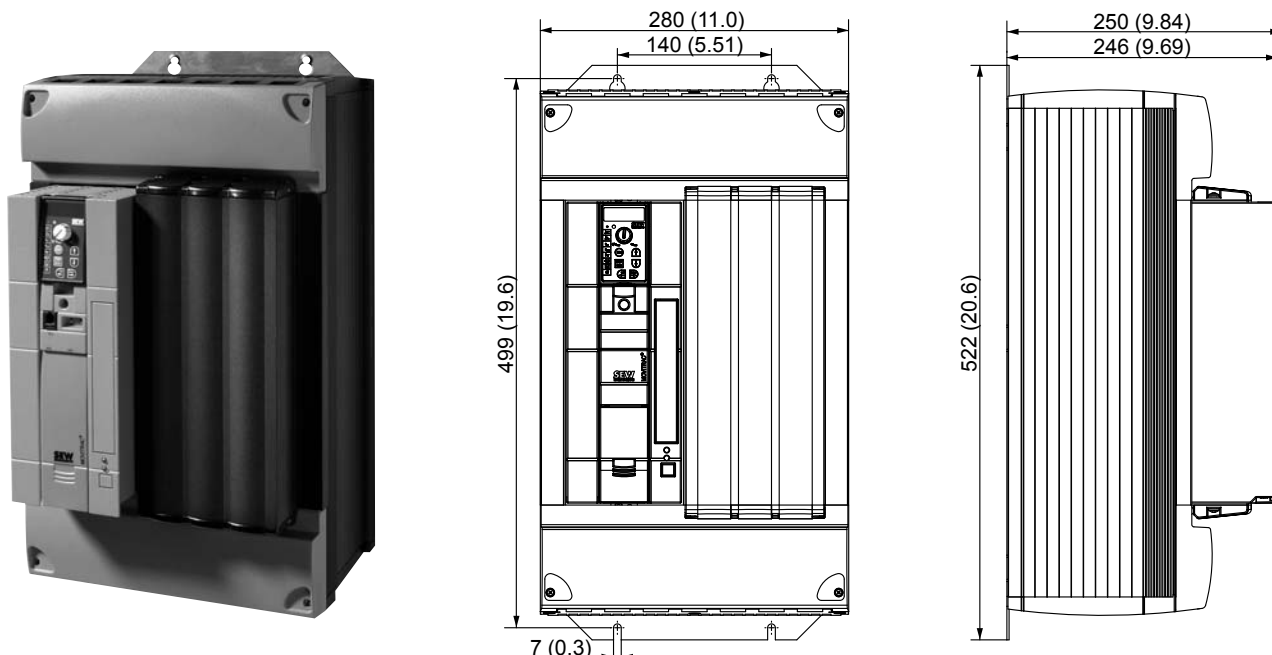
4.4.7 AC 400 / 500 V / 3-phase / size 3 / 15 / 22 / 30 kW / 20 / 30 / 40 HP



MOVITRAC® MC07B (3-phase power supply)		0150-503-4-00	0220-503-4-00	0300-503-4-00
Part number		828 528 4	828 529 2	828 530 6
INPUT ¹⁾				
Rated mains voltage	V _{mains}	3 × AC 380 – 500 V		
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %		
Rated mains current, 100 % operation	I _{mains}	AC 28.8 A	AC 41.4 A	AC 54.0 A
Rated mains current, 125 % operation	I _{mains 125}	AC 36.0 A	AC 51.7 A	AC 67.5 A
OUTPUT				
Output voltage	V _O	3 × 0 – V _{mains}		
Recommended motor power 100 % operation	P _{Mot}	15 kW / 20 HP	22 kW / 30 HP	30 kW / 40 HP
Recommended motor power 125 % operation	P _{Mot 125}	22 kW / 30 HP	30 kW / 40 HP	37 kW / 50 HP
Rated output current 100 % operation	I _N	AC 32 A	AC 46 A	AC 60 A
Rated output current 125 % operation	I _{N 125}	AC 40 A	AC 57.5 A	AC 75 A
Apparent output power 100 % operation	S _N	22.2 kVA	31.9 kVA	41.6 kVA
Apparent output power 125 % operation	S _{N 125}	27.7 kVA	39.8 kVA	52.0 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	15 Ω	12 Ω	
GENERAL INFORMATION				
Power loss 100 % operation	P _V	550 W	750 W	950 W
Power loss 125 % operation	P _{V 125}	690 W	940 W	1250 W
Current limitation		150 % I _N for at least 60 seconds		
Terminal cross section / tightening torque	Terminals	6 mm ² / AWG10	10 mm ² / AWG8	16 mm ² / AWG6
		3.5 Nm / 31 lb in		
Dimensions	W × H × D	200 × 465 × 251 mm / 7.87 × 18.3 × 9.88 in		
Mass	m	15 kg / 33 lb		

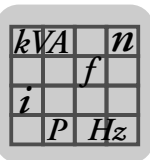
1) The mains and output currents must be reduced by 20 % from the nominal values for $V_{\text{mains}} = 3 \times \text{AC } 500 \text{ V}$.

4.4.8 AC 400 / 500 V / 3-phase / size 4 / 37 / 45 kW / 50 / 60 HP

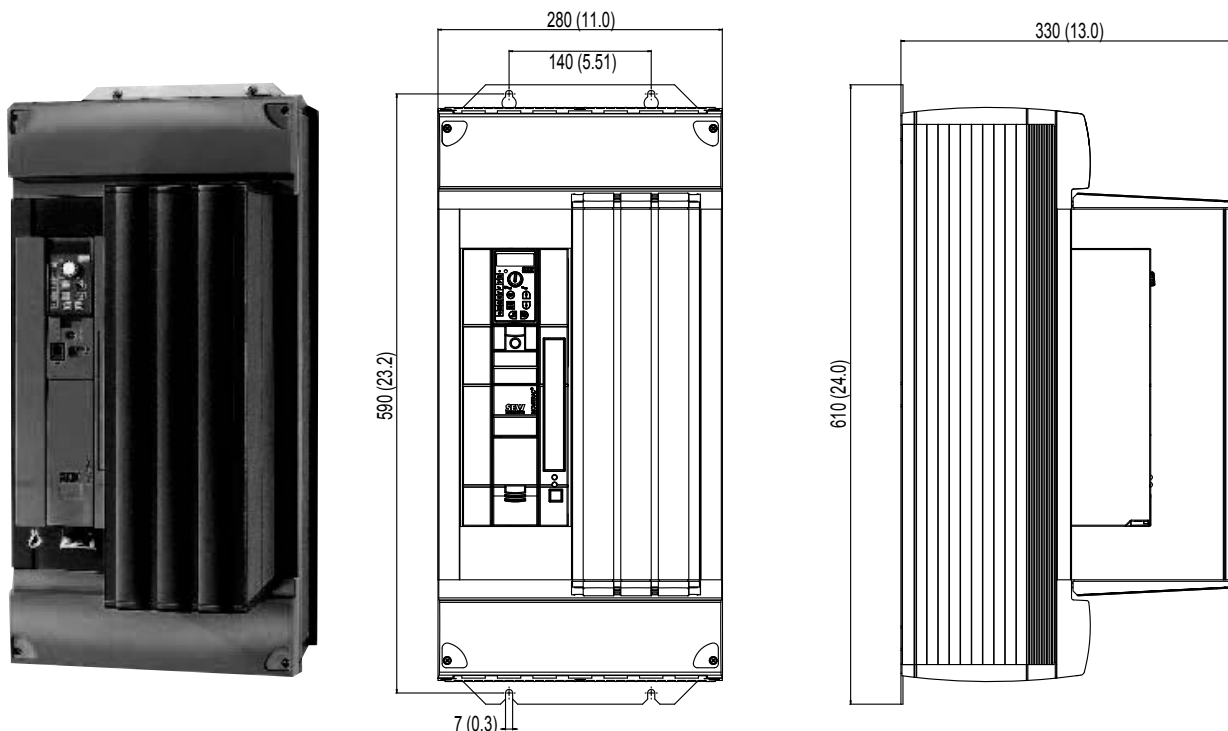


MOVITRAC® MC07B (3-phase power supply)		0370-503-4-00	0450-503-4-00
Part number		828 531 4	828 532 2
INPUT ¹⁾			
Rated mains voltage	V _{mains}	3 × AC 380 – 500 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 65.7 A	AC 80.1 A
Rated mains current, 125 % operation	I _{mains 125}	AC 81.9 A	AC 100.1 A
OUTPUT			
Output voltage	V _O	3 × 0 – V _{mains}	
Recommended motor power 100 % operation	P _{Mot}	37 kW / 50 HP	45 kW / 60 HP
Recommended motor power 125 % operation	P _{Mot 125}	45 kW / 60 HP	55 kW / 74 HP
Rated output current 100 % operation	I _N	AC 73 A	AC 89 A
Rated output current 125 % operation	I _{N 125}	AC 91.3 A	AC 111.3 A
Apparent output power 100 % operation	S _N	50.6 kVA	61.7 kVA
Apparent output power 125 % operation	S _{N 125}	63.2 kVA	77.1 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	6 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	1200 W	1400 W
Power loss 125 % operation	P _{V 125}	1450 W	1820 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	25 mm ² / AWG4	35 mm ² / AWG2
		14 Nm / 120 lb in	
Dimensions	W × H × D	280 × 522 × 250 mm / 11.0 × 20.6 × 9.84 in	
Mass	m	27 kg / 60 lb	

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



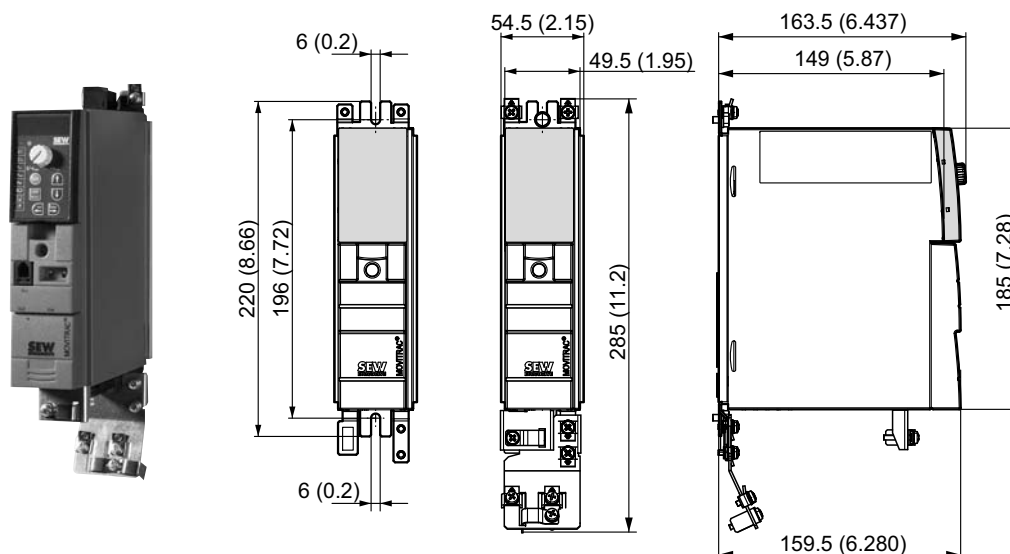
4.4.9 AC 400 / 500 V / 3-phase / size 5 / 55 / 75 kW / 74 / 100 HP



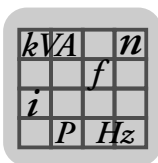
MOVITRAC® MC07B (3-phase power supply)		0550-503-4-00	0750-503-4-00
Part number		829 527 1	829 529 8
INPUT¹⁾			
Rated mains voltage	V_{mains}	3 × AC 380 – 500 V	
Rated mains frequency	f_{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I_{mains}	AC 94.5 A	AC 117 A
Rated mains current, 125 % operation	$I_{\text{mains 125}}$	AC 118.1 A	AC 146.3 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100 % operation	P_{Mot}	55 kW / 74 HP	75 kW / 100 HP
Recommended motor power 125 % operation	$P_{\text{Mot 125}}$	75 kW / 100 HP	90 kW / 120 HP
Rated output current 100 % operation	I_N	AC 105 A	AC 130 A
Rated output current 125 % operation	$I_{N 125}$	AC 131 A	AC 162 A
Apparent output power 100 % operation	S_N	73.5 kVA	91.0 kVA
Apparent output power 125 % operation	$S_{N 125}$	90.8 kVA	112.2 kVA
Minimum permitted braking resistance value (4 quadrant operation)	$R_{\text{BW_min}}$	6 Ω	4 Ω
GENERAL INFORMATION			
Power loss 100 % operation	P_V	1700 W	2000 W
Power loss 125 % operation	$P_{V 125}$	2020 W	2300 W
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	35 mm ² / AWG2	50 mm ² / AWG0
		14 Nm / 120 lb in	
Dimensions	W × H × D	280 × 610 × 330 mm / 11.0 × 24.0 × 13.0 in	
Mass	m	35 kg / 77 lb	

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

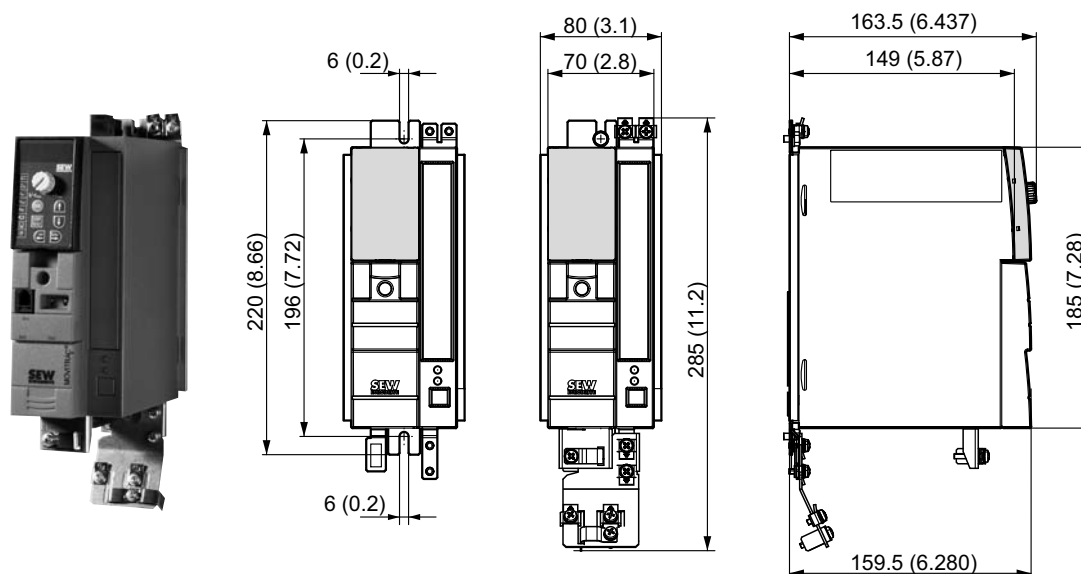
4.4.10 AC 230 V / 1-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP



MOVITRAC® MC07B (1-phase power supply)		0003-2B1-4-00	0004-2B1-4-00
Part number		828 491 1	828 493 8
INPUT			
Rated mains voltage	V _{mains}	1 × AC 200 – 240 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 4.3 A	AC 6.1 A
Rated mains current, 125 % operation	I _{mains 125}	AC 5.5 A	AC 7.5 A
OUTPUT			
Output voltage	V _O	3 × 0 – V _{mains}	
Recommended motor power 100 % operation	P _{Mot}	0.25 kW / 0.34 HP	0.37 kW / 0.50 HP
Recommended motor power 125 % operation	P _{Mot 125}	0.37 kW / 0.50 HP	0.55 kW / 0.74 HP
Rated output current 100 % operation	I _N	AC 1.7 A	AC 2.5 A
Rated output current 125 % operation	I _{N 125}	AC 2.1 A	AC 3.1 A
Apparent output power 100 % operation	S _N	0.7 kVA	1.0 kVA
Apparent output power 125 % operation	S _{N 125}	0.9 kVA	1.3 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	30 W	35 W
Power loss 125 % operation	P _{V 125}	35 W	45 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	54.5 × 185 × 163.5 mm / 2.15 × 7.28 × 6.437 in	
Mass	m	1.3 kg / 2.9 lb	

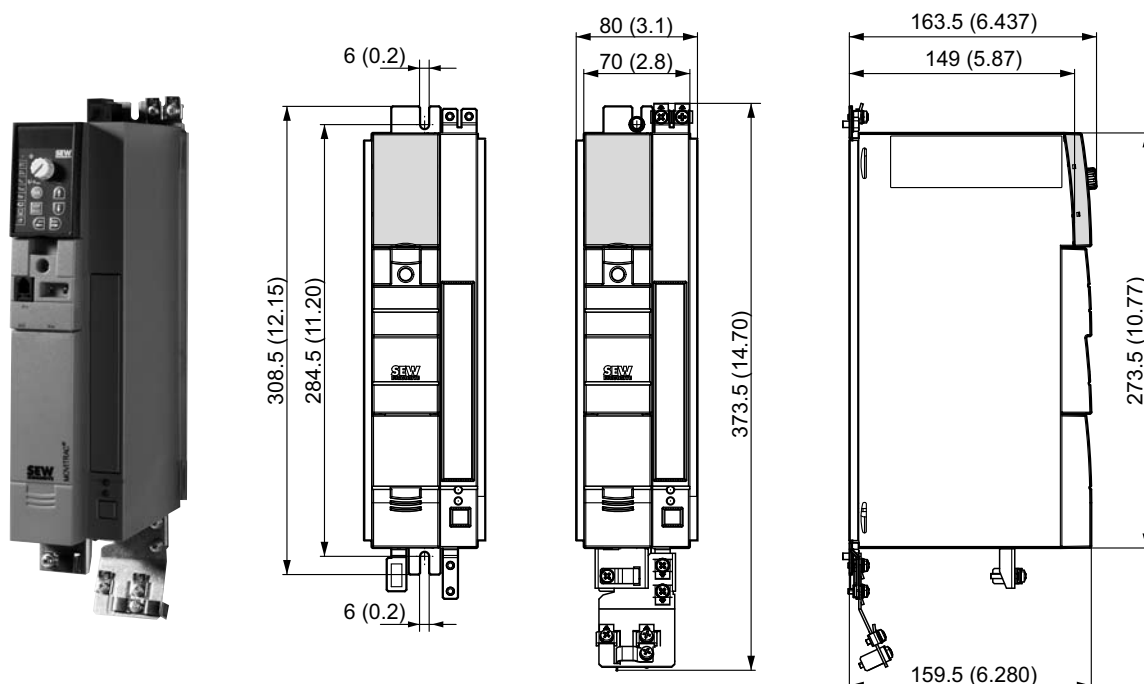


4.4.11 AC 230 V / 1-phase / size 0S / 0.55 / 0.75 kW / 0.74 / 1.0 HP

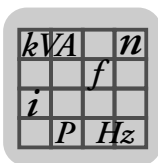


MOVITRAC® MC07B (1-phase power supply)		0005-2B1-4-00	0008-2B1-4-00
Part number		828 494 6	828 495 4
INPUT			
Rated mains voltage	V _{mains}	1 × AC 200 – 240 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 8.5 A	AC 9.9 A
Rated mains current, 125 % operation	I _{mains 125}	AC 10.2 A	AC 11.8 A
OUTPUT			
Output voltage	V _O	3 × 0 – V _{mains}	
Recommended motor power 100 % operation	P _{Mot}	0.55 kW / 0.74 HP	0.75 kW / 1.0 HP
Recommended motor power 125 % operation	P _{Mot 125}	0.75 kW / 1.0 HP	1.1 kW / 1.5 HP
Rated output current 100 % operation	I _N	AC 3.3 A	AC 4.2 A
Rated output current 125 % operation	I _{N 125}	AC 4.1 A	AC 5.3 A
Apparent output power 100 % operation	S _N	1.4 kVA	1.7 kVA
Apparent output power 125 % operation	S _{N 125}	1.7 kVA	2.1 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	45 W	50 W
Power loss 125 % operation	P _{V 125}	50 W	65 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	80 × 185 × 163.5 mm / 3.1 × 7.28 × 6.437 in	
Mass	m	1.5 kg / 3.3 lb	

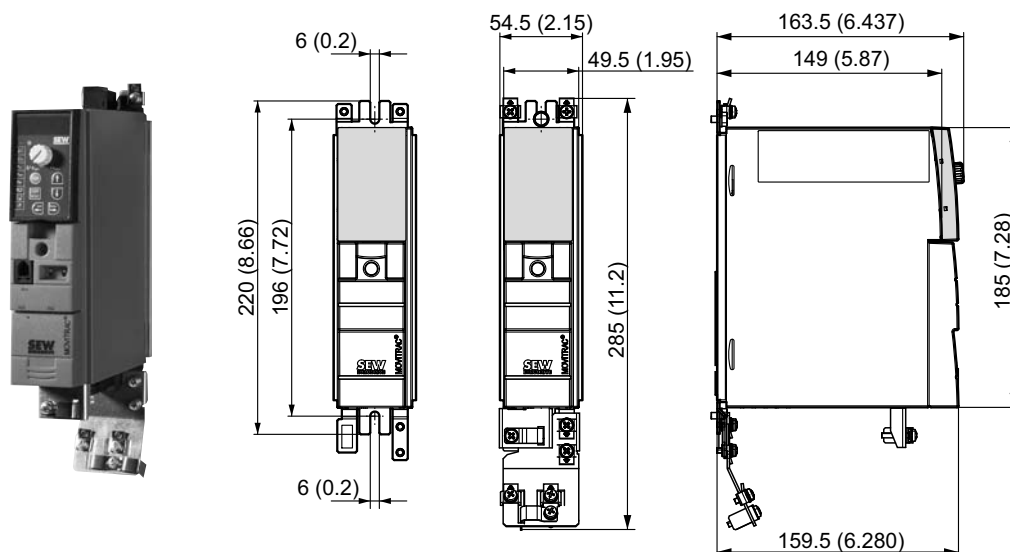
4.4.12 AC 230 V / 1-phase / size 0L / 1.1 / 1.5 / 2.2 kW / 1.5 / 2.0 / 3.0 HP



MOVITRAC® MC07B (1-phase power supply)		0011-2B1-4-00	0015-2B1-4-00	0022-2B1-4-00
Part number		828 496 2	828 497 0	828 498 9
INPUT				
Rated mains voltage	V _{line}	1 × AC 200 – 240 V		
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %		
Rated mains current, 100 % operation	I _{mains}	AC 13.4 A	AC 16.7 A	AC 19.7 A
Rated mains current, 125 % operation	I _{mains 125}	AC 16.8 A	AC 20.7 A	AC 24.3 A
OUTPUT				
Output voltage	V _O	3 × 0 – V _{mains}		
Recommended motor power 100 % operation	P _{Mot}	1.1 kW / 1.5 HP	1.5 kW / 2.0 HP	2.2 kW / 3.0 HP
Recommended motor power 125 % operation	P _{Mot 125}	1.5 kW / 2.0 HP	2.2 kW / 3.0 HP	3.0 kW / 4.0 HP
Rated output current 100 % operation	I _N	AC 5.7 A	AC 7.3 A	AC 8.6 A
Rated output current 125 % operation	I _{N 125}	AC 7.1 A	AC 9.1 A	AC 10.8 A
Apparent output power 100 % operation	S _N	2.3 kVA	3.0 kVA	3.5 kVA
Apparent output power 125 % operation	S _{N 125}	2.9 kVA	3.7 kVA	4.3 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	27 Ω		
GENERAL INFORMATION				
Power loss 100 % operation	P _V	70 W	90 W	105 W
Power loss 125 % operation	P _{V 125}	90 W	110 W	132 W
Current limitation		150 % I _N for at least 60 seconds		
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in		
Dimensions	W × H × D	80 × 273.5 × 163.5 mm / 3.1 × 10.77 × 6.437 in		
Mass	m	2.2 kg / 4.9 lb		

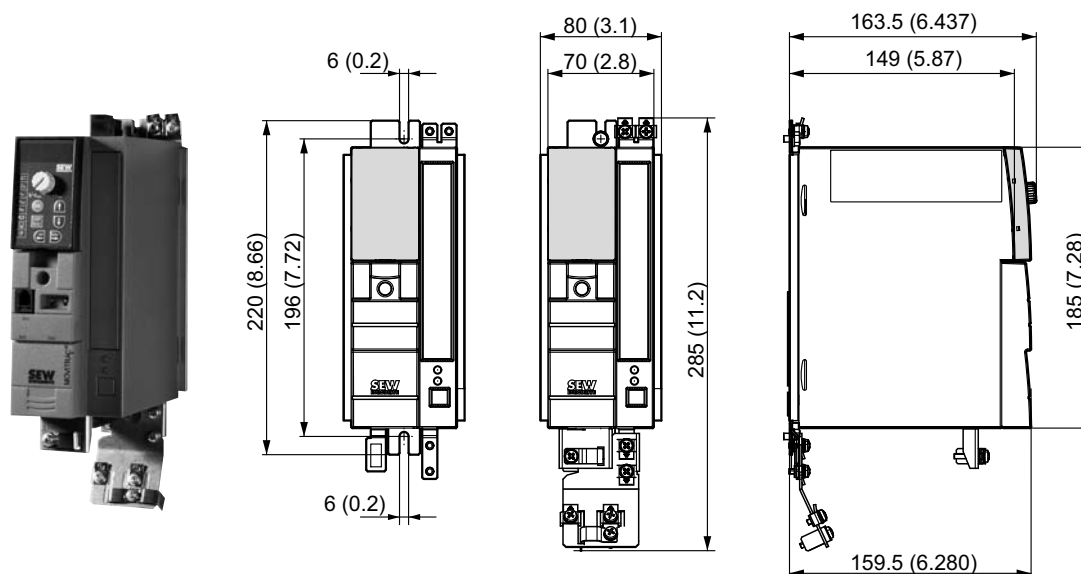


4.4.13 AC 230 V / 3-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP



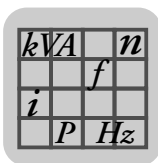
MOVITRAC® MC07B (3-phase power supply)		0003-2A3-4-00	0004-2A3-4-00
Part number		828 499 7	828 500 4
INPUT			
Rated mains voltage	V _{mains}	3 × AC 200 – 240 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 1.6 A	AC 2.0 A
Rated mains current, 125 % operation	I _{mains 125}	AC 1.9 A	AC 2.4 A
OUTPUT			
Output voltage	V _O	3 × 0 – V _{mains}	
Recommended motor power 100 % operation	P _{Mot}	0.25 kW / 0.34 HP	0.37 kW / 0.50 HP
Recommended motor power 125 % operation	P _{Mot 125}	0.37 kW / 0.50 HP	0.55 kW / 0.74 HP
Rated output current 100 % operation	I _N	AC 1.7 A	AC 2.5 A
Rated output current 125 % operation	I _{N 125}	AC 2.1 A	AC 3.1 A
Apparent output power 100 % operation	S _N	0.7 kVA	1.0 kVA
Apparent output power 125 % operation	S _{N 125}	0.9 kVA	1.3 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	35 W	40 W
Power loss 125 % operation	P _{V 125}	40 W	50 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	54.5 × 185 × 163.5 mm / 2.15 × 7.28 × 6.437 in	
Mass	m	1.3 kg / 2.9 lb	

4.4.14 AC 230 V / 3-phase / size 0S / 0.55 / 0.75 kW / 0.74 / 1.0 HP

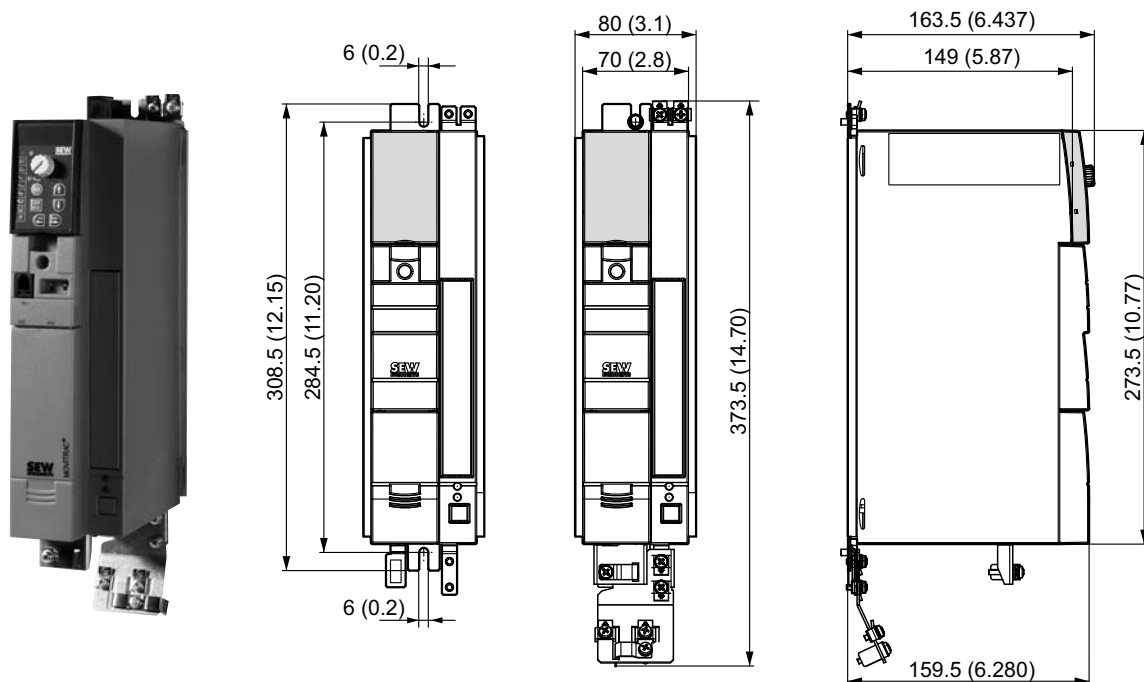


MOVITRAC® MC07B (3-phase power supply)		0005-2A3-4-x0	0008-2A3-4-x0
Part number, standard unit (-00)		828 501 2	828 502 0
Part number "Safe stop" (-S0) ¹⁾		829 987 0	829 988 9
INPUT			
Rated mains voltage	V _{mains}	3 × AC 200 – 240 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 2.8 A	AC 3.3 A
Rated mains current, 125 % operation	I _{mains 125}	AC 3.4 A	AC 4.1 A
OUTPUT			
Output voltage	V _O	3 × 0 – V _{mains}	
Recommended motor power 100 % operation	P _{Mot}	0.55 kW / 0.74 HP	0.75 kW / 1.0 HP
Recommended motor power 125 % operation	P _{Mot 125}	0.75 kW / 1.0 HP	1.1 kW / 1.5 HP
Rated output current 100 % operation	I _N	AC 3.3 A	AC 4.2 A
Rated output current 125 % operation	I _{N 125}	AC 4.1 A	AC 5.3 A
Apparent output power 100 % operation	S _N	1.4 kVA	1.7 kVA
Apparent output power 125 % operation	S _{N 125}	1.7 kVA	2.1 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	50 W	60 W
Power loss 125 % operation	P _{V 125}	60 W	75 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	80 × 185 × 163.5 mm / 3.1 × 7.28 × 6.437 in	
Mass	m	1.5 kg / 3.3 lb	

1) The unit type MC07B...-S0 must always be supplied by an external DC 24 V power supply unit.



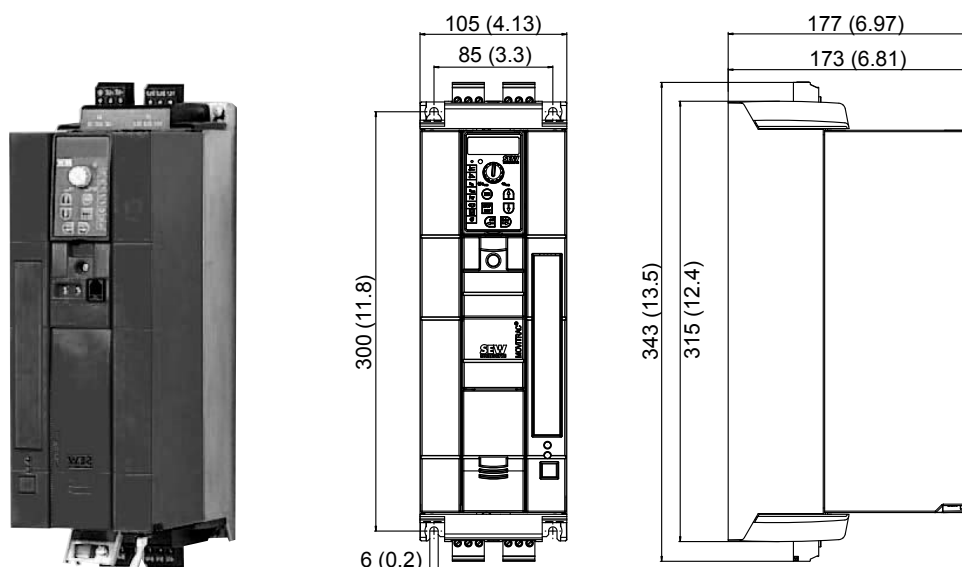
4.4.15 AC 230 V / 3-phase / size 0L / 1.1 / 1.5 / 2.2 kW / 1.5 / 2.0 / 3.0 HP



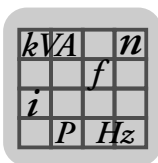
MOVITRAC® MC07B (3-phase power supply)		0011-2A3-4-00	0015-2A3-4-00	0022-2A3-4-00
Part number standard design (-00)		828 503 9	828 504 7	828 505 5
Part number "Safe technology" (-S0) ¹⁾		829 989 7	829 990 0	829 991 9
INPUT				
Rated mains voltage	V _{mains}	3 × AC 200 – 240 V		
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %		
Rated mains current, 100 % operation	I _{mains}	AC 5.1 A	AC 6.4 A	AC 7.6 A
Rated mains current, 125 % operation	I _{mains 125}	AC 6.3 A	AC 7.9 A	AC 9.5 A
OUTPUT				
Output voltage	V _O	3 × 0 – V _{mains}		
Recommended motor power 100 % operation	P _{Mot}	1.1 kW / 1.5 HP	1.5 kW / 2.0 HP	2.2 kW / 3.0 HP
Recommended motor power 125 % operation	P _{Mot 125}	1.5 kW / 2.0 HP	2.2 kW / 3.0 HP	3.0 kW / 4.0 HP
Rated output current 100 % operation	I _N	AC 5.7 A	AC 7.3 A	AC 8.6 A
Rated output current 125 % operation	I _{N 125}	AC 7.1 A	AC 9.1 A	AC 10.8 A
Apparent output power 100 % operation	S _N	2.3 kVA	3.0 kVA	3.5 kVA
Apparent output power 125 % operation	S _{N 125}	2.9 kVA	3.7 kVA	4.3 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	27 Ω		
GENERAL INFORMATION				
Power loss 100 % operation	P _V	75 W	90 W	105 W
Power loss 125 % operation	P _{V 125}	90 W	110 W	140 W
Current limitation		150 % I _N for at least 60 seconds		
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.5 Nm / 4 lb in		
Dimensions	W × H × D	80 × 273.5 × 163.5 mm / 3.1 × 10.77 × 6.437 in		
Mass	m	2.2 kg / 4.9 lb		

1) The unit type MC07B...-S0 must always be supplied by an external DC 24 V power supply unit.

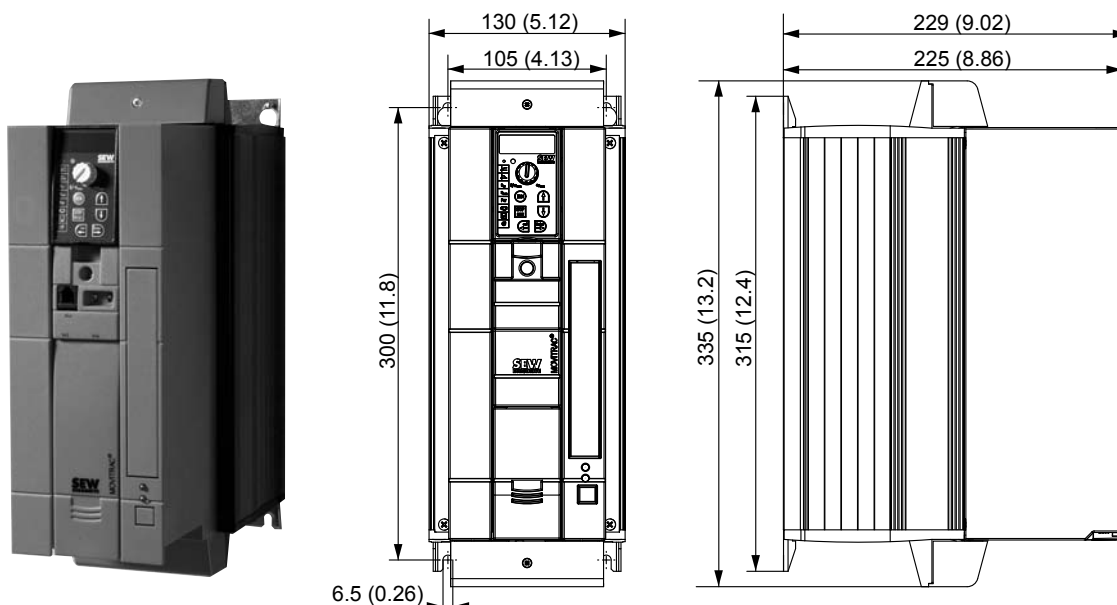
4.4.16 AC 230 V / 3-phase / size 1 / 3.7 kW / 5.0 HP



MOVITRAC® MC07B (3-phase power supply)		0037-2A3-4-00
Part number		828 506 3
INPUT		
Rated mains voltage	V_{mains}	3 × AC 200 – 240 V
Rated mains frequency	f_{mains}	50 / 60 Hz ± 5 %
Rated mains current, 100 % operation	I_{mains}	AC 12.9 A
Rated mains current, 125 % operation	$I_{\text{mains 125}}$	AC 16.1 A
OUTPUT		
Output voltage	V_O	3 × 0 – V_{mains}
Recommended motor power 100 % operation	P_{Mot}	3.7 kW / 5.0 HP
Recommended motor power 125 % operation	$P_{\text{Mot 125}}$	5.5 kW / 7.4 HP
Rated output current 100 % operation	I_N	AC 14.5 A
Rated output current 125 % operation	$I_{N 125}$	AC 18.1 A
Apparent output power 100 % operation	S_N	5.8 kVA
Apparent output power 125 % operation	$S_{N 125}$	7.3 kVA
Minimum permitted braking resistance value (4 quadrant operation)	$R_{\text{BW_min}}$	27 Ω
GENERAL INFORMATION		
Power loss 100 % operation	P_V	210 W
Power loss 125 % operation	$P_{V 125}$	270 W
Current limitation		150 % I_N for at least 60 seconds
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 0.6 Nm / 5 lb in
Dimensions	W × H × D	105 × 315 × 173 mm / 4.13 × 12.4 × 6.81 in
Mass	m	3.5 kg / 7.7 lb

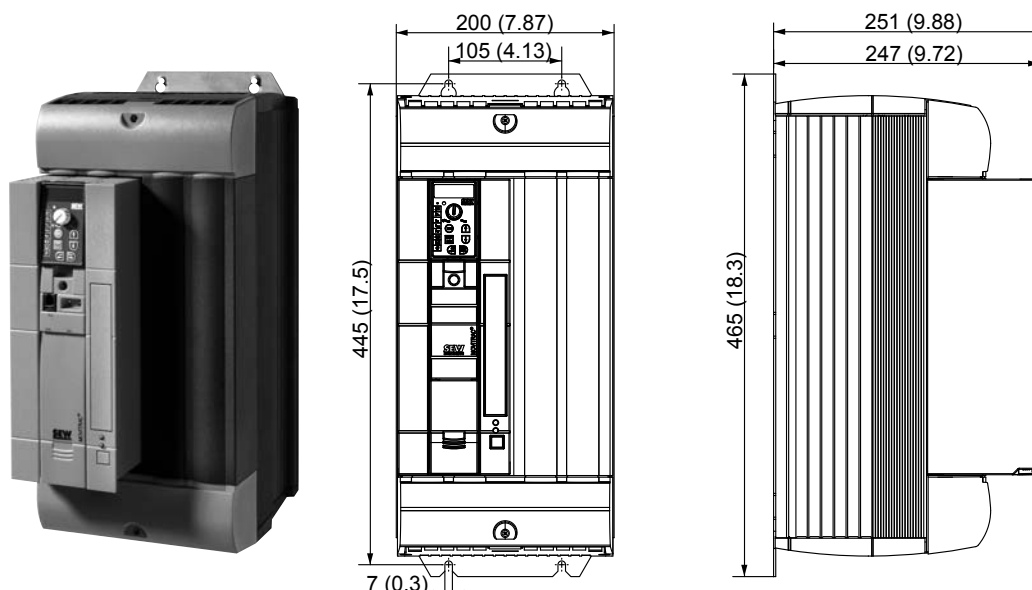


4.4.17 AC 230 V / 3-phase / size 2 / 5.5 / 7.5 kW / 7.4 / 10 HP

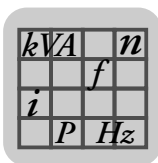


MOVITRAC® MC07B (3-phase power supply)		0055-2A3-4-00	0075-2A3-4-00
Part number		828 507 1	828 509 8
INPUT			
Rated mains voltage	V _{mains}	3 × AC 200 – 240 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 19.5 A	AC 27.4 A
Rated mains current, 125 % operation	I _{mains 125}	AC 24.4 A	AC 34.3 A
OUTPUT			
Output voltage	V _O	3 × 0 – V _{mains}	
Recommended motor power 100 % operation	P _{Mot}	5.5 kW / 7.4 HP	7.5 kW / 10 HP
Recommended motor power 125 % operation	P _{Mot 125}	AC 7.5 kW / 10 HP	11 kW / 15 HP
Rated output current 100 % operation	I _N	AC 22 A	AC 29 A
Rated output current 125 % operation	I _{N 125}	AC 27.5 A	AC 36.3 A
Apparent output power 100 % operation	S _N	8.8 kVA	11.6 kVA
Apparent output power 125 % operation	S _{N 125}	11.0 kVA	14.5 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	12 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	300 W	380 W
Power loss 125 % operation	P _{V 125}	375 W	475 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm ² / AWG12 / 1.5 Nm / 13 lb in	
Dimensions	W × H × D	130 × 335 × 229 mm / 5.12 × 13.2 × 9.02 in	
Mass	m	6.6 kg / 15 lb	

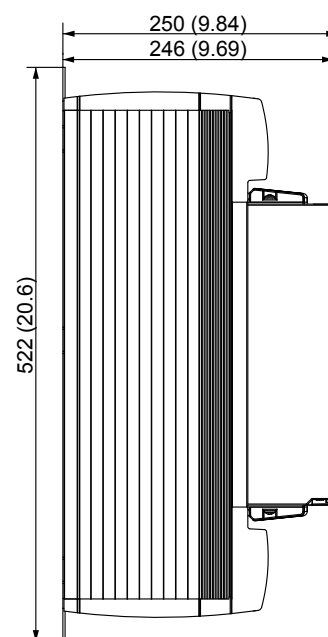
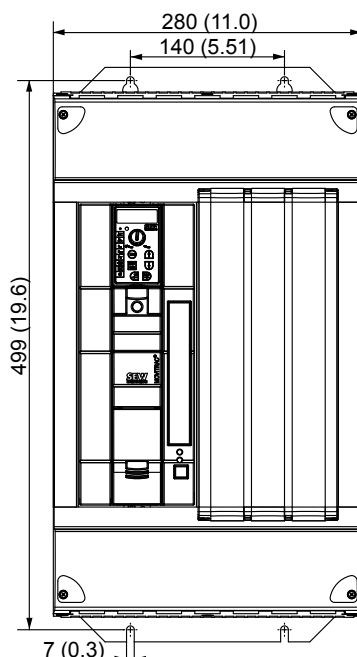
4.4.18 AC 230 V / 3-phase / size 3 / 11 / 15 kW / 15 / 20 HP



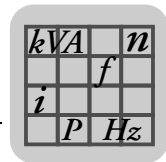
MOVITRAC® MC07B (3-phase power supply)		0110-203-4-00	0150-203-4-00
Part number		828 510 1	828 512 8
INPUT			
Rated mains voltage	V_{mains}	$3 \times \text{AC } 200 - 240 \text{ V}$	
Rated mains frequency	f_{mains}	$50 / 60 \text{ Hz} \pm 5 \%$	
Rated mains current, 100 % operation	I_{mains}	AC 40.0 A	AC 48.6 A
Rated mains current, 125 % operation	$I_{\text{mains } 125}$	AC 50.0 A	AC 60.8 A
OUTPUT			
Output voltage	V_O	$3 \times 0 - V_{\text{mains}}$	
Recommended motor power 100 % operation	P_{Mot}	11 kW / 15 HP	15 kW / 20 HP
Recommended motor power 125 % operation	$P_{\text{Mot } 125}$	15 kW / 20 HP	22 kW / 30 HP
Rated output current 100 % operation	I_N	AC 42 A	AC 54 A
Rated output current 125 % operation	$I_{N \text{ } 125}$	AC 52.5 A	AC 67.5 A
Apparent output power 100 % operation	S_N	16.8 kVA	21.6 kVA
Apparent output power 125 % operation	$S_{N \text{ } 125}$	21.0 kVA	26.9 kVA
Minimum permitted braking resistance value (4 quadrant operation)	$R_{\text{BW_min}}$	7.5 Ω	5.6 Ω
GENERAL INFORMATION			
Power loss 100 % operation	P_V	580 W	720 W
Power loss 125 % operation	$P_{V \text{ } 125}$	720 W	900 W
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	6 mm ² / AWG10	10 mm ² / AWG8
		3.5 Nm / 31 lb in	
Dimensions	$W \times H \times D$	200 × 465 × 251 mm / 7.87 × 18.3 × 9.88 in	
Mass	m	15 kg / 33 lb	



4.4.19 AC 230 V / 3-phase / size 4 / 22 / 30 kW / 30 / 40 HP



MOVITRAC® MC07B (3-phase power supply)		0220-203-4-00	0300-203-4-00
Part number		828 513 6	828 514 4
INPUT			
Rated mains voltage	V _{mains}	3 × AC 200 – 240 V	
Rated mains frequency	f _{mains}	50 / 60 Hz ± 5 %	
Rated mains current, 100 % operation	I _{mains}	AC 72 A	AC 86 A
Rated mains current, 125 % operation	I _{mains 125}	AC 90 A	AC 107 A
OUTPUT			
Output voltage	V _O	3 × 0 – V _{mains}	
Recommended motor power 100 % operation	P _{Mot}	22 kW / 30 HP	30 kW / 40 HP
Recommended motor power 125 % operation	P _{Mot 125}	30 kW / 40 HP	37 kW / 50 HP
Rated output current 100 % operation	I _N	AC 80 A	AC 95 A
Rated output current 125 % operation	I _{N 125}	AC 100 A	AC 118.8 A
Apparent output power 100 % operation	S _N	31.9 kVA	37.9 kVA
Apparent output power 125 % operation	S _{N 125}	39.9 kVA	47.4 kVA
Minimum permitted braking resistance value (4 quadrant operation)	R _{BW_min}	3 Ω	
GENERAL INFORMATION			
Power loss 100 % operation	P _V	1100 W	1300 W
Power loss 125 % operation	P _{V 125}	1400 W	1700 W
Current limitation		150 % I _N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	25 mm ² / AWG4	35 mm ² / AWG2
		14 Nm / 120 lb in	
Dimensions	W × H × D	280 × 522 × 250 mm / 11.0 × 20.6 × 9.84 in	
Mass	m	27 kg / 60 lb	



4.5 Front option FBG11B keypad

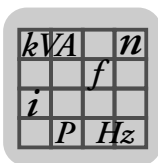
The FBG11B front option can be used for simple diagnostics and startup.

Part number 1820 635 2

- Functions
- Display process values and status
 - Error memory and error reset queries
 - Display and set parameters
 - Backup and transfer of parameter sets
 - Easy-to-use startup menu for SEW and non-SEW motors
 - Manual control of MOVITRAC® B

- Features
- 5-digit, 7-segment display / 6 buttons / 8 icons / speed control module
 - Selection of short or long menu
 - Can be plugged onto the inverter (during operation)
 - Degree of protection IP20 (EN 60529)

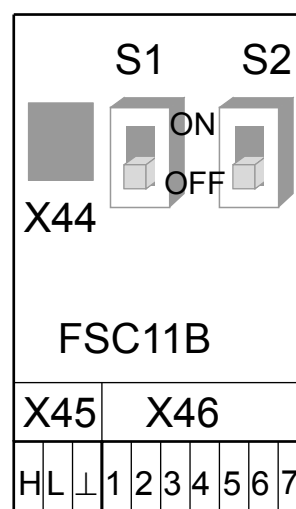
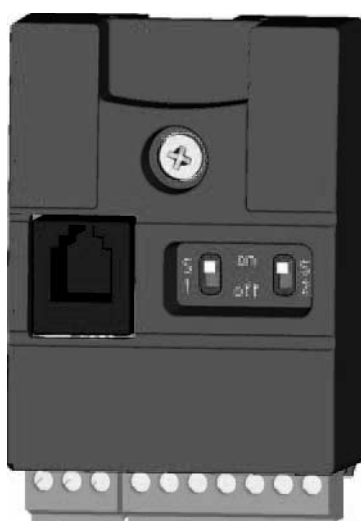




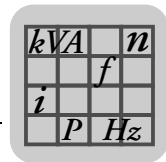
4.6 FSC11B communication module

The FSC11B communication module enables communication with other units. These may include: PC, operator terminals, MOVITRAC® or MOVIDRIVE®.

Part number	1820 716 2
Functions	• Communication with PLC / MOVITRAC®B / MOVIDRIVE® / PC • Operation / parameter setting / service (PC) • The options FSC11B and FIO11B are installed at the same fastening place and therefore cannot be used simultaneously.
Features	• RS-485 (one interface): Plug-in terminals and service interface (RJ10 socket) • CAN-based system bus (SBus) (plug-in terminals) • Supported protocols: MOVILINK® / SBus / RS-485 / CANopen



Function	Terminal	Designation	Data
System bus (SBus)	X46:1	SC11: SBus High	CAN bus according to CAN specification 2.0, parts A and B, transmission technology according to ISO 11898, max. 64 stations, terminating resistor (120 Ω) can be activated using DIP switch S1 . Terminal cross-section: 1.5 mm ² (AWG15) without conductor end sleeves 1.0 mm ² (AWG17) with conductor end sleeves
	X46:2	SC12: SBus Low	
	X46:3	GND: Reference potential	
	X46:4	SC21: SBus High	
	X46:5	SC22: SBus Low	
	X46:6	GND: Reference potential	
	X46:7	24VIO: Auxiliary voltage / external voltage supply	
RS-485 interface	X45:H	ST11: RS-485+	EIA standard, 9.6 kBaud, max. 32 stations Maximum cable length 200 m (656 ft) Dynamic terminating resistor with fixed installation Terminal cross-section: – 1.5 mm ² (AWG15) without conductor end sleeves – 1.0 mm ² (AWG17) with conductor end sleeves Connection: Only for service purposes, exclusively for point-to-point connection Maximum cable length 3 m (10 ft)
	X45:L	ST12: RS-485–	
	X45:?	GND: Reference potential	
	X44 RJ10	Service interface	



4.7 FIO11B analog module

Part number 1820 637 9

4.7.1 Description

The FIO11B analog module upgrades the basic version with the following interfaces:

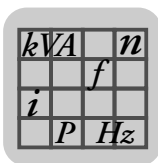
- Setpoint input
- Analog output
- RS-485 interface
- The options FIO11B, FSC11B and FIO21B are mounted on the same fastening place and therefore cannot be used simultaneously.



4.7.2 Electronics data FIO11B analog module

Function	Terminal	Designation	Data
Setpoint input ¹⁾	X40:1 X40:2	AI2: Voltage input GND: Reference potential	–10 – +10 V $R_i > 40 \text{ k}\Omega$ Resolution 10 bit Sampling time 5 ms
Analog output / alternative as current output or voltage output	X40:3 X40:4 X40:5	GND: Reference potential AOV1: Voltage output AOC1: Current output	0 – +10 V / $I_{\max} = 2 \text{ mA}$ 0 (4) – 20 mA Resolution 10 bit Sampling time 5 ms Short-circuit proof, protected against external voltage up to 30 V Load impedance $R_L \leq 750 \Omega$
RS-485 interface	X45:H X45:L X45:? X44 RJ10	ST11: RS-485+ ST12: RS-485– GND: Reference potential Service interface	EIA standard, 9.6 kBaud, max. 32 stations Maximum cable length 200 m (656 ft) Dynamic terminating resistor with fixed installation Terminal cross-section: – 1.5 mm ² (AWG15) without conductor end sleeves – 1.0 mm ² (AWG17) with conductor end sleeves Connection: Only for service purposes, solely for point-to-point connection Maximum cable length 3 m (10 ft)

1) If the setpoint input is not used, it should be set to GND. Otherwise a measured input voltage of –1 V ... +1 V is set.



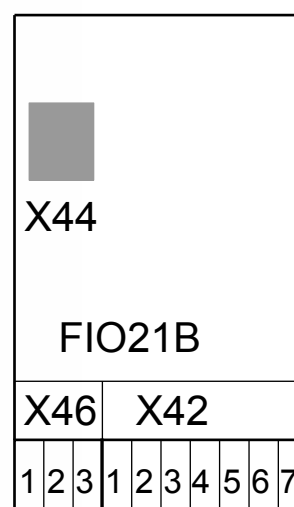
4.8 FIO21B digital module

Part number 1822 541 1

4.8.1 Description

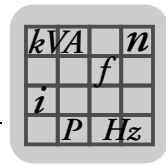
The FIO21B digital module upgrades the basic unit with the following interfaces:

- 7 additional binary inputs DI10 – DI16
- RS-485 service interface
- CAN-based system bus (SBus), plug-in terminals
- The options FIO11B, FSC11B and FIO21B are mounted on the same fastening place and therefore cannot be used simultaneously.



4.8.2 Electronics data of the FIO21B digital module

Function	Terminal	Designation	Data
Binary inputs	X42:1 X42:2 X42:3 X42:4 X42:5 X42:6 X42:7	DI10 DI11 DI12 DI13 DI14 DI15 DI16	$R_i = 3 \text{ k}\Omega$, IE = 10 mA, sampling interval 5 ms, PLC compatible Signal level according to EN 61131-2 type 1 or 3: • +11 V – +30 V: Contact closed • –3 V – +5 V: Contact open Factory set to "no function"
Service interface	X44 RJ10	Service interface	EIA standard, 9.6 kBaud Connection: Only for service purposes, solely for point-to-point connection Maximum cable length 3 m (10 ft)
System bus (SBus)	X46:1 X46:2 X46:3	SC11: CAN High SC12: CAN Low GND: Reference potential	CAN bus to CAN specification 2.0, parts A and B Transmission technology according to ISO 11898, max. 64 stations Bus termination possible between SC11 and SC12 with enclosed 120 Ω resistor. Terminal cross-section: • 1.5 mm² (AWG15) without conductor end sleeves • 1.0 mm² (AWG17) with conductor end sleeves



4.9 DBG60B keypad

4.9.1 Description

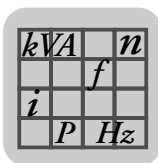
The basic version of MOVITRAC® B does not have a DBG60B keypad but has the option of an upgrade to include the plain text keypad.

Keypad		Language	Part number
	DBG60B-01	DE / EN / FR / IT / ES / PT / NL (German / English / French / Italian / Spanish / Portuguese / Dutch)	1 820 403 1
	DBG60B-02	DE / EN / FR / FI / SV / DA / TR (German / English / French / Finnish / Swedish / Danish / Turkish)	1 820 405 8
	DBG60B-03	DE / EN / FR / RU / PL / CS (German / English / French / Russian / Polish / Czech)	1 820 406 6
	DBG60B-04	DE / EN / FR / ZH (German / English / French / Chinese)	1 820 850 9
	Door installation set ¹⁾	Description (= scope of delivery)	Part number
	DBM60B	- Housing for DBG60B (IP65) - DKG60B extension cable, length 5 m (20 ft)	824 853 2
	Extension cable	Description (= scope of delivery)	Part number
	DKG60B	5 m long (20 ft) 4-core, shielded cable (AWG26)	817 583 7

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

4.9.2 Functions

- Display process values and status
- Display status of binary inputs/outputs
- Error 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 MOVITRAC® B units.
- User-friendly startup menu
- Manual control of MOVITRAC® B
- The FSC11B, FIO11B or FIO21B front option is required for connection



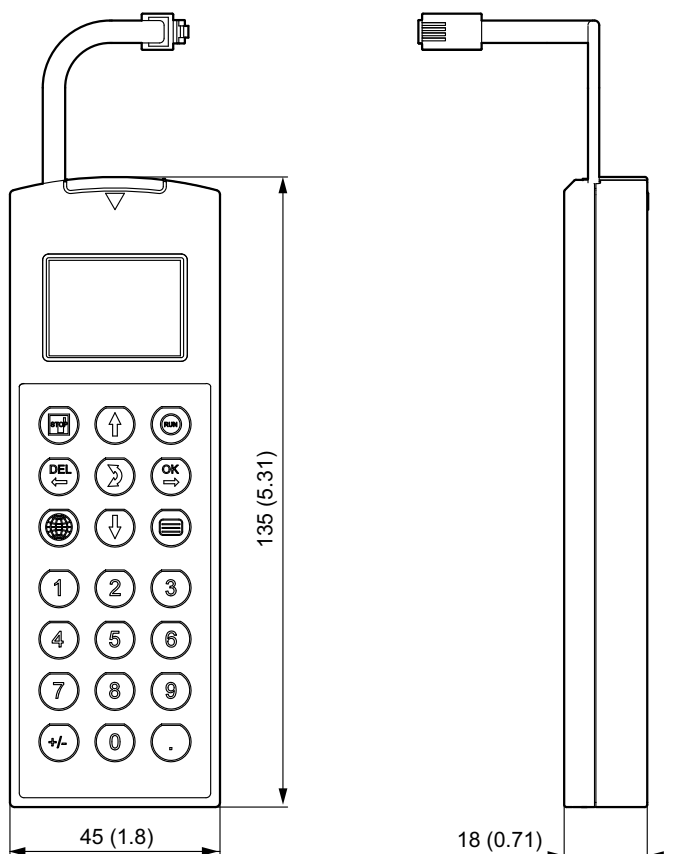
4.9.3 Features

- Illuminated plain text display, choice of 7 languages
- Keypad with 21 keys
- Can be connected via extension cable DKG60B (5 m (20 ft))
- Degree of protection IP40 (EN 60529)

	TIP The DBG60B keypad option is connected to the FSC11B or FIO11B communication front option. Simultaneous operation of DBG60B and PC, RS-485 connection, MOVIDRIVE® or MOVITRAC® is not possible.
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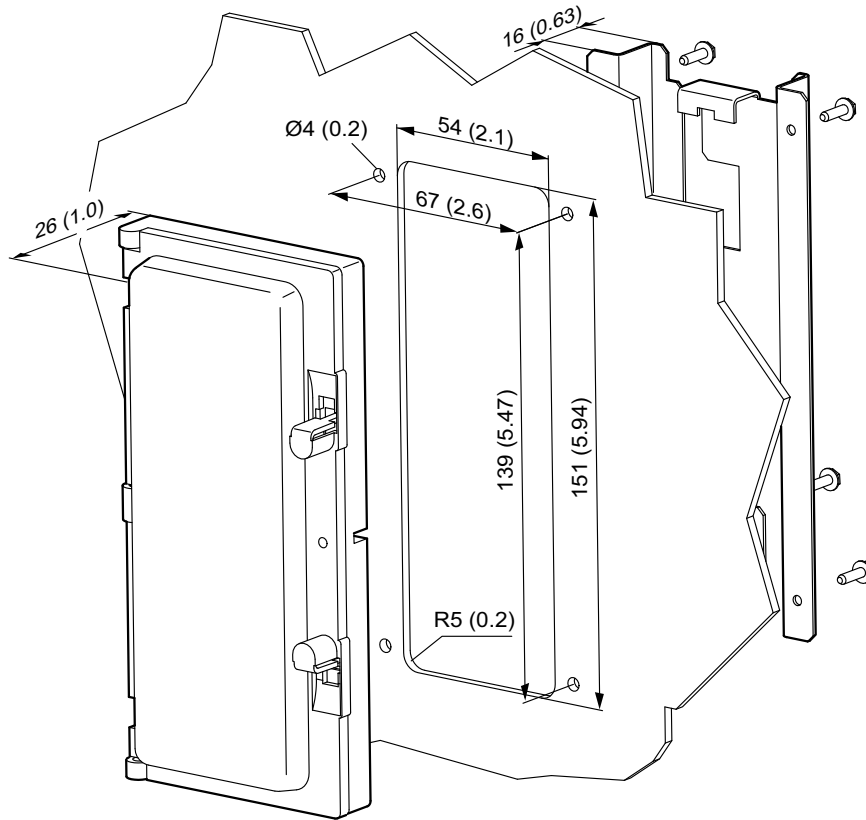
4.9.4 Dimension drawing for DBG60B

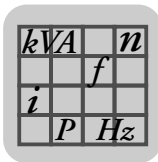
Dimension drawing for DBG60B, dimensions in mm



4.9.5 DBG60B housing dimension drawing

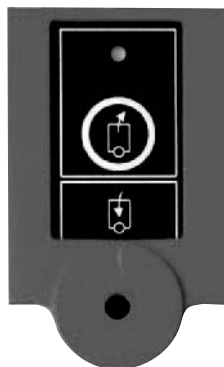
The DBM60B option can be used to mount the DBG60B keypad in the control cabinet door, for example. The DBM60B option consists of housing in degree of protection IP65 and a 5 m (20 ft) long DKG60B extension cable.





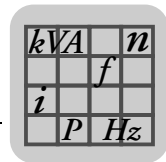
4.10 UBP11A parameter module

Part number: 823 933 9



Functional description:

- For saving data from the inverter to the parameter module
- Data from the parameter module can be read back into the inverter
- Operating status display
- The UBP11A parameter module requires front option FSC11B or FIO11B. Simultaneous operation of UBP11A and PC, RS-485 connection, MOVIDRIVE® or MOVITRAC® is not possible.
- Meaning of the LED:
 - Green: Data available
 - Flashing green: Data transmission in progress
 - Yellow: No data available
 - Red: Copy error



4.11 MBG11A speed control module

Functional description:

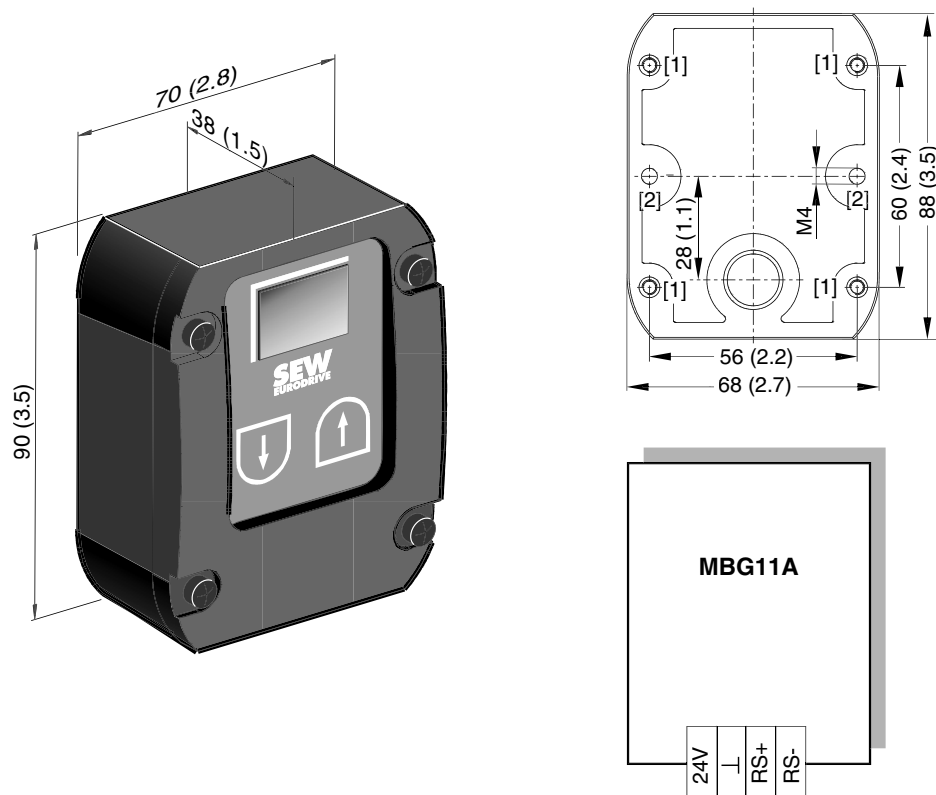
- The MBG11A speed control module has 2 keys and a display. They allow for remote speed control in the range of $-100\% - +100\% f_{\max}$ (potentiometer f1).
- Up to 31 MOVITRAC® B units can be controlled at the same time (broadcasting).
- The MBG11A setpoint control module requires the front option FSC11B or FIO11B.

Technical data:

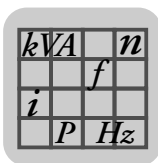
MBG11A option	
Part number	822 547 8
Input voltage	DC 24 V $\pm$ 25 %
Current consumption	ca 70 mA
Setpoint resolution	1 %
Serial interface ¹⁾	RS-485 for connecting max. 31 MOVITRAC® inverters (max. 200 m, (656 ft), 9600 baud)
Degree of protection	IP 65
Ambient temperature	$-15 - 60\text{ }^{\circ}\text{C}$ ($5 - 140\text{ }^{\circ}\text{F}$)

1) with integrated dynamic terminating resistor

Dimensions and connection assignment:



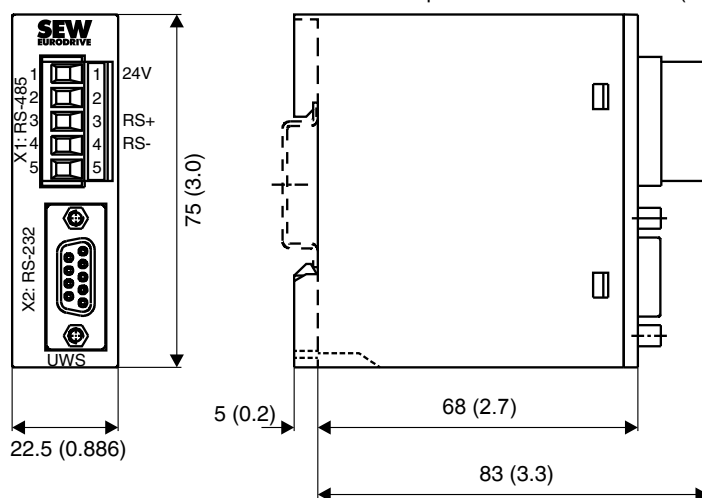
[1] Tapped hole on the rear
[2] Retaining holes for M4 screws



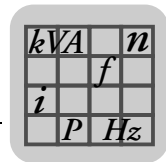
4.12 UWS11A interface adapter RS-232 / RS-485 for support rail

Part number	822 689 X	The FSC11B or FIO11B is required for connecting the UWS11A.
Ambient temperature	0 – 40 °C (32 – 104 °F)	
Degree of protection	IP20	
Description	The UWS11A option converts RS-232 signals, for example from the PC, into RS-485 signals. These RS-485 signals can then be routed to the RS-485 interface of MOVITRAC® B. The UWS11A option requires a DC 24 V voltage supply ($I_{\max} = \text{DC } 100 \text{ mA}$).	
RS-232 interface	The connection between UWS11A and PC is made using a commercially available serial interface cable (shielded!).	
RS-485 interface	You can use the RS485 interface of the UWS11A to network up to 32 MOVITRAC® B units for communication (max. total cable length 200 m (656 ft)). Do not connect external terminating resistors because dynamic terminating resistors are already installed.	
	Permitted cable cross-section:	One core per terminal 0.20 – 2.5 mm ² (AWG 24 - 12) 2 cores per terminal 0.20 – 1 mm ² (AWG 24 – 17)

Dimension drawing



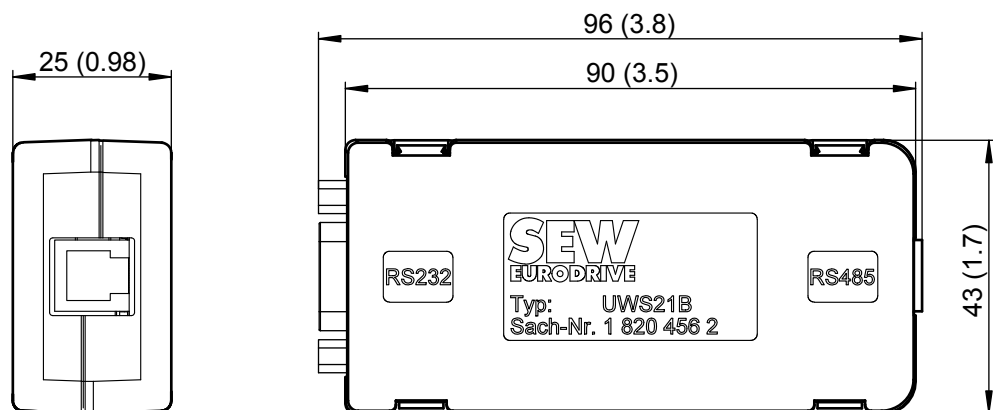
The UWS11A option is mounted on a mounting rail (EN 50022-35 × 7.5) in the control cabinet.



4.13 UWS21B interface adapter RS-232/RS-485

Part number	18204562	The FSC11B or FIO11B is required for connecting the UWS21B.
Ambient temperature	0 – 40 °C (32 – 104 °F)	
Degree of protection	IP20	
Description	The UWS21B option converts RS-232 signals, for example from the PC, into RS-485 signals. These RS-485 signals can then be routed to the interface of MOVITRAC® B.	
RS-232 interface	The UWS21B is connected to the PC using a standard serial interface cable (shielded).	
RS-485 interface	The connection between UWS21B and MOVITRAC® B is made using a serial interface cable with RJ10 plugs.	
Scope of delivery	The scope of delivery for the UWS21B option includes: • UWS21B • 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 plugs to connect UWS21B and MOVITRAC® B. • CD-ROM with drivers and MOVITOOLS® MotionStudio	

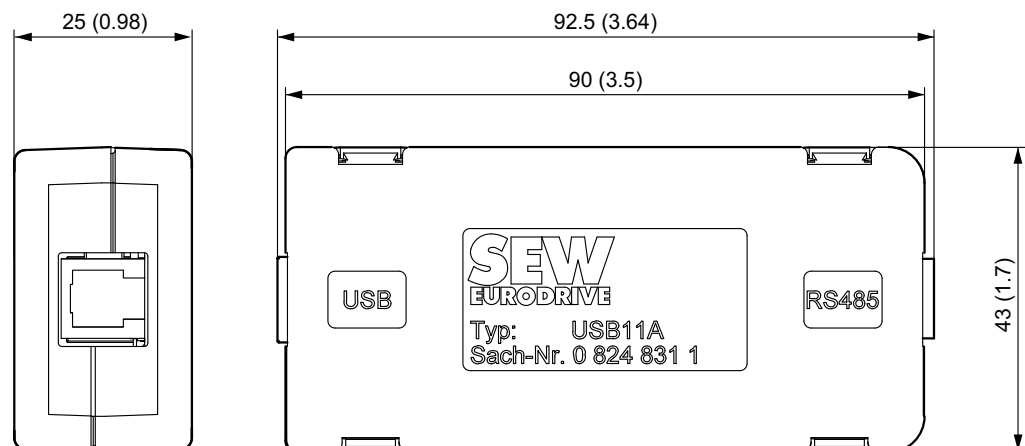
Dimension drawing for UWS21B

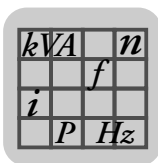


4.14 USB11A interface adapter USB/RS-485

Part number	824 831 1	The FSC11B or FIO11B is required for connecting the USB11A.
Ambient temperature	0 – 40 °C (32 – 104 °F)	
Degree of protection	IP20	
Description	The USB11A option is used to connect a PC or laptop with USB interface to the X44 interface of MOVITRAC® B. The USB11A interface adapter supports USB 1.1 and USB 2.0.	
USB interface	The connection between USB11A and PC is made using a standard USB cable type USB A-B (shielded!).	
Scope of delivery	The scope of delivery for the USB11A option includes: • USB11A unit • USB connection cable type USB A-B to connect PC to USB11A • Serial interface cable with two RJ10 connectors to connect MOVITRAC® B and USB11A. • CD-ROM with drivers and MOVITOOLS® MotionStudio.	

Dimension drawing for USB11A





4.15 BW series braking resistors

4.15.1 General information

BW series braking resistors are adapted to the MOVITRAC® B inverter series. The type of cooling is KS = self-cooling (air ventilation).

The resistor surfaces reach high temperatures under load with P_N . Make sure that you select an installation site that will accommodate these high temperatures. As a rule, braking resistors are therefore mounted on the control cabinet roof.

Provide for a load derating of 4 % per 10 K from an ambient temperature of 45 °C (118 °F). Do not exceed the maximum ambient temperature of 80 °C (176 °F). Note the maximum permissible temperature of other components (e.g. MOVITRAC® B) when installing braking resistors in the control cabinet.

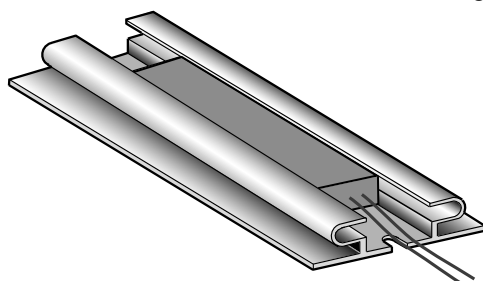
UL and cUL approval

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

4.15.2 PTC braking resistors

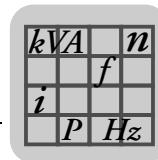
Observe the following points for PTC braking resistors:

- 4-quadrant operation is recommended for applications in which the level of regenerative energy is low.
- 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 (fault code 04).



Assignment of the PTC braking resistors:

Braking resistor type	BW1	BW2	BW3	BW4
Part number	822 897 3	823 136 2	823 598 8	823 599 6
Ambient temperature ϑ_A	-25 °C – +60 °C (-13 °F – 140 °F)			
For MOVITRAC® B	0003 – 0040 (400/500 V)		0003 – 0022 (230 V)	

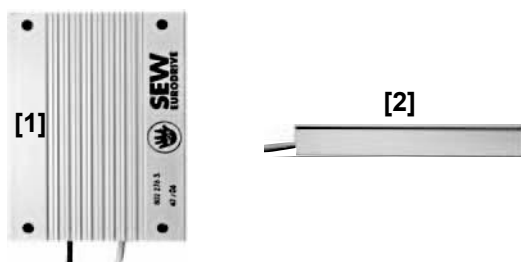


4.15.3 Flat design

Flat-type resistors have degree of protection IP54 and are equipped with internal thermal overload protection (cannot be replaced). Depending on their type, you can install the resistors as follows:

- With support rail mounting FHS or submounting FKB under the heat sink. Submounted braking resistors do not reach the specified CDF power. The FHS and FKB options are only suitable for the BW027-003 and BW072-003 braking resistors.
- Attach to a mounting rail using a BS touch guard.

Important: The load capacity applies for a horizontal mounting position [2]. Values are reduced by 10 % for a vertical mounting position [1].

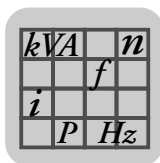


230 V

Braking resistor type	BW027-003	BW027-005
Part number	826 949 1	826 950 5
100 % cdf	230 W	450 W
50 % cdf	310 W	610 W
25 % cdf	410 W	840 W
12 % cdf	550 W	1200 W
6 % cdf	980 W	2360 W
Resistance value R_{BW}	$27 \Omega \pm 10 \%$	$27 \Omega \pm 10 \%$
Trip current	1.0 A	1.4 A
Ambient temperature ϑ_A	$-20^\circ\text{C} - +45^\circ\text{C} (-4^\circ\text{F} - 113^\circ\text{F})$	
For MOVITRAC® B 230 V	0003 – 0022	0003 – 0022

400 / 500 V

Braking resistor type	BW072-003	BW072-005
Part number	826 058 3	826 060 5
100 % cdf	230 W	450 W
50 % cdf	310 W	600 W
25 % cdf	420 W	830 W
12 % cdf	580 W	1110 W
6 % cdf	1000 W	2000 W
Resistance value R_{BW}	$72 \Omega \pm 10 \%$	$72 \Omega \pm 10 \%$
Trip current	0.6 A	1.0 A
Ambient temperature ϑ_A	$-20^\circ\text{C} - +45^\circ\text{C} (-4^\circ\text{F} - 113^\circ\text{F})$	
For MOVITRAC® B 400/500 V	0003 – 0040	0003 – 0040



4.15.4 Wire resistors 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® B system manual, section "Selecting the braking resistor").
- A temperature switch is integrated in the BW..-T braking resistor
- A thermal over-current relay is integrated in the BW..-P braking resistor

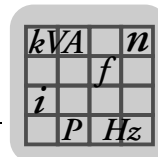
SEW-EURODRIVE recommends implementing additional protection against overload for the wire and grid resistors by using a bimetallic relay with trip characteristics of trip class 10 or 10A (in accordance with EN 60947-4-1). Set the trip current to the value I_F (→ following tables).

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 BW..-T / BW..-P series braking resistors, you can connect the integrated temperature sensor / over-current relay using a 2-core, shielded cable as an alternative to a bimetallic relay. The cable entry for BW..-T and BW..-P series 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 resistor surfaces reach high temperatures under load with P_N . Make sure that you select an installation site that will accommodate these high temperatures. As a rule, braking resistors are therefore mounted on the control cabinet roof.

The performance data listed in the following tables indicate the load capacity of the braking resistors depending on their cyclic duration factor. The cyclic duration factor cdf of the braking resistor is indicated in % and is based on a cycle duration of ≤ 120 s.



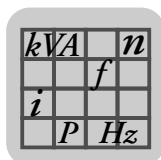
230 V

Type	BW027-006	BW027-012	BW018-015	BW018-035	BW018-075	BW012-025	BW012-050	BW012-100
Part number	822 422 6	822 423 4	—	—	—	821 680 0	—	—
Type BW..-T part number	—	—	1820 416 3	1820 138 5	1820 139 3	—	1820 140 7	1820 141 5
Type BW..-P part number	—	—	—	—	—	1820 414 7	—	—
100 % cdf	0.6 kW	1.2 kW	1.5 kW	3.5 kW	7.5 kW	2.5 kW	5.0 kW	10 kW
50 % cdf	1.1 kW	2.1 kW	2.7 kW	5.9 kW	12.8 kW ¹⁾	4.2 kW	8.5 kW	17 kW
25 % cdf	1.9 kW	3.8 kW	4.8 kW	10.5 kW	12.8 kW ¹⁾	7.5 kW	15.0 kW	19.2 kW ¹⁾
12 % cdf	3.6 kW	7.2 kW	9.0 kW	13.0 kW ¹⁾	12.8 kW ¹⁾	11.2 kW	19.2 kW ¹⁾	19.2 kW ¹⁾
6 % cdf	5.7 kW	8.7 kW ¹⁾	12.8 kW ¹⁾	13.0 kW ¹⁾	12.8 kW ¹⁾	19.0 kW	19.2 kW ¹⁾	19.2 kW ¹⁾
Resistance	27 Ω ±10 %		18 Ω ±10 %			12 Ω ±10 %		
Trip current I _F	4.7 A _{RMS}	6.7 A _{RMS}	9.1 A _{RMS}	13.9 A _{RMS}	20.4 A _{RMS}	14.4 A _{RMS}	20.4 A _{RMS}	28.9 A _{RMS}
Connections	Ceramic terminals 2.5 mm ² (AWG12)			M8 stud				
Tightening torque	0.5 Nm / 4 lb in		6 Nm / 50 lb in					
Design	Wire resistor			Grid resistor				
For MOVITRAC® B	0015 ... 0022		2 x parallel with 0110			0055 / 0075		

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

Type	BW039-003	BW039-006	BW039-012	BW039-026	BW915	BW106	BW206
Part number	821 687 8	821 688 6	821 689 4	—	—	—	—
Type BW...-T part number	—	—	1820 136 9	1820 415 5	1820 413 9	1820 083 4	1820 412 0
100 % cdf	0.3 kW	0.6 kW	1.2 kW	2.6 kW	15.3 kW	13 kW	18 kW
50 % cdf	0.5 kW	1.1 kW	2.1 kW	4.6 kW	15.3 kW	24 kW	32 kW
25 % cdf	1.0 kW	1.9 kW	3.8 kW	5.9 kW ¹⁾	15.3 kW ¹⁾	38.4 kW ¹⁾	38.4 kW ¹⁾
12 % cdf	1.7 kW	3.5 kW	5.9 kW ¹⁾	5.9 kW ¹⁾	15.3 kW ¹⁾	38.4 kW ¹⁾	38.4 kW ¹⁾
6 % cdf	2.8 kW	5.7 kW	5.9 kW ¹⁾	5.9 kW ¹⁾	15.3 kW ¹⁾	38.4 kW ¹⁾	38.4 kW ¹⁾
Resistance	39 Ω ±10 %				15 Ω ±10 %	6 Ω ±10 %	
Trip current I _F	2.8 A _{RMS}	3.9 A _{RMS}	5.5 A _{RMS}	8.1 A _{RMS}	28 A _{RMS}	38 A _{RMS}	42 A _{RMS}
Connections	Ceramic terminals 2.5 mm ² (AWG12)				M8 stud		
Tightening torque	0.5 Nm / 4 lb in				6 Nm / 50 lb in		
Design	Wire resistor				Grid resistor		
For MOVITRAC® B	0015 ... 0022				2 x parallel with 0110	0150 / 2 x parallel with 0220/0300	

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



Technical Data

BW series braking resistors

400 V

Type	BW100-006	BW168	BW268	BW147	BW247	BW347
Part number	821 701 7	820 604 X	820 715 1	820 713 5	820 714 3	820 798 4
Type BW...-T part number	1820 419 8	1820 133 4	1820 417 1	1820 134 2	1820 084 2	1820 135 0
100 % cdf	0.6 kW	0.8 kW	1.2 kW	1.2 kW	2.0 kW	4.0 kW
50 % cdf	1.1 kW	1.4 kW	2.2 kW	2.2 kW	3.8 kW	7.6 kW
25 % cdf	1.9 kW	2.6 kW	3.8 kW	3.8 kW	6.4 kW	12.8 kW
12 % cdf	3.6 kW	4.8 kW	6.7 kW	7.2 kW	12 kW	20 kW ¹⁾
6 % cdf	5.7 kW	7.6 kW	10 kW ¹⁾	11 kW	19 kW	20 kW ¹⁾
Resistance	100 Ω ±10 %	68 Ω ±10 %		47 Ω ±10 %		
Trip current I _F	2.4 A _{RMS}	3.4 A _{RMS}	4.2 A _{RMS}	5 A _{RMS}	6.5 A _{RMS}	9.2 A _{RMS}
Connections	Ceramic terminals 2.5 mm ² (AWG12)					Ceramic terminals 10 mm ² (AWG8)
Tightening torque	0.5 Nm / 4 lb in					1.6 Nm / 14 lb in
Design	Wire resistor					
For MOVITRAC® B	0015 ... 0040			0055 / 0075		

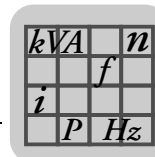
1) Physical power limit due to DC link voltage and resistance value.

Type	BW039-012	BW039-026	BW039-050	BW018-015	BW018-035	BW018-075
Part number	821 689 4	—	—	821 684 3	—	—
Type BW..-T part number	1820 1369	1820 415 5	1820 137 7	—	1820 138 5	1820 139 3
Type BW..-P part number	—	—	—	1820 416 3	—	—
100 % cdf	1.2 kW	2.6 kW	5.0 kW	1.5 kW	3.5 kW	7.5 kW
50 % cdf	2.1 kW	4.6 kW	8.5 kW	2.5 kW	5.9 kW	12.7 kW
25 % cdf	3.8 kW	8.3 kW	15.0 kW	4.5 kW	10.5 kW	22.5 kW
12 % cdf	7.0 kW	15.3 kW	24.0 kW ¹⁾	6.7 kW	15.7 kW	33.7 kW
6 % cdf	11.4 kW	24.0 kW ¹⁾	24.0 kW ¹⁾	11.4 kW	26.6 kW	52.2 kW ¹⁾
Resistance	39 Ω ±10 %			18 Ω ±10 %		
Trip current I _F	5.5 A _{RMS}	8.1 A _{RMS}	11.3 A _{RMS}	9.1 A _{RMS}	13.9 A _{RMS}	20.4 A _{RMS}
Connections	Ceramic terminals 2.5 mm ² (AWG12)		M8 stud	Ceramic terminals 2.5 mm ² (AWG12)	M8 stud	
Tightening torque	0.5 Nm / 4 lb in		6 Nm / 50 lb in	1.0 Nm / 8.9 lb in	6 Nm / 50 lb in	
Design	Wire resistor		Grid resistor			
For MOVITRAC® B	0110		0110	0150 / 0220		

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

Type	BW915	BW012-025	BW012-050	BW012-100	BW0106	BW206
Part number	—	821 680 0	—	—	—	—
Type BW...-T part number	1820 413 9	—	1820 140 7	1820 141 5	1820 083 4	1820 412 0
Type BW...-P part number	—	1820 414 7	—	—	—	—
100 % cdf	16 kW	2.5 kW	5.0 kW	10 kW	13.5 kW	18 kW
50 % cdf	27 kW	4.2 kW	8.5 kW	17 kW	23 kW	30.6 kW
25 % cdf	45 kW ¹⁾	7.5 kW	15.0 kW	30 kW	40 kW	54 kW
12 % cdf	45 kW ¹⁾	11.2 kW	22.5 kW	45 kW	61 kW	81 kW
6 % cdf	45 kW ¹⁾	19.0 kW	38.0 kW	56 kW ¹⁾	102 kW	136.8 kW
Resistance	15 Ω ±10 %	12 Ω ±10 %			6 Ω ±10 %	
Trip current I _F	32.6 A _{RMS}	14.4 A _{RMS}	20.4 A _{RMS}	28.8 A _{RMS}	47.4 A _{RMS}	54.7 A _{RMS}
Connections	M8 stud					
Tightening torque	6 Nm / 50 lb in					
Design	Grid resistor					
For MOVITRAC® B	0220	0300			0370 ... 0750	

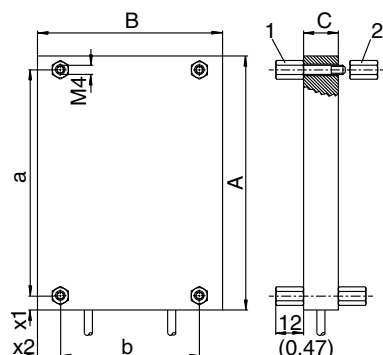
1) Physical power limit due to DC link voltage and resistance value.



4.15.5 Dimension drawing for BW braking resistors

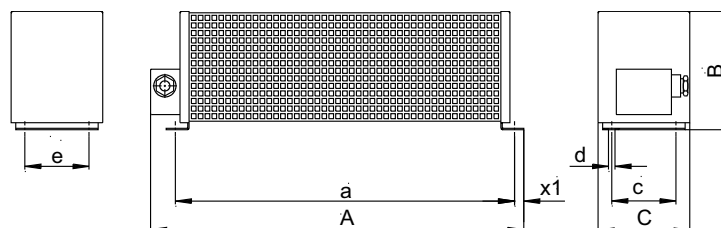
Flat-design

Flat-design resistors: The connecting lead is 500 mm (19.69 in) long. The scope of delivery includes four M4 threaded bushes each of type 1 and 2.

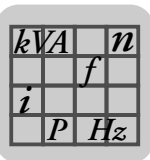


Type	Main dimensions [mm (in)]			Fastening parts [mm (in)]				Mass [kg (lb)]
	A	B	C	a	b	x1	x2	
BW072-003 BW027-003	110 (4.33)	80 (3.1)	15 (0.59)	98 (3.9)	60 (2.4)	6 (0.2)	10 (0.39)	0.3 (0.7)
BW072-005 BW027-005	216 (8.50)	80 (3.1)	15 (0.59)	204 (8.03)	60 (2.4)	6 (0.2)	10 (0.39)	0.6 (1)

Wire resistors



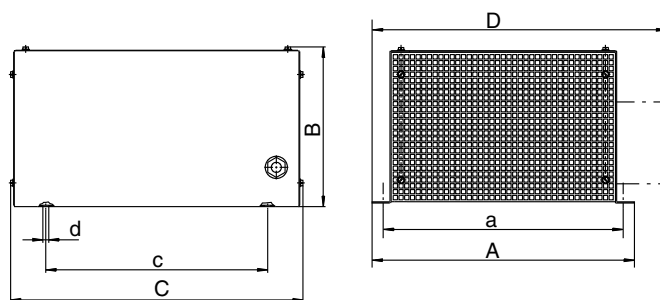
Type	Main dimensions [mm (in)]				Fastening parts [mm (in)]				Mass [kg (lb)]	BW..-T
	A	A BW..-T	B	C	a	c/e	x1	d		
BW027-006	486 (19.1)	—	120 (4.72)	92 (3.6)	430 (16.9)	64 (2.5)	10 (0.39)	6.5 (0.26)	2.3 (5.1)	—
BW027-012	486 (19.1)	—	120 (4.72)	185 (7.28)	430 (16.9)	150 (5.91)	10 (0.39)	6.5 (0.26)	4.3 (9.5)	—
BW100-006 (-T)	486 (19.1)	549 (21.6)	120 (4.72)	92 (3.6)	430 (16.9)	64 (2.5)	10 (0.39)	6.5 (0.26)	2.3 (5.1)	3 (7)
BW168 (-T)	365 (14.4)	479 (18.9)	120 (4.72)	185 (7.28)	330 (13.0)	150 (5.91)	10 (0.39)	6.5 (0.26)	3.3 (7.3)	4 (9)
BW268 (-T)	465 (18.3)	549 (21.6)	120 (4.72)	185 (7.28)	430 (16.9)	150 (5.91)	10 (0.39)	6.5 (0.26)	4.3 (9.5)	4.9 (11)
BW147 (-T)	465 (18.3)	549 (21.6)	120 (4.72)	185 (7.28)	430 (16.9)	150 (5.91)	10 (0.39)	6.5 (0.26)	4.3 (9.5)	4.9 (11)
BW247 (-T)	665 (26.2)	749 (29.5)	120 (4.72)	185 (7.28)	630 (24.8)	150 (5.91)	10 (0.39)	6.5 (0.26)	6.1 (13)	6.7 (15)
BW347 (-T)	670 (26.4)	749 (29.5)	210 (5.71)	185 (13.4)	630 (24.8)	150 (5.91)	10 (0.39)	6.5 (0.26)	13.2 (29.1)	11.9 (26.2)
BW039-003	286 (11.3)	—	120 (4.72)	92 (3.6)	230 (9.06)	64 (2.5)	10 (0.39)	6.5 (0.26)	1.5 (3.3)	—
BW039-006	486 (23.1)	—	120 (4.72)	92 (3.6)	430 (16.9)	64 (2.5)	10 (0.39)	6.5 (0.26)	2.3 (5.1)	—
BW039-012 (-T)	486 (19.1)	549 (21.6)	120 (4.72)	185 (7.28)	430 (16.9)	150 (5.91)	10 (0.39)	6.5 (0.26)	4.3 (9.5)	4.9 (11)
BW039-026-T	—	649 (25.6)	120 (4.72)	275 (10.8)	530 (20.9)	240 (9.45)	10 (0.39)	6.5 (0.26)	—	8 (20)
BW018-015	600 (23.6)	—	120 (4.72)	92 (3.6)	544 (21.4)	80 (3.1)	10 (0.39)	6.5 (0.26)	4 (9)	—
BW018-015-P	649 (25.6)	—	120 (4.72)	185 (7.28)	526 (20.7)	150 (5.91)	10 (0.39)	6.5 (0.26)	5.8 (13)	—



Technical Data

BW series braking resistors

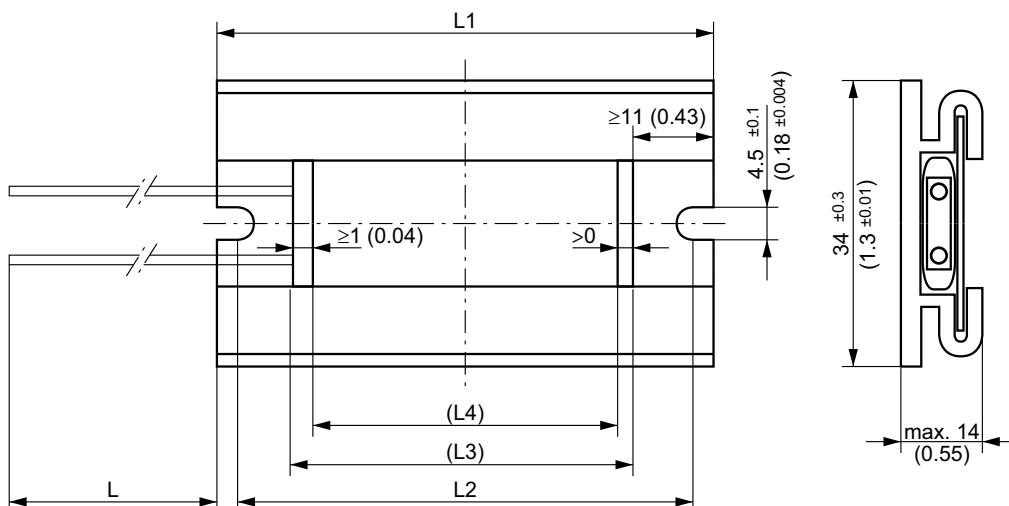
Grid resistors



Type	Main dimensions [mm (in)]				Fastening parts [mm (in)]			Mass [kg (lb)]
	A	A BW..-T	B	C	a	c	d	
BW012-025	295 (11.6)	—	260 (10.2)	490 (19.3)	270 (10.6)	380 (15.0)	10.5 (0.413)	8.0 (18)
BW012-025-P ¹⁾	295 (11.6)	—	260 (10.2)	490 (19.3)	270 (10.6)	380 (15.0)	10.5 (0.413)	8.0 (18)
BW012-050-T	—	395 (15.6)	260 (10.2)	490 (19.3)	370 (14.6)	380 (15.0)	10.5 (0.413)	12 (26)
BW012-100-T	—	595 (23.4)	270 (10.6)	490 (19.3)	570 (22.4)	380 (15.0)	10.5 (0.413)	21 (46)
BW018-035-T	—	295 (11.6)	260 (10.2)	490 (19.3)	270 (10.6)	380 (15.0)	10.5 (0.413)	9.0 (20)
BW018-075-T	—	595 (23.4)	270 (10.6)	490 (19.3)	570 (22.4)	380 (15.0)	10.5 (0.413)	18 (40)
BW039-050-T	—	395 (15.6)	260 (10.2)	490 (19.3)	370 (14.6)	380 (15.0)	10.5 (0.413)	12 (26)
BW915-T	—	795 (31.3)	270 (10.6)	490 (19.3)	770 (30.3)	380 (15.0)	10.5 (0.413)	32 (71)
BW106-T	—	795 (31.3)	270 (10.6)	490 (19.3)	770 (30.3)	380 (15.0)	10.5 (0.413)	30 (66)
BW206-T	—	995 (39.2)	270 (10.6)	490 (19.3)	970 (38.2)	380 (15.0)	10.5 (0.413)	40 (88)

1) D = 355 mm (14.0 in)

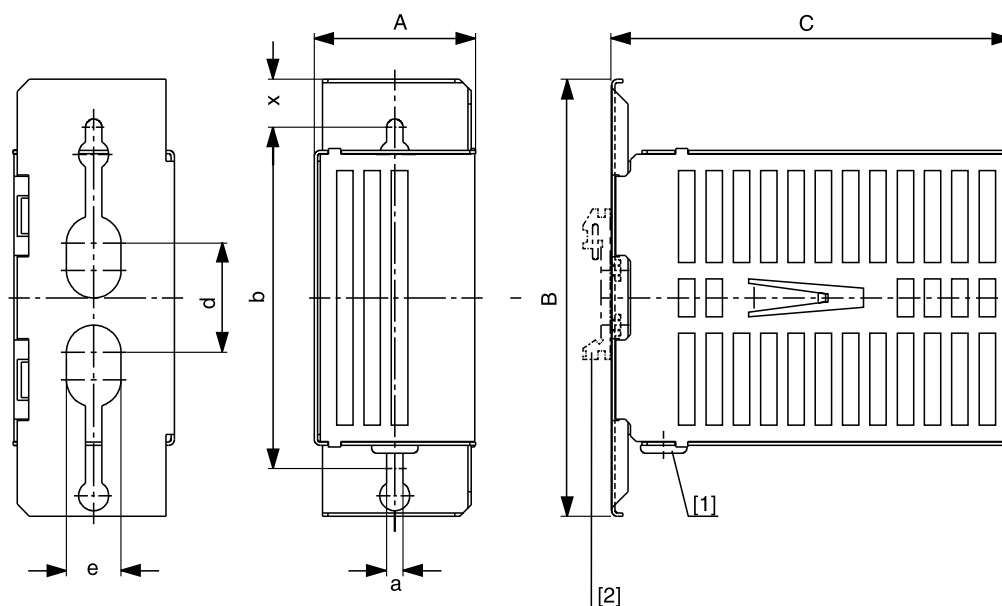
PTC braking resistors



Type	L1	L2	L3	L4	L
BW1	89 (3.5)	82 (3.2)	64 (2.5)	60 (2.4)	100 (3.94)
BW2	124 (4.88)	117 (4.61)	97 (3.8)	95 (3.7)	165 (6.50)
BW3	89 (3.5)	82 (3.2)	64 (2.5)	60 (2.4)	100 (3.94)
BW4	124 (4.88)	117 (4.61)	97 (3.8)	95 (3.7)	165 (6.50)

4.16 BS touch guard

Dimension drawing for touch guard:



[1] Grommet

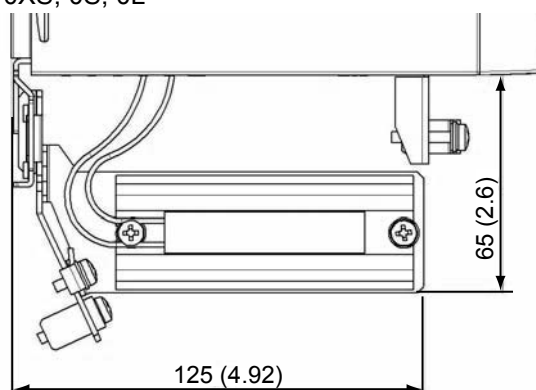
[2] Support rail mounting

Type	Main dimensions [mm (in)]			Mounting dimensions [mm (in)]				
	A	B	C	b	d	e	a	x
BS-003	60 (2.4)	160 (6.30)	146 (5.75)	125 (4.92)	40 (1.6)	20 (0.8)	6 (0.2)	17.5 (0.689)
BS-005	60 (2.4)	160 (6.30)	252 (9.92)	125 (4.92)	40 (1.6)	20 (0.8)	6 (0.2)	17.5 (0.689)

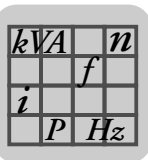
Type	Mass [kg (lb)]	Part number	Support rail installation	BW
BS-003	0.35 (0.77)	813 151 3	Accessory S001 / part number 822 194 4	BW027-003 / BW072-003
BS-005	0.5 (1)	813 152 X		BW027-005 / BW072-005

4.17 Mounting PTC braking resistors FKB10B

For sizes 0XS, 0S, 0L



Type	Part number	Size	230 V	400 V
FKB10B	18 216 218	0XS, 0S, 0L	BW3	BW1



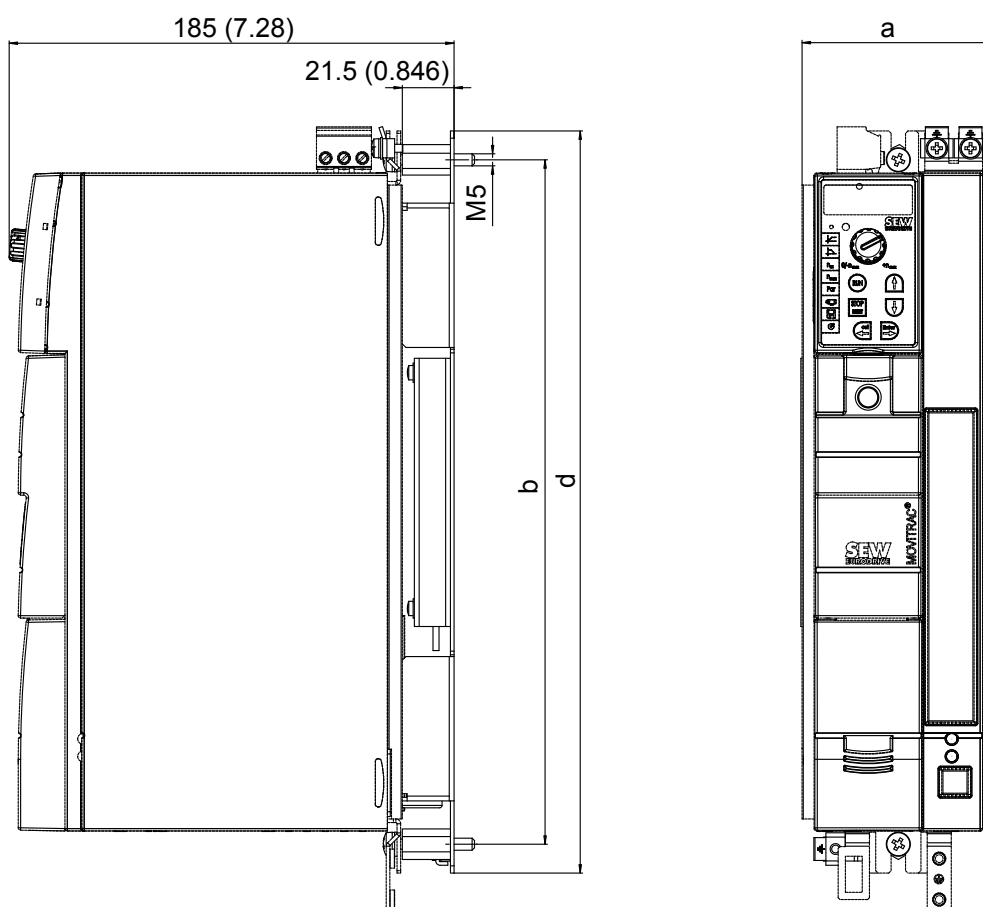
4.18 Submounting of flat-type FKB11/12/13B braking resistors

The FKB..B is used for submounting flat-design resistors under the inverter.

Type	Part number	Size	Braking resistor	
			230 V	400/500 V
FKB11B	1820 728 6	0XS	BW4	BW2
FKB12B	1820 729 4	0S	BW027-003	BW072-003
FKB13B	1820 730 8	0L		

Submounted braking resistors do not reach the specified CDF power.

Dimension drawing:



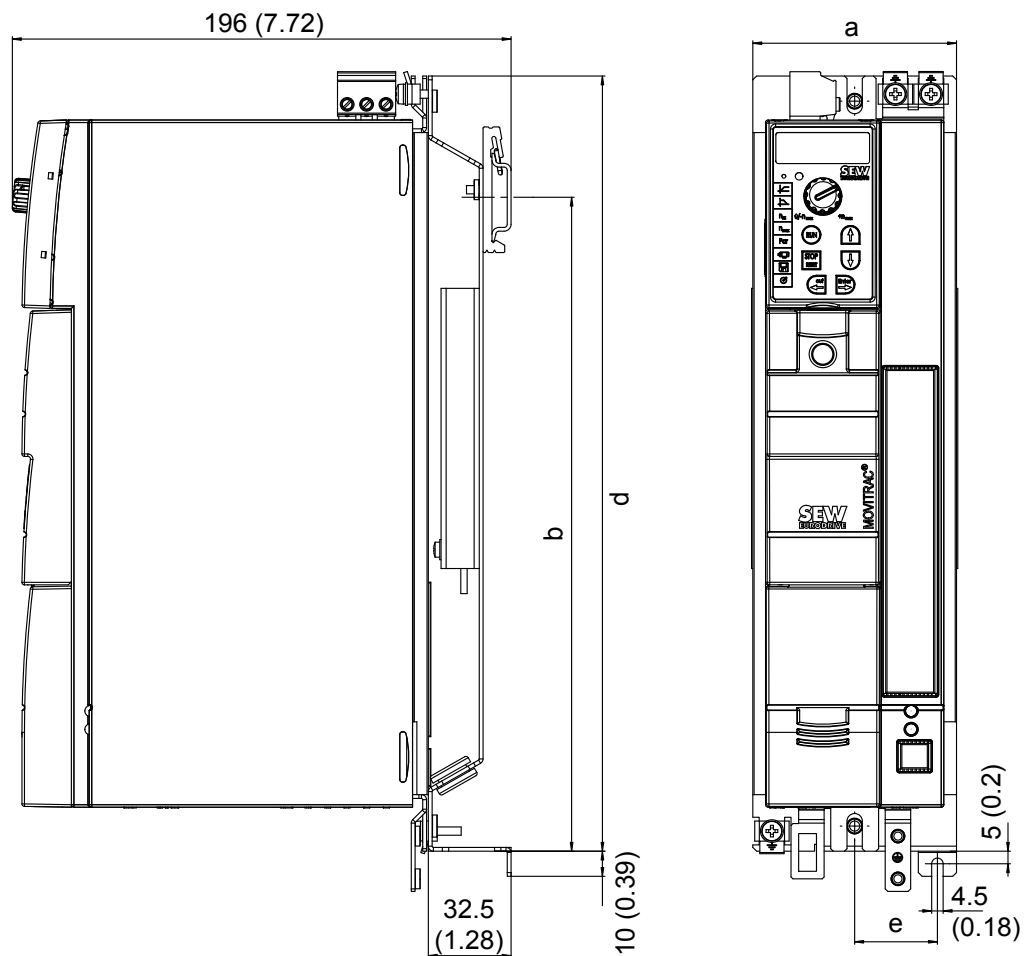
MOVITRAC® B size	a	b	d
0XS	55 (2.2)	196 (7.72)	220 (8.66)
0S	80 (3.1)	196 (7.72)	220 (8.66)
0L	80 (3.1)	284.5 (11.20)	308.5 (12.15)

4.19 FHS11B/12B/13B support rail mounting

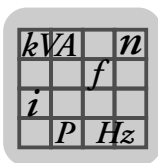
The FHS is used for support rail mounting of MOVITRAC® B frequency inverters and for the submounting of flat-design resistors.

Type	Part number	Size	Braking resistor	
			230 V	400/500 V
FHS11B	1820 724 3	0XS	BW4	BW2
FHS12B	1820 725 1	0S	BW027-003	BW072-003
FHS13B	1820 727 8	0L		

Dimension drawing:



MOVITRAC® B size	a	b	d	e
0XS	55 (2.2)	171.5 (6.752)	220 (8.66)	7.5 (0.30)
0S	80 (3.1)	171.5 (6.752)	220 (8.66)	32.5 (1.28)
0L	80 (3.1)	260.3 (10.25)	308.5 (12.15)	32.5 (1.28)



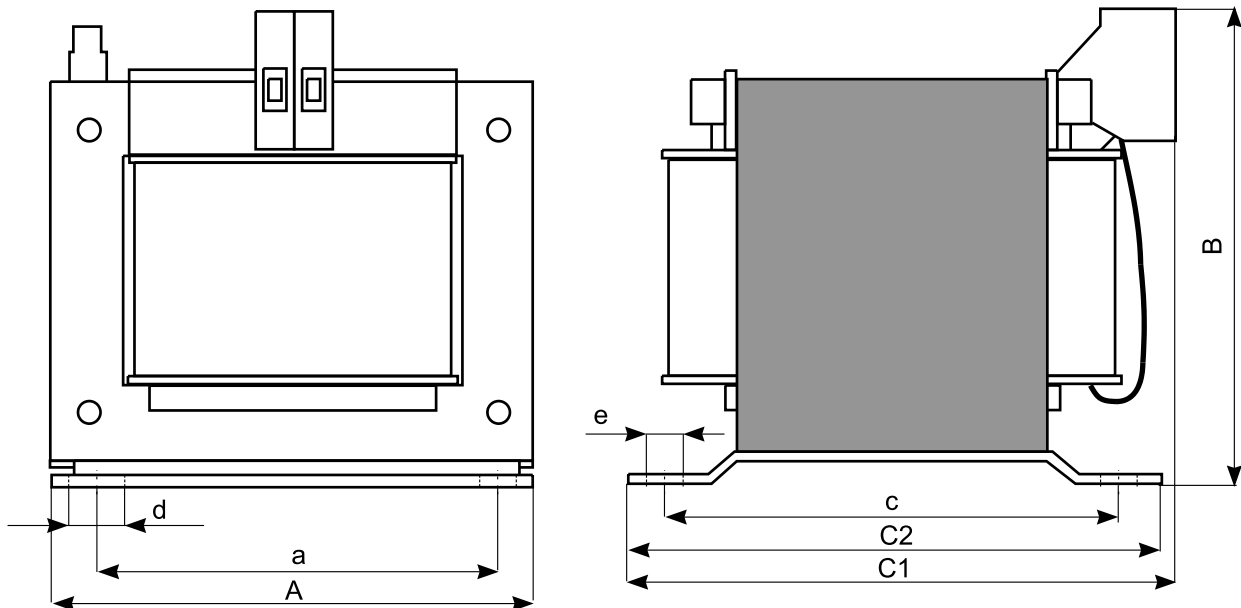
4.20 ND line chokes

The line choke assists in overvoltage protection. The line choke limits the charging current when several inverters are connected together in parallel on the input end with shared mains contactors. ND line filters have cRUus approval independent of MOVITRAC® B. The ambient temperature is $-25 - +45\text{ °C}$ ($-13 - 113\text{ °F}$). The degree of protection is IP00 (EN 60529).

Line choke type	ND 010-301	ND 020-151
Part number	826 972 6	826 973 4
Rated voltage V _N	1 x AC 230 V ±10 %	
Rated current I _N	AC 10 A	AC 20 A
Power loss at I _N P _V	6 W	10 W
Inductance L _N	3 mH	1.5 mH
Terminal strip	4 mm ² (AWG10)	10 mm ² (AWG8)
Tightening torque	0.6 Nm / 5 lb in	1.5 Nm / 13 lb in
Suitable for MOVITRAC® B		
1-phase 230 V	0003 – 0008	0011 – 0022

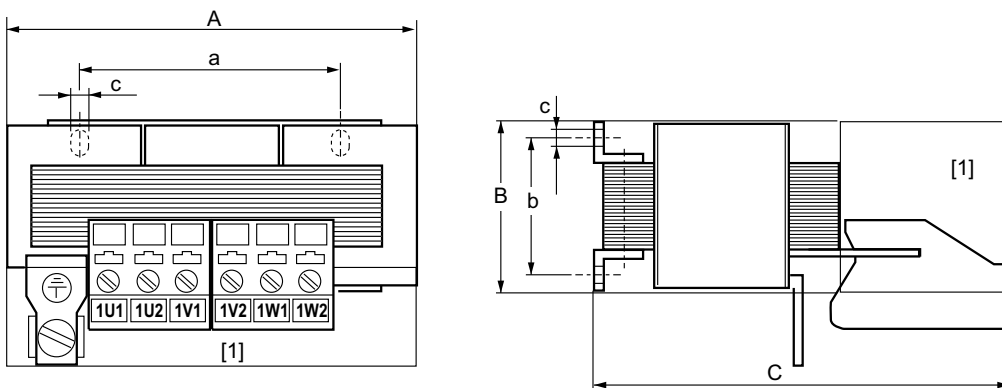
Line choke type	ND 020-013	ND045-013	ND085-013	ND150-013
Part number	826 012 5	826 013 3	826 014 1	825 548 2
Rated voltage V _N	3 x AC 380 – 500 V ±10 %			
Rated current I _N	AC 20 A	AC 45 A	AC 85 A	AC 150 A
Power loss at I _N P _V	10 W	15 W	25 W	65 W
Inductance L _N	0.1 mH			
Terminal strip	4 mm ² (AWG10)	10 mm ² (AWG8)	35 mm ² (AWG2)	M10/PE stud: M8
Tightening torque	0.6 – 0.8 Nm / 5 – 7 lb in	2.5 Nm / 22 lb in	3.2 – 3.7 Nm / 28 – 33 lb in	M10 stud: 10 Nm / 89 lb in PE: 6 Nm / 50 lb in
Suitable for MOVITRAC® B				
3-phase 400/500 V	100 % I _N	0003 – 0075	0110 – 0220	0300 – 0450
	125 % I _N	0003 – 0075	0110 – 0150	0220 – 0370
3-phase 230 V	100 % I _N	0003 – 0055	0075 – 0110	0150 – 0220
	125 % I _N	0003 – 0037	0055 – 0750	0110 – 0150

4.20.1 Dimension drawing for ND 010-301 / ND 020-151



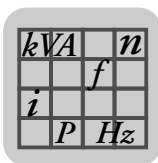
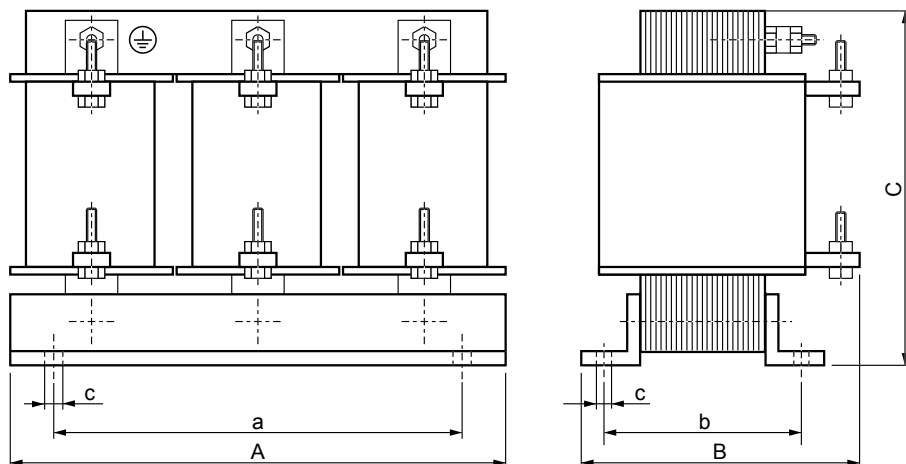
Type	Main dimensions [mm (in)]				Mounting dimensions [mm (in)]				Mass [kg (lb)]
	A	B	C1	C2	a	c	d	e	
ND 010-301	90 (3.5)	100 (3.94)	80 (3.1)	70 (2.8)	64 (2.5)	52 (2.0)	4.4 (0.17)	7.4 (0.29)	1.4 (3.1)
ND 020-151	90 (3.5)	100 (3.94)	90 (3.5)	70 (2.8)	64 (2.5)	52 (2.0)	4.4 (0.17)	7.4 (0.29)	1.4 (3.1)

4.20.2 Dimension drawing for ND 020-013 / ND 045-013 / ND 085-013



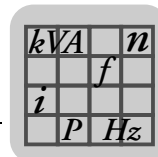
[1] = Space for touch-safe terminal strips

Type	Main dimensions [mm (in)]			Mounting dimensions [mm (in)]			Mass [kg (lb)]
	A	B	C	a	b	d/e	
ND 020-013	85 (3.3)	60 (2.4)	120 (4.72)	50 (2.0)	31 (1.2)	5 – 10 (0.2 – 0.39)	0.5 (1)
ND 045-013	125 (4.92)	95 (3.7)	170 (6.69)	84 (3.3)	55 – 75 (2.2 – 3.0)	6 (0.2)	2.5 (5.5)
ND 085-013	185 (7.28)	115 (4.53)	235 (9.25)	136 (5.35)	56 (2.2)	7 (0.3)	8 (20)


4.20.3 Dimension drawing for ND 150-013


[1] = Space for touch-safe terminal strips

Type	Main dimensions [mm (in)]			Mounting dimensions [mm (in)]			Mass [kg (lb)]
	A	B	C	a	b	d/e	
ND 150-013	250 (9.84)	160 (6.30)	230 (9.06)	180 (7.09)	77 (3.0)	8 (0.3)	17 (37)

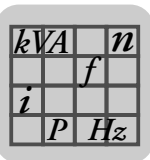


4.21 NF line filters

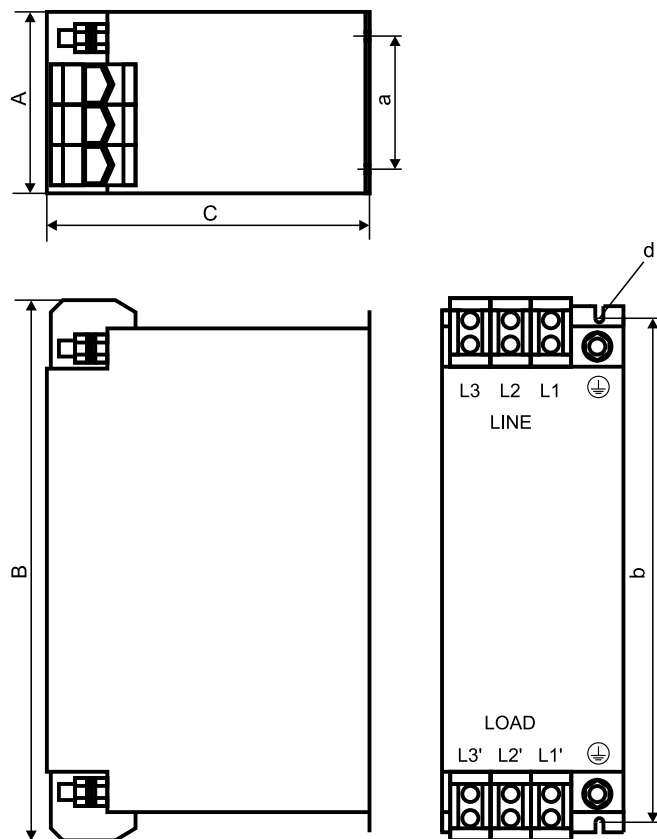
The line filter suppresses interference emissions on the line side of inverters. The ambient temperature is $-25 - +45\text{ }^{\circ}\text{C}$ ($-13 - 113\text{ }^{\circ}\text{F}$). The degree of protection is IP20 (EN 60529). NF line filters have cRUus approval independent of MOVITRAC® B.

Type	NF009-503	NF014-503	NF018-503	NF035-503	NF048-503	
Part number	827 412 6	827 116 X	827 413 4	827 128 3	827 117 8	
Rated current	AC 9 A	AC 14 A	AC 18 A _{AC}	AC 35 A	AC 48 A	
Power loss	6 W	9 W	12 W	15 W	22 W	
Earth-leakage current	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 40 mA	
Connections PE screw	4 mm ² (AWG10) M5			10 mm ² (AWG8) M5/M6		
Tightening torque	0.6 – 0.8 Nm / 5 – 7 lb in			1.8 Nm / 16 lb in		
Suitable for MOVITRAC® B						
3 x 400/ 500 V	100 % I _N	0003 – 0040	0055 / 0075	–	0110 / 0150	0220
	125 % I _N	0003 – 0030	0040 / 0055	0075	0110	0150
3 x 230 V	100 % I _N	0015 / 0022	0037	–	0055 / 0075	0110
	125 % I _N	0015	0022	0037	0055 / 0075	–

Type	NF063-503	NF085-503	NF115-503	NF150-503	
Part number	827 414 2	827 415 0	827 416 9	827 417 7	
Rated current	AC 63 A	AC 85 A	AC 115 A	AC 150 A	
Power loss	30 W	35 W	60 W	90 W	
Earth-leakage current	≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 30 mA	
Connections PE screw	16 mm ² (AWG6) M6	35 mm ² (AWG2) M8	50 mm ² (AWG1/0) M10	50 mm ² (AWG1/0) M10	
Tightening torque	3 Nm / 30 lb in	3.7 Nm / 33 lb in			
Suitable for MOVITRAC® B					
3 x 400/ 500 V	100 % I _N	0300	0370 / 0450	0550	0750
	125 % I _N	0220	0300 / 0370	0450	0550 / 0750
3 x 230 V	100 % I _N	0150	0220	0300	–
	125 % I _N	0110 / 0150	–	0220 / 0300	–

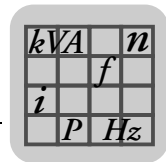


Dimension drawing for line filter [mm (in)]:



Line filter type	Main dimensions		
	A	B	C
NF009-503	55 (2.2)	195 (7.68)	80 (3.1)
NF014-503		225 (8.86)	
NF018-503	50 (2.0)	255 (10.0)	
NF035-503	60 (2.4)	275 (10.8)	100 (3.94)
NF048-503		315 (12.4)	
NF063-503	90 (3.5)	260 (10.2)	
NF085-503		320 (12.6)	140 (5.51)
NF115-503	100 (3.94)	330 (13.0)	155 (6.10)
NF150-503			

Line filter type	Mounting dimensions		Hole dimension d	PE connection	Mass kg (lb)
	a	b			
NF009-503	20 (0.79)	180 (7.09)	5.5 (0.22)	M5	0.8 (2)
NF014-503		210 (8.27)			0.9 (2)
NF018-503		240 (9.45)			1.1 (2.4)
NF035-503	30 (1.2)	255 (10.0)			1.7 (3.7)
NF048-503		295 (11.6)	M6	2.1 (4.6)	
NF063-503	60 (2.4)	235 (9.25)		6.5 (0.26)	M8
NF085-503		255 (10.0)	M10		
NF115-503	65 (2.6)			4.8 (11)	
NF150-503				5.6 (12)	



4.22 ULF11A folding ferrites

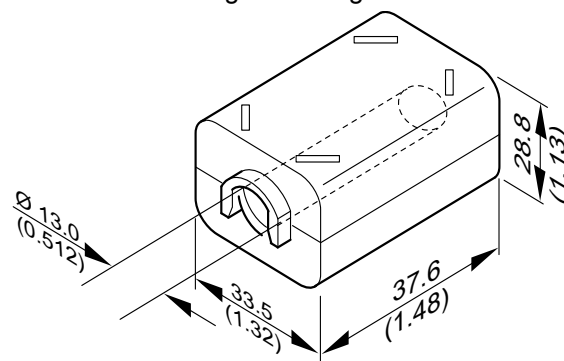
Folding ferrites are used to reduce interference radiated from the mains cable. Only use folding ferrites with single-phase units.

The delivery scope contains 3 folding ferrites, which must be installed according to the installation instructions.

Technical data:

Part number	1821 213 1 (3 pcs)
For cable diameter	10.5 – 12.5 mm (0.413 – 0.492 in)
Storage temperature	–40 °C – +85 °C (–40 – +185 °F)
Operating temperature	–25 °C – +105 °C (–13 – +221 °F)

Dimension drawing for folding ferrites:

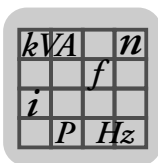


4.23 HD output chokes

You can reduce the radiated interference of the unshielded motor cable by using an output choke.

Output choke type	HD001	HD002	HD003
Part number	813 325 5	813 557 6	813 558 4
Max. power loss P_{Vmax}	15 W	8 W	30 W
Mass	0.5 kg (1 lb)	0.2 kg (0.4 lb)	1.1 kg (2.4 lb)
For cable cross sections	1.5 – 16 mm ² AWG16 – 6	≤ 1.5 mm ² ≤ AWG16	≥ 16 mm ² ≥ AWG6

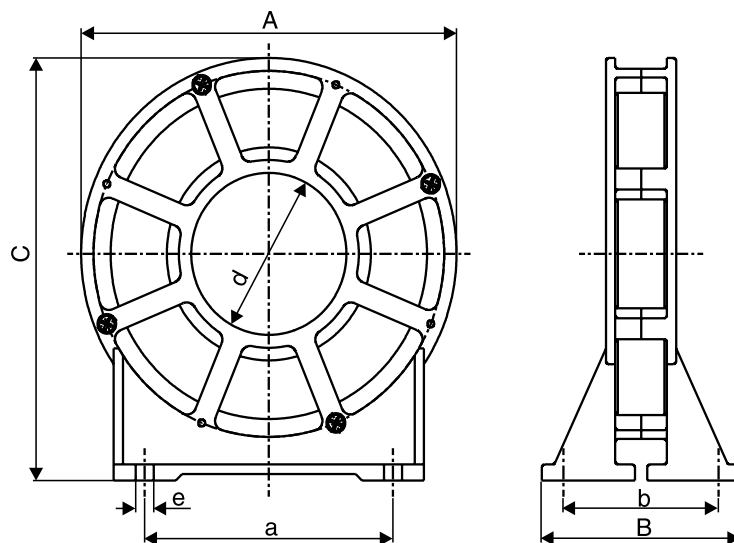
Output choke type	HD012	HD100	HD101
Part number	1821 217 4	829 837 8	829 838 6
Rated current	AC 12 A		
Power loss (at rated current)	11 W	20 W	
Ambient temperature	–10 °C – +60 °C (+14 – 140 °F) Derating 3% I _N at 40 °C – 60 °C (113 – 140 °F)		
Degree of protection		IP20	
Mains and motor connection	≤ 4 mm ² ≤ AWG12	Screw terminals 4 mm ² (AWG 10)	
Inverter connection		Cables with conductor end sleeves	
Mass	0.55 kg (1.2 lb)	0.40 kg (0.88 lb)	0.48 kg (1.1 lb)
Can be submounted for size	Cannot be sub-mounted	0S	0L
For MOVITRAC® B ...-5A3	0003 – 0040	0005 / 0008 / 0011 / 0015	0022 / 0030 / 0040
For MOVITRAC® B ...-2A3	0003 – 0022	0005 / 0008	0011 / 0015 / 0022



Technical Data

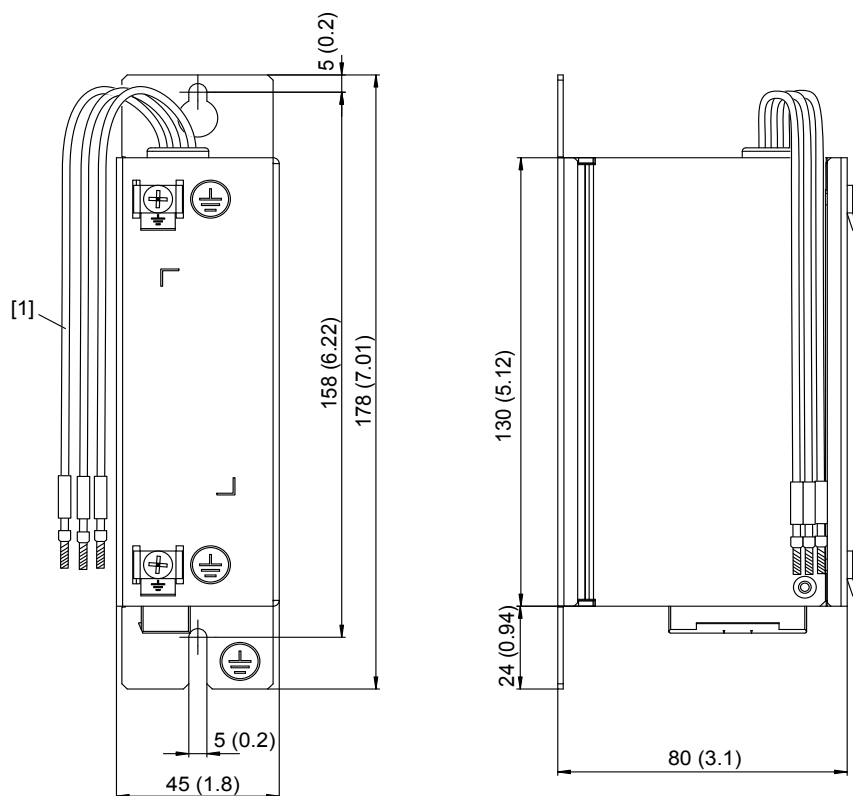
HD output chokes

Dimension drawing for HD 001 / 002 / 003 [mm (in)]:



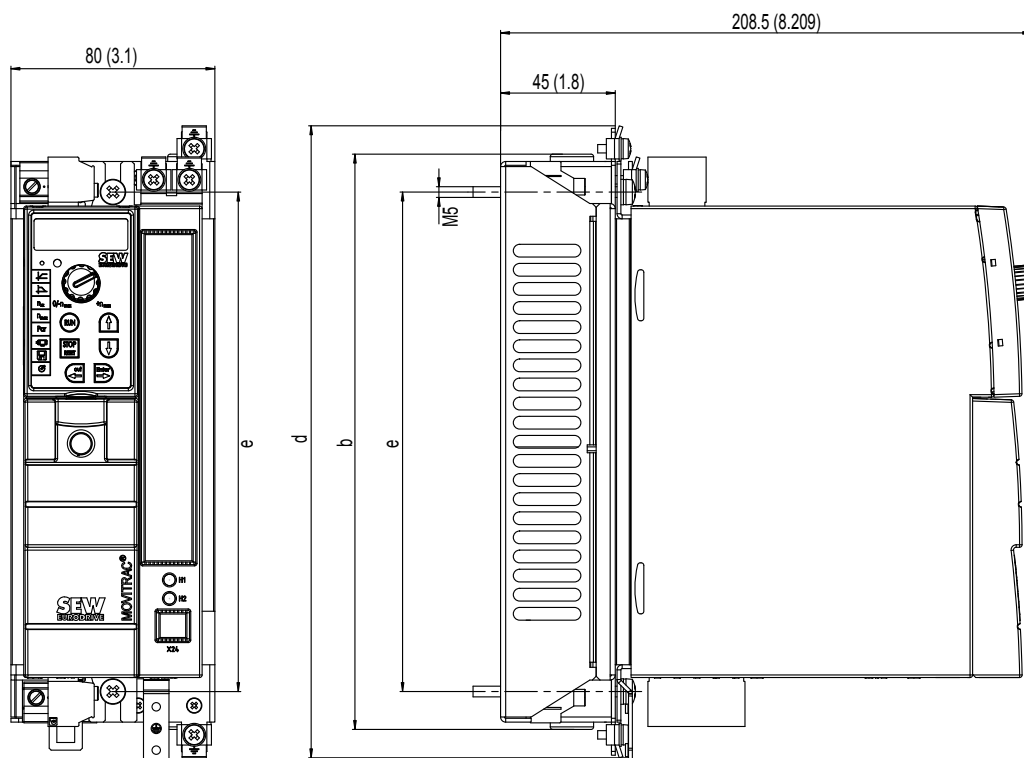
Output choke type	Main dimensions			Mounting dimensions		Inside diameter	Hole dimension
	A	B	C	a	b	d	e
HD001	121 (4.76)	64 (2.5)	131 (5.16)	80 (3.1)	50 (2.0)	50 (2.0)	5.8 (0.23)
HD002	66 (2.6)	49 (1.9)	73 (2.9)	44 (1.7)	38 (1.5)	23 (0.91)	5.8 (0.23)
HD003	170 (6.69)	64 (2.5)	185 (7.28)	120 (4.72)	50 (2.0)	88 (3.5)	7.0 (0.28)

Dimension drawing for HD012

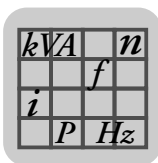


[1] Length = 100 mm (3.94 in)

Dimension drawing for HD100 / HD101:



Output choke type	MOVITRAC® B	b	d	e
HD100	Size 0S	226 (8.90)	248 (9.76)	196 (7.72)
HD101	Size 0L	314.5 (12.38)	336.5 (13.25)	284.5 (11.20)

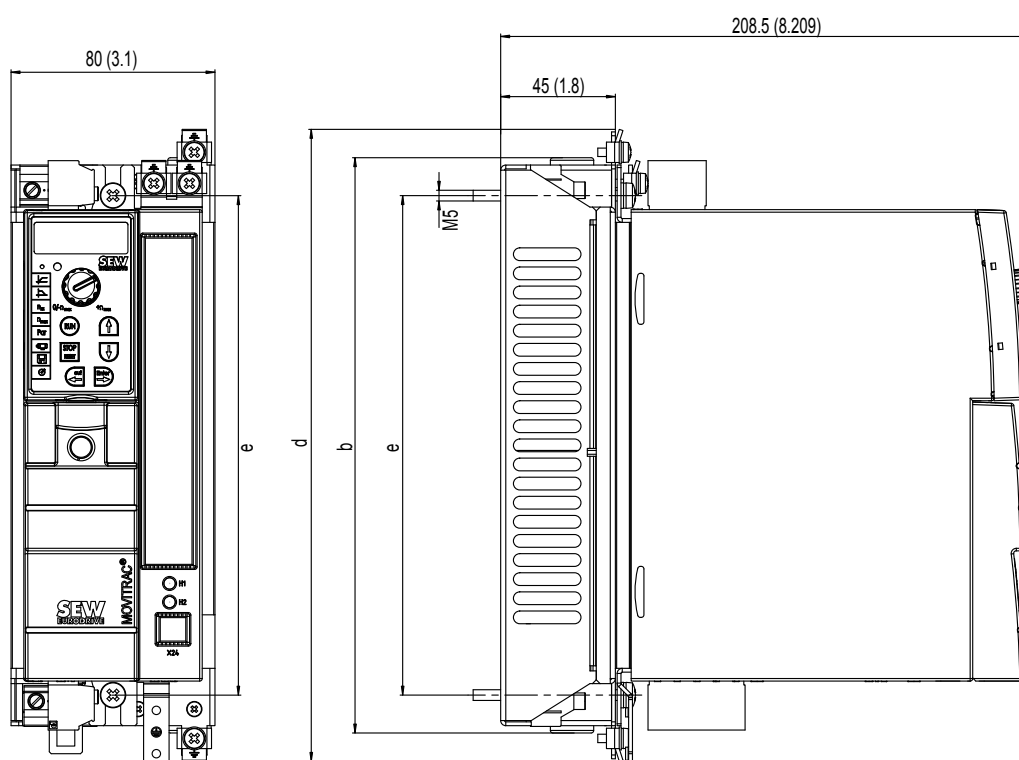


4.24 EMC module FKE12B/13B

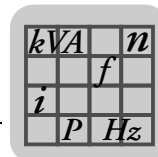
Using the EMC module, you can reach limit class C1 (B) on the input and output sides. The EMC module is designed for 100 % operation and 125 % operation.

Type	FKE12B	FKE13B
Part number	829 590 5	829 591 3
Rated voltage	3 × AC 230 – 500 V	
Voltage drop in the filter (at rated current)	< 1 %	
Rated current	AC 12 A	
Power loss (at rated current)	20 W	
Ambient temperature	–10 °C – +60 °C (+14 – 140 °F) Derating 3% I _N at 40 °C – 60 °C (113 – 140 °F)	
Degree of protection	IP20	
Mains and motor connection	Screw terminals 4 mm ² (AWG 10)	
Inverter connection	Cables with conductor end sleeves	
Mass	0.40 kg (0.88 lb)	0.48 kg (1.1 lb)
Can be submounted for size	0S	0L
For MOVITRAC® B ...-5A3	0005 / 0008 / 0011 / 0015	0022 / 0030 / 0040
For MOVITRAC® B ...-2A3	0005 / 0008	0011 / 0015 / 0022

Dimension drawing:



EMC module	MOVITRAC® B	b	d	e
FKE12B	Size 0S	226 (8.90)	248 (9.76)	196 (7.72)
FKE13B	Size 0L	314.5 (12.38)	336.5 (13.25)	284.5 (11.20)



4.25 HF output filters

SEW output filters of the HF type are sine filters. Sine filters smoothen the output voltage of the inverter. Use output filters 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 non-SEW motors, which are not suitable for inverters.
- To protect against overvoltage spikes in long motor cables (> 100 m (328 ft))

	TIP
	Do not use output filters in hoists because of the voltage drop in the filter!

	TIP
	During project planning of the drive, take into account the voltage drop in the output filter and consequently the reduced motor torque available. This applies particularly to AC 230 V units with output filters.

Output filters attenuate interference emission via unshielded motor lines.

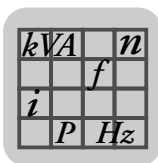
The ambient temperature is 0 – +45 °C (32 – 113 °F) (reduction: 3 % per K up to max. 60 °C (140 °F)).

Output filter type	HF008-503 ¹⁾	HF015-503 ¹⁾	HF022-503 ¹⁾	HF030-503 ¹⁾	HF040-503 ¹⁾	HF055-503 ¹⁾
Part number	826 029 X	826 030 3	826 031 1	826 032 X	826 311 6	826 312 4
Mains voltage V_N	3 × AC 200 V –10 % – 3 × AC 500 V +10 %, 50/60 Hz ²⁾					
Earth-leakage current at U_N ΔI	0 mA					
Power loss at I_N P_V	25 W	35 W	55 W	65 W	90 W	115 W
Degree of protection (EN 60529)	IP20					
Connections / tightening torque	M4 terminal studs 1.6 Nm ± 20 % / 14 lb in ± 20 %					
Mass	3.1 kg (6.8 lb)	4.4 kg (9.7 lb)			10.8 kg (23.8 lb)	
Assignment to AC 400/500 V units						
Voltage drop at I_N ΔU	< 6.5 % (7.5 %) at AC 400 V / < 4 % (5 %) at AC 500 V and f_{Amax} = 50 Hz (60 Hz)					
Rated throughput current ³⁾ $I_{N\ 400\ V}$ at V_{mains} = 3 × AC 400 V	AC 2.5 A	AC 4 A	AC 6 A	AC 8 A	AC 10 A	AC 12 A
Rated throughput current ³⁾ $I_{N\ 500\ V}$ at V_{mains} = 3 × AC 500 V	AC 2 A	AC 3 A	AC 5 A	AC 6 A	AC 8 A	AC 10 A
Rated operation (100 %) ³⁾	0003 – 0011	0015	0022	0030	0040	0055
Increased power (125 %) ³⁾	0003 – 0005	0008/0011	0015	0022	0030	0040
Assignment to AC 230 V units						
Voltage drop at I_N ΔU	–	< 18.5 % (19 %) at AC 230 V with f_{Amax} = 50 Hz (60 Hz)				
Rated throughput current ³⁾ $I_{N\ 230\ V}$ at V_{mains} = 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
Rated operation (100 %) ³⁾	0003 – 0008	0011	0015/0022	–	0037	0055
Increased power (125 %) ³⁾	0003 – 0005	0008	0011 – 0022	–	–	0037

1) Approved to UL/cUL in conjunction with MOVITRAC® inverters. SEW-EURODRIVE will provide certification on request.

2) A reduction of 6 % I_N per 10 Hz applies above $f_N = 60$ Hz for the rated through current I_N .

3) Only applies to operation without $V_{DC\ link}$ connection. For operating the inverter with $V_{DC\ link}$ connection, observe the project planning notes in the system manual of the respective inverter.



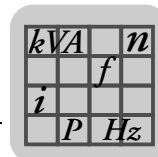
Output filter type	HF075-503 ¹⁾	HF023-403 ¹⁾	HF033-403 ¹⁾	HF047-403 ¹⁾	HF450-503
Part number	826 313 2	825 784 1	825 785 X	825 786 8	826 948 3
Rated voltage V_N	$3 \times \text{AC } 200 \text{ V} -10 \% - 3 \times \text{AC } 500 \text{ V} +10 \%, 50/60 \text{ Hz}^{2)}$				
Earth-leakage current at U_N ΔI	0 mA				
Power loss at I_N P_V	135 W	90 W	120 W	200 W	400 W
Degree of protection (EN 60529)	IP 20	IP20			IP 10
Connections / tightening torque	M4 terminal studs 1.6 Nm $\pm$ 20 % / 14 lb in $\pm$ 20 %	35 mm ² (AWG 2) 3.2 Nm / 28 lb in			
Mass	10.8 kg (23.8 lb)	15.9 kg (35.1 lb)	16.5 kg (36.4 lb)	23 kg (51 lb)	32 kg (71 lb)
Assignment to AC 400/500 V units					
Voltage drop at I_N ΔU	< 6.5 % (7.5 %) at AC 400 V / < 4 % (5 %) at AC 500 V and $f_{Amax} = 50 \text{ Hz}$ (60 Hz)				
Rated throughput current ³⁾ $I_{N \text{ 400 V}}$ at $V_{mains} = 3 \times \text{AC } 400 \text{ V}$	AC 16 A	AC 23 A	AC 33 A	AC 47 A	AC 90 A
Rated throughput current ³⁾ $I_{N \text{ 500 V}}$ at $V_{mains} = 3 \times \text{AC } 500 \text{ V}$	AC 13 A	AC 19 A	AC 26 A	AC 38 A	AC 72 A
Rated operation (100 %) ³⁾	0075	0110	0150/0300 ⁴⁾	0220	0370/0450/ 0550 ⁴⁾ / 0750 ⁴⁾
Increased power (125 %) ³⁾	0055	0075	0110/0220 ⁴⁾	0150	0300/0370/ 0450/0550 ⁴⁾ / 0750 ⁴⁾
Assignment to AC 230 V units					
Voltage drop at I_N ΔU	< 18.5 % (19 %) at AC 230 V with $f_{Amax} = 50 \text{ Hz}$ (60 Hz)				
Rated throughput current ³⁾ $I_{N \text{ 230 V}}$ at $V_{mains} = \text{AC } 230 \text{ V}$	AC 29 A	AC 42 A	AC 56.5 A	AC 82.6 A	AC 156 A
Rated operation (100 %) ³⁾	0075	0110	0150/0300 ⁴⁾	0220	0300
Increased power (125 %) ³⁾	0055	0075	0110/0220 ⁴⁾	0150	0220/0300

1) Approved to UL/cUL in conjunction with MOVITRAC[®] frequency inverters. SEW-EURODRIVE will provide certification on request.

2) A reduction of 6 % I_N per 10 Hz applies above $f_N = 60 \text{ Hz}$ for the rated through current I_N .

3) Only applies for operation without $V_{DC \text{ link}}$ connection. For operation with $V_{DC \text{ link}}$ connection, observe the project planning instructions in the MOVITRAC[®] system manual, section "Project Planning/Connecting the optional power components".

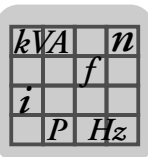
4) For operation with these MOVITRAC[®] units, connect **2 HF output filters in parallel**.



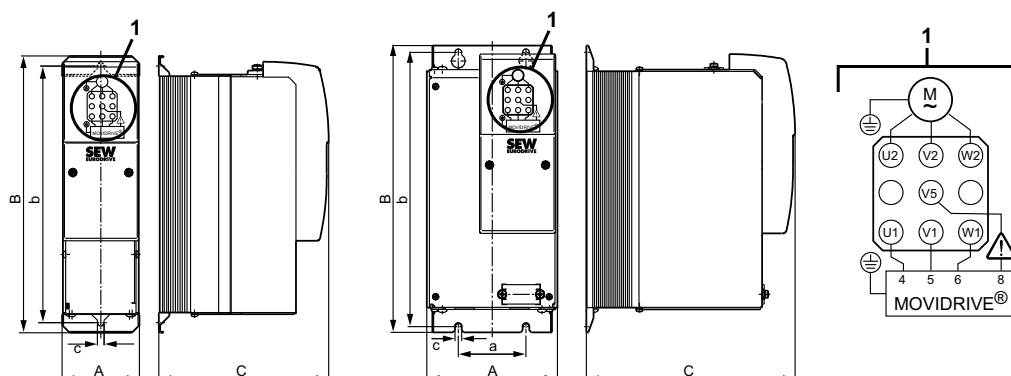
Output filter type	HF180-403
Part number	829 909 9
Rated voltage V_N	3 × AC 380 V –10 % – 3 × AC 500 V +10 %, 50/60 Hz ¹⁾
Earth-leakage current at U_N ΔI	0 mA
Power loss at I_N P_V	860 W
Degree of protection (EN 60529)	IP 00
Connections / tightening torque	M10 terminal studs / 70 mm ² (AWG 3/0) 30 Nm / 270 lb in
Mass	85.3 kg (188 lb)
Assignment to AC 400/500 V units	
Voltage drop at I_N ΔU	< 6.5 % (7.5 %) at AC 400 V / < 4.6 % (5.5 %) at AC 500 V and $f_{Amax} = 50$ Hz (60 Hz)
Rated throughput current ²⁾ $I_{N\ 400\ V}$ at $V_{mains} = 3 \times AC\ 400\ V$	AC 180 A
Rated throughput current ²⁾ $I_{N\ 500\ V}$ at $V_{mains} = 3 \times AC\ 500\ V$	AC 180 A
Rated operation (100 %) ²⁾	0550/0750
Increased power (125 %) ²⁾	0550/0750

1) A reduction of 6 % I_N per 10 Hz applies above $f_N = 60$ Hz for the rated through current I_N .

2) Only applies for operation without $V_{DC\ link}$ connection. For operation with V_{DClink} connection, observe the project planning instructions in the MOVITRAC® system manual, section "Project Planning/Connecting the optional power components".



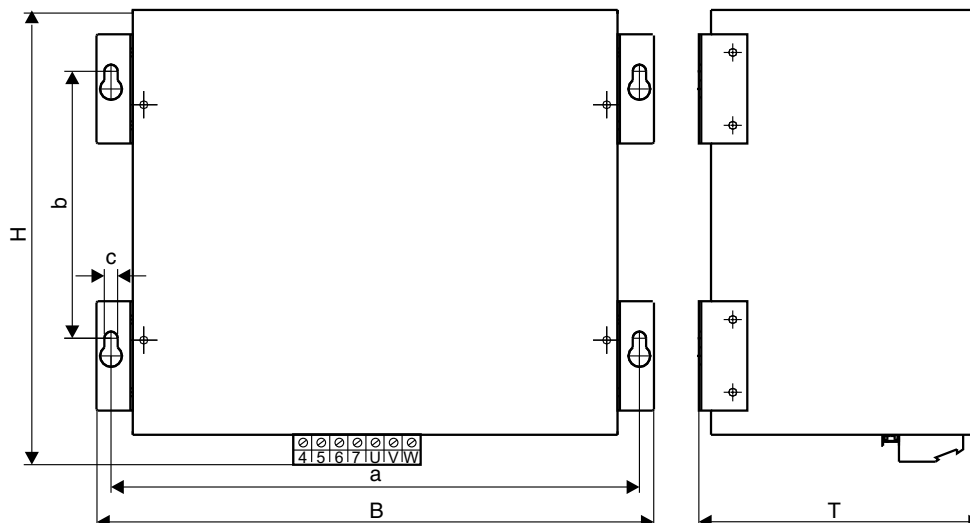
Dimension drawing for HF...-503 [mm (in)]:



Type	Main dimensions		
	A	B	C
HF008 / 015 / 022 / 030-503	80 (3.1)	286 (11.3)	176 (6.93)
HF040 / 055 / 075-503	135 (5.31)	296 (11.7)	216 (8.50)

Type	Mounting dimensions		Hole dimension c	Ventilation clearances	
	a	b		Above	Below
HF008 / 015 / 022 / 030-503	—	265 (10.4)	7 (0.3)	100 (3.94)	100 (3.94)
HF040 / 055 / 075-503	70 (2.8)	283 (11.1)	7 (0.3)	100 (3.94)	100 (3.94)

Dimension drawing for HF450-503 [mm (in)]:

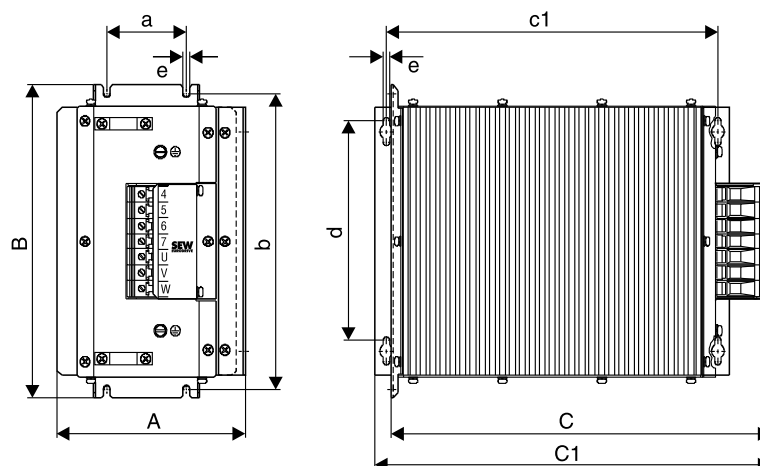


Only the mounting position shown in the dimension drawing is permitted

Output filter type	Main dimensions		
	B	H	T
HF450-503	465 (18.3)	385 (15.2)	240 (9.45)

Output filter type	Mounting dimensions		Hole dimension c	Ventilation clearances	
	a	b		Above	Below
HF450-503	436 (17.2)	220 (8.66)	8.5 (0.33)	100 (3.94)	100 (3.94)

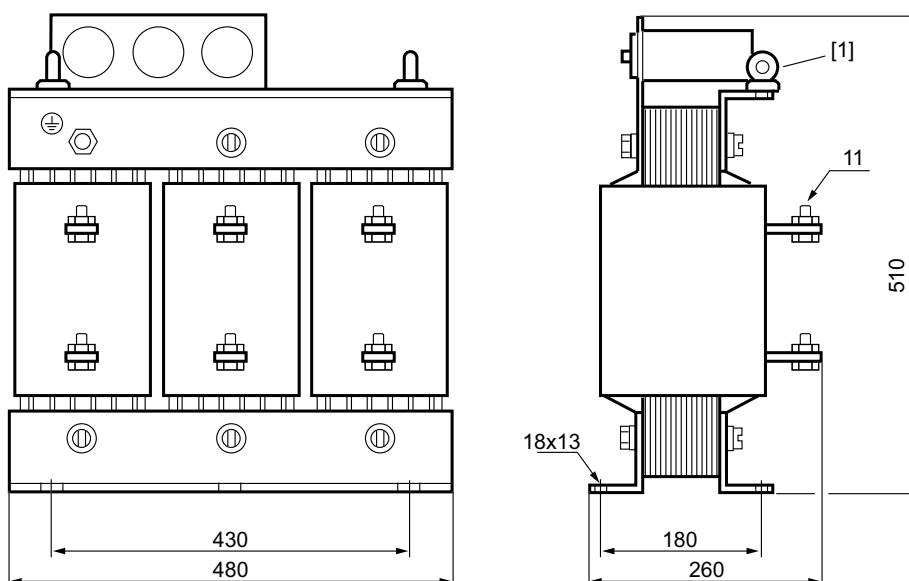
Dimension drawing for HF...-403 [mm (in)]:



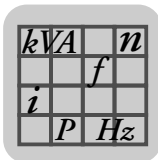
Type	Main dimensions			Standard installation	
	A	B	C/C1	b	a
HF023-403	145 (5.71)	284 (11.2)	365/390 (14.4/ 15.4)	268 (10.6)	60 (2.4)
HF033-403					
HF047-403	190 (7.48)	300 (11.8)	385/400 (15.2/ 15.7)	284 (11.2)	80 (3.1)

Type	Horizontal mounting position		Hole dimension e	Ventilation clearances		
	d	c1		At the sides	Above	Below
HF023-403	210 (8.27)	334 (13.1)	6.5 (0.26)	30 (1.2)	150 (5.91)	150 (5.91)
HF033-403						
HF047-403						

Dimension drawing for HF180-403:



[1] Remove eyelets after transport



4.26 Fieldbus connection

4.26.1 Fieldbus gateways

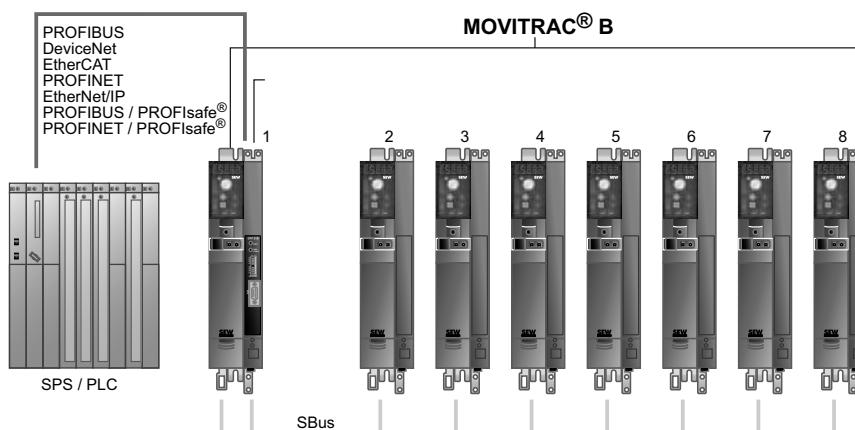
The fieldbus gateways convert standard fieldbuses into the SEW SBus. This means that up to 8 inverters can be triggered using one gateway.

The controller (PLC or PC) and the MOVITRAC® frequency inverter exchange process data such as a control word or speed using the fieldbus. You need an FSC11B communication option for connecting the MOVITRAC® B unit to the fieldbus gateway. This is also necessary if the gateway is integrated in the inverter. The FIO11B module cannot be used for connecting.

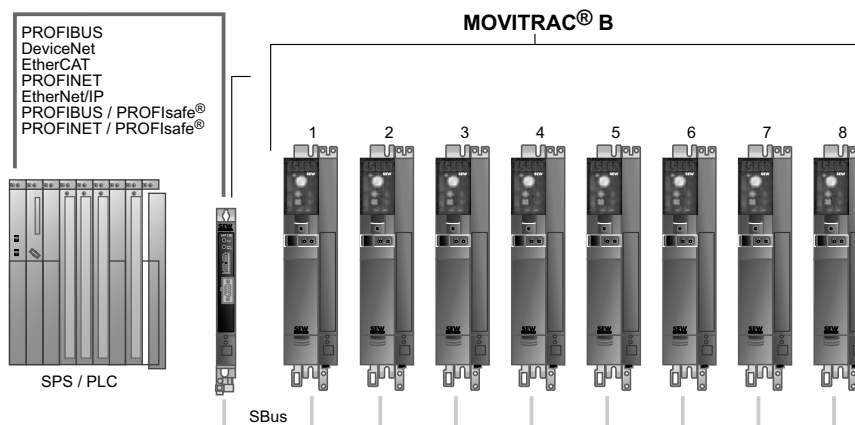
In general, you can also connect and operate other SEW units (such as MOVIDRIVE® inverters) using the SBus.

There are two different versions of gateway functionality:

- Integrated in the inverter: The DF..B fieldbus interface is mounted in MOVITRAC® B.



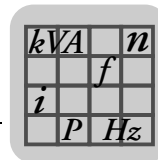
- In separate housing: The DF..B fieldbus interface is mounted in an UOH11B housing. The UFI11A gateway is available for INTERBUS.



TIP

If a fieldbus interface is factory-installed in MOVITRAC® B, then SBus address P881 is already factory set to "1".

In MOVITRAC® B without fieldbus interface, SBus address P881 is factory set to "0".



Gateways are available for the following bus systems for connection to fieldbuses.

Bus	Separate housing	Integrated in inverter ¹⁾
PROFIBUS	DFP21B / UOH11B	MC07B.../FSC11B/DFP21B
DeviceNet	DFD11B / UOH11B	MC07B.../FSC11B/DFD11B
EtherCAT	DFE24B / UOH11B	MC07B.../FSC11B/DFE24B
PROFINET	DFE32B / UOH11B	MC07B.../FSC11B/DFE32B
EtherNet/IP	DFE33B / UOH11B	MC07B.../FSC11B/DFE33B
PROFIBUS / PROFIsafe [®]	DFS11B / UOH11B	MC07B.../FSC11B/DFS11B
PROFINET / PROFIsafe [®]	DFS21B / UOH11B	MC07B.../FSC11B/DFS21B
INTERBUS	UF111A (823 898 7)	–

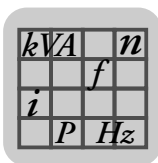
1) Integration in inverter not for size 0XS.

MOVITRAC[®] B must be supplied with DC 24 V at terminals X12.8 and X12.9 when it supplies the gateways.

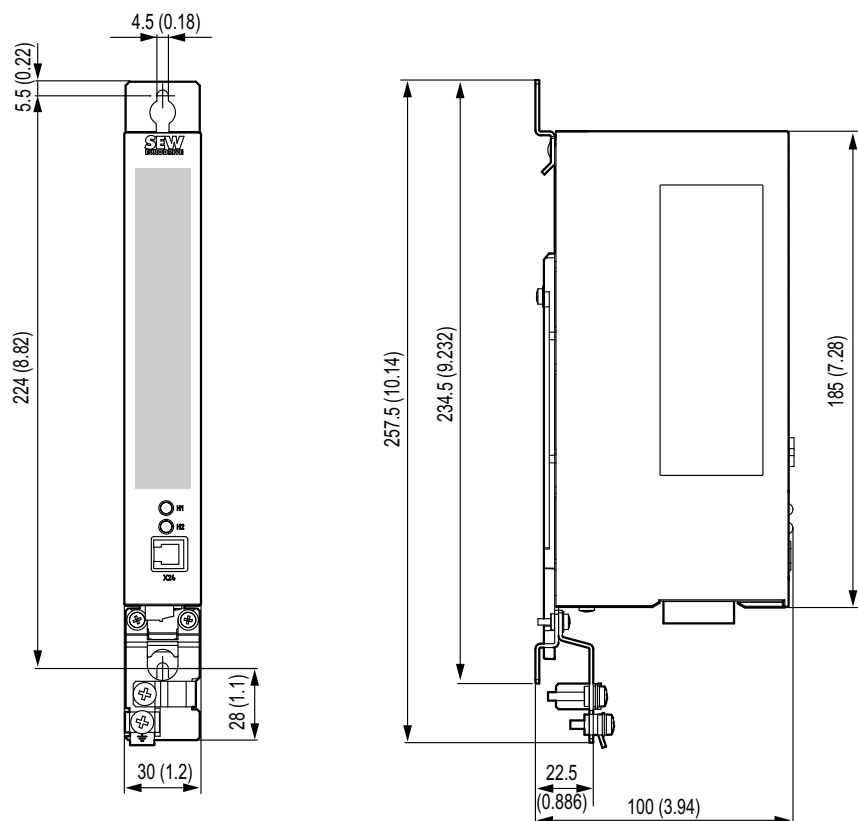
Operating principle

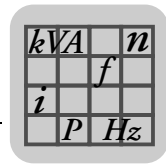
The fieldbus gateways have standardized interfaces. Connect lower-level MOVITRAC[®] B units to the fieldbus gateway via the SBus unit system bus.

Front view of MOVITRAC [®] B / UOH 11B	Description	Function
	LED H1 (red)	System error (only for gateway functionality)
	LED H2 (green)	Reserved
	X24 X terminal	RS-485 interface for diagnostics via PC and MOVITOOLS [®] MotionStudio



Dimension drawing
for UOH





4.26.2 DFP21B fieldbus interface for PROFIBUS

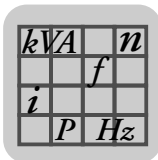
Description

The MOVITRAC® B frequency inverter enables you to use the DFP21B option to connect to higher-level automation systems via PROFIBUS DP and DP-V1 thanks to its powerful, universal fieldbus interface.

Refer to the publication "Fieldbus interface DFP21B PROFIBUS DP-V1" for installation.

Electronics data

DFP21B option		
	External voltage supply via X26	U = DC 24 V (–15 % / +20 %) $I_{\max}$ = DC 200 mA $P_{\max}$ = 3.4 W
	PROFIBUS protocol options	PROFIBUS DP and DP-V1 acc. to IEC 61158
	Automatic baud rate detection	9.6 kBd – 12 MBd
	Connection technology	- Via 9-pin D-sub connector - Pin assignment acc. to IEC 61158
	Bus termination	Not integrated, must be implemented using suitable PROFIBUS connector with terminating resistors that can be switched on.
	Station address	1 to 125, adjustable via DIP switches
	GSD file name	SEW_6009.GSD
	DP ID number	$6009_{\text{hex}} = 24585_{\text{dec}}$
	Application-specific parameter-setting data (Set-Prm-User-Data)	- Length: 3 bytes - Hex parameter setting 00,00,00
	DP configurations for DDLM_Chk_Cfg	See publication "Fieldbus Interface DFP21B PROFIBUS DP-V1".
	Diagnostics data	Standard diagnostics: 6 bytes



4.26.3 DFD11B fieldbus interface for DeviceNet

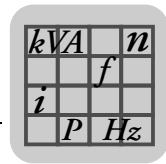
Description

The MOVITRAC® B frequency inverter together with the DFD11B option and its high-performance universal fieldbus interface enable the connection to higher-level automation systems via the open and standardized DeviceNet fieldbus system.

Refer to the publication "DFD11B DeviceNet Fieldbus Interface" for installation.

Electronics data

DFD11B option		
	External voltage supply via X26	U = DC 24 V (–15 %, +20 %) $I_{\max}$ = DC 200 mA $P_{\max}$ = 3.4 W
	Communication protocol	Master/slave connection set according to DeviceNet specification version 2.0
	Number of process data words	Can be set using DIP switch: 1 – 24 process data words with polled I/O 1 – 4 process data words with bit-strobe I/O
	Baud rate	125, 250 or 500 kBaud, can be set using DIP switch
	Bus cable length	For thick cable according to DeviceNet specification 2.0 appendix B: 500 m (1640 ft) with 125 kBaud 250 m (820 ft) with 250 kBaud 100 m (656 ft) with 500 kBaud
	Transmission level	ISO 11 98 - 24 V
	Connection technology	5-pin Phoenix-Kombicon terminal - Pin assignment according to DeviceNet specification
	MAC ID	0 – 63, can be set using DIP switch Max. 64 stations
	Supported services	- Polled I/O - Bit strobe I/O - Explicit messages: - Get_Attribute_Single - Set_Attribute_Single - Reset - Allocate_MS_Connection_Set - Release_MS_Connection_Set
	EDS file name	SEW_GATEWAY_DFD11B.eds



4.26.4 DFE24B fieldbus interface for EtherCAT

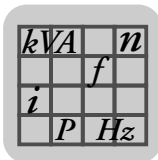
Description

The MOVITRAC® B frequency inverter enables you to use the DFE24B option to connect to higher-level automation systems via EtherCAT thanks to its powerful, universal fieldbus interface.

Refer to the publication "DFE24B EtherCAT Fieldbus Interface" for installation.

Electronics data

DFE24B option		
	External voltage supply via X26	U = DC 24 V (–15 %, +20 %) I _{max} = DC 200 mA P _{max} = 3.4 W
	Standards	IEC 61158, IEC 61784-2
	Baud rate	100 Mbaud full duplex
	Connection technology	2 × RJ45 (8x8 modular jack)
	Bus termination	Not integrated because bus termination is automatically activated.
	OSI layer 1/2	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)



4.26.5 DFE32B fieldbus interface for PROFINET IO RT

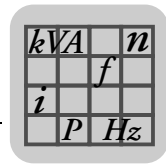
Description

The MOVITRAC® B frequency inverter enables you to use the DFE32B option to connect to higher-level automation systems via PROFINET IO RT thanks to its powerful, universal fieldbus interface.

Refer to the publication "DFE32B PROFINET IO Fieldbus Interface" for installation.

Electronics data

DFE32B option		
	External voltage supply via X26	U = DC 24 V (–15 %, +20 %) $I_{\max}$ = DC 200 mA $P_{\max}$ = 3.4 W
	Application protocols	• PROFINET IO (Ethernet frames with frame identification 8892_{hex}) to control and set parameters for the 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)
	OSI layer 1/2	Ethernet II
	Baud rate	100 MBd in full duplex mode
	Connection technology	2 x RJ45 with internal switch® and auto crossing
	Addressing	4 byte IP address or MAC-ID (00:0F:69:xx:xx:xx)
	Manufacturer ID (vendor ID)	010A _{hex}
	GSD file name	GSML-V2.1-SEW-DFE-DFS-2Ports-YYYYMMTT.xml



4.26.6 DFE33B fieldbus interface for EtherNet/IP

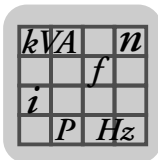
Description

The MOVITRAC® B frequency inverter enables you to use the EtherNet/IP DFE33B option to connect to higher-level automation systems via EtherNet/IP thanks to its powerful, universal fieldbus interface.

Refer to the publication "DFE33B EtherNet/IP Fieldbus Interface" for installation.

Electronics data

DFE33B option		
	External voltage supply via X26	U = DC 24 V (–15 %, +20 %) $I_{\max}$ = DC 200 mA $P_{\max}$ = 3.4 W
	Application protocols	• EtherNet/IP (Industrial Protocol) to control and set parameters for the 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) • 300 (SMLP) • 80 (HTTP) • 67 / 88 (DHCP)
	Ethernet services	• ARP • ICMP (ping)
	ISO/OSI layer 1/2 ISO/OSI layer 3/4	Ethernet II TCP/IP and UDP/IP
	Baud rate	10 / 100 Mbaud
	Connection technology	2 x RJ45 with internal switch® and auto crossing
	Addressing	4 byte IP address or MAC-ID (00:0F:69:xx:xx:xx)
	Manufacturer ID (vendor ID)	013B _{hex}
	EDS file name	SEW_GATEWAY_DFE33B.eds



4.26.7 DFS11B fieldbus interface for PROFIBUS / PROFIsafe®

Description

The MOVITRAC® B frequency inverter enables you to use the DFS11B option to connect to higher-level automation systems via PROFIBUS with PROFIsafe® thanks to its powerful, universal fieldbus interface.

Refer to the publication "DFS11B PROFIBUS DP-V1 with PROFIsafe® Fieldbus Interface" for installation.

Electronics data

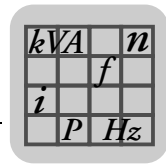
DFS11B option		
	External voltage supply via X26	U = DC 24 V (–15 % / +20 %) $I_{\max} = \text{DC } 200 \text{ mA}$ $P_{\max} = 3.4 \text{ W}$
	PROFIBUS protocol options	PROFIBUS DP and DP-V1 acc. to IEC 61158
	Automatic baud rate detection	9.6 kBaud ... 12 MBaud
	Connection technology	- Via 9-pin D-sub connector - Pin assignment acc. to IEC 61158
	Bus termination	Not integrated, must be implemented using suitable PROFIBUS connector with terminating resistors that can be switched on.
	Station address	1 ... 125, adjustable via DIP switches
	F address	1 ... 1022, adjustable via DIP switches
	GSD file name	SEW_6009.GSD
	DP ID number	$6009_{\text{hex}} = 24585_{\text{dec}}$
	Application-specific parameter-setting data (Set-Prm-User-Data)	- Länge 3 Byte - Hex parameter setting 00,00,00
	DP configurations for DDLM_Chk_Cfg	See publication "DFS11B PROFIBUS DP-V1 with PROFIsafe® Fieldbus Interface".
	Diagnostics data	Standard diagnostics: 6 bytes



TIP

Safety-oriented applications are implemented using PROFIsafe® interfaces.

Refer to the publication "DFS11B PROFIBUS DP-V1 with PROFIsafe® Fieldbus Interface" for installation.



4.26.8 DFS21B fieldbus interface for PROFINET / PROFIsafe®

Description

The MOVITRAC® B frequency inverter enables you to use the DFS21B option to connect to higher-level automation systems via PROFINET IO RT with PROFIsafe® thanks to its powerful, universal fieldbus interface.

Refer to the publication "DFS21B PROFINET with PROFIsafe®" for installation.

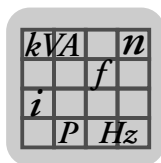
Electronics data

DFS21B option		
	External voltage supply via X26	U = DC 24 V (–15 %, +20 %) $I_{\max}$ = DC 200 mA $P_{\max}$ = 3.4 W
	Application protocols	• PROFINET IO (Ethernet frames with frame identification 8892_{hex}) to control and set parameters for the 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)
	OSI layer 1/2	Ethernet II
	Baud rate	100 MBd in full duplex mode
	Connection technology	2 x RJ45 with internal switch® and auto crossing
	Addressing	4 byte IP address or MAC-ID (00:0F:69:xx:xx:xx)
	F address	1 ... 1022, adjustable via DIP switches
	Manufacturer ID (vendor ID)	010A _{hex}
	GSD file name	GSML-V2.1-SEW-DFE-DFS-2Ports-YYYYMMTT.xml



TIP

Safety-oriented applications are implemented using PROFIsafe® interfaces.
Refer to the publication "DF21B PROFINET with PROFIsafe® Fieldbus Interface" for installation.



4.27 MOVI-PLC®

4.27.1 Unit types

The MOVI-PLC® controller is available in different variants, which differ in the modules available from a range of libraries. Refer to the publication "MOVI-PLC® Controller" for installation.

MOVI-PLC® unit type:		Description
MOVI-PLC® basic	DHP11B-T0	MOVI-PLC® basic controller
	DHP11B-T1 ¹⁾	Technology version I includes the functions electronic cam and synchronous operation in addition to the T0 version.
	DHP11B-T2 ¹⁾	Technology version II includes, for example, handling in addition to the T1 version.
MOVI-PLC® advanced	DHE41B	Functionality of MOVI-PLC® basic, but also enormous power reserves and high-speed interfaces.

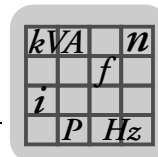
1) Versions T1 and T2 are only partly useful together with MOVITRAC® B. Please consult SEW-EURODRIVE.

4.27.2 Description

With the MOVI-PLC® basic DHP11B controller, SEW-EURODRIVE's product portfolio offers a user-programmable controller compliant with the IEC 61131-3 and PLCopen standards for the first time.

The DHP11B option is integrated ex works (not in size 0XS) or supplied in a separate UOH housing. Only SEW EURODRIVE can carry out an expansion of the unit with this option.

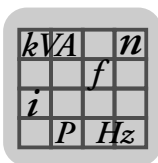
The MOVI-PLC® DHP11B.. controller is equipped with a PROFIBUS DPV1 slave interface, 2 SBus interfaces (CAN), RS-485, and 8 digital inputs/outputs, of which 5 are interrupt capable. The DHP11B control card can control 12 units simultaneously (MOVIDRIVE®, MOVITRAC®, MOVIMOT®).



4.27.3 Electronics data

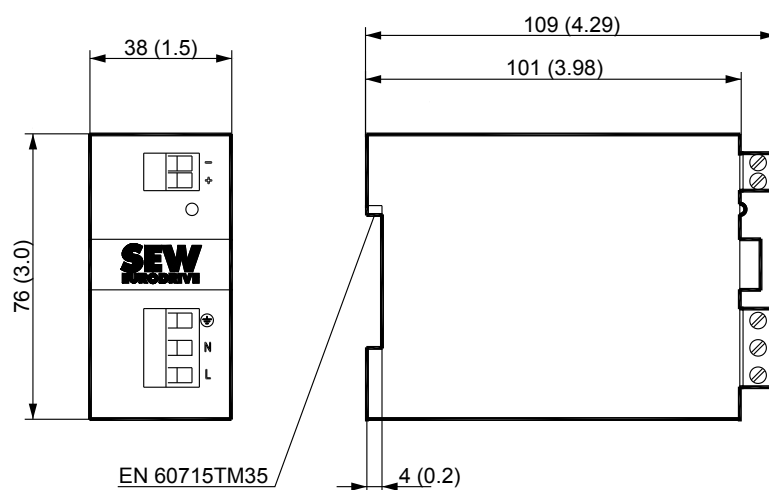
Electronics data of MOVI-PLC® basic DHP11B:

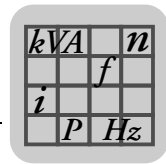
	Status display	LEDs for - Voltage supply I/O - Firmware - Program - PROFIBUS - System buses
	Fieldbus	- PROFIBUS DP and DPV1 according to IEC 61158 - Automatic baud rate detection from 9.6 kbaud to 12 Mbaud - Implement bus connection with suitable connector - GSD file SEW_6007.GSD - DP ident. number 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 kBd – 1 MBd - External bus terminator - Address range: 0 – 127
	Engineering	Via RS485, PROFIBUS and the system buses
	Panel operation	Via RS-485 and CAN 2 (in preparation)
	Connection technology	- PROFIBUS: 9-pole D-sub connector according to IEC 61158 - System buses and I/Os: plug-in terminals - RS-485: RJ10
	Binary inputs/outputs	8 I/Os to IEC 61131-2; can be configured as inputs or outputs, 5 of which are interrupt-capable.
	Memory	- Program: 512 kByte - Data: 128 kByte - Retain: 24 kByte
	Tools for startup	- Programming languages – STL – ST – LD – FBD – CFC – AS - Libraries for optimized inverter control



4.28 UWU52A switched-mode power supply

UWU52A switched-mode power supply	
Part number	188 181 7
Input voltage	1 × AC 110 V – AC 240 V
Voltage range	AC 95 – 265 V, DC 110 – 300 V
Frequency	50/60 Hz
Maximum no-load current	AC 40 mA
Rated input current at 1 × AC 110 V at 1 × AC 230 V	AC 1.04 A AC 0.63 A
Output voltage	DC 24 V (–1 % / +3 %)
Rated output current at 40 °C at 55 °C	DC 2.5 A DC 2.0 A
Residual ripple	< 50 mV _{eff}
Interference voltage	< 120 mV _{SS}
Power loss	< 5.5 W
Mass	0.23 kg (0.51 lb)
Working temperature	0 – +55 °C (+32 – +131 °F) (non-condensing)
Degree of protection	IP20 (EN 60529)
Protection class	I
Connection	Terminal screws for cable cross section of 0.20 – 2.5 mm ² (AWG24 – AWG13)





5 Parameters

As a rule, you only set the parameters during startup and if servicing is required. You can set the MOVITRAC® B parameters in various ways:

- With the keypad
- With the MOVITOOLS® MotionStudio programs on a PC via RS-485 interface
- By copying the parameters using the keypad

If you set the parameters other than the factory setting: Enter changes in the parameter list in the "Startup" section.

5.1 Explanation of the parameters

If a choice is offered, the factory setting is indicated in **bold**.

The parameters for motor startup are described in the section "Startup with the FGB keypad".

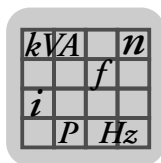
You can select the parameters on the FBG11B keypad as follows:

-  Selection in the FBG11B long menu
-  Selection in the FBG11B short and long menus
-  Direct selection in the FBG11B keypad and in the FBG11B long menu
-  Selection within FGB motor startup

The following symbols explain the parameters:

-  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).
-  The startup function automatically changes this parameter.

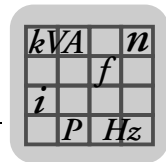
No.	FBG	Name	Description
0..		Display values	
00.		Process values	
000		Speed (signed) [rpm]	The displayed speed is the calculated actual speed.
001		User display for DBG11B	The user display is defined by the following parameters: • P850 Scaling factor numerator • P851 Scaling factor denominator • P852 User-defined unit
002		Frequency (signed) [Hz]	Output frequency of the inverter.
004		Output current (value) [% I _N]	Apparent current of the rated unit current.
005		Active current (signed) [% I _N]	Active current in the range 0 – 200 % of the rated unit current. The display value is positive when torque is in positive sense of rotation; negative when torque is in negative sense of rotation.
008		DC link voltage [V]	DC link voltage.



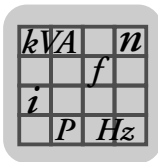
Parameters

Explanation of the parameters

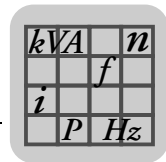
No.	FBG	Name	Description
009		Output current [A]	Apparent current at the inverter output, displayed in AC A.
01.		Status displays	
010		Inverter status	Status of the unit output stage: • INHIBITED • ENABLED
011		Operating state	The following operating states are possible: • 24 V OPERATION • CONTROLLER INHIBIT • NO ENABLE • STANDSTILL CURRENT • ENABLE • FACTORY SETTING • FAULT • SAFE STOP
012		Fault status	Fault number and fault in plain text.
013		Current parameter set	Parameter set 1 or 2.
014		Heat sink temperature [°C]	Heat sink temperature of the inverter.
02.		Analog setpoints	
020		Analog input AI1 [V]	Voltage 0 – +10 V at analog input AI1. When S11 = ON and P112 AI1 operating mode: • = NMAX, 0 – 20 mA: Display 0 – 10 V = $\frac{\Delta}{4}$ 0 – 20 mA • = NMAX, 4 – 20 mA: Display 2 – 10 V = $\frac{\Delta}{4}$ 4 – 20 mA
021		Analog input AI2 (optional)	Unit: [V] Voltage (–10 V – +10 V)
03.		Binary inputs	
030		Binary input DI00	Status of binary input DI00 (fault reset = factory setting)
031		Binary input DI01	Status of binary input DI01 (CW/STOP= fixed assignment)
032		Binary input DI02	Status of binary input DI02 (CCW/STOP = factory setting)
033		Binary input DI03	Status of binary input DI03 (ENABLE = factory setting)
034		Binary input DI04	Status of binary input DI04 (n11/n21 = factory setting)
035		Binary input DI05	Status of binary input DI05 (n12/n22 = factory setting)
039		Binary inputs DI00 – DI05	Collective display of binary inputs.
04.		Binary inputs option	
040		Binary input DI10	Status of binary input DI10 (factory setting = no function)
041		Binary input DI11	Status of binary input DI11 (factory setting = no function)
042		Binary input DI12	Status of binary input DI12 (factory setting = no function)
043		Binary input DI13	Status of binary input DI13 (factory setting = no function)
044		Binary input DI14	Status of binary input DI14 (factory setting = no function)
045		Binary input DI15	Status of binary input DI15 (factory setting = no function)
046		Binary input DI16	Status of binary input DI16 (factory setting = no function)
048		Binary inputs DI10 – DI16	Collective display of binary inputs.
05.		Binary outputs	
051		Binary output DO01	Status of binary output DO01 (/FAULT = factory setting)
052		Binary output DO02	Status of binary output DO02 (BREAKE RELEASED = factory setting)
053		Binary output DO03	Status of binary output DO03 (READY FOR OPERATION = factory setting)
059		Binary outputs DO01 – DO03	Collective display of binary outputs.
07.		Unit data	
070		Unit type	The unit type is displayed, e.g. MC07B0008-2B1

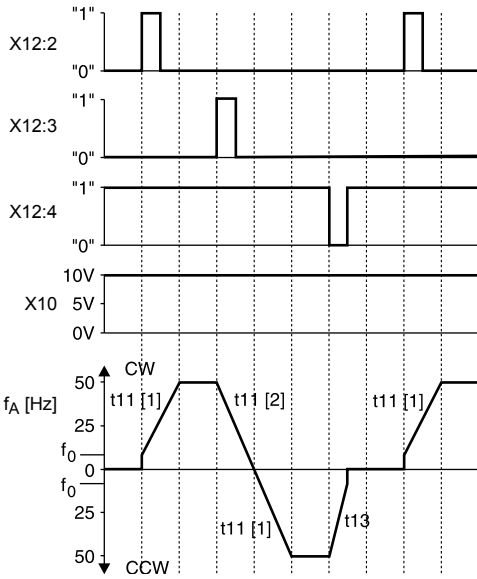
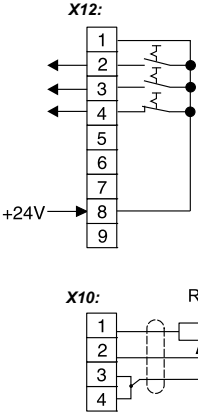


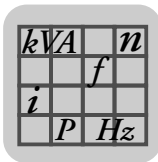
No.	FBG	Name	Description
071		Rated output current [A]	The rated unit current is displayed in [A]
076		Firmware of basic unit	Part number and firmware version
077		DBG firmware	Part number and firmware version
08.		Fault memory	
080 – 084	Long	Faults t-0 – t-4 (FBG11B keypad: fault t-0 only)	The unit saves the following information when a fault occurs. MOVITOOLS® MotionStudio can display this information if required: • P036/P053 Status of binary inputs / binary outputs • P013 Current parameter set • P011 Operating status of the inverter • P010 Inverter status • P014 Heat sink temperature • P000 Speed • P004 Output current • P005 Active current • Unit utilization • P008 DC link voltage
09.		Bus diagnostics	
094		PO 1 Setpoint [hex]	Process data output word 1, setpoint
095	Long	PO 2 Setpoint [hex]	Process data output word 2, setpoint
096		PO 3 Setpoint [hex]	Process data output word 3, setpoint
097		PI 1 Actual value [hex]	Process data input word 1, actual value
098		PI 2 Actual value [hex]	Process data input word 2, actual value
099		PI 3 Actual value [hex]	Process data input word 3, actual value
No.	FBG	Name	Description
1..		Setpoints/ramp generators	
10.		Setpoint selection / frequency input	
100	Short 	Setpoint source	0 / Bipolar / Fixed setpoint The setpoint is provided by the analog input or the fixed setpoints. The unit processes the fixed setpoints according to their value. The speed is limited by the maximum set speed P302/P312 in the event of a wire breakage. 1 / Unipolar / Fixed setpoint The setpoint is provided by the analog input or the fixed setpoints. The unit processes the fixed setpoints according to their value. The binary inputs specify the direction of rotation. 2/ RS-485 / Fixed setpoint The setpoint is provided by the RS-485 interface. The sign of the setpoint determines the direction of rotation. 4 / Motor potentiometer / Fixed setpoint Set the setpoint by programming the terminals <i>Motor potentiometer up</i> and <i>Motor potentiometer down</i> accordingly. The motor potentiometer is a virtual potentiometer that does not correspond to the setpoint potentiometer on the unit. 6 / Fixed setpoint + AI1 The setpoint is calculated by adding the selected fixed setpoint and analog input AI1. The binary inputs specify the direction of rotation. Furthermore, <i>P112 AI1 operating mode</i> applies. 7 / Fixed setpoint * AI1 The value at analog input AI1 serves as the evaluation factor for the selected fixed setpoint (0 – 10 V = 0 – 100 %). If not fixed setpoint is selected, n_{min} applies. The binary inputs specify the direction of rotation. 8 / MASTER SBus1 In master/slave mode, the setpoint is provided by the master via system bus 1. See P75x master/slave function. 9 / MASTER RS-485 The setpoint is provided by the master in master/slave mode via the RS-485 interface. See P75x master/slave function. 10 / SBus 1 / Fixed setpoint The system bus specifies the setpoint. The sign of the setpoint determines the direction of rotation.



No.	FBG	Name	Description															
100	Short	Setpoint source	11 / Frequency setpoint input / Fixed setpoint The frequency at binary input DI04 specifies the setpoint. Set the value with the <i>P102 Frequency scaling</i> parameter. You can influence the value with <i>P110 AI1 scaling</i>. The following parameters are included in the scaling if the PI controller is activated: • <i>P254 PI actual value scaling</i> • <i>P255 PI actual value offset</i> The optimum pulse duty factor (pulse width of the high and low signal) should be 1 : 1. The factor determines the rising edge and the falling edge of the input signal. Use P102 Frequency scaling (see page 201) to determine at which input frequency the system setpoint 100 % is reached. The reference of the system setpoint is set via P112 AI1 Operating mode (see page 201). The direction of rotation is set via the binary inputs CW/STOP and CCW/STOP. <table><tr><th>Frequency scaling</th><th>Minimum response time (delay)</th><th>Frequency input resolution</th></tr><tr><td>25 – 120 kHz</td><td>20 ms</td><td>50 Hz</td></tr><tr><td>12.5 – 24.99 kHz</td><td>40 ms</td><td>25 Hz</td></tr><tr><td>10 – 12.49 kHz</td><td>60 ms</td><td>16.7 Hz</td></tr><tr><td>1 – 9.99 kHz</td><td>500 ms</td><td>2 Hz</td></tr></table> Setpoint cascade P302: Maximum speed in rpm P110: Gain 0.1 – 1 – 10 P102: Frequency scaling 1 – 120 kHz P112: Operation mode setpoint Example: A setpoint generator with the value range 1 – 50 kHz is used to specify the motor speed from 30 – 1500 rpm. Set the following parameters for this: • P102 Frequency scaling: 50 kHz • P112 Operation mode setpoint: 3000 rpm • Setpoint scaling P110: 0.5 14 / Bipolar AI2 / Fixed setpoint The setpoint is provided by the optional analog input AI2 or the fixed setpoints. The unit processes the fixed setpoints according to their value.	Frequency scaling	Minimum response time (delay)	Frequency input resolution	25 – 120 kHz	20 ms	50 Hz	12.5 – 24.99 kHz	40 ms	25 Hz	10 – 12.49 kHz	60 ms	16.7 Hz	1 – 9.99 kHz	500 ms	2 Hz
Frequency scaling	Minimum response time (delay)	Frequency input resolution																
25 – 120 kHz	20 ms	50 Hz																
12.5 – 24.99 kHz	40 ms	25 Hz																
10 – 12.49 kHz	60 ms	16.7 Hz																
1 – 9.99 kHz	500 ms	2 Hz																



No.	FBG	Name	Description
101	 	Control signal source	0 / Terminals The binary inputs determine the control. 1 / RS-485 The RS-485 interface and the binary inputs determine the control. 3 / SBus The system bus and the binary inputs determine the control. 4 / 3-wire control The 3-wire control principle determines the control. In this case, the enable and direction of rotation signals will respond edge-controlled. - Connect start key CW with contact to binary input "CW/Halt". - Connect start key CCW with contact to binary input "CCW/Halt". - Connect stop key with normally open input "Enable/Stop". If you connect CW and CCW at the same time, the drive decelerates with downwards ramp P131 / P141. If the 3-WIRE CONTROL control signal source is active and the drive is started by a start edge: You can stop the drive using the STOP button when the RUN/STOP buttons are enabled. Then you can restart the drive with the RUN button without another start edge being required. The unit stores a start edge if you stop the drive using the stop button. If you then press the RUN key, the unit will enable the drive immediately.
		Control source 3-WIRE CONTROL   X12:2 = CW/Halt X12:3 = CCW/Halt X12:4 = Enable/Stop X10 = Setpoint input AI f_A = Output frequency f_0 = Start/Stop frequency CW = Clockwise CCW = Counterclockwise t11 [1] = t11 UP t11 [2] = t11 DOWN t13 = Stop ramp	
102	 	Frequency scaling f_{F11max}	Setting range: 0.1 – 10 – 120.00 [kHz]



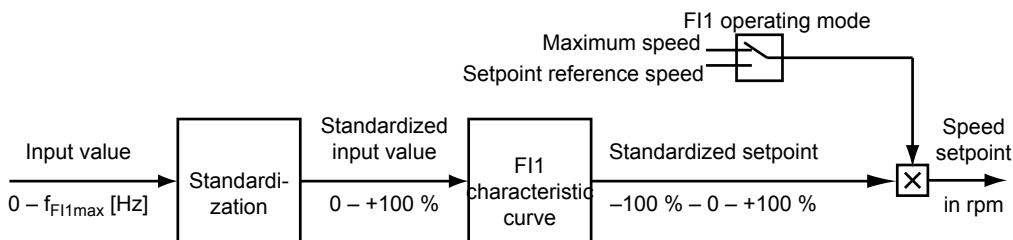
Parameters

Explanation of the parameters

No.	FBG	Name	Description
103	Lon5	FI1 reference	0 / $n_{\max}$ 1 / $n_{\text{reference}}$
104		Setpoint reference speed $n_{\text{reference}}$ for frequency input FI1 and analog inputs AI1 and AI2	Setting range: 0 – 3000 – 6000 rpm
105		AI1 wire breakage detection (with operating mode 4 – 20 mA)	Wire breakage detection is only available in operating mode 4 – 20 mA. 0 / No response 2 / Immediate stop/fault The inverter performs an emergency stop with an error message. The inverter inhibits the output stage and the brake is applied. The inverter revokes the ready signal and sets the programmed error output. A restart is only possible after an error reset has been performed during which the inverter is reinitialized. 4 / Rapid stop / Fault The inverter brakes the drive at the specified stop ramp (P136/P146). The inverter brakes with DC braking in 2-quadrant operation. Once the stop speed is reached, the inverter inhibits the output stage and the brake is applied. The error is signaled immediately. The inverter revokes the ready signal and sets the programmed error output. A restart is only possible after an error reset has been performed during which the inverter is reinitialized. 7 / Rapid stop / Warning The error response corresponds to STOP/FAULT but the inverter does not revoke the ready signal and the error output is set.

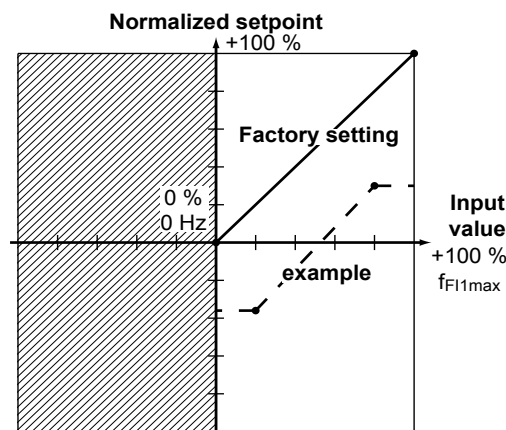
Frequency input FI1 characteristic curve

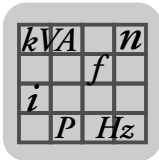
The frequency input can be configured using a characteristic curve:



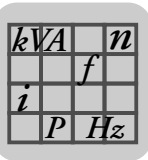
106	Lon5	FI1 characteristic curve x1	Setting range: 0 – 100 %
107		FI1 characteristic curve y1	Setting range: –100 % – 0 – +100 %
108		FI1 characteristic curve x2	Setting range: 0 – 100 %
109		FI1 characteristic curve y2	Setting range: –100 – 0 – +100 %

A 2-point characteristic curve is described by the coordinates x1/y1 and x2/y2, with which the FI1 frequency input is evaluated.





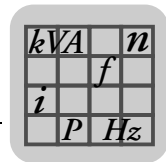
No.	FBG	Name	Description
11.		Analog input 1 (0 – +10 V)	
		The analog input can be configured using a characteristic curve.	
110	Short	AI1 scaling (up to firmware .12)	Setting range: 0.1 – 1 – +10. Is used to define the slope of the setpoint characteristic curve. If you set the scaling to the value "1", then the input voltage $V_1 = 10\text{ V}$ at the analog input corresponds to the operating mode of the analog input (P112). This is the speed 3000 rpm or the set maximum speed (P302). <i>Slope of the setpoint characteristic curve</i> You can only use the first quadrant with a unipolar setpoint source. Negative setpoint selections create the setpoint zero. P110 AI1 scaling has no effect if you set the current input operating mode. You set the current input operating mode by setting P112 AI1 to N_{MAX}, 0-20 mA or N_{MAX}, 4-20 mA.
112	Short	AI1 operating mode	1 / 10V, reference maximum speed Voltage input with reference n_{max} ($0 - 10\text{ V} = 0 - n_{max}$). You can adjust the characteristic curve with <i>AI1 scaling</i>. Switch S11 = V. 5 / 0 – 20 mA, reference maximum speed Current input $0 - 20\text{ mA} = 0 - n_{max}$. <i>P110 AI1 Scaling</i> has no effect. Switch S11 = mA. 6 / 4 – 20 mA, reference maximum speed Current input $4 - 20\text{ mA} = 0 - n_{max}$. <i>P110 AI1 Scaling</i> has no effect. Switch S11 = mA. 7 / 0 – 10 V, n-reference 8 / 0 – 20 mA, n-reference 9 / 4 – 20 mA, n-reference



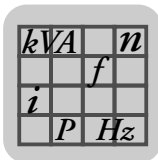
Parameters

Explanation of the parameters

No.	FBG	Name	Description
113	Short 	AI1 voltage offset (up to firmware 12)	Setting range: $-10\text{ V} - 0 - +10\text{ V}$ The zero passage of the setpoint characteristic can be moved along the U_E axis.
116		AI1 characteristic curve x1	Setting range: $0 - 100\%$
117		AI1 characteristic curve y1	Setting range: $-100\% - 0 - +100\%$
118	Short	AI1 characteristic curve x2	Setting range: $0 - 100\%$
119		AI1 characteristic curve y2	Setting range: $-100 - 0 - +100\%$
		A 2-point characteristic curve is described by the coordinates x1/y1 and x2/y2, with which the AI1 analog input is evaluated.	

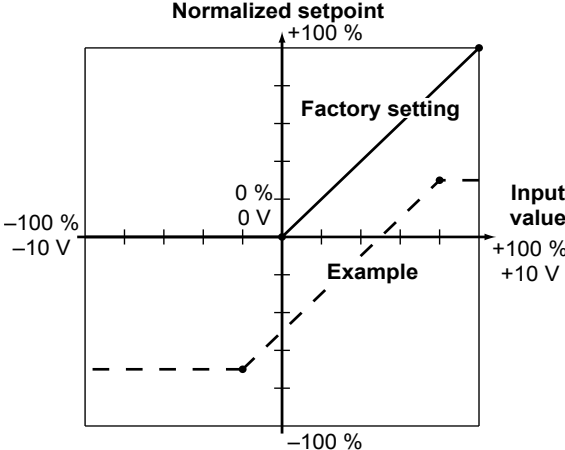
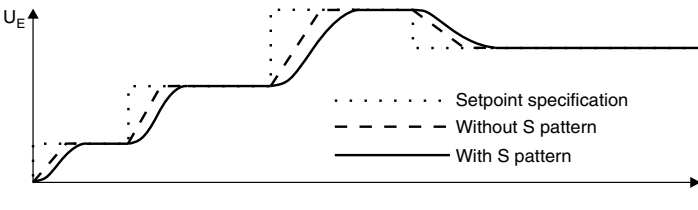


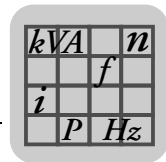
No.	FBG	Name	Description
12.		Analog input AI2 / FBG speed control module (option)	
		Analog input AI2 is only available with the optional analog module FIO11B.	
120	 	AI2 operating mode	0 / No function The setpoint at AI2 is not used; the external current limitation is set to 100 %. 1 / 0 – ± 10 V + setpoint / 100 % corresponds to n_{max} The evaluated setpoint at AI2 is added to setpoint 1 (= AI1) observing the signs; the external current limitation is set to 100 % I_{max}. 2 / 0 – 10 V current limit / 100 % corresponds to I_{max} The input serves as external current limitation.
121	 	Addition FBG speed control module	0 / Off The unit does not take into account the value from the speed control module of the FBG11 keypad. 1 / ON The value from the speed control module of the FBG11 keypad is added to any set setpoint source bipolar/fixed setpoint, unipolar/fixed setpoint, RS-485/fixed setpoint, frequency input/fixed setpoint or SBus/fixed setpoint. The addition also affects fixed setpoints. 2 / On (without fixed setpoint) The value from the speed control module of the FBG11 keypad is added to any set setpoint source bipolar/fixed setpoint, unipolar/fixed setpoint, RS-485/fixed setpoint, frequency input/fixed setpoint or SBus/fixed setpoint. The addition does not affect fixed setpoints.
122	 	Direction of rotation FBG manual operation	Setting the setpoint using the speed control module of the FBG11 keypad in FBG manual mode. 0 / Unipolar CW Adjustable speed: 0 – + n_{max}. 1 / Unipolar CCW Adjustable speed: 0 – – n_{max}. 2 / Bipolar CW and CCW Adjustable speed: – n_{max} – + n_{max}.



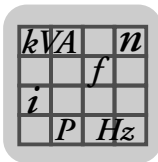
Parameters

Explanation of the parameters

No.	FBG	Name	Description
126		AI2 characteristic curve x1	Setting range $-100\% - 0 - +100\%$ ($-10\text{ V} - 0 - +10\text{ V}$)
127	Long	AI2 characteristic curve y1	Setting range $-100\% - 0 - +100\%$ ($-n_{\max} - 0 - +n_{\max} / 0 - I_{\max}$)
128		AI2 characteristic curve x2	Setting range $-100\% - 0 - +100\%$ ($-10\text{ V} - 0 - +10\text{ V}$)
129		AI2 characteristic curve y2	Setting range $-100\% - 0 - +100\%$ ($-n_{\max} - 0 - +n_{\max} / 0 - I_{\max}$)
		The characteristic curve is described by the coordinates x1/y1 and x2/y2, with which the analog input is evaluated. Normalized setpoint 	
13. / 14.		Speed ramps 1 / 2	
The ramp times refer to a setpoint change of $\Delta n = 3000\text{ rpm}$. Ramps t11 / t21 up and t11 / t21 down are effective when the setpoint is changed. The stop ramp t13/t23 is in effect when the enable is withdrawn by pressing the STOP/RESET key or via the terminals.			
130 / 140		Ramp t11/t21 up	Setting range $0 - 2 - 2000\text{ [s]}$; acceleration ramp
131 / 141		Ramp t11 / t21 down	Setting range $0 - 2 - 2000\text{ [s]}$; deceleration ramp
134 / 144		Ramp t12 / t22 up = down	Setting range $0 - 10 - 2000\text{ [s]}$ The following applies to this ramp: UP = DOWN and CW = CCW. Ramps t12/t22 are activated by a binary input ($\rightarrow$ P601 ... P608), which is set to the function "Ramp switchover".
135 / 145		S pattern t12 / t22 This function is only active when selecting t12 / t22.	Setting range: $0 / 1 / 2 / 3$ (0 = off, 1 = weak, 2 = medium, 3 = strong) The 2nd ramp (t12/ t22) of parameter sets 1 and 2 can be rounded with 3 pattern grades to achieve a smoother acceleration of the drive. Effect of the S pattern: 
136 / 146		Stop ramp t13 / t23 up = down	Setting range $0 - 2 - 20\text{ [s]}$; stop ramp when switching to NO ENABLE operating state



No.	FBG	Name	Description
139 / 149		Ramp monitoring 1 / 2	Setting range: YES / NO If you set the deceleration ramps to a value that is a lot shorter than can be physically accomplished in this system, the turning drive will be stopped after expiration of the monitoring time. Such a setting will cause a fault signal and increase brake wear. The respective ramp time also has to be increased, if the ramp timeout is definitely triggered by a preset ramp that cannot be traveled. This parameter is an additional monitoring function for speed monitoring. This parameter only applies to the deceleration ramp. This means the parameter can be used to monitor the downwards ramp, stop ramp or emergency stop ramp if speed monitoring is not desired.
15.		Motor potentiometer function (see <i>P100 Setpoint source</i>) The ramp times refer to a setpoint change of $\Delta n = 3000$ rpm.	
150		Ramp t3 up = down	Setting range 0.2 – 20 – 50 [s] The ramp is in effect when using the terminal functions <i>Motor pot. up</i> and <i>Motor pot. down</i>.
152		Save last setpoint	off / OFF The inverter starts with $n_{\min}$: • After power off and on • After revoking the enable If you use the motor potentiometer for permanent speed control, you will have to set <i>P152 Save last setpoint</i> to <i>OFF</i>. Else, error message F25 EEPROM will appear after about 100,000 storage operations. Saving only when the setpoint changes. If a fixed setpoint is deselected, the fixed setpoint will be used as motor potentiometer value. on / ON The inverter starts with the last set motor potentiometer setpoint: • After power off and on • After revoking the enable If a fixed setpoint is deselected, the old motor potentiometer setpoint will be used again.
16. / 17.		Fixed setpoints 1 / 2	
You can activate fixed setpoints via binary inputs DI02 – DI05 using arguments n11/n21 / n12/n22 and FIX SETPT SW.OV (parameter 60_). You activate the fixed setpoints n13/n23 by assigning the functions n11/n21 and n12/n22 to two binary inputs and applying a "1" signal to the two inputs.			
160 / 170		Internal setpoint n11 / n21	Setting range –5000 – 150 – 5000 [rpm]
161 / 171		Internal setpoint n12 / n22	Setting range –5000 – 750 – 5000 [rpm]
162 / 172		Internal setpoint n13 / n23	Setting range –5000 – 1500 – 5000 [rpm]
163 / 173		n11/n21 PI controller	Setting range 0 – 3 – 100 [%] (see section Project Planning / PI controller)
164 / 174		n12/n22 PI controller	Setting range 0 – 15 – 100 [%] (see section Project Planning / PI controller)
165 / 175		n13/n23 PI controller	Setting range 0 – 30 – 100 [%] (see section Project Planning / PI controller)

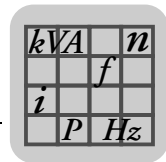


Parameters

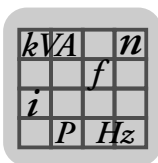
Explanation of the parameters

No.	FBG	Name	Description
2..		Controller parameters	
25.		PI controller (see section Project Planning / PI controller for a description of the parameters)	
		Setpoint % Actual value AI1 % Control difference 1 -1 P250 PI controller Normal Inverted x P251 P-gain P252 I-component P301/311 n_{max} P302/312 n_{min} Speed setpoint (value) Correcting variable	
250	Long	PI controller	0 / Off PI controller deactivated. 1 / Normal PI controller switched on normally. 2 / Inverted PI controller switched on inverted.
251	Long	P-gain	Setting range 0 – 1 – 64
252	Long	I component	Setting range 0 – 1 – 2000 [s]
253	Long	PI actual value mode (up to firmware .12)	1 / 10 V, reference maximum speed 5 / 0 – 20 mA, reference maximum speed 6 / 4 – 20 mA, reference maximum speed 7 / 0 – 10 V, n-reference 8 / 0 – 20 mA, n-reference 9 / 4 – 20 mA, n-reference
254		PI actual value scaling (up to .12)	0.1 – 1.0 – 10.0
255	Long	PI actual value offset (up to .12)	0.0 – 100.0 [%]

No.	FBG	Name	Description
3..		Motor parameters	
Use this parameter group to adjust the inverter to the motor.			
30. / 31.		Limits 1 / 2	
300 / 310	Long 1 2 AUTO	Start/stop speed 1 / 2	Setting range 0 – 150 [rpm] If the setpoint speed is higher than the start/stop speed, the drive will be enabled with the start/stop speed. The transition to the setpoint speed is made using the active speed ramp. If the setpoint speed is lower than the start/stop speed, the setpoint will become active immediately. In the VFC & hoist operating mode, the drive is always enabled with the rated motor slip speed. During startup, the start/stop speed is set to 50 % the rated slip speed of the connected motor. When a stop command is performed, this setting also defines the slowest speed at which the motor energization is switched off or at which post-magnetization takes effect and the brake is applied.



No.	FBG	Name	Description
301 / 311	  	Minimum speed 1 / 2	Setting range 0 – 15 – 5500 [rpm] Speed value, the lower limit of which must not be exceeded even when zero is selected as the setpoint. The minimum speed also applies when $n_{min} < n_{start/stop}$ was set. Important: - When the hoist function is active, the slowest speed is 15 rpm even if n_{min} was set to a lower value. - To also enable the drive to move clear of the limit switches at low speeds, n_{min} is not active when drive has contacted the hardware limit switch.
302 / 312	  	Maximum speed 1 / 2	Setting range 0 – 1500 – 5500 [rpm] No setpoint greater than the value set here can be selected. If you set $n_{min} > n_{max}$, then the value set in n_{max} applies to the minimum speed and the maximum speed. In the VFC and VFC + DC BRAKING operating mode, you may enter the following maximum speed values depending on the number of poles: 2-pole: max. 5500 rpm 4-pole: max. 4000 rpm 6-pole: max. 2600 rpm 8-pole: max. 2000 rpm Fault 08 <i>Speed monitoring</i> might be indicated when you enter higher values. When you perform a startup, the unit automatically sets the maximum speed to the transition speed.
303 / 313	  	Current limit 1 / 2	Setting range 0 – 150 [% I_N] The internal current limitation refers to the apparent current, i.e. the output current of the inverter. The inverter automatically decreases the current limit internally in the field weakening range. In this way, the inverter implements a stall protection for the motor. A current limit lower than the rated motor current is ignored when the hoist function is activated.
32. / 33.		Motor adjustment 1 / 2	
Use function <i>P320 / P330 Automatic adjustment</i> for single-motor operation only. You can use this function for all motors and control modes. The inverter calibrates the motor during pre-magnetization and sets the parameters <i>P322 / P332 IxR adjustment</i>. The values are saved in volatile memory. The motor is not calibrated if: - P320 / P330 Automatic adjustment = OFF. - VFC & Flying start operating mode is active. - The set pre-magnetization time is shorter by more than 30 ms than the pre-magnetization time calculated during startup. If you deactivate automatic adjustment, the values measured last will not be saved in volatile memory. The factory settings of parameters 321 – 324 / 331 – 334 depend on the motor.			
320 / 330	 	Automatic adjustment 1 / 2	off / OFF No automatic adjustment: The inverter does not calibrate the motor. on / ON Automatic adjustment: The inverter calibrates the motor whenever changing to ENABLE operating mode.
321 / 331	 	Boost 1/2	Setting range 0 – 100 [%] The value is calculated during startup. The value is 0 for VFC operating modes. Usually, this parameter need not be set manually. In exceptional cases, manual setting may be necessary to increase the breakaway torque. In this case, set the values to max. 30 % or I_{xR}. One third of I_{xR} is set for V/f operating modes. In exceptional cases, manual setting may be necessary to increase the break-away torque. In this case, set the values to max. 60 % of I_{xR}.



Parameters

Explanation of the parameters

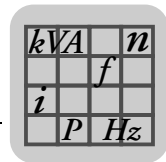
No.	FBG	Name	Description
322 / 332		IxR adjustment 1/2	Setting range 0 – 100 [%] The inverter sets the value automatically when <i>P320 / P330 Automatic adjustment</i> = ON. Manual alterations to individual controller parameters are reserved for optimization by specialists.
323 / 333	Long	Pre-magnetization time 1 / 2	Setting range 0 – 2 [s] Pre-magnetization builds a magnetic field in the motor when you enable the inverter.
324 / 334	1 2 AUTO	Slip compensation 1 / 2	Setting range 0 – 500 [rpm] Slip compensation increases the speed accuracy of the motor. Enter the rated slip of the connected motor manually. Do not enter a value more than 20 % different from the rated slip to compensate for fluctuations between various motors. The slip compensation is designed for a ratio smaller than 10 of load moment of inertia to motor moment of inertia. If the ratio is larger and the drive vibrates, then slip compensation must be reduced and even be set to 0 if necessary.
34.		I_N UL monitoring	
345 / 346	Long 1 2 AUTO	I _N UL monitoring 1 / 2	Setting range 0.1 – 500 A The function cannot be deactivated. The factory setting depends on the rated power of MOVITRAC® B and will be added to the rated current of the SEW motor with the same rating. At 150 % rated motor current, the inverter switches off after 5 minutes. At 500 % rated motor current, the inverter switches off after 20 seconds.

No.	FBG	Name	Description
4..		Reference signals	

The following reference values are used for recording and signaling certain operating states. All signals of parameter group 4.. can be output via binary outputs.

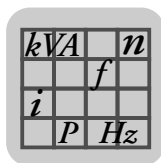
The signals are valid if the inverter has signaled *ready* after switch-on and there is no fault.

40.		Speed reference signal	The inverter issues the signal "1" at P403 if the speed is less or greater than the set reference speed. Speed reference signal
400		Speed reference value	Setting range 0 – 750 – 5000 [rpm]
401		Hysteresis	Setting range 0 – 100 – 500 [rpm]
402	Long	Delay time	Setting range 0 – 1 – 9 [s]
403		Signal = "1" when	0 / $n < n_{ref}$ 1 / $n > n_{ref}$



No.	FBG	Name	Description
43.		Current reference signal (in preparation)	
			Signal if the output current is greater or less than the reference value. P433: $I > I_{ref}$ P433: $I < I_{ref}$ Current reference signal
430	Long	Current reference value	Setting range 0 – 100 – 150 % I_N
431		Hysteresis	Setting range 0 – 5 – 30 % I_N
432		Delay time	Setting range 0 – 1 – 9 s
433		Signal = "1" when	$0 / I < I_{ref}$ $1 / I > I_{ref}$
44.		I _{max} signal (in preparation)	
			Signal if the inverter has reached the current limit.
440	Long	Hysteresis	Setting range 0 – 5 – 50 % I_N
441		Delay time	Setting range 0 – 1 – 9 s
442		Signal = "1" when	$0 / I = I_{max}$ $1 / I < I_{max}$
45.			PI controller reference signal (see Project Planning / PI controller / reference signal)
These parameters determine whether and how the PI reference signal responds			
450	Long	PI actual value reference	0.0 – 100.0 [%]
451		Signal = "1" when	$0 / \text{PI Actual value} < \text{PI Ref}$ $1 / \text{PI Actual value} > \text{PI Ref}$

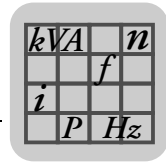
No.	FBG	Name	Description
5..		Monitoring functions	
50.		Speed monitoring 1 / 2	
The drive reaches the speed specified by the setpoint only with adequate torque. When the inverter reaches P303 Current limit it assumes that it does not reach the required speed. Speed monitoring responds when the inverter exceeds the current limit for longer than P501 delay time.			
500 / 502	Long	Speed monitoring 1 / 2	off / OFF on / Motor / regenerative Function of speed monitoring in motor and regenerative operation of the motor
501 / 503	1 2	Delay time 1/2	Setting range 0 – 1 – 10 [s] The set current limit can be reached briefly during acceleration, deceleration, or load peaks. You prevent the speed monitoring from responding too sensitively by setting the delay time. Monitoring responds when the current limit is reached for the duration of the delay time.



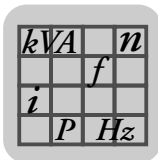
Parameters

Explanation of the parameters

No.	FBG	Name	Description
54.		Gear unit/motor monitoring (in preparation)	
These parameters are used to set the response to be triggered in the event of a motor or gear unit problem. The binary inputs have to be set accordingly for this purpose. Fault responses are triggered in the <i>Controller inhibit</i> or <i>No enable</i> inverter states.			
The binary input signals are filtered with a time constant of 10 s. This means the signal has to be present for at least 10 s.			
Response		Description	
No response		Neither an error is displayed nor an error response is triggered. The signaled error is ignored.	
Display error		The error is displayed and the error output is set (if programmed). The unit performs no other error responses. The error can be reset (terminal, RS-485, fieldbus, auto-reset).	
Immediate stop / fault		The inverter switches off immediately and an error is signaled. The output stage is inhibited and the brake is applied. The ready signal is revoked and the error output is set, if programmed. A restart is only possible after the error has been reset during which the inverter is reinitialized.	
Rapid stop/fault		The drive is braked with the set 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 and the error output is set, if programmed. A restart is only possible after the error has been reset during which the inverter is reinitialized.	
Rapid stop/ warning		The drive is braked with the set 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 error is signaled via the terminal, if programmed. The ready signal is not revoked. The drive restarts without a unit re-initialization if the error is rectified by an internal procedure or by an error reset.	
540	Long	Response to drive vibration / warning	Factory setting: Display error Once the drive vibration sensor signals a warning, the inverter will respond with the set response.
541		Response to drive vibration / fault	Factory setting: Rapid stop/warning Once the drive vibration sensor signals a fault, the inverter will respond with the set response.
542		Response to oil aging/warning	Factory setting: Display error If the oil aging sensor signals a warning, the inverter will respond with the set response.
543		Response to oil aging / fault	Factory setting: Display error If the oil aging sensor signals a fault, the inverter will respond with the set response.
544		Oil aging / overtemperature	Factory setting: Display error If the oil aging sensor signals overtemperatur, the inverter will respond with the set response.
545		Oil aging / ready signal	Factory setting: Display error If the oil aging sensor signals ready, the inverter will respond with the set response.
549		Response to brake wear	Factory setting: Display error If the brake wear sensor signals a fault, the inverter will respond with the set response.



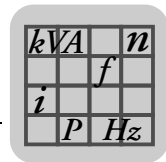
No.	FBG	Name	Description
56.		Current limit Ex-e motor: The parameter group <i>P56. Current limitation Ex e Motor</i> contains display and setting values that are specific to the "current limitation in the Ex e Motor on inverter" function. The factory setting is indicated in bold . The factory settings apply for the delivery status. Frequencies lower than frequency A and higher than the rated motor frequency are permanently illegal. The following rules always apply: • Frequency A < frequency B < frequency C < rated motor frequency • Current limitation A < current limitation B < current limitation C	
560		Current limit Ex-e motor	Setting range: On/ off ON: Current limitation for Ex-e motors active. On startup, the current limitation for Ex-e motors is automatically activated for motors selected and approved for the operation in potentially explosive areas.
561		Frequency A	Setting range: 0 – 5 – 60 Hz Value for minimum operating frequency f_A . The operation time with frequency A is 60 seconds, regardless of the current value. After this time, the inverter switches off and issues the "F110 Ex-e protection" error message.
562		Current limit A	Setting range: 0 – 50 – 150 % Current limitation that is permitted with operating frequency f_A . There is a linear gradient between current limitation A and current limitation B.
563	AUTO	Frequency B	Setting range: 0 – 10 – 104 Hz Value for operating frequency f_B .
564		Current limit B	Setting range: 0 – 80 – 150 % Current limitation that is permitted with operating frequency f_B . There is a linear gradient between current limitation B and current limitation C.
565		Frequency C	Setting range: 0 – 25 – 104 Hz Value for operating frequency f_C .
566		Current limit C	Setting range: 0 – 100 – 150 % Current limitation 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 frequency I_N .



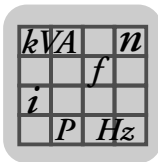
Parameters

Explanation of the parameters

No.	FBG	Name	Description
6..		Terminal assignment	
60.		Binary inputs (DI01 with fixed assignment CW/HALT)	
		Effective with inverter status	Inhibited Enabled
0: No function (–)		–	–
1: Enable / stop (no)		Stop at <i>P136 Stop ramp</i>	Enable
2: CW / halt (no)		Halt at <i>P131 ramp down</i>	Enable CW
3: CCW / halt (no)		Halt at <i>P131 ramp down</i>	Enable CCW
4: n11 / n21 (no)			
5: n12 / n22 (no)			
6: Fixed setpoint selection (yes)		Fixed setpoints n11/n12/n13	Fixed setpoints n21/n22/n23
7: Parameter set selection (yes)		Parameter set 1	Parameter set 2
8: Ramp selection (yes)		t11/t21 active	t12/t22 active
9: Motor potentiometer up (no)		–	Increase setpoint
10: Motor potentiometer down (no)		–	Decrease setpoint
11: /External fault (no)		External fault	–
12: Fault reset (yes)		Reset on positive edge 0 to 1	
19: Slave free running (yes)		Master/slave operation	Slave free running
20: Setpoint acceptance active (no)		Do not accept	Accept setpoint
26: TF signal (DI05 only) (no)		Motor overtemperature	No signal
27: Vibration/warning (yes)		Sensor signals warning	Sensor does not signal warning
28: Vibration/fault (yes)		Sensor signals fault	Sensor does not signal fault
29: Brake wear (yes)		Brake is worn	Brake is ok
30: /Controller inhibit (yes)		Inhibited	Enable
33: Oil aging/warning (yes)		Sensor signals warning	Sensor does not signal warning
34: Oil aging/fault (yes)		Sensor signals fault	Sensor does not signal fault
35: Oil aging / overtemperature (yes)		Sensor signals overtemperature	Sensor does not signal overtempera- ture
36: Oil aging/ready (yes)		Sensor not ready	Sensor ready
		Fixed setpoints	
n11/n21 = 0 and n12/n22 = 0:		External setpoints only	
n11/n21 = 1 and n12/n22 = 0:		n11/n21	
n11/n21 = 0 und n12/n22 = 1:		n12/n22	
n11/n21 = 1 und n12/n22 = 1:		n13/n23	
601		Binary input DI02	Factory setting: CCW/halt
602	Short	Binary input DI03	Factory setting: Enable
603		Binary input DI04	Factory setting: n11/n21
604		Binary input DI05	Factory setting: n12/n22
608		Binary input DI00	Factory setting: Error reset
61.		Binary inputs option	
610		Binary input DI10	Factory setting: No function
611		Binary input DI11	
612	Short	Binary input DI12	
613		Binary input DI13	
614		Binary input DI14	
615		Binary input DI15	
616		Binary input DI16	



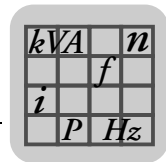
No.	FBG	Name	Description
62.		Binary outputs (use only binary output DO02 for controlling the brake rectifier)	
Effect when			0 signal 1 signal
0: No function			–
1: /fault			Collective fault signal
2: Ready			Not ready
3: Output stage ON			Unit inhibited
4: Rotating field ON			No rotating field
5: Brake released			Brake applied
8: Parameter set			1 active
9: Speed reference signal			$n > n_{ref} / n < n_{ref}$ (P403)
11: Setpoint-actual value comparison signal			$n \neq n_{setp}$
12: Current reference signal			$I > I_{ref} / I < I_{ref}$ (P433)
13: I _{max} signal			$I < I_{max} / I = I_{max}$ (P442)
21: IPOS output			–
22: /IPOS fault			Fault signal IPOS
23: PI ACT.VALUE REF			–
26: S pattern is generated			S pattern is not calculated
27: Safe stop			The display "Safe stop" is not safety-related and must not be used as a safety function.
30: /lxt warning (in preparation)			Normal operation
31: /lxt fault (in preparation)			Normal operation
620		Binary output DO01	Factory setting: /FAULT
621		Binary output DO02	Factory setting: BRAKE RELEASED
622			Binary output DO03
64.		Analog outputs AO1 (optional)	
		Analog output AO1 is only available with the optional analog module FIO11B	
		Output value 100 % = –3000 – 0 – 3000 rpm –100 – 0 – 100 Hz 0 – 100 % = 0 – 150 % I_N = 0 – 150 % unit utilization Standardi- zation –100 % – 0 – +100 % Referenced output value AO1 characteristic curve Output 0 – 10 V 0 / 4 – 20 mA	

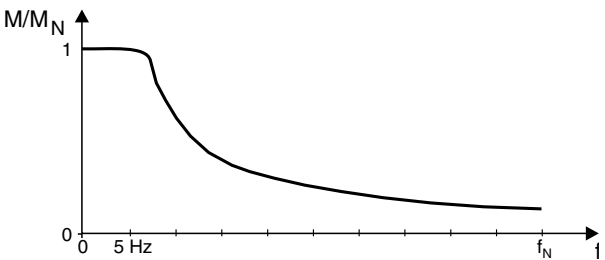
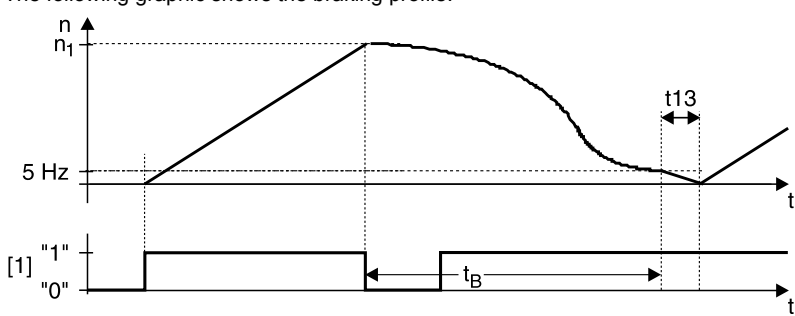


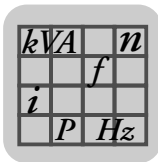
Parameters

Explanation of the parameters

No.	FBG	Name	Description
640		AO1 analog output	0 / No function The value 0 % evaluated by the characteristic curve is displayed. 1 / Ramp generator input (amount) / 100 % corresponds to 3000 rpm Setpoint speed at the input of the internal ramp generator 2 / Setpoint speed (amount) / 100 % corresponds to 3000 rpm Valid setpoint speed (output ramp generator or correcting variable of the higher-level controller) 3 / Actual speed (amount) / 100 % corresponds to 3000 rpm 4 / Actual frequency (amount) / 100 % corresponds to 100 Hz Rotating field frequency 5 / Output current (amount) / 100 % corresponds to 150 % I_{rated} Apparent current 6 / Apparent current (amount) / 100 % corresponds to 150 % I_{rated} 7 / Unit utilization / 100 % corresponds to 150 % unit utilization Current unit utilization 11 / Actual speed (signed) / ± 100 % corresponds to ± 3000 rpm 12 / Actual frequency (signed) / ± 100 % corresponds to ± 100 Hz Rotating field frequency
641		AO1 reference (as of firmware .13)	0 / 3000 rpm , 100 Hz, 150 % 1 / n_{max} 2 / n_{set} reference
642		AO1 Operating mode	0 / No function Output: Always 0 V or 0 mA 2 / 0 – 20 mA / 100 % corresponds to 20 mA 3 / 4 – 20 mA / 100 % corresponds to 20 mA 4 / 0 – 10 V / 100 % corresponds to 10 V
646		AO1 Characteristic curve x1	-100 % – 0 – +100 % -3000 rpm – 0 – +3000 rpm -100 Hz – 0 – 100 Hz 0 – 100 % I_N 0 – 100 % = 0 – 150 % unit utilization
647		AO1 Characteristic curve y1	0 – 100 % (as of firmware .18225632.10: -100 % – +100 %)
648		AO1 Characteristic curve x2	-100 % – 0 – +100 % -3000 rpm – 0 – +3000 rpm -100 Hz – 0 – 100 Hz 0 – 100 % I_N 0 – 100 % = 0 – 150 % unit utilization
649		AO1 Characteristic curve y2	0 – 100 % (as of firmware .18225632.10: -100 % – +100 %)
		The characteristic curve is described by the coordinates x1/y1 and x2/y2, with which the analog output is evaluated.	

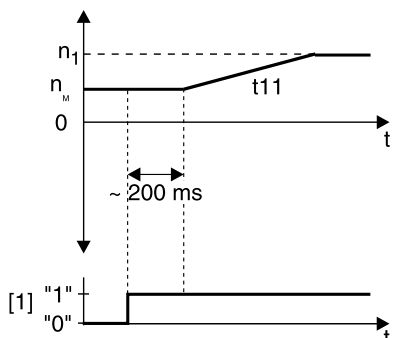
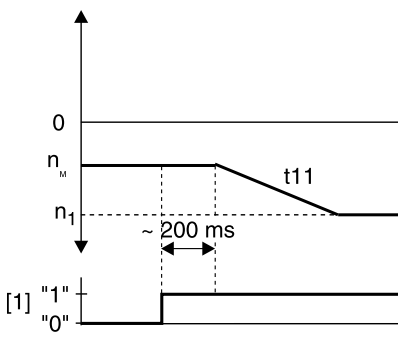


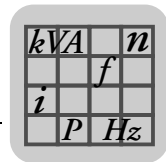
No.	FBG	Name	Description
7..		Control functions	
All settings with regard to the fundamental control properties of the inverter are defined within parameter group 7... The parameter group comprises functions which the inverter executes automatically when they are activated.			
70.		Operating mode 1 / 2	
This parameter is used to set the basic operating mode of the inverter. Setting at the keypad.			
VFC / V/f characteristic curve: Default setting for asynchronous motors. Suitable for general applications, such as conveyor belts, trolleys, and hoists with counterweight.			
VFC & hoist: The hoist function automatically provides all functions necessary for operating an unbalanced hoist. For safety reasons, make sure to activate monitoring functions that prevent the drive from starting. Monitoring functions: - Monitoring the output current during the pre-magnetization phase - Avoiding sag when the brake is released The unit detects the following incorrect configurations and displays them with the following faults: 2 or 3-phase motor phase interruption: F82 = Output open - Pre-magnetization time too short or incorrect motor/inverter combination: F81 = Start condition error - Motor phase failure due to active speed monitoring P500/501: F08 = n-monitoring error Important! - 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. - A single-phase motor phase failure cannot always be detected reliably. - SEW-EURODRIVE strongly recommends activating speed monitoring. - Prerequisites for correct performance of the hoist function: Motor brake controlled by the inverter. - Speed monitoring is set by changing parameters 500 / 502 and 501 / 503. The sagging of hoists cannot be avoided safely when monitoring is deactivated or the delay time is set too long.			
VFC & DC braking / V/f characteristic curve & DC braking: DC braking means the asynchronous motor brakes by using current injection. The motor brakes without braking resistor on the inverter. The following figure shows the braking torque profile when the braking current is the same as the rated motor current.			
 During braking, the inverter injects a constant current with a rotating-field frequency of 5 Hz. The braking torque = 0 at standstill. A greater braking torque acts at a slower speed; the braking torque drops as the speed increases. The braking time and consequently the duration of the braking current depends on the load connected to the motor. DC braking stops at a rotating-field frequency of 5 Hz. The motor stops along the stop ramp. Rated motor current is used for the current injection. In all cases, the inverter limits the current to max. 125%I_N. See "Brake function" for information about the brake control system.			
Important! It is not possible to enable a directed stop or to observe a certain ramp using DC braking. The main purpose of DC braking is to drastically reduce the time the motors need for coasting to a halt. The following graphic shows the braking profile.  $n_1 =$ [1] = $t_{13} =$ $t_B =$ Setpoint speed Enable Stop ramp Braking phase			



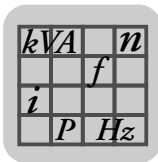
Parameters

Explanation of the parameters

No.	FBG	Name	Description
VFC & flying start function: The flying start function lets you synchronize the inverter to a motor that is already running. 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. P320 Automatic adjustment is deactivated in the FLYING START operating mode. It is important that the IxR value P322 stator resistance is set correctly to ensure that the flying start function is performed properly. Startup of an SEW motor: The IxR value is set for an SEW motor at operating temperature. This value has to be reduced if flying start takes place with a cold motor. The IxR value is measured at startup when a non-SEW motor is started up with MOVITOOLS® MotionStudio.   $n_1 =$ Setpoint speed $n_M =$ Motor speed $[1] =$ Enable The flying start function does not function if an output filter is connected to the inverter. Important! Do not use the flying start function in hoist applications.			
700 / 701	   	Operating mode 1 / 2	0 / VFC (field-oriented voltage flux control mode) 2 / VFC & hoist (field-oriented control mode for hoist applications, can only be set in MOVITOOLS® MotionStudio) 3 / VFC & DC braking (field-oriented controlled mode with DC braking) 4 / VFC & flying start function (field-oriented control mode with flying start function) 21 / V/f characteristic curve (voltage/frequency controlled mode) 22 / V/f & DC braking (voltage/frequency controlled mode with DC braking)
71.		Standstill current 1 / 2	With activated standstill current function, the inverter injects a current in the motor at standstill. This allows the inverter to fulfill the following functions: - When the ambient temperature of the motor is low, the standstill current prevents the risk of condensation and freezing (in particular of the disc brake). Set the amount of current in such a way that the motor does not overheat. Recommendation: Motor housing should be hand hot. - With activated standstill current, you can start the motor without pre-magnetization. Recommendation: Set to 45 – 50 % for hoists. - The rated magnetizing current will always be set for operating modes VFC & hoist, and VFC n-control & hoist if P710 is active. - In the other operating modes, a rapid start will only take place if the set standstill current is greater than or equal to the rated magnetizing current. You can activate the standstill current function by setting P710 to 0. Set the standstill current in % of the rated motor current. The standstill current cannot exceed the current limit (P303). You can switch off the standstill current by /CONTROLLER INHIBIT = 0. When the standstill current function is activated, the output stage remains enabled even in the "No enable" status to inject the motor standstill current. The standstill current is not switched off by pressing the stop/reset key. You have to set the function of an input terminal to controller inhibit to activate the standstill current function. Else the output stage will be energized directly.
710 / 711	 	Standstill current 1 / 2	0 – 50 % I _{Mot}



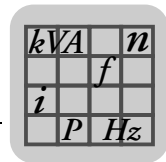
No.	FBG	Name	Description
72.		Setpoint stop function 1 / 2	
Use the <i>P720 / P723 Setpoint stop function</i> to enable the inverter automatically depending on the main setpoint. The inverter is enabled with all the necessary functions, such as pre-magnetization and brake control. It is important that you also enable the drive via terminals.			
720 / 723		Setpoint stop function 1 / 2	off / OFF on / ON
721 / 724		Stop setpoint 1 / 2	0 – 30 – 500 [rpm]
722 / 725		Start offset 1 / 2	0 – 30 – 500 [rpm]
73.		Brake function 1 / 2 MOVITRAC® B inverters are capable of controlling a brake installed on the motor. The brake function acts on the binary output which has the assignment of the "/BRAKE" function (24 V = brake released). Use DO02 for the brake control system. The brake is always applied when /CONTROL.INHIBIT = 0.	
731 / 734		Brake release time 1 / 2	Setting range 0 – 2 [s] This parameter determines how long the motor will remain at a standstill after expiration of the premagnetization time and how much time the brake has to release.
732 / 735		Brake application time 1 / 2	Setting range 0 – 2 [s] You can use this parameter to set the time required for the mechanical brake to apply. This parameter prevents a sagging of the drive especially in hoists.



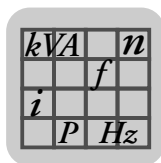
Parameters

Explanation of the parameters

No.	FBG	Name	Description
74.		Speed skip function The skip window center and skip width are values and automatically have an effect on positive and negative setpoints when activated. The function is deactivated by setting the skip width to 0.	The "Speed skip" function makes it possible to prevent the motor speed from remaining within a certain speed window. This suppresses vibration and noise, in particular in machines with pronounced mechanical resonance.
740 / 742		Skip center 1 / 2	Setting range 0 – 1500 – 5000 rpm
741 / 743	Long 1 2	Skip width 1/2	Setting range 0 – 300 rpm
75.		Master/slave function The master-slave function allows for implementing automatic functions such as speed synchronization. The RS-485 interface or the system bus interface can be used as the communication link. P100 "Setpoint source" must then be set to master SBus or master RS485. The process output data PO1 – PO3 (P870, P871, P872) are automatically set by the firmware. A programmable terminal function "Slave free run." P60x binary inputs basic unit, it is possible to separate the slave from the master setpoint and switch to local control mode (like control signal source bipolar/fixed setpoint). For the slave, the process data P87x are automatically assigned as follows: – PO1 = Control word 1 – PO2 = Speed – PO3 = IPOS PO data – PI1 = Status word 1 – PI2 = Speed – PI3 = IPOS PI data	P811 RS-485 Group address or P882 SBus Group address must be set to the same value in master and slave. For master/slave operation via RS-485 interface, set P811 RS-485 Group address 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.

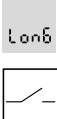


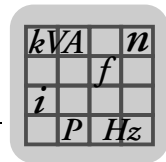
No.	FBG	Name	Description											
			Setpoint specified via RS-485: If the master specifies the setpoint for the slaves via RS-485, MOVITRAC® B takes over the master function in the RS-485 interface after the parameter 750 has been set to "RS-485 speed". The communication with MotionStudio is aborted after MOVITRAC® B is activated as RS-485 master, since it has only one RS-485 interface. To re-establish connection to MotionStudio, set parameter 750 to "MASTER-SLAVE OFF" again. Switch off both the 24 V backup voltage and the power supply voltage for MOVITRAC® B for this purpose. Next, switch the 24 V backup voltage or the power supply voltage back on again. After power on, parameter 750 can be set to another value using MotionStudio within a time frame of 30 seconds. Parameter 750 can be set to another value at any time using the FBG11B keypad (without having to switch voltage off and on again). Once you have the parameter 750 to "MASTER-SLAVE OFF", MotionStudio can operate as master on the RS-485 interface again. MotionStudio can also be connected via a UOH/DFxxx fieldbus gateway. In this combination, MOVITRAC® B can operate as a master on the RS-485 interface.											
			Connection check - System bus (SBus): P883 SBus timeout interval is in effect when there is a communication link via SBus. If P883 SBus timeout interval = 0, data transmission via SBus will not be monitored. - RS-485 interface: A connection check is always in effect if the communication link takes place via the RS-485 interface; P812 RS-485 timeout interval does not have any function. The slave inverter must receive a valid RS-485 telegram within the fixed time interval of t = 500 ms. If the time is exceeded, the slave drives will be stopped at the emergency stop ramp and fault signal F43 "RS485 timeout" will be issued.											
			<table><tr><th colspan="3">Overview of functions of master/slave operation</th></tr><tr><th>Speed synchronization:</th><th>Master</th><th>Slave</th></tr><tr><td rowspan="2">Master controlled Slave controlled</td><td>P750 Slave setpoint: SPEED (485+SBus)</td><td>P100 Setpoint source: MASTER SBus MASTER RS485:</td></tr><tr><td>P700 Operating mode 1: VFC VFC & Hoist V/f characteristic curve V/f & DC braking</td><td>P700 Operating mode 1: VFC VFC & Hoist V/f characteristic curve V/f & DC braking</td></tr></table>	Overview of functions of master/slave operation			Speed synchronization:	Master	Slave	Master controlled Slave controlled	P750 Slave setpoint: SPEED (485+SBus)	P100 Setpoint source: MASTER SBus MASTER RS485:	P700 Operating mode 1: VFC VFC & Hoist V/f characteristic curve V/f & DC braking	P700 Operating mode 1: VFC VFC & Hoist V/f characteristic curve V/f & DC braking
Overview of functions of master/slave operation														
Speed synchronization:	Master	Slave												
Master controlled Slave controlled	P750 Slave setpoint: SPEED (485+SBus)	P100 Setpoint source: MASTER SBus MASTER RS485:												
	P700 Operating mode 1: VFC VFC & Hoist V/f characteristic curve V/f & DC braking	P700 Operating mode 1: VFC VFC & Hoist V/f characteristic curve V/f & DC braking												
750		Slave setpoint	The setpoint to be transferred to the master is set on the master. The "MASTER-SLAVE OFF" setting must be retained on the slave. MASTER-SLAVE OFF - SPEED (RS485) - SPEED (SBus1)											
751		Scaling slave setpoint	Setting range: -10 – 0 – 1 – 10 When this setting is made in the slave, the setpoint transferred from the master is multiplied by this factor.											
76.		Manual operation												
760		Locking RUN/STOP keys (see Startup / External setpoint selection)	off / OFF (RUN/STOP keys are activated and can be used for starting and stopping the motor) on / ON (RUN/STOP keys are locked and therefore do not function)											
77.		Energy-saving function												
770		Energy-saving function	off / OFF on / ON											



Parameters

Explanation of the parameters

No.	FBG	Name	Description
8..		Unit functions	
80.		Setup	
800		Short menu (FBG11B only)	long short Use P800 to switch from the factory set short menu to the detailed parameter menu.
801		DBG60B language	Language selection only for DBG60B keypad.
You can use P802 to reset the factory settings stored in the EPROM for almost all parameters. You can also reset the unit to its initial delivery condition. Selecting DELIVERY STATE also resets the parameters listed above. You reset statistics data separately with <i>P804 Reset statistics data</i>. Setting the parameter to YES will restore the factory settings. SET appears on the display while the factory settings are being restored. The previous operating status of the inverter appears on the display after the factory settings have been restored. P802 automatically reverts to NO. Activating the factory setting causes almost all parameter values to be overwritten. Save the set values using MOVITOOLS® Motion-Studio before you restore the factory settings. Once the factory setting function has been used, you must adapt the parameter values and terminal assignments in accordance with the requirements.			
802		Factory setting	No (do not restore factory setting) Hrs / standard (restore factory setting) All / delivery status (for starting up IEC motors) NEMA / delivery status (for starting up NEMA motors)
By setting <i>P803 Parameter lock</i> = ON, you can prevent that any changes are made to the parameters. An exception are P841 Manual reset and P803 itself. The parameter lock is useful, for example, after having optimized the settings of MOVITRAC® B. To enable changes to parameters again, set <i>P803 Parameter lock</i> = OFF. The parameter lock also affects parameter changes via the RS-485 and SBus interfaces.			
803		Parameter lock	off / OFF (you can change all parameters) on / ON (You can change P803 and P840 only)
<i>P804 Reset statistic data</i> lets you reset the statistical data stored in the EEPROM (fault memory). These data are not affected when restoring the factory settings. The parameter automatically reverts to NO after a reset.			
804		Reset statistics data	No action (no reset is performed) Fault memory (the content of the fault memory is reset)
805		Rated mains voltage	Setting range 50 – 500 V
806		Copy DBG → MOVITRAC® B	Yes / No The parameter data in the DBG60B are transferred to MOVITRAC® B.
807		Copy MOVITRAC® B → DBG	Yes / No The parameter data in MOVITRAC® B are transferred to DBG60B.
808		24VIO auxiliary supply output	0 / OFF: 24 V switched off 1 / ON : 24 V switched on
809		IPOS enable	This parameter lets you activate the integrated positioning and sequence control
81.		Serial communication.	
810		RS-485 address	Setting range 0 ... 99 P810 sets the address of MOVITRAC® B for communication via serial interface. MOVITRAC® B units are always set to the address 0 on delivery. To avoid problems during data exchange in serial communication with several inverters, SEW-EURODRIVE recommends that you do not use address 0.
811		RS-485 group address	Setting range 100 – 199
812		RS-485 timeout interval	Setting range 0 – 650 [s]



No.	FBG	Name	Description
82.		Brake operation 1 / 2	
P820/P821 lets you switch 4-quadrant operation on and off. 4-quadrant operation is possible if you connect a braking resistor to MOVITRAC® B. P820/P821 must be set to OFF if there is no braking resistor connected to MOVITRAC® B, which means regenerative operation is not possible. In this operating mode, the MOVITRAC® B unit attempts to extend the deceleration ramp. As a result, the generated power is not too great and the DC link voltage remains below the switch-off threshold. If the regenerative power becomes too great despite the extended deceleration ramps, then MOVITRAC® B may switch off with the <i>F07 DC link overvoltage</i> fault. In this case you have to extend the deceleration ramps manually (P131). Therefore, do not set unreasonably short deceleration ramps! The unit responds with fault <i>F34 Ramp/timeout</i> if the ramp is set too short and the ramp which can actually be achieved is significantly longer than the set value.			
820 / 821		4-quadrant operation 1/2	off/OFF on/ON
83.		Fault responses	
The error EXT. FAULT triggers in inverter status ENABLED only. P830 programs the error response that is triggered by an input terminal programmed to /EXT. FAULT.			
830		Response terminal "external fault"	2 / Immediate stop/fault The inverter performs an emergency stop with an error message. The inverter inhibits the output stage and the brake is applied. The inverter revokes the ready signal and sets the programmed error output. A restart is only possible after an error reset has been performed during which the inverter is reinitialized. 4 / Rapid stop / fault (factory setting for P830) The inverter brakes the drive at the specified stop ramp (P136/P146). The inverter brakes with DC braking in 2-quadrant operation. Once the stop speed is reached, the inverter inhibits the output stage and the brake is applied. The fault is signaled immediately. The inverter revokes the ready signal and sets the programmed error output. A restart is only possible after an error reset has been performed during which the inverter is reinitialized. 7 / Rapid stop / warning (factory setting for 833 / 836) The error response corresponds to STOP/FAULT but the inverter does not revoke the ready signal and the error output is set.
833		Response to RS-485 timeout	
836		Response to SBus timeout	
84.		Reset behavior	
840		Manual reset Parameter P840 corresponds to the STOP/RESET key.	Yes MOVITRAC® B resets the existing error. P840 automatically reverts to NO after the reset. The motor immediately restarts to the specified setpoint if all required signals are present after the reset has been performed. Activating the manual reset does not have any effect if there is no error present. No No reset.
841		Auto reset In preparation.	ON The auto reset function is activated. In case of an error, this function automatically resets the unit after <i>P842 Restart time</i>. A maximum of five auto resets is possible during an auto reset phase. If 5 errors occur that are reset by an auto-reset, no more auto-resets are possible until: • a manual reset is performed using the input terminal, • a manual reset is performed via the serial interface, • there is a transition to 24 V backup mode, or the inverter is switched off. Five automatic resets are then possible again. OFF No auto reset.
842		Restart time In preparation.	Setting range 1 ... 3 ... 30 [s] P842 is used to set the time to be waited between the time an error occurs and the execution of an automatic reset.



Parameters

Explanation of the parameters

No.	FBG	Name	Description
85.		Scaling actual speed value	
Scaling actual speed value defines a user-specific display parameter P001 User display. For example, the user display is to be shown in 1/s. Such a setting requires a scaling factor of 1/60. This means the numerator scaling factor has to be set to 1 and the denominator scaling factor to 60. The user-defined unit 1/s is entered in P852.			
Actual speed value (1500 rpm) → $\frac{P850}{P851} = \frac{1}{60}$ → 001 USER [1/s] 25 P852 → 001 USER			
Scaling actual speed value (example)			
850		Scaling factor numerator	Setting range 1 – 65535
851	Long	Scaling factor denominator	Setting range 1 – 65535
852		User-defined unit	Factory setting: rpm Up to a maximum of eight ASCII characters; is displayed in P001 User display.
853	Long	Scaled speed FBG	0 / Speed 1 / Scaled speed
86.		Modulation 1 / 2	
P860/P861 lets you set the nominal cycle frequency at the inverter output. If P862/P863 is set to OFF, the cycle frequency may vary automatically depending on the unit utilization.			
860 / 861	Long	PWM frequency 1 / 2	4 kHz 8 kHz 12 kHz 16 kHz
862 / 863	1 2	PWM fix 1 / 2	on / ON (no automatic change of the cycle frequency by the inverter) off / OFF (autonomous change of the switching frequency by the inverter depending on the utilization)
87.		Process data parameter setting (for more information, refer to the MOVITRAC® B Communication manual)	
You can use P870 – P872 to define the content of process output data words PO1 – PO3. This definition is necessary so MOVITRAC® B can allocate the appropriate setpoints. The following PO assignments are available:			
0 / No function:		The content of the process output data word is ignored.	
1 / Setpoint speed:		Speed setpoint entry in rpm.	
5 / Max. speed:		Maximum speed (P302).	
8 / Ramp:		Ramp time for setpoint selection (P130 / P131).	
9 / Control word 1:		Control signals for start/stop, etc.	
10 / Control word 2:		Control signals for start/stop, etc.	
11 / Setpoint speed [%]:		Selection of a speed setpoint in % of P302.	
12 / IPOS PO data:		Specification of a 16-bit coded value for IPOSplus ^{plus} ®	
13 / PI controller setpoint [%]:		PI controller setpoint	
870		Setpoint description PO1	Factory setting: Control word 1
871	Long	Setpoint description PO2	Factory setting: Speed
872		Setpoint description PO3	Factory setting: No function

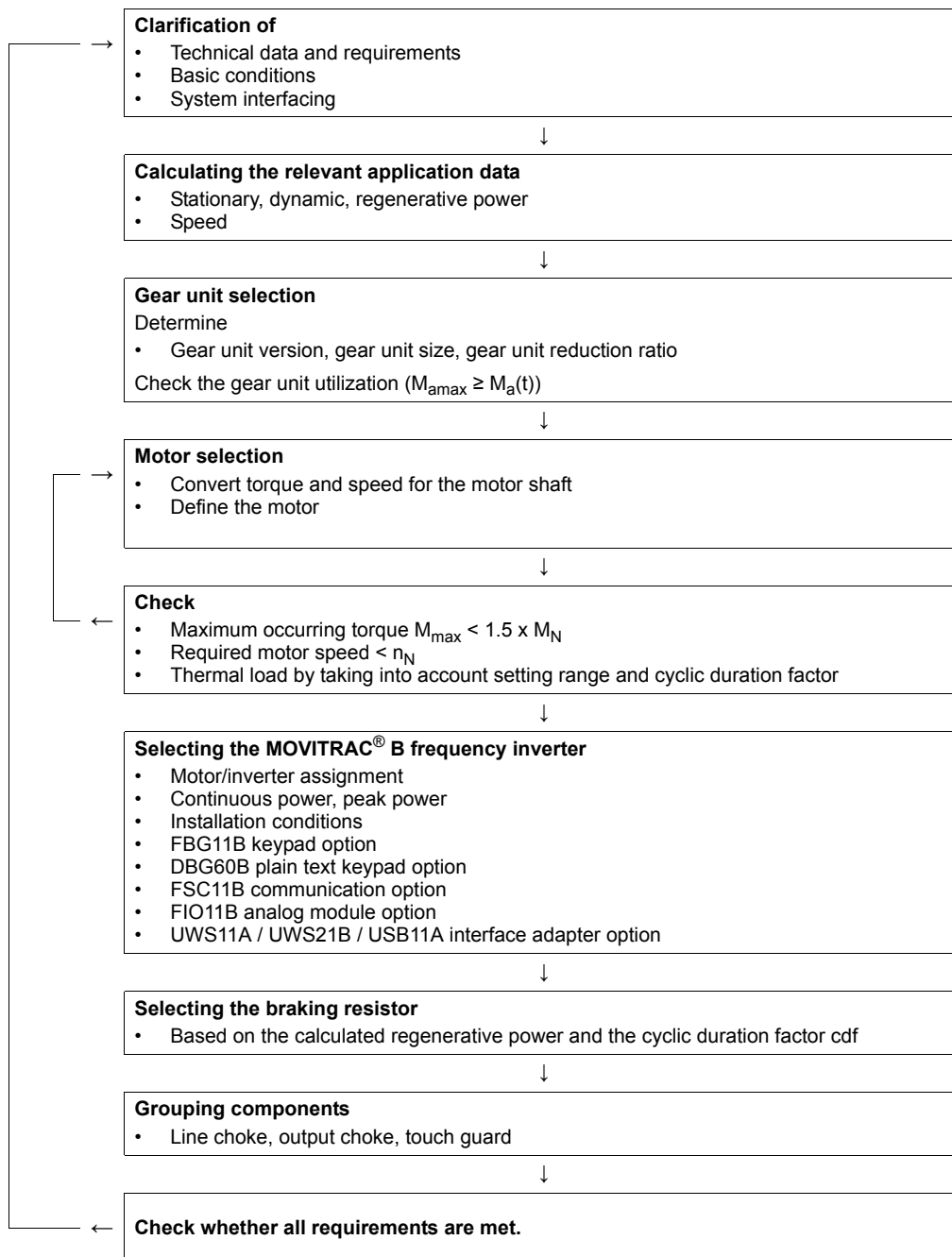


No.	FBG	Name	Description
You can use P873 – P875 to define the content of process input data words PI1 – PI3. This definition is necessary so MOVITRAC® B can allocate the appropriate actual values. The following PI assignments are available: 0 / No function: The content of the process input data word is 0000_{hex}. 1 / Actual speed: Momentary actual speed value in rpm. 2 / Output current: Momentary active current of the inverter in % of I_N. 3 / Active current: Momentary output current of the inverter in % of I_N. 6 / Status word 1: Status information of the inverter. 8 / Actual speed [%]: Momentary actual speed value in % of P302. 9 / IPOS PI data: IPOS Process input data. 10 / PI controller actual value [%]: Actual values of the PI controller.			
873		Actual value description PI1	Factory setting: STATUS WORD 1
874	Long	Actual value description PI2	Factory setting: SPEED
875		Actual value description PI3	Factory setting: OUTPUT CURRENT
876	Long	Enable PO data	no / NO The last valid process output data remain in effect. yes / YES The process output data that was last sent from the fieldbus control become effective.
88.		Serial communication SBus	
880	Long	SBus protocol	Setting range SBus 0 / MoviLink 1 / CANopen
881	Short	SBus address	Setting range 0 – 63 P881 lets you set the system address of the MOVITRAC® B unit. This address enables the MOVITRAC® B to communicate, for example, with PC, PLC or MOVIDRIVE® via the system bus. MOVITRAC® B units are always set to the address 0 on delivery. To avoid problems during data exchange in serial communication with several inverters, SEW-EURODRIVE recommends that you do not use address 0.
882		SBus group address	Setting range 0 – 63 P882 lets you group several MOVITRAC® B units for communication via the SBus interface. All MOVITRAC® B units with the same SBus group address can be addressed using a multicast telegram via this address. The data received via the group address are not acknowledged by MOVITRAC® B. For example, the SBus group address makes it possible to send setpoint selections to a group of MOVITRAC® B inverters at the same time. An inverter with group address 0 is not assigned to a group.
883	Long	SBus timeout interval	Setting range 0 – 650 [s] Use P883 to set the monitoring time for data transmission via the system bus. MOVITRAC® B performs the error response Stop/Fault if there is no data traffic via the system bus for the period set in P815. Data transmission via system bus is not monitored when P883 is set to 0.
884	Long	SBus baud rate	Use P816 to set the transmission speed of the system bus. 125 / 125 kBaud 250 / 250 kBaud 500 / 500 kBaud 1000 / 1000 kBaud
886	Long	CANopen address	Setting range 1 – 2 – 127 P886 is used to set the address for serial communication with the SBus.



6 Project Planning

6.1 Schematic procedure





6.2 Options for standard applications

Refer to the following table for available options for simple applications. Conditions for simple applications:

- Vertical movement: Braking time is less than 25 % of cyclic duration factor CDF and no longer than 30 s.
- Horizontal movement: Braking time is less than 12 % of cyclic duration factor CDF and no longer than 15 s.

Type MC07B		Braking resistor		Output choke	Line filter
		Horizontal movement	Vertical movement		
230 V 1-phase	0003	BW027-003	BW027-003	HD012	Integrated ¹⁾
	0004	BW027-003	BW027-003	HD012	
	0005	BW027-003	BW027-003	HD012	
	0008	BW027-003	BW027-005	HD012	
	0011	BW027-003	BW027-005	HD012	
	0015	BW027-003	BW027-006	HD012	
	0022	BW027-005	BW027-012	HD012	
230 V 3-phase	0003	BW027-003	BW027-003	HD012	Integrated ¹⁾
	0004	BW027-003	BW027-003	HD012	
	0005	BW027-003	BW027-003	HD012	
	0008	BW027-003	BW027-006	HD012	
	0011	BW027-003	BW027-006	HD012	
	0015	BW027-003	BW027-006	HD012	
	0022	BW027-006	BW027-012	HD012	
	0037	BW027-006	BW027-012	HD012	
	0055	BW012-025	BW012-025	HD001	
	0075	BW012-015	BW012-025	HD001	
	0110	BW012-025	BW012-050	HD003	NF048-503
	0150	2 × BW012-025	2 × BW012-050	HD003	NF063-503
	0220	2 × BW106	2 × BW106	HD003	NF085-503
	0300	2 × BW106	2 × BW106	HD003	NF115-503
400 V 3-phase	0003	BW072-003	BW072-003	HD012	Integrated ¹⁾
	0004	BW072-003	BW072-003	HD012	
	0005	BW072-003	BW072-003	HD012	
	0008	BW072-003	BW072-005	HD012	
	0011	BW072-003	BW072-005	HD012	
	0015	BW072-003	BW168	HD012	
	0022	BW072-005	BW168	HD012	
	0030	BW072-005	BW268	HD012	
	0040	BW168	BW268	HD012	
	0055	BW147	BW247	HD001	
	0075	BW147	BW347	HD001	
	0110	BW039-026	BW039-050	HD001	
	0150	BW018-035	BW018-075	HD003	NF035-503
	0220	BW018-035	BW018-075	HD003	NF048-503
	0300	BW018-075	BW915	HD003	NF063-503
	0370	2 × BW012-025	BW106	HD003	NF085-503
	0450	BW106	BW206	HD003	NF085-503
	0550	BW106	BW206	HD003	NF115-503
	0750	BW106	3 × BW012-100	HD003	NF150-503

1) Additional components are required to reach limit value class C1.



6.3 Description of applications

6.3.1 Project planning for trolleys

The motor load in the dynamic sections determines the peak motor power to be dimensioned. The thermal load determines the required continuous motor power. Refer to the travel cycle for determining the thermal load. The speed profile is the significant factor in determining the self-cooling of the motor.

6.3.2 Project planning for hoists

In practice, you must take particular account of thermal and safety-relevant criteria when sizing hoists.

The control must be designed so that the direction of rotation of the drive can only be changed when it is at a standstill.

Caution!

Speed monitoring is set by changing parameters 500 / 502 and 501 / 503. The sagging of hoists cannot be avoided safely when monitoring is deactivated or the delay time is set too long.

Thermal factors

In contrast to trolleys, hoists require approx. 70 – 90 % of the motor rated torque at constant speed.

Starting torque

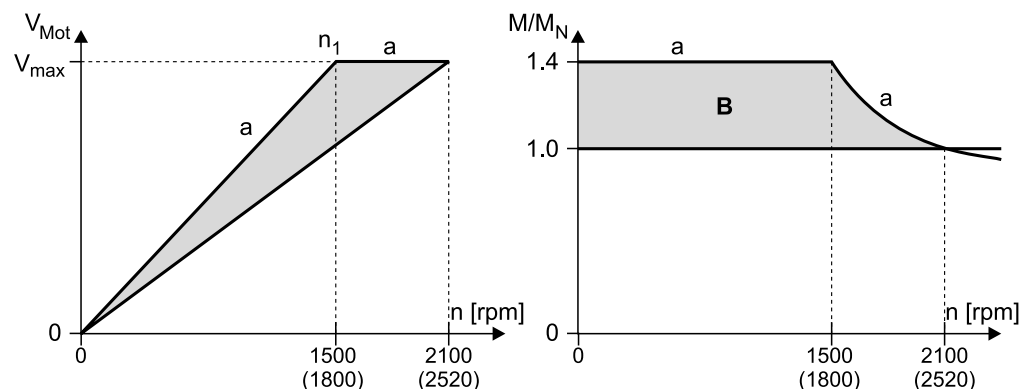
The highest operating torque is required for acceleration with maximum load in the **upwards** hoisting direction.

As a rule, design the 4-pole gearmotor for a maximum speed of

- 2100 rpm (70 Hz) at a transition speed of 1500 rpm (50 Hz)
- 2500 rpm (83 Hz) at a transition speed of 1800 rpm (60 Hz)

This means the gear unit input speed is increased by a factor of 1.4. This is why you have to select a 1.4 times higher gear unit reduction ratio. The motor will not lose any torque on the input shaft in the field weakening range (50 ... 70 Hz or 60 ... 83 Hz). The higher gear unit ratio compensates for the inversely proportionate decrease in torque in relation to speed. Furthermore, the startup torque is 1.4 times greater. Further advantages are that the speed range is greater and the self-cooling of the motor more powerful.

Hoist voltage/speed characteristic curve



a = Recommended voltage/speed characteristic curve and resultant torque profile
B = Torque reserve range



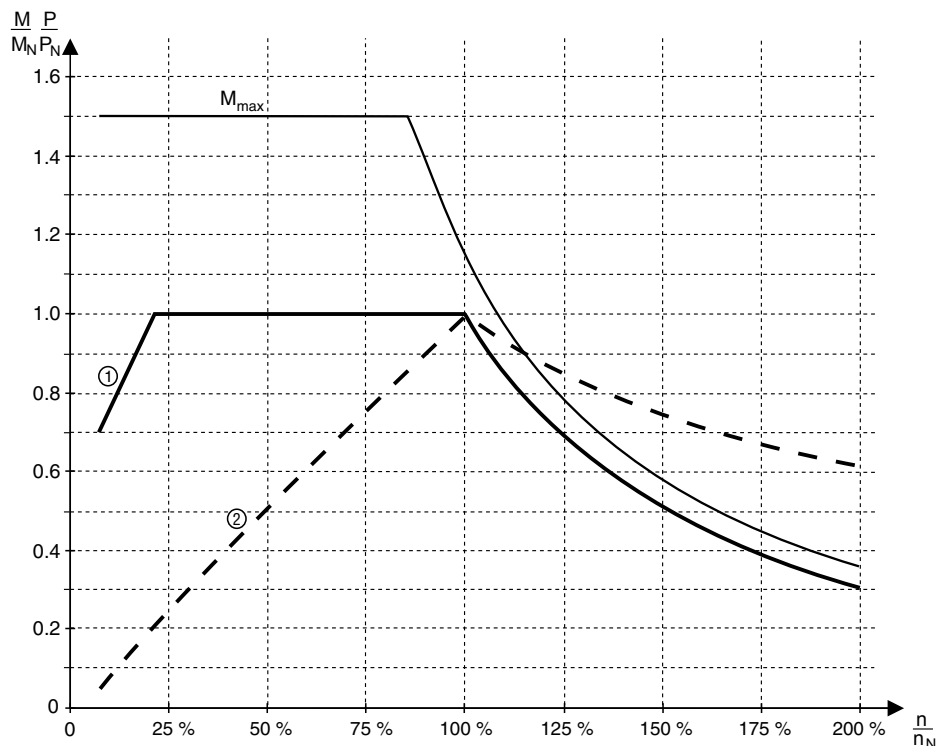
Select the motor power for hoists according to the load type:

- S1 (100 % cdf): Select the motor power of the next higher motor type than the selected inverter power, e.g. for lengthy upwards travel or continuous elevators.
- S3 (40 % cdf): Select the motor power according to the selected inverter power.

Activate the hoisting function by selecting operating mode P700 = VFC & hoist regardless of the above guidelines.

6.4 Speed-torque characteristic curve

The speed-torque characteristic curve looks as follows:



[1] M in S1 100 % cdf

[2] P in S1 100 % cdf

To characteristic curve 1:

Below 20 Hz, the drive cannot be loaded with the rated motor torque. The reduced speed decreases the self-cooling of the motor. As a result, the motor would heat up excessively.

This limit is not caused by the inverter. Motors with sufficient forced cooling can even be loaded with a rated torque below 20 Hz.



6.5 Motor selection

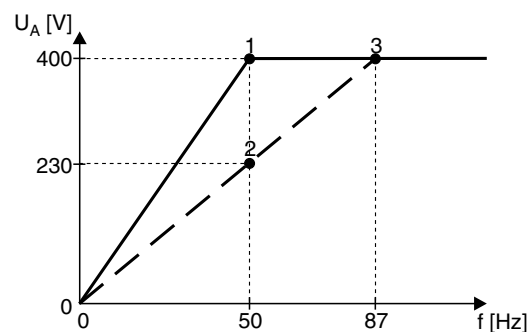
6.5.1 Basic recommendations

- Use only motors with at least thermal class 155 (F).
- Use the TF thermistor or TH bimetallic switch.
- Preferably use 4-pole motors. This applies particularly if you are operating gearmotors with a high oil filling level because of their vertical mounting position. 2-pole motors cause large churning losses.

6.5.2 Voltage-frequency characteristic curve

The asynchronous motor follows a load-dependent voltage/frequency characteristic in V/f operating modes. The motor model is continuously calculated in the VFC operating mode. At startup, set the characteristic curve with rated motor voltage and rated motor frequency. 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.



- 1 Star connection; 400 V, 50 Hz
- 2 Delta connection 230 V / 50 Hz
- 3 Delta connection 400 V / 87 Hz

The MOVITRAC® B output voltage is limited by the provided supply voltage.

6.5.3 Dynamic applications

For dynamic applications, you must have a drive with a rated inverter current greater than the rated motor current.

Set the following parameters so the motor can generate at most 150 % of the rated motor torque:

- *Current limit P303*
- *Slip compensation P324*

Increase these parameters manually by a factor of approx. 1.4 for dynamic applications.



6.5.4 Inverter / motor combinations

The following table shows possible inverter/motor combinations. You can also assign the next higher motor size to the inverters. The 4-pole motors (1500 rpm) are included in the factory setting of MOVITRAC® B. Smaller motors can deteriorate the control behavior.

MOVITRAC® B Speed [rpm] at 50 Hz Speed [rpm] at 60 Hz	Rated power P _N	SEW motor	
		3000 3600	1500 1800
MC07B0003-...-4-00	0.25 kW (0.34 HP)	DFR63M2	DFR63L4
MC07B0004-...-4-00	0.37 kW (0.50 HP)	DFR63L2	DT71D4
MC07B0005-...-4-00	0.55 kW (0.74 HP)	DT71D2	DT80K4
MC07B0008-...-4-00	0.75 kW (1.0 HP)	DT80K2	DT80N4
MC07B0011-...-4-00	1.1 kW (1.5 HP)	DT80N2	DT90S4
MC07B0015-...-4-00	1.5 kW (2.0 HP)	DT90S2	DT90L4
MC07B0022-...-4-00	2.2 kW (3.0 HP)	DT90L2	DV100M4
MC07B0030-...-4-00	3.0 kW (4.0 HP)	DV100M2	DV100L4
MC07B0040-...-4-00	4.0 kW (5.4 HP)	DV112M2	DV112M4
MC07B0055-...-4-00	5.5 kW (7.4 HP)	DV132S2	DV132S4
MC07B0075-...-4-00	7.5 kW (10 HP)	DV132M2	DV132M4
MC07B0110-...-4-00	11 kW (15 HP)	DV160M2	DV160M4
MC07B0150-...-4-00	15 kW (20 HP)	DV160L2	DV160L4
MC07B0220-...-4-00	22 kW (30 HP)	DV180L2	DV180L4
MC07B0300-...-4-00	30 kW (40 HP)	–	DV200L4
MC07B0370-...-4-00	37 kW (50 HP)	–	DV225S4
MC07B0450-...-4-00	45 kW (60 HP)	–	DV225M4
MC07B0550-...-4-00	55 kW (74 HP)	–	DV250M4
MC07B0750-...-4-00	75 kW (100 HP)	–	DV280S4



6.6 Overload capacity

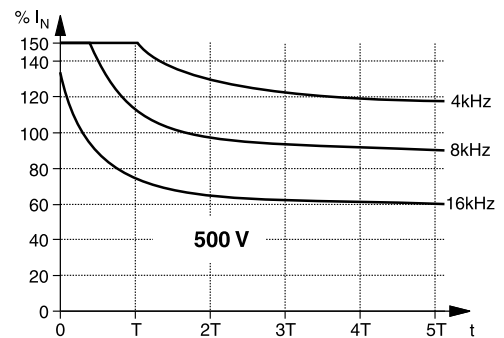
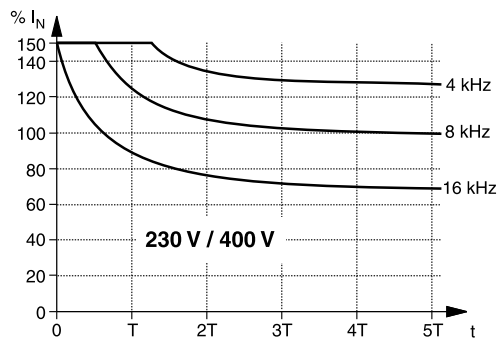
MOVITRAC® B frequency inverters permanently calculate the load on the inverter output stage (unit utilization). They can output the maximum possible power in every operating state.

The permitted continuous output current depends on:

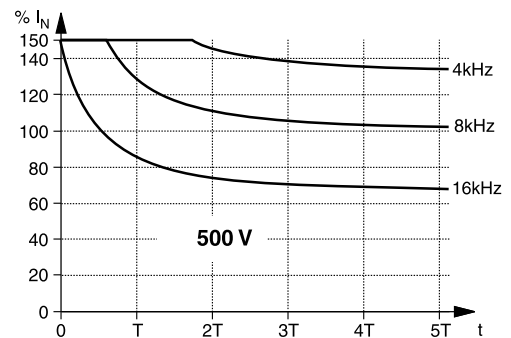
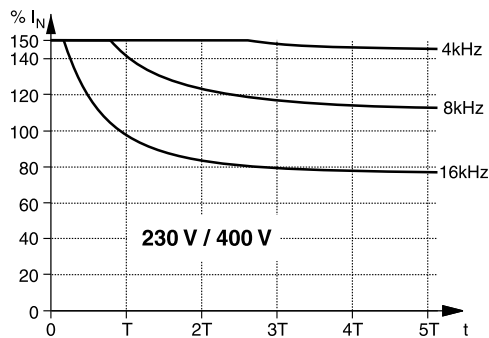
- Ambient temperature
- Heat sink temperature
- Mains voltage
- PWM frequency

If a PWM frequency > 4 kHz is set and "P862/P863 PWM fix 1/2" is set to off, the inverter automatically reduces the PWM frequency in the event of a unit overload. The inverter responds to a higher than permitted load by issuing the "F44 Unit utilization" error message and an immediate switch-off.

Overload capacity at 40 °C (104 °F)



Overload capacity at 25 °C (77 °F)



Size	0XS	0S < 1.5 kW	0S 1.5 kW	0L	1	2S	2	3	4	5
T (min)	20	20	8	8	3.5	4	5	4	9	5



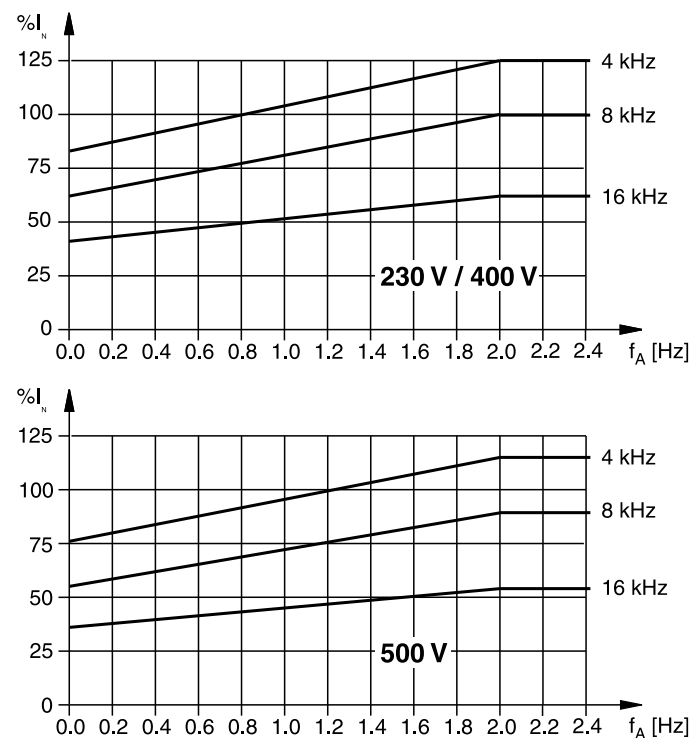
6.7 Load capacity of the units at low output frequencies

The thermal model in MOVITRAC® B implements dynamic limiting of the maximum output current. Consequently, the thermal model only permits less than 100 % output current at output frequencies less than 2 Hz if the capacity utilization is high.

In such operating states, configure the average output current of the inverter to max. 70 % of the rated inverter current.

	NOTE The output frequency of the inverter is comprised of the rotational frequency (speed) and the slip frequency.
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Guaranteed continuous currents depending on the output frequency:

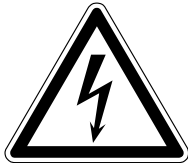


6.8 Project planning for explosion-proof AC asynchronous motors of category 2

Explosion-proof AC motors from SEW-EURODRIVE that are taken into operation with MOVITRAC® B must be approved for such operation according to the nameplate and EC type examination certificate.



6.9 Selecting the braking resistor



! DANGER

The supply cables to the braking resistor carry a **high DC voltage (ca. DC 900 V)**.

Severe or fatal injuries from electric shock.

- The braking resistor cables must be suitable for this high DC voltage.
- Install the braking resistor cables according to the regulations.



! WARNING

The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_{rated} .

Risk of burns and fire.

- Choose a suitable installation location. Braking resistors are usually mounted on top of the control cabinet.
- Do not touch the braking resistors.



TIPS

- 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 45 °C (113 °F). Do not exceed the maximum ambient temperature of 80 °C (176 °F).
- 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 **MOVITRAC®** and braking resistor is **100 m (328 ft)**.

• Parallel connection

Two braking resistors must be connected in parallel for some inverter/resistor combinations. In this case, set the trip current on the bimetallic relay to twice the value of I_F entered in the table.

• Peak braking power

The peak braking power can be lower than the load capacity of the braking resistor due to the DC link voltage and the resistance value. Formula for calculating the peak braking power:

$$P_{max} = V_{DC}^2 / R$$

V_{DC} is the maximum permitted DC link voltage. Its value is

- With 400 / 500 V units: DC 970 V
- With 230 V units: DC 485 V

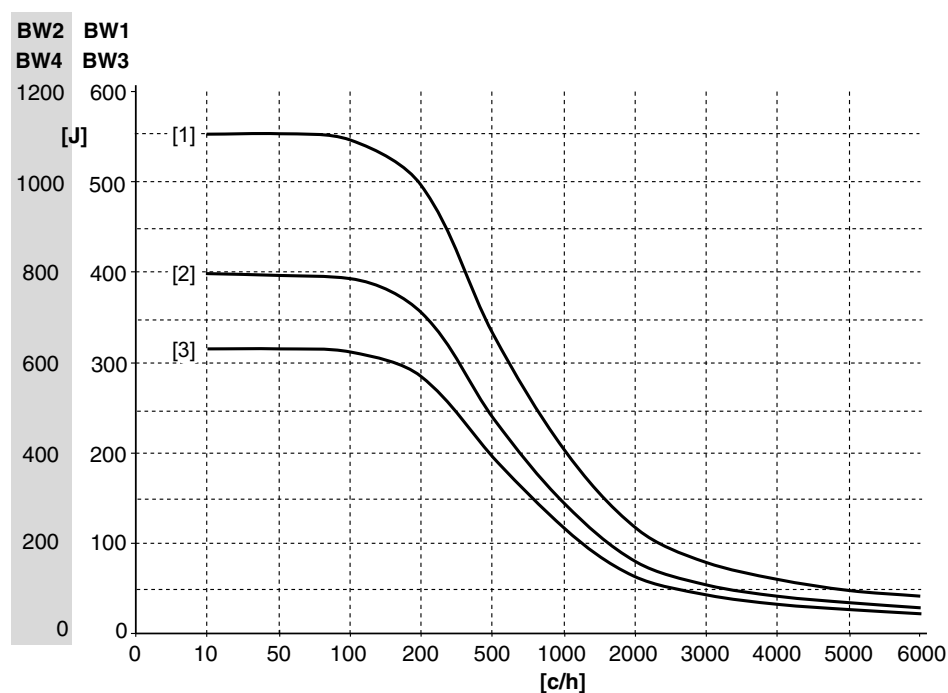


The following table lists the peak braking power levels that are possible for the different resistance values.

Resistance [Ω]	Peak breaking power [KW]	
	400/500 V units	230 V units
100	9.4	–
72	13.0	–
68	13.8	–
47	20.0	–
39	24.0	–
27	34.8	8.7
18	52.2	–
15	62.7	–
12	78.4	19.6
9 (2 × 18 Ω parallel)	–	26.1
6	156	39.2

6.9.1 Load capacity of PTC braking resistors

The following diagram shows the load capacity of braking resistors BW1 – BW4 per braking operation:



- [1] Brake ramp 10 s
 - [2] Brake ramp 4 s
 - [3] Brake ramp 0.2 s
- c/h cycles per hour



Project Planning

Selecting the braking resistor

Calculation example

Given:

- Average braking power: 0.25 kW
- Brake ramp: 2 s
- 200 brake applications per hour

Procedure:

Calculating energy from the power of the brake ramp:

$$W = P \times t = 0.25 \text{ kW} \times 2 \text{ s} = 500 \text{ J}$$

The brake ramp [3] (0.2 s) can be used for the brake ramp in the diagram. Use the characteristic curve with the shorter brake ramp because a shorter brake ramp means more power.

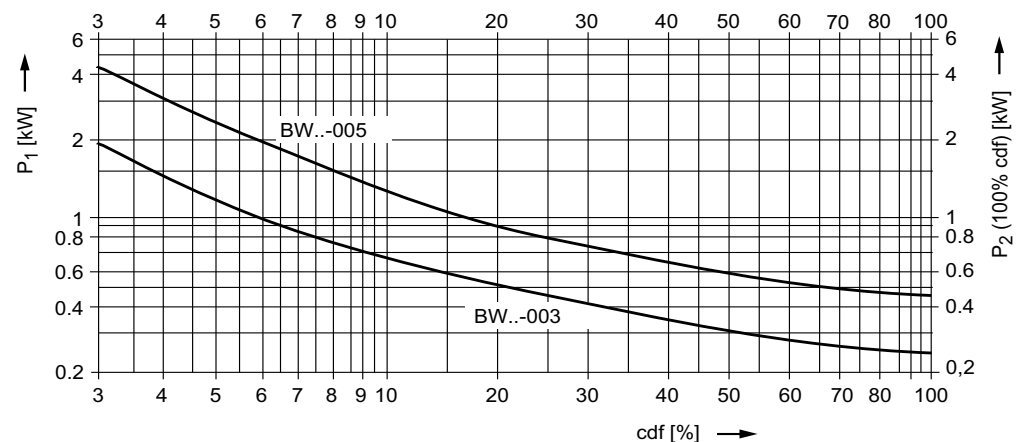
The diagram allows a power of 580 J with a 0.2 s brake ramp at 200 cycles per hour. In this case, the required 500 J can be dissipated with BW2/BW 4.

6.9.2 Load capacity flat design, wire resistors, grid resistors

In braking operations within the cycle duration T_D (standard: $T_D \leq 120 \text{ s}$), the cdf braking power can be used to determine the resulting continuous resistor dissipation (100 % cdf power) by means of the power diagrams. The right-hand y axis shows 100 % cdf power. Observe the conditional peak braking power due to the DC link voltage when determining the load capacity.

Flat-design power diagram

Power diagram for flat-design braking resistors:

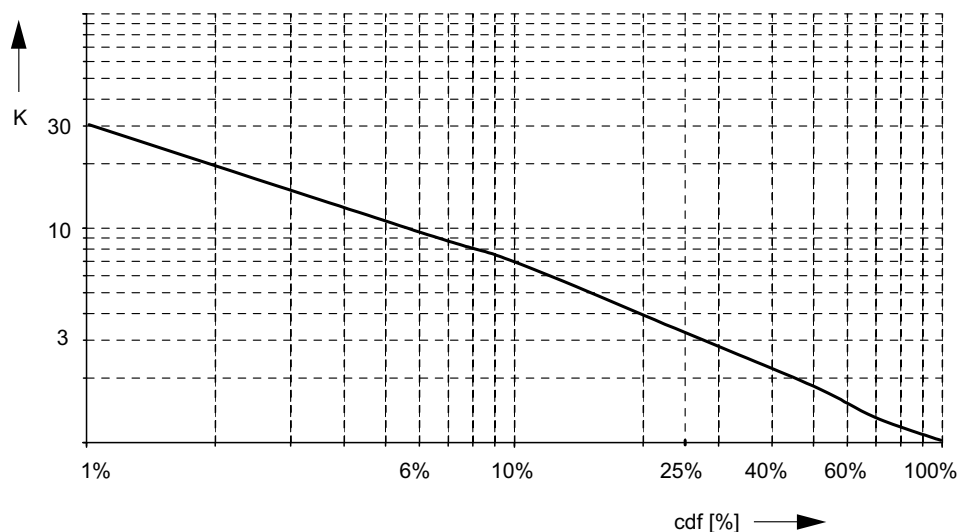


P_1 = Short-term power
 P_2 = Continuous power
 cdf = cyclic duration factor of the braking resistor



Overload factor for
wire resistors

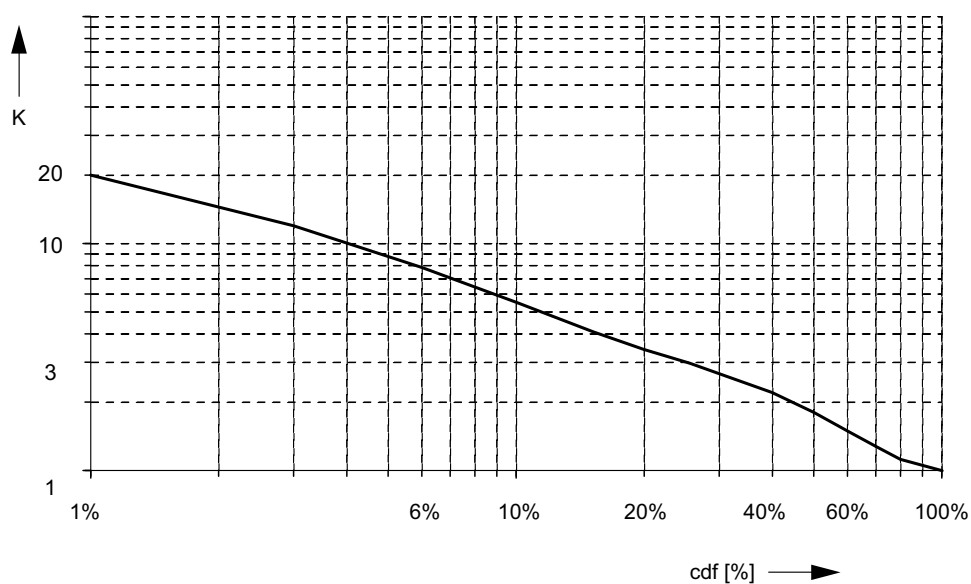
Overload factor dependent on the cycle duration factor for wire resistors:



Cyclic duration factor CDF	1 %	3 %	6 %	15 %	25 %	40 %	60 %	80 %	100 %
Overload factor K	30	15	9.5	5	3.2	2.2	1.5	1.12	1

Overload factor for
grid resistors

Overload factor depending on cycle duration factor for grid resistors:



Cyclic duration factor CDF	1 %	3 %	6 %	15 %	25 %	40 %	60 %	80 %	100 %
Overload factor K	20	12	7.6	4	3	2.2	1.5	1.12	1



Calculation example

Given:

- Peak braking power 13 kW
- Average braking power 6.5 kW
- Cyclic duration factor cdf 6 %

Required:

- BW.. braking resistor

Procedure

- The 100 % cdf power for wire and grid resistors is initially calculated using the following formula:

Average braking power / overload factor (wire / grid resistor)

Refer to the diagrams for the overload factor (wire and grid resistor) with a cyclic duration factor (cdf) of 6 %.

- Results:

100 % cdf power for wire resistors: 685 W.

100 % cdf power for grid resistors: 856 W.

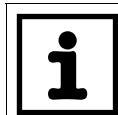
- The **maximum braking resistance value is 72 Ω** for a peak braking power of 13 kW when using a **MC07B...-5A3 (AC 400/500 V unit)** (→ peak braking power table).
- Select the appropriate braking resistor from the assignment tables with the following points:
 - Maximum braking resistance value
 - MOVITRAC® unit used

Result when using MC07B0110-5A3, for example: BW039-12

6.10 Connecting AC brakemotors

For detailed information about the SEW brake system, refer to the "Gearmotors" catalog, which you can order from SEW-EURODRIVE.

SEW 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.



TIP

The brake rectifier must have a separate supply system cable for inverter operation; it must not be powered using the motor voltage!



6.10.1 Brake rectifier

The brake rectifier can be switched off in two ways causing the brake to be applied:

1. Cut-off in the AC circuit
2. Cut-off in the DC and AC circuits (faster cut-off)

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

- All hoist applications

6.10.2 Brake activation

Always activate the brake via binary output DOØ2 "/Brake": do not use the PLC.

The binary 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 to switch the brake.

The startup function in the FBG11B keypad and in the MotionStudio software sets the brake parameters for the 2-pole 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 non-SEW motors.

6.10.3 Brake parameters

	TIP
	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.

6.11 Mains and motor connection

6.11.1 Permitted voltage supply systems

TIP
• Voltage supply systems with grounded star point MOVITRAC® B is intended for operation on TN and TT systems with directly grounded star point. • Voltage supply systems with non-grounded star point Operation on mains systems with a non-grounded star point (for example IT power systems) is also permitted. SEW recommends using an earth-leakage monitor for this according to the PCM (pulse code measuring) principle. Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter. • Phase conductor earthed power supply systems Only operate the inverters on supply systems with a maximum line-to-ground voltage of AC 300 V.



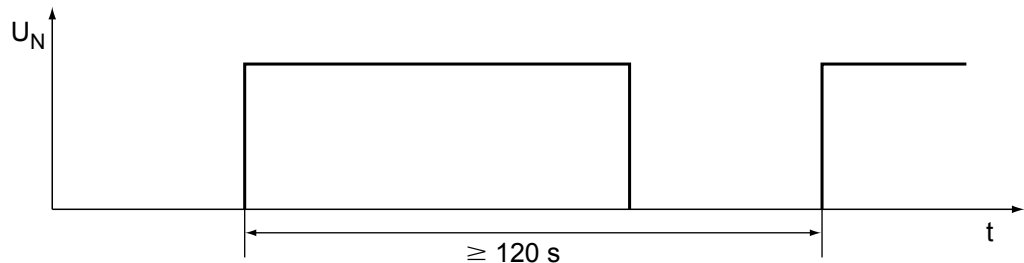
6.11.2 Input contactors and line fuses

Input contactor

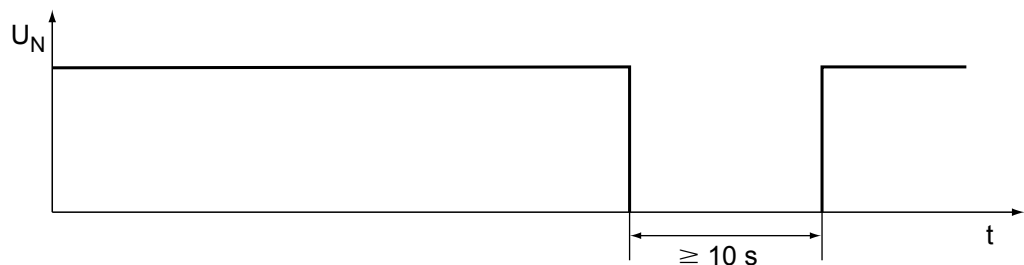
- Only use input contactors of utilization category AC-3 (EN 60947-4-1).

Mains activation

- Ensure a minimum time of 120 s between two mains activations for AC 230 V / 1-phase units.



- Maintain a minimum switch-off time of 10 s for 3-phase units.



TIP

- Do not use the K11 input contactor for jog mode, but only for switching the inverter on and off. Use the following commands for jog mode:
 - Enable/stop
 - CW/halt
 - CCW/halt

Input fuses

Fuse types:

- Line protection types in the operating classes gL, gG:
 - Rated fusing voltage $\geq$ rated mains voltage
 - Rated fusing current must be designed for 100 % or 125 % of the rated inverter current depending on the inverter utilization.
- Power circuit breaker with characteristics B, C:
 - Power circuit breaker rated voltage $\geq$ rated mains voltage
 - Rated power circuit breaker currents must be 10 % above the rated inverter current.



6.11.3 Line protection and core cross section

Comply with the regulations of the specific country and for the specific machine regarding fusing and selecting cable cross sections. If required, also adhere to the notes on **UL compliant installation**.

Always size the shared neutral conductor for the total current when using several single-phase units. Also size it according to the total current even if the unit connections are distributed over the three mains phases. This is because the third supply current harmonics are always cumulative.

Select the cable cross section of the motor so the voltage drop is as small as possible. An excessively high voltage drop means that the full motor torque is not achieved.

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 [mm ²]	Smallest bending space [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

Recommendation for standard installation, metric

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 mains currents of 100% of the rated inverter current:

MOVITRAC® B 1 × 230 V		0003	0004	0005	0008	0011	0015	0022
1-phase	Line protection	C16 ¹⁾ / gL16 / K16				C32 ²⁾ / gL25 / K25 / D20		
	Power supply cable	1.5 mm ²				4 mm ²		
	PE conductor	2 x 1.5 mm ²				2 x 4 mm ²		
Motor cable		1.5 mm ²				1.5 mm ²		
Unit terminal cross section of the power section		Terminal blocks 4 mm ² conductor end sleeves DIN 46228						

- 1) If there has been a pause of at least two minutes between turning the unit off and on again: B16
- 2) If there has been a pause of at least two minutes between turning the unit off and on again: B32

MOVITRAC® B 3 × 230 V		0003	0004	0005	0008	0011	0015	0022
3-phase	Line protection	10 A					16 A	
	Power supply cable	1.5 mm ²				4 mm ²		
	PE conductor	2 x 1.5 mm ²				2 x 4 mm ²		
Motor cable		1.5 mm ²				1.5 mm ²		
Unit terminal cross section of the power section		Terminal blocks 4 mm ² conductor end sleeves DIN 46228						



Project Planning

Mains and motor connection

MOVITRAC® B 3 × 230 V	0037	0055	0075	0110	0150	0220	0300
Fuses F11/F12/F13 I _N	25 A	25 A	35 A	50 A	63 A	80 A	100 A
Power supply L1/L2/L3	4 mm ²	4 mm ²	6 mm ²	10 mm ²	16 mm ²	25 mm ²	35 mm ²
PE conductor	2 × 4 mm ² 1 × 10 mm ²	2 × 4 mm ² 1 × 10 mm ²	2 × 6 mm ² 1 × 10 mm ²	1 × 10 mm ²	1 × 16 mm ²	1 × 16 mm ²	1 × 16 mm ²
Motor cable U/V/W	4 mm ²	4 mm ²	6 mm ²	10 mm ²	16 mm ²	25 mm ²	35 mm ²
Unit terminal cross section of the power section	Separable terminal strip 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		M10 bolt with nut max. 70 mm ² Press cable lug DIN 46235	

MOVITRAC® B 400 / 500 V		0003	0004	0005	0008	0011	0015	0022	0030	0040	0055	0075	
3-phase	Line protection	10 A					16 A					16 A	16 A
	Power supply cable	1.5 mm ²									1.5 mm ²	1.5 mm ²	
	PE conductor	2 x 1.5 mm ²					2 x 1.5 mm ² 1 x 10 mm ²			2 x 1.5 mm ² 1 x 10 mm ²	2 x 1.5 mm ² 1 x 10 mm ²		
Motor cable		1.5 mm ²									1.5 mm ²	2.5 mm ²	
Unit terminal cross section of the power section		Terminal blocks 4 mm ² conductor end sleeves DIN 46228									M4 screw with washer assembly with terminal clip 4 mm ² conductor end sleeve DIN 46228		

MOVITRAC® B 400 / 500 V		0110	0150	0220	0300
3-phase	Line protection	25 A	35 A	50 A	63 A
	Power supply cable	4 mm ²	6 mm ²	10 mm ²	16 mm ²
	PE conductor	2 x 4 mm ² 1 x 10 mm ²	2 x 6 mm ² 1 x 10 mm ²	1 x 10 mm ²	1 x 16 mm ²
Motor cable		4 mm ²	6 mm ²	10 mm ²	16 mm ²
Unit terminal cross section of the power section		M4 screw with 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		

MOVITRAC® B 400 / 500 V		0370	0450	0550	0750
3-phase	Line protection	80 A	100 A	100 A	125 A
	Power supply	25 mm ²	35 mm ²	35 mm ²	50 mm ²
	PE conductor	1 × 16 mm ²			25 mm ²
Motor cable		25 mm ²	35 mm ²	35 mm ²	50 mm ²
Unit terminal cross section of the power section		Bolt M10 with nut max. 70 mm ² crimp cable lug DIN 36235			

Recommendation for standard installation, USA NEC

MOVITRAC® B 1 × 230 V		0003	0004	0005	0008	0011	0015	0022
1-phase	Line protection	C16 ¹⁾ / gL16 / K16				C32 ²⁾ / gL25 / K25 / D20		
	Power supply cable	AWG16				AWG12		
	PE conductor	2 x AWG16				2 x AWG12		
Motor cable		AWG16				AWG16		
Unit terminal cross section of the power section		Separable terminal strip AWG10 conductor end sleeve						

1) If there has been a pause of at least two minutes between turning the unit off and on again: B16

2) If there has been a pause of at least two minutes between turning the unit off and on again: B32



MOVITRAC® B 3 × 230 V		0003	0004	0005	0008	0011	0015	0022
3-phase	Line protection	10 A					16 A	
	Power supply cable	AWG16				AWG12		
	PE conductor	2 x AWG16				2 x AWG12		
Motor cable		AWG16				AWG16		
Unit terminal cross section of the power section		Separable terminal strip AWG10 conductor end sleeve						

MOVITRAC® B 3 × 230 V		0037	0055	0075	0110	0150	0220	0300
Fuses F11/F12/F13 I_N		25 A	25 A	35 A	50 A	63 A	80 A	100 A
Power supply cable L1/L2/L3		AWG12	AWG12	AWG10	AWG6	AWG4	AWG4	AWG3
PE conductor		AWG12	AWG12	AWG10	AWG10	AWG8	AWG8	AWG6
Motor cable U/V/W		AWG12	AWG10	AWG10	AWG6	AWG4	AWG4	AWG3
Unit 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		M6 screw and washer assembly with washer Max. AWG10 crimp cable lug		M10 bolt with nut Max. AWG2/0 crimp cable lug	

MOVITRAC® B 400/500 V	0003	0004	0005	0008	0011	0014	0015	0022	0030	0040
Size	0						1			
Fuses F11/F12/F13 I _N	6 A							10A		15 A
Power supply cable L1/L2/ L3	AWG14						AWG14			
PE conductor	AWG14						AWG14			
Motor cable U/V/W	AWG14						AWG14			
Unit terminal cross section of the power section	Separable terminal strip AWG10 conductor end sleeve						Separable terminal strip AWG10 conductor end sleeve			

MOVITRAC® B 400/500 V		0055	0075	0110	0150	0220	0300
Size		2			3		
Fuses F11/F12/F13 I_N		20 A		30 A	40 A	60 A	80 A
Power supply cable L1/L2/L3		AWG12		AWG10	AWG8	AWG6	AWG4
PE conductor		AWG12		AWG10	AWG10		AWG8
Motor cable U/V/W		AWG12		AWG10	AWG8	AWG6	AWG4
Unit terminal cross section of the power section		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		

MOVITRAC® B 400/500 V		0450	0370	0550	0750
Size		4		5	
Fuses F11/F12/F13 I_N		90 A		110 A	150 A
Power supply cable L1/L2/L3		AWG4		AWG3	AWG1
PE conductor		AWG8		AWG6	AWG6
Motor cable U/V/W		AWG4		AWG3	AWG1
Unit terminal cross section of the power section		M10 bolt with nut Max. AWG2/0 crimp cable lug			



6.11.4 Motor cable length

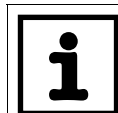
The maximum motor cable length depends on:

- Cable type
- Voltage drop in the cable
- Set PWM frequency
- Output filter

The limit values in the tables do not apply if you use an output filter. The motor cable length is then solely limited by the voltage drop on the motor cable.

MOVITRAC® B		Permitted maximum motor cable length in m (ft)			
Size		0XS / 0S / 0L		2S 0055	2S 0075 / 2 / 3 / 4 / 5
Voltage V_{mains}		3 AC 400 V 3 AC 230 V 1 AC 230 V	3 AC 500 V 3 AC 400 V (125 % I_N)	3 AC 230 V 3 AC 400/500 V	
Shielded cable	4 kHz ¹⁾	100 (328)	50 (160)	300 (984)	400 (1310)
	8 kHz	70 (230)	35 (110)	250 (820)	300 (984)
	12 kHz	50 (160)	25 (82)	200 (656)	250 (820)
	16 kHz	40 (130)	25 (82)	150 (492)	200 (656)
Unshielded cable	4 kHz ¹⁾	200 (656)	100 (328)	900 (2950)	1200 (3937)
	8 kHz	140 (459)	70 (230)	750 (2460)	900 (2950)
	12 kHz	100 (328)	50 (160)	600 (1970)	750 (2460)
	16 kHz	80 (264)	50 (160)	450 (1480)	600 (1970)

1) Standard setting



TIP

Do not use an earth-leakage circuit breaker with long motor cables. The earth-leakage currents caused by cable capacitance may cause mis-tripping.



6.11.5 Voltage drop

Select the cable cross-section of the motor cable so the **voltage drop is as small as possible**. An excessively high voltage drop means that the full motor torque is not achieved.

You can determine the expected voltage drop using the following tables. For shorter cables, you can calculate the voltage drop by converting in proportion to the length.

Cable cross section	Load with I [A] =															
	4	6	8	10	13	16	20	25	30	40	50	63	80	100	125	150
Copper	Voltage drop Δ U [V] with length = 100 m (328 ft) and θ = 70 °C (158 °F)															
1.5 mm ²	5.3	8	10.6	13.3	17.3	21.3	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
2.5 mm ²	3.2	4.8	6.4	8.1	10.4	12.8	16	1)	1)	1)	1)	1)	1)	1)	1)	1)
4 mm ²	1.9	2.8	3.8	4.7	6.5	8.0	10	12.5	1)	1)	1)	1)	1)	1)	1)	1)
6 mm ²					4.4	5.3	6.4	8.3	9.9	1)	1)	1)	1)	1)	1)	1)
10 mm ²						3.2	4.0	5.0	6.0	8.2	10.2	1)	1)	1)	1)	1)
16 mm ²								3.3	3.9	5.2	6.5	7.9	10.0	1)	1)	1)
25 mm ²									2.5	3.3	4.1	5.1	6.4	8.0	1)	1)
35 mm ²											2.9	3.6	4.6	5.7	7.2	8.6
50 mm ²														4.0	5.0	6.0

1) Load not permitted, in accordance with VDE 0100 part 430.

Cable cross section	Load with I [A] =															
	4	6	8	10	13	16	20	25	30	40	50	63	80	100	125	150
Copper	Voltage drop Δ U [V] with length = 100 m (328 ft) and θ = 70 °C (158 °F)															
AWG16	7.0	10.5	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)
AWG12	2.6	3.9	5.2	6.4	8.4	10.3	12.9	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)
AWG8						4.5	5.6	7.0	8.4	11.2	1)	1)	1)	1)	1)	1)
AWG6								4.3	5.1	6.9	8.6	10.8	13.7	1)	1)	1)
AWG4									3.2	4.3	5.4	6.8	8.7	10.8	13.5	1)
AWG3									2.6	3.4	4.3	5.1	6.9	8.6	10.7	12.8
AWG2											3.4	4.2	5.4	6.8	8.5	10.2
AWG1												3.4	4.3	5.4	6.8	8.1
AWG1/0												2.6	3.4	4.3	5.4	6.8
AWG2/0													2.7	3.4	4.3	5.1

1) More than 3 % voltage drop in relation to $V_{\text{mains}} = \text{AC } 460 \text{ V}$.



6.12 Multi-motor drive/group drive

Group drives are mechanically decoupled from each other (e.g. different conveyor belts). In this operating mode, the inverter operates without slip compensation and with a constant V/f ratio.

Multi-motor drives are mechanically coupled to each other (e.g. chain drive with multiple motors). Observe the notes in the publication "Multi-Motor Drives".

6.12.1 Motor currents

The total of the motor currents must not exceed the rated output current of the inverter.

6.12.2 Motor cable

You can calculate the permitted total length of all motor cables connected in parallel as follows:

$$l_{total} \leq \frac{l_{max}}{n}$$

l_{total} = Total length of the motor cables connected in parallel

l_{max} = Recommended maximum motor cable length for individual drives

n = Number of motors connected in parallel

6.12.3 Motor size

The motors in a group must not be more than 3 type sizes apart.

6.12.4 Output filter

For groups of more than 3 or 4 motors, SEW-EURODRIVE recommends that you use an HF output filter. An HF output filter is required when the maximum motor cable length (l_{max}) given in the table 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, it is the voltage drop on the motor cable that limits the maximum motor cable length, not the limit value in the table. The total of the rated motor currents must not exceed the rated through-current of the output filter.



6.13 Line chokes

6.13.1 1-phase

Use is required under the following circumstances:

- Mains inductances of less than 100 μH per branch
- Using line chokes is required when operating several units that are switched on simultaneously. The line choke limits overvoltages caused by the switching.

Use is optional in the following instances:

- Reduction in the supply system current harmonics
- Support for overvoltage protection

6.13.2 3-phase

Using line chokes is required when operating more than 4 units that are switched on simultaneously. The line choke limits overvoltages caused by the switching.

Use is optional for supporting overvoltage protection.

6.14 Electromagnetic compatibility EMC

MOVITRAC[®] B frequency inverters are components of machines and systems. They comply with the EMC product standard EN 61800-3 **Variable-speed electrical drives**. If you want to equip the machine / system with frequency inverters compliant with the EMC directive 89/336/EEC: Adhere to the notes on EMC compliant installation.

Following the relationship between new and old limit classes:

New limit class according to EN 61800-3	Previous limit class according to EN 55011/55014
C2	A
C1	B



6.14.1 Interference immunity

MOVITRAC® B meets the minimum requirements stipulated in EN 61800-3 with regard to interference immunity.

6.14.2 Interference emission

The interference emission of MOVITRAC® B was tested using standard equipment. The limit values complied with allow the units to be used in both industrial and private environments. The following measures are recommended depending on the target limit value class. Higher levels of interference are permitted in industrial environments. In industrial environments, you can dispense with the measures listed below depending on the situation of the supply system and the plant configuration.

Limit value class

The following possible solutions exist for EMC-compliant installation, depending on the plant configuration. Perform an EMC compliant installation.

Limit classes C1 and C2 according to EN 61800-3.

Limit value class		Size 0 230 V 1-phase	
		Input end	Output end
C2		No additional filtering required	Output choke HD012 / HD100 / HD101 or shielded motor cable, or HF output filter
C1	Cable conducted	No additional filtering required	Shielded motor cable
	Radiation conducted	Foldable ferrites ¹⁾	

1) 3 foldable ferrites ULF11A over the supply system cables L and N (without PE)

Limit value class		Size 0 400/500 V / 230 V 3-phase	
		Input end	Output end
C2		No additional filtering required	Output choke HD012 / HD100 / HD101 or shielded motor cable, or HF output filter
C1		Line filter NF	Output choke HD012 / HD100 / HD101 or shielded motor cable
		FKE EMC-module	

Limit value class		Sizes 1 / 2S / 2 400/500 V / 230 V 3-phase	
		Input end	Output end
C2		No additional filter required.	HD output choke, or shielded motor cable, or HF output filter
C1		Line filter NF	HD output choke or shielded motor cable

Limit value class		Size 3 / 4 / 5 400/500 V / 230 V 3-phase	
		Input end	Output end
C2		Line filter NF	HD output choke, or shielded motor cable, or HF output filter
C1			HD output choke or shielded motor cable



6.14.3 Connection

Observe the "Installation" section for EMC-compliant connection.

6.14.4 IT systems

	NOTES • No EMC limits are specified for interference emission in voltage supply systems without an NF earthed star point (IT systems). The efficiency of line filters is severely limited. • In size 0, you can deactivate the suppression capacitors. See the section "Installation / Installation for IT systems". • It is important that you deactivate the suppression capacitors when using earth-leakage monitors with pulse code measurement.
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6.14.5 Inverter-related earth leakage current

Earth-leakage currents ≥ 3.5 mA may occur during normal operation.

Earth leakage currents are determined mainly by:

- The amount of DC link voltage
- The PWM frequency
- The motor cable used and its length.
- The motor used

Reducing earth-leakage currents (size 0 only)

You can deactivate the suppression capacitors to PE (see section "Installation / Installation for IT systems") to reduce earth-leakage currents in the inverter.

When the suppression capacitors are deactivated, the EMC filter is no longer active.

SEW-EURODRIVE recommends that you do not use earth-leakage circuit breakers and instead choose other measures to ensure protection of personnel (e.g. according to EN 61800-5-1, EN 50178, EN 60204-1, etc.).



6.15 HF output filters

6.15.1 Important information

Observe the following instructions when using output filters:

- Do not use output filters in hoist applications.
- During project planning of the drive, take into account the voltage drop in the output filter and consequently the reduced motor torque available. This applies particularly to AC 230 V units with output filters.
- Flying start function is not possible with HF output filter

6.15.2 Installation, connection and operation

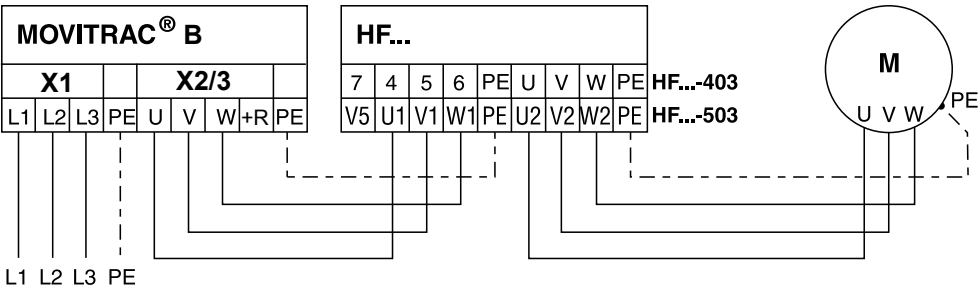
	TIPS • Install output filters next to the corresponding inverter. Leave a ventilation space of at least 100 mm (3.94 in) below and above the output filter. No clearance is required on the sides. • Limit the connection cable between inverter and output filter to the absolutely necessary length. Maximum 1 m (3 ft) with unshielded cable, 10 m (33 ft) with shielded cable. • An unshielded motor line is sufficient when using an output filter. Note the following instructions when you use an output filter together with a shielded motor cable: – The maximum permitted length of the motor cable for operation without V_{DC} link connection is 20 m (66 ft). – Operation with V_{DC} link connection is required if the motor cable is longer than 20 m (66 ft). – Observe the notes "Operation with V_{DC} link connection" on the next page. • 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 together to one output filter when operating a motor group from one inverter. The total value of the rated motor currents must not exceed the rated throughput 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. To do this, connect all like connections to the output filters in parallel. • 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 V_{DC} link connection. Observe the notes regarding V_{DC} link 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 V_{DC} link connection). • No V_{DC} link connection is permitted for size 0XS units.
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6.15.3 V_{DC} link connection

Operation without V_{DC} link connection:

- Approved only for PWM frequency 4 kHz or 8 kHz.



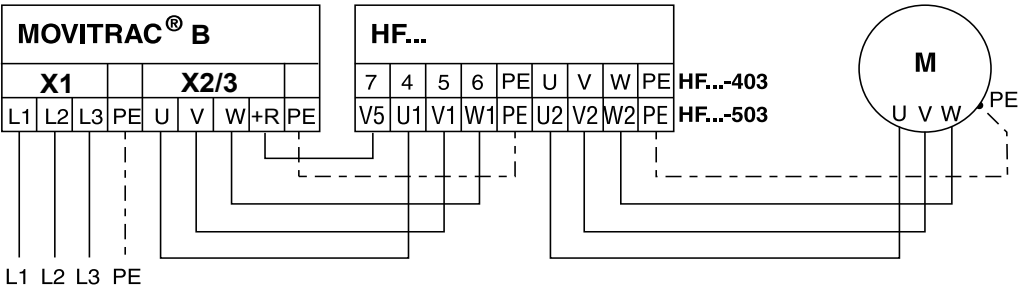
Operation with V_{DC} link connection

Connection of inverter terminal + R with HF...-503 terminal V5 or HF...-403 terminal 7

i	TIPS
	• Optimized grounded filter effect. • Improved filter effect in the low-frequency range (≤ 150 kHz). • Only approved for PWM frequency 12 kHz or 16 kHz. Note that increased losses (= power reduction) occur in the inverter when operating with 12 kHz or 16 kHz. • Set PMW fix = on; the inverter must not be able to reduce the PWM frequency automatically • Strictly observe the following for HF...-403: V_{DC} link connection is only permitted if $V_{mains} \leq AC 400$ V, not if $V_{mains} = AC 500$ V. • The V_{DC} link 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.

f_{PWM}	$V_{mains} = 3 \times AC 230$ V	$V_{mains} = 3 \times AC 400$ V	$V_{mains} = 3 \times AC 500$ V
12 kHz	4 %	12 %	15 %
16 kHz	3 %	8 %	12 %

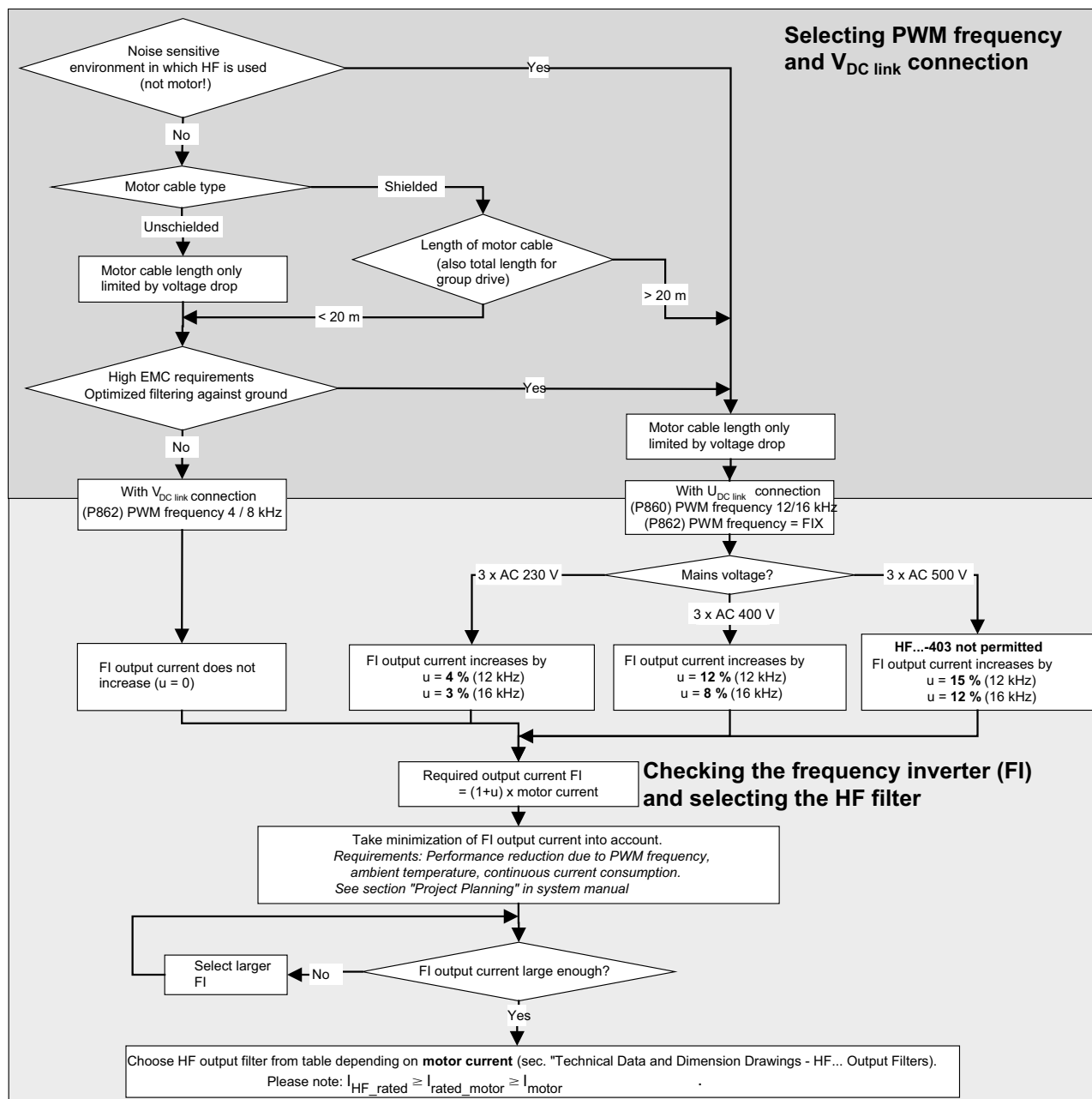
The increased power requirement causes an additional load on the inverter. Take this aspect into account during project planning of the drive. Failure to comply with this aspect may cause the inverter to shut down due to overload.



i	TIP
	No V_{DC} link connection is possible with size 0XS units.



The procedure for selecting the PWM frequency and checking the inverter is summarized in the following figure.





6.16 Electronics cables and signal generation

6.16.1 Cable type

The electronic terminals are suitable for:

- Cross sections up to 1.5 mm² (AWG16) without conductor end sleeves
- Cross sections up to 1.0 mm² (AWG17) with conductor end sleeves

Use shielded cables as standard. Ground the shield at both ends. Route electronics cables separately from power cables and leads to contactor controls or braking resistors.

6.16.2 0 V cables

Never connect 0 V cables GND for generating signals. The 0 V cables of several electrical units which are connected should not be looped from unit to unit, 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 at least 1 mm² (AWG17) cross section from a central point to each individual unit by the shortest possible route.

6.16.3 Coupling relays

You can use coupling relays for electrical isolation of the binary inputs and binary outputs to the functional ground. Use only coupling relays with encapsulated, dust-protected electronic contacts. The relays must be suitable for switching low voltages and currents (5 – 30 V, 0.1 – 20 mA).

6.17 External voltage supply DC 24 V

The internal voltage supply is sufficient for the basic unit and binary outputs up to 200 mA (DO02: 150 mA; DO03: 50 mA). FBG11B, FSC11B with options DBG60B, USB11A, UWS21A, or UWS21B can also be supplied by the internal voltage supply.

MOVITRAC[®] B can be supplied via an external DC 24 V voltage supply. This is useful, for example, with bus operation. The voltage supply must be sized large enough to operate the digital outputs also. Fieldbus options always require an external voltage supply.

In this case, you must always switch on the external DC 24 V power supply unit prior to the mains contactor or after switching off the mains contactor.

The DC 24V voltage output can be switched off with P808. This means external voltage supply is still possible.



DC 24 V power demand of MOVITRAC® B:

Size	Basic unit power demand ¹⁾	DBG60B	FIO11B / FIO21B	Fieldbus option ²⁾³⁾	DHP11B ³⁾
Size 0 MC07B...00	5 W	1 W	2 W	3 W	4.5 W
Size 0 MC07B...S0 ⁴⁾	12 W ⁵⁾				
1, 2S, 2	17 W				
3	23 W				
4, 5	25 W				

1) FBG11B, FSC11B (UWS11A/USB11A) included. Take account of the additional load of the binary inputs with 2.4 W per 100 mA.

2) Fieldbus options are: DFP21B, DFD11B, DFE11B, etc.

3) These options must always be supplied externally.

4) The unit type MC07B...S0 must always be supplied by an external DC 24 V power supply unit via X17:1 and X17:2.

5) 3 W of the 12 W is the power demand for the output stage via X17:3 SOV24, X17:4 SVI24.



TIPS

When using an auxiliary voltage for the backup mode on VIO24, you must ensure that the backup voltage is always applied in mains operation because other units connected to VIO24 are otherwise supplied by MOVITRAC® B in mains operation without a backup voltage supply.

The maximum current load for looping through the backup voltage supply from VIO24 / basic unit to VIO24 / FSC/FIO is 1 A.

6.17.1 Example

MC07B0015-5A3-4-00/DFP21B with options FSC11B & FBG11B. MOVITRAC® B supplies the binary inputs DI01 (CW/halt) and DI03 (Enable) with voltage. The motor brake is controlled via DO02. The brake coil of the brake relay requires 100 mA at DC 24 V. The master PLC evaluates the fault signal contact via DO00 at a current consumption of 50 mA.

Calculating the total power demand:

- Power demand of the basic unit (incl. FSC11B and power supply of the binary inputs): 5 W
- Power demand of the DFP21B fieldbus option: 3 W
- Power demand of the brake coil: 0 W because output is 0 active in DV 24 V operation.
- Power demand of the fault signal contact: $24 \text{ V} \times 0.05 \text{ A} = 1.2 \text{ W}$

The total power demand is 9.2 W. An external DC 24 V power supply is required in this case.



6.18 Parameter set selection

This function is used to operate two motors on one inverter using two different parameter sets.

The parameter set is switched over via binary input or fieldbus. A binary 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 when	
	"0" signal	"1" signal
PARAM. SELECT	Parameter set 1 active	Parameter set 2 active



TIP

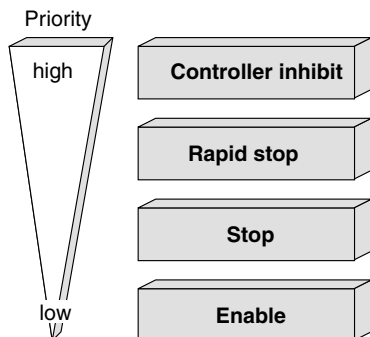
A changeover contactor should be provided for each of the two motor cables when two motors are operated alternately on the same inverter with the parameter set switchover function in use. Only switch changeover contactors when the unit is inhibited!



6.19 Priority of the operating states and interrelation between control signals

6.19.1 Priority of operating states

The following illustration shows the priority of operating states:



6.19.2 Interrelation of control signals

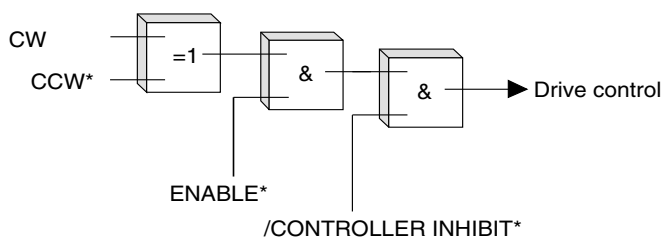
The following table shows the interrelation of control signals. "CW/halt" is programmed to binary input DIØ1 and cannot be changed. The other control signals are only in effect if a binary input is programmed to this function (→ parameter P60.).

/Controller inhibit	Binary input is programmed to			Inverter status
	Enable/ Rapid stop	CW/halt (DIØ1)	CCW/halt	
0	1)	1)	1)	Inhibited
1	0	2)	2)	
1	1	1	0	CW enabled
1	1	0	1	CCW enabled

1) Not relevant when the binary input is on controller inhibit and "/Control inhibit" = "0"

2) Not relevant if "Enable/rapid stop" = "0"

Linking control signals:



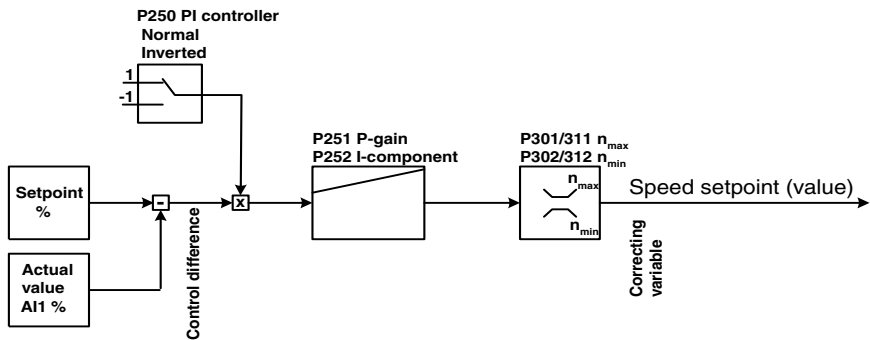
* If a binary input is programmed to this function.



6.20 PI controller

You can use the implemented PI controller for temperature control, pressure control or other applications. The PI controller can be switched on and off.

Structural diagram showing installation of the PI controller



Connect the actual value from the sensor (temperature, pressure, etc.) to analog input AI1. You can scale the actual value up or down and assign an offset value, thereby adapting it to the working range of the PI controller.

You can set the PI-controller setpoint using one of the six programmed fixed setpoints or specify the setpoint using the RS-485 or fieldbus (SBus) interface (*P100 = Setpoint source*). Furthermore you can specify the setpoint using the local setpoint potentiometer.

The correcting variable of the PI controller is a speed setpoint limited to a minimum and maximum speed (*P301=Minimum speed1* and *P302=Maximum speed1*). The setting of the speed ramp times has no effect when the PI controller is active.

The default settings for the parameters are indicated in **bold** below.

6.20.1 Parameterization

Activating the PI controller

Switch the PI-controller on and off using parameter P250. The values set for setpoint and actual values mentioned in the beginning are active when you switch on the PI controller.

The *NORMAL* setting increases the correcting variable if there is a positive system deviation; the correcting variable is reduced if there is a negative system deviation.

The *INVERTED* setting increases the correcting variable if there is a negative system deviation; the correcting variable is reduced if there is a positive system deviation.

P 250 PI controller **Off**
 Normal
 Inverted

Controller parameters

You can adapt the controller to the application using the following settings:

P 251	P-gain	0 – 1 – 64	Step width:	0.01
P 252	I component	0 – 1 – 2000 [s]	Range:	Step width:
			0	I-component OFF
			0.01 – 0.99	0.01
			1.0 – 9.9	0.1
			10 – 99	1
			100 – 2000	10



6.20.2 Setpoint selection

The following settings are possible as the setpoint source. You can select the setpoint source with parameter P100.

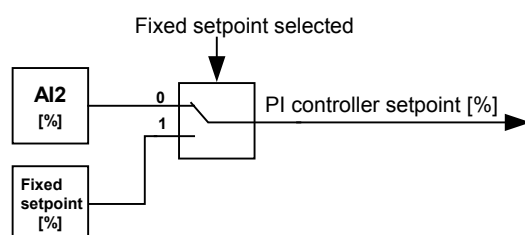
- **Unipolar / Fixed setpoint:** The setpoint zero applies as long as no setpoint is selected. The FBG speed control module can be added to setpoint zero or a fixed setpoint using P121.

P163/164/165 Setpoint n11/12/13 scales PI-controller [0 – 100 %] step width: 0.1 %

P173/174/175 Setpoint n21/22/23 scales PI-controller [0 – 100 %] step width: 0.1 %

Operation with optional second analog input (e.g. FIO1B)

The setpoint from the AI2 analog input applies as long as no setpoint is selected. The FBG speed control module can be added to AI1 or a fixed setpoint using P121.

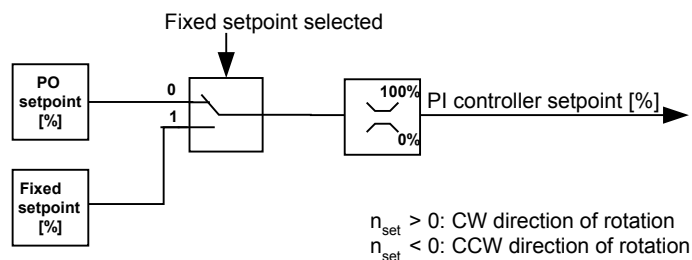


- **RS-485 / fixed setpoint**
- **SBus 1 / Fixed setpoint:** Specify the setpoint and set it using the following bus parameters:

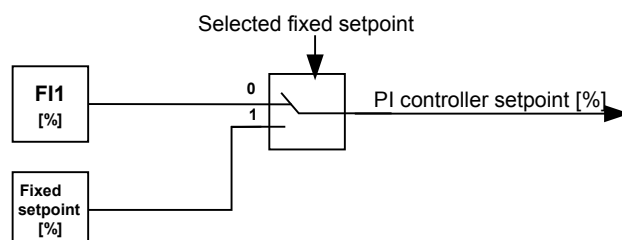
P870/871/872 Setpoint description PO1/PO2/PO3 [PI controller setpoint %]

$PO1/PO2/PO3 = 0 - 2^{14} = 0 - 100\%$ PI controller setpoint

Setpoint selection is **always unipolar**. The inverter restricts negative setpoints (e.g. via RS-485 or SBus) to zero.



- **For all setpoint sources:** The FBG speed control module can be added to the setpoint or a fixed setpoint using P121.
- The settings **Bipolar / fixed setpoint**, **Motor potentiometer / fixed setpoint** as well as **Fixed setpoint + AI1** and **Fixed setpoint * AI1** do not have any effect. If you set these, the inverter always specifies the setpoint zero.
- **Frequency input / fixed setpoint**





6.20.3 Actual value detection

The unipolar input AI1 is the actual value input.

You can set the operating mode for the actual value using *P112 AI1 operating mode* (see also parameters 116 – 119):

- **0 – 10 V:** The following applies to operation as a voltage input:
0 – 10 V = 0 – 100 % PI controller actual value
- **0 – 20 mA:** The following applies to operation as a current input:
0 – 20 mA = 0 – 100 % PI controller actual value
- **4 – 20 mA:** The following applies to operation as a current input:
4 – 20 mA = 0 – 100 % PI controller actual value

6.20.4 Reference signal

With this parameter, you can program a reference signal with regard to the actual value of the PI controller. By doing this, you can monitor the actual value for violation of a limit value.

P450	PI actual value reference	0 – 100 [%]	Step width:	0.1 %
P451	Signal = "1" when	PI actual value < PI reference PI actual value > PI reference		

You have to program a binary output terminal to "PI controller actual value reference" to issue the reference signal. The reference signal operates with a hysteresis of 5 %. The reference signal does not have a delay time and signals "1" depending on P451.

You must program the binary output DO01 P620, DO02 P621 or DO03 P622 to PI controller actual value reference.

6.20.5 Inverter control

You can determine the direction of rotation by using the terminals for the direction of rotation "CW/Stop and "CCW/Stop".

Upon enable, the inverter increases the speed up to P301 Minimum speed using the P130 Speed ramp. PI control becomes active once the minimum speed is reached. The PI controller correcting variable directly determines the speed setpoint.

If you revoke the CW/CCW terminal, the inverter deactivates PI control and stores the I-component of the PI controller. The speed decreases using the speed ramp (P131). If you enable the inverter before the drive has reached its stop speed, the PI controller becomes active again with the current setpoint.

If you stop the inverter with the "Enable/Stop" terminal, the drive decelerates with the stop ramp. The inverter stores the I-component of the controller.

With setpoint source RS485 or SBUS, the value of the PO data item determines the direction of rotation. "PI-REGLER %" and the value of the PO data item "PI-REGLER %" act as a setpoint for the PI controller.



6.21 Application examples

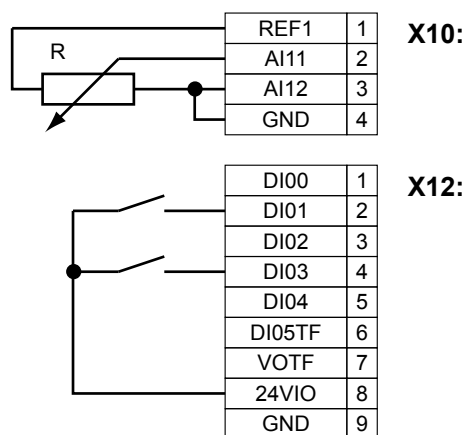
All application examples presented here assume that the unit has been started up correctly in accordance with the "Startup" section.

6.21.1 External setpoint potentiometer

The external setpoint potentiometer is not effective when manual operation is active.

Connect an external setpoint potentiometer as follows:

The resistance value of the external setpoint potentiometer R must be $\geq 3 \text{ k}\Omega$.



6.21.2 Setpoint value processing

Using AI1 as 0 – 10 V voltage input, no fixed setpoint selected, frequency inverter enabled.

Setpoint source	X1 P116 Y1 P117	X2 P118 Y2 P119	U_{AI1}	Setpoint speed	Diagram
Bipolar	0 % 100 %	100 % 100 %	0 V 5 V 10 V	n_{min} 50 % n_{max} n_{max}	Diagram illustrating the setpoint value processing for the frequency inverter. The graph shows the relationship between the setpoint voltage (U_{AI1}) and the resulting motor speed (n). The x-axis represents the setpoint voltage (U_{AI1}) from 0 V to 10 V. The y-axis represents the motor speed (n) from n_{min} to n_{max}. Key points on the graph: - At 0 V, the speed is n_{min} (0 %). - At 5 V, the speed is 50 % n_{max}. - At 10 V, the speed is n_{max} (100 %).

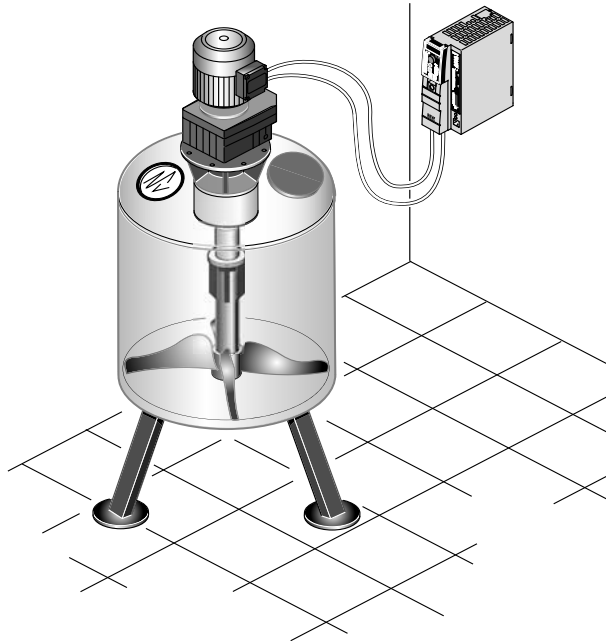


Setpoint source	X1 P116 Y1 P117	X2 P118 Y2 P119	U_{AI1}	Setpoint speed	Diagram
Bipolar	0 % -100 %	100 % 100 %	0 V 5 V 10 V	$-n_{max}$ $-n_{min} / +n_{min}$ $+n_{max}$	
Unipolar	0 % 100 %	100 % 100 %	0 V 5 V 10 V	n_{min} 50 % n_{max} n_{max}	
Unipolar	0 % 0 %	100 % 0 %	0 V 5 V 10 V	n_{max} 50 % n_{max} n_{min}	



6.21.3 Speed-controlled agitator

In this application, you can control the speed using the FBG speed control module.



The keypad is used to control:

- Reset
- Start
- Stop
- Speed control.

Select the "FBG speed control module" icon to operate the agitator.

Parameters

Adapt the following parameters for the agitator:

- P122 FBG manual operation: Direction of rotation
- Ramp t11 up (adjust with keypad or parameter P130)
- Ramp t11 up (adjust via keypad icon or parameter P131)
- P301 Minimum speed
- P302 Maximum speed
- P860 PWM frequency



6.21.4 Positioning a trolley

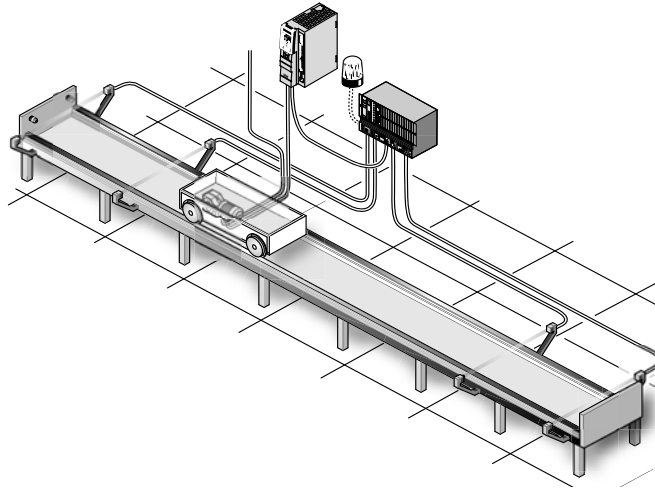
Principle

Positioning a trolley with rapid speed and creep speed, and position detection using proximity sensors.

The emergency off function must be guaranteed using a separate safety circuit.

Install a braking resistor.

Perform a startup for the VFC operating mode.



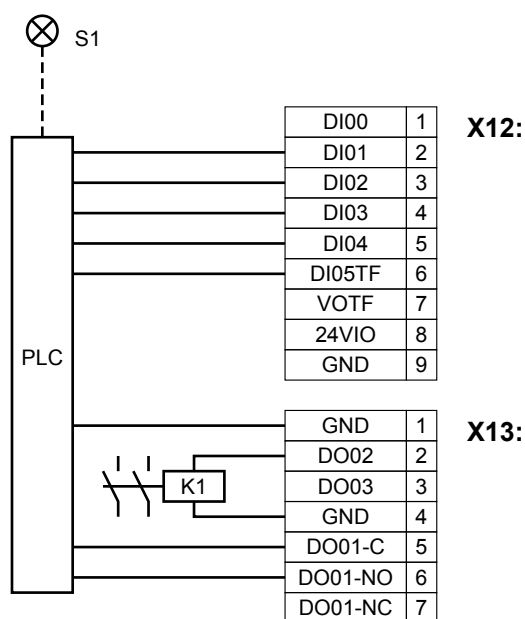


Terminals

- Rapid speed: DI04 = 1 and DI05 = 1
- Slow speed: DI04 = 1 and DI05 = 0

Assign the electronics terminal strip with

- DI01 = CW/stop
- DI02 = CCW/Stop
- DI03 = Enable
- DO01-C and DO01-NO = "Fault"
- DO02 = Brake



K1 is the brake contactor, S1 the fault indicator light.

The following signals between the machine controller PLC and MOVITRAC® B are important:

X12:2: Clockwise direction of rotation	X12:6: Slow speed/rapid speed
X12:3: Counterclockwise direction of rotation	X12:8: 24 V
X12:4: Start/Stop	X13:6: No malfunction
X12:5: Rapid speed	X13:2: Brake released

Parameters

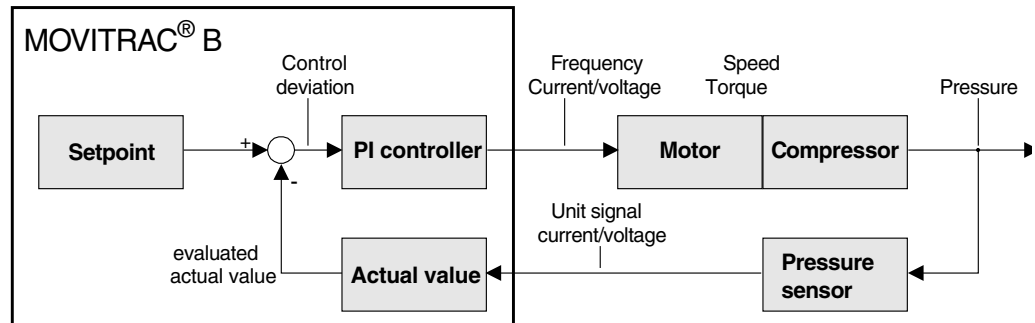
The following parameters are relevant for this application. Check whether you can leave all factory setting values unchanged.

P601 Binary input DI02: CCW/stop	P604 Binary input DI05: n12/n22
P602 Binary input DI03: Enable	P620 Binary output DO01: Malfunction
P603 Binary input DI04: n11/n21	P621 Binary output DO02: Brake released



6.21.5 PI controller

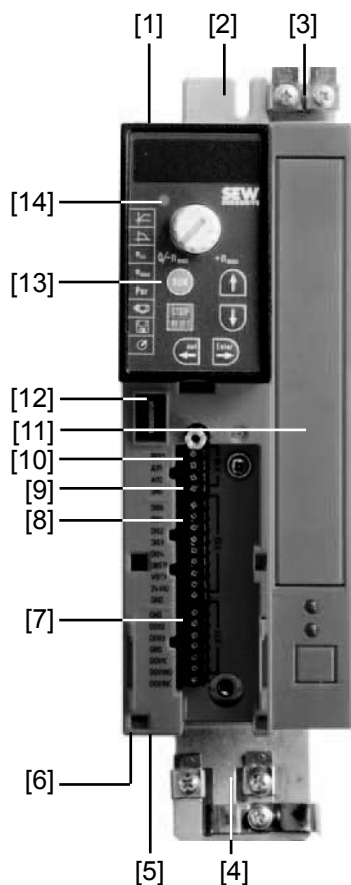
Following a diagram showing the basic structure of the control system with a PI controller, taking the example of a pressure control system.





7 Unit Design

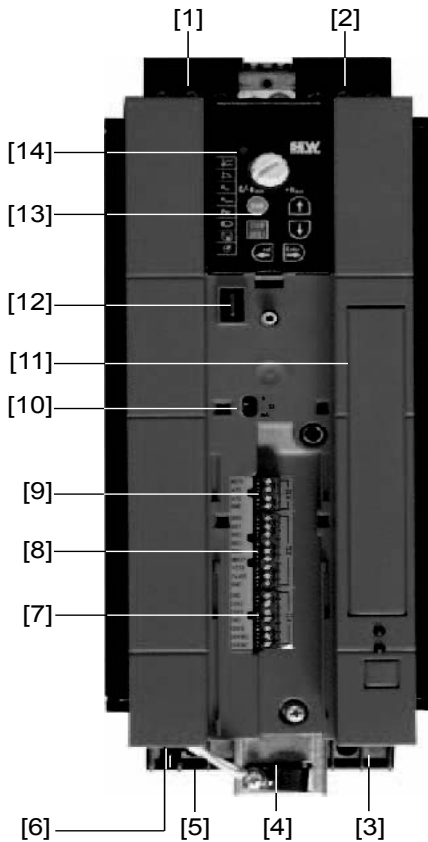
7.1 Sizes 0XS / 0S / 0L



- [1] X1: Power supply connection:
3-phase: L1 / L2 / L3
1-phase: L / N
- [2] Fixing strap
- [3] PE connection
- [4] Shield plate for motor cable, fixing strap underneath
- [5] X2: Motor connection U / V / W / Brake connection +R / -R
- [6] X17: Safety contact for safe stop (only MC07B...-S0: sizes 0S / 0L, 400 / 500 V)
- [7] X13: Binary outputs
- [8] X12: Binary inputs
- [9] X10: Analog input
- [10] Switch S11 for V-mA toggle analog input
(in sizes 0XS and 0S behind removable connector)
- [11] Option card slot (cannot be retrofitted / not for BG0XS)
- [12] Connection for optional communication / analog module
- [13] Optional keypad, inserted
- [14] Status LED (visible without optional keypad)



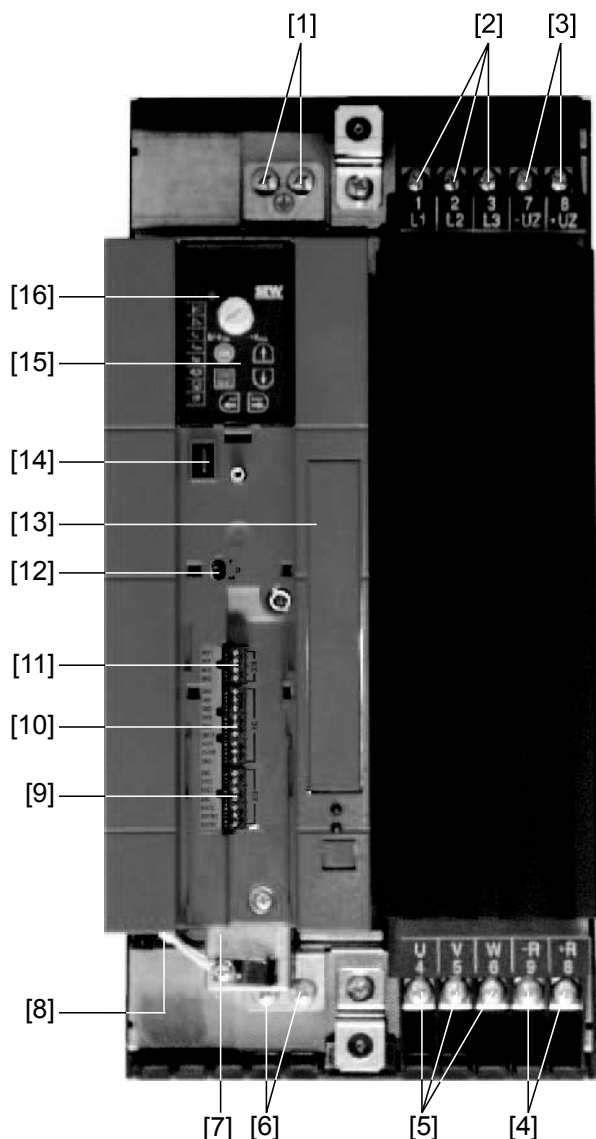
7.2 Sizes 1 / 2S / 2



- [1] X1: Power supply connection 3-phase: L1 / L2 / L3 / PE screw
- [2] X4: DC link connection $-U_Z$ / $+U_Z$
- [3] X3: Braking resistor connection R+ / R- / PE
- [4] Electronics shield clamp
- [5] X2: Motor connection U / V / W / PE screw
- [6] X17: Safety contact for safe stop (only 400 / 500 V)
- [7] X13: Binary outputs
- [8] X12: Binary inputs
- [9] X10: Analog input
- [10] Switch S11 for V-mA toggle analog input
- [11] Option card slot
- [12] Connection for optional communication / analog module
- [13] Optional keypad, inserted
- [14] Status LED (visible without optional keypad)



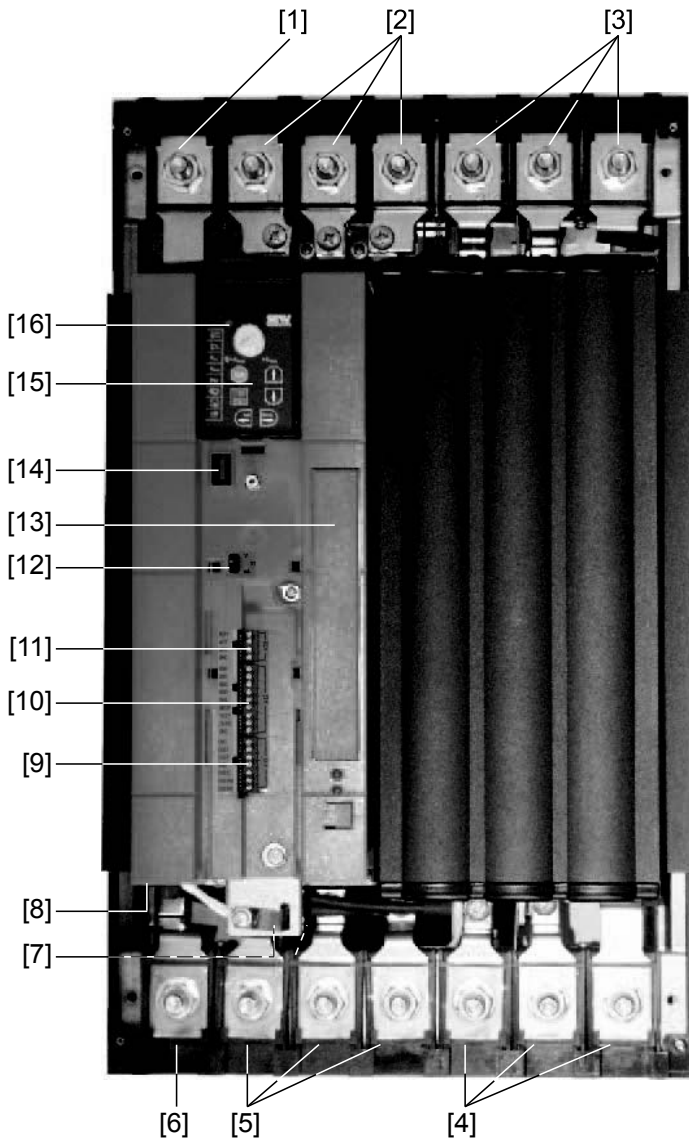
7.3 Size 3



- [1] X2: PE connection
- [2] X1: Power supply connection 3-phase: 1/L1 / 2/L2 / 3/L3
- [3] X4: DC link connection $-U_Z$ / $+U_Z$
- [4] X3: Braking resistor connection R+ (8) / R- (9) and PE connection
- [5] X2: Motor connection U (4) / V (5) / W (6)
- [6] X2: PE connection
- [7] Electronics shield clamp
- [8] X17: Safety contact for safe stop (only 400 / 500 V)
- [9] X13: Binary outputs
- [10] X12: Binary inputs
- [11] X10: Analog input
- [12] Switch S11 for V-mA toggle analog input
- [13] Option card slot
- [14] Connection for optional communication / analog module
- [15] Optional keypad, inserted
- [16] Status LED (visible without optional keypad)



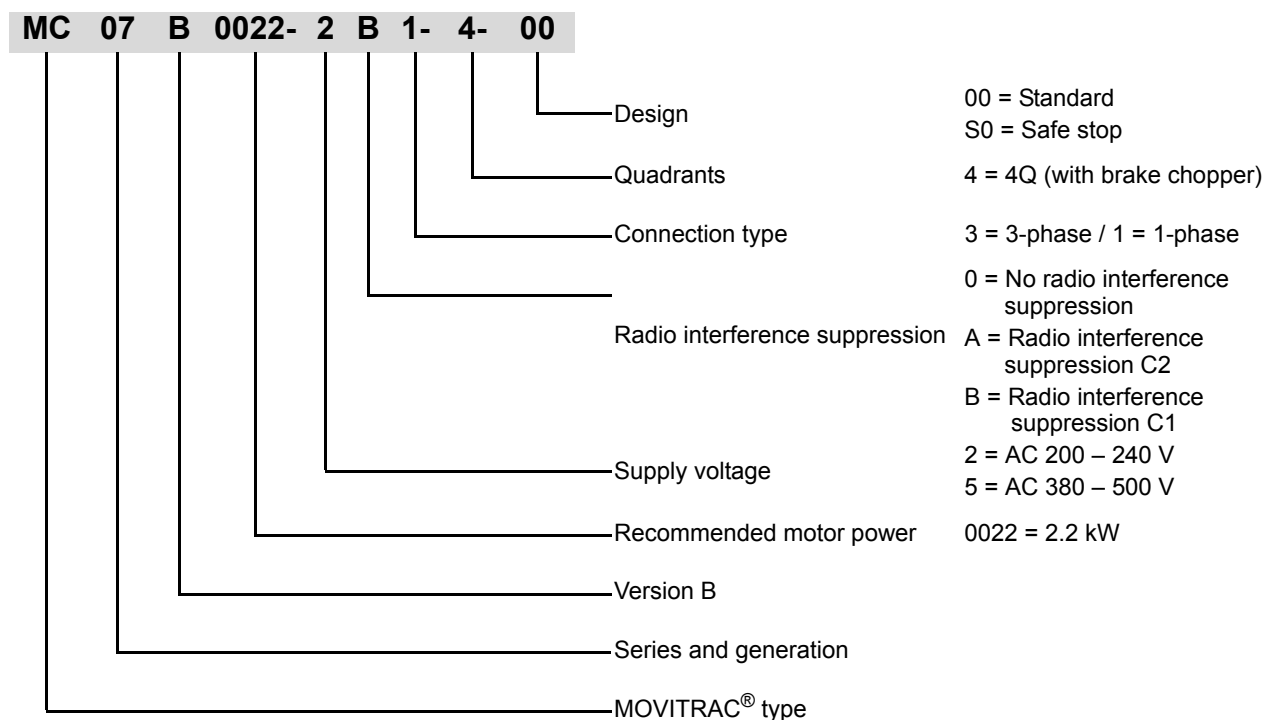
7.4 Sizes 4 / 5



- [1] X2: PE connection
- [2] X1: Power supply connection 3-phase: 1/L1 / 2/L2 / 3/L3
- [3] X4: DC link connection $-U_Z$ / $+U_Z$ and PE connection
- [4] X3: Braking resistor connection R+ (8) / R- (9) and PE connection
- [5] X2: Motor connection U (4) / V (5) / W (6)
- [6] X2: PE connection
- [7] Electronics shield clamp
- [8] X17: Safety contact for safe stop (only 400 / 500 V)
- [9] X13: Binary outputs
- [10] X12: Binary inputs
- [11] X10: Analog input
- [12] Switch S11 for V-mA toggle analog input
- [13] Option card slot
- [14] Connection for optional communication / analog module
- [15] Optional keypad, inserted
- [16] Status LED (visible without optional keypad)



7.5 Unit designation / nameplate



SEW EURODRIVE
D-76646 Bruchsal
Made in Germany

MOVITRAC-B
Umrichter
Inverter

Type: MC07B0022-2B1-4-00/FSC11B/DFE24B
P#: 08284989 S0#: 01.8508099801.0001.06

Eingang / Input	Ausgang / Output
U = 1x200...240V AC	U = 3x0...UN
I = 19.7A AC (230V)	I = 8.6A AC
f = 50...60Hz	f = 0...600Hz

T = -10...+50°C P Motor = 2.2kW/3.0HP IP20

Freitextzeile mit zur Zeit max. 51 Zeichen

12 10 13 -- -- ML0001

CE, UL, LISTED IND. CONT.EQ.2D06, PG CH01

MC07B0022-2B1-4-00

Input	U	Rated mains voltage
	I	Rated mains current, 100 % operation
	f	Rated mains frequency
Output	U	Output voltage 100 % operation
	I	Rated output current 100 % operation
	f	Output frequency
T		Ambient temperature
P motor		Recommended motor power 100 % operation

The unit status for communication with SEW-EURODRIVE is indicated over the bar code at the bottom. The unit status documents the hardware and software states of the unit.



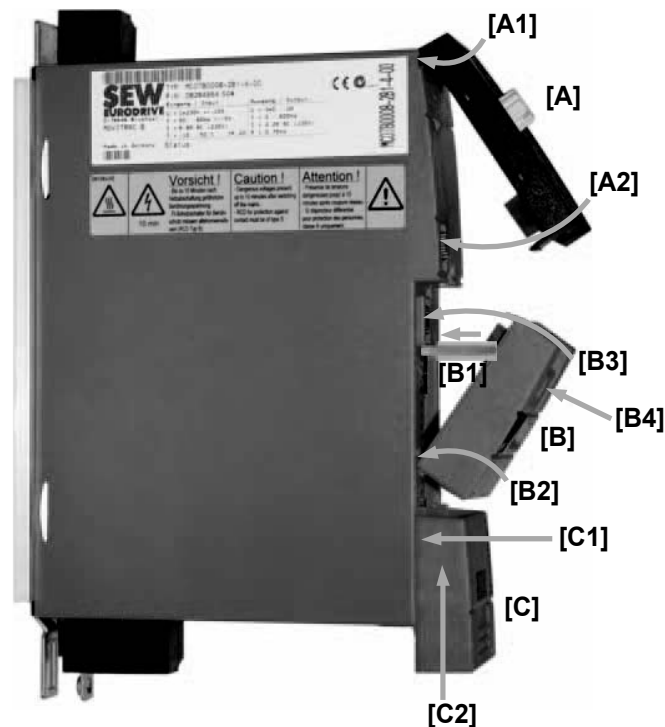
8 Installation

8.1 Recommended tools

- Use a screwdriver with a 2.5 mm wide blade for connecting the electronics terminal strip X10 / X12 / X13.

8.2 Installation notes

8.2.1 Mounting the front options



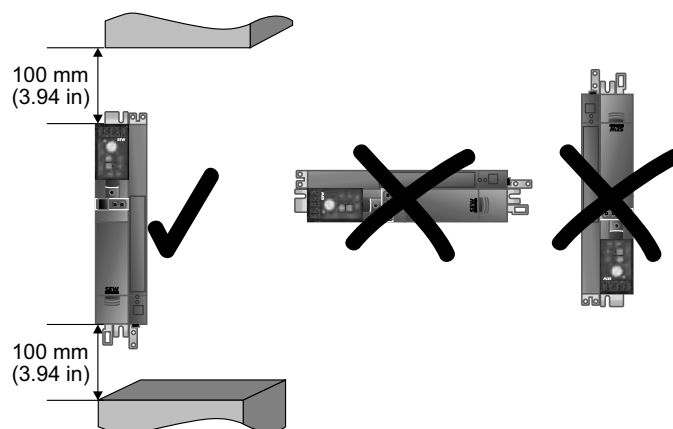
Attach the front options as follows:

- Inserting the FBG11A [A] keypad:
 1. Insert the FBG11B keypad [A] on top of the housing [A1].
 2. Press the socket on the keypad onto the connector in the unit [A2].
- Inserting the FSC11B communication module or the FIO11B analog module [B]:
 1. For size 0, mount the spacer bolt [B1] when using the FSC11B communication module or FIO11B analog module [B].
 2. Insert the FSC11B communication module and the FIO11B analog module [B] at the bottom of the housing [B2].
 3. Press the socket on the front option onto the connector in the unit [B3].
 4. Secure the front option using the screw on the unit [B4].
- Mounting the cover [C]:
 1. Position the cover [C] on the unit approximately 5 mm away from its final position [C1].
 2. Move the cover upwards [C2].



8.2.2 Minimum clearance and mounting position

- Leave 100 mm (3.94 in) clearance at the top and bottom of the housing for optimum cooling. There is no need for clearance at the sides. You can line up the units directly next to one another.
- It is important that air circulation is not impeded by cables and other installation material. Prevent the heated exhaust air from other units from blowing onto this unit.
- Install the units vertically only. You must not install them horizontally, tilted or upside down.
- Proper heat dissipation of the rear side of the heat sink improves the thermal utilization of the unit.

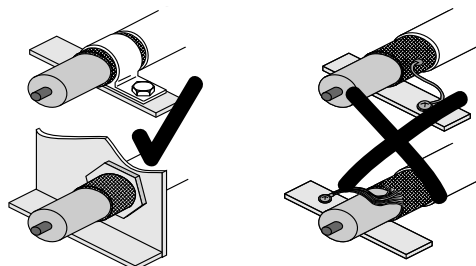


8.2.3 Separate cable ducts

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

8.2.4 EMC-compliant installation

- Shield all cables except for the power supply cable. For the motor cable, you can use the HD.. option (output choke) instead of the shielding to meet the interference emission limit values .
- When using shielded motor cables, e.g. prefabricated motor cables from SEW-EURODRIVE, you must keep the unshielded conductors between the shield and connection terminal of the inverter as short as possible.
- Connect the shield by the shortest possible route and make sure it is grounded over a wide area at both ends. If using double-shielded cables, ground the outer shield on the inverter end and the inner shield at the other end.





- You can also use earthed sheet-metal ducts or metal pipes to shield the cables. Install the power and control cables separately.
- Provide high frequency compatible grounding for the inverter and all additional units (wide area metal-on-metal contact between the unit housing and ground, e.g. unpainted control cabinet mounting panel).

8.2.5 Operation on IT systems

- SEW recommends using earth-leakage monitors with a pulse code measuring process in voltage supply systems with a non-earthed star point (IT systems). Use of such devices prevents the earth-leakage monitor mis-tripping due to the earth capacitance of the inverter.
- For size 0, SEW recommends deactivating the interference suppressor filter using the enclosed insulation discs (see Deactivating EMC capacitors (size 0 only)).

8.2.6 Utilization category of contactors

- Use only contactors in utilization category AC-3 (EN 60947-4-1).

8.2.7 Required cross sections

- Power supply cable: Cross section according to rated input current I_{mains} at rated load
Motor lead: Cross section according to rated output current I_N
Electronics cables: Maximum 1.5 mm² (AWG16) without conductor end sleeves¹⁾
Maximum 1.0 mm² (AWG17) with conductor end sleeves

8.2.8 Cable lengths for individual drives

- The cable lengths depend on the PWM frequency. The permitted motor cable lengths are listed in the "Project Planning" section of the MOVITRAC® B system manual.

8.2.9 Unit output

- Only connect an ohmic/inductive load (motor); do not connect a capacitive load!

8.2.10 Braking resistor connection

- Shorten the cables to the required length.
- Use 2 tightly twisted leads or a 2-core shielded power cable. Cross-section according to the rated output current of the inverter.
- Protect the braking resistor with a bimetallic relay with trip class 10 or 10A (wiring diagram). Set the trip current according to the technical data of the braking resistor.

1) Do not install fine wired cables without conductor end sleeves.



- For braking resistors in the BW...-T series, you can connect the integrated thermostat using a 2-core, shielded cable as an alternative to a bimetallic relay.
- The flat-type braking resistors have internal thermal overload protection (fuse cannot be replaced). Install the flat-design braking resistors together with the appropriate touch guard.

8.2.11 Installing the braking resistor

- The supply cables to the braking resistors carry a high voltage (approx. DC 900 V) during rated operation.
- The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_{rated} . Choose a suitable installation location. Braking resistors are usually mounted on the control cabinet roof.

8.2.12 Binary outputs

- The binary outputs are short-circuit proof and protected against external voltage to 30 V. Higher external voltages can destroy the binary outputs.

8.2.13 Interference emission

- Use shielded motor cables or HD output chokes for EMC compliant installation.

8.2.14 Switched inductances



NOTICE

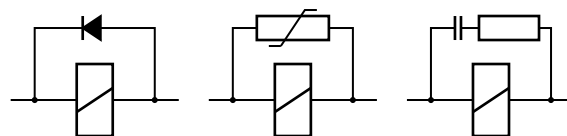
Switched inductances

Hazard: Malfunctions / damage to property.

Measure: The minimum distance of switched inductances to the inverter must be at least 150 mm (5.91 in).

- Use suppressors to suppress interference on
 - Contactors
 - Relays
 - Solenoid valves

Suppressors are, for example, diodes, varistors, or RC elements:



Do not connect any suppressors directly on MOVITRAC® B. Connect suppressors as closely as possible to the inductance.



8.2.15 Line filters

MOVITRAC® B frequency inverters have an integrated line filter as standard. They comply with the following limit value class to EN 55011 on the line side without further measures:

- Single-phase connection: C1 cable conducted
- Three-phase connection: C2

No EMC limits are specified for interference emission in voltage supply systems without an earthed star point (IT system). The efficiency of line filters is severely limited.

8.2.16 Line protection and earth-leakage circuit breaker

- Install fuses at the beginning of the mains cable behind supply bus junction (see basic unit wiring diagram).
- SEW-EURODRIVE recommends that you do not use earth-leakage circuit breakers. However, if an earth-leakage circuit breaker is stipulated for direct or indirect protection against contact, observe the following:

	TIP
	Use only type B earth-leakage circuit breakers. MOVITRAC® can cause direct current in the protective earth. In cases where an earth-leakage circuit breaker is used for protection against direct or indirect contact, only install a type B earth-leakage circuit breaker on the power supply end of the MOVITRAC® unit.

8.2.17 PE input connection

Earth-leakage currents ≥ 3.5 mA may occur during normal operation. Observe the following for reliable PE connection:

- Power supply cable $< 10 \text{ mm}^2$ (AWG7):
 - Route a second PE conductor with the same cross section as the power supply cable in parallel to the protective earth via separate terminals, or
 - Use a copper protective earth conductor with a cross section of 10 mm^2 (AWG7)
- Power supply cable $10 \text{ mm}^2 - 16 \text{ mm}^2$ (AWG7 – AWG5):
 - Copper protective earth conductor with the cross section of the power supply cable.
- Power supply cable $16 \text{ mm}^2 - 35 \text{ mm}^2$ (AWG5 – AWG2):
 - Copper protective earth conductor with a cross section of 16 mm^2 (AWG5)
- Power supply cable $> 35 \text{ mm}^2$ (AWG2):
 - Copper protective earth conductor with half the cross section of the power supply cable.



8.3 Installing optional power components

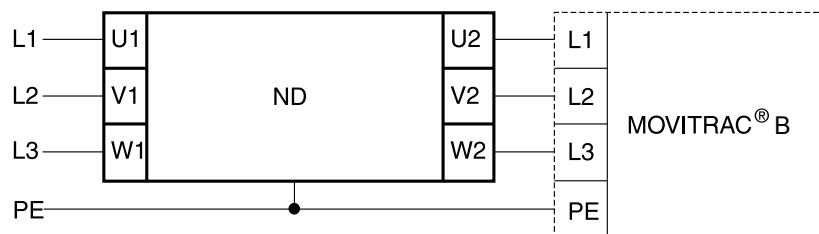
Input contactor for several units

Connect a line choke for limiting the inrush current:

- For 5 or more 3-phase units
- For 2 or more 1-phase units

8.3.1 ND line choke

Connecting ND series line choke



8.3.2 NF line filter

- Using the NF line filter, you can maintain limit value class C1 / B with MOVITRAC® B sizes 0 to 4.



NOTICE

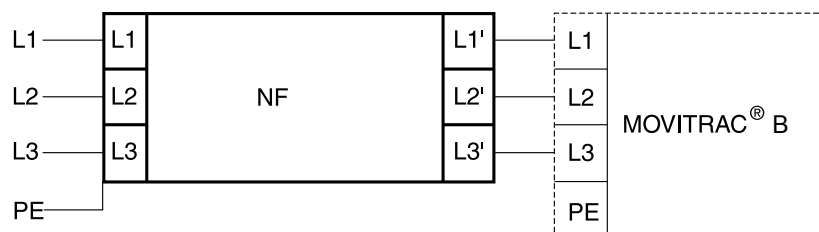
Possible damage to property

No switching is permitted between the line filter and MOVITRAC®.

- Consequences if disregarded: Damage to the input stage.

- Install the line filter close to the inverter but outside the minimum clearance for cooling.
- Restrict the cable between the line filter and the inverter to the absolute minimum length required, and never more than 400 mm (15.7 in). Unshielded, twisted cables are sufficient.
- Use also unshielded lines for the power supply cable.

Connecting NF line filters



8.3.3 ULF11A folding ferrites

Place the supply system cable (L and N) in the folding ferrite and press the folding ferrites together until they snap in place.

Compliance with EMC limit class C1 has been tested on a specified test setup. Compliance with class C1 for signal interference is achieved by the proper installation of ULF11A folding ferrites.

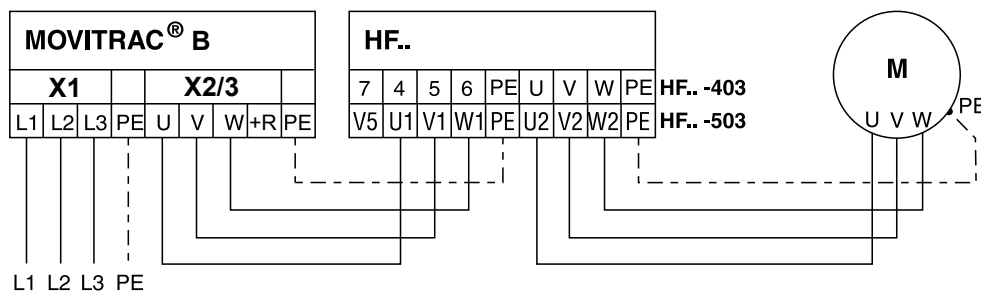


8.3.4 HF output filters

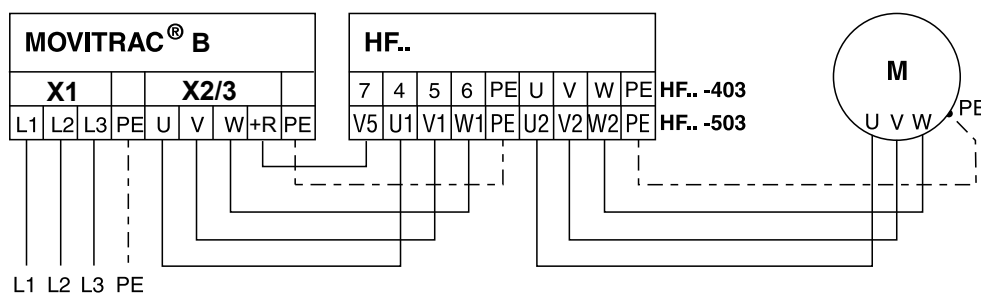
	TIP
	Install output filters next to the corresponding inverter. Leave a ventilation space of at least 100 mm (3.94 in) below and above the output filter. No clearance is required on the sides.

- Limit the length of the cable between inverter and output filter to the absolute minimum needed. Maximum 1 m / 3 ft with unshielded cable, 10 m / 33 ft with shielded cable.
- Several motors can be connected to one output filter when operating a motor group from one inverter. The total value of the rated motor currents must not exceed the rated throughput current of the output filter.
- Two identical output filters can be connected in parallel to one inverter output to double the rated throughput current. To do this, connect all like connections to the output filters in parallel.
- If you operate the inverter with $f_{PWM} = 4$ or 8 kHz, do not connect the output filter connection V5 (with HF..-503) or 7 (with HF..-403).
- No V_{DC} link connection is permitted for size 0XS units.

HF output filter connection without V_{DC} link connection (PWM frequency only 4 or 8 kHz)



HF output filter connection without V_{DC} link connection (PWM frequency only 12 or 16 kHz)

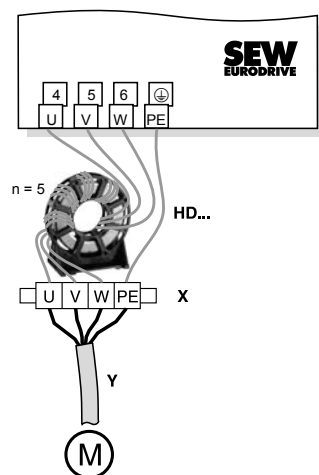




8.3.5 HD output choke

- Install the output choke close to MOVITRAC® B beyond the minimum clearance.
- Always route all 3 phases (not PE!) through the output choke.
- If the cable is shielded, the shield should not be routed through the output choke.

When using the HD output choke, you have to wrap the cable around the choke 5 times.



Only 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. SEW recommends connecting in series 2 output chokes in case of 4 windings and 3 output chokes in case of 3 windings.

- Installing HD012 output choke:

Install the output choke under the associated inverter. Leave a ventilation space of at least 100 mm (3.94 in) below and above the output choke. Provide a clearance of 10 mm (0.39 in) on each side.

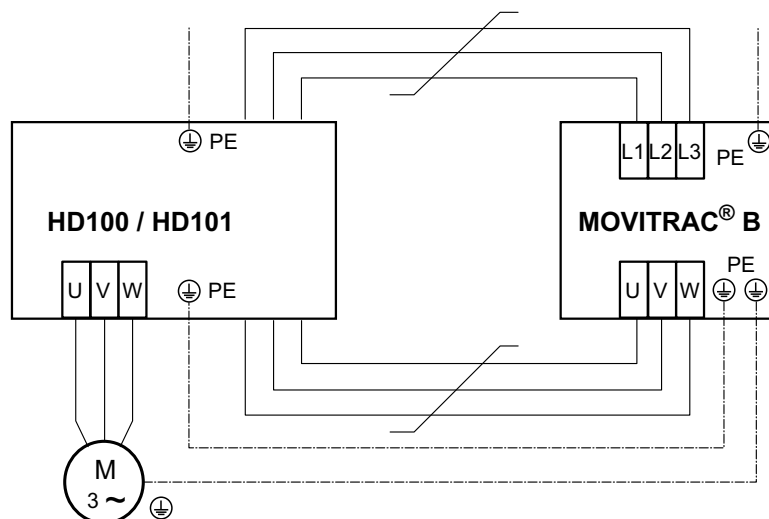
Three alternative connection options are provided for connecting the protective earth. You can connect the PE line of the motor cable directly on the frequency inverter.



*Installing output
choke HD100 /
HD101*

Use the supplied screws to mount the HD100 / HD101 output choke together with the MOVITRAC B frequency inverter onto the conductive mounting surface in the control cabinet.

The connections U / V / W are labeled U / V / W and have to be connected accordingly.

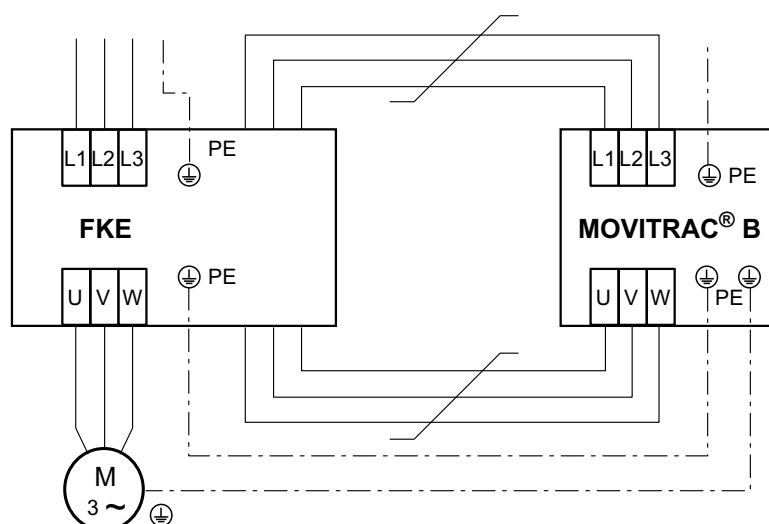


8.3.6 FKE12B / FKE13B EMC-modules

Use the supplied screws to mount the EMC module together with the MOVITRAC[®] B frequency inverter onto the conductive mounting surface in the control cabinet.

The connections U / V / W are labeled U / V / W and have to be connected accordingly.

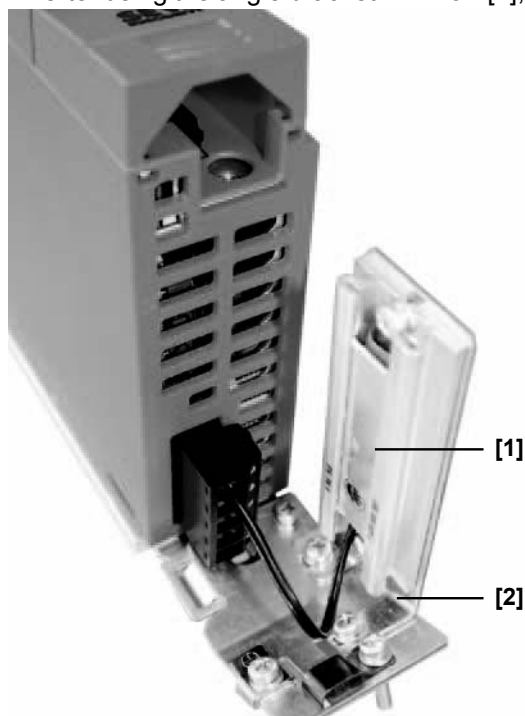
The connections L1 / L2 / L3 (brown / orange / white) can be connected in any order.





8.3.7 PTC braking resistors BW1 / BW3 with FKB10B

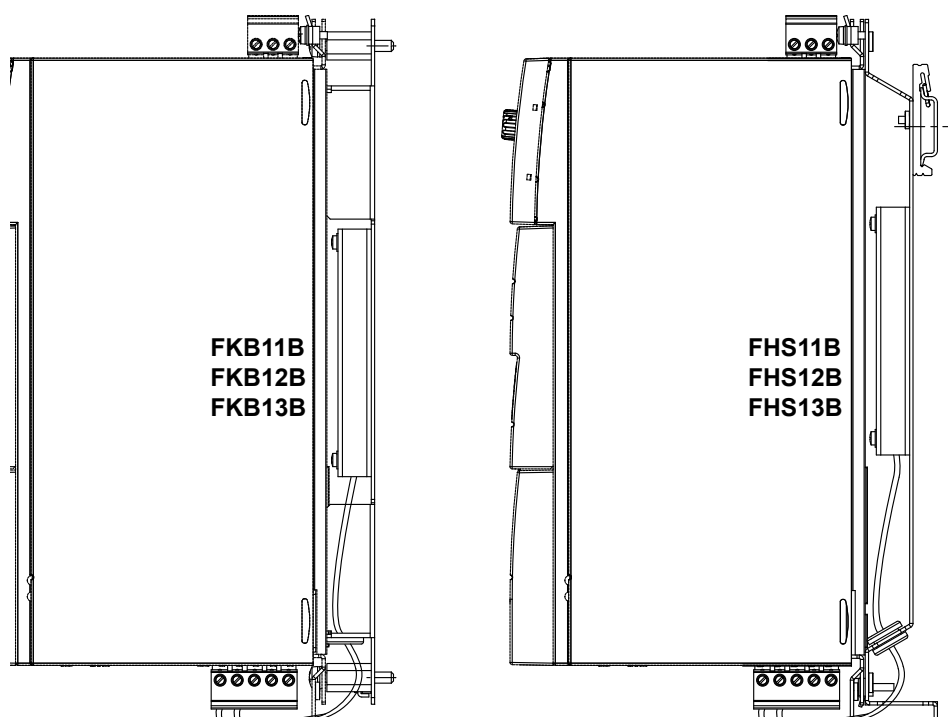
BW1 and BW3 PTC braking resistors [1] can be mounted to the shield plate under the inverter using the angle bracket FKB10B [2], part number 18216218 available as option.



8.3.8 Flat-design resistors with FKB11B / FKB12B / FKB13B and FHS11B / FHS12B / FHS13B

Flat-design braking resistors can be installed as follows:

- Installation on the back panel of the control cabinet: FKB11B / FKB12B / FKB13B
- Installation with mounting rail: FHS11B / FHS12B / FHS13B





8.4 UL compliant installation

Note the following points for UL-compliant installation:

- Only use copper cables with the following temperature ranges as connection cables:
 - MOVITRAC® B 0003 – 0300: Temperature range 60/75 °C (140/167 °F)
 - MOVITRAC® B 0370 and 0450: Temperature range 75 °C (167 °F)
- Necessary tightening torques of MOVITRAC® B power terminals: See technical data.
- Operate the inverters on supply systems with a maximum phase-to-earth voltage of AC 300 V only.
- The inverter can only be operated on IT systems if the phase-to-earth voltage of AC 300 V cannot be exceeded either during operation or in case of an error.
- MOVITRAC® B frequency inverters are only allowed to be operated on supply systems which can supply maximum values in accordance with the following table. Only use melting fuses. The performance data of the fuses must not exceed the values in the following table.



8.4.1 Maximum values/fuses

The following maximum values/fuses must be observed for UL compliant installation:

230 V units / 1-phase	Max. mains current	Max. mains voltage	Fuses
0003 / 0004 / 0005 / 0008	AC 5000 A	AC 240 V	15 A / 250 V
0011 / 0015 / 0022	AC 5000 A	AC 240 V	30 A / 250 V

230 V units / 3-phase	Max. mains current	Max. mains voltage	Fuses
0003 / 0004 / 0005 / 0008	AC 5000 A	AC 240 V	15 A / 250 V
0011 / 0015 / 0022	AC 5000 A	AC 240 V	20 A / 250 V
0037	AC 5000 A	AC 240 V	30 A / 250 V
0055 / 0075	AC 5000 A	AC 240 V	110 A / 250 V
0110	AC 5000 A	AC 240 V	175 A / 250 V
0150	AC 5000 A	AC 240 V	225 A / 250 V
0220 / 0300	AC 10000 A	AC 240 V	350 A / 250 V

400/500 V units	Max. mains current	Max. mains voltage	Fuses
0003 / 0004 / 0005 / 0008 / 0011 / 0015	AC 5000 A	AC 500 V	15 A / 600 V
0022 / 0030 / 0040	AC 5000 A	AC 500 V	20 A / 600 V
0055 / 0075	AC 5000 A	AC 500 V	60 A / 600 V
0110	AC 5000 A	AC 500 V	110 A / 600 V
0150 / 0220	AC 5000 A	AC 500 V	175 A / 600 V
0300	AC 5000 A	AC 500 V	225 A / 600 V
0370 / 0450	AC 10000 A	AC 500 V	350 A / 600 V
0550 / 0750	AC 10000 A	AC 500 V	500 A / 600 V



TIPS

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



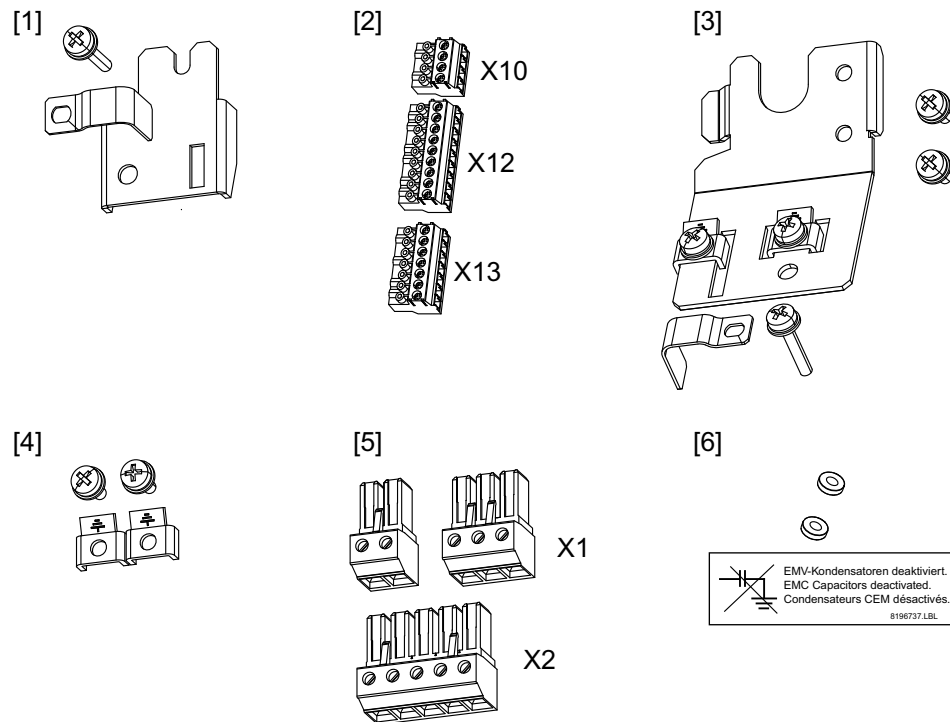
8.5 Installation of loose items

8.5.1 Scope of delivery of loose items

The scope of delivery includes a bag for loose items. Its contents depends on the size of the inverter.

Scope of delivery of loose items for size					
0XS / 0S / 0L	1	2S	2	3	4 / 5
- Shield plate for control electronics with clamps and screws [1] 3 connectors for electronics terminals [2]					
Grounding terminals with screws [4]				–	
- Shield plate for the power section with clamps and screws [3] - Connector for mains (2 or 3-pole) and motor [5] - Plastic insulations with stickers [6]	Shield plate for the power section without screws	- Touch guard - Shield plate for the power section with screws	–		Touch guard
	Fixing straps		–		

Loose items for size 0:



**8.5.2 Installing shield plate for control electronics (all sizes)**

MOVITRAC® B includes a shield plate for the control electronics with a retaining screw as standard. Install the shield plate for control electronics as follows:

1. Loosen the screw first [1].
2. Insert the shield clamp into the slot in the plastic housing.
3. Fasten the shield clamp.



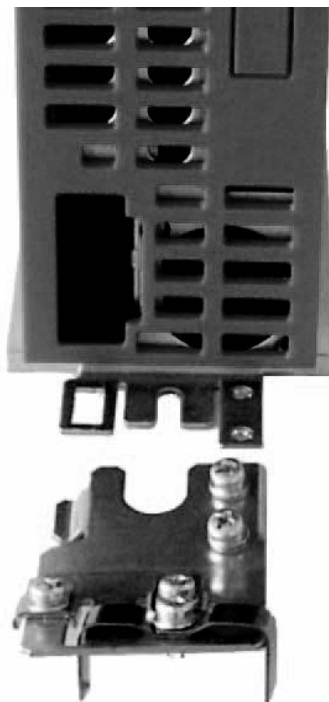
[1]

8.5.3 Installing shield plate for power section

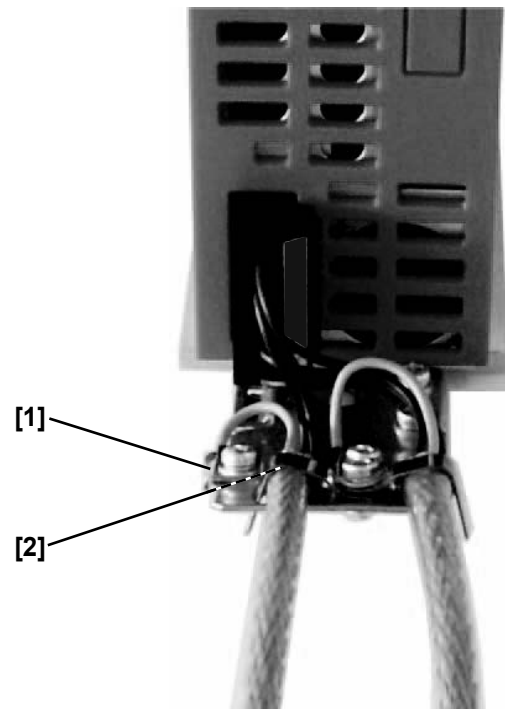
Size 0

A power shield plate for the power section with 2 retaining screws is supplied as standard with MOVITRAC® size 0.

Mount the shield plate for the power section using the two retaining screws.



[1] PE connection

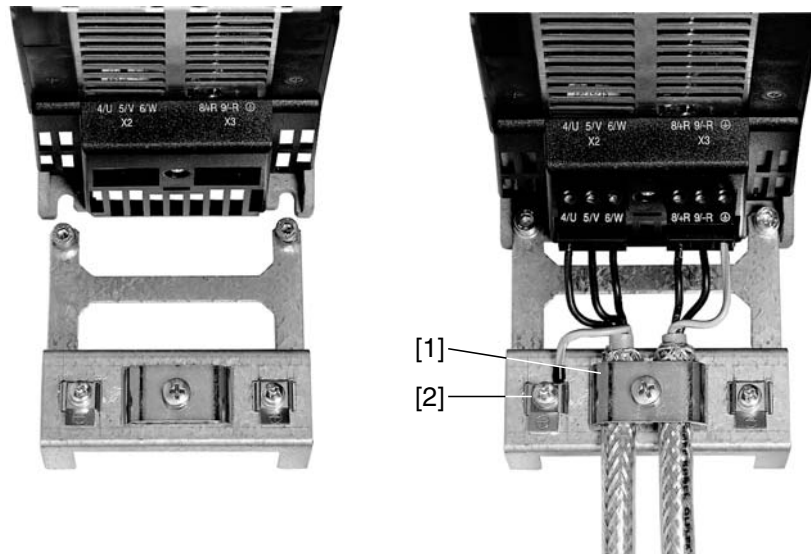


[2] Shield plate



Size 1

SEW-EURODRIVE supplies a shield plate for the power section as standard with MOVITRAC® B size 1. Mount the shield plate for the power section using the unit's two retaining screws.

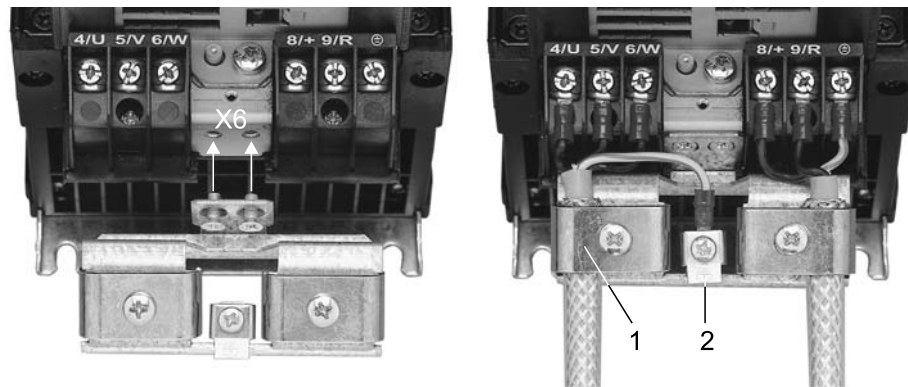


[1] Shield clamp

[2] PE connection

Sizes 2S / 2

SEW-EURODRIVE supplies a shield plate for the power section with two retaining screws as standard with MOVITRAC® B sizes 2S / 2. Mount the shield plate for the power section using the two retaining screws. The illustration shows size 2.



[1] Shield clamp

[2] PE connection

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

Sizes 3 – 5

No shield plates for the power section are supplied with MOVITRAC® B sizes 3 to 5. Use commercially available shield clamps for installing the shielding of motor and brake cables. Apply the shield as closely as possible to the inverter.



8.5.4 Installing the touch guard



! DANGER

Uncovered power connections.

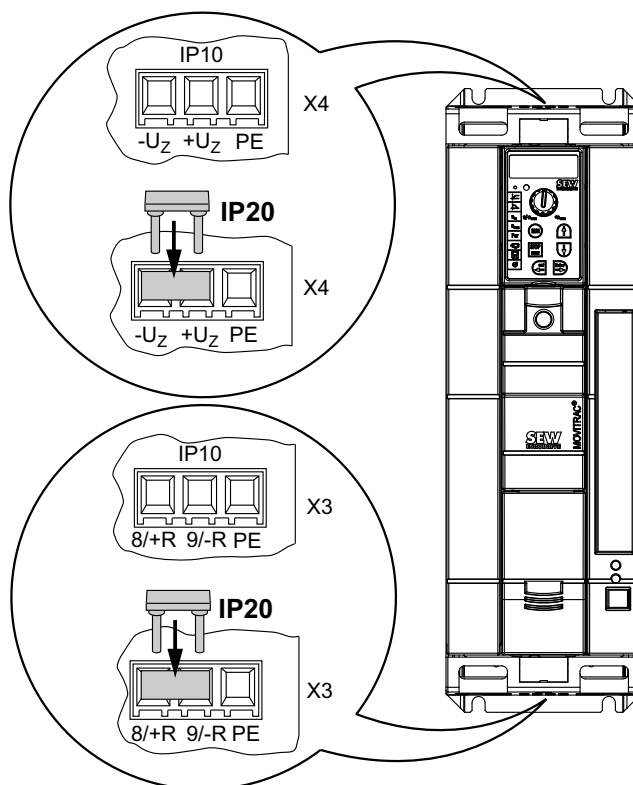
Severe or fatal injuries from electric shock.

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

Size 2S

SEW-EURODRIVE supplies two touch guards for the DC link and braking resistor terminals as standard with MOVITRAC® B size 2S. Without touch guard, MOVITRAC® B size 2S has degree of protection IP10. When the touch guard is installed, the unit has degree of protection IP20.

Install the touch guard as shown in this illustration:

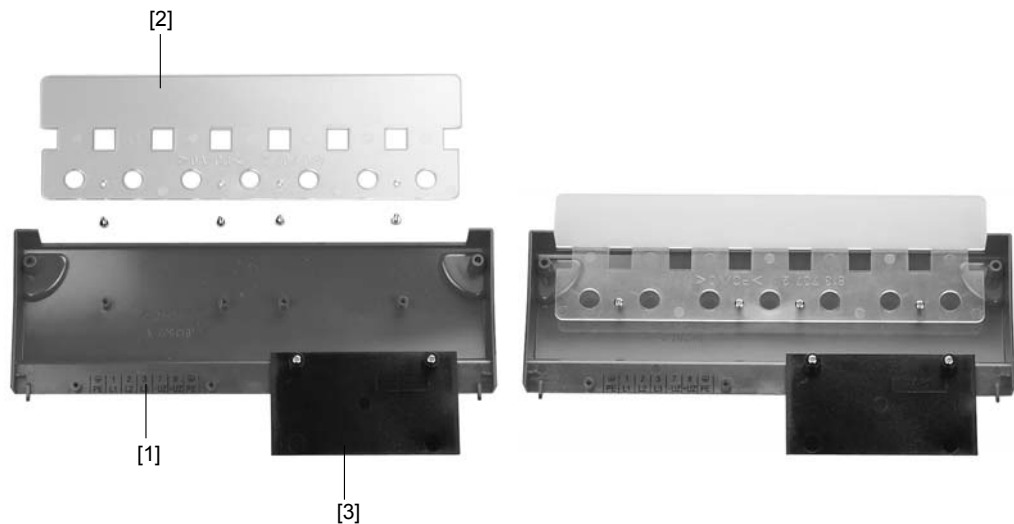




Sizes 4 / 5

Two touch guards with 8 retaining screws are supplied as standard with MOVITRAC® B sizes 4 / 5. Install the touch guard on both covers of the power section terminals.

Touch guard for MOVITRAC® B sizes 4 / 5:



The touch guard comprises the following parts:

- [1] Cover plate
- [2] Connection plate
- [3] Screen (only for size 4)

MOVITRAC® B unit sizes 4 / 5 can only achieve degree of protection IP10 when the following conditions are met:

- Touch guard is fully installed
- The shrink tubing is installed on all power terminals (X1, X2, X3, X4)



TIP

If the above conditions are not met, MOVITRAC® unit sizes 4 and 5 have degree of protection IP00.



Installation

Requirements for installing cold plate (size 0 only)

8.6 Requirements for installing cold plate (size 0 only)

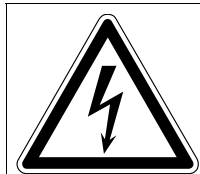
The frequency inverter power loss can be dissipated via coolers that work with different cooling media (air, water, oil, etc.). This can be useful, for example, in restricted installation spaces. When adhering to the usual installation notes (40 °C (104 °F) / 100 mm (3.94 in) space above and below), cold-plate technology is not necessary.

A good thermal connection to the cooler is important for safe operation of the frequency inverters:

- The contact area between cooler and frequency inverter has to be the size of the frequency inverter cooling plate.
- Level contact surface, deviation max. up to 0.05 mm (0.0002 in).
- Connect cooler and cooling plate with all necessary screw connections.
- The mounting plate must not exceed 70 °C (158 °F) during operation. This must be ensured by the cooling medium.
- Cold plate installation is not possible with FHS or FKB.

8.7 Deactivating EMC capacitors (size 0 only)

Only electricians are allowed to convert the unit. Once converted, the unit must be marked with the sticker provided in the accessory bag.



! DANGER

Severe or fatal injuries from electric shock.

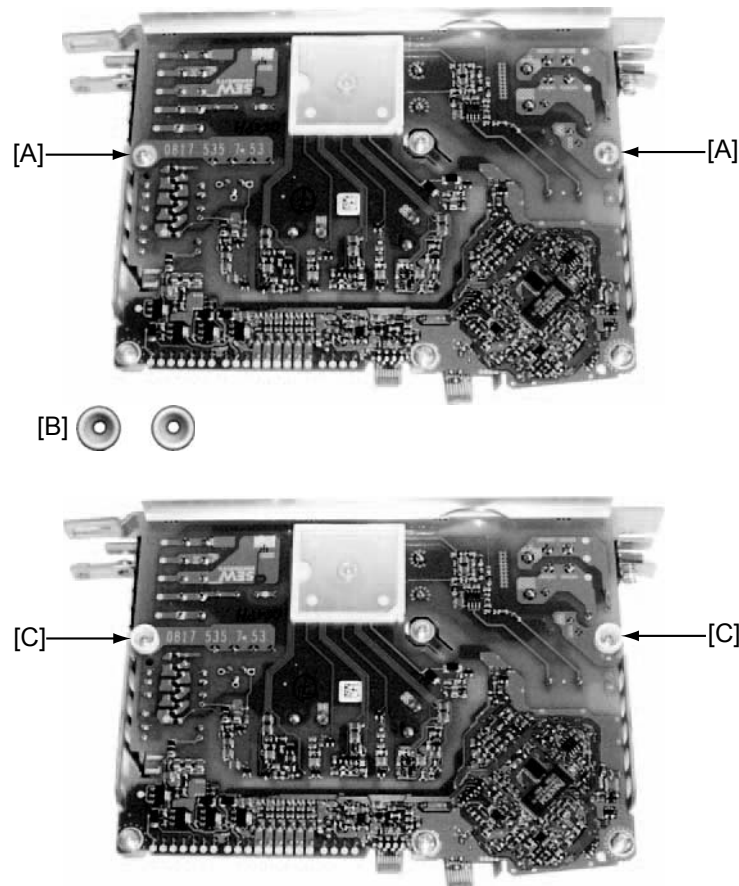
- Disconnect the inverter from the power. Switch off the DC 24 V and the mains voltage.
- Wait 10 seconds.
- Ensure that the unit is de-energized.
- Take appropriate measures to avoid electrostatic charges (use discharge strap, conductive shoes, etc.) before removing the cover.
- Touch only the unit frame and heat sink. Do not touch any electronic components.

Proceed as follows to deactivate the EMC capacitors for MOVITRAC® B:

1. Open the unit:
 - Remove **all** connectors.
 - Remove the electronics shield clamp.
 - Remove the housing retaining screw in the center of the housing front.
 - Remove the housing.



2. Remove the two screws [A] securing the circuit board.
3. Install the screws in the plastic insulations provided [B].
4. Fasten screws to the unit [C].
5. Close the unit.
6. Attach the sticker provided to the unit.



Deactivating the EMC capacitors stops earth-leakage currents from flowing over the EMC capacitors.

- Ensure that the earth-leakage currents are essentially only determined by the level of the DC link voltage, the PWM frequency, the applied motor cable and its length and the motor used.

When the suppression capacitors are deactivated, the EMC filter is no longer active.



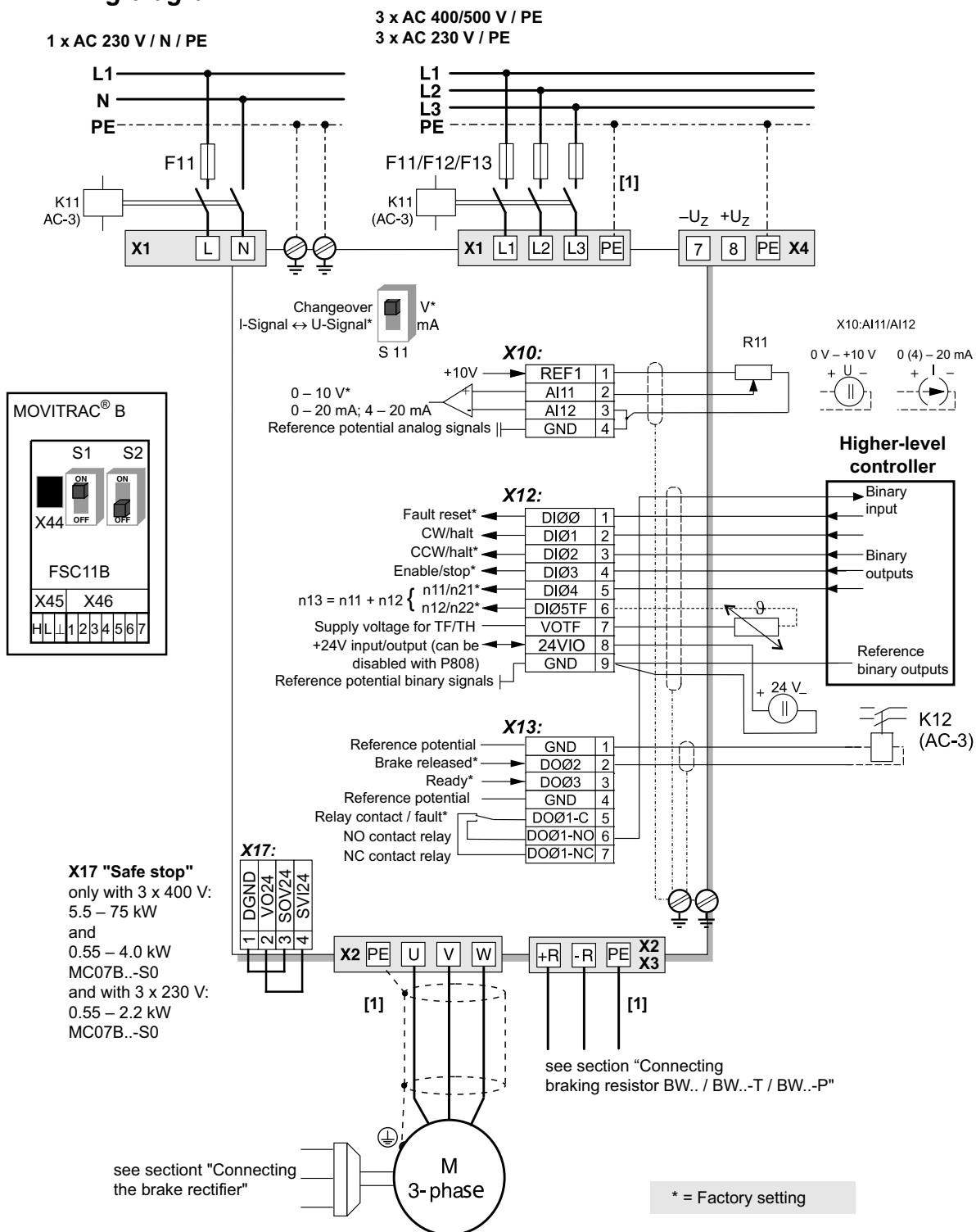
TIP

IT systems

- No EMC limits are specified for interference emission in voltage supply systems without a grounded star point (IT systems).



8.8 Wiring diagram



[1] In sizes 1, 2S, and 2, there is no PE connection next to the power supply connection terminals and motor connection terminals [X1]/[X2]. In this case, use the PE terminal next to the DC link connection [X4].

X4 is only available in sizes 1 – 5. From size 3 onwards, there are two additional PE terminals.

DC 24 V external at X12:8 / X12:9 as option except for "safe stop" MC07B...-S0.

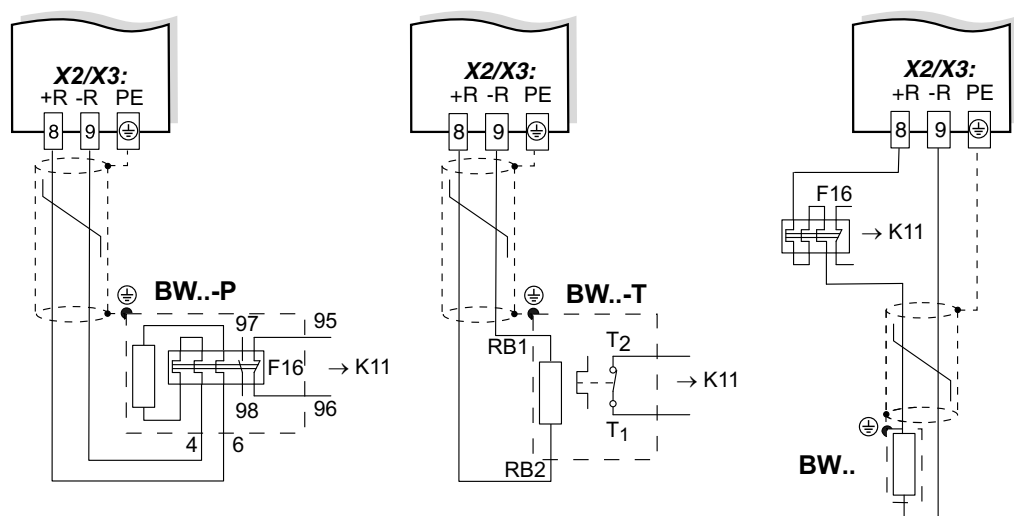


8.9 TF thermistor and TH bimetallic switch

The winding temperature is monitored using TF thermistors or TH bimetallic switches. Connect TF or TH to the TF output VOTF and the TF input DI05TF of MOVITRAC®. Set binary input DI05TF to TF signal. The temperature will then be monitored by MOVITRAC®; no additional monitoring unit is required.

You can also connect TH bimetallic switches to 24VIO and a binary input. Set the binary input to /External fault.

8.10 Connecting braking resistor BW..-P / BW..-T / BW.. to X3 / X2



Set a terminal to "/Controller inhibit". K11 must be opened and "/Controller inhibit" must receive a "0" signal in the following cases:

- BW..-P: The auxiliary contact trips
- BW..-T: The internal temperature switch trips
- BW..: The external bimetallic relay F16 trips

The resistor circuit must not be interrupted.

Overload protection for braking resistors BW:

Braking resistor type	Design specified	Overload protection	
		Internal temperature switch (..T)	External bimetallic relay (F16)
BW..	—	—	Required
BW..-T ¹⁾	—	One of the two options (internal temperature switch / external bimetallic relay) is required.	
BW..-003 / BW..-005	Adequate	—	Permitted

1) Permitted mounting options: On horizontal or vertical surfaces with brackets at the bottom and perforated sheets at top and bottom. **Mounting not permitted:** On vertical surfaces with brackets at the top, right or left.



8.11 Connecting brake rectifiers



TIP

The connection of the brake rectifier requires a separate supply system cable; supply from the motor voltage is not permitted!

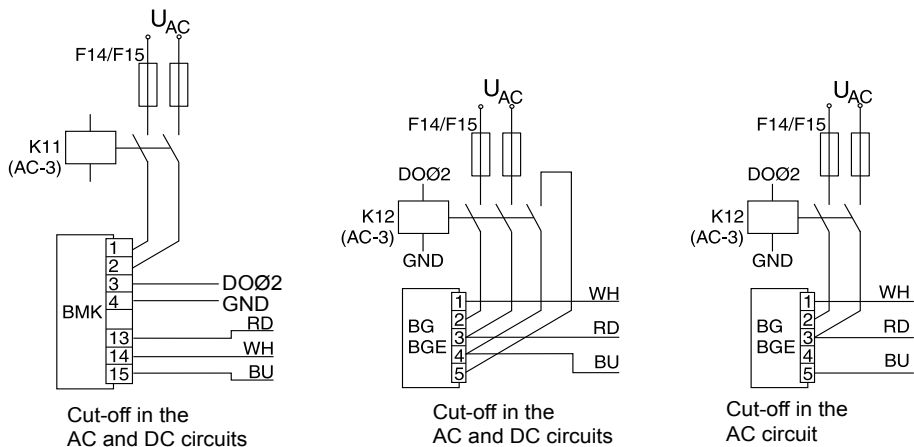
Use only contactors of utilization category AC-3 for K11 and K12.

Switch off the brake on the DC and AC sides with:

- All hoist applications.
- Drives which require a rapid brake response time.

If the brake rectifier is installed in the control cabinet, route the connecting leads between the brake rectifier and the brake separately from other power cables. Routing together with other cables is only permitted if the other cables are shielded.

Wiring diagrams

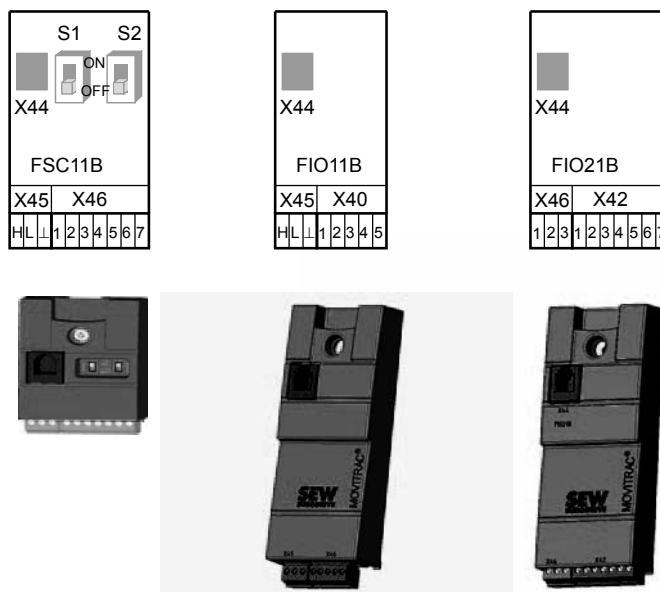


Note the corresponding connection regulations for brakes without BG/BGE or BME. Refer to the SEW publication "Drive Engineering - Practical Implementation:: SEW Disk Brakes".



8.12 Installing FSC11B / FIO11B / FIO21B

You can enhance the basic units using the FSC11B, FIO11B, and FIO21B modules.



Connection/unit	FSC11B	FIO11B	FIO21B
RS-485 service interface X44	yes	yes	yes
RS-485 terminal connection X45	yes	yes	no
SBus connection X46	yes	no	yes
Analog input/output X40	no	yes	no
Binary inputs X42	no	no	yes

8.12.1 Mounting and installation on FSC11B / FIO11B / FIO21B

Always attach the option to the unit with the screw that is included in the delivery. For size 0, mount the spacer bolt first. The bolt is already installed in sizes 1 and higher. Fitting the screw secures the high-frequency EMC connection between the basic unit and the option.

Function	Terminal	Description	Data	FSC11B	FIO11B	FIO21B
Service interface	X44	Via RJ10 plug connector	Only for service purposes Maximum cable length 3 m (10 ft)	yes	yes	yes
RS-485 interface	X45:H	ST11: RS-485+		yes	yes	no
	X45:L	ST12: RS-485-				
	X45:⊥	GND: Reference potential				
System bus	X46:1	SC11: SBus high	CAN bus to CAN specification 2.0, parts A and B Max. 64 stations	yes ¹⁾	no	yes ²⁾
	X46:2	SC12: SBus Low				no
	X46:3	GND: Reference potential				
	X46:4	SC21: SBus High				
	X46:5	SC22: SBus Low				
	X46:6	GND: Reference potential				



Function	Terminal	Description	Data	FSC11B	FIO11B	FIO21B
DC 24 V	X46:7	24VIO: Auxiliary voltage / external voltage supply		yes	no	no
Analog input	X40:1	AI2: Voltage input	-10 – +10 V $R_i > 40 \text{ k}\Omega$ Resolution 10 bit Sampling time 5 ms	no	yes	yes
	X40:2	GND: Reference potential				
Analog output	X40:3	GND: Reference potential	0 – +10 V $I_{\max} = 2 \text{ mA}$ 0 (4) – 20 mA Resolution 10 bit Sampling time 5 ms Short-circuit proof, protected against external voltage up to 30 V	no	yes	yes
	X40:4	AOV1: Voltage output				
	X40:5	AOI1: Current output				
Binary inputs	X42:1	DI10	$R_i = 3 \text{ k}\Omega$, $I_E = 10 \text{ mA}$, sampling time 5 ms, PLC-compatible	no	no	yes
	X42:2	DI11				
	X42:3	DI12				
	X42:4	DI13				
	X42:5	DI14				
	X42:6	DI15				
	X42:7	DI16				

1) Terminating resistor 120 Ω can be activated via DIP switch

2) Bus termination possible with enclosed 120 Ω resistor.

The DC 24 V function of X46:7 is identical to X12:8 of the basic unit. All GND terminals of the unit are connected to each other and to PE.

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 to 0.75 mm² (AWG 23 - AWG 18)
 - Cable resistance 120 Ω at 1 MHz
 - Capacitance per unit length $\leq 40 \text{ pF/m}$ at 1 kHz

Suitable cables include CAN bus or DeviceNet cables.

Connecting the shield

- Connect the shield to the electronics shield clamp on the inverter or master controller and make sure it is connected over a wide area at both ends.
- There is no need for a ground connections between MOVITRAC® B and gateways, or MOVITRAC® B and MOVITRAC® B with shielded cables. A 2-core cable is permitted in this case.
- When connecting MOVIDRIVE® B and MOVITRAC® B, be aware that the electrical isolation is eliminated between the reference potential DGND and ground in MOVIDRIVE® B.



CAUTION

Potential displacement

Possible consequences include malfunctions that could lead to irreparable damage to the unit.

- There must not be any potential displacement between the connected units. Take appropriate measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

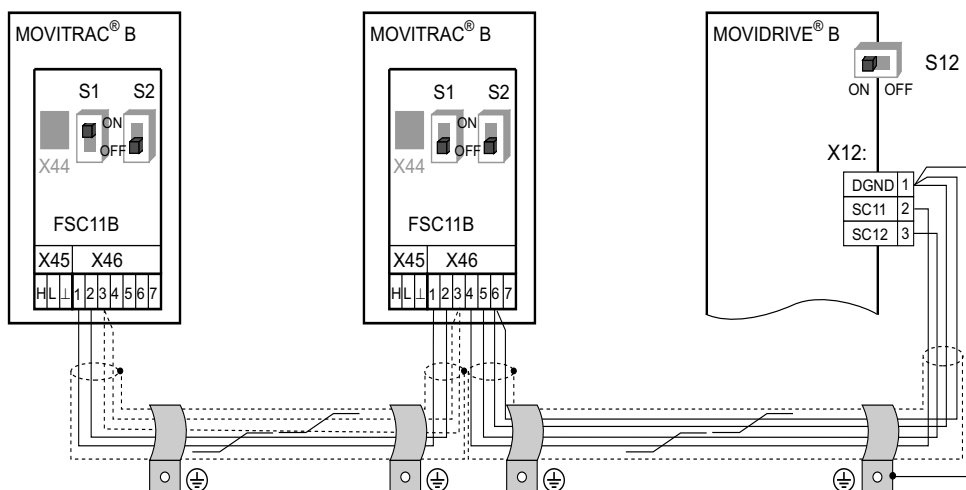


8.12.2 Installing the system bus (SBus) to FSC11B

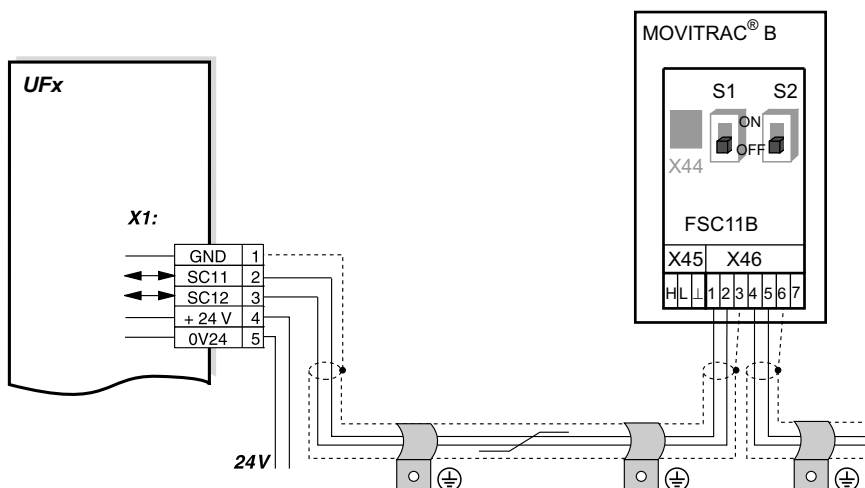
Max. 64 CAN bus stations can be addressed via system bus (SBus). The SBus supports transmission technology compliant with ISO 11898.

S1	S2	SC11/SC12	SC21/SC22
off	off	CAN1	CAN1
on	off	CAN1 concluded	—
X	on	Reserved	

MOVITRAC® B system bus connection



MOVITRAC®B system bus connection with UFx

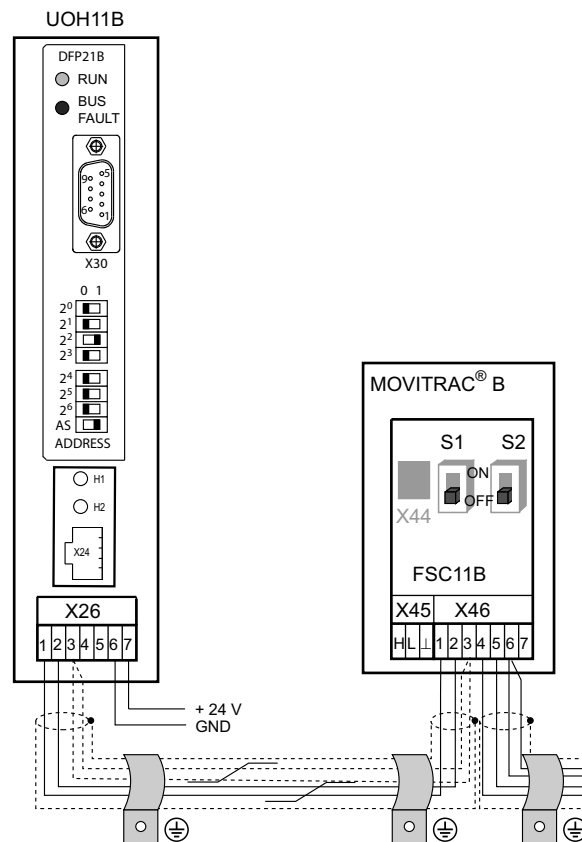




Installation

Installing FSC11B / FIO11B / FIO21B

MOVITRAC® B system bus connection with DFx/UOH11B gateways or DFx integrated in MOVITRAC® B



Cable length

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



TIP

Terminating resistor: Switch on the system bus terminating resistor (S1 = ON) at the start and end of the system bus connection. Switch off the terminating resistor on the units in between (S1 = OFF).

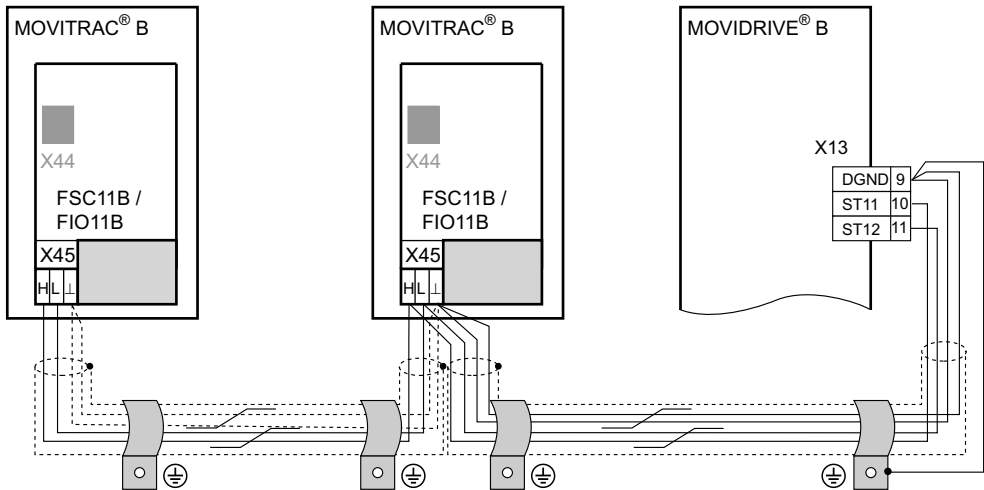
Certain units have a permanently integrated terminating resistor that cannot be switched off. This is the case for UFx and DFx/UOH. These gateways form the end of the physical line. **Do not connect any external terminating resistors.**



8.12.3 Installing RS-485 interface to FSC11B

The RS-485 interface can be used for connecting max. 32 MOVITRAC® units or 31 MOVITRAC® units and a higher-level controller (PLC).

MOVITRAC® B RS-485 connection



Cable length

- The permitted total cable length is 200 m.
- You must use shielded cables.



TIP
Terminating resistor: Dynamic terminating resistors are installed. **Do not connect any external terminating resistors.**

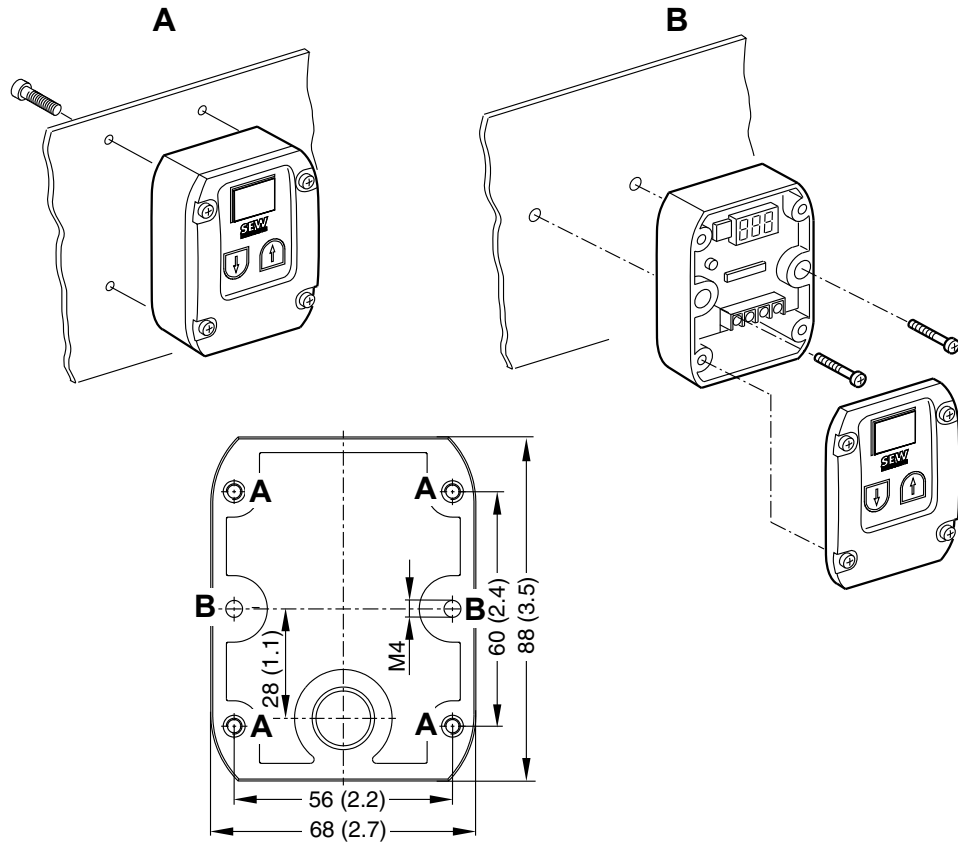
8.12.4 Wiring the FIO11B analog module

Bipolar analog input AI2	Unipolar analog input AI2	Current analog output AOC1	Voltage analog output AOV1																																																																								
<table><tr><th>X45</th><th>X40</th></tr><tr><td>RS-485+</td><td>RS-485-</td></tr><tr><td>RS-485-</td><td>GND</td></tr><tr><td>HL</td><td>AI2</td></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>GND</td></tr><tr><td>3</td><td>GND</td></tr><tr><td>4</td><td>AOV1</td></tr><tr><td>5</td><td>AOC1</td></tr></table>	X45	X40	RS-485+	RS-485-	RS-485-	GND	HL	AI2	1	GND	2	GND	3	GND	4	AOV1	5	AOC1	<table><tr><th>X45</th><th>X40</th></tr><tr><td>RS-485+</td><td>RS-485-</td></tr><tr><td>RS-485-</td><td>GND</td></tr><tr><td>HL</td><td>AI2</td></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>GND</td></tr><tr><td>3</td><td>GND</td></tr><tr><td>4</td><td>AOV1</td></tr><tr><td>5</td><td>AOC1</td></tr></table>	X45	X40	RS-485+	RS-485-	RS-485-	GND	HL	AI2	1	GND	2	GND	3	GND	4	AOV1	5	AOC1	<table><tr><th>X45</th><th>X40</th></tr><tr><td>RS-485+</td><td>RS-485-</td></tr><tr><td>RS-485-</td><td>GND</td></tr><tr><td>HL</td><td>AI2</td></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>GND</td></tr><tr><td>3</td><td>GND</td></tr><tr><td>4</td><td>AOV1</td></tr><tr><td>5</td><td>AOC1</td></tr></table> $R_L \leq 750 \Omega$	X45	X40	RS-485+	RS-485-	RS-485-	GND	HL	AI2	1	GND	2	GND	3	GND	4	AOV1	5	AOC1	<table><tr><th>X45</th><th>X40</th></tr><tr><td>RS-485+</td><td>RS-485-</td></tr><tr><td>RS-485-</td><td>GND</td></tr><tr><td>HL</td><td>AI2</td></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>GND</td></tr><tr><td>3</td><td>GND</td></tr><tr><td>4</td><td>AOV1</td></tr><tr><td>5</td><td>AOC1</td></tr></table>	X45	X40	RS-485+	RS-485-	RS-485-	GND	HL	AI2	1	GND	2	GND	3	GND	4	AOV1	5	AOC1
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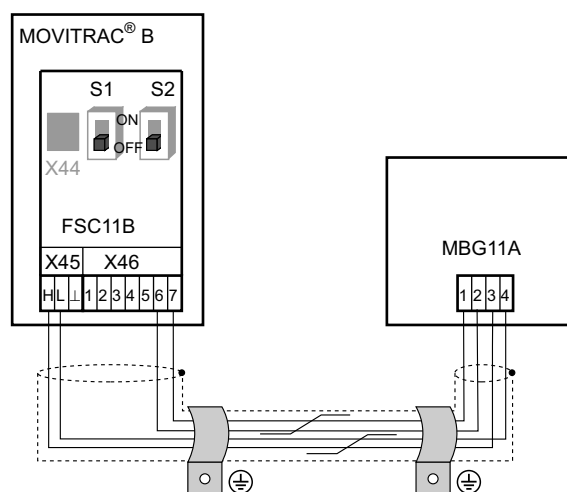


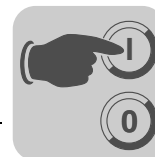
8.13 Installing the MBG11A speed control module

- A Mounting from the rear using 4 tapped holes.
- B Mounting from the front using 2 retaining holes



8.13.1 Connection





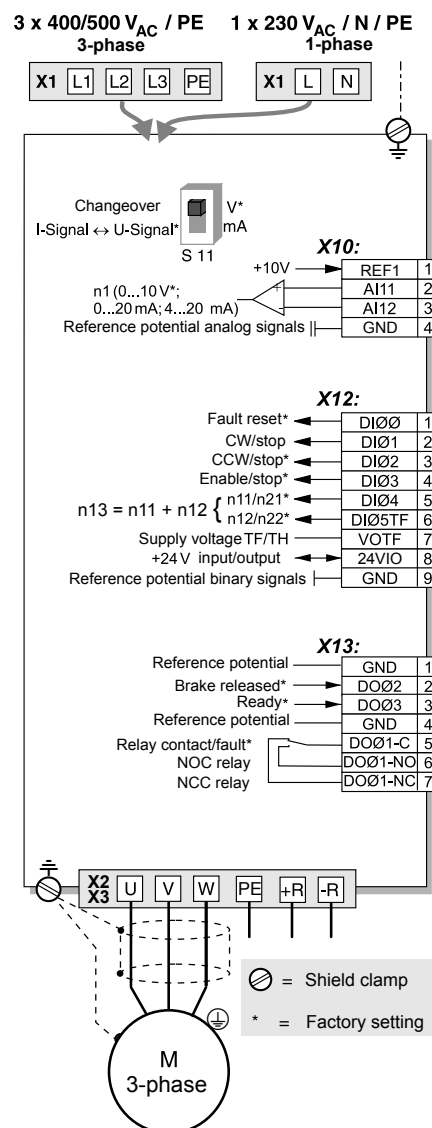
9 Startup

9.1 Brief description of the startup process

You can directly connect the MOVITRAC® B frequency motor to a motor with the same power rating. For example: A 1.5 kW (2.0 HP) motor can be connected directly to a MC07B0015.

9.1.1 Procedure

1. Connect the motor to MOVITRAC® B (terminal X2).
2. You have the option of connecting a braking resistor (terminal X2/X3).
3. The following signal terminals must be controlled with your control system:
 - Enable DIØ3
 - As required: CW/halt DIØ1 or CCW/halt DIØ2
 - Setpoint:
 - Analog input X10 and/or
 - DIØ4 = n11 = 150 rpm or/and
 - DIØ5 = n12 = 750 rpm or/and
 - DIØ4 + DIØ5 = n13 = 1500 rpm
 - For brakemotors:
 - DOØ2 = Brake control using brake rectifiers
4. You have the option of connecting the following signal terminals:
 - DIØØ = Fault reset
 - DOØ1 = /Fault (designed as relay contact)
 - DOØ3 = Ready
5. Check the controller for the required functionality.
6. Connect the frequency inverter to the mains (X1).



9.1.2 Notes

Signal terminal functions and setpoint settings can be modified using the FBG11B key-pad or a PC. A PC connection requires the FSC11B front option or one of the following interface adapters: UWS21B / UWS11A / USB11A.



9.2 General startup instructions

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

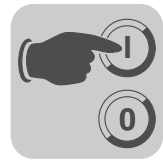
9.2.1 Prerequisite

The drive must be configured correctly to ensure that startup is successful.

MOVITRAC® B frequency inverters are factory set to be taken into operation with the SEW motor adapted to the correct power level (4-pole, 50 Hz) in V/f control mode. This means you can take the adjuster motor from SEW-EURODRIVE into operation without project planning.

9.2.2 Hoist applications

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



9.3 Preliminary work and resources

- Check the installation.

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

9.3.1 Preliminary work and resources on the MOVITRAC® B basic unit

- Connect the power supply system and the motor.
- Connect the signal terminals.
- Switch on the power supply system.

9.3.2 Preliminary work and resources for MOVITRAC® B with keypad

- Connect the power supply system and the motor. **Do not connect signal terminals to prevent the inverter from receiving an enable!**
- Switch on the power supply system.
- The display shows *Stop*.
- Program the signal terminals.
- Set the parameters (e.g. ramps).
- Check the set terminal assignment (P601 – P622).
- Switch off the power supply system.
- Connect the signal terminals.
- Switch on the power supply system.

	TIP
	The inverter automatically changes parameter values once you perform a startup.



9.4 Optional keypad FBG11B

Key arrangement and symbols on the keypad:



9.4.1 Keypad functions

The UP/DOWN and ENTER/OUT buttons are used for navigating through the menus. Use the RUN and STOP/RESET buttons to control the drive. The speed control module is used for setpoint specification.

		Use UP/DOWN to select symbols and change values.
		Use ENTER/OUT to activate and deactivate the symbols or parameter menus
		Use "RUN" to start the drive.
		Use "STOP/RESET" to reset errors and stop the drive.



The STOP/RESET button has priority over a terminal enable or an enable via the interface. If you stop a drive using the STOP/RESET key, you have to enable it again by pressing the RUN key.



TIP

After switching off the power supply, a drive that was previously stopped using the STOP key will no longer be stopped!

The STOP/RESET key can be used for performing a reset after a fault has occurred with a programmed error response. The drive is then inhibited and must be enabled by pressing the RUN key. You can deactivate the STOP function with parameter 760 using FBG11B.



If you stop the drive with the STOP/RESET key, the display `Stop` is flashing. This signal indicates you have to enable the drive using the "RUN" key.

After copying the parameter set in MOVITRAC® B, the unit is also stopped.

**9.5.1 Menu**

The LED integrated in the symbol lights up when you select a symbol. If a symbol only represents display values, the current display value appears immediately on the display.

9.5.2 Changing parameters

You can select the required parameter by selecting a symbol and pressing the ENTER key.

Press the ENTER key again to edit the parameter value. You can alter the value when the LED in the corresponding symbol flashes. When pressing the ENTER key again, the value becomes active and the LED does not flash any longer.

9.5.3 Status display

If the status is "Drive enabled", the display will show the calculated actual speed.

9.5.4 Fault display

In the event of a fault, the display changes and the fault code flashes in the display, for example F-11 (refer to the fault list in the "Service / List of Faults" section). This situation will not occur during active startup.

9.5.5 Warnings

You may not alter any parameter in any operating mode. If you try to do so, the display r-19 – r-32 will appear. The display shows a code depending on the action, e.g. r-28 (controller inhibit required). You find a list of warnings in the "Operation" section.

9.5.6 Parameter menu change short ↔ long

Using parameter P800, you can switch back and forth between short menu and long menu. The parameter description and parameter list indicates which parameters are accessible via short and long menu.



9.6 Manual operation with FBG11B speed control module

FBG11B speed control module of the keypad (local manual operation): LED flashing



The only relevant parameters in "FBG speed control module" operating mode are:

- *P122 Direction of rotation FBG manual operation*
- "RUN" and "STOP/RESET" buttons
- Speed control module (potentiometer)

When the FBG speed control module is activated, the symbol flashes.

You limit the smallest speed with *P301 Minimum speed* and the largest speed with the $n_{\max}$ symbol.

After a fault, a reset can be performed using the "STOP/RESET" button via the terminal or the interface. After a reset, the "manual speed control module" operating mode will be active again. The drive remains stopped.

The `stop` display flashes to indicate that you have to re-enable the drive by pressing "RUN."

The parameter *P760 Locking RUN/STOP keys* does not have any effect in "manual speed control module" operating mode.

Removing the FBG11B keypad will trigger a stop response.



9.7 External setpoint selection

External setpoint selection

Control via

- Terminals
- Serial interface
- Setpoint potentiometer connected to AI11/AI12

9.7.1 Set direction of rotation

You can specify the set direction of rotation:

- "CW/Stop and "CCW/Stop" in *P101 control signal source = terminals* or *P101 control signal source = 3 wire-control*
- The polarity of the setpoint in the process data word in *P101 Control signal source = RS485 or SBus* and *P100 Setpoint source = RS485 or SBus*

9.7.2 Setpoint speed

You can specify the setpoint speed using:

- Speed control module if *P121 Addition FBG speed control module* is set to ON
- *P100 Setpoint source*
 - Fixed setpoints
 - Fixed setpoints with analog input
 - Process data word from SBus or RS-485
 - Motor potentiometer

9.7.3 Direction of rotation enable with RS-485 or SBus

Unipolar setpoint sources:

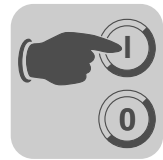
Unipolar / fixed setpoint
 Motor potentiometer / fixed setpoint
 Fixed setpoint + AI1
 Fixed setpoint* + AI1
 Frequency setpoint input / fixed setpoint

The direction of rotation is set with the CW or CCW terminals.

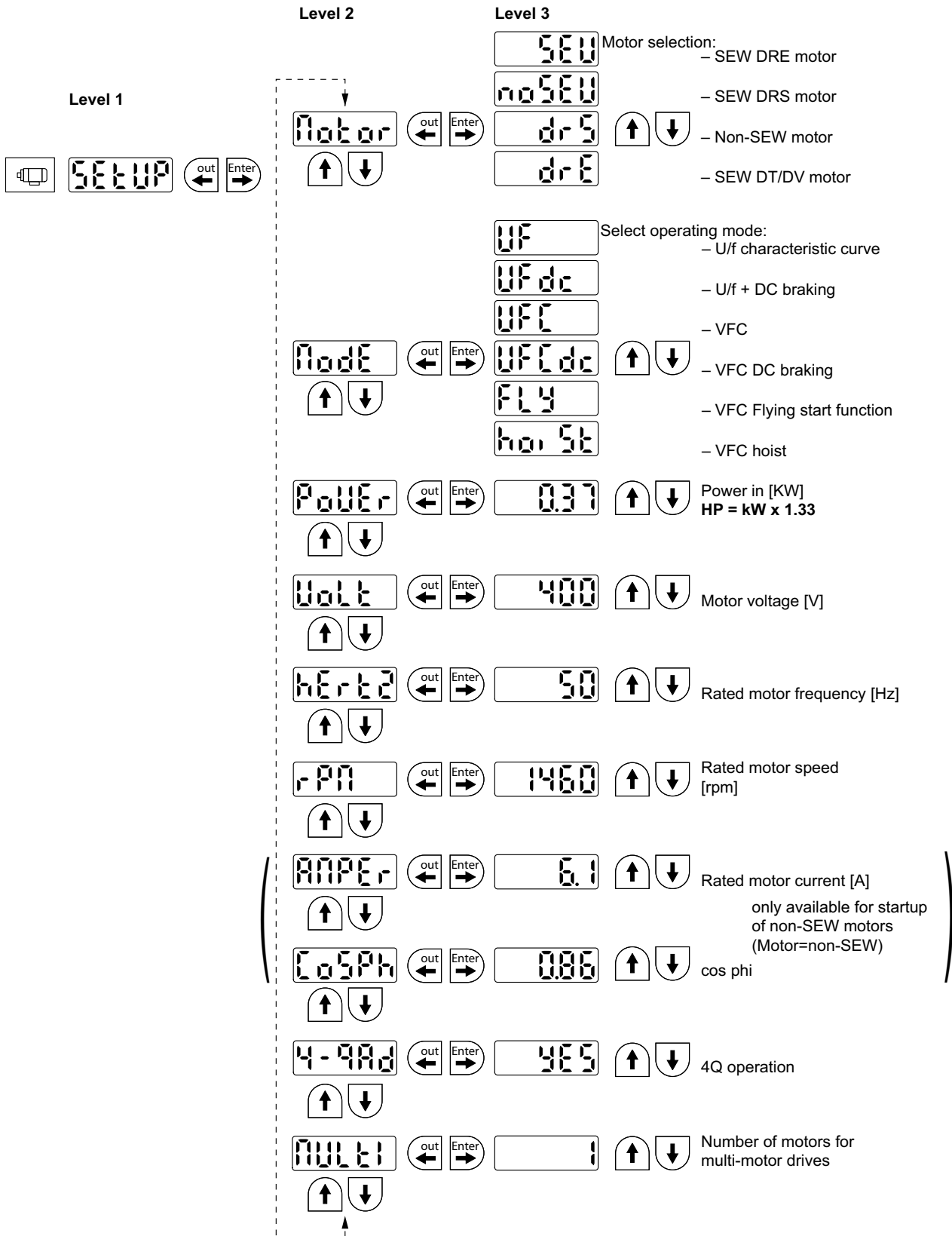
Bipolar setpoint sources:

Bipolar / fixed setpoint
 RS-485 / fixed setpoint
 SBus 1 / Fixed setpoint

The direction of rotation is determined by the setpoint. Enable with terminal CW or CCW.



9.8 Startup using the FBG11B keypad





Startup

Startup using the FBG11B keypad

9.8.1 Required data

The following data is required to ensure startup is successful:

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

9.8.2 Activating startup

Requirements:

- Drive "No enable": `stop`

If a smaller or a larger motor is connected (maximum difference one size), then you have to choose the value closest to the rated motor power.

The startup procedure is not complete until you have returned to the main menu level by pressing the OUT button.

You can then perform startup only with motor parameter set 1.

	NOTE The SEW motor startup is designed for 4-pole motors. It may be useful to start up 2-pole or 6-pole SEW motors as non-SEW motors.
--	--

9.8.3 V/f

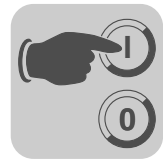
The default setting for the operating mode is V/f. Use this operating mode if you have no particular requirements and for applications where a high maximum speed is required.

9.8.4 VFC

Start up the inverter in VFC or VFC & DC brake operating mode for the following requirements:

- High torque
- Continuous duty at low frequencies
- Accurate slip compensation
- More dynamic behavior

For this purpose, you will have to choose the VFC or VFC & DC brake operating modes from `P-01` at startup.



9.8.5 Startup of multi-motor drive

Multi-motor drives are mechanically connected to each other (e.g. chain drive with several motors). Observe the notes in the publication "Multi-Motor Drives".

Multi-motor drives are possible with installed identical SEW motors only.

- Set the multi parameter of the motor startup to the number of connected motors.

9.8.6 Startup of group drives

Group drives are mechanically decoupled from each other (e.g. different conveyor belts). In this operating mode, the inverter operates without slip compensation and with a constant V/f ratio.

You can operate a group of asynchronous motors on one inverter in V/f characteristic curve operating mode. Important:

- Select V/f operating mode
- Set the power of the largest motor
- Disable automatic adjustment P320/330
- Set boost P321/331 to zero
- Set IxR compensation P322/332 to zero
- Set slip compensation P324/334 to zero
- Set current limitation P303/313 to 1.5 times the total current of all motors
- Set I_{rated} UL monitoring P345/346 to the total current of the connected motors. Implement motor protection individually.

In this operating mode, the inverter operates without slip compensation and with a constant V/f ratio.

	NOTE
	The parameter settings apply to all connected motors.

9.8.7 Startup with large mass moment of inertia, such as with pumps and fans

Slip compensation is designed for a ratio smaller than 10 of load moment of inertia to motor moment of inertia. If the ratio is larger and the drive vibrates, then slip compensation must be reduced and even be set to 0 if necessary.



9.9 Startup with DBG60B

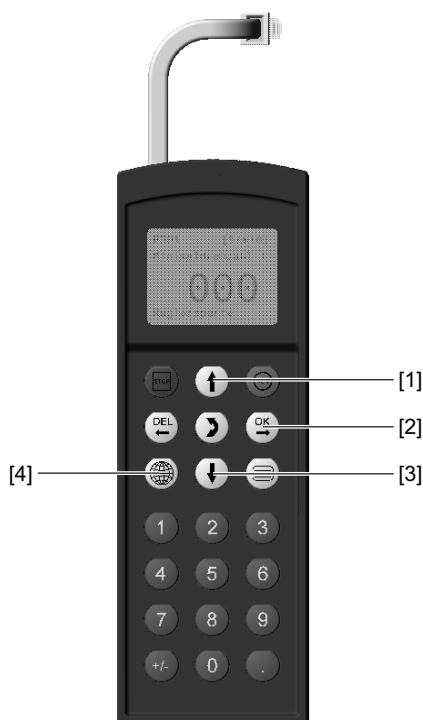
9.9.1 Required data

The following data is required to ensure startup is successful:

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

9.9.2 Selecting a language

The figure below shows the keys for selecting the language.



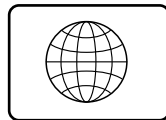
- | | | |
|-----|--------------|----------------------------------|
| [1] | ↑ key | Move up to the next menu item |
| [2] | OK key | Confirm entry |
| [3] | ↓ key | Move down to the next menu item |
| [4] | Language key | A list of languages is displayed |



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

SEW
EURODRIVE

The symbol for language selection then appears on the display.

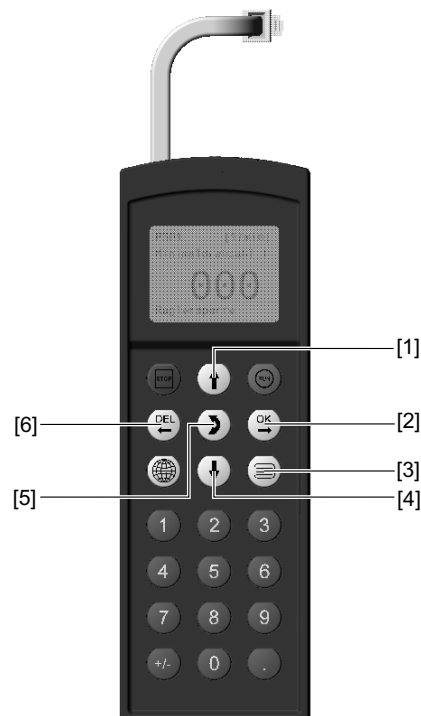


Proceed as follows to select the language:

- Press the language button. A list of languages is displayed on the screen.
- Choose the desired language using the ↑ / ↓ keys.
- Confirm your language selection by pressing the OK key. The basic display is now shown in your chosen language.

9.9.3 Startup

The figure below shows the keys required for startup.



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



9.9.4 Startup procedure

1. Enter "0" signal at terminal X12:2 (DIØ1 "/CW/STOP), e.g. by disconnecting X13 the electronics terminal block.

0.00rpm
0.000Amp
CONTROLLER INHIBIT

2. Press the context key to activate the context menu.

PARAMETER MODE
VARIABLE MODE
BASIC VIEW

3. Scroll down with the ↓ key until you have selected the menu option "STARTUP".

MANUAL MODE
STARTUP PARAMET.
COPY TO DBG
COPY TO MDX

4. To start up, press the OK key. The first parameter appears. The flashing cursor under the parameter number indicates that the keypad is in display mode.
 - 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 OK to confirm your selection.
 - Press ↔ to switch back to display mode. The flashing cursor appears again.
 - Press the ↑ key to choose the next parameter.

STARTUP PARAMET.
PREPARE FOR
STARTUP

C00*STARTUP

PARAMETER SET 1
PARAMETER SET 2

5. Set the motor type.

C22*MOTORS
SINGLE MOTOR
IDENT. MOTORS
DIFFERENT MOTORS

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

C01*OPER. MODE 1
STANDARD V/f
VFC1

VFC operating mode is required for activating the flying start or hoist function.

- a. When selecting STANDARD V/f operating mode:

C28*DC BRAKING

NO
YES

- b. When selecting VFC operating mode:

C36*OPER.MODE
SPEED CONTROL
HOIST
DC BRAKING
FLYING START



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

Press the ↑ key to choose the next parameter.

C02*MOTOR TYPE 1
DT71D2
DT71D4
DT80K2

C02*MOTOR TYPE 1

NON-SEW MOTOR
DT63K4/DR63S4

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

C03* V
MOT. RATED VOLT 1
+400.000

Example: Nameplate 230 Δ/400 ↘ 50 Hz

↘ connection → enter "400 V".

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

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

Example: Nameplate 400 Δ/690 ↘ 50 Hz

Only Δ connection possible → enter "400 V".

↘ connection is not possible.

Press the ↑ key to choose the next parameter.

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

Example: 230 Δ/400 ↘ 50 Hz

Enter "50 Hz" in ↘ and Δ connection.

C04* Hz
MOT. RATED FREQ. 1
+50.000

Press the ↑ key to choose the next parameter.



FOR SEW MOTORS

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

C47*4-Q OPERATION
NO
YES

FOR NON-SEW MOTORS

10. Enter the following motor nameplate data:

- C10* Rated motor current, type λ or Δ .
- C11* rated motor power
- C12* power factor $\cos \phi$
- C13* rated motor speed

C47*4-Q OPERATION
NO
YES

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

C05* V
MAINS RAT. VOLT. 1
+400.000

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

C06*CALCULATION

NO
YES

FOR SEW MOTORS

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

C06*SAVE

NO
YES

FOR NON-SEW MOTORS

12. For non-SEW motors, a calibration process is required to perform the calculation:
- The motor is energized automatically.

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

DATA IS
BEING COPIED...

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

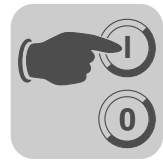
MANUAL MODE
STARTUP PARAMET.
COPY TO DBG
COPY TO MC07B

15. Press the $\downarrow$ key to scroll down until the menu item "EXIT" is selected.

EXIT UNIT
SETTINGS

16. Confirm your selection by pressing OK. The basic display appears.

0.00rpm
0.000Amp
CONTROLLER INHIBIT



DANGER

Parameter settings incorrect due to unsuitable data sets.

Severe or fatal injury.

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

- Enter any parameter settings which differ from the factory settings in the parameter list.
- In the case of non-SEW motors, set the correct brake application time (P732 / P735).
- Observe the notes for starting the motor in the section "Starting the Motor".
- With Δ connection and transition point at 87 Hz, set parameter P302/312 "Maximum speed $\frac{1}{2}$ " to the value for 87 Hz.

9.9.5 Setting parameters

Proceed in this order to set the parameters:

- Use the context key to call up the context menu. In the context menu, select the "PARAMETER MODE" menu item. Press the OK key to confirm your selection. The flashing cursor under the parameter number indicates that the keypad is in parameter mode.
- Use the $\leftrightarrow$ key to switch to edit mode. The flashing cursor disappears.
- Pressing the $\uparrow$ or $\downarrow$ key, you can select or set the correct parameter value.
- Press OK to confirm the selection or setting.
- Press the $\leftrightarrow$ key to switch back to parameter mode again. The flashing cursor appears again.
- Press the $\uparrow$ key to choose the next parameter.

9.9.6 Manual operation

The inverter can be controlled using the DBG60B keypad in manual operation (Context menu $\rightarrow$ Manual operation). The 7-segment display on the unit shows "H" during manual operation.

The binary inputs will be without any functions for the duration of manual operation, with the exception of a /Controller inhibit. A binary input "/Controller inhibit" must be assigned a "1" signal to enable the drive to be started in manual operation.

The direction of rotation is not determined by the "CW/stop" or "CCW/stop" binary inputs. Instead, you select the direction of rotation using the DBG60B keypad.

- Enter the required speed and then the direction of rotation (+ = CW/– = CCW) using the sign key (+/–).

Manual operation remains active when the power supply is switched off and on; however, the inverter is then inhibited.

- Use the "Run" key to enable and start the inverter at $n_{\min}$ in the selected direction of rotation. The speed is increased and decreased using the $\uparrow$ and $\downarrow$ keys.



Startup

Startup with PC and MOVITOOLS® MotionStudio



TIP

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



DANGER

Risk of crushing if the motor starts up unintentionally.

Severe or fatal injuries.

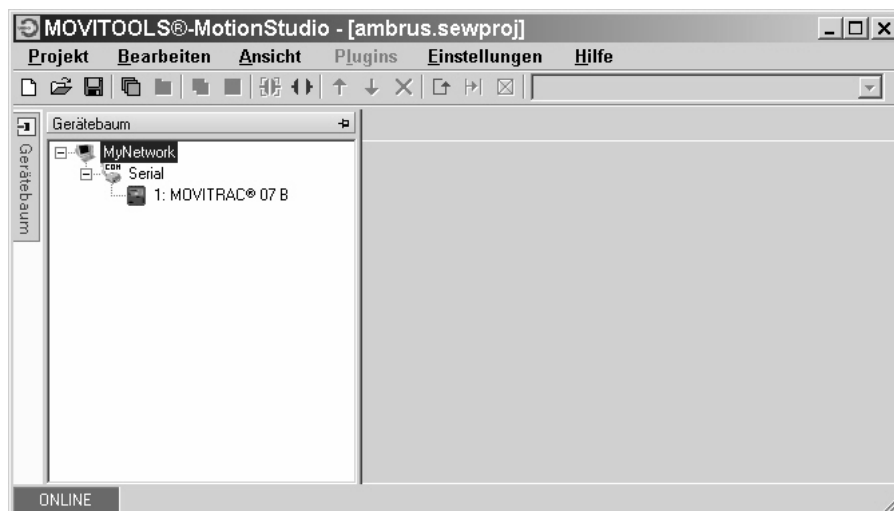
- Ensure that the motor cannot start inadvertently, for example, by removing the electronics terminal block X13.
- Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.

9.10 Startup with PC and MOVITOOLS® MotionStudio

Start MOVITOOLS® MotionStudio in the Windows start menu:

Programs / SEW / MOVITOOLS MotionStudio 5.x / MotionStudio 5.x

Press the MOVITOOLS® MotionStudio [Scan] button to list all connected units in the unit tree.



You can perform a startup by right-clicking on one of the units. You find additional information in the online help.



9.11 Startup for MBG11A speed control module

You cannot simultaneously establish communication between MOVITRAC® B / MBG11A and MOVITRAC® B / PC.

The MBG11A can simultaneously specify a setpoint for up to 31 MOVITRAC® B units.

9.11.1 Parameter settings

The following parameters have to be set in MOVITRAC® B other than the factory setting. When you use a FBG11B for setting the parameters, set the values indicated in parenthesis:

- P100: RS-485 (2)
- P101: RS-485 (1)
- P871: Set PO2 to "Speed [%]", then P876 PO data enable to "Yes".

The speed is now displayed: $-100\% - +100\%$ correspond to $-n_{\max} - +n_{\max}$.

9.11.2 Input terminals

The following input terminals must be connected with 24 V:

- DI01 CW/halt: Positive + negative direction of rotation are possible by selecting the +/- sign on the MBG11A.
- DI03 Enable/Stop

9.11.3 Settings for process data word

If you do not change the PO2 process data word, you can also use the MBG11B. In this case, the conversion is $1\% = 32 \text{ rpm}$. The results from the relationship $4000 \text{ hex} = 100\% \text{ speed}$. The following tables show the relevant values.

PO2 = Speed (standard parameter setting P871 = speed)

Percent	Hex	Decimal	Speed
1 %	A4 hex	164 dec	32
10 %	666 hex	1638 dec	328
25 %	1000 hex	4096 dec	819.2
33 %	1555 hex	5461 dec	1092.3
50 %	2000 hex	8192 dec	1638.4
75 %	3000 hex	12288 dec	2457.6
100 %	4000 hex	16384 dec	3276.8

PO2 = Speed [%] (changed parameter setting P871 = speed [%])

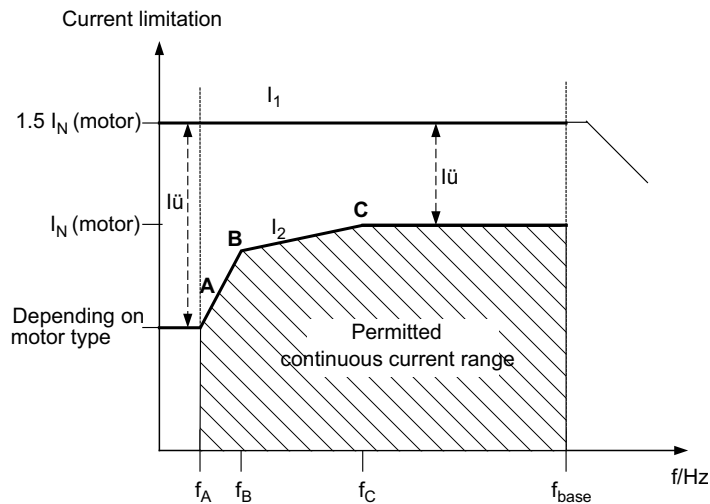
Percent	Hex	Decimal	Speed
1 %	A4 hex	164 dec	$n_{\max} / 100$
10 %	666 hex	1638 dec	$n_{\max} / 10$
25 %	1000 hex	4096 dec	$n_{\max} / 4$
33 %	1555 hex	5461 dec	$n_{\max} / 3$
50 %	2000 hex	8192 dec	$n_{\max} / 2$
75 %	3000 hex	12288 dec	$n_{\max} / 1.333$
100 %	4000 hex	16384 dec	$n_{\max}$



9.12 Startup of explosion-proof AC asynchronous motors of category 2 (94/9/EC)

Explosion-proof AC motors from SEW-EURODRIVE that are taken into operation with MOVITRAC® B must be approved for such operation according to the nameplate and EC type examination certificate.

A certified safety function is used in conjunction with temperature sensors in the motor to provide for a safe operation in potentially explosive areas. The current limitation function in MOVITRAC® B prevents the activation of the safety device, i.e. the motor is protected against impermissible overheating (→ following figure).

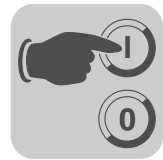


Use the MOVITOOLS® MotionStudio software for startup. During startup, parameters P560 – P566 are automatically activated for SEW motors selected and approved for Ex-e operation.

After startup, P560 can only be activated if a motor approved for Ex-e operation has been started up before.

After motor startup, current limitation I_1 is active. Current limitation I_2 determines the permanently permitted current (shaded area)

You can document the startup parameters and values with MOVITOOLS® MotionStudio. They are displayed in the "ATEX information" window.



9.13 Starting the motor

You have to exit manual operation before you can enable the motor via terminals.

9.13.1 Analog setpoint specification

The following table shows which signals must be present on terminals X11:2 (AI1) and X12:1 – X12:4 (DIØØ – DIØ3) when the "unipolar/fixed setpoint" setpoint is selected (P100) in order to operate the drive with an analog setpoint entry.

Function	X11:2 (AI1) Analog input n1	X12:1 (DIØØ) /Control- ler inhibit ¹⁾	X12:2 (DIØ1) CW/halt	X12:3 (DIØ2) CCW/ halt	X12:4 (DIØ3) Enable/ stop	X12:5 (DIØ4) n11/n21	X12:6 (DIØ5) n12/n22
Controller inhibit	X	0	X	X	X	0	0
Stop	X	1	X	X	0	0	0
Enable and halt	X	1	0	0	1	0	0
Clock- wise at 50 % n_{max}	5 V	1	1	0	1	0	0
Clock- wise with n_{max}	10 V	1	1	0	1	0	0
Counter- clockwise with 50 % n_{max}	5 V	1	0	1	1	0	0
Counter- clockwise with n_{max}	10 V	1	0	1	1	0	0

1) No default setting

0 = 0 signal

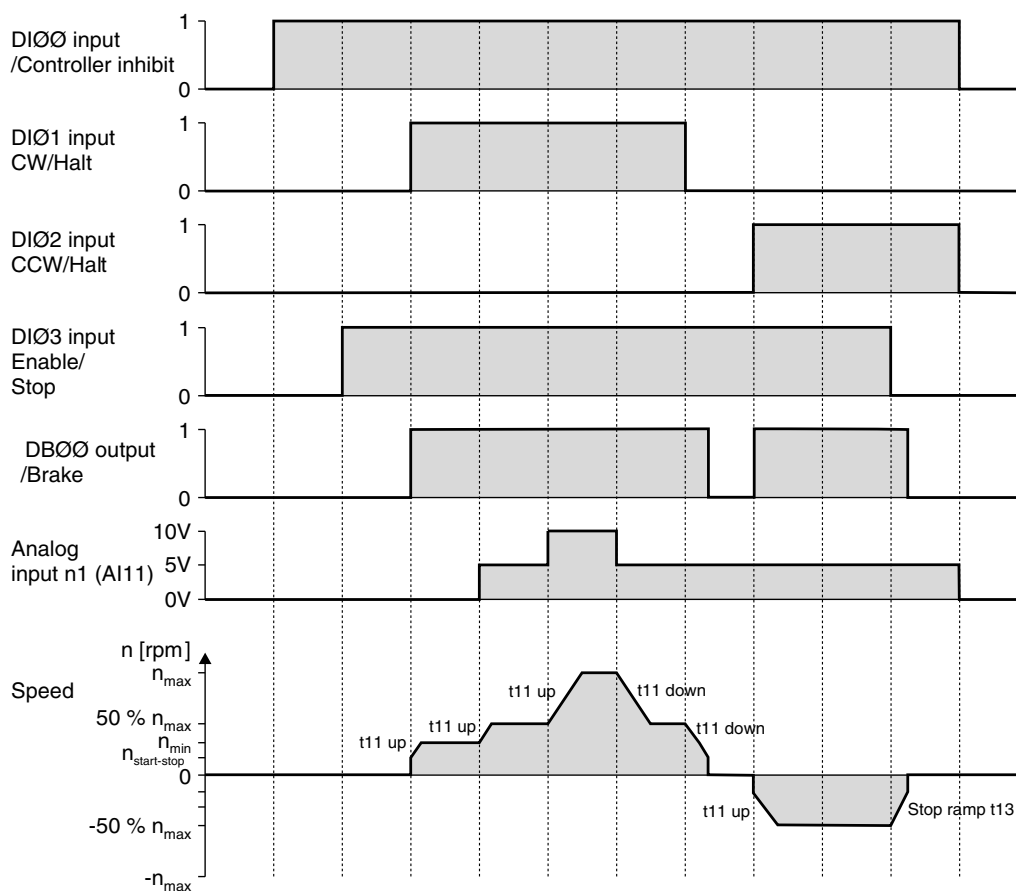
1 = 1 signal

X = Not relevant



Startup Starting the motor

The following travel cycle shows by way of example how the motor is started with the assignment of terminals X12:1 – X12:4 and analog setpoints. Binary output X10:3 (DBØØ "/Brake") is used for switching brake contactor K12.



TIP

The motor is not energized in the event of controller inhibit. A motor without brake will coast to standstill.



9.13.2 Fixed setpoints

The following table shows which signals must be present on terminals X12:1 – X12:6 (DIØØ – DIØ5) when the "unipolar/fixed setpoint" setpoint is selected (P100) in order to operate the drive with the fixed setpoints.

Function	X12:1 (DIØØ) /Control- ler inhibit	X12:2 (DIØ1) CW/halt	X12:3 (DIØ2) CCW/halt	X12:4 (DIØ3) Enable/stop	X12:5 (DIØ4) n11/n21	X12:6 (DIØ5) n12/n22
Controller inhibit	0	X	X	X	X	X
Stop	1	X	X	0	X	X
Enable and stop	1	0	0	1	X	X
CW operation with n11	1	1	0	1	1	0
CW operation with n12	1	1	0	1	0	1
CW operation with n13	1	1	0	1	1	1
CCW operation with n11	1	0	1	1	1	0

0 = 0 signal

1 = 1 signal

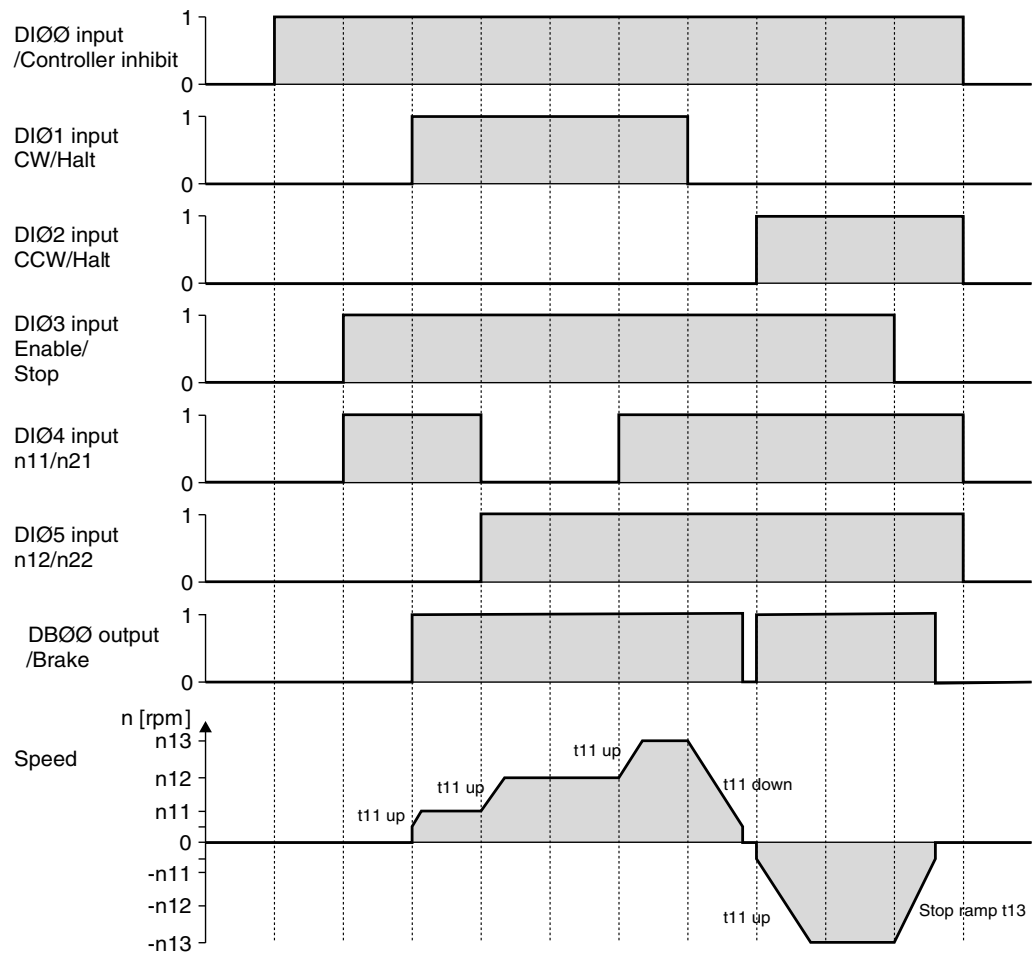
X = Not relevant



Startup

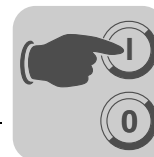
Starting the motor

The following travel cycle shows by way of example how the drive is started with the assignment of terminals X12:1 – X12:6 and the internal fixed setpoints. Binary output X10:3 (DBØØ "/Brake") is used for switching brake contactor K12.



TIP

The motor is not energized in the event of controller inhibit. A motor without brake will coast to standstill.



9.14 Parameter list

All parameters that can also be displayed and edited using the keypad are indicated as follows in the "FBG" (keypad) column:

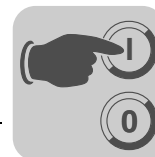
	Selection in long menu
	Selection in short or long menu
	Selection using symbol on keypad and in long menu
	Selection within FGB motor startup

If a choice is offered, the factory setting is indicated in **bold**.

No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
0..			Display values (read only)			
00.			Process values			
000		8318	Speed (signed)		[rpm]	
001		8501	User display for DBG11B		[Text]	
002		8319	Frequency (signed)		[Hz]	
004		8321	Output current (value)		[% I _N]	
005		8322	Active current (signed)		[% I _N]	
008		8325	DC link voltage		[V]	
009		8326	Output current		[A]	
01.			Status displays			
010		8310	Inverter status		[Text]	
011		8310	Operating state		[Text]	
012		8310	Error status		[Text]	
013		8310	Current parameter set		Current parameter set	
014		8327	Heat sink temperature		[°C]	
02.			Analog setpoints			
020		8331	Analog input AI1		[V]	
021		8332	Analog input AI2 (optional)		[V]	
03.			Binary inputs			
030		8844	Binary input DI00		Error reset	
031		8335	Binary input DI01		CW / halt (fixed assignment)	
032		8336	Binary input DI02		CCW/halt	



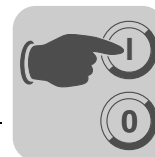
No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
033		8337	Binary input DI03		Enable/stop	
034		8338	Binary input DI04		n11/n21	
035		8339	Binary input DI05		n12/n22	
039		8334	Binary inputs DI00 – DI05		Collective display of binary inputs	
04.			Binary inputs option			
040			Binary input DI10		No function	
041			Binary input DI11		No function	
042			Binary input DI12		No function	
043			Binary input DI13		No function	
044			Binary input DI14		No function	
045			Binary input DI15		No function	
046			Binary input DI16		No function	
048		8348	Binary inputs DI10 – DI15		Collective display of binary inputs	
05.			Binary outputs			
051		8349	Binary output DO01		/fault	
052		8349	Binary output DO02		Brake released	
053		8349	Binary output DO03		Ready	
059		8349	Binary outputs DO01 – DO03		Collective display of binary outputs	
07.			Unit data			
070		8301	Unit type		[Text]	
071		8361	Rated output current		[A]	
076		8300	Firmware of basic unit		[Part number and version]	
077		–	DBG firmware		Only in DBG60B	
08.			Fault memory			
080 – 084		8366 – 8370	Fault t-0 – t-4	Fault code	Background information for previous faults.	
09.			Bus diagnostics			
094		8455	PO 1 setpoint		[hex]	
095		8456	PO 2 setpoint		[hex]	
096		8457	PO 3 setpoint		[hex]	
097		8458	PI 1 actual value		[hex]	



No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
098		8459	PI 2 actual value		[hex]	
099		8460	PI 3 actual value		[hex]	
1..			Setpoints / ramp generators (on FBG only parameter set 1)			
10.			Setpoint selection / frequency input			
100	Short	8461	Setpoint source	0 1 2 4 6 7 8 9 10 11 14	Bipolar / fixed setpoint Unipolar / fixed setpoint RS-485 / fixed setpoint Motor potentiometer/fixed setpoint Fixed setpoint + AI1 Fixed setpoint* + AI1 MASTER SBus1 MASTER RS-485 SBus 1 / Fixed setpoint Frequency setpoint input / Fixed setpoint Bipolar AI2 / Fixed setpoint	
101		8462	Control signal source	0 1 3 4	Terminals RS-485 SBus 1 3-wire control	
102		8840	Frequency scaling	0.1 – 10 – 120.00 [kHz]		
103		10247.15	FI1 reference	0 1	n _{max} n _{reference}	
104		10247.10	Setpoint reference speed n _{ref}	0 – 3000 – 6000 rpm		
105		10416.1	Wire breakage detection	0 2 4 7	No response Immediate stop/fault Rapid stop/fault Rapid stop/warning	
106	Long	10247.11	FI1 char. curve x1	0 – 100 %		
107		10247.12	FI1 char. curve y1	–100 % – 0 – +100 %		
108		10247.13	FI1 char. curve x2	0 – 100 %		
109		10247.14	FI1 char. curve y2	–100 % – 0 – +100 %		
11.			Analog input 1 (0 – 10 V)			
110	Short	8463	AI1 scaling	0.1 – 1 – 10		
112		8465	AI1 operating mode	1 5 6 7 8 9	10 V, reference maximum speed 0 – 20 mA, reference maximum speed 4 – 20 mA, reference maximum speed 0 – 10 V, n-reference 0 – 20 mA, n-reference 4 – 20 mA, n-reference	
113		8466	AI1 voltage offset	–10 V – 0 – +10 V		
116		10247.6	AI1 characteristic curve x1	0 – 100 %		
117		10247.7	AI1 characteristic curve y1	–100 % – 0 – +100 %		
118		10247.8	AI1 characteristic curve x2	0 – 100 %		
119		10247.9	AI1 characteristic curve y2	–100 % – 0 – +100 %		



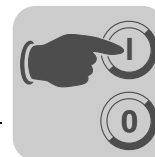
No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
12.			Analog input AI2 / FBG speed control module (option)			
120		8469	AI2 operating mode	0 1 2	No function 0 – ±10 V + setpoint 0 – 10 V current limit	
121		8811	Addition FBG setpoint control module	0 1 2	Off On On (without fixed setpoint)	
122		8799	Direction of rotation FBG manual operation	0 1 2	Unipolar CW Unipolar CCW Bipolar CW and CCW	
126		10247.1	AI2 characteristic curve x1	–100 % – 0 – +100 % (–10 V – 0 – +10 V)		
127		10247.2	AI2 characteristic curve y1	–100 % – 0 – +100 % (–n _{max} – 0 – +n _{max} / 0 – I _{max})		
128		10247.3	AI2 char. curve x2	–100 % – 0 – +100 % (–10 V – 0 – +10 V)		
129		10247.4	AI2 char. curve y2	–100 % – 0 – +100 % (–n _{max} – 0 – +n _{max} / 0 – I _{max})		
13. / 14.			Speed ramps 1 / 2			
130 / 140		8807 / 9264	Ramp t11/t21 up	0.1 – 2 – 2000 [s]		
131 / 141		8808 / 9265	Ramp t11 / t21 down	0.1 – 2 – 2000 [s]		
134 / 144		8474 / 8482	Ramp t12 / t22	0.1 – 10 – 2000 [s]		
135 / 145		8475 / 8483	S pattern t12 / t22	0 1 2 3	Off Weak Medium Strong	
136 / 146		8476 / 8484	Stop ramp t13 / t23	0.1 – 2 – 20 [s]		
139 / 149		8928 / 8929	Ramp monitoring 1 / 2	0 1	YES NO	
15.			Motor potentiometer function			
150		8809	Ramp t3 up = down	0.2 – 20 – 50 [s]		
152		8488	Save last setpoint	Off On	Off On	
16. / 17.			Fixed setpoints			
160 / 170		8489 / 8492	Internal setpoint n11 / n21	0 – 150 – 5000 [rpm]		
161 / 171		8490 / 8493	Internal setpoint n12 / n22	0 – 750 – 5000 [rpm]		
162 / 172		8491 / 8494	Internal setpoint n13 / n23	0 – 1500 – 5000 [rpm]		
163 / 173		8814 / 8817	n11/n21 PI controller	0 – 3 – 100 [%]		
164 / 174		8815 / 8818	n12/n22 PI controller	0 – 15 – 100 [%]		
165 / 175		8816 / 8819	n13/n23 PI controller	0 – 30 – 100 [%]		



No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
2..			Controller parameter			
25.			PI controller			
250		8800	PI controller	0 1 2	Off Normal Inverted	
251		8801	P-gain	0 – 1 – 64		
252		8802	I-component	0 – 1 – 2000 [s]		
253		8465	PI actual value mode	1 5 6 7 8 9	10 V, reference maximum speed 0 – 20 mA, reference maximum speed 4 – 20 mA, reference maximum speed 0 – 10 V, n-reference 0 – 20 mA, n-reference 4 – 20 mA, n-reference	
254		8463	PI actual value scaling	0.1 – 1.0 – 10.0		
255		8812	PI actual value offset	0.0 – 100.0 [%]		
3..			Motor parameters (on FBG only parameter set 1)			
30. / 31.			Limits 1 / 2			
300 / 310		8515 / 8519	Start/stop speed 1/2	0 – 150 [rpm]		
301 / 311		8516 / 8520	Minimum speed 1/2	0 – 15 – 5500 [rpm]		
302 / 312		8517 / 8521	Maximum speed 1/2	0 – 1500 – 5500 [rpm]		
303 / 313		8518 / 8522	Current limit 1/2	0 – 150 [% I _N]		
32. / 33.			Motor adjustment 1 / 2			
320 / 330		8523 / 8528	Automatic adjustment 1/2	Off On	Off On	
321 / 331		8524 / 8529	Boost 1 / 2	0 – 100 [%]		
322 / 332		8525 / 8530	IxR compensation 1/ 2	0 – 100 [%]		
323 / 333		8526 / 8531	Premagnetization time 1/2	0 – 2 [s]		
324 / 334		8527 / 8532	Slip compensation 1/ 2	0 – 500 [rpm]		
34.			I _N UL monitoring			
345 / 346		9114 / 9115	I _N UL monitoring 1/2	0.1 – 500 A		
4..			Reference signals			
40.			Speed reference signals			
400		8539	Speed reference value	0 – 750 – 5000 [rpm]		
401		8540	Hysteresis	0 – 100 – +500 [rpm]		
402		8541	Delay time	0 – 1 – 9 [s]		
403		8542	Signal = "1" when	0 1	n < n _{ref} n > n _{ref}	



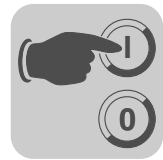
No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
43.			Current reference signal			
430	Long	8550	Current reference value	0 – 100 – 150 % I _N		
431		8551	Hysteresis	0 – 5 – 30 % I _N		
432		8552	Delay time	0 – 1 – 9 s		
433		8553	Signal = "1" when	0 1	I < I _{ref} I > I _{ref}	
44.			I _{max} signal			
440	Long	8554	Hysteresis	0 – 5 – 50 % I _N		
441		8555	Delay time	0 – 1 – 9 s		
442		8556	Signal = "1" when	0 1	I < I _{max} I > I _{max}	
45.			PI controller reference signal			
450	Long	8813	PI actual value reference	0.0 – 100.0 %		
451		8796	Signal = "1" if	0 1	PI Actual value < PI ref PI Actual value > PI ref	
5..			Control functions (on FBG only parameter set 1)			
50.			Speed monitoring 1 / 2			
500 / 502	Long	8557 / 8559	Speed monitoring 1 / 2	0 3	Off Motor/regenerative	
501 / 503		8558 / 8560	Delay time 1/2	0 – 1 – 10 [s]		
54.			Gear unit/motor monitoring			
540	Long	9284	Response to drive vibration / warning		Factory setting: Display error	
541		9285	Response to drive vibration / fault		Factory setting: Rapid stop/warning	
542		9286	Response to oil aging / fault		Factory setting: Display error	
543		9287	Response to oil aging/warning		Factory setting: Display error	
544		9288	Oil aging / over-temperature		Factory setting: Display error	
545		9289	Oil aging / ready signal		Factory setting: Display error	
549		9290	Response to brake wear		Factory setting: Display error	



No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
56.			Current limit Ex-e motor:			
560	Long	9293	Current limit Ex-e motor		ON / OFF	
561		9294	Frequency A		0 – 5 – 60 Hz	
562		9295	Current limit A		0 – 50 – 150 %	
563		9296	Frequency B		0 – 10 – 104 Hz	
564		9297	Current limit B		0 – 80 – 200 %	
565		9298	Frequency C		0 – 25 – 104 Hz	
566		9299	Current limit C		0 – 100 – 200 %	
6..			Terminal assignment			
60.			Binary inputs			
601	Short	8336	Binary input DI02 assignment		0: No function 1: Enable / stop (factory setting DI03) 2: CW/halt 3: CCW / halt (factory setting DI02) 4: n11/n21 (factory setting DI04) 5: n12/n22 (factory setting DI05) n13 = n11 + n12 6: Fixed setpoint switchover 7: Parameter set switchover 8: Ramp switchover 9: Motor potentiometer up 10: Motor potentiometer down 11: /External fault 12: Fault reset (factory setting DI00) 19: Slave free running 20: Setpoint acceptance active 26: TF signal (only with DI05) 27: Vibration/warning 28: Vibration/fault 29: Brake wear 30: Controller inhibit 33: Oil aging/warning 34: Oil aging/fault 35: Oil aging / overtemperature 36: Oil aging/ready	
602		8337	Binary input DI03 assignment			
603		8338	Binary input DI04 assignment			
604		8339	Binary input DI05 assignment			
608		8844	Binary input DI00 assignment			
61.			Binary inputs option			
610	Short	8340	Binary input DI10 assignment			
611		8341	Binary input DI11 assignment			
612		8342	Binary input DI12 assignment			
613		8343	Binary input DI13 assignment			
614		8344	Binary input DI14 assignment			
615		8345	Binary input DI15 assignment			
616		8346	Binary input DI16 assignment			



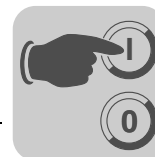
No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
62.			Binary outputs			
620	Short	8350	Binary output DO01 assignment		0: No function 1: /Fault (factory setting DO01)	
621		8351	Binary output DO02 assignment		2: Ready (factory setting DO03) 3: Output stage ON	
622		8916	Binary output DO03 assignment		4: Rotating field ON 5: Brake released (factory setting DO02 / not with DO03) 8: Parameter set 9: Speed reference message 11: Setpoint-actual value comparison signal 12: Current reference signal 13: I _{max} signal 21: IPOS output 22: /IPOS fault 23: PI controller actual value reference 24: Ex-e current limit active (in preparation) 27: Safe stop 30: Ixt warning 31: Ixt fault	
64.			Analog outputs AO1 (optional)			
640	Long	8568	AO1 analog output	0 1 2 3 4 5 6 7 11 12	No function Ramp generator input Setpoint speed Actual speed Actual frequency Output current Active current Unit utilization Actual speed (signed) Actual frequency (signed)	
641		10248.5	AO1 reference	0 1 2	3000 rpm, 100 Hz, 150 % n _{max} n _{set} reference	
642		8570	AO1 Operating mode	0 2 3 4	No function 0 – 20 mA 4 – 20 mA 0 – 10 V	
646	Long	10246.1	AO1 char. curve x1	–100 % – 0 – +100 %		
647		10246.2	AO1 char. curve y1	0 – 100 %		
648		10246.3	AO1 char. curve x2	–100 % – 0 – +100 %		
649		10246.4	AO1 char. curve y2	0 – 100 %		
7..			Control functions (on FBG only parameter set 1)			
70.			Operating modes 1 / 2			
700 / 701		8574 / 8575	Operating mode 1 / 2	0 2 3 4 21 22	VFC VFC & Hoist VFC & DC braking VFC & flying start function V/f characteristic curve V/f & DC braking	



No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
71.			Standstill current 1 / 2			
710 / 711	Long	8576 / 8577	Standstill current 1/2	0 – 50 % I _{Mot}		
72.			Setpoint stop function 1 / 2			
720 / 723		8578 / 8581	Setpoint stop function 1/2	Off On	Off On	
721 / 724	Long	8579 / 8582	Stop setpoint 1/2	0 – 30 – 500 [rpm]		
722 / 725		8580 / 8583	Start offset 1/2	0 – 30 – 500 [rpm]		
73.			Brake function 1 / 2			
731 / 734		8749 / 8750	Brake release time 1/2	0 – 2 [s]		
732 / 735	Long	8585 / 8587	Brake application time 1/2	0 – 2 [s]		
74.			Speed skip function			
740 / 742		8588 / 8590	Skip window center 1/2	0 – 1500 – 5000 rpm		
741 / 743	Long	8589 / 8591	Skip width 1/2	0 – 300 rpm		
75.			Master/slave function			
750		8592	Slave setpoint			
751	Long	8593	Scaling slave setpoint			
76.			Manual operation			
760	Long	8798	Lock RUN/STOP keys	Off On	Off On	
77.			Energy-saving function			
770	Long	8925	Energy-saving function	Off On	Off On	
8..			Unit functions (on FBG only parameter set 1)			
80.			Setup			
800		–	Quick menu	long short		
801		–	DBG language			
802	Short	8594	Factory setting	No Hours ALL NEMA	0 / No 1 / Standard 2 / Delivery status 4 / NEMA delivery status	
803		8595	Parameter lock	Off On	Off On	
804		8596	Reset statistics data		No action Fault memory	
805		–	Rated mains voltage		50 – 500 V	
806		–	Copy DBG → MOVITRAC® B		Yes No	



No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
807		–	Copy MOVITRAC® B → DBG		Yes No	
808		8660	24 V output voltage		Off On	
809		10204.1	IPOS enable		Off On	
81.			Serial communication			
810	Long	8597	RS-485 address	0 – 99		
811		8598	RS-485 group address	100 – 199		
812		8599	RS-485 timeout interval	0 – 650 [s]		
82.			Brake operation 1 / 2			
820 / 821		8607 / 8608	4-quadrant operation 1/2	Off On	Off On	
83.			Error responses			
830	Long	8609	Response terminal "external fault"	2 4 7	Immediate stop / fault Rapid stop / fault (830) Rapid stop / warning (833 / 836)	
833		8612	Response to RS-485 timeout			
836		8615	Response to SBus timeout			
84.			Reset behavior			
840		8617	Manual reset		Yes No	
841		8618	Auto reset		Off On	
842		8619	Restart time		1 – 3 – 30 s	
85.			Scaling actual speed value			
850	Long	8747	Scaling factor numerator	1 – 65535 (can be set with SHELL only)		
851		8748	Scaling factor denominator	1 – 65535 (can be set with SHELL only)		
852		8772 / 8773	User-defined unit	Text		
853		9312	Scaled speed FBG	0 1	Speed Scaled speed	
86.			Modulation 1 / 2			
860 / 861	Long	8620 / 8621	PWM frequency 1/2	4 8 12 16	4 kHz 8 kHz 12 kHz 16 kHz	
862 / 863		8751 / 8752	PWM fix 1 / 2	On Off	On Off	



No.	FBG	Index dec.	Name	Range / factory setting		Value after startup
				Display	MOVITOOLS® MotionStudio	
87.			Process data parameter setting			
870	Long	8304	Setpoint description PO1		No function (factory setting P872) Setpoint speed (factory setting P871) Max. speed Ramp Control word 1 (factory setting P870) Control word 2 Setpoint speed [%] IPOS PO data PI controller setpoint [%]	
871		8305	Setpoint description PO2			
872		8306	Setpoint description PO3			
873		8307	Actual value description PI1			
874	Long	8308	Actual value description PI2		Actual speed (factory setting P874) Output current (factory setting P875) Active current Status word 1 (factory setting P873) Actual speed [%] IPOS PI-DATA PI controller actual value [%]	
875		8309	Actual value description PI3			
876	Long	8622	Enable PO data		No Yes	
88.			Serial communication SBus			
880	Long	8937	SBus protocol	0 / MoviLink 1 / CANopen		
881		8600	SBus address	0 – 63		
882		8601	SBus group address	0 – 63		
883		8602	SBus timeout interval	0 – 650 [s]		
884	Long	8603	SBus baud rate	125 250 500 1000	125 kBd 250 kBaud 500 kBaud 1 MBaud	
886		8989	CANopen address	1 – 2 – 127		



10 Operation

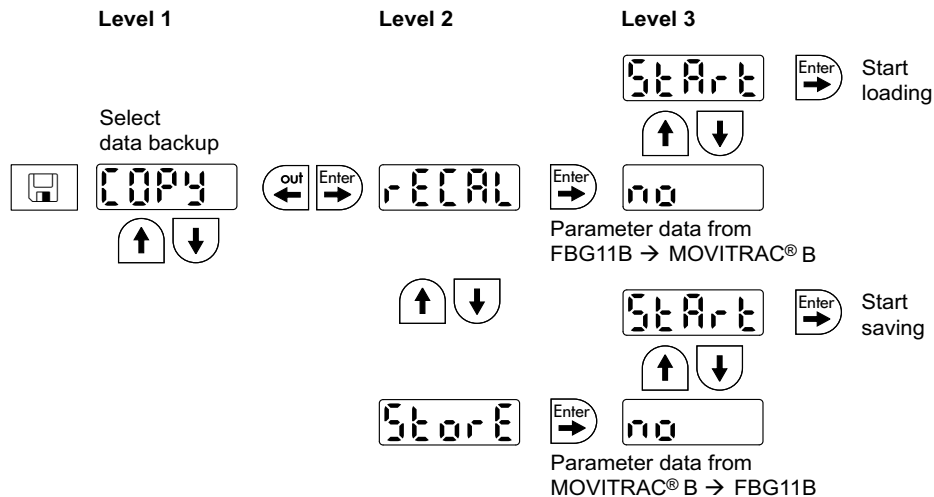
10.1 Data backup

10.1.1 Data backup using FBG11B

Use the FBG11B keypad to download parameter data from the MOVITRAC® B to the keypad or copy from the keypad to MOVITRAC® B.

After copying the parameters, check them for accuracy.

Data backup using FBG11B



After copying data, the MOVITRAC® B is inhibited. The inhibited status is indicated by a flashing STOP in the status display. The status LED also slowly flashes yellow.

You can revoke the inhibit by taking one of the following measures:

- Pressing the RUN button on the FBG11B.
- Switching the mains off, waiting 10 seconds, and switching the mains back on

10.1.2 Data backup using DBG60B

Copy the parameter set from MOVITRAC® B to the DBG60B keypad. You have the following options:

- In the context menu, select the "COPY TO DBG" menu item. Confirm your selection by pressing OK. The parameter set is copied from MOVITRAC® B to DBG60B.
- In the context menu, select the "PARAMETER MODE" menu item. Select parameter P807 "MCB → DBG". The parameter set is copied from MOVITRAC® B to DBG60B.

10.1.3 Data backup using UBP11A

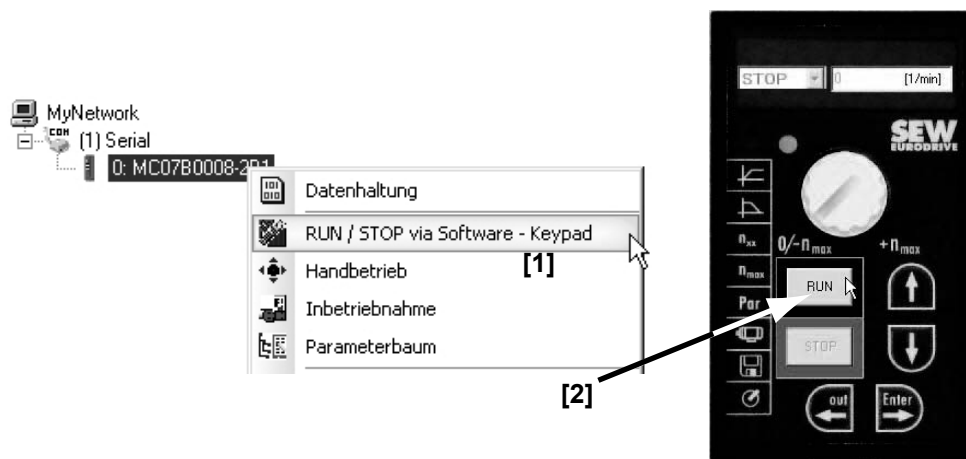
Copy the parameter set from MOVITRAC® B to the UBP11A parameter module. To do so, press the button at the lower end of the module. You need a pointed object for this purpose.



10.1.4 Data backup using MOVITOOLS® MotionStudio

When you use MOVITOOLS® MotionStudio to transfer data to the MOVITRAC® B frequency inverter, you must re-enable the inverter as follows:

- Select the unit in the network.
- Open the context menu with a right mouse click
- Select menu [RUN/STOP via software keypad] [1]
- Select [RUN] in the software keypad [2]



10.2 Return codes (r-19 – r-38)

Return codes MOVITRAC® B:

No.	Designation	Meaning
19	Parameter lock activated	Parameters cannot be changed
20	Factory setting in progress	Parameters cannot be changed
23	Option card missing	The option card required for the function is missing.
27	Option card missing	The option card required for the function is missing.
28	Controller inhibit required	Controller inhibit required
29	Invalid value for parameter.	- Invalid value for parameter. - FGB manual operation selection invalid as PC is in active manual operation.
32	Enable	You cannot perform this function in ENABLED status
34	Error during execution	- Error while saving in FBG11B. - Startup not performed with FBG. Perform FGB startup with MotionStudio or select a new motor.
38	FBG11B incorrect data set	Stored data set does not match the unit



10.3 Status displays

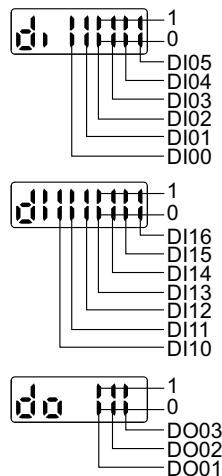
10.3.1 FBG11B keypad

If the status is "Drive enabled", the display will show the calculated actual speed.

Status	Display
Drive "Controller inhibit"	oFF
Drive "No enable"	StoP
Drive "Enable"	8888 (actual speed)
Factory setting	SEt (Set)
Standstill current	dc
24 V operation	24U

Status of binary inputs / outputs

Parameter P039 (binary inputs of basic unit), parameter P059 (binary outputs of option), and parameter P059 (binary outputs) are available as display parameters in the parameter menu. The status is displayed as binary. Every binary input or output has two segments vertically on top of one another of the 7-segment display assigned to it. The upper segment lights up when the binary input or output is set, and the lower segment lights up when the binary input or output is not set. The two 7-segment displays on the right indicate whether P039 (di = binary inputs basic unit), P048 (dl = binary inputs option), or P059 (do = binary outputs) are output.



If no FIO21B with binary inputs is available, the display will show di - - -.



10.3.2 LED flash codes

The LED on the front of the unit signals the following states:

Status	Display (optional with FBG)	LED flash code status of basic unit
"ENABLE"	Speed	Constant green light
"ENABLE" at current limit	Speed flashes	Rapid green flashing
"CURRENT AT STAND-STILL"	dc	Slow green flashing
Timeout	Faults 43 / 46 / 47	Flashing green/yellow
"NO ENABLE"	Stop	Constant yellow light
"FACTORY SETTING"	SEt	Rapid yellow flashing
"CONTROL.INHIBIT"	oFF	Rapid yellow flashing
"24 V operation"	Flashing 24U	Slow yellow flashing
"SAFE STOP"	Flashing U	Slow yellow flashing
FGB manual operation active or inverter stopped using "stop" button.	FGB manual operation symbol or "stop" is flashing	Yellow on long, off briefly
Copy	Fault 97	Flashing red/yellow
System fault	Faults 10 / 17 ... 24 / 25 / 32 / 37 / 38 / 45 / 77 / 80 / 94	Constant red light
Overvoltage / phase failure	Faults 4 / 6 / 7	Slow red flashing
Overload	Faults 1 / 3 / 11 / 44 / 84	Rapid red flashing
Monitoring	Faults 8 / 26 / 34 / 81 / 82	2 x red flashing
Motor protection	Faults 31 / 84	3 x red flashing



! WARNING

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

Severe or fatal injuries.

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

10.4 Unit status codes

Use status word 1 to determine the unit status code.

Code	Meaning
0x0	Not ready
0x1	Controller inhibit
0x2	No enable
0x3	Standstill current active, no enable
0x4	Enable
0x8	Factory setting is active



10.5 DBG60B keypad

10.5.1 Basic displays

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

Display when /CONTROLLER INHIBIT = "0".

```
0.00rpm
0.000Amp
NO ENABLE
```

Display when inverter is not enabled ("ENABLE/STOP" = "0").

```
950.00rpm
0.990Amp
ENABLE (VFC)
```

Display for enabled inverter.

```
NOTE 6:
VALUE TOO HIGH
```

Information message

```
(DEL)=Quit
Fault      9
STARTUP PARAMET.
```

Fault display

10.5.2 Information messages

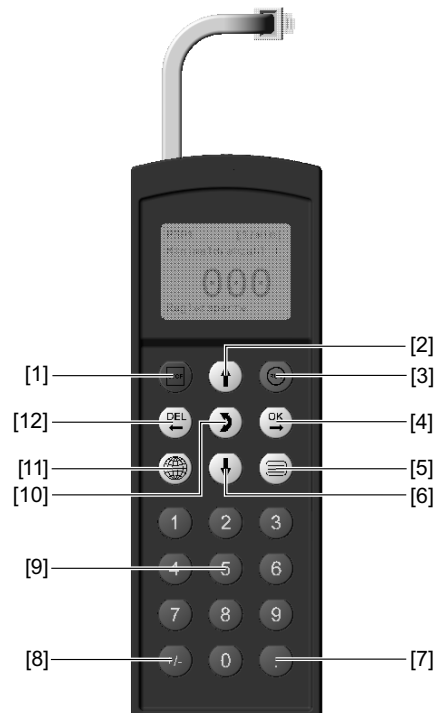
Information messages on the DBG60B (ca. 2 s in duration) or in MOVITOOLS® MotionStudio/SHELL (message that can be acknowledged):

No.	Text DBG60B/SHELL	Description
1	ILLEGAL INDEX	Index addressed via interface not available.
2	NOT IMPLEMENT.	- Attempt to execute a function that is not implemented. - An incorrect communication service has been selected. - Manual operation selected via invalid interface (e.g. fieldbus).
3	READ ONLY VALUE	Attempt to modify a read only value.
4	PARAM. INHIBITED	Parameter lock P 803 = "ON", parameter cannot be altered.
5	SETUP ACTIVE	Attempt to change parameters when factory setting is active.
6	VALUE TOO HIGH	Attempt to enter a value that is too high.
7	VALUE TOO LOW	Attempt to enter a value that is too low.
8	REQ. CARD MISSING	The option card required for the selected function is missing.
-		
10	ONLY VIA ST1	Manual operation must be completed using X13:ST11/ST12 (RS 485).
11	ONLY TERMINAL	Manual operation must be exited via TERMINAL (DBG60B or UWS21B).
12	NO ACCESS	Access to selected parameter denied.
13	CTRL. INHIBIT MISSING	Set terminal DI00 "/Controller inhibit" = "0" for the selected function.
14	INVALID VALUE	You tried to enter an invalid value.
--		
16	PARAM. NOT LOCKED	Overflow of EEPROM buffer, e.g., due to cyclic write access. Parameter not stored in non-volatile EEPROM.
17	INVERTER ENABLED	- Parameter to be changed can only be set in the state "CONTROLLER INHIBIT". - Attempt to change to manual mode during live operation



10.5.3 Functions of the DBG60B keypad

Key assignments
for DBG60B



[1]	Stop key	Stop
[2]	↑ key	Up arrow, moves up to the next menu item
[3]	RUN key	Start
[4]	OK key	OK, confirms the entry
[5]	Context key	Activate the context menu
[6]	↓ key	Down arrow, moves down to the next menu item
[7]	. key	Decimal point
[8]	± key	Sign reversal
[9]	Keys 0 ... 9	Digits 0... 9
[10]	↔ key	Change menu
[11]	Language key	Select language
[12]	DEL key	Delete previous entry

Copy function of the DBG60B

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

- In the context menu, select the menu item "COPY TO DBG". Confirm your selection by pressing OK.
- After the copying process has finished, plug the keypad in the other inverter.
- In the context menu, select the menu item "COPY TO MC07B". Confirm your selection by pressing OK.


Parameter mode

Proceed as follows to set the parameters in parameter mode:

1. Press the context key to activate the context menu. The first menu item is "PARAMETER MODE".

```
PARAMETER MODE
VARIABLE MODE
BASIC VIEW
```

2. Press the OK key to start PARAMETER MODE. The first display parameter P000 "SPEED" appears. Use the ↑ or ↓ key to select main parameter groups 0 to 9.

```
P 000 upm
SPEED
+0.0
CONTROLLER INHIBIT
```

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 GENERATORS

CONTROLLER INHIBIT
```

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 GENERATORS

CONTROLLER INHIBIT
```

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

```
\ 13. SPEED
RAMPS 1

CONTROLLER INHIBIT
```

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 INHIBIT
```

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

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

8. Press the 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 INHIBIT
```

9. Use the ↑ or ↓ key to set the required parameter value.

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

10. Press the OK key to confirm the setting. To exit setting mode, press the ↔ key. The flashing cursor is positioned under the third digit of the parameter number again.

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



11. Use the ↑ 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 INHIBIT

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 GENERATORS
CONTROLLER INHIBIT

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

PARAMETER MODE
VARIABLE MODE
BASIC VIEW

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

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

Adding parameters to the user menu

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

- Use the context key to call up the context menu. Select the "PARAMETER MODE" menu item.
- Select desired parameter and press the OK key to confirm.
- Use the context 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 by pressing OK. The selected parameter is stored in the user menu.

*Deleting
parameters from
the user menu*

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

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

*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 view. 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)
- Basic view

Proceed as follows to save a wake-up parameter:

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



11 Service / List of Faults

11.1 Unit information

11.1.1 Fault memory

The inverter stores the error message in fault memory P080. The inverter does not save a new fault until the error message has been acknowledged. The local operating panel shows the most recent fault. Whenever double faults occur, the value stored in P080 does not correspond to the value displayed on the operating panel. This is an example of what happens with F-07 DC link overvoltage followed by F34 Ramp timeout.

The inverter stores the following information when a malfunction occurs:

- Error occurred
- Status of the binary inputs / binary outputs
- Operating status of the inverter
- Inverter status
- Heat sink temperature
- Speed
- Output current
- Active current
- Unit utilization
- DC link voltage

11.1.2 Switch-off responses

There are 3 switch-off responses depending on the fault:

Immediate switch-off

This fault response causes immediate locking of the output stage with simultaneous control of the brake output so that an existing brake is applied. The "fault message" is set and the "ready message" is revoked.

This status can only be exited by an explicit fault reset.

Stop

This fault response causes a stop at the set stop ramp (P136 / P146). This fault stop is subject to time monitoring. If the drive does not reach the start / stop speed within a specified time period, the unit goes to the fault state, the output stage is inhibited and an existing brake is applied. The fault message "F34 Ramp timeout" is generated. The original fault message is overwritten. If the drive reaches the start/stop speed, the unit goes to the fault state, the brake is applied and the output stage is inhibited. The "fault message" is set and the "ready message" is revoked.

This status can only be exited by an explicit fault reset.



Timeout (warning) If the inverter is controlled via a communication interface (RS-485 or SBus) and the mains power was switched off and back on again, the enable remains ineffective until the inverter once again receives valid data via the interface, which is monitored with a timeout.

11.1.3 Reset

Reset basic unit An error message can be acknowledged by:

- Reset via input terminals with an appropriately assigned binary input (DIØØ, DIØ2...DIØ5). Factory setting for DIØØ is fault reset.

Reset keypad An error message can be acknowledged by:

- Manual reset on the keypad (STOP/RESET key).

The "STOP/RESET" key has priority over a terminal enable or an enable via the interface.

The STOP/RESET key can be used for performing a reset after a fault has occurred with a programmed error response. A reset inhibits the drive. To enable the drive, press the RUN key.

Interface reset An error message can be acknowledged by:

- Manual reset in MOVITOOLS® MotionStudio / *P840 Manual reset = Yes*, or in the status window of the reset button.



11.2 List of faults (F-00 – F-113)

No.	Designation	Response	Possible cause	Measure
00	No error			
01	Overcurrent	Immediate switch-off with inhibit.	• Short circuit on output	• Rectify the short circuit
			• Switching on output	• Switching with inhibited output stage only
			• Motor too large	• Connect a smaller motor
			• Faulty output stage	• Consult SEW Service if the error cannot be reset
03	Ground fault	Immediate switch-off with inhibit.	• Ground fault in motor	• Replace motor
			• Ground fault in inverter	• Replace MOVITRAC® B
			• Ground fault in the motor supply lead	• Eliminate ground fault
			• Overcurrent (see F-01)	• See F-01
04	Brake chopper	Immediate switch-off with inhibit.	• Too much regenerative power	• Extend deceleration ramps
			• Braking resistor circuit interrupted	• Check supply cable to the braking resistor
			• Short circuit in the braking resistor circuit	• Rectify the short circuit
			• Brake resistor resistance too high	• Check technical data of braking resistor
			• Brake chopper defective	• Replace MOVITRAC® B
			• Ground fault	• Eliminate ground fault
06	Mains phase failure	Immediate switch-off with inhibit (only with 3-phase inverter)	• Phase failure	• Check the power supply cable
			• Supply voltage too low	• Check the supply voltage
07	DC link overvoltage	Immediate switch-off with inhibit.	• DC link voltage too high	• Extend deceleration ramps • Check supply cable to the braking resistor • Check technical data of braking resistor
			• Ground fault	• Eliminate ground fault
08	Speed monitoring	Immediate switch-off with inhibit.	Current controller works at the set limit due to:	
			• Mechanical overload	• Reduce load • Check current limitation • Extend deceleration ramps • Increase P501 deceleration time setting ¹⁾
			• Phase failure in supply system	• Check mains phases
			• Phase failure in motor	• Check motor cable and motor
			• Maximum speed for VFC operating modes exceeded	• Reduce maximum speed
09	Startup	Immediate switch-off with inhibit.	• Inverter not started yet	• Start up the inverter
			• Unknown motor selected	• Select another motor



Service / List of Faults

List of faults (F-00 – F-113)

No.	Designation	Response	Possible cause	Measure
10	IPOS-ILLOP	Stop with inhibit With IPOS only	• Wrong command during program execution	• Check the program
			• Incorrect conditions during program execution.	• Check program run
			• Function does not exist / is not implemented in the inverter	• Use another function
11	Over-temperature	Stop with inhibit	• Thermal overload of inverter	• Reduce load and/or ensure adequate cooling • If a braking resistor is integrated in the heat sink: Install braking resistor externally
17 ... 24	System malfunction	Immediate switch-off with inhibit.	• Inverter electronics is faulty, possibly due to EMC influence	• Check grounding and shielding and improve, if necessary. • Contact SEW Service for advice if this fault reoccurs.
25	EEPROM	Stop with inhibit	• Fault while accessing EEPROM	• Activate factory settings, perform reset and reset parameters. • Contact SEW Service for advice if this fault reoccurs.
26	External terminal	Programmable	• Read in external fault signal via programmable input.	• Eliminate respective cause; reprogram terminal if necessary.
31	TF/TH sensor tripped	Stop with inhibit	• Motor too hot, TF sensor has tripped	• Let motor cool off and reset error
			• TF sensor of motor not connected or connected incorrectly • Connection of MOVITRAC® B and TF on motor interrupted	• Check connections / links between MOVITRAC® B and TF
32	IPOS index overflow	Stop with inhibit	• Programming principles violated leading to internal stack overflow	• Check user program and correct it
34	Ramp timeout	Immediate switch-off with inhibit.	• Set ramp time exceeded.	• Extend the ramp time
			• If you remove the inhibit and the drive exceeds the stop ramp time t13 by a certain time, the inverter will signal F34.	• Extend the stop ramp time
35	Ex-e protection operating mode	Programmable	• Wrong operating mode selected	• Permitted modes: • V/f, VFC, VFC hoist • Non-permitted modes: • Flying start function • DC braking • Group operation
			• Non-permitted parameter set	• Use parameter set 1 only
			• No Ex-e motor taken into operation	• Take Ex-e motor into operation
			• Incorrectly parameterized frequency points	• Frequency A < frequency B • Frequency B < frequency C
			• Current limits not set correctly	• Current limit A < current limit B • Current limit B < current limit C



No.	Designation	Response	Possible cause	Measure
36	Option missing	Immediate switch-off with inhibit.	- Type of option card not allowed - Setpoint source, control signal source or operating mode not permitted for this option card - Required option missing	- Use correct option card - Set correct setpoint source. - Set correct control signal source - Set the correct operating mode. - Check parameters P120 and P121 - Check the following parameters: - P121 for FBG11B - P120 and P642 for FIO12B
37	System watchdog	Immediate switch-off with inhibit.	Fault in system software sequence	- Check grounding and shielding and improve, if necessary. - Contact SEW Service for advice if this fault reoccurs.
38	System software	Immediate switch-off with inhibit.	System malfunction	- Check grounding and shielding and improve, if necessary. - Contact SEW Service for advice if this fault reoccurs.
43	RS-485 timeout	Stop without inhibit ²⁾	Connection between inverter and PC interrupted.	Check connection between inverter and PC.
44	Unit utilization	Immediate switch-off with inhibit.	Unit utilization (Ixt value) exceeded	- Decrease power output - Extend ramps - If mentioned points not possible: Use a larger inverter
45	Initialization	Immediate switch-off with inhibit.	Error during initialization	Contact SEW Service for advice.
47	System bus 1 timeout	Stop without inhibit	Fault during communication via system bus	Check system bus connection
77	IPOS control word	Stop with inhibit	System malfunction	Contact SEW Service for advice.
80	RAM test	Immediate disconnection	Internal unit fault, RAM defective.	Contact SEW Service.
81	Start condition	Immediate switch-off with inhibit.	Only in "VFC hoist" operating mode: The motor could not be supplied with the correct amount of current during the pre-magnetizing time: - Rated motor power too small in relation to rated inverter power - Motor cable cross section too small	- Check connection between inverter and motor - Check startup data and perform new startup, if necessary. - Check cross section of motor cable and increase if necessary.
82	Open output	Immediate switch-off with inhibit.	Only in "VFC hoist" operating mode: 2 or all output phases interrupted - Rated motor power too small in relation to rated inverter power	- Check connection between inverter and motor - Check startup data and perform new startup, if necessary.



No.	Designation	Response	Possible cause	Measure
84	Motor protection	Stop with inhibit	Motor utilization too high.	- Check P345/346 I_N UL monitoring - Reduce load - Extend ramps - Longer pause times
94	EEPROM checksum	Immediate switch-off with inhibit.	Defective EEPROM	Contact SEW Service.
97	Copy error	Immediate switch-off with inhibit.	- Parameter module is removed during copying process - Switching off/on during copying process	Prior to confirming the error: Load factory setting or complete data set from parameter module
98	CRC error flash	Immediate disconnection	Internal unit fault Flash memory defective.	Send unit in for repair.
100	Vibration/warning	Display error	Vibration sensor warning (→ "DUV10A" operating instructions)	Determine cause of vibrations. Continue operation until F101 occurs.
101	Oscillation fault	Rapid stop	Vibration sensor signals fault	SEW-EURODRIVE recommends that you remedy the cause of the vibrations immediately
102	Oil aging/warning	Display error	Oil aging sensor warns	Schedule oil change
103	Oil aging/fault	Display error	Oil aging sensor signals fault	SEW-EURODRIVE recommends that you change the gear unit oil immediately.
104	Oil aging/over-temperature	Display error	Oil aging sensor signals over-temperature	- Let oil cool down - Check if the gear unit cools properly
105	Oil aging / ready signal	Display error	Oil aging sensor is not ready for operation	- Check voltage supply of oil aging sensor - Check and, if necessary, replace the oil aging sensor
106	Brake wear	Display error	Brake lining worn down	Replace brake lining (→ "Motors" operating instructions)
110	"Ex-e protection" fault	Stop with inhibit	Duration of operation below 5 Hz exceeded	- Check project planning - Shorten duration of operation below 5 Hz
113	Analog input open circuit	programmable	AI1 analog input open circuit	Check the wiring
116	"Timeout MOVI-PLC" fault	Rapid stop/warning	MOVI-PLC® communication time-out	- Check startup - Check wiring

1) Speed monitoring is set by changing parameters 500 / 502 and 501 / 503. The sagging of hoists cannot be avoided safely when monitoring is deactivated or the delay time is set too long.

2) No reset required, error message disappears after communication is reestablished

11.3 SEW electronics service

11.3.1 Hotline

Call the Drive Service Hotline to talk to an SEW-EURODRIVE service specialist on 365 days a year, 24 hours a day.

Simply dial the prefix **01805** and then enter the key combination **SEWHELP**. Or simply dial **018057394357**.



11.3.2 Sending in for repair

Please contact the **SEW Electronics Service** if you cannot rectify a fault.

Please always specify the unit status code number when you contact the SEW electronics service so that our service personnel can assist you more effectively.

Provide the following information when sending the unit in for repair:
Serial number (→ nameplate)
Unit designation
Short description of application (application, control via terminals or serial)
Connected motor (motor voltage, star or delta connection)
Nature of the fault
Accompanying circumstances
Your own presumptions as to what has happened
Unusual events preceding the problem

11.4 Extended storage

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

Procedure when maintenance has been neglected:

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

If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. SEW-EURODRIVE recommends that you increase the voltage from 0 V to the first stage after a few seconds.

SEW-EURODRIVE recommends the following stages:

AC 400/500 V units:

- Stage 1: AC 350 V for 15 minutes
- Stage 2: AC 420 V for 15 minutes
- Stage 3: AC 500 V for 1 hour

AC 230 V units:

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

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