SEW EURODRIVE

System Manual

MOVITRAC® B

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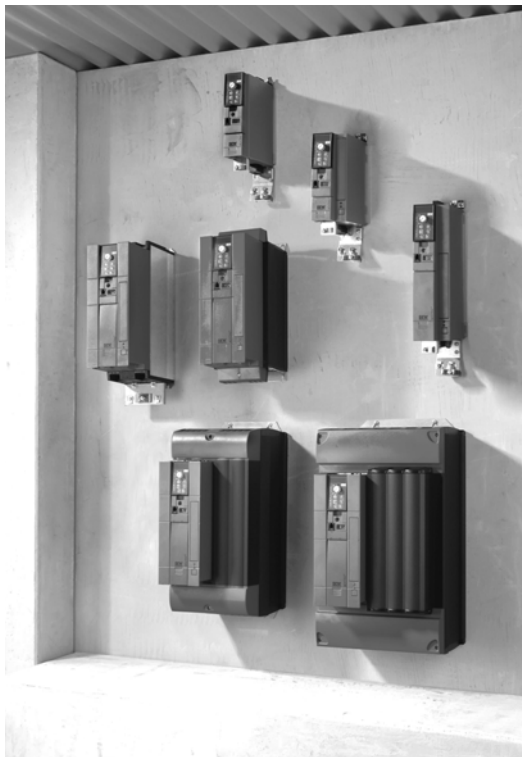
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Compact and economic: MOVITRAC® B – the standard inverter.

1.1 *Unit variants*

The MOVITRAC® B frequency inverters are available in 3 variants:

- Standard variant
- Technology variant
- Variant with coated printed circuit boards

1.1.1 Standard variant

The units are equipped with integrated IPOS^plus® positioning and sequence control as standard. MOVITRAC® B can be expanded with the available options.

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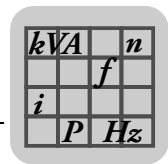
1.1.2 Technology variant

In addition to the standard features, you can use the MOVITOOLS® MotionStudio application module with the technology variant.

The technology variant is indicated by "0T" at the end of the type designation or by "Unit variant: Technology" in the "Unit data" in MOVITOOLS® MotionStudio.

1.1.3 Variant with coated printed circuit boards

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

The version with coated circuit board is indicated by the "00/L" digits at the end of the type designation.
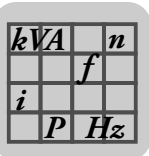
1.2 System overview MOVITRAC® B

Keypad
DBG60B

Digital module
FIO21B
Analog module
FIO11B
EtherCAT
FSE24B

Front option
keypad
FBG11B

1 x 200 – 240 V   3 x AC 200 – 240 V   3 x AC 380 – 500 V

Line choke ND

Line filter NF

MOVITRAC® B
MC07B..-2B1

MOVITRAC® B
MC07B..-..3

Drive operator panels
DOP

Front module
communication
FSC11B / 12B

Option cards:
– DFP21B
– MOVI-PLC®

Gateway
UOH11B

Braking resistor BW
with submounting option FKB

EMC module
FKE

Braking resistor BW

Support rail
fixture FHS

Interface adapters
USB11A, UWS11A, UWS21B

Setpoint
selector
MGB11A

Output filter HF

Output choke HD

MOVITOOLS®
MotionStudio

27021597999235595

Line connection
• ND line choke
• NF line filter

Power connection
• HF output filter
• HD output choke

BW braking resistor

Front modules
• FBG11B keypad
• FIO11B analog module or
• Digital module FIO21B or
• Communication FSC11B/FSC12B
• EtherCAT FSE24B

Option cards
• Fieldbus option DFx
• MOVI-PLC® controller

Installation
• FHS mounting rail attachment
• Submounting option for FKB braking resis-
  tor
• FKE EMC-module

MOVITOOLS® MotionStudio software

1.3 The units at a glance

Line connection	Motor power	Nominal output current	MOVITRAC® B type	Size
230 V 1-phase	0.25 kW / 0.34 HP	AC 1.7 A	MC07B**0003**-2B1-4-00	0XS
	0.37 kW / 0.50 HP	AC 2.5 A	MC07B**0004**-2B1-4-00	
	0.55 kW / 0.74 HP	AC 3.3 A	MC07B**0005**-2B1-4-00	0S
	0.75 kW / 1.0 HP	AC 4.2 A	MC07B**0008**-2B1-4-00	
	1.1 kW / 1.5 HP	AC 5.7 A	MC07B**0011**-2B1-4-00	0L
	1.5 kW / 2.0 HP	AC 7.3 A	MC07B**0015**-2B1-4-00	
	2.2 kW / 3.0 HP	AC 8.6 A	MC07B**0022**-2B1-4-00	
230 V 3-phase	0.25 kW / 0.34 HP	AC 1.7 A	MC07B**0003**-2A3-4-00	0XS
	0.37 kW / 0.50 HP	AC 2.5 A	MC07B**0004**-2A3-4-00	
	0.55 kW / 0.74 HP	AC 3.3 A	MC07B**0005**-2A3-4-00/S0	0S
	0.75 kW / 1.0 HP	AC 4.2 A	MC07B**0008**-2A3-4-00/S0	
	1.1 kW / 1.5 HP	AC 5.7 A	MC07B**0011**-2A3-4-00/S0	0L
	1.5 kW / 2.0 HP	AC 7.3 A	MC07B**0015**-2A3-4-00/S0	
	2.2 kW / 3.0 HP	AC 8.6 A	MC07B**0022**-2A3-4-00/S0	
	3.7 kW / 5.0 HP	AC 14.5 A	MC07B**0037**-2A3-4-00	1
	5.5 kW / 7.4 HP	AC 22 A	MC07B**0055**-2A3-4-00	2
	7.5 kW / 10 HP	AC 29 A	MC07B**0075**-2A3-4-00	
	11 kW / 15 HP	AC 42 A	MC07B**0110**-203-4-00	3
	15 kW / 20 HP	AC 54 A	MC07B**0150**-203-4-00	
	22 kW / 30 HP	AC 80 A	MC07B**0220**-203-4-00	4
	30 kW / 40 HP	AC 95 A	MC07B**0300**-203-4-00	
400 V 3-phase	0.25 kW / 0.34 HP	AC 1.0 A	MC07B**0003**-5A3-4-00	0XS
	0.37 kW / 0.50 HP	AC 1.6 A	MC07B**0004**-5A3-4-00	
	0.55 kW / 0.74 HP	AC 2.0 A	MC07B**0005**-5A3-4-00/S0	0S
	0.75 kW / 1.0 HP	AC 2.4 A	MC07B**0008**-5A3-4-00/S0	
	1.1 kW / 1.5 HP	AC 3.1 A	MC07B**0011**-5A3-4-00/S0	
	1.5 kW / 2.0 HP	AC 4.0 A	MC07B**0015**-5A3-4-00/S0	
	2.2 kW / 3.0 HP	AC 5.5 A	MC07B**0022**-5A3-4-00/S0	0L
	3.0 kW / 4.0 HP	AC 7.0 A	MC07B**0030**-5A3-4-00/S0	
	4.0 kW / 5.4 HP	AC 9.5 A	MC07B**0040**-5A3-4-00/S0	
	5.5 kW / 7.4 HP	AC 12.5 A	MC07B**0055**-5A3-4-00	2S
	7.5 kW / 10 HP	AC 16 A	MC07B**0075**-5A3-4-00	
	11 kW / 15 HP	AC 24 A	MC07B**0110**-5A3-4-00	2
	15 kW / 20 HP	AC 32 A	MC07B**0150**-503-4-00	3
	22 kW / 30 HP	AC 46 A	MC07B**0220**-503-4-00	
	30 kW / 40 HP	AC 60 A	MC07B**0300**-503-4-00	
	37 kW / 50 HP	AC 73 A	MC07B**0370**-503-4-00	4
	45 kW / 60 HP	AC 89 A	MC07B**0450**-503-4-00	
	55 kW / 74 HP	AC 105 A	MC07B**0550**-503-4-00	5
	75 kW / 100 HP	AC 130 A	MC07B**0750**-503-4-00	

1.4 Functions / features

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

1.4.1 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
- Rated operation up to an ambient temperature ϑ = 50 °C, operation up to an ambient temperature ϑ = 60 °C 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 "STO" function (safe torque off):
  - 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)
- STO (as of size 1 as standard, for size 0 only for -S0 units) according to EN 61800-5-2
  - Category 3, performance level e according to EN ISO 13849-1
- 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 TH evaluation for motor temperature monitoring.
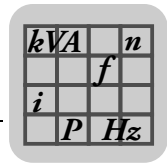
- Optional keypad for displaying setpoints and setting parameters
    - 5-digit 7-segment display
    - 9 LEDs for displaying the selected symbols
    - 6 control keys
    - 1 setpoint generator for speed specification
    - Data backup parameter set
- Braking resistor can be submounted as an option 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 possible with MDR regenerative power supply module (see system manual "MOVIDRIVE® MDR60A regenerative power supply module").

1.4.2 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)
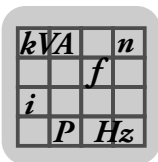
- Speed monitoring and monitoring of the motor and regenerative limit power.

- 5 error memories with all relevant operating data at the moment of the error.

- Standardized operation, parameter setting and identical unit connection technology across all units in the MOVITRAC® B range.

- Parameterizable signal range message (speed).

- Energy-saving function for optimizing the magnetization current automatically.

1.4.3 Setpoint technology

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

1.4.4 Optional communication / operation

- CAN based system bus (SBus) for networking max. 64 MOVITRAC® B units.
- CANopen Protocol DS301 V4.
- RS485 interface.
- Simple parameter setting and startup using optional keypad or MOVITOOLS® MotionStudio software.
- Fieldbus interfaces for
  - PROFIBUS
  - DeviceNet
  - INTERBUS
  - CANopen
- Industrial Ethernet:
  - EtherCAT
  - PROFINET
  - EtherNet/IP
  - Modbus/TCP
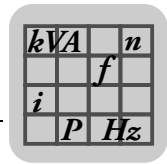
1.4.5 Application modules

Application modules are part of the MOVITOOLS® MotionStudio and can be used with MOVITRAC® B technology variants (...-0T). The individual application manuals can also be downloaded as PDFs from the SEW website.

1.4.6 Low-emission

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

1.5 *MOVITOOLS® MotionStudio*

The MOVITOOLS® MotionStudio program includes:

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

The MOVITRAC® B has the following functions:

- Startup
- Parameterization
- Visualization / diagnostics
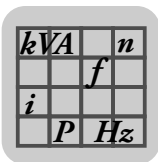
1.5.1 SCOPE

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 displays up to 8 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 familiarize yourself quickly 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.

2 Technical Data

2.1 *CE marking, UL approval and C-Tick*

2.1.1 CE-marking

MOVITRAC® B frequency inverters comply with the regulations of the Low Voltage Directive 2006/95/EC.

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 2004/108/EC. For detailed information on EMC compliant installation, refer to the publication "Electromagnetic Compatibility in Drive Engineering" from SEW-EURODRIVE.

Compliance with limit classes 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 2006/95/EC. SEW-EURODRIVE can issue a declaration of conformity to this effect on request.

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

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

- 230 V / 1-phase
- 230 V / 3-phase
- 400/500 V / 3-phase

cUL is equivalent to CSA approval.

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

C-Tick certifies conformity with ACMA (Australian Communications and Media Authority) standards.

The units 1 × 230 V and 3 × 400 V have the C-Tick.
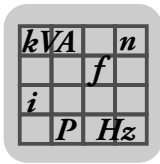
2.2 General technical data

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 (Line end)	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% I_N for 60 s): I_D = 100 % I_N / f_{PWM} = 4 kHz: –10 °C to +40 °C **Without overload capacity:** I_D = 100 % I_N / f_{PWM} = 4 kHz: –10 °C to +50 °C I_D = 100 % I_N / f_{PWM} = 8 kHz: –10 °C to +40 °C I_D = 125 % I_N / f_{PWM} = 4 kHz: –10 °C to +40 °C • **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% I_N for 60 s): I_D = 100 % I_N / f_{PWM} = 4 kHz: 0 °C to +40 °C **Without overload capacity:** I_D = 100 % I_N / f_{PWM} = 4 kHz: 0 °C to +50 °C I_D = 100 % I_N / f_{PWM} = 8 kHz: 0 °C to +40 °C I_D = 125 % I_N / f_{PWM} = 4 kHz: 0 °C to +40 °C • Mounting platform with **"Cold plate"** < 70 °C
Derating ambient temperature (current reduction)	2,5 % I_N per K at 40 °C to 50 °C 3 % I_N per K at 50 °C to 60 °C
Climate class	EN 60721-3-3, class 3K3
Storage temperature Transport temperature	–25 °C to +75 °C –25 °C to +75 °C

Type of cooling	Self-cooling: 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)
	        400/500 V: ≥ 1.5 kW (3.0 HP)
	(temperature-controlled fan, response threshold 45 °C)

Degree of protection EN 60529 (NEMA 1)	Sizes 0 to 3: IP20 Sizes 4 – 5 power connections: • IP00 • With the supplied Plexiglas cover mounted and shrinking tube mounted (not supplied) IP10
Operating mode	Continuous duty
Overvoltage category	III according to IEC 60664-1 (VDE 0110-1)
Line voltage tolerance	EN 50160: ±10 %
Pollution class	2 according to IEC 60664-1 (VDE 0110-1)
Protection against mechanically active substances	3S1
Protection against chemically active substances	3C2

MOVITRAC® B	All sizes

Installation altitude	Up to h ≤ 1000 m (3281 ft) without restrictions.
	The following restrictions apply at h ≥ 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):
	  – The safe disconnection of power and electronics connections can no longer be assured above 2000 m. This requires external measures (IEC 606641/ EN 61800-5-1).
	  – You have to connect an overvoltage protection device in order to reduce the overvoltages from category III to category II.

Dimensioning	According to DIN ISO 276-v
Size 0: Restrictions for continuous duty with 125 % I_N	• Maximum ambient temperature ϑ_A: 40 °C • No DIN rail mounting / submounting resistor • With 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.

2.3 MOVITRAC® B electronics data

Function	Terminal	Designa-tion	Default	Data
Setpoint input (differential input)	X10:1 X10:2 X10:3 X10:4	REF1 AI11 (+) AI12 (−) GND		+10 V, I_{max} = 3 mA 0 – 10 V (R_i > 200 kΩ) 0 – 20 mA / 4 – 20 mA (R_i = 250 Ω), Resolution 10 bits, sampling cycle 1 ms, accuracy ±100 mV, 200 µA 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	Error reset CW/stop CCW/stop Enable/stop n11/n21 n12/n22	R_i = 3 kΩ, I_E = 10 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 supply output / external voltage sup-ply[1]	X12:8	24VIO		Auxiliary supply output: V = DC 24 V, current carrying capacity I_{max} = 50 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} DO02 = 150 mA, I_{max} DO03 = 50 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 V, I_{max} = 800 mA
Safety contact	See chapter "MOVITRAC B electronics data for functional safety" (page 19).			
Terminal response times	Binary input and output terminals are updated every 5 ms			
Max. cable cross-sec-tion	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/12B / FIO11B/21B / FSE24B: 7 mm			
Tightening torque	X10 / X12 / X13: 0.25 Nm FSC11B/12B / FIO11B/21B / FSE24B: 0.22 – 0.25 Nm			

1) The MC07B...-S0 unit type must always be supplied with external voltage.
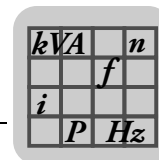
2.3.1 DC 24 V power demand for 24 V backup mode

Size	Power demand basic unit[1]	DBG60B	FIO11B	Fieldbus option[2][3]	DHP11B[3]	DHE21B/41B[3]	FSE24B
0 MC07B..-00	5 W						
0 MC07B..-S0	12 W						
1, 2S, 2	17 W	1 W	2 W	3 W	4.5 W	8.5 W	1.2 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 also be supplied externally.

2.4 MOVITRAC® B electronics data for functional safety

Safety input X17 for units with built-in functional safety:

Terminal	Designation				
X17:1	GND: Reference potential for X17:2				
X17:2	VO24: V_{OUT} = DC 24 V, only to supply X17:4 of the same unit; **cannot be used** to supply other units.				
X17:3	SOV24: Reference potential for DC +24 V "STO" input (safety contact)				
X17:4	SVI24: DC +24 V "STO" input (safety contact)				
Permitted cable cross section	1 core per terminal: 0.75 – 1.5 mm² (AWG21 – 15) Two cores per terminal: 0.75 – 1.0 mm² (AWG21 – 17)				
Tightening torque	• Min. 0.22 Nm • Max. 0.25 Nm				
	Size	Input capacitance	Min.	Type.	Max.
Safety-oriented 24 V voltage supply	–	–	DC 19.2 V	DC 24 V	DC 30 V
Power consumption X17:4	0S / 0L	27 µF			3 W
	1	270 µF			5 W
	2 / 2S	270 µF	–	–	6 W
	3	270 µF			7.5 W
	4	270 µF			8 W
	5	270 µF			10 W
Time between disconnection of the safety-oriented 24 V supply at MOVITRAC® B until the disconnection of the pulse pattern at output stage $t_{switch-off}$.	0	–	–	–	20 ms
	1 – 5	–	–	–	100 ms
Time for restart	200 ms				
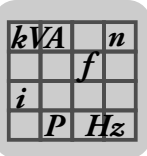
2.5 MOVITRAC® B technical data

2.5.1 Overview of MOVITRAC® B
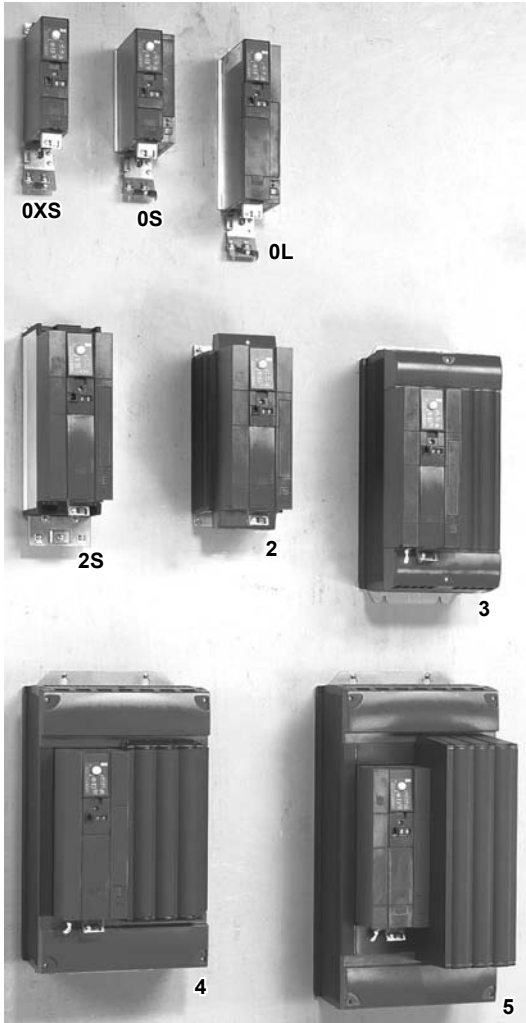
400 / 500 V   **230 V**
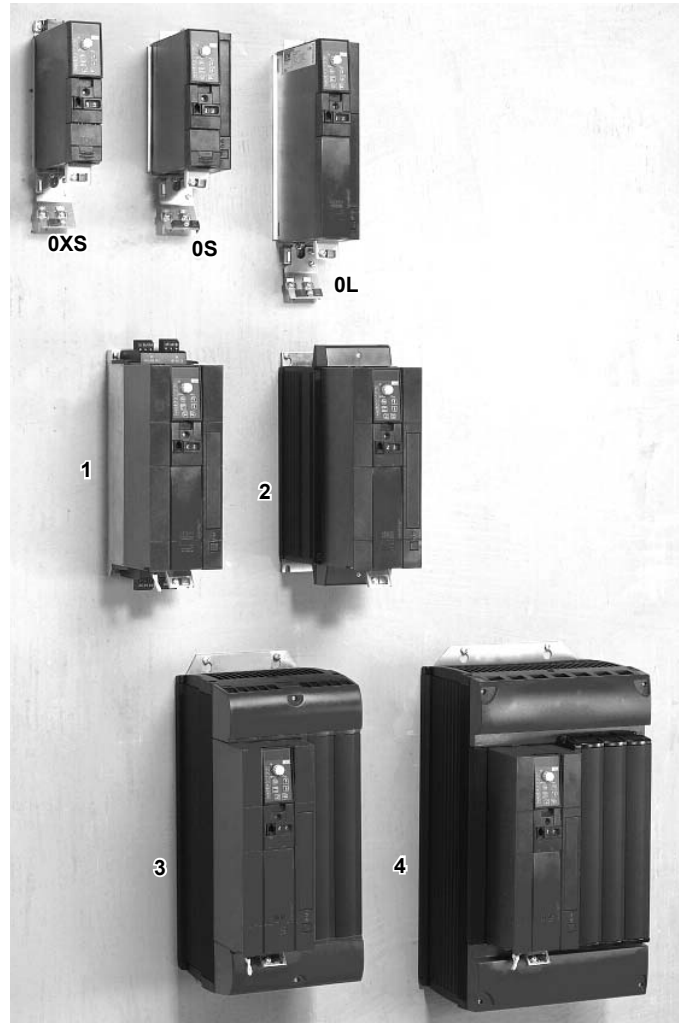
Power supply connection 400/500 V / 3-phase							
Size	0XS	0S	0L	2S	2	3	4	5
Power kW / HP	0.25 / 0.34 0.37 / 0.50	0.55 / 0.74 0.75 / 1.0 1.1 / 1.5 1.5 / 2.0	2.2 / 3.0 3.0 / 4.0 4.0 / 5.4	5.5 / 7.4 7.5 / 10	11 / 15	15 / 20 22 / 30 30 / 40	37 / 50 45 / 60	55 / 74 75 / 100

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

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

The dimensions are specified in mm (in).

6 (0.2)
54.5 (2.15)
49.5 (1.95)
163.5 (6.437)
149 (5.87)
220 (8.66)
196 (7.72)
285 (11.2)
185 (7.28)
6 (0.2)
159.5 (6.280) *
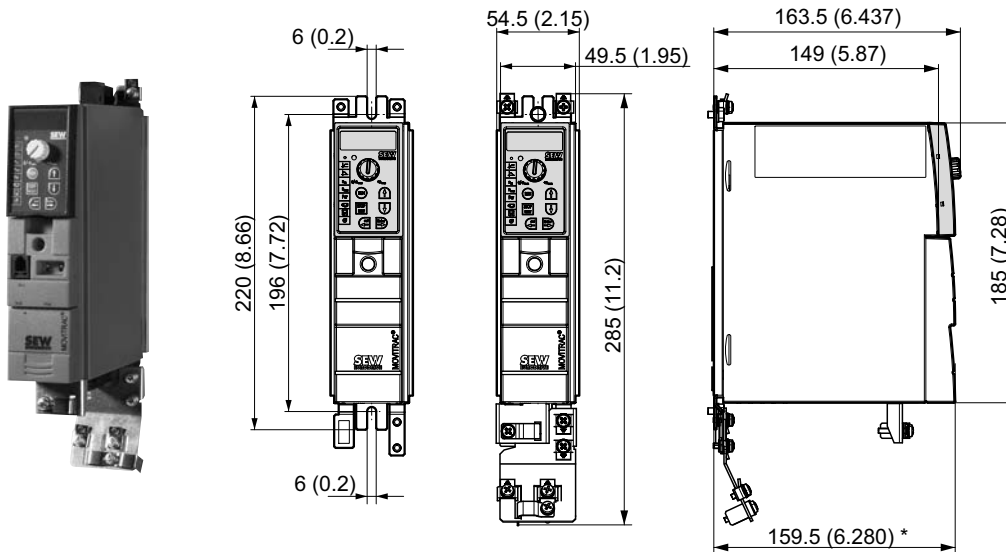
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0003-5A3-4-00	0004-5A3-4-00
Part number (without "safe stop")		828 515 2	828 516 0
INPUT[1]			
Rated line voltage	V_{line}	3 × AC 380 – 500 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 0.9 A AC 1.1 A	AC 1.4 A AC 1.8 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	0.25 kW / 0.34 HP 0.37 kW / 0.50 HP	0.37 kW / 0.50 HP 0.55 kW / 0.74 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_{line} $I_{line\ 125}$	AC 1.0 A AC 1.3 A	AC 1.6 A AC 2.0 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	0.7 kVA 0.9 kVA	1.1 kVA 1.4 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	68 Ω	
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	30 W 35 W	35 W 40 W
Type of cooling / cooling air consumption		Natural convection / –	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	54.5 mm × 185 mm × 163.5 mm (2.15 in × 7.28 in × 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_{mains} = 3 × AC 500 V.

2.5.3 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

The dimensions are specified in mm (in).
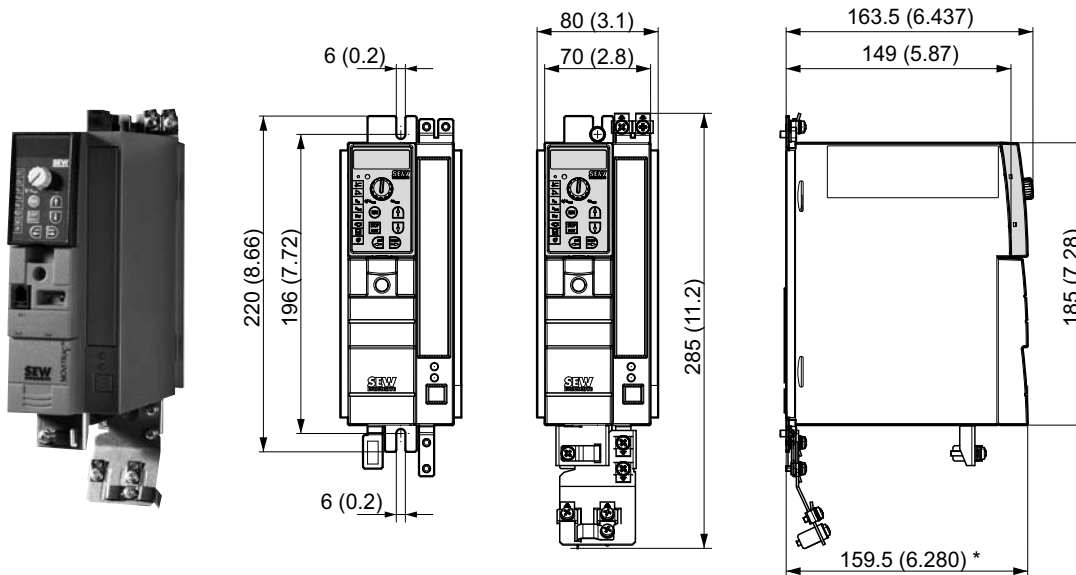
* With front module FSE24B +4 mm (0.16 in)

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) Part number "Safe stop" (-S0[1])		828 517 9 828 995 6	828 518 7 828 996 4	828 519 5 828 997 2	828 520 9 828 998 0
INPUT[2]					
Rated line voltage	V_{line}	3 × AC 380 – 500 V			
Nominal line frequency	f_{line}	50/60 Hz ±5 %			
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 1.8 A AC 2.3 A	AC 2.2 A AC 2.6 A	AC 2.8 A AC 3.5 A	AC 3.6 A AC 4.5 A
OUTPUT					
Output voltage	V_O	3 × 0 – V_{mains}			
Recom. motor power 100% operation Recom. motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	0.55 kW / 0.74 HP 0.75 kW / 1.0 HP	0.75 kW / 1.0 HP 1.1 kW / 1.5 HP	1.1 kW / 1.5 HP 1.5 kW / 2.0 HP	1.5 kW / 2.0 HP 2.2 kW / 3.0 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 2.0 A AC 2.5 A	AC 2.4 A AC 3.0 A	AC 3.1 A AC 3.9 A	AC 4.0 A AC 5.0 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	1.4 kVA 1.7 kVA	1.7 kVA 2.1 kVA	2.1 kVA 2.7 kVA	2.8 kVA 3.5 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	68 Ω			
GENERAL INFORMATION					
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	40 W 45 W	45 W 50 W	50 W 60 W	60 W 75 W
Type of cooling / cooling air consumption		Natural convection			Forced air cooling / 12 m³/h
Current limitation		150 % I_N for at least 60 seconds			
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.5 Nm / 4 lb in			
Dimensions	W × H × D	80 mm × 185 mm × 163.5 mm (3.1 in × 7.28 in × 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.

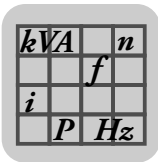### 2.5.4 AC 400 / 500 V / 3-phase / size 0L / 2.2 / 3.0 / 4.0 kW / 3.0 / 4.0 / 5.4 HP

The dimensions are specified in mm (in).
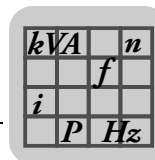
* With front module FSE24B +4 mm (0.16 in)

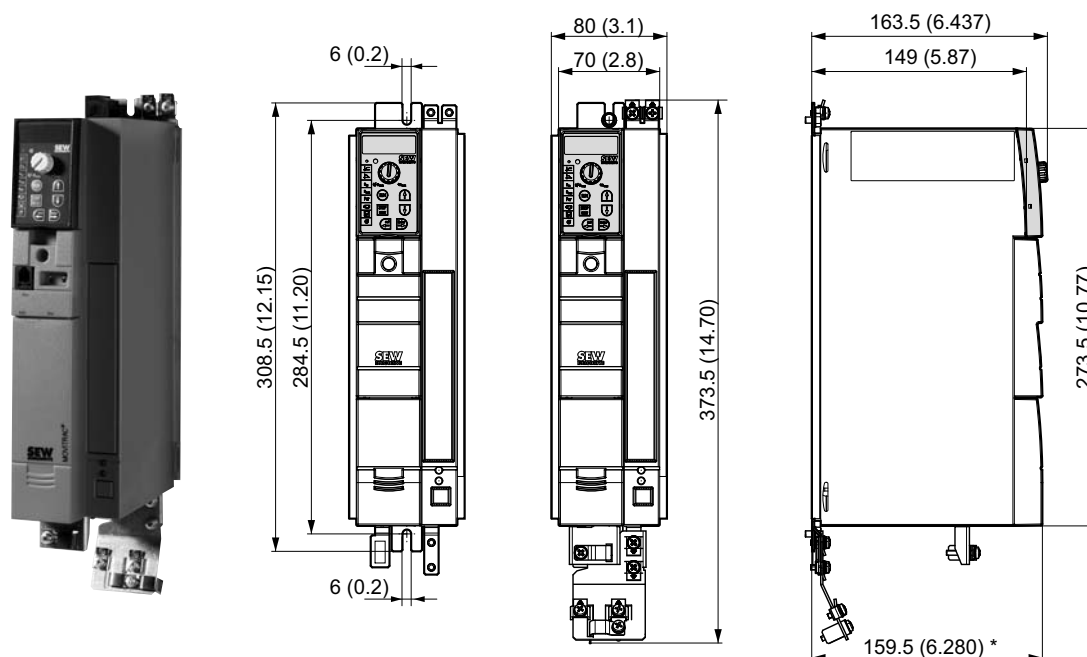| MOVITRAC® MC07B (3-phase power supply)		0022-5A3-4-x0	0030-5A3-4-x0	0040-5A3-4-x0
Part number, standard unit (-00)		**828 521 7**	**828 522 5**	**828 523 3**
Part number "Safe stop" (-S0[1]**)**		**828 999 9**	**829 000 8**	**829 001 6**
INPUT[2]				
Rated line voltage	V_{line}		3 × AC 380 – 500 V	
Nominal line frequency	f_{line}		50/60 Hz ±5 %	
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 5.0 A AC 6.2 A	AC 6.3 A AC 7.9 A	AC 8.6 A AC 10.7 A
OUTPUT				
Output voltage	V_O		3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	2.2 kW / 3.0 HP 3.0 kW / 4.0 HP	3.0 kW / 4.0 HP 4.0 kW / 5.4 HP	4.0 kW / 5.4 HP 5.5 kW / 7.4 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 5.5 A AC 6.9 A	AC 7.0 A AC 8.8 A	AC 9.5 A AC 11.9 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	3.8 kVA 4.8 kVA	4.8 kVA 6.1 kVA	6.6 kVA 8.2 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}		68 Ω	
GENERAL INFORMATION				
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	80 W 95 W	95 W 120 W	125 W 180 W
Type of cooling / cooling air consumption			Natural convection	Forced air cooling / 18 m³/h
Current limitation			150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals		4 mm² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D		80 mm × 273.5 mm × 163.5 mm (3.1 in × 10.77 in × 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_{mains} = 3 × AC 500 V.
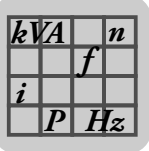
2.5.5 AC 400 / 500 V / 3-phase / size 2S / 5.5 / 7.5 kW / 7.4 / 10 HP

105 (4.13)

70 (2.8)

238 (9.37) *

234 (9.21)

325 (12.8)

335 (13.2)

7 (0.3)
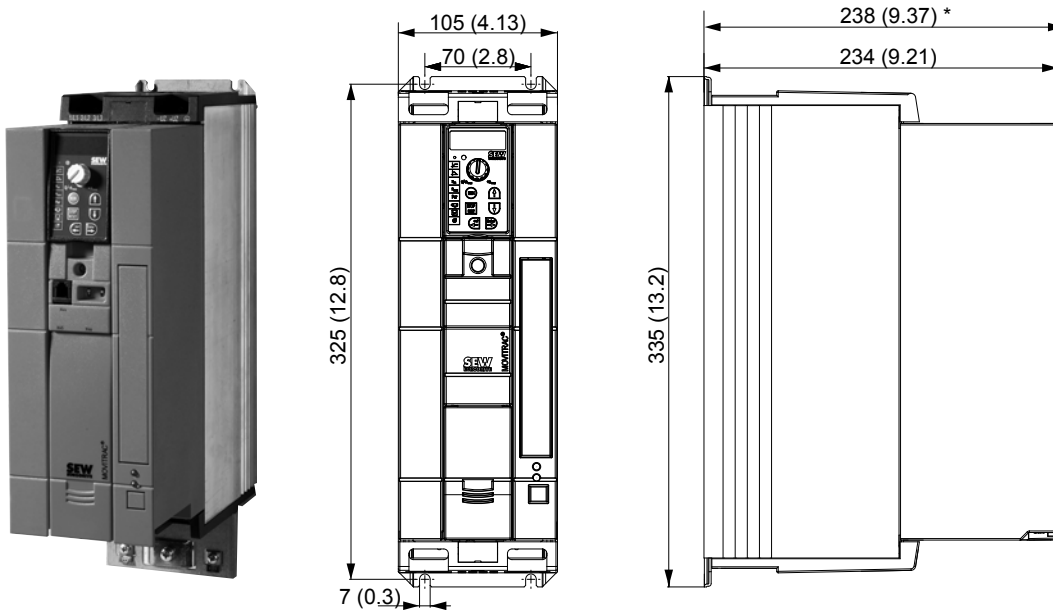
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0055-5A3-4-00	0075-5A3-4-00
Part number ("Safe stop" integrated)		828 524 1	828 526 8
INPUT[1]			
Rated line voltage	V_{line}	3 × AC 380 – 500 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 11.3 A AC 14.1 A	AC 14.4 A AC 18.0 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	5.5 kW / 7.4 HP 7.5 kW / 10 HP	7.5 kW / 10 HP 11 kW / 15 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 12.5 A AC 15.6 A	AC 16 A AC 20 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	8.7 kVA 10.8 kVA	11.1 kVA 13.9 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	47 Ω	
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	220 W 290 W	290 W 370 W
Current limitation		150 % I_N for at least 60 seconds	
Type of cooling / cooling air consumption		Forced air cooling / 80 m³/h	
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.6 Nm / 5 lb in	
Dimensions	W × H × D	105 mm × 335 mm × 238 mm (4.13 in × 13.2 in × 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_{mains} = 3 × AC 500 V.

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

130 (5.12)
105 (4.13)
300 (11.8)
6.5 (0.26)

229 (9.02) *
225 (8.86)
335 (13.2)
315 (12.4)
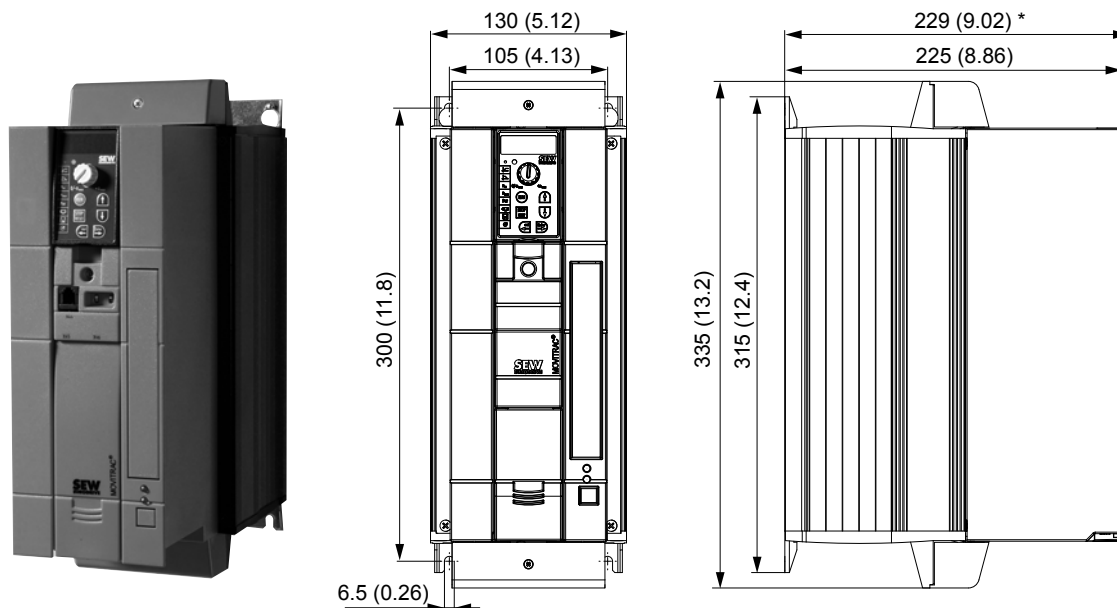
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0110-5A3-4-00
Part number ("Safe stop" integrated)		828 527 6
INPUT[1]		
Rated line voltage	V_{line}	3 × AC 380 – 500 V
Nominal line frequency	f_{line}	50/60 Hz ±5 %
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 21.6 A AC 27.0 A
OUTPUT		
Output voltage	V_O	3 × 0 – V_{mains}
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	11 kW / 15 HP 15 kW / 20 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 24 A AC 30 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	16.6 kVA 20.8 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	22 Ω
GENERAL INFORMATION		
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	400 W 500 W
Type of cooling / cooling air consumption		Forced air cooling / 80 m³/h
Current limitation		150 % I_N for at least 60 seconds
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 1.5 Nm / 13 lb in
Dimensions	W × H × D	130 mm × 335 mm × 229 mm (5.12 in × 13.2 in × 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_{mains} = 3 × AC 500 V.

2

kVA		n
	f	
i		
	P	Hz

Technical Data
MOVITRAC® B technical data

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

200 (7.87)
105 (4.13)
445 (17.5)
7 (0.3)

251 (9.88) ∗
247 (9.72)
465 (18.3)

* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0150-503-4-00	0220-503-4-00	0300-503-4-00
Part number ("Safe stop" integrated)		828 528 4	828 529 2	828 530 6
INPUT[1]				
Rated line voltage	V_{line}	3 × AC 380 – 500 V		
Nominal line frequency	f_{line}	50/60 Hz ±5 %		
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 28.8 A AC 36.0 A	AC 41.4 A AC 51.7 A	AC 54.0 A AC 67.5 A
OUTPUT				
Output voltage	V_O	3 × 0 – V_{mains}		
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	15 kW / 20 HP 22 kW / 30 HP	22 kW / 30 HP 30 kW / 40 HP	30 kW / 40 HP 37 kW / 50 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 32 A AC 40 A	AC 46 A AC 57.5 A	AC 60 A AC 75 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	22.2 kVA 27.7 kVA	31.9 kVA 39.8 kVA	41.6 kVA 52.0 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	15 Ω	12 Ω	
GENERAL INFORMATION				
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	550 W 690 W	750 W 940 W	950 W 1250 W
Type of cooling / cooling air consumption		Forced air cooling / 180 m³/h		
Current limitation		150 % I_N for at least 60 seconds		
Terminal cross section / tightening torque	Terminals	6 mm² / AWG10	10 mm² / AWG8	16 mm² / AWG6
		3.5 Nm / 31 lb in		
Dimensions	W × H × D	200 mm × 465 mm × 251 mm (7.87 in × 18.3 in × 9.88 in)		
Mass	m	15 kg / 33 lb		

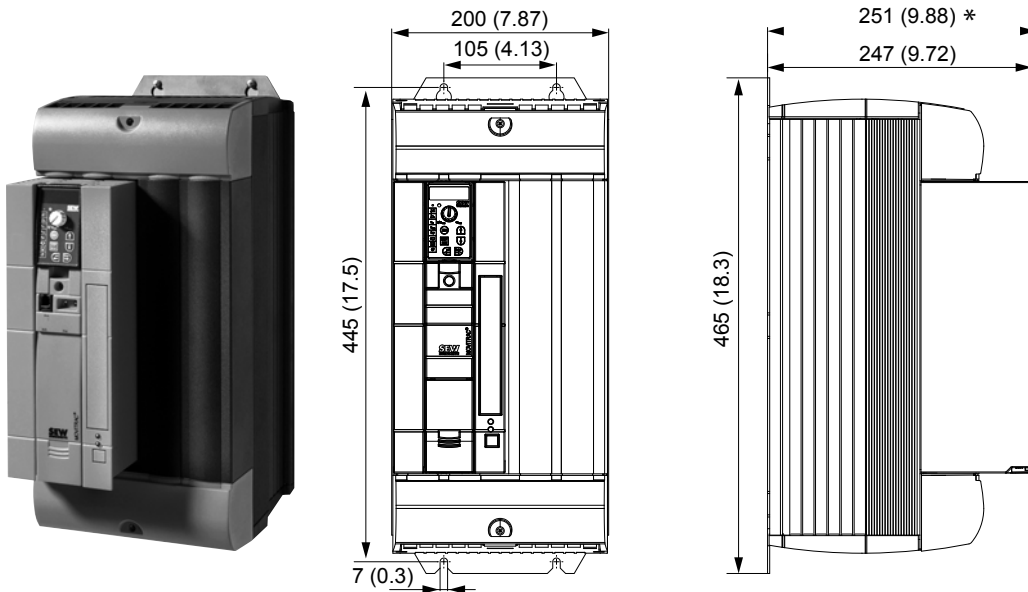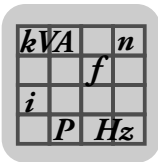1) The mains and output currents must be reduced by 20 % from the nominal values for V_{mains} = 3 × AC 500 V.

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

280 (11.0)
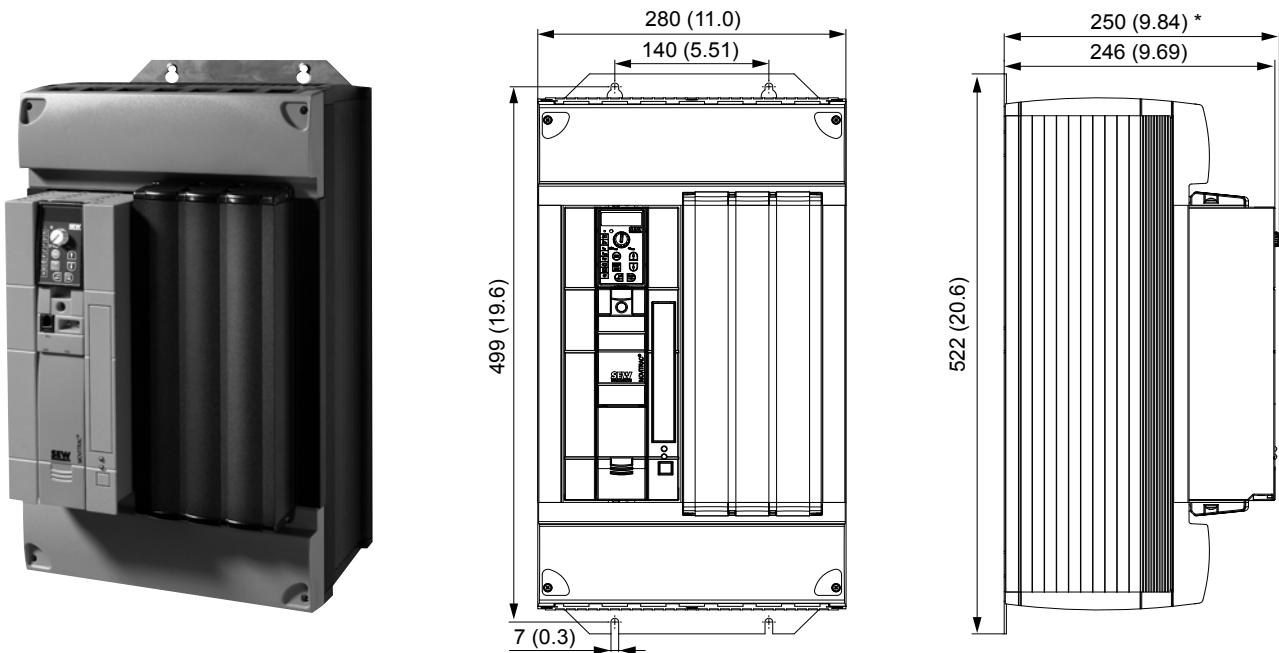140 (5.51)
499 (19.6)
7 (0.3)

250 (9.84) *
246 (9.69)
522 (20.6)

* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0370-503-4-00	0450-503-4-00
Part number ("Safe stop" integrated)		828 531 4	828 532 2
INPUT[1]			
Rated line voltage	V_{line}	3 × AC 380 – 500 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line} $I_{line\ 125}$	AC 65.7 A AC 81.9 A	AC 80.1 A AC 100.1 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	37 kW / 50 HP 45 kW / 60 HP	45 kW / 60 HP 55 kW / 74 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 73 A AC 91.3 A	AC 89 A AC 111.3 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	50.6 kVA 63.2 kVA	61.7 kVA 77.1 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	6 Ω	
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	1200 W 1450 W	1400 W 1820 W
Type of cooling / cooling air consumption		Forced air cooling / 180 m³/h	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	25 mm² / AWG4	35 mm² / AWG2
		14 Nm / 120 lb in	
Dimensions	W × H × D	280 mm × 522 mm × 250 mm (11.0 in × 20.6 in × 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_{mains} = 3 × AC 500 V.

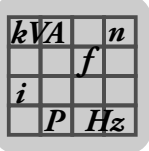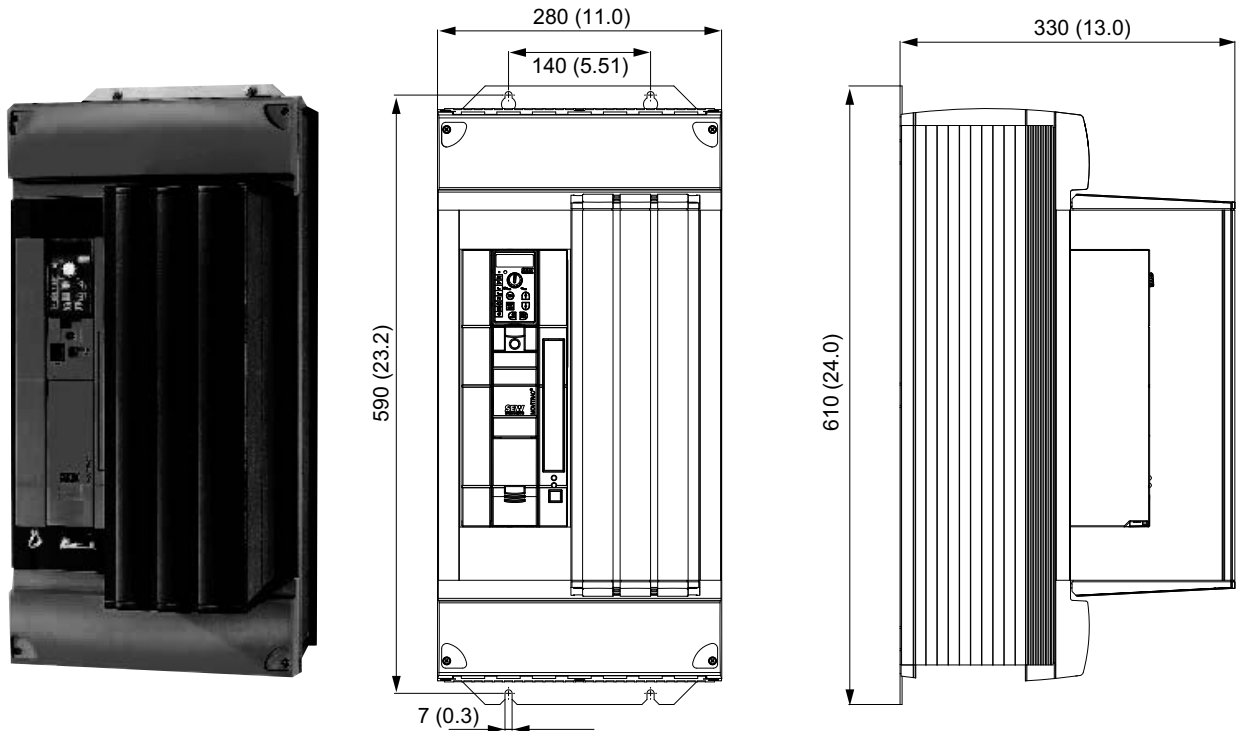### 2.5.9 AC 400 / 500 V / 3-phase / size 5 / 55 / 75 kW / 74 / 100 HP

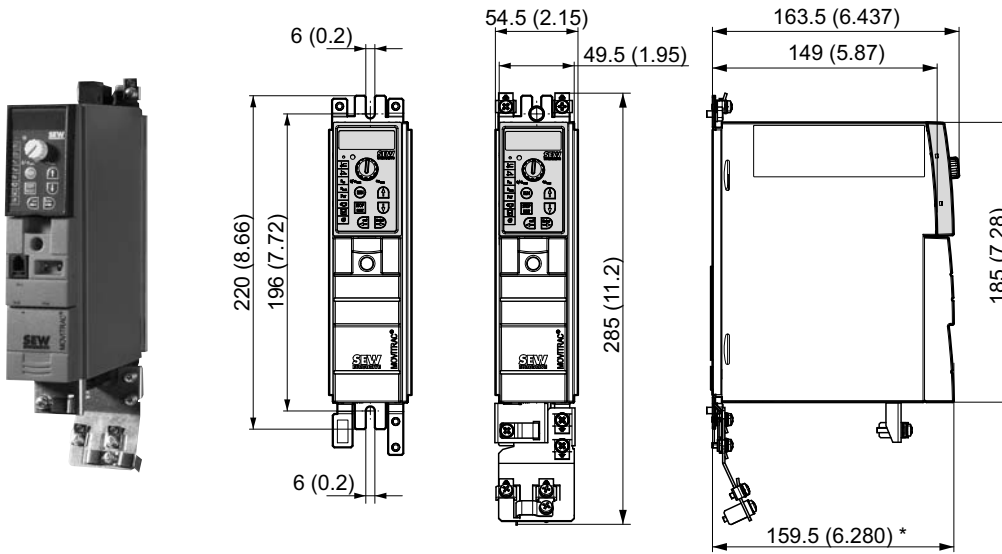| MOVITRAC® MC07B (3-phase power supply)		0550-503-4-00	0750-503-4-00
Part number ("Safe stop" integrated)		829 527 1	829 529 8
INPUT[1]			
Rated line voltage	V_{line}	3 × AC 380 – 500 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 3 × AC 400 V)	I_{line}	AC 94.5 A	AC 117 A
	$I_{line\ 125}$	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	$P_{Mot\ 125}$	75 kW / 100 HP	90 kW / 120 HP
Nominal output current 100% operation	I_N	AC 105 A	AC 130 A
Nominal 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
Min. perm. braking resistance (4-Q)	R_{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
Type of cooling / cooling air consumption		Forced air cooling / 360 m³/h	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	35 mm² / AWG2	50 mm² / AWG0
		14 Nm / 120 lb in	
Dimensions	W × H × D	280 mm × 610 mm × 330 mm (11.0 in × 24.0 in × 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_{mains} = 3 × AC 500 V.

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

* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (1-phase power supply)		0003-2B1-4-00	0004-2B1-4-00
Part number (without "safe stop")		**828 491 1**	**828 493 8**
INPUT			
Rated line voltage	V_{line}	1 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 1 × AC 230 V)	I_{line} $I_{line\,125}$	AC 4.3 A AC 5.5 A	AC 6.1 A AC 7.5 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\,125}$	0.25 kW / 0.34 HP 0.37 kW / 0.50 HP	0.37 kW / 0.50 HP 0.55 kW / 0.74 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\,125}$	AC 1.7 A AC 2.1 A	AC 2.5 A AC 3.1 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\,125}$	0.7 kVA 0.9 kVA	1.0 kVA 1.3 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\,125}$	30 W 35 W	35 W 45 W
Type of cooling / cooling air consumption		Natural convection / –	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	54.5 mm × 185 mm × 163.5 mm (2.15 in × 7.28 in × 6.437 in)	
Mass	m	1.3 kg / 2.9 lb	

2.5.11 AC 230 V / 1-phase / size 0S / 0.55 / 0.75 kW / 0.74 / 1.0 HP
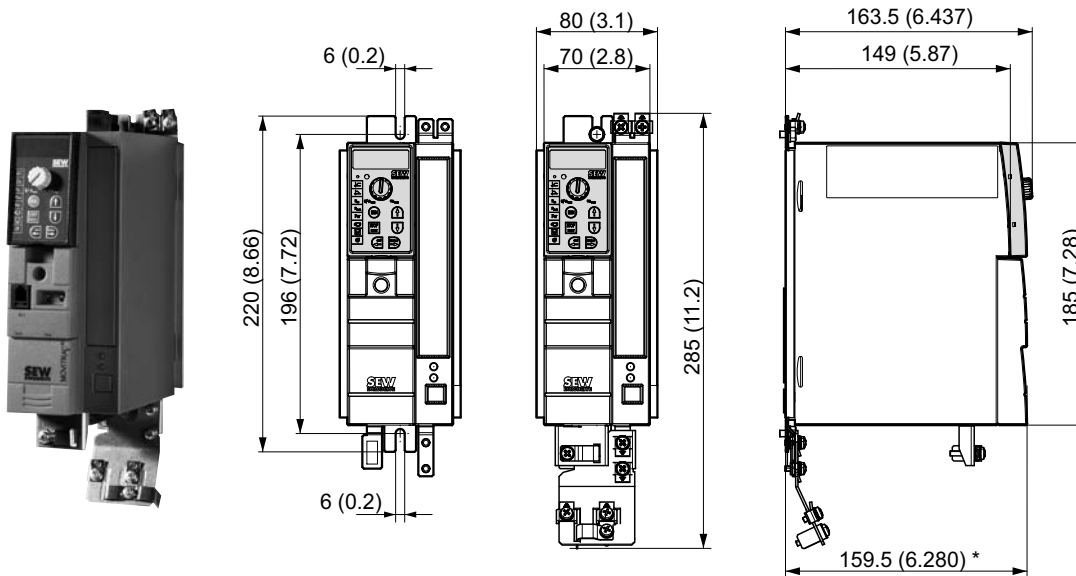
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (1-phase power supply)		0005-2B1-4-00	0008-2B1-4-00
Part number (without "safe stop")		828 494 6	828 495 4
INPUT			
Rated line voltage	V_{line}	1 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 1 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 8.5 A AC 10.2 A	AC 9.9 A AC 11.8 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	0.55 kW / 0.74 HP 0.75 kW / 1.0 HP	0.75 kW / 1.0 HP 1.1 kW / 1.5 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 3.3 A AC 4.1 A	AC 4.2 A AC 5.3 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	1.4 kVA 1.7 kVA	1.7 kVA 2.1 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	45 W 50 W	50 W 65 W
Type of cooling / cooling air consumption		Natural convection / –	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	80 mm × 185 mm × 163.5 mm (3.1 in × 7.28 in × 6.437 in)	
Mass	m	1.5 kg / 3.3 lb	

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

80 (3.1)
70 (2.8)
6 (0.2)
308.5 (12.15)
284.5 (11.20)
373.5 (14.70)
6 (0.2)
163.5 (6.437)
149 (5.87)
273.5 (10.77)
159.5 (6.280) *

* With option card FSE24B +4 mm (0.16 in)

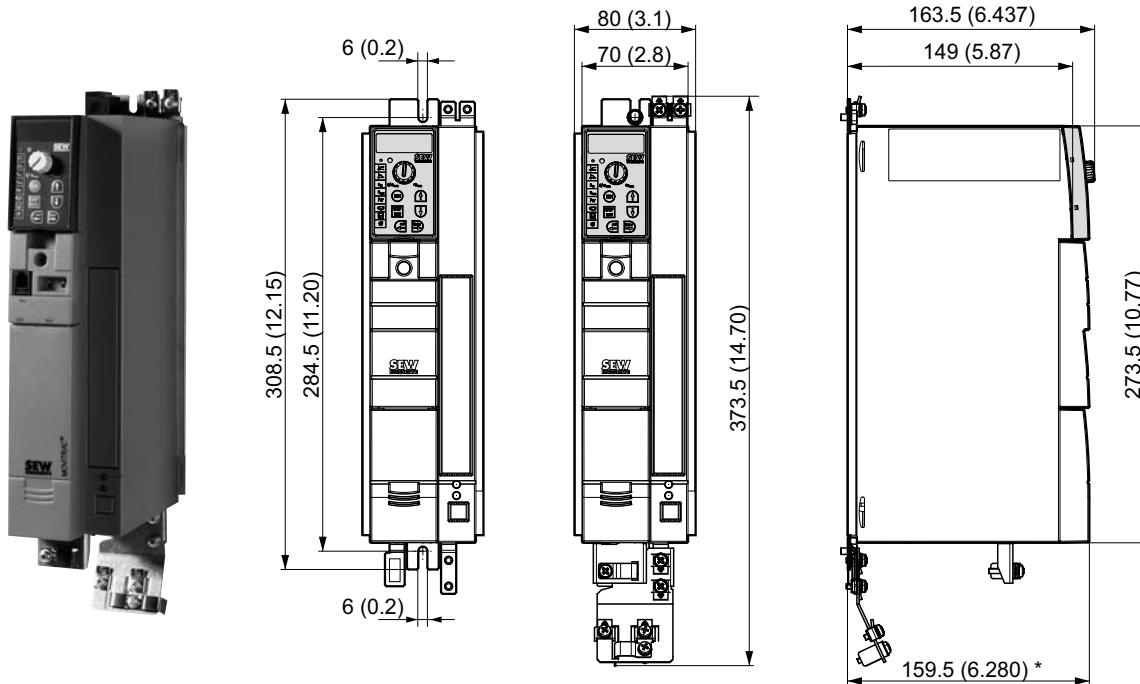| MOVITRAC® MC07B (1-phase power supply)		0011-2B1-4-00	0015-2B1-4-00	0022-2B1-4-00
Part number (without "safe stop")		828 496 2	828 497 0	828 498 9
INPUT				
Rated line voltage	V_{line}	1 × AC 200 – 240 V		
Nominal line frequency	f_{line}	50/60 Hz ±5 %		
Nominal line current (at V_{line} = 1 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 13.4 A AC 16.8 A	AC 16.7 A AC 20.7 A	AC 19.7 A AC 24.3 A
OUTPUT				
Output voltage	V_O	3 × 0 – V_{mains}		
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	1.1 kW / 1.5 HP 1.5 kW / 2.0 HP	1.5 kW / 2.0 HP 2.2 kW / 3.0 HP	2.2 kW / 3.0 HP 3.0 kW / 4.0 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 5.7 A AC 7.1 A	AC 7.3 A AC 9.1 A	AC 8.6 A AC 10.8 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	2.3 kVA 2.9 kVA	3.0 kVA 3.7 kVA	3.5 kVA 4.3 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	27 Ω		
GENERAL INFORMATION				
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	70 W 90 W	90 W 110 W	105 W 132 W
Type of cooling / cooling air consumption		Natural convection		Forced air cooling / 18 m³/h
Current limitation		150 % I_N for at least 60 seconds		
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.5 Nm / 4 lb in		
Dimensions	W × H × D	80 mm × 273.5 mm × 163.5 mm (3.1 in × 10.77 in × 6.437 in)		
Mass	m	2.2 kg / 4.9 lb		

2.5.13 AC 230 V / 3-phase / size 0XS / 0.25 / 0.37 kW / 0.34 / 0.50 HP
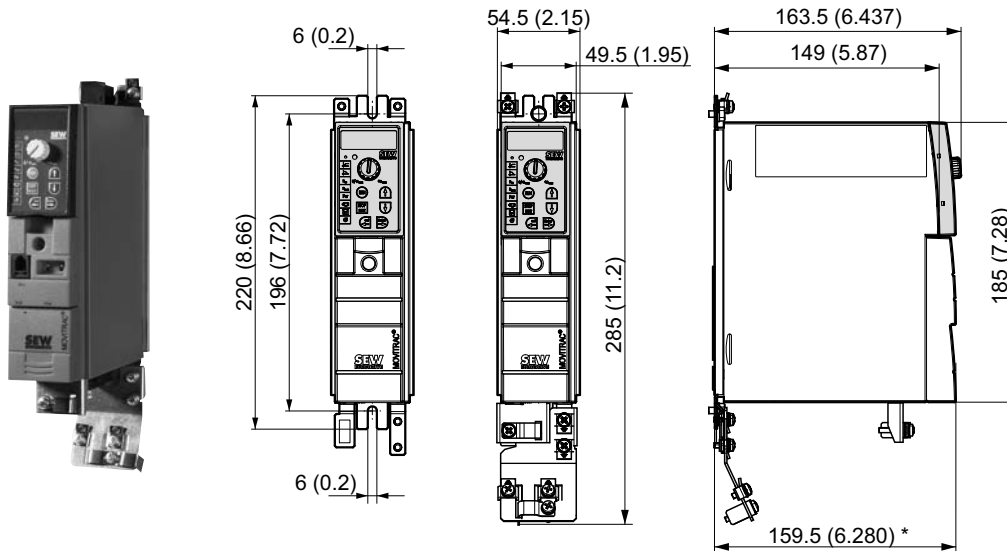
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0003-2A3-4-00	0004-2A3-4-00
Part number (without "safe stop")		828 499 7	828 500 4
INPUT			
Rated line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 1 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 1.6 A AC 1.9 A	AC 2.0 A AC 2.4 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	0.25 kW / 0.34 HP 0.37 kW / 0.50 HP	0.37 kW / 0.50 HP 0.55 kW / 0.74 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 1.7 A AC 2.1 A	AC 2.5 A AC 3.1 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	0.7 kVA 0.9 kVA	1.0 kVA 1.3 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	27 Ω	
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	35 W 40 W	40 W 50 W
Type of cooling / cooling air consumption		Natural convection / –	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.5 Nm / 4 lb in	
Dimensions	W × H × D	54.5 mm × 185 mm × 163.5 mm (2.15 in × 7.28 in × 6.437 in)	
Mass	m	1.3 kg / 2.9 lb	

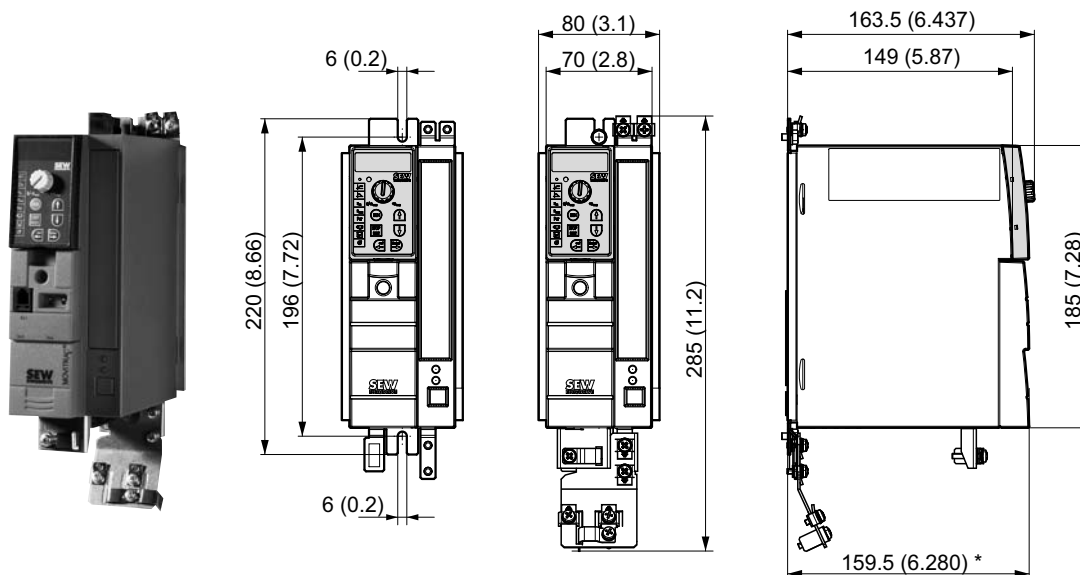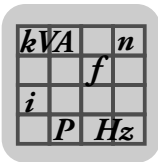### 2.5.14 AC 230 V / 3-phase / size 0S / 0.55 / 0.75 kW / 0.74 / 1.0 HP

* With front module FSE24B +4 mm (0.16 in)

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 line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current	I_{line}	AC 2.8 A	AC 3.3 A
(at V_{line} = 1 × AC 230 V)	$I_{line\ 125}$	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
Nominal output current 100% operation	I_N	AC 3.3 A	AC 4.2 A
Nominal 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
Min. perm. braking resistance (4-Q)	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
Type of cooling / cooling air consumption		Natural convection / –	
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 mm × 185 mm × 163.5 mm (3.1 in × 7.28 in × 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.

### 2.5.15 AC 230 V / 3-phase / size 0L / 1.1 / 1.5 / 2.2 kW / 1.5 / 2.0 / 3.0 HP
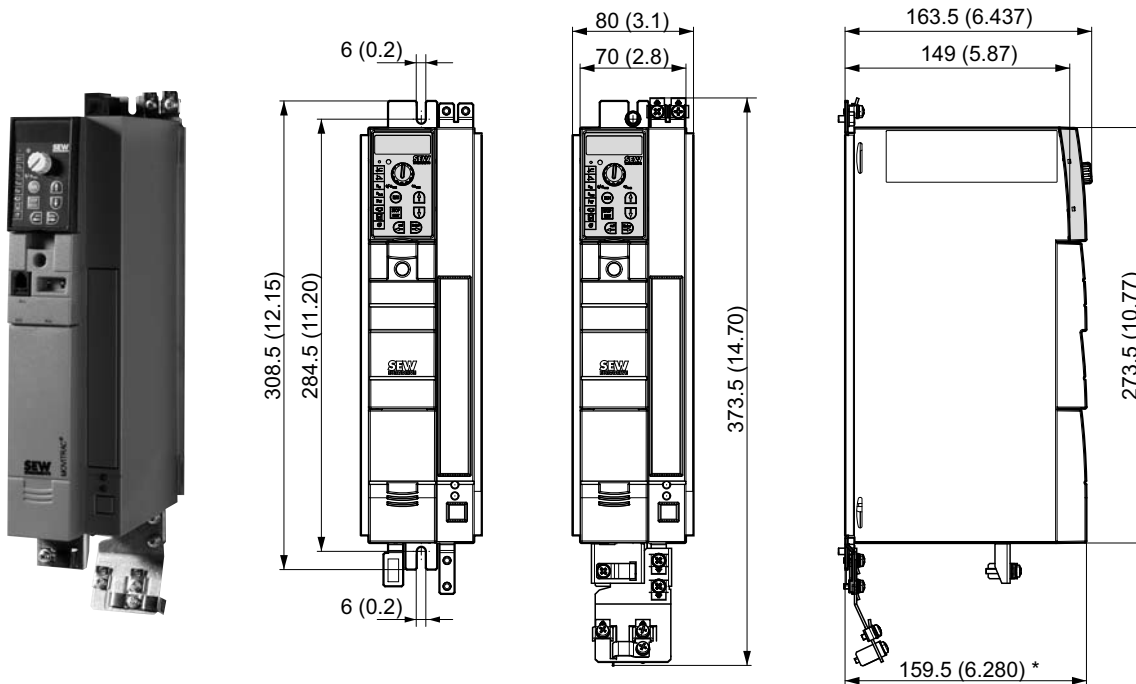
* With front module FSE24B +4 mm (0.16 in)

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 line voltage	V_{line}	3 × AC 200 – 240 V		
Nominal line frequency	f_{line}	50/60 Hz ±5 %		
Nominal line current (at V_{line} = 3 × AC 230 V)	I_{line} $I_{line\,125}$	AC 5.1 A AC 6.3 A	AC 6.4 A AC 7.9 A	AC 7.6 A AC 9.5 A
OUTPUT				
Output voltage	V_O	3 × 0 – V_{mains}		
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\,125}$	1.1 kW / 1.5 HP 1.5 kW / 2.0 HP	1.5 kW / 2.0 HP 2.2 kW / 3.0 HP	2.2 kW / 3.0 HP 3.0 kW / 4.0 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\,125}$	AC 5.7 A AC 7.1 A	AC 7.3 A AC 9.1 A	AC 8.6 A AC 10.8 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\,125}$	2.3 kVA 2.9 kVA	3.0 kVA 3.7 kVA	3.5 kVA 4.3 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	27 Ω		
GENERAL INFORMATION				
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\,125}$	75 W 90 W	90 W 110 W	105 W 140 W
Type of cooling / cooling air consumption		Natural convection		Forced air cooling / 18 m³/h
Current limitation		150 % I_N for at least 60 seconds		
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.5 Nm / 4 lb in		
Dimensions	W × H × D	80 mm × 273.5 mm × 163.5 mm (3.1 in × 10.77 in × 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.
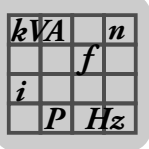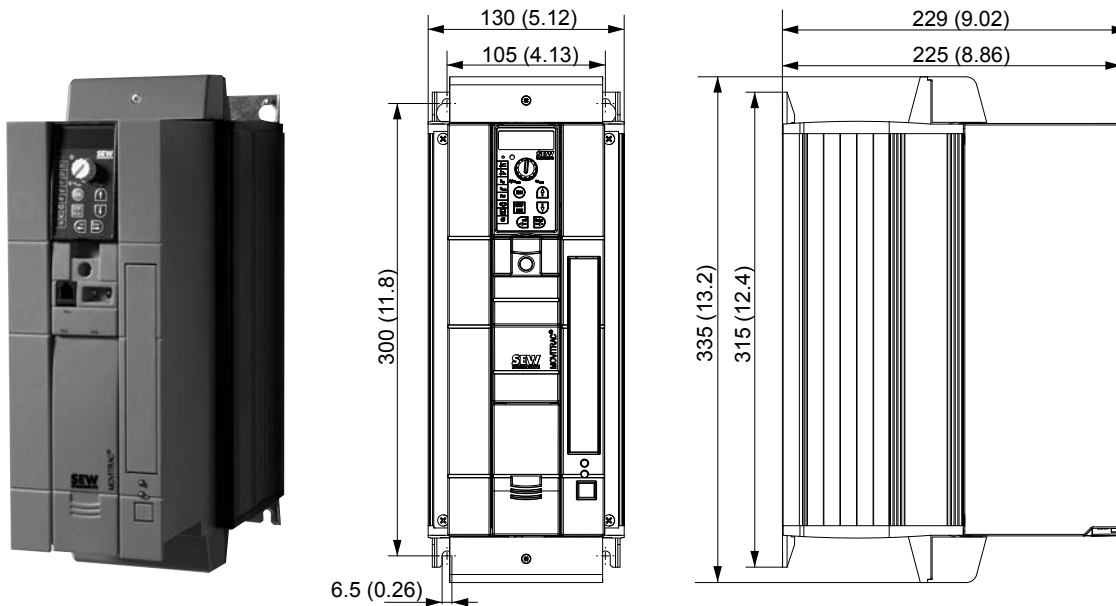
2.5.16 AC 230 V / 3-phase / size 1 / 3.7 kW / 5.0 HP
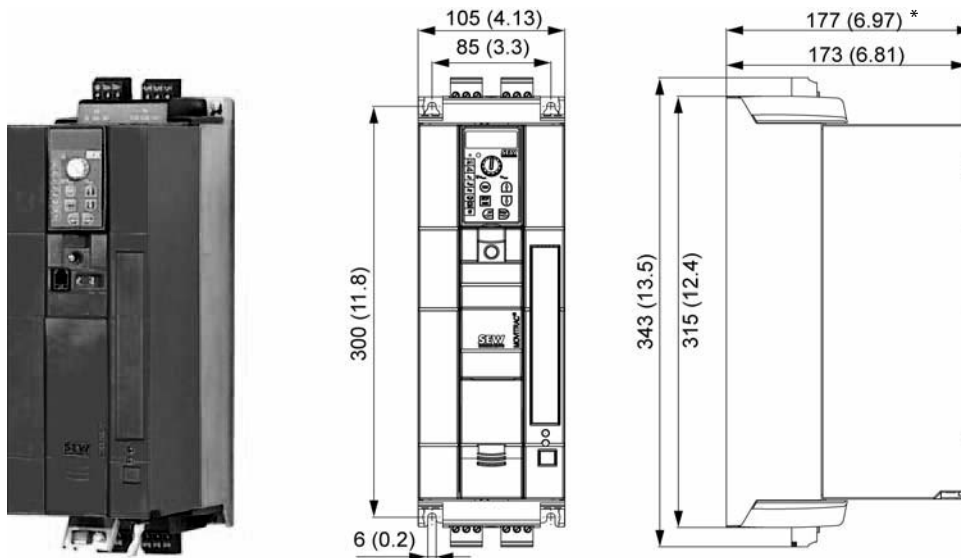
* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0037-2A3-4-00
Part number ("Safe stop" integrated)		828 506 3
INPUT		
Rated line voltage	V_{line}	3 × AC 200 – 240 V
Nominal line frequency	f_{line}	50/60 Hz ±5 %
Nominal line current (at V_{line} = 3 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 12.9 A AC 16.1 A
OUTPUT		
Output voltage	V_O	3 × 0 – V_{mains}
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	3.7 kW / 5.0 HP 5.5 kW / 7.4 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 14.5 A AC 18.1 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	5.8 kVA 7.3 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	27 Ω
GENERAL INFORMATION		
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	210 W 270 W
Type of cooling / cooling air consumption		Forced air cooling / 40 m³/h
Current limitation		150 % I_N for at least 60 seconds
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 0.6 Nm / 5 lb in
Dimensions	W × H × D	105 mm × 315 mm × 173 mm (4.13 in × 12.4 in × 6.81 in)
Mass	m	3.5 kg / 7.7 lb

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

130 (5.12)
105 (4.13)
229 (9.02)
225 (8.86)
300 (11.8)
335 (13.2)
315 (12.4)
6.5 (0.26)

* With front module FSE24B +4 mm (0.16 in)

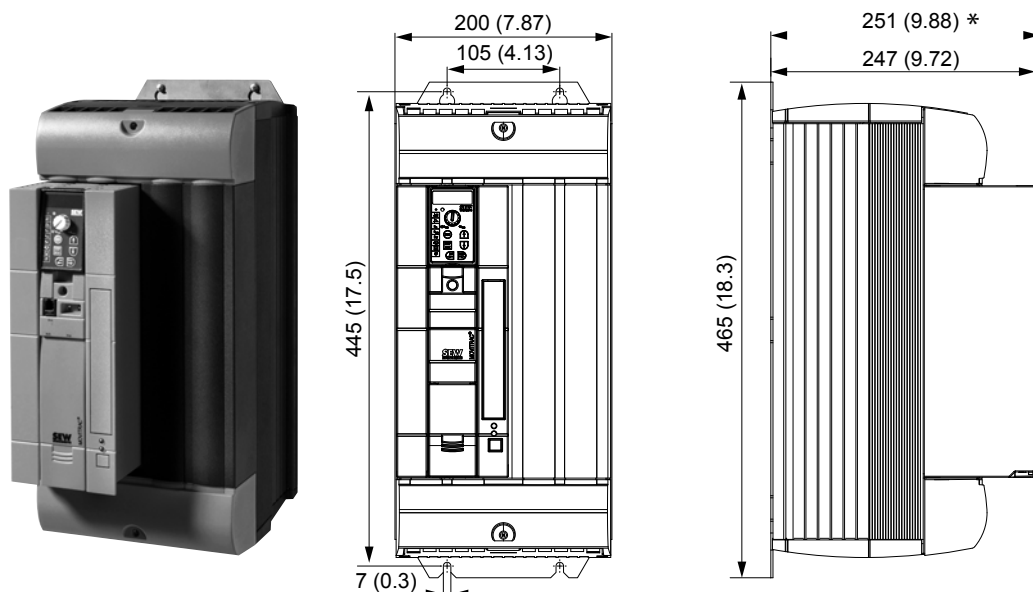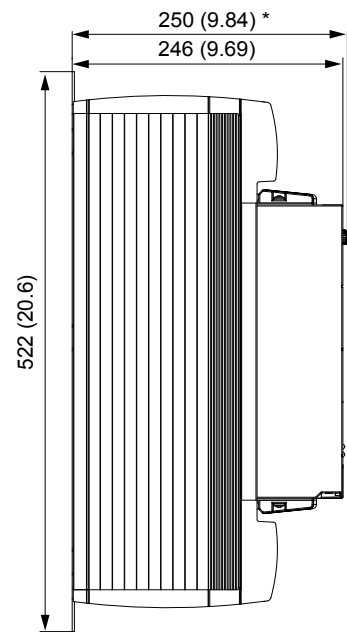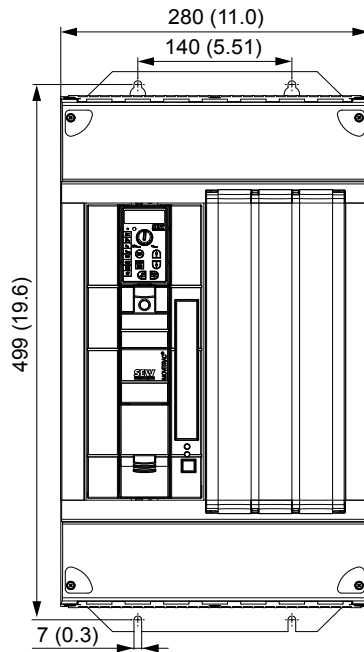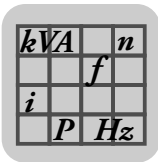| MOVITRAC® MC07B (3-phase power supply)		0055-2A3-4-00	0075-2A3-4-00
Part number ("Safe stop" integrated)		828 507 1	828 509 8
INPUT			
Rated line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current	I_{line}	AC 19.5 A	AC 27.4 A
(at V_{line} = 3 × AC 230 V)	$I_{line\ 125}$	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	$P_{Mot\ 125}$	7.5 kW / 10 HP	11 kW / 15 HP
Nominal output current 100% operation	I_N	AC 22 A	AC 29 A
Nominal 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
Min. perm. braking resistance (4-Q)	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
Type of cooling / cooling air consumption		Forced air cooling / 80 m³/h	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	4 mm² / AWG12 / 1.5 Nm / 13 lb in	
Dimensions	W × H × D	130 mm × 335 mm × 229 mm (5.12 in × 13.2 in × 9.02 in)	
Mass	m	6.6 kg / 15 lb	

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

* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0110-203-4-00	0150-203-4-00
Part number ("Safe stop" integrated)		828 510 1	828 512 8
INPUT			
Rated line voltage	V_{line}	3 × AC 200 – 240 V	
Nominal line frequency	f_{line}	50/60 Hz ±5 %	
Nominal line current (at V_{line} = 3 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 40.0 A AC 50.0 A	AC 48.6 A AC 60.8 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}	
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	11 kW / 15 HP 15 kW / 20 HP	15 kW / 20 HP 22 kW / 30 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 42 A AC 52.5 A	AC 54 A AC 67.5 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	16.8 kVA 21.0 kVA	21.6 kVA 26.9 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	7.5 Ω	5.6 Ω
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	580 W 720 W	720 W 900 W
Type of cooling / cooling air consumption		Forced air cooling / 180 m³/h	
Current limitation		150 % I_N for at least 60 seconds	
Terminal cross section / tightening torque	Terminals	6 mm² / AWG10	10 mm² / AWG8
		3.5 Nm / 31 lb in	
Dimensions	W × H × D	200 mm × 465 mm × 251 mm (7.87 in × 18.3 in × 9.88 in)	
Mass	m	15 kg / 33 lb	

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

* With front module FSE24B +4 mm (0.16 in)

MOVITRAC® MC07B (3-phase power supply)		0220-203-4-00	0300-203-4-00
Part number ("Safe stop" integrated)		828 513 6	828 514 4
INPUT			
Rated line voltage	V_{line}	3 × AC 200 – 240 V
Nominal line frequency	f_{line}	50/60 Hz ±5 %
Nominal line current (at V_{line} = 3 × AC 230 V)	I_{line} $I_{line\ 125}$	AC 72 A AC 90 A	AC 86 A AC 107 A
OUTPUT			
Output voltage	V_O	3 × 0 – V_{mains}
Recommended motor power 100% operation Recommended motor power 125 % operation	P_{Mot} $P_{Mot\ 125}$	22 kW / 30 HP 30 kW / 40 HP	30 kW / 40 HP 37 kW / 50 HP
Nominal output current 100% operation Nominal output current 125 % operation	I_N $I_{N\ 125}$	AC 80 A AC 100 A	AC 95 A AC 118.8 A
Apparent output power 100 % operation Apparent output power 125 % operation	S_N $S_{N\ 125}$	31.9 kVA 39.9 kVA	37.9 kVA 47.4 kVA
Min. perm. braking resistance (4-Q)	R_{BW_min}	3 Ω
GENERAL INFORMATION			
Power loss 100 % operation Power loss 125 % operation	P_V $P_{V\ 125}$	1100 W 1400 W	1300 W 1700 W
Type of cooling / cooling air consumption		Forced air cooling / 180 m³/h
Current limitation		150 % I_N for at least 60 seconds
Terminal cross section / tightening torque	Terminals	25 mm² / AWG4	35 mm² / AWG2
		14 Nm / 120 lb in
Dimensions	W × H × D	280 mm × 522 mm × 250 mm (11.0 in × 20.6 in × 9.84 in)
Mass	m	27 kg / 60 lb

2.6   Front modules

MOVITRAC® B is equipped with 2 slots for directly pluggable modules that can be used to realize many additional functions.

i

INFORMATION

The modules can only be connected to the predefined slot.

Only one module per slot possible (the modules FIO11B, FSC11B/12B and FSE24B are connected to the same slot and can thus not be used simultaneously).
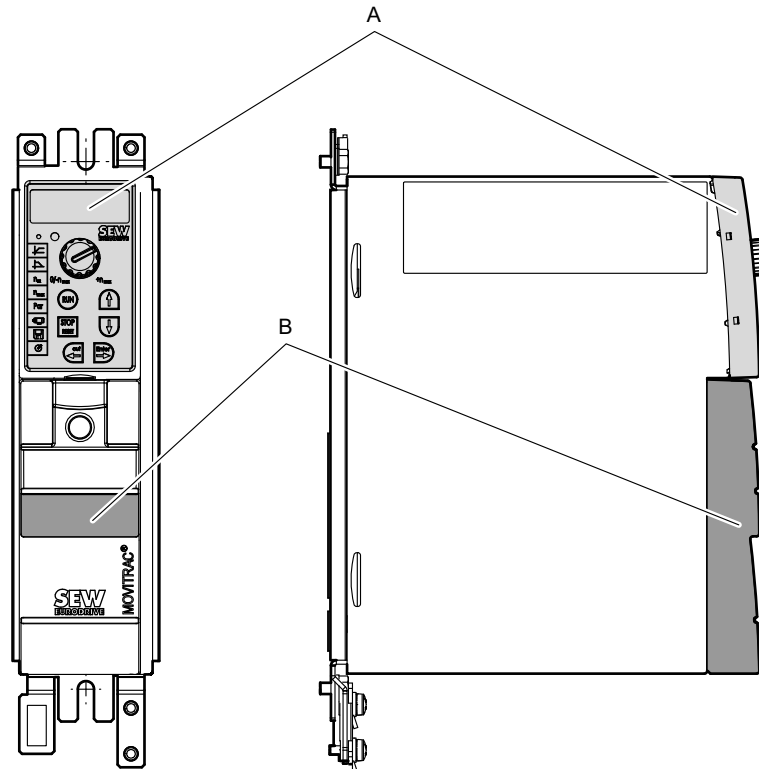
3818921227

Slot A is reserved for FBG11B.

Slot B is intended for one of the following modules:

- FSC11B/12B
- FSE24B
- FIO11B/21B

2.6.1 FBG11B keypad

Part number: 1820 635 2

Description   The FBG11B front module can be used for simple diagnostics and startup.
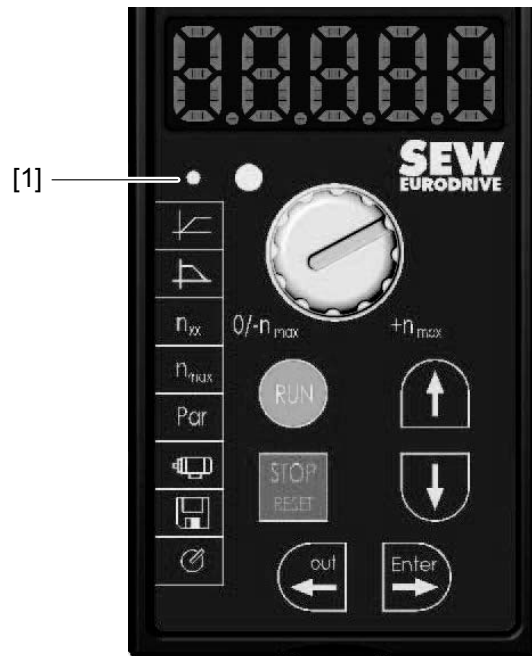
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[1] LED display

Functions
- Display process values and status
- Error memory queries and error reset
- Displaying and setting parameters
- Data 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
- Choice of short or long menu
- Can be plugged onto the inverter (during operation)
- Degree of protection IP20 (EN 60529)
- LED display with IPOS program started

2.6.2 FIO11B analog module

Part number: 1820 637 9

Description

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

• Setpoint input

• Analog output

• RS485 interface

9007199490009355

Electronics data FIO11B analog module

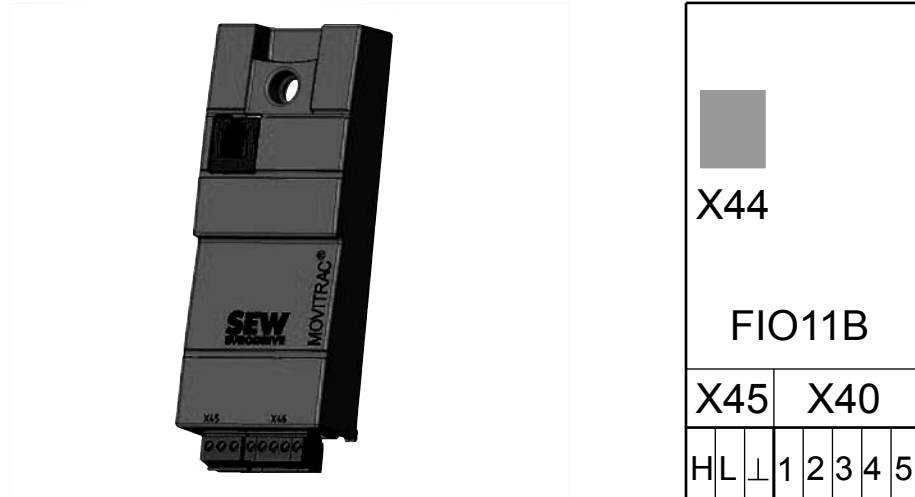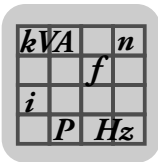| Function	Terminal	Designation	Data
Setpoint input[1]	X40:1 X40:2	AI2: Voltage input GND: Reference potential	–10 to +10 V R_i > 40 kΩ Resolution 10 bit Sampling time 5 ms Accuracy ±100 mV, 200 µA
Analog output / alternative as current output or voltage output	X40:3 X40:4 X40:5	GND: Reference potential AOV1: Voltage output AOC1: Current output	0 – 10 V / I_{max} = 2 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 ≤ 750 Ω Accuracy ±100 mV, 200 µA
RS485 interface	X45:H X45:L X45:⊥ X44 RJ10	ST11: RS485+ ST12: RS485– 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 Connection: Only for service purposes, solely for point-to-point connection Maximum cable length 3 m (10 ft) X44 and X45 are connected in parallel in the FIO11B.

1) If you do not use the setpoint input you should connect it to GND. Otherwise a measured input voltage of –1 to +1 V is present.

The terminal cross-section for all terminals of the FIO11B is:

• 1.5 mm^2 (AWG15) without conductor end sleeves

• 1.0 mm^2 (AWG17) with conductor end sleeves

2

kVA n
f
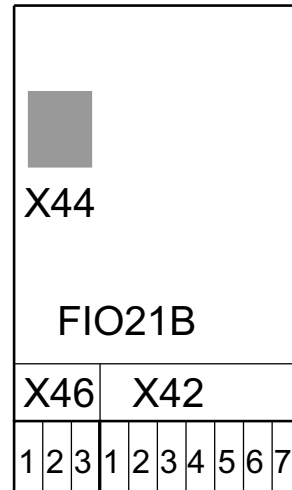i
P Hz

Technical Data
Front modules

2.6.3 FIO21B digital module

Part number 1822 541 1

Description

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

- 7 additional binary inputs DI10 – DI16
- RS485 service interface
- CAN-based system bus SBus (supported protocols: MOVILINK®, CANopen)
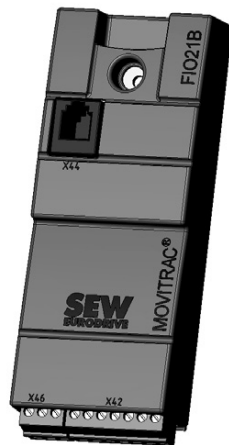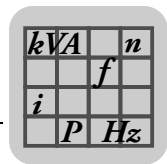
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Electronics data of the FIO21B digital module

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 kΩ, IE = 10 mA, sampling interval 5 ms, PLC compatible Signal level according to EN 61131-2 type 1 or 3: • 11 to 30 V: Contact closed • –3 to +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 with enclosed 120 Ω resistor between SC11 and SC12.

The terminal cross-section for all terminals of the FIO21B is:

- 1.5 mm^2 (AWG15) without conductor end sleeves
- 1.0 mm^2 (AWG17) with conductor end sleeves

2.6.4 FSC11B communication module

Part number: 1820 716 2

Description

The FSC11B communication provides the MOVITRAC® B communication interfaces to the outside, for communication with PLC, MOVITRAC® B, MOVIDRIVE®, PC or operator panel. The following interfaces are available:

- RS485
- CAN-based system bus (SBus) (supported protocols: MOVILINK® / CANopen)
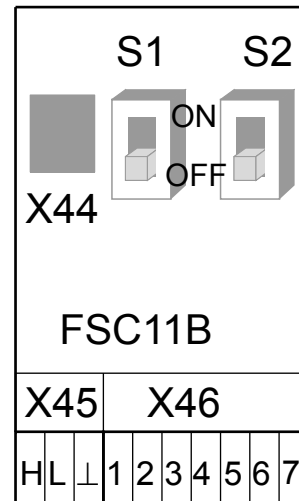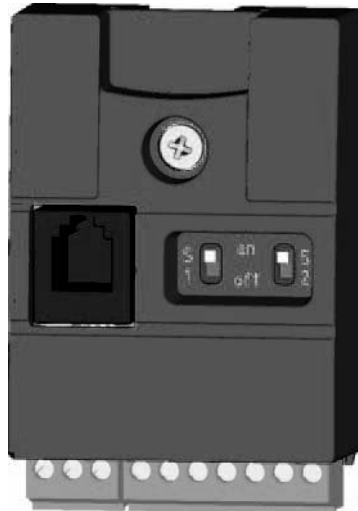
235261451

Electronics data for FSC11B communication module

Function	Terminal	Designation	Data
System bus (SBus)	X46:1 X46:2 X46:3 X46:4 X46:5 X46:6 X46:7	SC11: SBus high SC12: SBus low GND: Reference potential SC21: SBus high SC22: SBus low GND: Reference potential 24VIO: Auxiliary voltage / External voltage supply	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**.
RS485 interface	X45:H X45:L X45:⊥	ST11: RS485+ ST12: RS485– GND: Reference potential	EIA standard, 9.6 kBaud, max. 32 stations Maximum cable length 200 m (656 ft) Dynamic terminating resistor with fixed installation
	X44 RJ10	Service interface	Connection: Only for service purposes, solely for point-to-point connection, maximum cable length 3 m (10 ft) X44 and X45 are connected in parallel in the FSC.

The terminal cross-section for all terminals of the FSC11B is:

- 1.5 mm^2 (AWG15) without conductor end sleeves
- 1.0 mm^2 (AWG17) with conductor end sleeves

2.6.5 FSC12B communication module

Part number: 1824 045 3
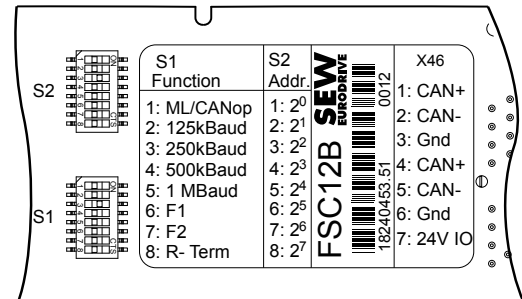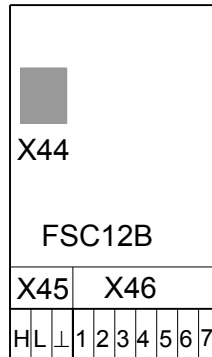
3833587211

Description

The FSC11B communication provides the MOVITRAC® B communication interfaces to the outside, for communication with PLC, MOVITRAC® B, MOVIDRIVE®, PC or operator panel. The following interfaces are available:

• RS485

• CAN-based system bus (SBus) (supported protocols: MOVILINK® / CANopen)

DIP switches allow you to set the following communication parameters:

• Profile (MOVILINK®, CANopen)

• Baud rate

• Address

Electronics data for FSC12B communication module

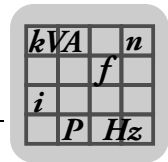| Function	Terminal/ switch	Designation	Data
System bus (SBus)	X46:1 X46:2 X46:3 X46:4 X46:5 X46:6 X46:7	SC11: SBus high SC12: SBus low GND: Reference potential SC11: SBus high SC12: SBus low GND: Reference potential 24VIO: Auxiliary voltage / External voltage supply	CAN bus according to CAN specification 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 **S1:8** (back).
RS485 interface	X45:H X45:L X45:⊥ X44 RJ10	ST11: RS485+ ST12: RS485– 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 Connection: Only for service purposes, solely for point-to-point connection, maximum cable length 3 m (10 ft) X44 and X45 are connected in parallel in the FSC.
DIP switch	S2	Address	Binary coded: $1:2^0$; $2:2^1$; $3:2^2$ Example: Address 9: S2:1 and S2:4 = ON Permitted address range: • 0 – 63 (MOVILINK®: S1:1 = OFF) • 1 – 127 (CANopen: S1:1 = ON)
	S1	S1:1 CAN profile S1:2 125 kBaud S1:3 250 kBaud S1:4 500 kBaud S1:5 1 MBaud S1:6 F1 S1:7 F2 S1:8 terminating resistor	OFF = MOVILINK®, ON = CANopen S1:2 – S1:5 • Baud rate: you may select exactly 1 baud rate S1:6 – S1:7 • F1 and F2 are reserved and may not be activated S1:8 switches 120 Ω bus termination between CAN high and CAN low

The terminal cross-section for all terminals of the FIO11B is:

- 1.5 mm^2 (AWG15) without conductor end sleeves
- 1.0 mm^2 (AWG17) with conductor end sleeves

All DIP switches are set to OFF by default. Thus the values set in the parameter *P88.* apply.

If no or several baud rates are selected via DIP switches S1:2 – S1:5, the baud rate set in parameter *P884* applies.

If an invalid address is set via DIP switch S2, the addresses set in *P881* and *P886* apply.

Invalid address examples:

- Address > 63 in the MOVILINK® profile (S1:1 = OFF) or
- Address > 127 or address = 0 in the CANopen profile (S1:1 = ON)

The FSC12B is only supported as of MOVITRAC® firmware 1822 5632.**11**.

Older firmware versions do not allow for communication via CAN.

SEW-EURODRIVE recommends that you use MOVITOOLS® MotionStudio as of version 5.70.

2.6.6 EtherCAT module FSE24B

Part number: 1824 006 2

Description

The EtherCAT FSE24B communication module upgrades the basic version with the following interfaces:

• EtherCAT

• RS485 service interface
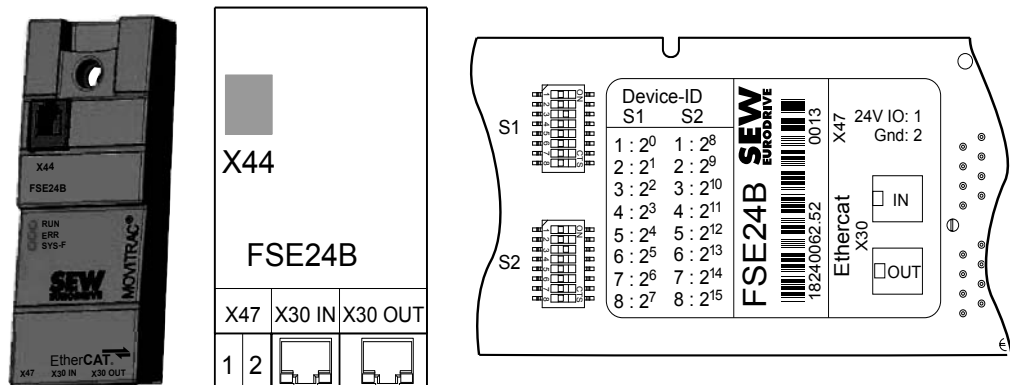
3833591435

Electronics data EtherCAT FSE24B

Function	Terminal	Designation	Data
EtherCAT	X30 IN X30 OUT (2 × RJ45)	Incoming and outgoing EtherCAT connection	• Fast Ethernet (100 MBaud, full duplex) • Auto-crossing • IEC 61158, IEC 61784-2
External voltage supply	X47:1 X47:2	24 V IO GND	• V = DC 24 V (–15 %, +20 %) • The FSE24B and MOVITRAC® B are supplied with 24 V via X47 • Alternatively, the FSE24B can supplied via the MOVITRAC® B only

You can use DIP switches S1 and S2 to set a binary-coded unit identification that can be read-out in MOVITOOLS® MotionStudio in parameter group *P09.* (bus diagnostics) in the parameter tree. Alternatively, you can read out this unit identification via index 10497, subindex 3.

To display the extended diagnostics parameters in parameter group *P09.* of the parameter tree, you require MOVITOOLS® MotionStudio version 5.70 or later.

2.7 DBG60B keypad

2.7.1 Description

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

Keypad		Language variants	Part number
1454354443	**DBG60B-01**	DE / EN / FR / IT / ES / PT / NL (German / English / French / Italian / Spanish / Portuguese / Dutch)	1820 403 1
	DBG60B-02	DE / EN / FR / FI / SV / DA / TR (German / English / French / Finnish / Swedish / Danish / Turkish)	1820 405 8
	DBG60B-03	DE / EN / FR / RU / PL / CS (German / English / French / Russian / Polish / Czech)	1820 406 6
	DBG60B-04	DE / EN / FR / ZH (German / English / French / Chinese)	1820 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	817 583 7

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

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

Functions
- Display process values and status
- Status displays of binary inputs/outputs
- Error memory queries and error reset
- 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

Features
- Illuminated text display, range of languages
- Keypad with 21 keys
- Selection between user menu, detailed parameter menu and startup menu in VFC mode (CFC and SERVO startup is not possible with the DBG60B)
- Can be plugged into MOVIDRIVE®
- Can be connected via extension cable DKG60B (5 m (20 ft))
- Degree of protection IP40 (EN 60529)

i

INFORMATION

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

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)

i

INFORMATION

The DBG60B keypad option is connected to the FSC11B/12B, FSE24B or FIO11B / FIO21B communication front module. If using DBG60B, you must not additionally connect the MOVITRAC® B RS485.

2.7.2 Functions

- Display process values and status
- Status displays of binary inputs/outputs
- Error memory queries and error reset
- 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

2.7.3 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)

i

INFORMATION

The DBG60B keypad option is connected to the FSC11B/12B, FSE24B or FIO11B / FIO21B communication front module. If using DBG60B, you must not additionally connect the MOVITRAC® B RS485.

2.7.4 Dimension drawing of DBG60B
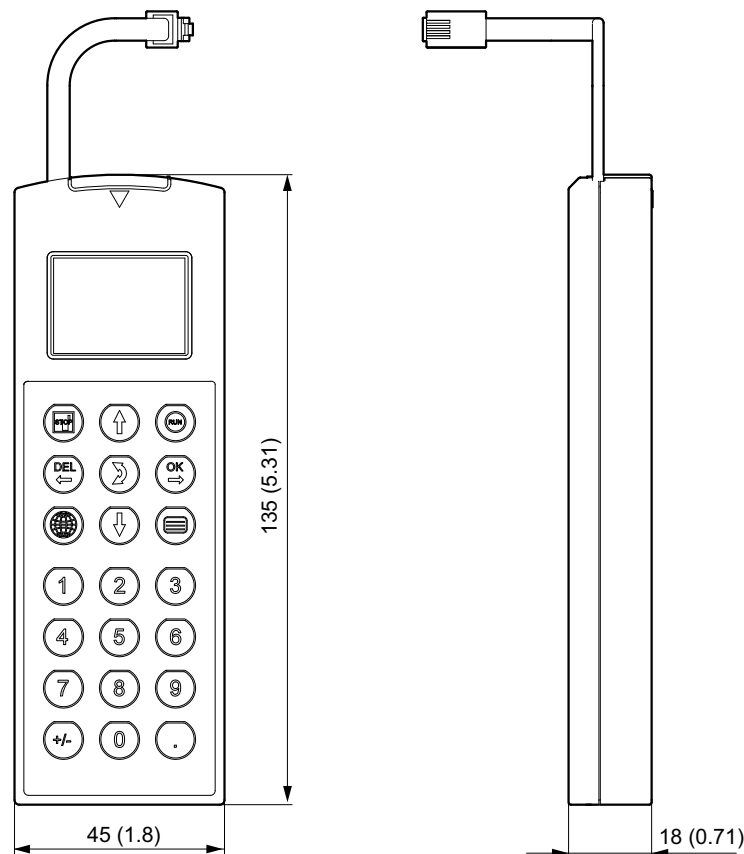
The following figure shows the mechanical dimensions in mm (in):

1454357771

All dimensions in mm (in)

2.8 DBM60B/DKG60B housing for DBG60B

2.8.1 Description

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

Part numbers
- DBM60B   08248532
- DKG60B   08175837

2.8.2 Dimension drawing of DBM60B/DKG60B
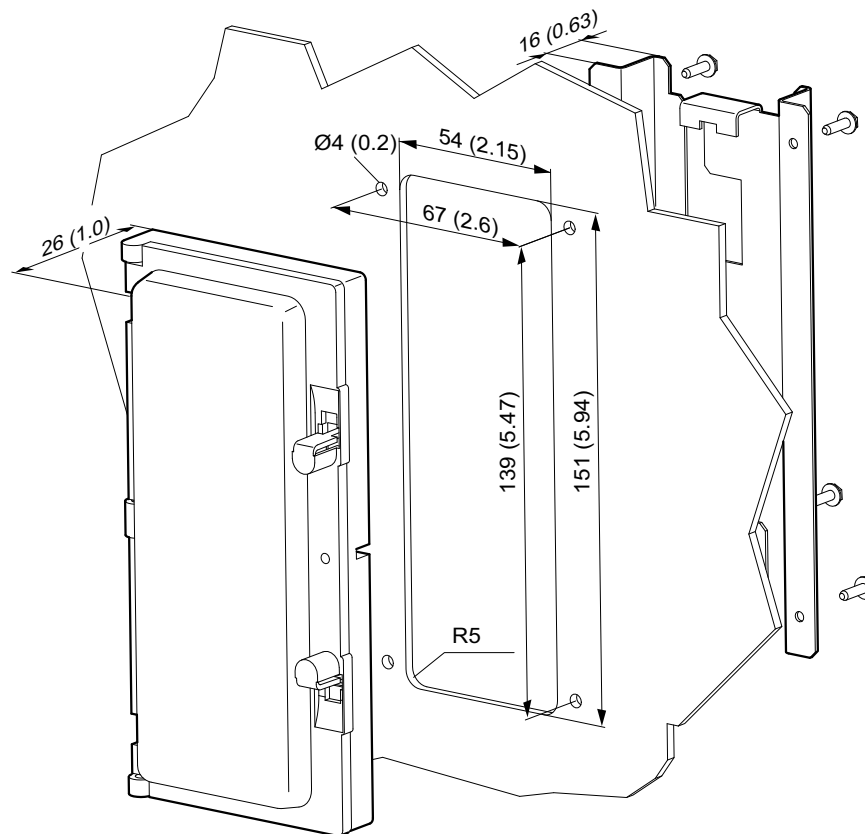
The following figure shows the mechanical dimensions in mm (in):

1454360843

All dimensions in mm (in)

2.9 UBP11A parameter module
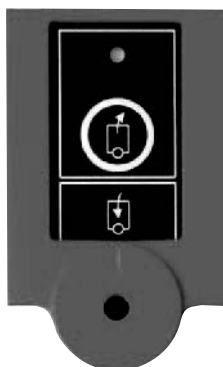
18028939

2.9.1 Part number

823 933 9

2.9.2 Description

- Saving data from the inverter to the parameter module
- Saving data from the parameter module to the inverter
- Indication of the operating state
- Meaning of the LED:
  - Green: Data available
  - Flashing green: Data transmission in progress
  - Yellow: No data available
  - Red: Copy error

INFORMATION

The UBP11A parameter module is connected to the FSC11B/12B, FSE24B or FIO11B / FIO21B communication front module. If using UBP11A, you must not additionally connect the MOVITRAC® B RS485.

2.10 MBG11A speed control module

2.10.1 Part number

822 547 8

2.10.2 Description

- The MBG11A speed control module has 2 keys and a display. They allow for remote speed control in the range of –100 % to +100 % n_{max} (*P302*).

- Up to 31 MOVITRAC® B units can be controlled at the same time (broadcasting).

- The MBG11A setpoint control module requires the front module FSC11B/12B or FIO11B.

2.10.3 Dimensions and connection assignment

The dimensions are specified in mm (in).
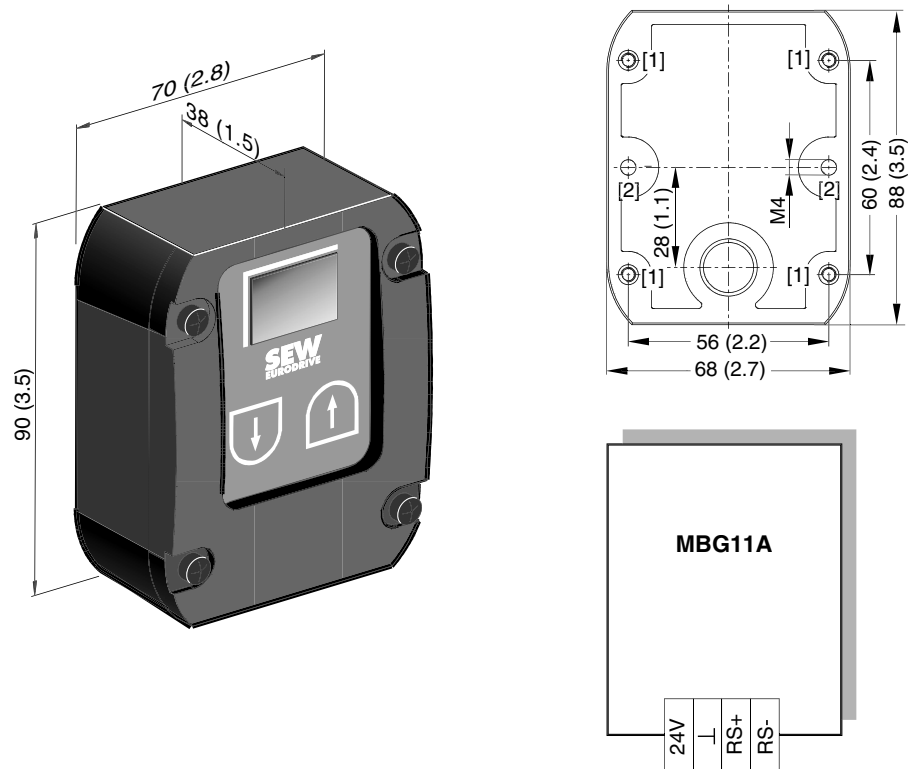
186412427

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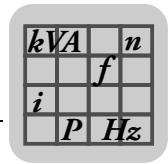
2.10.4 Technical data

Part number	822 547 8
Input voltage	DC 24 V ± 25%
Current consumption	About 70 mA
Setpoint resolution	1 %
Serial interface[1]	RS485 for connecting max. 31 MOVITRAC® inverters (max. 200 m, (656 ft), 9600 baud)
Degree of protection	IP65
Ambient temperature	−15 °C to +60 °C
Dimensions	90 mm × 70 mm × 38 mm (3.5 in × 2.8 in × 1.5 in)

1) With integrated dynamic terminating resistor

2.11 UWS11A interface adapter option

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INFORMATION

The FSC11B/12B or FIO11B is required for connecting the UWS11A.

2.11.1 Part number

822 689 X

2.11.2 Description

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

The UWS11A option requires a DC 24 V voltage supply (I_{max} = DC 50 mA).

2.11.3 RS232 interface

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

2.11.4 RS485 interface

Max. 32 MOVITRAC® units can be interconnected for communication [max. line length 200 m (656 ft)] via the RS485 interface of the UWS11A. Do not connect external terminating resistors as dynamic terminating resistors are already installed.

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

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

2.11.5 Dimension drawing of UWS11A
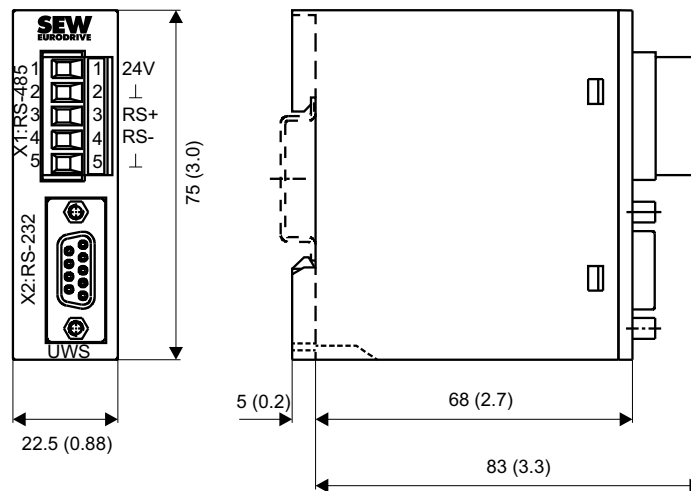
1454780939

All dimensions in mm (in)

The UWS11A option is mounted on a mounting rail (EN 50022-35 × 7,5) in the control cabinet.

2.11.6 Technical data

UWS11A	
Part number	822 689 X
Ambient temperature	0 °C to 40 °C
Storage temperature	−25 °C to +70 °C (according to EN 60721-3-3, class 3K3)
Degree of protection	IP20
Voltage supply	DC 24 V (I_{max} = 50 mA)
Current consumption	max. DC 50 mA
Mass	150 g (0.35 lb)
Dimensions	83 mm × 75 mm × 22.5 mm (3.3 in × 3.0 in × 0.88 in)

*Dimension drawing
of UWS11A*
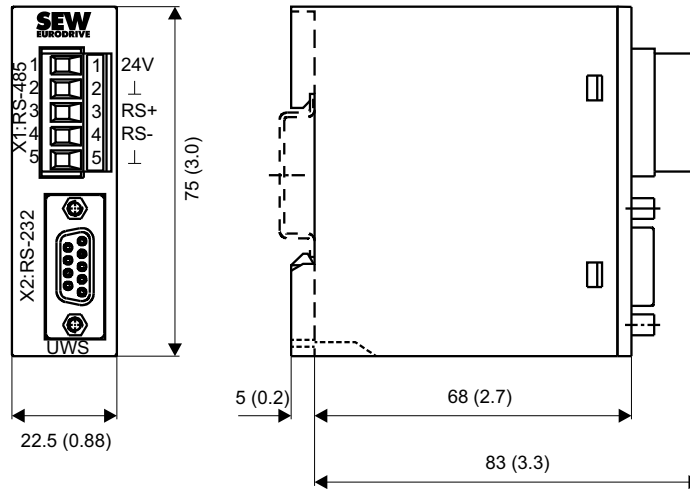
1454780939

All dimensions in mm (in)

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

2.12 UWS21B interface adapter

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INFORMATION

The FSC11B/12B, FSE24B or FIO11B/21B is required for connecting the UWS21B.

2.12.1 Part number

1820 456 2

2.12.2 Description

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

2.12.3 RS232 interface

The connection of UWS21B with PC is made using a standard serial interface cable (shielded).

2.12.4 RS485 interface

UWS21B and MOVITRAC® B are connected using a serial interface cable with RJ10 connectors.

2.12.5 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 connectors to connect UWS21B and MOVITRAC® B.

- CD-ROM with MOVITOOLS® MotionStudio engineering software

2.12.6 Dimension drawing of UWS21B

All dimensions in mm (in)

1454854283
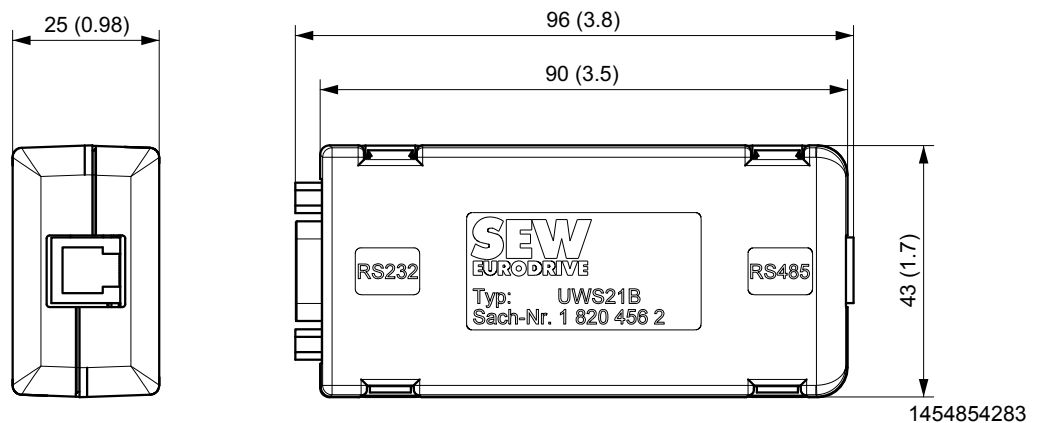
2.12.7 Technical data

UWS21B	
Part number	1 820 456 2
Ambient temperature	0 °C to 40 °C
Storage temperature	–25 °C to +70 °C (according to EN 60721-3-3, class 3K3)
Degree of protection	IP20
Mass	300 g (0.7 lb)
Dimensions	96 mm × 43 mm × 25 mm (3.8 in × 1.7 in × 0.98 in)

Dimension drawing
of UWS21B

1454854283
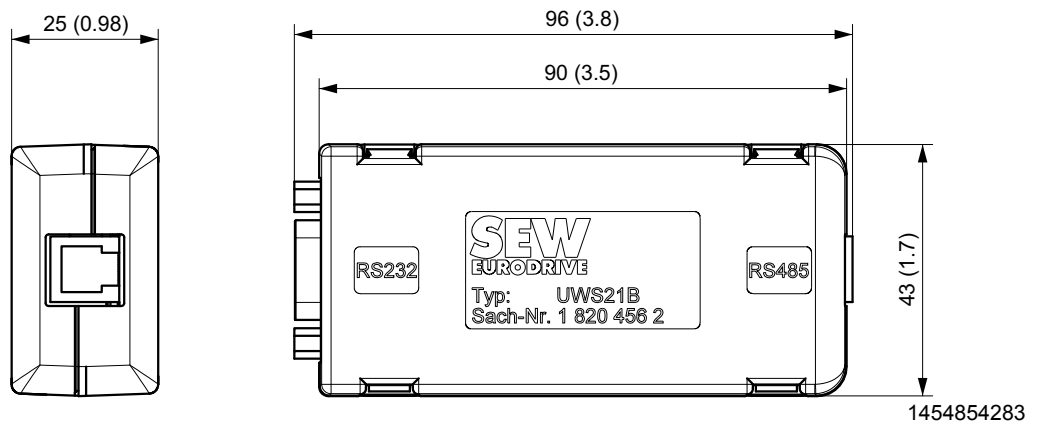
All dimensions in mm (in)

2.13 USB11A interface adapter

INFORMATION

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The FSC11B/12B, FSE24B or FIO11B/21B is required for connecting the USB11A.

2.13.1 Part number

824 831 1

2.13.2 Description

Option USB11A can be used to connect a PC or laptop with a USB interface to the XT slot of MOVITRAC® B. The USB11A interface adapter supports USB 1.1 and USB 2.0.

2.13.3 USB11A - PC

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

2.13.4 RS485 interface

USB11B and MOVITRAC® B are connected using a serial interface cable with RJ10 connectors.

2.13.5 MOVITRAC® - USB11A

MOVITRAC® B and USB11A are connected using a serial interface cable with RJ10 connectors.

2.13.6 Scope of delivery

The scope of delivery for the USB11A option includes:

• USB11A interface adapter

• USB connection cable to connect USB11A - PC

• Serial interface cable with 2 RJ10 connectors to connect USB11A and MOVITRAC® B

• CD-ROM with drivers and MOVITOOLS® MotionStudio engineering software

2.13.7 Dimension drawing

All dimensions in mm (in)
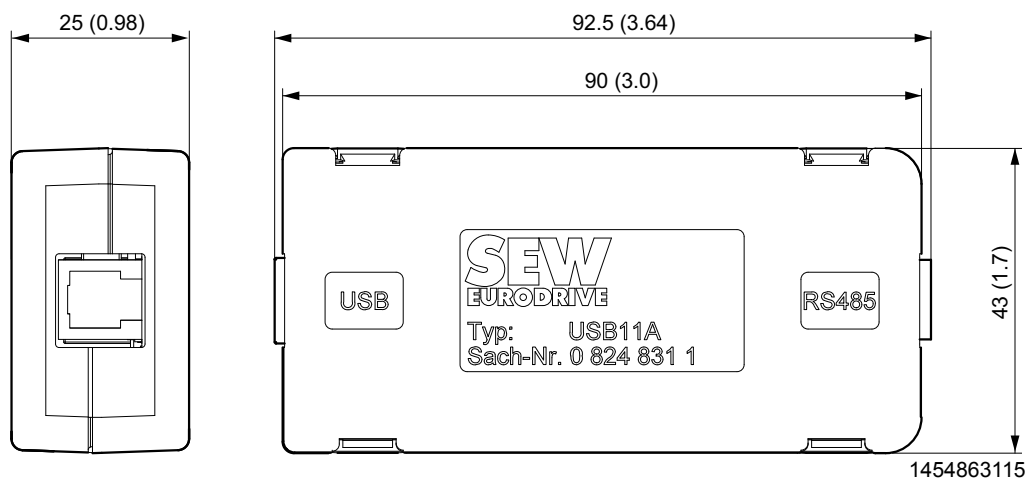
All dimensions in mm (in)

2.13.8 Technical data

USB11A	
Part number	824 831 1
Ambient temperature	0 to 40 °C
Storage temperature	−25 °C to +70 °C (according to EN 60721-3-3, class 3K3)
Degree of protection	IP20
Mass	300 g (0.7 lb)
Dimensions	92.5 mm x 43 mm x 25 mm (3.64 in x 1.7 in x 0.98 in)

2.14 BW braking resistors

2.14.1 General information

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

The resistor surfaces will get very hot under a load of 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.

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). 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® B frequency inverters. SEW-EURODRIVE will provide certification on request. The BW..-T and BW..-P braking resistors have cRUus approval independent of the MOVITRAC® B inverter.

2.14.2 PTC braking resistors

Observe the following points for PTC braking resistors:

• Only recommended for applications with little regenerative energy.

• The resistor reversibly protects itself against overload by changing abruptly to high resistance and no longer consuming any more energy.

The inverter then switches off and signals a "brake chopper" error (error *F04*).
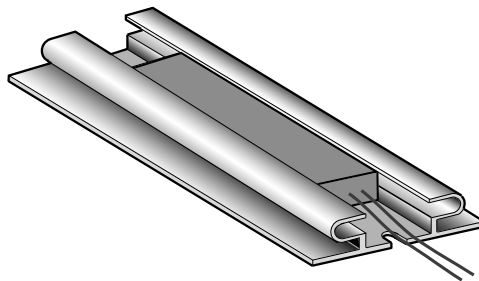
186415755

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 to +60 °C			
For MOVITRAC® B	0003 – 0040 (400/500 V)		0003 – 0022 (230 V)	
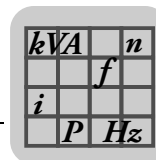
2.14.3 Flat design

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].
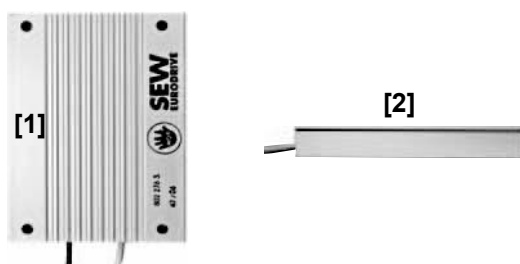
313597195

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 Ω ±10%	27 Ω ±10%
Trip current	1.0 A	1.4 A
Ambient temperature ϑ_A	−20 °C to +45 °C	
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 Ω ±10%	72 Ω ±10%
Trip current	0.6 A	1.0 A
Ambient temperature ϑ_A	−20 °C to +45 °C	
For MOVITRAC® B 400/500 V	0003 – 0040	0003 – 0040

2

kVA n
f
i
P Hz

Technical Data
BW braking resistors
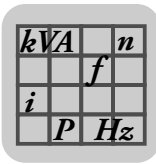
2.14.4 Wire resistors and grid resistors

- 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 (→ chapter "Braking resistor selection")

- 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 or the 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 will get very hot under a load of 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	6.7 A	9.1 A	13.9 A	20.4 A	14.4 A	20.4 A	28.9 A
Connections	Ceramic terminals 2.5 mm² (AWG12)		M8 stud					
Tightening torque	0.5 Nm / 4 lb in		6 Nm / 50 lb in					
Design	Wire resistor		Steel grid resistor					
For MOVITRAC® B	0015 – 0022		2 × 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	3.9 A	5.5 A	8.1 A	28 A	38 A	42 A
Connections	Ceramic terminals 2.5 mm² (AWG12)				M8 stud		
Tightening torque	0.5 Nm / 4 lb in				6 Nm / 50 lb in		
Design	Wire resistor				Steel grid resistor		
For MOVITRAC® B	0015 – 0022				2 × parallel with 0110	0150 / 2 x parallel with 0220/ 0300	

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

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	3.4 A	4.2 A	5 A	6.5 A	9.2 A
Connections	Ceramic terminals 2.5 mm² (AWG12)					Ceramic terminals 10 mm² (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 136 9	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	8.1 A	11.3 A	9.1 A	13.9 A	20.4 A
Connections	Ceramic terminals 2.5 mm² (AWG12)		M8 stud	Ceramic terminals 2.5 mm² (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		Steel 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	14.4 A	20.4 A	28.8 A	47.4 A	54.7 A
Connections	M8 stud					
Tightening torque	6 Nm / 50 lb in					
Design	Steel grid resistor					
For MOVITRAC® B	0220	0300			0370 – 0750	

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

2.14.5 Dimension drawing – braking resistors BW... / BW...-T / BW...-P

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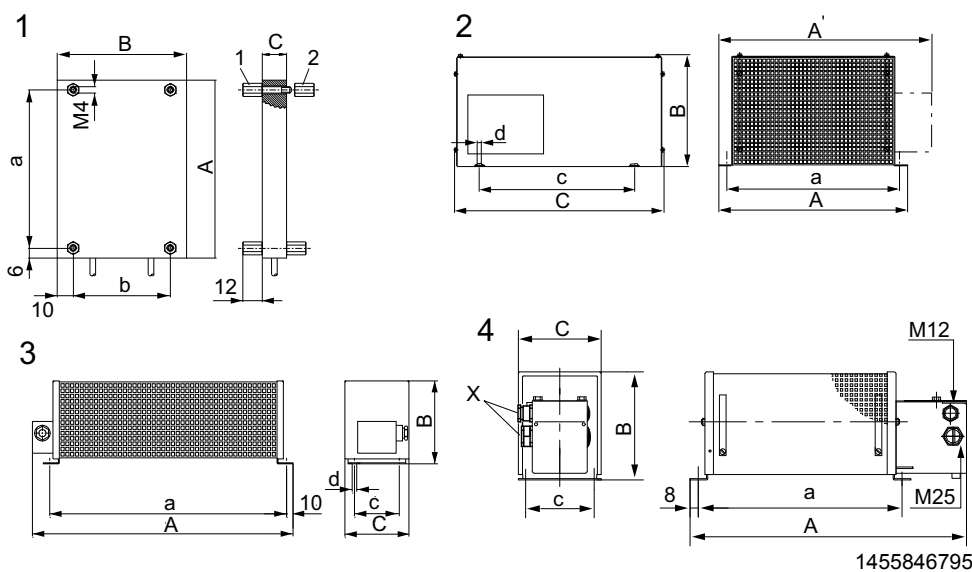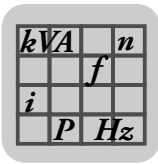

BW... :
- 1 = Flat design
  The connecting lead is 500 mm (19.7 in) long. The scope of delivery includes four M4 stud bolts each of type 1 and 2.
- 2 = Grid resistor
- 3 = Wire resistor
- 4 = Wire resistor with temperature switch (-T/-P) Cable entry (X) is possible from both sides.

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BW... type BW..-T/ BW...-P	Mounting position	Main dimensions mm (in)			Fastening parts mm (in)			Cable gland	Mass kg (lb)
		A/A'	B	C	a	b/c	d		
BW072-003	1	110 (4.33)	80 (3.1)	15 (0.59)	98 (3.9)	60 (2.4)	-	-	0.3 (0.7)
BW027-003	1	110 (4.33)	80 (3.1)	15 (0.59)	98 (3.9)	60 (2.4)	-	-	0.3 (0.7)
BW072-005	1	216 (8.5)	80 (3.1)	15 (0.59)	204 (8.03)	60 (2.4)	-	-	0.6 (1)
BW027-005	1	216 (8.5)	80 (3.1)	15 (0.59)	204 (8.03)	60 (2.4)	-	-	0.6 (1)
BW027-006	3	486 (19.1)	120 (4.72)	92 (3.6)	430 (16.9)	64 (2.5)	6.5 (0.26)	PG11	2.2 (4.9)
BW027-012	3	486 (19.1)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	6.5 (0.26)	PG11	4.3 (9.5)
BW100-006	4	486 (19.1)	120 (4.72)	92 (3.6)	430 (16.9)	64 (2.5)	6.5 (0.26)	PG11	2.2 (4.9)
BW100-006-T	4	549 (21.6)	120 (4.72)	92 (3.6)	430 (16.9)	80 (3.1)	6.5 (0.26)	M12 + M25	3.0 (6.6)
BW168	3	365 (14.4)	120 4.72)	185 (7.28)	326 (12.8)	150 (5.91)	6.5 (0.26)	PG13.5	3.5 (7.7)
BW168-T	4	449 (17.7)	120 (4.72)	185 (7.28)	326 (12.8)	150 (5.91)	6.5 (0.26)	M12 + M25	3.6 (7.9)
BW268	3	465 (18.3)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	6.5 (0.26)	PG13.5	4.3 (9.5)
BW268-T	4	549 (21.6)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	6.5 (0.26)	M12 + M25	4.9 (11)
BW147	3	465 (18.3)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	6.5 (0.26)	PG13.5	4.3 (9.5)
BW147-T	4	549 (21.6)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	6.5 (0.26)	M12 + M25	4.9 (11)
BW247	3	665 (26.2)	120 (4.72)	185 (7.28)	626 (24.6)	150 (5.91)	6.5 (0.26)	PG13.5	6.1 (13)
BW247-T	4	749 (29.5)	120 (4.72)	185 (7.28)	626 (24.6)	150 (5.91)	6.5 (0.26)	M12 + M25	9.2 (20)
BW347	3	670 (26.4)	145 (5.71)	340 (13.4)	630 (24.8)	300 (11.8)	6.5 (0.26)	PG13.5	13.2 (29.1)
BW347-T	4	749 (29.5)	210 (8.27)	185 (7.28)	630 (24.8)	150 (5.91)	6.5 (0.26)	M12 + M25	12.4 (27.3)
BW039-003	3	286 (11.3)	120 (4.72)	92 (3.6)	230 (9.06)	64 (2.5)	6.5 (0.26)	PG11	1.5 (3.3)
BW039-006	3	486 (19.1)	120 (4.72)	92 (3.6)	430 (16.9)	64 (2.5)	6.5 (0.26)	PG11	2.2 (4.9)
BW039-012	3	486 (19.1)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	6.5 (0.26)	PG11	4.3 (9.5)
BW039-012-T	4	549 (21.6)	120 (4.72)	185 (7.28)	426 (16.8)	150 (5.91)	6.5 (0.26)	M12 + M25	4.9 (11)
BW039-026-T	4	649 (25.6)	120 (4.72)	275 (10.8)	530 (20.9)	240 (9.45)	6.5 (0.26)	M12 + M25	7.5 (17)
BW018-015	3	620 (24.4)	120 (4.72)	92 (3.6)	544 (21.4)	64 (2.5)	6.5 (0.26)	PG11	4.0 (8.8)
BW018-015-P	4	649 (25.6)	120 (4.72)	185 (7.28)	530 (20.9)	150 (5.91)	6.5 (0.26)	M12 + M25	5.8 (13)
BW012-025	2	295 (11.6)	260 (10.2)	490 (19.3)	270 (10.6)	380 (15)	10.5 (0.41)	M12 + M25	8.0 (18)
BW012-025-P	2	295/355 (11.6)/(14)	260 (10.2)	490 (19.3)	270 (10.6)	380 (15)	10.5 (0.41)	M12 + M25	8.0 (18)
BW012-050-T	2	395 (15.6)	260 (10.2)	490 (19.3)	370 (14.6)	380 (15)	10.5 (0.41)	-	12 (26)
BW012-100-T	2	595 (23.4)	270 (10.6)	490 (19.3)	570 (22.4)	380 (15)	10.5 (0.41)	-	21 (46)
BW018-035-T	2	295 (11.6)	270 (10.6)	490 (19.3)	270 (10.6)	380 (15)	10.5 (0.41)	-	9.0 (20)
BW018-075-T	2	595 (23.4)	270 (10.6)	490 (19.3)	570 (22.4)	380 (15)	10.5 (0.41)	-	18.5 (40.8)
BW039-050-T	2	395 (15.6)	260 (10.2)	490 (19.3)	370 (14.6)	380 (15)	10.5 (0.41)	-	12 (26)

BW... type	Mounting position	Main dimensions mm (in)			Fastening parts mm (in)			Cable gland	Mass kg (lb)
BW..-T/ BW...-P		A/A'	B	C	a	b/c	d		
BW915-T	2	795 (31.3)	270 (10.6)	490 (19.3)	770 (30.3)	380 (15)	10.5 (0.41)	-	30 (66)
BW106-T	2	795 (31.3)	270 (10.6)	490 (19.3)	770(30.3)	380 (15)	10.5 (0.41)	-	32 (71)
BW206-T	2	995 (39.2)	270 (10.6)	490 (19.3)	970 (38.2)	380 (15)	10.5 (0.41)	-	40 (88)

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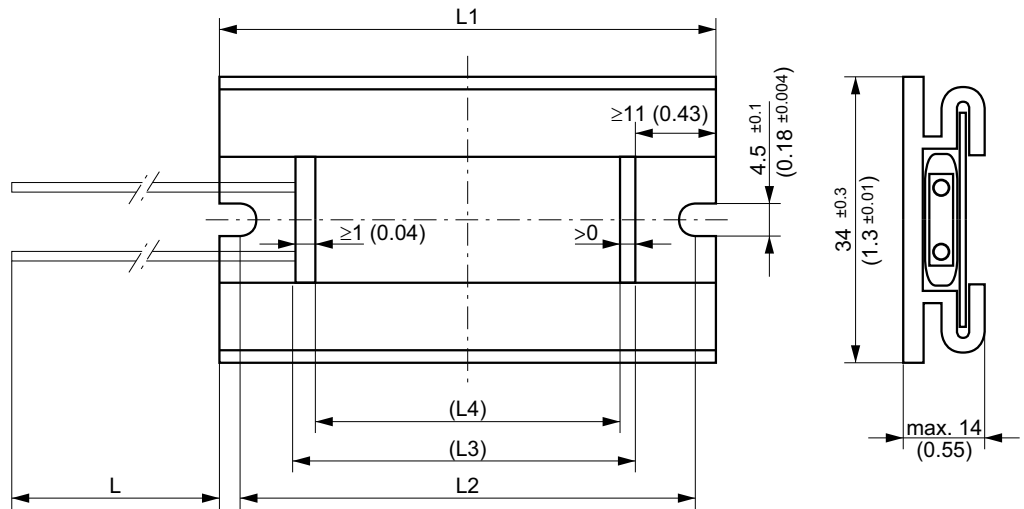
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Type	L1	L2	L3	L4	L
BW1	89 (3.5)	82 (3.2)	64 (2.5)	60 (2.4)	100 (3.94)
BW2	124 (4.88)	117 (4.61)	97 (3.8)	95 (3.7)	165 (6.50)
BW3	89 (3.5)	82 (3.2)	64 (2.5)	60 (2.4)	100 (3.94)
BW4	124 (4.88)	117 (4.61)	97 (3.8)	95 (3.7)	165 (6.50)

2.15 BS... touch guard

2.15.1 Description

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

Touch guard	BS003	BS005
Part number	813 151 1	813 152 X
for braking resistor	BW027-003 BW072-003	BW027-005 BW072-005 BW100-005

2.15.2 Dimension drawing BS...
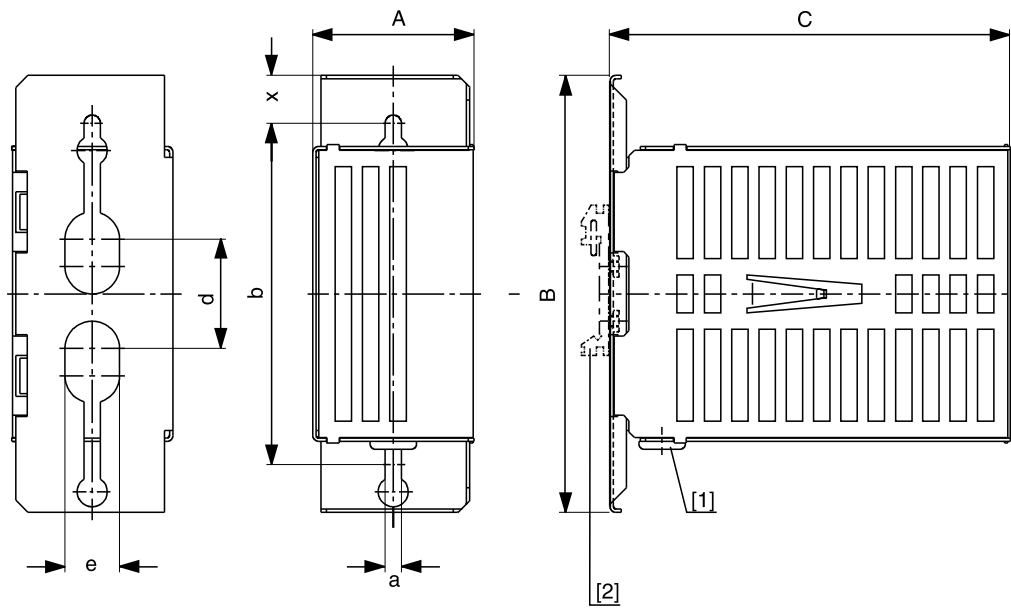
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[1] Grommet
[2] Support rail mounting

Type	Main dimensions mm (in)			Mounting dimensions mm (in)					Weight kg (lb)
	A	**B**	**C**	**b**	**d**	**e**	**a**	**x**	
BS-003	60 (2.4)	160 (6.3)	146 (5.75)	125 (4.92)	40 (1.6)	20 (0.79)	6 (0.2)	17.5 (0.69)	0.35 (0.77)
BS-005	60 (2.4)	160 (6.3)	252 (9.92)	125 (4.92)	4 (1.6)	20 (0.79)	6 (0.2)	17.5 (0.69)	0.5 (1)

Mounting rail installation   A mounting rail attachment HS001 is available from SEW-EURODRIVE, part number 822 194 4, for mounting the touch guard on a mounting rail.

2.16 Mounting braking resistors FKB10B

Type	Part number	Size	230 V	400 V
FKB10B	1821 621 8	0XS, 0S, 0L	BW3	BW1

2.16.1 Dimension drawing for sizes 0XS, 0S, 0L
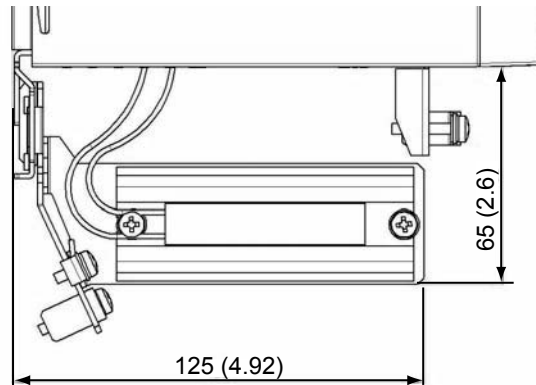
791021195

2.17 FKB11/12/13B for sub mounting braking resistors

FKB..B is used for submounting braking resistors under the inverter.

Type	Part number	Size	Braking resistor	
			230 V	**400 / 500 V**
FKB11B	1820 728 6	0XS, 0S	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.

2.17.1 Dimension drawing
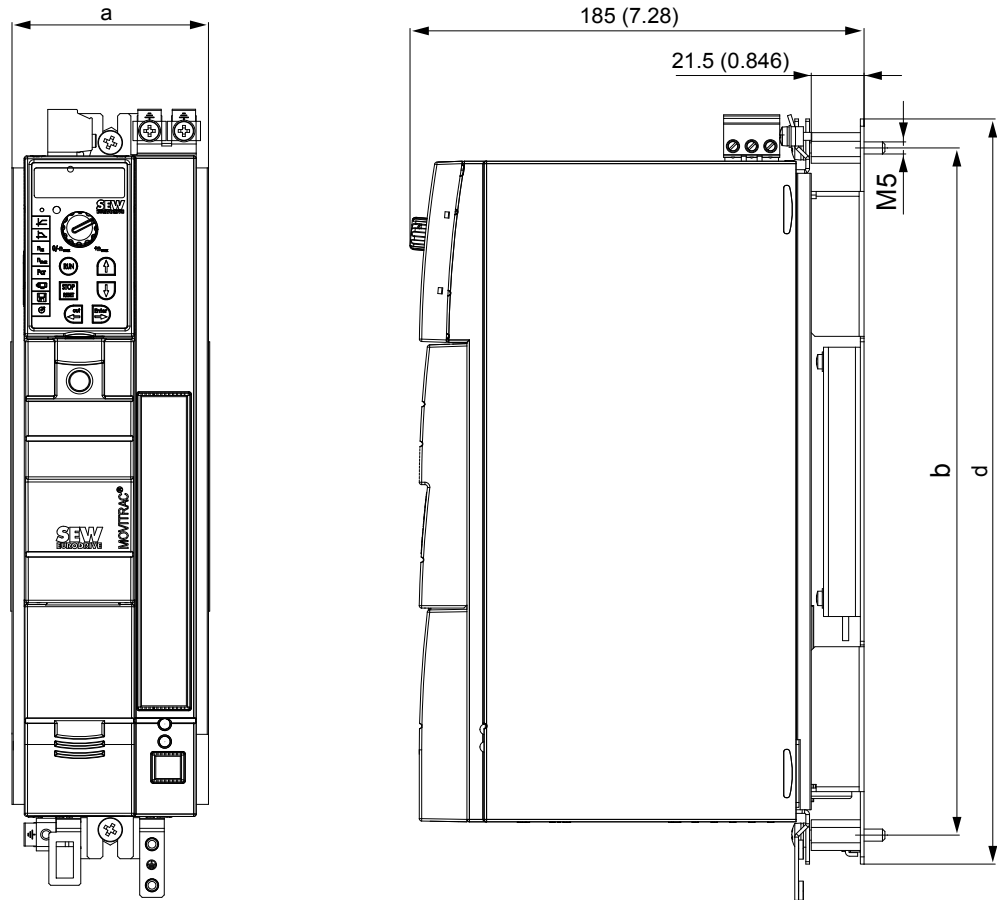
9007199340913035

MOVITRAC® B size	All dimensions in mm (in)		
	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)

2.18 Support rail mounting FHS11B/12B/13B

The FHS is used for support rail mounting of MOVITRAC® B frequency inverters and for the submounting of braking 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		

2.18.1 Dimension drawing

The dimensions are specified in mm (in).

9007199340909451
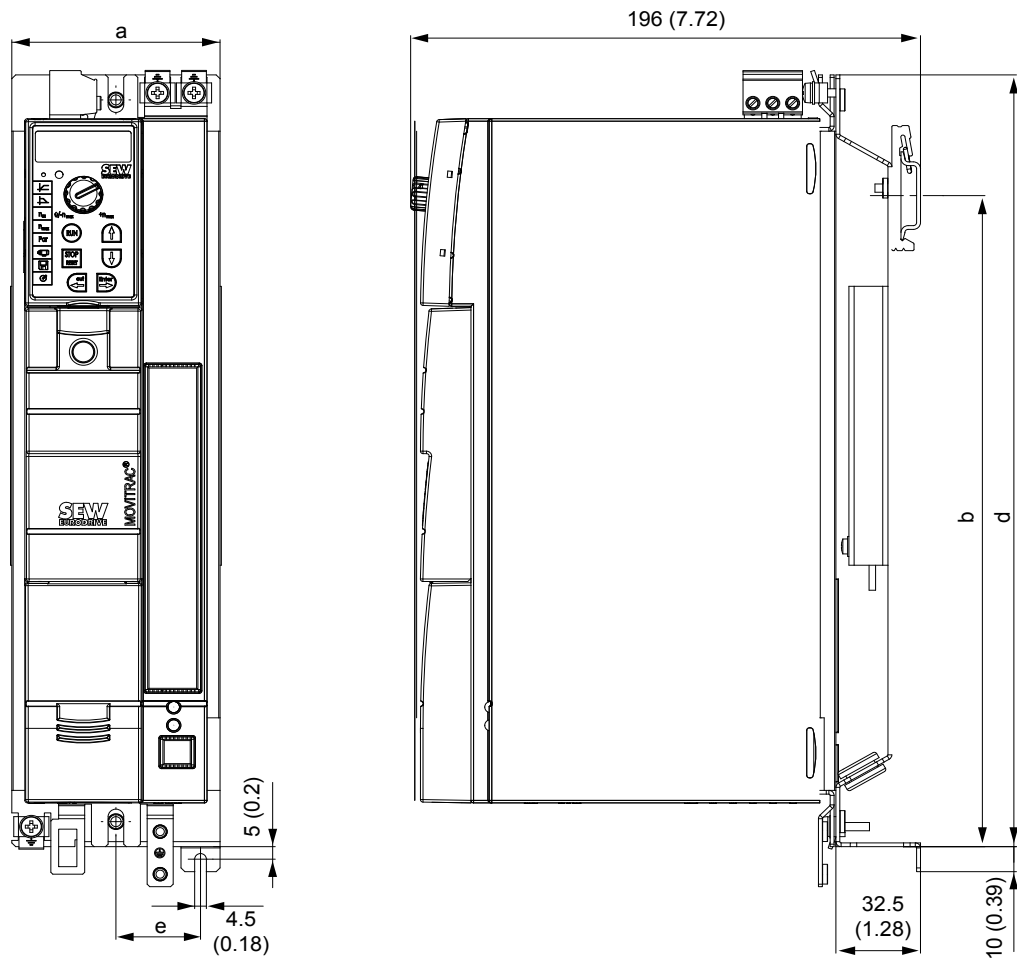
MOVITRAC® B size	All dimensions in mm (in)			
	a	**b**	**d**	**e**
0XS	55 (2.2)	171.5 (6.752)	220 (8.66)	7.5 (0.30)
0S	80 (3.1)	171.5 (6.752)	220 (8.66)	32.5 (1.28)
0L	80 (3.1)	260.3 (10.25)	308.5 (12.15)	32.5 (1.28)

2.19 ND line chokes

Using line chokes is optional:

- To support overvoltage protection

- To smoothen the line current, to reduce harmonics

- Protection in the event of distorted line voltage

- To limit the charging current when several inverters are connected together in parallel on the input end with shared line contactors (nominal current of line choke = total of inverter currents).

ND.. line chokes have cRUs approval independent of the MOVITRAC®.

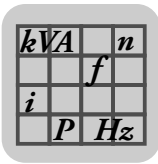| Line choke type	ND 010-301	ND 020-151
Part number	826 972 6	826 973 4
Nominal voltage V_N	1 × AC 230 V ±10 %	
Ambient temperature °C	– 25 °C to +45 °C	
Degree of protection	IP00 (EN 60529)	
Nominal current I_N	AC 10 A	AC 20 A
Power loss at I_N P_V	6 W	10 W
Inductance L_N	3 mH	1.5 mH
Terminal strip	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
Nominal voltage V_N	3 × AC 200 – 500 V ±10 %			
Ambient temperature °C	– 25 °C to +45 °C			
Degree of protection	IP00 (EN 60529)			
Nominal 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)	Stud M10 / PE: 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	0550 – 0750
	125 % I_N	0003 – 0075	0110 – 0150	0220 – 0370	0450 – 0750
3-phase 230 V	100% I_N	0003 – 0055	0075 – 0110	0150 – 0220	0300
	125 % I_N	0003 – 0037	0055 – 0750	0110 – 0150	0220 – 0300

2

kVA n
f
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P Hz

Technical Data
ND line chokes

2.19.1 Dimension drawing – line choke ND020.. / ND030.. / ND045.. / ND085..
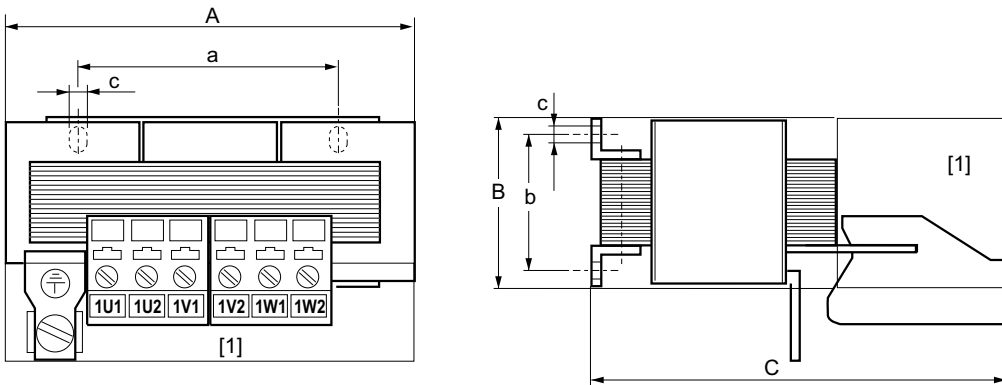
1455926923

[1]   Space for installation terminals   Input: 1U1, 1V1, 1W1
Any mounting position   Output: 1U2, 1V2, 1W2

Line choke type	Main dimensions mm (in)			Mounting dimensions mm (in)		Hole dimension mm (in)	Mass
	A	**B**	**C**	**a**	**b**	**c**	**kg (lb)**
ND020-013	85 (3.3)	60 (2.4)	120 (4.72)	50 (2)	31 - 42 (1.2 - 1.7)	5 - 10 (0.2 - 0.39)	0.5 (1)
ND030-023 ND045-013	125 (4.92)	95 (3.7)	170 (6.69)	84 (3.3)	55-75 (2.2 - 3)	6 (0.24)	2.5 (5.5)
ND085-013	185 (7.28)	115 (4.53)	235 (9.25)	136 (5.35)	56 - 88 (2.2 - 3.5)	7 (0.28)	8 (18)

2.19.2 Dimension drawing for line choke ND150..
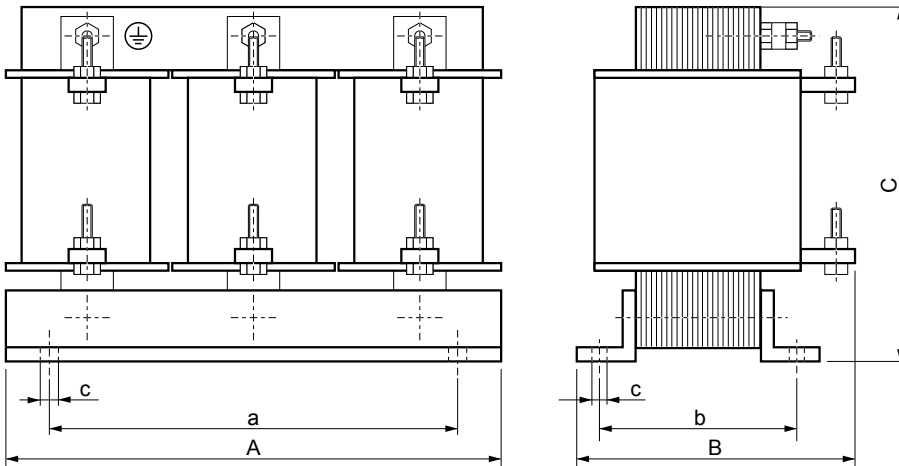
1455933707

Line choke type	Main dimensions mm (in)			Mounting dimensions mm (in)		Hole dimension mm (in)	Mass
	A	**B**	**C**	**a**	**b**	**c**	**kg (lb)**
ND150-013	255 (10)	140 (5.51)	230 (9.06)	170 (6.69)	77 (3)	8 (0.31)	17 (37)

Technical Data
NF line filter

kVA n
f
i
P Hz

2

2.20   NF line filter

- To suppress interference emission on the line side of inverters.

- Do not switch between the NF... line filter and MOVITRAC®.

- NF.. line filters have cRUus approval independent of MOVITRAC®.

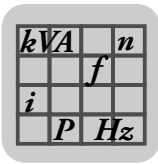| Type		NF009-503	NF014-503	NF018-503	NF035-503	NF048-503
Part number		827 412 6	827 116 X	827 413 4	827 128 3	827 117 8
Nominal voltage		3 × AC 200 – 500 V ±10 %				
Ambient temperature		– 25 °C to +45 °C				
Degree of protection		IP20 (EN 60529)				
Nominal current		AC 9 A	AC 14 A	AC 18 A$_{AC}$	AC 35 A	AC 48 A
Power loss		6 W	9 W	12 W	15 W	22 W
Leakage current		≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 25 mA	≤ 40 mA
Connections PE screw		4 mm² (AWG10) M5			10 mm² (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 × 400 / 500 V	100% I$_N$	0003 – 0040	0055 / 0075	–	0110 / 0150	0220
	125 % I$_N$	0003 – 0030	0040 / 0055	0075	0110	0150
3 × 230 V	100% I$_N$	0015 / 0022	0037	–	0055 / 0075	0110
	125 % I$_N$	0015	0022	0037	0055 / 0075	–

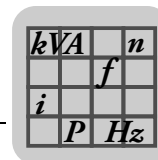| Type		NF063-503	NF085-503	NF115-503	NF150-503
Part number		827 414 2	827 415 0	827 416 9	827 417 7
Nominal voltage		3 × AC 200 – 500 V ±10 %			
Ambient temperature		– 25 °C to +45 °C			
Degree of protection		IP20 (EN 60529)			
Nominal current		AC 63 A	AC 85 A	AC 115 A	AC 150 A
Power loss		30 W	35 W	60 W	90 W
Leakage current		≤ 30 mA	≤ 30 mA	≤ 30 mA	≤ 30 mA
Connections PE screw		16 mm² (AWG6) M6	35 mm² (AWG2) M8	50 mm² (AWG1/0) M10	50 mm² (AWG1/0) M10
Tightening torque		3 Nm / 30 lb in	3.7 Nm / 33 lb in		
Suitable for MOVITRAC® B					
3 × 400 / 500 V	100% I$_N$	0300	0370 / 0450	0550	0750
	125 % I$_N$	0220	0300 / 0370	0450	0550 / 0750
3 × 230 V	100% I$_N$	0150	0220	0300	–
	125 % I$_N$	0110 / 0150	–	0220 / 0300	–

2.20.1 Dimension drawing – line filter NF009-503 – NF150-503
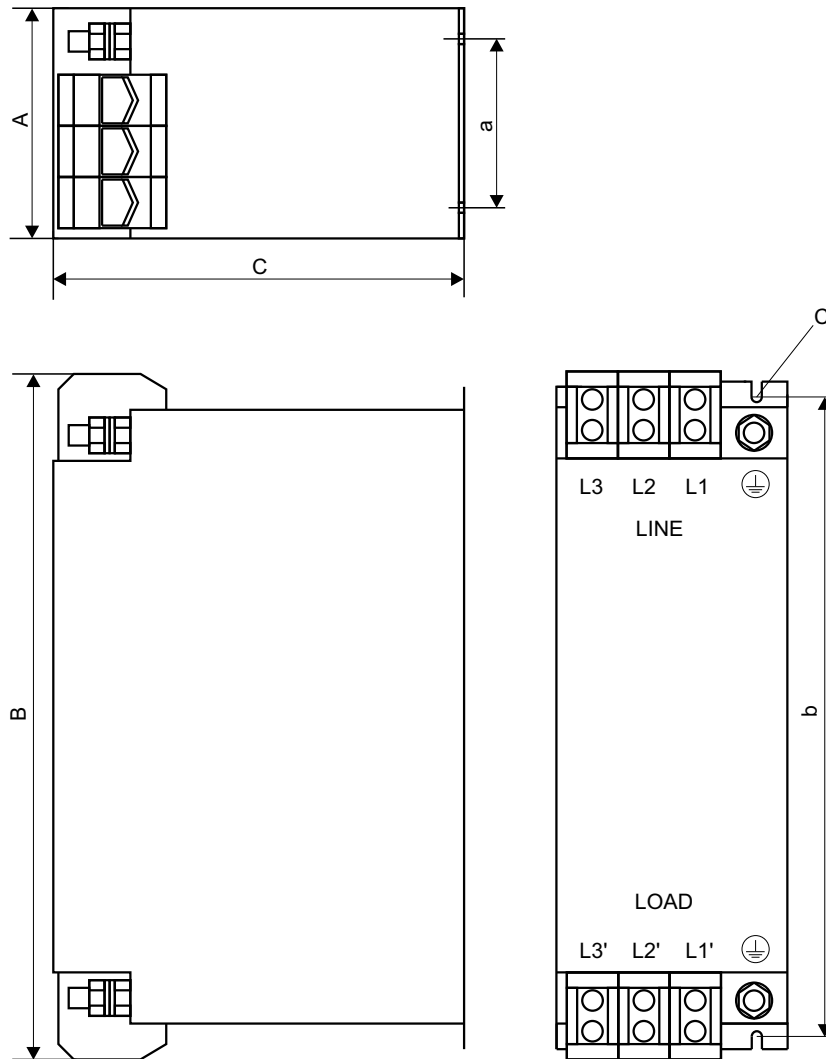
1456387083

Any mounting position

Line filter type	Main dimensions mm (in)			Mounting dimensions mm (in)		Hole dimension mm (in)	PE con-nection	Mass
	A	**B**	**C**	**a**	**b**	**c**		**kg (lb)**
NF009-503	55 (2.2)	195 (7.68)	80 (3.1)	20 (0.78)	180 (7.09)	5.5 (0.22)	M5	0.8 (2)
NF014-503	55 (2.2)	225 (8.86)	80 (3.1)	20 (0.78)	210 (8.27)	5.5 (0.22)	M5	0.9 (2)
NF018-503	50 (1.97)	255 (10)	80 (3.1)	20 (0.78)	240 (9.45)	5.5 (0.22)	M5	1.1 (2.4)
NF035-503	60 (2.36)	275 (10.8)	100 (3.94)	30 (1.18)	255 (10)	5.5 (0.22)	M5	1.7 (3.7)
NF048-503	60 (2.36)	315 (12.4)	100 (3.94)	30 (1.18)	295 (11.6)	5.5 (0.22)	M6	2.1 (4.6)
NF063-503	90 (3.54)	260 (10.2)	100 (3.94)	60 (2.36)	235 (9.25)	6.5 (0.26)	M6	2.4 (5.3)
NF085-503	90 (3.54)	320 (12.6)	140 (5.51)	60 (2.36)	255 (10)	6.5 (0.26)	M8	3.5 (7.7)
NF115-503	100 (3.94)	330 (13)	155 (6.1)	65 (2.56)	255 (10)	6.5 (0.26)	M10	4.8 (11)
NF150-503	100 (3.94)	330 (13)	155 (6.1)	65 (2.56)	255 (10)	6.5 (0.26)	M10	5.6 (12.3)

2.21 ULF11A folding ferrites

Part number: 1821 213 1 (3 pcs)

2.21.1 Description

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

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

2.21.2 Technical data

For cable diameter	10.5 – 12.5 mm (0.413 – 0.492 in)
Storage temperature	–40 °C to +85 °C
Operating temperature	–25 °C to +105 °C

2.21.3 Dimension drawing

The dimensions are specified in mm (in).
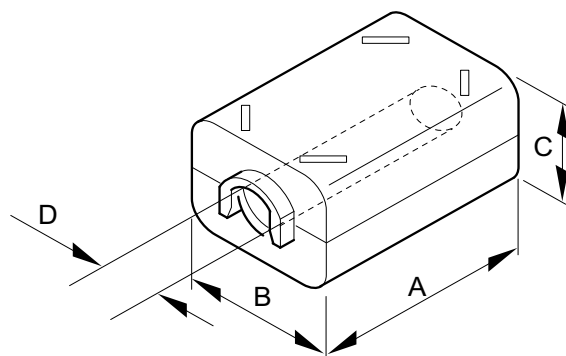
9007199346002571

Type	Main dimensions in mm (in)			
	A	**B**	**C**	**D**
ULF11A	37.6 (1.48)	33.5 (1.32)	28.8 (1.13)	Ø 13.0 (0.512)

2.22 HD output chokes

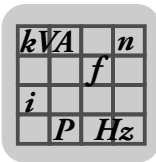You can reduce the radiated interference of the unshielded motor cable by using an output choke.

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
Nominal current	AC 12 A		
Power loss (at nominal current)	11 W	20 W	
Ambient temperature	−10 °C to +60 °C Derating 3 % I_N at 40 °C to 60 °C		
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 submounted	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

2.22.1 Dimension drawing of HD001 – HD003

The following figure shows the mechanical dimensions in mm (in):
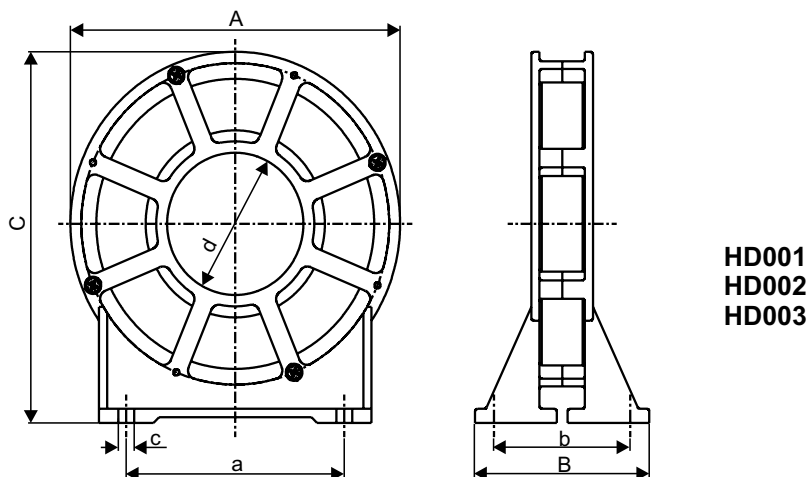
HD001
HD002
HD003

1456392203

Output choke type	Main dimensions mm (in)			Mounting dimensions mm (in)		Inner Ø mm (in)	Hole dimension mm (in)	Mass
	A	B	C	a	b	d	c	kg (lb)
HD001	121 (4.76)	64 (2.5)	131 (5.16)	80 (3.1)	50 (2.0)	50 (2.0)	5.8 (0.23)	0.5 (1)
HD002	66 (2.6)	49 (1.9)	73 (2.9)	44 (1.7)	38 (1.5)	23 (0.91)		0.2 (0.4)
HD003	170 (6.69)	64 (2.5)	185 (7.28)	120 (4.72)	50 (2.0)	88 (3.5)	7.0 (0.28)	1.1 (2.4)

2.22.2 Dimension drawing for HD012

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

5 (0.2)

[1]

158 (6.22)

178 (7.01)

130 (5.12)

24 (0.94)

5 (0.2)

45 (1.8)

80 (3.1)
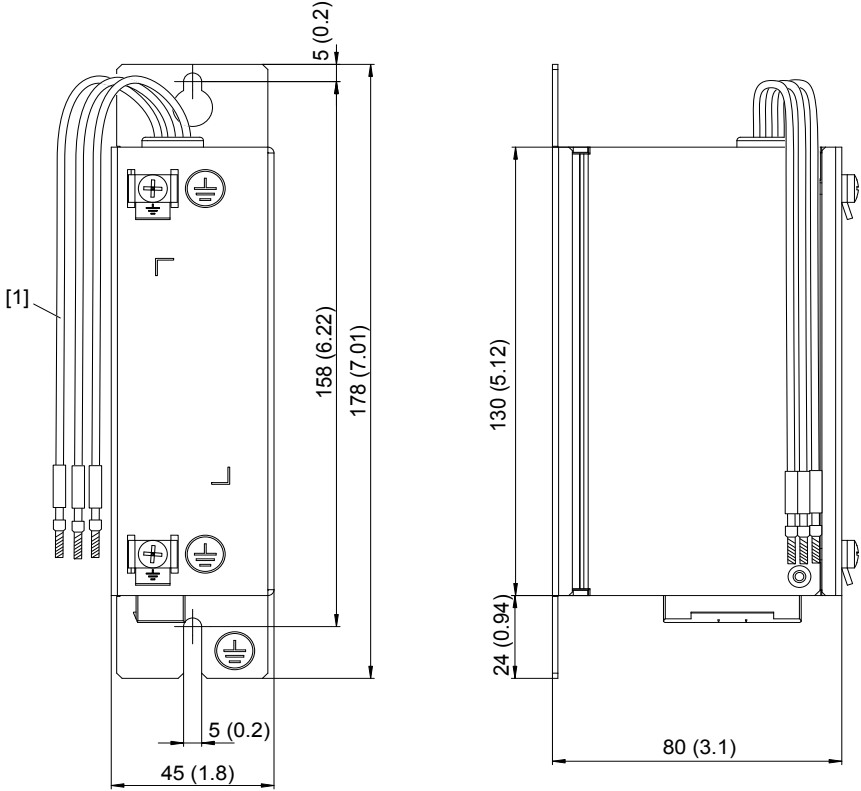
247576459

[1] Length = 100 mm (3.94 in)
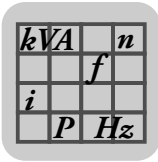
2.22.3 Dimension drawing HD100/HD101

The following figure shows the mechanical dimensions in mm (in):
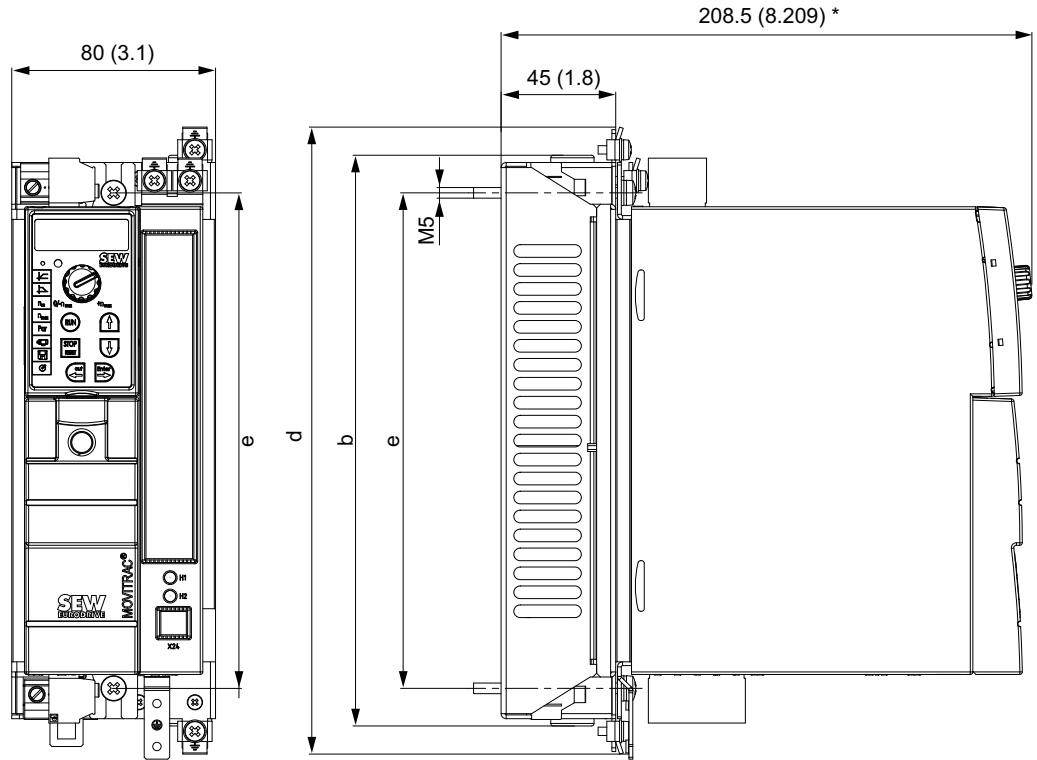
9007199616643467

* With front module FSE24B + 4 mm (0.16 in)

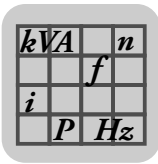| Output choke type	MOVITRAC® B	Main dimensions in mm (in)		
		b	d	e
HD100	Size 0S	226 (8.90)	248 (9.76)	196 (7.72)
HD101	Size 0L	314.5 (12.38)	336.5 (13.25)	284.5 (11.20)

2.23 EMC module FKE12B / FKE13B

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.

2.23.1 Technical data

Type	FKE12B	FKE13B
Part number	829 590 5	829 591 3
Nominal voltage	3 × AC 230 – 500 V	
Voltage drop in the filter (at rated current)	< 1 %	
Nominal current	AC 12 A	
Power loss (at rated current)	20 W	
Ambient temperature	−10 °C to +60 °C Derating 3 % I_N at 40 °C to 60 °C	
Degree of protection	IP20	
Mains and motor connection	Terminal screw 4 mm^2 (AWG10)	
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

2.23.2 Dimension drawing – EMC module FKE12B / FKE13B

The dimensions are specified in mm (in).
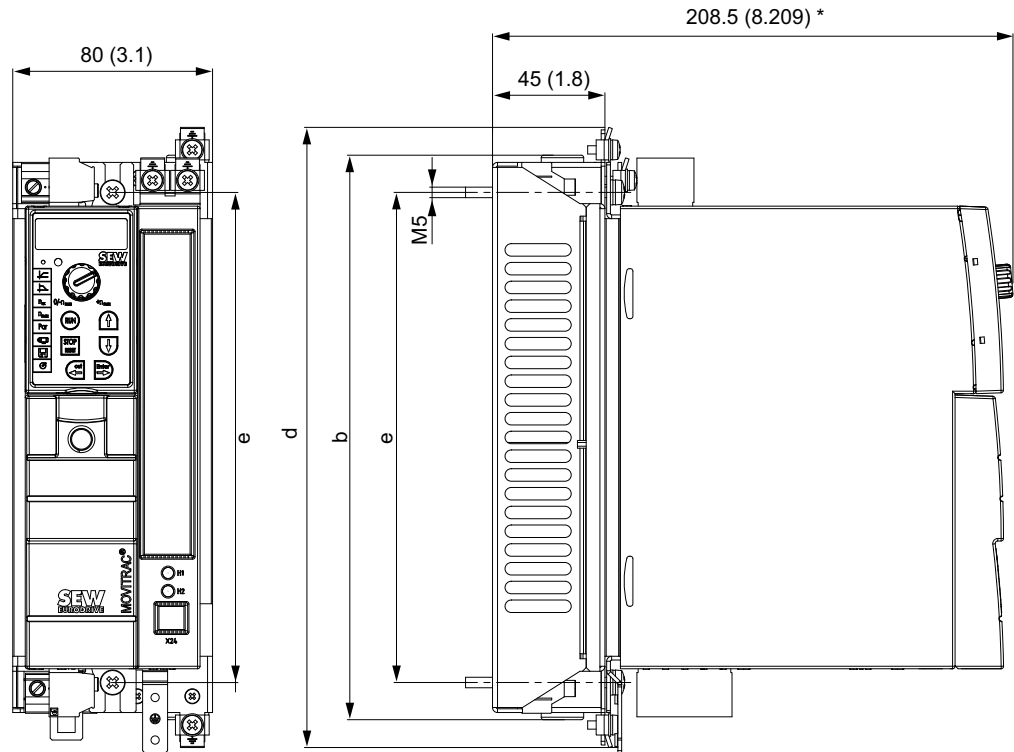
9007199616643467

* With front module FSE24B + 4 mm (0.16 in)

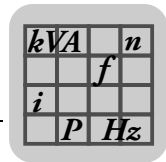| EMC module	MOVITRAC® B	Main dimensions in mm (in)		
		b	d	e
FKE12B	Size 0S	226 (8.90)	248 (9.76)	196 (7.72)
FKE13B	Size 0L	314.5 (12.38)	336.5 (13.25)	284.5 (11.20)

2.24 HF output filters

HF output filters are sine filters for smoothing the output voltage of inverters. HF... output filters (apart from HF450-503 and HF180-403) are approved according UL/cUL in conjunction with MOVITRAC®.

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

- In group drives (several motor leads in parallel); the discharge currents in the motor cables are suppressed.

- To protect the motor winding insulation of non-SEW motors which are not suitable for inverters

- For protection against overvoltage spikes in long motor cables (> 100 m).

Observe the following notes:

INFORMATION

- Operate output filters in V/f and VFC operating modes only.
- Do not use output filters in hoist applications.
- During project planning of the drive, take the voltage drop in the output filter into account and the reduced motor torque that results. This applies particularly to AC 230 V units with output filters.
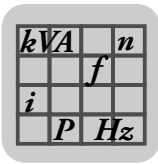
Output filter type	HF008-503[1]	HF015-503[1]	HF022-503[1]	HF030-503[1]	HF040-503[1]	HF055-503[1]
Part number	826 029 X	826 030 3	826 031 1	826 032 X	826 311 6	826 312 4
Nominal voltage V_N	3 × AC 230 – 500 V, 50/60 Hz[2]					
Earth-leakage current at U_N ΔI	0 mA					
Power loss at I_N P_V	25 W	35 W	55	65 W	90 W	115 W
Interference emission via unshielded motor cable	According to limit value class C1/C2 in accordance with EN 61800-3[3]					
Ambient temperature ϑ_{amb}	0 °C to +45 °C (reduction: 3% I_N per K to max. 60 °C)					
Degree of protection (EN 60529)	IP20					
Connections /	M4 terminal studs					
Tightening torque	1.6 Nm ±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)					
Nominal through current $I_{N\ 400\ V}$ (at V_{line} = 3 × AC 400 V)	AC 2.5 A	AC 4 A	AC 6 A	AC 8 A	AC 10 A	AC 12 A
Nominal through current $I_{N\ 500\ V}$ (at V_{line} = 3 × AC 500 V)	AC 2 A	AC 3 A	AC 5 A	AC 6 A	AC 8 A	AC 10 A
Nominal operation (100%) [3]	0005 – 0011	0014 / 0015	0022	0030	0040	0055
Increased power (125%) [3]	0005	0008 / 0011	0014 / 0015	0022	0030	0040
Assignment to AC 230 V units						
Voltage drop at I_N ΔU	–	< 18.5% (19%) at AC 230 V with f_{Amax} = 50 Hz (60 Hz)				
Nominal through current $I_{N\ 230\ V}$ (at V_{line} = 3 × AC 230 V)	AC 4.3 A	AC 6.5 A	AC 10.8 A	AC 13 A	AC 17.3 A	AC 22 A
Nominal operation (100%) [3]	–	–	0015/0022	–	0037	0055
Increased power (125%) [3]	–	–	0015/0022	–	–	0037

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

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

3) Observe the chapter on EMC-compliant installation according to EN 61800-3 in the SEW documentation

Output filter type	HF075-503[1]	HF023-403[1]	HF033-403[1]	HF047-403[1]	HF450-503	HF180-403
Part number	826 313 2	825 784 1	825 785 X	825 786 8	826 948 3	0 829 909 9
Nominal voltage V_N	3 × AC 230 – 500 V, 50/60 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	860 W

Output filter type	HF075-503[1]	HF023-403[1]	HF033-403[1]	HF047-403[1]	HF450-503	HF180-403
Interference emission via unshielded motor cable	According to limit value class C1/C2 in accordance with EN 61800-3[3]					
Ambient temperature ϑ_{amb}	0 °C to +45 °C (reduction: 3% I_N per K to max. 60 °C)					−25 °C to +85 °C
Degree of protection (EN 60529)	IP20	IP20			IP10	IP00
Connections / Tightening torque	M4 terminal studs 1.6 Nm ± 20 %	35 mm^2 (AWG 2) 3.2 Nm				M10 terminal studs / 70 mm^2 (AWG 3/0) 30 Nm (270 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)	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% (5%) at AC 500 V and f_{Amax} = 50 Hz (60 Hz)					
Nominal through current $I_{N\ 400\ V}$ (at V_{line} = 3 × AC 400 V)	AC 16 A	AC 23 A	AC 33 A	AC 47 A	AC 90 A	AC 180 A
Nominal through current $I_{N\ 500\ V}$ (at V_{line} = 3 × AC 500 V)	AC 13 A	AC 19 A	AC 26 A	AC 38 A	AC 72 A	AC 180 A
Nominal operation (100%) [3]	0075	0110	0150/0300	0220	0370/0450/ 0550[4]/0750	0550/0750
Increased power (125%) [3]	0055	0075	0110/0220	0150	0300/0370/ 0450 /0550/0750	0550/0750
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)					
Nominal through current $I_{N\ 230\ V}$ (at V_{line} = 3 × AC 230 V)	AC 29 A	AC 42 A	AC 56.5 A	AC 82.6 A	AC 156 A	-
Nominal operation (100%) [3]	0075	0110	0150/0300	0220	0300	-
Increased power (125%) [3]	0055	0075	0110/0220	0150	0220/0300	-

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

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

3) Observe the chapter on EMC-compliant installation according to EN 61800-3 in the SEW documentation

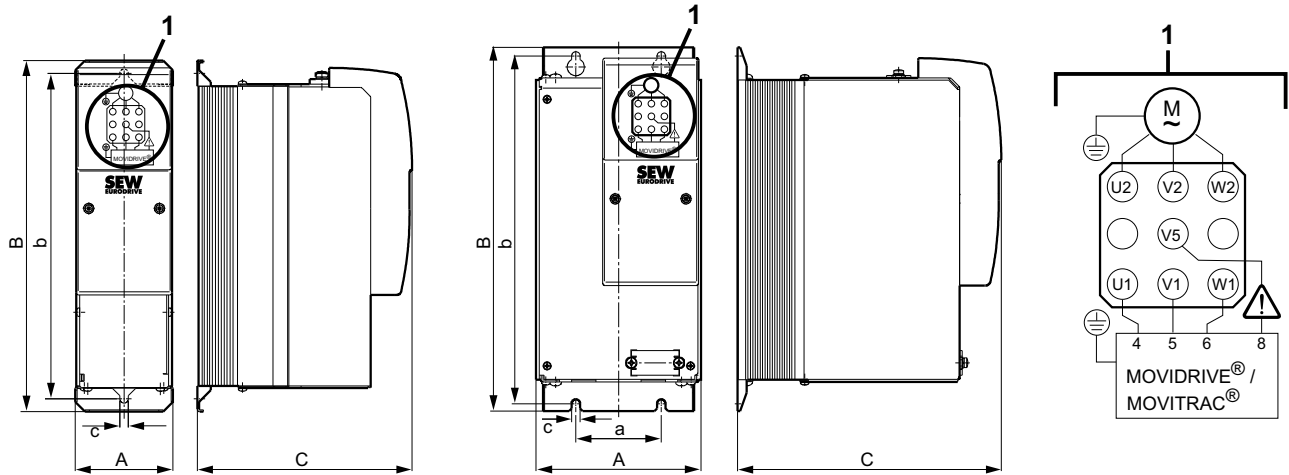4) Connect 2 HF...-... output filters in parallel for operation on these MOVITRAC®.

2.24.1 Dimension drawings – HF...-503 output filter

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

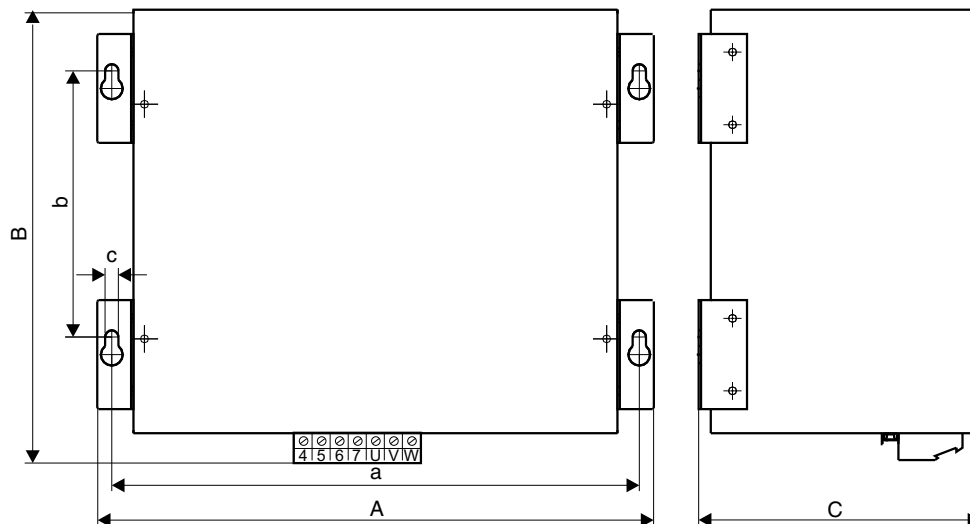HF008 / 015 / 022 / 030-503   HF040/055/075-503

1472824587

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

Output filter type	Main dimensions mm (in)			Mounting dimensions mm (in)		Hole dimen-sion mm (in)	Ventilation clearances[1] mm (in)	
	A	**B**	**C**	**a**	**b**	**c**	**Top**	**Bottom**
HF008 / 015 / 022 / 030-503	80 (3.1)	286 (11.3)	176 (6.93)	-	265 (10.4)	7 (0.3)	100 (3.94)	100 (3.94)
HF040/055/075-503	135 (5.31)	296 (11.7)	216 (8.5)	70 (2.8)	283 (11.1)			

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

HF450-503

1472827659

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

Output filter type	Main dimensions mm (in)			Mounting dimensions mm (in)		Hole dimen-sion mm (in)	Ventilation clearances mm (in)	
	A	**B**	**C**	**a**	**b**	**c**	**Top**	**Bottom**
HF450-503	465 (18.3)	385 (15.2)	240 (9.45)	436 (17.2)	220 (8.66)	8.5 (0.33)	100 (3.94)	100 (3.94)

2.24.2 Dimension drawings – HF...-403 output filter

The following figure shows the mechanical dimensions in mm (in):
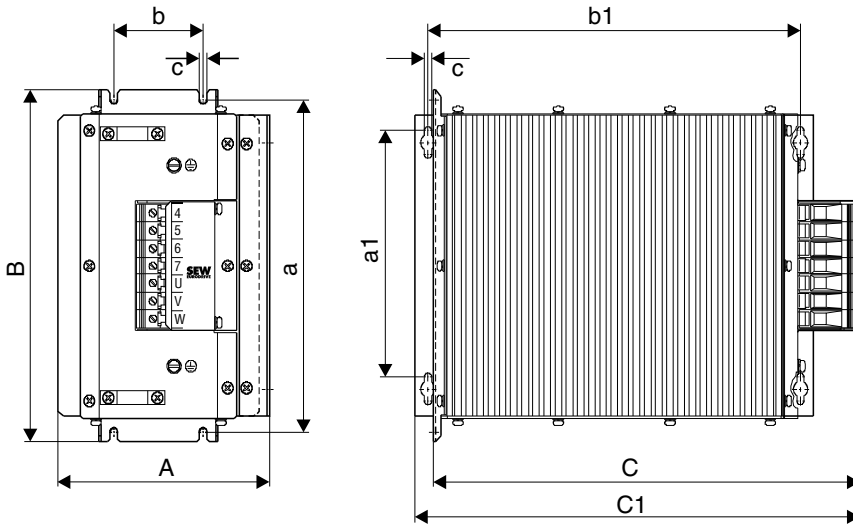
1472830731

Type	Main dimensions mm (in)			Mounting dimensions mm (in)				Hole dim. mm (in)	Ventilation clearances mm (in)		
				Std. installation		Hor. mount. pos.					
	A	B	C/C1	a	b	a1	a2	c	On the side	Top	Bottom
HF023-403	145 (5.71)	284 (11.2)	365/390 (14.4/15.4)	268 (10.6)	60 (2.4)	210 (8.27)	334 (13.1)	6.5 (0.26)	30 (1.2) each	150 (5.91)	150 (5.91)
HF033-403											
HF047-403	190 (7.48)	300 (11.8)	385/400 (15.2/15.7)	284 (11.2)	80 (3.1)						

2705456011

The ring cable lug must be attached directly to the copper clip.
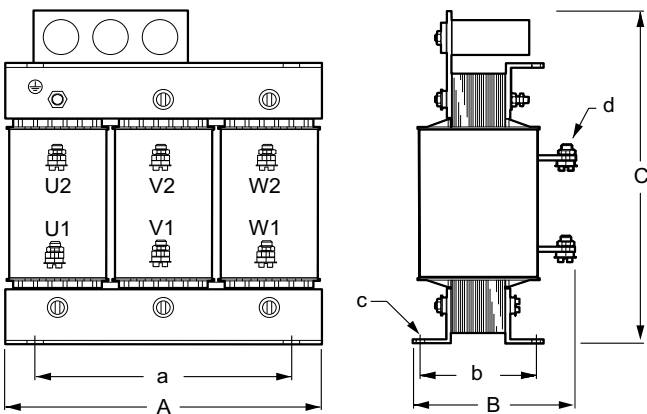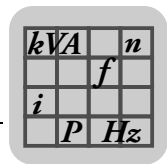Only the mounting position shown in the dimension drawing is permitted.

Output filter type	Main dimensions mm (in)			Mounting dimensions mm (in)		Hole dimension mm (in)		Ventilation clearances mm (in)		
	A	B	C	a	b	c	d	On the side	Top	Bottom
HF180-403	480 (18.9)	260 (10.2)	510 (20.1)	430 (16.9)	180 (7.1)	18 x 13 (0.71 x 0.51)	11 (0.43)	192 each (7.6)	510 (20.1)	510 (20.1)

2.25   Fieldbus connection

2.25.1   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/12B 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.

You can basically connect and operate other SEW units (e. g. MOVIDRIVE® inverters) with the fieldbus via the SBus.

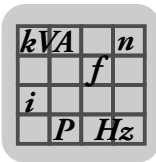There are two different versions of gateway functionality:

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

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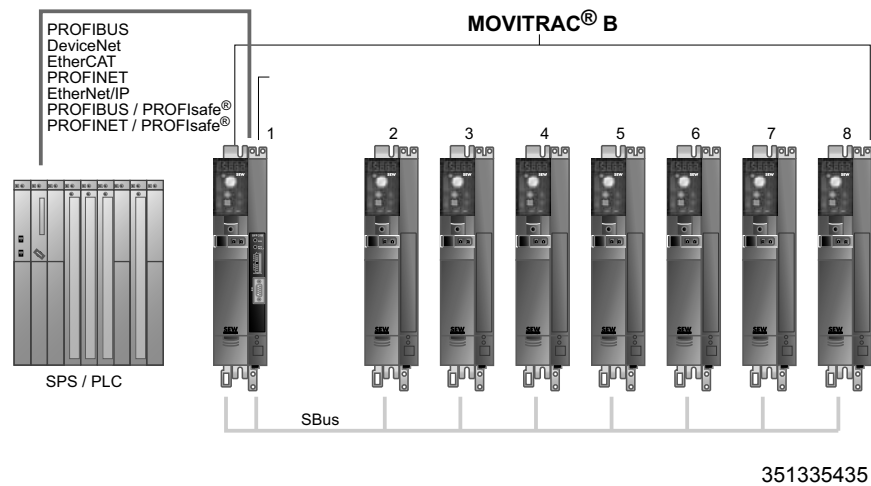
*   In separate housing: The DF..B fieldbus interface is mounted in an UOH11B housing. The UFI11A gateway is available for INTERBUS.

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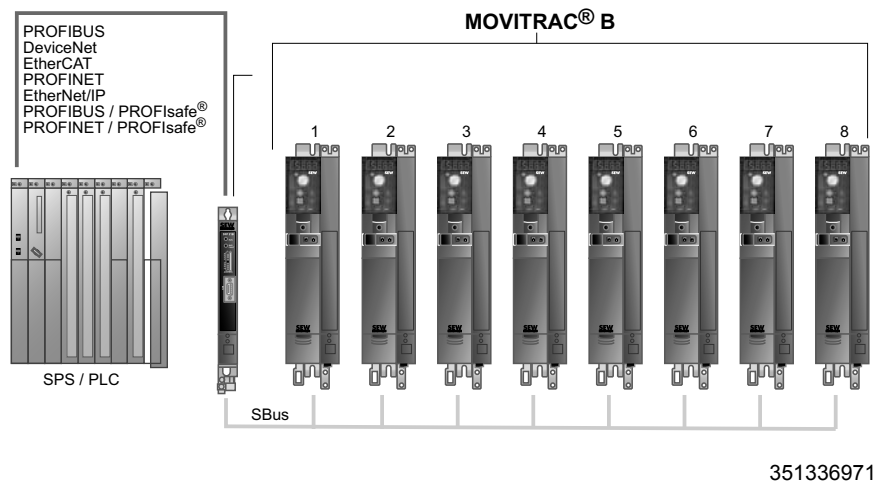
INFORMATION

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 preset to "0".

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

Bus	Separate housing	Integrated in the inverter[1]
PROFIBUS	DFP21B/UOH11B	MC07B... / FSC11B/12B / DFP21B
DeviceNet	DFD11B/UOH11B	MC07B... / FSC11B/12B / DFD11B
EtherCAT[2]	DFE24B/UOH11B	MC07B... / FSC11B/12B / DFE24B
PROFINET	DFE32B/UOH11B	MC07B... / FSC11B/12B / DFE32B
EtherNet/IP + Modbus/TCP	DFE33B/UOH11B	MC07B... / FSC11B/12B / DFE33B
PROFIBUS / PROFIsafe®	DFS11B/UOH11B	MC07B... / FSC11B/12B / DFS11B
PROFINET / PROFIsafe®	DFS21B/UOH11B	MC07B... / FSC11B/12B / DFS21B
INTERBUS	UFI11A (823 898 7)	–

1) Integration in inverter not with size 0XS.

2) As an alternative, you can connect each MOVITRAC® B unit can be connected to an EtherCAT network via an FSE24B front module.

MOVITRAC® B with installed option card comes with a connection cable for the SBus connection.

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

Functional principle

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

Front view of MOVITRAC® B / UOH11B	Description	Function
H1 ◯ H2 ◯ X24	LED H1 (red)	System error (only for gateway functionality)
	LED H2 (green)	Reserved
	X24 X terminal	RS485 interface for diagnostics via PC and MOVITOOLS® MotionStudio

dimension draw-
ing UOH

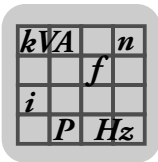The dimensions are specified in mm (in).
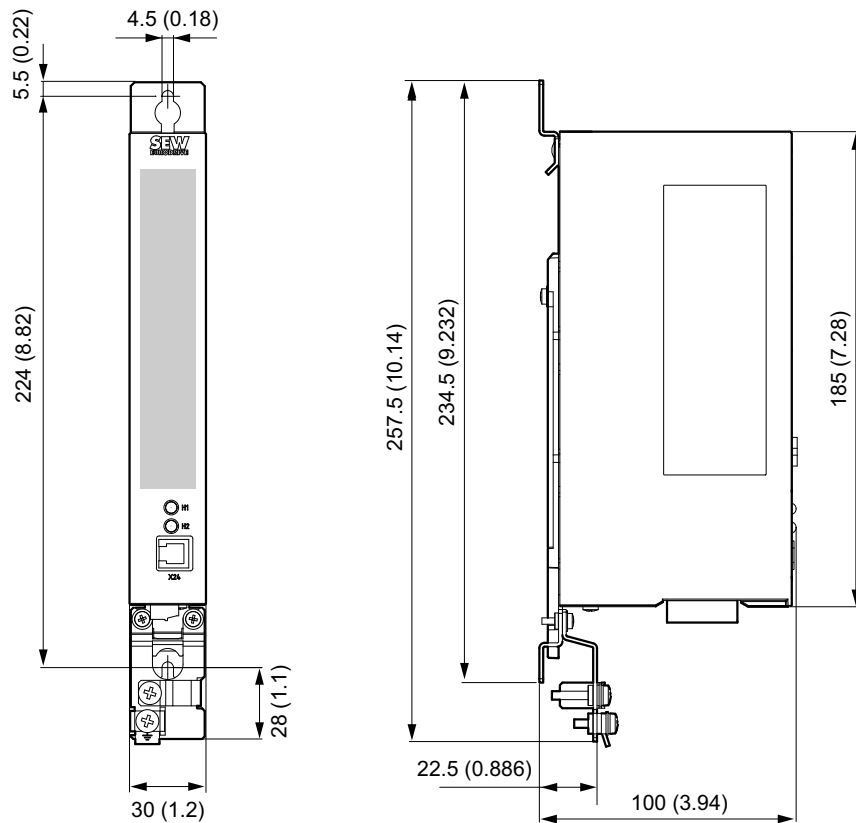
9007199470367499

2.25.2 DFP21B fieldbus interface for PROFIBUS

Description

The MOVITRAC® B frequency inverter enables you to use the DFP21B option to con-
nect 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 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, can be set via DIP switch
	GSD file name	SEW_6009.GSD
	DP ID number	6009_{hex} = 24585_{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

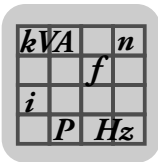### 2.25.3 DFD11B fieldbus interface for DeviceNet

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	Adjustable via DIP switches: • 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, to be set via DIP switches
	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

2.25.4 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.

Instead of the DFE24B, you may also use the FSE24B front module (page 46). It provides a larger scope of functions and does not require an additional FSC11B. One FSE24B is required per MOVITRAC® B.

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 (8 × 8 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)

2.25.5 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 parameterize 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 Mbaud in full duplex mode
	Connection technology	2 × RJ45 with internal switch and auto crossing
	Addressing	4 byte IP address and/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

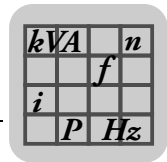### 2.25.6 DFE33B fieldbus interface for EtherNet/IP and Modbus/TCP

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		
DFE33B MODULE STATUS NETWORK STATUS MAC-ID : 00-0F-XX-XX-XX-XX IP : X30 X32 DEF IP AS 0 1 ETHERNET/IP	**External voltage supply**	$U = DC\ 24\ V\ (-15\ \% / +20\ \%)$ $I_{max} = DC\ 200\ mA$ $P_{max} = 3.4\ W$
	Application protocols	• **EtherNet/IP** (Industrial Protocol) or **Modbus/TCP** to control and parameterize 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) • 502 Modbus/TCP • 300 SMLP (TCP, UDP) • 80 HTTP • 67 / 68 DHCP
	Ethernet services	• ARP • ICMP (ping)
	ISO/OSI layer 1/2 **ISO/OSI layer 4/5**	• Ethernet II • TCP/IP and UDP/IP
	Automatic baud rate detection	10 / 100 MBaud
	Connection technology	2 × RJ45 with internal switch and auto crossing
	Addressing	4 byte IP address and/or MAC ID (00-0F-69-xx-xx-xx)
	Manufacturer ID (Vendor ID)	• $013B_{hex}$ (EtherNet/IP) • "SEW-EURODRIVE" (Modbus/TCP)
	Tools for startup	MOVITOOLS$^®$ MotionStudio version 5.40 and higher.
	Firmware version of MOVITRAC$^®$ B	No special firmware is required.
	EDS file name	SEW_GATEWAY_DFE33B.eds

2.25.7 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.
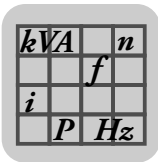
Electronics data

DFS11B option		
	External voltage supply via X26	U = DC 24 V (–15 % / +20 %) I_{max} = 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 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, can be set via DIP switch
	F address	1 – 1022, can be set via DIP switch
	GSD file name	SEW_6009.GSD
	DP ID number	6009_{hex} = 24585_{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 "DFS11B PROFIBUS DP-V1 with PROFIsafe Fieldbus Interface".
	Diagnostics data	Standard diagnostics: 6 bytes

• ⚠ **NOTICE**

Safety-oriented applications are implemented using PROFIsafe interfaces.

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

2.25.8 Fieldbus interface DFS21B 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 parameterize 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 Mbaud in full duplex mode
	Connection technology	2 × RJ45 with internal switch and auto crossing
	Addressing	4 byte IP address and/or MAC-ID (00:0F:69:xx:xx:xx)
	F address	1 – 1022, can be set via DIP switch
	Manufacturer ID (Vendor ID)	$010A_{hex}$
	GSD file name	GSML-V2.1-SEW-DFE-DFS-2Ports-YYYYMMTT.xml

• ⚠ **NOTICE**

Safety-oriented applications are implemented using PROFIsafe interfaces.

Refer to the publication "DF21B PROFINET with PROFIsafe Fieldbus Interface" for installation.

2.26 MOVI-PLC®

2.26.1 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.

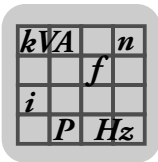| MOVI-PLC® unit type:		Description
MOVI-PLC® basic	DHP11B-T0	MOVI-PLC® basic controller
	DHP11B-T1[1]	Application version I includes the functions electronic cam and synchronous operation in addition to the T0 version.
	DHP11B-T2[1]	Application version II includes, for example, handling in addition to the T1 version.
MOVI-PLC® advanced	DHE21B/41B	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.

2.26.2 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.

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 DP-V1 slave interface, 2 SBus interfaces (CAN), RS485, and 8 digital inputs/outputs, of which 5 are interrupt capable. The DHP11B control card can control 12 units simultaneously (MOVIDRIVE®, MOVITRAC®, MOVIMOT®).

2.26.3 Electronics data for DHP11B
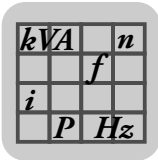
Electronics data of MOVI-PLC® basic DHP11B:

|		
	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) for control of 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 RS485 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 • RS485: 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
		  – IL
		  – ST
		  – LD
		  – FBD
		  – CFC
		  – OS
		
		• Libraries for optimized inverter control

2.26.4 DHE21B/41B electronics data

Electronics data of MOVI-PLC® basic DHE21B/41B:

DHE21B/41B option		
DHE 41B	Part number	• DHE21B option: 1823 607 3 DHE41B option: 1821 160 7
	Electrical supply	• X26: U = DC 24 V (–15 % / +20 %) DGND must be grounded (PELV) • Power consumption: P_{max} = 8.5 W • I_{max} = 600 mA • X31: Binary inputs and outputs must be supplied with DC 24 V separately
	Potential levels	Option DHE21B/41B has the following potential levels: • Potential control / CAN 1 / COM1 • Potential COM2 • Potential binary inputs and outputs • Potential system bus CAN 2
1455764363	**Memory**	• Retain data: 32 KByte • System variables (retain): 8 KByte Program memory: • DHE21B: 2 MB (for application program, incl. IEC libraries) • DHE41B: 6 MB (for user program, incl. IEC libraries) Data memory: • DHE21B: 4 MB (for IEC application) • DHE41B: 8 MB (for IEC application)

DHE21B/41B option		
	CAN 2 system bus X32:1 – X32:3 CAN 1 system bus X33:1 – X33:3	• System bus CAN 1 and CAN 2 to CAN specification 2.0, parts A and B, transmission technology to ISO 11898 • The CAN 2 system bus is electrically isolated • Max. 64 stations per CAN system bus • Max. 64 SCOM transmit objects / 32 receive objects per CAN system bus • Address range 0 - 127 • Baud rate: 125 kBd – 1 MBd • If X32 or X33 is the bus terminator, you must connect a terminating resistor (120 Ω) externally. • You can remove connector X32 or X33 without interrupting the system bus. • The system bus can be run in layer 2 (SCOM cyclic, acyclic) or in accordance with the SEW MOVILINK® protocol.
	Ethernet 1 X36	System bus, reserved
	Ethernet 2 X37	• TCP/IP • Connection options: Engineering PC, other controller, Intranet
	USB	USB 1.0 for connecting an engineering PC (in preparation)
	RS485 interface COM1/2 X34:1 – X34:4	• For connection of a DOP11A/B operator terminal or a gearmotor with integrated MOVIMOT® frequency inverter • I/O standard, 57.6 / 9.6 kBd, max. total cable length 200 m • Dynamic terminating resistor with fixed installation

	SD memory card	• PC-readable
		• Includes:
		  – Firmware
		  – IEC program
		  – Data
		
		• At least 128 MB memory
		• Versions, part numbers and functions:
		  – OMH41B-T0: 1821 204 2
		    Functions: Handling of speed control, positioning, e.g. with the MPLCMotion_MDX library
		  – OMH41B-T1: 1821 205 0
		    Functions: Additional: cam disk, electronic gear, cam controller, for example
		  – OMH41B-T2: 1821 206 9
		    Functions: Additional: material handling, for example

	Engineering	Engineering takes place via one of the following interfaces: • Ethernet 2 (X37) • In preparation: USB (X35) Engineering for all SEW components connected to the MOVI-PLC® *advanced* DHE41B control card can be performed using the MOVI-PLC® *advanced* DHE41B control card. Engineering of the MOVI-PLC® *advanced* DHE41B controller cannot be performed via the inverters. • MOVITOOLS® MotionStudio engineering software with PLC Editor

Technical Data
Control technology

2

kVA n
f
i
P Hz
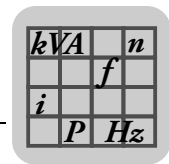
2.27 Control technology

SEW-EURODRIVE control technology consists of a scalable selection of controllers that can either be programmed in IEC 61131-3 (MOVI-PLC®) or are configured via predefined application modules (CCU). The controllers can either be integrated directly in the unit or operate any SEW drive electronics as compact controllers (UOH housing). SEW-EURODRIVE recommends performance class Basic and Standard for MOVITRAC® as it is designed for applications with coordinated single-axis motion of up to 16 axes.

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

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

- MOVI-PLC® is a universal solution because it is able to control the entire portfolio of SEW inverters and offers a simple upgrade to a more powerful MOVI-PLC® variant, thanks to its universal execution of the programs.

- MOVI-PLC® is scalable due to several different hardware platforms (standard, advanced, ...) and modular software concepts (libraries for numerous applications).

- MOVI-PLC® is powerful due to extensive technologies (such as electronic cam, synchronous operation) and the control of demanding applications (such as material handling).

MOVI-PLC® standard performance class

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

2.27.2 Configurable application controller (CCU)

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

CCU standard performance class

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

- Speed control

- Cam positioning

2.27.3 Unit variants

As an option card

Option card	Description
MOVI-PLC® basic DHP11B-T0	MOVI-PLC® basic
Standard DHE21B-T0 controller	Controller with integrated Ethernet interface (protocol UDP, TCP/IP) for the automation of coordinated single-axis motion. USB interface for engineering and SD card for simple data management.

As compact controller in the UOH housing

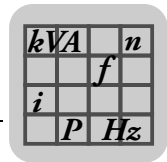| Option card	Description
MOVI-PLC® basic DHP11B-T0	MOVI-PLC® basic
Standard DHE21B-T0 controller	Controller with integrated Ethernet interface (protocol UDP, TCP/IP) for the automation of coordinated single-axis motion. USB interface for engineering and SD card for simple data management.
DHF21B-T0 controller	Like DHE21B but additionally with the fieldbus-slave interfaces Profibus and DeviceNet.
DHF21B-T0 controller	Like DHE21B but with additional Industrial Ethernet interfaces PROFINET, Ethernet IP and Modbus TCP.

2.27.4 Documentation for MOVI-PLC®

For detailed information on functionality, project planning and technical data, refer to the following publications:

- "Controller DHE21B / DHF21B / DHR21B (standard), DHE41B / DHF41B / DHR41B (advanced)" manual
- "MOVI-PLC® basic DHP11B Controller" manual

2.28 Switched-mode power supply UWU52A
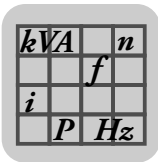
2.28.1 Technical data

UWU52A switched-mode power supply	
Part number	188 181 7
Input voltage	1 × AC 110 – 240 V
Voltage range	AC 95 – 265 V, DC 110 – 300 V
Frequency	50 / 60 Hz
Maximum no-load current	AC 40 mA

Nominal 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 %)

Nominal output current
    For 40 °C
    For 55 °C
	
	DC 2.5 A
	DC 2.0 A

Residual ripple	< 50 mV
Interference voltage	< 120 mV
Power loss	< 5.5 W
Mass	0.23 kg (0.51 lb)
Operating temperature	0 °C to +55 °C (condensation not permitted)
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) Tightening torque 0.4 – 0.5 Nm

2.28.2 Dimension drawing

The dimensions are specified in mm (in).
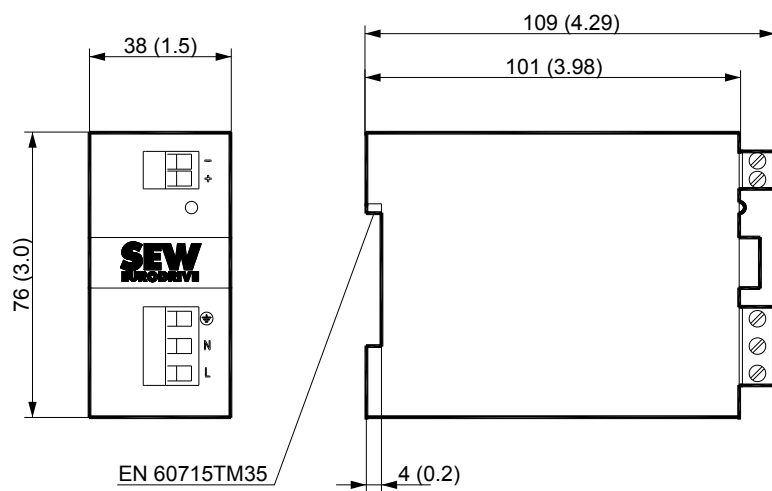
269954187

3 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
- Using the MOVITOOLS® MotionStudio programs on a PC via RS485 interface
- By copying the parameters using the keypad

3.1 Explanation of the parameters

If there are several options, the factory setting is <u>underlined</u>.

The parameters for motor startup are described in chapter "Startup with the FGB keypad" (page 253).

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

Long	Selection in the FBG11B long menu
Short	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:

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

3.1.1 Parameter group 0.. display value

Parameter group 00. process values

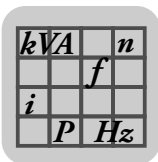|	
P000 speed (signed)	The displayed speed is the calculated actual speed in rpm
P001 user display for DBG11B	The user display is defined by the following parameters:
	• *P850 Scaling factor numerator*
	• *P851 Scaling factor denominator*
	• *P852 User-defined unit*
P002 frequency (signed)	Output frequency of the inverter in Hz
P004 output current (absolute value)	Apparent current in % I_N of the nominal unit value
P005 active current (signed)	Displayed in % 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, and negative when torque is in negative sense of rotation.
P008 DC link voltage Short	DC link voltage V
P009 output current	Apparent current at the inverter output, displayed in AC A

Parameter group 01. status displays

P010 inverter status	Status of the unit output stage:
	• INHIBITED
	• ENABLED

P011 operating status	The following operating states are possible:
	• 24 V OPERATION
	• CONTROLLER INHIBIT
	• NO ENABLE
	• STANDSTILL CURRENT
	• ENABLE
	• FACTORY SETTING
	• ERROR
	• SAFE STOP

P012 error status   Error number and error in plain text.

P013 current parameter set   Parameter set 1 or 2

P014 heat sink temperature   Heat sink temperature of the inverter in °C

`Lon6`

Parameter group 02. analog setpoints

P020 analog input AI1

`Lon6`

Voltage 0 – 10 V at analog input AI1.

When S11 = "ON" and *P112 AI1 operating mode*:

• = *NMAX, 0 – 20 mA*: Display 0 – 10 V = ≙ 0 – 20 mA

• = *NMAX, 4 – 20 mA*: Display 2 – 10 V = ≙ 4 – 20 mA

P021 analog input AI2 (optional)

`Lon6`

Voltage in V (–10 to +10 V)

Parameter group 03. binary inputs

P030 binary input DI00   Status of binary input DI00 (<u>fault reset</u>)

P031 binary input DI01   Status of binary input DI01 (fixed assignment CW/stop).

P032 binary input DI02   Status of binary input DI02 (<u>CCW/stop</u>)

P033 binary input DI03   Status of binary input DI03 (<u>enable</u>)

P034 binary input DI04   Status of binary input DI04 (<u>n11/n21</u>)

P035 binary input DI05   Status of binary input DI05 (<u>n12/n22</u>)

P039 Binary inputs DI00 – DI05   Collective display of binary inputs

`Lon6`

Parameter group 04. binary input option

P040 binary input DI10   Status of binary input DI10 (<u>no function</u>)

P041 binary input DI11   Status of binary input DI11 (<u>no function</u>)

P042 binary input DI12   Status of binary input DI12 (<u>no function</u>)

P043 binary input DI13   Status of binary input DI13 (<u>no function</u>)

P044 binary input DI14   Status of binary input DI14 (<u>no function</u>)

P045 binary input DI15   Status of binary input DI15 (<u>no function</u>)

P046 binary input DI16   Status of binary input DI16 (<u>no function</u>)

P048 binary inputs DI10 – DI16   Collective display of binary inputs

`Lon6`

Parameter group 05. binary outputs
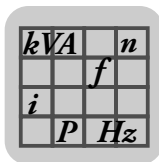
P051 binary output DO01   Status of binary output DO01 (<u>/MALFUNCTION</u>)

P052 binary output DO02   Status of binary output DO02 (<u>BRAKE RELEASED</u>)

P053 binary output DO03   Status of binary output DO03 (<u>READY</u>)

P059 binary outputs DO01 – DO03   Collective display of binary outputs

`Lon6`

Parameter group 07. unit data

P070 unit type	The unit type is displayed, e.g. MC07B0008-2B1
P071 nominal output current	Nominal unit current is displayed in A
P072 Front module	Display of the front module
P073 Firmware front module	Part number and firmware version for front module
P076 firmware basic unit	Part number and firmware version
P077 firmware DBG	Part number and firmware version

Parameter group 08. error memory

P080 – P084
Errors t0 – t4

`Lon6`

FBG11B keypad: only error t-0 (*P080*)

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*

Parameter group 09. bus diagnostics

P090 PD configuration	Display of the process data configuration, only applies to FSE24
P091 Fieldbus type	Display of the fieldbus type, only applies to FSE24
P092 Fieldbus baud rate	Baud rate in kBaud, only applies to FSE24
P093 Fieldbus address	Display of the address, only applies to FSE24
P094 PO1 setpoint `Lon6`	Process data output word 1, setpoint in hex

P095 PO2 setpoint

Lon6

Process data output word 2, setpoint in hex

P096 PO3 setpoint

Lon6

Process data output word 3, setpoint in hex

P097 PI1 actual value

Process data input word 1, actual value in hex

P098 PI2 actual value

Process data input word 2, actual value in hex

P099 PI3 actual value

Process data input word 3, actual value in hex

–

Display of the bus status, only applies to FSE24

–

Display of the unit identification, only applies to FSE24

3.1.2 Parameter group 1.. setpoints/ramp generators

Parameter group 10. setpoint selection / frequency input

P100 Setpoint source

Short

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 **absolute value** of the fixed setpoints. The binary inputs specify the direction of rotation.

2 / RS485 / fixed setpoint

The setpoint is obtained from the RS485 interface. The sign of the setpoint determines the direction of rotation.

4 / Motor potentiometer / Fixed setpoint

Set the setpoint using appropriately programmed terminals *Motor potentiometer up / motor potentiometer down*. 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, *P112 AI1 operating mode* applies.
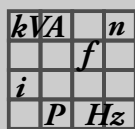
7 / Fixed setpoint × AI1

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 RS485

The setpoint comes from the master in master/slave mode via the RS485 interface. See *P75x Master-Slave function*.

10 / SBus1 / fixed setpoint

The system bus specifies the setpoint. The sign of the setpoint determines the direction of rotation.

11 / Frequency setpoint input / Fixed setpoint

The frequency at binary input DI04 specifies the setpoint.

The pulse duty factor (pulse width of the High and the Low signal) is ideally 1:1. Both, the rising and the falling edge are included. Use *P102 Frequency scaling* (page 253) to determine at which input frequency the system setpoint 100 % is reached. The direction of rotation is specified by the binary inputs CW/stop and CCW/stop.

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

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.

P101 control signal source

Short

<u>0 / Terminals</u>

The binary inputs determine the control.

1 / RS485

The RS485 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/Stop".

• Connect start key CCW with contact to binary input "CCW/Stop".

• 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 signal source 3-wire control
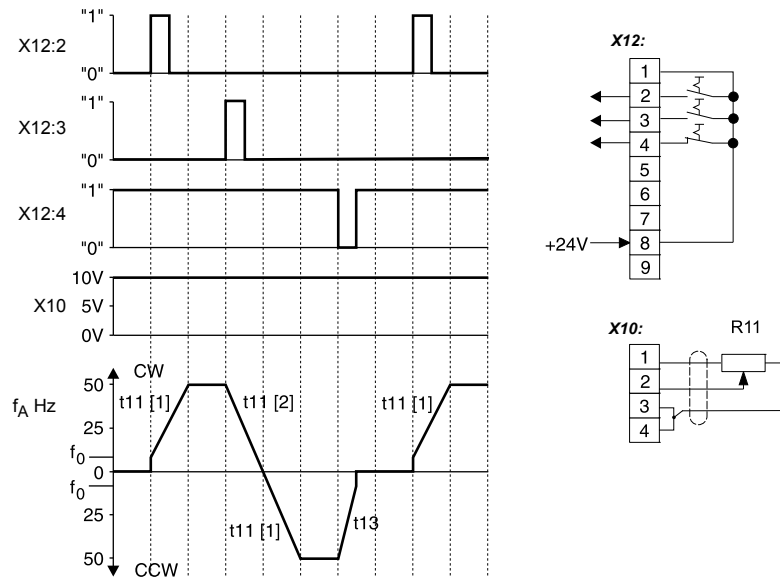
X12:2	CW/stop	CW	Clockwise rotation
X12:3	CCW/stop	CCW	Counterclockwise rotation
X12:4	Enable/stop	t11 [1]	t11 up
X10	Setpoint input AI	t11 [2]	t11 down
f_0	Output frequency	t13	Stop ramp
f_0	start/stop frequency		

3

kVA		n
	f	
i		
	P	Hz
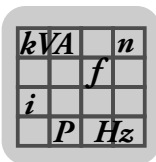
Parameters
Explanation of the parameters

P102 frequency scaling f_{FI1max}

└on6

Setting range: 0.1 – <u>10</u> – 120.00 kHz

P103 FI1 reference

└on6

<u>0 / n_{max}</u>

1 / $n_{reference}$

P104 Setpoint reference speed and analog inputs

└on6

Setpoint reference speed $n_{reference}$ for frequency input FI1 and analog inputs AI1 and AI2

Setting range: 0 – <u>3000</u> – 6000 rpm

P105 AI1 wire break detection

└on6

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.

<u>7 / Rapid stop / Warning</u>

  The error response corresponds to rapid stop/malfunction, except 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:
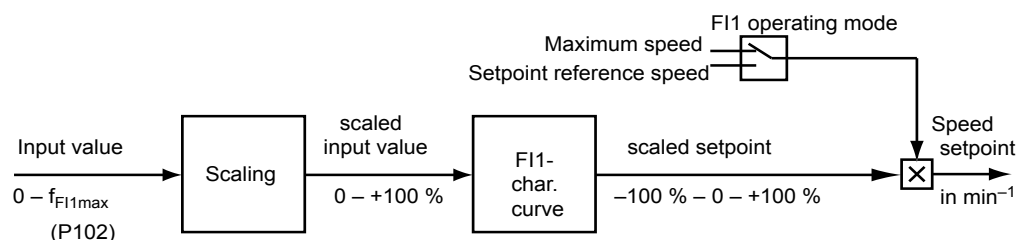
P106 FI1 charac-
teristic curve x1

ᴸᵒⁿᵇ

Setting range: 0 – 100 %

P107 FI1 charac-
teristic curve y1

ᴸᵒⁿᵇ

Setting range: –100 – 0 – +100 %

P108 FI1 charac-
teristic curve x2

ᴸᵒⁿᵇ

Setting range: 0 – 100 %

P109 FI1 charac-
teristic curve y2

ᴸᵒⁿᵇ

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.

Parameter group 11. analog input 1 (0 – 10 V)

The analog input can be configured using a characteristic curve.
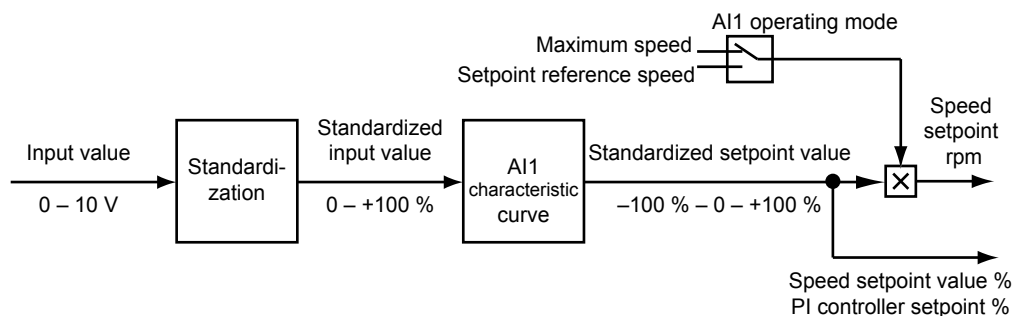
| *P112 AI1 operating mode* | **1 / 10 V, reference maximum speed** |
| | |

Voltage input with reference n_{max} (0 – 10 V = 0 – n_{max}). You can adjust the characteristic curve with *AI1 scaling*.

Switch S11 = V.

5 / 0 – 20 mA, reference maximum speed

Current input 0 – 20 mA = 0 – n_{max}. *P110 AI1 Scaling* has no effect.

Switch S11 = mA.

6 / 4 – 20 mA, reference maximum speed

Current input 4 – 20 mA = 0 – n_{max}. *P110 AI1 Scaling* has no effect.

Switch S11 = mA.

7 / 0 – 10 V, n-reference

8 / 0 – 20 mA, n-reference

9 / 4 – 20 mA, n-reference

P116 AI1 characteristic curve x1

Short

Setting range: 0 – 100 %

P117 AI1 characteristic curve y1

Short

Setting range: –100 – 0 – +100 %

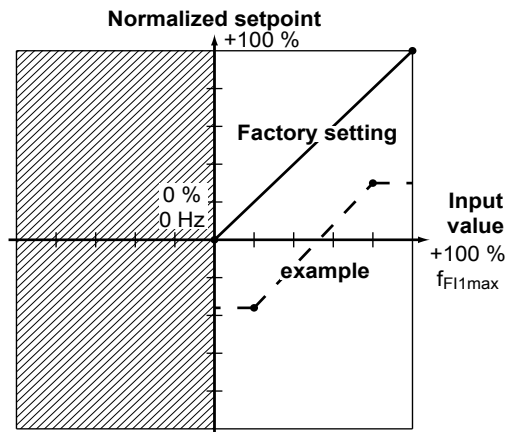*P118 AI1 characteristic curve x2*
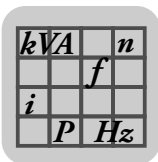
Short

Setting range: 0 – 100 %

P119 AI1 characteristic curve y2

Short

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.
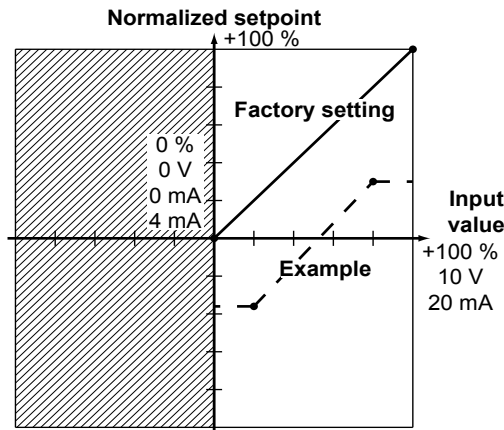

Parameter group 12. analog input AI2 / FBG speed control module (option)

Analog input AI2 is only available with the optional analog module FIO11B.
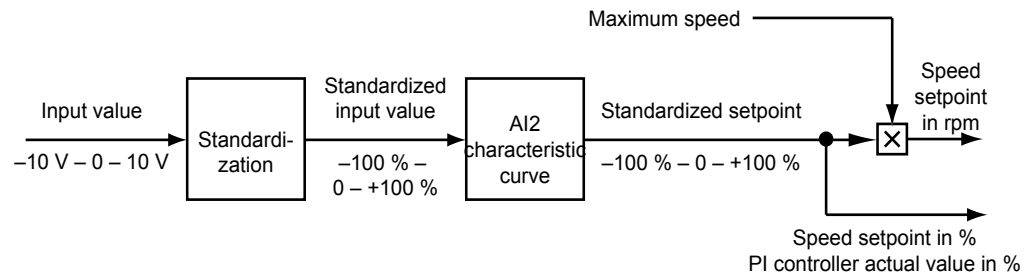
P120
AI2 operating mode

Long

<u>0 / No function</u>

The setpoint on analog input AI2 is not used.

1 / 0 – ±10 V + setpoint / 100 % corresponds to n_{max}

The evaluated setpoint at AI2 is added to setpoint 1 (= AI1) observing the signs.

2 / 0 – 10 V current limit / 100 % corresponds to I_{max}

The input serves as external current limitation.

P121 addition FBG speed control module

Short

<u>0 / Off</u>

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, RS485/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, RS485/fixed setpoint, frequency input/fixed setpoint or SBus/fixed setpoint. The addition does **not** affect **fixed setpoints**.
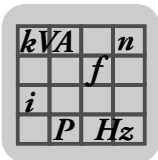
P122 direction of rotation FBG manual mode

Short

Setting the setpoint using the speed control module of the FBG11 keypad in FBG manual mode.

<u>0 / Unipolar CW</u>

Adjustable speed: 0 to $+n_{max}$.

1 / Unipolar CCW

Adjustable speed: 0 to $-n_{max}$.

2 / Bipolar CW and CCW

Adjustable speed: $-n_{max}$ to $+n_{max}$.

*P126
AI2 characteristic curve x1*

Long

Setting range: <u>–100</u> – 0 – +100 % (–10 – <u>0</u> – +10 V)

*P127
AI2 characteristic curve y1*

Long

Setting range: <u>–100</u> – 0 – +100 % ($-n_{max}$ – <u>0</u> – $+n_{max}$ / <u>0</u> – I_{max})

*P128
AI2 characteristic curve x2*

Long

Setting range: –100 – 0 – <u>+100 %</u> (–10 – 0 – <u>+10 V</u>)

*P127
AI2 characteristic curve y2*

Long

Setting range: –100 – 0 – <u>+100%</u> ($-n_{max}$ – 0 – <u>$+n_{max}$</u> / 0 – <u>I_{max}</u>)

The characteristic curve is described by the coordinates x1/y1 and x2/y2, with which the analog input is evaluated.
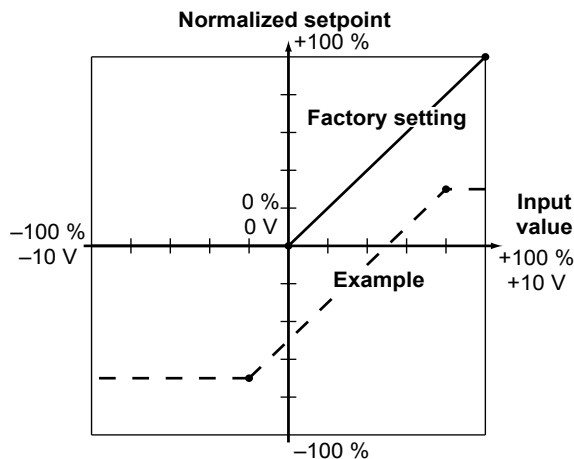
Parameter group 13. / 14. speed ramps 1 / 2

The ramp times refer to a setpoint change of Δn = 3000 rpm. The 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.

P130 / P140 ramp t11 / t21 up

Setting range: 0 – 2 – 2000 s; acceleration ramp

P131 / P141 ramp t11 / t21 up

Setting range: 0 – 2 – 2000 s; deceleration ramp

P134 / P144 ramp t12 / t22 up = down

Setting range: 0 – 10 – 2000 s

The following applies to this ramp: up = down and CW = CCW.

Ramps t12/t22 are activated via a binary input (→ *P601 – P608*), which is set to the function "Speed ramp switchover".

P135 / P145 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:
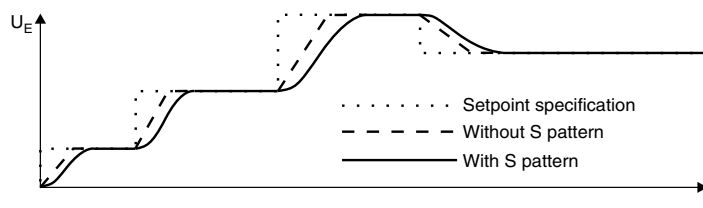
A started S pattern is interrupted by the stop ramp t13 / t23 and a changeover to ramp t11 / t21. If the setpoint is withdrawn or the drive stopped via the input terminals, the started S curve is completed. This allows the drive to continue to accelerate despite the fact that the setpoint has been withdrawn.

P136 / P146 stop ramp t13 / t23 up = down

Setting range: 0 – 2 – 20 s

Stop ramp when switching to the "NO ENABLE" operating status.

P139 / P149 ramp monitoring 1 / 2

Lon6

1 2

Setting range: <u>Yes</u>/No

If you set the deceleration ramps to a value that is much shorter than can be physically achieved in the system, the turning drive will be stopped once the monitoring time has expired. 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.

Parameter group 15. motor potentiometer function

See also *P100 setpoint source*.

The ramp times refer to a setpoint step change of Δn = 3000 rpm.

P150 ramp t3 up = down

Lon6

Setting range: 0.2 – <u>20</u> – 50 s

The ramp is in effect when using the terminal functions *motor potentiometer up* and *motor potentiometer down*.

P152 save last setpoint

Lon6

<u>Off</u>

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 *P152 Save last setpoint* to "off". Else, error message *F25 EEPROM* will appear after about 100000 storage operations.

Saving only in the event of setpoint change. If a fixed setpoint is deselected, the fixed setpoint will be used as motor potentiometer value.

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.

Parameter group 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 *P60_*). 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 2 inputs.

P160 / P170 internal setpoint n11 / n21

Setting range: –5000 – <u>150</u> – 5000 rpm

P161 / P171 internal setpoint n12 / n22	Setting range: –5000 – <u>750</u> – 5000 rpm

P162 / P172 internal setpoint n13 / n23	Setting range: –5000 – <u>1500</u> – 5000 rpm

P163 / P173 n11 / n21 PI controller n21 P173	Setting range: 0 – <u>3</u> – 100 %. see chapter "PI controller" (page 186).

P164 / P174 n12 / n22 PI controller	Setting range: 0 – <u>15</u> – 100 %. see chapter "PI controller" (page 186).

P165 / P175 n13 / n23 PI controller	Setting range: 0 – <u>30</u> – 100 %. see chapter "PI controller" (page 186).

3.1.3 Parameter group 2.. Controller parameters

Parameter group 25.. PI controller

For further information regarding the parameters, refer to chapter "PI controller" (page 186).

PI controller
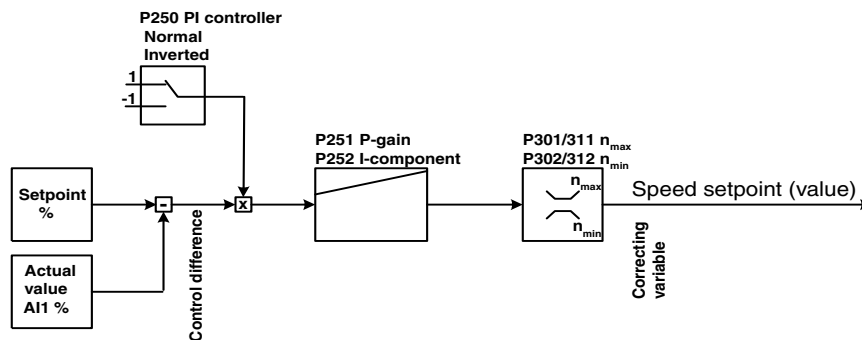
327699339

P250 PI-controller	**0 / Off**
	PI controller deactivated.
	1 / Normal
	PI controller switched on normally.
	2 / Inverted
	PI controller switched on inverted.

P251 P gain	Setting range: 0 – <u>1</u> – 64

P252 I component   Setting range: 0 – 1 – 2000 s

Lon6

3.1.4 Parameter group 3.. Motor parameters

Use this parameter group to adjust the inverter to the motor.

Parameter group 30. / 31. limits 1 / 2

*P300 / P310 start/
stop speed 1 / 2*

Lon6

1 2

AUTO

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.

*P301 / P311 mini-
mum speed 1 / 2*

Lon6

1 2

AUTO

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:

- If the hoist function is active, the slowest speed is 15 rpm even if n_{min} has been set to a lower value.

- To enable the drive to move clear of the limit switches even at low speeds, n_{min} is not active for the hardware limit switch with which the drive has come into contact.

*P302 / P312 maxi-
mum speed 1 / 2*

1 2

AUTO

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

Error *F08 speed monitoring* might be indicated when you enter higher values.

When you perform a startup, the unit automatically sets the maximum speed to the transition speed.

P303 / P313 current limit 1 / 2

Lon6

1 2

AUTO

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.

Parameter group 32. / 33. motor adjustment 1 / 2

Use function *P320 / P330 Automatic adjustment* 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 *P322 / P332 IxR adjustment*. 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 setting of the parameters *P321 – P324 / P331 – P334* depends on the motor.

P320 / P330 automatic adjustment 1 / 2

Lon6

1 2

AUTO

Off

No automatic adjustment: The inverter does not calibrate the motor.

On

Automatic adjustment: The inverter calibrates the motor whenever changing to "EN-ABLE" operating mode.

P321 / P331 boost 1 / 2

Lon6

1 2

AUTO

Setting range: 0 – 100 %

The value is calculated during startup. For VFC operating modes, the value is "0". Manual setting is usually not required. In exceptional cases, manual setting may be necessary to increase the breakaway torque. In this case, set the values to max. 30 % of IxR. One third of IxR is set for V/f operating modes. In exceptional cases, manual setting may be necessary to increase the breakaway torque. In this case, set the values to max. 60 % of IxR.

P322 / P332 IxR adjustment 1 / 2

Lon6

1 2

AUTO

Setting range: 0 – 100 %

The inverter sets the value automatically when *P320 / P330 Automatic adjustment* = "on". Manual alterations to individual controller parameters are reserved for optimization by specialists.

P323 / P333 pre-magnetization time 1 / 2

ᴸᵒⁿᵇ

[1][2]

[AUTO]

Setting range: 0 – 2 s

Pre-magnetization builds a magnetic field in the motor when you enable the inverter.

P324 / P334 slip compensation 1 / 2

ᴸᵒⁿᵇ

[1][2]

[AUTO]

Setting range: 0 – 500 rpm

Slip compensation increases the speed accuracy of the motor. Enter the nominal 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 load mass moment of inertia to motor moment of inertia ratio < 10. If the ratio is larger and the drive vibrates, then slip compensation must be reduced and even be set to "0" if necessary.

Parameter group 34. motor protection

P340/P342 motor protection 1/2

[1][2]

Setting range: OFF / ON ASYNCHRONOUS / ON SERVO

Depending on the motor connected (synchronous or asynchronous motor) this function can have the following effects.

OFF: Function not active

ON ASYNCHRONOUS:

When this function is activated, MOVITRAC® B takes over the thermal protection of the connected motor by electronic means. In most cases, the motor protection function is comparable to standard thermal protection (motor protection switch) and, furthermore, it takes account of speed-dependent cooling by the integrated fan. Motor utilization is determined using the inverter output current, cooling type, motor speed and time. The thermal motor model is based on the motor data entered during startup (MOVITOOLS® MotionStudio/DBG60B) and when the operating conditions specified for the motor are observed.

- **INFORMATION**

  If the motor also has to be protected against failure of the ventilation, blockage of air ducts, etc., it is also necessary to employ protection in the form of a TF positive temperature coefficient thermistor or TH bimetallic switch.
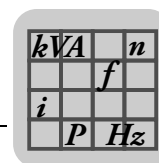
The following signal and display functions are available in conjunction with motor protection:

Parameters	Signal and display function
P006/P007 Motor utilization 1/2	Display of the motor utilization for parameter set 1/2.
P832 Response to MOTOR OVERLOAD	Error response of the inverter when reaching P006/P007 motor utilization 1/2 of 110%. <u>Emergency stop/malfunction</u>

Set the following parameters:

Parameters	Setting/meaning
P341/P343 Type of cooling 1/2	Self-ventilation or forced cooling
Binary output can be programmed to: • /Motor utilization 1 • /Motor utilization 2	Prewarning if *P006/P007 Motor utilization 1/2* exceeds a value of 100%. In this case, the programmed output is set to "0" = 0 V.

Important: Switching off the inverter (mains and 24 V external) always resets the motor utilization to "0"; i.e. any motor heating existing when the motor is switched back on is **not** taken into account.

The motor protection function processes the utilization of the connected motors separately for both parameter sets. The motor protection function must not be used if only one motor is permanently connected to the inverter and the "parameter set changeover" function is only used for control purposes. Equally, the motor protection function must not be used with group drives because it is not possible to protect each individual motor reliably.

ON SERVO:

• Motor without KTY temperature sensor: MOVITRAC® B calculates and displays the motor utilization based on the current. The goal is to determine if the drive is going to fail based on an overload with the error *F31 TF sensor* after only a few cycles or during startup. This setting is available for parameter set 1 only.
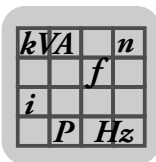
Requirements: Motor utilization is always determined based on the rated motor current. Enter the duration of the machine cycle to receive an exact statement concerning the utilization for the motor powering the machine cycle.

The following signal and display functions are available in conjunction with motor protection:

Parameters	Signal and display function
P006 Motor utilization 1	Display of motor utilization for parameter set 1. Valid after ca. 10 to 20 cycles or after ca 2 s and can be evaluated using IPOS^{plus}® or from a PLC.
P007 Motor utilization 2	In setting P340 = ON SERVO without function
P832 Response to MOTOR OVERLOAD	In setting P340 = ON SERVO without function

Set the following parameters:

Parameters	Setting/meaning
P344 Motor protection interval	Corresponds to the machine cycle of the application. Area: 0.1 s – 20 s

- **INFORMATION**

  Activating the function does not trigger monitoring or protection of the connected motor. Protection must be guaranteed via TF/TH.

  Setting a binary output to "Motor utilization_1" or "Motor utilization_2" also has no effect when *P340* is set to "ON SERVO".

- SEW motor with KTY temperature sensor: Motor utilization is calculated using a motor model stored in MOVITRAC® B (*P006 Motor utilization 1*, *P018 KTY utilization 1*). Once the motor dependent switch-off limit is reached, the inverter will be switched off using the response set in *P832 response to motor overload*. In this case, the settings in *P341* and *P344* are not relevant.

P341 / P343 type of cooling 1 / 2

Setting range: <u>FAN COOLED</u> / FORCED COOLING

You need to know the cooling type of the motor to calculate the thermal load on the motor as exactly as possible, as described in *P340/P342 Motor protection 1/2*.

P345 / P346 I_N-UL monitoring

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.

3.1.5 Parameter group 4.. Reference messages

The following reference values are used for detecting and reporting 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 error.

Parameter group 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
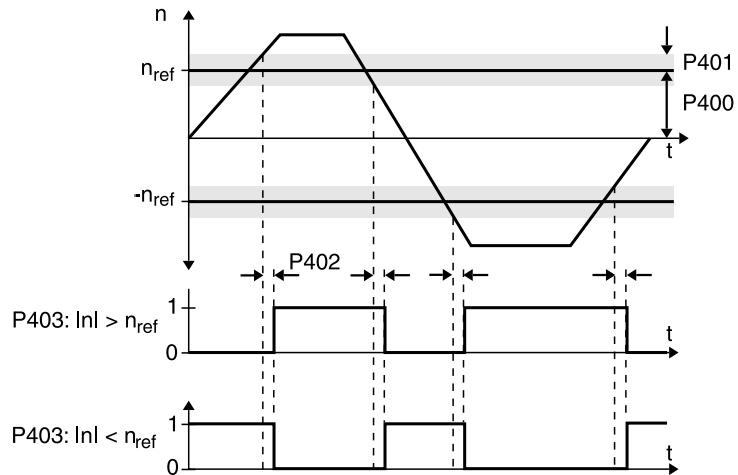
P400 Speed reference value

Setting range: 0 – <u>750</u> – 5000 rpm

P401 hysteresis

Setting range: 0 – <u>100</u> – 500 rpm

P402 deceleration time

Setting range: 0 – <u>1</u> – 9 s

P403 signal = "1" at

<u>0 / n < n_{ref}</u>

1 / n > n_{ref}
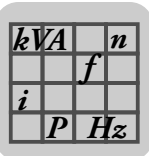
Parameter group 43. current reference signal

Signal if the output current is greater than or less than the reference value.
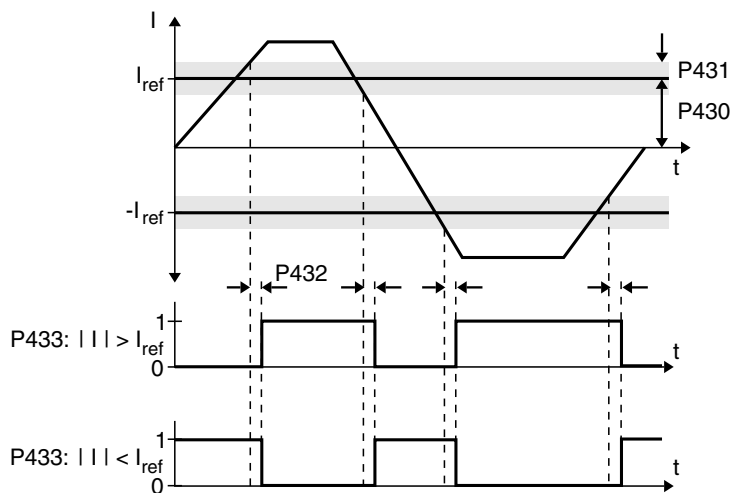
9007199902738315

P430 current reference value Lonb	Setting range: 0 – 100 – 150 % I_N
P431 hysteresis Lonb	Setting range: 0 – 5 – 30 % I_N
P432 deceleration time Lonb	Setting range: 0 – 1 – 9 s
P433 signal = "1" at Lonb	0 / I < I_{ref} 1 / I > I_{ref}

Parameter group 44. Imax signal

Signal if the inverter has reached the current limitation.

P440 hysteresis Lonb	Setting range: 0 – 5 – 50 % I_N
P441 deceleration time Lonb	Setting range: 0 – 1 – 9 s

P442 signal = "1" at

Ĺon6

0 / I = I$_{max}$

1 / I < I$_{max}$

Parameter group 45.. PI controller_reference signal

Also see chapter "PI controller / reference signal" (page 189).

These parameters determine whether and how the PI reference signal responds

P450 PI actual value reference

Ĺon6

0.0 – 100.0 %

P451 signal = "1" at

Ĺon6

0 / PI Actual value < PI Ref

1 / PI Actual value > PI Ref

3.1.6   Parameter group 5.. Monitoring functions

Parameter group 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 is triggered if the inverter exceeds the current limit for longer than set in *P501 deceleration time*.

P500/P502 Speed monitoring 1/2

Ĺon6

Off

on / motor / regenerative

Function of speed monitoring in motor and regenerative operation of the motor

P501 / P503 deceleration time 1 / 2

Ĺon6

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.

Parameter group 54. gear unit / motor monitoring

These parameters are used to set the response to be triggered in the event of a motor or gear unit problem. The binary inputs have to be set accordingly for this purpose. Fault responses are triggered in the *Controller inhibit* or *No enable* 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.

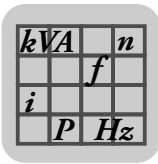| Response	Description
0 / No response	Neither an error is displayed nor an error response is performed. The signaled error is ignored.
1 / display error	The error is displayed and the error output is set (if programmed). The unit performs no other error responses. The error can be reset (terminal, RS485, fieldbus, auto-reset).
2 / 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 an error reset during which the inverter is reinitialized.
4 / 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 an error reset during which the inverter is reinitialized.
7 / 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 unit re-initialization if the error is rectified by an internal procedure or by an error reset.

P540 Response drive vibration / warning

`Long`

Display error

Once the drive vibration sensor signals a warning, the inverter will respond with the set response.

P541 Response drive vibration / error

`Long`

Rapid stop/warning

Once the drive vibration sensor signals an error, the inverter will respond with the set response.

P542 response oil aging / warning

`Long`

Display error

If the oil aging sensor signals a warning, the inverter will respond with the set response.

P543 response oil aging / warning

`Long`

Display error

If the oil aging sensor signals an error, the inverter will respond with the set response.

P544 oil aging / overtemperature

`Long`

Display error

If the oil aging sensor signals overtemperature, the inverter will respond with the set response.

P545 oil aging / ready

Lon6

Display error

If the oil aging sensor signals ready, the inverter will respond with the set response.

P549 response brake wear

Lon6

Display error

If the brake wear sensor signals a fault, the inverter will respond with the set response.

Parameter group 56. current limitation Ex e motor

The parameter group *P56. Current limitation Ex e Motor* contains display and setting values that are specific to the "current limitation in the Ex e Motor on inverter" function. The factory setting is underlined. The factory settings apply to the delivery status.

Frequencies lower than frequency A and higher than the rated motor frequency are permanently illegal. The following applies:

• Frequency A < frequency B < frequency C < frequency D < frequency E

For non-SEW EX motors, you have to perform the settings manually.
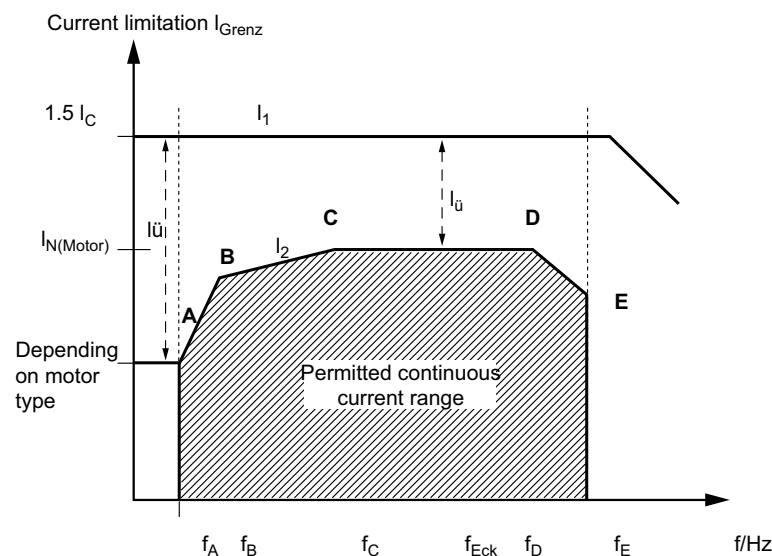
9007200296570891

P560 Current limit Ex-e motor

AUTO

This function is enabled automatically if an Ex-e motor has been started up.

Setting range: On/off

On: Current limitation for Ex-e motors enabled

(Current limit A < current limit B < current limit C)

On startup, the current limitation for Ex-e motors is automatically activated for motors selected and approved for the operation in potentially explosive areas.

P561 Frequency A

AUTO

Setting range: 0 – <u>5</u> – 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 with *F110 Ex e protection* error message.

P562 Current limit A

AUTO

Setting range: 0 – <u>50</u> – 150 %

Current limitation that is permitted with operating frequency f_A. There is a linear gradient between current limitation A and current limitation B.

P563 Frequency B

AUTO

Setting range: 0 – <u>10</u> – 104 Hz

Value for operating frequency f_B.

P564 Current limit B

AUTO

Setting range: 0 – <u>80</u> – 200 %

Current limitation that is permitted with operating frequency f_B. There is a linear gradient between current limit B and current limit C.

P565 Frequency C

AUTO

Setting range: 0 – <u>25</u> – 104 Hz

Value for operating frequency f_C.

P566 Current limit C

AUTO

Setting range: 0 – <u>100</u> – 200 %

Current limitation that is permitted with operating frequency f_C. There is a linear gradient between current limitation C and current limitation D.

P567 frequency D

AUTO

Setting range: 0 – <u>50</u> – 104 Hz

Value for operating frequency f_D.

P568 current limit D

AUTO

Setting range: 0 – <u>100</u> – 200 %

Current limitation that is permitted with operating frequency f_D. There is a linear gradient between current limitation D and current limitation E.

Parameter group 57. motor protection

P570 frequency E

AUTO

Setting range: 0 – <u>87</u> – 104 Hz

P571 current limit E

AUTO

Setting range: 0 – <u>100</u> – 200 %

Current limitation that is permitted with operating frequency f_E.

3.1.7 Parameter group 6.. Terminal assignment

Parameter group 60. binary inputs

DI01 with fixed assignment CW/stop

Response	Effect when		Effective with inverter status	
	0 signal	**1 signal**	**Disabled**	**Enabled**
0: No function	–	–	–	–
1: Enable/stop	Stop at stop ramp*P136 / P146*	Enabled	No	Yes
2: CW/stop	Stop at t11 / t12	Enable CW	No	Yes
3: CCW/stop	Stop at t11 / t12	Enable CCW	No	Yes
4: n11/n21	External setpoints only	Fixed setpoint selected	No	Yes
5: n12/n22	External setpoints only	see below	No	Yes
6: Fixed setpoint switchover	Fixed setpoints of the active parameter set selected	Fixed setpoints of the active parameter set selected	Yes	Yes
7: Parameter set switchover	Parameter set 1	Parameter set 2	Yes	No
8: Ramp switchover	t11/t21 active	t12/t22 active	Yes	Yes
9: Motor potentiometer up	–	Increase setpoint	No	Yes
10: Motor potentiometer down	External error (*F26*)	–	No	Yes
11: /External error	Reset on positive edge ("0" to "1")	–	Yes	Yes
12: Error reset	Master/slave operation	Slave free running	Yes	Yes
19: Slave free running	Do not accept	Accept setpoint	No	Yes
20: Setpoint acceptance active	External error (*F26*)	–	No	Yes
26: TF signal (DI05 only)	Motor overtemperature	–	No	Yes
27: Vibration/warning	Sensor signals warning	–	Yes	Yes
28: Vibration/fault	Sensor signals fault	–	Yes	Yes
29: Brake wear	Brake is worn	–	Yes	Yes
30: /Controller inhibit	Disabled	Enabled	Yes	Yes
33: Oil aging/warning	Sensor signals warning	–	Yes	Yes
34: Oil aging/fault	Sensor signals fault	–	Yes	Yes
35: Oil aging / overtemperature	Sensor signals overtemperature	–	Yes	Yes
36: Oil aging/ready	Sensor not ready	–	Yes	Yes

Fixed setpoints

Fixed setpoints	Description
n11 / n21 = "0" and n12 / n22 = "0":	External setpoints only
n11 / n21 = "1" and n12 / n22 = "0":	n11/n21
n11 / n21 = "0" and n12 / n22 = "1":	n12/n22
n11 / n21 = "1" and n12 / n22 = "1":	n13/n23
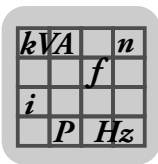
P601 binary input DI02   CCW/stop

Short

P602 binary input DI03   Enabled

Short

P603 binary input DI04   n11/n21

Short

P604 binary input DI05   n12/n22

Short

P608 binary input DI050   Error reset

Short

Parameter group 61. binary input option

P610 binary input DI10   No function

Short

P611 binary input DI11   No function

Short

Parameters
Explanation of the parameters

kVA n
f
i
P Hz

3

P612 binary input DI12

Short

No function

P613 binary input DI13

Short

No function

P614 binary input DI14

Short

No function

P615 binary input DI15

Short

No function

P616 binary input DI16

Short

No function
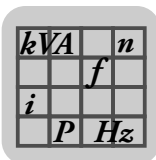
Parameter group 62. binary outputs basic unit

Only use binary output DO02 for controlling the brake rectifier.

Response	Effect when	
	0 signal	1 signal
0: No function	–	–
1: /Fault	Collective fault signal	–
2: Ready	Not ready	Ready
3: Output stage ON	Unit inhibited	Unit enabled and motor energized
4: Rotating field ON	No rotating field	Rotating field
5: Brake released	Brake applied	Brake released (not with DO03)
8: Parameter set	1 active	2 active
9: Speed reference signal	$n > n_{ref}$ / $n < n_{ref}$ *(P403)*	$n < n_{ref}$ / $n > n_{ref}$ *(P403)*
11: Setpoint-actual value comparison signal	$n \neq n_{set}$	$n = n_{set}$
	Signal if the speed is equal to or not equal to the setpoint speed.	
12: Current reference message	$I > I_{ref}$ / $I < I_{ref}$ *(P433)*	$I < I_{ref}$ / $I > I_{ref}$ *(P433)*
13: Imax signal	$I < I_{max}$ / $I = I_{max}$ *(P442)*	$I = I_{max}$ / $I < I_{max}$ *(P442)*
21: IPOS output	–	Depends on IPOS program
22: /IPOS fault	Fault signal IPOS	–
23: PI controller actual value reference	–	PI controller actual value has exceeded the set threshold
24: Ex-e current limit active	Current limit not active	Current limit active
26: S pattern is generated	S pattern is not calculated	S pattern is calculated
27: Safe stop	The display "Safe stop" is **not safety-related** and must not be used as a safety function.	
30: /Ixt warning	Normal mode	Ixt > 115 %
31: /Ixt error	Normal mode	Ixt > 125 %

P620 binary output DO01

Short

/FAULT

P621 binary output DO02

Short

BRAKE RELEASED

P622 binary output DO03

Short

READY (selection 5 (BRAKE RELEASED) not possible)

Parameter group 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

Referenced
output value

−100 % − 0 − +100 %

AO1
characteristic
curve

Output

0 − 10 V
0 / 4 − 20 mA
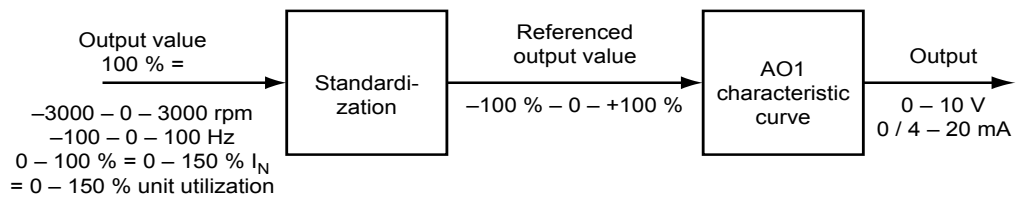
9007199426629643

P640 AO1 analog output

LonG

0 / No function

The value 0 % evaluated by the characteristic curve is displayed.

1 / ramp generator input (absolute value)

Setpoint speed at the input of the internal ramp generator

100 % corresponds to 3000 rpm

2 / setpoint speed (absolute value)

Valid setpoint speed (output ramp generator or correcting variable of the higher-level controller)

100 % corresponds to 3000 rpm

3 / actual speed (absolute value)

Rotating field frequency

100 % corresponds to 3000 rpm

4 / actual frequency (absolute value)

100 % corresponds to 100 Hz

5 / output current (absolute value)

Apparent current

100 % corresponds to 150 % I_N

6 / active current (absolute value)

100 % corresponds to 150 % I_N

7 / unit utilization

Current unit utilization

100 % corresponds to 150 % unit utilization

11 / actual speed (signed)

±100 % corresponds to ±3000 rpm

12/ actual frequency (signed)

Rotating field frequency

±100 % corresponds to ±100 Hz

P641
AO1 reference

0 / 3000 rpm, 100 Hz, 150 %

1 / n_{max}

2 / $n_{set\ reference}$

P642
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

P646 AO1 char. 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

P647 AO1 char. curve y1

–100 – +100 %

P648 AO1 char. 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
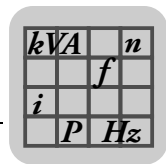
P649
AO1 characteristic curve y2

−100 – +100 %

The characteristic curve is described by the coordinates x1/y1 and x2/y2, with which the analog output is evaluated.

	Output	
	+100 %	
	+10 V	
	+20 mA	(x2/y2)

−100 %		
−3000 rpm	**Example**	**Factory setting**
−100 Hz		
−150 % I_N	(x1/y1)	
$-n_{max}$	0 %	0 %
$-n_{Set\ reference}$	0 V	0 rpm
	0/4 mA	0 Hz
		0 %

Output value
+100 %
+3000 rpm
+100 Hz
+150 % I_N
$+n_{max}$
$+n_{Set\ reference}$
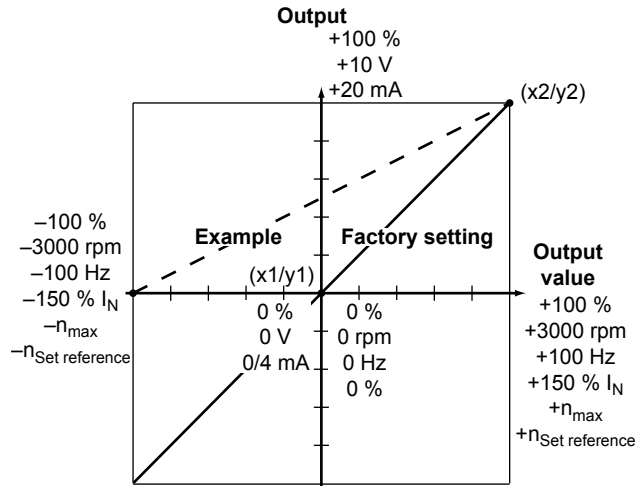
9007199426637579

3.1.8 Parameter group 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.

Parameter group 70. operating mode 1 / 2

This parameter is used to set the basic operating mode of the inverter. Setting on 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 premagnetization 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: Error *F82 output open*

• Premagnetization time too short or incorrect motor/inverter combination: Error *F81 start condition*

• Motor phase failure due to active speed monitoring *P500/502*: Error *F08 speed monitoring*

Notice

- 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**.

- In VFC & hoist mode, the signal "CW/stop" must be set for the lifting motion and signal "CCW/stop" must be set for lowering motion.

- A 1-phase motor phase failure cannot always be detected reliably.

- SEW-EURODRIVE strongly recommends activating speed monitoring.

- Prerequisite for correct performance of the hoist function: Motor brake controlled by the inverter.

- The speed monitoring is set by changing parameters *P500 / P502* and *P501 / P503*. 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.
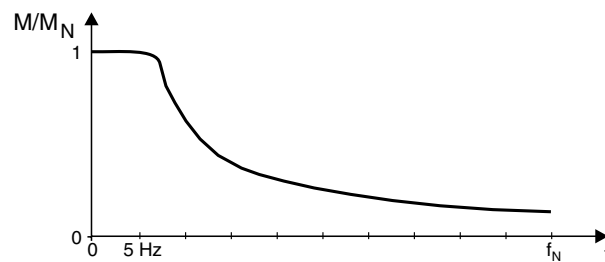
17888011

During braking, the inverter injects a constant current with a rotating field frequency of 5 Hz. The braking torque = "0" at standstill. At a low speed, the braking torque is high, at higher speeds, the braking torque decreases. The braking time and consequently the duration of the braking current depends on the load connected to the motor. DC braking stops at a rotating-field frequency of the motor 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.

Notice

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 diagram shows the braking profile.
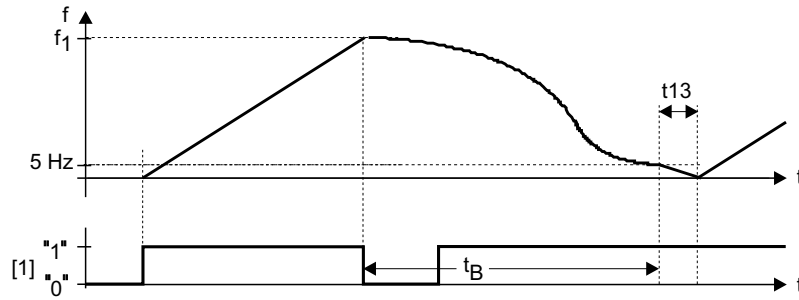
9007199272632587

n_1 =	Setpoint speed
[1] =	Enable
t13 =	Stop ramp
t_B =	Braking phase

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 "Flying start" 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.
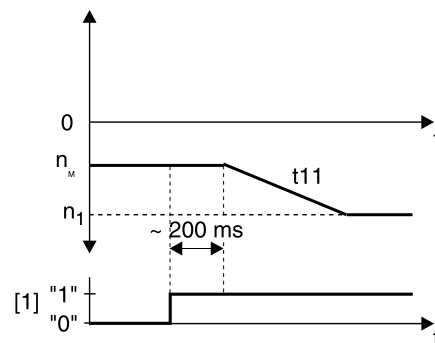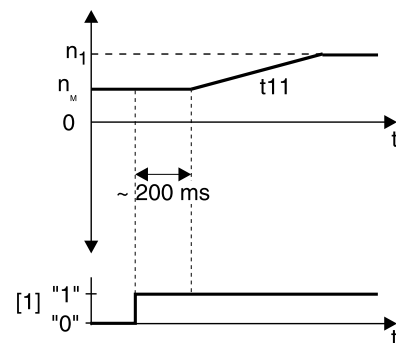
17894667

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.

Notice

Do not use the flying start function in hoist applications.

P700/P701 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)

Parameter group 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 disk 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 premagnetization. **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 standstill current* 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* = "0". Set the standstill current in % of the rated motor current. The standstill current cannot exceed the current limit (*P303*).

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.

The standstill current can only be deactivated via "\CONTROLLER INHIBIT" = "0" or safe stop.

You have to set the function of an input terminal to controller inhibit to activate the standstill current function. Otherwise the output stage will be energized directly.

P710 / P711 standstill current 1 / 2

$\underline{0}$ – 50% I_{Mot}

Parameter group 72. setpoint stop function 1 / 2

Use the *P720 / P723 setpoint stop function* 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.

P720 / P723 set- point stop function 1/2	Off
	On

Lon6

1 2

P721 / P724 stop setpoint 1 / 2	0 – 30 – 500 rpm

Lon6

1 2

P722 / 725 start offset 1 / 2	0 – 30 – 500 rpm

Lon6

1 2

Parameter group 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 "/CONTROLLER INHIBIT" = "0".
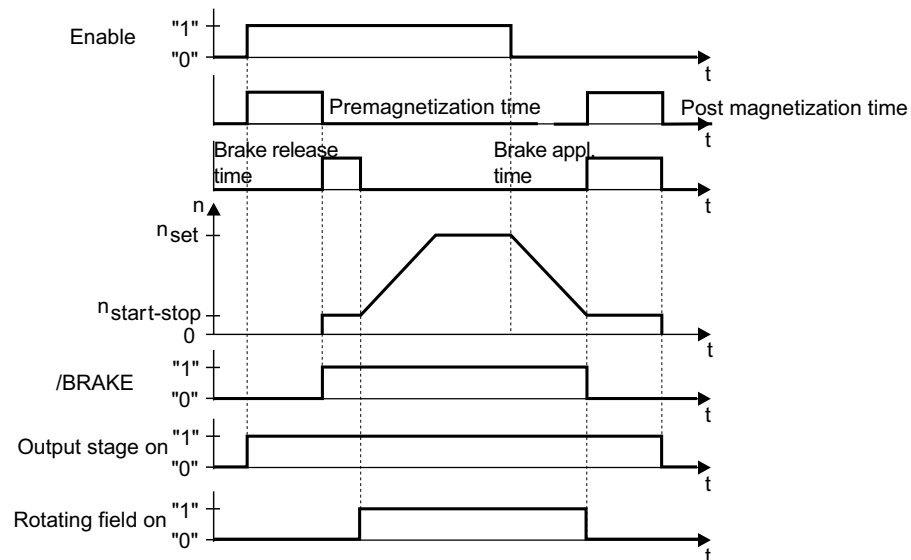
9007199272638731
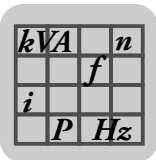
P731/P734 brake release time 1/2

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.

P732/P735 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.

Parameter group 74. speed suppression

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 if the "skip width" is set to "0".
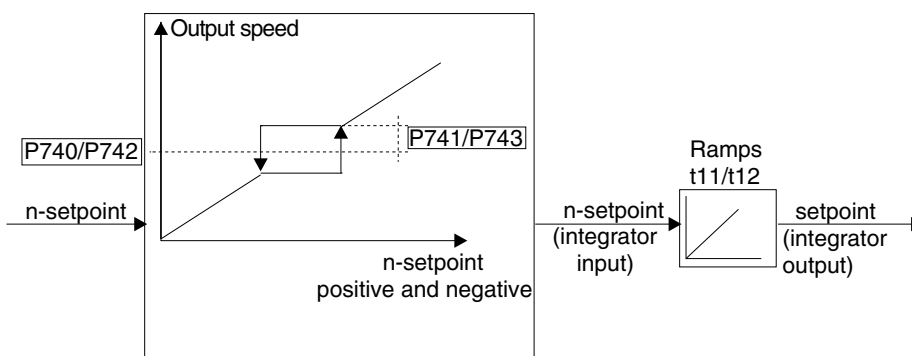
311009931

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.

P740 / P742 skip center 1 / 2

Setting range: 0 – 1500 – 5000 rpm

P741 / P743 Skip width 1/2

Setting range: 0 – 300 rpm

Parameter group 75. master-slave function

The master-slave function allows for implementing automatic functions such as speed synchronization. The RS485 interface or the system bus interface can be used as the communication link. *P100 Setpoint source* = Master SBus or *P100 Setpoint source* = Master RS485 must be set on the slave. 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

9007199989850507
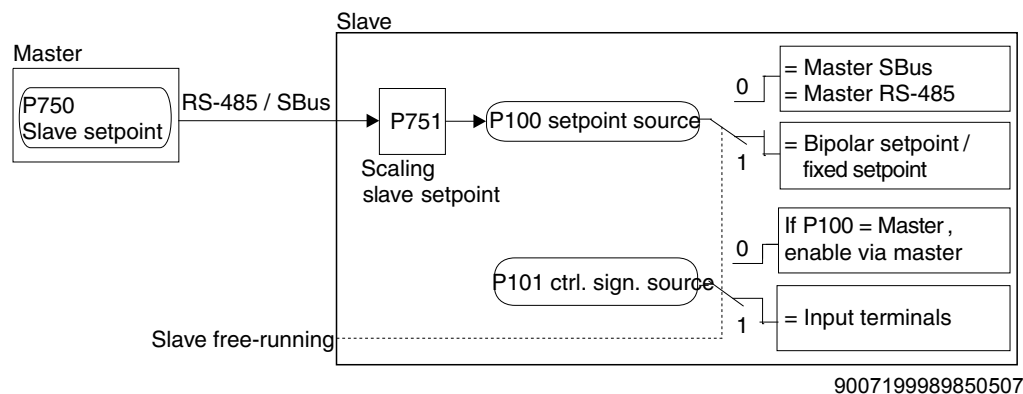
P811 RS485 Group address or *P882 SBus Group address* must be set to the same value in master and slave. For master/slave operation via RS485 interface, set *P811 RS485 Group address* to a value greater than 100. For operation via system bus (e.g. master-slave operation), the bus terminating resistors at the start and end of the system bus must be activated.

• **INFORMATION**

Setpoint specified via RS485:

If the master specifies the setpoint for the slaves via RS485, MOVITRAC® B takes over the master function in the RS485 interface after the parameter *P750 slave set-point* has been set to "RS485 speed". The communication with MotionStudio is aborted after MOVITRAC® B is activated as RS485 master, since it has only one RS485 interface.
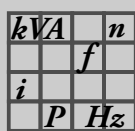
To re-establish connection to MotionStudio, set *P750 slave setpoint* to "MASTER-SLAVE OFF" again. Switch off both the 24 V backup voltage and the power supply voltage for MOVITRAC® B for this purpose. Next, switch the 24 V backup voltage or the power supply voltage back on again. After power on, *P750 slave setpoint* can be set to another value using MotionStudio within a time frame of 30 seconds. *P750* 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 *P750* to "MASTER-SLAVE OFF", MotionStudio can operate as master on the RS485 interface again. MotionStudio can also be connected via a UOH/DFxxxx fieldbus gateway. In this combination, MOVITRAC® B can function as a master on the RS485 interface.

Connection check

- System bus (SBus): *P815 SBus timeout interval* is in effect when there is a communication link via the SBus. If *P883 SBus timeout interval* = "0", data transmission via SBus is not monitored.

- RS485 interface: A connection check is always in effect if the communication link takes place via the RS485 interface; *P812 RS485 timeout interval* does not have any function. The slave inverter must receive a valid RS485 telegram within the fixed time interval of t = 500 ms. If the time is exceeded, the slave drives will stop at the stop ramp and error message F43 *RS485 timeout* will be issued.

Overview of functions of master/slave operation

Speed synchronization:	Master	Slave
Master controlled Slave controlled	*P750 slave setpoint*:	*P100 Setpoint source*:
	SPEED (RS485+SBus)	MASTER SBus MASTER RS485:
	P700 Operating mode 1:	*P700 Operating mode 1*:
	VFC VFC & Hoist V/f characteristic curve V/f & DC braking	VFC VFC & Hoist V/f characteristic curve V/f & DC braking

P750 slave setpoint

Lon6

The setpoint to be transmitted to the master is set on the master. The "MASTER-SLAVE OFF" setting must be retained on the slave.

- 0: MASTER-SLAVE OFF
- 1: SPEED (RS485)
- 2: SPEED (SBus1)
- 3: SPEED (RS485 + SBus)

P751 scaling of the slave setpoint

Lon6

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.
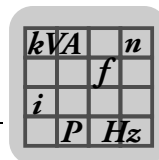
Parameter group 76. manual operation

P760 locking RUN/STOP keys

<u>Off</u> (RUN/STOP keys are activated and can be used for starting and stopping the motor)

On (RUN/STOP keys are locked and therefore do not function)

Lon6

Also refer to section "External setpoint selection (page 264)".

Parameter group 77. energy efficiency function

The energy-saving function can be activated for the following operating modes: VFC / VFC & FLYING START / V/f CHARACTERISTIC. During no-load operation, the power consumption of the inverter can be reduced by up to 70 %. Observe the following limitations:

- The energy-saving function only offers advantages in the part-load range

- No large changes in load should occur during operation

Energy can be saved when operating pumps, fans, conveyor belts, etc. In this procedure, the magnetization of the asynchronous motor is controlled depending on the load by adapting the voltage-frequency ratio; the motor is undermagnetized.

P770 energy-saving function

<u>Off</u>

On

Lon6

3.1.9   Parameter group 8.. Unit functions

Parameter group 80. setup

P800 quick menu (only FBG11B)

Long

<u>Short</u>

Short

Use *P800 quick menu* to switch from the factory setting short menu to the detailed parameter menu.

P801 language DBG60B

Language selection only for DBG60B keypad.

P802 factory setting

<u>No</u> (do not restore factory setting)

Std / standard (restore factory setting)

Lon6

All / delivery status (for starting up IEC motors)

NEMA / delivery status (for starting up NEMA motors)

You can use *P802 factory setting* to restore the factory setting stored in the EPROM for almost all parameters.

Activating the factory setting causes almost all parameter values to be overwritten. Save the set values using MOVITOOLS® MotionStudio 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.

Statistics data must be reset separately with *P804 Reset statistics data*. 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 factory setting* is reset to "no" automatically.

Select the delivery condition to reset all the parameters.

P803 parameter lock Lon6	<u>Off</u> (you can change all parameters) On (You can change *P803* and *P840* only) Set *P803 Parameter lock* to "on" to prevent that any changes are made to the parameters. Exceptions are *P840* manual reset and *P803* itself. The parameter lock is useful, for example, after having optimized the settings of MOVITRAC® B. To re-enable changes to parameters, set *P803 Parameter lock* to "off". The parameter lock also affects parameter changes via the RS485 and SBus interfaces.
P804 reset statistics data	<u>No action</u> (no reset is performed) Fault memory (the content of the fault memory is reset) *P804 reset statistic data* lets you reset the statistical data stored in the EEPROM (error memory). These data are not affected when restoring the factory settings. The parameter automatically reverts to "no" after a reset.
P805 nominal line voltage Lon6	Setting range: 50 – 500 V Limits the output voltage of the inverter.
P806 copy from DBG to MOVITRAC ®B	Yes/<u>No</u> The parameter data in the DBG60B are transferred to MOVITRAC® B.
P807 copy from MOVITRAC ®B to DBG	Yes/<u>No</u> The parameter data in MOVITRAC® B are transferred to DBG60B.
P808 24VIO auxiliary voltage output Lon6	0 / Off: 24 V switched off <u>1 / On</u>: 24 V switched on
P809 IPOS activation	This parameter lets you activate the integrated positioning and sequence control.

Parameter group 81. serial communication

P810 RS485 address Lon6	Setting range: <u>0</u> – 99 *P810* sets the address of MOVITRAC® B for communication via serial interface. On delivery, the MOVITRAC® B address is always 0. SEW-EURODRIVE recommends not using address 0, in order to prevent data transfer collisions when serial communication is used with several inverters.
P811 RS485 group address Lon6	Setting range: <u>100</u> – 199
P812 RS485 time-out interval Lon6	Setting range: <u>0</u> – 650 s

P819 fieldbus time-out interval   Display parameters for the EtherCAT master timeout interval in s.

Parameter group 82. brake operation 1 / 2

P820 / P821 allows you to enable and disable 4-quadrant operation. 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 error *F07 DC link overvoltage*. In this case you have to extend the deceleration ramps manually (*P131*).

Therefore, do not set unreasonably short deceleration ramps

The unit responds with error *F34 Ramp/timeout* if the ramp is set too short and the ramp which can actually be achieved is significantly longer than the set value.

P820 / P821 4-quadrant opera-tion 1 / 2

Off

<u>On</u>

Parameter group 83. error responses

Error "EXT. FAULT" can only be triggered when the inverter status is "ENABLED". *P830* programs the fault response which is triggered by an input terminal programmed to "/ EXT. FAULT".

P830 response to "External fault"

Lon6

2 / Immediate stop/malfunction (immediate switch-off with locking)

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 inverter sets the error signal and the revokes the ready message.

This status can only be exited by an explicit fault reset.

<u>4 / rapid stop / malfunction (stop with locking)</u>

(factory setting for *P830*)

This error 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 error state, the output stage is inhibited and an existing brake is applied. Error signal *F34 ramp timeout* is generated and the original error 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 error message is set and the ready message is revoked.

This status can only be exited by an explicit fault reset.

<u>7 / Rapid stop / Warning</u>

(factory setting for *P833 / P836*)

For timeout RS485 / SBus (stop without locking):

If the inverter is controlled via a communication interface (RS485 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.

For other errors (stop with locking):

The error response corresponds to rapid stop/malfunction, except the inverter does not revoke the ready signal and the error output is set.

Error list F31:

Error response: Stop with locking (ready signal is not revoked)

P833 response timeout RS485 Long	Description: See parameter *P830 response terminal "External error"*.
P836 response timeout SBus Long	Description: See parameter *P830 response terminal "External error"*.

Parameter group 84. reset behavior

P840 manual reset Yes

MOVITRAC® B resets the present 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.

<u>No</u>

No reset.

Parameter *P840* corresponds to the STOP/RESET key.

P841 manual reset On

Long

The auto reset function is activated. In case of an error, this function automatically resets the unit after *P842 Restart time*. 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,

- manual reset is performed using the serial interface (SHELL, DBGT60B, master controller),

- there is a transition to 24 V backup mode, or the inverter is switched off.

- Manual reset via the reset button of the FBG11B

Five automatic resets are then possible again.

- ⚠ **DANGER**

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

   Severe or fatal injuries.

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

   – Perform a manual reset.

Off

No auto reset.

P842 restart interval Lon6	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.

Parameter group 85. actual speed value scaling

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 scaling unit 1/2 is entered in *P852 User-defined unit*.

The following figure shows an example of the scaling actual speed value:
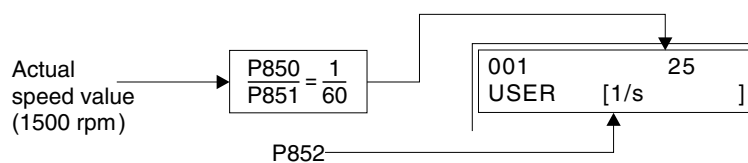
P850 Scaling factor numerator Lon6	Setting range: 1 – 65535

P851 Scaling factor denominator Lon6	Setting range: 1 – 65535

P852 user-defined unit	rpm Up to 8 ASCII characters; is displayed in *P001 User display*.
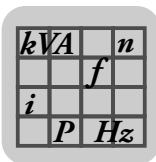
P853 scaled speed FBG

Lon6

P853 determines the content of the basic display of the FBG.

0 / Speed = motor speed

1 / scaled speed = motor speed × *P850* / *P851*

2 / H0 [0 – 99999] = positive values 0 to 99999

3 / H0 [–9999 – 9999] = signed values –9999 to 9999

4 / H0 = special format 09999

Settings 2 to 4 can only be performed via MOVITOOLS® MotionStudio and only if *P809 IPOS activation* is set to "on".
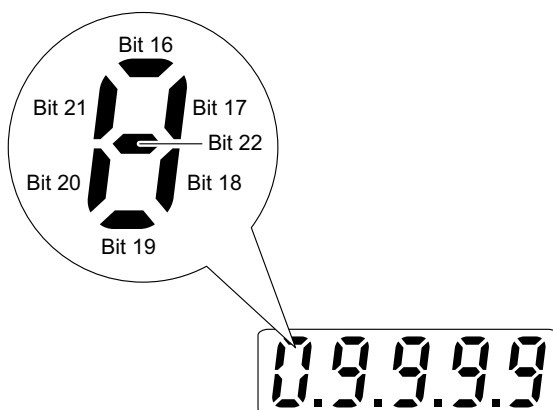
The display can be controlled via variable H0:

- Low word 0 – 9999: 7-segment digits (digits 2 – 5)
- High word (bit 16 – 22): Individual control of the segments via digit 1 (left)

In addition, all 4 decimal points are lit for setting values 2 – 4.

Parameter group 86. modulation 1 / 2

P860 / P861 allows you to 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.

P860 / P861 PWM frequency 1 / 2

Lon6

1 2

4 kHz

8 kHz

12 kHz

16 kHz

P862 / P863 PWM fix 1 / 2

Lon6

1 2

On (no automatic change of the cycle frequency by the inverter)

Off (autonomous change of the switching frequency by the inverter depending on the utilization)

Parameter group 87. process data parameterization

For further information, refer to the manual "MOVITRAC® B communication"

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:

Response	Description
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®
13 / PI controller setpoint %	PI controller setpoint

P870 setpoint description PO1

Lon6

<u>Control word 1</u>

P871 Setpoint description PO2

Lon6

<u>Speed</u>

P872 Setpoint description PO3

Lon6

<u>No function</u>

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:

Assignment	Description
0 / No function	The content of the process input data word is 0000_hex
1 / Actual speed	Current speed actual value of the drive 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
7 / Status word 2	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 value of the PI controller

P873 actual value description PI1

Lon6

<u>STATUS WORD 1</u>

P874 actual value description PI2

`LonG`

SPEED

P875 actual value description PI3

`LonG`

OUTPUT CURRENT

P876 PO data enable

`LonG`

No

    The last valid process output data remain in effect.

Yes

    The process output data that was last sent from the fieldbus controller becomes effective.

Parameter group 88. serial communication SBus

P880 SBus protocol

`LonG`

Setting range SBus

0 / MoviLink

1 / CANopen

FSE sets the parameter.

For FSC12B, the setting via the DIP switch has priority.

P881 SBus address

`Short`

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.

FSE sets the parameter.

On delivery, the MOVITRAC® B address is always 0. SEW-EURODRIVE recommends not using address "0", in order to prevent data transfer collisions when serial communication is used with several inverters.

For FSC12B, the setting via the DIP switch has priority.

P882 SBus group address

Setting range: 0 – 63

P882 allows you to 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. MOVITRAC® B does not acknowledge data received via group address. 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.

P883 SBus timeout interval

`LonG`

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/malfunction 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".

*P884 SBus baud
rate*

Lon6

Use *P816* to set the transmission speed of the system bus.

125 / 125 kBd

250 / 250 kBd

<u>500 / 500 kBd</u>

1000 / 1000 kBaud

For FSC12B, the setting via the DIP switch has priority.

*P886 CANopen
address*

Lon6

Setting range: 1 – <u>2</u> – 127

P886 is used to set the address for serial communication with the SBus.

For FSC12B, the setting via the DIP switch has priority.

4 Project Planning

4.1 Schematic procedure

→ **Clarification of**
- technical data and requirements
- Basic conditions
- System interfacing

↓

Calculation of the relevant application data
- Stationary, dynamic, regenerative power
- Speeds

↓

Gear unit selection
Determining
- gear unit version, gear unit size, gear unit reduction ratio

Check the gear unit utilization ($M_{amax} \geq M_a(t)$)

↓

→ **Motor selection**
- Convert torque and speed for the motor shaft
- Define the motor

↓

← **Check**
- Max. torque which can occur $M_{max} < 1.5 \times M_N$
- Required motor speed $< n_N$
- Thermal load by taking into account setting range and cyclic duration factor

↓

Selecting the MOVITRAC$^®$ B frequency inverter
- Motor/inverter assignment
- Continuous power, peak power
- Installation conditions
- FBG11B keypad option
- DBG60B plain text keypad option
- FSC11B/21B communication option
- FIO11B analog module option
- FIO21B digital module option
- FSE24B EtherCAT option
- UWS11A / UWS21B / USB11A interface adapter option

↓

Selecting the braking resistor
- based on the calculated regenerative power and the cyclic duration factor cdf

↓

Compilation of components
- Line choke, output choke, touch guard

↓

← **Check whether all requirements have been met.**

4.2 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.

4.3   Description of applications

4.3.1   Project planning for trolleys

The motor load in dynamic sections determines the motor peak power that has to be configured. 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.

4.3.2   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.

In VFC & hoist mode, the signal "CW/stop" must be set for the lifting motion and signal "CCW/stop" must be set for lowering motion.

Notice

The speed monitoring is set by changing parameters *P500* / *P502* and *P501* / *P503*. The sagging of hoists cannot be avoided safely when monitoring is deactivated or the delay time is set too long.

Thermal considerations

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 input speed of the gear unit is approx. 1.4 times higher. This is why you have to select a 1.4 times higher gear unit reduction ratio. This measure means that the motor does not lose any torque at 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

9007199272646667
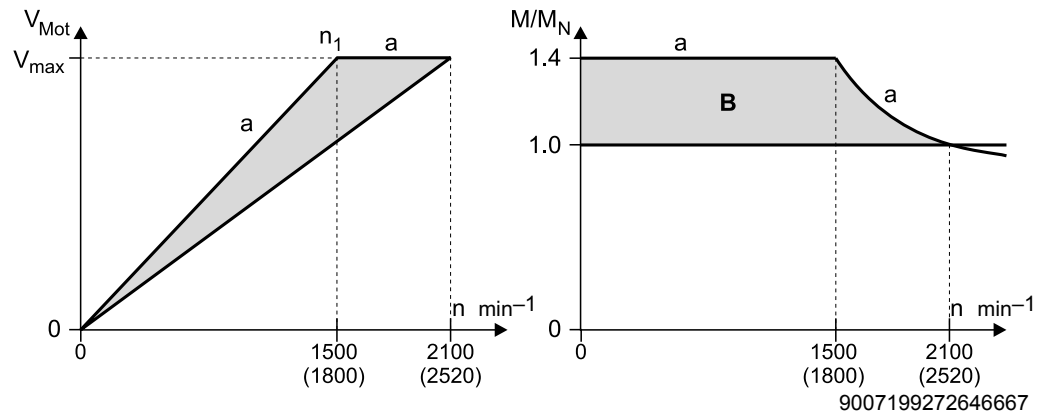
a = Recommended voltage/speed characteristic curve and resultant torque profile
B = Torque reserve range

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.

4.4 Speed-torque characteristic curve

The speed-torque characteristic curve looks as follows:
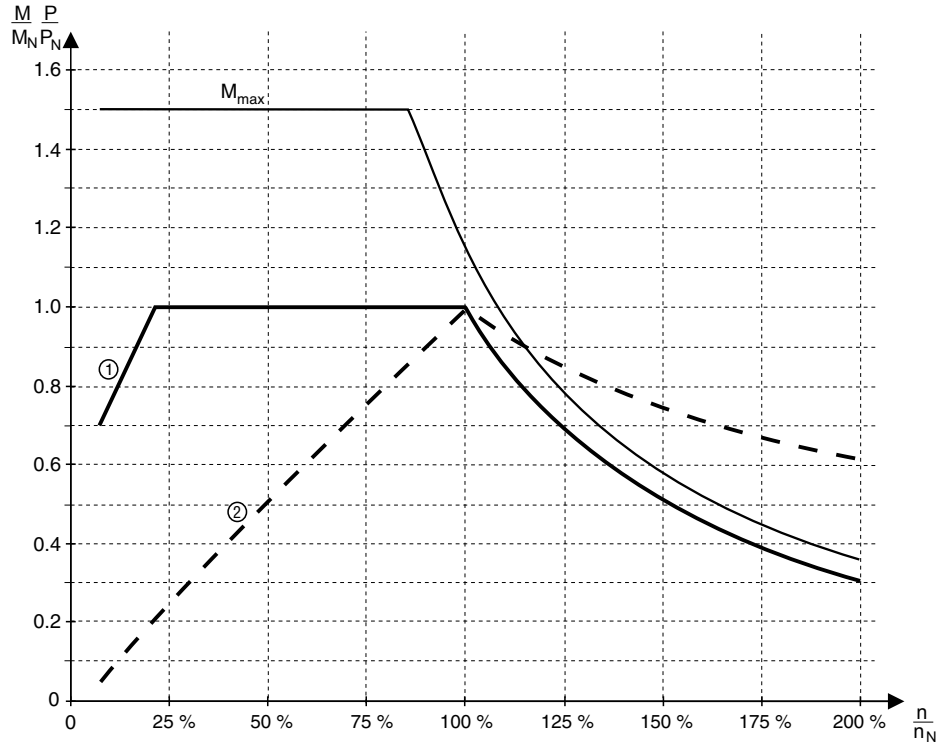
244146315

[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 nominal torque below 20 Hz.

4.5 Motor selection

4.5.1 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.

4.5.2 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.

9007199272658699
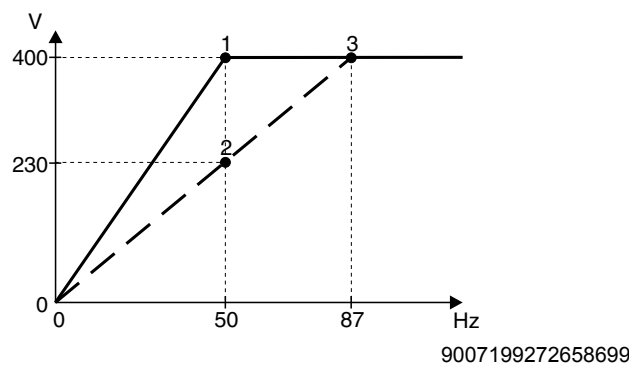
1 Star connection; 400 V, 50 Hz
2 Delta connection 230 V / 50 Hz
3 Delta connection; 400 V, 87 Hz (startup 230 V, 50 Hz)

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

4.5.3 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:

- *P303 current limit*

- *P324 slip compensation*

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

4.5.4 Inverter / motor combinations

The 4-pole motors (1500 rpm) are included in the factory setting of MOVITRAC® B.

You can also assign the next higher motor size to the inverters. Smaller motors can deteriorate the control behavior.

MOVITRAC® B Speed in rpm at 50 Hz Speed in rpm at 60 Hz	Recommended nominal motor power P_N
MC07B0003-..-4-00	0.25 kW (0.34 HP)
MC07B0004-..-4-00	0.37 kW (0.50 HP)
MC07B0005-..-4-00	0.55 kW (0.74 HP)
MC07B0008-..-4-00	0.75 kW (1.0 HP)
MC07B0011-..-4-00	1.1 kW (1.5 HP)
MC07B0015-..-4-00	1.5 kW (2.0 HP)
MC07B0022-..-4-00	2.2 kW (3.0 HP)
MC07B0030-..-4-00	3.0 kW (4.0 HP)
MC07B0040-..-4-00	4.0 kW (5.4 HP)
MC07B0055-..-4-00	5.5 kW (7.4 HP)
MC07B0075-..-4-00	7.5 kW (10 HP)
MC07B0110-..-4-00	11 kW (15 HP)
MC07B0150-..-4-00	15 kW (20 HP)
MC07B0220-..-4-00	22 kW (30 HP)
MC07B0300-..-4-00	30 kW (40 HP)
MC07B0370-..-4-00	37 kW (50 HP)
MC07B0450-..-4-00	45 kW (60 HP)
MC07B0550-..-4-00	55 kW (74 HP)
MC07B0750-..-4-00	75 kW (100 HP)

4.6 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

• Line 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. If the inverter is subjected to a higher than permitted load, it issues the fault message *F44 Unit utilization* and switches off immediately.

Overload capacity at 40 °C
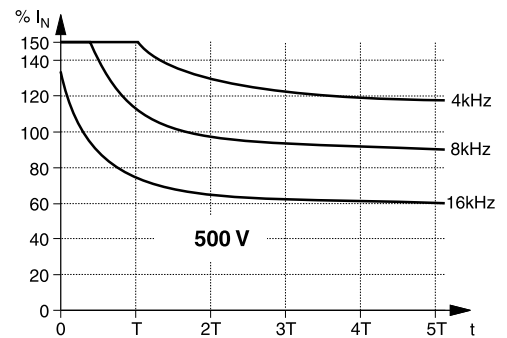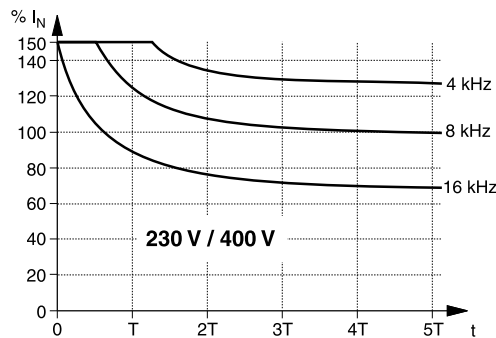
17923211

Overload capacity at 25 °C
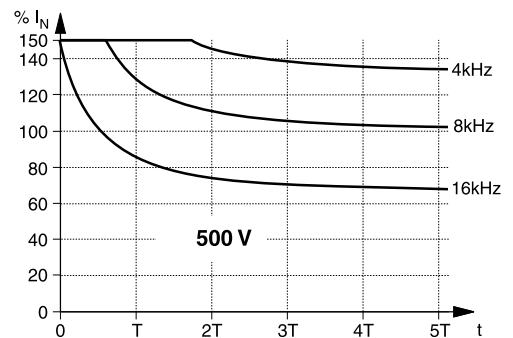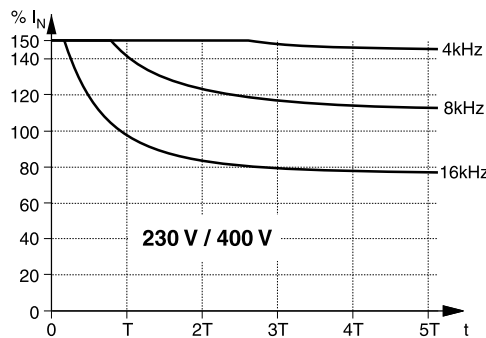
17926283

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

4.7 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 % nominal 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.

INFORMATION

The output frequency of the inverter is comprised of the rotational frequency (speed) and the slip frequency.

Guaranteed continuous currents depending on the output frequency:
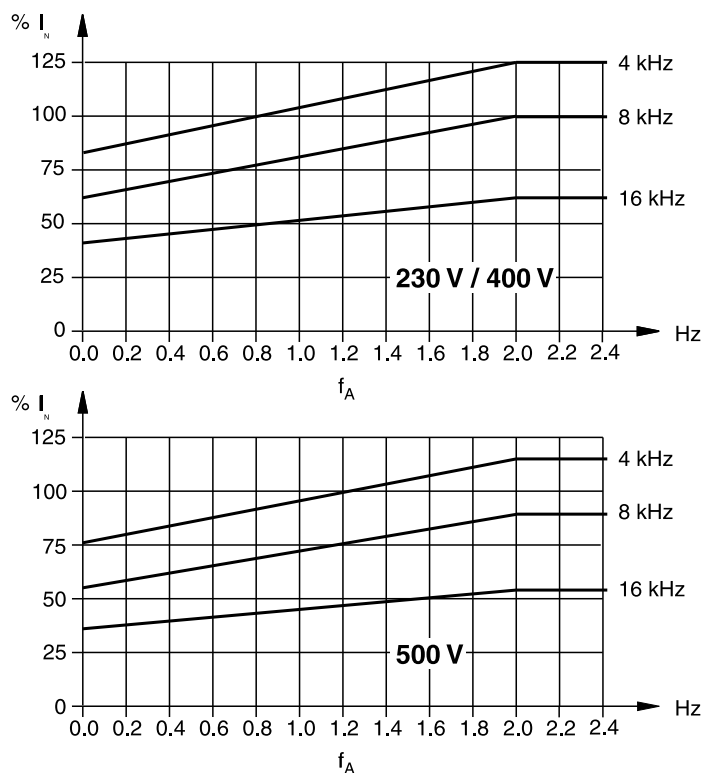
9007199272671371

4.8 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.

4.9   Braking resistor selection

⚠ 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_N.

Risk of burns and fire.

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

INFORMATION

- The data applies to BW.., BW..-T and BW..-P braking resistors.
- For BW.., BW..-T and BW..-P braking resistors, plan for a load derating of 4% per 10 K from an ambient temperature of 45 °C. Do not exceed a maximum ambient temperature of 80 °C.
- The overload factor of the BW..-T and BW..-P braking resistors is limited by using an integrated temperature relay:
  - BW..-T up to overload factor 12
  - BW..-P up to overload factor 40
- The **maximum permitted line length** between **MOVITRAC®** B 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 breaking 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 in Ω	Peak braking power in 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

4.9.1 Load capacity of PTC braking resistors

The following diagram shows the load capacity of braking resistors BW1 – BW4 per braking operation:
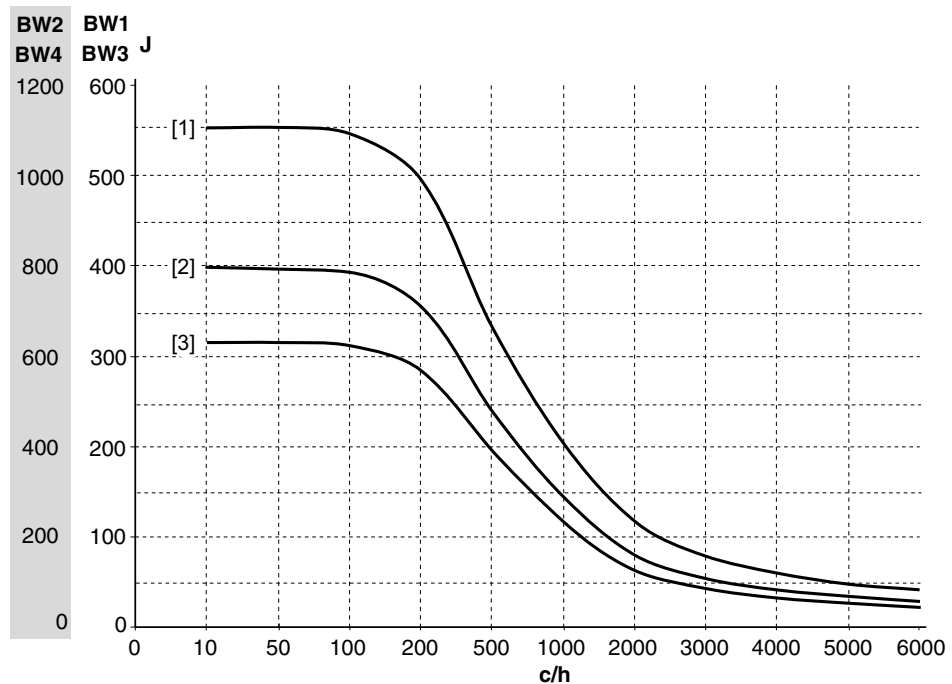
9007199346699275

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

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 of 2 s 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/BW4.

4.9.2 Load capacity flat design, wire resistors, grid resistors

In braking operations within the cycle duration T_D (standard: $T_D \leq 120$ 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 the 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:
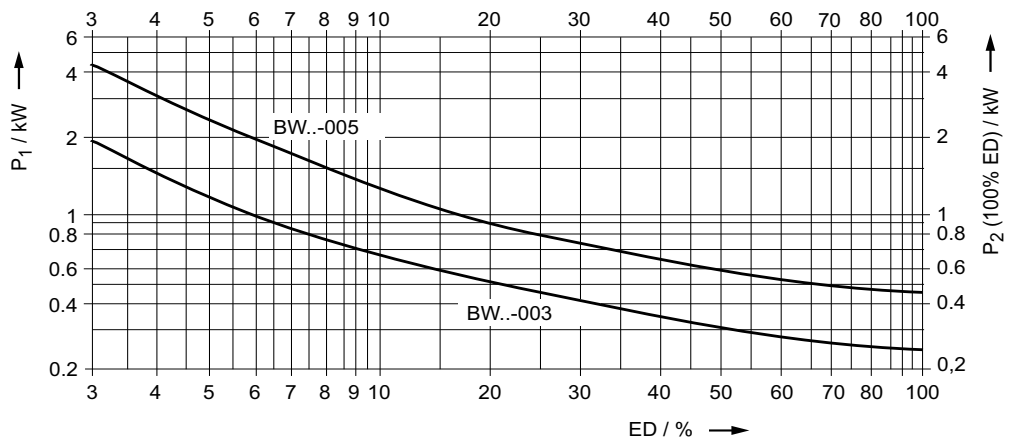
27021597856728715

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:
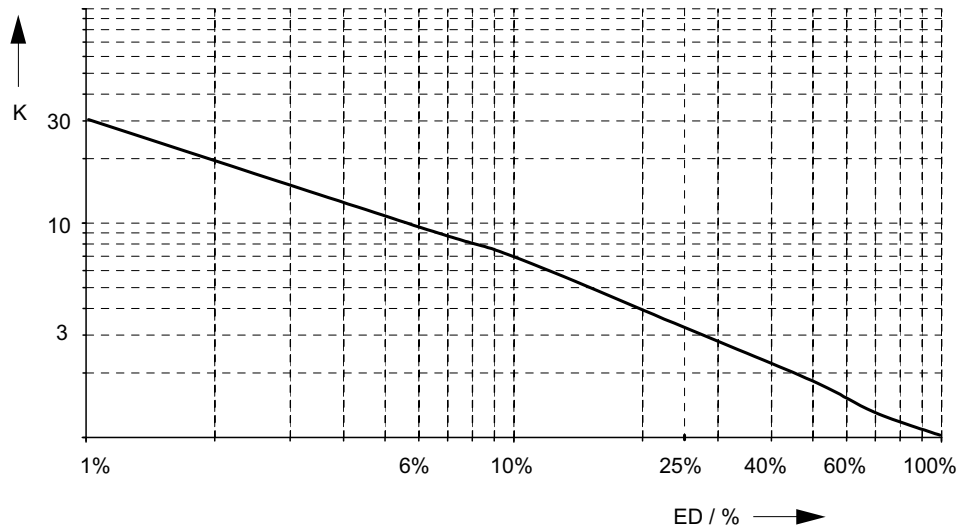
9007199347248267

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:
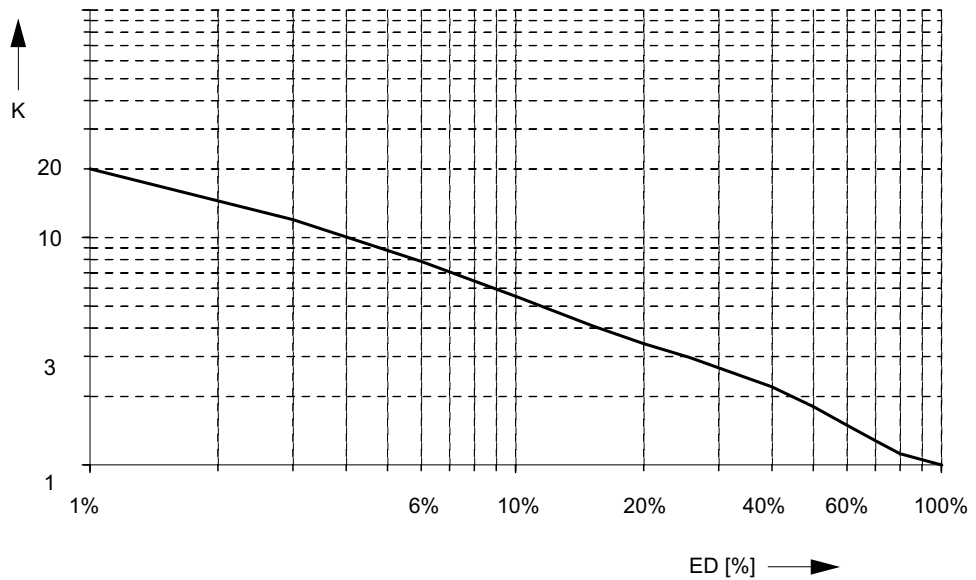
9007199347249803

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)** (see peak braking power table).
- Select the appropriate braking resistor from the assignment tables with the following points:
  - Maximum braking resistance value
  - MOVITRAC® B unit used

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

4.10 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.

i

INFORMATION

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

4.10.1 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

4.10.2 Activating the brake

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 MOVITOOLS® MotionStudio sets the brake parameters for the 2 and 4-pole motors from SEW-EURODRIVE. The brake parameters (*P73_*) must be set manually when using SEW-EURODRIVE motors with a higher number of poles and non-SEW motors.

4.10.3 Brake parameters

i

INFORMATION

The brake parameters are adapted to the brake activation arrangement shown in the wiring diagram. If the values set for the brake release and application times are too short, e.g. for long response times in the brake control system, hoists, for example, may sag.

4.11 Mains and motor connection

4.11.1 Permitted voltage supply systems

- **INFORMATION**

  – **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**

  For systems with non-grounded star point (IT systems), SEW-EURODRIVE recommends to earth-leakage monitor according to the PCM principle (pulse-code measurement). Using such devices prevents the earth-leakage monitor mis-tripping due to the ground capacitance of the inverter.

  – **Supply systems grounded via an outer conductor**

  Only operate the inverters on supply systems with a maximum line-to-ground voltage of AC 300 V.

4.11.2 Line contactors and line fuses

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

  Mains activations

- Ensure a minimum time of 120 s between two mains activations for AC 230 V / 1-phase units.
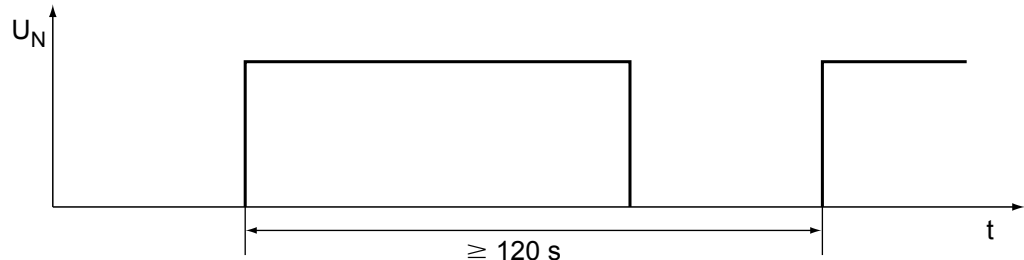
91421067

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

- Do not turn the supply system on or off more than once per minute.
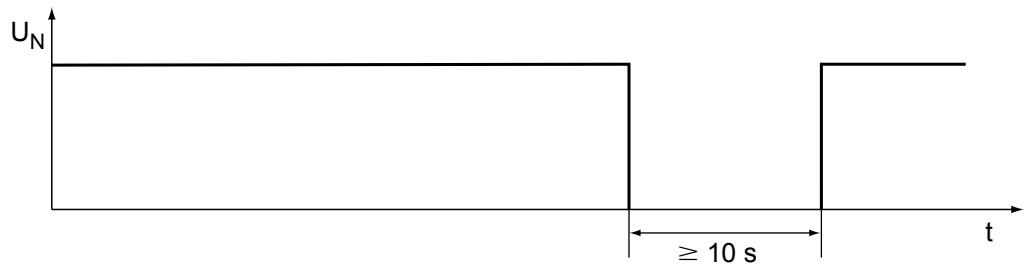
91425163

INFORMATION

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/stop
  – CCW/stop

Input fuses

Fuse types:

- Line protection types in operation classes gL, gG:
  – Nominal fusing voltage ≥ nominal line voltage
  – Nominal fusing current must be designed for at least 100 % or 125 % of the nominal inverter current depending on the inverter utilization.

- Power circuit breaker with characteristics B, C:
  – Nominal circuit breaker voltage ≥ nominal line voltage
  – Rated power circuit breaker currents must be 10 % above the rated inverter current.

4.11.3 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 1-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 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.

Smallest bending space (EN 61800-5-1)

As stipulated in EN 61800-5-1, the distance between a power connection terminal and an obstruction toward which the wire is directed on leaving the terminal must correspond with the minimum values given in the table below.

Cable cross section in mm^2	Smallest wire bending space in mm		
	Wires per connection terminal		
	1	2	3
10 – 16	40	–	–
25	50	–	–
35	65	–	–
50	125	125	180
70	150	150	190
95	180	180	205
120	205	205	230
150	255	255	280
185	305	305	330

Recommendation for standard installation, SI units

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		
	Supply system lead	1.5 mm^2				4 mm^2		
	PE conductor	2 × 1.5 mm^2				2 × 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 2 minutes between turning the unit off and on again: B16

2) If there has been a pause of at least 2 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		
	Supply system lead	1.5 mm^2				4 mm^2		
	PE conductor	2 × 1.5 mm^2				2 × 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						

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
Supply system cable L1/L2/L3	4 mm²	4 mm²	6 mm²	10 mm²	16 mm²	25 mm²	35 mm²
PE conductor	2 × 4 mm² 1 × 10 mm²	2 × 4 mm² 1 × 10 mm²	2 × 6 mm² 1 × 10 mm²	1 × 10 mm²	1 × 16 mm²	1 × 16 mm²	1 × 16 mm²
Motor cable U/V/W	4 mm²	4 mm²	6 mm²	10 mm²	16 mm²	25 mm²	35 mm²
Unit terminal cross section of the power section	Separable terminal strip 4 mm² conductor end sleeve DIN 46228	M4 screw and washer assembly with terminal clip 4 mm² conductor end sleeve DIN 46228 6 mm² crimp cable lug DIN 46234		M6 screw and washer assembly with washer max. 25 mm² Crimp cable lug DIN 46234		M10 bolt with nut max. 70 mm² Press cable lug DIN 46235	

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
	Supply system lead	1.5 mm²									1.5 mm²	1.5 mm²
	PE conductor	2 × 1.5 mm²					2 × 1.5 mm² 1 × 10 mm²				2 × 1.5 mm² 1 × 10 mm²	2 × 1.5 mm² 1 × 10 mm²
Motor cable		1.5 mm²									1.5 mm²	2.5 mm²
Unit terminal cross section of the power section		Terminal blocks 4 mm² conductor end sleeves DIN 46228									M4 screw with washer assembly with terminal clip 4 mm² 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
	Supply system lead	4 mm²	6 mm²	10 mm²	16 mm²
	PE conductor	2 × 4 mm² 1 × 10 mm²	2 × 6 mm² 1 × 10 mm²	1 × 10 mm²	1 × 16 mm²
Motor cable		4 mm²	6 mm²	10 mm²	16 mm²
Unit terminal cross section of the power section		M4 screw with washer assembly with terminal clip 4 mm² conductor end sleeve DIN 46228 6 mm² crimp cable lug DIN 46234	M6 screw and washer assembly with washer max. 25 mm² 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
	Supply system lead	25 mm²	35 mm²	35 mm²	50 mm²
	PE conductor	1 × 16 mm²			25 mm²
Motor cable		25 mm²	35 mm²	35 mm²	50 mm²
Unit terminal cross section of the power section		Stud: M10 with nut max. 70 mm² 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		
	Supply system lead	AWG16				AWG12		
	PE conductor	2 × AWG16				2 × 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 2 minutes between turning the unit off and on again: B16

2) If there has been a pause of at least 2 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	
	Supply system lead	AWG16				AWG12		
	PE conductor	2 × AWG16				2 × 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
Supply system 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						10 A			15 A
Supply system 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	
Supply system cable L1/L2/L3	AWG12	AWG10	AWG8	AWG6	AWG4	
PE conductor	AWG12	AWG10	AWG10		AWG8	
Motor cable U/V/W	AWG12	AWG10	AWG8	AWG6	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	0370	0450	0550	0750
Size	4		5	
Fuses F11/F12/F13 I_N	90 A	110 A	150 A	175 A
Supply system cable L1/L2/L3	AWG4	AWG3	AWG1	AWG2/0
PE conductor	AWG8	AWG6	AWG6	AWG6
Motor cable U/V/W	AWG4	AWG3	AWG1	AWG2/0
Unit terminal cross section of the power section	M10 bolt with nut Max. AWG2/0 crimp cable lug			

4.11.4 Motor cable length

The maximum motor cable length depends on:

• Cable type

• Voltage drop in the cable

• Set PWM frequency.

• Using an 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 Size		Permitted maximum motor cable length in m (ft)			
		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 (2640	50 (160)	450 (1480)	600 (1970)

1) Standard setting

i

INFORMATION

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

4.11.5 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 V / V with length = 100 m (328 ft) and ϑ = 70 °C															
1.5 mm²	5.3	8	10.6	13.3	17.3	21.3	1)	1)	1)	1)	1)	1)	1)	1)	1)	1)
2.5 mm²	3.2	4.8	6.4	8.1	10.4	12.8	16	1)	1)	1)	1)	1)	1)	1)	1)	1)
4 mm²	1.9	2.8	3.8	4.7	6.5	8.0	10	12.5	1)	1)	1)	1)	1)	1)	1)	1)
6 mm²				4.4	5.3	6.4	8.3	9.9	1)	1)	1)	1)	1)	1)	1)	1)
10 mm²					3.2	4.0	5.0	6.0	8.2	10.2	1)	1)	1)	1)	1)	1)
16 mm²							3.3	3.9	5.2	6.5	7.9	10.0	1)	1)	1)	
25 mm²								2.5	3.3	4.1	5.1	6.4	8.0	1)	1)	
35 mm²										2.9	3.6	4.6	5.7	7.2	8.6	
50 mm²														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 V / V with length = 100 m (328 ft) and ϑ = 70 °C															
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_{line} = AC 460 V.

4.12 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".

> ⚠ **WARNING**
>
> Switching between drives cause current peaks.
>
> Potential damage to property or disconnection with error *F01 overcurrent*.
>
> • Only switch the frequency inverter output when the output stage is inhibited.

4.12.1 Motor currents

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

4.12.2 Motor cable

You can calculate the permitted total length of all motor leads 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

4.12.3 Motor size

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

4.12.4 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.

4.13   Line chokes

Using line chokes is optional in the following instances:

- To support overvoltage protection

- To smoothen the line current, to reduce harmonics

- Protection in the event of distorted line voltage

- The line choke limits the charging current when several inverters are connected together in parallel on the input end with a shared mains contactor.

  (Nominal current of the line choke = sum of the inverter currents)

4.13.1   1-phase inverter

Use is required under the following circumstances:

- Mains inductances < 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 of the supply system current harmonics

- To support overvoltage protection

Connecting several single-phase inverters on one three-phase line choke

Prerequisites for connecting several 1-phase inverters to one 3-phase line choke:

- The mains contactor must be designed for the total current.

- The fuse must correspond to the rated current of the line choke.

- The symmetric connection of the MOVITRAC® B to line choke.

4.13.2   3-phase inverter

Using line chokes is required when operating more than 5 inverters that are switched on simultaneously. The line choke limits overvoltages caused by the switching.

Use is optional for supporting overvoltage protection.

4.14   Electromagnetic compatibility EMC

MOVITRAC® B frequency inverters are components of machines and systems. They comply with the EMC product standard EN 618003 **Variable-speed electrical drives**. If you want to equip the machine/system with frequency inverters compliant with the EMC directive 2004/108/EC: Adhere to the notes on EMC compliant installation.

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

4.14.1   Interference immunity

MOVITRAC® B meets the minimum requirements stipulated in EN 618003 with regard to interference immunity.

4.14.2   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 the industrial and private sphere. 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 side	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 side	Output end
C2	No additional filtering required	Output choke HD012 / HD100 / HD101 or shielded motor cable, or HF output filter
C1	NF line filter	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 side	Output end
C2	No additional filter required.	HD output choke, or shielded motor cable, or HF output filter
C1	NF line filter	HD output choke or shielded motor cable

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

4.14.3 Connection

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

4.14.4 IT systems

INFORMATION

- No EMC limits are specified for interference emission in voltage supply systems without a grounded 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.

4.14.5 Inverter-related earth leakage current

Earth-leakage currents ≥ 3.5 mA can 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 chapter "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.).

4.15 HF output filters

4.15.1 Important notes

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.

4.15.2 Installation, connection and operation

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INFORMATION

- 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.

4.15.3 V_{DClink} connection

Operation without $V_{DC\,link}$ connection:

- Approved only for PWM frequency 4 kHz or 8 kHz.
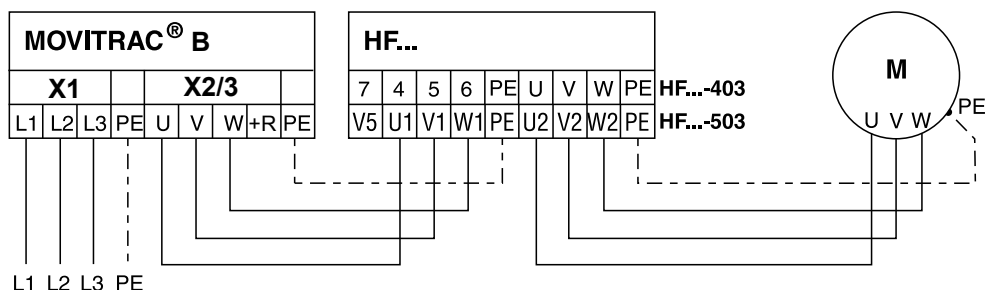
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Operation with $V_{DC\,link}$ connection

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

INFORMATION

- 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 $V_{line} \leq$ AC 400 V, not if $V_{line} =$ 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.
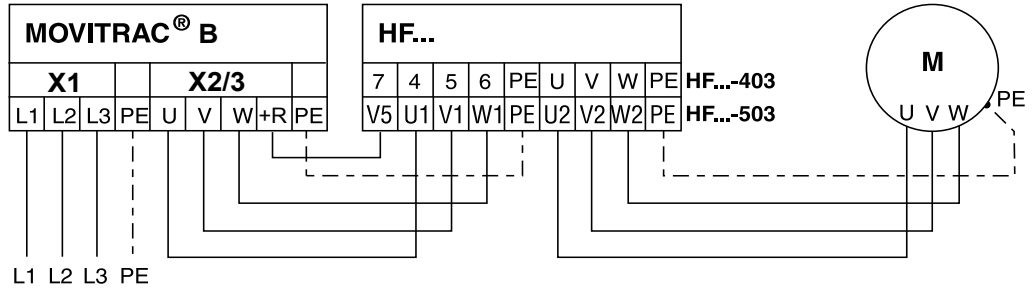
f_{PWM}	V_{line} = 3 × AC 230 V	V_{line} = 3 × AC 400 V	V_{line} = 3 × AC 500 V
12 kHz	4 %	12 %	15 %
16 kHz	3 %	8 %	12 %

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.
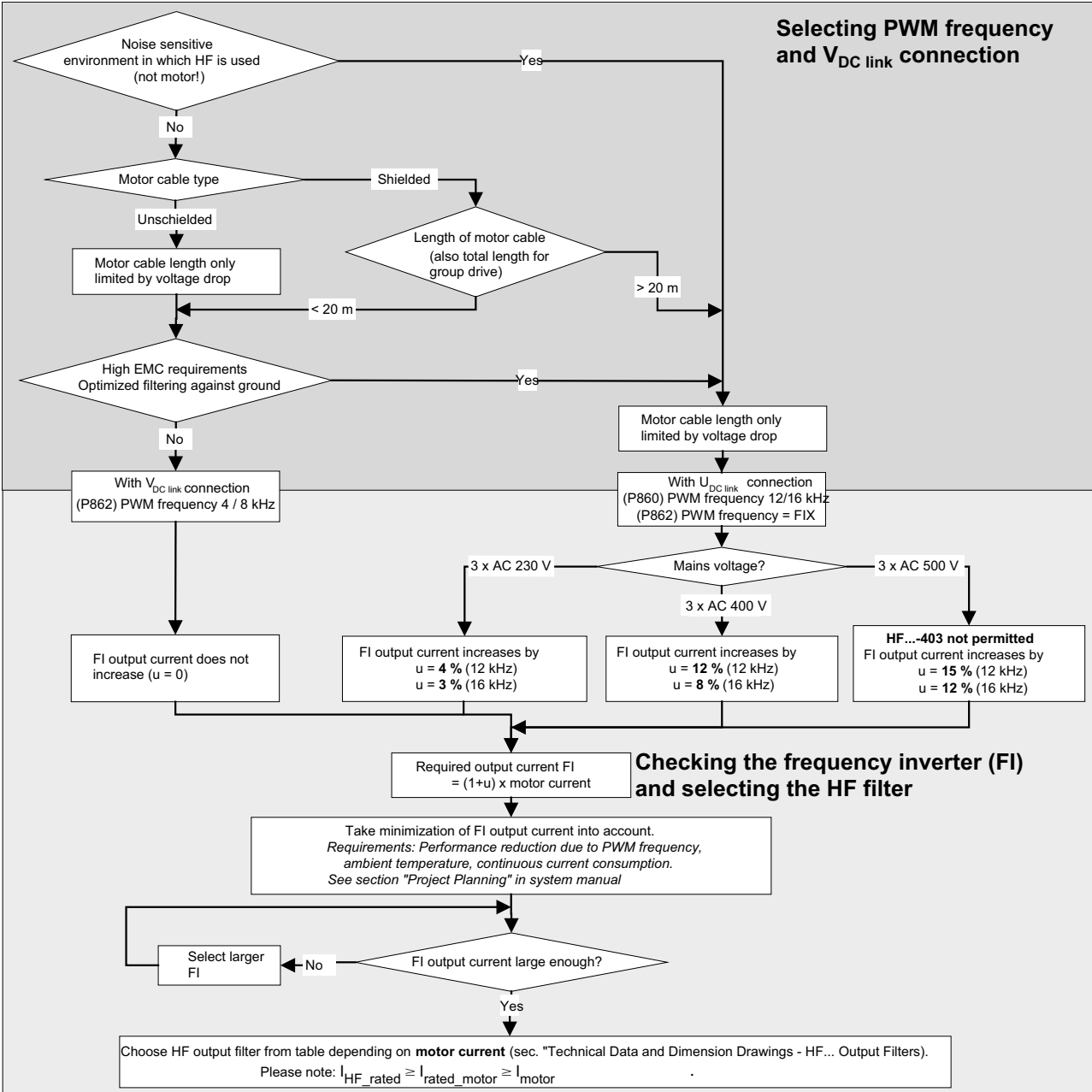

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INFORMATION

- No $V_{DC\ link}$ connection is permitted for size 0XS units.
- HF180-403 does not allow for $V_{DC\ link}$ connection.

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

Selecting PWM frequency and $V_{DC\ link}$ connection

- Noise sensitive environment in which HF is used (not motor!)
  - No
  - Yes →
- Motor cable type
  - Unshielded
  - Shielded →
    - Length of motor cable (also total length for group drive)
      - < 20 m
      - > 20 m
- Motor cable length only limited by voltage drop
- High EMC requirements Optimized filtering against ground
  - No
  - Yes →
- Motor cable length only limited by voltage drop
- With $V_{DC\ link}$ connection (P862) PWM frequency 4 / 8 kHz
- With $U_{DC\ link}$ connection (P860) PWM frequency 12/16 kHz (P862) PWM frequency = FIX
  - Mains voltage?
    - 3 x AC 230 V
    - 3 x AC 400 V
    - 3 x AC 500 V

- FI output current does not increase (u = 0)
- FI output current increases by u = **4 %** (12 kHz) u = **3 %** (16 kHz)
- FI output current increases by u = **12 %** (12 kHz) u = **8 %** (16 kHz)
- **HF...-403 not permitted** FI output current increases by u = **15 %** (12 kHz) u = **12 %** (16 kHz)

Checking the frequency inverter (FI) and selecting the HF filter

- Required output current FI = (1+u) x motor current
- Take minimization of FI output current into account. *Requirements: Performance reduction due to PWM frequency, ambient temperature, continuous current consumption. See section "Project Planning" in system manual*
- FI output current large enough?
  - No → Select larger FI
  - Yes
- Choose HF output filter from table depending on **motor current** (sec. "Technical Data and Dimension Drawings - HF... Output Filters). Please note: $I_{HF\_rated} \geq I_{rated\_motor} \geq I_{motor}$.

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4.16 Electronics cables and signal generation

4.16.1 Cable type

The electronic terminals are suitable for:

- Cross sections up to 1.5 mm^2 (AWG16) without conductor end sleeves
- Cross sections up to 1.0 mm^2 (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.

4.16.2 0 V cables

Never connect 0V cables GND. 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 mm^2 (AWG17) cross section from a central point to each individual unit by the shortest possible route.

4.16.3 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-proof electronic contacts. The relays must be suitable for switching low voltages and currents (5 – 30 V, 0.1 – 20 mA).

4.17 External voltage supply DC 24 V

The internal voltage supply is sufficient for the basic unit and binary output up to 200 mA (DO02: 150 mA; DO03: 50 mA). FBG11B, FSC11B / 12B and FSE24B with options DBG60B, USB11A or UWS21A / 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 and 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.

The MC07B...-S0 unit type must always be supplied with external voltage.

DC 24 V power demand of MOVITRAC® B:

Size	Power demand basic unit[1]	DBG60B	FIO11B / FIO21B	Fieldbus option[2][3]	DHP11B[3]	DHE21B / DHE41B	FSE24B
Size 0 MC07B..-00	5 W	1 W	2 W	3 W	4.5 W	8.5 W	1.2 W
Size 0 MC07B..-S0[4]	12 W[5]						
1, 2S, 2	17 W[6]						
3	23 W[6]						
4, 5	25 W[6]						

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 also 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.

6) Including current consumption for safe stop (X17)

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INFORMATION

- When using an auxiliary voltage for the backup mode on VIO24, you must ensure that the backup voltage is always applied, or *P808* is disconnected 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.

4.17.1 Sample

MC07B0015-5A3-4-00/DFP21B with options FSC11B & FBG11B. MOVTRAC® B supplies the binary inputs DI01 (CW/Stop) 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 (0.007 HP)

- 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 V x 0.05 A = 1.2 W

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

4.18 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

INFORMATION

A changeover contactor should be provided for each of the 2 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.

4.19 Priority of the operating states and interrelation between control signals

4.19.1 Priority of operating states

The following illustration shows the priority of operating states:
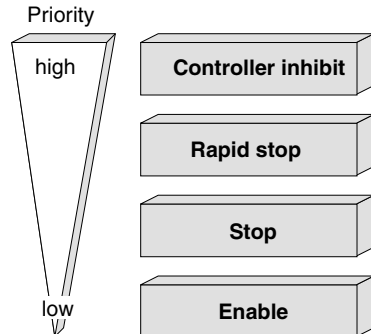
204161163

4.19.2 Interrelation of control signals

The control signals have the following significance:

- Controller inhibit

- Rapid stop

- Stop

They are activated via:

- Binary inputs

- Control word processing bus, if *P101 control source* is set to RS485 or SBus.

- IPOS^plus® control word H484 (LOGODrive units only)

The following table shows the interrelation of control signals. "CW/Stop" 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 state
	Enable/ Rapid stop	CW/stop (DI01)	CCW/stop	
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"

As soon as one of the three processing blocks triggers a control command of higher priority (such as "Rapid stop" or "/Controller.inhibit"), it will become effective.

The binary inputs will generally remain active even if the inverter is controlled via the process data (*P101 control source* = RS485 or SBus). Safety-related functions, such as "/Controller inhibit" and "No enable", will be equally processed by the terminal strip and the fieldbus. For control via fieldbus, the drive inverter must be enable via a terminal for CW or CCW rotation. The terminal CW or CCW does not determine the direction of rotation. The direction is determined by the sign of speed setpoint.

All other functions that can be activated via terminals and the control word or IPOS^plus® control word will be processed with an OR function.

Logic operation of control signals from input terminals and SBus
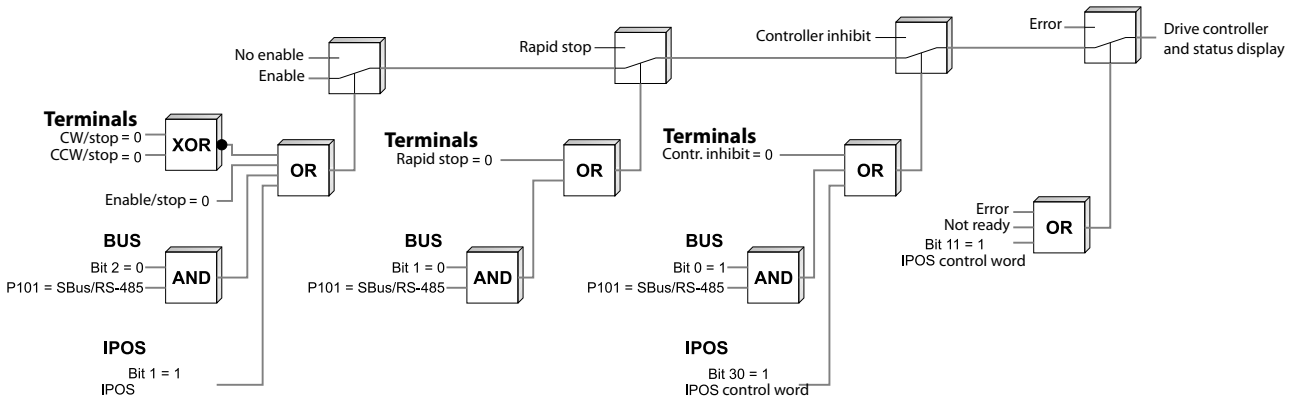
9007199458906251

For safety reasons, the basic control block is defined so that the inverter with the control word setting 0000_{hex} will assume the safe state "no enable" because all commercially available fieldbus master systems will definitely reset the outputs to 0000_{hex} in the event of an error. In this case, the inverter will execute a rapid stop and then activate the mechanical brake.

4.20 PI controller

The illustration below shows the basic structure of PI controller.
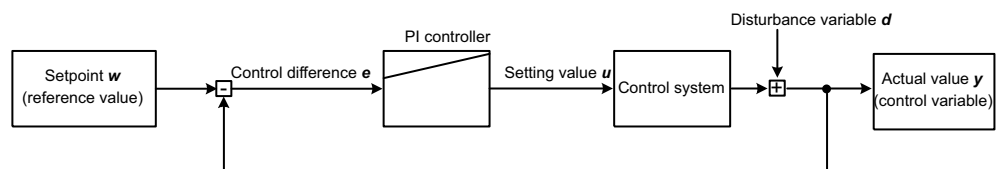
2888583435

Setpoint *w* (reference value):	Parameter *P100 setpoint source*. See chapter "setpoint selection" (page 188).
Correcting variable *u*	Speed
Actual value *y* (control variable)	Feedback via analog input AI1. See chapter "Actual value measuring" (page 189).

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 for implementing the PI controller
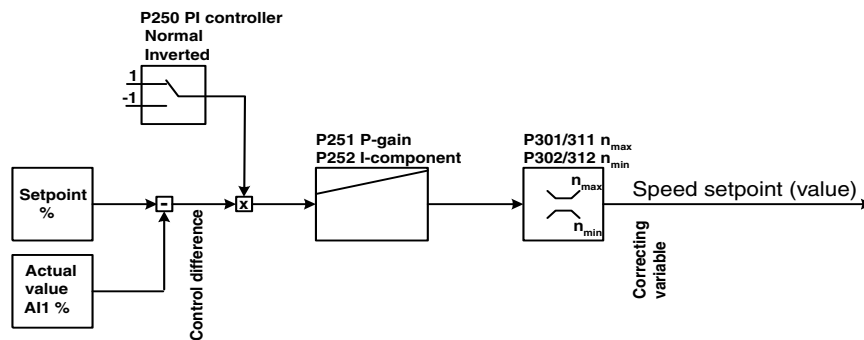
327699339

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 RS485 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 speed 1* and *P302 Maximum speed 1*). The setting of the speed ramp times has no effect when the PI controller is active.

4.20.1 Parameterization

The default settings for the parameters are underlined below.

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.

P250	PI controller	Off
		Normal
		Inverted

Controller parameters

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

P251	P-gain	0 – 1 – 64	Step width:	0.01
P252	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

4.20.2 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 "0" applies as long as no setpoint is selected. The FBG speed control module can be added to the setpoint "0" 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. FIO11B)

  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*.
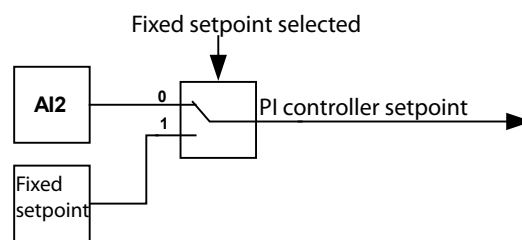
9007199785744523

- **RS485/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 "0".
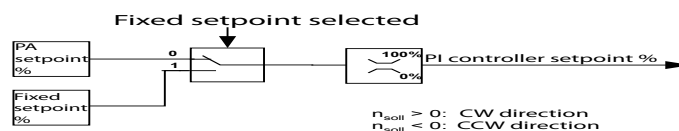
9007199785799563

- **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 "0".

- **Frequency input / fixed setpoint**

Fixed setpoint selected
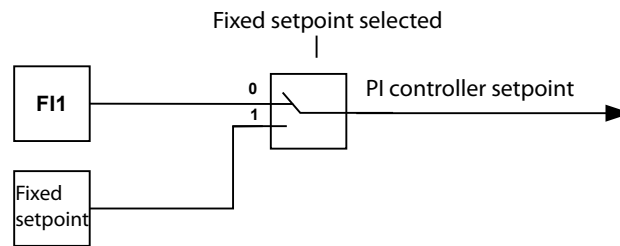
9007199785803403

4.20.3 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 parameter *P116 – P119*):

- 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

4.20.4 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	*Message = "1" if:*	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.

4.20.5 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 CONTROLLER %" and the value of the PO data item "PI CONTROLLER %" act as a setpoint for the PI controller.

4.21 Application examples

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

4.21.1 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 ≥ 3 kΩ.

REF1	1	**X10:**
AI11	2	
AI12	3	
GND	4	

DI00	1	**X12:**
DI01	2	
DI02	3	
DI03	4	
DI04	5	
DI05TF	6	
VOTF	7	
24VIO	8	
GND	9	
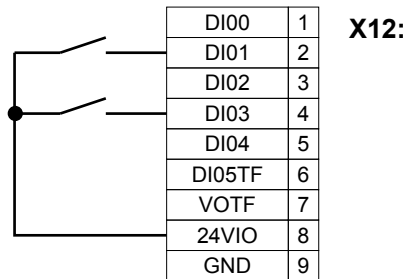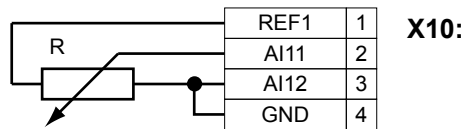
18101643

4.21.2 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*	V_{AI1}	Setpoint speed	Diagram
Bipolar	0 % 100 %	100 % 100 %	0 V 5 V 10 V	n_{min} 50 % n_{max} n_{max}	

Setpoint source	X1 *P116* Y1 *P117*	X2 *P118* Y2 *P119*	V_{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}	

4.21.3 Speed-controlled agitator

In this application, you can control the speed using the FBG speed control module.
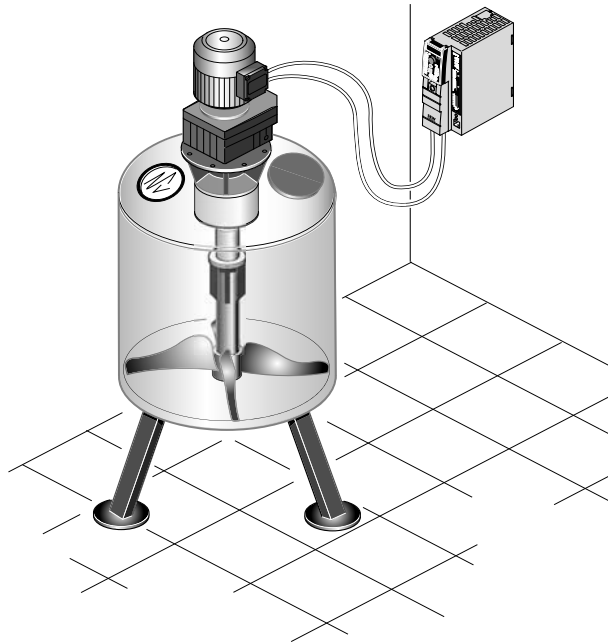
18108811

The keypad is used to control:

- Reset
- Start
- Stop
- Speed control.

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

Parameters　Adapt the following parameters for the agitator:

- *P122 Direction of rotation FBG manual operation*
- Ramp t11 up (adjust with keypad or parameter *P130*)
- Ramp t11 up (adjust via keypad icon or parameter *P131*)
- *P301 Minimum speed 1 / 2*
- *P302 Maximum speed 1 / 2*
- *P860 PWM frequency 1 / 2*

4.21.4 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.
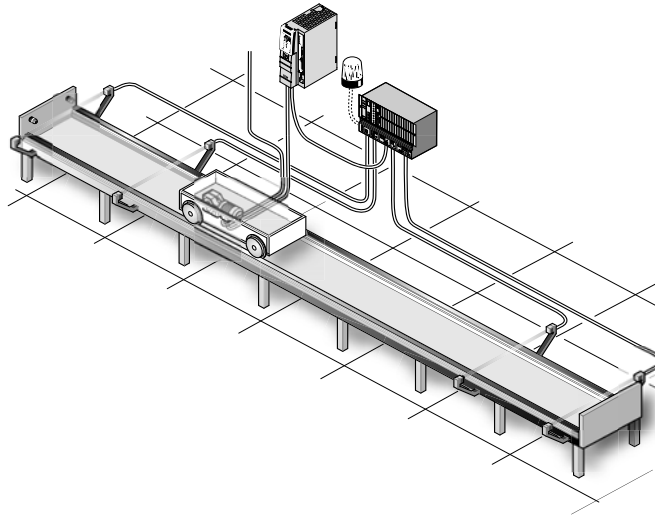
18125835

Terminals

- Rapid speed: DI04 = 1 and DI05 = 1
- Creep 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
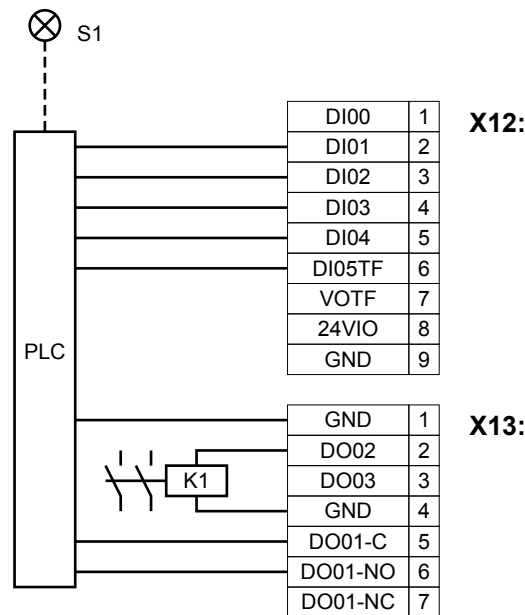
18131467

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
X12:3: Counterclockwise direction of rotation
X12:4: Start/stop
X12:5: Rapid speed

X12:6: Creep speed/rapid speed
X12:8: 24 V
X13:6: no malfunction
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
P602 Binary input DI03: Enabled
P603 Binary input DI04: n11/n21

P604 Binary input DI05: n12/n22
P620 Binary output DO01: Malfunction
P621 Binary output DO02: Brake released

4.21.5 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.
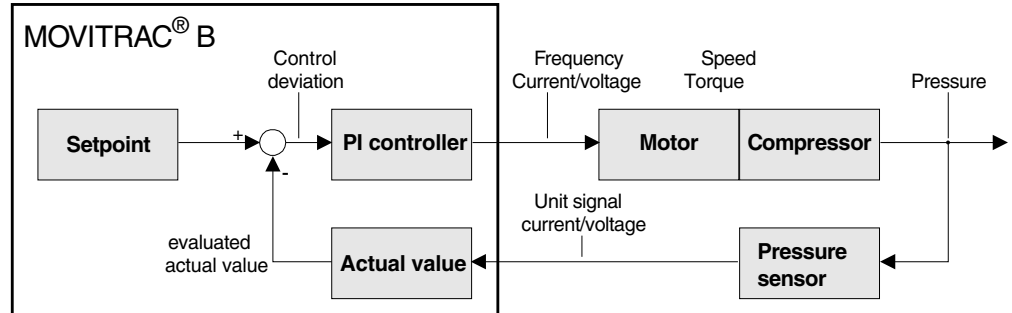
18148235

5 General Information

5.1 Use of this documentation

The documentation is an integral part of the product and contains important information on operation and service. The documentation is written for all employees who install, startup, and service this product.

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

5.2 Structure of the safety notes

5.2.1 Meaning of the signal words

The following table shows the grading and meaning of the signal words for safety notes, notes on potential risks of damage to property, and other notes.

Signal word	Meaning	Consequences if disregarded
⚠ DANGER	Imminent danger	Severe or fatal injuries
⚠ WARNING	Possible dangerous situation	Severe or fatal injuries
⚠ CAUTION	Possible dangerous situation	Minor injuries
NOTICE	Possible damage to property	Damage to the drive system or its environment
INFORMATION	Useful information or tip: Simplifies the handling of the drive system.	–

5.2.2 Structure of the section-related safety notes

Section safety notes do not apply to a specific action, but to several actions pertaining to one subject. The used symbols indicate either a general or a specific hazard.

This is the formal structure of a section safety note:

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

5.2.3 Structure of the embedded safety notes

Embedded safety notes are directly integrated in the instructions just before the description of the dangerous action.

This is the formal structure of an embedded safety note:

• ⚠ **SIGNAL WORD** Nature and source of hazard.

Possible consequence(s) if disregarded.

– Measure(s) to prevent the danger.

5.3 Rights to claim under limited warranty

A requirement of fault-free operation and fulfillment of any rights to claim under limited warranty is that you adhere to the information in the MOVITRAC® B documentation. Read the documentation before you start working with the unit!

5.4 Exclusion of liability

You must comply with the information contained in the MOVITRAC® B documentation to ensure safe operation of MOVITRAC® B and to achieve the specified product characteristics and performance requirements. SEW-EURODRIVE assumes no liability for injury to persons or damage to equipment or property resulting from non-observance of the documentation. In such cases, any liability for defects is excluded.

5.5 Copyright notice

5.6 Product names and trademarks

The brands and product names contained within this publication are trademarks or registered trademarks of the titleholders.

6   Safety Notes

The following basic safety notes must be read carefully to prevent injury to persons and damage to property. The operator must ensure that the basic safety notes are read and adhered to. Make sure that persons responsible for the plant and its operation, as well as persons who work independently on the 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-EURO-DRIVE.

6.1   Preliminary information

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

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

6.2   General information

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 observance 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.
- Submit a complaint to the shipping company immediately in the event of damage.

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.

6.3 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 must only be carried out by persons who are trained appropriately.

6.4 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 Directive 2006/42/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.

6.4.1 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.

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

- MOVITRAC® B / functional safety

This documentation is available via "Documentation \ Software \ CAD" on the **SEW-EU-RODRIVE web site**.

6.4.2 Content of this publication

This publication contains conditions and amendments related to MOVITRAC® B in safety-oriented applications.

The system comprises a frequency inverter with asynchronous motor and safety-tested external disconnecting device.

6.5 Applicable documentation

This document supplements the MOVITRAC® B operating instructions and limits the application notes according to the following information.

It can only be used in conjunction with the following publications:

- MOVITRAC® B compact operating instructions
- MOVITRAC® B communication manual
- The respective manual of the used option card

6.6 Transport / storage

Inspect the shipment for any damage that may have occurred in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup. Observe the climate conditions according to chapter "General technical data (page 16)".

6.7 Installation

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.

6.8 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.

6.9 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.

6.10   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 housings 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 supply system 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.

6.11   Unit temperature

MOVITRAC$^®$ B frequency inverters are usually operated with braking resistors. The braking resistors are usually installed on the control cabinet.

The braking resistors can reach a surface temperature of significantly more than 70 °C.

Never touch the braking resistors during operation or in the cool down phase once the unit has been switched off.

7 Unit Structure

7.1 Size 0XS / 0S / 0L
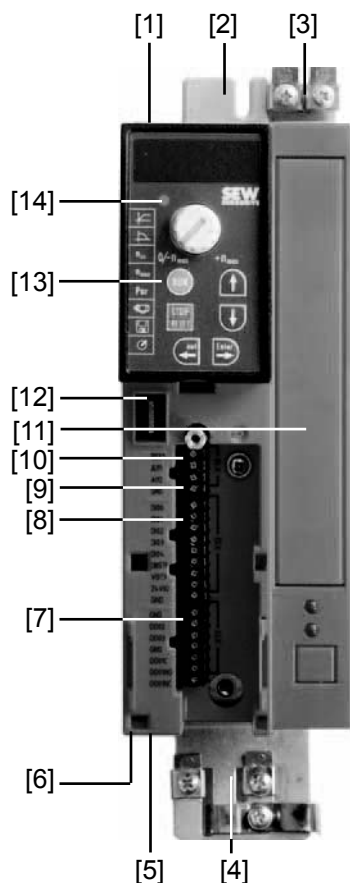
9007199279301643

[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 switchover analog input (with size 0XS and 0S behind the removal connector)

[11] Option card slot (cannot be retrofitted / not for BG0XS)

[12] Connection for optional communication / analog module

[13] Optional keypad, inserted

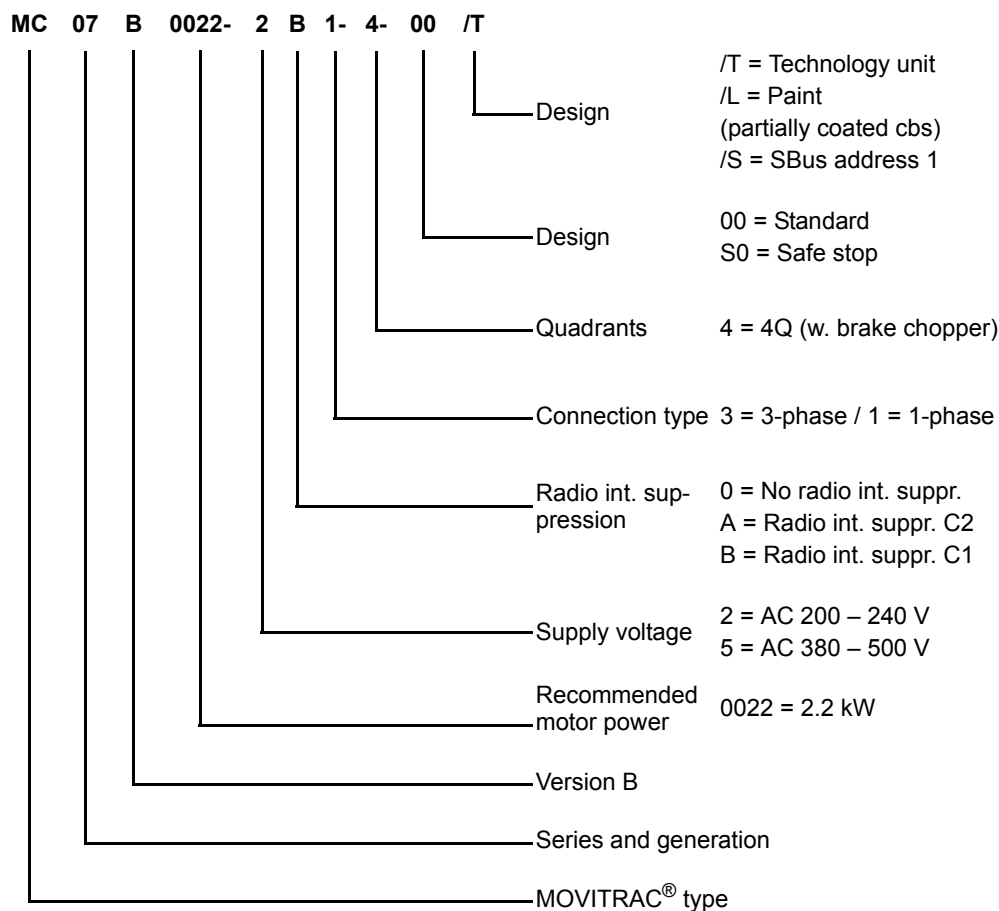[14] Status LED (visible without optional keypad)

7.2 Size 1 / 2S / 2
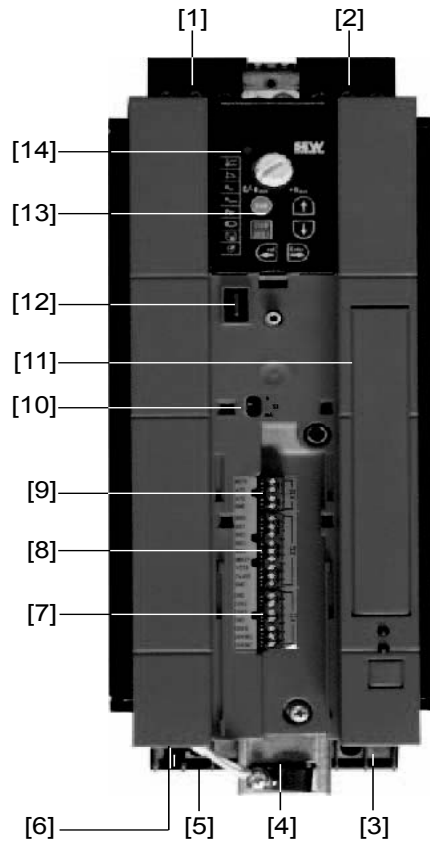
9007199346901259

[1]   X1: Power supply connection 3-phase: L1 / L2 / L3 / PE screw
[2]   X4: Connection for DC link coupling $-U_Z$ $+U_Z$
[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]   Space for option card (cannot be retrofitted)
[12]   Connection for optional communication / analog module
[13]   Optional keypad, inserted
[14]   Status LED (visible without optional keypad)

7.3   Size 3
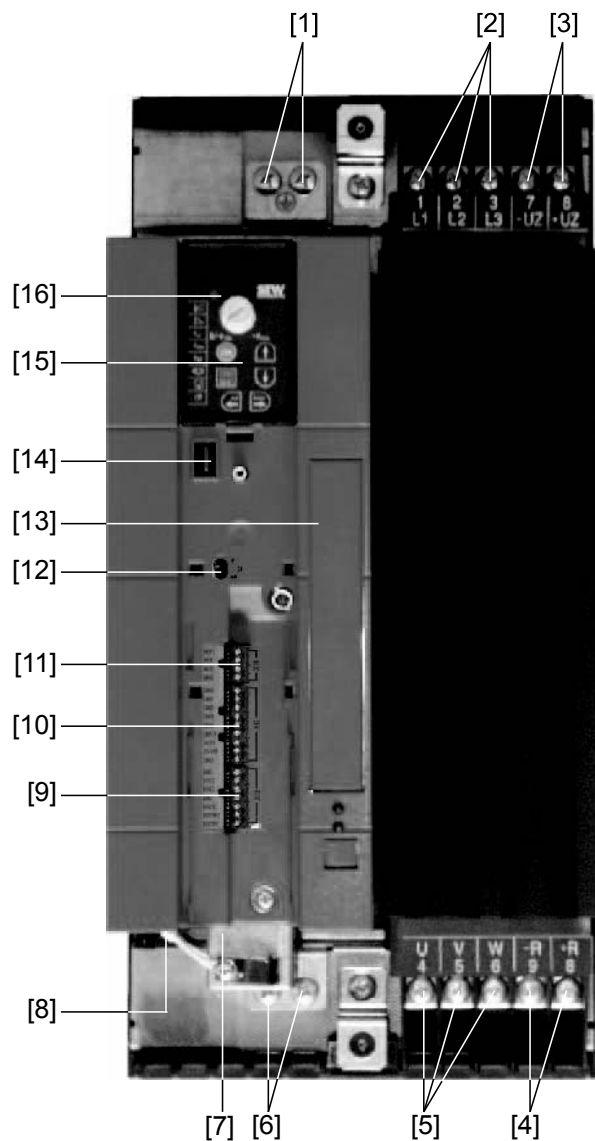
9007199346833675

[1]   X2: PE connection

[2]   X1: Power supply connection 3-phase: 1/L1 / 2/L2 / 3/L3

[3]   X4: Connection for DC link coupling $-U_Z$ $+U_Z$

[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]   Space for option card (cannot be retrofitted)

[14]   Connection for optional communication / analog module

[15]   Optional keypad, inserted

[16]   Status LED (visible without optional keypad)

7.4   Sizes 4 / 5
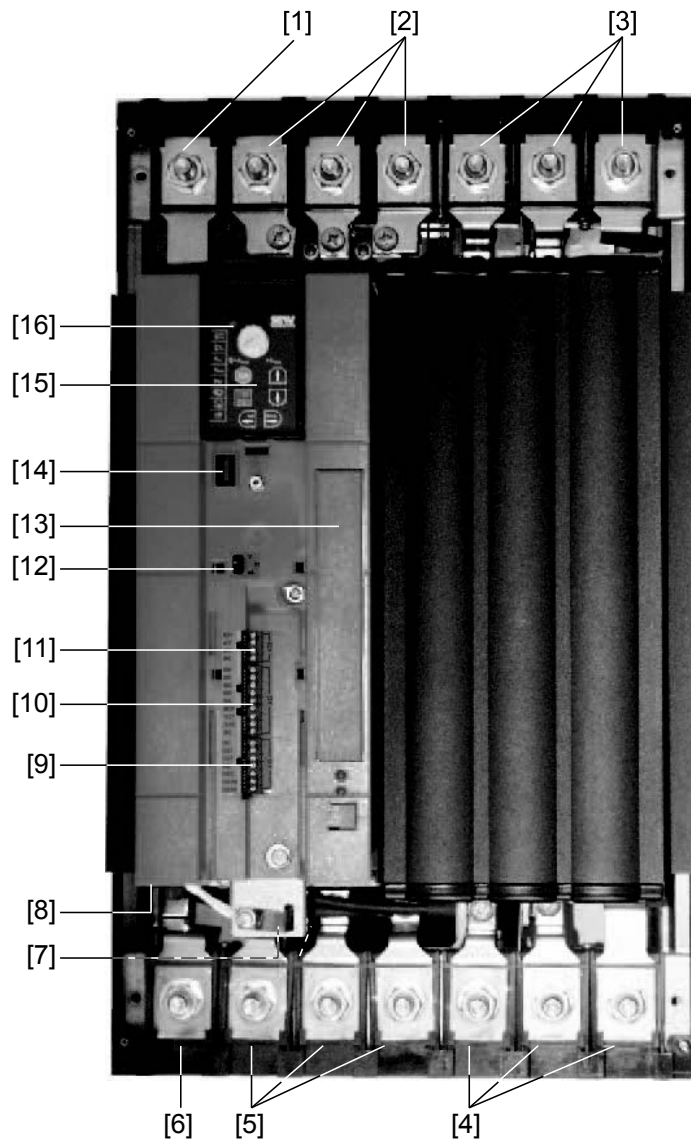
9007199346827019

[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]   Space for option card (cannot be retrofitted)
[14]   Connection for optional communication / analog module
[15]   Optional keypad, inserted
[16]   Status LED (visible without optional keypad)

7.5 Type designation

The following diagram shows a type designation:

MC 07 B 0022- 2 B 1- 4- 00 /T

Field	Description	Values
Design		/T = Technology unit /L = Paint (partially coated cbs) /S = SBus address 1
Design		00 = Standard S0 = Safe stop
Quadrants		4 = 4Q (w. brake chopper)
Connection type		3 = 3-phase / 1 = 1-phase
Radio int. suppression		0 = No radio int. suppr. A = Radio int. suppr. C2 B = Radio int. suppr. C1
Supply voltage		2 = AC 200 – 240 V 5 = AC 380 – 500 V
Recommended motor power		0022 = 2.2 kW
Version B		
Series and generation		
MOVITRAC® type		

7.6 Nameplate

The following figure shows a nameplate:

3185547659

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

The unit status is indicated above the lower barcode. It documents the hardware and software states of the unit.

8 Installation

⚠ DANGER

The surface temperatures of the heat sinks can exceed 70 °C.

Danger of burns.

• Do not touch the heat sink.

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 Attaching the front modules

Attach the front modules as follows:

FIO 11B
FIO 21B
FSC 11B
FSC 12B
FSE 24B
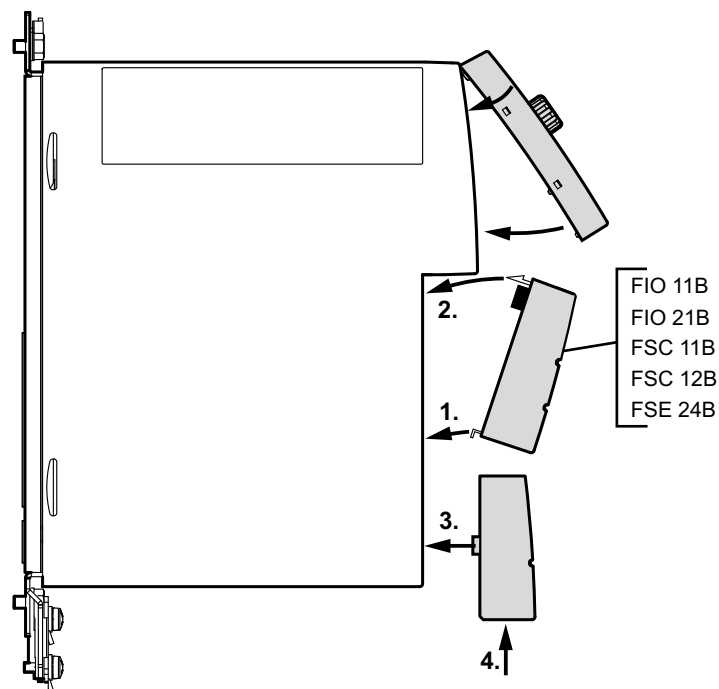
3889591435

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.
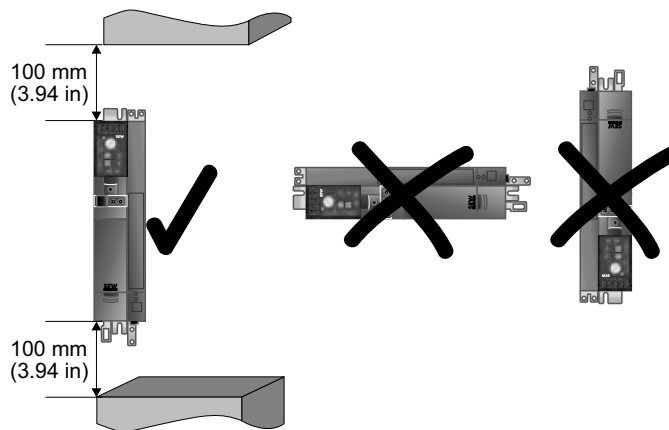
648722187

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.
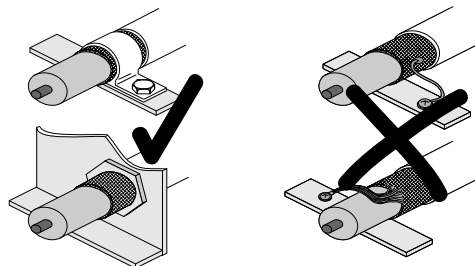
9007199272247947

- 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).

INFORMATION

- MOVITRAC® B is a product with restricted availability in accordance with EN 61800-3. It may cause EMC interference. In this case, it is recommended for the operator to take suitable measures.
- For detailed information on EMC compliant installation, refer to the SEW publication "Drive Engineering – Practical Implementation, Electromagnetic Compatibility in Drive Engineering".

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) (page 227)).

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

- Supply system lead: Cross section according to rated input current I_{mains} at rated load

    Motor lead: Cross section according to rated output current I_N

    Electronics cables: Max. 1.5 mm^2 (AWG16) without conductor end sleeves[1]

    Maximum 1.0 mm^2 (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 chapter "Project planning".

8.2.9 Unit output

- Only connect ohmic/inductive load (motor).

---

[1] Never mount finely stranded cables without conductor end sleeves.

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.

- 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 Braking resistor installation

- 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_N. 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.
>
> • 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:
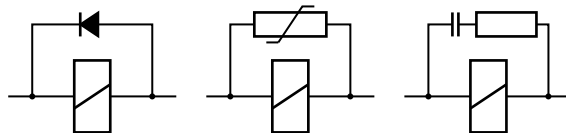
644450187

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

8.2.15 Line filters

Up to 11 kW, MOVITRAC® B frequency inverters have an integrated line filter as standard. They comply with the following limit value class to EN 61800-3 on the line side without further measures:

• 1-phase connection: C1 cable conducted

• 3-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 RCDs. However, if an earth-leakage circuit breaker is stipulated for direct or indirect protection against contact, observe the following:

• ⚠ **WARNING** Wrong type of earth-leakage circuit breaker installed.

Severe or fatal injuries

– MOVITRAC® can cause direct current in the PE conductor. If a residual current device (RCD) or a residual current monitoring device (RCM) is used for protection in the event of a direct or indirect contact, only a type B RCD or RCM is permitted on the supply end of the MOVITRAC®.

8.2.17 PE line connection according to EN 61800-5-1

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

- Supply system lead < 10 mm^2:
  - Route a second PE conductor with the same cross section as the supply system lead in parallel to the protective earth via separate terminals, or
  - use a copper protective earth conductor with a cross section of 10 mm^2
- Supply system cable 10 – 16 mm^2:
  - Copper protective earth conductor with the cross section of the supply system lead.
- Supply system cable 16 – 35 mm^2:
  - use a copper protective earth conductor with a cross section of 16 mm^2
- Supply system lead > 35 mm^2:
  - Copper protective earth conductor with half the cross section of the supply system lead.

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
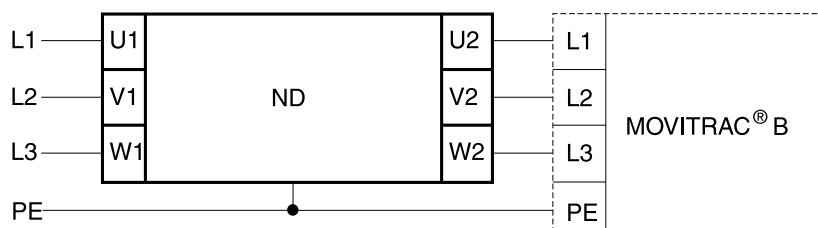
9007199272823563

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

  Damage to the input level.

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

- 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 unshielded cables for the supply system connection as well.

Connecting NF line filters

18014398527568907
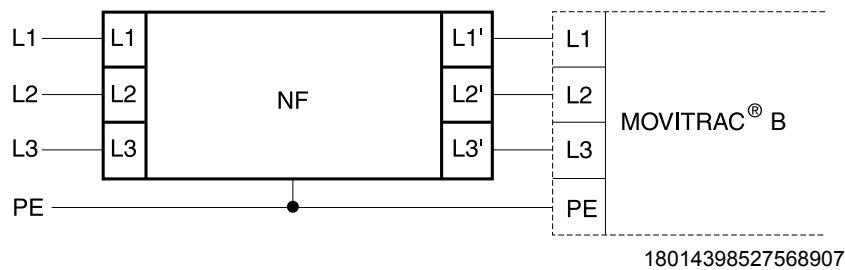
8.3.3 ULF11A folding ferrites

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

INFORMATION

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.

- Output filter connection V5 (with HF..-503) or 7 (with HF..-403) must not be connected when the inverter is operated with f_{PWM} = 4 or 8 kHz.

- 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)
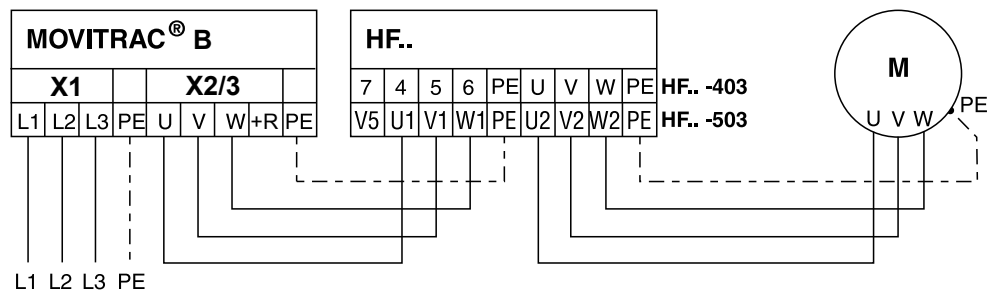
9007199272832779

HF output filter connection without $V_{DC\ link}$ connection (PWM frequency only 12 or 16 kHz)
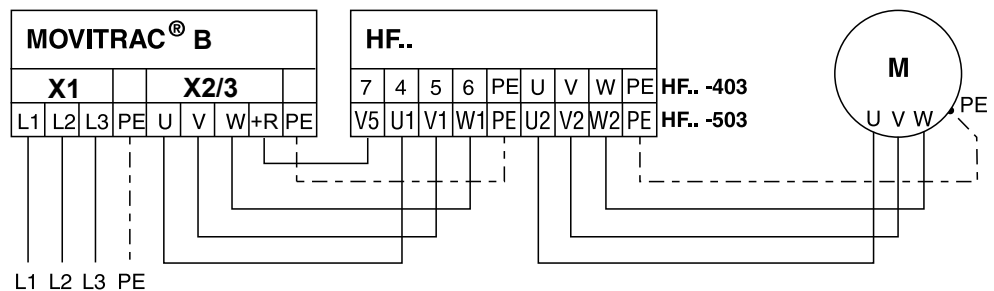
9007199345067147

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.

  In the case of the HD output choke, the cable must be wrapped around the choke 5 times.
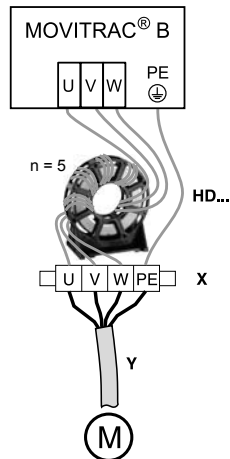
9007199271903243

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-EURODRIVE 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.

Installation of out-put 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.
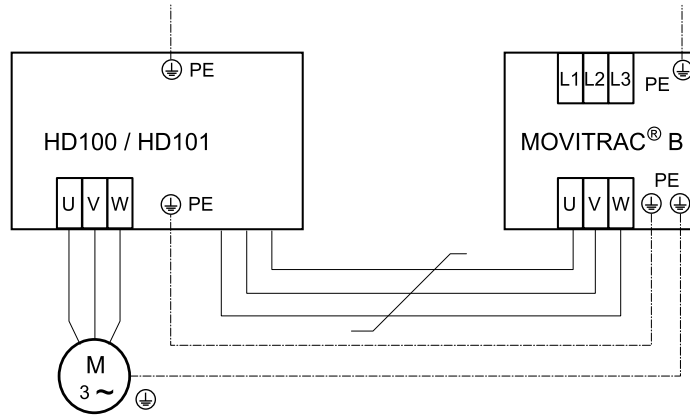
9007200304810123

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.
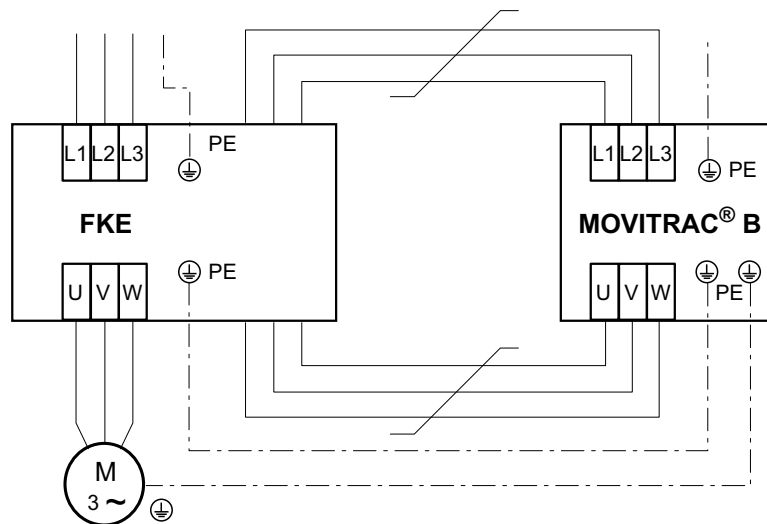
9007199753732747

8.3.7 PTC braking resistors BW1 / BW3 with FKB10B

BW1 and BW3 PTC braking resistors [1] can be mounted to the shield plate underneath the inverter using the angle bracket FKB10B [2], part number 1 821 621 available as option.
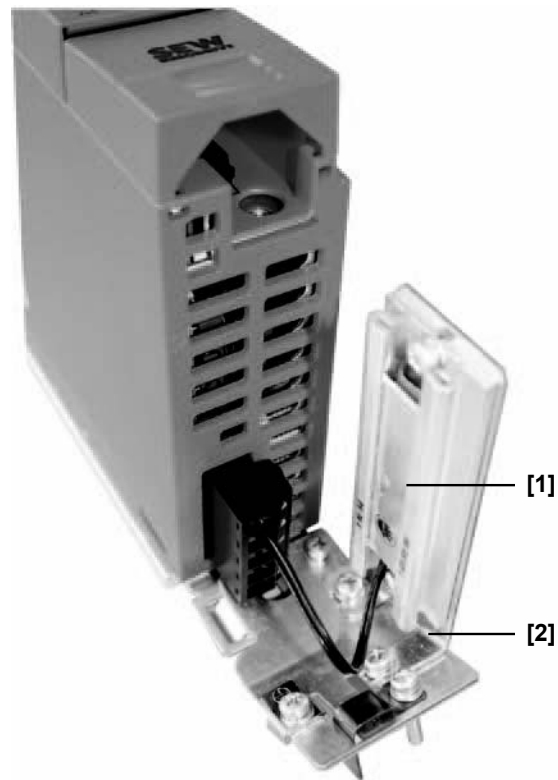
9007199923476235

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

Proceed as follows to install flatpack braking resistors:

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

FKB11B
FKB12B
FKB13B

FHS11B
FHS12B
FHS13B
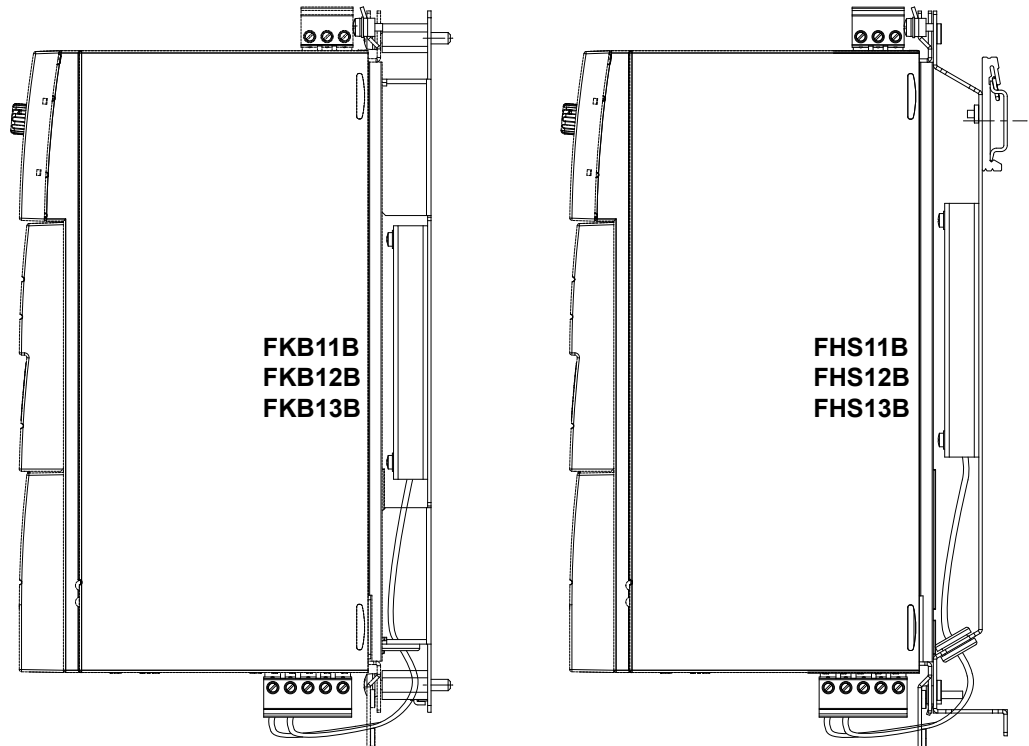
18014399298721547

8.4 UL compliant installation

Note the following points for UL-compliant installation:

- Only use copper cables with the following temperature characteristics:
  - MOVITRAC® B 0003 – 0300: Temperature range 60/75 °C
  - MOVITRAC® B 0370 and 0450: Temperature range 75 °C
- 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

INFORMATION

Use only tested units with a limited output voltage (V_{max} = DC 30 V) and limited output current ($I \leq 8$ A) as an external DC 24 V voltage source.

UL certification does not apply to operation in voltage supply systems with a non-grounded star point (IT systems).

8.5 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:
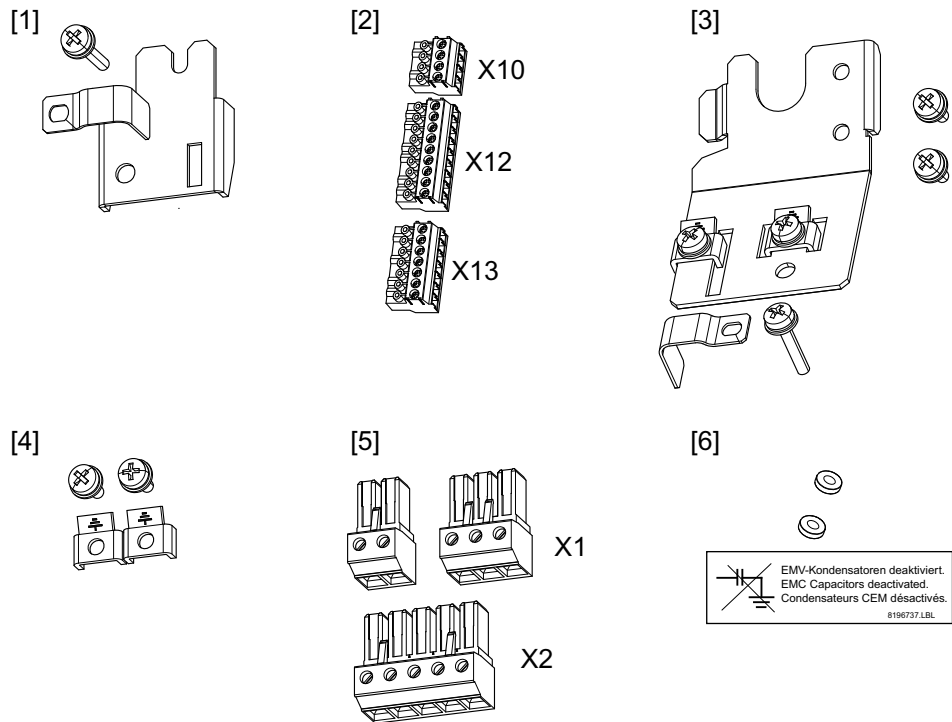
1234745355

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]
[2]
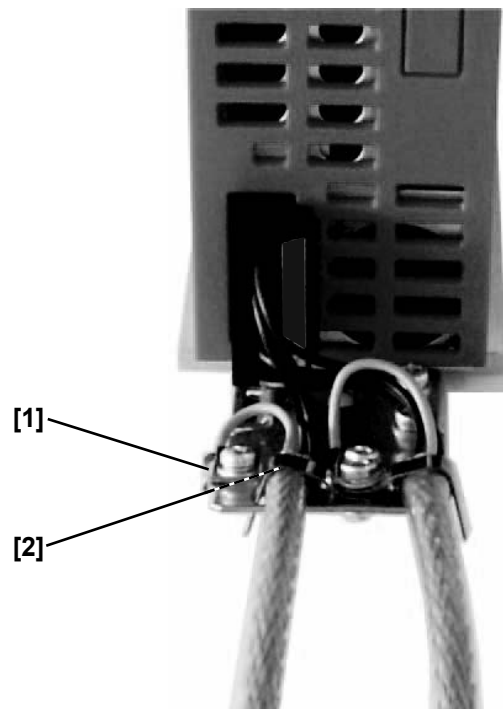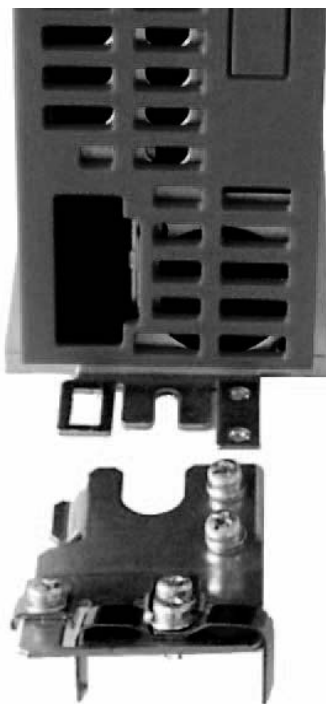
318334475

[1] PE connection
[2] Shield plate

Size 1

A shield plate is supplied as standard for the power section with MOVITRAC® B size 1. Mount the shield plate for the power section using the unit's two retaining screws.
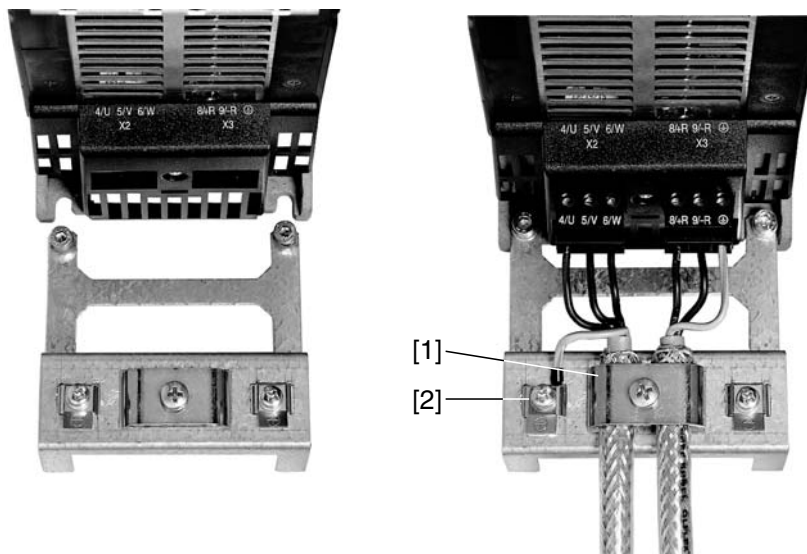
244986123

[1] Shield clamp
[2] PE connection

Size 2S/2

A power shield plate for the power section with 2 retaining screws is supplied as standard with MOVITRAC® B size 2S/2. Mount the shield plate for the power section using the two retaining screws. The illustration shows size 2.
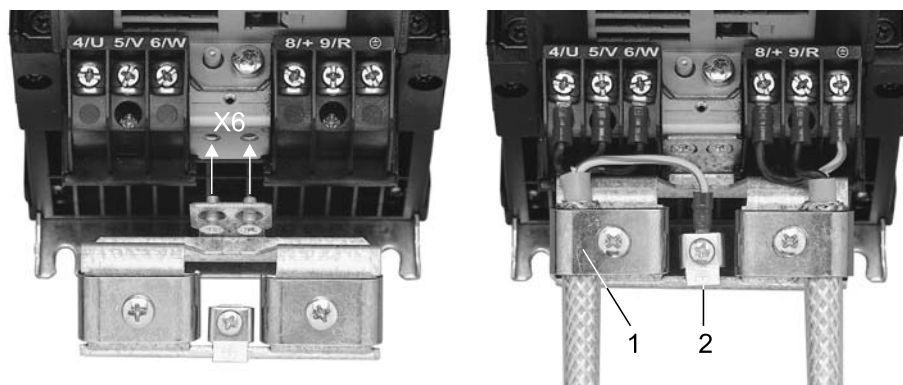
111752587

[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 braking resistor 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 2 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:
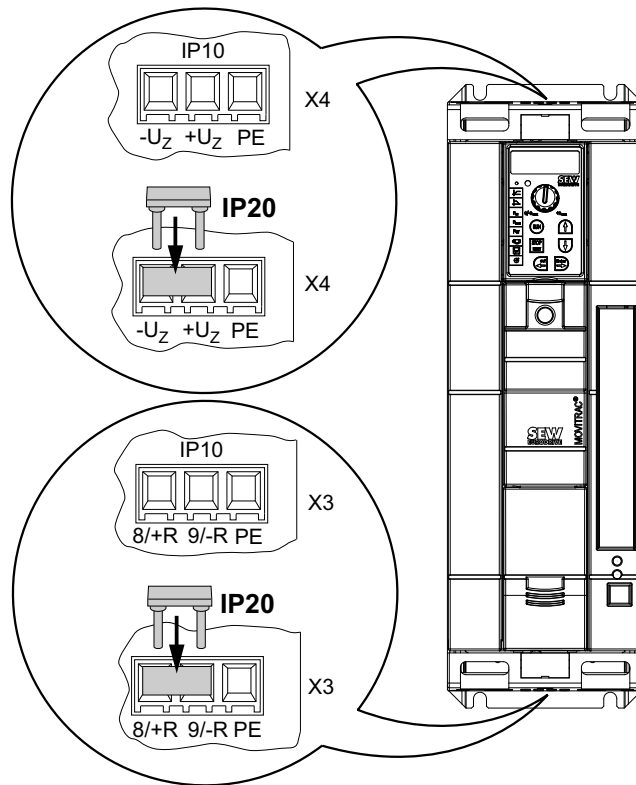
9007199366497419

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:
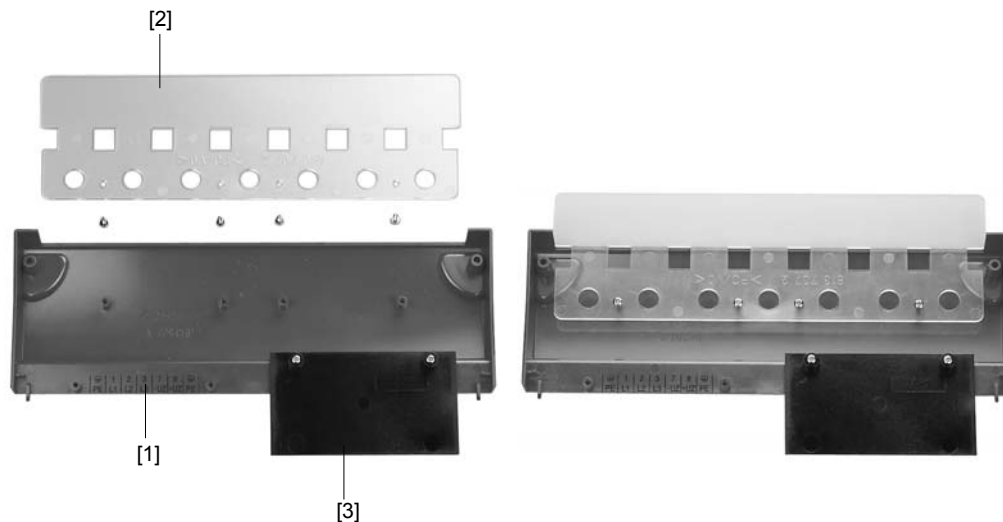
188886667

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)

INFORMATION

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

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 heeding the usual installation notes (40 °C/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 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)
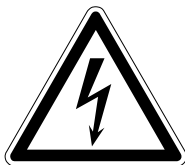
> ⚠ **DANGER**
>
> Severe or fatal injuries from electric shock.
> - Disconnect the inverter from the power. Switch off the DC 24 V and the line voltage.
> - Wait 10 seconds.
> - Ensure that the unit is de-energized.
> - Take appropriate measures to avoid electrostatic charges (use discharge strap, conductive shoes, etc.) before removing the cover.
> - Touch only the unit frame and heat sink. Do not touch any electronic components.

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

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.
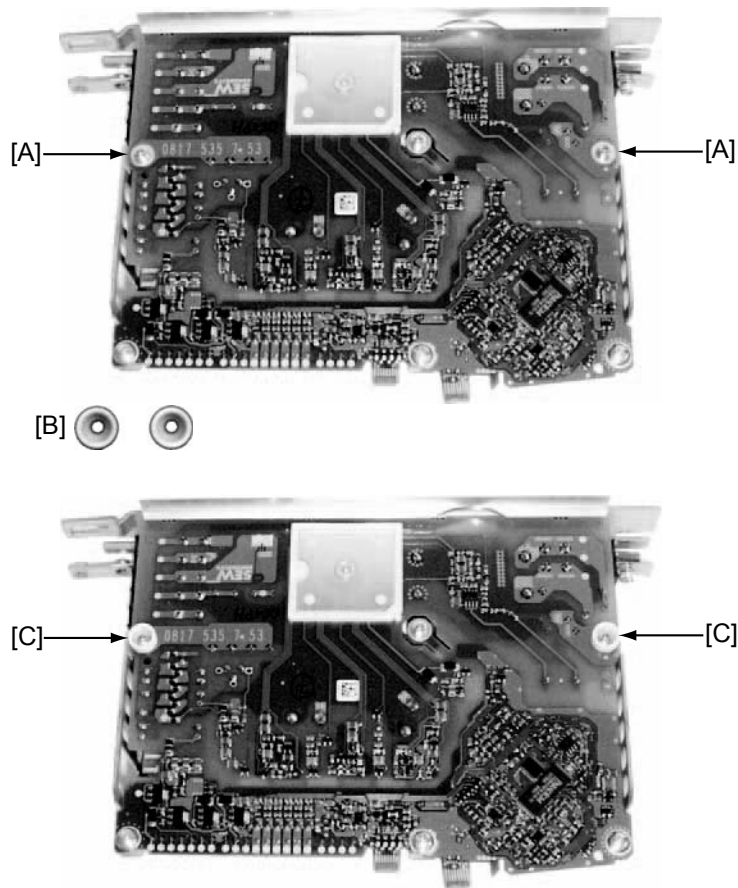
25372555

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.

INFORMATION

IT systems

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

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

8.8 Wiring diagram
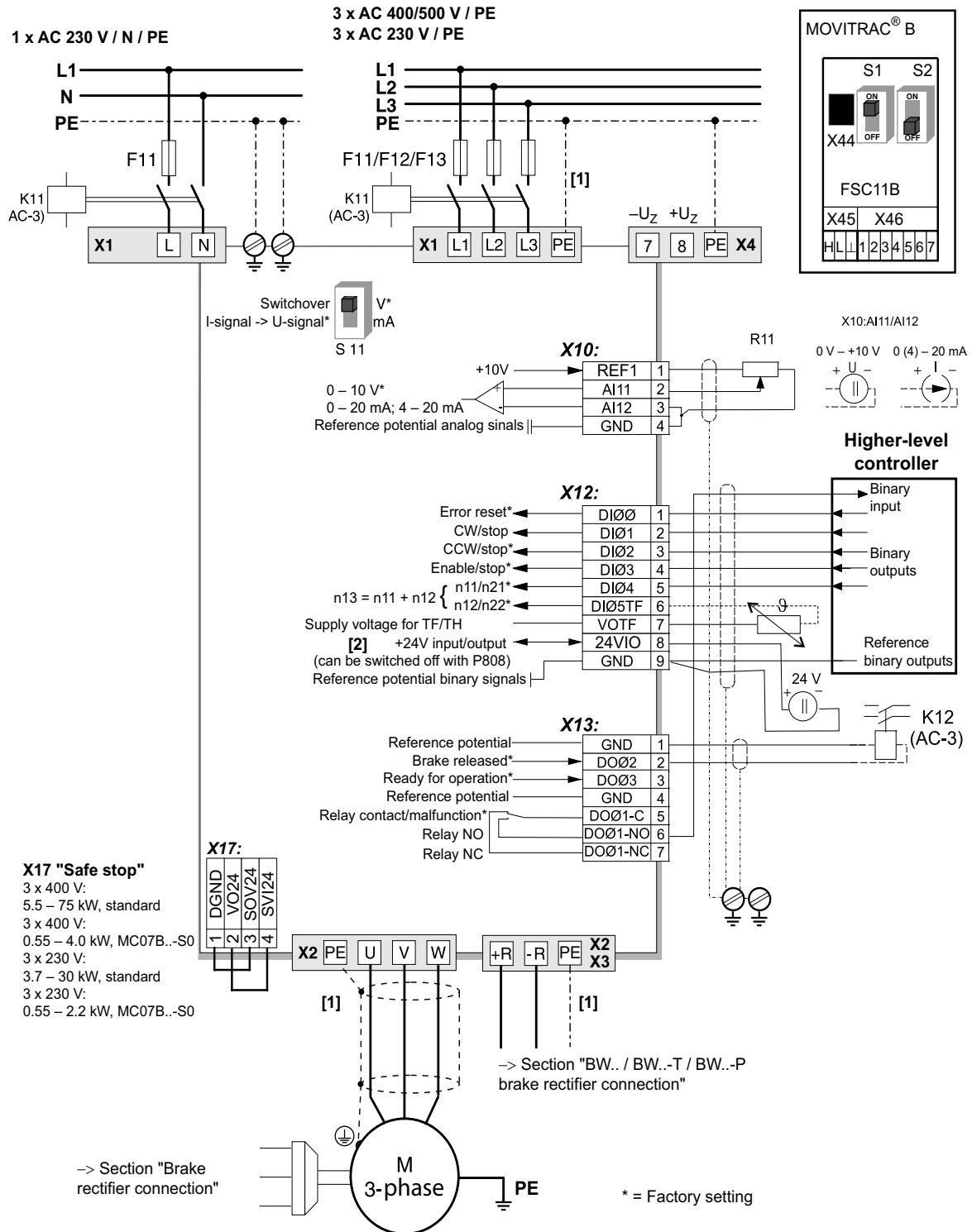
[1] In sizes 1, 2S, and 2, there is no PE connection next to the power supply connection terminals and motor connection terminals [X1]/[X2]. Use the PE terminal next to the DC link connection [X4] (only size 1 – 5). For size 0, the plate is the PE connection.

[2] The MC07B..-S0 unit type must always be supplied with external voltage.

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

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® B. Set binary input DI05TF to TF signal. The temperature will then be monitored by MOVITRAC® B; 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 error".

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

⚠ **WARNING**

The surfaces of the braking resistors get very hot when the braking resistors are loaded with P_N.

Risk of burns and fire.

- Choose a suitable installation location. Braking resistors are usually mounted on top of the control cabinet.
- Do not touch the braking resistors.
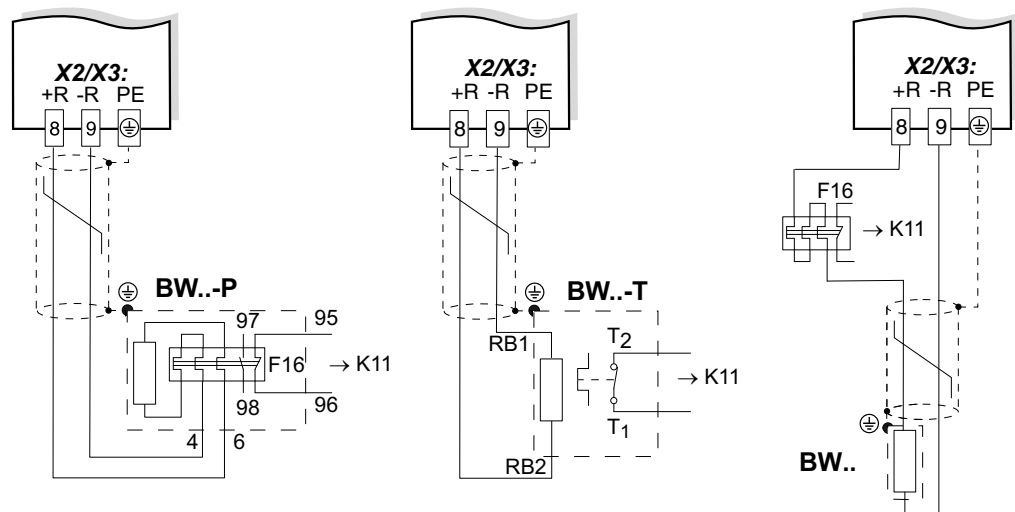
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Set a terminal to "/Controller inhibit". K11 must be opened and "/Controller inhibit" must receive a "0" signal in the following cases:

- 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	Overload protection		
	Design specified	Internal temperature switch (..T / ..P)	External bimetallic relay (F16)
BW..	–	–	Required
BW..-T[1] / BW..-P	–	One of the two options (internal temperature switch/ external bimetallic relay) is required.	
BW..-003 / BW..-005	Adequate	–	Permitted
BW1 – BW4	Adequate	–	–

1) Permitted installation: On horizontal or vertical surfaces with brackets at the bottom and perforated sheets at top and bottom. **Improper installation:** On vertical surfaces with brackets at the top, right or left.

8.11 Brake rectifier connection

ℹ️

INFORMATION

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.
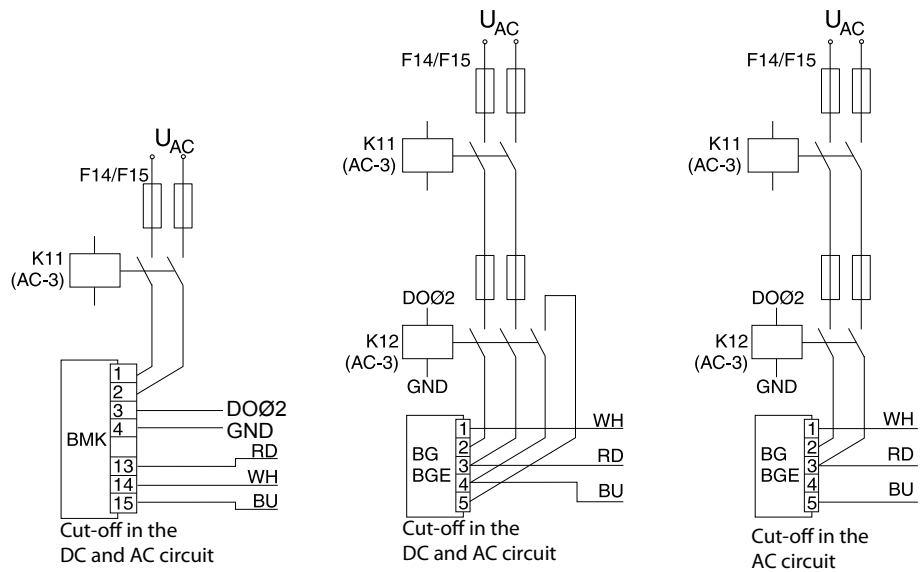
• Drives which require a rapid brake response time.

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.
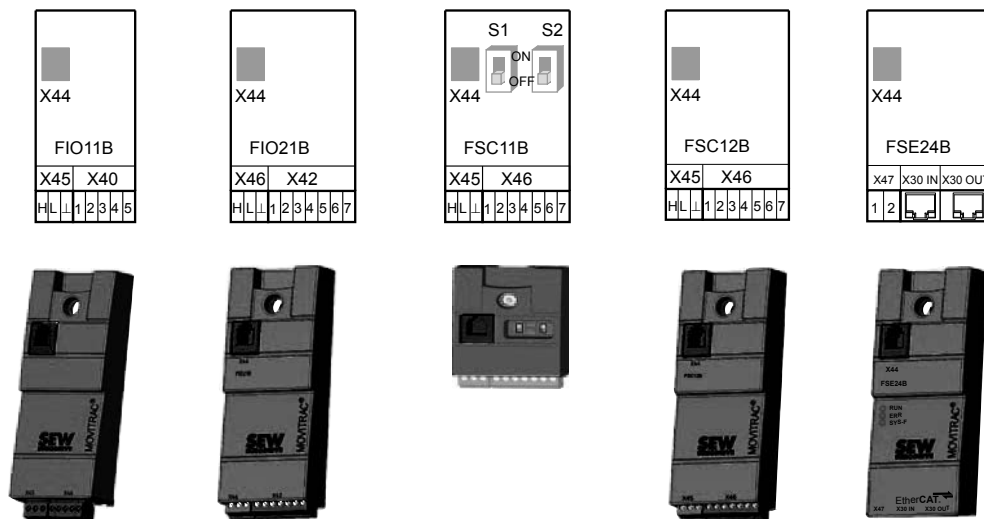
8.11.1 Wiring diagrams

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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 FIO11B/21B, FSC11B/12B and FSE24B

You can enhance the basic units with the FIO11B/21B, FSC11B/12B and FSE24B modules.

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Connection/module type	FIO11B	FIO21B	FSC11B/12B	FSE24B
	Analog module	Digital module	Communication	Communication
Analog input/output X40	Yes	No	No	No
Binary inputs X42	No	Yes	No	No
RS485 for diagnostics (RJ10) X44	Yes	Yes	Yes	Yes
RS485 terminal connection X45	Yes	No	Yes	No
SBus terminal connection X46	No	Yes	Yes	No
EtherCAT connection (2 × RJ45) X30	No	No	No	Yes

8.12.1 Connection and installation of the front modules

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	FIO11B	FIO21B	FSC11B/12B	FSE24B
Service interface	X44	Via RJ10 plug connector	Only for service purposes Maximum cable length 3 m (10 ft)	Yes	Yes	Yes	Yes
RS485 interface	X45:H	ST11: RS485+	Connected in parallel with X44	Yes	No	Yes	No
	X45:L	ST12: RS485–					
	X45:⊥	GND: Reference potential					

Function	Terminal	Description	Data	FIO11B	FIO21B	FSC11B/ 12B	FSE24B
System bus	X46:1	SC11: SBus high	CAN bus to CAN specification 2.0, parts A and B Max. 64 stations	No	yes[1]	yes[2]	No
	X46:2	SC12: SBus low					
	X46:3	GND: Reference potential					
	X46:4	SC21: SBus high		No	No	yes[3]	No
	X46:5	SC22: SBus low					
	X46:6	GND: Reference potential					
DC 24 V	X46:7	24VIO: Auxiliary voltage / external voltage supply		No	No	Yes	No
DC 24 V	X47:1	24VIO: External voltage supply		No	No	No	only input
	X47:2	GND: Reference potential					
EtherCAT	X30:In	Via 2 RJ45 plug connector	Fast Ethernet	No	No	No	Yes
	X30:Out						
Analog input	X40:1	AI2: Voltage input	-10 to $+10$ V $R_i > 40$ kΩ Resolution 10 bit Sampling time 5 ms Accuracy ±100 mV	Yes	No	No	No
	X40:2	GND: Reference potential					
Analog output	X40:3	GND: Reference potential	0 to $+10$ V $I_{max} = 2$ mA 0 (4) – 20 mA Resolution 10 bit Sampling time 5 ms Short-circuit proof, protected against external voltage up to 30 V Accuracy ±100 mV	Yes	No	No	No
	X40:4	AOV1: Voltage output					
	X40:5	AOI1: Current output					
Binary inputs	X42:1	DI10	$R_i = 3$ kΩ, $I_E = 10$ mA, Sampling time 5 ms, PLC compatible	No	Yes	No	No
	X42:2	DI11					
	X42:3	DI12					
	X42:4	DI13					
	X42:5	DI14					
	X42:6	DI15					
	X42:7	DI16					

1) Bus termination possible with enclosed 120 Ω resistor between SC11 and SC12.

2) Terminating resistor 120 Ω can be activated via DIP switch, SC21 and SC22 are then enabled,

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

The DC 24 V potential 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 – 0.75 mm^2 (AWG23 – AWG18)
  – Cable resistance 120 Ω at 1 MHz
  – Capacitance per unit length ≤ 40 pF/m at 1 kHz

  Suitable cables include CAN bus or DeviceNet cables.

Connecting the shield
- Connect the shield to the electronics shield clamp on the inverter or master controller and make sure it is connected over a wide area at both ends.
- There is no need for a ground connection 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.

- ⚠ **NOTICE** 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 suitable measures to avoid potential displacement, such as connecting the unit ground connectors using a separate cable.

i

INFORMATION

The FIO21B and FSE24B front modules require a 24 V supply. If there is no external voltage supply, you must not switch off parameter *P808 24VIO auxiliary voltage output*.

8.12.2 Wiring the FIO11B analog module

Analog input AI1		Analog output AO1	
Bipolar	**Unipolar**	**Current output AOC1**	**Voltage output AOV1**

−10 V external   +10 V external

+10 V external or X10:1

R_L ≤ 750 Ω

8.12.3 FIO21B digital module wiring

DC 24 V

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8.12.4 Installation RS485 interface on FSC11B / 12B

The RS485 interface enables you to interconnect up to 32 MOVITRAC® B units.

RS485 connection MOVITRAC® B
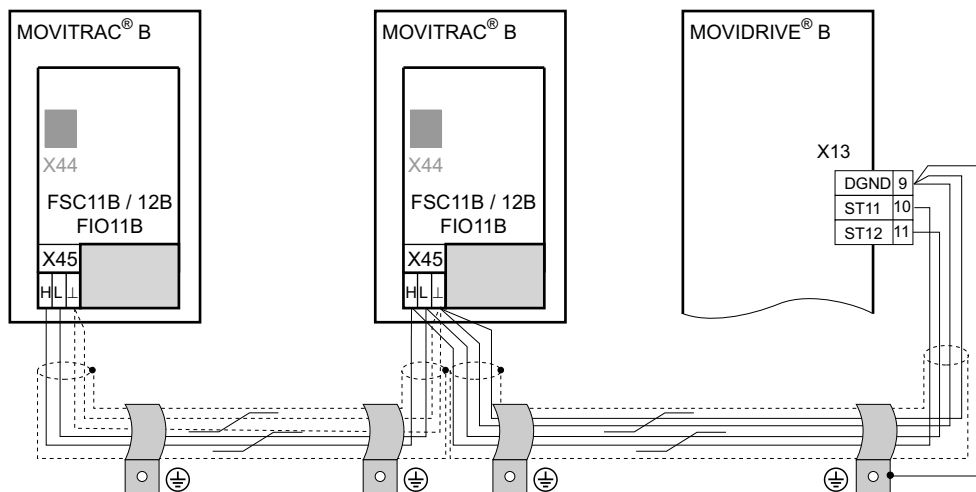
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INFORMATION

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

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

8.12.5 Installing the system bus (SBus) to FSC11B/12B

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

FSC11 S1	FSC12 S1:8	FSC11/12 X46:1;:2	FSC11 X46:4;:5	FSC12 X46:4;5
Off		CAN 1	CAN 1	CAN 1
On		CAN 1 terminated	–	CAN 1 terminated

S2 is reserved on FSC11B and must always be set to "Off".

MOVITRAC® B with installed option card comes with a connection cable for the SBus connection.

MOVITRAC® B system bus connection
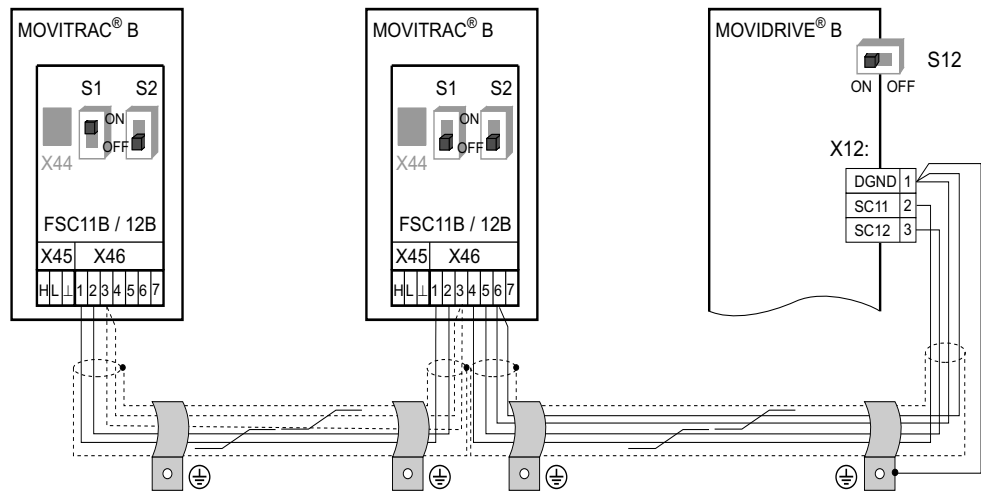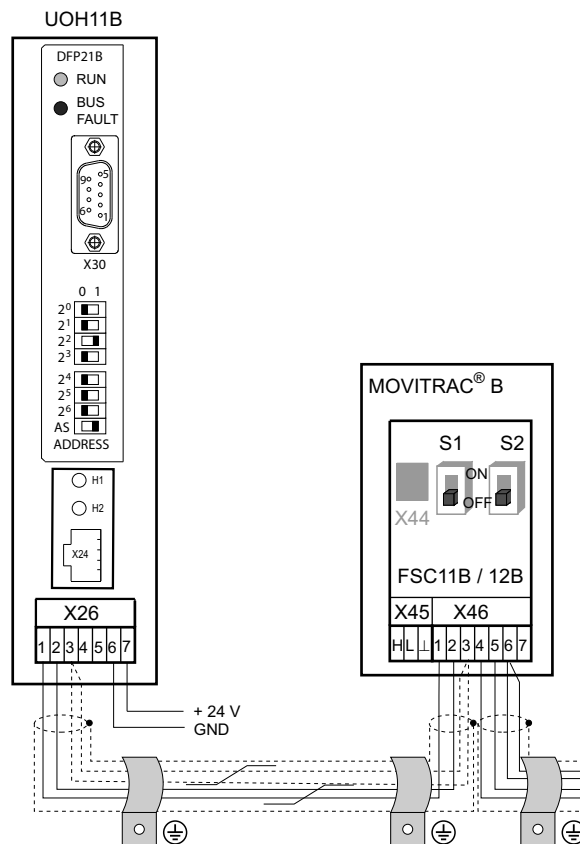

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MOVITRAC® B with UFx system bus connection
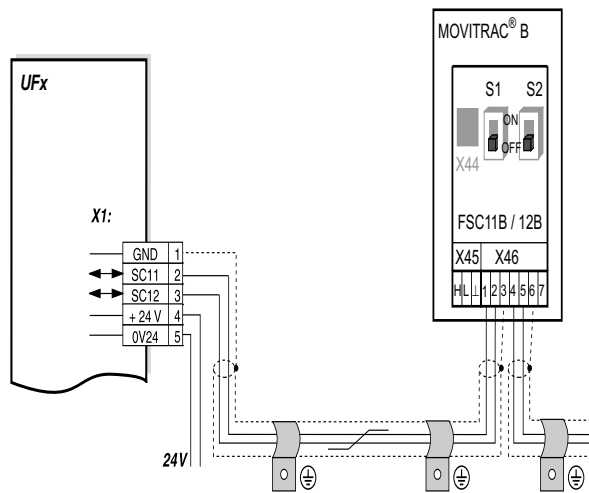
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MOVITRAC® B system bus connection with DFx/UOH11B gateways or DFx integrated in MOVITRAC® B

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Cable length
- The permitted total cable length depends on the baud rate setting of the SBus (*P884*):
  – 125 kBaud: 500 m (1640 ft)
  – 250 kBaud: 250 m (820 ft)
  – 500 kBaud: 100 m (328 ft)
  – 1000 kBaud: 25 m (82 ft)
- You must use shielded cables.

INFORMATION

- 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.**

Cable specification

Use a 4-core twisted and shielded copper cable (data transmission cable with braided copper shield). The cable must meet the following specifications:

– Cable cross section 0.25 – 0.75 mm^2 (AWG23 – AWG18)

– Cable resistance 120 Ω at 1 MHz

– Capacitance per unit length ≤ 40 pF/m at 1 kHz

Suitable cables include CAN bus or DeviceNet cables.

Connecting the shield

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

• There is no need for a ground connection 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.

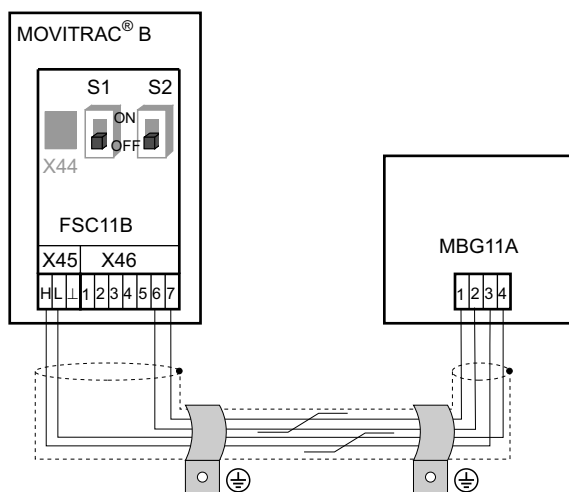## 8.13   Installing the MBG11A speed control module

• A: Mounting from the rear using 4 tapped holes.

• B: Mounting from the front using 2 retaining holes
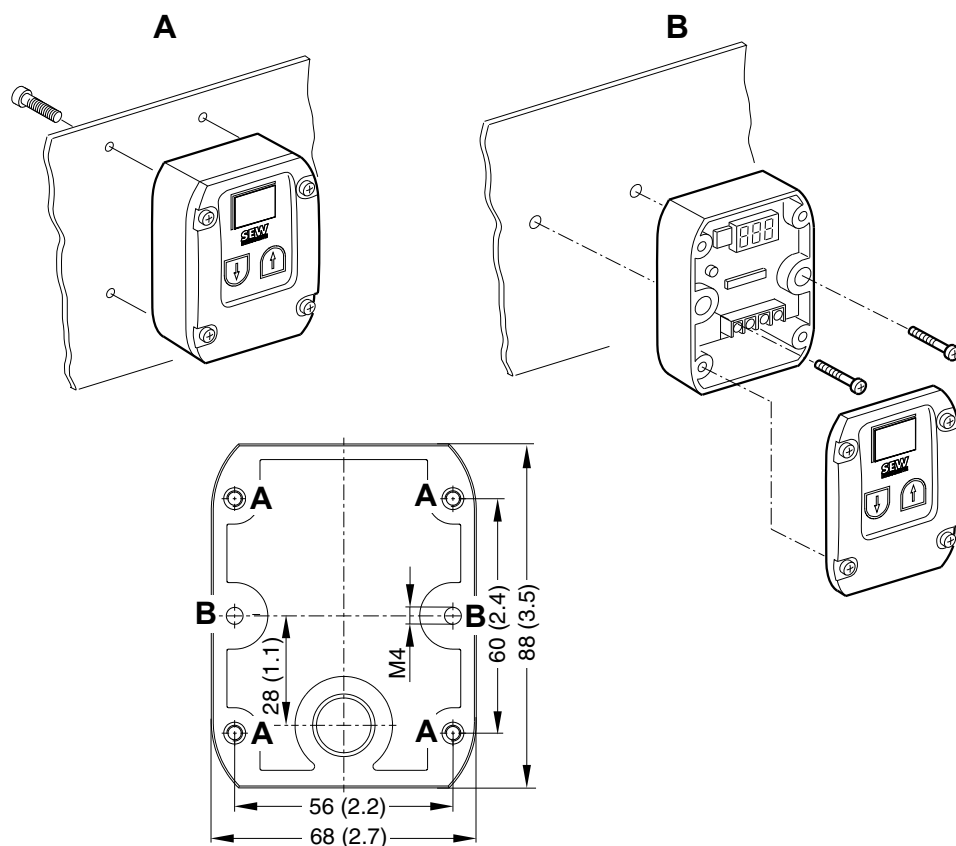
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8.13.1 Connection

188285707

9 Startup

9.1 General startup instructions

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

9.1.1 Requirements

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. Thus you can startup the adjusted SEW-EURODRIVE motor without project planning.

9.1.2 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.

9.2 Preliminary work and resources

- Check the installation.

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

9.2.1 Preliminary work and tools for startup with factory setting

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

9.2.2 Preliminary work and tools for startup with keypad or with PC

- Connect the 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 terminal assignment that has been set (*P601 – P622*).
- Switch off the power supply system.
- Connect the signal terminals.
- Switch on the power supply system.

INFORMATION

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

9.3 Starting the motor

You have to exit manual operation before you can enable the motor via terminals.

9.3.1 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.

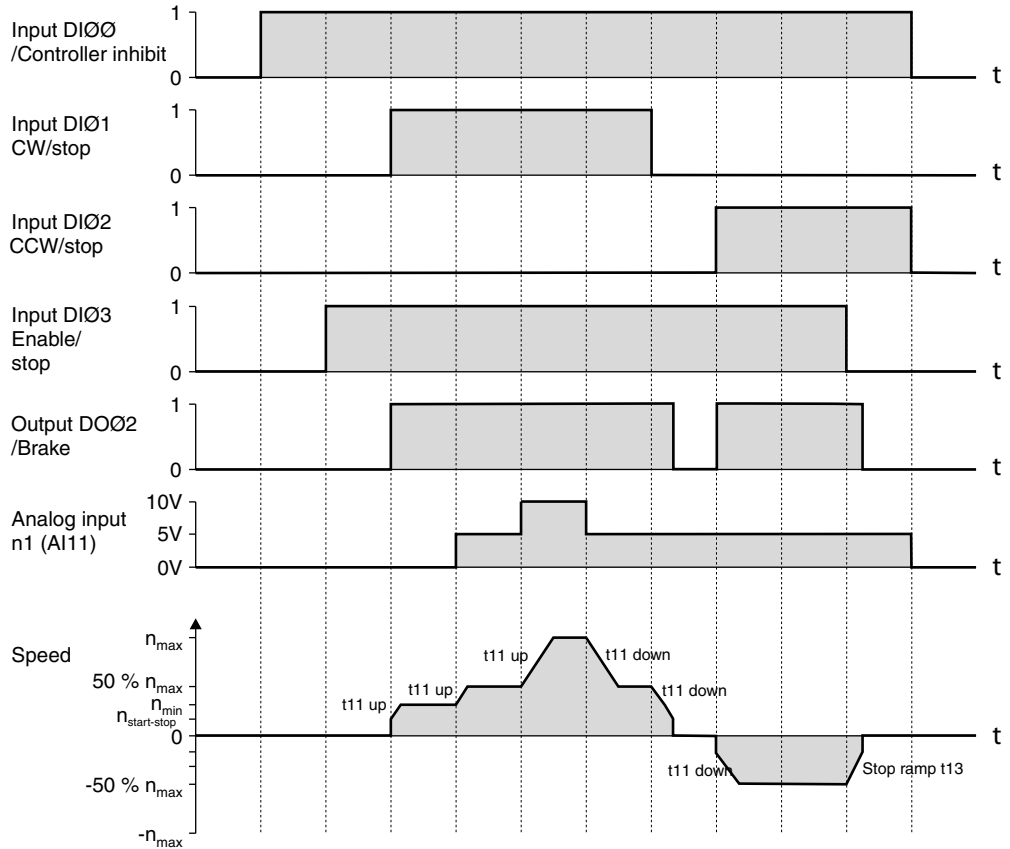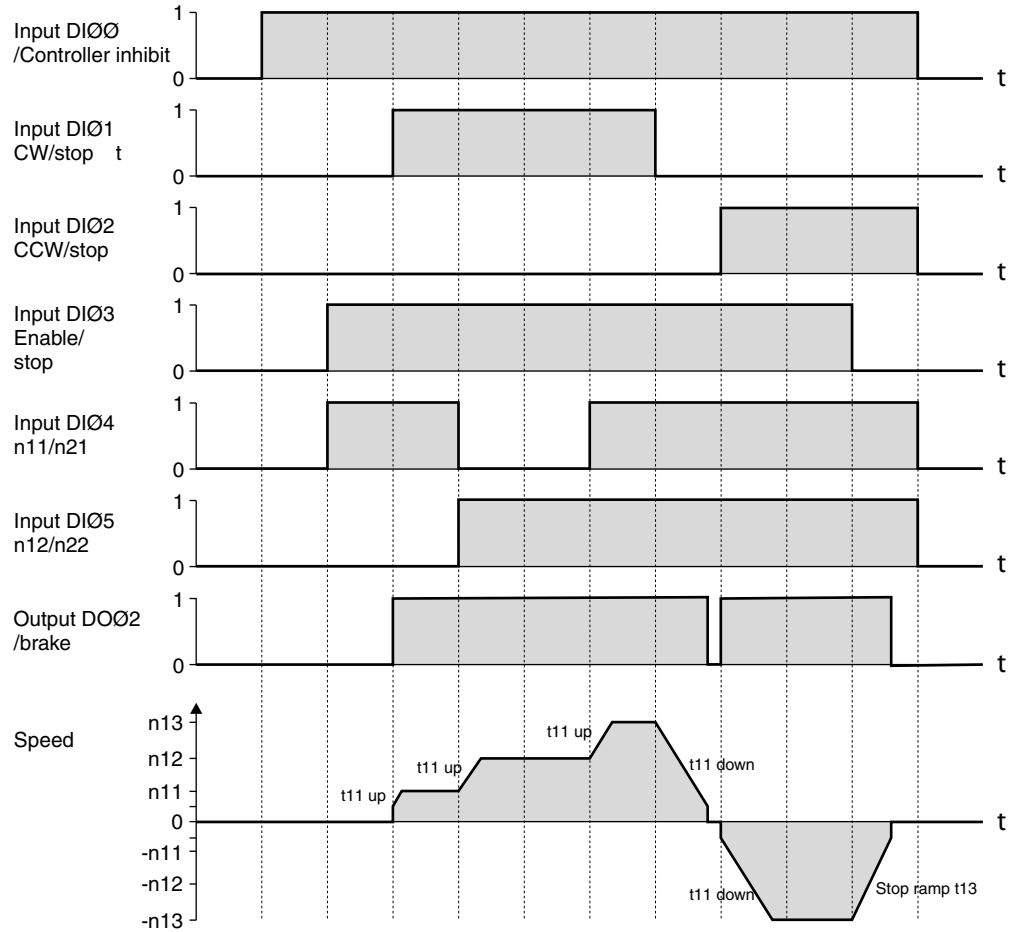| Function	X11:2 (AI11) Analog input n1	X12:1 (DIØØ) /Controller inhibit[1]	X12:2 (DIØ1) CW/stop	X12:3 (DIØ2) CCW/ stop	X12:4 (DIØ3) Enable/ stop	X12:5 (DIØ4) n11/n21	X12:6 (DIØ5) n12/n22
Controller inhibit	X	0	X	X	X	0	0
Stop	X	1	X	X	0	0	0
Enable and stop	X	1	0	0	1	0	0
Clockwise at 50 % n_{max}	5 V	1	1	0	1	0	0
Clockwise with n_{max}	10 V	1	1	0	1	0	0
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

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.


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i	**INFORMATION**

The motor is not energized in the event of controller inhibit. A motor without brake will coast to standstill.

9.3.2 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) /Controller inhibit	X12:2 (DIØ1) CW/stop	X12:3 (DIØ2) CCW/stop	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

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.

Input DIØØ /Controller inhibit	
Input DIØ1 CW/stop t	
Input DIØ2 CCW/stop	
Input DIØ3 Enable/ stop	
Input DIØ4 n11/n21	
Input DIØ5 n12/n22	
Output DOØ2 /brake	
Speed	

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INFORMATION

The motor is not energized in the event of controller inhibit. A motor without brake will coast to standstill.

9.4 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).
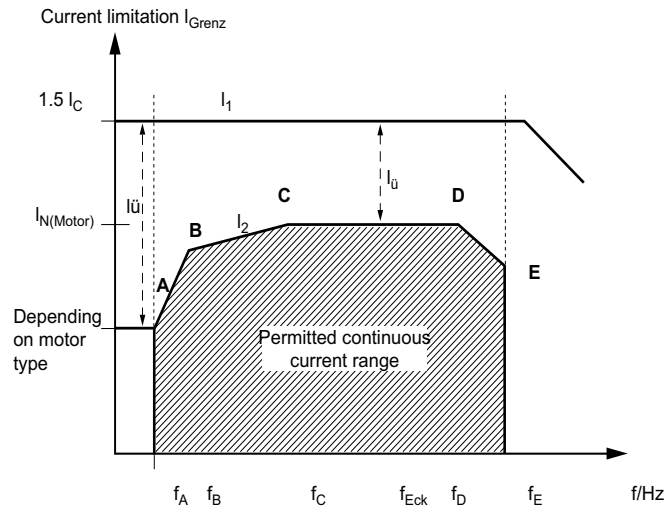
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Use the MOVITOOLS® MotionStudio software for startup. During startup, parameters *P560 – P566* are automatically activated for SEW motors selected and approved for Ex e operation.

After startup, *P560* can only be activated if a motor approved for Ex e operation has been started up beforehand.

After motor startup, current limitation I_1 is active. Current limitation I_2 determines the current permanently permitted (shaded area)

You can document the startup parameters and values with MOVITOOLS® MotionStudio. They are displayed in the "ATEX information" window.

INFORMATION

Refer to the "Explosion-Proof AC Motors, Asynchronous Servomotors" operating instructions for more information.
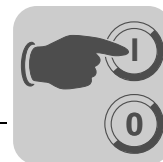
9.5 Startup with factory setting – brief description

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.

9.5.1 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/STOP DIØ1 or CCW/STOP DIØ2
   - Setpoint:
     - Analog input (X10) and/or
     - DIØ4 = n11 = 150 rpm and/or
     - DIØ5 = n12 = 750 rpm and/or
     - DIØ4 + DIØ5 = n13 = 1500 rpm
   - For brakemotors:
     DOØ2 = brake control via brake rectifiers
4. You have the option of connecting the following signal terminals:
   - DIØØ = error reset
   - DOØ1 = /malfunction (designed as a relay contact)
   - DOØ3 = ready
5. Check the controller for the required functionality.
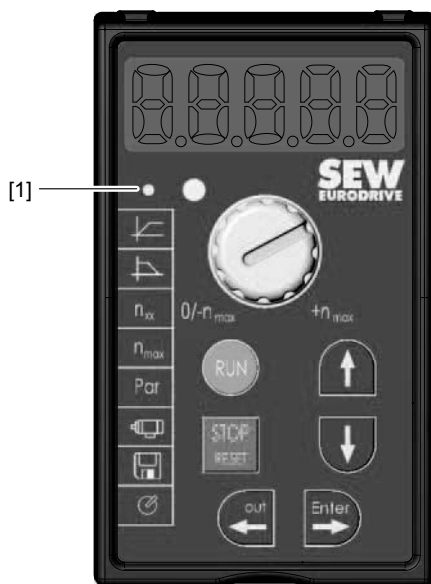6. Connect the frequency inverter to the mains (X1).
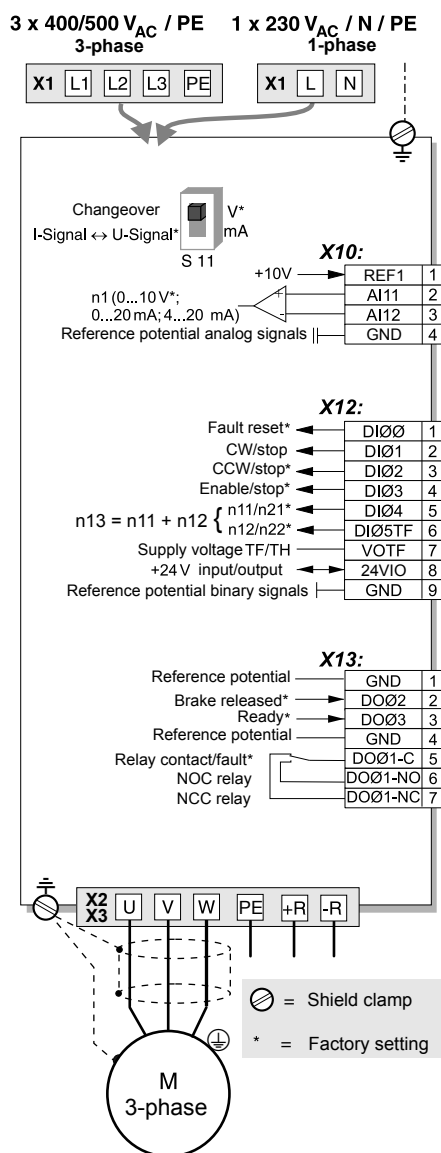
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9.5.2 Notes

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

9.6 Keypad FBG11B

Key arrangement and symbols on the keypad:

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[1] LED display with IPOS program started

9.6.1 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.
out Enter	Use ENTER/OUT to activate and deactivate the symbols or parameter menus
RUN	Use RUN to start the drive.
STOP RESET	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.

INFORMATION

After switching off the power supply, a drive that was previously stopped using the STOP/RESET 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 *P760* using FBG11B.
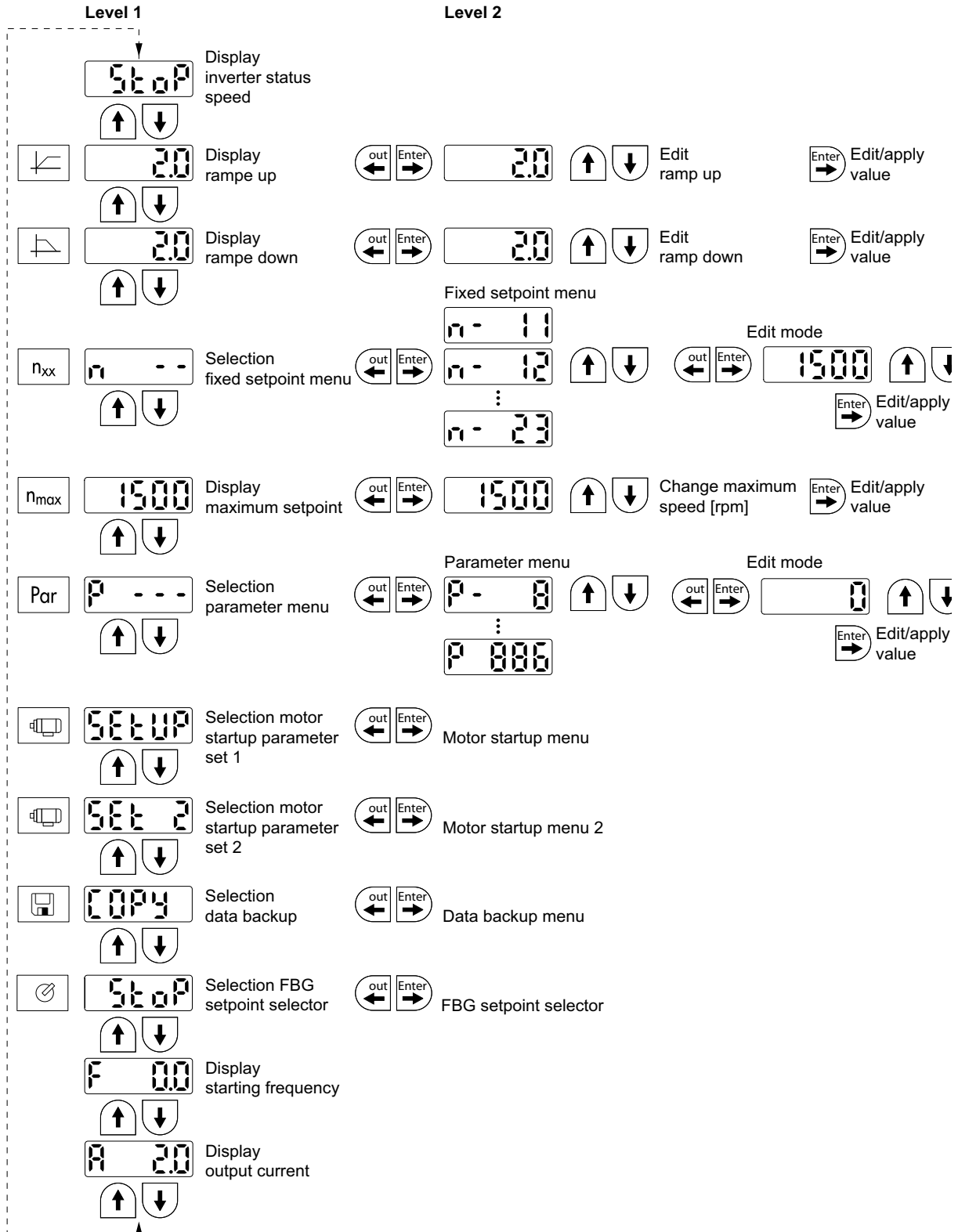
If you stop the drive with the STOP/RESET key, the display Stop flashes. This signal indicates you have to enable the drive using the RUN key.

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

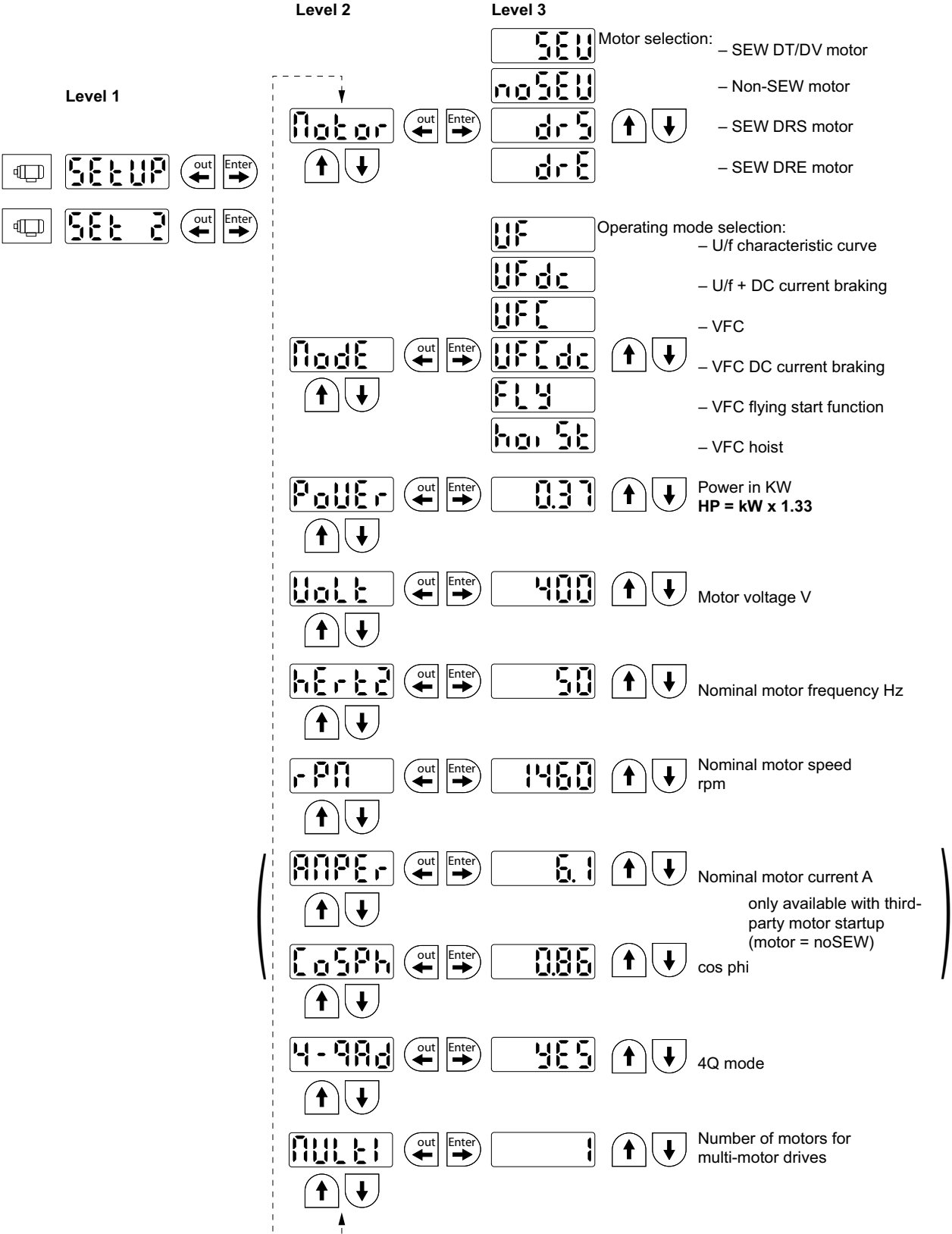### 9.6.2 General operation of the FBG11B keypad

Level 1

Level 2

StoP — Display inverter status speed

2.0 — Display rampe up → 2.0 — Edit ramp up → Edit/apply value

2.0 — Display rampe down → 2.0 — Edit ramp down → Edit/apply value

Fixed setpoint menu

n—— — Selection fixed setpoint menu → n- 11 / n- 12 ⋮ n- 23

Edit mode

1500 → Edit/apply value

1500 — Display maximum setpoint → 1500 — Change maximum speed [rpm] → Edit/apply value

Parameter menu

P ——— — Selection parameter menu → P- 0 ⋮ P 886

Edit mode

0 → Edit/apply value

SEtUP — Selection motor startup parameter set 1 → Motor startup menu

SEt 2 — Selection motor startup parameter set 2 → Motor startup menu 2

COPY — Selection data backup → Data backup menu

StoP — Selection FBG setpoint selector → FBG setpoint selector

F 0.0 — Display starting frequency

A 2.0 — Display output current

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

9.6.3   Startup using the FBG11B keypad

Level 1

Level 2

Level 3

Display	Description
5EU	Motor selection: – SEW DT/DV motor
noSEU	– Non-SEW motor
dr5	– SEW DRS motor
drE	– SEW DRE motor

Motor

SEtUP

SEt 2

Mode

Display	Description
UF	Operating mode selection: – U/f characteristic curve
UFdc	– U/f + DC current braking
UFC	– VFC
UFCdc	– VFC DC current braking
FLY	– VFC flying start function
hoiSt	– VFC hoist

PoUEr — 0.37 — Power in KW
HP = kW x 1.33

UoLt — 400 — Motor voltage V

hErtZ — 50 — Nominal motor frequency Hz

rPM — 1460 — Nominal motor speed rpm

AMPEr — 6.1 — Nominal motor current A
only available with third-party motor startup (motor = noSEW)

CoSPh — 0.86 — cos phi

4-9Ad — YES — 4Q mode

MULtI — 1 — Number of motors for multi-motor drives

27021597782442891

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: Nominal current, nominal power, power factor cos ϕ, and nominal speed.
- Rated line voltage

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.

INFORMATION

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.

Operating mode V/f	The default setting for the operating mode is V/f. Use this operating mode if you have no particular speed quality requirements and for applications that require a maximum output frequency > 150 Hz.

Operating mode 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 *P01* at startup.

Startup of multi-motor drive	Multi-motor drives are mechanically coupled to each other (e.g. chain drive with multiple motors).
	Observe the notes in the "MOVIDRIVE® Multi-Motor Drives" manual.
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.
	Observe the notes in the "MOVIDRIVE® Multi-Motor Drives" manual.
Startup with large load mass moment of inertia, such as with pumps and fans	The slip compensation is designed for a load mass moment of inertia to motor moment of inertia ratio smaller than 10. If the ratio is larger and the drive vibrates, then slip compensation must be reduced and even be set to 0 if necessary.

9.6.4   Manual operation with FBG11B speed control module

FBG11B speed control module of the keypad (local manual operation): LED $\boxed{\oslash}$ flashes.

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

- *P122 Direction of rotation FBG manual operation*
- RUN key and STOP/RESET key
- 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 an error, a reset can be performed using the STOP/RESET button via the terminal or the interface. After a reset, the "manual setpoint generator" operating mode will be active again. The drive remains stopped.

The `Stop` display flashes to indicate that you have to re-enable the drive via the RUN button.

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 Startup with DBG60B keypad

9.7.1 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: Nominal current, nominal power, power factor cos ϕ, and nominal speed.
- Rated line voltage

9.7.2 Selecting a language

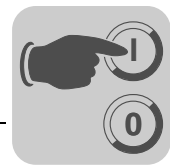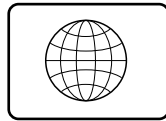The figure below shows the keys for selecting the language.
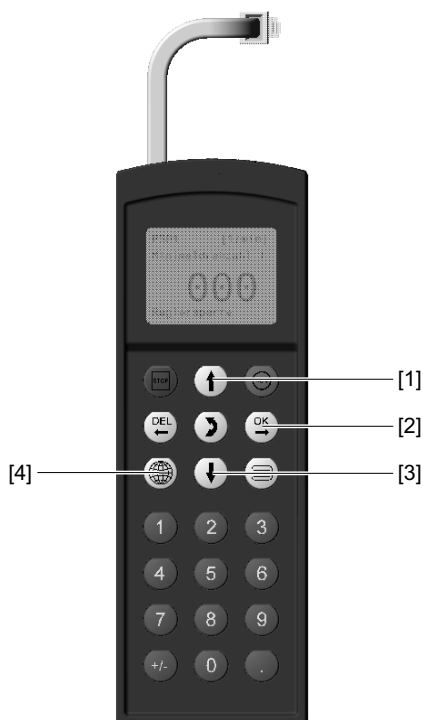
247015051

[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.

9.7.3 Startup

The figure below shows the keys required for startup.
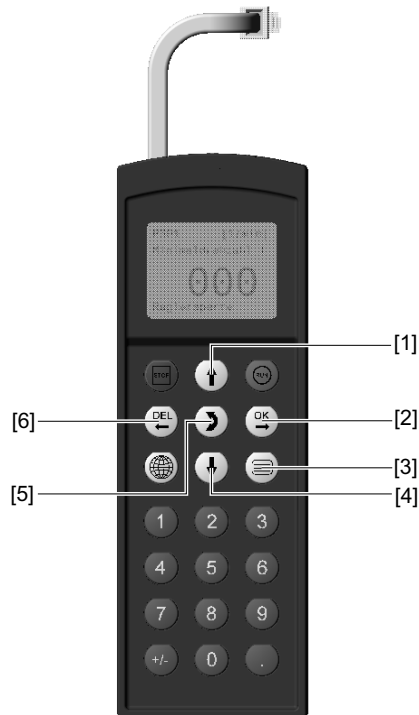
247163659

[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

9.7.4 Startup procedure

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

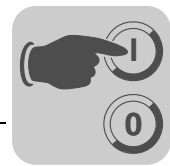   VFC operating mode is required for activating the flying start or hoist function.

```
C01*OPER. MODE 1
STANDARD V/f
VFC1
```

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-EURO-DRIVE 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
NOM. MOT. VOLT 1
  +400.000
```

    Example: Nameplate 230△/400⅄50 Hz

    ⅄ connection → enter "400 V".

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

    △ 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△/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△/400⅄50 Hz

    Enter "50 Hz" in ⅄ and △ connection.

```
C04*    Hz
NOM. MOT. 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* Observe rated motor current, connection type ⊥ or △ .
    - C11* rated motor power
    - C12* power factor cos ϕ
    - 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
NOM. LINE 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
COPY TO DBG
COPY TO MC07B
```
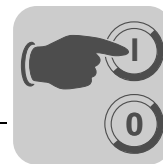
15. Press the ↓ key to scroll down until the menu item "EXIT" is selected.

```
UNIT SETTINGS
QUIT
```

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 injuries.

  – 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 chapter "Starting the Motor".

- With Δ connection and transition point at 87 Hz, set parameter *P302* / *P312* "Maximum speed 1/2" to the value for 87 Hz.

9.7.5 Startup with 87 Hz characteristic curve

For startup with 87 Hz characteristic curve, specify the motor data in delta connection. After startup , set the maximum speed with parameter *P302* and/or *P312* to the value for 87 Hz.

Example

For a motor with nominal speed 1420 rpm, nominal voltage V_n = 230/400 V, nominal frequency 50 Hz and startup in delta connection / transition point at 87 Hz, enter the following startup data:

Rated motor voltage	230 V
Rated motor frequency	50 Hz
Maximum speed (transition speed)	2470 rpm

9.7.6 Setting parameters

Proceed as follows to set 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 ↔ key to switch to edit mode. The flashing cursor disappears.

- Pressing the ↑ or ↓ key, you can select or set the correct parameter value.

- Press OK to confirm the selection or setting.

- Press the ↔ key to switch back to parameter mode again. The flashing cursor appears again.

- Press the ↑ key to choose the next parameter.

9.7.7 Manual operation

The inverter can be controlled using the DBG60B keypad in manual operation (Context menu → 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 ↑ and ↓ keys.

INFORMATION

If you quit the manual mode, the signals at the binary inputs are active immediately. A binary input /Controller inhibit does not have to be wired "1"-"0"-"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 X12.

  – Additional safety precautions must be taken depending on the application to avoid injury to people and damage to machinery.
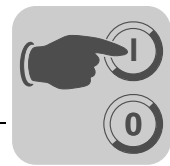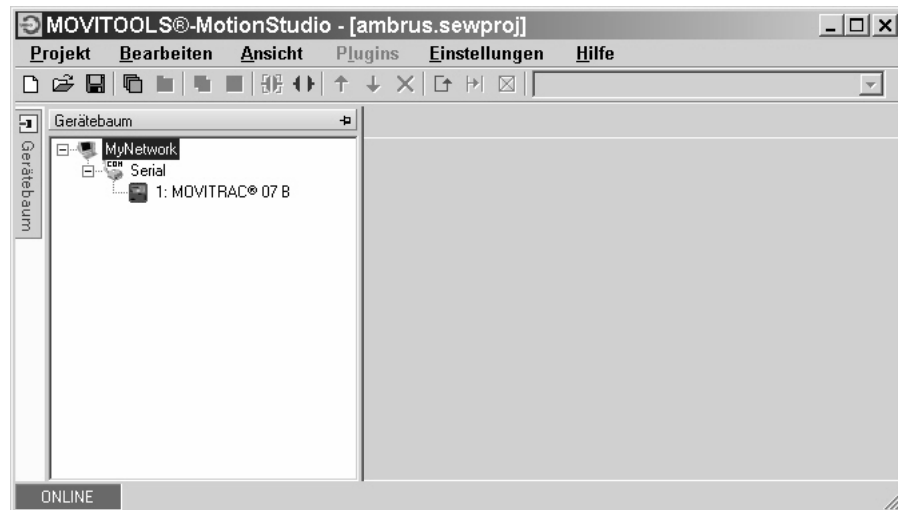
9.8   *Startup with PC and MOVITOOLS® MotionStudio*

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.

189003915

You can perform a startup by right-clicking on one of the units. Refer to the online help for further information.

9.9 External setpoint selection

External setpoint selection

Control via

– Terminals

– Serial interface

– Setpoint potentiometer connected to AI11/AI12

9.9.1 Set direction of rotation

You can set the direction:

- "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*

9.9.2 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 SBus or RS485

  – Motor potentiometer

9.9.3 Enabling the direction of rotation with RS485 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
RS485/fixed setpoint
SBus 1/fixed setpoint

The direction of rotation is determined by the setpoint. Enable with terminal CW or CCW.
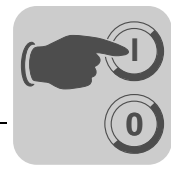
9.9.4 Startup for MBG11A speed control module

You cannot simultaneously establish communication between MOVITRAC® B / MBG11A and MOVITRAC® B / PC via RS485.

The MBG11A can simultaneously specify a setpoint for up to 31 MOVITRAC® B units.

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 Setpoint source*: RS485 (2)

- *P101 Control signal source*: RS485 (1)

- *P871 Setpoint description PO2*: Set PO2 to "Speed %", then *P876 PO data enable* to "Yes".

The speed is now displayed: –100 % to +100 % correspond to $-n_{max}$ to $+n_{max}$.

Input terminals   The following input terminals must be connected with 24 V:

- DI01 CW/Stop: Positive + negative direction of rotation are possible by selecting the +/- sign on the MBG11A.

- DI03 Enable/Stop

Settings for process data word   If you do not change the PO2 process data word, you can also use the MBG11B. The conversion is 1 % = 32 rpm. The results from the relationship 4000 hex = 100 % 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 %)

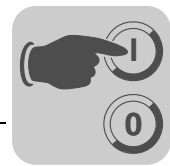| Percent	Hex	Decimal	Speed
1 %	A4 hex	164 dec	n_max / 100
10 %	666 hex	1638 dec	n_max / 10
25 %	1000 hex	4096 dec	n_max / 4
33 %	1555 hex	5461 dec	n_max / 3
50 %	2000 hex	8192 dec	n_max / 2
75 %	3000 hex	12288 dec	n_max / 1.333
100 %	4000 hex	16384 dec	n_max

9.10 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 the long menu (*P800* = long)

Selection in the short or long menu (*P800* = short)

Display in the pictogram menu in the FBG11B keypad

Selection within FGB motor startup

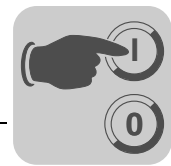If there are several options, the factory setting is <u>underlined</u>.

No.	FBG	Index dec.	Name	Range / factory setting	
				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	Short	8325	DC link voltage		V
009	📊◀	8326	Output current		A
01.			**Status displays**		
010		8310	Inverter state		Text
011		8310	Operating state		Text
012		8310	Error status		Text
013		8310	Current parameter set		Current parameter set
014	Long	8327	Heat sink tempera-ture		°C
02.			**Analog setpoints**		
020		8331	Analog input AI1		V
021	Long	8332	Analog input AI2 (optional)		V
03.			**Binary inputs** (see parameter *P60.*)		
030		8844	Binary input DI00		<u>Error reset</u>
031		8335	Binary input DI01		CW / STOP (fixed assignment)
032		8336	Binary input DI02		<u>CCW/stop</u>
033		8337	Binary input DI03		<u>Enable/stop</u>
034		8338	Binary input DI04		<u>n11/n21</u>
035		8339	Binary input DI05		<u>n12/n22</u>

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	**MOVITOOLS® MotionStudio**
039	ᴸon6	8334	Binary inputs DI00 – DI05		Collective display of binary inputs
04.			**Binary inputs option** (see parameter *P60.*)		
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	ᴸon6	8348	Binary inputs DI10 – DI15		Collective display of binary inputs
05.			**Binary outputs** (see parameter *P62.*)		
051		8349	Binary output DO01		/Fault
052		8349	Binary output DO02		Brake released
053		8349	Binary output DO03		Ready
059	ᴸon6	8349	Binary outputs DO01 – DO03		Collective display of binary outputs
07.			**Unit data**		
070		8301	Unit type		Text
071		8361	Nominal output current		A
073		8362	Front module		
073		8364	Firmware front module		
076		8300	Basic unit firmware		Part number and version
077		–	DBG firmware		Only in DBG60B
08.			**Error memory**		
080 – 084	ᴸon6	8366 – 8370	Error t-0 – t-4	Error code	Background information for previous errors.
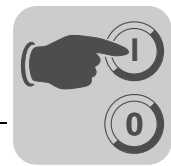
No.	FBG	Index dec.	Name	Range / factory setting	
				Display	MOVITOOLS® MotionStudio
09.			**Bus diagnostics**		
090		8451	PD configuration		
091		8452	Fieldbus type		
092		8453	Fieldbus baud rate		
093		8454	Fieldbus address		
094		8455	PO 1 setpoint		hex
095		8456	PO 2 setpoint		hex
096	Lonɡ	8457	PO 3 setpoint		hex
097		8458	PI 1 actual value		hex
098		8459	PI 2 actual value		hex
099		8460	PI 3 actual value		hex
–		10497.1	Bus status		
		10497.3	Device identification		
1..			**Setpoints / ramp generators** (on FBG only parameter set 1)		
10.			**Setpoint selection / frequency input**		
100		8461	Setpoint source	0 1 2 4 6 7 8 9 10 11 14	Bipolar / fixed setpoint <u>Unipolar / fixed setpoint</u> RS485/fixed setpoint Motor potentiometer / fixed setpoint Fixed setpoint + AI1 Fixed setpoint* + AI1 MASTER SBus1 MASTER RS485: SBus 1/fixed setpoint Frequency setpoint input/fixed setpoint Bipolar AI2 / Fixed setpoint
101	Short	8462	Control signal source	<u>0</u> 1 3 4	<u>Terminals</u> RS485 SBus 1 3-wire control
102		8840	Frequency scaling	0.1 – <u>10</u> – 120.00 kHz	
103		10247.15	FI1 reference	<u>0</u> 1	$\underline{n_{max}}$ $n_{reference}$
104		10247.10	Setpoint reference speed $n_{reference}$	0 – <u>3000</u> – 6000 rpm	
105		10416.1	Wire breakage detection	0 2 4 <u>7</u>	No response Immediate stop/malfunction Rapid stop/malfunction <u>Rapid stop/warning</u>
106		10247.11	FI1 characteristic curve x1	<u>0</u> – 100 %	
107		10247.12	FI1 characteristic curve y1	–100 % – <u>0</u> – +100 %	
108	Lonɡ	10247.13	FI1 characteristic curve x2	0 – <u>100 %</u>	
109		10247.14	FI1 characteristic curve y2	–100 % – 0 – <u>+100 %</u>	
11.			**Analog input 1 (0 – 10 V)**		

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	**MOVITOOLS® MotionStudio**
112	Short	8465	AI1 operating mode	<u>1</u> 5 6 7 8 9	<u>10 V, reference potential maximum speed</u> 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
116		10247.6	AI1 char. curve x1	<u>0</u> – 100 %	
117		10247.7	AI1 char. curve y1	−100 % – <u>0</u> – +100 %	
118		10247.8	AI1 char. curve x2	0 – <u>100</u> %	
119		10247.9	AI1 char. curve y2	−100 % – 0 – <u>+100 %</u>	
12.		**Analog input AI2 / FBG speed control module (option)**			
120		8469	AI2 operating mode	<u>0</u> 1 2	<u>No function</u> 0 – ±10 V + setpoint 0 – 10 V current limit
121	Long	8811	Addition FBG speed cont. module	<u>0</u> 1 2	<u>Off</u> On On (without fixed setpoint)
122		8799	Direction of rotation FBG manual operation	<u>0</u> 1 2	<u>Unipolar CW</u> Unipolar CCW Bipolar CW and CCW
126		10247.1	AI2 char. curve x1	<u>−100 %</u> – 0 – +100 % (<u>−10 V</u> – 0 – +10 V)	
127	Long	10247.2	AI2 char. curve y1	<u>−100 %</u> – 0 – +100 % (<u>−n_{max}</u> – 0 – +n_{max} / <u>0</u> – I_{max})	
128		10247.3	AI2 char. curve x2	−100 % – 0 – <u>+100%</u> (−10 V – 0 – <u>+10 V</u>)	
129		10247.4	AI2 char. curve y2	−100 % – 0 – <u>+100%</u> (−n_{max} – 0 – <u>+n_{max}</u> / 0 – <u>I_{max}</u>)	
13. / 14.		**Speed ramps 1 / 2**			
130 / 140		8807 / 9264	Ramp t11/t21 up	0.1 – <u>2</u> – 2000 s	
131 / 141		8808 / 9265	Ramp t11 / t21 down	0.1 – <u>2</u> – 2000 s	
134 / 144		8474 / 8482	Ramp t12 / t22	0.1 – <u>10</u> – 2000 s	
135 / 145	Long	8475 / 8483	S pattern t12 / t22	<u>0</u> 1 2 3	<u>Off</u> Weak Medium Strong
136 / 146		8476 / 8484	Stop ramp t13 / t23	0.1 – <u>2</u> – 20 s	
139 / 149		8928 / 8929	Ramp monitoring 1 / 2	<u>0</u> 1	<u>YES</u> NO
15.		**Motor potentiometer**			
150		8809	Ramp t3 up = down	0.2 – <u>20</u> – 50 s	
152	Long	8488	Save last setpoint	<u>oFF</u> on	<u>Off</u> On
16. / 17.		**Fixed setpoints**			

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	**MOVITOOLS® MotionStudio**
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 %	
2..		**Controller parameters**			
25.		**PI controller**			
250		8800	PI controller	0	Off
				1	Normal
				2	Inverted
251		8801	PI gain	0 – 1 – 64	
252		8802	I component	0 – 1 – 2000 s	
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**			
340		8533	Motor protection 1	OFF / ON ASYNCHRONOUS / ON SERVO	
341		8534	Cooling type 1	FAN COOLED / FORCED COOLING	
342		8535	Motor protection 2	OFF / ON ASYNCHRONOUS / ON SERVO	
343		8536	Cooling type 2	FAN COOLED / FORCED COOLING	
345 / 346		9114 / 9115	I_N UL monitoring 1 / 2	0.1 – 500 A	
4..		**Reference messages**			

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	MOVITOOLS® MotionStudio
40.			**Speed reference signal**		
400		8539	Speed reference value	0 – <u>750</u> – 5000 rpm	
401		8540	Hysteresis	0 – <u>100</u> – +500 rpm	
402	Lon6	8541	Deceleration time	0 – <u>1</u> – 9 s	
403		8542	Message = "1" if:	<u>0</u> 1	$n < n_{ref}$ $n > n_{ref}$
43.			**Current reference signal**		
430		8550	Current reference value	0 – <u>100</u> – 150 % I_N	
431		8551	Hysteresis	0 – <u>5</u> – 30 % I_N	
432	Lon6	8552	Deceleration time	0 – <u>1</u> – 9 s	
433		8553	Signal = "1" when	<u>0</u> 1	$I < I_{ref}$ $I > I_{ref}$
44.			**I_{max} signal**		
440		8554	Hysteresis	0 – <u>5</u> – 50 % I_N	
441		8555	Deceleration time	0 – <u>1</u> – 9 s	
442	Lon6	8556	Signal = "1" when	<u>0</u> 1	$I < I_{max}$ $I > I_{max}$
45.			**PI controller reference message**		
450		8813	PI actual value reference	<u>0.0</u> – 100.0 %	
451	Lon6	8796	Message = "1" if:	0 <u>1</u>	PI Actual value < PI ref <u>PI Actual value > PI ref</u>
5..			**Control functions** (on FBG only parameter set 1)		
50.			**Speed monitoring 1 / 2**		
500 / 502		8557 / 8559	Speed monitoring 1 / 2	<u>0</u> 3	<u>Off</u> Motor/regenerative
501 / 503	Lon6	8558 / 8560	Delay time 1/2	0 – <u>1</u> – 10 s	
54.			**Gear unit/motor monitoring**		
540		9284	Response to drive vibration/warning	<u>1</u>	<u>Display error</u>
541		9285	Response to drive vibration/fault	<u>7</u>	<u>Rapid stop/warning</u>
542		9286	Response to oil aging/error	<u>1</u>	<u>Display error</u>
543	Lon6	9287	Response to oil aging/warning	<u>1</u>	<u>Display error</u>
544		9288	Oil aging / overtemperature	<u>1</u>	<u>Display error</u>
545		9289	Oil aging / ready signal	<u>1</u>	<u>Display error</u>
549		9290	Response to brake wear	<u>1</u>	<u>Display error</u>
56.			**Ex-e motor current limitation**		
560		9293	Ex-e motor current limit		ON / <u>OFF</u>

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	**MOVITOOLS® MotionStudio**
561		9294	Frequency A		0 – <u>5</u> – 60 Hz
562		9295	Current limit A		0 – <u>50</u> – 150 %
563		9296	Frequency B		0 – <u>10</u> – 104 Hz
564		9297	Current limit B		0 – <u>80</u> – 200 %
565		9298	Frequency C		0 – <u>25</u> – 104 Hz
566		9299	Current limit C		0 – <u>100</u> – 200 %
567		10247.20	Frequency D		0 – <u>50</u> – 104 Hz
568		10247.21	Current limit D		0 – <u>100</u> – 200 %
57.	Motor protection				
570		10247.22	Frequency E		0 – <u>87</u> – 104 Hz
571		10247.23	Current limit E		0 – <u>100</u> – 200 %
6..	**Terminal assignment**				
60.	**Binary inputs**				
601		8336	Binary input DI02 assignment	0: No function	
602		8337	Binary input DI03 assignment	1: Enable / stop (factory setting DI03)	
603	Short	8338	Binary input DI04 assignment	2: CW/stop	
				3: CCW / stop (factory setting DI02)	
				4: n11/n21 (factory setting DI04)	
604		8339	Binary input DI05 assignment	5: n12/n22 (factory setting DI05)	
				n13 = n11 + n12	
608		8844	Binary input DI00 assignment	6: Changing the fixed setpoint	
				7: Parameter set switchover	
61.			**Binary inputs option**	8: Ramp switchover	
				9: Motor potentiometer up	
610		8340	Binary input DI10 assignment	10: Motor potentiometer down	
611		8341	Binary input DI11 assignment	11: /External error	
				12: Fault reset (factory setting DI00)	
612	Short	8342	Binary input DI12 assignment	19: Slave free running	
				20: Setpoint acceptance active	
613		8343	Binary input DI13 assignment	26: TF signal (only with DI05)	
				27: Vibration/warning	
614		8344	Binary input DI14 assignment	28: Vibration/fault	
				29: Brake wear	
615		8345	Binary input DI15 assignment	30: Controller inhibit	
				33: Oil aging/warning	
616		8346	Binary input DI16 assignment	34: Oil aging/fault	
				35: Oil aging / overtemperature	
				36: Oil aging/ready	
62.	**Binary outputs**				

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	**MOVITOOLS® MotionStudio**
620		8350	Binary output DO01 assignment	0	No function
				1	/Malfunction (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)
	Short			8	Parameter set
				9	Speed reference signal
				11	Setpoint-actual value comparison signal
				12	Current reference message
				13	Imax signal
				21	IPOS output
				22	/IPOS fault
				23	PI controller actual value reference
				24	Ex-e current limit active
				27	Safe stop
				30	Ixt warning
				31	Ixt fault
64.			**Analog outputs AO1** (optional)		
640		8568	AO1 analog output	0	No function
				1	Ramp generator input
				2	Setpoint speed
				3	Actual speed
				4	Actual frequency
				5	Output current
	Lon6			6	Active current
				7	Unit utilization
				11	Actual speed (signed)
				12	Actual frequency (signed)
641		10248.5	AO1 reference	0	3000 rpm, 100 Hz, 150%
				1	n_{max}
				2	$n_{set\ reference}$
642		8570	AO1 Operating mode	0	No function
				2	0 – 20 mA
				3	4 – 20 mA
				4	0 – 10 V
646		10246.1	AO1 Char. curve x1	−100 % – 0 – +100 %	
647		10246.2	AO1 Char. curve y1	−100 – 100 %	
648	Lon6	10246.3	AO1 Char. curve x2	−100 % – 0 – +100 %	
649		10246.4	AO1 Char. curve y2	−100 – 100 %	
7..			**Control functions** (on FBG only parameter set 1)		
70.			**Operating modes 1 / 2**		
700 / 701		8574 / 8575	Operating mode 1 / 2	0	VFC
				2	VFC & Hoist
				3	VFC & DC braking
				4	VFC & flying start function
				21	V/f characteristic curve
				22	V/f & DC braking
71.			**Standstill current 1 / 2**		

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	**MOVITOOLS® MotionStudio**
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	LonG	8592	Slave setpoint	0 1 2 3	Master/slave off Speed RS485 Speed SBus Speed RS485 + SBus
751		8593	Scaling slave setpoint		1, 00
76.		**Manual operation**			
760	LonG	8798	Lock RUN / STOP / RESET 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	No Standard Delivery state Delivery state NEMA
803		8595	Parameter lock	oFF on	Off On
804		8596	Reset statistics data	–	No action Error memory
805	LonG	8660	Rated line voltage		50 – 500 V

No.	FBG	Index dec.	Name	Range / factory setting		
				Display	MOVITOOLS® MotionStudio	
806		–	Copy DBG → MOVITRAC® B		Yes No	
807		–	Copy MOVITRAC® B → DBG		Yes No	
808		10204.3	24 V output voltage	Off On	Off On	
809		10204.1	IPOS enable	–	Off On	
81.		**Serial communication**				
810	LonG	8597	RS485 address	0 – 99		
811		8598	RS485 group address	100 – 199		
812		8599	RS485 Timeout interval	0 – 650 s		
819		8606	Fieldbus timeout interval	Fieldbus timeout interval display		
82.		**Brake operation 1 / 2**				
820 / 821		8607 / 8608	4-quadrant opera-tion 1/2	oFF on	Off On	
83.		**Error responses**				
830	LonG	8609	Response terminal "external fault"	2	Immediate stop/malfunction	
833		8612	Response timeout RS485	4	Rapid stop / Malfunction (*Factory setting for P830*)	
836		8615	Response to SBus timeout	7	Rapid stop / Warning (*Factory setting for P833 / P836*)	
84.		**Reset behavior**				
840		8617	Manual reset		Yes No	
841	LonG	8618	Auto reset	Off On	Off On	
842	LonG	8619	Restart time		1 – 3 – 30 s	
85.		**Scaling actual speed value**				
850		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	LonG	8772 / 8773	User unit	Text		
853		9312	Scaled speed FBG	0	Speed	
				1	Scaled speed	
86.		**Modulation 1 / 2**				

No.	FBG	Index dec.	Name	Range / factory setting	
				Display	**MOVITOOLS® MotionStudio**
860 / 861	Lon6	8620 / 8621	PWM frequency 1 / 2	<u>4</u> 8 12 16	<u>4 kHz</u> 8 kHz 12 kHz 16 kHz
862 / 863		8751 / 8752	PWM fix 1 / 2	on <u>oFF</u>	On <u>Off</u>
87.		**Process data parameter setting**			
870	Lon6	8304	Setpoint description PO1	0 1 5 8 9 10 11 12 13	<u>No function</u> (factory setting *P872*) <u>Setpoint speed</u> (factory setting *P871*) Max. speed Ramp <u>Control word 1</u> (*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	0 1 2 3 6 7 8 9 10	No function <u>Actual speed</u> (*factory setting P874*) <u>Output current</u> (factory setting *P875*) Active current <u>Status word 1</u> (*factory setting P873*) Status word 2 Actual speed % IPOS PI-DATA PI controller actual value %
874		8308	Actual value description PI2		
875		8309	Actual value description PI3		
876	Lon6	8622	PO data enable	No Yes	No <u>Yes</u>
88.		**Serial communication SBus**			
880	Lon6	8937	SBus protocol	<u>0 / MOVILINK</u> 1 / CANopen	
881		8600	SBus address	<u>0</u> – 63	
882		8601	SBus group address	<u>0</u> – 63	
883		8602	SBus timeout interval	<u>0</u> – 650 s	
884	Lon6	8603	SBus baud rate	125 250 <u>500</u> 1000	125 kBd 250 kBd <u>500 kBd</u> 1 Mbaud
886		8989	CANopen address	1 – <u>2</u> – 127	
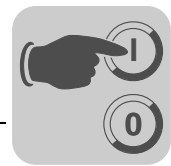
10 Operation

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.

Check that the required data set has been copied to the inverter.

Data backup with FBG11B
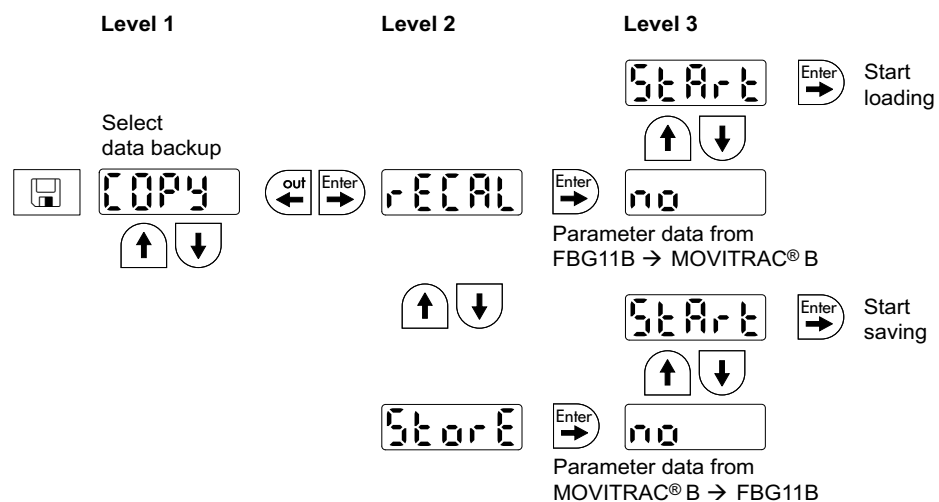
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After copying data, the MOVITRAC® B is inhibited. The inhibited status is indicated by a flashing STOP in the status display. The status LED also slowly flashes yellow.

You can revoke the inhibit by taking one of the following measures:

- Press the RUN key on the FBG11B.
- Switch off the power supply, wait for 10 seconds and switch the power 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 copy MOVITRAC® B → 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

• Right-click to open the context menu

• Select menu [RUN/STOP via software keypad] [1]

• Select [RUN] in the software keypad [2]
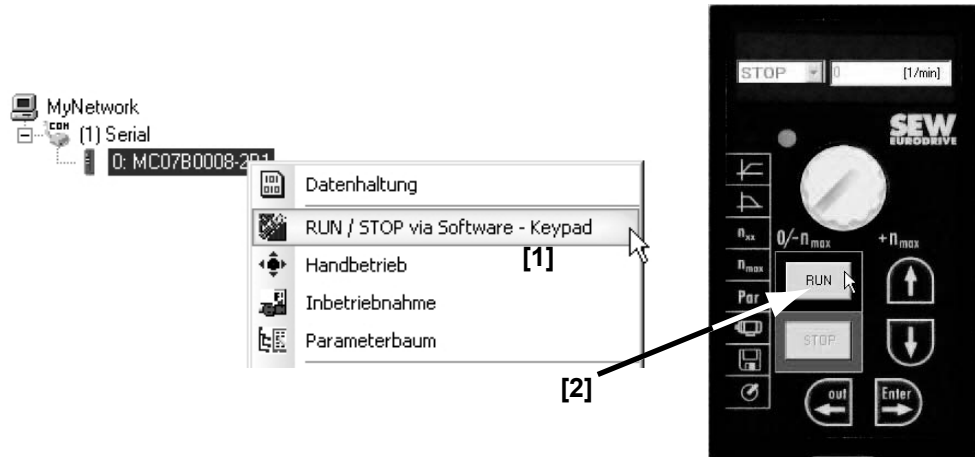
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10.2 Return codes (r19 – r38)

Return codes when entering / editing a unit parameter in the FBG11B:

No.	Designation	Meaning
18	Only read access	Parameter cannot be changed
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	Enabled	You cannot perform this function in ENABLED status
34	Error in sequence	• Error while saving in FBG11B. • Startup not performed with FBG. Perform 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 Basic unit / keypad FBG11B

The status displays on the unit are as follows:

State	Display (optionally with FBG11B key pad)	Basic unit status LED flash code	Unit status (high byte in status word 1)
"ENABLE"	Speed	Constant green light	4
"ENABLE" at current limit	Speed flashes	Rapid green flashing	
"CURRENT AT STAND-STILL"	`dc`	Slow green flashing	3
"NO ENABLE"	`Stop`	Constant yellow light	2
"FACTORY SETTING"	`SEt`	Rapid yellow flashing	8
"CONTROL.INHIBIT"	`oFF`	Rapid yellow flashing	1
"24 V operation"	`24U` flashing	Slow yellow flashing	0
"SAFE STOP"[1]	`U` flashing or `24U` flashing	Slow yellow flashing	17
FBG manual mode active or inverter stopped using STOP button.	FGB manual operation symbol or "stop" is flashing	Yellow on long, off briefly	
Timeout	Errors 43 / 47	Flashing green/yellow	
Copy	Error 97	Flashing red/yellow	
System error	Error 10 / 17 – 24 / 25 / 32 / 37 / 38 / 45 / 77 / 80 / 94	Constant red light	
Overvoltage / phase failure	Errors 4 / 6 / 7	Slow red flashing	
Overload	Errors 1 / 3 / 11 / 44 / 84	Rapid red flashing	
Monitoring	Errors 8 / 26 / 34 / 81 / 82	2 x red flashing	
Motor protection	Errors 31 / 84	3 x red flashing	

1)   "U" flashing (status 17) if connected to supply system, "24U" flashing (status 0) if in backup mode.

- ⚠ **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.

Cause for controller inhibit (OFF)

The controller inhibit (OFF) can be caused by the following conditions:

- Binary input terminal (DI00, DI02 – DI05) programmed to controller inhibit and activated.

- Controller inhibit due to PC manual mode via MOVITOOLS® MotionStudio.

- Temporary controller inhibit: Is triggered if a change of parameter *P100 setpoint source* would directly cause an enable signal. The temporary controller inhibit is removed once the enable signal is reset for the first time.

- Controller inhibit set via IPOS control word H484.

10.3.2 Status of binary inputs / outputs

The following parameters are available in the parameter menu as display parameters:

- *P039 Binary inputs of basic unit*
- *P048 Binary inputs option*
- *P059 binary outputs*

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* (dI = binary inputs option), or *P059* (do = binary outputs) are output.
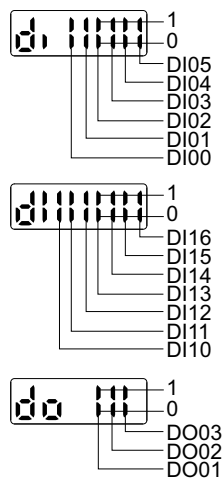
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If no FIO21B with binary inputs is available, the display will show `dl - - -`.
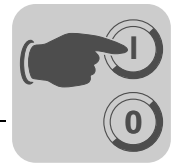
10.4   DBG60B keypad

10.4.1 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
ERROR    9
STARTUP
```
Error display

10.4.2 Information messages

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

No.	Text DBG60B/SHELL	Description
1	ILLEGAL INDEX	Index addressed via interface not available.
2	NOT IMPLEMENT.	• Attempt to execute a 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 *P803* = "ON", parameter cannot be altered.
5	SETUP ACTIVE	Attempt to change parameters while 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 MISS-ING	Set terminal DIØØ "/Controller inhibit" = "0" for the selected function.
14	INVALID VALUE	Attempt to enter an invalid value.
--		
16	PARAM. NOT SAVED	Overflow of EEPROM buffer, e.g. through cyclic write access. Parameter not saved 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

10.4.3 Functions of the DBG60B keypad

*Key assignments
for DBG60B*
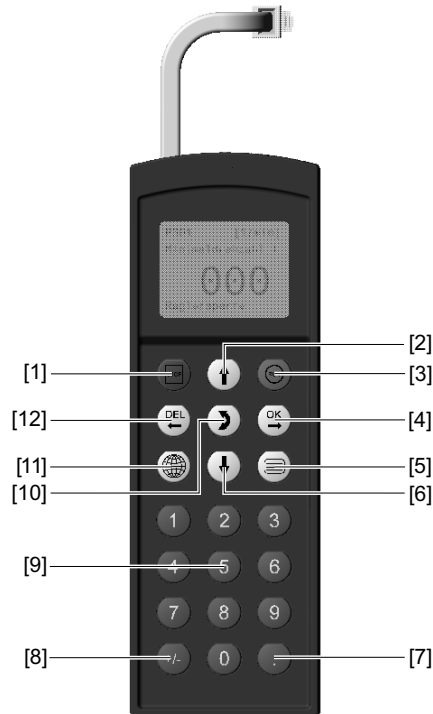
247460747

[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 to do so:

- 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 DBG60B

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   rpm
> 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.

> <u>PARAMETER MODE</u>
> VARIABLE MODE
> BASIC VIEW

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 display. You can select which parameter should be the wake up parameter. Wake up parameter can be:

• Parameter (→ parameter mode)

• Parameter from the user menu (→ user menu)

• Basic display

Proceed as follows to save a wake-up parameter:

• First select the required parameter in parameter mode.

• In the context menu, select the menu item "XXXX INITIAL PARAM.". "XXXX" is the selected initial parameter. Confirm your selection by pressing OK.

11 Service / List of Errors

11.1 Unit information

11.1.1 Error 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 error. 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 *F07 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 state of the inverter

- Inverter state

- 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 stop/malfunction (immediate switch-off with locking)

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.

Rapid stop/malfunction (stop with locking)

This error 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 error 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.
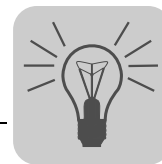
Rapid stop/warning (stop without locking)

The error response corresponds to rapid stop/malfunction but the inverter does not revoke the ready signal and the error output is set.

Timeout RS485 / SBus:

If the inverter is controlled via a communication interface (RS485 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. Once the communication has been reestablished, the error message is reset.

11.1.3 Reset

Reset basic unit

An error message can be reset 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 button).

The STOP/RESET button 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   Error list (F00 – F113)

No.	Designation	Response	Possible cause	Measure
00	No error	–	–	–
01	Overcurrent	Immediate switch-off with inhibit.	• Short circuit at output	• Rectify the short circuit
			• Switching at the 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 the MOVITRAC$^®$ B
			• Ground fault in the motor supply lead	• Eliminate ground fault
			• Overcurrent (see *F01*)	• See *F01*

No.	Designation	Response	Possible cause	Measure
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 resistance too high	• Check technical data of braking resistor
			• Brake chopper defective	• Replace the 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 line cable
			• Supply voltage too low	• Check the supply voltage
07	DC link over-voltage	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 set deceleration time $P501$[1]
			• Phase failure in supply system	• Check line 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
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	Overtemperature	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 error reoccurs.
25	EEPROM	Stop with inhibit	• Error while accessing EEPROM	• Restore factory settings, perform reset and reset parameters. • Consult SEW Service if the error reoccurs
26	External terminal	Programmable	• Read in external fault signal via programmable input.	• Eliminate respective cause; reprogram terminal if necessary

No.	Designation	Response	Possible cause	Measure
31	TF/TH sensor tripped	Stop without inhibit • "Ready" signal is maintained	• 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	Immediate switch-off with inhibit.	• Wrong operating mode selected	Permitted modes: • V/f, VFC, VFC hoist Incorrect modes: • Flying start function • DC braking • Group operation
			• Non-permitted parameter set	• Use parameter set 1 only
			• No Ex-e motor started up	• Start up Ex-e motor
			• Incorrect parameterization of the frequency points	• Frequency A < frequency B • Frequency B < frequency C
			• Incorrect parameterization of the current limits	• Current limit A < current limit B • Current limit B < current limit C
36	Option missing	Immediate switch-off with inhibit.	• Type of option card not allowed	• Use correct option card
			• Setpoint source, control signal source or operating mode not permitted for this option card	• Set correct setpoint source. • Set correct control signal source. • Set the correct operating mode. • Check parameters *P120* and *P121*
			• Required option missing	• Check the following parameters: • *P121* for FBG11B • *P120* and *P642* for FIO12B
			• Front module FIO21B not supplied	• Set *P808* to "On" or supply basic unit with external 24 V
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 error 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 error reoccurs.
43	RS485 timeout	Stop without locking[2]	• Connection between inverter and PC interrupted.	• Check connection between inverter and PC
			• Communication to FSE24B interrupted	• Check voltage supply • Check *P808*
44	Unit utilization	Immediate switch-off with inhibit.	• Unit utilization (I × t value) exceeded	• Decrease power output • Extend ramps • If neither is possible: Use a larger inverter
45	Initialization	Immediate switch-off with inhibit.	• Error during initialization	• Contact SEW Service.

No.	Designation	Response	Possible cause	Measure
47	System bus 1 timeout	Stop without inhibit[2]	• Error during communication via system bus	• Check system bus connection • Check P808 • Check voltage supply of FSE24B • Check EtherCAT communication with connected FSE24B
77	IPOS control word	Stop with inhibit	• System malfunction	• Contact SEW Service.
80	RAM test	Immediate disconnection	• Internal unit error, 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	• Check connection between inverter and motor • Check startup data and perform new startup, if necessary.
			• Motor cable cross section too small	• 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	• Check connection between inverter and motor
			• Rated motor power too small in relation to rated inverter power	• Check startup data and perform new startup, if necessary.
84	Motor protection	Stop with inhibit	• Motor utilization too high.	• Check $P345$ / $P346$ I_N-UL monitoring • Reduce load • Extend ramps • Longer rest periods
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 acknowledgement: • Load factory setting or complete data set from parameter module
98	CRC error flash	Immediate disconnection	• Internal unit error, flash memory defective.	• Send unit in for repair
100	Vibration/warning	Display error	• Vibration sensor warning (see "DUV10A diagnostics unit" operating instructions)	• Determine cause for vibration, operation possible until *F101*
101	Vibration error	Rapid stop	• Vibration sensor signals error	• 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

No.	Designation	Response	Possible cause	Measure
106	Brake wear	Display error	• Brake lining worn	• Replace brake lining (see "Motors" operating instructions)
110	Ex-e protection	Emergency stop	• Duration of operation below 5 Hz exceeded	• Check configuration • Shorten duration of operation below 5 Hz
111	System bus (SBus) error	This error number signals the EtherCAT or fieldbus master that the communication between FSE24B and MOVITRAC® B is interrupted. MOVITRAC® B would detect error 47.		• Check FSE24B plug connection
113	Analog input open circuit	Programmable	• AI1 analog input open circuit	• Check wiring
116	Error application module *Suberror:* 14: Encoder error 29: Limit switch contacted 42: Lag error 78: Software limit switch reached			

1) Change parameters *P500* / *P502* and *P501* / *P503* to set the speed monitoring. 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 **01805 739 4357**.

11.3.2 Sending a unit in for repair

Consult **SEW Electronics Service if you are unable to rectify the error**.

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 (see nameplate)
- Type 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
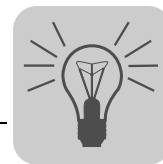
11.4   Extended storage

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 de-energized. This effect can damage the capacitors if the unit is connected using the rated voltage after a longer period of storage.

If you have not performed maintenance regularly, SEW-EURODRIVE recommends that you increase the line voltage slowly up to the maximum voltage. This can be done, for example, by using a variable transformer for which the output voltage has been set according to the following overview. 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:

• Step 1: AC 350 V for 15 minutes

• Step 2: AC 420 V for 15 minutes

• Step 3: AC 500 V for 1 hour

AC 230 V units:

• Step 1: AC 170 V for 15 minutes

• Step 2: AC 200 V for 15 minutes

• Step 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.

12   Address List

Germany			
Headquarters Production plant Vertrieb	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal Postfachadresse Postfach 3023 • D-76642 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-1970 http://www.sew-eurodrive.de sew@sew-eurodrive.de
Fertigungswerk / Industriegetriebe	**Bruchsal**	SEW-EURODRIVE GmbH & Co KG Christian-Pähr-Str.10 D-76646 Bruchsal	Tel. +49 7251 75-0 Fax +49 7251 75-2970
Service Compe- tence Center	**Mitte**	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 1 D-76676 Graben-Neudorf	Tel. +49 7251 75-1710 Fax +49 7251 75-1711 sc-mitte@sew-eurodrive.de
	Nord	SEW-EURODRIVE GmbH & Co KG Alte Ricklinger Straße 40-42 D-30823 Garbsen (bei Hannover)	Tel. +49 5137 8798-30 Fax +49 5137 8798-55 sc-nord@sew-eurodrive.de
	Ost	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (bei Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
	Süd	SEW-EURODRIVE GmbH & Co KG Domagkstraße 5 D-85551 Kirchheim (bei München)	Tel. +49 89 909552-10 Fax +49 89 909552-50 sc-sued@sew-eurodrive.de
	West	SEW-EURODRIVE GmbH & Co KG Siemensstraße 1 D-40764 Langenfeld (bei Düsseldorf)	Tel. +49 2173 8507-30 Fax +49 2173 8507-55 sc-west@sew-eurodrive.de
	Elektronik	SEW-EURODRIVE GmbH & Co KG Ernst-Blickle-Straße 42 D-76646 Bruchsal	Tel. +49 7251 75-1780 Fax +49 7251 75-1769 sc-elektronik@sew-eurodrive.de
	Drive Service Hotline / 24-h-Rufbereitschaft		+49 180 5 SEWHELP +49 180 5 7394357 14 Cent/Min. aus dem deutschen Fest-netz, max. 42 Cent/Min. aus Mobil-funknetzen
	Weitere Anschriften über Service-Stationen in Deutschland auf Anfrage.		

Frankreich			
Fertigungswerk Vertrieb Service	**Haguenau**	SEW-USOCOME 48-54 route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
Fertigungswerk	**Forbach**	SEW-USOCOME Zone industrielle Technopôle Forbach Sud B. P. 30269 F-57604 Forbach Cedex	Tel. +33 3 87 29 38 00
Montagewerk Vertrieb Service	**Bordeaux**	SEW-USOCOME Parc d'activités de Magellan 62 avenue de Magellan - B. P. 182 F-33607 Pessac Cedex	Tel. +33 5 57 26 39 00 Fax +33 5 57 26 39 09
	Lyon	SEW-USOCOME Parc d'affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15

Frankreich			
	Nantes	SEW-USOCOME Parc d'activités de la forêt 4 rue des Fontenelles F-44140 Le Bignon	Tel. +33 2 40 78 42 00 Fax +33 2 40 78 42 20
	Paris	SEW-USOCOME Zone industrielle 2 rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Weitere Anschriften über Service-Stationen in Frankreich auf Anfrage.		

Ägypten			
Vertrieb **Service**	**Cairo**	Copam Egypt for Engineering & Agencies 33 EI Hegaz ST, Heliopolis, Cairo	Tel. +20 2 22566-299 +1 23143088 Fax +20 2 22594-757 http://www.copam-egypt.com/ copam@datum.com.eg

Algerien			
Vertrieb	**Alger**	REDUCOM Sarl 16, rue des Frères Zaghnoune Bellevue 16200 El Harrach Alger	Tel. +213 21 8214-91 Fax +213 21 8222-84 info@reducom-dz.com http://www.reducom-dz.com

Argentinien			
Montagewerk **Vertrieb**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar http://www.sew-eurodrive.com.ar

Australien			
Montagewerke **Vertrieb** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Belgien			
Montagewerk **Vertrieb** **Service**	**Brüssel**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.be info@sew-eurodrive.be
Service Compe- **tence Center**	**Industrie-** **getriebe**	**SEW-EURODRIVE n.v./s.a.** Rue de Parc Industriel, 31 BE-6900 Marche-en-Famenne	Tel. +32 84 219-878 Fax +32 84 219-879 http://www.sew-eurodrive.be service-wallonie@sew-eurodrive.be

Brasilien			
Fertigungswerk **Vertrieb** **Service**	**São Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 152 - Rodovia Presi- dente Dutra Km 208 Guarulhos - 07251-250 - SP SAT - SEW ATENDE - 0800 7700496	Tel. +55 11 2489-9133 Fax +55 11 2480-3328 http://www.sew-eurodrive.com.br sew@sew.com.br

Bulgarien			
Vertrieb	**Sofia**	BEVER-DRIVE GmbH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9151160 Fax +359 2 9151166 bever@bever.bg

Chile			
Montagewerk Vertrieb Service	Santiago de Chile	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile Postfachadresse Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 http://www.sew-eurodrive.cl ventas@sew-eurodrive.cl

China			
Fertigungswerk Montagewerk Vertrieb Service	Tianjin	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25323273 info@sew-eurodrive.cn http://www.sew-eurodrive.com.cn
Montagewerk Vertrieb Service	Suzhou	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew-eurodrive.cn
	Guangzhou	SEW-EURODRIVE (Guangzhou) Co., Ltd. No. 9, JunDa Road East Section of GETDD Guangzhou 510530	Tel. +86 20 82267890 Fax +86 20 82267922 guangzhou@sew-eurodrive.cn
	Shenyang	SEW-EURODRIVE (Shenyang) Co., Ltd. 10A-2, 6th Road Shenyang Economic Technological Development Area Shenyang, 110141	Tel. +86 24 25382538 Fax +86 24 25382580 shenyang@sew-eurodrive.cn
	Wuhan	SEW-EURODRIVE (Wuhan) Co., Ltd. 10A-2, 6th Road No. 59, the 4th Quanli Road, WEDA 430056 Wuhan	Tel. +86 27 84478388 Fax +86 27 84478389 wuhan@sew-eurodrive.cn
	Xi'An	SEW-EURODRIVE (Xi'An) Co., Ltd. No. 12 Jinye 2nd Road Xi'An High-Technology Industrial Development Zone Xi'An 710065	Tel. +86 29 68686262 Fax +86 29 68686311 xian@sew-eurodrive.cn
	Weitere Anschriften über Service-Stationen in China auf Anfrage.		

Dänemark			
Montagewerk Vertrieb Service	Kopenhagen	SEW-EURODRIVEA/S Geminivej 28-30 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Elfenbeinküste			
Vertrieb	Abidjan	SICA Société industrielle & commerciale pour l'Afrique 165, Boulevard de Marseille 26 BP 1115 Abidjan 26	Tel. +225 21 25 79 44 Fax +225 21 25 88 28 sicamot@aviso.ci

Estland			
Vertrieb	Tallin	ALAS-KUUL AS Reti tee 4 EE-75301 Peetri küla, Rae vald, Harjumaa	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finnland			
Montagewerk Vertrieb Service	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 201 589-300 Fax +358 3 780-6211 http://www.sew-eurodrive.fi sew@sew.fi
Fertigungswerk Montagewerk	**Karkkila**	SEW Industrial Gears Oy Valurinkatu 6, PL 8 FI-03600 Karkkila, 03601 Karkkila	Tel. +358 201 589-300 Fax +358 201 589-310 sew@sew.fi http://www.sew-eurodrive.fi

Gabun			
Vertrieb	**Libreville**	ESG Electro Services Gabun Feu Rouge Lalala 1889 Libreville Gabun	Tel. +241 741059 Fax +241 741059 esg_services@yahoo.fr

Griechenland			
Vertrieb	**Athen**	Christ. Boznos & Son S.A. 12, K. Mavromichali Street P.O. Box 80136 GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Großbritannien			
Montagewerk Vertrieb Service	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate Normanton West Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk
	Drive Service Hotline / 24-h-Rufbereitschaft		Tel. 01924 896911

Hong Kong			
Montagewerk Vertrieb Service	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 36902200 Fax +852 36902211 contact@sew-eurodrive.hk

Indien			
Firmensitz Montagewerk Vertrieb Service	**Vadodara**	SEW-EURODRIVE India Private Limited Plot No. 4, GIDC POR Ramangamdi • Vadodara - 391 243 Gujarat	Tel. +91 265 3045200, +91 265 2831086 Fax +91 265 3045300, +91 265 2831087 http://www.seweurodriveindia.com salesvadodara@seweurodrivein-dia.com
Montagewerk Vertrieb Service	**Chennai**	SEW-EURODRIVE India Private Limited Plot No. K3/1, Sipcot Industrial Park Phase II Mambakkam Village Sriperumbudur - 602105 Kancheepuram Dist, Tamil Nadu	Tel. +91 44 37188888 Fax +91 44 37188811 saleschennai@seweurodriveindia.com

Irland			
Vertrieb Service	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458 info@alperton.ie http://www.alperton.ie

Israel			
Vertrieb	**Tel Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 http://www.liraz-handasa.co.il office@liraz-handasa.co.il

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

Japan			
Montagewerk **Vertrieb** **Service**	**Iwata**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Iwata Shizuoka 438-0818	Tel. +81 538 373811 Fax +81 538 373855 http://www.sew-eurodrive.co.jp sewjapan@sew-eurodrive.co.jp

Kamerun			
Vertrieb	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 33 431137 Fax +237 33 431137 electrojemba@yahoo.fr

Kanada			
Montagewerke **Vertrieb** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, ON L6T 3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.watson@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. Tilbury Industrial Park 7188 Honeyman Street Delta, BC V4G 1G1	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Lasalle, PQ H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Weitere Anschriften über Service-Stationen in Kanada auf Anfrage.		

Kasachstan			
Vertrieb	**Almaty**	ТОО "СЕВ-ЕВРОДРАЙВ" пр.Райымбека, 348 050061 г. Алматы Республика Казахстан	Тел. +7 (727) 334 1880 Факс +7 (727) 334 1881 http://www.sew-eurodrive.kz sew@sew-eurodrive.kz

Kolumbien			
Montagewerk **Vertrieb** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 http://www.sew-eurodrive.com.co sewcol@sew-eurodrive.com.co

Kroatien			
Vertrieb **Service**	**Zagreb**	KOMPEKS d. o. o. Zeleni dol 10 HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@inet.hr

Lettland			
Vertrieb	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 6 7139253 Fax +371 6 7139386 http://www.alas-kuul.com info@alas-kuul.com

Libanon			
Vertrieb	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 510 532 Fax +961 1 494 971 ssacar@inco.com.lb
Jordanien Kuwait Saudi-Arabien Syrien	**Beirut**	Middle East Drives S.A.L. (offshore) Sin El Fil. B. P. 55-378 Beirut	Tel. +961 1 494 786 Fax +961 1 494 971 info@medrives.com http://www.medrives.com

Litauen			
Vertrieb	**Alytus**	UAB Irseva Statybininku 106C LT-63431 Alytus	Tel. +370 315 79204 Fax +370 315 56175 irmantas@irseva.lt http://www.sew-eurodrive.lt

Luxemburg			
Montagewerk **Vertrieb** **Service**	**Brüssel**	**SEW-EURODRIVE n.v./s.a.** Researchpark Haasrode 1060 Evenementenlaan 7 BE-3001 Leuven	Tel. +32 16 386-311 Fax +32 16 386-336 http://www.sew-eurodrive.lu info@sew-eurodrive.be

Malaysia			
Montagewerk **Vertrieb** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 sales@sew-eurodrive.com.my

Marokko			
Vertrieb **Service**	**Mohammedia**	SEW EURODRIVE SARL Z.I. Sud Ouest - Lot 28 2ème étage Mohammedia 28810	Tel. +212 523 32 27 80/81 Fax +212 523 32 27 89 sew@sew-eurodrive.ma http://www.sew-eurodrive.ma

Mexiko			
Montagewerk **Vertrieb** **Service**	**Quéretaro**	SEW-EURODRIVE MEXICO SA DE CV SEM-981118-M93 Tequisquiapan No. 102 Parque Industrial Quéretaro C.P. 76220 Quéretaro, México	Tel. +52 442 1030-300 Fax +52 442 1030-301 http://www.sew-eurodrive.com.mx scmexico@seweurodrive.com.mx

Neuseeland			
Montagewerke **Vertrieb** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 http://www.sew-eurodrive.co.nz sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Niederlande			
Montagewerk **Vertrieb** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 Service: 0800-SEWHELP http://www.sew-eurodrive.nl info@sew-eurodrive.nl

Norwegen			
Montagewerk Vertrieb Service	Moss	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 24 10 20 Fax +47 69 24 10 40 http://www.sew-eurodrive.no sew@sew-eurodrive.no

Österreich			
Montagewerk Vertrieb Service	Wien	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://www.sew-eurodrive.at sew@sew-eurodrive.at

Pakistan			
Vertrieb	Karatschi	Industrial Power Drives Al-Fatah Chamber A/3, 1st Floor Central Commercial Area, Sultan Ahmed Shah Road, Block 7/8, Karachi	Tel. +92 21 452 9369 Fax +92-21-454 7365 seweurodrive@cyber.net.pk

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

Polen			
Montagewerk Vertrieb Service	Łódź	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Łódź	Tel. +48 42 676 53 00 Fax +48 42 676 53 49 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl
	Service	Tel. +48 42 6765332 / 42 6765343 Fax +48 42 6765346	Linia serwisowa Hotline 24H Tel. +48 602 739 739 (+48 602 SEW SEW) serwis@sew-eurodrive.pl

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

Rumänien			
Vertrieb Service	Bukarest	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russland			
Montagewerk Vertrieb Service	St. Petersburg	ZAO SEW-EURODRIVE P.O. Box 36 195220 St. Petersburg Russia	Tel. +7 812 3332522 +7 812 5357142 Fax +7 812 3332523 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Schweden			
Montagewerk Vertrieb Service	Jönköping	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442 00 Fax +46 36 3442 80 http://www.sew-eurodrive.se jonkoping@sew.se

Schweiz			
Montagewerk Vertrieb Service	Basel	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch

Senegal			
Vertrieb	Dakar	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 338 494 770 Fax +221 338 494 771 senemeca@sentoo.sn http://www.senemeca.com

Serbien			
Vertrieb	Beograd	DIPAR d.o.o. Ustanicka 128a PC Košum, IV sprat SRB-11000 Beograd	Tel. +381 11 347 3244 / +381 11 288 0393 Fax +381 11 347 1337 office@dipar.rs

Singapur			
Montagewerk Vertrieb Service	Singapore	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 Fax +65 68612827 http://www.sew-eurodrive.com.sg sewsingapore@sew-eurodrive.com

Slowakei			
Vertrieb	Bratislava	SEW-Eurodrive SK s.r.o. Rybničná 40 SK-831 06 Bratislava	Tel. +421 2 33595 202 Fax +421 2 33595 200 sew@sew-eurodrive.sk http://www.sew-eurodrive.sk
	Žilina	SEW-Eurodrive SK s.r.o. Industry Park - PChZ ulica M.R.Štefánika 71 SK-010 01 Žilina	Tel. +421 41 700 2513 Fax +421 41 700 2514 sew@sew-eurodrive.sk
	Banská Bystrica	SEW-Eurodrive SK s.r.o. Rudlovská cesta 85 SK-974 11 Banská Bystrica	Tel. +421 48 414 6564 Fax +421 48 414 6566 sew@sew-eurodrive.sk
	Košice	SEW-Eurodrive SK s.r.o. Slovenská ulica 26 SK-040 01 Košice	Tel. +421 55 671 2245 Fax +421 55 671 2254 sew@sew-eurodrive.sk

Slowenien			
Vertrieb Service	Celje	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO - 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

Spanien			
Montagewerk Vertrieb Service	Bilbao	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 94 43184-70 Fax +34 94 43184-71 http://www.sew-eurodrive.es sew.spain@sew-eurodrive.es

Südafrika			
Montagewerke Vertrieb Service	Johannesburg	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 http://www.sew.co.za info@sew.co.za

Südafrika			
	Cape Town	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 cfoster@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaco Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 cdejager@sew.co.za
	Nelspruit	SEW-EURODRIVE (PTY) LTD. 7 Christie Crescent Vintonia P.O.Box 1942 Nelspruit 1200	Tel. +27 13 752-8007 Fax +27 13 752-8008 robermeyer@sew.co.za

Südkorea			
Montagewerk **Vertrieb** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 http://www.sew-korea.co.kr master.korea@sew-eurodrive.com
	Busan	SEW-EURODRIVE KOREA Co., Ltd. No. 1720 - 11, Songjeong - dong Gangseo-ku Busan 618-270	Tel. +82 51 832-0204 Fax +82 51 832-0230 master@sew-korea.co.kr

Thailand			
Montagewerk **Vertrieb** **Service**	**Chonburi**	SEW-EURODRIVE (Thailand) Ltd. 700/456, Moo.7, Donhuaroh Muang Chonburi 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com

Tschechische Republik			
Vertrieb	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Lužná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 255 709 601 Fax +420 220 121 237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Tunesien			
Vertrieb	**Tunis**	T. M.S. Technic Marketing Service Zone Industrielle Mghira 2 Lot No. 39 2082 Fouchana	Tel. +216 79 40 88 77 Fax +216 79 40 88 66 http://www.tms.com.tn tms@tms.com.tn

Türkei			
Montagewerk **Vertrieb** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Gebze Organize Sanayi Bölgesi 400.Sokak No:401 TR - 41480 Gebze, Instanbul	Tel. +90 262 999 1000 http://www.sew-eurodrive.com.tr sew@sew-eurodrive.com.tr

Ukraine			
Montagewerk **Vertrieb** **Service**	**Dnepropetrovsk**	SEW-EURODRIVE Str. Rabochaja 23-B, Office 409 49008 Dnepropetrovsk	Tel. +380 56 370 3211 Fax +380 56 372 2078 http://www.sew-eurodrive.ua sew@sew-eurodrive.ua

Ungarn			
Vertrieb **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

USA			
Fertigungswerk **Montagewerk** **Vertrieb** **Service**	**Southeast Region**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manufacturing +1 864 439-9948 Fax Assembly +1 864 439-0566 Fax Confidential/HR +1 864 949-5557 http://www.seweurodrive.com cslyman@seweurodrive.com
Montagewerke **Vertrieb** **Service**	**Northeast Region**	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Midwest Region	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 332-0038 cstroy@seweurodrive.com
	Southwest Region	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Western Region	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, CA 94544	Tel. +1 510 487-3560 Fax +1 510 487-6433 cshayward@seweurodrive.com
	Weitere Anschriften über Service-Stationen in den USA auf Anfrage.		

Venezuela			
Montagewerk **Vertrieb** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve ventas@sew-eurodrive.com.ve sewfinanzas@cantv.net

Vereinigte Arabische Emirate			
Vertrieb **Service**	**Schardscha**	Copam Middle East (FZC) Sharjah Airport International Free Zone P.O. Box 120709 Sharjah	Tel. +971 6 5578-488 Fax +971 6 5578-499 copam_me@eim.ae

Vietnam			
Vertrieb	**Ho-Chi-Minh-Stadt**	**Alle Branchen außer Hafen, Bergbau und Offshore:** Nam Trung Co., Ltd 250 Binh Duong Avenue, Thu Dau Mot Town, Binh Duong Province HCM office: 91 Tran Minh Quyen Street District 10, Ho Chi Minh City	Tel. +84 8 8301026 Fax +84 8 8392223 namtrungco@hcm.vnn.vn truongtantam@namtrung.com.vn khanh-nguyen@namtrung.com.vn
		Hafen, Bergbau und Offshore: DUC VIET INT LTD Industrial Trading and Engineering Services A75/6B/12 Bach Dang Street, Ward 02, Tan Binh District, 70000 Ho Chi Minh City	Tel. +84 8 62969 609 Fax +84 8 62938 842 totien@ducvietint.com
	Hanoi	Nam Trung Co., Ltd R.205B Tung Duc Building 22 Lang ha Street Dong Da District, Hanoi City	Tel. +84 4 37730342 Fax +84 4 37762445 namtrunghn@hn.vnn.vn

Weißrussland			
Vertrieb	**Minsk**	SEW-EURODRIVE BY RybalkoStr. 26 BY-220033 Minsk	Tel.+375 17 298 47 56 / 298 47 58 Fax +375 17 298 47 54 http://www.sew.by sales@sew.by

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